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SCS ENGINEERS

LETTER OF TRANSMITTAL

TO Washington Department of Ecology
Southwest Region
300 Desmond Drive
Lacey, WA 98503

DATE July 31, 2013
JOB NO. 04213030.15
ATTENTION Mr. Mohsen Kourehdar, P.E.
RE:

WE ARE SENDING YOU:
X Enclosed Report
☐ Under separate cover via_____
☐ Shop drawings ☐ Prints
☐ Copy of letter ☐ Change order
☐ Plans ☐ Samples
☐ Specifications ☐ _____

COPIES	REPORT DATE	DESCRIPTION
2	July 30, 2013	2013 Leichner Landfill Compliance Monitoring Plan. Note that the enclosed report includes a complete electronic version of the report on the compact disc attached to the report back cover.

THESE ARE TRANSMITTED as checked below:
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☐ For review and comment ☐ _____
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REMARKS: SCS Engineers is submitting the enclosed reports on behalf of and as approved by Clark County, Environmental Services.

COPY TO: Gary Bickett (CCPH)
Melissa Sutton (CCPH)
Mike Davis (Clark County)
Brian Carlson (City of Vancouver)
Craig Leichner (LBLRC)
Mark Leichner (LBLRC)

SIGNED Louis Caruso

SCS ENGINEERS







COMPLIANCE MONITORING PLAN

Leichner Landfill
9411 NE 94th Avenue
Vancouver, WA 98862
Facility ID No. 1017

Prepared for:

Clark County
Bureau of Environmental Services
1300 Franklin St, 6th Fl, Ste 650
Vancouver, WA 98660

Prepared by:

SCS ENGINEERS
14945 SW Sequoia Parkway, Suite 180
Portland, OR 97224
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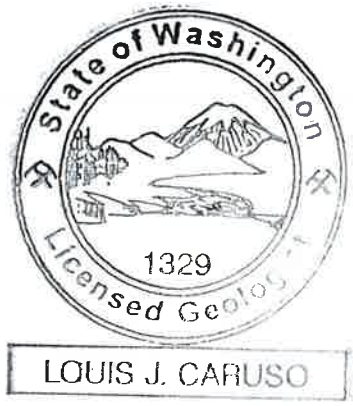
July 30, 2013
File No. 04213030.15

CERTIFICATION

Compliance Monitoring Plan
Closed Leichner Landfill
Facility ID No. 1017
July 30, 2013

The information contained in this Compliance Monitoring Plan for the closed Leichner Landfill was prepared by licensed professionals certified with the State of Washington specifically for the Clark County Bureau of Environmental Services. This document was completed under the supervision and direction of the undersigned, and is hereby authorized for issue.

Louis J. Caruso, L.G. 1329
Project Director
SCS ENGINEERS



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1.0 INTRODUCTION

1.1 PURPOSE

This Compliance Monitoring Plan (CMP) was prepared on behalf of Clark County Bureau of Environmental Services (the County) by SCS Engineers, Inc. (SCS) for the Leichner Landfill located at 9411 NE 94th Avenue in Vancouver, Washington. The Leichner Landfill is a closed facility that was recently purchased by Clark County (County) from the Leichner Brothers Land Reclamation Corporation (LBLRC) and is managed under the jurisdiction of the County. This CMP describes the (1) methods and procedures for monitoring groundwater, stormwater, and landfill gas (LFG) migration at the Leichner Landfill, (2) monitoring schedule and parameters, and (3) requirements for reporting compliance monitoring data and information to the LBLRC members, the Washington State Department of Ecology (Ecology), and Clark County Public Health (CCPH).

A CMP dated August 2000 was prepared in accordance with a July 17, 1996, Consent Decree between Ecology and the LBLRC, and pursuant to Washington Administrative Code (WAC) 173-340-410 and 173-340-820. An updated CMP dated April 2005 (EMCON/OWT, 2005) was prepared primarily to reflect a change in the type of industrial National Pollutant Discharge Elimination System stormwater discharge permit for the Leichner Landfill. This updated CMP incorporates the following modifications to the environmental monitoring network and programs since issuance of the April 2005 EMP:

- Changes to the groundwater monitoring network and sampling procedures.
- Issuance of a new Industrial Stormwater General Permit (ISGP; No. WAR005572B), effective January 1, 2010, for the Leichner Landfill[1] and related changes to the stormwater monitoring program. In conjunction with the County's purchase of the landfill, the Stormwater Permit was administratively transferred to the County in March 2013.
- Changes to the LFG collection and control system (GCCS) and LFG monitoring schedule.
- Change of contractor performing onsite management of environmental monitoring, operations and maintenance (O&M), and engineering services. SCS began performing these services on behalf of the LBLRC in January 2011. Notification of this contractor change was provided to Ecology in a letter dated March 23, 2011 (LBLRC, 2011).

The objectives of this CMP are to (1) specify procedures that will provide an accurate representation of groundwater quality, surface water quality, and subsurface LFG conditions to evaluate regulatory compliance and the effectiveness of remedial actions and post-closure O&M activities implemented at the landfill since it was closed, (2) identify quality control (QC) procedures to be implemented

[1] Condition S1.C.10 of the General Permit issued in October 2009 specifies that closed landfills, which are capped, stabilized, and in compliance with WAC 173-304, are not required to obtain coverage under the new ISGP. Although Leichner Landfill likely meets these requirements, the facility is retaining ISGP coverage and has implemented an updated stormwater pollution prevention plan (SWPPP) consistent with the requirements of the new ISGP as a self-directed objective to prevent potential pollutants from affecting stormwater discharge quality at the facility.

during sampling activities and laboratory testing, and (3) specify data analysis and reporting requirements.

1.2 PROJECT ORGANIZATION

Ecology is responsible for implementing the Model Toxics Control Act (MTCA), Chapter 70.150D RCW, at sites where hazardous substances have been released to the environment. Ecology and LBLRC negotiated the 1996 Consent Decree pursuant to MTCA regulations that provides for remedial action at the site. The Consent Decree required LBLRC to monitor groundwater, surface water, and LFG at the Leichner Landfill, and to comply with the terms of the post-closure permit issued annually by the CCPH. With the transfer of ownership of the property, the County is responsible for meeting the Consent Decree monitoring and reporting requirements. The County's designated Project Manager for the Leichner Landfill project is Michael Davis. The contact person for Ecology is Mohsen Kourehdar, PE.

The CCPH is responsible for implementing Clark County ordinances and state laws governing solid waste handling. The CCPH regulates the post-closure operations of the Leichner Landfill, and on an annual basis, issues a post-closure permit pursuant to these ordinances. The post-closure permit requires groundwater, surface water, and LFG monitoring, and maintenance of the facility, facility structures, and monitoring systems. The contact person for the CCPH is Gary Bickett.

SCS is managing and performing environmental, O&M, and reporting services for the Leichner Landfill project pursuant to a signed agreement between the County, LBLRC, City of Vancouver, and SCS executed in December 2010. The project manager for SCS is Louis Caruso, LG.

1.3 HEALTH AND SAFETY

A site-specific Health and Safety plan for the Leichner Landfill is included as Appendix A.

2.0 GROUNDWATER MONITORING

2.1 MONITORING NETWORK

The groundwater monitoring network consists of monitoring wells discretely screened in the alluvium water-bearing zone (WBZ) and the Troutdale Formation aquifer. The monitoring network well locations are shown in Figure 2-1. The following describes the monitoring network components.

- Wells used to monitor groundwater elevation and/or quality in the upper portion of the alluvium WBZ are denoted with an "S" in the well number (e.g., well LB-1S).
- Wells used to monitor groundwater elevation and/or quality in the middle (or intermediate) portion of the alluvium WBZ are denoted with an "I" in the well number (e.g., LB-27I).
- Wells used to monitor groundwater elevation and/or quality in the deeper Troutdale Formation aquifer are denoted with a "D" in the well number (e.g., well LB-1D).

2.2 COMPLIANCE MONITORING WELL NETWORK, SCHEDULE AND PARAMETERS

The compliance groundwater monitoring well network consists of 20 monitoring wells that are monitored annually or semiannually. During the annual event, typically performed in the first quarter calendar period (January 1 through March 31) in late winter-early spring (usually in March), groundwater samples are collected from the following 20 site compliance monitoring wells: LB-1S, LB-1D, LB-3S, LB-3D, LB-4SR, LB-4D, LB-5S, LB-5D, LB-6S, LB-10SR, LB-10DR, LB-13I, LB-13D, LB-17I, LB-17D, LB-20S, LB-26I, LB-26D, LB-27I, and LB-27D. During the semiannual monitoring event, typically performed in the third quarter calendar period (July 1 through September 30) in late summer-early fall (usually September), groundwater samples are collected from the following seven compliance monitoring wells: LB-1S, LB-5S, LB-6S, LB-10SR, LB-13I, LB-26I, and LB–27I.

Groundwater samples collected during the annual or semiannual monitoring events will be submitted to the contract laboratory, currently TestAmerica in Beaverton, Oregon, for analyses of the following list of long-term monitoring parameters approved by Ecology: volatile organic compounds (VOCs)[2] and inorganic leachate indicator parameters (including nitrate [as nitrogen], total dissolved solids [TDS], chloride [Cl], dissolved iron [Fe], and dissolved manganese [Mn]) The

[2] In response to Ecology's five-year periodic review dated April 2011 (Ecology, 2011a), vinyl chloride and 1,1-dichloroethene were analyzed using a low-level Method 8260B in order to meet the compliance level of 0.1 micrograms per liter (µg/L) for these two VOCs. Laboratory testing for VOC using this high-resolution analytical method was implemented in the March 2011 semiannual monitoring event. Consistent with Ecology's recommendation documented in its five-year review document (Ecology, 2011a), if after two years of testing the results show that vinyl chloride and 1,1-dichloroethene are not detected above a method reporting limit (MRL) of 0.1 µg/L, then the testing for these two VOCs can be discontinued.

monitoring wells and the parameters to be analyzed are summarized in Table 2-1. Analytical methods and method reporting limits are provided in Table 2-2.

2.3 GROUNDWATER LEVEL MEASUREMENTS

Groundwater levels will be measured on a semiannual basis (when groundwater quality monitoring is performed) in the monitoring wells listed in Table 2-3. The piezometric well network includes the 20 compliance monitoring wells and additionally wells used only for measuring groundwater levels. Each round of water level measurements will be obtained on the same day. The depth to groundwater will be measured with an electric water level probe to the nearest 0.01 foot. All measurements will be taken from a marked surveyed point on the top of the well casing. Each measurement record will include the date and time of measurement. The water level probe will be decontaminated between uses at each well as described in Section 2.6.

2.4 MONITORING WELL PURGING AND SAMPLING

This section describes monitoring well purging and sampling methods that will be implemented to collect representative groundwater samples for laboratory testing. The monitoring wells will be purged before sample collection to obtain groundwater samples representative of the subsurface WBZs rather than stagnant water from the well casing. Disposable, nitrile gloves will be worn at all times during handling of equipment and collection of samples.

Groundwater purging and sampling was historically performed at the Leichner Landfill using non-dedicated bailers by the traditional purge method (i.e., purging at least three casing volumes of groundwater from each well prior to sampling). Ecology and CCPH approved the use of low-flow purge sampling in correspondence (emails) dated July 19, 2011 (Ecology, 2011c; CCPH, 2011), based on a request for approval by SCS dated July 14, 2011 (SCS, 2011). Low-flow purge sampling was first implemented during the third quarter (September) 2011 semiannual monitoring event. However, both low-flow purge sampling and traditional purge sampling are described below in the event traditional purge sampling is implemented due to problems encountered (i.e., equipment failure) during low-flow purge sampling.

2.4.1 Low-Flow Purge Sampling

A non-dedicated, portable, stainless steel bladder pump will be used to purge and sample the monitoring wells. New, disposable, polyethylene bladders will be used for each well. Dedicated, polyethylene discharge tubing used for each well will be kept inside the well casings for use during future monitoring events.

The monitoring wells will be purged at a pump rate less than or equal to 500 milliliters per minute (mL/min). A flow controller will be used to control the pump rate. During pumping, the water level in the wells will be monitored to document that water level stabilization (i.e., less than 0.3 foot of drawdown over three successive measurements) is achieved. During purging, the approximate volume of the stagnant water in the discharge tubing will be purged before recording field water quality parameters.

A field-calibrated, water quality meter attached to a flow-through cell will be used to measure pH, temperature, specific conductance, dissolved oxygen (DO), and oxidation-reduction potential (ORP) during well purging. Field water quality parameters will be recorded on a Field Sampling Data Sheet (FSDS; an example FSDS is provided in Appendix B) at the beginning of the purging process (after stagnant water within the discharge tubing is removed) and at approximately 0.1 to 0.25-gallon intervals (approximately 2 to 3 minute intervals) during purging. Purging will continue until field parameters stabilize for three consecutive measurements to within ±0.2 units for pH, ±1° Celsius for temperature, 5 percent for specific conductance, and 10 percent for DO. There is no stabilization criteria established for ORP.

After the water level has stabilized in each well and the groundwater quality field parameters have stabilized, groundwater samples will be collected directly from the discharge tubing of the dedicated bladder pump after disconnecting it from the flow-through cell. Groundwater samples will be collected into laboratory-supplied containers. When collecting samples into 40-mL vials for VOC analysis, the pump flow rate will be regulated to approximately 100 to 200 mL/min to minimize turbulence and aeration in the pump discharge.

The non-dedicated stainless steel bladder pump will be decontaminated after it is used to collect groundwater samples from each well as described in Section 2.6.

2.4.2 Traditional Purge Sampling

In the event that the traditional purge sampling is required to be used, it will be performed using one of the following methods:

- A non-dedicated electric submersible pump.
- Non-dedicated bailers with nylon cord or stainless steel cable.

When using a non-dedicated submersible pump, the discharge tubing will be replaced for each well and the pump will be decontaminated after it is used to collect groundwater samples from each well as described in Section 2.6. When using non-dedicated bailers, a new bailer for each well will be attached to a stainless steel cable, and the cable will be decontaminated after it is used to collect groundwater samples from each well as described in Section 2.6.

As a general rule, a minimum of three times the volume of water standing in the well casing (three casing volumes) will be purged from the well before sampling. The casing volume will be calculated by determining the inside diameter of the monitoring well and the height of the water column (feet) in the casing measured prior to sample collection, and then by consulting a standard purge volume chart. If purged dry, the well should be allowed to recharge (recover) for at least 4 hours or after the water level recovers to within 90 percent of its original value, whichever occurs first, before sampling the well.

A field-calibrated, water quality meter will be used to measure pH, temperature, specific conductance, DO, and ORP during well purging. Field water quality parameters and purge volume will be recorded on a FSDS at the beginning of the purging process and after each casing volume of

water has been removed. Purging will continue until field parameters for pH, temperature, and specific conductance stabilize for three consecutive measurements to within 10 percent. Stabilization of DO and ORP are not required because the traditional purge sampling method agitates the water and can result in non-stabilized measurements of DO and ORP.

After the groundwater quality field parameters have stabilized, groundwater samples will be collected in laboratory-supplied containers either directly from (1) the bailer using a bottom emptying device if bailers are used or (2) the discharge tubing of the submersible pump, with the discharge rate lowered to minimize turbulence and aeration in the pump discharge.

2.4.3 Field Filtering

Groundwater samples collected for dissolved metals analysis (i.e., Fe and Mn) will be filtered at the time of sample collection. A new 0.45-micron, acrylic copolymer in-line filter will be used at each well location. If non-dedicated pumps are used (either a bladder or submersible pump), the disposable in-line filter will be attached directly to the discharge tubing of the pump. If a bailer is used, the filtered sample will be collected by attaching new, appropriately sized, polyethylene tubing to the bottom emptying device and then attaching the tubing to the filter.

2.4.4 Sample Containers

Sample containers will be prepared and provided by the contract laboratory. Samples will be preserved in accordance with recommendations described in Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency (EPA) 600/4-79-020 (March 1983), or in Standard Methods for the Examination of Water and Wastewater. Table 2-4 summarizes EPA-recommended containers, sample preservation, and holding times. The type and size of container used for each parameter and any preservative will be recorded on a FSDS for each monitoring well sampled. Any deviations from Table 2-4 will be documented and noted in the FSDS.

2.5 SAMPLE LABELING, CHAIN OF CUSTODY, AND TRANSPORTATION

2.5.1 Sample Labeling

Sample container labels will be completed immediately before or following sample collection. Container labels will include the following information:

- Project name.
- Sample number.
- Name of collector.
- Date and time of collection.

Each sample will be assigned an alpha-numeric code that will be used to identify the site, the date of sample collection, and the source of the sample (monitoring well location or quality control sample). The designation "LB" will be used to identify the site. The site designation will be followed by the month, day, and year of collection. Finally a numbered sequence of one through n (the total number of samples collected) will be added. For example LB-010911-1 would indicate the first sample from a sampling event that began on January 9, 2011.

2.5.2 Chain of Custody

Once a sample is collected, it will remain in the custody of the sampler or other qualified personnel until delivery to the laboratory. A Chain of Custody form (example provided in Appendix B) will be used to list the required analyses and turnaround time. The Chain of Custody form will also list quality control samples such as duplicate samples, field blanks, and trip blanks.

Upon transfer of sample possession to subsequent custodians, the Chain of Custody form will be signed by the person accepting custody of the sample containers. Upon receipt of samples at the laboratory, the condition of the samples will be recorded by the laboratory. Chain of Custody records will be included in the analytical report prepared by the laboratory.

2.5.3 Sample Transportation

Groundwater samples will be transported to the contract laboratory using the following procedures:

- Sample containers will be transported on ice in a sealed ice chest or other suitable container.
- Glass bottles will be separated in the shipping container with packing material to prevent breakage.
- Ice will be placed in separate plastic bags and sealed.
- All sample shipments will be accompanied by a Chain of Custody form. If samples are shipped via a delivery company (e.g., Federal Express), the completed form will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- The cooler will be sealed with shipping tape if not transported to the contract laboratory the same day as sampling.

2.6 DECONTAMINATION PROCEDURES

The electronic water level probe (or stainless steel bailer cable if used with a bailer) will be rinsed with non-phosphatic detergent consisting of a dilute mixture of Liquinox (or equivalent) and tap water, followed by a final rise with distilled water.

If a stainless steel bladder pump assembly capable of being dismantled is used, it will be dismantled and decontaminated between sampling each well. Decontamination will consist of the following steps: (1) an initial scrub rinse with tap water, (2) a scrub wash with non-phosphatic detergent

consisting of a dilute mixture of Liquinox (or equivalent) and tap water, and (3) a final rise with distilled water. A separate bucket or other suitable container will be used for each stage of contamination.

If a non-dismantled bladder pump or a submersible pump is used, the entire pump assembly will be placed in enough water to cycle the liquids through the pump for a minimum of 30 seconds for each stage of decontamination as described above. A small length of new discharge tubing will be attached to the pump used to recirculate the liquids.

2.7 RESIDUALS MANAGEMENT

Water generated from purging and sampling onsite wells will be allowed to infiltrate into the soil near the sampling location, except for off-site wells. Water generated from off-site wells will be transported on site and discharged to the groundwater surface to infiltrate into the soil. Liquids generated from the decontamination of sampling equipment will be placed in the on-site condensate holding tank for eventual offsite disposal.

Used disposable equipment (i.e., gloves, bailers, nylon cord, etc.) will be placed in plastic bags and disposed of off-site as solid waste.

2.8 DOCUMENTATION

Accurate documentation of field activities will be maintained using field log books, field data forms, correspondence records, and photographs. Entries will be made in sufficient detail to provide an accurate record of field activities.

An FSDS (example provided in Appendix B) will be used during groundwater sampling. The FSDS will provide documentation of the following information:

- Project name.
- Sample number.
- Location and sampling source.
- Time and date of sampling.
- Depth-to-water measurement.
- Purging and sampling method.
- Field measurements of water quality parameters.
- Appearance of sample.
- Volume, type, and number of containers.
- Sample preservation.
- Weather.

Daily field logs will be dated, include a chronological description of task activities, names of individuals present, names of visitors (if any), and weather conditions for each day that sampling was performed. All entries will be legibly entered in ink and the field logs will be signed.

2.9 QUALITY CONTROL SAMPLES

QC samples will consist of duplicate samples, equipment rinsate or field blanks, and laboratory-supplied trip blanks. Equipment blanks (or field blanks) and duplicate samples will be labeled and listed on the Chain of Custody form such that they are submitted "blind" to the analytical laboratory. Trip blanks will simply be labeled "trip blank."

- Duplicate groundwater samples will be obtained by alternately filling like sample bottles for two sample sets until all containers are full. Two duplicate groundwater samples will be collected during the annual monitoring event. One duplicate groundwater sample will be collected during the semiannual sampling event. Duplicate samples will be analyzed for the same suite of parameters analyzed for primary groundwater samples.

- Equipment rinsate blanks (equipment blanks) will be obtained following equipment decontamination by collecting deionized or distilled water that has passed through non-dedicated pumping equipment. One equipment blank will be collected during each sampling event (annual and semiannual sampling events) if non-dedicated sampling equipment is used. Equipment blanks will be analyzed for the same suite of parameters analyzed for primary groundwater samples.

- Trip blanks, consisting of deionized water, will be provided by the contract laboratory. Trip blanks will accompany the transportation of sample bottles to the site, and will return to the laboratory for analysis with the sample shipment. Trip blanks will not be opened until returned to the laboratory for analysis. One trip blank will be included for each sampling event (annual and semiannual sampling events). Trip blanks will simply be labeled "trip blank" on the Chain of Custody form, and will be analyzed for VOCs only.

In the event that disposable bailers are used exclusively for sampling during a monitoring event, a field blank will be collected during the sampling event to detect contamination introduced through sampling procedures, external field conditions, sample transportation, container preparation, sample storage, or bias in the analysis process. Field blanks will be prepared in the field by the sampling technician by exposing deionized or distilled water to the ambient atmosphere at a specified monitoring point during sample collection and placing the water into laboratory-provided containers. One field blank sample will be collected during each monitoring event (annual and semiannual monitoring events) and will be analyzed for the same suite of parameters analyzed for primary groundwater samples.

Laboratory QC samples typically consist of method blanks, matrix spikes/matrix spike duplicates, surrogate spikes, and duplicate samples will be analyzed during each sampling event, consistent with the analytical method requirements.

2.10 MONITORING WELL REPLACEMENT

If a monitoring well is damaged and must be replaced or relocated, Ecology and CCPH will be notified of the well being replaced, the reasons for its replacement, and the proposed location and construction of the replacement well. The well will be replaced only after approval is received from the regulatory agencies. After the monitoring well has been replaced, a second notification will be sent showing the replacement well's location and final construction details.

2.11 LABORATORY REPORTING REQUIREMENTS

The laboratory will be required to submit the following summary data and QC information:

- Case narrative for each sample batch that includes a summary of any quality control, sample, shipment, or analytical problems, as well as documentation of all internal decisions. Problems will be outlined and final solutions documented.
- A copy of the signed Chain of Custody form for each batch of samples.
- Sample concentrations reported on standard data sheets in proper units. For undetected values, the method reporting limit for each compound will be reported.
- Dates of sample extraction and analysis.
- Method blank results.
- Surrogate recovery results for organic analyses, including spike concentrations (for each sample analyzed).
- Matrix spike/matrix spike duplicate (MS/MSD) results for organic analyses and matrix spike results for inorganic and metals, including percent recoveries, spike levels, and relative percent differences.
- Laboratory duplicate results for inorganic and metals analyses.

2.12 DATA VALIDATION

To assess data acceptability, the laboratory results will be reviewed consistent with regulatory guidelines, using the methods described below. Laboratories provide several levels of data reporting deliverables to meet specific project needs. For Leichner Landfill data, a laboratory deliverable will be prepared that includes a case narrative, sample results, method blank results, surrogate recovery results, signed Chain of Custody form, laboratory duplicate results (when required by the method), and matrix spike or matrix spike duplicate results.

Data that do not pass validation will be assigned qualifiers to restrict or modify usage, or will be rejected. A data validation summary report, which includes a summary of any qualifiers, will be prepared for each sampling event and be included with the quarterly progress reports for the Leichner Landfill.

2.12.1 Laboratory Reporting QC

- Compare Chain of Custody documentation (analyses requested) with laboratory report (analyses performed).
- Proof preliminary data for anomalies; investigate and correct where reasonably possible.
- Check computerized data entries.
- Check the adequacy of the MRLs.

2.12.2 Laboratory QC

- Check sample holding time against the recommended holding time criteria established by the analytical method to determine data validity and usability. The holding time is the period between the date of sample collection and the date of extraction or analysis by the laboratory.
- Check laboratory method blank frequency and results to assess the effect of the laboratory environment on the data. Method blanks consist of analyte-free water that is processed through the entire analytical system, using procedures identical to those for the environmental samples.
- Add surrogate standards (compounds similar to the parameters of interest but not normally found in environmental samples) to each environmental and QC sample, where applicable. Surrogate results will be reported as percent recoveries and will be used to assess the effect of the sample matrix on analytical accuracy.
- Use matrix spike and matrix spike duplicate results to assess analytical accuracy and precision. A selected sample will be spiked in duplicate with known concentrations of parameters. The results will be reported as percent recovery and used to determine accuracy and measure bias in the system. The relative percent difference between the matrix spike and the matrix spike duplicate results will be used to assess precision (reproducibility).
- Quantify and report all concentrations above the MRLs. MRLs are the minimum amount of analytes that the analytical systems can routinely and reproducibly distinguish from background noise with 95 percent confidence. Because of matrix interference or because a sample may be diluted in order to quantify the most concentrated analyte observed, actual MRLs can sometimes exceed those routinely used.

- Check results for trip blanks (prepared by the laboratory and used when sampling for VOCs) and other QC samples to assess whether contamination was introduced while preparing the sample container, during sampling, or during sample transportation and storage.

If any items are noted which require laboratory clarification, a data quality review (DQR) will be submitted to the laboratory. A DQR is a request for the laboratory to formally review results that differ from historical results or that exceed certain regulatory requirements or QC criteria. It is the first line of investigation after an anomalous result is detected. The laboratory is required to prepare a formal written response to each DQR, explaining the discrepancy.

After the data review is complete and data qualifiers are assigned (if applicable), a data quality review report will be prepared that documents and clearly identifies any problems associated with the data. The data quality report will be sent to the laboratory for review and possible corrective action. The report will be kept in the project file.

2.13 DATA EVALUATION AND REPORTING

2.13.1 Data Evaluation

Field measurements and validated laboratory data will be entered into a computerized database. Water quality data will be evaluated semiannually by comparing analytical results to compliance levels specified in the 1996 Consent Decree and accompanying Cleanup Action Plan (CAP).

A rolling 5-year record of analytical data will be evaluated statistically on an annual basis. Mean values and the upper confidence limit (UCL 95) on the mean will be calculated using the following guidelines. The distribution of values for individual compounds will be evaluated for each well to determine if the data show a normal, lognormal, or non-parametric distribution, determined using the Ecology-approved MTCA Stat 97 software, or equivalent software. If the data distribution is either normal or lognormal, the UCL 95 will be calculated. If the data distribution is neither normal or lognormal, data values will be ranked and an estimate of the UCL 95 will be determined using the method of Van der Parren (1970), as described in *Statistical Guidance for Ecology Site Managers* (Ecology, 1992). For non-parametric data, the Van der Parren method defaults to the highest reported value.

As presented in the 2011 Fourth Quarter and Annual Report for the Leichner Landfill (SCS, 2012), water quality data from 1997 to 2011 were evaluated using the procedures described above for background monitoring wells LB-4SR and LB-4D and for monitoring wells located near or downgradient of the property boundary. Table 2-5 provides a summary of calculated UCL 95 values and includes groundwater compliance levels established in the 1996 Consent Decree. Table 2-5 is provided for informational purposes only and is intended as an example of the results obtained using the procedures described above. As such, no interpretation of these data is provided herein.

2.13.2 Reporting

Quarterly progress reports are required to be submitted to Ecology and CCPH in accordance with the 1996 Consent Decree. The progress reports summarize field activities performed during each

quarterly calendar period, and presents results of groundwater, LFG, and stormwater compliance monitoring, and the monitoring and maintenance of the facility's landfill GCCS. Groundwater monitoring results (following annual or semiannual monitoring events) will be summarized twice a year in the progress reports. Quarterly reports containing groundwater monitoring results must be submitted to Ecology and CCPH within 60 days of receipt of the final analytical data.

Reports of semiannual groundwater monitoring will include the following information:

- Summary of data validation.
- Summary tables of analytical data, field parameter measurements, and water level measurements.
- Figures showing groundwater elevation contours of the alluvial WBZ and Troutdale Formation aquifer.
- Analytical data report(s).
- Summary of any deviations from the compliance monitoring plan and/or problems encountered in the field.

An annual report will be prepared and submitted by March 1 of each year to Ecology, CCPH, the County, and the LBLRC. In addition to the information included in the semiannual report, the annual report will include a copy of the updated groundwater database and results of statistical analyses performed using MTCA Stat 97 software, or equivalent software.

3.0 STORMWATER MONITORING

3.1 INDUSTRIAL STORMWATER PERMIT

In 2009, Ecology issued a new ISGP effective January 1, 2010, for industrial facilities. The new ISGP (No. WAR005572B) requires implementation, or update, of a technology-based Stormwater Pollution Prevention Plan (SWPPP) to eliminate surface water quality standards violations caused by stormwater. An updated SWPPP dated July 2013 (SCS, 2013) was prepared, consistent with the requirements of the ISGP, by SCS on behalf of the County.

The industrial activities currently performed at the Leichner Landfill are related to maintenance of the landfill cover system, operation and maintenance of the GCCS, and maintenance of the stormwater collection system. These systems are currently maintained by SCS on behalf of the County.

3.2 STORMWATER COLLECTION SYSTEM

During 1988 and 1989, LBLRC completed construction of a stormwater collection, impoundment, and pumped-discharge system for surface water drainage on closed parts of the landfill. Final closure of the landfill was completed in October of 1992. Figure 3-1 illustrates site boundaries, buildings, stormwater drainage flow patterns, control features, stormwater discharge locations, and compliance monitoring locations. For the purposes of this CMP, the Leichner Landfill property has been divided into three stormwater drainage areas (Figure 3-1) as described below.

- **Area 1**. Area 1 is pervious to stormwater. Previous earthmoving operations in Area 1 have resulted in localized topographic depressions. Stormwater in Area 1 either immediately infiltrates into the ground or collects in local topographic depressions and eventually infiltrates into the ground.

- **Area 2**. The landfill cap and stormwater control system control and regulate stormwater flow in Area 2. The stormwater control system consists of five main components: the landfill cap collection system, the west drainage basin and pump station, the north sedimentation basin, the north detention basin and pump station, and the off-site conveyance system. The west drainage basin receives surface water from the south and west portions of the landfill (approximately 35 acres) and is pumped to the north sedimentation basin. The north sedimentation basin receives surface water runoff from the north and east portions of the landfill (approximately 35 acres). Stormwater is conveyed by gravity flow from the north sedimentation basin to the north detention basin, and then pumped to Curtin Creek through a pump station located at the west end of the north detention basin. The pump(s) are automatically activated to discharge stormwater depending on the water level in the north detention basin.

- **Area 3**. Area 3 is pervious to stormwater. Previous earthmoving operations in Area 3 have resulted in localized topographic depressions. Stormwater in Area 3 either immediately

infiltrates into the ground or collects in local topographic depressions and eventually infiltrates into the ground.

One compliance stormwater discharge location has been identified for the Leichner Landfill and is designated as Outfall 1. Outfall 1 is located at the pump station in the north detention basin (see Figure 3-1). This outfall receives all the stormwater that discharges from Area 2.

3.3 COMPLIANCE MONITORING SCHEDULE AND PARAMETERS

3.3.1 Monthly Visual Inspection

The facility's ISGP requires that visual inspection of stormwater discharge be performed and documented monthly. The monthly visual stormwater inspections must be completed documented throughout the five year term of the ISGP.

Monthly visual inspections are to be conducted when site conditions result in stormwater being discharged at Outfall 1. The inspection will include an examination of stormwater discharge at Outfall 1, the stormwater conveyance systems (catch basins, drainage ditches, and culverts), and areas with storage of significant materials. The visual inspection will document observations for the presence of oil sheen, floating materials, color, odor, clarity, suspended solids, foam, and other potential indicators of potential stormwater pollution. These observations will be documented in an industrial stormwater monthly inspection form (an example form is provided in Appendix B).

The visual inspections should also include the following:

- Review of the SWPPP to verify (1) that the recommended best management practices (BMPs) are being implemented and (2) that the potential pollutant source areas are identified and current with site industrial activities.

- Review of the site map to verify that the map is accurate and reflects current site conditions.

- Observation of the stormwater management controls identified in the SWPPP to verify they are operating correctly.

- Confirmation that no illicit, non-stormwater discharge (e.g., LFG condensate) is occurring at the facility. Surface water flows observed during the dry season months should be evaluated for any non-stormwater contributions.

3.3.2 Quarterly Stormwater Sampling

The ISGP requires that quarterly stormwater sampling occur under the following conditions:

- The storm event sampled must result in a stormwater discharge from the facility.

- Samples must be collected within the initial 12 hours of stormwater discharge, or as soon as practical thereafter.
- Stormwater must be sampled in the fourth quarter (October 1 through December 31) during the "first fall storm event". This is defined as the first stormwater discharge on or after October 1.
- All samples must be taken as close to the point of discharge as reasonably practical and can be achieved safely.
- Sampling must be conducted to capture stormwater with the greatest exposure to significant sources of pollution.

The quarterly monitoring periods are defined as the first (June 1 to March 31), second (April 1 to June 30), third (July 1 through September 30), and fourth (October 1 through December 31) calendar quarters.

The quarterly stormwater samples will be submitted to the contract laboratory, currently TestAmerica in Beaverton, Oregon, for analyses of the ISGP-required parameters including turbidity, total copper and zinc, biological oxygen demand (BOD), TDS, ammonia as nitrogen, and select semi-volatile organic compounds (alpha terpineol, benzoic acid, p-cresol, and phenol). pH measurements can be recorded in the field during sample collection using a portable field meter or litmus paper. Additionally, TestAmerica will perform laboratory pH analysis as QC check on the field pH measurement. The remaining analyses will be performed by the contract laboratory. Table 3-1 summarizes the stormwater sample analytical parameters and test methods.

3.4 STORMWATER SAMPLING METHODS

Quarterly stormwater grab samples will be collected at Outfall 1 during qualifying storm events that generate stormwater discharge at the facility (described in the previous section). The stormwater discharge grab samples will be collected from within the concrete vault that contains the discharge pumps. The samples will be transferred from a sample dipper or disposable bailer into the laboratory-supplied sample containers.

The following field information will be documented on a stormwater FSDS (an example is provided in Appendix B) when collecting stormwater discharge grab samples:

- Sample date and time.
- Sample designation (i.e., Outfall 1)
- Individual who performed the sampling.
- Weather conditions including magnitude and duration of the storm event.
- Time when stormwater discharge began.

- Method for sample collection (i.e., grab sample).
- Sample container type, volume, and preservation, if applicable.

Field documentation should also be completed during months when no stormwater discharges occur (e.g., during the dry summer months) with a notation of "no stormwater discharge observed".

3.5 DATA EVALUATION AND REPORTING

3.5.1 Quarterly Discharge Monitoring Reports

The quarterly field and laboratory data will be compared to the benchmarks identified in the ISGP and summarized in Table 3-1. Quarterly stormwater monitoring data must be submitted to Ecology within 45 days of the end of the reporting quarter using an Ecology-approved Discharge Monitoring Report (DMR) form or using the Ecology WAWebDMR website.

If no stormwater sample is obtained from the Leichner Landfill during a given reporting period, a DMR will still need to be submitted to Ecology indicating "no sample obtained", or "no discharge during the quarter", as applicable.

3.5.2 Quarterly Progress Report

Quarterly progress reports are required to be submitted to Ecology and CCPH in accordance with the 1996 Consent Decree (discussed previously in Section 2.13.2). The progress reports will summarize stormwater monitoring results with reference to the DMR submittals to Ecology and the CCPH.

3.5.3 Annual Report

The ISGP requires the Leichner Landfill to complete and submit an annual report to Ecology no later than May 15th of each year using an Ecology-approved annual report form. The annual report form needs to be submitted to Ecology in hardcopy with original signatures. The annual report form cannot be submitted electronically using Ecology's WAWebDMR.

The annual report will provide corrective action documentation (if applicable), including the status of any outstanding corrective action(s). The annual report will include the following, if applicable:

- Identification of the condition(s) triggering the need for corrective action review, if applicable.
- Descriptions of each problem identified and their discovery dates, if applicable.
- A summary of any Level 1, 2 or 3 corrective actions triggered during the previous calendar year, if applicable.
- Status and completion dates (or expected completion dates) for all Level 2 or 3 corrective actions, if applicable.

4.0 LANDFILL GAS MONITORING

4.1 LANDFILL GAS COLLECTION AND MONITORING SYSTEM

LFG is produced during the decomposition of refuse. The principal components of LFG are methane and carbon dioxide, which are generally present in approximately equal portions. Positive pressure can develop within the interior of landfills due to refuse decomposition and subsequent gas production. This pressure becomes the driving force which pushes gas from the landfill and migrates into the atmosphere and/or surrounding native soils.

A GCCS was initially installed at the Leichner Landfill in 1978 in response to offsite migration of LFG, and has been modified several times over the years, including installation of a single, smaller enclosed flare station in 2007 due to decreasing methane production. The GCCS includes a LFG extraction well field with over 90 gas extraction wells, a LFG condensate collection system, and a LFG blower and flare station.

Fifty compliance LFG monitoring probes have also been installed along the perimeter of the landfill property boundary to monitor subsurface LFG migration, and in areas within the property to more closely monitor the performance of the GCCS. Compliance LFG monitoring probes constructed as dual-completion probes (i.e., a shallow and deep probe constructed within the same borehole) are designated with an "A" for the shallow probe and "B" for the deep probe. Compliance LFG monitoring probes with the same probe number but constructed in different boreholes are designated with an "S" for the shallow probe and "D" for the deep probe. Figure 4-1 shows the current GCCS components in relation the site features. Table 4-1 provides a list of the compliance LFG monitoring probes.

This following sections address compliance monitoring of the perimeter (compliance) LFG monitoring probes which is required to ensure that methane concentrations do not exceed state and federal regulatory levels at the Leichner Landfill property boundary (i.e., compliance boundary).

4.2 COMPLIANCE MONITORING SCHEDULE AND PARAMETERS

The schedule for performing compliance LFG monitoring of the perimeter LFG monitoring probes was modified from monthly to quarterly beginning in the third quarter 2011 period, as approved by Ecology in a letter dated April 27, 2011 (Ecology, 2011b). The quarterly monitoring periods are defined as the first (June 1 to March 31), second (April 1 to June 30), third (July 1 through September 30), and fourth (October 1 through December 31) calendar quarters.

Parameters to be measured at the gas probes include static pressure and the concentrations of oxygen, carbon dioxide, and methane, although a regulatory standard is only established for methane.

4.3 FIELD EQUIPMENT AND CALIBRATION

A portable, CES LandTec® GEM-2000 LFG extraction monitor (GEM-2000), or equivalent, will be used to measure the concentrations of oxygen, carbon dioxide, and methane. This instrument can measure 0 to 100 percent methane by volume, 0 to 100 percent of the lower explosive limit (LEL) for methane, oxygen concentrations between 0 and 100 percent by volume, and carbon dioxide concentrations between 0 and 75 percent by volume. Static pressures can also be measured using the GEM-2000 in inches water column (w.c.).

The GEM-2000 (or equivalent) should be routinely maintained and calibrated in accordance with the manufacturer's recommendations. This will ensure that reliable data is collected during LFG monitoring. This becomes critically important when verifying compliance and charting trends in data over time. Additionally, the instrument should be calibrated at a concentration and temperature approximately near the concentration and temperature at which the instrument will be used. The instrument accuracy is reduced with monitoring concentrations and temperatures furthest from the point of calibration.

The GEM-2000 (or equivalent) will be checked and calibrated (if necessary) before each monitoring event. Calibration standards are commercially available through the equipment manufacturer, or by special order through a local industrial gas supplier. Two types of calibration gas are necessary to calibrate the portable gas analyzers: (1) a mixture that represents high concentrations of LFG (methane and carbon dioxide) for the high range sensor, and (2) ambient air for the lower end (zero) methane sensor and high range oxygen sensor. The following two mixtures are recommended for calibration gas:

1. 50 percent methane, 35 percent carbon dioxide, and 0 percent oxygen.

2. Ambient air 20.9 percent oxygen and 0 percent methane.

Calibration gas should be supplied with a pressure gage and regulator. To avoid damage to the instrument when calibrating, gas should be supplied to the instrument at the flow and pressure recommended by the instrument manufacturer. The calibration test results should be saved to the testing instrument's data files, or be documented on an appropriate form.

4.4 MONITORING PROCEDURES

The following considerations and procedure will be used for monitoring the perimeter LFG monitoring probes.

4.4.1 Precautions

Care should be exercised when opening the lids and covers of protective casings (monuments) and/or vaults to avoid potential hazards including insects and rodents that may nest within the monument, and elevated LFG concentrations or pressures that have accumulated within the casing (or vault).

4.4.2 Inspection

Inspection can be done during monitoring. Inspect each monitoring probe for deteriorating conditions to the well casing, sample port, valves, and fittings. If liquid blockage is a concern, periodically inspect the liquid level in the monitoring probe.

4.4.3 Landfill Gas Probe Monitoring

All monitoring will be performed using a portable, calibrated gas analyzing instrument using the following procedure:

1. Record ambient conditions such as barometric pressure, temperature, precipitation, and wind conditions.

2. Connect the instrument with flexible tubing to the sample port on the LFG monitoring probe before opening the sample valve. Open the sample valve and measure undisturbed probe pressure/vacuum before taking LFG measurements. It is critical that the unit be zeroed after every pressure reading. Typically, probe pressures will be measured in increments of hundredths to tenths of an inch w.c.

3. Activate the instrument's internal pump and purge the probe casing for at least 60 seconds, or until the gas readings have stabilized for at least 30 seconds, before recording gas concentration measurements (methane, carbon dioxide, and oxygen).

4. Recorded data should be saved to the testing instrument's data files, or be documented on an appropriate form.

4.5 LFG MONITORING PROBE REPLACEMENT

If a compliance LFG monitoring probe is damaged and must be replaced or relocated, Ecology and CCPH will be notified of the probe being replaced, the reasons for its replacement, and its new proposed location and construction. The probe will be replaced only after approval is received from the regulatory agencies. After the replacement probe is installed, a second notification will be sent showing the probe's new location and completion (as built) construction details.

4.6 DATA EVALUATION AND LFG SYSTEM ADJUSTMENTS

4.6.1 Data Evaluation and Follow-up Actions

Compliance standards for compliance LFG monitoring are specified in Washington Administrative Code (WAC) 173-304, Minimum Functional Standards (MFS), which requires that methane concentrations at the property boundary shall not exceed 5 percent methane by volume (the lower explosive limit for methane).

If the methane concentrations are below the MFS performance standard of 5 percent (by volume) in perimeter compliance LFG probes, then the probes are in compliance and no action is necessary.

If methane concentrations detected at the property boundary (in any perimeter LFG compliance probe) exceeds 5 percent (by volume), the following actions should be performed:

- Immediately notify the project manager.
- Re-monitor the probe(s) the following day or within a reasonable timeframe to verify findings.
- Adjust nearby gas extraction wells to optimize or balance gas extraction flow rates in the vicinity of the affected probe(s).
- Re-monitor affected probes and adjusted gas extraction wells.
- Continue to adjust the landfill gas extraction system until methane concentrations at the affected probe(s) drop to within and stabilize below the compliance level.

It should be noted that the methane concentrations measured at some compliance LFG monitoring probes located at the northwestern area of the site have exhibited periodic methane concentrations exceeding 5 percent by volume. These probes are not located along the Leichner Landfill's point of compliance (i.e., the property boundary); rather, they are located in the northwest closure area (Module 1) near or within the waste limits. As such, detections of methane above 5 percent in these performance probes do not represent an exceedance of a compliance standard. Adjustments made to the landfill GCCS, including balancing of the LFG extraction wells, are typically successful at reducing the methane concentrations at these wells to below 5 percent by volume within a month. These periodic exceedances of the regulatory standard have previously been reported to Ecology and CCPH.

If methane concentrations exceeding 5 percent by volume persist, Ecology and CCPH will be notified. Corrective actions, if necessary, will be developed in coordination with Ecology and CCPH to reduce the potential for lateral LFG migration and methane intrusion into adjacent structures to ensure protection of human health and safety.

4.7 DOCUMENTATION

Compliance LFG monitoring data should be saved to the testing instrument's data files, or be documented on an appropriate form. All data should be downloaded or transferred into an electronic filing system. In addition to the LFG probe data, the following information will be recorded during each monitoring session:

- Date and time of monitoring session.
- Name of person performing the monitoring.
- Instrumentation used and calibration results.
- Weather conditions, including temperature and barometric pressure.

- Any problems associated with the monitoring equipment that may impact accuracy of the monitoring results.

4.8 REPORTING

Quarterly progress reports are required to be submitted to Ecology and CCPH in accordance with the 1996 Consent Decree (discussed previously in Section 2.13.2). The progress reports will present the quarterly compliance LFG monitoring results and the results will also be summarized in the annual monitoring reports that are required to be submitted to the regulatory agencies by March 1 following each monitoring year.

5.0 REFERENCES

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Washington State Department of Ecology (Ecology), 2011c, Email (re: Request to Change Groundwater Sampling Method: Leichner Brothers Landfill – Facility ID No. 1017) to M. Davis, Clark County Environmental Services, and L. Caruso, SCS Engineers, from M. Kourehdar, Ecology, Toxics Cleanup Program, July 19.

TABLES

Table 2-1
Groundwater Monitoring Schedule and Parameters
Compliance Monitoring Plan
Leichner Landfill
Vancouver, Washington

Monitoring Well Designation	Water Bearing Zone	Field Parameters	Nitrate as Nitrogen	Total Dissolved Solids	Chloride	Dissolved Metals (Fe and Mn)	VOCs[a]
Compliance Level [b]		Constituent Specific [c]	10 (mg/L)	500 (mg/L)	250 (mg/L)	Fe = 0.03 Mn = 0.005 (mg/L)	Constituent Specific [d]
LB-1S	Alluvial	S	S	S	S	S	S
LB-5S	Alluvial	S	S	S	S	S	S
LB-6S	Alluvial	S	S	S	S	S	S
LB-10SR	Alluvial	S	S	S	S	S	S
LB-13I	Alluvial	S	S	S	S	S	S
LB-26I	Alluvial	S	S	S	S	S	S
LB-27I	Alluvial	S	S	S	S	S	S
LB-1D	Troutdale	A	A	A	A	A	A
LB-3S	Troutdale	A	A	A	A	A	A
LB-3D	Troutdale	A	A	A	A	A	A
LB-4S(R)	Alluvial	A	A	A	A	A	A
LB-4D	Troutdale	A	A	A	A	A	A
LB-5D	Troutdale	A	A	A	A	A	A
LB-10DR	Troutdale	A	A	A	A	A	A
LB-13D	Troutdale	A	A	A	A	A	A
LB-17I	Alluvial	A	A	A	A	A	A
LB-17D	Troutdale	A	A	A	A	A	A
LB-20S	Alluvial	A	A	A	A	A	A
LB-26D	Troutdale	A	A	A	A	A	A
LB-27D	Troutdale	A	A	A	A	A	A
Equipment blank [e]	—	S	S	S	S	S	S
Trip blank [f]	—	S	S	S	S	S	S
Duplicate [g]	—	S	S	S	S	S	S

NOTES:

Fe = iron; Mn = manganese; mg/L = milligrams per liter; VOCs = volatile organic compounds

A = annual monitoring event during the first calendar quarter (June 1 to March 31)

S = semiannual monitoring events during the first (June 1 to March 31) and third (July 1 through September 30) calendar quarters

[a] The County received approval from Ecology to discontinue analysis of VC and 1,1-DCE from the groundwater monitoring program as memorialized in an email correspondence to the County dated February 12, 2013 (Ecology, 2013).

[b] Compliance levels specified in the 1996 Consent Decree and accompanying Cleanup Action Plan, unless otherwise specified.

[c] Compliance level for specific conductance is 700 microSiemens per centimenter (µS/cm). Regulatory level for pH is 6.5 - 8.5 standard units.

[d] Compliance levels were specified in the 1996 Consent Decree for five VOCs only (1,1-dichloroethene and vinyl chloride at 0.1 micrograms per liter [µg/L]; 1,4-dichlorobenzene at 1.8 µg/L; and tetrachloroethene and trichloroethene at 5.0 µg/L).

[e] Collected when non-dedicated pumping equipment is used to sample groundwater. Alternatively, a field blank sample will be collected if disposable bailers are used to sample groundwater. One equipment or field blank sample per monitoring event.

[f] One trip blank per monitoring event.

[g] One duplicate sample collected for semiannual event and two for annual event.

Table 2-2
Groundwater Analytical Testing Methods and Method Reporting Limits
Compliance Monitoring Plan
Leichner Landfill
Vancouver, Washington

Analytical Parameter	Units	Laboratory Analytical Method [a]	Compliance Level [b]	Maximum Allowable MRL [c]	Laboratory MRL
VOCs [d]	µg/L	SW 8260B	Constituent Specific [e]	Constituent Specific	Constituent Specific
Inorganics					
Chloride	mg/L	MCAWW 300.0 or EPA 9251	250	25	0.5
Nitrate as Nitrogen	mg/L	MCAWW 353.2 or EPA 300.0	10	1	0.1
Total Dissolved Solids	mg/L	SM 2540C or MCAWW 160.1	500	50	10
Dissolved Metals					
Iron	mg/L	EPA 6010B or 6020	0.3	0.03	0.025
Manganese	mg/L	EPA 6010B or 6020	0.05	0.005	0.002

NOTES:

mg/L = milligrams per liter; µg/L = micrograms per liter; MRL = method reporting limit; VOCs = volatile organic compounds

EPa = U.S. Environmental Protection Agency; MCAWW = Methods for Chemical Analysis of Water and Wastes; SM = Standard Method

[a] There are equivalent methods for the same analyte published by different authorities on method development; e.g. the EPA Office of Water, EPA Office EPA Office of Solid Waste, Standard Methods, and ASTM. The analytical methods specified above may be substituted provided that the alternate methods are approved for use by the DEQ, provide technically defensible data, and are appropriate for the media being tested. The use of alternative approved methods is considered an acceptable deviation from the above-listed methods and should not be considered a violation of the requirements of the CMP.

[b] Compliance levels specified in the 1996 Consent Decree and accompanying Cleanup Action Plan.

[c] Maximum MRL is based on ten percent of the compliance level, if applicable.

[d] The County received approval from Ecology to discontinue analysis of VC and 1,1-DCE from the groundwater monitoring program as memorialized in an email correspondence to the County dated February 12, 2013 (Ecology, 2013).

[e] Compliance levels were specified in the 1996 Consent Decree for five VOCs only (1,1-dichloroethene and vinyl chloride at 0.1 µg/L; 1,4-dichlorobenzene at 1.8 µg/L; and tetrachloroethene and trichloroethene at 5.0 µg/L).

Table 2-3
Groundwater Level Monitoring Schedule
Compliance Monitoring Plan
Leichner Landfill
Vancouver, Washington

Monitoring Well Designation	Water Bearing Zone	Groundwater Levels
Compliance Monitoring Wells		
LB-1D	Troutdale	S
LB-1S	Alluvial	S
LB-3D	Troutdale	S
LB-3S	Alluvial	S
LB-4D	Troutdale	S
LB-4SR	Alluvial	S
LB-5D	Troutdale	S
LB-5S	Alluvial	S
LB-6S	Alluvial	S
LB-10DR	Troutdale	S
LB-10SR	Alluvial	S
LB-13D	Troutdale	S
LB-13I	Alluvial	S
LB-17D	Troutdale	S
LB-17I	Alluvial	S
LB-20S	Alluvial	S
LB-26D	Troutdale	S
LB-26I	Alluvial	S
LB-27D	Troutdale	S
LB-27I	Alluvial	S
Piezometers (Used For Water Level Monitoring Only)		
LB-9SR	Alluvial	S
LB-17S	Alluvial	S
LB-21D	Troutdale	S
LB-21S	Alluvial	S
LB-22S	Alluvial	S
LB-23S	Alluvial	S
LB-24S	Alluvial	S
MW-1E	Alluvial	S
MW-1N	Alluvial	S
MW-1S	Alluvial	S
MW-NE	Alluvial	S
R-2	Alluvial	S

NOTES:
S = semiannual monitoring events during the first (June 1 to March 31) and third (July 1 through September 30) calendar quarters

Table 2-4
Groundwater Sample Containers, Preservation, and Holding Times
Compliance Monitoring Plan
Leichner Landfill
Vancouver, Washington

Analytical Parameter	Container	Preservation Method	Holding Time
VOCs [a]	40 ml glass vial; teflon septum in cap	Cool to 4°C; hydrochloric acid preservation	14 days
Inorganics [b]			
Chloride	500 ml poly	Cool to 4°C; no preservation	28 days
Nitrate as Nitrogen	500 ml poly	Cool to 4°C; no preservation	48 hours
Total Dissolved Solids	500 ml poly	Cool to 4°C; no preservation	7 days
Dissolved Metals [c]			
Iron	250 ml poly	Cool to 4°C; nitric acid preservation; field filter	6 months
Manganese	250 ml poly	Cool to 4°C; nitric acid preservation; field filter	6 months

NOTES:
ml = milliliters; °C = degrees centigrade; VOCs = volatile organic compounds

[a] Collect three 40 ml glass vials for each sample.

[b] Inorganic parameters can be collected in the same 500 ml poly bottle for each sample.

[c] Dissolve metals parameters can be collected in the same 250 ml poly bottle for each sample.

Table 2-5

Statistical Summary of Groundwater Quality Data[a]

95 Percent Upper Confidence Limit of the Mean[b]

Leichner Landfill

Parameter	Compliance Level	Units	LB-1S	LB-1D	LB-3S	LB-3D	LB-4SR	LB-4D	LB-5S	LB-5D	LB-6S	LB-10SR	LB-10DR	LB-13I	LB-13D	LB-17I	LB-17D	LB-20S	LB-26I	LB-26D	LB-27I	LB-27D
Inorganic Parameters																						
Chloride	250	mg/L	M(14)	7.48	3.64	4.18	5.55	3.35	5.74	13.22	M(9.8)	20.61	28.86	M(12)	4.42	23.35	M(19)[c]	M(22.1)[c]	9.55	4.91	29.57	11.32
Nitrate	10	mg/L	6.04	6.08	3.75	5.48	5.60	6.96	5.03	1.48	2.46	3.66	1.73	4.76	5.42	All ND	All ND	M(0.1)	5.36	6.50	1.24	M(4.0)
Total Dissolved Solids	500	mg/L	209.61	193.73	181.81	192.39	188.42	152.10	174.91	241.39	212.88	267.58	324.08	203.74	M(193)[c]	269.93	222.36	341.80	214.94	M(196)[c]	381.48	M(364)
Metals																						
Iron (dissolved)	0.3	mg/L	**M(0.51)**	All ND	All ND	All ND	All ND	All ND	**M(0.707)**	All ND	**M(0.379)**	**M(1.15)**	M(0.047)	All ND	All ND	**8.76**	0.11	**M(0.368)[c]**	M(0.0392)	All ND	M(0.032)	M (0.033)
Manganese (dissolved)	0.05	mg/L	M(0.002)	All ND	All ND	All ND	All ND	All ND	M(0.0157)	All ND	0.031	M(0.0138)	**M(0.155)[c]**	0.0054	All ND	**M(1.55)[c]**	**4.37**	**2.31**	M(0.011)	M(0.0034)	**0.39**	**M(0.285)**
Volatile Organic Compounds [d]																						
1,4-Dichlorobenzene	1.8	µg/L	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	M(0.26)	All ND	M(0.25)	All ND	All ND	All ND	All ND
Tetrachloroethene	5	µg/L	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND
Trichloroethene	5	µg/L	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	M(0.15)	All ND	All ND	All ND	M(0.81)	All ND	All ND	All ND	All ND	All ND	All ND

NOTE:
mg/L = milligrams per liter; µg/L = micrograms per liter; ND = indicates not detected at any sampling event; M = maximum value detected in last five years shown in parenthesis.
Values shown in **bold** are greater than the specified compliance level.

[a] Data evaluated for the last five years of monitoring (2008 through 2012).

[b] Values shown are the 95 percent upper confidence limit on the mean (UCL-95) calculated using MTCA Stat 97 program and Statistical Guidance for Ecology Site Managers.

[c] Calculated UCL-95 value of lognormally distributed data exceeded the range of concentrations from 2008 to 2012 using Land's method; value shown represents the maximum value detected in the last five years.

[d] The County received approval from Ecology to discontinue analysis of VC and 1,1-DCE from the groundwater monitoring program as memorialized in an email correspondence to the County dated February 12, 2013 (Ecology, 2013).

Table 3-1
Stormwater Monitoring Schedule and Parameters
Compliance Monitoring Plan
Leichner Landfill
Vancouver, Washington

Analytical Parameter	Laboratory Analytical Method [a]	Benchmark Concentration
OUTFALL 1: VISUAL PARAMETERS DURING MONTHLYMONTHLY INSPECTIONS		
Oil Sheen	Visual	No Visual Sheen
OUTFALL 1: ANALYTICAL REQUIREMENTS AND BENCHMARKS FOR QUARTERLY SAMPLING [b]		
pH	Laboratory (SM 4500) or Field Meter/Litmus Paper	5.0 – 9.0 S.U.
Turbidity	Laboratory (EPA 180.1) or Field Meter [c]	25 NTU
Total Copper	SW 200.8	14 µg/L
Total Zinc	EPA 200.8	117 µg/L

NOTES:
EPA = U.S. Environmental Protection Agency; NTU = nephelometric turbidity units; SM = Standard Method
S.U. = pH standard units; mg/L = milligrams per liter; µg/L = micrograms per liter

[a] Ecology has provided written guidance allowing the use of either field- or laboratory-measurement.

[b] First (June 1 to March 31), second (April 1 to June 30), third (July 1 through September 30) and fourth (August 1 to December 31) calendar quarters.

[c] Other equivalent EPA-approved analytical testing methods may be used with same or lower quantitation level

Table 4-1
Landfill Gas Monitoring Schedule and Parameters
Compliance Monitoring Plan
Leichner Landfill
Vancouver, Washington

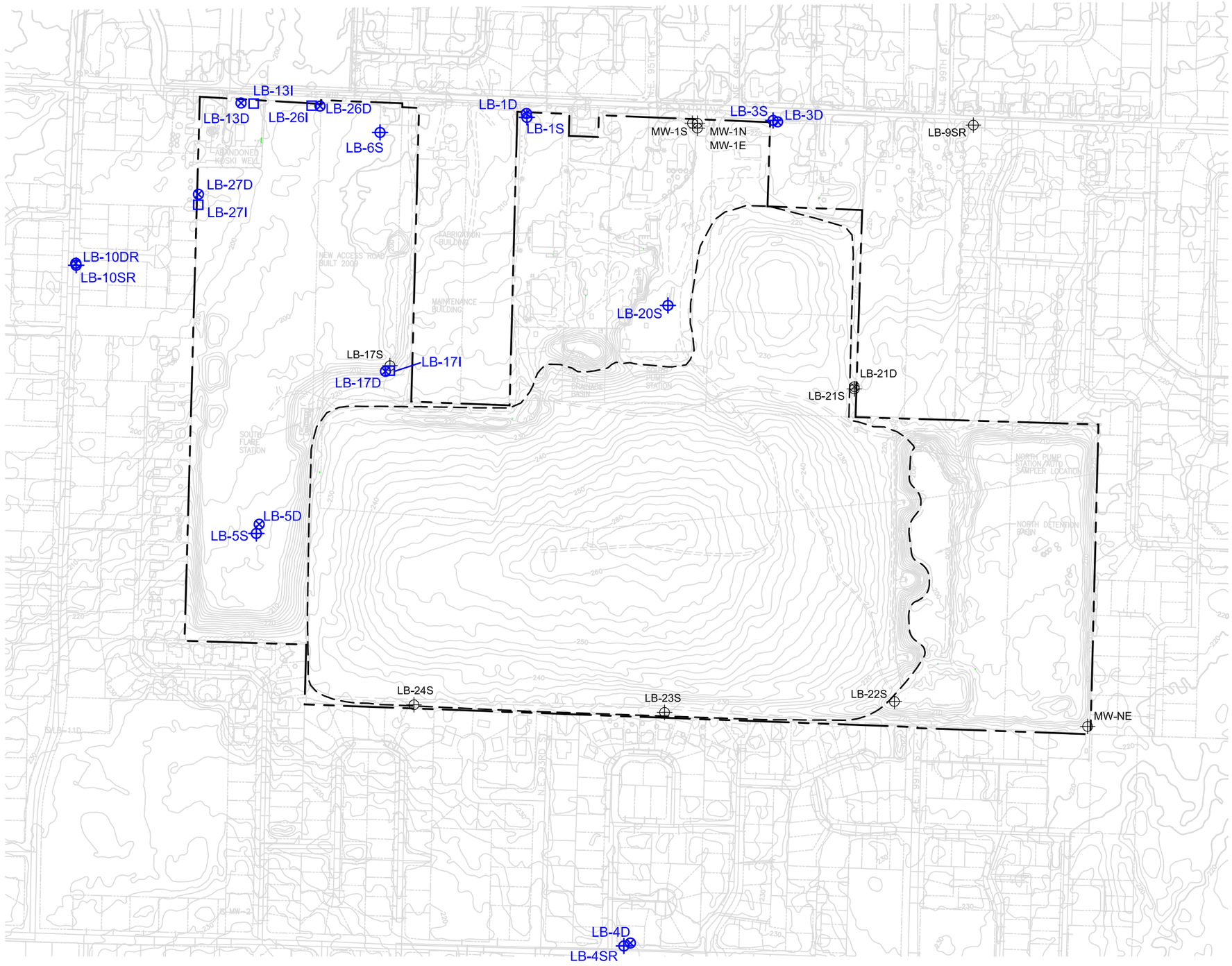
Compliance Monitoring Probe Designation	Quarterly Monitoring Parameters[a, b]			
	Vacuum (inches w.c.)	Methane (% by volume)	Carbon Dioxide (% by volume)	Oxygen (% by volume)
GP-1A	X	X	X	X
GP-1B	X	X	X	X
GP-2	X	X	X	X
GP-3	X	X	X	X
GP-4A	X	X	X	X
GP-4B	X	X	X	X
GP-5	X	X	X	X
GP-6R	X	X	X	X
GP-7	X	X	X	X
GP-8	X	X	X	X
GP-9A	X	X	X	X
GP-9B	X	X	X	X
GP-10A	X	X	X	X
GP-10B	X	X	X	X
GP-11	X	X	X	X
GP-12	X	X	X	X
GP-13	X	X	X	X
GP-14R	X	X	X	X
GP-15	X	X	X	X
GP-16S	X	X	X	X
GP-16D	X	X	X	X
GP-17S	X	X	X	X
GP-17D	X	X	X	X
GP-18S	X	X	X	X
GP-18D	X	X	X	X
GP-19S	X	X	X	X
GP-19D	X	X	X	X
GP-20	X	X	X	X
GP-21A	X	X	X	X
GP-21B	X	X	X	X
GP-22	X	X	X	X
GP-23	X	X	X	X
GP-24A	X	X	X	X
GP-24B	X	X	X	X
GP-25A	X	X	X	X
GP-25B	X	X	X	X
GP-26	X	X	X	X
GP-27	X	X	X	X
GP-28	X	X	X	X
GP-29	X	X	X	X
GP-30A	X	X	X	X
GP-30B	X	X	X	X
GP-31	X	X	X	X
GP-32	X	X	X	X
GP-33	X	X	X	X
GP-34	X	X	X	X
GP-35	X	X	X	X
GP-36	X	X	X	X
GP-37	X	X	X	X
GP-38	X	X	X	X

NOTES: w.c. = water column

[a] First (June 1 to March 31), second (April 1 to June 30), third (July 1 through September 30) and fourth (August 1 to December 31) calendar quarters.

[b] Field measurements using a portable CES LandTec® GEM-2000 gas extraction monitor or equivalent.

FIGURES



LEGEND:

LB-5S ⊕	Monitoring Well Location, Alluvial Water–Bearing Zone
LB-5D ⊗	Monitoring Well Location, Troutdale Aquifer
LB-17I □	Monitoring Well Location, Middle of Alluvial Water–Bearing Zone
—— - - ——	Property Boundary
— — — — —	Limit of Landfill Cover and Approximate Edge of Waste

NOTES:

1. Monitoring wells designated by blue color are compliance monitoring wells.
2. Topography taken from Clark County GIS, December 2008.

SCS ENGINEERS
Environmental Consultants and Contractors
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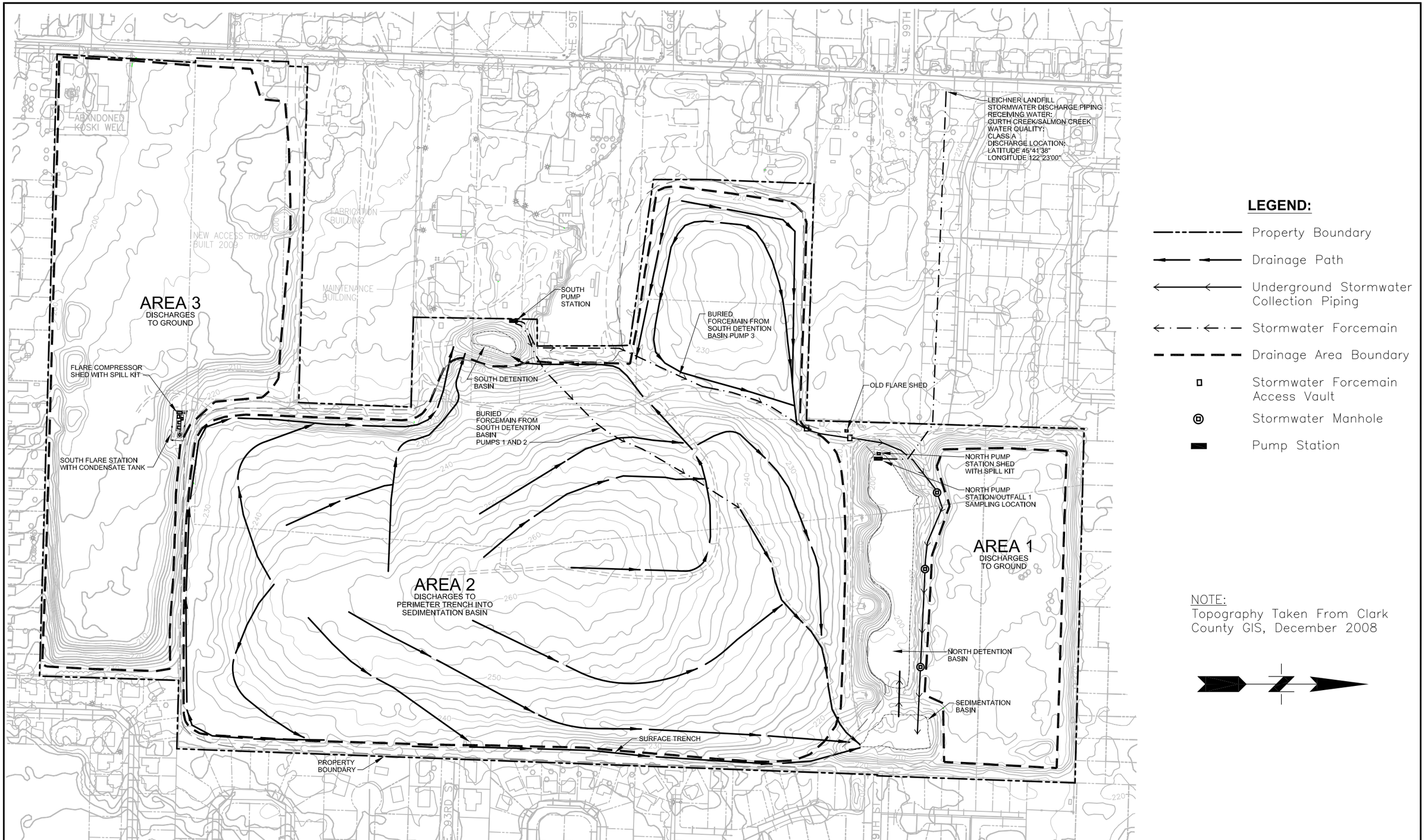
Portland, Oregon 97224
(503) 639-9201 FAX: (503) 684-6948

SCALE
0 400 800 FEET

PROJECT NO. 04213030.15	DES BY T.A.	GROUNDWATER MONITORING LOCATIONS	DATE JULY 2013
SCALE AS SHOWN	CHK BY J.D.	LEICHNER LANDFILL VANCOUVER, WASHINGTON	FIGURE 2-1
CAD FILE FIGURE 2-1	APP BY L.C.		



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SCALE
0 300 600 FEET

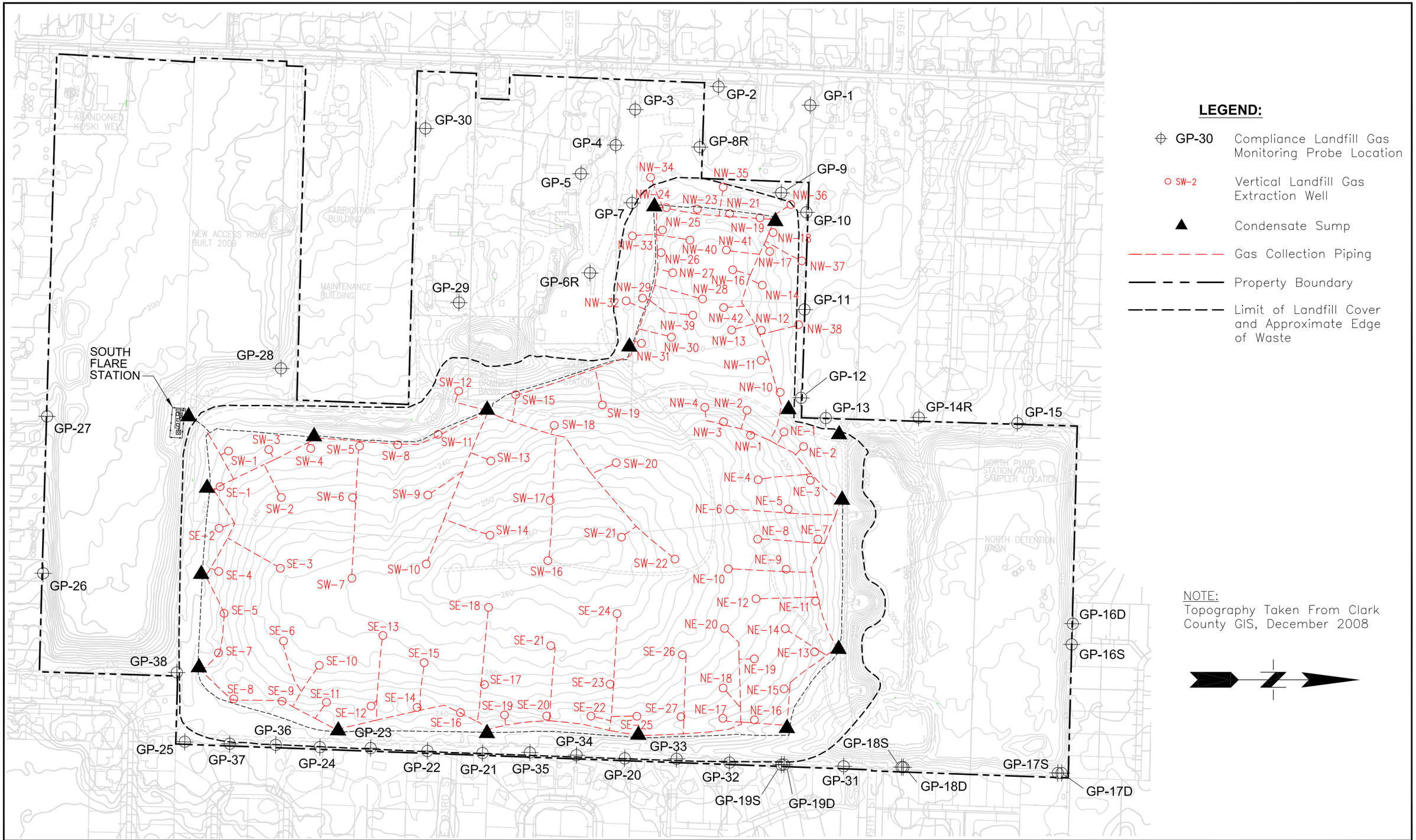
PROJECT NO. 04213030.15	DES BY T.A.
SCALE AS SHOWN	CHK BY J.D.
CAD FILE FIGURE 3-1	APP BY L.C.

SITE MAP AND STORMWATER SYSTEM

LEICHNER LANDFILL
VANCOUVER, WASHINGTON

DATE JULY 2013

FIGURE 3-1



LEGEND:

- GP-30 — Compliance Landfill Gas Monitoring Probe Location
- SW-2 — Vertical Landfill Gas Extraction Well
- Condensate Sump
- Gas Collection Piping
- Property Boundary
- Limit of Landfill Cover and Approximate Edge of Waste

NOTE:
Topography Taken From Clark County GIS, December 2008

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SCALE
0 300 600 FEET

PROJECT NO. 04213030.15	DES BY T.A.
SCALE AS SHOWN	CHK BY J.D.
CAD FILE FIGURE 4-1	APP BY L.C.

LANDFILL GAS PROBE AND EXTRACTION WELL LOCATIONS

LEICHNER LANDFILL
VANCOUVER, WASHINGTON

DATE JULY 2013

FIGURE 4-1

APPENDIX A

Health and Safety Plan

HEALTH AND SAFETY PLAN FOR LEVEL D TASKS

1 GENERAL PROJECT SITE INFORMATION

Job #:	04213030.00
Job Name:	Closed Leichner Landfill
Site Address:	9411 NE 94th Ave. Vancouver, WA
Client Contact Information:	Mike Davis (360) 397-6118
Scope of Work:	• Landfill gas system field maintenance and monthly operation and maintenance • Storm water monitoring • LFG probe monitoring and GCCS adjustment • Greenhouse gas monitoring and reporting • Groundwater and storm water monitoring • Possible decommissioning and installation of groundwater-monitoring wells

ONSITE ORGANIZATION AND COORDINATION

Project or Site Team Leader:	Stephen Harquail	(503) 867-2369
Primary H&S Representative:	Suzanne Sturgeon	(562) 426-9544
Onsite Safety Representative:	Brian Doan	(452) 289-5445
Client Representative:	Mike Davis	(360) 397-6118
Project Manager or Director:	Louis Caruso	(503) 639-9208
Health and Safety Plan Date and Revision:	July 15, 2013, Revision 3	

2 EMERGENCY CONTACT AND NOTIFICATION INFORMATION

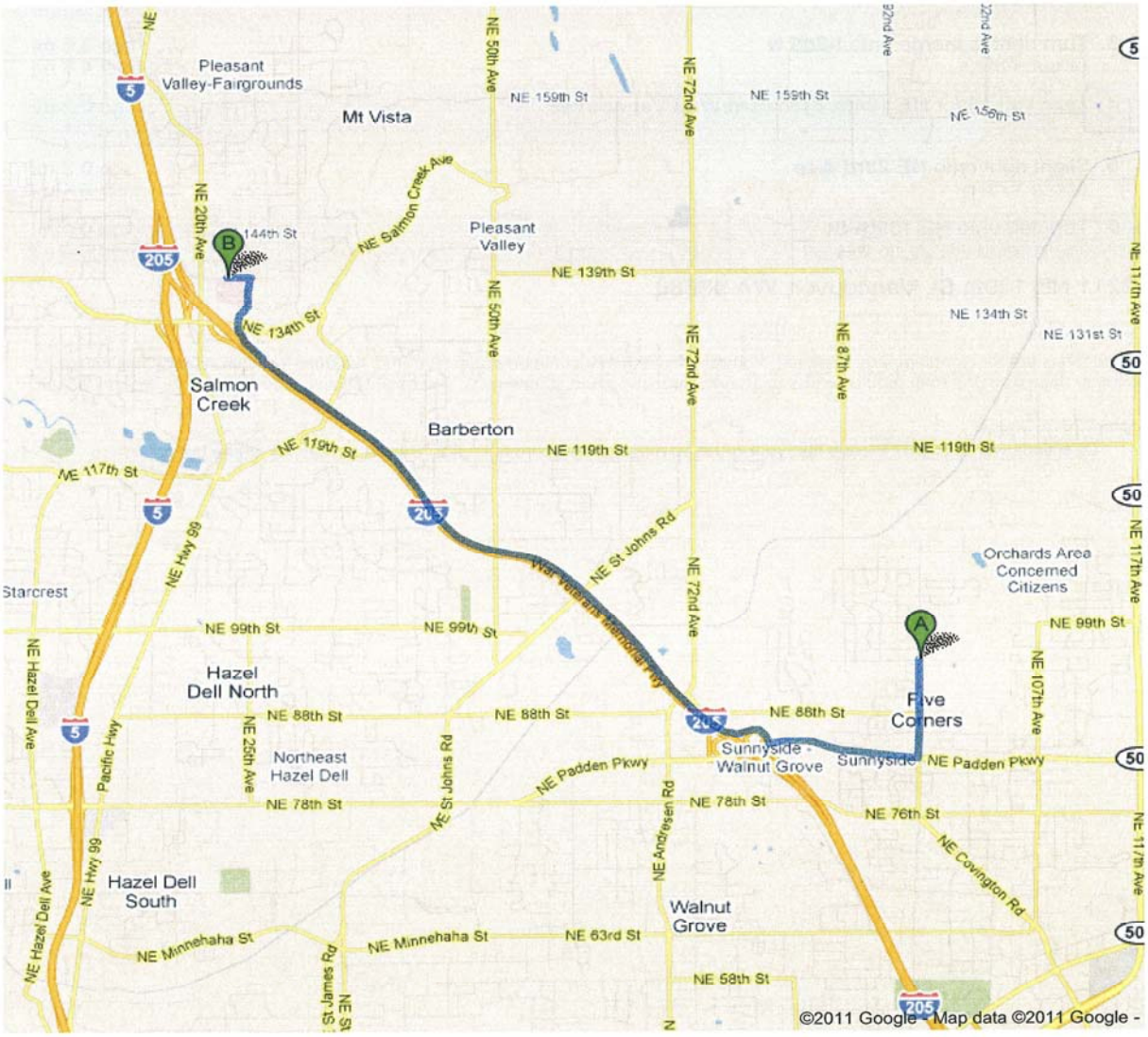
Nearest Hospital Address (attach directions and map):	**Legacy Salmon Creek Hospital (360) 487-1000** **2211 NE 139th St Vancouver, WA**
Police:	**911**
Fire :	**911**
Ambulance:	**911**
Describe Client Emergency Notification System (if available)	None. The Site Superintendent is responsible for determining if circumstances exist for area contamination, and should always assume worst-case conditions until proven otherwise. Fire and police departments must be contacted. A list of their addresses and telephone numbers will be located in the field trailer, and/or will be carried by the Site Superintendent.
Describe Emergency Procedures and Medical Care	Employees may respond to low danger emergencies, such as administration of first aid or fighting small fires (with fire extinguishers). Should outside medical or other emergency assistance be required, personnel will notify the HSO of the nature of the emergency and a call will be made to 911 and SCS Engineers at (562) 426-9544. First aid will be administered to the injured person under the provisions of the Washington State "Good Samaritan Act" (RCW 4.24.300). SCS Engineers has not designated a first aid responder from its staff. A first aid kit meeting the minimum state requirements must be on-site at all times. If the injury or illness appears to be relatively minor, the affected person or persons may be driven to the emergency room of the nearest hospital (see page 3). In the case of life-threatening problems or emergencies, SCS personnel will leave the area and will not assist in handling the emergency. Fire District No. 5 will be contacted immediately, access gates will be monitored and access restricted to only emergency vehicles. SCS will report all life-threatening problems and emergencies to Clark County immediately or as soon as practical after necessary response actions are performed. All vehicles and the blower flare station will be equipped with proper fire extinguishers and first aid supplies. All personnel will be trained in the proper use of various types of fire extinguishers and their locations. Site personnel will have mandatory first aid training every two years (The American Red Cross).

DRIVING DIRECTIONS AND MAP FROM PROJECT SITE TO HOSPITAL

A 9411 NE 94th Ave, Vancouver, WA 98662

1.	Head **south** on **NE 94th Ave** toward **NE 95th St** About 2 mins	go 0.6 mi total 0.6 mi
2.	Turn right onto **NE Padden Pkwy** About 2 mins	go 0.8 mi total 1.3 mi
3.	Turn right to merge onto **I-205 N** About 4 mins	go 3.5 mi total 4.8 mi
4.	Take exit **36** for **NE 134th St** toward **Wsu Vancouver**	go 0.2 mi total 5.1 mi
5.	Slight right onto **NE 23rd Ave** About 1 min	go 0.3 mi total 5.4 mi
6.	Turn left onto **NE 139th St** Destination will be on the left	go 0.1 mi total 5.5 mi

B 2211 NE 139th St, Vancouver, WA 98686



3 JOB TASK SAFETY ANALYSIS AND PPE ASSESSMENT (JTSA)

A Job Task Safety Analysis and PPE Assessment were performed for the following tasks:

- JTSA01 – Drain liquids from laterals
- JTSA02 – Excavation and backfill
- JTSA05 – Flare system monitoring
- JTSA06 – Heavy equipment use
- JTSA08 – LFG extraction well/probe/structure monitoring
- JTSA09 – Liquid measurements in LFG extraction wells/leachate wells
- JTSA10 – Non-routine LFG collection system piping repairs
- JTSA11 – Colorimetric Tube (Draeger) LFG Well Monitoring
- JTSA12 – Raise or lower LFG collection system extraction wells
- JTSA15 – Sample Collection – Groundwater or Leachate
- JTSA16 – Sample Collection – Summa Canister or Tedlar Bag
- JTSA17 – Sump or condensate sump pump repairs
- JTSA18 – Surface emissions monitoring
- JTSA19 – Use of down-hole cameras
- JTSA20 – Vehicle operation
- JTSA22 – Flare burner cleaning
- JTSA23 – Electrical panel troubleshooting
- JTSA25 – Sump installation/replacement
- JTSA26 – Blower installation/replacement
- JTSA27 – Pump installation/replacement
- JTSA28 – Header/lateral installation/replacement

- JTSA – GW Well Installation
- JTSA – Stormwater Monitoring

4 SAFE OBSERVATIONS

SCS Engineers has implemented a behavior-based safety program called the SAFE program (Safety Awareness for Everyone). The centerpiece of the behavior-based SAFE program is the SAFE Observation Checklist.

The OM&M SAFE Observation Report will be used by OM&M field and project personnel. The SAFE Observation Checklist for ES/Solid Waste Professionals will be used by field and project personnel from the engineering offices. The different checklists reflect the different scopes of work that OM&M and the engineering staff typically perform.

The goal is to make at least one observation per month during site activities. If activities are performed all month by the project team members, two observations per month will be performed by project personnel.

5 PHYSICAL HAZARDS

Physical hazards include ergonomic hazards (lifting and repetitive motion) and treacherous footing (i.e., sandy soil or clay, uneven ground), which can be particularly hazardous on slopes. Other physical hazards include traffic and heavy equipment, excavations, natural hazards (such as poisonous plants, snakes, and other animals), and temperature extremes.

Confined spaces may exist at the site. All confined spaces at the site will be assumed to be permit-required confined spaces due to the potential presence of landfill gas (LFG).

NATURAL HAZARDS

The following hazards could be potentially encountered while performing the operation and maintenance functions of project:

Hantavirus - Infection typically occurs by the inhalation of tiny airborne droplets of fresh or dried rodent excretions. Transmission to humans may also occur through direct contact with rodents or rodent-contaminated materials, and ingestion of contaminated food or water is also a possible route of transmission. Sweeping or “shaking out” rodent contaminated materials should be avoided unless performed using respiratory protection.

Lyme Disease – An illness caused by a tick-borne bacterium. Lyme disease is associated with a range of debilitating symptoms (e.g., flu-like discomfort, joint pain, fatigue, headache, lack of concentration, facial paralysis). Main item to look for would be a bulls-eye rash from tick bite. Avoid areas known to have ticks or wear DEET repellant. Wear full-covering, light-colored clothing to help make ticks visible. Check carefully for ticks and remove any as soon as possible after field activity.

Africanized Honey Bees - Aggressive and unpredictable, responds quickly and stings in large numbers, senses threats from people or animals 50 feet or more from nest, sense vibrations from power equipment 100 feet or more from nest, swarm frequently to establish new nests, pursues an enemy 3 miles or more, nest in small cavities and sheltered areas. Avoid areas known to contain bees.

Snakes – Rattle snakes, vipers and coral snakes are poisonous. Not all rattle snakes give an audible warning before striking. Extra caution should be taken if tools or other materials are dropped in highly vegetated areas, around rocks, stockpiles of pipe, etc., or when walking through highly vegetated areas where visibility (of the ground) is limited. The most active time for rattlesnakes is in the morning, late afternoon and early evening, however, an encounter could happen at any time of the day. Walking loudly, shuffling feet, making noise, etc. while working is recommended. Boots that reach mid calf or snake guards are recommended and all personnel should have leather work gloves.

Poisonous inspects, snakes, and/or plants are sometimes difficult to eliminate or avoid on some landfill sites because the sites are typically rural and remote. Employees should be aware of the potential for encountering poisonous animals and plants. Where possible, nesting places should be removed and or limited. If several infestations are present, remedies should be discussed with

your supervisor and the client. Refer to SOP-21 in the SCS *Injury and Illness Prevention Plan* (2010) for identification tips, precautions, and treatment for biological hazards.

EXCAVATIONS

SCS personnel may be required to enter excavated areas for purposes of inspecting waste. See attached Appendix J (Excavation and Construction Earthwork Program) of the SCS *Injury and Illness Prevention Plan* (2010) for safe precautions and requirements for excavation safety. Excavations will conform to proper shoring, sloping, and engineering precautions as outlined in OSHA Excavation Standards.

The following specific hazards may be encountered in the excavated areas:

- Limited Access and Egress;
- Cave-in/Possible Engulfment or Entrapment;
- Sharp Objects;
- Bloodborne Pathogens;
- Explosive or toxic gases including methane gas, hydrogen sulfide gas, and oxygen deficiency.

To reduce possible effects of the hazards listed above, workers in excavated areas and personnel performing the excavation will:

- Install proper ladders or ramps in accordance with OSHA Excavation Standards;
- Utilize proper engineering techniques of sloping and/or shoring as outlined in outlined in OSHA Excavation Standards.
- Wear steel-toed/leather work boots, and leather work gloves when entering excavated areas.
- Monitor for methane gas, hydrogen sulfide gas, and oxygen deficiencies prior to and during entry into excavated areas.

Entry into any excavated area will not be permitted if methane gas levels are detected at 10 percent LEL methane gas (0.5 percent methane gas by volume) or higher, hydrogen sulfide gas levels are detected at 10 ppm, hydrogen sulfide gas by volume or higher, or oxygen levels are detected at 19.5 percent oxygen gas by volume or lower. All personnel must evacuate the excavated area if the above levels are detected. Personnel may not reenter the excavated area until safe gas levels are attained by ventilation or other means.

Excavation Monitoring

SCS Field Services will have a competent individual monitor any trench or excavation and any shoring at the beginning of the work shift, periodically during the day, and as conditions change, such as after a rain storm. The individual must be competent by means of experience and training and must have the authority to order changes or to stop work based on the findings of the

excavation monitoring. The purpose of the monitoring is to evaluate the potential for collapse of any excavation.

CONFINED SPACES

All SCS employees at the site shall be trained in and briefed about the identification of confined spaces. A confined space has the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means of entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, pits, and crawl spaces; and
- Is not designed for continuous employee occupancy.

Atmospheric monitoring and hazard assessment must be performed before entering any sump, vault or manhole, or other structure that meets the definition of a confined space. As a result, confined space entry will be avoided during routine OM&M activities. Any necessary entry into a confined space will be considered a non-routine activity, and will be performed in accordance with applicable regulations and SCS's standard operating procedures.

Excavations greater than 4 feet deep and excavations in waste are considered confined spaces for which a confined-space evaluation must be filled out to determine whether a permit is required for entry. The SCS Confined-Space Entry Program is presented Appendix K of the SCS Engineers *Injury and Illness Prevention Plan* (2010). The program includes sample blank forms, including an entry permit form, and a detailed discussion of hazards, control measures, and protocols.

Due to the potential presence of landfill gas, air quality will be monitored at all excavations (borings, trenches, test pits, etc.). Landfill gas commonly contains methane, VOCs, and hydrogen sulfide. Landfill gas is dangerous because it can displace oxygen creating a suffocation hazard. Also, methane can explode. The VOCs can cause short-term poisoning (weakness and internal bleeding) and long term health problems (damage to the central nervous system, blood and liver disorders, and liver cancer). Hydrogen sulfide can cause respiratory arrest resulting in asphyxiation.

Physical hazards associated with confined space entry include engulfment from collapse of a space or excavation, crushing by materials or machinery falling onto workers in the space, and methane explosion.

TEMPERATURE EXTREMES

Heat Stress

The risk of heat stress is typically greater for workers wearing PPE. Heat stress includes several heat-induced illnesses heat exhaustion and the more severe heat stroke, and can result in death.

Heat stress happens when the body is unable to cool itself by sweating. Factors leading to heat stress include high temperature and humidity, direct sun or heat, limited air movement, physical exertion, poor physical condition, some medicines, and inadequate tolerance for hot workplaces.

To reduce the potential for heat stress, it is important to maintain your body's level of liquid. Ensure each employee at the site has at least 2 gallons of water available each day if heat stress is a potential hazard. For guidance, be particularly aware of signs of heat stress when the air temperature is at or above 89 degrees Fahrenheit.

Immediately report signs or symptoms of heat stress and take action to cool the victim. It is important to remove heat-retaining personal protective equipment such as non-breathable, chemical-resistant clothing during all breaks. Take your break in the shade if available or in an air-conditioned vehicle.

Symptoms of Heat Exhaustion: Headaches, dizziness, lightheadedness or fainting; weakness and moist skin; mood changes such as irritability or confusion; upset stomach or vomiting.

Symptoms of Heat Stroke: Dry, hot skin with no sweating; mental confusion or losing consciousness; seizures or convulsions.

Preventing Heat Stress: Know the symptoms of heat-related illnesses; monitor yourself and coworkers; block out direct sun or other heat sources if possible; use cooling fans/air-conditioning; rest regularly; drink lots of water; about 1 cup every 15 minutes; wear lightweight, light colored, loose-fitting clothes; avoid alcohol, caffeinated drinks, or heavy meals.

Cold Stress

When the body is unable to warm itself, serious cold- related illnesses and injuries may occur, and permanent tissue damage and death may result. Hypothermia can occur when land temperatures are above freezing or water temperatures are below 98.6°F/37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.

Workers will be protected from cold stress by providing training, controlling temperature and wind when possible by using heaters and windbreaks, rotating workers in cold jobs so that no one is exposed too long, scheduling work at warmest times, encouraging self-pacing and extra breaks if necessary, establishing a buddy system, and keeping first aid supplies and equipment available.

Employees can help prevent cold stress. Proper insulation and good ventilation is critical for clothing worn during cold stress exposures. Better insulation is achieved by layering clothes rather than by wearing just one warm garment. Layering allows a person to add or remove layers to adjust for different insulation needs during the work period.

NOISE

Decibel levels of on-site equipment will be controlled by proper maintenance or use of mufflers. Vibrations and air surging from the LFG blower flare station (BFS) will be monitored and minor

modifications made, if needed. Hearing protection will be worn when working in the vicinity of noise sources over which a conversation at normal volume would be difficult to hear. Examples include heavy equipment, power tools, compressors, blowers, etc.

6 CHEMICAL AND ATMOSPHERIC HAZARDS

Due to the potential presence of landfill gas, air quality will be monitored at all excavations (borings, trenches, test pits, etc.). Landfill gas commonly contains methane, volatile organic compounds (VOCs), and hydrogen sulfide. Landfill gas is dangerous because it can displace oxygen creating a suffocation hazard. Also, methane can explode. The VOCs can cause short-term poisoning (weakness and internal bleeding) and long-term health problems (damage to the central nervous system, blood and liver disorders, and liver cancer). Hydrogen sulfide can cause respiratory arrest resulting in asphyxiation.

Air monitoring will be conducted when there is a reasonable concern for the presence of landfill gas and in the following specific instances:

- Prior to entry of any trench or excavation and periodically while the trench or excavation is occupied.
- Prior to entry of a confined space and periodically while the confined space is occupied. Permit-required confined spaces include any excavation that contacts waste. (See also Confined Space Entry, above.)

Table 1. Chemical Hazards and Air Monitoring Plan

Chemical	PEL (WA) (ppm)	TLV (ppm)	IDLH (ppm)	Monitoring equipment	Action Level	Sample Location ID and Frequency	Procedures when Action Level Exceeded
Methane	NA	1000	13,000	4-gas monitor	10% of LEL	Various. Continuous personal monitor if hazard present.	Evacuate area and use ventilation fan to lower concentrations.
Carbon Monoxide	35 (200 ppm 5-min. STEL)	25	1200	4-gas monitor	12 ppm	Various. Continuous personal monitor if hazard present.	Move upwind from source of CO such as generators or equipment.
Hydrogen Sulfide	10 (15 ppm 15-min. STEL)	10/15 (STEL)	100	4-gas monitor	5 ppm	Various. Continuous personal monitor if hazard present.	Evacuate the area and return with supplied-air respirators. Use ventilation fan to lower concentrations.
Oxygen	N/A	N/A	N/A	4-gas monitor	<19.5% or >23.5%	Various. Continuous personal monitor if hazard present.	Evacuate the area and return with supplied-air respirators. Use ventilation fan to return oxygen concentrations to normal.

Senior SCS site personnel or his or her qualified designate is responsible for conducting the air monitoring, maintaining and calibrating the monitoring equipment, and documenting the maintenance, calibration, and results of the air monitoring. An air-monitoring log form is available on the company intranet site at: **http://eye.scsengineers.com/TechnicalAdvisor/Health&Safety/index.htm**.

SCS Engineers maintains a written personal-protective-equipment (PPE) program as Appendix E of its written *Injury and Illness Prevention Plan*. The PPE program addresses PPE selection, training, inspection, proper fitting, use, and limitations. A copy of the written PPE Program is maintained in the health and safety file at the SCS Engineers office. An electronic copy is maintained on the SCS Engineers intranet web site.

This safety plan assumes that air-purifying respirators (APRs) will not be used. If a future task requires APR use, the JTSA must provide a cartridge change-out schedule that accounts for expected contaminant concentrations, temperature, humidity, breathing rate, etc.

7 SITE SECURITY, CONTROL, DECONTAMINATION, AND DISPOSAL

SITE SECURITY AND CONTROL MEASURES

Trespassing and unauthorized access will be controlled by maintenance of the perimeter fence and lockable gates. Site access will be controlled such that only verified team members, subcontractors, and previously-approved guests will be allowed in work areas or areas containing potentially hazardous materials or conditions. Unauthorized access to the flare station equipment will be deterred by locked gates, fences, etc.

DECONTAMINATION AND DISPOSAL PROCEDURES

Decontamination (decon) is the process of removing contaminants that have accumulated on personnel and equipment. Proper decon protects workers & others from hazardous substances that may contaminate clothing, PPE, tools, vehicles, etc. used on a landfill site. A decontamination station will be established where workers might contact waste. The site safety officer will monitor the effectiveness of the decontamination procedures. Typically, decontamination equipment will consist of brushes and wash tubs filled with water and a detergent (for example tri-sodium phosphate).

Hands and face must be thoroughly cleaned prior to eating, drinking, or other hand-to-mouth activities. Care should be taken not to swipe debris from the eyes with soiled fingers during any work activity involving refuse or contact with condensate.

Avoiding or minimizing contact with refuse, LFG condensate, etc. greatly simplifies decontamination and reduces the potential of injury. Do not walk through, handle, or touch refuse materials if possible. Wear gloves when handling equipment or tools that have been in contact with refuse or condensate. Skin abrasions, cuts, and scratches present the potential for infectious agents or chemicals to enter the body. Skin injuries should be adequately covered. Washing with antibacterial soaps or disinfectants minimizes infection.

Spillage of LFG condensate or leachate on skin should be thoroughly washed with toothpaste, soap, and water. Spillage of LFG condensate or leachate onto personal clothing should be washed after use by itself. Do not launder contaminated clothing with other personal clothing.

Contaminated gloves and Tyvek coveralls will be disposed of with other solid waste generated during site activities. All personnel leaving a contaminated area must decontaminate entirely before leaving the site and must shower as soon as possible. All clothing and equipment leaving a contaminated area shall be disposed of or appropriately decontaminated.

8 ACCIDENT REPORTING

Every employee should report immediately any injury, no matter how small, to the SCS project manager and the safety and health coordinator at SCS Engineers' Bellevue, Washington, office.

If the injury is serious in nature (e.g., loss of limb, fractures, unconsciousness, or hospitalization), the project manager must report the incident to the office director, office services manager, and the safety and health coordinator. A written report of the incident will be completed when all of the facts have been gathered.

In case of injury resulting in death, probable death, or in-patient hospitalization, the safety and health coordinator or project manager must report the incident to the SCS office director as soon as possible. Within 8 hours of its occurrence, an employee accident resulting in death, probable death, or in-patient hospitalization shall be reported to the safety and health coordinator at SCS Engineers' Bellevue, Washington, office who will report, either orally or in writing, to the corporate health and safety director, the nearest OSHA area director and the state regulatory agency for safety. For these accidents, do not move equipment involved in the accident until the state regulatory agency for safety can inspect the accident scene. Equipment involved in the accident may be moved if it is necessary to remove any victims or prevent further incidents and injuries.

9 APPLICABLE STANDARD OPERATING PROCEDURES (SOP) AND PROGRAMS

SOP-01 General Code of Safe Work Practices

SOP-02 Project and Site Specific Health and Safety Plans

SOP-04 JTSA and PPE Assessment

SOP-05 Work Permits

SOP-06 Safe Procedures for Forklift and Heavy Machinery Operations

SOP-07 Handling Compressed Gas Cylinders & Safely Using Air Compressors

SOP-09 Electrical Safety

SOP-10 Fall Protection

SOP-11 Fire Extinguishers – Use and Maintenance

SOP-12 Safe Procedures for Hand and Power Tools

SOP-13 Ladder Safety

SOP-14 Safe Procedures for Landfill Leachate & Condensate Collection Systems

SOP-15 Lockout/Tagout Procedures

SOP-16 Safe Procedures for Manhole/Vault Entry

SOP-17- Safe Procedures for Material Use, Storage, and Handling

SOP-18- Safe Procedures for Polyethylene and PVC Pipe Fusion & Tapping

SOP-19 Site Sanitation Requirements

SOP-20 Scaffolding Requirements (Manlifts)

SOP-21 Safe Procedures for Biological Hazards

SOP-22 Safe Procedures for H2S High Hazard Areas

SOP-24 Safe Procedures to Avoid Slips, Trips & Falls

Appendix B – Hazard Communication Program

Appendix C – HAZWOPER Program

Appendix D – Exposure Assessment Program

Appendix E – Personal Protective Equipment Program

Appendix F – Respiratory Protection Program

Appendix G – Motor Vehicle and Fleet Safety Program

Appendix H – Hearing Conservation Program

Appendix I – Bloodborne Pathogens Program

Appendix J – Trenching & Excavation Program

Appendix K – Confined Space Entry Program

Appendix L – Ergonomics Program

ACKNOWLEDGEMENT PAGE

"I have read the attached health and safety plan for the Leichner Landfill, dated January 19, 2011. I have discussed any questions that I have regarding the materials with the person in charge of site safety for SCS activities on the project, and I understand the requirements."

Name	Signature	Company	Date

Approved by: _____

Date: _____July 15, 2013_____

Job Task Safety Analysis and PPE Assessment Form-01

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Drain liquids from laterals; as needed basis, up to 8 hours per day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.3	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	40 Hour HAZWOPER		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form-02

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Excavation and backfilling operations; up to 8 hrs/day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.3	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pipe fusion. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 02 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Perform safety check of equipment	Malfunctioning equipment could cause injury to people in surrounding area or operator – Follow the instructions in the Equipment Operators Manual.	• Follow instructions in the Equipment Operators Manual	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: None Respiratory: None Hearing: None Eye/Face: None
3. Monitor area to ensure the ground is stable and personnel are at a safe distance.	If area is not clear and stable the trench could cave in causing damage to the machine or injury to people in the area.		Same as Above
4. Use ropes or straps to hold vertical pipe perpendicular to grade.	This keeps anyone on the ground away from the pipe and ensures a higher level of safety.	• Keep unnecessary personnel out of the fall zone of the pipe. Ground crew must high visibility clothing.	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather/Cotton Glove Respiratory: None Hearing: None Eye/Face: None
5. Use the bucket/blade to push all of the material in the trench before compacting with the tracks on the excavator.	This decrease the chance of an air pocket in the material which could cause the excavator to become unstable.	• Compact material slowly and stop if excess settling occurs to add additional material	Same as Above
End of Form 2			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form - 01 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. If multiple personnel on site, conduct tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • If necessary, implement lockout/tagout procedure. • Identify job duties for each employee, tools required	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
3. Evaluate laterals for liquid blockages	• Heavy machinery • Slips, trips, falls • Biological hazards • LFG, CO, H2S	• Be aware of Heavy machinery operating near by • Be aware of slip, trip, fall hazards • Be aware of biological hazards • Conduct air monitoring if necessary •	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
4. Adjust laterals to promote liquid drainage	• Heavy machinery • Slips, trips, falls • Biological hazards • LFG, CO, H2S • Muscle Strain/injury during lifting	• Be aware of Heavy machinery operating near by • Be aware of slip, trip, fall hazards • Be aware of biological hazards • Conduct air monitoring if necessary • DO Not twist torso more than 45 degrees when lifting laterals, use mechanical assistance if necessary	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
5.			
6.			

Job Task Safety Analysis and PPE Assessment Form - 01 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
7.			
8.			
End of Form 1			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-05

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Flare station monitoring; several times a week, 1-2 hours.	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.3	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On the Job Training of Flare Station Monitoring Requirements 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 05 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Drive to flare station	Vehicle traffic; road conditions	• Wear seat belt • Practice defensive driving • Avoid muddy conditions, stay on driving path	Head: Hardhat Body: None Foot: Steel toe - ANSI Rated Hand: None Respiratory: None Hearing: Earplugs are required if blower/compressor noise levels exceed 85 dBA Eye/Face: None
3. Observe equipment readings	Slip/trip fall hazards; overhead piping; high noise; dust; possible electrical hazards electrocution)	• Wear hardhat and observe warning signs for electrical and overhead hazards • Observe surroundings and walking surface hazards • Avoid contact with high voltage parts	Same as above
4. Monitor the gas	Gas inhalation; possible high H_2S; explosive gas present	• Stay upwind of vapors • Monitor for LEL in area or use flare detector monitors. Do enter flare station if detector warning lights are activated • Avoid all ignition sources, NO SMOKING!	Same as above
5. Change chart paper or electronic storage disk	Possible exposure to methane and H_2S; electrical hazards	• DO NOT TOUCH electrical parts, only chart recorder • Monitor for H_2S in area if high H_2S gas stream	Same as above

Job Task Safety Analysis and PPE Assessment Form - 05 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
6. Monitor pressure on flare arrestor	Slip/trip hazards; potential gas exposure	• Observe surroundings and walking surfaces for trip or slip hazards • Shut off flare blower if gas is present in area	Same as above
7. Check levels on condensate tank or sump	Lifting hazards, slip/trip/fall hazards; gas present	• Monitor for H_2S if high H_2S gas stream • Observe surroundings and walking surfaces for trip or slip hazards • Lift lid with handle or magnet (use magnet if lid is to heavy to remove with handle) and use caution when lowering or raising lid • Stay upwind when lifting lid off tank	Same as above
End of Form 05			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-06

Task Type (Check all that apply)	**OM&M -** X **Construction -** **Energy -** **Engineering Services -** X	**Task Description** : Heavy Equipment Operation	**Location or Project:** Leichner Landfill **Date:** 07/15/13 **Project #/Revision #:** 04210030.01/Rev.0	
Analysis Team Member		**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail		Project Manager		
Ken Kampfen		Region H&S Specialist		
Special Training Required		Equipment specific Training (as required for type and model of equipment being operated) *Note- "Heavy Equipment Certification", "OSHA Certification" or other job specific certification(s) may be required depending on location, or type of work being performed.* At a minimum, the operator will demonstrate proficiency in the operation of the equipment before beginning work.		
Applicable SAFE Checklist(s): Specify type and category number		Daily Vehicle Inspection Checklist (as applicable) Follow the equipment specific procedures in the Manufactures' Operations Manual for the equipment being used. If not available, obtain from rental vendor, manufacture or on-line,		

Job Task Safety Analysis and PPE Assessment Form-06

Job Task Step	Potential Environmental and Personal Hazards[1]	Critical Actions	PPE Required
Perform Equipment Inspection before use	Do not pinch fingers/ hands in hood doors or other pinch points. Do not smoke near flammable liquids. Use caution when climbing or accessing engine compartment or other elevated areas. (watch for wet or slippery surfaces)	Do not have keys in ignition while performing pre-use inspection. Use appropriate hand and foot holds and steps.	Head Body Foot- Steel-Toe boots Hands –gloves as needed Respiratory Hearing
Inspect all accessories and attachments (hydraulic hoses, fittings, pins, safety guards, chains, control cables, connections and other items as needed)	Watch for slip, trip and fall hazards. Do not contact sharp corners/ items. Do not crush hands/ feet under or between moving items.	Watch for unstable equipment/ items. Do not place hands, legs or body under or between heavy items or pinch points.	Head Body Foot-non slip/ as needed Hand-as needed for sharp items Eyes – safety glasses as needed Hearing
Adjust seat, mirrors, and fasten seat belt	Do not pinch hands or skin in seat belt.	Perform these actions before starting and moving vehicle.	Head Body Foot Hand Respiratory Hearing

Job Task Safety Analysis and PPE Assessment Form-06

Activate "hand-free" & (cell phone) and GPS devices	Set volume at appropriate level so that driver will not be startled. Secure personnel items in proper location(s).	Perform these actions before starting and moving equipment	Head Body Foot Hand Respiratory Hearing

Job Task Step	Potential Environmental and Personal Hazards[1]	Critical Actions	PPE Required
Start vehicle	Ensure all compartments are closed and that no foreign objects are in engine or battery compartment. Keep others away from outside of vehicle Check all controls for proper operation.	Ensure personnel and equipment is clear of vehicle, boom, bucket, forks, wheels and/ or tracks before starting.	Head Body Foot Hand – gloves as needed Respiratory Hearing – ear plugs as needed
Operate vehicle	Follow speed limit, road signs and traffic laws. Use directional signals when changing lanes or turning. Be courteous to other drivers. If driving off-road, pay attention to tilt angles and terrain conditions. Drive straight up and down slopes to reduce chances of roll-over.	Check blind spots When in doubt get out and look to ensure safe passage is possible. Utilize spotter as needed	Head – hard hat for spotter Body- seat belt Foot-non slip/ as needed Hand-as needed for sharp items Eyes – safety glasses as needed Hearing- earplugs as needed

Stop and park vehicle	Do not park in road or in a manner that blocks other needed access points/ areas (set park brake) Turn off lights and battery; disengage all accessories, place boom, bucket, forks, etc. on the ground.	Park in safe, well lighted and designated area	Head Body Foot Hand Respiratory Hearing

[2] See ***Table SOP 4-2*** (below) for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-10

Job Task Safety Analysis Form			
Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Gas system repairs or tie-ins including header pipe repair; as needed basis 2-4 hours per day.	**Location or Project:** Leichner Landfill **Date Revised:** 07/05/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pipe fusion. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 10 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • Implement lockout/tagout procedure. • Identify job duties for each employee, tools required	None
3. Shut off the valves and isolate line.	None	• Ensure Lockout/Tagout is applied.	Head: Hardhat Body: Tyvek coveralls Foot: Steel toe - ANSI Rated Hand: Nitrile or neoprene gloves Respiratory: None, (Use 4 gas Monitor) Hearing: None Eye/face: Safety glasses
4. Disconnect all wellheads from the line being repaired or tied-in	Landfill gas exposure	• Conduct air monitoring for H2S, LEL, O2, and CO to ensure no exceedances • Perform personal monitoring for methyl mercaptan to establish exposure levels • If gas levels above action limits, evacuate line with force air or place a vacuum on line to pull vapors from cut area	Head: Hardhat Body: Tyvek coveralls Foot: Steel toe - ANSI Rated Hand: Nitrile or neoprene gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/face: Safety glasses
5. Excavate soil if necessary	Excavation safety Landfill gas Heavy machinery	• Barricade excavation area • Maintain contact with ground	Head: Hardhat Body: Tyvek coveralls Foot: Steel toe - ANSI Rated

Job Task Safety Analysis and PPE Assessment Form - 10 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
		personnel • Conduct area air monitoring and personal monitoring	Hand: Nitrile or neoprene gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/face: Safety glasses
6. Drill sample port on line being repair and tied in and monitor air	H2S and flammable gases	• Monitor for LEL, 0xygen, and H2S in sample port • Perform personal monitoring for methyl mercaptan to establish exposure levels	Head: Hardhat Body: Tyvek coveralls Foot: Steel toe - ANSI Rated Hand: Nitrile or neoprene gloves Respiratory: None, (Use 4 gas Monitor) Hearing: None Eye/face: Safety glasses
7. Cut the gas system piping and fused new pipe	Landfill gas; hot fusion equipment; chainsaw or hand saws	• Monitor for LEL, O2, H2S • Keeps hands from fusion jaws and hot fusion equipment • Use confined space procedures if above action levels of air contaminants • Refer to pipe fusion JTSA for pipe fusion procedures, hazards, critical actions and PPE	Same as Above
8. Cleanup area and backfill with soil	H2S, CO, landfill gas	• Conduct air monitoring for H2S, LEL, oxygen, CO • Perform personal monitoring for methyl mercaptan to establish exposure levels	Head: Hardhat Body: Tyvek coveralls Foot: Steel-toe ANSI rated boots Hand: Nitrile or neoprene gloves Respiratory: None, (Use 4 gas Monitor) Hearing: None Eye/face: Safety glasses
End of Form 10			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-10B

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** LFG system HDPE Pipe Fusion; as needed, up to 8/hours a day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) Certified Fusion Technician for at least one crew member 2) On-the-job training for operating and calibrating GEM 3) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 10B Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Inspect the fusion machinery	Hot surfaces	• Ensure that the surface is not hot and use gloves when inspect fusion plates	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather gloves Respiratory: None Hearing: None Eye/Face: None
2. Drive fusion equipment to site and lift equipment off vehicle onto ground	Surface hazards, ditches. Lifting ergonomic hazards	• Be aware of surface hazards, recognize all obstructions • Use at least two people to lift generator and equipment off vehicle onto ground, or use a lifting aid such as a backhoe or • Inspect any lifting straps for damage	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather gloves Respiratory: None Hearing: None Eye/Face: None
3. Inspect straps for lifting pipe	None	• Replace any damaged or frayed straps	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: None Eye/Face: None
4. Pick up pipe and insert into fusion machine	Pinch points between pipe and fusion machine; struck by pipe	• Avoid putting hands in jaws or clamps • Be aware of pipe when lifted, do not stand under pipe	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: Earplugs when generator operating Eye/Face: None

Job Task Safety Analysis and PPE Assessment Form - 10B Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
5. Clamp jaws down on pipe and flush	Pinch points on clamps	• Avoid putting hands in jaws or clamps	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: Earplugs when generator operating Eye/Face: None
6. Face both sides of pipe with blades or saws	Struck by face plate; sharp blades or saws; sloped surfaces causing slip hazards	• Avoid putting hands in jaws or clamps • Two people on slope surfaces with pipe greater than 18" diameter to hold face • Avoid contact with blade or saw	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: Earplugs when generator operating Eye/Face: None
7. Set hydraulic pressure and put pipe to iron	Pinch points; sharp jaws on machine	• Avoid putting hands in jaws or clamps • Avoid hot surfaces	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: Earplugs when generator operating Eye/Face: None
8. Fuse pipe with pressure	Pinch points; sharp jaws on machine; hot surfaces	• Avoid putting hands in jaws or clamps • Avoid hot surfaces	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: Earplugs when generator operating Eye/Face: None

Job Task Safety Analysis and PPE Assessment Form - 10B Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
9. Allow pipe to cool	Pinch points; sharp jaws on machine; hot surfaces	• Avoid putting hands in jaws or clamps • Avoid hot surfaces	Head: Hardhat Body: Safety vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: Earplugs when generator operating Eye/Face: None
End of Form 10B			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-12

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** LFG Well Extention 2-4 hrs/day on a quarterly basis as needed	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for PVC pipe construction 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 12 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Drive to the wells and assess the height of well raise and required fittings	Vehicle traffic; road conditions such as uneven slopes	• Wear seat belt • Practice defensive driving • Avoid muddy conditions, stay on driving path, be aware of road conditions • Drive below 15 mph	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: none Respiratory: None Hearing: none Eye/Face: None
2. Profile the well with gas monitoring equipment	H_2S gas, methane	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Stay upwind of well when monitoring	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None Hearing: None Eye/Face: None
3. Determine the level of PPE based on air monitoring results	H_2S gas, methane	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Ensure that gas system is operating under vacuum • Avoid all ignition sources, NO SMOKING!	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: None Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: None
4. Cut the lateral on vacuum side of the well piping and cap pipe	Heavy lifting of piping; cut by reciprocating saws; slip/trip hazards; exposure to H_2S gas, methane	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Ensure guards are on saws, stay away from blade, use safe practices for saw operation (see H&S manual)	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: None

Job Task Safety Analysis and PPE Assessment Form - 12 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
5. Pipe fusion or electrical fusion of piping	Electrical hazards from generator; lifting of fusion equipment	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Inspect cords for damage and keep cords away from traffic • Avoid standing in water and use GFCI on generator or power tools • Use forklifts to lift fusion equipment and generators. If required to manually lift generator, use at least two people to lift generator	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: Safety glasses with side shields or safety goggles
6. Remove the wellhead	Lifting hazards, slip/trip/fall hazards; possible gas exposure	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Observe surroundings and walking surfaces for trip or slip hazards • Increase vacuum on wells in vicinity of raised well • Stay upwind of wells • Check pressure on wells	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None, (Use 4 gas Monitor) Hearing: None Eye/Face: Safety glasses with side shields or safety goggles
7. Prep both sides of pipe by putting glue on ends and prime ends	Fumes from the glue; grinding on pipes, flying particles	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Use grader and power tools safely • Have GFCI for electrical power tools • Inspect cords for damage and keep cords out of traffic • Avoid contact with scraper edge	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: Safety glasses with side shields or safety goggles

Job Task Safety Analysis and PPE Assessment Form - 12 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
8. Glue well side of pipe, and fuse the lateral side of pipe	Fumes from the glue; lifting fusion equipment	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Avoid contact with glue and primer • Use legs to lift piping	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Nitrile or leather gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: Safety Glasses or Facshield
9. Stand up pipe with ladder or manlift	Fall from elevation; slip/trip hazards, lifting piping	• Continuous monitoring to ensure gases (CH4, CO, H2S, O2) are below action levels • Use manlift whenever possible • If manlift is not available, use sturdy ladder with good and sound footing, do not step on top two rungs of ladder. Use caution when handling piping on ladder. • Need to have at least 3 points of contact with ladder at all times	Head: Hardhat Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather or cotton gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: None
End of Form 12			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-15

Task Type (Check all that apply)	Engineering Services **-**	**Task Description** : Quarterly groundwater monitoring	**Location or Project:** Clark County Closed Leichner Landfill **Date: 07-15-2013** **Project #: 0421030.00** **Revision #: 03**	
Analysis Team Member		**Position Title**	**Reviewed by**	**Position Title**
Brian Doan		OHSC, project safety representative	Louis Caruso	Project Manager
David Lamadrid		Sr. Project Scientist		
Tiffany Andrews		Staff Environmental Scientist		
Jason Davendonis		Senior Environmental Scientist		
Brian McMullen		Associate Staff Professional		
Tim Browning		Project Manager		
Special Training Required		Hazwoper with current annual refresher training. Review sampling and health and safety plan.		
Applicable SAFE Checklist(s): Specify type and category number		Engineering services or Bellevue		

Job Task Step	Potential Environmental and Personal Hazards[1,2]	Critical Actions	PPE Required
1. Review & Sign SSHSP/SOP/JTSA		Determine potential hazards at sampling locations.	Eyes: Safety glasses
2. Travel to first well and calibrate equipment.	Awkward moving of equipment from vehicle.	Avoid overreaching and twisting when lifting equipment from vehicle.	Head: hardhat Body: Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots Eyes: safety glasses Hearing: none
3. Access monitoring point.	Biological hazards (insects, spiders). Slip and trip hazards from vegetation, branches, and uneven ground. Awkward moving of equipment from vehicle. Chemical hazards from contaminated groundwater. Compressed gases (N2 or CO2). Slip and trip hazards from vegetation, branches, and uneven ground. Biological hazards (insects, spiders, thorny and poisonous plants, etc.). Cold stress or heat stress depending on weather.	Remain aware of surroundings (weather, animals). Watch for uneven ground. Check probe for signs of insects or spiders and use large stick to remove them. Maintain organized vehicle to make it easier to access equipment. Avoid overreaching and twisting when lifting equipment from vehicle. Use good lifting techniques to move heavy objects. Avoid contact with groundwater. Take breaks and consume fluids and calories as appropriate to avoid cold stress or heat stress. Compressed gases: always handle with care, keep cap in place when travelling, see SCS IIPP appendix for compressed gas safety. Cryogenic hazard with CO2.	Head: hardhat Body: safety vest. Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots Eyes: safety glasses Hearing: none
4. Collect samples	Chemical hazards from preservatives (acids). Chemical hazards from contaminated groundwater. Other hazards per step 3.	Avoid contact with preservatives. Keep preserved bottles away from face when opening and when filling. Avoid contact with groundwater. Wear recommended PPE (gloves, safety glasses). Other Critical	Head: hardhat Body: safety vest. Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots

		actions per step 3.	Eyes: safety glasses Hearing: none
5. Close well and load.	Pinch point at lid. Other hazards per step 3.	Keep hands out of the shut point of the probe monument. Other Critical actions per step 3.	Head: hardhat Body: safety vest. Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots Eyes: safety glasses Hearing: none
6. Mob to next well	Hazards per step 3.	Critical actions per step 3.	Head: hardhat Body: safety vest. Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots Eyes: safety glasses Hearing: none
End of JTSA Form			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-17

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Leachate or condensate sump pump repairs	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating and calibrating GEM & Gas Alarm Action Levels 2) On-the-job-training of Vault Cover Lifting Tools 3) Class C license & permission to operate company vehicle		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 17 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Turn off air source, power, and close shutoff valve. Implement Lockout/Tagout procedure.	- Skin abrasions - Condensate or leachate liquids	• Implement lockout/tagout on all necessary valves, disconnect all electric power to shut flow to pump, including air sources	Head: None Body: Hi-Visibility Shirt (Long Sleeve) Foot: Steel toe - ANSI Rated Knees: none Hand: Rubber or neoprene gloves Respiratory: None (Monitor with GEM for Gas build-up) Hearing: None Eye/Face: Splash goggles
3. Lift lid from vault with metal hooked stick or magnet	- Pinch points when lifting vault lid - Ergonomic lifting hazards	• Use GEM to Monitor (CH4 & O2) in work area. Do not have beathing zone break plane of sump vault - Ventilate area if LEL ≥ 1.25%, or 02 ≤ 19.5% • Avoid using hands to remove vault lid and crushing fingers or hand • Avoid bending back when lifting vault lid	Same as above
4. Drain discharge hose and lift pump from vault using discharge hose	- Muscle & Skeletal Strain - Leachate or condensate liquids -	• Avoid bending back when lifting pump • Drain pump liquids as much as possible. Avoid skin contact with liquids	Same as above

Job Task Safety Analysis and PPE Assessment Form - 17 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
5. Repair pump	- Liquid splash - Electric shock	• Ensure lockout/tagout all power and necessary valves • Avoid skin contact with liquids	Same as above
6. Return pump back to vault using discharge hose	- Lifting hazards	• Do not bend or twist back when lifting pump	Same as above
7. Reverse lockout/tagout and activate pump	-Liquid splash	• Avoid any liquids	Same as above
End of Form 17			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-18

Task Type (Check all that apply)	**OM&M -** ☒ **Construction -** ☐ **Energy -** ☐ **Eng. Services -** ☒	**Task Description (include estimate of task duration in hours/day):** Surface emission monitoring, 4-8/ hours day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member		**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail		Project Manager		
Ken Kampfen		Region H&S Specialist		
Special Training Required		On-the-job training for operating and calibrating Surface Emissions Meter		

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
1. Fill with Hydrogen and Calibrate the Surface Emissions Meter	Compressed Hydrogen Gas; Compressed Methane Calibration Gas	• Avoid any ignition sources (including static electricity generated by sitting in a vehicle – ground yourself) • Calibrate in a well ventilated area • Calibrate in clean area • Ensure that hydrogen cylinder is properly secured during storage • Open hydrogen cylinder valve slowly to avoid automatic ignition	Head: Hardhat Body: None Foot: Steel-toe ANSI boots Hand: None Respiratory: None Hearing: None Eye/Face: Safety Glasses

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
2. Walk on surface path and take readings with Surface Emissions Meter	Weather related stress to your body; snakes; large wildlife (cougars and bears); heavy equipment and vehicles; 20 lb instrument on your back; slips, trips, and falls	• Frequent breaks to avoid heat stress • Liquid hydration • Wear proper clothing in winter that wicks moisture away from the body and protects you extreme cold • Make noise to avoid snakes • Clear brush to avoid snakes and stay on establish walk paths • Be aware of wildlife in the area. Do not approach any animals. Refer to SOP 21 – Safe Procedures for Biological Hazards • Wear high visibility vest or shirt • Use caution when walking on uneven surfaces, around debris, piping, and landfill liner material	Head: Hardhat when working near active face of landfill Body: Snake guards if needed Foot: Steel-toe ANSI boots Hand: Leather gloves Respiratory: None Hearing: None Eye/Face: None

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
Walk on surface path and take readings with Surface Emissions Meter - continued	Weather related stress to your body; snakes; large wildlife (cougars and bears); heavy equipment and vehicles; 20 lb instrument on your back; slips, trips, and falls	• Wear proper slip-resistant footwear for terrain • Be aware of deep cracks in terrain and other trip hazards • Take breaks often to reduce back strain	
3. Indicate hot spots with flags	Same as above	• Same as above	Same as above

Job Task Safety Analysis and PPE Assessment Form-20

Task Type (Check all that apply)	**OM&M -** X **Construction -** **Energy -** **Engineering Services -** X	**Task Description** : Vehicle Operations (Cars and trucks < 10,000 lbs GVW)	**Location or Project:** Leichner Landfill **Date:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member		**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail		Project Manager		
Ken Kampfen		Region H&S Specialist		
Tiffany Andrews		Staff Professional		
Brian McMullen		Associate Staff Professional		
Special Training Required		Valid Drivers License *Note – This JTSA does not address the requirements for the operation of vehicles in excess of 10,000 pounds Gross Vehicle Weight (GVW). If the total weight f the vehicle and trailer exceed 10,000 lbs. additional requirements are necessary.*		
Applicable SAFE Checklist(s): Specify type and category number		Weekly Vehicle Inspection Form		

Job Task Safety Analysis and PPE Assessment Form-20

Job Task Step	Potential Environmental and Personal Hazards[1]	Critical Actions	PPE Required
Perform Vehicle Safety Inspection	Do not pinch fingers/ hands in hood Do not smoke near flammable liquids Use caution/ watch for traffic	Do not have keys in ignition while checking under hood	Head Body Foot Hand Respiratory Hearing
Ensure all equipment & materials are properly secured	Watch for slip, trip and fall hazards Do not contact sharp corners/ items Do not crush hands/ feet under or between moving items	Watch for unstable equipment/ items	Head Body Foot-non slip/ as needed Hand-as needed for sharp items Eyes – safety glasses as needed Hearing
Adjust seat, mirrors, and fasten seat belt	Do not pinch hands or skin in seat belt	Perform these actions before starting and moving vehicle	Head Body Foot Hand Respiratory Hearing
Activate “hand-free” & (cell phone) and GPS devices	Set volume at appropriate level so that driver will not be startled	Perform these actions before starting and moving vehicle	Head Body Foot Hand Respiratory Hearing

Job Task Step	Potential Environmental and Personal Hazards[1]	Critical Actions	PPE Required
Start vehicle	Ensure hood is closed and that no foreign objects are in engine compartment Keep others away from outside of vehicle	Ensure personnel are clear of vehicle and exhaust when starting	Head Body Foot Hand Respiratory Hearing
Drive/ operate vehicle	Follow speed limit, road signs and traffic laws. Use directional signals when changing lanes or turning. Be courteous to other drivers. If driving off-road, pay attention to tilt angles and terrain conditions. Drive straight up and down slopes to reduce chances of roll-over. Avoid mud and water. If lost, pull into safe area to ask directions or revise route.	Check blind spots When in doubt get out and look to ensure safe passage is possible Increase following distance as needed for load and road and weather conditions	Head Body- seat belt Foot-non slip/ as needed Hand-as needed for sharp items Eyes – safety glasses as needed Hearing
Stop and park vehicle	Do not park in road or in a manner that blocks other needed access points/ areas (set park brake) Turn off lights and lock all compartments as needed	Park in safe, well lighted and designated area	Head Body Foot Hand Respiratory Hearing
Properly, store valuables (computer, GPS, GEM etc.)	Use proper lifting techniques	Do not carry too much at one time	Head Body

		Do not leave items in plain view	Foot Hand Respiratory Hearing

[2] See ***Table SOP 4-2*** (below) for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-22

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Flare burner cleaning	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating and calibrating GEM. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 22 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Drive to flare station	Vehicle traffic; road conditions	• Wear seat belt • Practice defensive driving • Avoid muddy conditions, stay on driving path	Head: None Body: None Foot: Steel toe - ANSI Rated Hand: None Respiratory: None Hearing: None Eye/Face: None
2. Obtain tools and equipment from truck	Watch for vehicle traffic, avoid sharp objects and hand crushing hazards, lift properly, Use caution climbing into and out of truck (do not jump)	• Do not reach out to lift, use two hands when needed • Drop tailgate and climb in to get items when needed to avoid injury • Do not carry too much at one time	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: Leather gloves Respiratory: None Hearing: Earplugs are required if blower/compressor noise levels exceed 85 dBA Eye/Face: None
3. Turn off flare	Gas inhalation; possible high H_2S; explosive gas present	• Use H_2S and CH4 personal or area monitors to ensure that the actuator seal and blower inlet valve are fully closed • Follow local shut down procedures and notifications • Avoid all ignition sources, NO SMOKING!	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel toe - ANSI Rated Hand: None Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: None

Job Task Safety Analysis and PPE Assessment Form - 22 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
4. Remove access panel/ open door to burner area	Possible exposure to methane and H_2S; electrical hazards, hand hazards, lifting hazards, eye hazards if cutting bolts. Perform continuous monitoring to ensure safe atmosphere is maintained	• DO NOT TOUCH electrical parts, only flame arrestor • Use caution when removing bolts- hand hazard • Use proper lifting techniques, use two people if needed • Wear safety glasses if cutting bolts • Once bolts loosen allow gases to vent before removing panel/ opening door.	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel-toe ANSI boots Hand: Leather gloves Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: Goggles (if cutting bolts off)
5. Clean and inspect flare burner assembly	Lifting hazard, eye hazard from pressure washer, Slip/trip hazards from wet surface; proper management of waste generated from cleaning. Continue to monitor for safe atmosphere	• Use proper lifting techniques, use two people if needed • Wear face shield when using pressure washer • Properly classify, contain and manage waste generated from cleaning • Replace any damaged parts • Take photographs for records	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel-toe ANSI boots Hand: Leather gloves Respiratory: None(Use 4 gas Monitor) Hearing: Earplugs Eye/Face: Face shield
6. Reinstall door/ access panel	Possible exposure to methane and H_2S; electrical hazards, hand hazards, lifting hazards	• DO NOT TOUCH electrical parts, only flame arrestor • Use proper lifting techniques, use two people if needed • Use caution when installing bolts- hand hazard	Same as Above

Job Task Safety Analysis and PPE Assessment Form - 22 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
7. Restart flare	Gas inhalation; possible high H_2S; explosive gas present	• Use H_2S and CH4 personal or area monitors to ensure that the actuator seal and blower inlet valve are not leaking • Follow local start up procedures and notifications • Avoid all ignition sources, NO SMOKING!	Head: None Body: Hi-Visibility Shirt/Vest Foot: Steel-toe ANSI boots Hand: None Respiratory: None (Use 4 gas Monitor) Hearing: None Eye/Face: None
End of Form 22			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-25

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Sump installation/replacement; as needed basis, up to 8 hours per day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pipe fusion/fitting. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 25 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • Implement lockout/tagout procedure. • Identify job duties for each employee, tools required	None
3. Excavate soil	• Excavation safety • LFG, CO, H2S • Heavy machinery	• Barricade excavation area • Maintain contact with ground personnel • Conduct air monitoring and personnel monitoring	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
4. If replacing, remove existing sump from excavation	• Excavation safety • LFG, CO, H2S • Heavy machinery • Slips, trips, falls • Splash hazard	• Barricade excavation area • Maintain contact with ground personnel • Conduct air monitoring • Wear appropriate PPE • Be aware of slip, trip, fall hazards	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Nitrile gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
5. Install sump	• Same as above	• Same as above	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Nitrile gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses

Job Task Safety Analysis and PPE Assessment Form - 25 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
6. Clean up area and backfill with soil	• Excavation safety • LFG, CO, H2S • Heavy machinery • Heavy lifting or back strain if using jumping jack	• Barricade excavation area • Maintain contact with ground personnel • Conduct air monitoring and personnel monitoring • Rotate work with jumping jack or take rest breaks as necessary	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: Ear plugs with Jumping Jack Eye/face: Safety glasses
7.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
8.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
End of Form 25			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-26

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Blower installation/replacement; as needed basis, up to 8 hours per day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Tim Logan	Senior Project Professional		
Simon Garibaldo	Foreman/Technician		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pipe fusion. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 26 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • Implement lockout/tagout procedure. • Identify job duties for each employee, tools required	None
3. If replacing, remove existing blower	• Electrocution hazard • Heavy machinery • Slips, trips, falls • Biological hazards • LFG, CO, H2S • Back strain for small blowers	• Follow Lockout/Tagout procedures • Maintain contact with ground personnel • Be aware of slip, trip, fall hazards • Be aware of biological hazards • Conduct air monitoring • Use mechanical assistance as needed	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: Earplugs Eye/face: Safety glasses
4. Install blower	• Same as above	• Same as above	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
5.			Head: Body: Foot: Hand: Respiratory: Hearing:

Job Task Safety Analysis and PPE Assessment Form - 26 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
			Eye/face:
6.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
7.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
8.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
End of Form 26			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-27

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Pump installation/replacement; as needed basis up to 8 hours per day.	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pump installation. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 27 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • Implement lockout/tagout procedure. • Identify job duties for each employee, tools required	None
3. Isolate energy sources: includes compressed air or electrical	• Electrocution • Biological hazards • Secondary energy sources	• Wear appropriate PPE and use caution when isolating electrical sources • Follow Lockout/tagout procedures • Be aware of biological hazards when isolating sources; valves, breakers, etc.	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None Hearing: None Eye/face: Safety glasses
4. If replacing, pull existing pump out of well or sump	• Biological hazards • Muscle strain • Splash hazard • Heavy machinery, if necessary • LFG, CO, H2S	• Be aware of biological hazards • Use mechanical assistance if necessary • Wear appropriate PPE • Conduct air monitoring • Use caution if using heavy machinery	Head: Hardhat Body: Tyvek suit Foot: Steel-toe boots Hand: Nitrile gloves Respiratory: None; monitor air Hearing: None Eye/face: Safety glasses
5. Install pump	• Biological hazards • Muscle strain • Splash hazard • Heavy machinery, if necessary • LFG, CO, H2S	• Be aware of biological hazards • Use mechanical assistance if necessary • Wear appropriate PPE • Conduct air monitoring • Use caution if using heavy machinery	Head: Hardhat Body: Tyvek suit Foot: Steel-toe boots Hand: Nitrile gloves Respiratory: None; monitor air Hearing: None Eye/face: Safety glasses

Job Task Safety Analysis and PPE Assessment Form - 27 Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
6.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
7.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
8.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
End of Form 27			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-28

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Header/ Lateral Installation / Replacement	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pipe fusion. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form - 28 HDPE Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • Implement lockout/tagout procedure. • Identify job duties for each employee, tools required	None
3. Fuse pipe together in manageable lengths	• Hot surfaces • Pinch points • Muscle strain from larger diameter pipes • Electrocution	• Keep hands from fusion machine jaws and hot surfaces • Use machinery to lift larger diameter pipes into place • Refer to pipe fusion JTSA for proper procedures, hazards, etc.	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None Hearing: Earplugs Eye/face: Safety glasses
4. Excavate soil if necessary	• Excavation safety • Landfill gas, CO, H2S • Heavy machinery	• Barricade excavation area • Maintain contact with ground personnel • Conduct area air monitoring and personnel monitoring	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
5. Clean up area and backfill with soil if necessary	• Same as above	• Same as above	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses

Job Task Safety Analysis and PPE Assessment Form - 28 HDPE Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
6. Staking of pipe if necessary	• Bodily injury from hammer or jackhammer • Muscle strain • Impalement on stakes/rebar	• Use hand and power tools properly • Rotate work with jackhammer or take rest breaks as necessary • Use OSHA Approved rebar caps on all staking	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None Hearing: None, earplugs with jackhammer Eye/face: Safety glasses
7.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
8.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
End of Form 28 HDPE			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form-28B

Task Type (Check all that apply) ☒ **OM&M** ☐ **Construction** ☐ **Energy** ☒ **Engineering**	**Task Description (include estimate of task duration in hours/day):** Header/lateral installation; as needed basis, up to 8 hours per day	**Location or Project:** Leichner Landfill **Date Revised:** 07/15/13 **Project #/Revision #:** 04210030.00/Rev.03	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Steve Harquail	Project Manager		
Ken Kampfen	Region H&S Specialist		
Special Training/Certification Required (In Addition to IIPP and Site Specific Health & Safety Plan)	1) On-the-job training for operating heavy equipment and pipe fitting. 2) Training on operating, calibrating and using air monitoring equipment such as the 4 gas monitor, and associated Gas Alarm Action Levels		
Applicable SAFE Checklist(s): Specify type and category number	OM&M General SAFE Observation Report & Employee Suggestions		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Safety Analysis and PPE Assessment Form – 28B Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
1. Review & Sign SSHSP/JTSA		• None	None
2. Tailgate safety meeting. Discuss PPE, wind direction, necessary equipment, project scope, tools.	None	• Ensure that possible hazards are discussed, ensure employees are away from gas emissions. • Discuss measures if action levels are exceeded, meeting place for evacuation. • Implement lockout/tagout procedure. • Identify job duties for each employee, tools required	None
3. Excavate Soil if necessary	• Excavation safety • LFG, CO, H2S • Heavy machinery	• Barricade excavation area • Maintain contact with ground personnel • Conduct air monitoring and personnel monitoring	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
4. Stage pipe to be installed	• Slips, trips, falls • Muscle strain • Heavy machinery if necessary • Biological hazards	• Use caution if working on slopes • Use mechanical assistance if needed • Maintain contact with ground personnel if using heavy machinery • Be aware of biological hazards	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None Hearing: None Eye/face: Safety glasses
5. Glue pipe together	• Slips, trips, falls • Muscle strain • Heavy machinery if necessary • Biological hazards • VOCs, LFG, CO, H2S	• Use caution when working on slopes • Use mechanical assistance if needed • Maintain contact with ground personnel if using heavy machinery • Be aware of biological hazards • Conduct air monitoring, including VOC	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Nitrile gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses

Job Task Safety Analysis and PPE Assessment Form – 28B Cont.			
Job Task Step	**Potential Environmental and Personnel Hazards[1,2]**	**Critical Actions**	**PPE Required**
6. Clean up area and backfill with soil if necessary	• Excavation safety • LFG, CO, H2S • Heavy machinery	• Barricade excavation area • Maintain contact with ground personnel • Conduct air monitoring and personnel monitoring	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None, monitor air Hearing: None Eye/face: Safety glasses
7. Staking of pipe if necessary	• Bodily injury from hammer or jackhammer • Muscle strain • Impalement on stakes/rebar	• Use hand and power tools properly • Rotate work with jackhammer or take rest breaks as necessary • Use OSHA Approved rebar caps on all staking	Head: Hardhat Body: Hi-vis shirt or vest Foot: Steel-toe boots Hand: Leather gloves Respiratory: None Hearing: None, earplugs with jackhammer Eye/face: Safety glasses
8.			Head: Body: Foot: Hand: Respiratory: Hearing: Eye/face:
End of Form 28 PVC			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

Job Task Safety Analysis and PPE Assessment Form
Groundwater Well Installation

Job Task Safety Analysis Form			
Task Type: Engineering Services	**Task Description** Installation/Decommission of groundwater wells	**Location or Project:** Clark County Closed Leichner Landfill	
		Date: 07-15-2013	
		Project #: 0421030.00 **Revision #: 03**	
Analysis Team Member	**Position Title**	**Reviewed by**	**Position Title**
Brian Doan	OHSC, project safety representative	Louis Caruso	Project Manager
David Lamadrid	Sr. Project Scientist		
Tiffany Andrews	Staff Environmental Scientist		
Jason Davendonis	Senior Environmental Scientist		
Special Training Required:	Hazwoper with current annual refresher training. Review sampling and health and safety plan.		
Applicable SAFE Checklist(s):	Engineering services or Bellevue		

This form is the certification that the hazard assessment has been performed for the workplace as required under 29 CFR 1910.132.

Job Task Step	Potential Environmental and Personal Hazards[1]	Critical Actions	PPE Required
1. Review & Sign SSHSP/JTSA	None	None	None
2. Mark drilling locations	Traffic hazards; slip/trip hazards	Watch for slip/trip hazards such as potholes, hidden logs under heavy vegetation Set up traffic cones or barriers if working near traffic or heavy machinery	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves available Respiratory: None Hearing: None Eye/face: Safety glasses
3. Call Underground-Utility Locating Center. Consider also contacting local utility and pipeline locator and locate utilities and piping	Electrical hazards; gas/sewer lines rupturing if piping and utilities not properly located	Ensure all piping and utilities are properly marked and located. Gather any available location diagrams	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: None Respiratory: None Hearing: None Eye/face: Safety glasses
4. Driller mobilization of equipment	Overhead power lines; steep slopes or hills	Identify smooth path of travel to each drilling location Maintain required distance between drilling machine and overhead power lines (at least	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves Respiratory: None

		10 feet for conventional power lines), increase distance if wet or humid conditions	Hearing: None Eye/face: Safety glasses
Job Task Step	**Potential Environmental and Personal Hazards[1]**	**Critical Actions**	**PPE Required**
5. Delineation of work zone	Traffic hazards	Set up barricade fencing or traffic cones around drilling location	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves available Respiratory: None Hearing: None Eye/face: Safety glasses
6. Drilling (well installation or decommissioning)	Flying particles; organic vapors; chlorinated solvents; noise	Confer with driller before starting work about safe practices around drill rig. Monitor for air contaminants as specified in H&S plan. Use PID for organic and chlorinated solvents, and color-indication tube if benzene may be present.	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves available Respiratory: None, APR available if air monitoring action levels are exceeded Hearing: Earplugs or ear muffs when the rig is drilling Eye/face: Safety glasses
7. Collect geological sample or soil sample	Moving machinery; organic or chlorinated hydrocarbon vapors.	Monitor for organic vapors or other site contaminants as specified in H&S plan. Stay upwind of any vapors Avoid getting hit by drill rod or drilling machine, allow machine to stop before collecting sample. Wear gloves when collecting soil sample.	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves available Respiratory: None, APR available if action levels of air monitoring devices are exceeded Hearing: Earplugs or ear muffs when the rig is drilling Eye/face: Safety glasses

8. Monitoring Well Construction	Airborne silica hazard from silica sand. Ergonomic hazard from lifting bags of bentonite and sand.	Use good lifting techniques to lift bags. Avoid overreaching and twisting when lifting. Avoid breathing airborne silica by maintaining distance from drill rig.	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves Respiratory: None Hearing: None Eye/face: Safety glasses
9. Remove surface features	Heavy equipment. Ergonomic hazards from digging out or lift bollards, monuments, etc.	Stay back from and out of the swing radius of any heavy equipment. Use equipment to load materials and wastes to the extent possible.	Head: Hard hat Body: Hi-vis safety vest Foot: ANSI safety boots Hand: Leather gloves Respiratory: None Hearing: None Eye/face: Safety glasses
End of JTSA Form			

Job Task Safety Analysis and PPE Assessment Form
Stormwater Monitoring

Job Task Safety Analysis Form **Storm Water Sampling**				
Task Type (Check all that apply)	Engineering Services **-**	**Task Description** : Storm water sampling during a qualifying storm event.	**Location or Project:** Clark County Closed Leichner Landfill	
			Date: 7-15-2013	
			Project #: 0421030.00 **Revision #: 03**	
Analysis Team Member		**Position Title**	**Reviewed by**	**Position Title**
Brian Doan		OHSC, project safety representative	Louis Caruso	Project Manager
David Lamadrid		Sr. Project Scientist		
Tiffany Andrews		Staff Environmental Scientist		
Jason Davendonis		Senior Environmental Scientist		
Simon Garibaldo		Senior Technician		
Brian McMullen		Associate Staff Professional		
Tim Browning		Project Manager		
Special Training Required		Hazwoper with current annual refresher training. Review sampling and health and safety plan. Prefer ability to swim.		

Job Task Safety Analysis and PPE Assessment Form
Stormwater Monitoring

Job Task Safety Analysis Form **Storm Water Sampling**	
Applicable SAFE Checklist(s): Specify type and category number	Engineering services or Bellevue

Job Task Step	Potential Environmental and Personal Hazards[1,2]	Critical Actions	PPE Required
1. Review & Sign SSHSP/SOP/JTSA		Determine potential hazards at sampling locations.	None required
2. Access sample area near water body during storm event.	Slip/trip hazards due to Slip and trip hazards from vegetation, branches, and wet and possibly spongy ground. Biological hazards (insects, spiders, thorny and poisonous plants, etc.). Drowning. Cold stress depending on weather	Find an area with firm ground and minimal slip hazards. Wear personal flotation device. Use good lifting techniques to move heavy objects such as coolers. Remain aware of surroundings (traffic, weather, animals). If clearing route with machete, wear thick leather gloves to protect hands from thorns and poisonous plants. Safety glasses are mandatory. Watch for uneven ground. Be aware that vegetation will make ground appear more even than it is. Take breaks and consume fluids and calories as appropriate to avoid cold stress.	Head: hardhat Body: safety vest and personal flotation device. Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots, waders as needed Eyes: Safety glasses Hearing: none
3. Collect surface water sample.	Hazards per step 2.	Use bailer, extension rod, or dipper to collect samples, avoid getting too close to the bank or into the water. Other critical actions per step 2.	Head: hardhat Body: safety vest and personal flotation device. Hand: Nitrile gloves Foot: ANSI boots or rubber ANSI boots, waders as needed Eyes: Safety glasses Hearing: none

4. Prepare samples to be shipped to lab.	Take care in handling samples. Chemical hazards from preservatives (acids).	Avoid contact with preservatives. Keep preserved bottles away from face when opening and when filling. Avoid contact with surface water. Wear recommended PPE (gloves, safety glasses). Follow proper guidelines for shipping samples.	Head: none required Body: none required Hand: Nitrile gloves Foot: none required Eyes: Safety glasses Hearing: none
End of JTSA Form			

[1] See SCS Injury Illness and Prevention Plan *Table SOP 4-1* for examples of Environmental Hazards.
[2] See SCS Injury Illness and Prevention Plan Table SOP 4-2 for examples of Personal Hazards.

APPENDIX B

Example Field Forms
(Field Sampling Data Sheet, Chain of Custody Form, Industrial Stormwater Monthly Inspection Report)

FIELD SAMPLING DATA SHEET *(EXAMPLE ONLY)*

SCS ENGINEERS

14945 SW Sequoia Parkway, Suite 180,
Portland, OR 97224

Office: 503.639.9201 Fax: 503.684.6984

PROJECT NAME: Leichner Landfill **WELL ID:**

SITE ADDRESS: 9411 NE 94th Avenue, Vancouver, WA 98662 **BLIND ID:**

DUP ID: **NA**

WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
WEATHER:	SUNNY		CLOUDY		RAIN		?		**TEMPERATURE:**	° F . ° C	

[Circle appropriate units]

HYDROLOGY/LEVEL MEASUREMENTS (Nearest 0.01 ft)

Date	Time	DT-Bottom	DT-Product	DT-Water	[Product Thickness] DTP-DTW	[Water Column] DTB-DTW		[Water Column x Gal/ft] Volume (gal)
/ /	:	.	.	.	.	.	X 1	.
/ /	:	.	.	.	.		X 3	.

Gal/ft = $(dia./2)^2$ x 0.163	1" = 0.041	2" = 0.163	3" = 0.367	4" = 0.653	6" = 1.469	10" = 4.080	12" = 5.875

§ METHODS: (A) Submersible Pump (B) Peristaltic Pump (C) Disposable Bailer (D) PVC/Teflon Bailer (E) Dedicated Bailer (F) Dedicated Pump (G) Other =

GROUNDWATER SAMPLING DATA (if product is detected, do NOT sample) Sample Depth: [√ if used]

Bottle Type	Date	Time	Method §	Amount & Volume mL	Preservative [circle]	Ice	Filter	pH	√
VOA Glass	/ /	:			40 ml	HCl	YES	NO		
Amber Glass	/ /	:			250, 500, 1L	(None) (HCl) (H_2SO_4)	YES	NO		
White Poly	/ /	:			250, 500, 1L	None	YES	NO	NA	
Yellow Poly	/ /	:			250, 500, 1L	H_2SO_4	YES	NO		
Green Poly	/ /	:			250, 500, 1L	NaOH	YES	NO		
Red Total Poly	/ /	:			125, 250, 500	HNO_3	YES	NO		
Red Diss. Poly	/ /	:			250, 500, 1L	HNO_3	YES	YES		
	/ /	:			250, 500, 1L		YES			

White no acid, Yellow H2SO4, Red HNO3 Total Bottles (include duplicate count):

Analysis Allowed per Bottle Type

BOTTLE TYPE	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
VOA - Glass	(8260) (8011) OR [ ] WA [ ]
AMBER - Glass	(8080) (8150) (TOX) OR [ ] WA [ ]
WHITE - Poly	(pH) (Conductivity) (TDS) (TSS) (Alkalinity) (HCO_3/CO_3) (Cl) (SO_4) (Silica, T.) (NO3)
YELLOW - Poly	(COD) (TOC) (NH_3) (NO_3/NO_2) (Tannin/Lignin)
GREEN - Poly	(Cyanide)
RED TOTAL - Poly	(As) (Sb) (Ba) (Be) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hardness)
RED DISSOLVED - Poly	(Ca) (Fe) (Mg) (Mn) (K) (Na)

WATER QUALITY DATA Purge Start Time: : Pump/Bailer Inlet Depth:

Meas.	Method §	Purged (gal)	pH	ORP	E Cond (µS)	°F Temp °C	DTW	Diss O_2 (mg/l)	Water Quality
0		**0.00**	.			.	.	.	
1		.	.			.	.	.	
2		.	.			.	.	.	
3		.	.			.	.	.	
4		.	.			.	.	.	
5		.	.			.	.	.	
6			.			.	.	.	

[Casing] [Select A-G] [Cumulative Totals] [Circle units] [Clarity, Color]

SAMPLER: _____ _____

(PRINTED NAME) (SIGNATURE)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT:

INVOICE TO:

REPORT TO:
ADDRESS:

PHONE: FAX:

P.O. NUMBER:

PROJECT NAME:

PROJECT NUMBER:

SAMPLED BY:

PRESERVATIVE

REQUESTED ANALYSES

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses

10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses

5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify:

** Turnaround Requests less than standard may incur Rush Charges.*

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:
RELEASED BY:		DATE:	RECEIVED BY:		DATE:
PRINT NAME:	FIRM:	TIME:	PRINT NAME:	FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE OF

TAL-1000(0408)

Environmental Consultants
and Contractors

14945 SW Sequoia Parkway
Suite 180
Portland, OR 97224

503 639-9201
FAX 503 684-6948
www.scsengineers.com

SCS ENGINEERS

LEICHNER LANDFILL *(EXAMPLE ONLY)*
INDUSTRIAL STORMWATER MONTHLY INSPECTION REPORT

FACILITY NAME: Leichner Landfill	**INSPECTION TIME:** **DATE:**

WEATHER INFORMATION:

- Description of Weather Conditions (e.g., sunny, cloudy, raining, snowing, etc.):

  _____

  _____

- Was stormwater (e.g., runoff from rain or snowmelt) flowing at outfalls and/or discharge areas shown on the Site Map during the inspection: ☐ **Yes** ☐ **No** ☐ Comments: **Stormwater discharge is controlled with pumps in the onsite detention ponds. The pumps are operated with automatic water-level activation.**

  _____

  _____

I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION

	Yes	No	Findings and Remedial Action Documentation:
SWPPP and Site Map: Have a copy of the SWPPP and site map with you during the inspection so that you can ensure they are current and accurate. Use it as an aide in recording the location of any issues you identify during the inspection.			**(Note: An updated SWPPP dated May 2011 is filed on site in the flare station air compressor shed. The SWPPP was prepared by SCS Engineers.)**
• Is the Site Map current and accurate?	☐	☐	
• Is the SWPPP inventory of activities, materials and products current?	☐	☐	
Any new potential pollutant sources must be added to the map and reflected in the *SWPPP Facility Assessment & Tables 2, 2A, 3 and 5.*			**Initials** _____

	Yes	No	NA	Findings and Remedial Action Documentation:
Vehicle/Equipment Areas:				**(Note: There are no onsite vehicle/equipment cleaning or fueling areas.)**
Equipment cleaning: Check NA if not performed on-site. Skip section.				
Is equipment washed and/or cleaned only in designated areas?	☐	☐	☐	
• Observe washing: Is all wash water captured and properly disposed of?				
Equipment fueling: Check NA if not performed on-site. Skip section.				
• Are all fueling areas free of contaminant buildup and evidence of chronic leaks/spills?	☐	☐	☐	
• Are all chemical liquids, fluids, and petroleum products, on an impervious surface that is surrounded with a containment berm or dike that is capable of containing 10% of the total enclosed tank volume or 110% of the volume contained in the largest tank, whichever is greater?	☐	☐	☐	
• Are structures in place to prevent precipitation from accumulating in containment areas?	☐	☐	☐	
o If not, is there any water or other fluids accumulated within the containment area?				
o Note: If containment areas are not covered to prevent water from accumulating, the SWPPP must include a plan describing how accumulated water will be managed and disposed of.				**Initials** _____

Equipment maintenance:	Yes	No	NA	Findings and Remedial Action Documentation:
• Are maintenance tools, equipment and materials stored under shelter, elevated and covered?	☐	☐	☐	**(Note: Minor quantities of equipment maintenance fluids [less than 10 gallons combined] are stored in the flare station air compressor shed which is fully enclosed. There are no drums at the site.)**
• Are all drums and containers of fluids stored with proper cover and containment?	☐	☐	☐	
• Are exteriors of containers kept outside free of deposits?	☐	☐	☐	
• Are any vehicles and/or equipment leaking fluids? Identify leaking equipment.	☐	☐	☐	
• Is there evidence of leaks or spills since last inspection? Identify and address.	☐	☐	☐	
• Are materials, equipment, and activities located so that leaks are contained in existing containment and diversion systems (confine the storage of leaky or leak-prone vehicles and equipment awaiting maintenance to protected areas)?	☐	☐	☐	
Add any additional site-specific BMPs: _____ _____ _____				**Initials _____**

I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION				
Good Housekeeping BMPs:	**Yes**	**No**	**NA**	Findings and Remedial Action Documentation:
1. Are paved surfaces free of accumulated dust/sediment and debris?	☐	☐	☐	**(Note: There are no paved surfaces at the site.)**
• Date of last quarterly vacuum/sweep _				
• Are there areas of erosion or sediment/dust sources that discharge to storm drains?				
2. Are all waste receptacles located outdoors:	☐	☐	☐	
• In good condition?				
• Not leaking contaminants?				
• Closed when is not being accessed?				
• External surfaces and area free of excessive contaminant buildup?				
3. Are the following areas free of accumulated dust/sediment, debris, contaminants, and/or spills/leaks of fluids?	☐	☐	☐	
• Flare Station Area				
• Other areas of industrial activity: _____ _____ _____ _____ _____				**Initials _____**

Spill Response and Equipment:	**Yes**	**No**	**NA**	Findings and Remedial Action Documentation:
Are spill kits available, in the following locations?	☐	☐	☐	**(Note: If generated, contaminated absorbent materials will be properly disposed offsite.)**
• Equipment maintenance/storage areas				
Do the spill kits contain all the permit required items?	☐	☐	☐	
• Oil absorbents capable of absorbing 15 gallons of fuel.				
• A storm drain plug or cover kit. **(NA)**				
• A non-water containment boom, a minimum of 10 feet in length with a 12 gallon absorbent capacity.				
• A non-metallic shovel.				
• Two five-gallon buckets with lids.				
Are contaminated absorbent materials properly disposed of?	☐	☐	☐	
				Initials _____

I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION

General Material Storage Areas:	**Yes**	**No**	**NA**	Findings and Remedial Action Documentation:
• Are damaged materials stored inside a building or another type of storm resistance shelter?	☐	☐	☐	**(Note: Landfill condensate is temporarily stored in an outdoor, covered, double-walled poly tank located at the flare station area.)**
• Are all uncontained material piles stored in a manner that does not allow discharge of impacted stormwater?	☐	☐	☐	
• Are scrap metal bins covered?	☐	☐	☐	
• Are outdoor containers covered?	☐	☐	☐	
				Initials _____

Stormwater BMPs and Treatment Structures: Visually inspect all stormwater BMPs and treatment structures devices, discharge areas infiltration and outfalls shown on the Site Map.	**Yes**	**No**	**NA**	Findings and Remedial Action Documentation:
• Are BMPs and treatment structures in good repair and operational?	☐	☐	☐	
• Are BMPs and treatment structures free from debris buildup that may impair function?	☐	☐	☐	
• The permit requires Permittees to clean catch basins when the depth of debris reaches 60% of the sump depth. In addition, the Permittee must keep the debris surface at least 6 inches below the outlet pipe. Based on this, do catch basins need to be cleaned?	☐	☐	☐	
• Are berms, curbing or other methods used to divert and direct discharges adequate and in good condition?	☐	☐	☐	
				Initials _____

Observation of Stormwater Discharges:	**Yes**	**No**	**NA**	Findings and Remedial Action Documentation:
• Is the discharge free of floating materials, visible oil sheen, discoloration, turbidity, odor, foam or any other signs of contamination?	☐	☐	☐	**(Note: Landfill condensate is temporarily stored in double-walled poly tank located at the flare station area, and routinely transported and disposed offsite.)**
• Water from washing vehicles or equipment, steam cleaning and/or pressure washing is considered process wastewater and is not allowed to comingle with stormwater or enter storm drains. Is process water comingling with stormwater or entering storm drains?	☐	☐	☐	
• Illicit discharges include domestic wastewater, noncontact cooling water, or process wastewater (including leachate). Were any illicit discharges observed during the inspection?	☐	☐	☐	
				Initials _____

II. CORRECTIVE ACTION AND SWPPP MODIFICATIONS DESCRIPTIONS: Additional space to describe inspection findings and corrective actions if needed. Provide brief explanation of the general location and the rationale for the additional or different BMPs.

III. CERTIFICATION STATEMENTS AND SIGNATURES:

Inspector - Certification: This section must be completed by the person who conducted the site inspection prior to submitting this form to the person with signature authority (see Permit Condition G2) or a duly authorized representative of that person.

☐ The facility is in compliance with the terms and conditions of the SWPPP and the Industrial Stormwater General Permit.

☐ The facility is out of compliance with the terms and conditions of the SWPPP and the Industrial Stormwater General Permit. This report includes the remedial actions that must be taken to meet the requirements of the SWPPP and permit, including a schedule of implementation of the remedial actions.

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief."

Inspector's Name – Printed	**Inspector's Signature**	**Inspector's Title**	**Date**

Permittee – Certification:

☐ The facility is in compliance with the terms and conditions of the SWPPP and the Industrial Stormwater General Permit.

☐ The facility is out of compliance with the terms and conditions of the SWPPP and the Industrial Stormwater General Permit. This report includes the remedial actions that must be taken to meet the requirements of the SWPPP and permit, including a schedule of implementation of the remedial actions.

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

PRINTED NAME of person with **Signature Authority** (permit condition G2.A) or a **Duly Authorized Representative**[1]	SIGNATURE of person with **Signature Authority** (permit condition G2.A) or a **Duly Authorized Representative**[1]	**DATE**

[1]A person is duly authorized representative only if 1) the authorization is made in writing by a person described in Permit Condition G2.A and submitted to Ecology, and 2) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated *facility*, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.