Part III

Attachment III-F

Appendix III–F.2

GROUNDWATER SAMPLING AND ANALYSIS PLAN

Pescadito Environmental Resource Center

MSW No. 2374

Webb County, Texas

PESCADITO
ENVIRONMENTAL RESOURCE CENTER

March 2015

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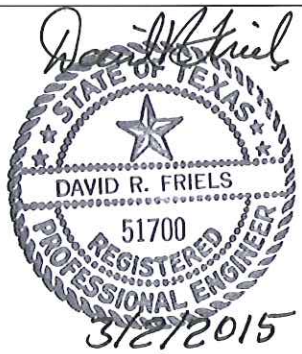

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1.0 INTRODUCTION

The procedures outlined in this document were developed as guidance for the sampling and analysis of groundwater at the Pescadito Environmental Resource Center (PERC), MSW Permit No. 2374. This Groundwater Sampling and Analysis Plan (GWSAP) was prepared as required by 30 Texas Administrative Code (TAC) Chapter 330.63(f) and to comply with 330 TAC Subchapter J (as adopted on March 27, 2006). Procedures, techniques, and provisions provided herein are consistent with those specified in 30 TAC §330.405(b) to ensure an accurate representation of groundwater quality at the background and point of compliance wells at the PERC. An approved copy of the GWSAP will be kept in the facility's operating record as part of the Site Development Plan. Groundwater monitoring must be conducted throughout the active life and any required post-closure care period.

The PERC is located in Webb County, Texas, approximately 20 miles east of Laredo. The landfill is permitted to accept Type I Municipal Solid Waste and Industrial Class 1 Non Hazardous Waste, both Solid and Liquid Waste.

2.0 GROUNDWATER SAMPLING PROCEDURES

The sampling procedures contained herein are designed to allow the collection of representative groundwater samples at each monitor well location. These procedures should be observed by all personnel conducting groundwater monitor well sampling activities at the PERC.

2.1 Field Setup

Prior to purging and sampling activities and at least daily during sampling activities, all water quality (pH, specific conductivity, and temperature) measurement instruments will be calibrated according to the manufacturer's recommendations. All non-dedicated equipment used in the purging and sampling process will be properly decontaminated prior to arriving at the site using methods prescribed in Section 2.10. Insect repellent, sun screen, or other topical skin applications that may contain organic compounds should not be applied near monitor wells or during purging and sampling activities.

2.2 Well Integrity

Prior to purging, each monitor well will be visually inspected for integrity concerns. A visual inspection will be conducted to insure that the:

- monitor well is properly labeled;
- outer protective casing is intact, and not damaged or excessively corroded;
- concrete pad is intact (no evidence of significant cracking or erosional undercutting);
- padlock is functional;
- inner casing is intact; and
- inner casing is properly capped

Any of the above (or other relevant) concerns identified during the visual inspection will be documented by field personnel and will be reported to site personnel and repairs will be conducted as necessary. Photographs of the review may be made to assist in the documentation.

2.3 Depth to Water Measurements

Prior to purging each monitoring well, the depth to water will be measured from a permanently marked reference point of known elevation on the top of the inner monitor well casing. The depth to water will be recorded to the nearest one-hundredth of a foot. Per §330.405(b)(2), the depth to water measurements should be collected over a period of time short enough to avoid temporal variations in groundwater elevation. The total depth of the monitor wells should be measured periodically to assess potential sediment accumulation within the well casing. The water level indicator will be properly decontaminated between each monitor well following the procedures specified in Section 2.10.

2.4 Monitor Well Purging

The purpose of purging a monitor well is to remove stagnant water from the well casing and allow representative formation groundwater to accumulate within the well casing for sample collection. Monitor wells should be purged in order from highest to lowest groundwater elevations (i.e. upgradient to downgradient), or if contamination is known to be present, least contaminated to most contaminated, or an alternative procedure approved by the TCEQ. Purging may be accomplished by either removing three (3) well volumes or by "Low-Flow" techniques.

Care will be taken during purging to avoid introducing contaminants to the water in the well. All non-dedicated and non-disposable equipment used during purging will be decontaminated in accordance with the Equipment Decontamination section prior to use at the next monitor well. Clean equipment will be kept off the ground to prevent contamination by placing disposable plastic sheeting around each well before purging and sampling. The sheeting will be dedicated for each individual well and will not be reused at other well locations. A new pair of disposable gloves will be donned prior to purging each monitor well to reduce the possibility of cross-contamination between wells.

The water removed from each well during purging and decontamination water will be stored in dedicated drums placed next to each monitor well for proper disposal. The purge water may be disposed in the Landfill's Liquid Waste Solidification Facility or may be held until analytical data is reviewed to allow disposal of the water in a manner consistent with TCEQ directives.

Data collected prior to sampling will be recorded in the project field book, or on the field data sheet and will include weather conditions, the initial depth to water, measured well depth, height of the water column, well volume, pump and tubing volume, purging discharge rate, well purging time, and volume of water purged from the well. In addition, physical groundwater characteristics such as pH, conductivity, temperature, and turbidity readings will also be recorded for each well.

2.4.1 Purging Three Well Volumes

For removal of three well volumes, the volume of water to be purged for one well volume can be calculated using the following formula:

V = (Total Depth – Depth to Water) x Gallons of Water per Foot (dependent upon well diameter)*

Where:

V = (1) well volume

*Gallons of Water per Foot = 0.163 for a 2" diameter well

0.653 for a 4" diameter well

Purging will be considered complete once a minimum of three (3) well volumes of water have been removed from the well or until dry. Any monitor well that is purged dry should be allowed to sufficiently recharge prior to the collection of groundwater samples. If the well is purged until dry, a recovery time of up to seven days between purging and sampling will be allowed, before declaring the well to be dry. Purged volumes may be measured using a calibrated bucket or drum. Purging will be accomplished with portable or dedicated pumps. However, if the pump is deemed inoperable, monitor wells may be purged using a bailer as an appropriate alternative. Sampling will be performed as specified below in the Sample Collection Section.

2.4.2 Low-Flow Purging

Purging and sampling may also be conducted using low-flow purging and sampling (also known as "minimal drawdown" or "micro-purge" sampling). The purpose of this technique is to sample the well with minimal disturbance in order to obtain the most representative

groundwater sample. The well is purged at a low rate until field parameters stabilize, and then a sample is obtained immediately.

Purging and sampling will be conducted using dedicated low-flow pumps installed in each well. The well will be purged at approximately 0.1 to 0.5 liter/minute (the appropriate rate depends on the drawdown; additional discussion follows). Pumping rate may be adjusted as described below. The purged liquid will be pumped through a flow cell device that will be used to continuously monitor specific conductivity, pH, and temperature. Purging will be conducted until three consecutive readings spaced approximately three minutes apart indicate stabilization (i.e., pH = $\pm$ 0.2 units and conductivity $\pm$ 3%), and the minimum purge volume of two pump and tubing volumes have been removed. Sampling will then be conducted at the same flow rate as purging. All measurements and observations made during purging will be recorded in a log book or appropriate form.

Pumping rate will be adjusted as necessary based on the observed drawdown in the well. Drawdown will be measured and recorded approximately every two minutes during purging until water level stabilization, using an electric water level indicator capable of providing water level measurements within 0.01 foot or equivalent device. Pumping rate will be adjusted to maintain a maximum drawdown goal of 0.2 feet. The pumping rate will be adjusted as necessary for each well. Pumping rate will be determined with a graduated cylinder and a timer such as a watch. If drawdown in excess of 0.2 feet occurs, the well will be purged until 3 well volumes are removed or the well is dry, followed by sampling. If the well is purged until dry, a recovery time of up to seven days between purging and sampling will be allowed, before declaring the well to be dry. (Pumping rate can be increased as necessary under these circumstances to accomplish purging until dry or obtaining three well volumes.)

As noted above, groundwater will be purged through a flow cell device to continuously measure temperature, specific conductance, and pH. Due to temperature differential inherent between the groundwater and atmosphere, the temperature must be measured immediately after retrieval from the wells. Next, the sampler will measure the specific conductivity of the sample, then pH. Groundwater characteristics such as color, odor, foaming, presence of more than one phase of liquid (if any), and turbidity of the sample may also be noted in the log book or field data sheet. The equipment used for field measurements will be calibrated at least daily during sampling. Provisions will be made for backup equipment to be available in the event of primary equipment failure.

2.5 Sample Collection

Groundwater samples will be collected within 48 hours of purging three well volumes (recovery time may be extended up to 7 days with prior TCEQ approval). If sampling with low-flow procedures, the sample will be collected immediately following purging. Monitor wells should be sampled in order from highest to lowest groundwater elevation (i.e. upgradient to downgradient), or if contamination is known to be present, least contaminated to most contaminated, or an alternative procedure approved by the TCEQ. To collect representative groundwater samples in accordance with §330.283(c), monitor wells will be sampled using the following procedures:

- For sampling with a bailer, lower the bailer slowly and gently into the water column. Do not allow the bailer to "free fall" down the well. Care must be taken not to agitate the water column to avoid the collection of non-representative groundwater samples. Slowly remove the bailer from the well and transfer the water into the appropriate sample containers.
- If sampling with a dedicated pump, the pump discharge rate should be lowered to as close as practical to 0.1 L/min for collection of VOCs and 1 L/min for metals and other inorganic parameters.
- Measure the temperature, specific conductance, and pH of the groundwater in a container not to be used for laboratory analysis and record the data in a field log book or on a field data sheet.

- If groundwater samples will be collected by means of dedicated low-flow pumps, as described in the well purging section, samples can be collected immediately upon parameter and water level stabilization using the same flow rate as used for purging (i.e., between 0.1 to 0.5 liter/minute). Field measurements during sampling should be consistent with the measurements during purging.
- Under normal conditions, the sample bottles should filled in the order of decreasing volatilization sensitivity. Generally, that will be in the following order, as practical:
  - Volatile organic compounds
  - Total metals
  - Dissolved metals (if collected)
  - Other inorganic constituents (if collected)

Groundwater samples should be collected directly from the pump discharge tubing, and field filtering of samples will not be allowed. Filling the VOC sample containers requires extra care. VOCs should be collected in 40-milliliter glass vials with Teflon® lined caps. The groundwater should be collected directly from the pump discharge tubing into each 40-millileter glass vial until a positive meniscus is formed over the top of the vial. After the cap has been placed on the vial and tightened, the vial should be checked for air bubbles by turning the vial upside down and gently tapping with your finger.

Consistent with Section 2.4 (Monitor Well Purging), groundwater samples may be collected using bailers. If bailers are used during sampling, they should be dedicated to each well, or if disposable bailers are used, they should be discarded following sample collection. Samples will be collected by transferring groundwater from the bailer directly into the sample containers. Per §330.405(c), no groundwater samples shall be field filtered prior to laboratory analysis.

2.6 Sample Containers and Labeling

Groundwater samples will be collected in laboratory grade pre-cleaned bottles of appropriate size and material for analysis of the required parameters. In accordance with §330.283, a list of parameters and corresponding typical containers, preservation, holding times, and minimum

volumes required for analysis are provided in Table III-F.2.1. Sample containers must be marked as described below.

Sample labels are to be affixed to each sample container and must contain the following information in waterproof ink:

- Project name (includes site name)
- Sample and well number
- Date and time of sample collection
- Type of preservatives added
- Analysis to be performed
- Special handling instructions and/or checklist

Quality control/quality assurance samples, such as trip and equipment blanks, will be labeled accordingly. Well duplicates, will be labeled as such. However, to evaluate laboratory precision, the monitor well at which the duplicate sample was collected will only be recorded in the field log book or on the field data sheet, and not on the sample container label itself.

2.7 Sample Preservation and Shipment

Several of the constituents to be analyzed require chemical preservation prior to laboratory analysis. Typical preservation requirements for organic and inorganic constituents are listed in Table 1.

Once collected, the groundwater sample containers will be placed in an insulated container and packed with sufficient ice to prevent breakage and maintain the temperature as nearly as practical to 4°C while in the field and during sample shipment/transport. Dry ice should not be used to chill the samples. Samples will be shipped/transported to the laboratory under proper chain-of-custody as soon as practical following the completion of sampling activities.

2.8 Quality Assurance and Quality Control

To document that sample collection and handling procedures used in the field have not affected the quality of groundwater samples, a trip blank and equipment (or rinsate) blank will be prepared and analyzed. The blanks collected during groundwater sampling activities should consist of the following:

- One (1) Trip Blank per sampling event
- One (1) Equipment Blank per sampling event

A trip blank is prepared by filling a sample container with laboratory-grade de-ionized water (typically prepared by the laboratory), transporting the container to the site, handling it as a sample, and transporting it back the laboratory accompanying the collected groundwater samples for analysis.

An equipment blank is typically prepared by pouring laboratory-grade de-ionized water through or over the sampling device in the field prior to being used for sample collection into a sample container. An equipment blank is collected to determine if contamination is present on the sampling equipment prior to the collection of groundwater samples.

Duplicates are prepared by collecting an additional set of samples from a well using the same equipment used for the collection of samples. A field duplicate is collected to evaluate laboratory precision. One (1) duplicate should be collected per sampling event.

Duplicates will be analyzed for detection monitoring constituents listed in Table III-F.2-1. Trip and equipment blanks will be analyzed for VOCs only.

2.9 Chain-of-Custody Documentation

A chain-of-custody (COC) form will be maintained to document possession and handling of samples from field collection through laboratory analysis. COC records are maintained to account for the custody of samples at all times. Samples are considered "under custody" of an individual when samples are in an individual's sight or secured under an individual's control.

COC documentation is maintained on a COC record form (typically provided by the laboratory). Each sample should be logged onto the COC record form as it is collected. Per §330.281(a), information on the COC record form typically includes the following information, as appropriate:

- Project name and number (Pescadito Environmental Resource Center, MSW No. 2374)
- Site location
- Sample number
- Sample date and time
- Sample type
- Number and type of sample containers
- Analyses required
- Sample preservative
- Carrier/shipping number
- Special instructions
- Spaces for signatures of sampler(s) and everyone assuming sample custody
- Date and time of custody transfers

The COC record will contain the signatures of anyone assuming custody of the samples. Each time the custody of the samples changes hands, the party releasing the samples signs under "Relinquished By" and records the date and time. The party receiving the samples signs under the heading "Received By" and subsequently records the date and time of acceptance.

2.10 Equipment Decontamination

All reusable or non-dedicated purging and sampling equipment that comes in contact with groundwater during purging or sampling are to be decontaminated prior to use at each monitor well location. The following decontamination standards or equivalent procedures are to be followed for well purging and sampling equipment.

- Wash the equipment with a non-phosphate detergent (i.e. alconox or liquinox) and rinse with laboratory-grade distilled water. Appropriately dry equipment before use.
- Discard disposable and/or any non-dedicated equipment, in addition to, disposable health and safety garments. Decontamination water and cleaning agents should be disposed of in accordance with applicable regulations.

2.11 Field Documentation

Field activities must be thoroughly documented. Below is a list of the information to be documented during field activities, as appropriate for the conditions:

- Project name and number
- Date and time of all activities
- Weather conditions
- Sampling personnel
- Field instrument calibration methods and remarks
- Well identification number
- Well description (i.e. casing diameter and construction material)
- Description of well condition
- Initial air quality monitoring measurements and the time of each measurement (includes background, initial well headspace, and breathing zone), if performed
- Initial water-level measurement with point of reference (top of casing)
- Depth to the well bottom with point of reference (can be obtained from well records)
- Well volume calculations (if purging 3 well volumes)
- Presence and thicknesses of immiscible layers, if present
- Any physical description of groundwater noted (color, odor, turbidity)
- Time starting and ending well purging, volume purged, and method of removal

- Sampling equipment and remarks
- Temperature, conductivity, and pH measurements
- Sample time and date
- Description of sample
- Quality control remarks

3.0 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Laboratory data and analyses will be prepared by a TCEQ-accredited environmental testing laboratory and in accordance with acceptable accreditation standards. The laboratory used for analysis will be accredited by NELAC (National Environmental Laboratory) for analysis of groundwater samples.

All analytical data submitted under the requirements of this permit will be examined by the owner and/or operator to ensure that the data quality objectives are considered. The owner or operator will determine if the sample results are accurate and complete. All data will be reviewed by the owner/operator prior to submittal for the TCEQ to review. The quality control results, supporting data, and data review by the laboratory must be included in the review of the owner/operator. Any potential impacts will be reported such as the bias on the quality of the data, footnotes in the report, and anything of concern that was identified in the laboratory case narrative summary.

It is the responsibility of the owner or operator to ensure that the laboratory documents and reports all problems and anomalies observed that are associated with the analysis. If the analysis of the data indicates that it failed to meet the quality control goals for the laboratory's analytical data analysis program, it does not necessarily mean that the data is unusable. The owner and/or operator may still report the analytical data but must report any and all problems and corrective action that the laboratory identified during the analysis.

A Laboratory Case Narrative (LCN) report for all problems and anomalies observed must be submitted by the owner and/or operator. The LCN will report the following information:

1. State the exact number of samples, testing parameters and sample matrix, and the name of the laboratory involved in the analysis. If more than one laboratory is used, all laboratories shall be identified in the case narrative.
2. State the test objective regarding samples.
3. Explain each failed precision and accuracy measurement determined to be outside of the laboratory and/or method control limits

4. Explain if the effect of the failed precision and accuracy measurements on the results induces a positive or negative bias.
5. Identify and explain problems associated with the sample results, along with the limitations these problems have on data usability.
6. A statement on the estimated uncertainty of analytical results of the samples when appropriate and/or when requested.
7. A statement of compliance and/or noncompliance with the requirements and specifications. Exceedance of holding times and identification of matrix interferences must be identified. Dilutions shall be identified and if dilutions are necessary, they must be done to the smallest dilution possible to effectively minimize matrix interferences and bring the sample into control for analysis.
8. Identify any and all applicable quality assurance and quality control samples that will require special attention by the reviewer.
9. A statement on the quality control of the analytical method of the permit and the analytical recoveries information shall be provided when appropriate and/or when requested.

In addition to the LCN, the following information must be submitted for all analytical data:

1. A table identifying the field sample name with the sample identification in the laboratory report.
2. Chain of custody must be provided.
3. Analytical Report that documents the results and methods for each sample and analyte to be included for every analytical testing event. These test reports must document the reporting limit/method detection limit the laboratory used.
4. A release statement must be submitted from the laboratory. This statement must state "I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached

exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data."

a. If it is an in house laboratory, it must have the following statement: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

5. If the data is from soil and/or sediment samples, it must be reported on a dry weight basis with the percent solids and the percent moisture reported so that any back calculations of the wet analysis may be performed.

6. Include a Laboratory Checklist such as the example provided in Attachment F.2.1. For every response of "No, NA, or NR" that is reported on the checklist, the permittee will ensure the laboratory provides an exception report. Exceptions should be included in the summary of the LCN. A Laboratory Checklist will be completed by the laboratory.

4.0 GROUNDWATER MONITORING REQUIREMENTS

Groundwater Monitoring at the PERC will be conducted in accordance with TCEQ regulations for detection, assessment, and corrective action monitoring as specified in Subchapter J: Groundwater Monitoring and Corrective Action. Groundwater monitoring wells will comply with the location/spacing requirements of §330.403 and construction specifications of §330.421.

4.1 Detection Monitoring

The detection monitoring program for Type I Landfills is outlined in 30 TAC §330.407. Required parameters, monitoring frequency, and statistical methods pursuant to §330.407 are discussed below. If it is determined that the detection monitoring program no longer satisfies §330.407, a permit modification or amendment will be submitted to make the necessary revisions.

4.1.1 Detection Monitoring Parameters

Per §330.419(a), all monitor wells comprising the groundwater monitoring system at the Pescadito Environmental Resource Center Landfill will be sampled for the parameters listed in 40 Code of Federal Regulations (CFR) Part 258, Appendix I on a semi-annual basis. A list of the required detection monitoring constituents is provided in Table III-F.2-2.

The analytical laboratory will use the practical quantization limits (PQLs) that have been established by the TCEQ and provided to the approved laboratories by the TCEQ. The PQL shall be equal to or lower than maximum contaminant levels (MCLs) where established. The PQL is defined as the lowest concentration reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions, and is analogous to the limit of quantitation definition in the most recent available National Environmental Laboratory Accreditation Conference (NELAC) Standard. The PQL is method specific, instrument specific, and analyte specific, and may be updated as more data becomes available. The PQL must be below the groundwater protection standard established for that analyte as defined by 30 TAC §330.409(h), unless approved otherwise by the TCEQ. Reporting limits will be quantization limits that meet the

requirements of 30 TAC §330.405(f)(5), and analytical results must be reported to the lowest concentration levels that can be reliably quantified.

The reporting laboratory shall comply with the following precision and accuracy criteria for each PQL:

Constituents/Chemicals of Concern	Precision (percent RSD)	Accuracy (percent recovery)
Metals	10	70-130
Volatiles	20	50-150
Semi-Volatiles	30	50-150

The precision and accuracy of the PQL initially will be determined from the PQLs reported over the course of a minimum of eight groundwater monitoring events. The results obtained from these events will be used to demonstrate that the PQLs meet the specified precision and accuracy limits. The PQL may be updated as more data becomes available but will not be changed from the TCEQ established value without the approval of the TCEQ. The PQL will be supported by analysis of a PQL check sample, consisting of a laboratory reagent grade sample matrix spiked with constituents/chemicals of concern at concentrations equal to or less than the PQL. At a minimum, a PQL check sample will be performed quarterly during the calendar year to demonstrate that the PQL continues to meet the specified limits for precision and accuracy. Analytical results from data below the limit of detection must be reported as less than the established PQL that meets the specified precision and accuracy requirements. If a PQL cannot be established according to the specified precision and accuracy limits, the owner or operator will ensure that the laboratory provides sufficient documentation to justify the alternative precision and accuracy limits. This information will be reported to the executive director by the owner or operator and will be evaluated case by case basis.

4.1.2 Detection Monitoring Frequency

Detection monitoring events will be conducted on a semi-annual basis once background sampling has been completed. Background sampling will be conducted on a quarterly basis and will be considered complete once a total of eight (8) statistically independent samples have been collected for each of the monitor wells. Background sampling for any new wells will commence no later than the quarter following installation and will be conducted in the same manner until eight independent samples have been collected. For those monitor wells that do not already have an established background statistical analysis will commence upon completion of eight (8) background sampling events.

4.1.3 Detection Monitoring Statistical Methods

A statistical evaluation of detection monitoring constituents is required under 30 TAC §330.405(e) to determine if a single constituent in a particular well exhibits a statistically significant increase (SSI) over background concentrations for constituents listed in 40 CFR Part 258 Appendix I. All 40 CFR Part 258, Appendix I constituents sampled at the Pescadito Environmental Resource Center, with the exception of VOCs, will be statistically evaluated on an intrawell basis via Shewhart-CUSUM control charts using the Sanitas™ for Groundwater or an equivalent statistical analysis program pursuant to §330.405(e)(4) and §330.405(f)(3). Shewhart-CUSUM control charts assume the background and compliance data are independent and normally distributed with a constant mean and a constant variance and are a parametric statistical method allowing for the detection of both immediate and gradual releases from a facility.

In accordance with 30 TAC §330.407(b) the owner or operator will determine whether there has been a statistically significant increase (SSI) over background of any tested constituent at any monitoring well, including upgradient wells. An SSI would have a value greater than the practical quantitation limit (PQL); which are below the groundwater protection standard established for each analyte. PQLs are defined in Section 4.1.1 of this GWSAP. In general, a confirmed detection of a VOC above the respective laboratory PQL will be considered an SSI.

Parameters that have been detected less than 50 percent of the time in the background pool and/or non-normal background data distributions will be statistically evaluated using non-parametric

intrawell prediction intervals. A non-parametric prediction interval typically sets the highest background concentration as the statistical limit.

Interwell statistical analysis may also be conducted for detection monitoring wells pursuant to §330.405(e) as appropriate. Interwell statistical analysis allows comparison of upgradient to downgradient groundwater data and can provide a secondary statistical evaluation.

In accordance with 30 TAC §330.407(a)(1), upon completion of background monitoring and during background updates, the owner or operator will evaluate the background data to ensure the data are representative of background groundwater constituent concentrations unaffected by waste management activities or other sources of contamination, and the evaluation will be documented in a report and submitted to the executive director of the (TCEQ) before the next subsequent groundwater monitoring event following the updated (or initial) background period. An "outlier analysis" will be used to detect non representative data points, and those points considered non-representative will be removed from the background data set.

During the background data collection period, an interwell statistical analysis will be performed on data from any new point of compliance monitor well semiannually following the same frequency and schedule as the detection monitoring analysis. If an SSI is verified by the following quarterly sample, resulting in two consecutive SSIs for the same constituent, the results will be evaluated to determine if the SSIs resulted from other than groundwater contamination from MSW and if so an ASD will be submitted.

Per §330.407(a)(1) background data sets may be updated once every two years provided data proposed to be included in the updated background are demonstrated to be representative of background groundwater quality. According to Gibbons[1], the incorporation of new data into the background pool is recommended every two years when performing intrawell statistical analyses, provided appropriate outliers are removed and any potential significant trends are addressed. It should be assumed the background pool for all facility monitor wells reflects current background concentration levels. However, some long-term fluctuation in background concentrations may be possible even if contamination has not occurred at a given well. The background pool should be

[1] Gibbons, Robert, D. 1994. Statistical Methods for Groundwater Monitoring, John Wiley & Sons, Inc. New York.

updated to include more recent observations as background data. Better estimates of the true background mean and variance can be obtained by including more data at a later time[2].

4.1.4 Detection Monitoring Reporting and Submittals

Detection monitoring sampling events will be conducted semi-annually. Upon receipt of the laboratory analytical report and subsequent review of the results, the data will be statistically evaluated within 60 days following the date of sampling to determine if an SSI over background has occurred for any 40 CFR Part 258 Appendix I constituent. If there is determined to be an SSI using statistical analysis for a 40 CFR Part 258 Appendix I constituent, the TCEQ and any local pollution agency with jurisdiction that has requested to be notified will be notified in writing within 14 days of the date of determination in accordance with §330.407(b) and a notice will also be placed in the site operating record. If an SSI is determined, a notice shall be placed in the operating record describing the increase and an assessment monitoring program must be established within 90 days of the date of the notice to TCEQ, or verification resampling may be conducted to confirm the SSI in accordance with §330.407(b)(2).

Verification resampling will be conducted for any 40 CFR Part 258 Appendix I constituent exhibiting an SSI to confirm the exceedence. Per §330.407(b)(2), the results of the verification resampling will be completed and the results submitted to the executive director within 60 days of the determination of an initial exceedance (that is, within 120 days of the initial sampling for a detection monitoring event).

A notification of the confirmed SSI and the intent to submit an Alternate Source Demonstration (ASD) shall be provided in writing to the TCEQ and any local pollution agency with jurisdiction that has requested to be notified firmed SSI within 14 days of the date of determination in accordance with §330.407(b)(3)(A). A notice will also be placed in the site operating record.

If hazardous constituents are detected and confirmed; information, supporting data, and analysis to establish assessment monitoring per §330.409 will be provided to the TCEQ. Additionally, the

[2] U.S. Environmental Protection Agency, 1992. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance. Office of Solid Waste Management Division, U.S. EPA, Washington D.C.

assessment monitoring program and a description of any special waste previously handled at the facility will also be provided to the TCEQ.

If there is reasonable cause to believe the SSI is derived from a source other than the landfill, an ASD may be submitted to the TCEQ within 90 days of determining an SSI per §330.407(b)(3). The landfill will continue with detection monitoring unless notified by the TCEQ that the ASD is determined to be unsatisfactory. The ASD should document the SSI over background is a result of an error in sampling, statistical evaluation, natural variation, or other potential alternate source. No filtering of samples for the ASD analysis will be allowed, and the TCEQ may require leachate analysis to support the ASD.

In accordance with 30 TAC §330.407(b)(4), if the owner/operator does not make a demonstration satisfactory to the executive director, the owner/operator shall initiate an assessment monitoring program within 90 days of the notice. Assessment monitoring will be initiated at the well(s) exhibiting the SSI and the immediately adjacent wells on each side of the well(s) exhibiting the SSI, unless an alternative subset of wells is designated by the executive director.

In accordance with §330.407(c), the results of semi-annual groundwater monitoring events will be summarized in an annual report and submitted to the TCEQ within 90 days following the last semi-annual groundwater monitoring event in each calendar year.

The annual report will include the results of all groundwater monitoring, testing, and analytical work obtained or prepared under the requirements of the permit.

All facility groundwater sample and field quality control sample analytical data will be submitted in hard copy format on the most current version of form TCEQ-0312, Groundwater Sampling Report, and in an electronic format if requested by the executive director. The annual report will include a summary of background groundwater quality values, groundwater monitoring analyses, and statistical calculations, as well as graphs, drawings, a statement regarding whether an SSI has occurred over background values in any wells during the previous calendar year period and the status of any SSI over background, and the groundwater flow rate and direction of flow in the uppermost aquifer for both semi-annual monitoring events during the calendar year (including piezometric water level contour map(s) and documentation used to determine the flow rate and

direction). The report will include any recommendations for changes in the monitoring program and any other items requested by the TCEQ.

The facility will also submit a laboratory case narrative and, either a laboratory checklist or the laboratory quality assurance and quality control data and laboratory analytical data not previously submitted. The facility will also explain any problems encountered in the laboratory analysis, either by adding additional explanations to the laboratory checklist or by extending the laboratory case narrative. Any information required in the laboratory case narrative that cannot be completed by the laboratory will be completed by the permittee.

The groundwater analytical data submitted in the annual report will be provided in the laboratory report pursuant to the specifications listed in Section 3.0 and also presented in the TCEQ-0312 form format or on any alternative form prescribed by TCEQ. The general format of the TCEQ-0312 forms is provided in Attachment F.2.1. The form may be reproduced with minor modifications to allow ease of data entry or computer printing. The first page of the TCEQ-0312 form will be completely filled out. It will be signed and dated by an authorized representative of the landfill operator permitte. The remaining three pages provide the TCEQ with the laboratory analytical results in a prescribed format and will be completed by the contracted laboratory.

Every submittal (including the cover letter) will be provided to TCEQ in duplicate. The original and one copy will be filed in TCEQ Central Records in Austin. An additional copy will be sent to the appropriate regional office. Copies of all submittals will be maintained in the operating record for the site.

4.2 Assessment Monitoring

The assessment monitoring program for Type I Landfills is outlined in 30 TAC §330.409. Assessment monitoring is required if a monitor well has exhibited an SSI over background for one or more of the constituents listed in 40 CFR Part 258 Appendix I that have been confirmed by resampling and is not demonstrated to be derived from a source other than the landfill, or an error in sampling or statistical evaluation. Required parameters, monitoring frequency, and statistical methods pursuant to §330.409 are discussed below. If this assessment monitoring

program no longer satisfies §330.409, the owner or operator shall submit a permit modification or amendment to make any appropriate changes to the program.

4.2.1 Assessment Monitoring Parameters

Assessment monitoring parameters consist of the constituents listed in 40 CFR Part 258 Appendix II (Appendix II). If initiation of assessment monitoring is required, the respective monitor well(s) will be sampled for the parameters listed in 40 CFR Part 258 Appendix II within 90 days of determining the SSI for which assessment monitoring was initiated. Assessment monitoring will include the well(s) exhibiting the SSI and the immediately adjacent wells on each side of the well(s) exhibiting the SSI. The executive director may accept an appropriate subset of wells for future sampling of Appendix II parameters.

In accordance with §330.409(b), any Appendix II constituents may be deleted from the required list of assessment monitoring parameters (following approval from the TCEQ) if it can be documented the constituents are not reasonably expected to be in or derived from the landfill. The selected analytical laboratory will achieve TCEQ specified PQLs for Appendix II constituents. PQLs are defined in Section 4.1.1 of this GWSAP.

The TCEQ may specify an alternative frequency for repeated sampling and analysis for the full set of Appendix II constituents during the active life and closure and post-closure care period of the landfill as set forth in §330.409(c).

4.2.2 Assessment Monitoring Frequency

As described above, if initiation of assessment monitoring is required, the respective monitor well(s) exhibiting the SSI, and the immediately adjacent wells on each side of the well(s) exhibiting the SSI, will be sampled for the parameters listed in 40 CFR Part 258 Appendix II (Appendix II) within 90 days of determining the SSI for which assessment monitoring was initiated, unless an alternative subset of wells is designated by the executive director. Following the initial assessment monitoring event (within 90 days following the determination of the confirmed SSI), assessment monitoring shall be conducted semi-annually and may be conducted concurrent with semi-annual detection monitoring events as appropriate unless the TCEQ

specifies a different frequency. Monitoring will continue for Appendix I constituents and any constituent detected during the Appendix II analysis unless approved otherwise by the TCEQ.

4.2.3 Assessment Monitoring Statistical Methods

Not later than 60 days after each sampling event, the owner or operator shall submit to the TCEQ the results of the initial and subsequent events and place them in the operating record. For any new constituents detected as a result of the Appendix II analysis, a minimum of four statistically independent samples shall be collected from each background well and analyzed to establish background levels for the additional constituent(s). The Groundwater Protection Standard (GWPS) shall be established per §330.409(h) or (i) and submitted to the TCEQ along with the sampling results. Not later than 60 days after each sampling event the owner or operator shall determine if any of the 40 CFR Part 58 Appendix II constituents were detected at statistically significant levels above the GWPS.

Appendix II constituents detected in a monitor well during assessment monitoring having an established background will initially be evaluated using intrawell Shewhart-CUSUM control charts or non-parametric intra-well prediction intervals for those constituents having less than 50 percent detections in the background pool and/or non-normal background data distributions to determine if the respective constituent has been detected above background values.

Additionally, any Appendix II constituents that are statistically determined to have been detected above background values will be further evaluated to determine if the respective constituent was detected at a statistically significant level above its GWPS. Typically, such an evaluation is conducted using 95-percent Lower Confidence Limit interval or other similar statistical method that allows direct comparison to the GWPS or MCL.

If the results of statistical analysis indicate the concentrations of all Appendix II constituents are at or below background values, using the statistical procedures described above for two consecutive events, the well may return to detection monitoring per §330.409(e). The owner or operator will notify the executive director in writing and receive approval before returning to detection monitoring. Alternatively, if the results of statistical analysis indicate the concentrations of any Appendix II constituents are above background values, but below the

GWPS or MCL established for the constituent, assessment monitoring will continue in accordance with §330.409.

Any Appendix II constituents are reported at or below background (or below their PQL) for two consecutive assessment monitoring events may be eliminated from the list of assessment monitoring parameters for subsequent sampling events after notification and approval by the TCEQ.

If Appendix II constituents are determined to have been detected at a statistically significant level above its GWPS, the TCEQ and appropriate local government officials shall be notified in writing within seven days of the determination. Additionally, the owner or operator shall initiate an assessment of corrective measures as required by §330.411 within 90 days of the notice and addressed below in Subsection 4.2.5.

4.2.4 Assessment Monitoring Reporting and Submittals

The results of the initial assessment monitoring event and any subsequent events will be submitted to the TCEQ no later than 60 days following the sampling event, and also placed in the site operating record. If assessment monitoring is conducted in conjunction with semi-annual detection monitoring events, the assessment monitoring results may be submitted with the semi-annual event data.

If any of the 40 CFR Part 58 Appendix II constituents were detected at statistically significant levels above the GWPS, the TCEQ and appropriate local government officials shall be notified in writing within seven days of the determination.

In accordance with §330.409(k), the results of semi-annual groundwater monitoring events will be summarized in an annual report and submitted to the TCEQ within 60 days following the last semi-annual groundwater monitoring event in each calendar year. Groundwater samples determined to have The annual report will include at a minimum the requirements listed in 30 TAC §330.409(k): the monitor well groundwater analytical data, statistical analysis results, the status of any SSI over background, a statement regarding whether a statistically significant level above a GWPS occurred (and the applicable GWPS) , the groundwater rate and flow in the uppermost aquifer for both semi-

annual monitoring events during the calendar year, and a groundwater contour map of the uppermost aquifer based at a minimum upon concurrent measurement in all monitoring wells. The annual report shall also include recommendations for changes to the monitoring program and any other information requested by the TCEQ.

4.2.5 Assessment of Corrective Measures and Remedy

If Appendix II constituents are determined to have been detected at a statistically significant level above its GWPS or MCL, or if a hazardous constituent has exceeded its concentration limit; the owner or operator shall conduct further evaluations consistent with the requirements of §330.409(g).

If there is reasonable cause to believe the contamination (i.e., exceedance above the GWPS) is derived from a source other than the solid waste management unit, an ASD may be submitted to the TCEQ within 90 days of determining the concentration was detected at a statistically significant level above its GWPS or MCL, or if a hazardous constituent has exceeded it concentration limit (exceedance). The ASD must be prepared and certified by a qualified groundwater scientist. The TCEQ must be notified within 14 days of the exceedence determination of the intent to submit and ASD. The landfill will continue with assessment monitoring unless notified by the TCEQ that the ASD is determined to be unsatisfactory. The ASD should document the exceedence is a result of an error in sampling, analysis, statistical evaluation, natural variation, or other potential alternate source. No filtering of samples for the ASD analysis will be allowed, and the TCEQ may require leachate analysis to support the ASD.

If the ASD is determined by the TCEQ to be unsatisfactory or if no ASD is submitted, the landfill shall proceed with the requirements of §330.409(g)(1). The landfill shall install at least one additional monitoring well between the well with the exceedance and the next adjacent wells along the point of compliance prior to the next sampling event and notify in writing all persons that own or occupy the land that directly overlies any part of the plume of contamination, if contamination has migrated off site. If necessary to characterize the nature and extent of the release, additional monitoring wells will be installed.

Within 90 days of the notice of the exceedance to the TCEQ of finding that any of the Appendix II constituents are determined to have been detected at a statistically significant level above its GWPS or MCL, or if a hazardous constituent has exceeded it concentration limit; the owner or operator shall initiate assessment of corrective measures consistent with the requirements of §330.411. The assessment of corrective measures shall be completed within 180 days after initiating the assessment. Within 30 days of completing the assessment of corrective measures, the owner or operator shall submit to the TCEQ an engineering report and any applicable plans that describe the remedy or remedies proposed for selection and the way the proposed remedy(ies) meet the standards of §330.413(b).

5.0 GROUNDWATER MONITORING SYSTEM

The groundwater monitoring system at the PERC is based on site specific technical information, and is designed to consist of a sufficient number of wells installed at approximate locations and depths to yield representative groundwater samples from the uppermost water bearing unit. A description of site geology, hydrogeology, groundwater flow, and the groundwater monitoring system pursuant to §330.403(a)(2) is provided in Part III, Attachment III-F. The design, as well as any revisions to the design, shall be certified by a qualified groundwater scientist. All parts of the groundwater monitoring system shall be operated and maintained so that they perform at least to design specifications.

If changes in the facility construction or operation or any changes in the adjacent property occur that affect or will likely affect the direction and rate of flow of the groundwater and the potential for detecting groundwater contamination from the landfill, it may be necessary to install additional monitoring wells or sampling points. If any revisions are required to the number of wells or sampling points, a modification to the site development plan will be required.

TABLE III-F.2-1
Typical Sampling, Preservation, and Storage
Procedures for Groundwater Monitoring Constituents

Parameter	Recommended Containers	Preservation	Maximum Holding Time	Minimum Volume
Heavy Metals (includes iron and manganese)	P, G	Acidify w/ HNO_3 to pH<2, 4°C	6 months except 28 days for Hg	1 liter
Calcium, Magnesium, Sodium, Potassium, Fluoride, Sulfate, Chloride, and Hardness	P, G	4°C	28 days	1 liter

TDS (may be included with above parameters)	P, G	4°C	7 days	1 liter
Nitrate	P, G	4°C	48 hours	100 ml
Ammonia	P, G	4°C; acidify w/ H_2SO_4 to pH<2, 4°C	7 days; 28 days if acified	500 ml
Alkalinity	P, G	4°C	48 hours	200 ml
NPOC	G amber, T-lined caps	4°C; acidify w/ HCI to pH<2, 4°C	48 hours; 28 days if acidified	100 ml/replicate
COD	P, G	4°C; acidify w/ H_2SO_4 to pH<2, 4°C	48 hours; 28 days if acidified	100 ml
SVOC	G, T-lined caps	4°C	7 days until extraction, then analyze within 40 days	1 liter
BOD	P, G	4°C	24 hrs	1 liter
VOC	G, T-lined septa	4°C; acidify w/ HCI to pH<2, 4°C	14 days	3 x 40 ml

TABLE III-F.2-2

Required Detection Monitoring Constituents (as Specified in 30 TAC §330.419(a) and 40 CFR Part 258 Appendix I)

Volatile Organic Compounds	CAS No.	Test Method
Acetone	67-64-1	8260
Acrylonitrile	107-13-1	8260
Benzene	71-43-2	8260
Bromochloromethane	74-97-5	8260
Bromodichloromethane	75-27-4	8260
Bromoform	75-25-2	8260
Carbon disulfide	75-15-0	8260
Carbon tetrachloride	56-23-5	8260
Chlorobenzene	108-90-7	8260
Chloroethane	75-00-3	8260
Chloroform	67-66-3	8260
Dibromochloromethane	124-48-1	8260
1,2-dibromo-3-chloropropane (DBCP)	96-12-8	8260
1,2-dibromomethane (EDB)	106-93-4	8260
o-dichlorobenzene	95-50-1	8260
p- dichlorobenzene	106-46-7	8260
Trans-1,4-dichloro-2-butene	110-57-6	8260
1,1-dichloroethane	75-34-3	8260
1,2-dichloroethane	107-06-2	8260
1,1-dichloroethylene	75-35-4	8260
Cis-1,2-dichloroethylene	156-59-2	8260
Trans-1,2-dichloroethylene	156-60-5	8260
1,2-dichloropropene	78-87-5	8260
Cis-1,3-dichloropropene	10061-01-5	8260
Trans-1,3-dichloropropene	10061-02-6	8260
Ethylbenzene	100-41-4	8260
2-hexanone	591-78-6	8260
Methyl bromide	74-83-9	8260
Methyl chloride	74-87-3	8260
Methylene bromide	74-95-3	8260
Methylene chloride	75-09-2	8260
Methyl ethyl ketone	78-93-3	8260
Methyl iodide	74-88-4	8260
4-methyl-2-pentanone	108-10-1	8260
Styrene	100-42-5	8260
1,1,1,2-tetrachloroethane	630-20-6	8260

1,1,2,2-tetrachloroethane	79-34-5	8260
Tetrachloroethylene	127-18-4	8260
Toluene	108-88-3	8260
1,1,1-trichloroethane	71-55-6	8260
1,1,2-trichloroethane	79-00-5	8260
Trichloroethylene	79-01-6	8260
Trichlorofluromethane	75-69-4	8260
1,2,3-trichloropropane	96-18-4	8260
Vinyl acetate	108-05-4	8260
Vinyl chloride	75-01-4	8260
Xylenes (total)	1330-20-7	8260

Metals	**Test Method**
Antimony	6020
Arsenic	6020
Barium	6020
Beryllium	6020
Cadmium	6020
Chromium	6020
Cobalt	6020
Copper	6020
Lead	6020
Nickel	6020
Selenium	6020
Silver	6020
Thallium	6020
Vanadium	6020
Zinc	6020

Optional Groundwater Quality Indicator Parameters not Required for Detection Monitoring

Groundwater Quality Indicators*	Test Method
Sulfate	300.0
Ammonia	350.1
Chloride	300.0
Total Alkalinity	310.1
Hardness	2340B
Total Dissolved Solids	160.1
Nitrate	353.2
Iron (dissolved)	6010
Calcium (dissolved)	6010
Magnesium (dissolved)	6010

APPENDIX III-F.2-1

LABORATORY REVIEW CHECK LIST

Laboratory Data Package Cover Page

This data package consists of:

- [ ] This signature page, the laboratory review checklist, and the following reportable data:
- [ ] R1 Field chain-of-custody documentation;
- [ ] R2 Sample identification cross-reference;
- [ ] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - b) dilution factors,
  - c) preparation methods,
  - d) cleanup methods, and
  - e) if required for the project, tentatively identified compounds (TICs).
- [ ] R4 Surrogate recovery data including:
  - a) Calculated recovery (%R), and
  - b) The laboratory's surrogate QC limits.
- [ ] R5 Test reports/summary forms for blank samples;
- [ ] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - a) LCS spiking amounts,
  - b) Calculated %R for each analyte, and
  - c) The laboratory's LCS QC limits.
- [ ] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - a) Samples associated with the MS/MSD clearly identified,
  - b) MS/MSD spiking amounts,
  - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  - d) Calculated %Rs and relative percent differences (RPDs), and
  - e) The laboratory's MS/MSD QC limits
- [ ] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - a) the amount of analyte measured in the duplicate,
  - b) the calculated RPD, and
  - c) the laboratory's QC limits for analytical duplicates.
- [ ] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;
- [ ] R10 Other problems or anomalies.
- [ ] The Exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [ ] This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (Printed)	Signature	Official Title (printed)	Date

Laboratory Review Checklist: Reportable Data

Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
R1	OI	**Chain-of-custody (C-O-C)**					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?					
		Were all departures from standard conditions described in an exception report?					
R2	OI	**Sample and quality control (QC) identification**					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?					
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?					
R3	OI	**Test reports**					
		Were all samples prepared and analyzed within holding times?					
		Other than those results < MQL, were all other raw values bracketed by calibration standards?					
		Were calculations checked by a peer or supervisor?					
		Were all analyte identifications checked by a peer or supervisor?					
		Were sample quantitation limits reported for all analytes not detected?					
		Were all results for soil and sediment samples reported on a dry weight basis?					
		Were % moisture (or solids) reported for all soil and sediment samples?					
		If required for the project, TICs reported?					
R4	O	**Surrogate recovery data**					
		Were surrogates added prior to extraction?					
		Were surrogate percent recoveries in all samples within the laboratory QC limits?					
R5	OI	**Test reports/summary forms for blank samples**					
		Were appropriate type(s) of blanks analyzed?					
		Were blanks analyzed at the appropriate frequency?					
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?					
		Were blank concentrations < MQL?					
R6	OI	**Laboratory control samples (LCS):**					
		Were all COCs included in the LCS?					
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?					
		Were LCSs analyzed at the required frequency?					
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?					
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?					
		Was the LCSD RPD within QC limits?					
R7	OI	**Matrix spike (MS) and matrix spike duplicate (MSD) data**					
		Were the project/method specified analytes included in the MS and MSD?					
		Were MS/MSD analyzed at the appropriate frequency?					
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?					
		Were MS/MSD RPDs within laboratory QC limits?					
R8	OI	**Analytical duplicate data**					
		Were appropriate analytical duplicates analyzed for each matrix?					
		Were analytical duplicates analyzed at the appropriate frequency?					
		Were RPDs or relative standard deviations within the laboratory QC limits?					
R9	OI	**Method quantitation limits (MQLs):**					
		Are the MQLs for each method analyte included in the laboratory data package?					
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?					
		Are unadjusted MQLs included in the laboratory data package?					
R10	OI	**Other problems/anomalies**					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?					
		Were all necessary corrective actions performed for the reported data?					
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?					

Laboratory Review Checklist: Supporting Data										
Laboratory Name:			LRC Date:							
Project Name:			Laboratory Job Number:							
Reviewer Name:			Prep Batch Number(s):							
#[1]	A[2]	Description			Yes	No	NA[3]	NR[4]	ER#[5]	
S1	OI	**Initial calibration (ICAL)**								
		Were response factors and/or relative response factors for each analyte within QC limits?								
		Were percent RSDs or correlation coefficient criteria met?								
		Was the number of standards recommended in the method used for all analytes?								
		Were all points generated between the lowest and highest standard used to calculate the curve?								
		Are ICAL data available for all instruments used?								
		Has the initial calibration curve been verified using an appropriate second source standard?								
S2	OI	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank[6] :**								
		Was the CCV analyzed at the method-required frequency?								
		Were percent differences for each analyte within the method-required QC limits?								
		Was the ICAL curve verified for each analyte?								
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?								
S3	O	**Mass spectral tuning:**								
		Was the appropriate compound for the method used for tuning?								
		Were ion abundance data within the method-required QC limits?								
S4	O	**Internal standards (IS):**								
		Were IS area counts and retention times within the method-required QC limits?								
	OI	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**								
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?								
		Were data associated with manual integrations flagged on the raw data?								
S6	O	**Dual column confirmation**								
		Did dual column confirmation results meet the method-required QC?								
S7	O	**Tentatively identified compounds (TICs):**								
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?								
S8	I	**Interference Check Sample (ICS) results:**								
		Were percent recoveries within method QC limits?								
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**								
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?								
S10	OI	**Method detection limit (MDL) studies**								
		Was a MDL study performed for each reported analyte?								
		Is the MDL either adjusted or supported by the analysis of DCSs?								
S11	OI	**Proficiency test reports:**								
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?								
S12	OI	**Standards documentation**								
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?								
S13	OI	**Compound/analyte identification procedures**								
		Are the procedures for compound/analyte identification documented?								
S14	OI	**Demonstration of analyst competency (DOC)**								
		Was DOC conducted consistent with NELAC Chapter 5C?								
		Is documentation of the analyst's competency up-to-date and on file?								
S15	OI	**Verification/validation documentation for methods** (NELAC Chap 5n 5)								
		Are all the methods used to generate the data documented, verified, and validated, where applicable?								
S16	OI	**Laboratory standard operating procedures (SOPs):**								
		Are laboratory SOPs current and on file for each method performed?								

Laboratory Review Checklist: Exception Reports		
Laboratory Name:		LRC Date:
Project Name:		Laboratory Job Number:
Reviewer Name:		Prep Batch Number(s):
ER #[5]	DESCRIPTION	

1. Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2. O= organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

6. CCB = Continuing Calibration Blank