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## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

December 22, 2014

To: Owners and Operators of Type I Municipal Solid Waste (MSW) Landfills

Re: Guidelines for Groundwater Monitoring Report Submittals

Dear MSW Owner or Operator:

The Texas Commission on Environmental Quality (TCEQ), MSW Permits Section offers the following guidelines to assist owners and operators with meeting the reporting requirements for groundwater monitoring in Title 30 Texas Administrative Code (30 TAC), Chapter 330, §§330.405 through 330.409.

### **Topics covered in these guidelines:**

#### Background Monitoring

- Background Sampling Reports
- Background Evaluation Report
- Background Update Report

#### Detection Monitoring

- Semiannual Detection Monitoring Report (first semiannual event)
- Notice of Initial Exceedance
- Verification Resampling Report
- Alternate Source Demonstration (ASD)
- Annual Detection Monitoring Report (second semiannual event)

#### Assessment Monitoring

- Semiannual Assessment Monitoring Report (first semiannual event)
- Report of Assessment Monitoring Results
- Notice of Statistically Significant Level (SSL)
- Annual Assessment Monitoring Report (second semiannual event)

The reports described here and the timing of their submission is summarized in Table 1.

**Table 1. Groundwater monitoring reports and timeframes for submission.**

<b>Report Type</b>	<b>Recommended Submission Time (days after sampling)</b>	<b>Report Content and Nominal Rule Based Submission Time (days after sampling)</b>
Semiannual Detection and Assessment Monitoring	60	Assessment Monitoring Results (60 days) Notice of SSL (67 days) Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results
Semiannual Detection Monitoring only	74	Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results
Verification Resampling	120	Verification Resampling (120 days)
ASD	150	ASD (150 days)
Annual Detection and Assessment Monitoring	60	Annual Assessment Report (60 days) Assessment Monitoring Results (60 days) Notice of SSL (67 days) Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results Annual Detection Report (90 days)
Annual Detection Monitoring Only	74	Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results Annual Detection Report (90 days)
Background Evaluation	After completion of background monitoring	Background Evaluation Report (after completion of background monitoring)
Background Update	n/a	Background Update Report (may be updated once every two years)

## **Background Monitoring**

### *Background Sampling Report*

Quarterly background monitoring is required for new wells to determine the quality of groundwater. According to 30 TAC §330.407(c), the results of all groundwater monitoring, testing, and analytical work performed during a calendar year may be included in an annual detection monitoring report. However, to maintain currency and timeliness, the MSW Permits Section encourages the facility owner or operator to submit background sampling results semiannually. These reports can be combined with other semiannual reports.

*It is also advised that during background data collection periods, sampling results be evaluated after each event for evidence of releases from the facility, to enable a prompt and early response to a potential adverse situation.*

The report should include the following information:

1. Sampling results on Form TCEQ-00312.
2. The laboratory case narrative and laboratory checklist.
3. The chain of custody record.

#### *Background Evaluation Report*

The evaluation must be submitted in accordance with §330.405(d) and §330.407(a)(1) after collecting background samples. Details about the information that should be included in a report were provided in the TCEQ MSW Permits Section letter dated August 30, 2010, available on the TCEQ website at

<[www.tceq.texas.gov/assets/public/permitting/waste/msw/msw-gw-background.pdf](http://www.tceq.texas.gov/assets/public/permitting/waste/msw/msw-gw-background.pdf)>.

#### *Background Data Update Report*

Background data sets may be updated with semiannual monitoring results that are demonstrated to be representative of background groundwater quality in accordance with §330.407(a)(1). Updating of background should occur when enough new measurements (at least 4 measurements, representing approximately 2 years of semiannual monitoring) have been collected.

A report must be prepared and submitted for each background update. The report should include the following information:

1. A narrative explaining the statistical process used to select and evaluate data to be incorporated into the facility's updated background data set, including methods for evaluating data distribution, and for identifying trends and outliers.
2. A discussion of the differences between the existing background data sets and updated data sets.
3. A summary table of updated background data sets for the Title 40 Code of Federal Regulations, Part 258, Appendix I metals, identifying which results were included in background and which were removed as outliers.
4. A summary table of the intermediate statistics (for example, mean and standard deviation) and computations, and calculated statistical limits for each well and constituent.
5. Charts that include the updated background data sets and updated statistical limits.

## Detection Monitoring

### *Semiannual Detection Monitoring Report (first semiannual event)*

Although the MSW rules do not require a semiannual detection monitoring report, we encourage the facility owner or operator to submit a semiannual report within 74 days after the first semiannual event. Having this information at mid-year allows for a better understanding of the groundwater conditions at a facility.

The report should include the following information:

1. A summary table of the groundwater monitoring event that lists event date and type, and monitoring status of each well (background or detection).
2. A table indicating which initial exceedances were determined along with their reported constituent concentrations and background limits (see example in Table 2, below).

**Table 2. Example summary of initial exceedances determined during a detection monitoring event (constituent concentrations in µg/L).**

Well	Constituent	Detected Concentration	Statistical Limit	Type of Comparison	Proposed Action
MW-2	Arsenic	25	20	Interwell	Resampling
MW-3	Barium	900	250	Intrawell	ASD

3. A statement explaining how the facility intends to proceed regarding any statistical exceedances. Possible actions include treating the initial exceedance as a statistically significant increase (SSI) without verification and establishing an assessment monitoring program, conducting verification resampling, or preparing and submitting an alternate source demonstration (ASD).
4. Results of all groundwater monitoring, resampling, and analytical work produced during the first semiannual sampling event, including:
  - groundwater sampling results on the TCEQ-00312 forms,
  - a table of background statistical limits (see example in Table 3, below) or statistical analysis summary table that includes limits,
  - a laboratory case narrative and laboratory checklist,
  - the chain of custody record, and
  - charts of the detected concentrations, including statistical limits.

**Table 3. Summary of background statistical limits (constituent concentrations in µg/L).**

<b>Monitor Well</b>	<b>Antimony</b>	<b>Arsenic</b>	<b>Barium</b>	<b>Beryllium</b>	<b>Cadmium</b>	<b>Chromium</b>	<b>Cobalt</b>	<b>Copper</b>	<b>Lead</b>	<b>Nickel</b>	<b>Selenium</b>	<b>Silver</b>	<b>Thallium</b>	<b>Vanadium</b>	<b>Zinc</b>
MW-1	5	5	35	4	2	20	5	10	15	20	50	10	1	10	100
MW-2	5	5	47	4	2	20	6	10	15	20	50	10	1	10	100

5. A contour map of piezometric groundwater levels and groundwater flow direction. Also, the map should include the background wells, point of compliance wells and active cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.
6. Recommendations for any changes or updates to the background data set.
7. Any other items requested by the executive director.

The entire laboratory report which includes laboratory quality assurance and quality control (QA/QC) data and laboratory analytical data should be provided on a compact disc (CD) in PDF file.

*Notice of Initial Exceedance*

The term “initial exceedance” refers to a monitoring result that exceeds a statistical limit but has not yet been verified. If an initial exceedance was identified during a detection monitoring event, notify the TCEQ in writing within 14 days of the determination as required in §330.407(b).

A notice of initial exceedance should include the following information:

1. A table indicating which exceedances were determined along with their reported concentrations and background limits (see earlier example in Table 2).
2. A statement explaining how the facility intends to proceed regarding any exceedances. Possible actions include treating the initial exceedance as a statistically significant increase (SSI) without verification and establishing an assessment monitoring program, conducting verification resampling, or preparing and submitting an alternate source demonstration.

The MSW Permits Section encourages you to include the notice of initial exceedances in the semiannual report.

*Verification Resampling Report*

If an initial exceedance occurs, results of resampling (if conducted) must be submitted within 60 days of determining the exceedance in accordance with §330.407(b)(2). The report should include the following information:

1. A discussion of the statistical evaluations and conclusions.

2. A summary table indicating verification resampling results (see example in Table 4, below).
3. Verification resampling results on Form TCEQ-00312.
4. The laboratory case narrative and laboratory checklist.
5. The chain of custody record.

**Table 4. Verification resampling results (constituent concentrations in µg/L).**

Well	Constituent	Initial Result	Statistical Limit	Resampling Result	Confirmed SSI?	Proposed Action
MW-1	Selenium	65	50	<50	No	Detection
MW-2	Arsenic	25	20	23	Yes	Assessment

*Alternate Source Demonstration (ASD)*

If an SSI is confirmed, an ASD may be submitted if there is reasonable cause to think that the SSI is a result of contamination from a source other than the landfill unit; *or* resulted from an error in sampling, analysis, statistical evaluation; *or* is due to natural variation in groundwater quality. The ASD should be submitted to the TCEQ within 90 days of determining the SSI. The ASD may be submitted together with the verification resampling report.

An ASD should include the following information:

1. A discussion of the statistical evaluation and any resampling.
2. Identification of a source; errors in sampling, analysis, or statistical evaluation; or the natural variation; or the source other than the landfill unit.
3. Data, which may include:
  - information explaining the error along with corrected data, new calculations, and the results of a revised statistical evaluation,
  - information describing the natural variation,
  - analysis of the landfill leachate, and
  - samples collected from offsite sources or comparisons with background data sets from facility monitoring wells.

Acceptance of ASDs are well-specific, constituent-specific, and concentration-specific. If the concentration of a constituent that was covered by an ASD increases, the previously accepted demonstration may no longer be satisfactory and assessment monitoring may be triggered unless a new demonstration is accepted.

*Annual Detection Monitoring Report (second semiannual event)*

The rule in §330.407(c) requires that an annual detection monitoring report be submitted within 90 days after the last groundwater monitoring event in a calendar year at a facility. The last groundwater monitoring event refers to a second semiannual event.

An annual detection monitoring report should include the following information:

1. A discussion regarding SSIs during the calendar year and results of the statistical calculations summarized (see examples in Table 1 and Table 3).
2. A summary table of the groundwater monitoring events with the monitoring status of each well (see example in Table 5, below).

**Table 5. Groundwater monitoring events.**

<b>Event Date</b>	<b>Event Type</b>	<b>Monitoring Wells</b>
February 15, 2013	First Semiannual	Detection: MW-1, 2, 3 <sup>1</sup> , 5 Assessment: MW-4
February 15, 2013	First Background Monitoring	MW-6, 7 and 8
April 15, 2013	Second Background Monitoring	MW-6, 7 and 8
April 15, 2013	Verification Resampling	MW-1
August 15, 2013	Second Semiannual	Detection: MW-1, 2, 3 <sup>1</sup> Assessment: MW-4, 5
August 15, 2013	Third Background Monitoring	MW-6, 7 and 8

<sup>1</sup> Dry well.

3. Results of all groundwater monitoring, resampling, and analytical work produced during the sampling events for the year, including:
  - groundwater sampling results on the TCEQ-0312 forms,
  - a table of background statistical limits (see example in Table 2) or statistical analysis summary table that includes limits,
  - a laboratory case narrative and laboratory checklist,
  - the chain of custody record, and
  - charts of the detected concentrations, including statistical limits.
4. A contour map of piezometric groundwater levels and groundwater flow direction for each sampling event. The map should include the background wells, point of compliance wells and active cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.
5. Recommendations for any changes or updates to the background data set.
6. Any other items requested by the executive director.

The entire laboratory report which includes laboratory QA/QC data and laboratory analytical data should be provided on CD in PDF file.

*If a Semiannual Detection Monitoring Report covering the first half of the calendar year was submitted, the annual report should not duplicate information (such as TCEQ-0312 forms, statistical analysis, laboratory checklist...) in the semiannual report, but should include a summary of the semiannual report.*

## Assessment Monitoring

### *Semiannual Assessment Monitoring Report (first semiannual event)*

Although the MSW rules do not specify a semiannual assessment monitoring report requirement, the MSW Permits Section encourages facility owner or operator to submit a semiannual report within 60 days after the first semiannual event. Having this information at mid-year allows for a better understanding of the groundwater conditions at a facility.

A report should include the following information:

1. A statement whether a statistically significant level (SSL) above a groundwater protection standard (GWPS) occurred during the first semiannual event (see example in Table 6), including:
  - all historical data, statistical limits, GWPS and calculations of 95% lower confidence limits (LCL),
  - groundwater sampling results on the TCEQ-00312 forms,
  - a laboratory case narrative and laboratory checklist,
  - the chain of custody record, and
  - statistical calculations, graphs and drawings.

**Table 6. Summary of SSLs determined during the assessment monitoring sampling event (constituent concentrations in µg/L).**

Monitoring Well	Constituent	Detected Concentration	95% LCL	GWPS	Recommended Action
MW-1	Arsenic	12	11	10	ASD
MW-1	Benzene	7	7.5	5	Corrective Action

2. A contour map of piezometric water levels and groundwater flow direction. The map should include the background wells, point of compliance wells and active cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.
3. Recommendations for any changes.

The entire laboratory report which includes QA/QC data and laboratory analytical data should be provided on CD in PDF file.

*Report of Assessment Monitoring Results*

According to §330.409(d), the results from the initial and subsequent assessment monitoring events must be submitted not later than 60 days after each assessment sampling event. At a minimum, the report of assessment monitoring results must include the following information:

1. Sampling results from assessment monitoring wells on Form TCEQ-00312.
2. The laboratory case narrative and laboratory checklist.
3. The chain of custody record.

The MSW Permits Section encourages you to include assessment monitoring results in the semiannual report.

*Notice of Statistically Significant Level (SSL)*

If an SSL is determined after a semiannual assessment monitoring event, notify the TCEQ in writing within 7 days of the determination, in accordance with §330.409(g). The notice of an SSL should include the following information:

1. A summary table indicating constituents for which SSLs were determined, along with their reported concentrations, calculated 95% LCL and GWPS (see earlier example in Table 6).
2. A statement explaining how the facility intends to proceed.

The MSW Permits Section encourages you to include the notice of SSL in the semiannual report.

*Annual Assessment Monitoring Report (second semiannual event)*

In accordance with §330.409(k), an annual assessment monitoring report must be submitted within 60 days after the facility's second semiannual groundwater monitoring event.

A report should include the following information:

1. A statement whether an SSL above a groundwater protection standard occurred during the calendar year, along with:
  - a summary table of the groundwater monitoring events with the monitoring status of each well (see earlier example in Table 5),
  - all historical data, statistical limits and calculations of 95% LCLs,
  - groundwater sampling results on the TCEQ-00312 forms,
  - a laboratory case narrative and laboratory checklist,
  - the chain of custody record, and

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- statistical calculations, graphs and drawings.
2. A contour map of piezometric groundwater levels and groundwater flow direction for each sampling event. The map should include the background wells, point of compliance wells, active cells and future cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.
  3. Recommendations for any changes.

The entire laboratory report which includes QA/QC data and laboratory analytical data should be provided on CD, in PDF file.

*If a Semiannual Detection Monitoring Report covering the first half of the calendar year was submitted, the annual report should not duplicate information (such as TCEQ-0312 forms, statistical analysis, laboratory checklist...) in the semiannual report, but should include a summary of the semiannual report.*

### **Additional Information**

The MSW Permits Section suggests submitting semiannual reports after the first semiannual groundwater monitoring events and annual reports after the second semiannual groundwater monitoring events. Detection Reports can be combined with Assessment Reports if submitted **within 60 days** after the last day of the facility's semiannual events.

Text files are no longer required to be submitted. Please do not send text files. Electronic data files for analytical results are no longer required to be submitted via email. Please do not send electronic data files via email. The MSW Permits Section requests groundwater reports be submitted according to the following instructions:

1. Please submit the following number of copies:
  - One hard copy of the report to the MSW Permits Section in central office.
  - One PDF copy of the report on CD to the MSW Permits Section in central office (the entire laboratory report with analytical data and laboratory QA/QC should be added to the PDF copy of the report).
  - One hard copy of the report to the appropriate TCEQ regional office.
2. All PDF files on CD should be properly named. A PDF file name should consist of:
  - Record series (MSW PA), Permit number, Folder code (RP for reports and PA for permits), date of document (Year Month Day) and Document name.

Example:

*MSW PA\_1222\_RP\_20131215\_GW-Annual-2013-Report.pdf*

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3. Small reports such as ASDs, Verification Resampling Reports or others may be submitted in hard copy only (original and one copy to the MSW Permits Section in central office, and one copy to region office).

If you have any questions about these reporting guidelines, please contact Ms. Iryna Kushnirsky at (512) 239-1471, or in writing at the address on our letterhead. When addressing written correspondence, please use mail code MC 124.

Sincerely,



Earl Lott, Director  
Waste Permits Division  
Texas Commission on Environmental Quality

EL/IMK