



John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

December 17, 2012

CERTIFIED MAIL 7012 1010 0000 9467 7322

Mr. Paul Quinn
Service Director
City of Westlake
27216 Hilliard Boulevard
Westlake, Ohio 44145

**RE: WESTLAKE CITY LANDFILL
CUYAHOGA COUNTY
GROUND WATER
NOTICE OF VIOLATION
ADDITIONAL INFORMATION NEEDED**

Dear Mr. Quinn:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), has reviewed the following report for Westlake Landfill:

- Semi-annual Assessment Activities Report, dated July 16, 2012.

The "Groundwater Quality Assessment Report of Activities" (July 2012 SAA) is dated July 16, 2012. It was received on July 19, 2012 and reviewed for compliance with Ohio Administrative Code (OAC) 3745-27-10 and the facility's revised 2004 ground water detection monitoring plan (GWDMP). The July 2012 SAA report was prepared and submitted by Mr. Fraser Hamilton of Earth Consulting, LTD, on behalf of the City of Westlake.

Westlake Landfill closed under the 1990 Solid Waste Landfill Regulations, and is currently conducting post-closure ground water detection monitoring and ground water quality assessment monitoring in accordance with OAC Rule 3745-27-10 of the 2003 revised Solid and Infectious Waste Regulations. Monitoring wells WW-2, WW-5, and WW-9 through WW-13 are currently in the ground water quality assessment program and are being sampled in accordance with the ground water quality assessment plan. All other monitoring wells (i.e. WW-1, WW-3R, WW-4, WW-6R, WW-7, WW-8) at the facility are currently in the detection monitoring program.

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The July 2012 SAA report was prepared and submitted to conform with OAC Rule 3745-27-10(E)(12). Therefore, the December 2011 SAA report was reviewed for compliance with 3745-27-10(E)(12) and other applicable paragraphs in OAC 3745-27-10 and the facility's revised, May 2011 GWQAP.

Ohio EPA has reviewed the above referenced document and has noted the following violations:

Violations:

- 1. OAC Rule 3745-27-10(C)(1)(a): A written sampling and analysis plan, which documents the sampling and analysis procedures that shall be utilized in the ground water monitoring program. The owner or operator is required to use the procedures documented within the sampling and analysis plan.**

During the June 2012 sampling event at wells WW-2, WW-3R, WW-6R, WW-10, WW-11 and WW-12, the owner or operator did not follow the procedures for low-flow purging and sampling that are prescribed in the sampling and analysis plan (SAP) in Section 4.3.2(c) of the Ground Water Detection Monitoring Program Plan (GWDMP). Specifically, drawdown of the ground water level within the wells mentioned was not stabilized prior to obtaining the last three stabilization measurements nor prior to obtaining the ground water sample despite being required in the SAP.

Graphical displays of drawdown at select monitoring wells that did not achieve a stabilized drawdown (WW-2, WW-10, WW-11, WW-12) are shown in "Purge Drawdown" below. Additionally, for reference, drawdown at select monitoring wells that did achieve a stabilized drawdown (WW-4, WW-5) are also shown in "Purge Drawdown" below. Specific provisions in the SAP that were not followed include the following:

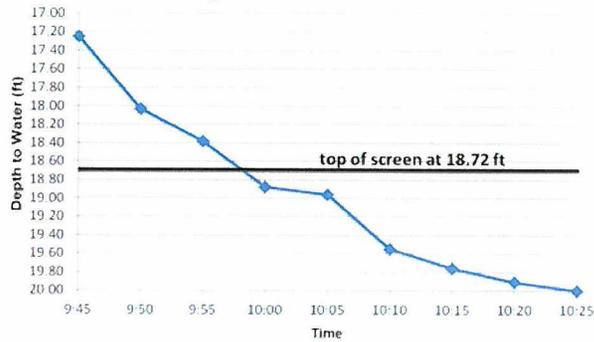
- The owner or operator did not start with a low pumping rate. The SAP requires "to begin purging, the pump should be started at the lowest speed setting and then the speed can be slowly increased until water begins discharging. Check the water level and slowly adjust the pump speed until there is little or no drawdown or drawdown has stabilized." This report and previous reports (e.g. May 2011) show that pumping rates as low as 0.05 gallons per minute (gpm) [0.05 gpm=190 milliliters per minute (ml/min)] have been achieved at these wells and the SAP indicates that pumping rates "as low as 100 ml/min" (0.0264 gpm) can be achieved. However, a pumping rate of 0.1 gpm (380 ml/min) was used throughout purging at WW-2, WW-3R, WW-10, WW-11 and WW-12 and a pumping rate of 0.05 gpm was used at WW-6R and WW-13 throughout purging despite the fact that drawdown was not stabilizing at these wells. Per the

SAP, the owner or operator should have started with a lower pumping rate and increased the pumping rate only if drawdown remained stabilized.

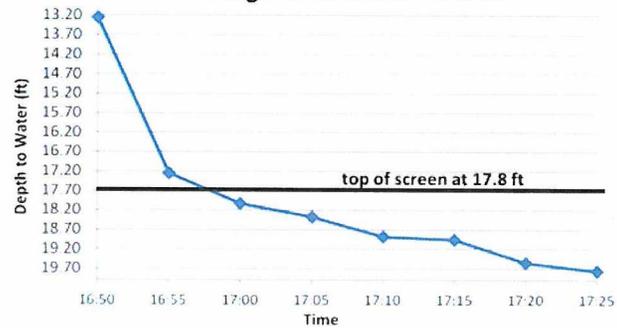
- The owner or operator did not reduce the pumping rate as necessary to achieve a stabilized drawdown. The SAP requires the sampler to “check the water level and slowly adjust the pump speed until there is little or no drawdown or drawdown has stabilized,” and “to minimize disturbance, pumping rate adjustments are best made within the first fifteen minutes of purging.” However, a pumping rate of 0.1 gpm was used throughout purging despite the fact that drawdown was not stabilizing. Per the SAP, the owner or operator should have lowered the pumping rate when it became evident that drawdown was not stabilizing.
- The water level in monitoring wells WW-2 and WW-10 was drawn down below the top of screen during purging and sampling. The SAP states that “If the static water level is above the well screen, the water level should not be allowed to fall below the top of the screen. To minimize disturbance, pumping rate adjustments are best made within the first fifteen minutes of purging.” As shown on the drawdown graphs for WW-2 and WW-10 below, drawdown dropped below the top of the well screen about 15 minutes into purging at WW-2 and about 10 minutes into purging at WW-10. The pumping rate should have been lowered prior to the water level dropping below the top of screen such that drawdown would stabilize above the top of the well screen.
- Purge stabilization measurements and the ground water samples at WW-2, WW-10, WW-11 and WW-12 were obtained prior to drawdown stabilization. The SAP states “stabilization measurements should begin after drawdown of the water level has stabilized,” and “a sample can be considered representative when both drawdown and water quality indicators have stabilized,” and “the stabilization should be documented.” However, as documented among the June 2012 drawdown data from monitoring well sampling data forms for WW-2, WW-10, WW-11 and WW-12 and as shown on the graphs below, drawdown was not stabilized at WW-2, WW-10, WW-11 and WW-12 at any time prior to collection of stabilization parameter measurements or prior to sampling. The owner or operator should have lowered the pumping rate and stabilized the drawdown prior to collection of stabilization parameter measurements and sampling should have been delayed until both drawdown stabilization and subsequent stabilization of parameters was achieved across three consecutive measurements.

To demonstrate compliance at future sampling events, the owner or operator must comply with the low-flow purging and sampling procedures described in the SAP, including as specified in the bulleted paragraphs above.

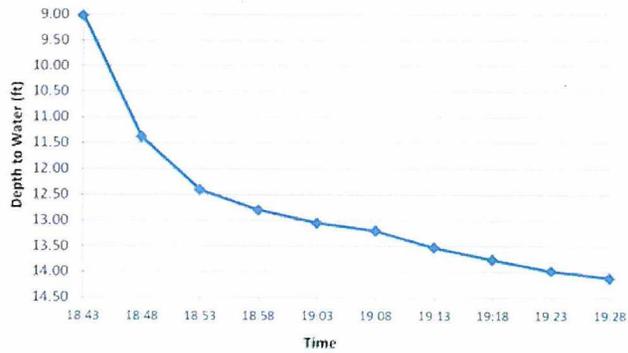
Purge Drawdown - WW2



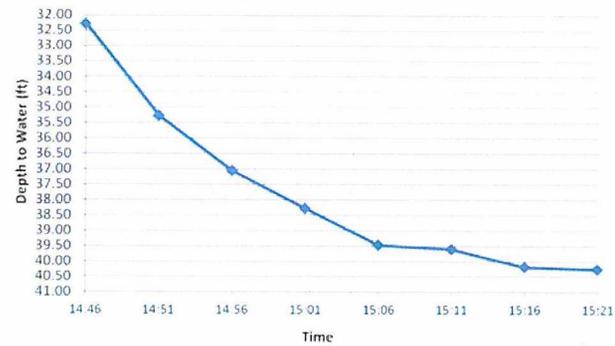
Purge Drawdown - WW10



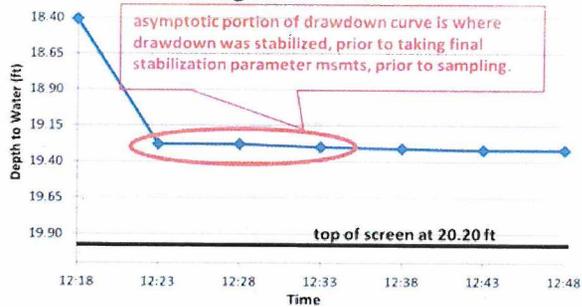
Purge Drawdown - WW11



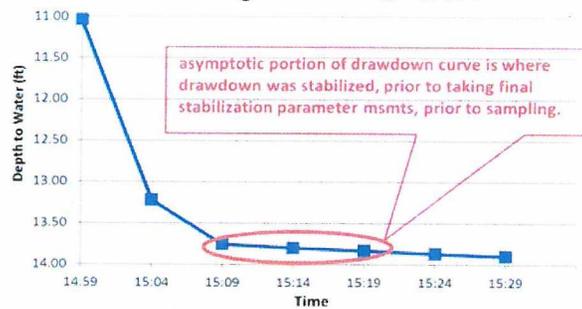
Purge Drawdown - WW12



Purge Drawdown - WW5



Purge Drawdown - WW4



2. **OAC Rule 3745-27-10(D)(5)(a)(ii)(b): Beginning one year after implementing the ground water detection monitoring program and continuing during subsequent semiannual sampling events, at least one sample from each monitoring well screened in the uppermost aquifer system (background and downgradient) must be collected and analyzed for the parameters specified in paragraph (D)(5)(a)(i) of this rule.**

A semi-annual sample was not obtained from detection monitoring wells WW-3R and WW-6R in spring 2012. No laboratory results for WW-3R and WW-6R during the June 2012 sampling event or other sampling event during the first half of 2012 have been received from the owner or operator. Furthermore, the June 2012 sampling event monitoring well sampling data sheets for detection monitoring wells WW-3R and WW-6R indicate that no sample was obtained from WW-3R and WW-6R because the "well purged dry" and that subsequently there was "insufficient water (recharge) to sample."

As described in Violation 1) above, the owner or operator did not follow the procedures for low-flow purging and sampling detailed in the SAP. Specifically, the owner or operator pumped WW-3R and WW-6R at a higher than necessary rate (0.1 gpm at WW-3R, 0.05 gpm at WW-6R) and thereby caused the water level in the wells to drawdown below the level of the pump at WW-3R and WW-6R, thus preventing collection of samples.

Additionally, since the owner or operator collects stabilization measurements based exclusively on time (every 5 minutes) rather than by volume and time and the owner or operator used a pumping rate at WW-3R and WW-6R (0.1 and 0.05 gpm, respectively) that was too high, the resultant purge volumes between stabilization parameter measurements was unnecessarily high and caused these wells to be dewatered. Furthermore, as described in the SAP, the purge volume between stabilization measurements (after initially purging the "dead volume" of the pump and tubing) could be as low as the volume of the flow-through-cell (i.e. "such that the flow of water in the cell is replaced between measurements") provided that the measurements are also "at least three to five minutes apart." If lower pumping rates and lower purge volumes between measurements had been utilized, a sample likely could have been obtained from both WW-3R and WW-6R during the June 2012 event.

Finally, should the lowest achievable pumping rate for the bladder pumps used at WW-3R and WW-6R still be too high to achieve a stabilized drawdown during purging at certain sampling events, the owner or operator could have utilized a contingent "No Purge" sampling technique at WW-3R and/or WW-6R. Such a "No Purge" method would need to be specified in the SAP beforehand and should include parameter measurements during purging and sample collection, but would not require stabilization

of parameters nor stabilization of ground water levels prior to collection of the sample, but rather would only require that the “dead volume” of water remaining in the dedicated pump and tubing from the previous event (typically about 1 liter) be purged prior to collection of the sample.

Thus, the owner or operator is responsible for researching, planning (i.e. in the SAP) and implementing the proper sampling procedures and where necessary, contingent sampling procedures to assure that a sample is collected from each applicable well during each semi-annual ground water monitoring event.

To demonstrate compliance during future semi-annual sampling events, the owner or operator should do one of the following:

- a) Comply with the low-flow purging and sampling procedures described in the SAP, including as specified in this Violation;
- b) Comply with the low-flow purging and sampling procedures described in the SAP, including as specified in this Violation,

and,

Revise the sampling and analysis plan in the SAP to include a contingent “No Purge” sampling technique at WW-3R and/or WW-6R for events when the static ground water elevation is particularly low and/or when drawdown is not stabilizing during the initial few minutes of pumping at the lowest rate and/or data indicate an insufficient volume of water to both purge the dead volume and collect a sample will remain if pumping at the lowest rate. Such a “No Purge” method should include parameter measurements during purging and sample collection, but would not require stabilization of parameters nor stabilization of ground water levels prior to collection of the sample, but rather would only require that the “dead volume” of water remaining in the dedicated pump and tubing from the previous event (typically about 1 liter) be purged prior to collection of the sample. Then utilize this contingent technique when applicable.

Since samples have been successfully collected at WW-3R and WW-6R using the prescribed low-flow sampling technique during previous sampling events, the low-flow method should continue to be the preferred method, with the “No Purge” method described above being the contingent purging and sampling method to be utilized when low-flow is not possible.

Additionally, it should be noted that the total depth of WW-3R is listed as 24.49 feet on the monitoring well sampling data sheet, but the depth to water listed in the final measurement prior to the conclusion that well “purged dry” is only 16.31 feet. The July 10, 2008 well installation log for WW-3R indicates that the total depth is approximately 15 feet below ground surface (not accounting for stick-up casing). Therefore, it appears that the total depth of 24.49 feet at WW-3R listed on the monitoring well sampling data sheet is in error. This should be corrected.

3. **OAC Rule 3745-27-10(E)(5)(b)(ii)(a): The owner or operator shall sample all monitoring wells in the ground water quality assessment monitoring program, as follows. A monitoring well is considered part of the ground water quality assessment monitoring program if the well is needed or used to meet the provisions of paragraph (E)(6) of this rule...At least annually for one of the following...All parameters in appendix II of this rule.**

According to Ohio EPA records, none of the seven assessment wells installed prior to the date of the July 2012 SAA report (WW-2, WW-5, WW-9, WW-10, WW-11, WW-12, WW-13) have been sampled and analyzed for Appendix II parameters within the last year, and assessment well WW-12 was never initially sampled for Appendix II parameters. Table 1 below reflects Ohio EPA records of Appendix I and Appendix II sampling and analysis reported by the owner or operator to Ohio EPA since assessment began in December 2010.

Table 1

Sample Date	Dec-10		Jan-11		May-11		Jul-11		Oct-11		Jun-12		Months Since last App II sample (as of 7/16/2012)
	App I	App II											
WW-2					x	x			x		x		14
WW-5	x	x							x		x		19
WW-9			x	x					x		x		18
WW-10			x		x	x			x		x		14
WW-11					x	x			x		x		14
WW-12											x		never done
WW-13							x	x	x		x		12

To return to compliance, the owner or operator must as soon as possible sample assessment wells WW-2, WW-5, WW-9, WW-10, WW-11, WW-12 and WW-13 and have these samples analyzed for all of the parameters in Appendix II of OAC 3745-27-10.

Additionally, it should be noted that newly-installed assessment wells WW-14 and WW-15 must also eventually be sampled and analyzed for Appendix I and II parameters.

More Information Needed to Determine Compliance

- 1) OAC Rule 3745-27-10(C)(1): which requires the owner or operator to conduct a ground water monitoring program that includes consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of ground water quality at the background and downgradient wells at the facility.**

As described in Violation 1) above, the owner or operator did not follow the SAP procedures for low-flow purging and sampling at monitoring wells WW-2, WW-10, WW-11 and WW-12 during the June 2012 sampling event. As a result, the following problems occurred that bring into question whether the samples submitted for laboratory analysis were representative of ground water quality at these monitoring locations:

- Drawdown at WW-2, WW-10, WW-11 and WW-12 never stabilized prior to taking the final three stabilization parameter measurements. Therefore, mixing of the stagnant, unrepresentative water column overlying the screened section was invariably mixing with formation water entering the screen and eventually the pump. Such a gradual mixing of these two bodies of water could cause artificial parameter stabilization according to the criteria in the SAP, giving the false impression that water entering the pump is representative.
- Drawdown at WW-2, WW-10, WW-11 and WW-12 never stabilized prior to taking the final sample. Therefore, mixing of the stagnant, unrepresentative water column overlying the screened section was invariably mixing with formation water entering the screen and eventually the pump. Therefore, the sample obtained may have been a mixture of formation water with the stagnant, unrepresentative water overlying the screened section.
- The water level in monitoring wells WW-2 and WW-10 were drawn down below the top of screen during purging and sampling. When the static water level is above the top of screen (1.5 feet at WW-2; 4.6 feet at WW-10), much of the water flowing through the screen is largely isolated from air since the entire sand pack is submerged. However, if pumping stresses the well enough to drop the water level below the top of screen, then the sand pack voids in the newly-unsaturated portion of the screen become filled with air, creating a much larger water-air interface, and potentially causing greater reaction between the water and air and potentially creating unrepresentative samples.

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To demonstrate compliance with this rule, the owner or operator should further evaluate the June 2012 data from WW-2, WW-10, WW-11 and WW-12 and submit a written report demonstrating that this data is representative of ground water quality at these locations. Examples of such an evaluation include, but are not limited to the following:

- Comparison of the laboratory results from the June 2012 event with laboratory results from previous sampling events, including a statistical comparison showing that the June 2012 data are from the same population as data from previous events at each well.
- Piper and/or Stiff diagrams of laboratory results from the June 2012 and previous sampling events showing that the June 2012 data are from the same population as data from previous events at each well.
- Comparison of the purge stabilization parameter results from the June 2012 event with purge stabilization parameter results from previous sampling events, with results indicating that the June 2012 data are the same or very similar to that in previous events at each well.

Statements

- 1) The owner or operator is required by OAC 3745-27-10(E)(12) to submit a semi-annual assessment activities report approximately every six months during implementation of the ground water quality assessment plan.**

The next semi-annual assessment activities report is due around December 2012-January 2013 based on the dates of the previous reports (December 2011, July 2012). It should be noted that a corrected copy of the soil boring/well completion log(s) for WW-12 has not yet been received and so should be included in the upcoming semi-annual assessment activities report. Additionally, the owner or operator should also submit copies of soil boring/well completion logs for recently-installed assessment wells WW-14 and WW-15.

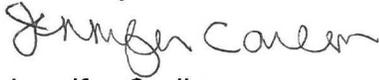
If you have any technical questions regarding this review, please contact Steve Churchill at of the Division of Drinking and Ground Waters at (614) 728-1225. Please submit all correspondence to Jennifer Carlin, Division of Materials and Waste Management, NEDO, Ohio EPA, 2110 East Aurora Road, Twinsburg, OH 44087.

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Nothing in this letter shall be construed to authorize any waiver from the requirements of any applicable state or federal laws or regulations. This letter shall not be interpreted to release the owner or operator, or others, from responsibility under Chapters 3704, 3714, 3734, or 6111 of the Ohio Revised Code or under the Federal Clean Water or Comprehensive Environmental Response, Compensation, and Liability Acts remedying conditions resulting from any release of contaminants to the environment.

If you have any questions regarding this letter, please feel free to contact me at (330) 963-1133 or e-mail me at "jennifer.carlin@epa.state.oh.us."

Sincerely,



Jennifer Carlin
Environmental Specialist
Division of Materials and Waste Management

JC/cl

cc: Mike Sekerak, Cuyahoga County Health Department
Fraser Hamilton, Earth Consulting, LTD
Stephen Churchill, DDAGW, CO
File: [Sowers/LAND/Westlake City LF/GRO/18]
DMWM ID #: (4601