



State of Ohio Environmental Protection Agency

Northwest District Office

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Ted Strickland, Governor
Lee Fisher, Lieutenant Governor
Chris Korleski, Director

Re: Statistical Report of Groundwater Quality
St. Marys Landfill, Auglaize County
Notice of Violation

December 1, 2008

Auglaize County Commissioners
209 South Blackhoof Street
Wapakoneta, Ohio 45895

Mr. Thomas Hitchcock
Director of Public Service and Safety
City of St. Marys
101 East Spring Street
St. Marys, Ohio 45885

Dear Commissioners and Mr. Hitchcock:

The Ohio Environmental Protection Agency (Ohio EPA) completed a review of the statistical report of ground water quality for the July 7-9, 2008, sampling event for the St. Marys Landfill. The submittal was dated September 18, 2008 and received September 19, 2008. Following are Ohio EPA comments relating to the review.

VIOLATIONS

- The owner/operator continues to be in violation of OAC Rule 3745-27-10 (C)(1) and (C)(1)(a) which require that the ground water monitoring program include consistent sampling and analysis procedures and statistical methods that are protective of human health and the environment and that are designed to ensure monitoring results that provide an accurate representation of ground water quality at the background and downgradient wells; and that the owner or operator use the procedures documented within the sampling and analysis plan. The owner/operator needs to sample wells that purge dry as soon as enough water is available. Other wells should be sampled immediately after purging to ensure that representative samples are collected.**

The sampling and analysis plan, revised June 2003, states on page 22, "If a sample cannot be obtained after the initial purging, multiple trips to the well with less than 24 hours between trips will be made in accordance with the Ohio EPA Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring (February 1995)."

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This manual indicates that for wells that purge dry the samples should be collected as soon as sufficient water is available. This is because extended recovery times after purging allow the ground water to equilibrate with atmospheric conditions thereby changing ground water chemistry.

A review of the field data sheets in the submittal indicates that wells: MW-1 (not dry) MW-2 (not dry), MW-3 (dry), MW-4 (not dry), MW-5 (not dry), MW-6 (dry), MW-7 (not dry), MW-8 (not dry), MW-9 (not dry), AW-1 (not dry), AW-2 (not dry), AW-3 (dry), AW-4 (dry), BW-1 (not dry), BW-2 (not dry), BW-3 (not dry), BW-4 (not dry), BW-5 (dry), and BW-6 (not dry), whether purged dry or not, were purged on July 7, 2008, but not sampled until July 8, 2008. Some of these wells recharge quickly enough to collect samples immediately after purging. Other wells recharge quickly enough to collect samples in much less than 24 hours. Only 5 of these 19 wells (MW-3, MW-6, AW-3, AW-4, and BW-5) were purged dry. The ability for some of the wells to be sampled on the same day has been established during previous sampling events. There was no resampling event at this time. During the September 2005 resampling event, three wells were purged on September 21, 2005 and then sampled on the same day. BW-2 was sampled at 13:35; BW-3 was sampled at 13:17; and BW-5 was sampled at 13:55. During the September 2006 resampling event, seven wells were purged on September 19, 2006 and sampled the same day. Some of these wells (MW-3, AW-3, and AW-4) were originally bailed dry, but were sampled within about three hours of purging. During the September 24, 2007 resampling event five wells were purged and sampled on the same day with MW-3, which was bailed dry, being sampled within three hours and eleven minutes of the time of purging. (It is not clear if the time of purging was at the beginning or the end of purging.) The wells, sampled on July 8, 2008 could have been sampled on July 7, 2008 within a reasonably short time span after the end of purging. Also, during the March 13, 2008 resampling event, well MW-6 was bailed dry at 13:15 and sampled at 14:30, which is only one (1) hour and 15 minutes after purging the well dry. Clearly this well can be purged and sampled on the same day and sampling can occur within a few hours of purging.

In addition, some of the wells which should have been sampled shortly after purging display changes in field parameters between the end of purging on July 7, 2008 and sampling on July 8, 2008. Following is a table indicating the change in field parameter values from purging on July 7, 2008 to the sampling on July 8, 2008 for wells which were not bailed dry and displayed a significant change in ground water chemistry between purging and sampling. (It should be noted that the typical wait time between purging and sampling is about 22 hours.) This change may be due to stagnation of the water in the well between purging and sampling. The values which appear to show a significant change are in **bold**.

These differences in values exceed the 10% value specified by the City in SOP No. F3007 included in their sampling and analysis plan. The values marked with an asterisk are those which exceed the current Ohio EPA standards (pH ± 0.1 S.U., conductance $\pm 3\%$, temperature $\pm 0.5^\circ\text{C}$).

WELL	07/07/08 pH	07/08/08 pH	07/07/08 Temp.	07/08/08 Temp.	07/07/08 Cond.	07/08/08 Cond.
MW-1	6.42*	6.80*	13.6*	14.4*	2040	2030
MW-2	6.87	6.93	12.0*	14.8*	1620*	1240*
MW-4	6.59	6.49	13.7*	14.4*	1770*	1850*
MW-5	7.23	7.18	12.6*	14.1*	1400	1400
MW-7	6.88*	7.00*	12.4*	13.8*	1550	1530
MW-8	7.04	7.02	13.2*	14.8*	1570	1530
MW-9	7.24	7.15	12.8*	14.0*	860	879
AW-1	7.03	7.08	10.5*	13.2*	1210	1240
AW-2	6.98	6.88	11.8*	14.3*	1400*	1340*
BW-1	6.52	6.62	13.6*	14.4*	1430	1410
BW-2	6.98*	7.14*	11.7*	13.8*	1100	979
BW-3	7.02	7.04	13.0*	15.4*	1200*	1250*
BW-4	6.75	6.80	13.8*	14.5*	1540	1550
BW-6	6.80	6.85	13.4*	15.0*	1660	1650

Also, it is recommended that recharge rates of wells that bail dry should be recorded and monitored in order for the field personnel to know when sufficient water is available and when it is appropriate to sample the well. It had been previously observed that enough water is available for sampling, in wells which bailed dry, within about 3 hours of purging.

2. **The owner/operator continues to be in violation of OAC Rule 3745-27-10 (B)(3)(e), requiring that all monitoring wells be designed, installed, and developed in a manner that allows the collection of ground water samples that are representative of ground water. The owner/operator needs to conduct any necessary maintenance or well repairs immediately.**

An Ohio EPA review of the field data sheets for the July 2008 and previous sampling events indicates there are still wells with errors in the measured total depth. Since the wells were said to have been redeveloped, the errors in well depth may be due to other factors such as well damage. Following is a table of significant errors based on the July 2008 data.

Well	Measured Total Depth of Well Relative to Bottom of Screen
MW-3	TD 0.67' above bottom.
MW-4	TD 0.75' above bottom.
MW-5	TD 1.64' above bottom.
AW-1	TD 1.5' above bottom.
AW-2	TD 1.18' above bottom.
AW-3	TD 3.11' above bottom. (Well screen is said to be 3 feet long.)
AW-4	TD 2.12' above bottom.
BW-1	TD 1.48' above bottom.
BW-2	TD 3.45' above bottom.
BW-3	TD 0.49 above bottom.
BW-4	TD 1.34' above bottom.
BW-5	TD 1.1' above bottom.
BW-6	TD 0.77' above bottom.

- The City of St. Marys continues to be in violation of OAC Rule 3745-27-10 (C)(3)(b) which requires that the ground water flow direction be determined for all significant zones of saturation monitored. Maps for all significant zones of saturation need to be provided.**

Based on cross sections provided by the owner/operator in 2004, there are three separate significant zones of saturation. The owner/operator submitted one map indicating flow direction; however, since there are three (3) significant zones of saturation, there should be a map for each of these zones.

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4. **The City of St. Marys continues to be in violation of OAC Rule 3745-27-10 (B)(1)(b) which requires that the ground water monitoring system consist of a sufficient number of wells in significant zones of saturation that represent the quality of the ground water downgradient of the limits of solid waste placement. Additional wells need to be added to the monitoring system for each of the three significant zones of saturation.**

OAC Rule 3745-27-10 (B)(1)(b) requires that the monitoring system have sufficient number of downgradient wells in the significant zones of saturation. Based on cross sections provided by the owner/operator in 2004, there are three separate significant zones of saturation. As yet, each of these three zones is not properly monitored and additional wells are needed in each of these three zones as documented by Ohio EPA in a letter to the owner/operator dated September 27, 2004. In addition, the need for additional wells and the potential locations of these wells was discussed with the owner/operator in a meeting held in the City of St. Marys on September 16, 2004.

MORE INFORMATION NEEDED TO DETERMINE COMPLIANCE

5. **Compliance with OAC Rule 3745-27-10(C)(7), which requires that the statistical method used to evaluate ground water monitoring data be appropriate for the distribution of chemical parameters or waste-derived constituents, cannot be determined at this time. The owner/operator needs to submit specific information regarding background and normality testing.**

As part of specifying in the ground water monitoring detection plan the statistical method to be used, there also needs to be a demonstration that given the site specific ground water chemistry the statistical method used to evaluate ground water monitoring data shall be appropriate for the distribution of chemical parameters or waste-derived constituents. This rule requires that the demonstration submitted with the ground water detection monitoring plan along with the specified statistical method include a section showing that the results of a normality test supports the type (parametric or non-parametric) of the statistical method specified. This will require including in the demonstration the following information for each constituent required to be statistically analyzed:

1. A listing of the current background data to be used with the specified method; and
2. A description of the normality test used in making the demonstration including the formula for the test; and
3. The results of the normality test.

In order to determine compliance with OAC Rule 3745-27-10 (C)(7), the owner/operator must submit the above information (items 1, 2 and 3 above) to the operating record and the Ohio EPA. This needs to be in the form of a revision/addendum to the plan. If these values and the formulas for normality have been provided for the current analyses, the agency requests that the owner/operator provide the location of the specified background values.

The statistical method section of the GWMP will have to be revised each time the background data is updated. This comment or a similar comment was also made relative to the owner/operator's report for the July 2004, January 2005, July 2005, January 2006, July 2006, February 2007, July 2007, and January 2008 sampling events.

6. **Compliance with OAC Rule 3745-27-10(C)(1), which requires the plan to contain procedures which produce results which are representative of the ground water of the site, cannot be determined at this time. The City of Saint Marys needs to indicate how the collection of excessively turbid samples provides results which are representative of the ground water of the site or ensure that low turbidity samples are collected from the site's wells. They should also document why the field and laboratory turbidities significantly differ from the wells listed in the table.**

A review of the laboratory turbidity, field turbidity, and total suspended solids (TSS) data for the well samples included in the submittal indicates that several wells continue to demonstrate excessive turbidity/TSS values. Following is a list of the wells which display significantly excessive values (bold) as observed from the results for the July 2008 sampling event/resampling event. Compared to previous sampling events, the number of wells displaying high turbidity readings appears to have decreased significantly.

WELL	FIELD TURBIDITY (NTU)	LAB TURBIDITY (NTU)	LOWEST HISTORICAL REPORTED TURBIDITY (DATE) (NTU)	TSS (MG/L)
AW-4	1000	146	13.4 (06/02)	198
MW-3	49	197	50 (6/97)	10
MW-8	62	126	15.1 (7/07)	6.5
MW-9	294	28.8	28.8 (7/08)	20.5

7. **Compliance with OAC Rule 3745-27-10(B)(3)(e), which requires that monitoring wells be operated and maintained to perform to design specifications, and OAC Rule 3745-27-10 (C)(1), which requires that representative samples be collected, cannot be determined at this time. The City of St. Marys needs to describe any changes in well conditions which occurred at the site and if any of the wells were damaged. In addition, the owner/operator needs to describe any changes in purging, sampling or analytical procedures which might affect the turbidity of these samples.**

During the July, 2007 sampling event, wells MW-3 and MW-4 displayed increases in turbidity values compared to previous years. In general, the MW-3 turbidity values from June 2002 to the present are significantly greater than those prior to June 2002. In addition, the MW-4 turbidity values from February and July 2007, and January 2008 are greater than turbidity values back to June 1996 and December 2001. OAC Rule 3745-27-10 (B)(3)(e) requires that the wells be maintained to perform to design specifications and OAC Rule 3745-27-10 (C)(1) requires that procedures be used which will result in data which is representative of the ground water of the site. These increases in turbidity may be the result of changes in sampling procedure or may be due to damage to the wells. Since these wells have been installed and sampled for some time and the conditions in most of the wells have stabilized at lower turbidity values, it would not be expected that turbidity values would rise due to natural conditions. Ground water velocities would typically not be sufficient to mobilize additional fine material to cause increased turbidity unless some outside stress was applied. These wells were purged and sampled with a bailer. Care must be taken to purge and sample with a bailer in order to not produce increased turbidity. It might be helpful to use a constant flow pump at a very slow rate to obtain low turbidity samples. The use of slow rate constant flow pumps has been successful in reducing turbidity at other sites.

STATEMENTS

8. **Wells BW-5 and BW-6 were in the assessment program, but an OAC Rule 3745-27-10 (E)(9)(b) demonstration was approved and they were returned to the detection monitoring program. In the current submittal the owner/operator notes that they once again have exceeded the statistical limits for chloride. Ohio EPA can discuss this situation with the owner/operator relative to their options.**

9. **Several parameters display exceedances in MW-2, MW-3, and MW-4.** On page 5 of the submittal the owner/operator notes that, "For assessment monitoring wells, statistical significances were calculated for ammonia-nitrogen and chloride in monitoring well MW-2; chloride and sodium in monitoring well MW-3 chloride and sodium in monitoring well MW-4 and chloride in monitoring well MW-5." The owner/operator also notes that volatile organic compounds (VOCs) were observed above their respective practical quantitation limits in MW-2, MW-3 and MW-4. A review of the data also indicates that arsenic concentrations were significantly above values recorded at upgradient well MW-1. Well MW-1 reported a concentration of 9.08 µg/L while MW-2 reported a concentration of 27.9 µg/L, MW-3 reported a concentration of 98.2 µg/L, and MW-4 reported a concentration of 125 µg/L. Although statistical analyses were not performed for metals on these wells, other metals appear to display significant increases. In addition, while not statistically significant, other VOCs and mercury are present at levels below the PQL in some of these three wells. Mercury is also present below the PQL in AW-1 and AW-2.
10. **A letter dated June 13, 2008 (5-7702) sent by Ohio EPA to the City of Saint Marys provided thirty one comments related to violations, requests for more information and statements. No response has yet been received by Ohio EPA relative to these requests.** The owner/operator should respond to the agency requests.
11. **In previous Ohio EPA reviews of owner/operator reports of ground water quality the agency indicated that the City of Saint Marys continued to be in violation relative to several rules and information requested by Ohio EPA of the owner/operator had not yet been received. This information is again requested.** These comments include:
 - A violation of OAC Rule 3745-27-10 (B)(3)(d) relative to the documentation of redevelopment activities conducted in the summer of 2005,
 - A violation of OAC Rule 3745-27-10 (C)(1)(a) relative to providing field data sheets for the March 29, 2007 re-sampling event,
 - A violation of OAC Rule 3745-27-10(C)(7)(e) relative to the inclusion of metals values associated with excessive TSS values and reanalysis for statistically significant increases above background for the February and March 2007 sampling events, and

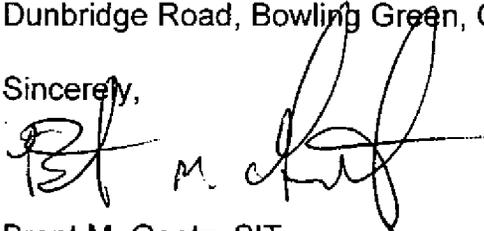
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- A violation of OAC Rule 3745-27-10 (C)(1) relative to errors in the potentiometric surface map for the significant zones of saturation produced for the February and March 2007 sampling events.

It is the understanding of Ohio EPA that Auglaize County has assumed the responsibility of post closure care at the St. Marys Landfill. Given the new role of the County, it is Ohio EPA's opinion that a meeting would be appropriate to discuss ongoing groundwater issues at the facility. Please contact me at (419)373-4114 with regards to scheduling a meeting.

If you have any questions regarding the details of this letter please feel free to contact Randy Skrzyniecki at the Ohio EPA Northwest District Office (419-373-3149). Any written correspondence should be sent to the attention of Brent Goetz, S.I.T Division of Solid and Infectious Waste Management, Ohio EPA Northwest District Office, 347 Dunbridge Road, Bowling Green, Ohio 43402.

Sincerely,



Brent M. Goetz, SIT
Environmental Specialist
Division of Solid and Infectious Waste Management

/csl

pc: Bill Petruzzi, Hull & Associates, Inc.
DSWIM-NWDO File: Auglaize County, Wapakoneta Landfill, Groundwater:

ec: Mike Reiser, DSIWM, NWDO
Jack Leow, DDAGW, NWDO
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