



State of Ohio Environmental Protection Agency

**Northwest District Office**

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

Re: St. Marys Landfill, Auglaize County  
Groundwater

July 14, 2010

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

Dear Mr. Hitchcock:

The Ohio Environmental Protection Agency (Ohio EPA) has reviewed "Statistical Report of Groundwater Quality for the Detection Monitoring Program and Notification of Constituents Detected in Assessment Monitoring Wells at the St. Marys Landfill (AUG006.100.0003.DOC)". The report was submitted by Hull & Associates on behalf of the owner/operator of the closed St. Marys Landfill (facility). The report is dated April 16, 2010 and documents the February 8 and 9, 2010 sampling event.

The facility is currently operating under the detection monitoring plan as required by OAC Rule 3745-27-10 (D) for the uppermost aquifer system, and under the assessment monitoring plan as required by OAC Rule 3745-27-10 (E) for the stated significant zone of saturation. A revised corrective measures plan has been submitted to Ohio EPA for the stated significant zone of saturation, but has been found to be inadequate. Based upon Ohio EPA's evaluation, the well systems are not adequate for the significant zones of saturation. The owner or operator should move toward implementation of an effective corrective measure. The following are Ohio EPA comments relating to the current submittal.

**COMMENTS**

**VIOLATIONS**

- 1. 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**

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**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 April 2009, 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)." 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 (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 February 8, 2010, but not sampled until February 9, 2010. 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 6 of these 19 wells (MW-3, MW-6, MW-8, AW-3, AW-4, and BW-5) were purged dry. (MW-8, which purged dry this event, was not purged dry in the July 2008 event.) The ability for some of the wells to be sampled on the same day has been established during previous sampling events.

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 February 8, 2010 and sampling on February 9, 2010. Following is a table indicating the change in field parameter values from purging on February 8, 2010 to sampling on February 9, 2010 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  $\pm 0.2$  S.U., conductance  $\pm 3\%$ , temperature  $\pm 0.5^\circ\text{C}$ ).

WELL	02/08/10 pH	02/09/10 pH	02/08/10 Temp.	02/09/10 Temp.	02/08/10 Cond.	02/09/10 Cond.
MW-1	6.98	6.97	<b>12.1*</b>	<b>10.3*</b>	2080	2110
MW-2	6.70*	7.34*	<b>11.3*</b>	<b>8.1*</b>	<b>1800*</b>	<b>1410*</b>
MW-4	6.54*	6.90*	<b>11.5*</b>	<b>10.0*</b>	2230	2220
MW-5	7.01*	7.28*	<b>11.7*</b>	<b>9.2*</b>	1550	1540
MW-7	7.02*	7.39*	<b>11.5*</b>	<b>8.9*</b>	1680*	1790*
MW-9	7.20*	7.56*	<b>10.0*</b>	<b>7.2*</b>	1090*	1130*
AW-1	6.91	7.11	<b>10.2*</b>	<b>7.7*</b>	1480	1480
AW-2	6.96*	7.36*	<b>10.4*</b>	<b>7.8*</b>	1550*	1620*
BW-1	6.94*	6.64*	<b>12.0*</b>	<b>9.5*</b>	1570	1570
BW-2	7.05*	7.41*	<b>11.0*</b>	<b>8.8*</b>	1230	1220
BW-3	7.15*	7.54*	<b>11.7*</b>	<b>8.6*</b>	1350	1390
BW-4	6.89*	7.45*	12.0*	11.0*	1710	1750
BW-6	7.17*	7.54*	<b>11.5*</b>	<b>7.8*</b>	1840	1870

Also, it is recommended that recharge rates of wells that purge 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 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 April 2009, there are two, and perhaps three separate significant zones of saturation. (AW-3 and AW-4 are screened in a separate zone from the other SZS wells based on the most recent cross sections.) The owner/operator submitted one map for the "Significant Saturated Units", indicating flow direction; however, since there are two (2) or three (3) significant zones of saturation, there should be a map for each of these zones.

3. **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 significant zones of saturation.**

Based on cross sections provided by the owner/operator in April 2009, there are two (or three) separate significant zones of saturation. As of yet, and based on the cross sections, the two thicker zones (typically occurring at about 825' and 835') are not properly monitored and additional wells are needed in each of these 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. Based on the recent cross sections and maps there are at least six (6) more monitoring wells that are needed at the site in the two thicker zones.

4. **The City of St. Marys continues to be in violation of OAC Rule 3745-27-10(D)(7)(c)(ii) which requires the owner/operator, who has not obtained approval to remain in detection monitoring under this rule, to comply with the provisions of OAC Rule 3745-27-10 (D)(7)(c)(ii) within two hundred and ten days from initial sampling. The owner/operator needs to comply with the requirements of this rule.**

On April 27, 2009 Ohio EPA received the statistical report of ground water quality for the February 11, 2009 sampling event. On page 5 of this report the owner/operator indicates, "This report serves as formal notification to Ohio EPA that the chloride values reported for detection monitoring wells BW-5 and BW-6 during the February 2009 sampling event demonstrate statistically significant increases over their statistical backgrounds." The two hundred and ten day period from initial sampling ended September 10, 2009. No demonstration for chloride at wells BW-5 or BW-6 has been provided to Ohio EPA and no approval has been granted.

5. **The City of St. Marys continues to be in violation of OAC Rule 3745-27-10(E)(1) which requires the owner/operator, who has not obtained approval to remain in detection monitoring under OAC Rule 3745-27-10(D)(7)(c)(ii), to implement a ground water quality assessment plan capable of determining the concentration, rate and extend of migration of waste-derived constituents. The owner/operator needs to implement a ground water quality assessment plan.**

On April 27, 2009 Ohio EPA received the statistical report of ground water quality for the February 11, 2009 sampling event. On page 5 of this report the owner/operator indicates, "This report serves as formal notification to Ohio EPA that the chloride values reported for detection monitoring wells BW-5 and BW-6 during the February 2009 sampling event demonstrate statistically significant increases over their statistical backgrounds." The two hundred and ten day period from initial sampling ended September 10, 2009. No demonstration for chloride at wells BW-5 or BW-6 has been provided to Ohio EPA and no approval has been granted. Also, the owner/operator has not implemented a ground water quality assessment plan.

6. **The City of St. Marys continues to be in violation of OAC Rule 3745-27-10(E)(3) which requires the owner/operator, who has not obtained approval to remain in detection monitoring under OAC Rule 3745-27-10(D)(7)(c)(ii), to submit to Ohio EPA a ground water quality assessment plan within one hundred and thirty-five days of notifying the agency of a statistically significant increase over background. The owner/operator needs to submit a ground water quality assessment plan.**

On April 27, 2009 Ohio EPA received the statistical report of ground water quality for the February 11, 2009 sampling event. On page 5 of this report the owner/operator indicates, "This report serves as formal notification to Ohio EPA that the chloride values reported for detection monitoring wells BW-5 and BW-6 during the February 2009 sampling event demonstrate statistically significant increases over their statistical backgrounds."

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The one hundred and thirty-five day period from notification ended September 10, 2009. No demonstration for chloride at wells BW-5 or BW-6 has been provided to Ohio EPA and no approval has been granted. Also, the owner/operator has not provided a ground water quality assessment plan.

7. **The owner/operator is in violation of OAC Rule 3745-27-10 (C)(1)(a) which requires that the owner or operator use the procedures documented within the sampling and analysis plan. The owner/operator needs to complete the field data sheet for each well. The owner/operator also needs to provide the time of purging for well MW-9 for this sampling event.**

On page 22 of the sampling and analysis plan the owner/operator states, "A field data sheet will be filled out for each monitor well sampled." The field data sheet in the plan shows a space to record the date and time of purging. The field data sheet utilized in the current submittal shows a space to record the "DATE/TIME OF PURGING". A review of the field data sheet for well MW-9 in the current submittal indicates that while the date of purging was provided the time of purging was not filled out as required by the plan.

8. **The owner/operator is in violation of OAC Rule 3745-27-10 (C)(10)(a), which requires the submittal of all ground water elevation, sample analysis and statistical analysis results including lab data sheets. The owner/operator needs to provide the laboratory analytical reports including QA/QC data as well as the chain of custody forms and all associated records for wells MW-6, MW-7, MW-8 and MW-9.**

A review of the submittal indicated the presence of field data sheets and historical analytical results, however; no laboratory analytical results, chain of custody forms or associated records could be found in the submittal for wells MW-6, MW-7, MW-8 or MW-9. This information must be provided as soon as possible.

#### **MORE INFORMATION NEEDED TO DETERMINE COMPLIANCE**

9. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment number 1 above. The City of St. Marys needs to indicate how the collection of excessively turbid samples provides results which are representative of the ground water of the site and ensure that low turbidity samples are collected from the site's wells. They should also document why the field and laboratory turbidities significantly differ for some of the**

wells listed in the table. Results from samples collected with excessive turbidities should not be used in background. In addition, the owner/operator needs to describe any changes in purging, sampling or analytical procedures which might affect the turbidity of these samples.

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 February 2010 sampling event. There appears to be a marked difference between some of the field and laboratory turbidity and TSS readings. If the procedures are consistent the readings should be nearly consistent.

Ground water velocities would typically not be sufficient to mobilize additional fine material to cause increased turbidity unless some outside stress was applied. Wells MW-3 and MW-4, for example, 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.

WELL	FIELD TURBIDITY (NTU)	LAB TURBIDITY (NTU)	LOWEST HISTORICAL REPORTED TURBIDITY (NTU)	SAMPLE DATE	TSS (MG/L)
MW-2	34	80	10.7	07/08/08	<b>114</b>
MW-3	<b>170</b>	<b>230</b>	50	06/24/97	<b>288</b>
MW-4	58	<b>180</b>	54	07/28/09	<b>322</b>
MW-5	59	29	23	06/25/97	36.5
AW-1	11	30	10.2	01/18/06	54
AW-2	27	70	7.4	09/19/96	75
AW-3	71	45	28.8	07/28/05	31
AW-4	ND	<b>150</b>	13.4	06/15/00	<b>278</b>

10. Compliance with OAC Rule 3745-27-10(B)(3)(e), which requires that monitoring wells be operated and maintained to perform to design specifications 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.**

During the February 2010 sampling event, the wells noted in comment 4 above displayed excessive turbidity or TSS values. 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. This excessive turbidity may be the result of sampling procedures or may be due to damage to the wells. Since the site's 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.

To further the understanding of the high turbidity values in some of the wells Ohio EPA analyzed the TSS readings at well MW-3 for trends. The earliest data, typically collected between 1994 and 1997, display a decreasing trend. This is common with new wells which, in effect, are developed over time. The data collected from January 1997 to the present show an increasing trend. This increasing trend is troublesome in that it might be due to damage to the well. This well, and perhaps others, need to be refurbished.

11. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment number 1 above. The City needs to clarify when the field parameter results were determined both in the field and in the laboratory.**

A review of the field data sheets indicates that the field parameters were determined in the field on February 9, 2010 subsequent to purging on February 8, 2010. The laboratory report indicates, for example, that "Turbidity – Client Supplied" was analyzed on February 11, 2010 at 08:39. The laboratory report also indicates that specific conductance, pH, and temperature were also analyzed on February 11, 2010 at 08:39. The laboratory-derived turbidity and TSS, however, were analyzed on February 10, 2010 at 12:36 which is prior to when the laboratory report indicates the field parameters were analyzed.

12. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment number 1 above. The owner/operator needs to explain how Figure 1, Potentiometric Surface Map for the Significant Saturated Units meets the requirements of this rule.**

**Alternatively the owner/operator may redraw the map making all necessary corrections and resubmit the map to Ohio EPA.**

A review of the above-referenced map indicates that some of the contours may be inappropriately drawn relative to data for wells MW-2, AW-3, AW-4, MW-4, and MW-7. Well MW-2, with a ground water elevation of 834.47' is drawn closer to the 835' contour line than the 834' contour line. It would be expected closer to the 834' line rather than the 835' line. However, well AW-1, with a ground water elevation of 834.90', is drawn about the same distance from the 835' line as well MW-2. Similarly, well MW-5, with a value of 836.56' would be expected to be about midway between the 836' and 837' lines, but it is located very close to the 837' line. Also, well MW-7 with a ground water elevation of 834.44' is located very close to the 835' line; and MW-9, with a value of 840.41 is drawn very close to the 840' line. Also, well BW-2, with a ground water elevation of 834.59', is drawn very near the 835' contour. Corrections will change the direction of flow in the areas of these wells.

13. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment number 1 above. The City needs to explain why the high RPD values for the arsenic and zinc duplicate sets at well MW-2 are not excessive and meet the requirements of this rule for providing representative results. If it is excessive, they need to ensure that these results are not used in background. Also, the owner/operator should review the data relative to field or laboratory errors.**

A review of the arsenic and zinc data for well MW-2 indicates that a duplicate sample set was collected on February 9, 2010. The relative percent difference (RPD) for arsenic was 30% and the relative percent for zinc was 24%. These RPD results appear to be excessive and should be explained.

14. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment number 1 above. The City needs to replace the compliance data for wells BW-5 and BW-6 in the data set and perform the control chart analyses again.**

Near the top of page 4 the owner/operator states, "Additionally, the results of outlier tests completed for chloride in monitoring wells BW-5 and BW-6 indicate that the June 2003 chloride value reported for monitoring well BW-5 and the February 2007 chloride value reported for monitoring well BW-6 are statistical outliers and are not representative of other chloride values reported for these respective monitoring wells."

The removed values are not in the background data set, but are in the compliance data set. Compliance data should not be removed especially in control charts since the removal of such data can have an effect on the statistical analyses. The removal of data from the compliance portion of the data set which appear to be outliers may result in the removal of statistically significant increases over background. The removal of apparent "outliers" from the compliance data set is inappropriate. A review of the control chart for sodium at well BW-6 also appears to indicate that sodium compliance data collected in June and December 2002 were also removed and should be returned to the data base and the analyses performed again.

15. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment number 1 above. The City needs to carefully review and explain all laboratory procedures relative to the detection of a significant number of parameters in the laboratory blank, relative percent difference exceedances in the laboratory duplicate QC data, recovery exceedances in the matrix spike/matrix spike duplicate QC data, and other QC data. In addition, the owner/operator needs to completely explain how these detections and exceedances meet the requirements of this rule. In addition the owner/operator needs to explain how the presence and detections of these parameters impacts the analyses in the field samples. The owner/operator also needs to list all necessary changes to procedures to ensure that representative results are provided. The case narrative needs to be provided.**

A review of the QA/QC portion of the TestAmerica analytical report indicates a significant number of detections in laboratory blanks. Laboratory blanks are typically prepared with analyte-free water and should result in no detections. The review also indicates a significant number of exceedances in relative percent differences in laboratory duplicates, LCS/LCS duplicates, matrix spike and matrix spike duplicates, and "other" data. No case narrative describing these problems could be found in the report.

#### STATEMENTS

16. **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, chloride, potassium, and sodium 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 18.7 µg/L while MW-3 reported a concentration of 89.2 µg/L, and MW-4 reported a concentration of 52.6 µg/L. Although statistical analyses were not performed for metals on these wells, other metals appear to display significant increases above background. Also, wells AW-1, AW-2 and AW-3 display chloride levels above upgradient background, and well AW-4 displays sodium and potassium levels above upgradient background.

17. **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. More recently, a letter dated December 1, 2008 (5-8055) provided 11 comments. Also, a letter dated July 17, 2009 (5-8504) contained 18 comments and a letter dated February 8, 2010 (5-8901) contained 26 comments. No responses have been received from the City. It is important that the owner/operator respond to the agency requests for information and violations.**
  
18. **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, but are not limited to:**
  - 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

- 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.

19. **Wells MW-2, MW-3, MW-4, and MW-5 are affected and in the assessment program.** At the bottom of the second paragraph on page 1 of the submittal the City states, "Note that significant saturated unit monitoring wells MW-1 through MW-5 are included in both the detection and assessment monitoring programs at the facility." While well MW-1 is used as a background well and is considered a detection well, wells MW-2 through MW-5 are affected based on OAC Rule 3745-27-10 (D) and are in the assessment program based on OAC Rule 3745-27-10 (E). If these wells are returned to the detection monitoring program by OAC Rule 3745-27-10 (E)(9), they will then be considered to be in the detection program.
20. **It is important that apparently non-representative data not be removed from the data set, but it should not be used in background.** At the base of the first paragraph in the "Data Review" section on page 2 of the submittal the owner/operator states, "In a letter dated March 18, 2004 from Ben Smith of Ohio EPA to Mike Mackenzie of the City, Ohio EPA states that the low flow data does not appear to be an accurate representation of groundwater quality and requested it be removed from the dataset. Note that this data was not used in the evaluation and has been excluded from the facility's dataset."

Ohio EPA did not say to exclude the data from the dataset, but indicated that it not be used in background. In the March 2004 letter, Ohio EPA stated, "The analytical results determined from low flow samples should not be utilized in the background data set until they can be shown to be representative of the ground water of the site." It is important to retain the data, but not use it in background for several reasons including the situation where, in the future, it can be shown to be representative of the ground water of the site.

21. A review of the historical data for the wells at the site indicates that some of the wells display an apparent increasing trend for non-statistical parameters and perhaps a few statistical parameters. This information is shown on the following table. Investigation of these potential trends would be appropriate.

WELL	PARAMETERS	APPARENT INCREASING TREND?
MW-6	nitrate/nitrite, conductance	yes
MW-1	conductance	yes
AW-1	conductance	yes
AW-3	nitrate/nitrite, conductance, chloride, sodium	yes
AW-4	conductance	yes
BW-1	conductance	yes
BW-2	nitrate/nitrite	yes
BW-3	nitrate/nitrite, conductance	yes
BW-4	nitrate/nitrite, conductance	yes
BW-6	nitrate/nitrite, conductance	yes

22. **A review of "Figure 1 Potentiometric Surface Map for the Significant Saturated Units" indicates the values at several pairs of wells, which are located relatively close to each other, cause unusual changes in ground water gradient in their immediate area.** In the immediate area of wells MW-4 and AW-3 the data causes the contours to constrict indicating an anomalous increase in gradient. In the immediate area of AW-4 and MW-7, the data indicates a local change in gradient from east to west at these wells. This information suggests that the two wells are completed in separate zones. It appears from the ground water data and the boring log/cross section data, that AW-4 is completed in a different zone than either MW-7 (deeper zone typically observed at about 825') or MW-4 (shallower zone typically observed at about 835').
23. **In the first paragraph in the "Statistical Analysis" section on page 3 the owner/operator references the U.S. EPA 1989 and 1992 statistical guidance documents relative to the statistical methodologies and techniques used in this report. The owner/operator should be aware that the 2009 U.S. EPA Unified Guidance is now available and should take precedence over the other two documents.**
24. **Duplicate samples are part of the same duplicate sample set and are collected at the same time as each other.** Near the top of page 4 the owner/operator states, "A review of the dataset established for monitoring well BW-6 indicates that the relative percent difference calculated for the chloride values reported for the original and duplicate samples collected on March 10, 1997 and on August 20, 1997 exceed 50 percent." Duplicate samples are collected as part of proper QA/QC. When collecting these samples, both samples are considered part of a duplicate set of samples. The results of these samples should be within a very narrow range of each other. If they are within this range, as expressed by a low relative percent difference (RPD), the mean of these results should be taken and that mean should be used in statistical analyses.

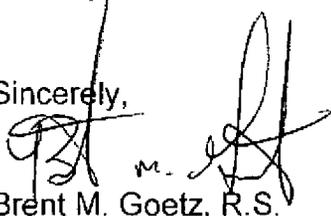
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If the difference between these members of the duplicate set exceeds the RPD, the data from either of these samples should not be used in statistical analyses. There is no "original" sample followed by the "duplicate" sample.

25. **Sodium in assessment well AW-4 appears to display an increasing trend over time. The earliest sodium results, collected beginning in December 1995, are in the range of 37 to 54 mg/L. The latest data, collected in the last 5 years, are in the range of 70 to 88 mg/L. Well AW-4 is completed in an intermediate zone.**

If you have any questions 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, Division of Solid and Infectious Waste Management, Ohio EPA Northwest District Office, 347 Dunbridge Road, Bowling Green, Ohio 43402.

Sincerely,



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

/lb

pc: Auglaize County Commissioners  
Bill Petruzzi, Hull & Associates, Inc.

~~DSIWM-NWDO File: Auglaize County, St. Marys Landfill, Groundwater~~

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