



State of Ohio Environmental Protection Agency

Northwest District Office

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

Re: Hancock County Landfill
Spring 2008 GW Monitoring
Report

August 7, 2008

Hancock County Board of Commissioners
300 South Main Street
Findlay, Ohio 45840

Dear Commissioners:

On July 22, 2008, the Ohio Environmental Protection Agency (Ohio EPA), Northwest District Office, received a document titled "Groundwater Monitoring Report, Spring 2008, (Year 14, 2)", dated July 21, 2008, for the Hancock County Sanitary Landfill (Facility). Ohio EPA reviewed the submittal to determine compliance with Ohio Administrative Code (OAC) Rule 3745-27-10. Below are Ohio EPA's comments regarding this submittal.

COMMENTS

VIOLATIONS

1. **The owner/operator continues to be in violation of OAC Rule 3745-27-10 (C)(1) which requires that Hancock County provide, "... an accurate representation of ground water quality at the background and downgradient wells". Hancock County needs to ensure that procedures are utilized which provide representative samples of low turbidity in all future sampling events. In addition, analytical data from samples displaying these excessive turbidity readings must not be utilized in any background data base unless they can be shown to be representative of the ground water of the site.**

A review of the submittal indicates that several of the samples collected displayed excessive turbidity readings. While sampling procedures initiated by the owner/operator during this sampling event have greatly reduced the number of wells with turbid samples, four wells, MW-13 (157 NTU), SW-12 (713 NTU), SZ-03B (>1100 NTU for the sample and resample) and SZ-04A (290 NTU), displayed excessive turbidity readings. The owner/operator's Table 3-3 also provides some of this information.

These turbidity readings are excessive and are representative of samples with extreme levels of suspended solids. The analytical results are skewed by the inclusion of these suspended solids and are not representative of the ground water of the site. Because the results are skewed, the utilization of these samples indicates that the procedure is not capable of determining the impact of the facility on the quality of the ground water. Also, the procedures utilized are not resulting in the collection of representative samples. The >1,100 NTU values are at least 220 times the target turbidity levels expressed by the owner/operator in the sampling and analysis plans.

MORE INFORMATION NEEDED TO DETERMINE COMPLIANCE

- 2. Compliance with OAC Rule 3745-27-10 (C)(3)(b), which requires that the owner/operator, "...determine, for the uppermost aquifer system and for all significant zones of saturation monitored, the direction of ground water flow ...", cannot be determined at this time. Hancock County needs to accurately redraw the map for the SW zone and provide the new interpretations to Ohio EPA. Alternatively, the owner/operator should clearly explain how the current interpretations accurately represent ground water flow under the site.**

A review of Figure 3, "Silt Zone Potentiometric Surface Map May 12, 2008" indicates several possible problems. In the northeast corner of the site, ground water elevations in wells SW-13 and SW-3 are nearly flat with each other (ground water elevations of 764.51' and 764.55' respectively). A contour line drawn through one of these wells, would, therefore, extend nearly through the other well and trend north northwest to east southeast. The 766' and 764' contours, however, are drawn approximately north northeast to south southwest which is perpendicular to this trend. The owner/operator's interpretation in this area effectively spreads the 764' and 766' contours in this area. This results in a hydraulic gradient between SW-13 and the 764' contour of 0.004; and a hydraulic gradient between SW-3 and the 766' contour of 0.006; but results in a hydraulic gradient between SW-13 and SW-3 of 0.00009. This anomalous change in hydraulic gradient may be indicative of a contouring error.

While the map consistently shows a general southeast to northwest flow direction for ground water in this zone there are local anomalies in the interpretation which may affect the understanding of the ground water flow in these areas. For example, well SW-9 with a ground water elevation of 755.46 and located in the north western portion of the site, is drawn very near the 754' contour and a distance from the 756' contour. Unless there is clear evidence of a significant change in gradient the well should be located much closer to the 756' contour. In general the contours on the map should more closely honor the data points.

As previously indicated the general ground water flow direction is from the southeast toward the northwest. In the upgradient portion, located on the southeast, the dominant feature is a generally southeast to northwest trending swale. The map interprets this swale as ending abruptly at the 758' contour line. Northwest of this contour line and roughly on trend with the swale on the southeast is a pronounced flat-topped ground water nose trending toward the northwest. It appears that the presence of the nose is controlled by ground water measurements from well B-8. Well B-8 is a new well installed recently. It is possible there is an error in the survey point on the casing or the correlations relative to the ground water producing zone. The owner/operator should review all of the data associated with this new well to ensure proper elevations and correlations.

3. **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 should explain how the requirements of this rule have been met relative to the pH in well MW-14.**

OAC Rule 3745-27-10 (C)(1) requires procedures be used which provide representative results. The collection of representative samples typically requires purging the well until stability is observed for key indicator parameters including temperature, conductivity and pH. The field data sheet for well MW-14 indicates that stability was not observed during purging for pH. Stability for pH is based on a variability in the last three readings of 0.1 standard units. The variability during purging for the May 13, 2008 sampling event was 0.17 standard units. Report page 1-5 confirms this observation. In this situation it may be appropriate to purge the well for a longer time.

4. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. In January 2008 the owner/operator advanced several borings and installed one inch piezometers in seven of those borings. A report of this activity has not been received. In order to determine if the piezometers accurately describe conditions at the landfill the owner/operator should provide a report of this activity including boring logs and a map showing the borings and wells installed at that time.**

On page 2-2 of the submittal the owner/operator states, "In January, several borings were advanced in the borrow area to the west of the landfill. Seven of the borings were completed as 1-inch inside diameter piezometers. These piezometers were installed in grey sandy gravels or interbedded silts and clays. The piezometers [sic] installed in B-8 appears to screen the Silt Zone at the Landfill, while the other piezometers are screened in saturated lenses deeper than the Silt Zone. The potentiometric surface measurement for piezometers [sic] B-8 was included in the potentiometric surface map for the Silt Zone."

Since no report of this activity has been received, it is unclear how, or if, the geology of the site changes in the area of the borrow pit located immediately west of the active landfill. It is also necessary to review this data to determine how the zones observed in B-8 correlate with the other defined zones on the site. This information would be helpful in understanding the geology and hydrogeology of the site and also determine if the zones are properly monitored.

5. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. It is unclear when the wells were purged and sampled. The owner/operator needs to clarify when the wells were purged and sampled.**

In the last paragraph on page 2-3 of the submittal the owner/operator states, "Groundwater levels in the uppermost aquifer were between 3.37 feet (MW-8) and 4.40 feet (MW-12) feet higher in April 2008 than in October 2007." Later in that paragraph the owner/operator states, "The potentiometric surface map for the May 2008 sampling event exhibits the same general groundwater flow patterns as the Fall 2007 flow map for this zone." In addition, the field data sheets reference May 2008 dates for the sampling events. However, it is now unclear if the owner/operator measured the wells in April 2008 or May 2008.

6. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. The owner/operator indicates that the Silt Zone under the northern portion of the borrow area may be displaying recharge from water in the borrow pit. The owner/operator needs to clarify this statement.**

In the second paragraph on page 2-4 the owner/operator states, "In the northern portion of the expansion/borrow area of the landfill, there appears to be a radial flow component that may be due to recharge to the silt Zone from the water standing in the low-lying borrow area." While recharge to saturated permeable zones may occur from standing water on the surface, the bottom of the borrow pit slopes to the south and the standing water is located in the southern one half to one third of the borrow pit. Recharge in the "northern portion of the expansion/borrow area of the landfill" is more likely from infiltration of precipitation and not from standing water, which is located to the south. In addition, since the standing water is in the southern portion of the borrow area the Sand/Silt Zone would display recharge if it was occurring. There is no mention of recharge of the standing water to the Sand/Silt Zone.

7. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. Relative percent difference (RPD) values produced from the comparison of analytical results for the two samples in the duplicate sets are generally small and support the use of good quality assurance/quality control (QA/QC) procedures.**

For copper at the SW-2 duplicate sample set (labeled SW-2 and SW-25), however, the RPD was 123%, which is excessive. The owner/operator should explain the reasons for this excessive RPD.

On page 3-3 the owner/operator states, "Based on lab analyses, only one parameter did not meet these criteria; copper in SW-2/SW-25 showed a 123% difference." While overall the RPD values show excellent attention to consistency as required by OAC Rule 3745-27-10 (C)(1) the excessive RPD for copper should be investigated to ensure that proper QA/QC is being followed.

8. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. The owner/operator needs to explain why the field data sheet for well MW-13 indicates that the ground water sample was "clear" and yet the turbidity was 157 NTU. In addition the owner/operator needs to explain why the turbidity at well SZ-4A, which is reported at 290 NTU, is not listed on Table 3-3, "Monitoring Well Samples with Turbidity Greater than 100 NTUs".**

On page 3-5 the owner/operator provides Table 3-3 "Monitoring Well Samples with Turbidity Greater than 100 NTUs". On this table they indicate well MW-13 exceeded 100 NTU. A review of the field data sheets indicates that MW-13 displayed a turbidity value of 157 NTU, but was described as "clear". In addition, the field data sheets indicate that the sample turbidity for well SZ-4A was 290 NTU and yet it was not included on the list. It is unclear what samples actually exceeded the owner/operator's 100 NTU stated limit.

9. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. The owner/operator should explain how Figure 5 Statistical Method Flowchart on page 3-6 meets the requirements of this rule and accepted statistical procedure or correct the flow chart.**

On page 3-6 the owner/operator provides Figure 5 Statistical Method Flowchart. This chart indicates that non-detect values are replaced by $\frac{1}{2}$ the detection level (presumably PQL) prior to the determination of normality which occurs prior to the use of Cohen's adjustment. Cohen's adjustment cannot be utilized if there are no non-detects. There would be no non-detects if they were already replaced by $\frac{1}{2}$ the PQL.

10. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. On the field data sheet for well SW-1 the owner/operator states, "Duration from end of purging to sampling = #VALUE! hours". It is unclear what this means. The owner/operator needs to clarify information provided on the field data sheet for well SW-1.**

11. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. The owner/operator needs to explain how increasing the amount of flow to purge the well dry meets the requirements of this rule. The owner/operator must also specify how it will purge the wells in the future in a manner which will result in representative samples.**

On the field data sheet for well SZ-4A the owner/operator states, "Increase Flow to Purge Well Dry". Prior to the increased rate the turbidity readings were "clear 115, 109.1, clear, 55.2". It appears that turbidity was decreasing. The sample turbidity, following an increased flow to purge the well dry, was 290 NTU and the sample was cloudy. In wells with turbidity problems, increasing the purge rate will tend to increase the turbidity by increasing intergranular velocities and bringing in more fine material to the well. Purge rates should be much less than development rates. Ideally, water levels should not be allowed to be below the top of the screen since chemical changes could occur. OAC Rule 3745-27-10 (C)(1) requires the use of procedures that provide representative samples. Increasing the purge rate resulted in providing samples which were not representative due to their turbidity. (For reference see comment number 1 above.)

12. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. The chain of custody form for the May 2008 event is a copy which is very light and hard to read. It is not possible to determine exactly what information was provided on the form. The owner/operator needs to provide a better copy of this form.**
13. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. If the limits provided in Appendix D are equal to the PQL the limit should be listed as less than the PQL (<PQL).**

A review of the Limits for Determination of Statistically Significant Events in Appendix D indicates that the limit for ammonia at well MW-14 is listed as <0.5 mg/L which is equal to the PQL. Other limits, however, which appear to be equal to the respective PQLs, are not labeled as less than (<). The owner/operator should understand that detections at the PQL are statistically significant increases if all of the background data is non-detect. This is because the non-detect values are less than the PQL and anything equal to the PQL is a detection.

14. **Compliance with OAC Rule 3745-27-10 (C)(1) cannot be determined at this time. For rule citation see comment 1 above. The owner/operator should provide or modify field or laboratory procedures to ensure that proper labeling of sample containers will be ensured at all times. In addition, the owner/operator should explain what problems have occurred relative to mislabeling of sample containers.**

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In the case narrative from TestAmerica regarding Belmont Labs Lot # C8E220381 the laboratory states, "The client label on one of the vials for 0805733-014B was SW12, collected 5/12/08 16:30. The client label on one of the vials for 0805733-19B was MW12, collected 5/12/08 15:45. These vials were not used for analysis as they may have been mislabeled. It is unclear what happened and how mislabeling occurred.

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 Jeremy Scoles, Division of Solid and Infectious Waste Management, Ohio EPA Northwest District Office, 347 North Dunbridge Road, Bowling Green, Ohio 43402.

Sincerely,



Jeremy Scoles, SIT, CHMM
Environmental Specialist
Division of Solid and Infectious Waste Management

/lr

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