OhioEPA

State of Ohio Environmental Protection Agency

Northeast District Office

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

February 20, 2008

RE: MAHONING LANDFILL GROUND WATER NOTICE OF VIOLATION

CERTIFIED MAIL

Scott Herman
Mahoning Landfill, Inc.
3510 Garfield Road
New Springfield, Ohio 44443

Dear Mr. Herman:

The Ohio Environmental Protection Agency (Ohio EPA) has reviewed the Ground-Water Assessment Program-Vertical Rate and Extent Evaluation, dated October 30, 2007. The document was received at the Northeast District Office of Ohio EPA on October 31, 2007. The document is a continuation of the owner/operator's ground water quality assessment report and contains:

- the results of a pumping test to determine the hydraulic conductivities of the Vanport Limestone and the Lawrence Claystone;
- the estimated time of travel for vertical migration of ground water through the Lawrence Claystone;
- ground water quality comparisons between residential water wells surrounding the landfill and upgradient wells monitoring the background ground water quality at the landfill;
- a determination that the full vertical rate and extent has been determined;
- a statement that well VP-1 should be removed from the assessment program, and
- a statement that no additional wells should be installed in the Vanport Limestone.

Ohio EPA does not concur with the majority of the owner/operator's conclusions or statements, and has identified the following violations:

The owner/operator remains in violation of OAC Rules 3745-27-10(E)(1) and 3745-27-10(E)(6) for failing to install a sufficient number of vertical extent wells in the Vanport Limestone to make a complete determination of the vertical rate, extent, and concentration of ground water contamination beneath the facility.

The owner/operator has not yet installed a sufficient number of vertical extent wells in the Vanport Limestone to determine the full vertical rate, extent and concentration of ground water contamination that is present in the Middle Kittanning Sandstone (uppermost aquifer system) above. The owner/operator has only installed one deep vertical extent well, VP-1, in the Vanport Limestone adjacent to uppermost aquifer system compliance well MKS-4 as of December 1, 2006. While ground water sampling results from VP-1 appear to indicate that the vertical rate and extent of ground water contamination evident at MKS-4 has been adequately determined, this is only one deep well to monitor possible vertical migration from a contaminant plume that is nearly 2,000 feet wide at the southern boundary of the facility and migrating off site. With a contaminant plume so large, and geologic and hydrogeologic conditions that may not be the same along the rest of the southern boundary of the facility, additional wells installed into the Vanport Limestone are necessary to ensure that the full vertical rate, extent, and concentration has been determined.

To return to compliance with these rules, the owner/operator must immediately install and sample three additional vertical extent wells in the Vanport Limestone. These additional vertical extent wells should be spaced along the remaining width of the existing plume of contamination in the uppermost aquifer system, in order to identify and provide a more comprehensive analysis of any vertical migration of ground water contamination to the Vanport Limestone. Ohio EPA recommends that one additional Vanport Limestone vertical extent well be installed within 50 feet of each of the following Middle Kittanning Sandstone compliance/assessment wells: MKS-5, MKS-6, and MKS-9S, to adequately determine whether or not ground water contamination present in the Middle Kittanning Sandstone at these locations has migrated to the Vanport Limestone. The owner/operator must immediately revise the assessment plan, to include the details of this investigation, and submit it to the Ohio EPA. As always, these rules are self implementing. If the owner/operator determines that ground water contamination has migrated to the Vanport Limestone, the owner/operator is obligated to immediately undertake all necessary plan revisions and field work to investigate the next saturated zone below the Vanport Limestone to make a full vertical determination of rate, extent, and concentration.

The following comments are additional issues of technical disagreement regarding the subject document:

- Regarding the section titled, "Site Hydrogeologic Setting," the owner/operator makes some very site specific interpretations of the hydrogeologic conditions at Mahoning Landfill based on more general local/regional geologic information and typically expected ground water flow behavior. For example, the owner/operator states that because the landfill is located close to a ground water discharge area, that nearly all ground water flow components are horizontal and vertical flow is negligible. The owner/operator contends that the site specific downward hydraulic gradient that is present, as evidenced by the fact that water levels in the Vanport Limestone (VP-1) are only 0.53 feet lower than the water levels in the Middle Kittanning Sandstone

(MKS-4), supports this. Ohio EPA does not concur. The site specific information is clear, a downward hydraulic gradient exists. Therefore, vertical flow is present and occurring across the Lawrence Claystone from the Middle Kittanning Sandstone to the Vanport Limestone. Previous drilling in the Lawrence Claystone, test borings TB-17 and TB-18, yielded significant amounts of water. So the unit is not acting as an impenetrable aquitard. Ground water is present and moving through the unit.

- Regarding the section titled, "VP-1 Pumping Test Results and Computer Modeling Evaluation," Ohio EPA did not have any significant comments pertaining to the pump test and the analysis that was conducted to calculate the hydraulic conductivities for the Vanport Limestone and the Lawrence Claystone. However, Ohio EPA does not concur with the owner/operator's time of travel calculation for the Lawrence Claystone (191 years). Ohio EPA noted that the owner/operator used a porosity of 15% (0.15) for the claystone in the velocity portion of the time of travel calculation.

  Ohio EPA has two concerns about the use of this porosity value for the claystone. First, it is not clear that this value represents the effective porosity of the claystone. Using the effective porosity provides a much more meaningful velocity calculation, because it only takes into account the connected pore space or fractures that are truly available for ground water flow through the formation. If this value is not the effective porosity, then the owner/operator has calculated a velocity that is much lower than the true velocity at which ground water is moving through the claystone.

  Second, this porosity value is much higher than any of the referenced values for effective porosity Ohio EPA was able to find for a claystone or shale. According to Domenico and Schwartz (1990), the expected range of effective porosity for shale is 0.5 to 5%. According to Driscoll (1986), the expected range of effective porosity for shale is 0 to 10%. And, according to the USEPA Guidance Document on the Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities (1989), the default value of effective porosity for shale is 0.01%. As such, the use of 15% porosity in the velocity calculation grossly underestimates the true velocity of ground water flowing downward through the claystone, and has resulted in a much longer time of travel calculation than what may really be happening.

- Regarding the section titled, "Residential Well Water Quality Evaluation," the owner/operator uses off site ground water quality results from unsecured, open hole, residential water wells potentially communicating with more than one saturated unit, that may or may not be affected by water softeners, for comparisons against the background ground water quality results produced by the on site background ground water monitoring wells installed at Mahoning Landfill. Ohio EPA cannot accept the comparison of site specific background ground water quality results collected from Mahoning Landfill's secured and regulated on site ground water

monitoring system to off site, unsecured, minimally regulated, residential water wells. If the owner/operator is concerned that the on site ground water monitoring system does not adequately represent true background ground water quality, the owner/operator is free to install as many additional background monitoring wells as necessary, in accordance with OAC Rule 3745-27-10.

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 Entity from obligations 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 for remedying conditions resulting from any release of contaminants to the environment.

If you have any questions concerning this letter, please contact me at (330) 963-1257.

Sincerely,

Katharina Snyder
Division of Solid and Infectious Waste Management

KS:cl

cc: Mark Kroenke, DDAGW-NEDO
Mary Helen Smith, Mahoning County Health Department
File: [Sowers/LAND/MAHONING/GRO/50]

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Sent To: Scott Herman

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