



TOWN OF PERINTON

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TO: Perinton Town Board
FROM: Perinton Conservation Board
RE: Interim Recommendations Regarding Current WM Odor Issues & Mitigation Efforts
DATE: 1/24/18

Board Members:

As requested, the Perinton Conservation Board (PCB) was directed to provide the Town Board with a factual explanation for the long-term persistence of landfill odors from the High Acres landfill.

Additionally, the PCB was asked to review resident concerns and comments, and lastly, to provide the Town Board with recommendations concerning the Town interaction with the facility regarding odors and other operational issues.

EXECUTIVE SUMMARY

Resident odor complaints have increased dramatically since July, 2017. Together with Town staff and the Town Supervisor, I meet with the management of Waste Management (WM) in mid November to discuss operational issues that had involved the uptick in resident complaints and mitigation measures that were being implemented. On December 7, 2017 WM sent a letter to the PCB (see Appendix 1) describing the company's intended odor control and mitigation plan. At the January 16th meeting of the PCB, WM presented additional information (See Appendix 2); the board was also in receipt of resident comments (PCB meeting and written). WM also sent a formal corrective action plan to NYSDEC Region 8 Director, Mr. Paul D'Amato, and copied the PCB (See Appendix 3).

It is the opinion of the PCB that increased odors at High acres landfill are due to:

- A gas collection system design that relied on "slip well technology" (exclusively in Cell 11) – use of vertical wells, only - rather than concomitant horizontal collectors which WM has historically used in other wells.

The PCB notes that these design changes were approved by NYSDEC.

The PCB recommends that NYSDEC direct WM to comply, now, with new landfill gas collection regulations (below) instead of at permit renewal (2023):

In accordance with 6 NYCRR 363-7.1(e)(1) landfills such as High Acres landfill which receive putrescible waste must install horizontal landfill gas collection lines. The horizontal gas collection lines, must be installed in the waste mass at a horizontal spacing of not more than 100 feet and a vertical spacing of not more than 20 feet and shall terminate at least 100 feet from the exterior slope of the waste mass.

- WM's decision to remove the temporary Cell 10 internal access road which required the excavation and on site hauling of odorous materials during unfavorable weather conditions in the summer months.



- Loss of significant vacuum (15 inches of water column vs. the typical 40 inches of water column) due to a clogged header pipe.
- Watering out of 12 vertical wells (approximately 40% of the available gas collection system in Cell 11) causing a loss of vacuum, resulting in increased gas emissions, including NMOCs and hydrogen sulfide (H₂S).
- Continued lack of “looped” collection header system limiting the vacuum in the Cell 11 gas collection system
- Incidents of extended holding times for CSX rail car waste transfer containers loaded with municipal solid waste.

Other operation issues:

- January 2, 2018 facility gas plant shut-down with concomitant flare resonance (flow-induced vibrations, FIV).
- January 10, 2018 system subjected to FIV testing (no resident pre-notification).

Below, are interim recommendations for Town Board review concerning WM’s current compliance obligations under NYSDEC permit authority (permit renewal in 2023) and its effect on odors and flare vibration disturbances affecting nearby Town residents.

These recommendations are to 1) assure compliance with newly-implemented NYSDEC Part 363-7.1(e)(1) landfill gas collection requirements (effective November, 2017), 2) improve monitoring of emissions from the landfill, and 3) implement corrective action when monitoring shows an issue exists, 4) immediately divert MSW filling in the Perinton portion of High Acres landfill. until all mitigation measures are verified completed and effective, 5) greatly reduce the potential for flow-induced vibrations, 6) provide information regarding odor effects at nearby Fairport schools, 7) provide for an on-site electric power capacity to operate the gas collection and control system in the event of a power outage, and to 8) compel timely notification¹ of residents regarding exceedances, or other operational actions that may impact area residents. These recommendations apply to the entire facility – both Perinton and Macedon portions.

Specifically, with regard to air quality monitoring, the PCB recommends that the Town of Perinton petition the NYSDEC to change High Acre’s air quality permit to compel (A) compliance with newly-effective Part 363-7.1(e)(1) landfill gas collection requirement; (B) regulatory monitoring of hydrogen sulfide (H₂S) gas at the facility; (C) lower threshold landfill surface monitoring levels of methane gas from 500 to 200ppmv as well as monitoring for H₂S if during landfill surface scans methane is detected at any location at a concentration of 200 ppmv or greater that location must be monitored for H₂S ; (D) compel increased frequency of surface monitoring for methane; (E) compel additional monitoring of all cover penetrations such as the gas collection wells; (F) compel timely reporting of monitoring exceedances to NYSDEC, Town of Perinton, and local residents as immediate mitigation measures.

¹ The PCB recommends that “timely notification” means at least 24 hours prior to initiating operational actions that could cause odors, or operational exceedances; or within one-hour of a time-critical event (such as unexpected gas plan shutdown), or within 12 hours of a known permit exceedance that could impact local residents.

PCB RECOMMENDATIONS:

- (1) **Direct WM to retrofit Cell 11, and all existing and future solid waste disposal areas, to conform with 6 NYCRR 363-7.1(e)(1).**

Rationale:

High Acres' operating permit renewal is up for renewal in 2023. These new regulations should be implemented now. They reaffirm the use of horizontal gas collection systems. The PCB further recommends that the spacing of vertical wells be 200 feet (Cell 11 and ongoing).

- (2) **High Acres should operate the collection and control system so that the hydrogen sulfide concentration is less than 10 ppbv above background at the surface of the landfill for odor control and compliance with the NYSDEC 1-hour average concentration of H₂S not to exceed 0.01 ppmv (10 ppbv) under 6 NYCRR 257-10.3.**

Rationale:

Landfill gas is composed of approximately 50% methane (CH₄), 49% carbon dioxide (CO₂), 1% non-methane organic compounds (NMOC) and reduced sulfur compounds such as hydrogen sulfide (H₂S).

CH₄ and CO₂ are colorless and odorless gases but NMOCs can impart some odors. H₂S on the other hand is colorless but can impart the distinct odor of rotten eggs. The human olfactory sense (smell) can detect H₂S at very low concentrations but the olfactory sensitivity to H₂S concentration in the air can vary from person to person. According to the New York Department of Health's, Hydrogen Sulfide Chemical Information Sheet (revised October 2005) people can initially smell H₂S in the air at a concentration between 0.5 parts per billion by volume (ppbv) and about 100 ppbv. The New Jersey Department of Health Fact Sheet for Hydrogen Sulfide, revised May 2012, (see Appendix 3), indicates the odor threshold for H₂S ranges from 0.008 to 0.1 part per million by volume (ppmv) or 8 to 100 parts per billion by volume (ppbv). According information in both fact sheets (New York, New Jersey – See Appendix 4), odor thresholds vary greatly, and one should not rely on smell alone to determine potentially hazardous exposures. So, using the New York and New Jersey H₂S odor threshold information H₂S can be detected by most people at a concentration range between 0.5 ppbv and 100 ppbv (see Appendix 4).

On January 11, 2018, the PCB requested metadata of reduced sulfur (e.g., hydrogen sulfide) analysis of several samples of landfill gas from High Acres landfill. High Acres provided analytical data (see Appendix 5) for gas samples taken on 3/22/2010, 1/24/2012 and 8/15/2012. H₂S concentrations in the samples taken varied from 51 ppmv to 470 ppmv.

High Acres landfill is required to operate the landfill gas collection and control system (GCCS) in accordance with 6 NYCRR 208.4(d) so that CH₄ concentration is less than 500 ppmv above background at the surface of the landfill. This rule requires High Acres landfill to conduct surface testing (quarterly) of the landfill to demonstrate that CH₄ concentrations are less than 500 ppmv.

While detecting CH₄ concentrations of less than 500 ppmv at the surface of the landfill meets the operating criteria of 208.4(d), it doesn't provide control of odors from such gases as H₂S.

Assuming the landfill gas at High Acres landfill has 50% CH₄ with an H₂S concentration of 470 ppmv (the higher value of H₂S detected from High Acres landfill gas samples), there is the potential for off site migration of H₂S at concentrations high enough to be smelled beyond High Acres' property boundary.

For example, using the assumption above 50% CH₄ equates to 500,000 ppmv CH₄ with 470 ppmv H₂S. Using the operating criteria under 208.4(d) with CH₄ concentration at the landfill surface being less than 500 ppmv, the hydrogen sulfide concentration could be approximately 470 ppbv (dividing 500,000 ppmv CH₄ and the 470 ppmv H₂S by 1000). The 470 ppbv H₂S concentration is approximately 5 to 1000 times the odor threshold range for H₂S².

Using the lower concentration of H₂S of 51 ppmv in the High Acres landfill gas the H₂S concentration component in a landfill surface CH₄ concentration of 500 ppmv would be approximately 50 ppbv (about the middle of the detectable H₂S odor threshold range).

There are H₂S detection meters with a detection level of 3 ppbv, a resolution of 20 parts per trillion and an accuracy of +/-1ppbv at 5 ppbv. **High Acres should operate the collection and control system so that the H₂S concentration is 10 ppbv or less above background at the surface of the landfill for odor control and compliance with the NYSDEC 1-hour average concentration of H₂S not to exceed 0.01ppmv (10 ppbv) under 6 NYCRR 257-10.3.**

To determine if this level is exceeded, the owner or operator must conduct surface testing using a hydrogen sulfide analyzer. The owner or operator must conduct surface testing in a manner similar to 6 NYCRR 208.4(d) at least once every two weeks around the perimeter of the landfill and daily around the perimeter of the landfill working face, open areas of the landfill surface such as areas of excavation into the waste mass, drilling locations where vertical gas collection wells are being installed and monthly along a pattern that traverses the landfill at no more than 30-meter intervals at any surface scan location where methane is detected at 200 ppmv or greater and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover, and all cover penetrations.

(3) Compel monitoring for hydrogen sulfide at any surface scan location where methane readings are 200 parts per million by volume or greater.

Rationale:

The PCB suggests 200 ppmv CH₄ as an action level because based on analytical data for the High Acres' landfill gas described above the H₂S concentration might be 10 ppbv or greater.

(4) Request vertical and horizontal gas collection well monitoring (temperature, oxygen/nitrogen, and pressure) be performed weekly instead of monthly.

Rationale:

This will provide more data on the functionality of each gas well and provide more real time data that can be used to show changes in well performance and providing an indication that corrective action might be needed. Assure there are enough wells to cover the landfill to control gas emissions (surface monitoring). If methane or H₂S emissions have exceedances, that can't be corrected by adding additional cover or by adjusting the vacuum of gas collection wells in the areas of exceedance, then additional vertical wells might be needed to be installed.

(5) Direct that WM be required to provide PCB with updates on mitigation progress and monitoring at each scheduled PCB meeting. (This information would be made public.)

Rationale:

² This does not take into account the fact that H₂S could react with oxygen and minerals in the cover soil to reduce the concentration of H₂S in the methane surface emissions.

Timely reporting will assure timely identification of operational issues before odors are detected outside the facility perimeter and impacting local residents.

(6) Ask Waste Management to immediately suspend all municipal solid waste (MSW) disposal in Perinton temporarily until WM can demonstrate to the satisfaction of the NSDEC that all mitigation and compliance measures have been met and demonstrated effective in odor emissions.

Rationale:

WM needs to focus all efforts on odor mitigation.

(7) Have WM support third-party monitoring of local Fairport schools, as directed by the Fairport Superintendent of Schools, for NMOCs and H₂S until such time as the technical data indicates that there is no health concern due to odors from the High Acres landfill.

Rationale:

Children are more susceptible to airborne environmental exposures because their lung function is not completely developed³

(8) Request that NYSDEC implement flow-induced vibration (FIV) requirements⁴ that minimize flare-induced vibration occurrences, and compel reporting and resident notification. Require residential / Town notification of gas plant shutdowns exceeding one-hour and the potential impacts for odors, vibration, or other potential issues that can immediately impact residences.

Rationale: Many factors can influence a sustained (> one hour) gas plant shutdown. Some include: interruption of power generation, landfill collection system issues, landfill powerplant issues. Gas plant shut down can affect odor generation, as well as produce flare vibrations at flare startup and operation that can affect local residences.

(9) Request that NYSDEC compel on-site backup power (generator) to operate the gas collection and control system such that a power failure or gas plant shutdown will not affect system control (vacuum) requirements, gas/odor collection and control per Title 5 permit which covers the entire facility (both Perinton and Macedon).

Rationale: Per NYSDEC Title 5 permitting, gas collection / control systems cannot be inoperative for > one hour without taking action to control landfill gas emissions. The High Acres landfill expansion into Macedon will affect gas collection and transport because of increased piping distances (and may affect vacuum) as additional cells are added.

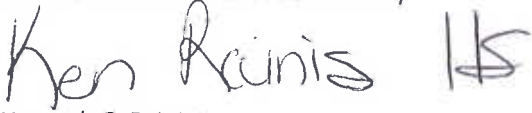
(10) The Town of Perinton establish a question and answer resource on the Town website that provides general information about landfills, odors, and odor control. The PCB recommends that the Town engage a third-party consultant who will work with the PCB's topic outline. Furthermore, the PCB recommends that the consultant compile answers to submitted questions by residents to the Town website. Additionally, a notification should be sent to the residents informing them that this resource is available.

³ T. F. Bateson and J. Schwartz, "Children's response to air pollutants," *Journal of Toxicology and Environmental Health—Part A*, vol. 71, no. 3, pp. 238–243, 2008.

⁴ Although the perceptibility threshold for ground-borne vibration is about 65 vibration decibels (VdB), human response to vibration is not usually substantial unless the vibration exceeds 70 VdB.

The PCB is currently reviewing resident comments and plans to make further recommendations to this Board regarding the Host Community Agreement and Special Use Permit (SUP).

For the Perinton Conservation Board,

Handwritten signature of Ken Rainis in black ink, followed by a stylized monogram 'KR'.

Kenneth G. Rainis
Chairman

TECHNICAL NOTES

Recommendation 1 Implementation of Hydrogen Sulfide (H₂S) Standard:

Operate the collection system so that the H₂S concentration is 10 parts per billion by volume (ppbv) or less above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator must conduct surface testing using a hydrogen sulfide analyzer with a detection level of no greater than 3 ppb, a resolution of 20 parts per trillion and an accuracy of +/- 1ppb at 5 ppb. The owner or operator must conduct H₂S surface testing at least monthly around the perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals at any surface scan location where methane is detected at 200 ppmv or greater and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations. Thus, the owner or operator must monitor any openings that are within an area of the landfill where waste has been placed and a gas collection system is required. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan must be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30-meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

If monitoring demonstrates that the operational requirements in the paragraph above are not met, corrective action must be taken as specified in paragraph (4)(a), (b), (c), or (d). If corrective actions are taken as specified in paragraph (4), the monitored exceedance is not a violation of the operational requirements in this section.

The following procedures must be used for compliance with the surface hydrogen sulfide operational standard as provided above.

(1) After installation and startup of the gas collection system, the owner or operator must monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals (or a site-specific established spacing) for each collection area on a monthly basis using an hydrogen sulfide detector specified above.

(2) The background concentration must be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of 40CFR 60, except that the probe inlet must be placed within 5 to 10 centimeters of the ground. Monitoring must be performed during typical meteorological conditions.

(4) Any reading of 10 parts per billion or more above background at any location must be recorded as a monitored exceedance and the actions specified in paragraphs (4)(a) through (e) of this section must be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements above.

(a) The location of each monitored exceedance must be marked and the location and concentration recorded. For location, you must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places.

(b) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance must be made and the location must be re-monitored within 10 calendar days of detecting the exceedance.

(c) If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (4)(e) must be taken, and no further monitoring of that location is required until the action specified in paragraph (4)(e) has been taken.

(d) Any location that initially showed an exceedance but has a H₂S concentration of 10 parts per billion or less of hydrogen sulfide above background at the 10-day re-monitoring specified in paragraph (4)(b) or (c) must be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration of 10 parts per billion or less above background, no further monitoring of that location is required until the next monthly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in paragraph (4)(c) or (e) must be taken.

(e) For any location where monitored methane concentration equals or exceeds 10 parts per billion above background three times within a two month period, a new well or other collection device must be installed within 90 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation shall be submitted to the NYSDEC for approval.

(5) The owner or operator must implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

APPENDICIES

- (1) WM letter to Chair, Perinton Conservation Board, December 7, 2017; Odor Mitigation Plan
- (2) PPT presentation, Waste Management, Conservation Board meeting, January 16, 2018.
- (3) WM letter to Mr. Paul, D'Amato; Region 8, DEC, Director
- (4a) Health Effects from Inhalation of Hydrogen Sulfide
https://www.health.ny.gov/environmental/chemicals/hydrogen_sulfide/
- (4b) NJ Health Fact Sheet – hydrogen sulfide (H₂S).
- (5) H₂S data, provided by WM to PCB, January 11, 2018