COMMONWEALTH OF PENNSYLVANIA **MEMO**
Department of Environmental Protection
Southwest Regional Office

TO Air Quality Permit File PA-65-00767C

FROM Melissa L. Jativa/MLJ
Environmental Engineering Specialist
Air Quality Program

THROUGH Thomas J. Joseph, P.E./TJJ
Environmental Engineer Manager
Air Quality Program

Mark R. Gorog, P.E./MRG
Program Manager
Air Quality Program

Dwight Shearer, P.E./DAS
Bureau Director
Radiation Protection Program

DATE February 23, 2023

RE Comment and Response Document
Westmoreland Sanitary Landfill, LLC
Rostraver Township, Westmoreland County
APS 1003567 Auth 1291604 PF 514148

On October 9, 2019, the Department received a plan approval application from The Hillcrest Group, LLC on behalf of Westmoreland Sanitary Landfill, LLC (WSL) for authorization to install and operate a leachate evaporator at the facility located in Rostraver Township, Westmoreland County. Department of Environmental Protection's ("Department's") review of the submitted application has been completed and the public comment period has expired. This memo documents activity that has taken place since the Department's review memo addendum was finalized.

Review of this application by the Department has been completed and in accordance with 25 Pa. Code §§ 127.44-46, notice of intent to issue the plan approval was published in the *Pennsylvania Bulletin* on July 23, 2022; published in *The Mon Valley Independent* on August 16-18, 2022; sent to United States Environmental Protection Agency (EPA) on July 21, 2022; and sent to states within 50 miles of the proposed facility (Maryland and West Virginia) on July 19, 2022.

Concurrently with the notice of intent to issue the plan approval, notice of intent to hold a public hearing was published in the *Pennsylvania Bulletin* on July 23, 2022, and in *The Mon Valley Independent* on August 16-18, 2022. On August 31, 2022, the Department held a hearing at the Rostraver Central Fire Department in Rostraver Township, PA. On September 1, 2022, the Department held a virtual public hearing. At the public hearing all those that desired to testify on the proposed plan approval had the opportunity to testify. In accordance with the procedure identified in Title 25 Pa. Code §127.49(c), the period to provide additional written statements was extended for at least 10 days after the hearing, ending on September 19, 2022.

Copies of the proposed plan approval, review memo, and review memo addendum were made available for the public to view on the Department's regional website on July 23, 2022.

Received comments are substantively addressed in this document below the list of commentators. Comments have been identified, summarized, and categorized where possible. Numbers in parentheses following each comment identify to which commentators the comment applies.

LIST OF COMMENTATORS

1. Stephen Lester
   Science Director, Center for Health, Environment & Justice

2. Jose Aguayo Pozo
   Senior Science Associate, Center for Health, Environment & Justice

3. Jenna Rindy
   Staff Environmental Scientist, Protect PT

4. Gillian Graber
   Executive Director, Protect PT

5. Ranajit Sahu, Ph.D.
   Consulting Engineer

6. Kelsey Krepps
   Senior Campaign Representative, Sierra Club

7. Katie Muth
   State Senator, 44th Senatorial District

8. Makenzie White
   Public Health Manager, Environmental Health Project

9. Nathan Deron
   Environmental Data Scientist, Environmental Health Project

10. Steven Lovasic
    Westmoreland County

11. Morgan Moran
    Westmoreland County

12. Haley Soboslay
    Westmoreland County

13. Marye Phillips
    Westmoreland County

14. Stephen Loughnane
    Westmoreland County

15. James Sepesky
    Westmoreland County

16. Mary Lou Mills
    Westmoreland County

17. B. Arrindell
    Director, Damascus Citizens for Sustainability

18. Innes Donahue
    Allegheny County

19. Chris Chacko
    Westmoreland County

20. Thomas Barger

21. Brandon Williams

22. Phil Miceli

23. W. Philip Goodboy
    Westmoreland County

24. Joanne Hall
    Westmoreland County

25. Kathy Gonzalez

26. Bob Dannon
    Washington County

27. Cathy Lodge
    Washington County

28. John F. Stolz, Ph.D.
    Professor, Biological Sciences, Duquesne University

29. Jack Kruell

30. Debby Fought

31. Lisa Fordanich

32. John Lunt

33. Jenna Rindy

34. Garmon Longnecker

35. Joseph Dalfonso
    Solicitor, Rostraver Township

36. Eric Harder
    Mountain Watershed Association

37. Kristin Van Strien
    Westmoreland County

38. Catherine Anderson

39. Lois Bower-Bjornson
    Southwestern Pennsylvania Field Organizer, Clean Air Council

40. Ric Frantz

41. Elaine Hruby

42. Morgan Moran
    Fossil Fuel Community Organizer, Protect PT

COMMENTS AND RESPONSES

1. **Comment:** The DEP Review Memo states that "the permittee shall submit a leachate sampling and analysis protocol to the Department for review within 30 days of plan approval issuance to be approved by the Department in writing prior to sampling" (DEP Review Memo, p. 13). It would be important for the public to have the opportunity to review and comment on the leachate sampling and analysis protocol required by DEP. (1, 2)

   Response: The sampling and analysis protocol will be posted on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

2. **Comment:** The DEP has failed to require monitoring for Non-Methane Organic Compounds (NMOCs), toxic substances, such as HAP metals, HAP volatile substances, and dioxins, and for specific new waste products created during the leachate evaporation process, particularly products of incomplete combustion. Therefore, please provide the analytical results of any testing for NMOCs, air toxics, and products of incomplete combustion conducted at a full-scale operating facility designed to the same (or similar) specifications as that proposed for the Westmoreland landfill to support the appropriate and successful treatment of landfill leachate using the leachate evaporator. The agency needs to provide this information because it provides the basis for the agency's action on the permit application. Please include the sampling plan and protocols, sampling and analytical methodologies and detection limits used for any NMOC air emissions testing conducted at a full-scale operating leachate evaporator facility. (1, 2)

   Response: The Department's analysis was based on site specific data. As part of the plan approval application review, the Department reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports. Form 50 reports require quarterly testing of leachate discharge for a range of analytes. Form 50 reports are included as Attachment G of the Westmoreland Sanitary Landfill Response (8-31-2020) which are available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx. The data from these reports was used to develop emission limits. Compliance with these limits will be verified by stack testing. The plan approval includes monthly leachate sampling for VOC, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Gross Alpha, Gross Beta, Radium-226, Radium-228, Sulfur Compounds, and HAP Metals. The plan approval also includes EPA reference method stack testing for PM_{10} (filterable and condensable), $PM_{2.5}$ (filterable and condensable), Gross Alpha, Gross Beta, Radium-226, Radium-228, NO_X, CO, SO_2, VOC, Dioxins/Furans, and HAP Metals. Protocols for EPA reference method stack tests are required to be submitted to the Air Quality Program's Source Testing Section for review and approval prior to each discrete stack testing event.

3. **Comment:** The DEP has failed to make available specific testing to identify specific waste residual constituents in air, water or as a solid that remain after the evaporation process. Therefore, please provide any analytical results of this testing including the sampling plan and protocols, sampling and analytical methodologies and detection limits used. In addition, please provide the analytical results of any testing for specific waste residual constituents conducted at a full-scale operating facility designed to the same (or similar) specifications as that proposed for the Westmoreland landfill to support the appropriate and successful treatment of landfill leachate using the leachate evaporator system. The agency needs to provide this information because it provides the basis for the agency's action on the permit application. (1, 2)

   Response: The Department's analysis was based on site specific data. Emissions from leachate evaporators will largely depend on the composition of the leachate specific to each facility. Data from WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports was used to develop emission limits. Form 50 reports are included as Attachment G of the Westmoreland Sanitary Landfill Response (8-31-2020) which are available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

   See also response to Comment No. 2.

4. **Comment:** Multiple comments requested more information on the two (2) open top leachate storage tanks, specifically the size of the storage tanks, the quantity of leachate that will be stored in the tanks, and the quantity of leachate that will evaporate from the open-top tanks during storage. (1 - 5)

   Response: The two (2) open top leachate storage tanks are existing onsite leachate storage tanks and will not be changed as part of the plan approval. The existing configuration includes two (2) 550,000-gallon (approximate) steel, glass-lined storage tanks and are covered in Form 25 of the facility's solid waste permit. These tanks will remain in place following installation and initiation of operation of the leachate evaporator. The tanks are required by the solid waste permit to provide onsite leachate storage. Following installation of the evaporator, all leachate will be primarily managed onsite through the leachate evaporator system and it is anticipated that the tanks will only be used on an as-needed basis for storage of leachate prior to processing through the evaporator.

5. **Comment:** The DEP Review Memo states that "the proposed evaporator will evaporate approximately 90% of the leachate passing through …". The DEP has failed to provide the data that was used to support this statement. Therefore, please provide the data used to specify that "the proposed evaporator will evaporate approximately 90% of the leachate passing through …". (1, 2)

   Response: Leachate reduction of approximately 90% was estimated based on information provided by WSL in the plan approval application. The plan approval application can be found on the designated DEP Community Information webpage for

Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

6. **Comment:** Multiple commentators expressed concern that the plan approval is not subject to the Environmental Justice Public Participation Policy. DEP should agree to consider this permit application process to be subject to its Environmental Justice Public Participation Policy and follow its environmental justice policy guidelines. (1, 2, 6)

   Response: Though the plan approval is not subject to the Department's Environmental Justice Public Participation Policy the Department took steps to provide greater opportunities for public participation. Specifically, the Department provided the public the opportunity to provide testimony at two public hearings, one in person and one virtual. Notice of Public Hearing was published in the Pennsylvania Bulletin and in the Mon Valley Independent. Comments received during the public hearings and during the public comment period have been addressed in this comment response document. Further, the draft plan approval, review memorandum and other documents pertaining to the evaporator plan approval were posted on Southwest Region's website, Community Information page.
   https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx

7. **Comment:** Multiple commentators expressed concern over leachate containing HAP metals and whether HAP metals will be reported by individual HAP or if HAP metals will be reported as one cumulative value. (1, 2, 7, 10, 17, 23, 24)

   Response: The proposed plan approval contains an emission limitation for Total HAP from the evaporator of 0.22 ton per year. The proposed plan approval also includes requirements for monthly leachate sampling for HAP Metals and EPA reference method stack testing for HAP Metals within 180 days after initial startup and every five years thereafter. In accordance with 25 Pa. Code §135.3, the annual air emissions inventory requirement from Section C, Condition #014 requires WSL to report speciated HAP annual emissions.

8. **Comment:** The DEP has failed to provide details on what will be included in the audit inspection as well as other monitoring requirements. Therefore, please provide the details on what will be included in the audit inspection as well as other monitoring requirements. The DEP Review Memo summarizes the testing and monitoring requirements that that apply to the leachate evaporation system (pp. 14-15). These monitoring requirements include testing for radionuclides; monitoring the temperature of the leachate evaporation system; and conducting an audit inspection of the hydrocarbon recovery unit after 5 years of operation. (1, 2)

   Response: The requirement for the audit inspection has been changed from once every five years to once every 12 months to be consistent with services provided by Heartland Water Technology (HRT). The yearly service from HRT includes a full system inspection, system cleaning and instrument calibration, real-time coaching to operating

staff, online and onsite training and certification for operators, and system restoration in the case of unexpected performance issues.

Section D Condition #017 of the draft plan approval will be revised as follows:

~~Within 180 days of commencement of operation of the hydrocarbon recovery unit and at a minimum of every five years thereafter, the permittee shall have an audit inspection performed by either the hydrocarbon recovery unit manufacturer and leachate evaporation system manufacturer or an equivalently specialized third-party entity to evaluate the Pentair Hydrocarbon Recovery Unit and Heartland Water Technology, LM-HT Concentrator, Evaporator and Entrainment Separator performance, condition, and maintenance. The resulting audit inspection report shall be made available to the Department upon request.~~

Within 180 days of commencement of operation of the hydrocarbon recovery unit and at a minimum of once every twelve months thereafter, the permittee shall have an audit inspection performed by the hydrocarbon recovery unit manufacturer and leachate evaporation system manufacturer or an equivalently specialized third-party entity to evaluate the Pentair Hydrocarbon Recovery Unit and Heartland Water Technology, LM-HT Concentrator, Evaporator and Entrainment Separator performance, condition, and maintenance. The resulting audit inspection report shall be made available to the Department upon request.

9. **Comment:** The agency failed to define what is meant by "area monitoring." (1, 2)

   Response: "Area monitoring" refers to thermoluminescent dosimeter (TLD) radiation measurement devices. These devices measure the radiation exposure a person would receive while occupying the area. TLDs will be maintained at six locations, measuring 100% of the time. They will be analyzed quarterly where the results will be compared against the Pennsylvania gamma exposure limits to members of the public. More information regarding "area monitoring" can be found in the radiological monitoring and testing plan titled "Westmoreland Sanitary Landfill – Leachate Evaporator Radiological Emissions Monitoring and Test Plan" on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx

10. **Comment:** The DEP failed to require perimeter monitoring, area monitoring, and air dispersion modeling for any substances other than Radium-226 and Radium-228 (see DEP Review Memo, p. 10). The Air Dispersion Modeling Protocol for Westmoreland Sanitary Landfill Leachate Evaporator report prepared by Civil & Environmental Consultants for Nobel Environmental, Inc, June 25, 2021, specifically excluded PM_{10}, $PM_{2.5}$, nearby sources, background concentrations, and secondary formation of $PM_{2.5}$ from this analysis (p. 4). (1, 2)

    Response: Given the unique nature of the pollutants involved, the Department is requiring modeling and monitoring of radionuclides. Air dispersion modeling was performed to estimate radionuclide concentrations and was used as the basis in selecting

the locations of the radiological monitoring sites. The proposed plan approval requires pre-treatment of the leachate with 99.97% removal of particles 3-micron diameter or greater and 99.9% removal of hydrocarbons. The evaporator will include a three-stage demisting filtration system with a 99% removal efficiency of filterable PM. The proposed plan approval includes numerous measures that are intended to monitor particulate emissions and assure compliance with particulate emission limitations. Specifically, the draft plan approval requires quarterly EPA reference method stack testing for PM_{10} and $PM_{2.5}$, daily facility-wide inspections for visible stack emissions and fugitive emissions, and a yearly audit inspection of the leachate pre-treatment system and evaporator.

See also response to Comment No. 8.

11. **Comment:** The DEP failed to provide information on the longest period of continuous operation (without interruptions) of the leachate evaporator system processing leachate at any operating facility. Therefore, please provide information on the longest period of continuous operation (without interruptions) of the leachate evaporator system processing leachate at any operating facility. It is also unclear if any of the facilities identified by Heartland Water Technology as examples of operating leachate evaporating facilities have the same (or similar) design as that proposed for the Westmoreland Landfill. Therefore, please clarify if any of the facilities identified by Heartland Water Technology as examples of operating leachate evaporating facilities have the same (or similar) design as that proposed for the Westmoreland Landfill. (1, 2)

    Response: Emission estimates for this project were based on the maximum number of hours in a year (excluding leap years), which is 8,760 hours. The Department's analysis was based on site specific data. See also responses to Comment No. 2 and No. 8.

12. **Comment:** The DEP failed to identify if there are particular substances/waste that may be present in leachate that cannot be treated by the leachate evaporator system. Therefore, please to identify if there are particular substances/waste that may be present in leachate that cannot be treated by the leachate evaporator system. DEP also failed to determine what would happen if these substances/wastes find their way into the system. (1, 2)

    Response: The purpose of the evaporator is to reduce leachate volume by evaporating water. To ensure that air emissions from evaporating are minimized, the Department has reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports to determine the composition of the leachate. The data from these reports, along with natural gas combustion from the 25.2 MMBtu/hr burner, was used to develop emission limits. The plan approval contains the following enforceable emission limitations for constituents expected to be in the leachate and/or combustion gases as shown in Section D, Condition #004 of the proposed plan approval and listed in Table I below:

Table I:
Leachate Evaporation System (Source ID 113)
Potential-to-Emit

Pollutant	Potential Emissions (TPY)
CO	1.00
NOx	1.65
PM (Total)	7.45
PM_{10}	7.45
$PM_{2.5}$	7.45
SOx	0.12
VOC	0.72
HAP (Total)	0.22
Ammonia	0.08

Per 25 Pa. Code §127.1, the Department evaluated the proposed source for best available technology (BAT) as defined in 25 Pa. Code §121.1. BAT is defined as "equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce, or control emissions of air contaminants to the maximum degree possible and which are available or may be made available." BAT for the proposed source was determined to be the following:

- Leachate pre-treatment with 99.97% removal of particles 3-micron and 99.9% removal of hydrocarbons.
- The use of an evaporator with a three-stage demisting filtration system with a 99% removal efficiency of filterable PM.
- The use of low NOx burner, pipeline quality natural gas, and good combustion practices.

13. **Comment:** The DEP failed to identify the time needed for start-up and shut-down; what the operating hours of the facility would be; whether there will be monitoring during the start-up and shut-down periods, and if so, what will be monitored. Therefore, please provide this information. (1, 2)

Response: The leachate evaporator would be authorized to operate continuously 24-hours per day, 7-days per week. The startup and shutdown times of the evaporator unit are minimal. The flow into the evaporator may be turned on and off instantaneously through control of the pump station.

The onsite radiation monitors will run continuously 24 hours a day, 7 days a week regardless of operation of the evaporator. Perimeter monitor filters will be changed out on a weekly basis and analyzed for total alpha and total beta/gamma radiation. Alpha and beta/gamma are associated with the decay of Radium-226 and Radium-228. The weekly results of the filter analysis will be compared against the Nuclear Regulatory Commission (NRC) air discharge limits for Radium-226 and Radium-228. Area monitoring includes thermoluminescent dosimeter (TLD) radiation measurement devices. TLDs are passive radiation dosimeters used to measure the external exposure to ionizing radiation. The dosimeters will be sent to a laboratory for analysis on a quarterly basis. Each quarter, the results will be compared against the Pennsylvania gamma radiation exposure limits to members of the public.

14. **Comment:** The DEP failed to identify whether any safety features exist in the system to prevent and/or reduce air emissions from escaping into the surrounding community; how sudden increases in temperature, pressure, gas volumetric flow rate, etc. will be handled; or what happens if there is a power outage. Therefore, please provide this information. (1, 2)

    Response: The plan approval had been conditioned to ensure proper operation of the evaporator. The plan approval restricts the leachate evaporation system evaporation zone temperature to less than or equal to 1,000°F. Radium is in a solid phase below 1,285°F and will remain as a solid at temperatures at which the evaporator will operate. The plan approval requires the temperature of the leachate evaporation system and the volumetric flowrate of the leachate to be continuously monitored. Thus, flowrate or temperature changes would be immediately noticed. The facility will implement a radiological monitoring program as described in response to Comment No. 13. A yearly audit inspection of the hydrocarbon recovery unit and evaporator will also be required to ensure both are functioning properly as described in response to Comment No. 8. Disposal during evaporator downtimes will depend on the length of downtime and the quantity of leachate generated at the site during those downtimes. The existing onsite storage tanks are able to be used for temporary storage of liquids during evaporator downtimes. If the evaporator would be down for an extended period of time, leachate disposal may be performed through offsite disposal at an approved facility, as the landfill is currently doing.

15. **Comment:** The DEP failed to provide a material balance and energy balance around major components. Therefore, please provide this information. (1, 2)

    Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12. Material balance and energy balance techniques were not employed.

16. **Comment:** The DEP failed to define the actual energy consumption (e.g., electrical-kWh/hr, natural gas-therms/hr, etc.) during idling periods when no waste is being processed and during periods when waste is being processed. Therefore, please provide this information. (1, 2)

    Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12.

17. **Comment:** The DEP failed to describe the Cleaver Brooks ProFire MYHG 25.2 natural gas-fired burner and how will it be used in the proposed leachate evaporation system. The agency also failed to explain why it is not listed in Cleaver Brook's inventory. Therefore, please provide this information. (1, 2)

    Response: The 25.2 MMBtu/hr natural gas-fired burner will provide heat to the evaporator. Landfill fluids will come in direct contact with hot gas within a compact turbulent evaporation zone. [1] The plan approval contains a typo in the burner model.

[1] See Section 7 of Plan Approval Application

Condition #017 of Section C will be updated to: Leachate Evaporation System: One (1) Pentair Hydrocarbon Recovery Unit; One (1) Cleaver Brooks, ProFire MTH 25.2, natural gas-fired burner, 25.2 MMBtu/hr; One (1) Heartland Water Technology, LM-HT Concentrator, Evaporator and Entrainment Separator, 45,000 gallons per day (gpd).

18. **Comment:** The DEP failed to define the expected life of the leachate evaporator system. Therefore, please provide this information. (1, 2)

    Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12. Please also see response to Comment No. 8 regarding the annual audit process. Defining the expected life of the evaporator system is beyond the scope of the plan approval review.

19. **Comment:** The DEP failed to provide a breakdown of annual operating costs including all utilities, consumable items, natural gas, etc. Therefore, please provide this information. (1, 2)

    Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12. Evaluating operating costs of the evaporator system is beyond the scope of the plan approval review.

20. **Comment:** Multiple commentators expressed concern that the plan approval does not address operator qualifications and training required to run the leachate evaporator system. (1, 2, 10)

    Response: Operator training is covered under HWT's Performance Optimization Plan (See response to Comment No. 8). The following condition pertaining to operator training requirements have been added to the plan approval:

    The permittee shall have a trained operator on site at all times of leachate evaporation system (Source ID 113) operation. The permittee shall maintain proof of operator training.

21. **Comment:** The DEP failed to define the space, siting, utility, and other installation requirements for operating the proposed leachate evaporator system for the Westmoreland landfill. Therefore, please provide this information. (1, 2)

    Response: A site plan was included as part of the original plan approval application which can be found on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

    The Department has determined that the project will meet best available technology as described in response to Comment No. 12.

22. **Comment:** The DEP failed to determine whether there are odor, insect, or vermin problems associated with the proposed leachate evaporator system for the Westmoreland landfill. Therefore, please provide this information. (1, 2)

Response: The analysis of insect or vermin problems is beyond the scope of this plan approval application review. The Department has determined that the project will meet best available technology as described in response to Comment No. 12. Additionally, the facility is subject to the requirements of 25 Pa Code Section 123.31 and the operator is required to perform a daily facility-wide inspection for the presence of potentially objectionable odors.

The DEP waste management regulations, 25 PA Code § 273.218, requires nuisance minimization and control at landfills. Sanitary Landfill's Operation Plan, which was submitted with their leachate evaporator application to DEP's waste management program, addresses nuisances including odors, insects, and vermin at the landfill. DEP waste inspectors conduct monthly inspections at Sanitary Landfill, (or more frequently if complaints are received), and if DEP determines that the nuisance minimization and control plan is inadequate to minimize or control public nuisances, the DEP may modify the plan or require the Sanitary Landfill to modify the plan and obtain DEP approval. The waste management regulations also require Sanitary Landfill to perform regular site inspections to evaluate the effectiveness of cover, capping, gas collection and destruction, waste acceptance and all other waste management practices in reducing the potential for offsite odor creation and if odors are a problem, they are required to promptly address and correct the problems. DEP has determined that the Operation Plan submitted by Sanitary Landfill, which includes Nuisance Controls, meets the requirements of the waste management regulations; however, if the Sanitary Landfill Nuisance Controls are found to be inadequate to control odors, insects or vermin once the evaporator is operating, DEP has the ability to require a modification to their Operation Plan to correct the problems.

23. **Comment:** Multiple commentators expressed concern over WSL's history of non-compliance with permits issued by the Department. (1 - 7, 9, 15, 21 - 27, 30 - 33, 36 - 41)

Response: The Department has conducted a Compliance Review under Section 7.1 of the Air Pollution Control Act and 25 Pa. Code § 127.12a, which addresses whether WSL or a general partner, parent, or subsidiary is in violation of the Act, regulations, or permits issued thereunder. The Department inspected the facility and conducted a full compliance evaluation (FCE) on November 29, 2022. The Department identified violations during the FCE. The Department will take appropriate action on the violations and carry out follow up inspections. A previous FCE was conducted on January 29, 2021. No violations were noted during that FCE.

To that end, the Department is adding conditions to the plan approval which will better ensure proper maintenance and operation of the proposed leachate evaporator: the Department has changed the frequency of the audit inspection from once every five years to once every 12 months. The Department has also added an operator training requirement to the plan approval. See also response to Comments No. 8 and 20.

24. **Comment:** The Plan Approval document and the DEP Review Memo are written in technical jargon that is difficult to understand. The DEP Plan Approval is written in technical jargon that may be easily understood by insiders to the permitting process, but to the general public, the language is hard to follow and difficult to understand. (1, 2)

    Response: Thank you for your comment. The Department aims to write documents in language that can be understood by the general public to the extent possible. The Department held two public hearings during which Department representatives sought public input into the proposed action in part to better address public concerns. The Department provided a plain language information sheet at the public hearings which can also be found on the Department's website at: WSL_hearing_information_sheet_Aug-Sept_2022.pdf (state.pa.us).

25. **Comment:** The lack of an established track record for the Leachate Evaporation System is cause for concern. The Westmoreland landfill is contracting the services of Heartland Water Technology (HWT) to provide the leachate evaporator, the main component of the leachate evaporation system. The company claims to have over 10 years of experience providing leachate treatment solutions. However, we could only find three examples of their leachate treatment system in place in the country – at the Joseph J. Brunner, Inc. Landfill in New Sewickley Township, PA, the Cumberland County Solid Waste Complex in Millville, NJ and at the 3 Rivers Regional Landfill in Pontotoc, Mississippi. The scarcity of other locations with a demonstrated track record of effectiveness treating leachate is cause for concern.

    If these three facilities are currently operating, it would be very helpful to obtain specific leachate analyses and air emissions data from these facilities to evaluate whether the results do indeed support the appropriate and successful treatment of landfill leachate using the leachate evaporator system. Reviewing leachate analyses and air testing results from these facilities will help evaluate what substances were measured and whether these test results are adequate to evaluate public health risks posed by the air emissions coming from these facilities.

    It would also be important to obtain the specific design specifications of these facilities to compare to the proposed design for the Westmoreland landfill leachate evaporator. The similarities as well as the differences between the leachate evaporation system proposed for the Westmoreland landfill and the three case studies need to be defined and included in the Plan Approval document made available to the public. If there are differences, those modifications need to be clearly identified. Beyond the three examples of operating leachate evaporators provided by HWT, it would be important to identify if there are other full-scale operating facilities in the United States that use the same, or similar, leachate evaporative system as proposed for the Westmoreland landfill. It would be important to identify where these facilities are located and how long they have been in operation. (1, 2)

    Response: Emissions from leachate evaporators will largely depend on the composition of the leachate specific to each facility. The Department's analysis was based on site

specific data geared toward WSL's waste stream. As part of the plan approval application review, the Department reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports. The data from these reports was used to develop emission limits. Two bench scale studies were performed by Pentair to demonstrate the effectiveness of the filtration system. The bench scale studies resulted in the use of an improved filter. The bench scale study using the improved filters resulted in a 99.89% reduction of particles 2-mircon and larger (TSS), a 99.98% reduction of particles 3-micron and larger, and a 99.9% reduction of hydrocarbons. See also response to Comments No. 2 and No. 12.

26. **Comment:** It is unclear if any air pollution controls are part of the leachate evaporation process that will reduce air emissions released from the stack of the leachate evaporator. The DEP Application Memo includes a Best Available Technology Analysis that discusses how the emissions of constituents with specific emissions limits will be controlled (pp. 5 to 9). Unfortunately, there is no description of the "devices, methods or techniques" that will be used to reduce emissions. Furthermore, the agency did not discuss how these devices, methods or techniques were selected as the Best Available Technology for controlling air emissions coming from the proposed leachate evaporation system. DEP needs to provide clear explanations and documentation for how these technologies were selected and why there is no need to include specific air pollution controls to the leachate evaporator stack.

    There is one control technology discussed in the DEP Review Memo. This system is used prior to heating the leachate in the evaporator. Specifically, DEP states that to control VOC emissions, the landfill operator proposes to "use a hydrocarbon recovery unit (HRU) that will remove oils in the leachate prior to the evaporation system along with good combustion practices…" (p. 7). DEP also states that the applicate concluded that "due to the low quantity of emissions it is not feasible to install any type of air pollution control devices on the system" (p. 7).

    It is very troubling that no air pollution controls will be used to limit air emissions from the stack coming of the leachate evaporator. This is especially worrisome since only limited testing has been done to determine what chemical constituents are present in the leachate and what substances are being released from the stack of the leachate evaporator. (1, 2)

    Response: See pages 5-7 of the plan approval review memo for the full BAT analysis and response to Comment No. 12. Per 25 Pa. Code § 127.1, the Department evaluated the proposed source for BAT as defined in 25 Pa. Code § 121.1. BAT is defined as "equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce, or control emissions of air contaminants to the maximum degree possible and which are available or may be made available". BAT for the proposed source was determined to be the following:

    - Leachate pre-treatment with 99.97% removal of particles 3-micron and 99.9% removal of hydrocarbons.
    - The use of an evaporator with a three-stage demisting filtration system with a 99% removal efficiency of filterable PM.

- The use of low NOx burner, pipeline quality natural gas, and good combustion practices.

Accordingly, no additional controls are appropriate for this source.

27. **Comment:** The proposed Leachate Evaporation System will largely transfer chemicals present in the leachate following a vague pre-treatment step from the groundwater to the ambient air. Leachate first will pass through a pretreatment step referred to as the Pentair HRU Pre-treatment system (Review Memo, p. 5). This system "includes four stages of filtration where the first two stages remove larger particles, the third stage removes finer particles, and the fourth stage separates and removes hydrocarbons from the leachate (Review Memo, p. 5).

    This fourth stage would be responsible for removing the more toxic chemicals found in the leachate like VOCs, but it is unclear just how effective it will be. Specifically, although bench testing claims that more than 99% of hydrocarbons are removed by the HRU, it does not specify which hydrocarbons are bypassing this separation process. If, for example, lighter hydrocarbons such as benzene or trichloroethene are not being captured consistently, they will make their way into the evaporator and ultimately be emitted through the stack. More details need to be provided about the HRU and specifically how that fourth stage will remove the more egregious chemicals found in the leachate.

    Any chemical that bypasses the HRU will make its way to the leachate evaporation system. Here, the leachate will be heated to reduce its volume and will transfer any contaminants present from the water phase to the vapor phase. This evaporation process has been described as functioning very much like what occurs when a leachate pond or lagoon is used to evaporate landfill leachate, only in a greatly accelerated time frame and without regard to weather conditions. These chemicals will then be emitted into the air out of the evaporator stack without any kind of air pollution control devices in place. (1, 2)

    Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12.

    Data from WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports was used to develop VOC emission limitations. The Department reviewed the quarterly Form 50 reports from 2017 through 2019 and neither benzene nor trichloroethene were found in detectable amounts in any of the samples. The plan approval includes emission limitations for the leachate evaporator of 0.72 tons per year VOC and 0.22 tons per year HAP. Compliance with these limits will be verified by stack testing. The plan approval also includes monthly leachate sampling for VOC and HAP metals.

28. **Comment:** Multiple commentators expressed concern over the project's potential impacts on human health. (1 - 9, 17, 23-25, 27)

Response: The Department has evaluated the air contamination aspects of this proposed facility in accordance with the applicable regulations derived from the U.S. Clean Air Act and the Pennsylvania Air Pollution Control Act. Like all plan approval applications, this plan approval application was evaluated on a case-by-case basis.

The Clean Air Act required EPA to set National Ambient Air Quality Standards ("NAAQS") for pollutants considered harmful to public health and the environment and establishes two levels of national ambient air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. WSL is located in an area of attainment for all NAAQS. Additionally, all of the Commonwealth of Pennsylvania is located in the Ozone Transport Region and is therefore treated like a moderate ozone nonattainment area.

Regional air quality is monitored by the Department's ambient air monitoring network. Stations in this network measure concentrations of criteria pollutants and air toxics, including VOCs. As a natural minor facility, emissions from the proposed project are not expected to cause a significant impact for pollutants in an area of attainment with the NAAQS. A natural minor facility has the potential to emit inherently low amounts of regulated pollutants.

The Department has determined that the project will meet best available technology as described in response to Comment No. 12. Per 25 Pa. Code §127.1, the Department evaluated the proposed source for BAT as defined in 25 Pa. Code §121.1. BAT is defined as "equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce, or control emissions of air contaminants to the maximum degree possible and which are available or may be made available". BAT for the proposed source was determined to be the following: leachate pre-treatment with 99.97% removal of particles 3-micron and 99.9% removal of hydrocarbons; the use of an evaporator with a three-stage demisting filtration system with a 99% removal efficiency of filterable PM; the use of low NOx burner, pipeline quality natural gas, and good combustion practices. Hazardous Air Pollutants (HAPs) were evaluated as part of the plan approval application. The proposed plan approval includes an emission limitation of 0.22 ton per year for Total HAP from the evaporator.

See also response to Comment 32.

29. **Comment:** The DEP has failed to adequately identify a full range of waste constituents in the landfill leachate. The sampling plan and protocols, sampling and analytical methodologies and detection limits are not included in the documents available on the DEP Westmoreland Landfill website. The DEP Review Memo discusses bench scale testing of a leachate sample from the Westmoreland landfill conducted by "Pentair at their Starscan Analysis facility in Conroe, Texas in April 2019". The memo states further that leachate influent and effluent samples were analyzed for the total hydrocarbon content and for total dissolved solids (p. 6). It appears that no other leachate constituents were analyzed in this sampling effort. It would be important to verify if any other leachate constituents were analyzed in this sampling effort. Additional testing of leachate samples

was conducted in February and June 2020 and the results provided to DEP by Civil Design Solutions, a contractor for the landfill operator (see August 31, 2020 Response to the July 2, 2020 DEP Technical Deficiency Letter). These samples were analyzed for total hydrocarbon content, total dissolved solids and for radiological parameters (Attachment A to August 31, 2020 Response from Civil Design Solutions).

Based on our review of the many reports and data available on the DEP website, the only chemical constituents that have been analyzed for in the Westmoreland landfill leachate have been total hydrocarbon content, total dissolved solids and radiological parameters (Radium-226, Radium-228, Strontium-90, Gross Alpha and Gross Beta). It would be important to verify if any other leachate constituents were analyzed in this or any other sampling of the leachate from the Westmoreland landfill.

It is important to note that once the leachate evaporation system begins operation, raw leachate will be tested for the same constituents discussed above with the addition of sulfur compounds and Hazardous Air Pollutant (HAP) metals which include antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel and selenium (Review Memo, p. 13). The DEP has failed to require that these other substances be included now at the permit review stage. Without this information, it is not possible to adequately evaluate the public health and environmental risks posed by the leachate evaporator proposed for the Westmoreland landfill. This monitoring effort still falls short of what is needed to adequately identify the constituents of the leachate. More testing is needed for a broad range of contaminants to determine the full range of waste constituents in the landfill leachate at the Westmoreland landfill. This testing should include the following common landfill leachate constituents: chlorinated compounds such as vinyl chloride, trichloroethene and dichloroethane; heavy metals such as arsenic, lead and mercury; volatile organic compounds such as benzene, toluene and xylene; radionuclides; polyfluoroalkyl substances (PFAS) such as perfluorooctanoic Acid (PFOA); and semi-volatile compounds such as Polycyclic Aromatic Hydrocarbons (PAHs) and phthalates. Pesticides and PCBs have also been found in landfill leachate at many landfills. (1, 2)

Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12.

The Department's analysis was based on site specific data. Leachate is currently sampled and analyzed quarterly as required by the Department's Bureau of Waste Management. The data from leachate samples from 2017 through 2019 was used during the permit review stage to develop potential emissions of volatile organic compounds, hazardous air pollutants, and particulate matter. Vinyl chloride, trichloroethene, dichloroethane, HAP metals, benzene, toluene and xylene are all analyzed as part of the quarterly leachate sampling. Form 50 reports are included as Attachment G of the Westmoreland Sanitary Landfill Response (8-31-2020) which are available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

See also response to Comment No. 60.

30. **Comment:** Harmful chemicals not present in the leachate waste will be generated by the Leachate Evaporation System. The leachate evaporator will operate at temperatures as hot as 1,000°F. At these temperatures, new chemical compounds not previously present in the leachate will be created. These substances are called "products of incomplete combustion." These are substances that were not in the original waste but are newly formed during the heating process. What happens is, as the leachate is heated, chemicals are released into the air that react with each other to form new chemicals that weren't there before. The heated evaporator essentially serves as a large reaction vessel where these substances are formed. Products of incomplete combustion can sometimes be more toxic than the original substances that were burned. Additionally, landfill gases will be burned at high temperatures in the existing "High-Btu" unit (See DEP Application Review Memo). These hot gases will go to the evaporator to provide extra heat. This additional burning step provides another opportunity for products of incomplete combustion to form.

    Dioxins are an example of a product of incomplete combustion. These chemicals are considered one of the most toxic substances ever tested. DEP is anticipating dioxins being formed in the heating process as they plan to require measuring them in the stack gas released from the evaporator. (1, 2)

    Response: The High-Btu Plant was exempted from plan approval requirements on May 2, 2018. Waste heat from the existing High-Btu Plant will be used to replace natural gas consumption from the 25.2 MMBtu/hr natural gas-fired burner and to provide as much heat as possible to the evaporator. Use of waste heat will result in less natural gas usage and fewer potential "products of incomplete combustion."

    See also response to Comments No. 2, 12, and 28.

31. **Comment:** Testing of air emissions from the Leachate Evaporation System stack is very limited and will not characterize emissions coming from the stack. Although harmful chemicals will be released into the ambient air from the leachate evaporation system, the Plan Approval only requires minimal and limited monitoring of the air emissions coming out of the leachate evaporator stack. DEP only requires monitoring of the leachate content before and after the pre-treatment step in the hydrocarbon recovery unit and very limited monitoring of the air emissions coming out of the leachate evaporator stack. There are serious issues with the way both of these monitoring requirements are set up.

    Raw leachate will be tested before and after being filtered by the hydrocarbon recovery unit (HRU). Very few substances were analyzed in the leachate passing through the HRU. Based on our review, the only chemical constituents that have been analyzed for in the Westmoreland landfill leachate have been total hydrocarbon content, total dissolved solids and radiological parameters (Radium-226, Radium-228, Strontium-90, Gross Alpha and Gross Beta). This limited testing is inadequate to determine what chemical constituents are present in the landfill leachate. Without additional testing, it's impossible to know what chemical constituents will end up in the emissions. This information is needed to properly evaluate the public health and environmental risks posed by the emissions released from the leachate evaporation system.

Furthermore, the proposed testing schedule of the leachate passing through the HRU unit was changed from every week to every month. A monthly testing regime provides too little information on the potential changes in leachate content and concentrations and too large a window for potential mistakes in the way the HRU operates.

More worrisome is the testing schedule for the stack emissions of the leachate evaporator. The proposed stack testing requirements are summarized in the DEP Review Memo include conducting a single emissions test following the initial start-up period (within the first 180 days of operation), and then "at a minimum of once every five years thereafter" (p. 13). This testing requirement schedule is far too infrequent and is inadequate to properly characterize the emissions coming from the leachate evaporation system. This is especially true since this process is unproven and it is unclear if the operation of this system, as proposed for the Westmoreland landfill, has been employed at full scale. Continuous emissions testing from the stack would be the ideal form of monitoring. However, if continuous testing is infeasible, then a monitoring schedule of once every month should be adopted until a consistency in the operation of the leachate evaporation system has been achieved and a clear picture of the air emissions has been established. Monthly monitoring will also ensure that any failures in the leachate evaporation system that leads to an increase in hazardous gas emissions (and violations of the air permit) are identified and resolved in a timely way.

Monitoring could eventually go to a quarterly basis, but no less frequently. If quarterly testing is required for evaluating impacts on groundwater, why would monitoring air emissions for the same purpose be any different? Lastly, monitoring the stack more frequently would help evaluate the public health risks the leachate evaporator would pose on the surrounding community. This would not be possible with testing done only once every 5 years. (1, 2)

Response: The plan approval requires quarterly stack testing of the evaporator for PM_{10} (filterable and condensable), $PM_{2.5}$ (filterable and condensable), Gross Alpha, Gross Beta, Radium-226, and Radium-228 in addition to the five year testing for NOx, CO, SO_2, VOC, Dioxins/Furans, and HAP Metals. The plan approval also includes requirements for continuous radiological monitors.

See also responses to Comments No. 8, 10, 12, 26 - 29, and 45.

32. **Comment:** Multiple commentators expressed concern that operation of a leachate evaporator would release radioactive materials into the air. (1, 2, 6 - 10, 17, 23 - 28, 42)

Response: Based on discussions with the Department's Radiation Protection Program, the two radionuclides of concern are Radium-226 and Radium-228. Potential radionuclide emissions will be in the form of particulate matter as Radium-226 and Radium-228. Radium exists in a solid state under the conditions that would be experienced at the evaporator and if emitted through the evaporator would be in the form of particulate. Standards for protection of humans and the environment from ionizing radiation are set forth in 10 CFR Part 20 ("Part 20"). Appendix B to Part 20 generally contains criteria for evaluating the safety to humans and environment from emissions or

discharges of radionuclides, and specifically contains “Effluent” criteria for use in assessing and controlling the dose to the public of radionuclides emitted from a facility. When multiple radionuclides are being emitted in an effluent, the “Rule of Unity” is used to determine the safety of the emissions. That means summation of the radionuclide concentration emitted to the atmosphere for inhalation divided by the respective air effluent criteria from Table 2 of Appendix B to Part 20 must be equal to or less than 1. A summation of one or less would correspond to a safe dose of radiation. The maximum concentrations of Radium-226 and Radium-228 obtained from laboratory testing of representative samples of the facility's leachate were used to model the Radium within the leachate and the calculation resulted in a value of 0.016. Since the calculation results in a value of <l, the Rule of Unity is satisfied, and the evaporator radionuclide emissions would be within standards protective of humans and the environment. Using stack emission rates is a conservative way to evaluate the Rule of Unity. This is a conservative approach because atmospheric concentrations of Radium-226 and Radium-228 will be lower than the stack emission rate.

The proposed plan approval requires monthly sampling of leachate prior to and post leachate recovery unit for Gross Alpha, Gross Beta, Radium-226, and Radium-228. The monthly leachate sampling results will be compared against the NRC air discharge limits for Radium-226 and Radium-228. The proposed plan approval includes quarterly stack testing for Gross Alpha, Gross Beta, Radium-226, and Radium-228. The proposed plan approval also requires the installation and operation of four (4) outdoor air monitors and six thermoluminescent dosimeter radiation measurement devices. The onsite monitors will run continuously 24 hours a day, 7 days a week. Air monitor filters will be changed out on a weekly basis and analyzed for total alpha and total beta/gamma radiation. Alpha and beta/gamma are associated with the decay of Radium-226 and Radium-228. The weekly results of the filter analysis will be compared against the NRC air discharge limits for Radium-226 and Radium-228. TLDs are passive radiation dosimeters used to measure the external exposure to ionizing radiation. The dosimeters will be sent to a laboratory for analysis on a quarterly basis. Each quarter, the results will be compared against the Pennsylvania gamma radiation exposure limits to members of the public.

Air dispersion modeling was performed to support the selection of radiological monitoring sites. The Department’s Air Quality Modeling Section reviewed the modeling portion of the plan approval application and concluded that WSL’s air dispersion modeling for estimating radionuclide concentrations is consistent with the EPA’s relevant air dispersion modeling policy and guidance and WSL’s air dispersion modeling results are appropriate for estimating radionuclide concentrations within and beyond WSL’s property line. Furthermore, WSL’s “plot” output files, generated by AERMOD, are appropriate for determining the areas of maximum radionuclide concentrations, supporting the selection of radiological monitoring sites. The Department’s Radiation Protection Program reviewed the radionuclide related aspects of the plan approval application and concluded that WSL’s leachate containing TENORM can be evaporated through the proposed process and still be within the safe discharge limits established by the NRC and adopted by the Commonwealth through agreement status, and which are generally accepted by radiation professionals. The monitoring plan as proposed is also acceptable as a means to detect radiation and stop operations, if needed. Therefore, the Department’s Radiation Protection Program concluded that the proposed operation and

monitoring of the evaporator would be protective of public health from a radiation protection perspective. *See* page 10 of the review memo addendum. The review memo addendum, air dispersion modeling memo, and radiation protection memo can be found on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

The Department has determined that the project will meet best available technology as described in response to Comment No. 12.

33. **Comment:** Although the proposed air quality plan regarding the leachate evaporator system has experienced multiple draft rounds, it is still scientifically inadequate and does not properly provide details and monitoring techniques to ensure public safety. In Section D, III, #012 of the plan, volumetric flow rate the leachate entering the hydrocarbon recovery unit is required to be monitored in order to adhere to 25 PA Code 127.12b. However, there is no requirement to report the volumetric flow rate to the DEP and to the public. An unreported flow rate to the DEP or the public leads to an inability of DEP scientists or our NGO scientists to develop accurate emission rates that reflect the National Ambient Air Quality Standards (NAAQS) developed by the EPA. We therefore question how the Section D, I, Emission Restrictions were developed, as no mass inflow of leachate was reported, and therefore no mixing ratio for emissions can be calculated. While we recognize Section D, I, #004 conditionalizes pollutant emissions from the leachate evaporation system, the units are presented in pounds per hour and total per year–both of which are incapable of being converted to the milligrams or micrograms per meter cubed (or the mixing ratio parts per billion) without mass inflow rate. The lack of transparency in the emissions calculations is concerning to the public, as it indicates the DEP is not requiring the leachate evaporator to adhere to the NAAQS. Therefore, we request the emissions calculations of the air quality plan adhere to the NAAQS. There is also no daily percent error requirement on the flow rate, which allows WSL to pass a very wide range of leachate volumes through the system. Overall, we request transparency on how and if the emissions restrictions from the evaporator adhere to the NAAQS and the 25 PA Code 121.1 emission limits. (3 - 5)

Response: Per Section D, Condition #018 (page 17) of the proposed plan approval, WSL is required to maintain daily, monthly, and 12-month rolling totals of volumetric flow rate of leachate to the evaporator. WSL is required to submit annual emission inventory reports to the Department in which throughput is a parameter that is considered in the reporting of emissions. As part of the plan approval application review, the Department reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports. The data from these reports, along with combustion from the natural gas burner was used to develop potential emissions from the evaporator. Potential emissions were based on maximum leachate flowrate of 45,000 gallons per day. Documents for this project are available for review by any interested party at the Department's Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, PA 15222. A file review can be scheduled through the DEP's website at https://www.dep.pa.gov/Citizens/PublicRecords/Pages/Informal-File-Review.aspx.

34. **Comment:** The proposed air quality plan requires WSL to perform stack tests on their evaporator system 180 days after initial startup for an array of harmful pollutants, but only requires the testing once every five years following this initial test. In combination with no flow rate provided or required by the plan, it is impossible to tell if the stack is regularly adhering to proper emission levels when samples are only analyzed once every five years. Our scientific analysis suggests that stack testing should occur for all pollutants at least once every year to ensure compliance with air quality standards and to avoid negative public health outcomes. It appears *Section D, III, #014* aimed to ensure the ambient air would be monitored for non-compliance with air pollutants. However, the term "outdoor perimeter air monitors" does not describe the pollutants required to be monitored, and WSL is unlikely to be able to monitor all pollutants of concern with only four monitors. It is irresponsible of the DEP to request only four air monitors, to propose no specifications on the pollutants monitored, and to have no requirements regarding monitor placement–responsible monitoring would ideally occur prior to and post emission source based on wind direction. The U.S. Environmental Protection Agency only accesses meteorological data from eight stations across Pennsylvania, and only one of those is within 50 km of the WSL; due to the prevailing wind direction, we highly advise a new meteorological monitoring station be established proximal to the WSL for accurate reporting of atmospheric conditions and air pollutant movement. Additionally, we request specific testing to be required for residual waste components in the air with analytical results and sampling methodologies regularly available for public viewing. (3-5)

    Response: Air dispersion modeling was performed to support the selection of radiological monitoring sites. The Department's Air Quality Modeling Section reviewed the modeling portion of the plan approval application and concluded that WSL's air dispersion modeling for estimating radionuclide concentrations is consistent with the EPA's relevant air dispersion modeling policy and guidance and WSL's air dispersion modeling results are sufficient for estimating radionuclide concentrations within and beyond WSL's property line. Furthermore, WSL's "plot" output files, generated by AERMOD, are sufficient for determining the areas of maximum radionuclide concentrations for supporting the selection of radiological monitoring sites. The Department's Radiation Protection Program reviewed the radionuclide related aspects of the plan approval application and concluded that the steps in which applicant took to determine the locations, and number of monitoring stations, the frequency of monitoring and the types of monitoring devices to be used are the same steps that the Bureau of Radiation Protection would expect from a fully licensed radioactive materials user that would be operating an evaporator. Thus, the radionuclide monitoring plan as currently proposed is adequate to monitor airborne radionuclides emitted from the proposed evaporator. See page 10 of the review memo addendum.

    The Department issues an Annual Ambient Air Monitoring Network Plan. To propose a new monitor location to be included in the annual plan, members of the public can submit comments at the appropriate time through the following link: www.ahs.dep.pa.gov/eComment.

The proposed plan approval includes numerous requirements that are intended to assure compliance with emission limitations. Specifically, the draft plan approval requires monitoring of leachate flowrate, monitoring of evaporator temperature, daily facility-wide inspections for visible stack emissions and fugitive emissions, malfunction reporting, maintenance recordkeeping, annual burner tune-up, and a yearly audit inspection of the leachate pre-treatment system and evaporator.

The quarterly report results of onsite monitoring and stack testing will be available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

See also responses to Comments No. 8, 9, 10, and 31.

35. **Comment:** The document is lacking technical information regarding the full characterization of pollutants (1) created by the leachate evaporator process and (2) emitted into the air because they are enveloped in leachate. In agreement with engineer Dr. Ranajit Sahu, we highlight the lack of clarity on the variables included in the models produced for the air quality plan. No information was provided to the public regarding the timeliness of the characterization for radiative components in the leachate or the accuracy of the characterization. As the fate of radiative components through phase-changes is not well understood in the literature, the DEP has an expectation to adhere to the precautionary principle by taking measures to protect human health and the environment, including refusal to put the public in harm's way from the leachate evaporation system. If the DEP chooses to ignore the environmental precautionary principle, we request sampling for the fate of all radiative components in the leachate throughout the entire evaporation process in order to further scientific knowledge. (3-5)

Response: The Department's analysis was based on site specific data. Leachate is currently sampled and analyzed quarterly. The Department reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports to determine the composition of the leachate. The data from these reports was used to develop emission limits. Form 50 reports are included as Attachment G of the Westmoreland Sanitary Landfill Response (8-31-2020) which are available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

The proposed plan approval requires monthly sampling of leachate prior to and post leachate recovery unit for Gross Alpha, Gross Beta, Radium-226, and Radium-228. The monthly leachate sampling results will be compared against the NRC air discharge limits for Radium-226 and Radium-228. The proposed plan approval includes quarterly stack testing for Gross Alpha, Gross Beta, Radium-226, and Radium-228. The proposed plan approval also requires the installation and operation of four (4) outdoor air monitors and six thermoluminescent dosimeter radiation measurement devices. The onsite monitors will run continuously 24 hours a day, 7 days a week. Air monitor filters will be changed out on a weekly basis and analyzed for total alpha and total beta/gamma radiation. Alpha

and beta/gamma are associated with the decay of Radium-226 and Radium-228. The weekly results of the filter analysis will be compared against the NRC air discharge limits for Radium-226 and Radium-228. TLDs are passive radiation dosimeters used to measure the external exposure to ionizing radiation. The dosimeters will be sent to a laboratory for analysis on a quarterly basis. Each quarter, the results will be compared against the Pennsylvania gamma radiation exposure limits to members of the public.

See also response to Comment No. 32.

36. **Comment:** In line with our concerns, we also include reservations regarding the air quality plan from the staff scientists at the Center for Health, Environment, and Justice (CHEJ). The main concerns of CHEJ address the failure of the DEP to require testing in the air quality plan for other constituents of leachate not mentioned in the plan. It is well-known that leachate contains chlorinated and fluorinated compounds that are persistent in the environment, including vinyl chloride and polyfluoroalkyl substances. The extreme temperatures brought about by the thermal burner will also produce products of incomplete combustion, such as dioxins, and compounds not yet identified by the air quality plan. Therefore, it is the assessment of both Protect PT and CHEJ that the DEP has failed to prioritize the safety of Pennsylvania residents by neglecting to place emission standards for the above mentioned pollutants. We request emission standards be placed and regular sampling be conducted for the above mentioned pollutants. (3-5)

Response: As part of the plan approval application review, the Department reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports over the time period of February 2017 to March 2019. The data from these reports, along with natural gas combustion from the 25.2 MMBtu/hr burner was used as the basis in developing emission limitations. Vinyl chloride is one of the pollutants analyzed in these quarterly leachate analyses reports. The plan approval includes emission limitations for products of incomplete combustion, including CO and NO_X. The plan approval also includes EPA reference method stack testing for PM_{10} (filterable and condensable), $PM_{2.5}$ (filterable and condensable), Gross Alpha, Gross Beta, Radium-226, Radium-228, NO_X, CO, SO_2, VOC, Dioxins/Furans, and HAP Metals.

See also response to Comments No. 12, 28, 30, and 60.

37. **Comment:** In addition to calling on the DEP to deny the evaporator permit, we ask DEP to require third party fence line air monitoring and publicly release results monthly, and provide updated information from other landfills using this technology so residents know of the safety implications in other areas. (6)

Response: The Department's Air Quality Modeling Section reviewed the air dispersion modeling portion of the plan approval application to determine the areas of maximum point of impact. The areas of maximum impact were selected as the locations of radiological monitoring sites. The air monitoring program will be implemented by a third party. The quarterly report results of onsite monitoring will be available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at

https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

See also the response to Comment No. 34.

38. **Comment:** Multiple commentators expressed concern over allowing radioactive waste from oil and gas drilling operations to be disposed of at landfills. (6, 7, 8, 9, 18, 19, 20, 24-27)

Response: The Department has determined that the project will meet best available technology as described in response to Comment No. 12. Disposal of oil and gas wastes is regulated by the Department's Solid Waste Management Program. WSL has obtained all approvals required to accept and dispose of oil and gas wastes.

See responses to Comments No. 25, 29, and 35 for the leachate characterization information considered by the Department.

39. **Comment:** If leachate is evaporated in the proposed system, this could lead to the creation of other byproducts such as radon, also a potential health concern. Radon leaks in landfills as the radium decays into radon gas. While radon has a much shorter half-life of 3.8 days, it can travel through air, settle on surface water, seep into groundwater, and collect in basements. Exposure to radon, whether through inhalation or ingestion, is detrimental to human health. The EPA considers radon to be a human carcinogen, indicating that the more exposure someone has to radon the higher the chance they will develop cancer. Radon is the second leading cause of lung cancer in the United States, and it is estimated that radon is responsible for 20,000 lung cancer deaths every year. Exposure to radon by children can be especially harmful because children have smaller lungs and faster breathing rates, which leads to higher radiation doses inhaled in the lungs in comparison to adults. The leachate evaporator would pose a large health risk to residents nearby due to substances like radon and radium being released from the leachate through the evaporation process.

A report conducted by the U.S. Department of Energy through the Environmental Science Division of Argonne National Laboratory in North Dakota looked at the risk of TENORM throughout the landfill disposal process. This report confirmed that if equipment such as fans or spray systems are used to enhance the evaporation rate, this may result in the formation of aerosols containing TENORM that could then travel downwind. (8, 9)

Response: The Department's Bureau of Radiation Protection reviewed the radiation related aspects of the proposed plan approval. The Department's Air Quality Modeling Section reviewed the air dispersion modeling portion of the plan approval application and the results showed that the evaporator radionuclide emissions would be within the standards protective of humans and the environment. The Department has also required air monitoring to provide actual data to support the plume model. See also the responses to Comments No. 28 and 32.

40. **Comment:** The proposed permit requires the immediate shutdown of the leachate evaporator if any monitoring results exceed the NRC's air discharge limits. For nearby residents to take action to protect their health in this situation, we ask that the DEP require the operator to alert all nearby residents to the facility of any exceedance. (8, 9)

    Response: Any potential risk to the public would be obviated by shutdown of the leachate evaporator equipment. The air monitoring results, including exceedance results, will be available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

41. **Comment:** The characterization of the raw leachate to establish the radiological design basis appears to be inconsistent and low with other reported information. The Radium concentration being used as the starting point for the radiological design basis is just above the EPA drinking water standard of 5 pCi/L. A low starting concentration for Radium will result in outcomes of low radioactive airborne emissions and residuals, regardless of the assumptions analysts apply to demonstrate conservatism in their results. Since this effort has been ongoing for some time, the DEP should explain why more samples have not been collected to better define the entire raw leachate composition. (10)

    Response: The maximum concentrations of radium-226 and radium-228 obtained from laboratory testing of representative samples of the facility's leachate were used to model the radium within the leachate. Composite samples of the facilities leachate were collected over one-week periods to provide two approximate 50-gallon representative samples for testing the Pentair HRT pre-treatment system. During the bench scale test, smaller samples were collected prior to passing through the pre-treatment system (unfiltered) and after passing through the pre-treatment system (filtered) and sent to a laboratory for testing. The emissions calculations used the maximum concentration of radium-226 and radium-228 from leachate samples.

    See also the response to Comment No. 32.

42. **Comment:** There is a lack of urgency to get the unit in compliance as demonstrated by allowing multiple 180-day shakedown periods. Multiple 180-day shakedown periods also demonstrate a lack of understanding of how the system will behave when raw leachate is processed. The permit promotes the DEP and WSL to study the process as a test pilot plant. A well understood system that includes a fully characterized influent stream, vendor testing prior to startup, and a well- planned startup test program before introducing raw leachate will shorten system startup period. (10)

    Response: Section B, Condition 003 reflects the Temporary Operation requirements of Pennsylvania Air Quality regulations and was not tailored to address this specific plan approval. The permittee will need to submit extension requests until all conditions of this plan approval have been met, including stack testing requirements, and have been incorporated into the Title V Operating Permit.

43. **Comment:** There appears to be heavy reliance on landfill operator reporting and little independent monitoring. (10)

    Response: The air monitoring program at WSL will be implemented by Perma-Fix Environmental Services, a third party. Air monitoring will consist of four (4) air monitors and six (6) thermoluminescent dosimeter (TLDs) radiation measurement devices. In addition to onsite monitoring, a third-party consultant will perform stack testing on a quarterly basis. Monitoring and stack testing results will be submitted to the Department in a quarterly report. The plan approval will also require an annual third party audit inspection. Operator recordkeeping and reporting is subject to Department oversight, and enforcement for defective or deficient recordkeeping and monitoring. See also response to Comments No. 8 and 37.

44. **Comment:** If this permit is approved, other PA landfill operators that accept oil and gas wastes will likely use forced evaporation to reduce landfill leachate water. There will not be an effort to determine the best process to reduce the environmental impact to contain pollutants within the landfill boundary. (10)

    Response: The potential actions of other landfill operators is beyond the scope of this plan approval application review. Further, evaporators may or may not be appropriate for other landfills. The operators of other landfills will make their leachate disposal choices based on their own unique site-specific needs and criteria.

45. **Comment:** Page 16 of the proposed plan approval indicates that leachate sampling shall be performed monthly. In the review memo addendum, the leachate sampling frequency was changed from weekly to monthly. The DEP should explain the technical basis for changing the sampling frequency from weekly to monthly. (10)

    Response: The Department bases emission estimates on 12-month rolling total. The monthly leachate sampling frequency required by this plan approval is more stringent than quarterly leachate sampling that is required by the Department's Bureau of Waste Management Form 50 Municipal Waste Landfill Leachate Analyses.

46. **Comment:** The review memo addendum indicates the filtration and hydrocarbon removal will remove 99+ percent of the total suspended and dissolved solids. A three-stage mist eliminator is estimated to remove 99 percent of the total dissolved solids or particles less than 2-micron present within the leachate. The memo assumes that 99 percent of the radionuclides will be removed by the mist eliminator. The corrosive nature of the high temperature process and the pH of the leachate are not addressed. The DEP should address whether there is any degradation in performance by the filters and mist eliminators to remove Radium and other contaminants due to material corrosion. (10)

    Response: The high temperature evaporation zone is fabricated from high alloy metals. According to Heartland Water Technology, the higher alloy metals used in the evaporation zone have shown no signs of corrosion in units deployed for 10+ years. With the mixed flowing liquid/gas stream cooled and evaporation of water completed, downstream sections of the Heartland Concentrator are fabricated from engineered

materials with an equivalent corrosion resistance to high alloy metals. [2] See also response to Comment #8.

47. **Comment:** Page 6 Item #003 of the plan approval discusses temporary operations. The permit allows WSL a multiple number of 180-day extensions for equipment shakedown. Should the shakedown stage be reached, the DEP should explain: its oversite role to monitor the shakedown process, and if any plan exists to measure WSL progress. Using the design basis processing rate of 45,000 gpd, over one million gallons of water can be processed in less than one month. During the shakedown period, will lower processing rates be imposed until compliance is demonstrated at a lower processing rate? Do all permit requirements apply during the shakedown period or will WSL be allowed to violate any discharge limits? (10)

    Response: All plan approval requirements apply during shakedown period. Compliance with all conditions of the plan approval must be met and an Initial Operating Permit Inspection must be completed before WSL can submit an amendment to incorporate the requirements of this plan approval into the Title V Operating Permit. See also response to Comment No. 42.

48. **Comment:** Page 15 Item #004 of the plan approval lists the emission limits for nine substances. Most are general categories of pollutants. Lead and ground level ozone were not included but both are criteria air pollutants identified by the EPA. The DEP should indicate why only those substances in Item #004 are being monitored. The general category of VOC is listed as part of Item #004. The DEP should explain if more testing for specific VOCs will be performed and reported rather than reporting the general category. The DEP should explain how the risk to the public will be determined if only the general category is reported without the knowledge of a specific substance. (10)

    Response: Lead is included in the monthly leachate sampling and is also an included pollutant for stack testing. Ground level ozone is not emitted directly into the air, but is created by chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOC). The plan approval includes emission limitations for NOx and VOC of 1.65 tpy and 0.72 tpy, respectively. Stack testing shall verify compliance with NOx and VOC emission limitations. See also response to Comment No. 28.

49. **Comment:** The plan approval lists recordkeeping location requirements on pages 12 and 18 in Items #013 and #019, respectively. Require both on-site storage and an alternate storage location as part of Items #013 and #019. The requirement is to reproduce records for up to 5 years. The plan approval allows the permittee to store all logs/records on site or an alternative site approved by the DEP. If a single storage location is used and fire, water, or wind damage occurs, records may be destroyed. As reported in *The MonValley Independent*, WSL experienced fire and explosion on separate dates in August, 2020, and a building structural collapse of a purchased property in February, 2021. The recent reported destructive occurrences should be sufficient proof to require two separate recordkeeping storage locations. The DEP should explain why items like as-built

[2] Heartland Water Technology, Westmoreland Landfill Technical Query 19-001, September 2019

drawings, operating and maintenance instructions, startup test procedures, and operator training qualifications are not required for record storage for the life of the unit. (10)

Response: The plan approval requires all logs and records be maintained for a minimum of five years. The permittee is required to make any records available to the Department upon request. Several of the items listed in the comment, like as built drawings and test procedures are also submitted to the Department or available from the vendor.

50. **Comment:** The DEP does not require a post vapor processing (scrubber) for odor control. P age 10 Item #006 of the plan approval discusses malodor limitations. The permit limits for malodorous air contaminants are subjective and nearly an unenforceable limitation. The DEP should explain why post vapor processing for odor control is not needed. (10)

Response: Per 25 Pa. Code §127.1, the Department evaluated the proposed source for best available technology (BAT) as defined in 25 Pa. Code §121.1. BAT is defined as "equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce, or control emissions of air contaminants to the maximum degree possible and which are available or may be made available". BAT for the proposed source was determined to be the following:

- Leachate pre-treatment with 99.97% removal of particles 3-micron and 99.9% removal of hydrocarbons.
- The use of an evaporator with a three-stage demisting filtration system with a 99% removal efficiency of filterable PM.
- The use of low NOx burner, pipeline quality natural gas, and good combustion practices.

The facility is subject to the requirements of 25 Pa Code Section 123.31 and the plan approval also requires the permittee to perform a daily facility-wide inspection which includes the presence of potentially objectionable odors. Unlawful malodors are not anticipated from the evaporator's operation, but the foregoing requirements will identify such odors.

51. **Comment:** The description in the plan approval, page 2 is inconsistent with the rest of the permit. The plan approval description is for the construction of a 45,000 gpd leachate evaporative system. There is no reference in the summary that the permit applies to startup, operation, and maintenance of the evaporation system. As written, it is inconsistent with page 6 Item #003 that discusses temporary operation. Even if this section is only a summary statement, it should properly reflect the intent of the permit. Revise the plan approval description to be consistent with the entire permit unless the DEP plans to issue another permit requesting startup and operation of the system. (10)

Response: The plan approval description is a general description of what is proposed to be installed as part of the plan approval. The permittee is required to show compliance with all requirements of the plan approval. The notice of intent to issue the plan approval published in the *Pennsylvania Bulletin* and in *The Mon Valley Independent* stated that the plan approval would authorize construction and initial temporary operation of the leachate evaporation system.

52. **Comment:** The Department received a few comments asserting that issuing the plan approval would be contrary to Article I, Section 27 of Pennsylvania's Constitution, or that Article I, Section 27 prohibited the Department from issuing the plan approval. (11-18, 24-27, 30, 31, 37)

Response: The Department appreciates and thanks the commenters for their interest in protecting the natural resources, air and water of Pennsylvania.

However, the Department cannot agree that issuing the plan approval would violate Article I, Section 27. To the contrary the Department has properly carried out its trustee duties under Article I, Section 27 in coming to its recommendation to approve the evaporator. The record shows that the Department conducted a lengthy review, and pressed the applicant for more information and more protective measures. Please see documents posted on the Community Information page of DEP Southwest Region's website that evince this rigorous review. https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

In fact, the Department took the unusual step of pulling back the initial draft plan approval, dated May 9, 2020, to address concerns raised by the public, requiring more information, analysis, modeling and monitoring from the applicant, and commencing a fresh comment period, which included two public hearings.

The equipment and controls the plan approval would authorize for use meet or exceed the regulatory requirement to "control the emission of air contamination to the maximum extent, consistent with the best available technology." 25 Pa. Code § 127.1. In addition, modeling and calculations using accepted scientific methods, show that the radionuclides emitted will not pose a health risk. Finally, the Department took the unusual step of requiring the applicant to install radiation monitors. The monitors were located based on modeling and meteorology to measure at the most potentially sensitive locations.

The modeling and extensive monitoring which the Department required the applicant to perform are beyond requirements in the air quality laws and regulations. Per Section D, Condition 24 of the Plan Approval the evaporator may be shutdown if radiological monitoring shows an exceedance of NRC radionuclide discharge limits. Further, the permittee Sanitary must provide the results of radionuclide monitoring to the Department frequently (quarterly basis), have the results available on site for inspection at all times, and the Department intends to post the results on its website.

Though whether liners or other waste components of a municipal waste landfill, like Westmoreland Sanitary, can handle oil and gas pad wastes is beyond the scope of this air quality plan approval, the Department is confident that the suitability of the waste is adequately evaluated to protect the public and the environment under waste management regulations. The air quality program has confirmed that Westmoreland Sanitary has received the appropriate solid waste authorizations to accept this waste for disposal.

The Department is mindful of past compliance problems at Westmoreland Sanitary, and is taking measures coordinated amongst the different environmental programs to increase inspection and compliance activities. In a recent inspection of the landfill the Department documented several violations of air quality requirements. The air quality program will take appropriate action on the violations and carry out follow up inspections.

To foster compliant operation of the evaporator the Department is adding conditions to the plan approval, which will better ensure proper maintenance and operation of the proposed leachate evaporator, as follows:

a. The Department has changed the frequency of the audit inspection from once every five years to once every 12 months.
b. The Department is requiring the permittee to have a trained operator on site at all times of leachate evaporation system (Source ID 113) operation. The permittee shall also maintain proof of operator training.
c. The Department has added a condition requiring quarterly testing of the leachate prior to and post hydrocarbon recovery unit for Per- and Polyfluoroalkyl Substances (PFAS) concentration for one year.

See also responses to Comments No. 2, 3, 6, 8, 10, 12, 14, 20, 26, 28, 29, 31-37, 39-41, 43, 54-56, and 60.

According, the Department has fulfilled its trustee duty under Article I, Section 27 in its review of the application and recommendation to issue the plan approval.

53. **Comment:** Evaporation of toxic materials doesn't just release water vapor into the air; anything that is volatile under atmospheric conditions is emitted, as well. Many VOCs, present in landfill leachate, especially when the landfill accepts fracking waste, cannot be allowed to contaminate the air that we breathe. (18)

    Response: The Department evaluated the proposed source for best available technology. The plan approval requires leachate pre-treatment with 99.9% removal of hydrocarbons. See also response to Comments No. 12 and 30.

54. **Comment:** Multiple commentators expressed concern regarding whether other options were evaluated to dispose of the leachate other than evaporation. (7, 19, 20, 24, 25)

    Response: The Department evaluated the proposed source for BAT as defined in 25 Pa. Code §121.1. BAT is defined as “equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce, or control emissions of air contaminants to the maximum degree possible and which are available or may be made available.”

55. **Comment:** Review of the Heartland Tech LM-HT concentrator information page on the company web site shows an outlet sack of about 40 feet in height. This relatively low height will not accomplish any distant dispersion, but will allow short distance dispersion

and accompanied high local concentration of the waste gas. The waste gas is expected to be nearly saturated, so drop out of the pollutants will occur near the stack and even more so in cold winter months. (23)

Response: The stack height does not exceed Good Engineering Practice (GEP) stack height, the regulatory standard for stack height.[3] Air dispersion modeling was prepared by Civil & Environmental Consultants, Inc. (CEC), on behalf of WSL, for estimating radionuclide concentrations to determine whether radionuclide limits would be exceeded and to support the selection of radiological monitoring sites. The Department's Air Quality Modeling Section reviewed the modeling portion of the plan approval application and concluded that WSL's air dispersion modeling for estimating radionuclide concentrations is consistent with the EPA's relevant air dispersion modeling policy and guidance and WSL's air dispersion modeling results are sufficient for estimating radionuclide concentrations within and beyond WSL's property line. Furthermore, WSL's "plot" output files, generated by AERMOD, are sufficient for determining the areas of maximum radionuclide concentrations for supporting the selection of radiological monitoring sites. The Department's Radiation Protection Program reviewed the radionuclide related aspects of the plan approval application and concluded that the steps in which applicant took to determine the locations, and number of monitoring stations, the frequency of monitoring and the types of monitoring devices to be used are the same steps that the Bureau of Radiation Protection would expect from a fully licensed radioactive materials user that would be operating an evaporator. Thus, the radionuclide monitoring plan as currently proposed is adequate to monitor airborne radionuclides emitted from the proposed evaporator. See page 10 of the review memo addendum.

56. **Comment:** Leachate is hard to clean and some of the chemical composition would be released into the air. The permit does not contain information on how the leachate is being tested before going into the evaporator. This should be a requirement of the permit. Without knowing the composition or concentration of pollutants, how can limits be considered?

    All the estimates in the application are just that, estimates. This is a newer process and has not been tested. How will you determine if the contaminants released will be in compliance? The permit does not address air monitoring for what will directly come out of the smokestack so how will you know if they are in compliance and staying within the prescribed limits of the released compounds? (24)

    Response: The plan approval requires monthly sampling of leachate prior to and post leachate recovery unit. The plan approval includes emission limitations based on site specific data. As part of the plan approval application review, the Department reviewed WSL's quarterly Form 50 Municipal Waste Landfill Leachate Analyses reports. The data from these reports, along with combustion from the natural gas burner, was used to develop emission limitations. Compliance with these limits will be verified by stack testing.

[3] Code of Federal Regulations. 40 CFR § 51.100(ii). Definition of "good engineering practice stack height."

Form 50 reports are included as Attachment G of the Westmoreland Sanitary Landfill Response (8-31-2020) which are available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

57. **Comment:** I was provided a sample of leachate from the Westmoreland Sanitary Landfill by the Bel Vernon Municipal Authority (POTW) in April of 2019. I also collected samples of discharge and dried sludge from the waste treatment facility (which had up until that time been processing over 100,000 gallons of leachate a day from the landfill). The liquid samples were analyzed for anions and cations. All samples were tested for Radium. The results showed that the leachate had the characteristics of produced water from oil and gas operations. This was indicated by composition including high concentrations of chloride, bromide, and barium, and the results of mass ratio analyses. Most significantly, the leachate had 120 pCi/L of Radium-226 (^{226}Ra) and 250 pCi/L of Radium-228 (^{228}Ra) (data vetted by Dwight Shearer, PA DEP Radiation Protection Program). It was also clear from my analysis, that the discharge from the POTW was also impacted as it contained the same constituents (i.e., chloride, bromide, barium etc.) as the leachate but at lower concentrations. Again, this composition was atypical for a POTW, as it too had the characteristics of residual waste from oil and gas including bromide. Further, the toxicity of the "leachate" had affected the efficiency of the POTW and as a result the treated effluent being discharged into the Monongahela River had Total Dissolved Solids (TDS) ~3 times over legal limit. Both the POTW effluent (20 pCi ^{226}Ra) and dried sludge (1,630 pCi/kg ^{226}Ra and 1,920 pCi/kg ^{228}Ra) were found to be radioactive. The permit indicates that in excess of 45,000 gallons of leachate will be treated daily with a 95% reduction of volume. A simple calculation indicates that the final material could have over 63,000,000 pCi of Radium (370 pCi/L x 45,000 gal x 3.8 L/gal = 63,270,000 pCi).

While the new permit does include requirements for testing the leachate and air emissions, it still does not indicate where the bulk of the radioactivity, including Radon-222 (a decay product of Radium 226) is going to wind up. If it does go out the stack, will this pose a risk of exposure to those living downwind? How will the radioactive concentrated liquid and residual sludge be disposed of? It is for these unanswered questions that I am again requesting the permit be denied. (28)

Response: Data from the April 2019 sample was not vetted by the Department.

The evaporator includes a three-stage mist eliminator which is estimated to remove 99% of total dissolved solids (TDS) that may be present within the leachate. The evaporator will evaporate approximately 90% of the leachate passing through and approximately 10% will discharge as concentrated liquid residual, which will be continuously collected in a dual-contained storage box adjacent to the evaporator. The evaporator will operate at temperatures of 600 to 1,000 ^{o}F. Radium is in a solid phase to 1,285 ^{o}F and will remain a solid at temperatures at which the evaporator is proposed to operate. The radionuclides are expected to be dissolved solids in the leachate. Radium emissions from the evaporator stack were conservatively calculated in the application. See pages 7 and 8 of the review memo addendum.

The concentrated residual will be staged onsite until the materials are tested and are approved for disposal within the landfill in accordance with Department solid waste requirements. Specifically, each load of waste from the evaporator will be scanned for radiation by passing through the landfill's fixed portal radiation detectors in accordance with the Department's Bureau of Waste Management Form X and each box will follow the Department's Bureau of Waste Management Form U process for disposal. See also the response to Comment #32.

58. **Comment:** Multiple commentators expressed concern over the uncertainty of what pollutants would be monitored, why only four (4) air monitors are being required, and the placement of the monitors. (1-5, 24)

    Response: Perimeter monitoring incudes four (4) outdoor air monitors that will run continuously. These monitors will pull air through a filter designed to collect particles. The filters will be changed out on a weekly basis and analyzed for total alpha and total beta/gamma radiation. Alpha and beta/gamma are associated with the decay of Radium-226 and Radium-228. The weekly results of the filter analysis will be compared against the NRC air discharge limits for Radium-226 and Radium-228. Area monitoring includes six (6) TLD radiation measurement devices. TLDs are passive radiation dosimeters used to measure the external exposure to ionizing radiation. The dosimeters will be sent to a laboratory for analysis on a quarterly basis. Each quarter, the results will be compared against the Pennsylvania gamma radiation exposure limits to members of the public. The locations of the air monitoring devices were selected based upon the results of the air dispersion modeling.

    Air dispersion modeling was performed to support the selection of radiological monitoring sites. The Department's Air Quality Modeling Section reviewed the modeling portion of the plan approval application and concluded that WSL's air dispersion modeling for estimating radionuclide concentrations is consistent with the EPA's relevant air dispersion modeling policy and guidance and WSL's air dispersion modeling results are sufficient for estimating radionuclide concentrations within and beyond WSL's property line. Furthermore, WSL's "plot" output files, generated by AERMOD, are sufficient for determining the areas of maximum radionuclide concentrations for supporting the selection of radiological monitoring sites. The Department's Radiation Protection Program reviewed the radionuclide related aspects of the plan approval application and concluded that the steps in which applicant took to determine the locations, and number of monitoring stations, the frequency of monitoring and the types of monitoring devices to be used are the same steps that the Bureau of Radiation Protection would expect from a fully licensed radioactive materials user that would be operating an evaporator. Thus, the radionuclide monitoring plan as currently proposed is adequate to monitor airborne radionuclides emitted from the proposed evaporator. See pages 8 - 10 of the review memo addendum.

59. **Comment:** The draft air quality monitoring plan includes continuous and passive monitors to measure radiological emissions from the leachate evaporator. However, under this plan, the results from these monitors will only be made available to the DEP on a quarterly basis. EHP is in favor of this continuous and ongoing monitoring, but to best

protect the health of residents in the surrounding area, the resulting data needs to be publicly available. The data collected by these monitors should be made publicly available as soon as the results are collected. Additionally, the results from quarterly testing of stack emissions and leachate should be made available to the public as soon as possible. (8, 9)

Response: The quarterly report results of onsite monitoring and stack testing will be available for review on the designated DEP Community Information webpage for Westmoreland Sanitary Landfill, LLC, found at https://www.dep.pa.gov/About/Regional/SouthwestRegion/Community%20Information/Pages/Westmoreland-Sanitary-Landfill-LLC.aspx.

60. **Comment:** Multiple commentators expressed concern that the plan approval should require testing of the leachate for per-and polyfluoroalkyl substances (PFAS). (1–2, 7–9)

    Response: PFAS is a contaminant of emerging concern. The Department is currently engaged in a data collection effort to gain knowledge regarding PFAS. A condition has been added to the plan approval requiring testing of the leachate for PFAS prior to the pre-treatment unit and post pre-treatment unit. The following condition has been added to the plan approval:

    The permittee shall conduct quarterly sampling of the leachate prior to the hydrocarbon recovery unit (i.e., prior to the pre-treatment unit) and post hydrocarbon recovery unit (i.e., post pre-treatment unit) for Per- and Polyfluoroalkyl Substances (PFAS) concentration for one year in accordance with EPA Draft Method 1633. Any change in the frequency of sampling shall be approved by the Department in writing prior to implementation by the permittee.

61. **Comment:** The filtration equipment and mist eliminators will concentrate radium along with heavy metals and contaminants. Scale and sludge will likely deposit on the evaporator surfaces. No worker safeguards are identified for maintenance activities. Servicing or replacing equipment potentially exposes maintenance workers to ingesting loose contaminants. The review memo addendum discusses an overview of how the residuals will be processed but there is no discussion about protecting individuals that will periodically service the unit. Guidelines for first responders that might have to enter the evaporator facility should also be addressed. (10)

    Response: Worker safeguards is outside the scope of this plan approval application review.

62. **Comment:** The review memo addendum describes an overview of how the concentrated residual stream will be processed and scanned for radiation. It indicates the concentrated liquid residual will be contained in a storage box adjacent to the evaporator. The residuals from the evaporator will pass through the landfill's fixed portal radiation detectors. But Radium-226 decays by alpha particle radiation that is easily shielded, likely by the storage box. The DEP should expand its discussion to identify the materials being look for by the portal radiation monitors and why it is necessary.

The raw leachate contains radioisotopes and hazardous materials that will concentrate in the filters, mist eliminators, and residuals. The DEP should assess the potential to generate a low-level mixed waste in filters, mist eliminators, and the concentrated residual stream, and whether any independent monitoring or oversite for this type of waste will be performed. (10)

Response: The fixed portal radiation detectors have the ability to detect very low energy level radioactivity buried in fully loaded transportation vehicles. Residual waste materials will be staged onsite until the materials are tested and are approved for disposal within the landfill. Specifically, each load of waste from the evaporator will be scanned for radiation by passing through the landfill's fixed portal radiation detectors in accordance with the Department's Bureau of Waste Management Form X Radiation Protection Plan.

The plan approval will require an annual audit inspection which shall include a full system inspection, system cleaning and instrument calibration. See also response to Comment No. 8.