February 8, 2021

Delaware River Basin Commission
Commission Secretary
P.O. Box 7360
25 Cosey Road
West Trenton, NJ 08628-0360

Submitted via: http://dockets.drbc.commentinput.com/.

Re: DOCKET NO. D-1988-054-8, Waste Management of Fairless LLC, Landfill Leachate Treatment Plant, Falls Township, Bucks County, Pennsylvania

Delaware Riverkeeper Network (DRN) submits these comments on behalf of our more than 25,000 members throughout the Delaware River Watershed, including members in Pennsylvania and those who receive water from water intakes influenced by the discharge of effluent from the subject landfill leachate treatment plant.

Delaware River Basin Commission (DRBC) noticed the proposed docket as "An application to renew approval of the applicant's existing 0.3 mgd GROWS Landfill leachate treatment plant (LTP) and its discharge. The LTP will continue to discharge treated effluent directly to Delaware River Water Quality Zone 2 at River Mile 125.6 in Falls Township, Bucks County, Pennsylvania."

These comments are on two specific topics and do not represent support or tacit concurrence for other items in Docket D-1988-054-8. In fact, among DRN concerns regarding the draft Docket are proposed relaxations of standards or lack of rigorous action to achieve improved water quality conditions in the river regarding TDS, PCBs, true color effluent limitations, and the over allocation in Water Quality Zone 2 for carbonaceous biochemical (first stage) oxygen demand (CBOD20).

DRN focuses in this comment on two issues that are not addressed by the Docket:

1. PFAS contamination in the discharges; and
2. Radioactive wastes and/or TENORM in wastes.

Request to Add PFAS Monitoring, Reporting and Treatment Requirements to this Docket

We know the landfill units that contribute leachate to the subject leachate treatment system receive sludge and other municipal waste from sewage treatment plants and municipal trash collection facilities. Highly toxic compounds known as per- and polyfluoroalkyl substances (PFAS),

Delaware Riverkeeper Network
925 Canal Street, Suite 3701
Bristol, PA 19007
Office: (215) 369-1188
fax: (215)369-1181
drn@delawareriverkeeper.org
www.delawareriverkeeper.org

including specific Perfluorinated Compounds (PFC) Perfluorooctanoic Acid (PFOA) and perfluorooctane sulfonate (PFOS), have been found at extremely high levels in drinking water, groundwater wells and in surface water in New Jersey, Pennsylvania and other states. These regions may send sewage treatment facility sludge or other PFAS-contaminated materials to the landfill units. In addition to sewage sludge, contaminated cartridges, soil and other waste from PFAS treatment and handling has been identified as a disposal problem that could add to the load of PFAS-contaminated waste at landfills. (See: https://www.theintell.com/news/20190802/waste-containing-pfas-chemicals-poses-conundrums) If these contaminants are disposed in these landfill units, they could make their way into the leachate collected for discharge through the leachate treatment system.

Delaware Riverkeeper Network advocates that a suite of PFAS compounds, specifically including PFOA and PFOS, be added to the permit requirements under this DRBC Docket with effluent limitations, monitoring and reporting requirements. Sampling could be done to find which PFAS compounds are present and the permit parameters designed around those that are present. Since PFOA and PFOS are the most prevalently found in Bucks and Montgomery Counties and other sources of landfill materials that are accepted at the landfill, including water and wastewater treatment plant sludge, residuals, and other waste containing PFAS compounds, the suite should definitely include these compounds in addition to others identified through sampling of the incoming waste.

The landfill units that contribute leachate to the leachate treatment system are listed in the Docket as Tullytown Resource Recovery Facility (TRRF), GROWS, GROWS North and Fairless Landfills. It is also stated that some of the leachate is pumped up to the Municipal Authority of the Borough of Morrisville (MBMA) wastewater treatment plant for disposal through that system, which also discharges to the main stem Delaware River upriver from these landfill sites (there is a separate Docket for the Morrisville Treatment Plant). The Docket also states, “Non-hazardous waste sludges that are approved by PADEP are disposed of at the landfills. Some of this waste stream originates from municipalities that are located outside of the Delaware River Basin.” This is essentially a wild card that could mean that high concentrations of PFAS are being accepted at these landfill units but the concentrations and totals are unknown.

Scientific papers and reports are available that identify some of the known contaminants in sludge. A study published in 2011 analyzed perfluorinated chemicals (PFCs) in land-applied biosolids coming from a sewage treatment plant in Decatur, Alabama. Local farmers had applied it to agricultural fields in Lawrence, Morgan, and Limestone counties in Alabama. (Lindstrom, A.B. Strynar, M.J., Delinsky, A.D., Nakayama, S.F., McMillan, L., Lieblo, E.L., Neill, M., & Thomas, L. (2011), “Application of WWTP Biosolids and Resulting Perfluorinated Compound Contamination of Surface and Well Water in Decatur, Alabama, USA. *Environ. Sci. Technol.*, 2011”, 45 (19), pp 8015–8021. Retrieved from https://pubs.acs.org/doi/abs/10.1021/es1039425)

Another study in Wisconsin issued in January 2019 has found that PFAS compounds can escape from treatment plants through the processed wastewater that is deposited into public waters and the treated sludge spread onto farm fields or otherwise disposed. Modern sewage treatment processes eliminate many hazards, but PFAS compounds are not rendered harmless by those

processes. Retrieved from https://madison.com/wsj/news/local/govt-and-politics/wisconsin-case-shows-how-sewage-plants-spread-unregulated-toxins-across/article_e9e50bb6-85b8-5377-95ab-736541129386.html). The problem is that these sludges containing PFAS may also be disposed of in these landfill units but are going undetected and uncontrolled.

Other solids that contain PFAS also can make their way into these landfill units. For instance, considering that PFAS-contaminated soils are currently being cleaned up from sites under remediation in the region, these highly contaminated soils could be coming into these landfill units; PFAS could be building up in the landfill leachate from these sources. Because PFAS is not currently regulated in Pennsylvania as a hazardous waste, these soils would not be flagged for the hazardous treatment system at the landfill, are not being tracked or sampled for, and could be mixed in with non-hazardous waste, leaching into the leachate collection system. In other words, PFAS could be slipping between the cracks, untreated, spreading these highly toxic compounds into the river and the environment, compounding the breadth of PFAS contamination.

Another scientific report examined PFAS contaminants in landfill and wastewater leachates and in wastewater treatment. Issued by the Michigan PFAS Science Advisory Board, the report found:

> "When PFAS-containing products reach the end of their usefulness, the remainder commonly ends up in landfills, where constituents may leach from the landfill. The leachate from such point sources may be treated on-site or at a wastewater treatment plant, but the effectiveness of these processes in reducing PFAS levels or sequestering them remains in doubt (Benskin et al. 2012)." Page 24
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> Preferential accumulation of longer chain PFAS into biosolids has been reported (Sinclair and Kannan 2006), but PFAS are often released in wastewater treatment plant discharges. Levels of one PFAS compound (PFOA) discharged into effluent waters by six wastewater treatment plants in New York were on the order of 100 ppt, comparable to the 70 ppt EPA advisory level (Sinclair and Kannan 2006). Page 25
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> ("Scientific Evidence and Recommendations for Managing PFAS Contamination in Michigan", Michigan PFAS Science Advisory Panel, Report developed for the Michigan PFAS Action Response Team (MPART), Lansing, MI, December 7, 2018.)

PFOA and PFOS have been found above the Environmental Protection Agency's health advisory levels of 70 ppt in public wells in Bucks and Montgomery Counties. These counties are where three military facilities are located that released PFAS-laden firefighting foams from the bases into the environment for decades. Water samples from these counties were among the ten highest sampling results for PFAS in the nation in the EPA-required sampling done between 2013 and 2015. (https://www.epa.gov/sites/production/files/2015-09/ucmr-3-occurrence-data.zip) Sampling done since then has shown a much wider contamination across Pennsylvania, including in southeastern Pennsylvania which may send sludge and other PFAS waste to the subject landfill units. Between 70,000 and 100,000 residents and at least two dozen communities in Bucks and Montgomery Counties have discovered their water was contaminated by PFAS, the most prevalent being PFOA and PFOS.

In a recent blood study discussed by the PA Department of Health in December, people who live around the military bases in Bucks and Montgomery Counties were found to have elevated levels of PFOA, PFOS, Perfluorohexanesulfonic acid (PFHxS) and perfluorononanoic acid (PFNA). Additionally, sewage sludge and PFAS waste imported to the subject landfill units may also originate in New Jersey, which has among the greatest levels of PFAS contamination of any state (most prevalent are PFOA, PFOS, and PFNA). (Post GB, et al, "Occurrence of perfluorinated compounds in raw water from New Jersey public drinking water systems", 2013, retrieved from https://www.ncbi.nlm.nih.gov/pubmed/24187954).

These chemicals pose severe threats to human health and the environment. The scientific literature and the data gleaned from health studies show that PFAS are linked to serious disease, including cancers, and detrimental human health conditions. Fetuses, infants, and children are the most vulnerable populations due to negative developmental impacts, which also affects pregnant women, women of childbearing age and women who are breastfeeding. Chief among the bodies of data and findings available for PFOA are those from the court-ordered C8 Health Panel and the C8 Health Project in West Virginia, related to the DuPont facility there. Among the conclusions of this multi-year study of human subjects, their blood and scientific reports, it was found that PFOA is correlated with Kidney Cancer, Testicular Cancer, Thyroid Disease, High Cholesterol, Pregnancy-Induced Hypertension/Preeclampsia, and Ulcerative Colitis. (http://www.c8sciencepanel.org/newsletter10.html) In other published studies, probable links were found to decreased birth weight and decreased response to vaccines. A report reviewing all of the studies on low birth weight concluded that PFOA does reduce human birth weight. (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4181929/pdf/ehp.1307893.pdf)

PFAS do not break down in the environment (dubbed "forever chemicals"), are ubiquitous throughout the planet, and, when ingested, build up in people's blood, increasing the risk of developing adverse health effects. To protect public health and fish, fishlife and benthic life it is essential that permitting for this landfill leachate treatment plant discharge require sampling, long term monitoring, and treatment for PFAS and that discharge limits be established to prevent its release to the Delaware River.

Request to Add Radioactive Materials Radium-226 and Radium-228 Monitoring, Reporting and Treatment Requirements to this Docket

Radium is known to be contained in landfill leachate in Pennsylvania. It is also known to be contained in sewage sludge, which is part of the waste stream at the landfill units included in this Docket. Another known source of radioactive materials is in waste solids produced by oil and gas drilling, which include cuttings and other solids. According to a report from PA Department of Environmental Protection (PADEP), Technically Enhanced Naturally Occurring Radioactive Materials or "TENORM" was in waste that was accepted at Tullytown Landfill and GROWS North Landfill in the past. (See https://www.delawareriverkeeper.org/sites/default/files/PADEP%20NORM%20Response%20%E2%80%93%20Landfills%202014.pdf) Despite the statement in the draft Docket that no gas drilling wastewater is accepted at GCSL, which DRN emphatically supports, it is possible that solids or

sludge that inadvertently contain Technically Enhanced Naturally Occurring Radioactive Materials or "TENORM" (which contains radium-226 and radium-228) can be entering the landfill. As far as DRN is aware, there is no prohibition of cuttings or solids from gas well drilling at the subject landfill units or other landfills in Pennsylvania or within the Delaware River Basin. In fact, it is known that some solids and/or cuttings produced by gas drilling have been imported into the Delaware River Basin and brought to facilities for treatment. (See: "Three facilities in the Pennsylvania portion of the Delaware River Basin already accept waste from unconventional oil and gas wells in Pennsylvania, including Berks Transfer in Reading, Berks County; Republic Environmental Systems Inc. in Hatfield, Montgomery County; and Waste Recovery Solutions in Myerstown, Lebanon County", page 12 and "Although just a small fraction of the statewide O&G waste management picture, the waste accepted by facilities in the Delaware River Basin is significant, especially the more than 34,000 tons of drill cuttings disposed of at the Republic Environmental Systems facility. With waste haulers being willing to drive as far a Michigan to dispose of some Pennsylvania's waste, the economic pressure of finding closer destinations is likely considerable", page 13 at https://www.delawareriverkeeper.org/sites/default/files/FT-WhitePaper-DRB-2018%20%28003%29.pdf)

It is unknown if any of these TENORM-contaminated solids continue to make their way into landfill units included in this Docket today or if these could be accepted in the future but it is a real threat that must be addressed in the Docket. The radiation monitors employed at landfills in Pennsylvania do not detect all types of radioactive materials so cannot be completely relied upon to catch all radiation. Furthermore, it is reasonable that levels of radioactivity just below detectable levels can be brought into the landfill, accumulating over time to concentrations that result in the presence of radium-226 and radium-228 in the treated leachate. This is a likely explanation as to how TENORM accumulated to high levels in the PADEP-sampled leachate at landfills even though they employ radiation monitors on incoming waste. Because the Waste Management Leachate Treatment System is not required to monitor for or treat for these materials in the permit for the leachate treatment plant, these contaminants could slip through the cracks and enter the waterway.

Therefore, the potential for leachate to contain radioactive materials is present and requires investigation and action by DRBC to prevent its distribution through effluent discharge to the Delaware River. As discussed further below, there are other sources of radioactive materials in the waste stream such as sludge and hospital waste so no one source, such as TENORM, is the only possible source of radioactive materials at the subject landfill units, further supporting the addition of this parameter to the Docket.

The dangers associated with the distribution of radium into the environment and the human health and wildlife threats posed by exposure to radium are too great to ignore. Radium is a known cancer-causing substance and exposure to high levels of radium can lead to a higher risk of developing bone, liver and breast cancer (see: https://www.dhss.delaware.gov/dhss/dph/files/radiumfaq.pdf).

In PADEP's report on Technologically Enhanced Naturally Occurring Radioactive Materials ("the TENORM Report"), radium was detected in all landfill leachate samples gathered for the report by

PADEP's experts. Since radium-226 and radium-228 are not sampled for or removed by this leachate treatment system, these dangerous contaminants could be polluting the river. The long life of radium-226 (half-life of 1600 years) and the fact that it can build up in the receiving sediment below an effluent outfall, elevates the severity of this pollution legacy that has the potential to contaminate the environment and deliver harmful health effects from the present through to generations to come.

For PADEP's TENORM study, samples of leachate were collected from 51 landfills and analyzed using gamma spectroscopy for Ra-226 and Ra-228. Nine landfills were selected based on the volume O&G waste accepted. It is unknown if the GROWS landfill units were of those tested but DRBC could find out that information from PADEP. For the landfills that were tested, radium was detected above the MDC value in 34 of 51 samples. Sample results from the 42 unselected landfills showed Ra-226 results that ranged from 54.0 to 416 pCi/L with an average of 112 pCi/L. Radium-226 results from the nine selected landfills ranged from 85 pCi/L to 378 pCi/L with an average of 106 pCi/L. Radium-228 results ranged from 2.5 to 55.0 pCi/L with an average of 11.9 pCi/L in the 42 unselected landfills. Radium-228 results from the nine selected landfills ranged from 10.0 pCi/L to 1,100 pCi/L with an average of 139 pCi/L. (Pennsylvania Department of Environmental Protection's (PADEP) "Technologically Enhanced Naturally Occurring Radioactive Materials Study Report", January 2015, page 5-1).

From the above referenced report regarding landfill leachate:

> **5.2.1 Influent and Effluent Leachate**
> Nine influent and seven effluent leachate samples were collected at the nine selected landfills. All nine landfills treat leachate onsite. The samples were analyzed using gamma spectroscopy. The results of the Ra-226, Ra-228, K-40, as well as gross □ and gross □ activity levels are presented in **Table 5-4** for effluent samples and in **Table 5-5** for influent samples. Radium was detected in all of the leachate samples. Radium-226 results ranged from 67.0 to 378 pCi/L with an average of 142 pCi/L for effluent samples. Radium-228 results ranged from 3.00 to 1,100 pCi/L with an average of 178.0 pCi/L for effluent samples. Radium-226 results ranged from 48.5 to 116 pCi/L with an average of 83.4 pCi/L for influent samples. Radium-228 results ranged from 4.00 to 15.0 pCi/L with an average of 7.94 pCi/L for influent samples. The influent and effluent samples from the same facility do not represent the same leachate at different times in treatment. (PADEP, "Technologically Enhanced Naturally Occurring Radioactive Materials Study Report", January 2015, page 5-1).
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> **5.2.2 Leachate Filter Cake**
> Filter cake from three of the nine landfills was sampled and analyzed using gamma spectroscopy. The results of the Ra-226 and Ra-228 analyses are presented in **Table 5-6**. Radium was detected in all of the filter cake samples. Radium-226 results ranged from 8.73 to 53.0 pCi/g, with an average of 24.3 pCi/g. Radium-228 results ranged from 1.53 to 5.03 pCi/g, with an average of 3.85 pCi/g. (PADEP, "Technologically Enhanced Naturally Occurring Radioactive Materials Study Report", January 2015, page 5-2).

5.2.3 Effluent Discharge Sediment-Impacted Soil

At three landfills that discharged effluent water to the environment, a sediment-impacted soil sample was collected at each of the three effluent outfalls. The gamma spectroscopy results are presented in **Table 5-7**. Radium was detected in all of the samples. Radium-226 results ranged from 2.82 to 4.46 pCi/g with an average of 3.57 pCi/g. Radium-228 results ranged from 0.979 to 2.53 pCi/g with an average of 1.65 pCi/g.
(PADEP, "Technologically Enhanced Naturally Occurring Radioactive Materials Study Report", January 2015, page 5-2).

DRN also points out that outside of gas drilling sources of radioactive materials, there are other known sources of radioactivity in sewage sludge and waste that could be imported to the subject landfill units and carried through to its leachate treatment plant. Sewage flowing into a POTW can include anthropogenic materials exempt from regulatory control, such as excreta from individuals undergoing medical diagnosis or therapy, and discharges of limited quantities of radioactive materials from some licensees of the U.S. Nuclear Regulatory Commission (NRC) and NRC Agreement State licensees.

Other sources of radioactive materials that may enter sewage collection systems include stormwater runoff, groundwater, surface water, residuals from drinking water treatment plants, and waste streams from certain industries (e.g., ceramics, electronics, optics, mining, petroleum, foundries, and pulp/paper mills). Some states have identified cases where radium from drinking water treatment residuals has been concentrated in sewage sludge. (U.S. Nuclear Regulatory Commission (2004), SCORS Assessment of Radioactivity in Sewage Sludge: Modeling to Assess Radiation Doses, Sewage Sludge Subcommittee. Retrieved from http://www.iscors.org/pdf/FinalDoseModeling.pdf)

It is essential that the presence of radium be sampled and monitored for and that it be removed from effluent discharged to the Delaware River through permit requirements. DRN advocates that monitoring, reporting and treatment requirements for radium-226 and radium-228 be added to the parameters of this Docket.

In closing, the Docket states, "The nearest surface water intake of record for public water supply within a 5-mile tidal influence of the docket holder's LTP is located on the Delaware River approximately 3.3 River Miles away and is operated by the Lower Bucks County Joint Municipal Authority." DRN points out that there are water intakes downstream of the discharge of the landfill leachate treatment plant that are among the largest on the Delaware River. The intake at the Baxter Water Treatment Plant on the Delaware River supplies approximately 57% of the 546 million gallons of water per day that is consumed by the greater Philadelphia region (the rest of the water withdrawn for Philadelphia is from the Belmont and Queen Lane Plants on the Schuylkill River). The Philadelphia water system is vulnerable to this potential contamination and could already be exposed to unsafe levels of PFAS and radioactive substances from the ongoing point and nonpoint discharges from these landfill units, the Morrisville Sewage Treatment Plant and the leachate treatment plant that is the subject of this Docket. DRN urges the Commission to take action quickly to regulate these dangerous and toxic substances in this Docket.

Thank you for the opportunity to comment on this draft docket.

Submitted by:

Maya K. van Rossum
the Delaware Riverkeeper
keepermaya@delawareriverkeeper.org

Tracy Carluccio
Deputy Director
Delaware Riverkeeper Network
tracy@delawareriverkeeper.org