



Office of the
City Manager

City of Bristol, Virginia

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October 24, 2021

LANDFILL UPDATE

1. Landfill Break-In

- a. This morning around 9:00a.m., an employee of the Solid Waste Disposal Facility was reporting to the landfill in order to complete a daily check. Upon arrival, the employee noticed damage to the facility. The employee contacted landfill management, and landfill management contacted law enforcement. Evidence of the incident was recorded by video. Law enforcement is actively searching for the suspect(s). This is an ongoing criminal investigation. Release of further information will come from the Bristol Virginia Police Department at the appropriate time.

2. Possible Litigation with Bristol, Tennessee

- a. On September 30, 2021, the City became aware the City of Bristol, Tennessee had retained outside counsel to represent Bristol, Tennessee in potential litigation against Bristol, Virginia as it relates to issues associated with the City's landfill.
- b. City Attorney Randall Eads has had a conversation with counsel for Bristol, Tennessee, Andrea Wortzel, and Eads was advised the City of Bristol, Tennessee would just like to have a conversation with Bristol, Virginia. Ms. Wortzel was advised that Bristol, Virginia Council Members had been in contact with Bristol, Tennessee Council Members and the City Managers have had discussions as well. Ms. Wortzel was also advised the City Manager for Bristol, Tennessee and council members attended several City sponsored discussions about the landfill and community sponsored discussions about the landfill as well.
- c. On October 22, 2021, Bristol, Tennessee published a notice for a called meeting to discuss possible legal action against Bristol, Virginia.
- d. The City of Bristol, Virginia has discussed the landfill issues since January 2021 in council meetings, with the media, privately with concerned citizens and at City sponsored meetings prior to council meetings. Bristol, Virginia has never denied a discussion with any person who wants information about the landfill.
- e. The City of Bristol, Virginia welcomes the opportunity to discuss the landfill, in detail, with members of the Bristol, Tennessee City Council if they so desire. Otherwise, we will be prepared for any litigation that arises with Bristol, Tennessee.

3. Gas Well Installation and Connection to the Landfill Gas Collection System

- a. Twenty-one (21) wells have been installed.
 - i. 2170' or an average of 103'

- b. Council will approve a contract for the connection of the wells at a regularly scheduled council meeting on Tuesday, October 26, 2021.
- c. The contract calls for the well connections to be completed within 50 days after the Contract Time commences to run. The City expects this to be completed mid to late December 2021.

4. EPA Monitoring

- a. The City has recently noticed comments that the odor has not been as bad since the EPA is on-site this past week.
- b. The landfill has not changed operations due to the EPA being on-site.
- c. A staff member noticed a composting odor near Robin Road this past week. As a test, staff moved an odor neutralizing unit to the composting area of the landfill to attempt to mitigate the composting odor.
- d. Two additional staff members have been added to assist in keeping condensate lines free from condensation, therefore, allowing more gas to be pulled from the waste.
- e. The flare is only being used when Ingenco is not using gas to produce electricity. At the moment, Ingenco is running more than 20 hours per day.

5. Best Practices when Dealing with a Potentially Hot Landfill

- a. See Exhibit A or hyperlink below. Exhibit A is a blog post written by James Walker, PE. He is a senior client manager with Cornerstone, A Tetra Tech Company. He earned his degree in Civil Engineering and has 30 years of experience with Subtitle D landfill design and construction projects across the United States. Here he discusses challenges solid waste managers may encounter related to hot landfills as well as prevention and management tactics.
- b. <https://www.tetrattech.com/en/blog/when-temperatures-rise-the-challenges-of-hot-landfills>
- c. The City has completed or will complete 11 out of 12 of the steps outlined in the blog post and as described below:
 - i. **Increase the number of LFG wells with dewatering capabilities where necessary** - Completed well installation; dewatering systems will be added during connection phase and before December 31, 2021.
 - ii. **Construct localized capping for target control of odor and air intrusion** - Staff has capped the landfill except the working face.
 - iii. **Increase operations and maintenance (O&M) activities to ensure uninterrupted gas and leachate collection** - Added additional staff (Landfill Director and up to 4 other MEOs) to assist with this item.
 - iv. **Add LFG and leachate piping to critical areas** - Completed January 2021 to April 2021.
 - v. **Upgrade gas collection and control system (GCCS) headers to accommodate additional wells** – Will be completed prior to December 31, 2021.
 - vi. **Upgrade flare as necessary** – Installed larger flare in October 2021; there may be additional upgrades to include auto start of flare; ability to run flare and Ingenco simultaneously; upgrade computer communications; a possible larger blower for the flare and a generator for the flare in the event of electrical loss, if necessary, in late 2021 and early 2022.
 - vii. **Repair excessive settlement to prevent ponding and control infiltration.** Ponding is not an issue, however, the intrusion of excessive water due to this being a quarry landfill is an issue. The well installations

and connections will include the addition of twenty-one (21) pumps for the removal of water.

- viii. **Add air and forcemain upgrades as dewatering wells are added.** Twenty-one dewatering pumps will be added as part of the gas well connection process.
- ix. **Expand capping for control of odor and air intrusion, if necessary.** Staff has capped the landfill except the working face.
- x. **Consider separation of clean and dirty gas and leachate systems for improved liquids management.** The City is monitoring this issue and will make any changes recommended by its experts.
- xi. **Implement leachate and GCCS treatment when the quality warrants improvement.** Leachate treatment will be completed by June 2024 as part of the benzene remediation.
- xii. **Finally, prepare operation, maintenance, and monitoring (OM&M) plan once systems are in place and in a controlled state.** The City will update the operation, maintenance, and monitoring plan by June 2022.



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When Temperatures Rise —The Challenges of Hot Landfills

By James Walker | Fri May 18 21:37:43 UTC 2018



James Walker, PE, is a senior client manager with Cornerstone, A Tetra Tech Company. He earned his degree in Civil Engineering and has 30 years of experience with Subtitle D landfill design and construction projects across the United States. Here he discusses challenges solid waste managers may encounter related to hot landfills as well as prevention and management tactics. This blog post originally appeared on [CornerPost](#). All opinions expressed in this post are the author's own.

The issue of hot landfills has become a significant challenge to the waste industry over the last 10 years. When a landfill's temperature begins to elevate significantly, rapid response is necessary to minimize impacts to the public and costs to the owner. Each hot landfill is unique, and I wanted to share the

experience gained from these sites to educate others on the prevention, detection, and solutions to manage these facilities. Design of odor, gas, and leachate controls for these sites are outside the norm, and the lessons learned are valuable for efficiently managing new hot landfills and reducing the associated cost.

What is a hot landfill and what are its impacts?

Landfills are generally considered to be hot landfills when temperatures exceed 140°F, although some site and regional conditions might explain higher normal temperatures. However, temperatures of up to 250°F have been measured in municipal solid waste landfills when they are undergoing a subsurface reaction. High heat has even been measured in saturated waste. At these temperatures, “thermal runaway” can occur. This means the increased temperature changes conditions in a way that causes even further increases, often leading to destructive results.

One potential casualty of hot landfills is high-density polyethylene (HDPE), which is commonly used for landfill liners and pipes. HDPE loses half its strength at every 60°F rise in temperature. At 140°F, HDPE will buckle at a very small load, and at 260°F the HDPE melts.

Hot landfills lead to significantly more landfill gas (LFG), so much that operators can have difficulty keeping up with it. This also may lead to large scale settlement, which may allow more rainwater to enter the landfill. It also can lead to an increase in odors—and neighbor complaints. Leachate volumes can increase significantly, and there may not be enough storage for efficient management. Finally, a hot landfill may produce high-strength leachate, which may be difficult and expensive to treat and dispose.

Not every hot landfill is considered a fire. For example, what on the surface looks like smoke may really be steam and hydrogen gas with moderate carbon monoxide (CO) levels resulting from exposure of a gas well for remedial activities.

An ounce of prevention

When it comes to hot landfills, an ounce of prevention is worth a ton of cure. Wastes to be especially cautious of include aluminum dross and other metal waste, sulfur treatment media, hot loads, and lime materials. Chemical reactions from mixtures of these materials can contribute to heat accumulation at localized areas within a landfill.

Unfortunately, toxicity characteristic leaching procedure (TCLP)

tests on special wastes do not tell the whole story! Be sure to add ASTM C-1702 ([Standard Test Method for Measurement of Heat of Hydration of Hydraulic Cementitious Materials Using Isothermal Conduction Calorimetry](#)) to your special waste testing protocol before you consider accepting special wastes. Also, be sure to keep liquids and gases under control—not allowing them to build leachate head or pressure at depth in the waste mass—and keep a close watch on your LFG chemistry. Calculate the CH₄/CO₂ ratio at every LFG well. If it is less than 1.0, take action. Finally, make sure the hydrogen levels in LFG wells are less than 0.5 percent by volume.

Additional causes of excessive heat in a landfill

Aside from overheating materials, there are a few other causes of landfill heat. First off, there are actions taken for NSPS compliance, for example, tuning wells down to stay in compliance with 131°F criteria, or pulling too hard to stay below the 500 parts per million by volume (ppmv) methane concentration for surface emission monitoring (SEM).

Then there are operations that lead to perched leachate, which retains heat and impairs LFG removal. These include not stripping out old roads prior to filling, not stripping out intermediate cover, using clay or silt for daily cover, and recirculating too much leachate.

Management strategies for heat in landfills

The two most effective strategies for managing heat in landfills include getting the liquids out—1 gallon per minute at 150°F = 949 BTU/minute; and then getting the LFG out; where 30 cubic feet per minute at 145°F = 387 BTU/minute.

Here's a suggested progression of remedial activities for a hot landfill:

- Increase the number of LFG wells with dewatering capabilities where necessary
- Construct localized capping for target control of odor and air intrusion
- Increase operations and maintenance (O&M) activities to ensure uninterrupted gas and leachate collection
- Add LFG and leachate piping to critical areas
- Upgrade gas collection and control system (GCCS) headers to accommodate additional wells
- Upgrade flare as necessary
- Repair excessive settlement to prevent ponding and control infiltration

Add air and forcemain upgrades as dewatering wells are added

- Expand capping for control of odor and air intrusion, if necessary
- Consider separation of clean and dirty gas and leachate systems for improved liquids management
- Implement leachate and GCCS treatment when the quality warrants improvement
- Finally, prepare operation, maintenance, and monitoring (OM&M) plan once systems are in place and in a controlled state.

Operators would do well to take a very proactive approach to preventing hot landfills. Otherwise, the results can prove extremely expensive. Here are just a few examples of the impacts of hot landfills that I have seen: Loss of millions of yards of airspace, regulatory fines, expensive remediation and O&M costs, additional wells per acre for GCCS control, waste excavation to create an isolation break, and construction of costly storage tanks and wastewater treatment plants to manage leachate.

Landfills can take a very long time to cool off—and millions of dollars to remediate! At one landfill I am familiar with, the hot landfill condition cost more than \$100 million dollars, about 100 times more than it would have cost to prevent. That does not include other lasting impacts, such as loss of public trust and loss of airspace. At this site, control and containment was the long-term resolution. Eleven years ago at one hot landfill, landfill gas was measured at 280°F, while it is now at 200°F. Odor, gas, and leachate are under control, but continued settlement effects need to be dealt with. The facility is operated in a controlled manner and operators have implemented an OM&M plan for management.

About the Author



James Walker, PE, is a senior client manager in the Farmington Hills, Michigan, office of Cornerstone, A Tetra Tech Company. He earned his degree in Civil Engineering and has more than 40 years of experience in civil and environmental engineering design, including 30 years involvement with

the design, permitting, and construction of more than 80 solid waste disposal facilities throughout the Midwest and Northeast. This experience includes detailed design and permitting of four greenfield sites; six lateral expansions; four vertical expansions; and numerous conceptual expansion designs, alterations, and permit modifications.

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