The Underground Chemistry Behind Middle Point Landfill

The cost of consumption in Nashville is far more serious than many realize. Waste mismanagement at our regional landfills has resulted in significant environmental damage and mounting human health concerns across Middle Tennessee. Middle Point Landfill (MPL) in Murfreesboro, just thirty minutes outside Nashville, has effectively become the city's dumping ground, accepting thousands of tons of waste each day from the greater urban area.

Image: Truck dropping off waste at Middle Point Landfill.

Over the past decade, it has become increasingly clear that Middle Point is not only nearing capacity but also inflicting substantial environmental harm on surrounding communities. The U.S. Environmental Protection Agency has classified MPL as an elevated temperature landfill, with gases being released at average temperatures exceeding 131 degrees Fahrenheit — hot enough to cause severe burns. Additionally, in 2011, when MPL opened up a trench in the landfill, a BFI employee shared that the waste temperatures reached high enough that their IR (infrared thermometer) gun, with a max 1500 degrees Fahrenheit range, couldn't register an exact temperature. Temperature estimations were noted to be ~2000 degrees Fahrenheit. An employee working at MPL noted that it appeared to be a vast "white hot glowing cavern" and what "I imagine hell looking like." Yet the danger lies not only in the heat and overwhelming odor of these emissions, but in their chemical composition.

When landfill leachate — the contaminated liquid formed as rainwater percolates through waste — mixes with trash containing heavy metals, industrial byproducts, and other pollutants, it mobilizes those substances. These materials can trigger exothermic (heat-releasing) chemical reactions, raising internal landfill temperatures. As temperatures rise, gas production accelerates. Expanding methane, hydrogen sulfide, and other noxious compounds increase internal pressure, leading to over-pressurized wells, system strain, and the potential for uncontrolled gas releases.

The growing body of documentation detailing elevated temperatures, excessive positive-pressure wells, methane exceedances, and the release of hazardous gases suggests more

than isolated incidents — it points to systemic operational failure at Middle Point. The landfill's containment and gas collection systems appear unable to fully manage the dangerous byproducts generated within its boundaries, leaving surrounding communities to bear the consequences.

The EPA has attributed these elevated temperature reactions to the deposition of aluminum dross at Middle Point Landfill. Aluminum dross — often referred to as "saltcake" — is a reactive industrial byproduct of aluminum smelting and recycling composed of oxidized aluminum, residual metallic aluminum, and various salts. The aluminum nitride compounds present in these saltcakes are highly sensitive to moisture; when exposed to rainwater or landfill leachate, they undergo chemical reactions that release heat and generate ammonia gas. These exothermic reactions can significantly raise internal landfill temperatures and intensify gas production.

Image: Crushed aluminum dross saltcakes

If aluminum dross is not disposed of under properly controlled conditions, it can accelerate these chemical processes, amplify the release of noxious gases, increase internal pressure, and elevate the risk of landfill fires and hazardous byproducts. Guidance from the Aluminum Association recommends that aluminum dross saltcakes be placed in a dedicated single-waste cell, segregating them from other wastes to ensure safe disposal. However, the recurring pattern of elevated temperatures, documented exothermic reactions, and past landfill fires at Middle Point raises serious questions about whether such disposal protocols are being consistently followed. The impacts of these reactions do not end there; the excess heat drives gas expansion and mounting pressure within the landfill's gas collection wells.

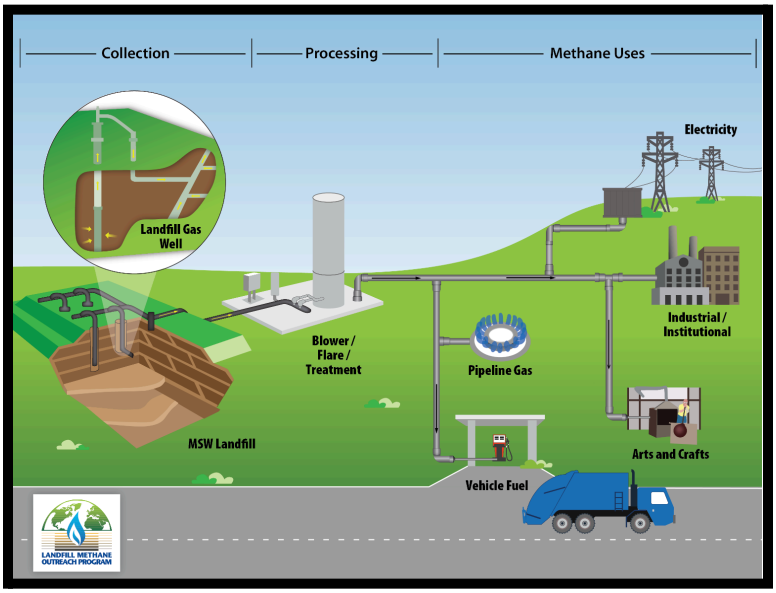

Image: EPA diagram, basic information about landfill gas collection systems.

Gas collection wells are engineered vertical or horizontal boreholes installed within or beneath a landfill to collect, monitor, and control gases and liquids generated by decomposing waste. They function as part of a broader landfill gas management system, in which captured gases are drawn through piping to a central collection point where they can be flared or processed for treatment. These systems are critical for limiting the release of potent greenhouse gases such as methane and carbon dioxide, as well as toxic compounds that pose risks to environmental and human health.

However, when these wells become overpressurized — operating under positive pressure rather than the intended vacuum — the system begins to fail. Elevated internal temperatures and accelerated gas generation from chemical reactions, including those triggered by aluminum dross and leachate, can overwhelm the wells' designed capacity to capture and control emissions. When gas production exceeds what the system can safely manage, pressure forces gases and contaminated vapors out through unintended pathways.

This can result in gas migration beyond landfill boundaries, noxious odor releases, liner damage, and increased risks of air and groundwater contamination in surrounding communities. When methane concentrations exceed regulatory thresholds — as documented at Middle Point — the issue moves beyond operational strain and into potential violations of the Clean Air Act, which requires landfills to maintain effective gas collection systems that prevent uncontrolled emissions. Persistent positive-pressure wells are indicators that the landfill may be failing to meet federally mandated air quality standards.

Alongside the exceedances in methane releases, MPL has also been criticized for the release of volatile organic compounds (VOCs) and Hydrogen Sulfide. Both are toxic substances that have detrimental human health impacts. However, to determine the extent of release and damage, the Tennessee Department of Environment and Conservation (TDEC) must conduct more extensive and more frequent testing. Currently, TDEC hasn't completed updated gas sampling for these issues.

While much of the landfill's instability unfolds underground and out of sight, there have been moments when its consequences became unmistakably visible. In June 2022, Middle Point Landfill experienced a significant landfill fire, with waste burning in open air for hours before it was extinguished. Republic Services, the owners of Middle Point Landfill, hauled in tons of dirt to smother the fire, but it failed to prevent the overwhelming, nauseating odors experienced by nearby residents. The cause of the fire was debated, with MPL noting the fire was due to a "hot load" while other officials traced it to an exploded battery. However, the fire marked a visible manifestation of the instability within MPL and raised further concerns for the operational and systematic issues.

Left Image: Photograph of landfill gas plume from MPL in August 2025. Credit: Rutherford Forward. Right Image: Enhanced contrast photograph of landfill gas plume from MPL in November 2025. Credit: Rutherford Forward.

When a thick plume of landfill gas was documented in August 2025, it renewed concerns that the landfill's underlying chemical and structural issues had not been fully resolved, and that the conditions contributing to past fires may still be present. Rutherford Forward, a local advocacy organization focused on raising awareness about air and water contamination from Middle Point, recorded and shared images of the incident. Eyewitnesses shared that the plume spewed yellowish gas for around 30 minutes. When concerns regarding the plume were shared with TDEC, they allegedly responded that it must have been due to a bush fire on the southern side of the landfill, despite the images strongly suggesting the plume stemmed from a gas collection well. However, there appears to have been no detailed public documentation of the event released by Middle Point or the Tennessee Department of Environment and Conservation (TDEC), leaving residents and local officials with unanswered questions.

Overall, Middle Point Landfill has experienced a pattern of regulatory and operational failures that pose serious risks to both the surrounding community and the regional environment. Documentation of these concerns continues to grow, with recurring reports of elevated temperatures, excessive positive-pressure wells, methane exceedances, gas leaks, and landfill fires. Frustration from city officials and community members has done little to compel meaningful structural improvements at MPL or to prompt expanded air monitoring by the Tennessee Department of Environment and Conservation (TDEC).

Taken together, these incidents cannot reasonably be dismissed as isolated events; rather, they point to a troubling and persistent pattern of mismanagement. Elevated temperatures driven

by interactions among decomposing waste, leachate, and aluminum dross have created ongoing internal instability within the landfill. That instability is reflected in the rising number of overpressurized wells, signaling a breakdown in the containment systems designed to prevent uncontrolled emissions of greenhouse gases and other hazardous substances. When smoke plumes and fires become visible above ground, they serve as stark reminders of the chemical and structural volatility occurring beneath the surface.

At its core, this issue extends beyond landfill operations alone. Middle Point's strain reflects the consequences of Nashville's rapid growth and the designation of Murfreesboro as the region's dumping ground. Urban consumption generates thousands of tons of waste each day, yet the environmental and public health burdens fall disproportionately on the surrounding community. The issues unfolding at Middle Point havetangible consequences for a region that has yet to confront the true environmental cost of its consumption.