

Best Management Practices for ETLFs: ***Lessons learned from other ETLFs***

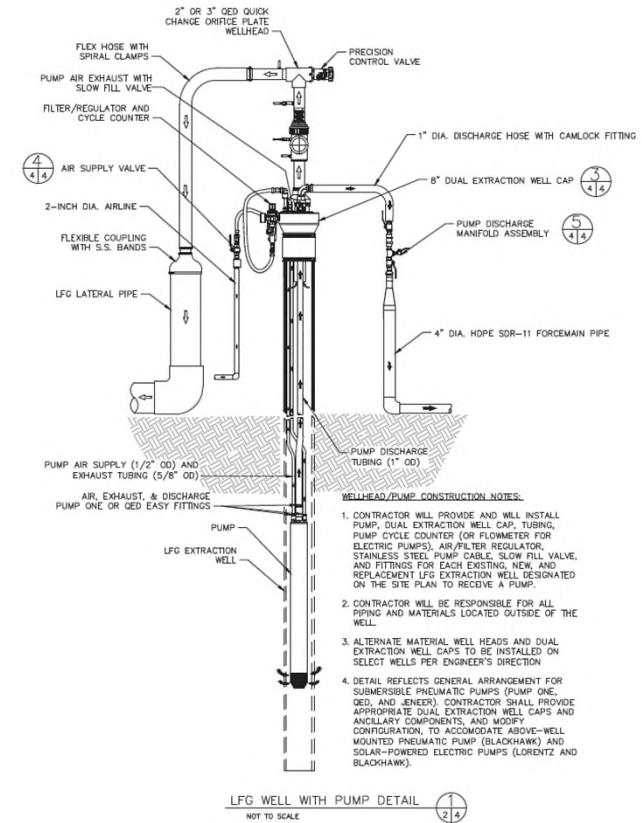
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28-29 October 2026

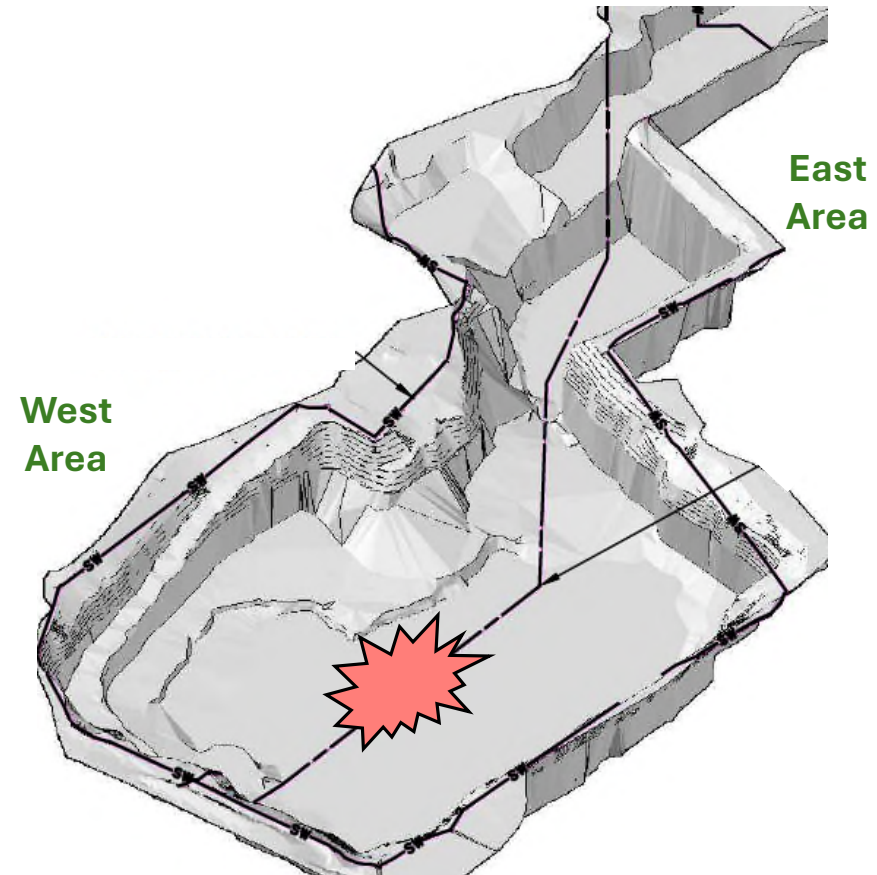
Key Best Management Practices

- Manage the gas to control odors – enhanced gas collection and interim geomembrane cover (EVOH).
- Remove heat by removing leachate and gas with dual phase extraction wells.
- Be prepared to manage leachate much stronger than usual.
- Be patient and persistent, adjust to unexpected issues. **Think before acting.**



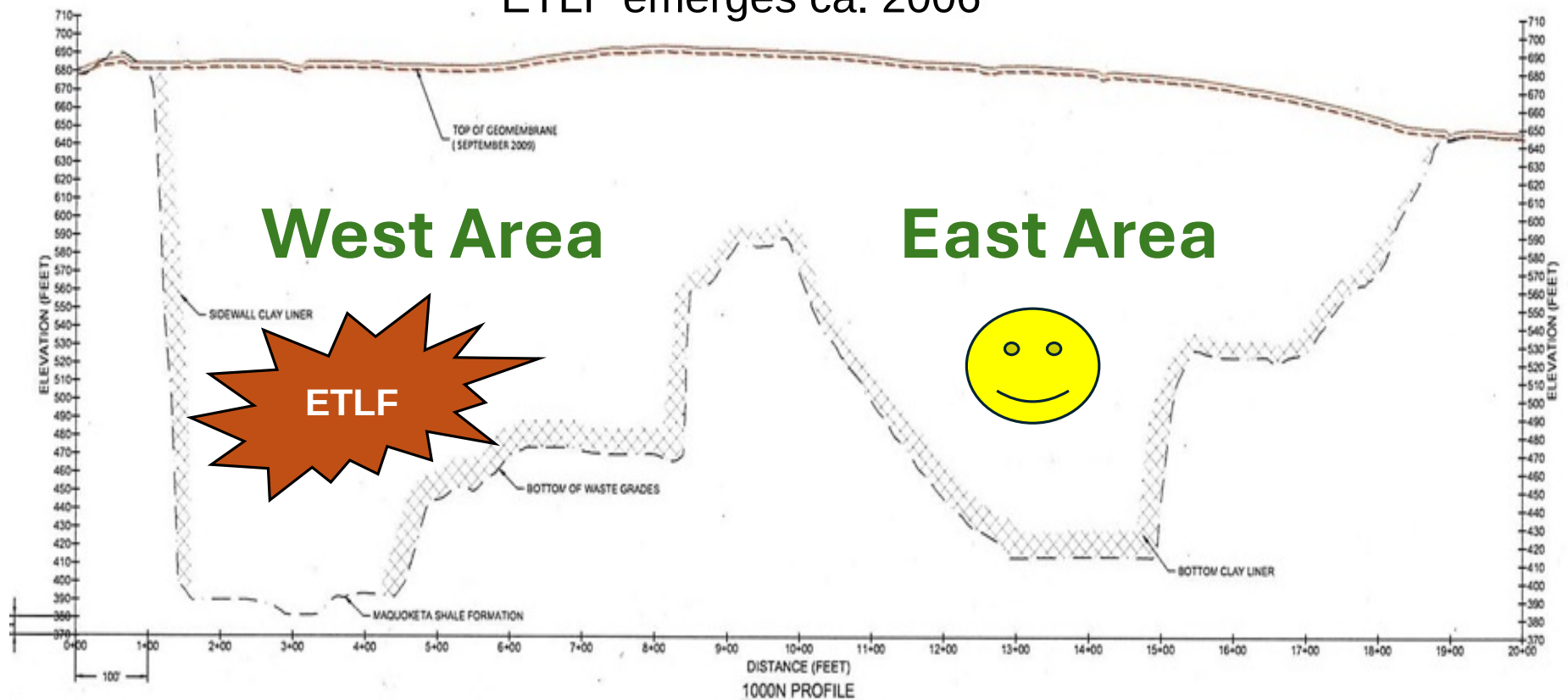
If we follow these BMPs, impacts are moderated and the landfill stabilizes, ultimately returning to typical conditions.

Congress Landfill: Quarry Landfill on West Side Chicago



Cross Sectional View of Congress: West and East Areas

ETLF emerges ca. 2006



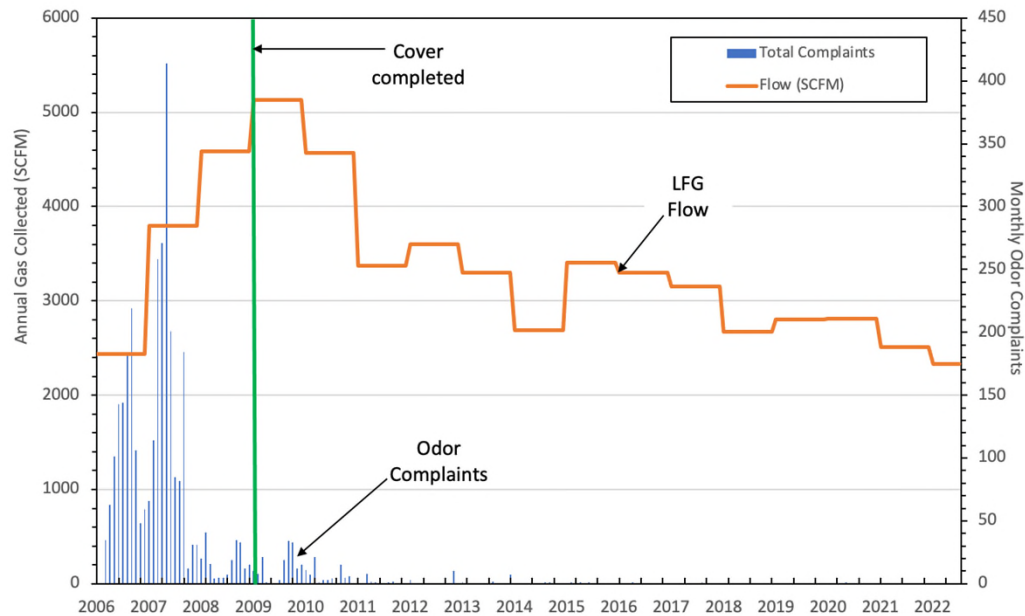
Strategy to Address ETLF Conditions

- Follow recommended best management practices (**BMPs**).
- **126** gas collection wells, **72** with dual-phase (gas and leachate) extraction over 55 acres (2.3 wells/acre).
- **26** dedicated leachate extraction wells.
- Flare and thermal oxidizer for gas treatment; on-site leachate pre-treatment.
- **16** deep dedicated transducers for leachate level/pressure and waste temperature, temperature strings for profiling.
- Final cover installed with geomembrane over GCL, gas collection layer.

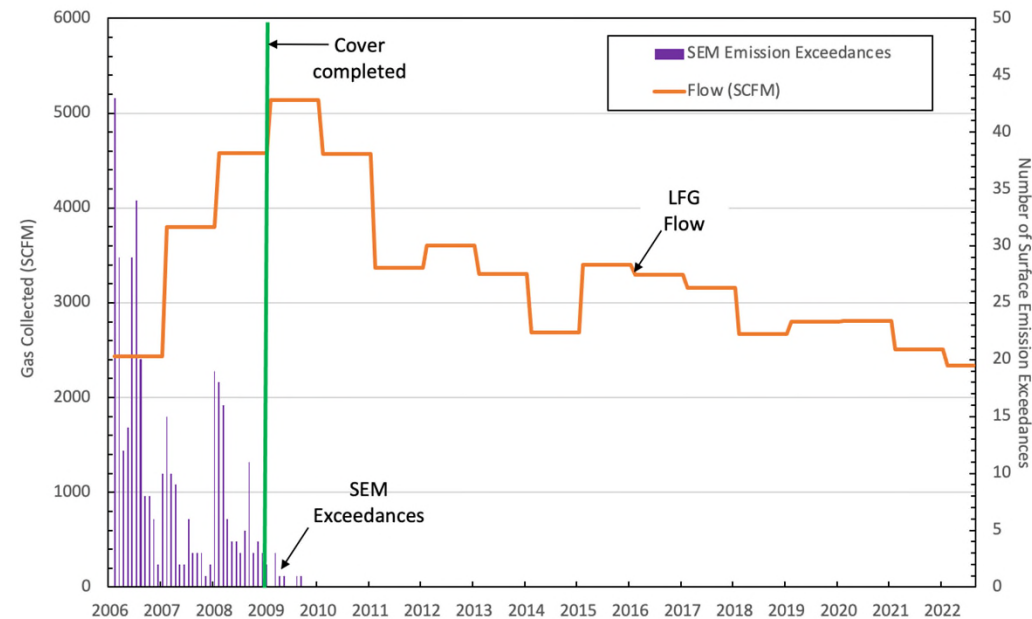
Remove leachate, gas, and heat!

Outcomes: Odor Complaints & SEM Exceedances Eliminated

Odor Complaints



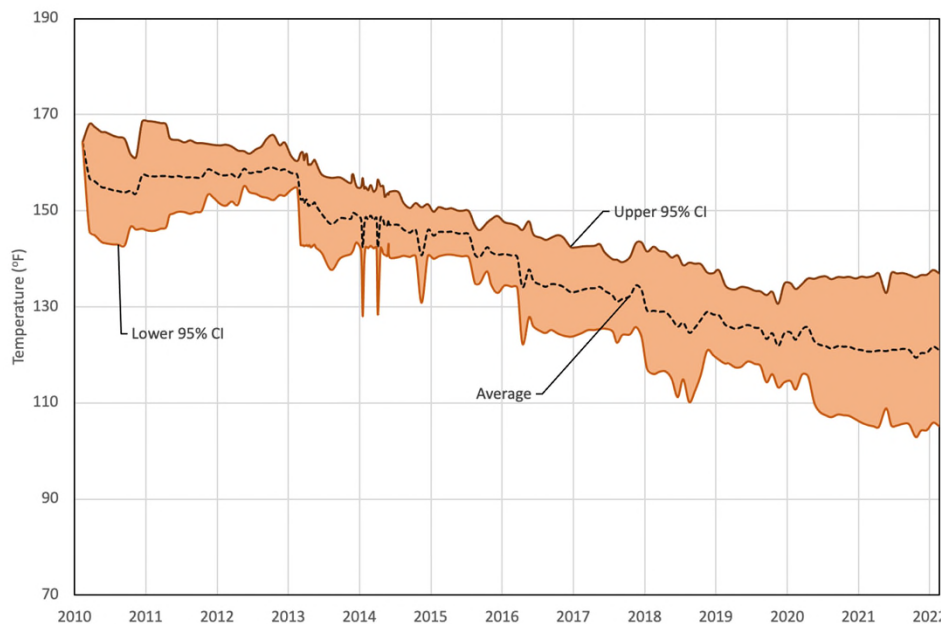
SEM Exceedances



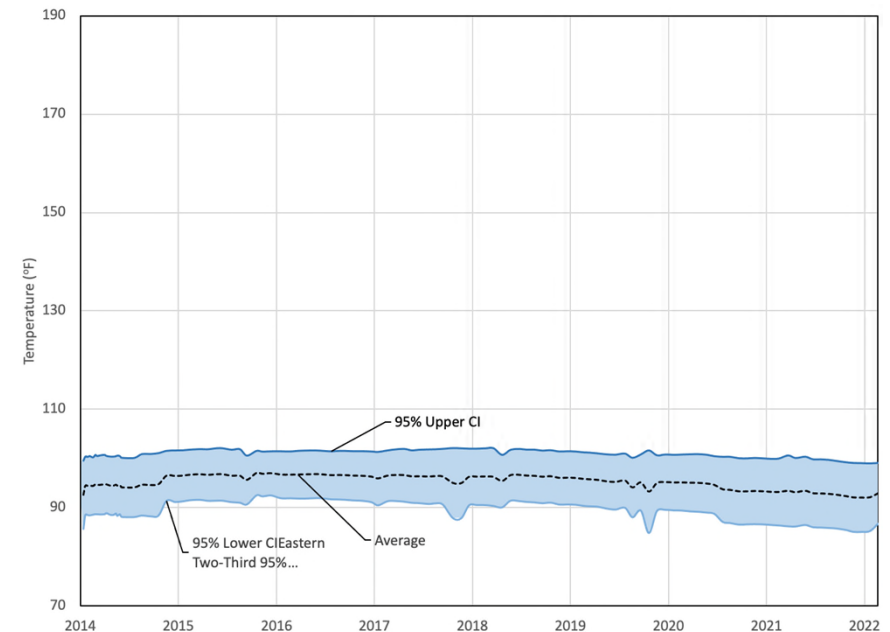
Best Management Practices Work!
Virtually no impacts for 15 years.

Outcomes: Waste Temperatures Decreasing

West Area - ETLF Conditions



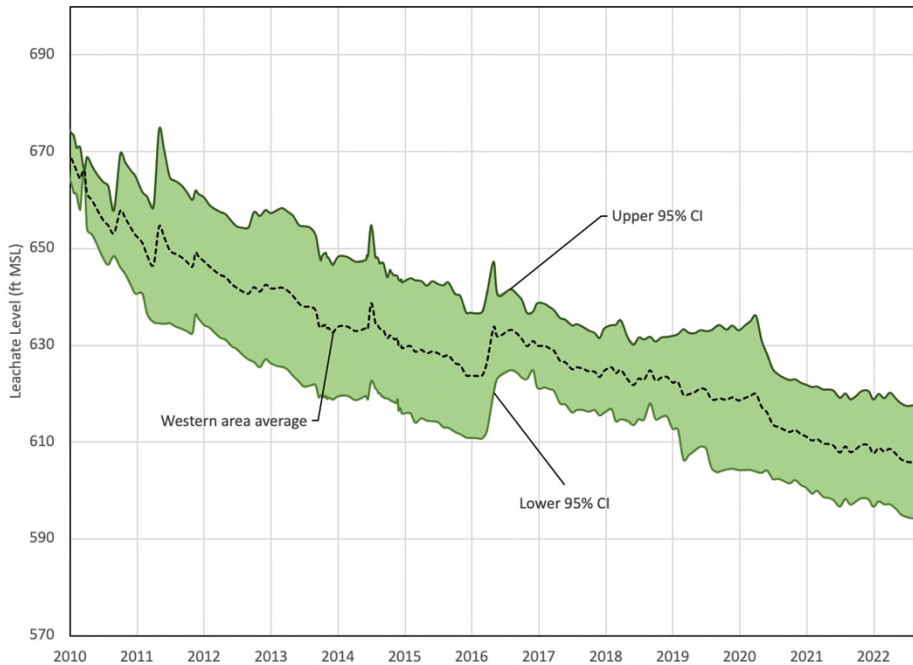
East Area - Unaffected



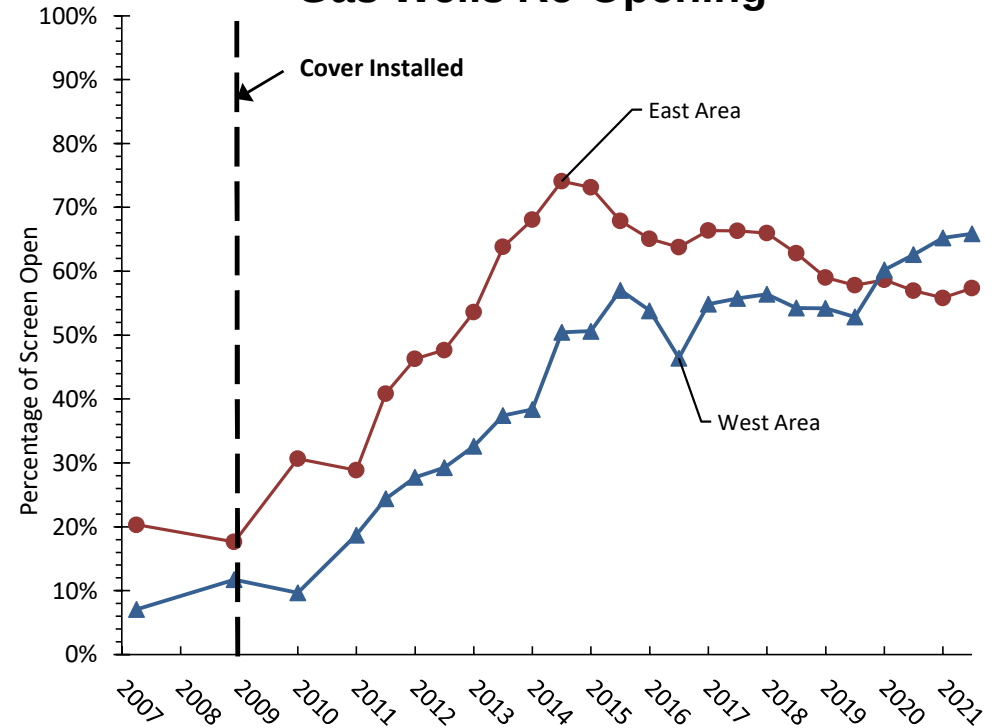
West Area cooled to normal landfill temperatures.
Slowly approaching East Area condition.

Outcomes: Leachate Elevation Dropping, Gas Wells Opening

Leachate Level Dropping

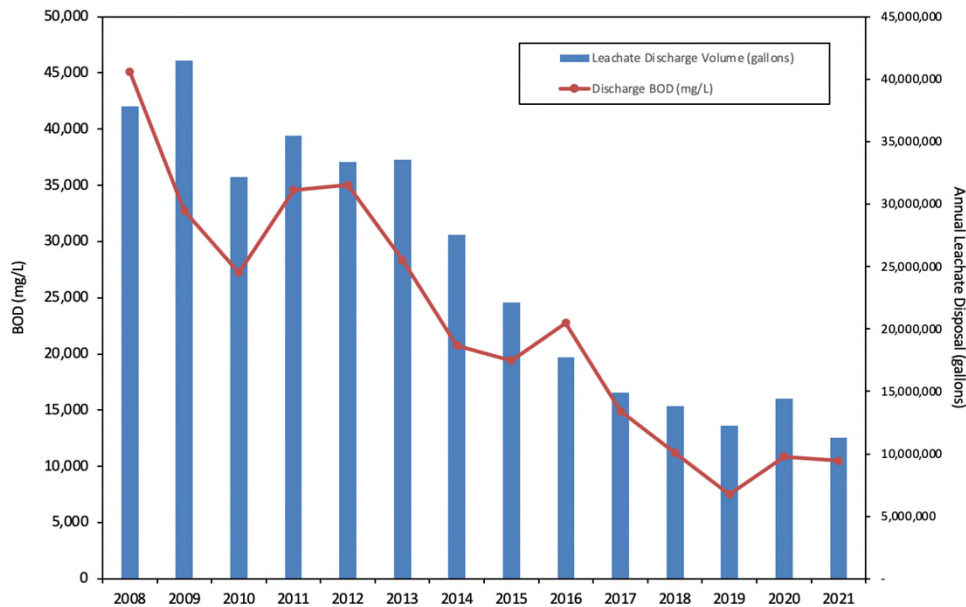


Gas Wells Re-Opening



Liquid extraction dewatered waste, removing heat and opening pores for gas flow

Outcomes: Leachate Quality Improving

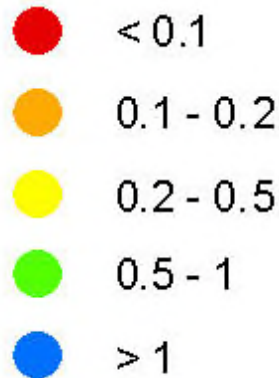


- BOD elevated during high temperatures due to pyrolytic thermal decomposition of waste.
- BOD dropping as waste temperature decreases and thermal decomposition diminishes.
- BOD/COD approaching more typical conditions (not shown).

Outcomes: Methanogenesis Re- Emerging



$\text{CH}_4 \div \text{CO}_2$

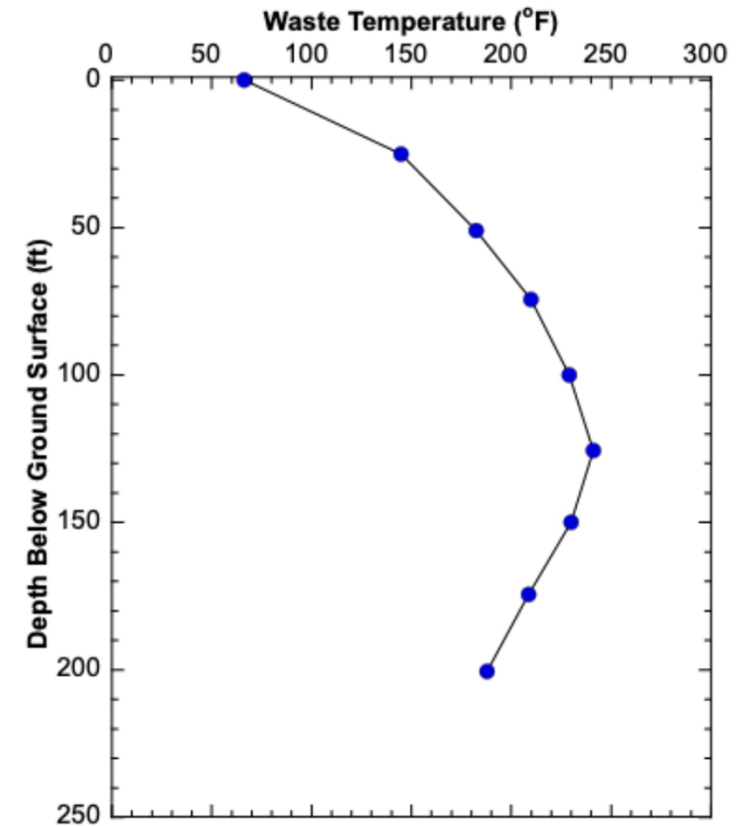


- 2009 – 41% of wellheads in west area have primary gas ratio (CH_4/CO_2) < 0.1
- 2022 – 67% of wellheads in west area have primary gas ratio (CH_4/CO_2) > 1.0

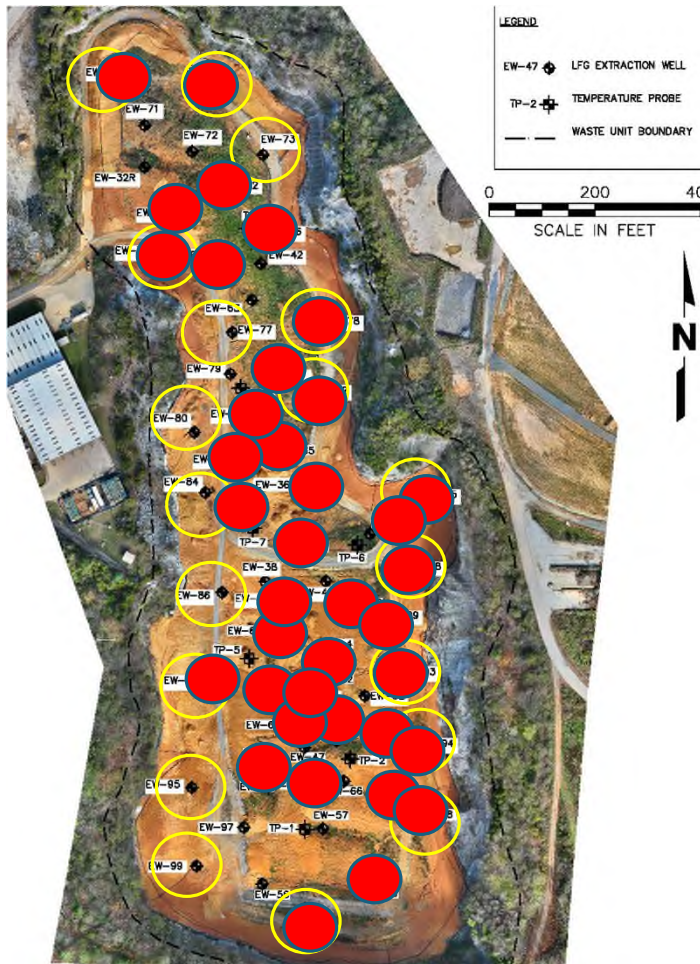
Bristol Landfill in Bristol, Virginia



- Deep quarry landfill with waste > 300 ft deep.
- Elevated temperatures & odors first observed ca. 2000.
- Peak temperatures of approximately 275 °F, deep in waste.

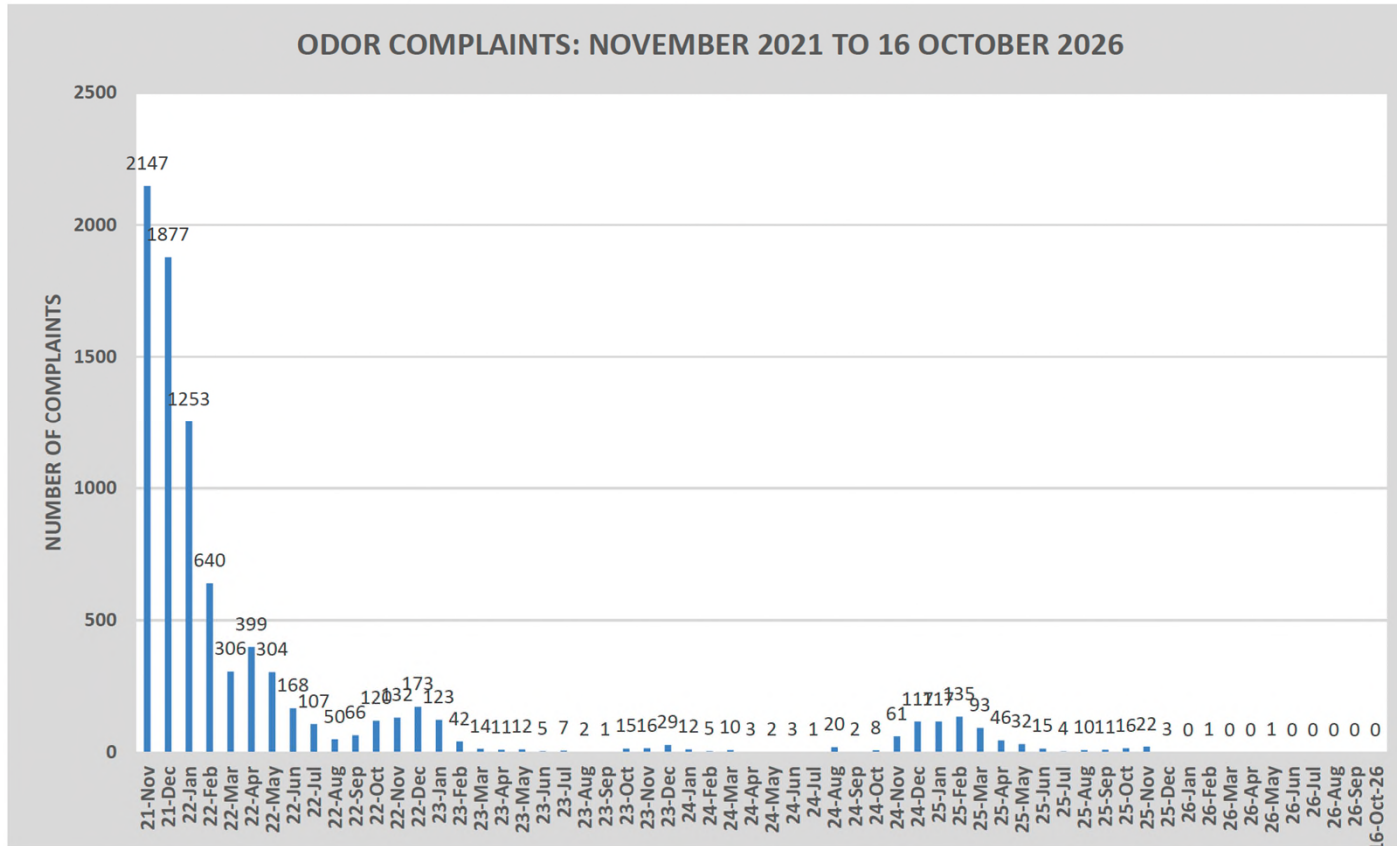


Gas and Leachate Removal to Control Odors & Remove Heat



- Adopted recommended best management practices (**BMPs**).
- 59 gas extraction wells (before 38).
- 40 leachate extraction pumps in dual phase wells.
- 17.9 acres surface area; ~ 3 gas wells per acre.

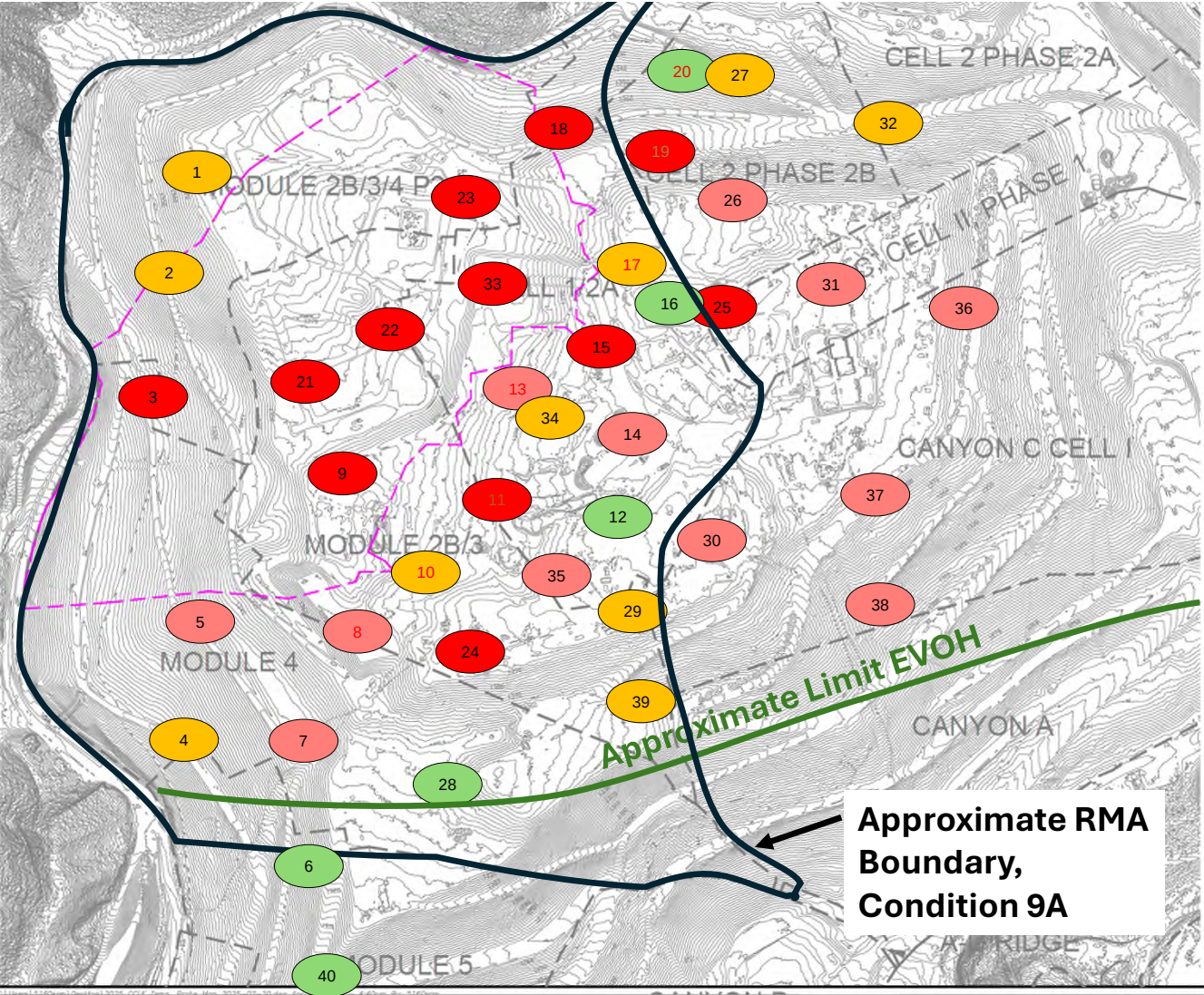
Outcomes: Impact on Odors in Community



- Odor complaints dropped dramatically
- **2** odor complaints in 2026.

Best Management Practices Work!

Conditions at Chiquita Canyon – October 2026

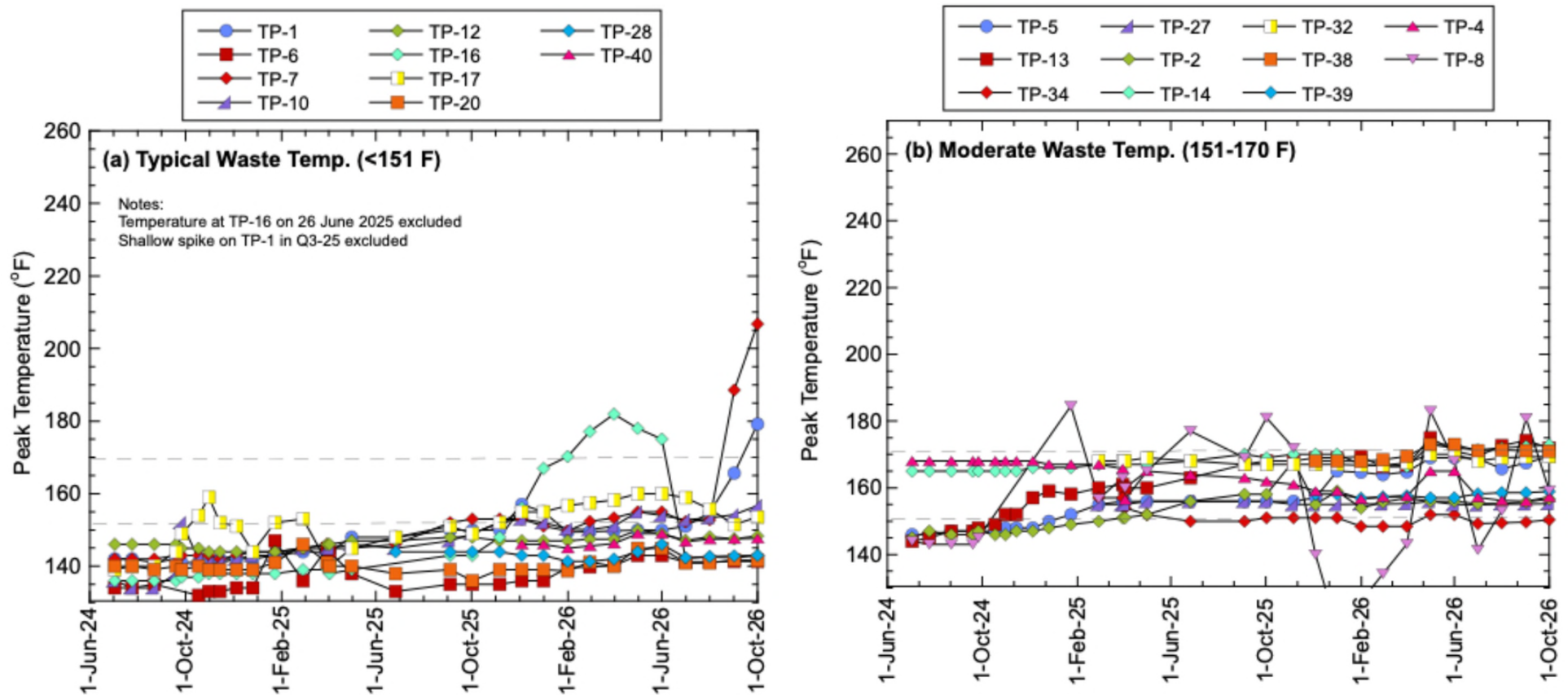


High Waste Temperatures in Central & Northern Regions

Waste Temperature Index

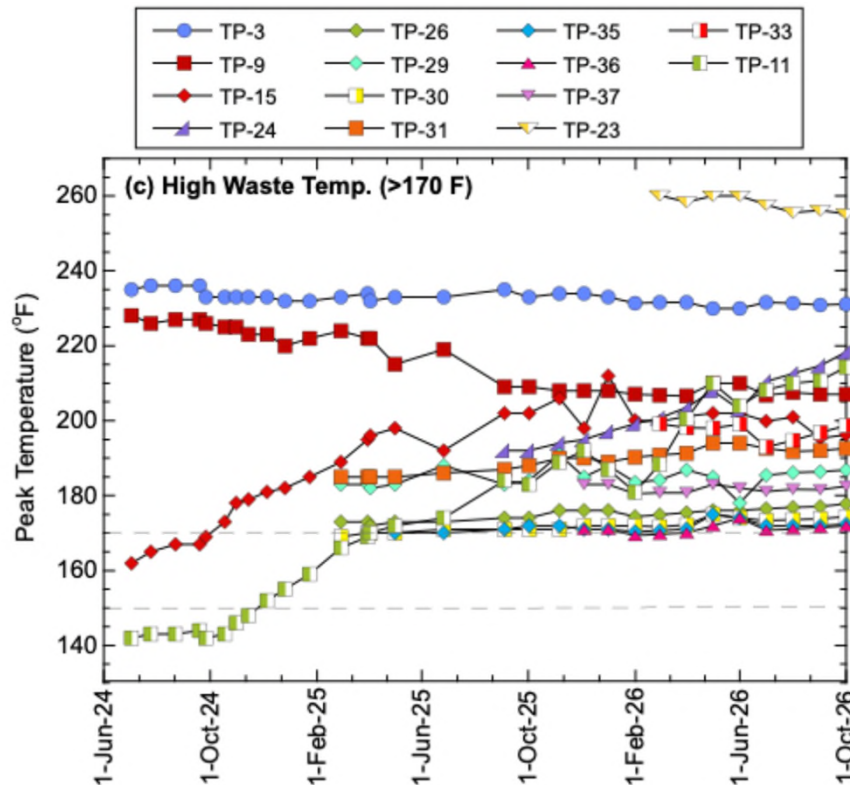
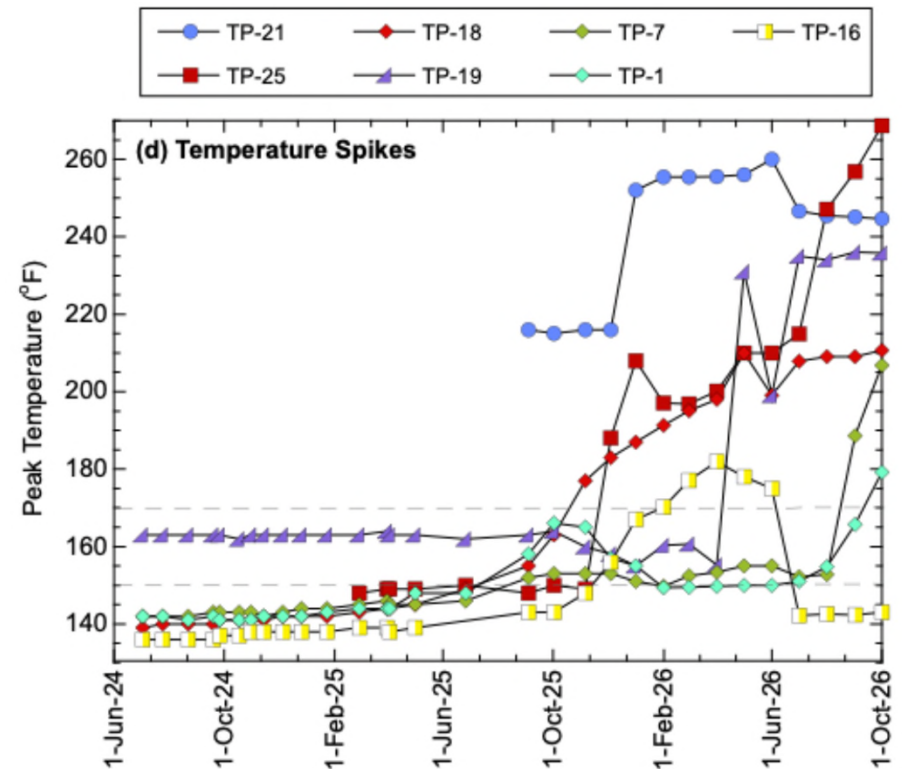
- Typical waste temperatures (< 151 °F)
- Intermediate waste temps. (151-170 °F)
- High waste temps. (170 - 200 °F)
- Very high waste temps. (> 200 °F)

Temporal Behavior of Waste Temperature - 1



**Thermal Spikes in Areas Where Gas & Leachate
Extraction Suspended for Construction**

Temporal Behavior of Waste Temperature - 2



**Thermal Spikes in Areas Where Gas & Leachate Extraction
Suspended for Construction**



Chiquita – Expectations Going Forward

- Chiquita applying best management practices (BMPs), with gas and leachate extraction via dual-phase wells, EVOH cover to control odor emissions, & management of strong leachate.
- ETLF conditions are stable, although some thermal spikes where gas and leachate extraction shut down for EVOH installation or west slope construction.
- Odor complaints have dropped, as odors have decreased.
- Expect Chiquita to follow similar path as other ETLFs where BMPs were installed, with odor complaints dropping, temperatures cooling (albeit in years), leachate quality improving.
- Make decisions about additional cover wisely, recognizing that shutting down gas and leachate extraction for construction causes heat to accumulate, and temperatures to spike.