



REGION 9

SAN FRANCISCO, CA 94105

July 7, 2026

SUBMITTED VIA ELECTRONIC MAIL

Frank Bonillas
Environmental Services Administrator
City of Tucson, Environmental Services
Frank.Bonillas@tucsonaz.gov

RE: Higher Operating Value Request for Well EW71 of Gas Collection and Control System at the Los Reales Municipal Solid Waste Landfill

Dear Frank Bonillas,

The Air Section in the Enforcement and Compliance Assurance Division at U.S. Environmental Protection Agency Region 9 ("EPA") received the Higher Operating Value Request for EW71 ("HOV Request"), dated August 21, 2025. The City of Tucson, ("COT"), submitted the request to operate the EW71 wellhead at the Los Reales Municipal Solid Waste Landfill at a higher operating value temperature of 155°F pursuant to 40 C.F.R. Part 63, Subpart AAAA, § 63.1958(c)(2).

BACKGROUND ON HIGHER OPERATING VALUES FOR TEMPERATURE

Pursuant to 40 C.F.R. § 63.1958(c)(2),

The owner or operator may establish a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to the Administrator¹ for approval and must include supporting data demonstrating that

¹ "Administrator" means the Administrator of the United States Environmental Protection Agency or his or her authorized representative (e.g., a State that has been delegated the authority to implement the provisions of this part). 40 C.F.R. § 63.2. The Pima County Department of Environmental Quality ("PDEQ") is delegated for 40 C.F.R. Part 63, Subpart AAAA. However, in accordance with the EPA Process Manual for Responding to Requests Concerning Applicability and Compliance Requirements of Certain Clean Air Act Stationary Source Programs, dated July 2020, and at PDEQ's request, EPA is responding to this HOV Request.

the elevated parameter neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved (i.e., neither causing fires nor killing methanogens is acceptable).

As stated, a higher operating value (“HOV”) demonstration may be submitted to the Administrator for approval for a higher operating temperature value at a particular well. Therefore, EPA must review submitted demonstrations on a well-by-well basis. The demonstration must show that the elevated temperature neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved, meaning conditions are neither causing fires nor killing methanogens.

EPA may consider the following data to demonstrate approvable conditions: wellhead temperatures, down well temperatures, methane concentrations (“CH₄”), carbon dioxide concentrations (“CO₂”), oxygen concentrations (“O₂”), carbon monoxide concentrations (“CO”), balance gas concentrations (100% minus CH₄, CO₂, and O₂ concentrations), liquids (known as leachate) levels relative to well depth, and wellhead pressure readings to assess the anaerobic activity and risk of causing a surface fire or subsurface oxidation at the requested temperatures.

EPA reviews the data to determine whether the temperatures and gas compositions were representative of down well conditions. If conditions such as positive, or near positive, pressure, air intrusion, or other factors would render the data unrepresentative, then the demonstration for establishment of an HOV would be insufficient. A lack of recent data would also be considered an insufficient demonstration.

EPA reviews the data to determine if conditions of a subsurface oxidation (“SSO”) or subsurface anoxic exothermic reaction (“SAR”) are present. SAR events are also known as subsurface elevated temperature or Elevated Temperature Landfill (“ETLF”) events. An SAR is not dependent on oxygen, occurs deep in the landfill waste mass, and is exothermic and self-propagating in nature. One of the impacts of an SAR is significantly decreased methanogenesis activity. Decreased methanogenesis activity can be observed by measuring CO concentrations, CH₄ concentrations, and CH₄ to CO₂ concentration ratios correlated with increased down well or wellhead temperatures. SARs increase the risk of shallow, subsurface oxidation and landfill fires, especially when associated with air intrusion into the shallow portion of the landfill.² A well’s radius of influence (“ROI”) may include areas and depths of the waste mass that are undergoing SSO, SAR, and/or air intrusion, which further complicate the assessment of conditions within the ROI.

² <https://www.epa.gov/land-research/elevated-temperature-landfill>
<https://www.epa.gov/land-research/citations-elevated-temperature-landfill-research>

SUMMARY OF DETERMINATION

COT provided EPA with visible observations, wellhead temperature, boring logs, and landfill gas data for EW71 in COT's HOV Request. EPA reviewed the complete dataset provided to determine if the demonstration for the well was representative and met the criteria for approval. EPA also reviewed the July-December 2025 Semi-Annual report, submitted to EPA, dated January 30, 2026, for similar datasets for EW71.

Pressure and flow measurements taken by COT from August 1 to December 18, 2025, show EW71 has operated under consistent negative pressure at an average flow rate of 20 Standard Cubic Feet Per Minute ("SCFM")³, with significant variation in flow rate between 1 and 37 SCFM.

EW71 Wellhead temperature measurements taken by COT from the same period show an average wellhead temperature of 145°F, generally ranging from 140 to 148°F. Downwell temperatures observed during the boring of EW71, completed on April 3, 2025, show a maximum downwell temperature of 174°F at a depth of 50 feet ("ft"), associated with "a band of damp waste approximately 15ft thick from 50ft to 65ft".

EW71 CH₄ and CO₂ measurements taken by COT from the same period show an average CH₄ concentration of 45%, an average CO₂ concentration of 45%, and an average CH₄:CO₂ ratio of 1.00. O₂ and balance gas measurements taken by COT over the same period show an average O₂ concentration of 0% and balance gas concentration of 10% with significant variation between 4% and 22%.

The visual observations logged by the COT from the same period indicate that no visual observations of a subsurface oxidation event were present at EW71. Six CO measurements taken by COT from August 4 to December 22, 2025, show an average CO concentration of 37 ppm within the landfill gas collected by EW71.

EPA has determined that the demonstration is sufficiently representative of the conditions within the ROI of EW71, and the operation of EW71 at the elevated wellhead temperatures between 145°F and 150°F has not significantly increased the risk of a landfill fire or significantly inhibited anaerobic decomposition by killing methanogens. EPA has determined that the elevated temperatures and associated landfill gas characteristics at EW71 are not evident of a SSO or SAR event within the ROI of the EW71 during the demonstrated period.

³ EPA presumed the flow rate unit for columns "Init_Flow" and "Adj_Flow" in Attachment 2 of the HOV request is SCFM, per industry standard practice observations.

APPROVALS AND CONDITIONS

EPA approves the Wellhead Temperature HOV of 150°F for EW71, subject to the conditions below. EPA is not approving the HOV request at 155°F, as COT did not provide a demonstration of approvable conditions at or near the elevated temperature of 155°F.

1. COT shall monitor CO at EW71 at least monthly according to the procedure in 40 C.F.R. § 63.1961(a)(5)(vi): EPA Method 10 of appendix A-4 to part 60 of this chapter, or an equivalent method with a detection limit of at least 100 ppmv of CO in high concentrations of CH₄.
2. If the wellhead temperature of EW71 increases to greater than 150°F, COT shall monitor the well according to the procedure in 40 C.F.R. § 63.1961(a)(5). If the wellhead temperature of the well subsequently decreases to below the approved HOV limit of 150°F, COT shall monitor the well in accordance with Condition 1 of this HOV approval.

RECOMMENDED CORRECTIVE ACTIONS FOR WELLS WITH ELEVATED TEMPERATURES

EPA recommends the following corrective actions to address elevated temperatures when an area or well(s) exhibit some or all symptoms of a SSO or SAR event described above that may manifest as elevated wellhead temperatures (>145°F).⁴

1. Distinguishing between SSOs and SARs to inform appropriate corrective action by reviewing CO, downwell temperature, gas and liquid characterization, and other data.
2. Temporarily restricting vacuum/flow at SSO to extinguish subsurface fires or smoldering.
 - a. Improving cover thickness and density to prevent future air intrusion during collection upon returning the well to service as soon as practicable.
3. Increasing vacuum/flow at affected or surrounding wells to increase heat and pressure removal and prevent heat accumulation for SARs.
4. Addressing any liquids in the well via a pump or other leachate collection improvement.
 - a. SARs are likely to significantly increase leachate production.
 - b. SSOs may be caused by air intrusion because of occluded perforations in the well without sufficient vacuum tuning or inadequate cover.
5. Improving cover integrity at affected or surrounding wells to allow for consistent or increased vacuum/flow without introducing air intrusion during increased heat removal.
6. Installing additional well density within and surrounding the area to allow for increased heat removal without overpulling from fewer wells.
7. Re-evaluation of well-casing materials to ensure they can withstand the increased temperatures at affected wells.
 - a. Down well temperature and camera monitoring are necessary to determine the integrity of the entire well to avoid below-grade perforation melting, pinching and decreased collection efficiency.
 - b. Consideration may also be needed for wellhead materials.

⁴ See footnote 1.

EPA holds that the monitoring, corrective action, and other applicable temperature related provisions of 40 C.F.R. Part 63 Subpart AAAA still apply to approved HOV wells, except that the HOV for temperature at EW41 under 40 C.F.R. § 63.1958(c)(2) is approved to be 150°F. Corrective action plans submitted pursuant to 40 C.F.R. § 63.1960(a)(4) should include the recommended actions above. Any alternative monitoring request to the monitoring provisions should be made to EPA Region 9 Enforcement and Compliance Assurance Division.

Note that any attempted corrective measures must not cause exceedances of other operational or performance standards, including abandoning or otherwise ceasing supply of vacuum to the well such that collection in the area covered by the well is eliminated, pursuant to 40 C.F.R. § 63.1960(a)(4)(i).

If you have any questions regarding these determinations, please reach out to Tyler Holybee at holybee.tyler@epa.gov.

Sincerely,

**MATTHEW
SALAZAR**

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MATTHEW SALAZAR
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cc: Jose Garcia, Environmental Services Inspector, City of Tucson, Environmental Services
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