

SANTA BARBARA COUNTY

**Resource Recovery &
Waste Management Division**

Innovative Environmental Solutions



Regular Variance Petition for the Tajiguas Resource Center

June 3, 2026

Presented by Travis Spier and Lindsay Cokeley

Resource Center Description

- Co-located at the Tajiguas Landfill
- Consists of a material recovery facility (MRF), an anaerobic digestion facility (ADF), and a compost management unit (CMU)

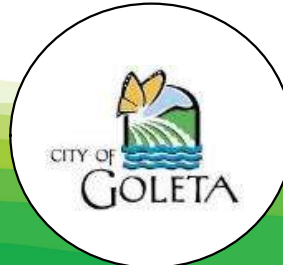


Communities Served

- The ReSource Center serves 220,000 people located within:
 - City of Santa Barbara
 - City of Goleta
 - City of Solvang
 - City of Buellton
 - Unincorporated County of Santa Barbara areas
- Crucial in managing regional waste and recycling processing, greenhouse gas reduction, and organic diversion goals set locally and by the State



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Material Recovery Facility

- Processes ~138,000 tons of Municipal Solid Waste and ~36,000 tons of Source Separated Recyclables annually
- Particulate emissions controlled by two baghouse filters routed through 25-foot exhaust stacks.
- Landfill gas is combusted in an enclosed flare and two Combined Heat and Power (CHP) engines
- Engines are equipped with a continuous emissions monitoring system (CEMS) and data is telemetered via the Data Acquisition System (DAS)



Anaerobic Digestion Facility

- ~60,000 tons of Organic Fraction of Municipal Solid Waste (OFMSW) processed annually
- A Guaranteed Energy Production of biogas is sold to Southern California Edison
- Emissions at the ADF are controlled by a biofilter, flare, and two CHP engines
- Engines are equipped with CEMS and data is telemetered to the District via the DAS



Compost Management Unit

- Digestate from the ADF is loaded onto the CMU to be processed into compost.
- Emissions and odors at the CMU are controlled by a Covered Aerated Static Pile system with Gore® blankets
- Temperature and Oxygen are monitored daily to ensure compost piles meet the process to further reduce pathogens (PFRP) standards.



Six Findings

Finding Number 1

HSC § 42352: The petitioner for a variance is, or will be in violation of H&SC Section 41701 or any rule, regulation, or order of the district

- **Rule 206 – Conditional Approval of Authority to Construct or Permit to Operate**
 - Resource Center Throughput Operational Limits (Green Waste vs Food Waste)
 - Biogas Treatment System Operations (Utilize existing LFG treatment)
 - CHP Engines Emission and Operational Limits (Blended Fuel/Operational Scenarios)
 - ADF Enclosed Flare Emission and Operational Limits (Engines Down for Upgrades)
 - Biofilter Operating Parameters (Must match manufacturer's literature)
 - Monitoring Conditions and Plans (Need updates after improvements made)
- **Rule 328 – Continuous Emission Monitoring**
 - CEMS Plan and the Continuous Emissions Monitoring System (Permit modification)

Finding Number 2

HSC § 42352 – Conditions causing the violation were beyond the reasonable control of the Petitioner and requiring compliance would result in either an arbitrary or unreasonable taking of property or the practical closing and elimination of a lawful business.

- The Resource Center (MRF, ADF, CMU) is an essential public service that has a net positive impact on the environment and the community.
- Corrective action cannot be achieved without equipment upgrades, finalization of permit revision, air model update, health risk assessment update, and CEQA review.



Finding Number 2

HSC § 42352 - Conditions causing the violation were beyond the reasonable control of the Petitioner and requiring compliance would result in either an arbitrary or unreasonable taking of property or the practical closing and elimination of a lawful business.

- Anaerobic Digestion Emission Factor Assumptions
 - Green Waste vs. Food Waste vs. OFMSW
- Biogas contains Siloxanes
 - Combustion of siloxanes damages engines and SCR emission controls
- Engine Upgrades
 - ADF Engine upgrades Complete May 2026, MRF planned in August (delayed)



Finding Number 2

HSC § 42352 - Conditions causing the violation were beyond the reasonable control of the Petitioner and requiring compliance would result in either an arbitrary or unreasonable taking of property or the practical closing and elimination of a lawful business.

- Permit assumptions and equipment specifications are inaccurate and outdated
- District requires engineering documentation to change assumptions
- Stationary Source Permitting Actions are complex and need thorough review and extensive staff time to ensure compliance

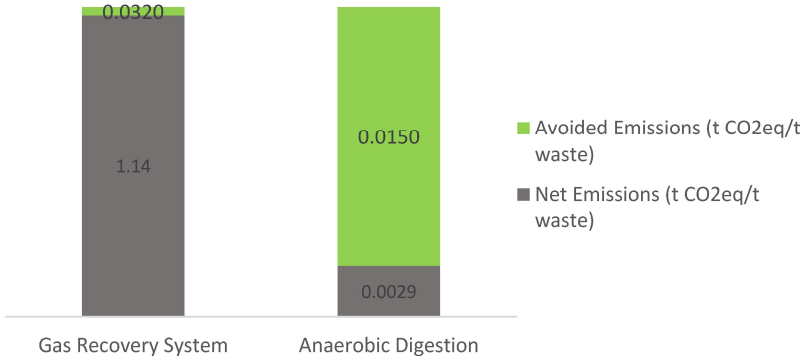
Four CHP engines + Two flares = Fourteen Operational Scenarios
With Hourly/Quarterly/Annual Limits

Operating Limitations					
Hours of Operation			Heat Input (MMBtu)		
hour/day	hour/quarter	hour/year	per hour	per quarter	per year
16	1,120	4,479	13,562	15,186,050	60,744,198
16	1,120	4,479	13,562	15,186,050	60,744,198
24	120	120	13,562	1,627,440	1,627,440
24	120	120	13,562	1,627,440	1,627,440
0.5	41.3	165	6,781	279,716	1,118,865
0.5	41.3	165	6,781	279,716	1,118,865
24	1,029	4,116	13,562	13,955,298	55,821,192
16	876	876	4,500	3,942,000	3,942,000
7	637	2,555	34,146	21,751,270	87,244,103
16	1,157	4,644	30,172	34,900,235	140,110,607
1	92	363	36,933	3,397,847	13,480,389
16	299	1,196	43,724	13,073,452	52,293,808
24	N/A	438	1,410	N/A	617,738

Finding Number 3

HSC § 42352: *The closing or taking would be without a corresponding benefit in reducing air contaminants.*

Comparative Environmental Impact of Gas Recovery and Anaerobic Digestion Systems



Amancio et al. (2026). A Carbon Footprint Comparative Analysis of Anaerobic Digestion vs. Landfill Gas Recovery in Brazil. *Recycling*, 11(1), 5.
<https://doi.org/10.3390/recycling11010005>

- Net Increase in Emissions due to:
 - Increased Landfilling of Organics
 - Increased Truck Trips once Landfill Capacity Reached
- CHP Engines Destroy Methane
 - Produces clean energy that is used by Santa Barbara County Southern California Edison users
 - 99% Hydrocarbon destruction efficiency reduces emissions

Slide 13

LC1 Fix this section graphics after Sharepoint file is complete.
Lindsay Cokeley, 2026-05-29T14:57:32.935

LC1 0 ADF combustion/destruction of methane (even without emission controls?) is more beneficial than landfilling.
Lindsay Cokeley, 2026-05-29T16:58:19.005

Finding Number 4

HSC § 42352: The applicant has given consideration to curtailing operations of the source in lieu of obtaining a variance.

- Curtailment not possible – Santa Barbara County residents generate organic waste.
- Facility Shutdown would lead to:
 1. Violation of Senate Bill 1383 requirements
 2. Breach of Southern California Edison Power Purchase Agreement
 3. Violation of Permit Conditions
 - a. 100% Flaring of Landfill Gas and Biogas
 - b. Equipment Failures & Unsafe Operations

Slide 14

LC1 CHP engines shut down -> PPA fines and penalties, would not allow ADF to operate.
Lindsay Cokeley, 2026-05-29T16:48:34.265

Finding Number 5

HSC § 42352: *During the period the variance is in effect, that the applicant will reduce excess emissions to the maximum extent feasible.*

- Operational Changes
 - Immediate compliance with ADF Air Modeling assumptions (Time of Day Operations)
 - Real-time biogas monitoring before treatment and after treatment with immediate corrective action
 - Frequent media changeouts (Every 2-3 months vs. 1-2 per year)
 - Increase CMU dry material ratio based on scientific review of operational procedures
- Compliance with Operational Limits does not equate to more excess emissions



January 2026 – Compost Pile Source Test
3 out of 4 piles passed ROC limits

Finding Number 5

HSC § 42352: *During the period the variance is in effect, that the applicant will reduce excess emissions to the maximum extent feasible.*

ADF FLARE HOURS VS. PERMITTED APR-DEC 2025

Actual total hours
3,653 hrs
All scenarios, 9 months

Permit Allowance
1,154 hrs
Scen. E Limit: 278 + Scen. F Limit: 876

**NO_x
Emission Factor
vs permit**

-51%

Cleaner than
modeled

**Net NO_x
multiple**

~1.7x

3.4 x 0.49 EF ratio

**Purging
Exceedances**

0/3

quarters
exceeded

HSC § 42352 – Finding Number 6

During the period the variance is in effect, the applicant will monitor or otherwise quantify emission levels from the source, if requested to do so by the district, and report these emission levels to the district pursuant to a schedule established by the district.

- ADF Flare Emissions Quantified Hourly
- CEMS telemetry in place for CHP engines
- Pilot Testing at CMU
 - Will measure changes air quality as operational changes implemented at CMU
 - Use of calibrated instruments to directly measure ammonia emissions more frequently than annual source testing
 - Development of Odor Monitoring Protocol similar to BAAQMD's "South Bay Odor Attribution Study"



Status & Progress Made

Variance 2025-09-R Status

- **April-June 2025:** Conducted forensic evaluation on biogas and landfill gas quality – discovered high siloxanes in Biogas
- **August-October 2025:** Engine controller failure — sourced replacement hardware; both engines safely restored to service by Oct. 29, 2025
- **November 2025:** Overhauled stationary source emissions with AECOM using updated EMFAC2025 mobile source data. Aligned ReSource Center emissions with 2024 Landfill Capacity Increase Project emissions.
- **January 2026:** Managed sudden drop in raw biogas quality causing engine failures and temporary flow totalizer issues
- **March 2026:** Completed Engineering Evaluation of Existing Biogas Treatment System
- **Mar.–Apr. 2026:** Achieved full compliance on:
 - Condensate totalizer monitoring
 - Daily MRF throughput limits
 - Biofilter fan set points
 - ADF flare monitoring data accuracy
 - Permanent woodchipper removal and decommissioning
- These items have been removed from the variance petition — representing measurable, documented progress toward full compliance

Biogas Contamination — Root Cause of NOx Exceedances



Lab testing revealed siloxane concentrations of 2,794–12,918 parts per billion by volume (ppbv) in untreated ADF biogas — far exceeding design assumptions

Siloxanes originate from consumer products (cosmetics, detergents) in the municipal waste stream

The original permit design assumed siloxanes would not be a significant constituent of the organic feedstock



During combustion in the CHP engines, siloxanes oxidize into microcrystalline silicon dioxide (SiO_2) — a glass-like dust

This SiO_2 coats and destroys the Selective Catalytic Reduction (SCR) catalyst bricks in both ADF engines

SCR catalyst poisoning directly disables our NOx emission control systems, causing the exceedances that required this variance



Existing H_2S treatment vessels are undersized and lack humidity controls required for effective siloxane removal

Confirmed by third-party engineering evaluation by Tetra Tech (March 2026)

Engineering Evaluation — Three Treatment Options Analyzed

Option 1 —
New Fixed-
Bed Polishing
System (NOT
SELECTED)

- Annual costs spike even higher given our extreme siloxane concentrations (up to 12,918 ppbv)



Engineering Evaluation — Three Treatment Options Analyzed

Option 1 — New Fixed-Bed Polishing System (NOT SELECTED)

- Annual costs spike even higher given our extreme siloxane concentrations (up to 12,918 ppbv)

Option 2 — New Regenerative System (NOT SELECTED)

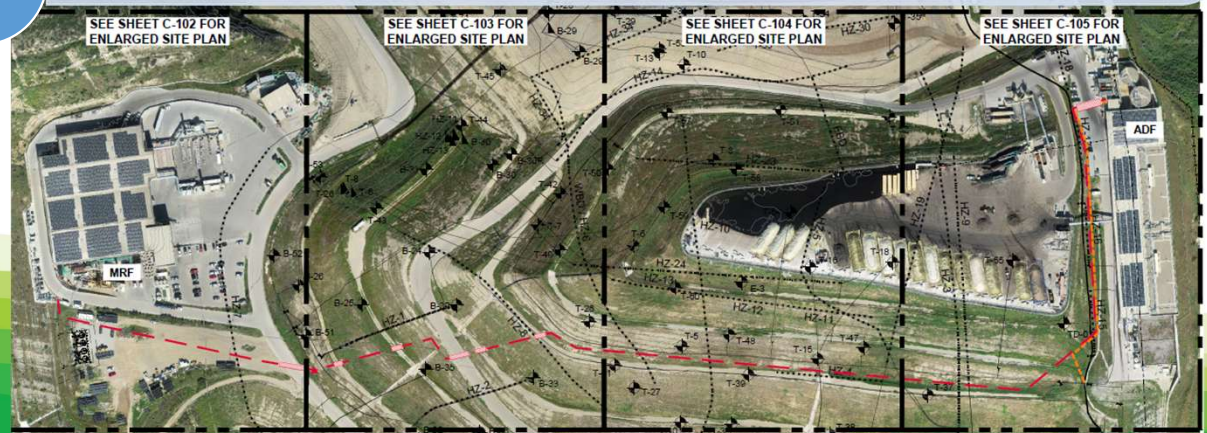
- TOX consumes ~300 scfm of biogas continuously just to maintain operating temperature — over half of facility gas output burned as process fuel



Engineering Evaluation — Three Treatment Options Analyzed

Option 3 — Dual HDPE Pipeline to Existing MRF Treatment System (SELECTED)

- Install 2,830-foot dual 8-inch HDPE pipeline connecting ADF biogas to the MRF's existing regenerative siloxane removal and H₂S treatment systems
- Existing MRF system verified by Tetra Tech to handle the additional biogas load
- Shortest lead time and lowest construction complexity; selected after comprehensive cost-benefit analysis



Biogas Treatment Project — Milestones & Schedule

- **June 8–12, 2026:** Finalize 50% conceptual engineering designs
- **July 20–31, 2026:** Finalize 100% technical specifications; issue public bid package
- **Aug. 3–28, 2026:** Contractor bidding window opens and closes
- **Nov. 10, 2026:** Construction contract awarded by the Board of Supervisors
- **Nov. 12, 2026 – Jan. 12, 2027:** Core pipeline physical construction phase**
- **Jan. 13–26, 2027:** System startup, safety testing, and full pipeline commissioning
- **Feb. 26 – Mar. 23, 2027:** Removal and physical replacement of poisoned SCR catalyst bricks on ADF engines
- **Mar. 23 – Apr. 6, 2027:** Final SCR system commissioning — achieving full permit compliance
 - Requested variance extension through May 29, 2027 provides adequate buffer for this schedule

**Dependent on Issuance of ATC 16463

Questions?

Thank you!



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www.LessIsMore.org/ReSourceCenter