

PERFORMANCE TEST REPORT REVIEW

Performance Test Date(s):	12-05-2024		
Date Report Submitted:	1-27-2025		
Media:	Air		
Regulatory Program(s)	Clean Air Act		
Company Name:	Stop and Shop		
Facility or Site Name:	Stop and Shop Distribution Center		
Facility/Site Physical Location:	136 South Main Street		
(city, state, zip code)	Freetown, MA 02702		
Geographic Coordinates:	Lat: 41.77564 Long: -71.09181		
Mailing address:	P.O. Box 55888		
(city, state, zip code)	Boston, MA, 02205		
County:	Suffolk		
Facility/Test Contact:	John Mesheau	David A. Caron District & Client Project Manager (Montrose) (978) 499-9300 x11303	
	John.Mesheau@adusa.com		
Facility/Site Identifier:	100000185113 (ECHO identifier listed under CAA for this site)		
Media Number:			
NAICS:	49311		
SIC:	4222		
Report Reviewer(s):			
Tyler Kotsifas	Region 1 Laboratory Services and Applied Sciences Division (LSASD) Field Services Branch 2 (FSB2)	Physical Scientist	Kotsifas.Tyler@epa.gov 617-918-8392
Report Author: Report Author is same as Lead Inspector			
Tyler Kotsifas	TYLER KOTSIFAS  Digitally signed by TYLER KOTSIFAS Date: 2025.03.05 10:55:35 -05'00'		
Team Leader Review:			
Jerry Keefe	JEROME KEEFE  Digitally signed by JEROME KEEFE Date: 2025.03.05 11:00:23 -05'00'		
	Region 1 LSASD FSB2	Environmental Engineer	Keefe.Jerome@epa.gov 617-918-8376

SECTION I – INTRODUCTION

On December 5, 2024, Ahold Delhaize/Stop and Shop Distribution Center conducted compliance testing on their spark ignition engine that runs on biogas fuel. The facility runs a GE Jenbacher J416 GS-B82 “lean-burn” internal combustion (IC) engine which is used to power facility heat and electricity and runs on biogas created from a food digester onsite.

The engine can produce 1.137 megawatts (MW) while firing natural gas and 0.994 megawatts (MW) while firing on biogas. According to the protocol (dated 8-9-2024) the engine was manufactured after July 1, 2010. I was unable to confirm exact manufacture date. The permit dated April 24, 2015, discusses approval for construction of the biogas digester system. The testing was done to comply with Clean Air Act regulations 40 CFR Part 60- Subpart JJJJ and MassDEP Air Permit Approval Number SE-15-007 (permit dated April 24, 2015).

The specific program objectives were to determine CO, NO_x, SO₂ and VOC emission rates on a ppm @ 15% O₂, lb/MMBtu, lb/MW-hr, and g/HP-hr basis for comparison with applicable regulation limits. The compliance testing was conducted while the engine was operated within 10% of maximum load.

The final report was submitted to EPA Region 1 on January 27, 2025.

SECTION II – OBSERVATIONS

The test methods used for this program were:

- Methods 1-4: Flow/Moisture, O₂, CO₂
- Method 6C- SO₂
- Method 7E- NO_x
- Method 10- CO
- ALT-106: Non-Methane Ethane Organic Compounds (NMEOC)

Under 40 CFR 60.4244(a), this test is required to be conducted within 10% of maximum load. The test had an average load rating of 91.32% (907.67 kW) for the day. The 90% engine load for biogas fuel stated by the test protocol was 894.6 kilowatts (kW).

The emission results are shown below in the summary section after being corrected for oxygen percentages and unit conversions.

Method 1 alternative criteria require port sampling locations to be at least two diameters downstream and one-half diameter upstream from any disturbances. The stack diameter is 15.5 inches and ports were located greater than 31 inches downstream and 7.75 inches upstream.

Section 3.3.1 of the final report (dated 1-27-25) states no cyclonic flow checks were conducted due to past checks passing with no changes to stack configurations. The report doesn't provide this past data instead suggesting to “reference past reports to find these results”.

Appendix A of the final report provides emission calculations and field data sheets. This includes reference method analyzer data, flow and moisture data, and facility process data.

SECTION III – SUMMARY

Based on my review this performance test was conducted at the proper engine load as specified by the applicable regulations and all emission rates are below the limits after corrective calculations. All calibration gases are not expired and certificates match values on cal sheets. Low-mid range are within proper range of span according to Method 7E. Calibrations pass both system bias and drift criteria.

Below are the emissions limits from the MassDEP Permit and 40 CFR 60 Subpart JJJJ:

MassDEP Permit Limits			
Pollutant	lb/MMBtu	lb/MW-hr	g/hp-hr
CO ₂	0.9	9.1	3.0
NO _x	0.18	1.8	0.6
SO ₂	0.05	0.5	0.16
VOCs	0.13	1.3	0.43

Table 1 – Limits in MassDEP Air Permit Approval Number SE-15-007

Subpart JJJJ – Landfill/Digester Gas on Lean Burn Engines manufactured after 7/1/2010		
Pollutant	ppm @ 15% O ₂	g/HP-hr
CO ₂	610	5.0
NO _x	150	2.0
VOCs	80	1.0

Table 2 – Emission limits from Table 1 of 40 CFR 60 Subpart JJJJ for Digester Gas on Lean Burn Engines manufactured after 7/1/2010.

Figures 1 and 2 are shown below with test run results and facility process data from page 23 of the final report (dated 1-27-25):

Summary of Emissions					
Parameter	Units	Run 1	Run 2	Run 3	Average
CO	lb/MMBtu	0.54	0.54	0.54	0.54
	lb/hr	5.51	5.75	5.57	5.61
	lb/MW-hr	6.07	6.34	6.14	6.18
	g/HP-hr	2.05	2.14	2.08	2.09
	ppm@15%O ₂	239.2	240.8	240.1	240.1
NO _x	lb/MMBtu	0.12	0.12	0.13	0.13
	lb/hr	1.28	1.33	1.31	1.30
	lb/MW-hr	1.41	1.47	1.44	1.44
	g/HP-hr	0.48	0.50	0.49	0.49
	ppm@15%O ₂	33.7	33.9	34.3	34.0
SO ₂	lb/MMBtu	0.01	0.01	0.02	0.01
	lb/hr	0.13	0.10	0.16	0.13
	lb/MW-hr	0.14	0.11	0.18	0.14
	g/HP-hr	0.05	0.04	0.06	0.05
NMOC/VOC	lb/MMBtu	0.01	0.01	0.01	0.01
	lb/hr	0.10	0.10	0.10	0.10
	lb/MW-hr	0.11	0.11	0.11	0.11
	g/HP-hr	0.04	0.04	0.04	0.04
	ppm@15%O ₂	2.6	2.6	2.7	2.6

Figure 1 - Emission rates summarized for pollutants tested on 12-05-2024

- General Run Information -					
Parameter	Units	Run 1	Run 2	Run 3	Average
Test Date	MM/DD/YY	12/5/2024	12/5/2024	12/5/2024	-
Start Time	HH:MM	10:27	11:57	13:33	-
End Time	HH:MM	11:27	12:57	14:23	-
Stack Flow	dscfh	148,781	153,902	149,612	150,765
Stack Temp	F	804.9	786.4	790.9	794.1
Stack Moist.	%	11.7	11.9	12.2	11.9
Stack Velocity	ft/sec	86.8	88.7	86.8	87.5
Stack O ₂	%	8.33	8.30	8.30	8.31
Stack CO ₂	%	11.58	11.33	11.27	11.40
-Facility Data -					
Parameter	Units	Run 1	Run 2	Run 3	Average
Actual Load	kW	907.72	907.68	907.62	907.67
Load Rating	MW	994	994	994	-
% of Max. Load	%	91.32	91.32	91.31	91.32

Figure 2 - General run information and facility process data

SECTION IV – AREAS OF CONCERN

- Run stop times listed incorrectly in various places for Run 3 as 14:23. Correct Run 3 end time is 14:33. Discrepancies between run times throughout final report are listed below:
 - Page 23 General Run Information table
 - Page 38 Instrumental Analyzer Monitoring Data
 - Page 42 CEMS Pre/Post test calibrations, drift, bias checks
 - Page 43 ALT-106 data sheet
 - Page 50 Flow and Moisture Calculations
 - Page 53 Input Data