NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: May 12, 2025

Region: Asheville Regional Office
County: Caldwell
NC Facility ID: 1400204
Inspector's Name: Amro Ali
Date of Last Inspection: 08/13/2024
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Tapaha Dynamics, LLC

Facility Address:
Tapaha Dynamics, LLC
708 Lynhaven Drive
Lenoir, NC 28645

SIC: 7374 / Data Processing Services
NAICS: 518210 / Data Processing, Hosting, and Related Services

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 02D: .0516, .0521, .0524, .1111
02Q: .0317
NSPS: Subpart IIII
NESHAP: Subpart ZZZZ
PSD: n/a
PSD Avoidance: NOx
NC Toxics: n/a
112(r): n/a
Other: n/a

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Kerry Barnett Facilities Manager (770) 876-4823 708 Lynhaven Drive Lenoir, NC 28645	Kerry Barnett Facilities Manager (770) 876-4823 708 Lynhaven Drive Lenoir, NC 28645	Josh Turner Data Center EHS Program Manager (828) 712-2224 708 Lynhaven Drive Lenoir, NC 28645

Application Data

Application Number: 1400204.24A
Date Received: 10/17/2024
Application Type: Modification
Application Schedule: TV-Minor

Existing Permit Data
Existing Permit Number: 09733/T09
Existing Permit Issue Date: 07/19/2021
Existing Permit Expiration Date: 06/30/2026

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2023	0.0500	20.51	0.7500	3.49	0.1600	0.0045	0.0030 [Xylene, m-]
2022	0.0600	9.91	0.6200	1.71	0.1600	0.0045	0.0030 [Xylene, m-]
2021	0.0500	3.49	0.1800	0.9400	0.1600	0.0045	0.0030 [Xylene, m-]
2020	0.0200	3.06	0.1600	0.8200	0.1600	0.0045	0.0030 [Xylene, m-]
2019	0.1500	7.21	0.4500	1.09	0.2600	0.0108	0.0030 [Xylene, m-]

Review Engineer: Russell Braswell

Review Engineer's Signature: **Date:**

Russell Braswell May 12, 2025

Comments / Recommendations:
Issue 09733T10
Permit Issue Date: May 12, 2025
Permit Expiration Date: June 30, 2026 (no change)

1. Purpose of Application

Tapaha Dynamics, LLC (Tapaha; the facility) operates a data center in Caldwell County under Title V permit 09733T09 (the existing permit).

Tapaha has applied to modify the existing permit in order to include several more emergency generators. In addition, Tapaha has requested that hydrotreated vegetable oil (HVO) be added to the permit as an allowable fuel for all generators.

Tapaha submitted this application pursuant to 15A NCAC 02Q .0515 "Minor Modifications." In the application, Tapaha included Form A1 – MINOR on which Tapaha stated that it believes this application qualifies as a minor modification.

2. Application Chronology

Date	Event
October 17, 2024	Application received, but not deemed complete.
October 31, 2024	Request sent to Tapaha by email: Please provide an electronic copy of the application.
November 5, 2024	Request sent to Tapaha by email: 1. An "unacceptable risk analysis" is required for these new generators. Relative to EG-1 through 58, where at this facility are the new generators located? If they are close to the original generators (e.g., not across the street, on a newly purchased plot of land, etc.), then Tapaha's 2012 modeling demonstration may be used as the basis of the unacceptable risk analysis. 2. In order to demonstrate compliance with the NOx PSD avoidance limit, the Title V permit should include the specific method of calculating NOx. This is not included in the existing permit, but DAQ must correct this going forward. The permit should include the NOx emission factors for each generator. What are the appropriate NOx emission factors? 3. An electronic copy of the application still has not been received.
November 7, 2024	Response received to the October 31 and November 5 request: 3. Tapaha provided an electronic copy of the application.
December 11, 2024	Response received to the November 5 request: 1. Tapaha provided the positions of the new generators. 2. Tapaha provided NOx emission factors for all generators.
December 17, 2024	Response received to the November 5 request: 1. Tapaha provided minor corrections to the information received December 11.
December 31, 2024	Request sent to Tapaha by email: 1. What are the stack parameters for the new generators? (*e.g.*, stack heights) 2. What is the base elevation of the new generators? 3. Will there be a new building associated with the new generators? If so, what is the position and elevation of that building? 4. To be clear, were the emission factors provided on December 17 based on manufacturer data? 5. Will Tapaha track engine operating data such that % load can be determined?
January 14, 2025	Response received to the December 31 request: 1. Tapaha provided the stack parameters. 2. Tapaha provided the base elevation. 3. Tapaha provided the position and elevation of the new building. 4. Yes. 5. Yes. Separately, Tapaha asked two questions: a. Why were the pollutants chosen for the unacceptable risk analysis? b. Can Tapaha propose an operating limit to avoid any requirements for TAP emissions?

Date	Event
January 14, 2025	DAQ responded to Tapaha's questions from January 14: a. This was based on Tapaha's previous modeling demonstration, performed in 2012. b. An operating limit to avoid requirements for TAP emissions may be possible, but DAQ's initial unacceptable risk analysis will be based on no specific TAP limits.
February 7, 2025	Request sent to Tapaha by email: 1. It appears DAQ's record of the position of the existing generators is incomplete. Please provide the position data for generators 59 through 120. 2. Is there a 3rd building on-site that DAQ does not have position data on?
February 10, 2025	Response received to the February 7 request: 1. Tapaha provided the additional position data. 2. Tapaha provided position data for the 3rd building. *With this information, the application was deemed complete. Tapaha was informed via email.*
March 10, 2025	Request sent to Tapaha by email: 1. After analyzing the generator position data, there are several generators with overlapping stack positions. Is that correct?
March 11, 2025	Response received to the March 10 request: 1. Tapaha provided some corrections to the generator position data.
March 17, 2025	Request sent to Tapaha by email: 1. Looking at the NOx emission factors received on December 11, Generator 59 does not have complete data.
April 9, 2025	Response received to the March 10 and March 17 requests: 1. Tapaha provided more corrections to the generator position data. 2. Tapaha provided NOx emission factor data for all operating scenarios for generator 59.
April 24, 2025	DAQ SSCB issued an air dispersion modeling analysis memo for the new and existing sources at the facility.
April 25, 2025	An initial draft of the permit and this application review were sent to DAQ Permits staff.
April 25, 2025	DAQ Permits staff requested that the permit include a method of calculating CO emissions to comply with the new CO PSD Avoidance limit.
April 25, 2025	Request sent to Tapaha by email: 1. Please provide a method for Tapaha to calculate CO emissions that can be included in the permit.
April 30, 2025	Response received to the April 25 request: 1. Tapaha calculates the CO emissions in the same manner as the NOx emissions. The engine manufacturers provided emission factors for varying loads, and Tapaha records the load during operation. Please see the attached Excel file for the emission factors of each generator.
April 30, 2025	A revised draft of the permit and this application review were sent to DAQ Permits staff.

Date	Event
May 1, 2025	In-person discussion with Rahul Thaker (Title V Supervisor, DAQ RCO) and Mark Cuilla (Permits Chief, DAQ RCO). This meeting concluded that: 1. This minor modification should *not* include a CO PSD avoidance limit. 2. There will be a subsequent reopen-for-cause application so that DAQ can add the CO PSD avoidance limit to the permit in a way that allows for public participation. 3. DAQ can, for this application only, rely on the fact that CO is always less than NOx to show that the CO PSD avoidance limit will not be exceeded.
May 1, 2025	A revised draft of the permit and this application review were sent to DAQ Permits staff.
May 2, 2025	A revised draft of the permit and this application review were sent to DAQ SSCB staff, DAQ ARO staff, and Tapaha staff.
May 12, 2025	Permit issued.

3. Application Discussion

3.1 Existing facility

The existing facility is a data center. Emission sources at the existing facility consist of 120 diesel-fired emergency generators and other activities that support the data center, such as cooling towers and diesel storage tanks.

The existing facility is subject to a 250 tpy PSD avoidance limit for NOx. Therefore, the existing facility is not a major stationary source under PSD.

The existing facility is a major source for Title V because it has potential emissions of regulated pollutants greater than 100 tpy. The existing facility is an area source of hazardous air pollutants (HAP) (see 40 CFR 63.2) because it does not have potential emissions of HAP greater than the threshold levels. See Section 7 for a discussion of the facility's current and future emissions.

3.2 New emergency generators

Tapaha plans to add the following new emergency generators to the list of permitted emission sources:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
EG-121 through EG-156 **NSPS IIII, MACT ZZZZ**	Thirty-six (36) emergency electricity generators, each powered by one stationary diesel/HVO*-fired internal combustion engine (4,034 brake horsepower, 2,750 kW electrical output, each)	N/A	N/A
EG-157 through EG-163 **NSPS IIII, MACT ZZZZ**	Seven (7) emergency electricity generators, each powered by one stationary diesel/HVO*-fired internal combustion engine (2,347 brake horsepower, 1,750 kW electrical output, each)	N/A	N/A

* HVO fuel shall meet the ASTM D975 specification for diesel fuel.

Although larger than the other emergency generators at this facility, these generators are ultimately similar to the existing generators.

In the application, Tapaha states that the facility will continue to comply with NSPS Subpart IIII, MACT Subpart ZZZZ, and PSD Avoidance (these rules are discussed in Section 4, below).

Given that the proposed new generators are similar to the existing generators, adding these new generators will not change regulatory applicability for the facility. See Section 4 for regulatory applicability for these generators.

3.3 Use of hydrotreated vegetable oil (HVO) in all generators

At the existing facility, each generator can burn only diesel fuel. Tapaha proposes to add HVO as an allowable fuel for all generators (both existing and proposed) at the facility:

> "HVO is a renewable diesel made from fats and oils of crops such as soybeans. HVO meets the ASTM D975 specification for petroleum in the United States. The technical white papers discussing HVO emission factors from Rolls Royce and Caterpillar reviewed by Tapaha indicated that the criteria pollutant emission factors for HVCO are lower than those form diesel." (Application at 3)

Given that HVO meets the ASTM specification for diesel fuel, it is reasonable to state that emissions should not increase from the permitted generators because they are already diesel-fired. Furthermore, as discussed in Section 4 and 6, this facility is subject to facility-wide emission limits that Tapaha is not proposing to change. Therefore, the use of HVO is not expected to impact actual emissions at the facility.

The application includes documents from Cummins and Caterpillar (manufacturers of the emergency generators at this facility) which stated that certifications and warranties for their diesel-fired engines still apply when using HVO. As discussed in Section 4, the use of HVO is allowable under NSPS Subpart IIII (which applies to each generator at this facility, both existing and proposed).

Note that Tapaha is not the first facility in North Carolina to propose the use of HVO in emergency generators. See the following permits issued by DAQ to similar facilities with diesel/HVO-fired generators:

Table 1: Other facilities with diesel/HVO-fired generators in North Carolina

Facility Name	Facility ID	Permit No.
1800599	Microsoft Corporation, CLT04	10824R00
1800601	Microsoft Corporation, CLT10	10849R00
1800602	Microsoft Corporation, CLT17	10850R00

3.4 15A NCAC 02Q .0515 "Minor Modifications"

A facility may apply for a minor modification if the modification meets the criteria in 15A NCAC 02Q .0515(a):

Table 2: Minor modification criteria

Criteria for minor modification	Disallows minor modification?	Notes
(1) do not violate any applicable requirement	No	Tapaha does not propose to violate any applicable requirement.

Criteria for minor modification	Disallows minor modification?	Notes
(2) do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit	No	The changes to monitoring, recordkeeping, and reporting discussed in Section 4, below, are needed regardless of Tapaha's application. Tapaha already calculates NOx emissions in the method that will be added to the permit; the permit is now being updated to explicitly include this method. In other words, DAQ would add the specific method of calculating NOx emissions for PSD avoidance even if Tapaha did not propose to add new emission sources. Note that the permit must include a CO PSD avoidance limit. However, this should have already been included in the permit, and that Tapaha is not proposing it be added to the permit at this time. DAQ will add the CO PSD avoidance limit through a separate permitting action.
(3) do not require or change a case-by-case determination of an emission limitation or other standard, a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis	No	There are no case-by-case determinations in the existing permit.
(4) do not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement and that the facility has assumed to avoid an applicable requirement to which the facility would otherwise be subject.	No	The addition of a CO limit for PSD avoidance discussed in Section 4, below, is needed regardless of Tapaha's application, *i.e.*, Tapaha did not propose to add this limit. DAQ will add the CO PSD avoidance limit discussed above through a separate permitting action.
(5) are not modifications pursuant to any provision of Title I of the federal Clean Air Act	No	Tapaha is not proposing a Title I modification.
(6) are not required to be processed as a significant modification pursuant to 15A NCAC 02Q .0516	No	This application meets all the above criteria, and therefore is not required to be a significant modification.

3.5 Changes to the existing permit

Page No.	Section	Description of Changes
Throughout	Throughout	• Updated dates and permit numbers. • Added references to new generators ES-121 through ES-163 as needed.
1	Permit Cover Page	• Corrected the deadline for a renewal application. Renewal applications are required no less than six months before expiration (see General Condition K). The permit expires on June 30, 2026, and therefore the renewal application is due by December 31, 2025 (was previously listed as January 31, 2026).
4	1	• Added HVO as an allowable fuel for all generators as requested by the Permittee. • Added the term "maximum engine power" to description of each generator to match the term found in NSPS Subpart IIII. • Added the term "maximum generator electrical output" to the description of each generator to differentiate this capacity from the engine capacity (NSPS applicability is based on engine capacity, not generator capacity). • Added ES-121 through ES-163 as requested by the Permittee. • Added footnote regarding minor modifications. • Added footnote requiring HVO to meet ASTM D975.
6	2.1 A.3	• Updated this rule to reflect recent regulatory updates.
8	2.1 A.5	• Corrected NOx emission limit to 250 tpy (was 249.9). This is only a correction. PSD avoidance is generally based on emitting less than 250 tpy. • Added NOx calculation formula. • Added NOx emission factors supplied by the Permittee. • Clarified reporting requirements.
11	3 (new)	• Moved list of insignificant activities to this section. • Added storage tanks to I-BT as requested by Permittee. • Added cooling towers to I-CT as requested by Permittee. • Removed reference to NSPS Subpart IIII and MACT Subpart ZZZZ from I-MISC because those rules do not apply to portable sources. • Added I-EG and I-EF as requested by the Permittee.
12	4	• Updated General Conditions to v8.0. Updates to the General Conditions are made to all Title V permits issued by DAQ as necessary and are not the result of any specific action of the Permittee.

* This list is not intended to be a detailed record of every change made to the permit but a summary of those changes.

4. Rules Review

Applicable rules: The new emission sources at Tapaha will be subject to the following State Implementation Plan (SIP) rules and state-enforceable only rules, in addition to the General Conditions:

- 15A NCAC 02D .0516 "Sulfur Dioxide from Combustion Sources"
- 15A NCAC 02D .0521 "Control of Visible Emissions"
- 15A NCAC 02D .0524 "New Source Performance Standards" (40 CFR Part 60 Subpart IIII)
- 15A NCAC 02D .1111 "Maximum Achievable Control Technology (40 CFR Part 63 Subpart ZZZZ)
- 15A NCAC 02Q .0317 "Avoidance Conditions" (PSD Avoidance)

Tapaha's requirements for the applicable rules are discussed below.

Nonapplicable rules:

- Note that the rules under 15A NCAC 02D .0900 do not apply to this facility because Caldwell County is not one of the named regions in 02D .0902(f) and the statewide rules in 02D .0902(e) do not apply to any activity at this facility.

- Note that the rules under 15A NCAC 02D .1400 do not apply to this facility because the only permitted sources at this facility are emergency generators, which are explicitly exempted from 02D .1400 (see 02D .1402(h)).

4.1 15A NCAC 02D .0516 "Sulfur Dioxide from Combustion Sources"

Applicability: This rule applies to combustion sources that are not subject to an SO_2 emission limit under one of the rules specifically listed in 02D .0516(c). NSPS and MACT rules are included in 02D .0516(c) but note that 02D .0501 and PSD are not.

The emergency-use engines are subject to this rule because neither MACT Subpart ZZZZ nor NSPS Subpart IIII include a specific SO_2 emission limit. Note that NSPS Subpart IIII *does* include a standard for fuel sulfur content, but that is not a specific emission limit for SO_2 and therefore does not provide exemption from this rule.

Emission limit: The emission limit is 2.3 pounds of SO_2 per million Btu of heat input.

Compliance: SO_2 emissions are a product of sulfur included in fuel, and Tapaha does not use any control devices for SO_2. Therefore, SO_2 emissions from these sources can be calculated simply by using the emission factors published by EPA in AP-42:

No. 2 fuel oil combustion in a stationary engine (*e.g.*, diesel-fired emergency generators):
AP-42 Table 3.4-1 (diesel fuel; SO_x; S_1=0.5)[1]:

$$1.01 \times 0.5 = \frac{\mathbf{0.505\ lb}}{\mathbf{MMBtu}}$$

[1] Note that "S_1=0.5" implies that the fuel oil has a sulfur content of 0.5% by weight.

Based on this calculation, diesel fuel with a sulfur content of 0.5%, when burned in a large diesel-fired engine, is expected to comply with the SO_2 limit by a wide margin.

Note that 0.5% equates to 500 ppm. In order to comply with NSPS Subpart IIII, all fuel burned in these engines must have a sulfur content no more than 15 ppm, making this analysis extremely conservative.

Monitoring, recordkeeping, and reporting: Based on the wide margin of compliance for each of the subject sources at this facility, DAQ has determined that no monitoring, recordkeeping, or reporting is required to demonstrate compliance with 15A NCAC 02D .0516 for the uncontrolled sources.

4.2 15A NCAC 02D .0521 "Control of Visible Emissions"

Applicability: This rule applies to sources of visible emissions (VE) that are not subject to another VE standard under 02D .0500. Generally, this rule is not applied to sources that are not expected to produce any VE (*e.g.*, from a storage tank). Each emergency generator at this facility is subject to this rule.

Emission limits: The VE limit for this rule depends on the construction date of the individual source in question. For sources constructed before July 1, 1971, the VE limit is 40%. For other sources, the VE limit is 20%. Each source at this facility is subject to the 20% limit.

Requirements for emergency generators: DAQ has previously determined that no VE monitoring is required for the emergency generators at this facility. The addition of new emergency generators will not change this determination.

4.3 15A NCAC 02D .0524 "New Source Performance Standards" (40 CFR Part 60 Subpart IIII "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines")

Background: This rule incorporates the NSPS rules (40 CFR Part 60) into North Carolina's SIP. The only NSPS rule that applies to the emergency generators is NSPS Subpart IIII.

Applicability: This rule applies to stationary compression ignition internal combustion engines (CI ICE) constructed or modified after the applicability dates in 40 CFR 60.4200(a)(2) (*i.e.*, constructed after July 11, 2005 and manufactured after April 1, 2006 for non-fire pump engines). For the purposes of this rule, each engine at this facility is an emergency-use (non-fire pump) CI ICE subject to this rule.

Rule updates: There have been minor revisions to NSPS Subpart IIII since the most recent Title V permit was issued.

- 87 FR 48603 (August 10, 2022): This update amended the rule to reflect a 2015 court decision which disallowed emergency engines to operate for demand response up to 100 hours per year.

- 89 FR 70512 (August 30, 2024): This update added electronic reporting requirements and clarified that annual oil changes must occur every 12 months (rather than calendar year, which could allow for changes to occur, for example, on December 31 and January 1). This update also clarified the CO emission standards in Table 4, but did not actually change those standards.

Those revisions will be addressed in this modified permit.

Emission standards: Emergency CI engines subject to this rule must be certified to meet the applicable emission standards in 40 CFR 60.4205(b):

Rated power (kW)	Starting model year	NO_X + NMHC	CO	PM
kW > 560	2006	6.4 g/kW-hr	3.5 g/kW-hr	0.20 g/kW-hr

Note that for emergency generators, compliance with these limits is a certification by the manufacturer. The certification testing is performed by the manufacturer, not by the operator. Based on the way emission testing is performed for the certification process, periods of operation above the NSPS standards are allowable. Therefore, the emission factors for NOx, discussed in Section 4.5 below, that are higher than the NOx+NMHC limit above do not indicate noncompliance with NSPS Subpart IIII.

Fuel requirements: Diesel fuel must meet the sulfur requirements in 40 CFR 1090.305 (15 ppm sulfur, a.k.a. ultra-low sulfur diesel).

Diesel fuel: Under NSPS Subpart IIII (which applies to each generator at this facility), "diesel fuel" is defined as "any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is number 2 distillate oil" (see 40 CFR 60.4219). HVO is not distilled from petroleum, and therefore nominally cannot meet the definition of diesel fuel under this rule. However, US EPA has previously considered the use of non-petroleum diesel fuel for NSPS-affected engines.

EPA has previously considered the use of non-petroleum diesel under NSPS Subpart IIII. In a letter to the Hawaiian Electric Company, EPA concluded that biodiesel fuel (a diesel fuel that is not distilled from petroleum) would be allowable "if all of the following conditions are met:

- The biodiesel meets the fuel requirements of 40 CFR 60.4207(b)
- The engine manufacturer's warranty for the engine (including the emission control systems) includes the use of the biodiesel (or biodiesel blend) being used in the engine
- The biodiesel meets ASTM D6751"[2]

It appears that HVO meets all three criteria above:

1. 40 CFR 60.4207(b) states that engines must "use diesel fuel that meets the requirements of 40 CFR 1090.305 for nonroad diesel fuel." Subsequently, 40 CFR 1090.305 states:

   § 1090.305 ULSD standards.

   (a) ***Overview***. Except as specified in § 1090.300(a), diesel fuel must meet the ULSD per-gallon standards of this section.
   (b) ***Sulfur standard***. Maximum sulfur content of 15 ppm.
   (c) ***Cetane index or aromatic content***. Diesel fuel must meet one of the following standards:
   (1) Minimum cetane index of 40.
   (2) Maximum aromatic content of 35 volume percent.

   Under 40 CFR Part 1090.80 (which can be discussed here because 40 CFR Part 1090 is referenced by 40 CFR 60.4207(b)), diesel fuel is defined:

[2] Letter from Robert J. Wayland (Leader, Energy Strategies Group, US EPA) to Brenner Munger (Manager, Environmental Department, Hawaiian Electric Company), dated January 12, 2012. See EPA applicability determination control number 1500067, available at https://cfpub.epa.gov/adi/

§ 1090.80 Definitions.

Diesel fuel means any of the following:

(1) Any fuel commonly or commercially known as diesel fuel.
(2) Any fuel (including NP diesel fuel or a fuel blend that contains NP diesel fuel) that is intended or used to power a vehicle or engine that is designed to operate using diesel fuel.
(3) Any fuel that conforms to the specifications of ASTM D975 (incorporated by reference in § 1090.95) and is made available for use in a vehicle or engine designed to operate using diesel fuel.

Nonpetroleum (NP) diesel fuel means renewable diesel fuel or biodiesel. NP diesel fuel also includes other renewable fuel under 40 CFR part 80, subpart M, that is used or intended for use to power a vehicle or engine that is designed to operate using diesel fuel or that is made available for use in a vehicle or engine designed to operate using diesel fuel.

HVO does appear to meet the definition of "diesel fuel" under 40 CFR Part 1090 and has a sulfur content less than the limit incorporated by 40 CFR 60.4207(b).

2. In the application, Tapaha included documents from Cummins and Caterpillar (manufacturers of the emergency generators at this facility) which stated that certifications and warranties for their diesel-fired engines still apply when using HVO.

3. HVO cannot meet ASTM D6751 because that standard is specifically for biodiesel, and HVO is not biodiesel. However, HVO *can* meet ASTM D975, which is simply the standard for diesel.

Monitoring requirements: Tapaha must install a non-resettable hour meter on each subject emergency engine. The engines must only be operated such that they meet the definition of an emergency engine (*e.g.*, not operated as a peak shaving engine).

Compliance requirements: The engines must be operated with good work practices and according to the manufacturer's instructions. To be designated as an emergency engine, the engine can operate for non-emergency purposes (*e.g.*, maintenance testing) for less than 100 hours per year. Up to 50 of those hours can be for non-emergency use, except for peak-shaving (with rare exceptions).

Changes to the existing permit: No changes to the specific condition for NSPS Subpart IIII are required as a result of adding Tapaha's proposed new generators. However, the specific condition for NSPS Subpart IIII has been updated to reflect recent rule updates.

4.4 15A NCAC 02D .1111 "Maximum Achievable Control Technology" (MACT; 40 CFR Part 63 Subpart ZZZZ "National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines")

Background: This rule incorporates the MACT rules (40 CFR Part 63) into North Carolina's SIP.

Applicability: This rule applies to all stationary reciprocating internal combustion engines (RICE). Each engine at this facility is subject to this rule. The rule has different requirements for engines based on the status of the facility (major or area source of HAP), use of the engine (emergency, nonemergency, etc.), age of the engine, and size of the engine.

RICE subject to NSPS: Pursuant to 40 CFR 63.6590(c), RICE that are subject to a requirement under 40 CFR Part 60 (*i.e.,* subject to an NSPS rule), located at an area source of HAP, and are "new" under MACT Subpart ZZZZ demonstrate compliance with MACT by demonstrating compliance with the applicable NSPS. Each generator at this facility (both current and proposed) meets these criteria. Therefore, Tapaha has no further requirements under MACT Subpart ZZZZ.

Rule updates: There have been minor revisions to MACT Subpart ZZZZ since the most recent Title V permit was issued. However, none of those updates has any effect on Tapaha's requirements under this rule.

4.5 15A NCAC 02Q .0317 "Avoidance Conditions"

Applicability: This rule allows a Permittee to accept enforceable limits in order to avoid applicability of specific rules (see 02Q .0317(a)). Tapaha has accepted emission limits in order to avoid being designated as a major stationary source, and therefore avoid applicability of 15A NCAC 02D .0530 "Prevention of Significant Deterioration" (PSD).

Major stationary source: Under PSD, a major stationary source is a facility with actual or potential emissions greater than the thresholds in 40 CFR 51.166(b)(1)(i). For facilities not specifically included in the list of categories in 40 CFR 51.166(b)(1)(i)(a), the limit is 250 tpy of any regulated NSR pollutant. Data centers are not included in that list of categories, so Tapaha is subject to the 250 tpy limit.

Emission limits: This facility has potential emissions of NOx greater than 250 tpy, so the permit must include an emission limit for NOx. Note that the existing facility also has potential emissions of CO greater than 250 tpy (see Section 7 for a summary of emissions from the existing facility), so the permit should also include a limit for CO. However, the permit does not include this limit.

Corrections to the existing permit: The existing permit only requires Tapaha to keep records of NOx emissions from the facility. The existing permit does not specify any method of determining NOx emissions and does not reference CO at all.

- The existing permit indicates the PSD avoidance limit is 249.9 tpy. As discussed above, the limit is 250 tpy.

- DAQ will add a clear, specific method of calculating NOx emissions to the permit. Tapaha is already calculating NOx emissions, so this change is ultimately only for clarity and does not represent a change in Tapaha's monitoring, recordkeeping, or reporting requirements.

- The permit should already include a limit for CO. Even though this limit should already be in the permit, DAQ cannot add such a limit to the permit through a minor modification because that would establish a permit term for which there is no corresponding underlying applicable requirement (see Table 2, Item 4, above). DAQ will add the CO limit to the Title V permit through a "reopen for cause" permit action, separate from this application.

Compliance for NOx: Tapaha will demonstrate compliance with the NOx emission limit by calculating NOx emissions from the facility on a monthly basis using the equation shown below. The emission factors for the equation are based on manufacturer specifications and were provided by Tapaha by email on December 11, 2014.

$$NO_{X,month} = \left(\sum \left(EF_{i,L} \times C_{i,L} \times O_{i,L}\right) \times \left(\frac{1 \text{ ton}}{907{,}185 \text{ g}}\right)\right) + (Misc.)$$

Where:

$NO_{x,month}$ = The facility-wide NOx emissions from the generators. (tons per month)

$EF_{i,L}$ = For each generator listed in Section 1, above, and loading listed in Tables 2.1 A.5-1 and 2, below, as applicable, the approved NOx emission factor. See Tables 2.1 A.5-1 and 2 below. (grams per horsepower-hour)

$C_{i,L}$ = For each generator and loading, the rated capacity of that generator for that loading. For example, if the maximum capacity of the generator is 2,000 horsepower, $C_{i,L}$ for the 50-75% category would be 2,000 × 75% = 1,500 horsepower. (horsepower)

$O_{i,L}$ = For each generator and loading, the monthly operations of that generator at that loading. See Tables 2.1 A.5-1 and 2 below. (hours per month)

Misc. = The monthly emissions of NOx from other sources at the facility. The Permittee shall calculate NOx emissions from miscellaneous sources using the applicable emission factor published by US EPA in AP-42, unless another emission factor is approved by DAQ. (tons per month)

Table 2.1 A.5-1

Generator	**NOx EF, by loading [$EF_{i,L}$] (g/hp-hr)**			
	0-25%	**25-50%**	**50-75%**	**75-100%**
EG-1 through EG-37	3.18	3.04	4.6	5.11
EG-38 through EG-50	2.7	3.1	4.7	5.3
EG-51 through EG-54	4.17	5.2	3.87	3.95
EG-55 and EG-56	2.7	3.1	4.7	5.3
EG-57 and EG-58	3.2	3.5	4.9	5.8
EG-59	2.7	3.1	4.7	6.0

Table 2.1 A.5-2

Generator	**NOx EF, by loading [$EF_{i,L}$] (g/hp-hr)**				
	0-10%	**10-25%**	**25-50%**	**50-75%**	**75-100%**
EG-60 through EG-75	6.47	3.5	3.74	5.15	6.38
EG-76 through EG-107	5.61	3.14	3.97	6.00	7.54
EG-108 through EG-120	5.94	4.19	3.18	3.89	5.46
EG-121 through EG-156	8.92	4.83	4.44	5.82	8.53
EG-157 through EG-163	6.15	4.11	4.30	5.47	6.83

Compliance for CO: Although not required by the existing permit for PSD avoidance, Tapaha is required to calculate CO emissions on an annual basis in order to comply with the annual emission inventory requirement (General Condition X of the existing permit). DAQ requested that Tapaha provide its method of calculating CO emissions. Tapaha responded:

> "Tapaha calculates the CO emissions in the same manner as the NOx emissions. The engine manufacturers provided emission factors for varying loads, and Tapaha records the load during operation. Please see the attached Excel file for the emission factors of each generator." (Response to request for additional information, received by email on April 30, 2025).

DAQ compared the provided CO emission factors to the NOx emission factors and determined that the CO emission factors are, on average, 18% of the NOx emission factor (see Attachment 2 for details of this calculation). Therefore, given that Tapaha calculates CO and NOx emissions in the same manner, and the limit is the same for NOx and CO to avoid PSD, it can be assumed that Tapaha will comply with a PSD avoidance limit for CO.

Monitoring, recordkeeping, and reporting: Tapaha must keep records of NOx calculations and submit a semiannual summary report.

Changes to the existing permit:

- The existing permit will be updated to include the NOx emission calculation above and the associated NOx emission factors.

- The NOx limit in the existing permit will be corrected (is currently 249.9, should be 250.).

It should be emphasized that the above changes are not the result of Tapaha's proposed modification. The above NOx limit and calculation methods should have already been included in the permit.

Future changes to the permit: DAQ must reopen the Title V permit "for cause" in order to add the a PSD avoidance limit for CO. At that time, DAQ will also include monitoring, recordkeeping, and reporting for CO.

5. North Carolina Toxic Air Pollutants

Background: In general, a facility that emits toxic air pollutants (TAP) at rates greater than the TAP permitting emission rate (TPER) listed in 15A NCAC 02Q .0711 must perform air dispersion modeling following the procedures in 15A NCAC 02D .1106. The results of this modeling must be less than the acceptable ambient limits (AAL) listed in 15A NCAC 02D .1104. For this analysis, TAP emitted by sources exempt pursuant to 15A NCAC 02Q .0702(a)(27) (*e.g.*, generators subject to MACT Subpart ZZZZ) are not included.

Unacceptable risk: If a facility proposes to add a MACT-affected source, DAQ must evaluate those sources pursuant to G.S. 143-215.107(a)(5)b, which requires DAQ to "review the application to determine if the emission of toxic air pollutants from the source or facility would present an unacceptable risk to human health" (see 15A NCAC 02Q .0706(d)).

Tapaha proposes to add many new emergency generators which are all subject to MACT Subpart ZZZZ. DAQ must therefore consider if these sources pose an unacceptable risk to human health.

Previous modeling: Tapaha has previously submitted air dispersion modeling. In 2012 (shortly before G.S. 143-215.107(a)(5)b was passed), Tapaha performed air dispersion modeling for the following pollutants: arsenic, benzene, beryllium, cadmium, chromium, formaldehyde, and mercury. At the time that modeling was conducted, the facility consisted of 56 generators.[3]

Following 2012, Tapaha has added several new generators. DAQ has previously analyzed those new generators against the unacceptable risk criteria and determined that those new generators did not pose an unacceptable risk without conducting a new modeling analysis.[4]

New unacceptable risk determination: Tapaha proposes to add many new generators in a location relatively far from the existing generators. In order to evaluate these new generators for an unacceptable risk, DAQ will conduct a new modeling analysis of each of the generators (new and existing) using the previously modeled pollutants.

DAQ requested that Tapaha provide emission point locations and characteristics for each of the new generators. DAQ re-used the emission point locations and characteristics for the generators modeled in 2012 after verifying that they are still accurate. DAQ calculated emissions of arsenic, benzene, beryllium, cadmium, chromium, formaldehyde, and mercury using AP-42 emission factors and 500 hours of operation per year. No specific restrictions were applied in the analysis (*i.e.*, the emissions were based on potential operations). See Attachment 1 for emissions DAQ's calculations for those pollutants.

Using the above information, DAQ conducted a new air dispersion modeling analysis. Based on this new modeling, the proposed facility will not cause an exceedance of the AAL for any of the above-mentioned pollutants. The results of DAQ's new air dispersion modeling analysis are shown in Table 4, below:

[3] See memo *Modeling Analysis for Tapaha Dynamics, LLC*, issued June 4, 2012.
[4] See DAQ's review application 1400204.21A and associated Title V permit revision 09733T09, issued July 19, 2021.

Table 3: Air dispersion modeling results[5]

Pollutant	Averaging Period	Max. Conc. (µg/m³)	AAL (µg/m³)	% of AAL
Arsenic	Annual	0.00018	0.0021	8.6%
Benzene	Annual	0.034	0.12	28.3%
Beryllium	Annual	0.00013	0.0041	3.2%
Cadmium	Annual	0.00013	0.0055	2.4%
Chromium VI	24-hour	0.015	0.62	2.4%
Formaldehyde	1-hour	1.55	150	1.0%
Mercury	24-hour	0.015	0.6	2.5%

Given that the modeling analysis did not show an exceedance of any AAL, and that the analysis was performed based on potential emissions (rather than any specific control or restriction being applied), DAQ concludes that this project will not pose an unacceptable risk to human health. Therefore, this project is not a modification pursuant to 15A NCAC 02Q .0706(d).

[5] See memo *Toxics Air Dispersion Modeling Analysis Tapaha Dynamics, LLC*, issued April 24, 2025.

6. Compliance Status and Other Regulatory Concerns

Compliance status:

- The original application includes a signed Form E5 "Title V Compliance Certification." On this form, Tapaha certified compliance with all applicable requirements.

- This facility was most recently inspected by Amro Ali on August 13, 2024. Tapaha appeared to be in compliance with the Title V permit at that time.

- In the past five years, Tapaha has been issued one Notice of Violation (NOV). On August 27, 2024, Tapaha was issued an NOV due a late semiannual report. DAQ considers this matter resolved as of December 19, 2024.

Application fee: Applications for minor modification require an application fee. Tapaha paid the appropriate application fee via ePay.

PE Seal: Some applications must be sealed by a Professional Engineer. This application does not meet the criteria for a PE seal in 15A NCAC 02Q .0112.

Zoning Consistency Determination: Applications that meet the criteria in 15A NCAC 02Q .0507(d) require a zoning consistency determination. Tapaha is proposing to expand an existing facility and therefore submitted a request for zoning consistency to the City of Lenoir Planning Department.

Minor modifications: Applications for minor modification must include From A1 – Minor "Title V Minor Modification (Prior to Permit Revision)." Tapaha submitted the required form. On that form, Tapaha certified that this application qualified as a minor modification and included the specific conditions that were being changed as part of this modification.

General Conditions: The General Conditions (Section 3 of the existing permit) has been updated to DAQ's latest version (Version 8.0). The General Conditions appear in each Title V permit issued by DAQ. Changes to the General Conditions are not targeted at any specific facility or triggered by any action of an applicant. Note that the General Conditions have been moved to Section 4 of the new permit.

Removal of References to Affirmative Defense: EPA has promulgated a rule (88 FR 47029, July 21, 2023), with an effective date of August 21, 2023, removing the emergency affirmative defense provisions in operating permits programs, codified in both 40 CFR 70.6(g) and 71.6(g). EPA has concluded that these provisions are inconsistent with the EPA's current interpretation of the enforcement structure of the CAA, in light of prior court decisions.[6] Moreover, per EPA, the removal of these provisions is also consistent with other recent EPA actions involving affirmative defenses[7] and will harmonize the EPA's treatment of affirmative defenses across different CAA programs.

[6] NRDC v. EPA, 749 F.3d 1055 (D.C. Cir. 2014).

[7] In newly issued and revised New Source Performance Standards (NSPS), emission guidelines for existing sources, and NESHAP regulations, the EPA has either omitted new affirmative defense provisions or removed existing affirmative defense provisions. See, e.g., National Emission Standards for Hazardous Air Pollutants for the Portland Cement Manufacturing Industry and Standards of Performance for Portland Cement Plants; Final Rule, 80 FR 44771 July 27, 2015); National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters; Final Rule, 80 FR 72789 (November 20, 2015); Standards of

As a consequence of this EPA action to remove these provisions from 40 CFR 70.6(g), it will be necessary for states and local agencies that have adopted similar affirmative defense provisions in their Part 70 operating permit programs to revise their Part 70 programs (regulations) to remove these provisions. In addition, individual operating permits that contain Title V affirmative defenses based on 40 CFR 70.6(g) or similar state regulations will need to be revised.

DAQ has not adopted these discretionary affirmative defense provisions in its Title V regulations (15A NCAC 02Q .0500). Instead, DAQ has chosen to include them directly in individual Title V permits as General Condition J. Per EPA, DAQ is required to promptly remove such impermissible provisions, as stated above, from individual Title V permits, after August 21, 2023, through normal course of permit issuance.

Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units; Final Rule, 81 FR 40956 (June 23, 2016).

7. Facility Emissions Review

Changes in emissions: Tapaha proposes to add several new emission sources but does not propose to increase the facility-wide limit on NOx (or CO).

Emissions from the existing facility and post-modification facility are calculated in Table 4:

Table 4: Potential emissions from combined emergency generators

Pollutant	Emission Factor	Potential Emissions, Existing facility (tpy)	Potential Emissions, Post-modification (tpy)	Notes
NOx	6.4 g/kW-hr	1,845.82	2,610.63	1,2
CO	3.5 g/kW-hr	1,009.43	1,427.69	2,3
$PM=PM_{10}=PM_{2.5}$	0.2 g/kW-hr	57.68	81.58	3
SO_2	1.34E-05 lb/hp-hr	1.30	1.84	4
VOC	7.05E-04 lb/hp-hr	68.76	97.25	5
Benzene (high HAP)	7.76E-04 lb/MMBtu	0.53	0.75	6
Total HAP	1.75E-03 lb/MMBtu	1.19	1.69	7

Constants and Factors
7,000 Btu/hp-hr, brake-specific fuel consumption (BSFC). See AP-42 Table 3.4-1, note e.
390,138 hp total engine capacity, facility-wide (existing facility)
551,791 hp total engine capacity, facility-wide (post modification)
453.5 g/lb
1.341 hp/kW
2,000 lb/ton
500 hours per year potential operation of emergency generators, each

Notes
1. Emission factor based on NSPS Subpart IIII emission limit, assuming that 100% of NOx+NMHC=NOx.
2. This pollutant is subject to a facility-wide emission limit of 250 tpy.
3. Emission factor based on NSPS Subpart IIII emission limit.
4. AP-42 Table 3.4-1 "SOx", S1=15/10,000 (*i.e.*, 15 ppm). Note that NSPS Subpart IIII includes a limit on the sulfur content of diesel fuel (no greater than 15 ppm).
5. AP-42 Table 3.4-1 "TOC (as CH_4)"
6. AP-42 Table 3.4-3.
7. Sum of AP-42 Table 3.4-3. Also includes metal HAP contribution from AP-42 Table 1.3-10. Note that metal emissions from combustion are a function of the metal content of the fuel. There are no specific factors in AP-42 for metal emissions from large diesel-fired engines, so the metal emission factors for No. 2 fuel oil-fired boilers are used instead.

In addition to the new generators, Tapaha plans to add several fuel storage tanks with capacities between 1,150 and 6,000 gallons. In the application, Tapaha estimated emissions from all fuel storage tanks using US EPA's TANKS software. Tapaha estimates emissions of VOC to be approximately 0.25 tpy of VOC and less than 0.1 tpy of HAP.

Finally, Tapaha plans to add several cooling towers. Based on the calculations included in the application, the potential emissions from the cooling towers are less than 0.1 tpy of PM.

Title V: Tapaha is a major source for Title V (as defined in 40 CFR 70.2) because it has potential emissions of regulated pollutants greater than 100 tpy. This application for minor modification will not affect Tapaha's status as a major source for Title V.

HAP: Tapaha is an area source of HAP (as defined in 40 CFR 63.2) because it does not have actual or potential emissions of HAP greater than the major source threshold. The new sources proposed by Tapaha will not cause this facility to become a major source of HAP.

PSD: Tapaha is not a major stationary source for PSD because the facility operates under a facility-wide emission limit for NOx and CO in order to avoid being designated as a major stationary source. The limit for each pollutant is 250 tpy (see 40 CFR 51.166(b)(1)(i)(*b*)). Tapaha will continue to comply with these emission limits, and therefore this minor modification will not cause the facility to be a major stationary source.

8. Draft Permit Review Summary, Public Notice, and EPA Review

Initial draft: An initial draft of the permit and this application review were sent to DAQ Permits staff on April 24, 2025. On April 25, 2025, DAQ Permits staff requested that the permit include a method of quantifying CO emissions to show compliance with the CO PSD avoidance limit.

Revised draft: After discussing CO emission calculations with Tapaha, a revised draft of the permit and this application review were sent to DAQ permits staff on April 30, 2025. In a meeting on May 1 with DAQ Permits staff (Rahul Thaker, Title V supervisor and Mark Cuilla, Permits Chief), it was determined that a CO limit for PSD avoidance cannot be added as part of a minor modification. Instead, because DAQ previously failed to include this limit, adding the limit now means that DAQ would be correcting a material mistake, which is covered by 15A NCAC 02Q .0517 "Reopening for Cause."

DAQ will inform Tapaha that, following the issuance of this minor modification, DAQ will reopen the Title V permit in order to include a CO limit for PSD avoidance.

Subsequent draft: A subsequent draft of the permit and this application review were sent to DAQ ARO staff, DAQ SSCB staff, and Tapaha staff on May 2, 2025.

DAQ ARO staff and DAQ SSCB staff had no comments on the May 2 draft. Tapaha staff provided the following comments:

1. There is no pollutant identified in the PSD avoidance condition Section 2 Subsection 5.a of the draft permit. This condition should be revised to say "In order to avoid applicability of 15A NCAC 02D .0530, the facility shall discharge into the atmosphere less than 250 tons of nitrogen oxides (NOx) per consecutive 12-month period."

   Response: This typo will be corrected.

2. In the Subject line please include the road and zip code of the facility: 708 Lynhaven Drive, 28645.

   Response: The SUBJECT line of the cover letter to the Title V permit follows DAQ's format and will not be changed at this time.

3. In the second paragraph of the cover letter, please add "in" between "described General Condition R".

   Response: This typo will be corrected.

4. In Section 1, please add "in" between "described General Condition R".

   Response: This typo will be corrected.

5. Please replace the Technical Contact (Jon Rogers) with the following site representative:

   a. Josh Turner
   b. Data Center EHS Program Manager
   c. (828) 712-2224

Response: This contact information will be updated.

Public Notice: This application is a minor modification submitted pursuant to 15A NCAC 02Q .0515. Per 02Q .0521(a), a public notice period is not required for such applications.

EPA Review: Pursuant to 15A NCAC 02Q .0515, the permit revision will be "proposed" to EPA for their 45-day review and the changes made to the current permit will become effective on the 60th day from the issuance date if no EPA comment is received. If the EPA does comment on the proposed permit within the 45-day review period, the permit will be reissued with changes as appropriate.

9. Recommendations

This permit application has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility appears to be complying with all applicable requirements.

DAQ recommends issuance of Permit No. 09733T10. ARO, SSCB, and Tapaha have received a copy of this permit and submitted comments that were incorporated as described in Section 8.

Attachment 1 to Review of Application 1400204.24A
TAP Emission Calculations

The calculations below were used to determine TAP emission rates for air dispersion modeling.

Constants:
7,000 Btu/hp-hr, brake-specific fuel consumption (BSFC). See AP-42 Table 3.4-1, note e.
500 hours per year potential operation for emergency-use engines.
8,760 hours per year, total.

Emission factors:
4 lb Arsenic / 10^{12} Btu fuel input. See AP-42 Table 1.3-10.
3 lb Beryllium / 10^{12} Btu fuel input. See AP-42 Table 1.3-10.
3 lb Cadmium / 10^{12} Btu fuel input. See AP-42 Table 1.3-10.
3 lb Chromium / 10^{12} Btu fuel input. See AP-42 Table 1.3-10.
3 lb Mercury / 10^{12} Btu fuel input. See AP-42 Table 1.3-10.
7.89E-05 lb formaldehyde / MMBtu fuel input. See AP-42 Table 3.4-3.
7.76E-04 lb benzene / MMBtu fuel input. See AP-42 Table 3.4-3.

Notes:
1. Metal emissions from combustion are a function of the metal content of the fuel. There are no specific factors in AP-42 for metal emissions from large diesel-fired engines, so the metal emission factors for No. 2 fuel oil-fired boilers (AP-42 Table 1.3-10) are used instead.
2. The use of 500 hours per year of potential operations for emergency generators comes from an EPA memo for calculating potential emissions from emergency units.
3. Pollutant emission rates in units of lb/hr.

TAP Emission Calculations:

Source ID	Engine Cap. (HP)	Arsenic	benzene	Beryllium	Cadmium	Chromium	Mercury	Form.
EG-001	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-002	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-003	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-004	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-005	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-006	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-007	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-008	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-009	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-010	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-011	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-012	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-013	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-014	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-015	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-016	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-017	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-018	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-019	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-020	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03

Source ID	Engine Cap. (HP)	Arsenic	benzene	Beryllium	Cadmium	Chromium	Mercury	Form.
EG-021	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-022	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-023	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-024	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-025	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-026	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-027	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-028	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-029	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-030	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-031	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-032	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-033	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-034	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-035	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-036	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-037	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-038	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-039	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-040	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-041	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-042	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-043	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-044	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-045	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-046	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-047	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-048	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-049	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-050	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-051	1482	2.37E-06	4.59E-04	1.78E-06	1.78E-06	3.11E-05	3.11E-05	8.19E-04
EG-052	1482	2.37E-06	4.59E-04	1.78E-06	1.78E-06	3.11E-05	3.11E-05	8.19E-04
EG-053	1482	2.37E-06	4.59E-04	1.78E-06	1.78E-06	3.11E-05	3.11E-05	8.19E-04
EG-054	1482	2.37E-06	4.59E-04	1.78E-06	1.78E-06	3.11E-05	3.11E-05	8.19E-04
EG-055	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-056	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-057	2205	3.52E-06	6.84E-04	2.64E-06	2.64E-06	4.63E-05	4.63E-05	1.22E-03
EG-058	2205	3.52E-06	6.84E-04	2.64E-06	2.64E-06	4.63E-05	4.63E-05	1.22E-03
EG-059	2919	4.67E-06	9.05E-04	3.50E-06	3.50E-06	6.13E-05	6.13E-05	1.61E-03
EG-060	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-061	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-062	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03

Source ID	Engine Cap. (HP)	Arsenic	benzene	Beryllium	Cadmium	Chromium	Mercury	Form.
EG-063	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-064	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-065	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-066	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-067	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-068	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-069	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-070	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-071	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-072	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-073	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-074	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-075	3614	5.78E-06	1.12E-03	4.33E-06	4.33E-06	7.59E-05	7.59E-05	2.00E-03
EG-076	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-077	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-078	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-079	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-080	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-081	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-082	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-083	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-084	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-085	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-086	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-087	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-088	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-089	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-090	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-091	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-092	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-093	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-094	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-095	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-096	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-097	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-098	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-099	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-100	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-101	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-102	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-103	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-104	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03

Source ID	Engine Cap. (HP)	Arsenic	benzene	Beryllium	Cadmium	Chromium	Mercury	Form.
EG-105	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-106	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-107	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-108	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-109	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-110	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-111	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-112	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-113	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-114	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-115	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-116	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-117	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-118	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-119	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-120	2937	4.69E-06	9.11E-04	3.52E-06	3.52E-06	6.17E-05	6.17E-05	1.62E-03
EG-121	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-122	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-123	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-124	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-125	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-126	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-127	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-128	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-129	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-130	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-131	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-132	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-133	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-134	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-135	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-136	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-137	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-138	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-139	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-140	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-141	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-142	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-143	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-144	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-145	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-146	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03

Source ID	Engine Cap. (HP)	Arsenic	benzene	Beryllium	Cadmium	Chromium	Mercury	Form.
EG-147	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-148	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-149	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-150	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-151	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-152	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-153	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-154	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-155	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-156	4034	6.45E-06	1.25E-03	4.84E-06	4.84E-06	8.47E-05	8.47E-05	2.23E-03
EG-157	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03
EG-158	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03
EG-159	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03
EG-160	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03
EG-161	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03
EG-162	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03
EG-163	2347	3.75E-06	7.28E-04	2.81E-06	2.81E-06	4.93E-05	4.93E-05	1.30E-03

Attachment 2 to Review of Application 1400204.24A
CO and NOx Emission Factor Comparison

The NOx and CO emission factors below were provided by the applicant.
The determination of the average difference between the NOx and CO factors was performed by DAQ.

Weighted average difference = (# of Generators in group) × (Group Average Diff) / (# of Generators, total) = **18.6%**

i.e., on average, the CO factor is 18.6% of the NOx factor.

Generator Group	Loading category	**0-25%**	**25-50%**	**50-75%**	**75-100%**			
EG-1 through EG-37	NOx (g/hp-hr)	3.18	3.04	4.6	5.11			
	CO (g/hp-hr)	0.65	0.4	0.19	0.21	Average Diff.	# of Generators	**Group Average Diff.**
	Diff. (%)	**20.4**	**13.2**	**4.1**	**4.1**	10.5	37	**388.5**
EG-38 through EG-50	NOx	2.7	3.1	4.7	5.3			
	CO	0.57	0.36	0.13	0.18			
	Diff	**21.1**	**11.6**	**2.8**	**3.4**	9.7	13	**126.1**
EG-51 through EG-54	NOx	4.17	5.2	3.87	3.95			
	CO	0.66	0.36	0.48	0.66			
	Diff	**15.8**	**6.9**	**12.4**	**16.7**	13.0	4	**51.8**
EG-55 and EG-56	NOx	2.7	3.1	4.7	5.3			
	CO	0.57	0.36	0.13	0.18			
	Diff	**21.1**	**11.6**	**2.8**	**3.4**	9.7	2	**19.4**
EG-57 and EG-58	NOx	3.2	3.5	4.9	5.8			
	CO	0.96	0.55	0.4	0.48			
	Diff	**30**	**15.7**	**8.2**	**8.3**	15.6	2	**31.2**
EG-59	NOx	2.7	3.1	4.7	6			
	CO	0.57	0.36	0.13	0.16			
	Diff	**21.1**	**11.6**	**2.8**	**2.7**	9.6	1	**9.6**

Generator Group	Loading category	**0-10%**	**10-25%**	**25-50%**	**50-75%**	**75-100%**			
EG-60 through EG-75	NOx (g/hp-hr)	6.47	3.5	3.74	5.15	6.38			
	CO (g/hp-hr)	4.26	1.47	0.58	0.48	0.76	Average Diff.	# of Generators	**Group Average Diff.**
	Diff. (%)	65.8	42	15.5	9.3	11.9	19.7	16	**315.2**
EG-76 through EG-107	NOx	5.61	3.14	3.97	6	7.54			
	CO	4.05	2.66	0.82	1.23	0.74			
	Diff	**72.2**	**84.7**	**20.7**	**20.5**	**9.8**	33.9	32	**1084.8**
EG-108 through EG-120	NOx	5.94	4.19	3.18	3.89	5.46			
	CO	2.42	1.17	0.33	0.21	0.3			
	Diff	**40.7**	**27.9**	**10.4**	**5.4**	**5.5**	12.3	13	**159.9**
EG-121 through EG-156	NOx	8.92	4.83	4.44	5.82	8.53			
	CO	3.43	1.68	0.57	0.56	1.16			
	Diff	**38.5**	**34.8**	**12.8**	**9.6**	**13.6**	17.7	36	**637.2**
EG-157 through EG-163	NOx	6.15	4.11	4.3	5.47	6.83			
	CO	4.64	2.03	1.45	1.36	0.94			
	Diff	**75.4**	**49.4**	**33.7**	**24.9**	**13.8**	30.5	7	**213.5**