NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date:

Region: Raleigh Regional Office
County: Wake
NC Facility ID: 9200290
Inspector's Name: Jeff Harris
Date of Last Inspection: 05/23/2023
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): North Carolina State University

Facility Address:
North Carolina State University
2701 Sullivan Drive
Raleigh, NC 27695

SIC: 8221 / Colleges and Universities, nec
NAICS: 61131 / Colleges, Universities, and Professional Schools

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

Permit Applicability (this application only)

SIP: 02D .0503, .0512, .0516
NSPS: Db, Dc, IIII, JJJJ, KKKK
NESHAP: ZZZZ, JJJJJJ
PSD: NA
PSD Avoidance: 02D .0614
NC Toxics: 02D .1100, 02Q .0711
112(r): NA
Other: 02D. 0521

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Alan Daeke Director Utilities Services. (919) 513-5081 NC State University Raleigh, NC 27695	Charles Maimone Exec. VC/Finance & Administration (919) 515-2155 Holladay Hall, 106 NC State University Raleigh, NC 27695	Alan Daeke Director Utilities Services. (919) 513-5081 NC State University Raleigh, NC 27695

Application Data

Application Number: 9200290.23A
Date Received: 12/19/2023
Application Type: Renewal/Modification
Application Schedule: TV-Renewal

Existing Permit Data
Existing Permit Number: 02977/T25
Existing Permit Issue Date: 03/27/2019
Existing Permit Expiration Date: 02/28/2024

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2022	2.83	57.96	3.56	37.50	1.47	1.41	0.6134 [Formaldehyde]
2021	2.87	45.99	3.44	34.60	0.8600	1.49	0.5882 [Formaldehyde]
2020	2.35	45.06	3.12	36.96	0.9800	1.35	0.5140 [Hexane, n-]
2019	2.68	55.76	3.50	34.81	1.80	1.23	0.5554 [Formaldehyde]
2018	2.03	61.83	3.46	37.56	1.66	1.17	0.5578 [Hexane, n-]

Review Engineer: Eric L. Crump, P.E.

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

Comments / Recommendations:
Issue 02977/T26
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Application

North Carolina State University (hereinafter referred to as NCSU) is a university located in Raleigh, Wake County, North Carolina. The facility currently operates under Title V Permit No. 02977T25 with an expiration date of February 28, 2024. NCSU has applied for renewal of their Title V air quality permit.

The renewal application (No. 9200290.23A) was received on December 19, 2023, which is less than six months prior to the expiration date as required by General Condition 3.K of the current permit. Therefore, the existing permit was not covered by the application shield and would have expired if the renewal permit were not issued by February 28, 2024. To address this gap in permitting, NCSU will be subject to special order by consent (SOC) No. 2024-052ST, issued March 18, 2024, by the North Carolina Environmental Management Commission. Under the terms of this SOC, all terms and conditions of the existing permit shall remain in effect until the renewal permit has been issued or denied.

Through permit application No. 9200290.23A, NCSU has included the following changes to the existing permit:

- Addition of nine diesel-fired emergency generators to various buildings on campus
- Modification of an emergency generator (IES-141E) at Williams Hall
- Reduction of the heating capacity of boiler ES-54B at Building 123
- Removal of seven Greek house generators
- Removal of four emergency generators (three diesel-fired, one natural gas-fired)
- Removal of three boilers (IES-58B, ES-52, ES-24B)
- Removal of a paint spray booth (IES-156) from the CBC Facilities Operation Center

2. Facility Description

NCSU is a major public research university with undergraduate and graduate programs in numerous disciplines. With an enrolment of over 35,000 students, it is the largest university in the state. Permitted sources include boilers, emergency power generators, combustion turbines with heat recovery steam generators, and woodworking operations. These emissions sources are distributed among several different campus areas, identified as Main Campus, Centennial Campus, Centennial Biomedical Campus, and the Carter Finley Stadium Complex.

3. Application Chronology

March 27, 2019	Division of Air Quality (DAQ) issues Permit No. 02977T25 to NCSU as a Title V renewal and completion of a two-step significant modification.
December 19, 2023	DAQ receives permit renewal application No. 9200290.23A from NCSU.
February 21, 2024	DAQ requests spreadsheets with calculations of the emission estimates for the eight emergency engines being added to the permit from NCSU. NCSU emails the requested spreadsheets to DAQ.
July 3, 2024	DAQ emails NCSU requesting clarification on why criteria pollutant emission estimates for the emergency engines in the application differ from those in the DAQ spreadsheets provided in February.
July 23, 2024	DAQ emails NCSU again requesting NCSU clarify the emission factors they are using to estimate emergency generator emissions. For the criteria pollutants, the emission factors should be equivalent to those specified for MACT/NSPS compliant emergency engines. DAQ notes that processing of the renewal will be stopped until NCSU submits the requested information.
October 11, 2024	NCSU submits updated emission estimates for new emergency generators to DAQ.

November 12, 2024	Draft permit and review sent for DAQ supervisory review.
December 12, 2024	DAQ supervisor provides comments on draft permit and review.
December 23, 2024	Revised draft permit and review sent for DAQ supervisory review.
January 10, 2025	DAQ supervisor provides final comments on draft permit and review.
January 22, 2025	DAQ sends draft permit to NCSU, Stationary Source Compliance Branch (SSCB) and Raleigh Regional Office (RRO) for review and comment.
February 3, 2025	DAQ receives comments on draft permit from SSCB.
xxx	Permit renewal notice published, 30-day public notice and comment period begins, and 45-day EPA comment period begins.
xxx	30-day public notice and comment period ends.
xxx	45-day EPA comment period ends.

4. Changes to Permit and Title V Equipment Editor (TVEE) Discussion

The following table summarizes changes made to the current NCSU permit in this permit renewal.

Page No.	Section	Description of Changes
Cover and throughout	---	• Updated all dates and permit revision numbers • Updated all limits/standards summary tables to current standard format • Replaced all instances of "§" with "40 CFR" • 11 point font changed to 10 point font throughout
Insignificant Activities List	Attachment	Moved to Section 3 of permit
2	Table of Contents	Changed Section 3 from "General Conditions" to "Insignificant Activities per 15A NCAC 02Q .0503(8)" Added new Section 4, "General Conditions"
3	List of Acronyms	Relocated here (formerly last page of permit)
4-10	1	Table edited accordingly to add new sources, modify existing sources, and delete sources removed from the permit with this renewal
14	2.1 B 3.c 2.1 B.3.e	Revised to include specific requirements for fuel supplier certification Deleted specific requirements for fuel supplier certification, and added requirement to identify all instances of deviation from permit requirements
15-16	2.1 C	Deleted boiler ES-24B from list of sources and limits/standards table Added boiler ES-26B to list of sources and limits/standards table
16	2.1 C.1.g 2.1 C.1.i 2.1 C.2	Deleted boiler ES-24B and emissions limit; re-lettered subsequent paragraphs in section 2.1 C.1 accordingly Deleted boiler ES-24B from monitoring/recordkeeping/reporting requirements Deleted boiler ES-24B

Page No.	Section	Description of Changes
17	2.1 C.3	Deleted boiler ES-24B
22	2.1 E	Deleted generators ES-08E, ES-46E and ES-93E from list of sources
25	2.1 F	Deleted generator ES-140E from list of sources and limits/summary table, and throughout this section
26	2.1 F.3	Updated section to reflect the most current stipulations for 15A NCAC 02 .0524, New Source Performance Standards (Subpart IIII)
28	2.1 F.4	Updated section to reflect the most current stipulations for 15A NCAC 02 .0524, New Source Performance Standards (Subpart JJJJ)
34	2.1 G.3.b	Added "per megawatt-hour" between "NOx" and "(MWh)
36	2.1 G.3.u	Added "in Section 2.1 G.p through t" after "recordkeeping activities"
38	2.2 A	This section edited to remove sources IES-38B, IES-155E, IES-156, IES-162E, IES-36B, ES-163E, ES-93E,
39	2.2 A.1 d, f, g	Deleted source ES-08E
41	2.2 A.3	• Updated section to reflect the most current stipulations for 15A NCAC 02D .1100, Control of Toxic Air Pollutants • Deleted boiler ES-24B and generators ES-08E and ES-93E from toxic emission limits table
49	2.2 A.4	Updated section to reflect the most current stipulations for 15A NCAC 02Q .0711, Emission Rates Requiring a Permit
50	2.2 B.1.d	Deleted paragraph (requirement to monitor and record type of fuel combusted in the affected boilers each month). Subsequent paragraphs in Section 2.2 B.1 are renumbered accordingly.
51	2.2 B.1.g.iii, v	Updated paragraphs to reflect the most current stipulations for 40 CFR Part 63, Subpart JJJJJJ
52	2.2 B.1.i.iv	Inserted "Records of" at beginning of paragraph
53	2.2 B.2.f.iv	Inserted "Records of" at beginning of paragraph
55	3	• Section 3 is now "Insignificant Activities per 15A NCAC 02Q .0503(8)" • Removed footnotes for NSPS, GACT, and PSD; added these descriptors to Emission Source ID column where appropriate • Deleted sources IES-147, IES-155E, IES-31B, IES-36B, IES-38B through IES-42B, IES-58B, and IES-156 • Added sources IES-163E through IES-166E, and IES 168E through IES172E
60-68	4	Updated General Conditions to Version 6.0 dated January 7, 2022

The following changes have been made to the TVEE:

New Sources Added:

Source ID No.	Description
IES-08E-R	One diesel-fired emergency generator (500 kW), located at Building No. 058 [NSPS IIII, GACT ZZZZ]

Source ID No.	Description
IES-163E	One diesel-fired emergency generator (150 kW), located at Building No. 101C [NSPS IIII, GACT ZZZZ]
IES-164E	One diesel-fired emergency generator (175 kW), located at Building No. 164A [NSPS IIII, GACT ZZZZ]
IES-165E	One natural gas-fired emergency generator (22 kW), located at Building No. 435 [NSPS JJJJ, GACT ZZZZ]
IES-166E	One natural gas-fired emergency generator (50 kW), located at Building No. 444A [NSPS JJJJ, GACT ZZZZ]
IES-168E	One diesel-fired emergency generator (300 kW), located at Building No. 465R [NSPS IIII, GACT ZZZZ]
IES-169E	One diesel-fired emergency generator (350 kW), located at Building No. 465R [NSPS IIII, GACT ZZZZ]
IES-170E	One diesel-fired emergency generator (125 kW), located at Building No. 024 [NSPS IIII, GACT ZZZZ]
IES-171E	One diesel-fired emergency generator (60 kW), located at Building No. 054 [NSPS IIII, GACT ZZZZ]
IES-172E	One diesel-fired emergency generator (250 kW), located at Building No. 001 [NSPS IIII, GACT ZZZZ]

Existing Sources Deleted:

Source ID No.	Description
ES-24B	One natural gas-fired boiler (0.2 million Btu per hour maximum heat input capacity), located at Building No. 317A
ES-52	One natural gas/No. 2 fuel oil-fired boiler (2.94 million Btu per hour maximum heat input capacity), located at Building No. 174
ES-46E	One diesel-fired emergency generator (35 kW), located at Building No. 111
ES-93E	One natural gas-fired emergency generator (33 kW), located at Building No. 062
ES-140E	One diesel-fired emergency generator (1500 kW), located at Building No. 051 [NSPS IIII, GACT ZZZZ]
ES-08E	One diesel-fired emergency generator (500 kW), located at Building No. 058
IES-31B	One natural gas-fired boiler (0.7 million Btu per hour maximum heat input capacity), located at Building No. 141
IES-36B	One natural gas-fired boiler (0.7 million Btu per hour maximum heat input capacity), located at Building No. 145
IES-38B	One natural gas-fired boiler (0.7 million Btu per hour maximum heat input capacity), located at Building No. 147
IES-39B	One natural gas-fired boiler (0.7 million Btu per hour maximum heat input capacity), located at Building No. 148
IES-40B	One natural gas-fired boiler (0.7 million Btu per hour maximum heat input capacity), located at Building No. 151
IES-41B	One natural gas-fired boiler (0.7 million Btu per hour maximum heat input capacity), located at Building No. 152
IES-42B	One natural gas-fired boiler (0.9 million Btu per hour maximum heat input capacity), located at Building No. 155

Source ID No.	Description
IES-58B	One natural gas-fired boiler (2.6 million Btu per hour maximum heat input capacity), located at Building No. 712
IES-156	One paint spray booth, located at Building No. 317A
IES-155E	One diesel-fired emergency generator (85 kW), located at Building No. 111

Existing Sources Modified:

Source ID No.	Former TVEE Description	Revised Description
IES-141E	One diesel-fired emergency generator (40 kW), located at Building No. 070 [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (40 kW), located at Building No. 062 [NSPS IIII, GACT ZZZZ]
IES-54B	One natural gas-fired boiler (1.0 million Btu per hour maximum heat input capacity), located at Building No. 123	One natural gas-fired boiler (0.96 million Btu per hour maximum heat input capacity), located at Building No. 123
IES-64	One diesel-fired emergency generator (500 kW), located at Building No. 783A [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (500 kW), located at Building No. 783A [NSPS IIII, GACT ZZZZ, PSD]
IES-123E	One diesel-fired emergency generator (125 kW), located at Building No. 317A [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (125 kW), located at Building No. 317A [NSPS IIII, GACT ZZZZ, PSD]
IES-125E	One diesel-fired emergency generator (80 kW), located at Building No. 713A [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (80 kW), located at Building No. 713A [NSPS IIII, GACT ZZZZ, PSD]
IES-128E	One diesel-fired emergency generator (60 kW), located at Building No. 118 [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (60 kW), located at Building No. 118 [NSPS IIII, GACT ZZZZ, PSD]
IES-129E	One diesel-fired emergency generator (250 kW), located at Building No. 124A [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (250 kW), located at Building No. 124A [NSPS IIII, GACT ZZZZ, PSD]
IES-130E	One diesel-fired emergency generator (30 kW), located at Building No. 774A [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (30 kW), located at Building No. 774A [NSPS IIII, GACT ZZZZ, PSD]
IES-131E	One diesel-fired emergency generator (400 kW), located at Building No. 102 [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (400 kW), located at Building No. 102 [NSPS IIII, GACT ZZZZ, PSD]
IES-132E	One diesel-fired emergency generator (200 kW), located at Building No. 161 [NSPS IIII, GACT ZZZZ]	One diesel-fired emergency generator (200 kW), located at Building No. 161 [NSPS IIII, GACT ZZZZ, PSD]

5. Description of Changes and Estimated Emissions

The following changes are requested in this NCSU permit renewal:

Sources Added to the Permit:

- Seven diesel-fired emergency generators (IES-163E, IES-164E, and IES-167 through IES-172E)
- Two natural gas-fired emergency generators (IES-165E and IES-166E)

Estimated emissions for each of the nine new emergency generators are shown in Appendix A of this review. They are based upon 500 hours of annual operation as per EPA guidance[1], and estimated based on applicable emissions standards (such as Subpart NSPS IIII or JJJJ of 40 CFR Part 60). The generators can be classified as insignificant activities under 15A NCAC 02Q .0503(8) because the emissions from each generator would not violate any applicable emissions standard, the potential uncontrolled criteria pollutant emissions for each are no more than five tons per year, and the potential uncontrolled HAP emissions for each are below 1000 pounds per year. Since they are insignificant activities, no conditions are included in the permit for these nine emergency generators.[2]

Sources Being Removed from the Permit:

- Three diesel-fired emergency generators (ES-46E, ES-140E, and IES-155E)
- One natural gas-fired emergency generator (ES-93E)
- One natural gas/No. 2 fuel oil-fired boiler (ES-52)
- Nine natural gas-fired boilers (ES-24B, IES-31B, IES-36B, IES-38B through IES-42B, and IES-58B)
- One paint spray booth (IES-156)

Of these removed sources, all except two diesel-fired generators (ES-46E and ES-140E), one natural gas generator (ES-93E), one natural gas/No. 2 fuel-oil fired boiler (ES-52), and one natural gas-fired boiler (ES-24) were listed as insignificant activities. The following table lists the non-insignificant sources being removed from the permit and their respective emissions, which will no longer be emitted after removal from NCSU.

Pollutant ton/yr	Emission Source					Totals
	ES-46E Diesel	ES-140E Diesel	ES-93E Natural Gas	ES-52 Gas/No.2 Fuel Oil	ES-24 Natural Gas	
PM, ton/yr	0.03	0.35	0.0033	0.01	0.00	0.39
PM_{10}, ton/yr	0.03	0.35	0.00	0.01	0.00	0.39
$PM_{2.5}$, ton/yr	0.03	0.35	0.00	0.01	0.00	0.39
SO_2, ton/yr	0.00	2.03	0.00	0.01	0.00	2.04
NO_X, ton/yr	0.36	6.54	1.03	1.26	0.09	9.28
CO, ton/yr	0.08	2.77	0.11	1.06	0.07	4.09
VOC, ton/yr	0.03	0.32	0.039	0.07	0.00	0.46
Highest HAP, lb/yr	0.194 (formaldehyde)	5.46 (benzene)	0.018 (formaldehyde)	45.4 (hexane)	30.9 (hexane)	---
Total HAPs, lb/yr	0.632	12.34	0.023	47.7	32.4	93.1

Existing Sources Modified/Corrected:

- Relocation of one diesel-fired emergency generator (IES-141E)
- Correction to the capacity of one natural gas-fired boiler (IES-54B)
- Replacement of diesel-fired emergency generator (ES-08E) with emergency generator (IES-08E-R) located at Building No. 058

[1] Calculating Potential to Emit (PTE) for Emergency Generators. Memorandum from John S. Seitz, Director, U.S. EPA, OAQPS, RTP, NC, September 6, 1995.

[2] Classifying an emission source or activity as an insignificant activity does not mean it is exempted from any applicable requirement, or that the Permittee is exempted from demonstrating compliance with any applicable requirement. The Permittee is required to have documentation— including calculations, if necessary—available at the facility at all times that demonstrates that an emission source or activity is insignificant.

The decrease in the heat input rate for the boiler IES-54B from 1 million British thermal units (MMBtu) per hour (hr) to 0.96 MMBtu/hr is a correction, not a physical change; this correction is minimal and will not affect the boiler's status as an insignificant activity. Emergency generator IES-141E is simply being moved from one building (No. 070) to another (No. 062); its status as an insignificant activity remains unchanged.

As indicated in a footnote in Section 1 of the current permit, emergency generator (ES-08E) was permitted to operate until its replacement (IES-08E-R) has been placed into service. NCSU has notified DAQ via email received on January 22, 2025 that this replacement has occurred. Both generators are the same size (500 kW). The replacement generator meets the criteria for an insignificant activity due to its potential emissions.

6. Regulatory Review

NCSU is subject to the following state regulations, in addition to the requirements in the General Conditions:

15A NCAC 02D .0503, Particulates from Fuel Burning Indirect Heat Exchangers. This rule applies to particulate matter emissions from fuel combustion in indirect heat exchangers (e.g., boilers and furnaces) that are discharged from any stack or chimney into the atmosphere. The rule provides the following equation for determining the allowable emissions limit as a function of maximum heat input:

$$E = 1.090 \times Q^{-0.2594}$$

Where:

E = allowable emissions limit for particulate matter in pounds per MMBtu (lb/MMBtu); and

Q = maximum heat input in MMBtu/hr. The maximum heat input is the total heat content of all fuels and is the sum of maximum heat input of all fuel burning indirect heat exchangers at a plant site which are in operation, under construction, or permitted when determining the allowable emission limit for each fuel burning indirect heat exchanger.

The boilers listed in Section 2.1 A, B, C, and D of this permit, and the heat recovery steam generator portion of three turbines listed in Section 2.1 G of this permit are subject to this regulation. The emission limits determined for each unit in accordance with this regulation are listed in the following table.

Permit Section	Boiler/ID No.	Fuel	PM Emission Limit lb/MMBtu heat input	Boiler Heat Input, MMBtu/hr maximum capacity
2.1 A	Boiler ES-02	Natural gas/No. 2 fuel oil	0.228	141
2.1 B	Boiler ES-27	Natural gas/No. 2 fuel oil	0.295	25.1
	Boiler ES-28	Natural gas/No. 2 fuel oil	0.295	25.1
	Boiler ES-31	Natural gas/No. 2 fuel oil	0.395	16.33
	Boiler ES-32	Natural gas/No. 2 fuel oil	0.395	16.33
	Boiler ES-39	Natural gas/No. 2 fuel oil	0.519	17.5
	Boiler ES-45	Natural gas/No. 2 fuel oil	0.261	92.1
	Boiler ES-61	Natural gas/No. 2 fuel oil	0.367	16.4
2.1 C	Boiler ES-46	Natural gas/No. 2 fuel oil	0.221	3.25
	Boiler ES-47	Natural gas/No. 2 fuel oil	0.221	4.18
	Boiler ES-48	Natural gas/No. 2 fuel oil	0.221	4.15
	Boiler ES-49	Natural gas/No. 2 fuel oil	0.221	4.15
	Boiler ES-50	Natural gas/No. 2 fuel oil	0.221	4.18
	Boiler ES-51	Natural gas/No. 2 fuel oil	0.221	4.18
	Boiler ES-52	Natural gas/No. 2 fuel oil	0.221	2.94
	Boiler ES-53	Natural gas/No. 2 fuel oil	0.221	2.94
	Boiler ES-54	Natural gas/No. 2 fuel oil	0.221	3.75
	Boiler ES-55	Natural gas/No. 2 fuel oil	0.221	3.75
	Boiler ES-04B	Natural gas	0.260	2.0

Permit Section	Boiler/ID No.	Fuel	PM Emission Limit lb/MMBtu heat input	Boiler Heat Input, MMBtu/hr maximum capacity
	Boiler ES-05B	Natural gas	0.260	2.0
	Boiler ES-01B	Natural gas	0.386	3.75
	Boiler ES-02B	Natural gas	0.386	3.75
	Boiler ES-13B	Natural gas	0.386	3.0
	Boiler ES-17B	Natural gas	0.386	5.4
	Boiler ES-18B	Natural gas	0.386	5.4
	Boiler ES-06B	Natural gas	0.226	0.5
	Boiler ES-07B	Natural gas	0.226	2.4
	Boiler ES-08B	Natural gas	0.226	3.8
	Boiler ES-09B	Natural gas	0.226	1.5
	Boiler ES-11B	Natural gas	0.226	4.8
	Boiler ES-12B	Natural gas	0.226	1.4
	Boiler ES-14B	Natural gas	0.226	1.53
	Boiler ES-20B	Natural gas	0.194	4.8
	Boiler ES-21B	Natural gas	0.194	4.8
	Boiler ES-22B	Natural gas	0.194	3.7
	Boiler ES-23B	Natural gas	0.188	0.4
	Boiler ES-25B	Natural gas/No. 2 fuel oil	0.188	1.18
	Boiler ES-24B	Natural gas	0.367	0.2
	Boiler ES-26B	Natural gas	0.260	0.15
2.1 D	Boiler ES-3A	Natural gas/No. 2 fuel oil	0.194	121.4
	Boiler ES-4A	Natural gas/No. 2 fuel oil	0.194	121.4
2.1 G	Turbine w/ combustor & heat recovery steam generator (ES-1A)	Natural gas/No. 2 fuel oil	0.194	Simple cycle mode: 66.3 each Combined heat & power mode: 66.3 for turbine, 27 for generator
	Turbine w/ combustor & heat recovery steam generator (ES-1B)	Natural gas/No. 2 fuel oil	0.194	Simple cycle mode: 66.3 each Combined heat & power mode: 66.3 for turbine, 27 for generator
	Turbine w/ heat recovery steam generator w/ natural gas fired duct burner (ES-5A)	Natural gas/No. 2 fuel oil	0.254	60 for turbine, 33 for generator

*Ton/yr = lb/hr *(1 ton/2000 lb) * (8760 hr/yr) → 1 lb/hr = 4.38 ton/yr

To calculate PM emissions from the combustion of natural gas and No. 2 fuel oil in these sources, emission factors published in the U.S. EPA's AP-42, Fifth Edition, Volume I, Chapter 1, External Combustion Sources can be used.

PM emissions from boilers firing No. 2 fuel oil

- Filterable PM: 2 lb/10^3 gal (Table 1.3-1: Criteria Pollutant Emission Factors for Fuel Oil Combustion)
- Condensable PM: 1.3 lb/10^3 gal (Table 1.3-2: Condensable Particulate Matter Emission Factors for Oil Combustion)

Total PM = Filterable + Condensable = 3.3 lb/10^3 gal ÷ 140 MMBtu/10^3 gal = 2.36E-02 lb/MMBtu
To convert to lb/MMBtu of No. 2 oil, divide by 140 MMBtu/10^3 gal
PM emissions = 3.3 lb/10^3 gal ÷ 140 MMBtu/10^3 gal = **2.36E-02 lb/MMBtu**

PM emissions from boilers firing natural gas

- Total PM: 7.6 lb/10^6 scf (Table 1.4-2: Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

To convert from lb/10^6 scf to lb/MMBtu, divide by 1,020.
PM emissions = 7.6 lb/10^6 scf ÷ 1,020 MMBtu/10^6 scf = **7.45E-03 lb/MMBtu**

Therefore, whether firing No. 2 fuel oil or natural gas, PM emissions from the sources listed above are well below the PM limits established under 15A NCAC 02D. 0503. Since these sources fire relatively clean fuels and are unlikely to exceed PM limits, no monitoring, recordkeeping, or reporting are required for particulate matter emissions from these sources. This permit renewal does not affect this status. Continued compliance is expected.

15A NCAC 02D .0512, Particulates from Miscellaneous Wood Products Finishing Plants. This rule states: "The Permittee shall not cause, allow, or permit particulate matter caused by the working, sanding, or finishing of wood to be discharged from any stack, vent, or building into the atmosphere without providing, as a minimum for its collection, adequate ductwork and properly designed collectors. In no case shall the ambient air quality standards be exceeded beyond the property line."

The two wood shops at NCSU (Daniels Hall Wood Shop (ES-137) at Building No. 038, and Leazar Hall Wood Shop (ES-138) at Building No. 018) are subject to this regulation. Particulate emissions from each wood shop are controlled by their associated bagfilters (CD-137 and CD-138, respectively). Because particulate emissions from the wood shops are considerably less than shops used in commercial production and are adequately controlled, DAQ has determined that no monitoring, recordkeeping, or reporting is required for particulate matter emissions from these sources. This permit renewal does not affect this status. Continued compliance is expected.

15A NCAC 02D .0516, Sulfur Dioxide Emissions from Combustion Sources. Under this rule, emissions of sulfur dioxide (SO_2) from any source of combustion discharged from any vent, stack, or chimney shall not exceed 2.3 pounds of SO_2 per million British thermal units (MMBtu) of heat input.

The boilers and emergency generators listed in Sections 2.1 A, C, E, and F of the permit (see Appendix B of this review for a complete listing) are subject to this rule. These boilers and generators either fire only natural gas, or both natural gas and No.2 fuel oil – fuels with a very low sulfur content, which emit relatively little sulfur when fired.

The following emission factors from the U.S. EPA's AP-42, Fifth Edition, Volume I, Chapter 1, External Combustion Sources and Chapter 3, Stationary Internal Combustion Sources, were used to estimate SO_2 emissions for these sources.

SO_2 from boiler firing natural gas: 0.6 lb/10^6 scf (Table 1.4-2)
0.6 lb/10^6 scf ÷ 1,020 MMBtu/10^6 scf = **0.001 lb/MMBtu**

SO_2 from boiler firing No. 2 fuel oil: 142S lb/10^3 gal, where S = weight % of sulfur in fuel (Table 1.3-1)
For No. 2 fuel oil, S = 0.5%, so SO_2 emission factor = 142 × 0.5 = 71 lb/10^3 gal
71 lb/10^3 gal ÷ 140 MMBtu/10^3 gal = **0.51 lb/MMBtu**

SO_2 from generator firing natural gas: **5.88 E-04 lb/MMBtu** (Table 3.2-2)

SO_2 from generator firing No. 2 fuel oil: 1.01S_1 lb/MMBtu, where S_1 = weight % of sulfur in fuel (Table 3.4-1)
For No. 2 fuel oil, S = 0.5%, so SO_2 emission factor = 1.01 × 0.5 = **0.51 lb/MMBtu**

As shown above, emissions from these sources, regardless of fuel, will be well below the SO_2 emissions limit of 2.3 lb/MMBtu in the rule. For this reason, no monitoring, recordkeeping, or reporting is required for SO_2 emissions from these sources. This permit renewal does not affect this status. Continued compliance is expected.

15A NCAC 02D .0521, Control of Visible Emissions. This rule establishes opacity limits for visible emissions generated by fuel burning operations and industrial processes where visible emissions are expected to occur (except during startups, shutdowns, and malfunctions approved according to procedures in 15A NCAC 02D .0535, Excess Emissions Reporting and Malfunctions). The rule establishes opacity limits for visible emissions from sources based on the date the sources were manufactured. The following table lists the sources at NCSU that are subject to this rule and their respective opacity limits.

Date of Manufacture	Sources	Opacity Limit	Additional limitations
As of July 1, 1971	Boiler ES-02 (listed in Section 2.1 A of the permit)	40 percent opacity averaged over a six-minute period	Six-minute averaging periods may exceed 40 percent not more than: • once in any hour, and • four times in any 24-hour period. In no event shall the six-minute average exceed 90 percent opacity.
After July 1, 1971	All other boilers, generators, the three turbines, and two wood shops (listed in Sections 2.1 B through G of the permit	20 percent opacity averaged over a six-minute period	Six-minute averaging periods may exceed 20 percent not more than: • once in any hour, and • four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity.

No monitoring, recordkeeping, or reporting is required for these sources because the visibility limit is unlikely to be exceeded from the emissions from these sources. Natural gas and No.2 diesel fuel tend to generate low amounts of visible emissions when used to fire boilers, generators, and turbines. The two wood shops (Daniels Hall Wood Shop (ES-137) at Building No. 038, and Leazar Hall Wood Shop (ES-138) at Building No. 018) are controlled with baghouses, which provide good control of visible emissions from sawdust. This permit renewal does not affect this status. Continued compliance is expected.

15A NCAC 02D .0524, New Source Performance Standards. See Section 8 of this review.

15A NCAC 02D .0530, Prevention of Significant Deterioration. See Section 8 of this review.

15A NCAC 02D .1100, Control of Toxic Air Pollutants. See Section 12 of this review.

15A NCAC 02D .1111, Maximum Achievable Control Technology (MACT). See Section 7 of this review.

15A NCAC 02Q .0317, Avoidance Conditions. Avoidance conditions for MACT are discussed in Section 7 of this review. Avoidance conditions for PSD are discussed in Section 8 of this review.

15A NCAC 02Q .0711, Emission Rates Requiring a Permit. See Section 12 of this review.

Note: The permit has been updated to reflect the most current stipulations for all applicable regulations.

7. National Emission Standards for Hazardous Air Pollutants (NESHAPS): Maximum and/or Generally Achievable Control Technology (MACT/GACT)

NCSU is an area source as defined in 40 CFR Part 63.2 with regard to hazardous air pollutants (HAPs) because it has been determined that the facility does not have the potential to emit 10 tons per year or more of any single HAP or 25 tons per year or more of any combination of HAPs. The facility is subject to the following MACT/GACT standards:

40 CFR Part 63, Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE). Owners/operators of stationary RICE at a major or area source of HAP emissions are subject to this regulation, except for those being tested at a stationary RICE test cell/stand, or those that meet the definition of an emergency stationary RICE in 40 CFR 63.6675. The following compression ignition (i.e., diesel-fired) engine emergency generators are subject to Subpart ZZZZ:

- ES-57, located at Building No. 300C
- ES-60, located at Building No. 782C
- ES-62, located at Building No. 782A
- ES-63, located at Building No. 086
- ES-37E, located at Building No. 060
- ES-50E, located at Building No. 096
- ES-91E, located at Building No. 067
- ES-98E, located at Building No. 762A
- ES-107E, located at Building No. 032A
- ES-115E, located at Building No. 050
- ES-116E, located at Building No. 039
- ES-117E, located at Building No. 067
- ES-140E, located at Building No. 051
- ES-163E, located at Building No. Plant Sciences

Seven of the nine new emergency generators (ES-166E through ES-172) added with this permit renewal will also be subject to Subpart ZZZZ. All of these except for ES-165 and ES-166 (natural gas-fired) are diesel-fired generators. Emergency diesel-fired generators ES-46E and ES-140E, as well as natural gas-fired generator ES-93E are being removed from the permit with this renewal.

NCSU meets the requirements of Subpart ZZZZ for these diesel generators by meeting all applicable requirements in 40 CFR 60 Subpart IIII (see Section 8 of this permit review).

Existing spark ignition engine (natural gas-fired) emergency generator ES-118E located at Building No. 105, along with new generator ES-166 are also subject to this rule. The requirements of Subpart ZZZZ for these generators are met by meeting all applicable requirements in 40 CFR 60 Subpart JJJJ (see Section 8 of this permit review).

Since the last renewal of the NCSU permit, amendments were made to Subpart ZZZZ (87 FR 48607, August 10, 2022). These amendments do not change the requirement that these generators meet the requirements of Subpart ZZZZ by meeting all applicable requirements in 40 CFR 60 Subpart JJJJ. Beyond the addition and removal of the aforementioned emergency generators, this permit renewal does not affect the status of the facility with regard to Subpart ZZZZ. Continued compliance is expected.

40 CFR 63, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers. The following natural gas/No.2 fuel oil-fired boilers at NCSU are subject to Subpart JJJJJJ:

- Boilers ES-3A and ES-4A, each 121.4 MMBtu/hr, each equipped with dual-fuel low-NOx burners, located at Building No. 029
- Boiler ES-45, 92.1 MMBtu/hr, including low-NO_x burner equipment, located at Building No. 705A

- Boiler ES-02, 141 MMBtu/hr, located at Building 029
- Boilers ES-27 and ES-28, 25.1 MMBtu/hr, located at Building No. 705A
- Boilers ES-31 and ES-32, 16.33 MMBtu/hr each; ES-39, 17.5 MMBtu/hr; and ES-61, 16.4 MMBtu/hr – located at Building No. 302

Because boilers ES-3A and ES-4A met the definition of new oil-fired boilers with heat input capacity of 10 MMBtu/hr or greater that did not meet the definition of seasonal boiler or limited-use boiler when added to the facility (Air Permit 02977T20, issued September 8, 2009), the emissions limit for filterable PM emissions for these two boilers was established at 0.03 lb per MMBtu of heat input (per Table 1 of Subpart JJJJJJ) in Section 2.1 B.1 of the permit. The other boilers listed above do not fit any of the categories in Table 1 of Subpart JJJJJJ; accordingly, these boilers have no emission limits. All of the boilers listed above are required to be operated and maintained in a manner consistent with safety and good air pollution control practices for minimizing emissions (40 CFR 63.11205), and to conduct biennial tune-ups (40 CFR 63.11223).[3]

For each of the boilers listed above, Subpart JJJJJJ requires NCSU to maintain the following records for five years after the date of the recorded action; the first two of those five years the records must be on-site or otherwise readily accessible:

- Copies of all required notifications.
- Records documenting conformance with the work practices, emission reduction measures, and management practices:
- Tune-up records identifying each boiler, the date of tune-up, the procedures followed for the tune-up, and the manufacturer's specifications to which the boiler was tuned.
- A copy the energy assessment required by 40 CFR 63.11214(c).
- Records of monthly fuel use by each boiler including the type(s) of fuel and amount(s) used.
- Records documenting the occurrence and duration of each malfunction of the boiler, associated air pollution control equipment, or associated emissions monitoring equipment
- Records of the actions taken to minimize emissions, as required by 40 CFR 63.11205(a), during malfunctions and to restore the malfunctioning boiler, air pollution control, or monitoring equipment to its normal or usual manner of operation.
- Records of all inspection and monitoring data required by 40 CFR 63.11221 and 63.11222, and the information identified in 40 CFR 63.11223(c)(6).

For each of the boilers listed above, Subpart JJJJJJ requires that NCSU submit a compliance certification report for the previous year by March 1 annually.

There have been no amendments to Subpart JJJJJJ since this permit was last renewed. As discussed in Section 5 of this review, ten boilers—ES-24B, ES-52, IES-31B, IES-36B, IES-38B through IES-42B, and IES-58B—are being removed from the permit with this renewal. Other than these removals, this permit renewal does not affect the status of the facility with regard to Subpart JJJJJJ. Continued compliance is expected.

8. New Source Performance Standards (NSPS)

NCSU is subject to the following NSPS:

40 CFR Part 60, Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. This NSPS applies to each steam generating unit that commenced construction, modification, or reconstruction after June 19, 1984, with a heat input capacity from fuels combusted in the steam generating unit of greater than 29 megawatts (MW) (100 MMBtu/hr). Boilers ES-3A and ES-4A—which are both natural gas/No. 2 fuel oil-fired, 121.4 MMBtu/hr boilers—are subject to this NSPS. The following emission limitations apply to both of these boilers:

[3] Boilers ES-3A and ES-4A would be allowed under Subpart JJJJ to conduct tune-ups every 5 years if they were equipped with an oxygen trim system that maintains an optimum air-to-fuel ratio (40 CFR 63.11223). Currently they do not have oxygen trim systems.

- SO_2: shall not exceed 0.32 lb/MMBtu heat input on a 30-day rolling average basis – including periods of startup, shutdown, or malfunction
- Visible emissions: shall not exceed 20 percent opacity when averaged over a 6-minute period, except for one 6-minute period per hour of not more than 27 percent opacity. The limit applies at all times, excluding periods of startup, shutdown, or malfunction
- NO_X: not to exceed 0.20 lb/MMBtu heat input on a 30-day rolling average basis. The emission limit applies at all times, including periods of startup, shutdown, or malfunction.

Upon request, NCSU shall conduct testing to demonstrate compliance with the opacity and NO_X limits, and the exemption from the PM limit. They are required to calibrate, maintain, and operate a continuous opacity monitoring system and a continuous emissions monitoring system to measure NO_X and O_2 (or CO_2). NCSU must keep records of the amounts of each fuel type combusted each day in the boilers and calculate annual capacity factors for each fuel for each reporting period. Records for opacity, along with fuel receipts demonstrating the type of fuel used must be maintained. Semiannual reporting is required.

This permit renewal does not affect the status of the facility with regard to Subpart Db. Continued compliance is expected.

40 CFR Part 60, Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. This NSPS applies to any steam generating unit that commenced construction, modification, or reconstruction after June 9, 1989, and that has a maximum design heat input capacity of 29 MW (100 MMBtu/hr) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). The following natural gas/No. 2 fuel oil-fired boilers at NCSU are subject to Subpart Dc:

- ES-28 – 25.1 MMBtu/hr
- ES-31 and ES-32 – 16.33 MMBtu/hr each
- ES-39 – 17.5 MMBtu/hr
- ES-45 – 92.1 MMBtu/hr
- ES-61 – 16.4 MMBtu/hr

Under this subpart, the maximum sulfur content of any fuel oil received and burned in these boilers shall not exceed 0.5 percent by weight. The emissions are to be monitored by review of fuel supplier certification records. In addition, NCSU must maintain records of the amounts of each fuel fired monthly. Semiannual reporting is required.

This permit renewal does not affect the status of the facility with regard to Subpart Dc. Continued compliance is expected.

40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Any of the following stationary compression ignition (CI) internal combustion engines (ICE) owned and operated by NCSU that meet the following are subject to this regulation:

- Commenced construction after July 11, 2005, where the stationary CI ICE are:
  - Manufactured after April 1, 2006, and are not fire pump engines, or
  - Manufactured as a certified National Fire Protection Association fire pump engine after July 1, 2006.
- Modified or reconstructed after July 11, 2005 (including any person that modifies or reconstructs any stationary CI ICE after July 11, 2005).

The following diesel-fired emergency generators are subject to Subpart IIII.

- ES-57, 1000 kW, located at Building No. 300C
- ES-60, 550 kW, located at Building No. 782C
- ES-62, 1000 kW, located at Building No. 782A
- ES-63, 750 kW, located at Building No. 086

- ES-37E, 33 kW,located at Building No. 060
- ES-50E, 60 kW, located at Building No. 096
- ES-91E, 230 kW, located at Building No. 067
- ES-98E, 150 kW, located at Building No. 762A
- ES-107E, 230 kW, located at Building No. 032A
- ES-115E, 500 kW, located at Building No. 050
- ES-116E, 400 kW, located at Building No. 039
- ES-117E, 400 kW, located at Building No. 067
- ES-140E, 1500 kW, located at Building No. 051
- ES-163E, up to 1250kW, located at Building No. 763 (Plant Sciences)

The following diesel-fired emergency generators added to the permit with this renewal will also be subject to Subpart IIII:

- IES-163E, 150 kW, located at Building No. 101C
- IES-164E, 175 kW, located at Building No. 164A
- IES-168E, 300 kW, located at Building No. 465R
- IES-169E, 350 kW, located at Building No. 465R
- IES-170E, 125 kW, located at Building No. 024
- IES-171E, 60 kW, located at Building No. 054
- IES-172E, 250 kW, located at Building No. 001

The conditions in the permit for these generators are being updated to match the most current version of Subpart IIII, as summarized below:

- NCSU must comply with the emission standards in 40 CFR 60.4202 for all pollutants, for the same model year and maximum engine power for each of these engines.
- Diesel fuel must meet the requirements of 40 CFR 1090.305 (including maximum sulfur content of 15 ppm and minimum cetane index of 40 or a maximum aromatic content of 35 volume percent.
- Each engine shall have a non-resettable hour meter prior to startup; and if equipped with a diesel particulate filter, must be installed with a backpressure monitor that provides notification when the high backpressure limit of the engine is approached.
- Each engine shall be operated and maintained according to the manufacturer's emission-related instructions, while changing only emission-related settings permitted by the manufacturer.
- As emergency engines, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, under specified guidelines, is prohibited.
- The required inspection and maintenance records will be maintained in a logbook, along with documentation from the manufacturer that each engine is certified to meet the emission standards.
- Biannual reporting of monitoring and recordkeeping activities is required.

As insignificant sources, generators IES-163E and IES-164E will not be subject to permit conditions.

Since the last renewal of the NCSU permit, amendments were made to Subpart IIII (86 FR 34358, June 29, 2021). For the NCSU facility, the most significant of these amendments was the addition of an electronic reporting requirement for any emergency stationary CI ICE with a maximum engine power exceeding 100 horsepower that operates for up to 50 hours per calendar year in non-emergency situations. NCSU must submit an annual report according to the requirements at 40 CFR 60.4214(d) for such engines. The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*https://cdx.epa.gov/cdx*). The permit language has been updated to include this change and other minor changes called for by the most recent amendments to Subpart IIII. Other than these updates, this permit renewal does not affect the status of the facility with regard to Subpart IIII. Continued compliance is expected.

40 CFR Part 60 Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. This rule applies to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in 40 CFR 60.4230, paragraphs (a)(1) through (6). Emergency generator ES-118E (natural gas-fired, 40 kW, located at Building No. 105) is subject to this rule. In addition, the following natural gas-fired emergency generators added to the permit with this permit renewal will be subject to this rule:

- IES-165E, 22 kW located at Building No. 435
- IES-166E, 50 kW, located at Building No. 444A

As an insignificant source, generator IES-165E will not be subject to permit conditions. The other two SI ICE will be subject to the following conditions under Subpart JJJJ:

The following emission standards and requirements apply:

Excerpt from Table 1 to 40 CFR Part 60 Subpart JJJJ

Engine type	Maximum engine power	Manufacture date (after)	Emission standards*					
			g/hp-hr			ppmvd @ 15% O_2		
			NO_X	CO	VOC‡	NO_X	CO	VOC‡
Emergency	25< HP<500	1/01/2009	10†	387	N/A	N/A	N/A	N/A

*Owners and operators of stationary non-certified SI engines may choose to comply with the emission standards in units of either grams per horsepower-hour (g/HP-hr) or parts per million volume, dry (ppmvd) at 15 percent O_2.

†The emission standards applicable to emergency engines between 25 HP and 130 HP are in terms of NO_X + HC.

‡For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.

[40 CFR 60.4233(d), 40 CFR 60 Table 1 to Subpart JJJJ]

- The engine must:
  - have a non-resettable hour meter prior to startup and comply with the emission standards in 40 CFR 60.4231(a) through (c), as applicable, for the same engine class and maximum engine power.
  - be operated and maintained according to the manufacturer's emission-related written instructions.
  - meet the requirements in 40 CFR Part 1068, Subparts A through D, as they apply to the engine. If engine settings are adjusted according to and consistent with the manufacturer's instructions, the engine will not be considered out of compliance.
- NCSU must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required for the owner/operator.
- To be considered an emergency stationary ICE, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in nonemergency situations for 50 hours per year, as described in 40 CFR 60.4243(d)(1) through (3) is prohibited.
- Emergency stationary ICE may be operated for a maximum of 100 hours/year for maintenance checks and readiness testing, provided the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. NCSU may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if NCSU maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours/year.
- NCSU may operate the stationary SI natural gas fired engine using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations but shall keep records of such use.
- NCSU must keep records of all notifications required by Subpart JJJJ, maintenance conducted on the engine, documentation that the engine is certified to meet emission standards.
- Semiannual reporting is required.

Since the NCSU permit was last renewed, Subpart JJJJ has been amended (86 FR 34362, June 29, 2021; and 87 FR 48606, August 10, 2022). The only change to the permit requirements for emergency generator ES-118E as a result of the rule amendments was that the 50 hours of operation per year allowed for non-emergency situations can no longer be used for emergency demand response. Otherwise, along with the two generators described above as

insignificant activities being added to the permit with this renewal, this permit renewal does not affect the status of the facility with regard to Subpart JJJJ. Continued compliance is expected.

40 CFR Part 60 Subpart KKKK, Standards of Performance for Stationary Combustion Turbines. This regulation applies to the owner or operator of a stationary combustion turbine with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 MMBtu/hr), based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005[4]. The following combustion turbines at NCSU are subject to this regulation.

- Nos. ES-1A and ES-1B: Two natural gas/No. 2 fuel oil-fired internal combustion turbines equipped with dual-fuel dry low-NO_x combustors and two heat recovery steam generators (HRSGs) equipped with dual-fuel low-NOx duct burners, located at Building No. 086. These turbines were added to the permit on 9/08/2009 (Permit No. 02977T20). Their nominal output of each turbine is 5.5 megawatts (MW).
  - Simple-cycle mode of operation: 66.3 MMBtu/hr nominal heat input rate each when firing natural gas or No. 2 fuel oil
  - Combined heat and power mode of operation:
    - When firing natural gas: 66.3 million Btu per hour nominal heat input rate each for gas turbine and 27 MMBtu/hr nominal heat input rate each for heat recovery steam generator
    - When firing No. 2 fuel oil: 63.3 MMBtu/hr nominal heat input rate each for gas turbine and 27 MMBtu/hr nominal heat input rate each for heat recovery steam generator
- No. ES-5A: One natural gas/No. 2 fuel oil-fired internal combustion turbine (60 MMBtu/hr maximum heat input) with HRSG, equipped with natural gas-fired low-NOx duct burners (33 MMBtu/hr maximum heat input rate), located at Building No. 705A. This turbine was added to the permit on 11/17/2016 (Permit No. 02977/T24). The nominal output of this turbine is 5.5 MW.

The following emission limits apply to the turbines under Subpart KKKK:

Turbine No.	Pollutant	Operational Mode	Emission Limit for Each Combustion Turbine
ES-1A, ES-1B, and ES-5A	NO_X	75% or more of peak load Temperature at 0°F or higher Firing natural gas in the combustion turbine alone OR in both turbine and HRSG duct burners	25 ppm of NO_X at 15 percent O_2 or 1.2 lb NO_X/megawatt-hour (MWh)
ES-1A, ES-1B, and ES-5A	NO_X	75% or more of peak load Temperature at 0°F or higher Firing No. 2 fuel oil in the combustion turbine alone	74 ppm of NO_X at 15 percent O_2 or 3.6 lb NO_X /MWh
ES-1A and ES-1B	NO_X	75% or more of peak load Temperature at 0°F or higher Firing No. 2 fuel oil in the both the combustion turbine and HRSG duct burners	74 ppm of NO_X at 15 percent O_2 or 3.6 lb NO_X /MWh
ES-1A, ES-1B, and ES-5A	NO_X	Below 75% of peak load or below 0°F Firing natural gas OR No. 2 fuel oil	150 ppm of NO_X at 15 percent O_2 or 8.7 lb NO_X /MWh
ES-1A and ES-1B	NO_X	HRSG operating independent of its respective combustion turbine *(except during startup, shutdowns, and malfunctions)*	54 ppm at 15 percent O_2 or 0.86 lb NO_X/MWh

[4] Per 40 CFR 60.4305, only heat input to the combustion turbine should be included when determining whether or not this subpart applies to a turbine. Any additional heat input to associated heat recovery steam generators (HRSG) or duct burners should not be included when determining the peak heat input. However, this subpart does apply to emissions from any associated HRSG and duct burners.

Turbine No.	Pollutant	Operational Mode	Emission Limit for Each Combustion Turbine
ES-1A, ES-1B, and ES-5A	NO_X	75% or more of peak load Temperature of 0°F or higher Co-firing natural gas and No. 2 fuel oil – with *natural gas providing at least 50 percent of the total heat input*	25 ppm of NO_X at 15 percent O_2 or 1.2 lb NO_X/MWh
ES-1A, ES-1B, and ES-5A	NO_X	75% or more of peak load Temperature of 0°F or higher Co-firing natural gas and No. 2 fuel oil – with *No. 2 fuel oil providing at least 50 percent of the total heat input*	74 ppm of NOx at 15 percent O_2 or 3.6 lb NOx/MWh
ES-1A, ES-1B, and ES-5A	SO_2	At all times *(except during startup, shutdowns, and malfunctions)*	0.9 lb/MWh gross output each—or alternatively, no fuel shall be burned in the combustion turbines and associated HRSG duct burners that contains total potential sulfur emissions in excess of 0.06 lb/MMBtu each

NCSU is required to perform testing to determine NO_X emissions from (1) all three turbines in the combined cycle mode annually, and (2) on turbines ES-1A and ES-1B in simple cycle mode annually. In both cases, the testing frequency can be reduced to once every two years if NO_X emissions from an approved performance test are less than or equal to 75% of the applicable NOx emission limit. NCSU has elected to demonstrate compliance with the SO_2 emissions limit using fuel sulfur content determinations in lieu of annual performance testing. They must maintain records of the quality characteristics of each fuel fired in the combustion turbines and associated HRSG duct burners. The records must show that the sulfur content of the No. 2 fuel oil is 0.05 weight percent (500 parts per million by weight) or less, and that the sulfur content of the natural gas used is 20 grains of sulfur per 100 standard cubic feet or less. Semiannual reporting is required.

Subpart KKKK has been amended since the NCSU permit was last renewed (85 FR 63410, October 7, 2020). None of the rule amendments warrant a change to the permit language with regard to Subpart KKKK. Continued compliance is expected.

9. New Source Review (NSR)/Prevention of Significant Deterioration (PSD)

Wake County, where NCSU is located, is in attainment of the NAAQS for all criteria pollutants. Hence, the PSD program applies in this county to all major sources and major modifications.

NCSU is classified as a major source for PSD because the facility has the potential to emit (PTE) 250 tons/year or more of a regulated pollutant. As a university (SIC: 8221/NAICS: 61131) it is not one of the source categories listed in 40 CFR 51.166(b)(1) which are major for PSD if their potential to emit any regulated pollutant is 100 tons/year or more.

As described in detail in the permit review for Air Permit No. 02977T25 (R. Simpson, March 27, 2019), NCSU has accepted avoidance limitations for some sources to avoid the applicability of 15A NCAC 02D .0530: Prevention of Significant Deterioration with regard to NO_X and SO_2. NCSU must demonstrate that annual NO_X emissions are less than 242 tons, and that annual SO_2 emissions are less than 247 tons.

Because NCSU has a large number of emergency generators spread out over four campus areas and athletic complexes, the time required to collect data for each emission source would be extensive. In addition, NCSU has historically had facility-wide NO_X and SO_2 emissions well below permitted limits. For these reasons, as discussed in the permit review for Air Permit No. 02977T25, NCSU proposed—and DAQ concurred—that compliance with the avoidance condition can be demonstrated by tracking NOx and SO_2 emissions from a subset of the affected sources.

As long as the 12-month rolling average emissions from the subset are less than their potential by at least the amount that potential emissions from all affected facility wide sources are more than the limit, compliance is assured.

- For the NO_X PSD avoidance limit, NCSU must track fuel use for its five largest affected boilers (at that time, these included boilers ES-12, ES-13, ES-31, ES-32 and ES-39) and run hours for its ten largest affected emergency generators (ES-11, ES-17, ES-21, ES-33, ES-36, ES-38, ES-56, ES-58, ES-59, ES-60) and emergency generator ES-08E). On the basis of fuel usage, NCSU must perform monthly calculations to show NO_X emissions from these sources do not exceed 53 tons per consecutive twelve-month period. Meeting this limit ensures that NO_X emissions from facility-wide affected sources will be less than 242 tons per year.
- For the SO_2 PSD avoidance limit, NCSU must track fuel use for its five largest affected boilers (at that time, these included boilers ES-12, ES-13, ES-31, ES-32 and ES-39) and use this information to perform monthly calculations to show SO_2 emissions from these sources do not exceed 154 tons per consecutive twelve-month period – which ensures SO_2 emissions from facility wide affected sources are less than 247 tons per year.

Note: when Air Permit no. 02977T25 was issued, boilers ES-12 and ES-13 were removed from the permit; as a result, NCSU is only required to track fuel usage for boilers ES-31, ES-32 and ES-39 and perform monthly calculations to demonstrate compliance with the NO_X and SO_2 PSD avoidance limits.

As explained in the response to public comments in the permit review for Air Permit No. 02977/T22 (R. Thaker, July 1, 2014), PSD avoidance limits were established on a facility wide basis for the sources existing at the time Air Permit 02977T16 was issued (R. Thaker, November 30, 2005. Since that permit revision, emissions of any modification deemed "minor" for PSD need not be restricted under these existing PSD limits. Emissions from any modification deemed "major" for PSD cannot be part of the existing PSD avoidance limits. For example, the modification involving sources ES-2, ES-3A, and ES-4A was deemed a "major modification", as per air permits 02977T20 (issuance date 9/8/2009) and 02977T21 (issuance date 11/7/2011). Hence, their emissions are not restricted through the existing NSR avoidance limitations.

The NCSU permit includes primary and alterative compliance monitoring scenarios for the NO_X avoidance conditions, summarized in the following tables. The alternative scenario only applies when compliance with the NO_X emissions limit is not demonstrated using the primary scenario.

Primary Compliance Monitoring Scenario	
Emission Sources	**Compliance Monitoring Requirements**
Emergency generators **ES-11, ES-17, ES-21, ES-33, ES-36, ES-38, ES-56, ES-58, ES-59, ES-60 and ES-08E**	Record each month the monthly and total annual hours of operation. Operation of any of these generators shall not exceed 500 hours per consecutive 12-month period.
Natural gas/No. 2 fuel oil-fired boilers **ES-31, ES-32, and ES-39**	Keep monthly records in a logbook (written or electronic format) of the amount of each fuel fired
All generators and boilers listed above	Calculate and record each month in a logbook (written or electronic format) the monthly and total annual emissions of nitrogen oxides (as NO_2) from these sources using the specified equation below. The combined emissions shall not exceed 53 tons per consecutive 12-month period.

For the primary scenario, NOx emissions shall be calculated with the following equation:

$$NO_x \text{ tons/month} = [\sum\{20 \text{ lbs}/10^3\text{gallon} \times F \text{ gal/mth}\} + \sum\{100 \text{ lbs}/10^6 \text{ scf} \times G \text{ scf/mth} + \sum\{0.024 \text{ lbs/hp-hr} \times H \text{ hp-hr/month}\}] / 2000 \text{ lbs/ton}$$

Where: F = No. 2 fuel oil usage in gallons per month for each boiler (**ID Nos. ES-31, ES-32, and ES-39**), if it burned this fuel in a given month

G = Natural gas usage in standard cubic feet per month for each boiler (**ID Nos. ES-31, ES-32, and ES-39**), if it burned this fuel in a given month

H = Combined power output in hp-hr per month for each diesel fired emergency generator (**ID Nos. ES-11, ES-17, ES-21, ES-33, ES-36, ES-38, ES-56, ES-58, ES-59, ES-60 and ES-08E)**, if it burned this fuel in a given month

Alternative Compliance Monitoring Scenario	
Emission Sources	**Compliance Monitoring Requirements**
Affected emergency generators **ES-11, ES-17, ES-21, ES-25, ES-33, ES-36, ES-38, ES-56, ES-58 through ES-60, ES-05E to ES-10E, ES-15E, ES-16E, ES-19E, ES-22E through ES-24E, ES-26E, ES-30E, ES-36E, ES-37E, ES-40E, ES-42E, ES-45E, ES-47E through ES-50E, ES-53E, ES-55E, ES-57E, ES-58E, ES-61E through ES-69E, ES-71E, ES-73E through ES-76E, ES-79E, ES-80E, ES-82E through ES-88E, ES-91E, ES-94E through ES-95E, ES-97E through ES-100E, ES-102E through ES-104E, ES-106E to ES-111E, ES-114E to ES-118E, and ES-120E**	Record each month the monthly and total annual hours of operation. Operation of any of these generators shall not exceed 500 hours per consecutive 12-month period.
Affected boilers **ES-31, ES-32, ES-39, ES-46 through E-55, ES-01B, ES-02B, ES-04B through ES-14B, ES-17B, ES-18B and ES-20B to ES-22B**	Keep monthly records in a logbook (written or electronic format) of the amount of each fuel fired
Facility-wide, except for **ES-1A, ES-1B, ES-2, ES-3A, ES-4A, ES-5A, ES-27, ES-28, ES-45, ES-48, ES-49, ES-57, ES-61 through ES-63, IES-64, ES-137, ES-138, ES-23B through ES-26B, IES-27B through IES-30B, IES-32B through IES-35B, IES-43B through IES-62B, IES-161, IES-08E-R, IES-52E-R, IES-65E-R, IES-123E through IES-125E, IES-128E through IES-132E, IES-135E, IES-136E, IES-139E, ES-140E, IES-141E, IES-143E through IES-146E, IES-154E, IES-157, IES-158E through IES-160E, IES-162E, and ES-163E), , ES-158E through ES-160E, ES-162E, and ES-163E**	The use of fuel shall be limited such that facility-wide nitrogen oxides (as NO_2) emissions are less than 242 tons for each consecutive 12-month period. Calculate and record each month in a logbook (written or electronic format) the monthly and total annual emissions of nitrogen oxides (as NO_2) from these sources using the specified equation in Section 2.2 A.1.j.

For the alternative scenario, NOx emissions shall be calculated with the following equation:

$$NO_x \text{ tons/month} = [\sum\{20 \text{ lbs}/10^3 \text{ gallon} \times A \text{ gallon/month}\} + \sum\{100 \text{ lbs}/10^6 \text{ scf} \times C_1 \text{ scf/month}\} + \sum\{280 \text{ lbs}/10^6 \text{ scf} \times C_2 \text{ scf/month}\} + \sum\{0.031 \text{ lbs/hp-hr} \times D_1 \text{ hp-hr/month}\} + \sum\{0.024 \text{ lbs/hp-hr} \times D_2 \text{ hp-hr/month}\} + \sum\{0.018 \text{ lbs/hp-hr} \times E \text{ hp-hr/month}\}] / 2000 \text{ lbs/ton}$$

Where: A = No. 2 fuel oil usage in gallons per month for each No. 2 fuel oil-fired boiler (<100 million Btu per hour), if it burned this fuel in a given month

C_1 = Natural gas usage in standard cubic feet per month for each natural gas-fired boiler (<100 million Btu per hour), if it burned this fuel in a given month

C_2 = Natural gas usage in standard cubic feet per month for each (Pre-NSPS) natural gas-fired boiler (>100 million Btu per hour), if it burned this fuel in a given month

D_1 = Power output in hp-hr per month for each diesel fired emergency generator (<600 hp), if it burned this fuel in a given month

D_2 =Power output in hp-hr per month for each diesel fired emergency generator (>600 hp), if it burned this fuel in a given month

E = Power output in hp-hr per month for any natural gas fired emergency generator or a chiller engine, if it burned this fuel in a given month.

NCSU shall submit semiannual summary reports containing the monthly nitrogen oxides (as NO_2) emissions for the previous 17 months for either the Primary or the Alternative Compliance Monitoring Scenarios, identified accordingly. NCSU must calculate emissions for each of the 12-month periods over the previous 17 months.

The following monitoring and recordkeeping requirements are included in the avoidance conditions for SO_2 at NCSU.

- NCSU shall keep monthly records in a logbook (written or electronic format) of the amount of each fuel fired in natural gas/No. 2 fuel oil-fired boilers **ES-31, ES-32, and ES-39.**
- NCSU shall calculate and record each month the monthly and total annually emissions of SO_2 from natural gas/No. 2 fuel oil-fired boilers **ES-31, ES-32, and ES-39,** using the following equation:

  SO_2 tons/month = $[\sum\{142S_2 \text{ lbs}/10^3 \text{ gallon} \times F \text{ gallon/month}\} + \sum\{0.6 \text{ lbs}/10^6 \text{ scf} \times G \text{ scf/month}\}] / 2000$ lbs/ton

  Where: F = Total No. 2 fuel oil usage in gallons per month for boilers **ES-31, ES-32, and ES-39**, if it burned this fuel in a given month
  G = Total natural gas usage in standard cubic feet per month for boilers **ES-31, ES-32, and ES-39**, if it burned this fuel in a given month
  S_2 = Weight percent of sulfur in No. 2 fuel oil

- Compliance is demonstrated when the combined emissions of SO_2 from boilers **ES-31, ES-32, and ES-39** are 154 tons or less for each consecutive 12-month period.
- Semiannual summary reports shall be submitted containing the monthly combined SO_2 emissions from boilers **ES-31, ES-32, and ES-39** for the previous 17 months. SO_2 emissions must be calculated for each of the 12-month periods over the previous 17 months.

This permit renewal does not affect this status of the NCSU facility with regard to NSR/PSD. Continued compliance is expected.

10. Risk Management Plan (RMP) Requirements

40 CFR Part 68 requires stationary sources storing more than threshold quantities of regulated substances to develop a RMP in accordance with Section 112(r) of the Clean Air Act. The RMP lists the potential effects of a chemical accident at the facility, steps the facility is taking to prevent an accident, and emergency response procedures to be followed if an accident should occur.

NCSU is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in the Rule. This permit renewal does not affect the 112(r) status of the facility.

11. Compliance Assurance Monitoring (CAM)

The CAM rule (15A NCAC 02D .0614) applies to each pollutant specific emissions unit located at a facility required to obtain a Title V, Part 70 or 71 permit if it meets all of the following criteria:

- It is subject to an emission limitation or standard, and
- It uses a control device to achieve compliance, and
- It has potential pre-control emissions that equal or exceed the major source threshold (i.e., either 100 tons per year (tpy) for criteria pollutants, 10 tpy of any individual HAP, or 25 tpy of any combination of HAP).

The following emission limitations or standards are exempted from the CAM rule:

- NSPS or NESHAP standards proposed after November 15, 1990;
- Stratospheric ozone protection requirements under Title VI of the Clean Air Act
- Acid rain program requirements;
- Emission limitations or standards or other requirements that apply solely under an approved emissions trading program approved pursuant to of Subchapters 02D and 02Q of Chapter 15A and incorporated in a permit issued under 15A NCAC 02Q .0500;
- An emissions cap that is approved pursuant to Subchapters 02D and 02Q of Chapter 15A and incorporated in a permit issued under 15A NCAC 02Q .0500;
- Emission limitations or standards for which a permit issued under 15A NCAC 02Q .0500 specifies a continuous compliance determination method, as defined in 40 CFR 64.1—unless the applicable compliance method includes an assumed control device emission reduction factor that could be affected by the actual operation and maintenance of the control device; and
- Certain municipally owned utility units, as defined in 40 CFR 72.2.

Please note that the emission unit is not exempted from the CAM rule if nonexempt emission limitations or standards (e.g., a state rule or an older NSPS emission limits) apply to the emissions unit.

CAM was determined in a preceding permit review (R. Simpson, Air Permit No. 02977T25, March 27, 2019) to not be applicable because potential pre-controlled emissions were less than CAM thresholds. This permit renewal does not affect the facility's status with respect to compliance assurance monitoring (CAM). Continued compliance is expected.

12. Facility-wide Air Toxics Review

NCSU is subject to state air toxics emission limits for the sources listed in Appendix C to this permit review, in accordance with 15A NCAC 02D .1100, "Control of Toxic Air Pollutants". These emission limits were established as a facility-wide worst-case single stack modeling demonstration. This permit renewal does not affect the status of this facility with regard to these state air toxic emission limits.

In addition, the permit lists the following NC toxic air pollutants (TAPs) and their respective toxic permit emission rates (TPERs) as established in 15A NCAC 02Q .0711, "Emission Rates Requiring a Permit".

Pollutant (CAS Number)	Carcinogens lb/yr	Chronic Toxicants lb/day	Acute Systemic Toxicants lb/hr	Acute Irritants lb/hr
Soluble Chromate Compounds, as Chromium VI Equivalent		0.013		
Fluorides		0.34	0.064	
Toluene (108-88-3)		98		14.4

NCSU has made a demonstration that its plant-wide actual emissions do not exceed the TPERs.[5] The permit requires NCSU to operate and maintain the facility so that emissions of any listed TAPs from the facility, including fugitive emissions, will not exceed the TPERs; and to maintain records that demonstrate compliance with each TPER. Based on the most recent inspection, NCSU has been complying with this regulation. Continued compliance will be determined during subsequent inspections.

The permit stipulations for 15A NCAC 02D .1100 and 15A NCAC 02Q .0711 have been updated to the most current wording and format.

[5] Memo from J. Freeman, AQAB, to R. Thaker, RCO, "Dispersion Modeling Review for NCSU, Raleigh, Wake County, Facility ID: 9200290, May 20, 2011.

13. Facility Emissions Review

The table in the header page of this review summarizes emissions NCSU has reported in the annual emissions inventories from the years 2018 to 2022 after application of required emission controls. They show a relative consistency in criteria pollutant and HAP emissions over that time period.

As discussed earlier in this review, several sources (most of which were emergency generators and boilers classified as insignificant activities) were removed from the NCSU campus, and several new emergency generators classified as insignificant activities. Overall no significant change in the potential to emit at NCSU is expected as a result of the changes occurring under this permit renewal.

14. Compliance History and Status

The following chronology dates from when the NCSU permit was last renewed on March 27, 2019.

May 14, 2020	Stationary Source Compliance Branch (SSCB) issues review of the November 7, 2019, EPA Method 7E nitrogen oxide (NO_X) testing of combustion turbine ES-1A. The results demonstrated compliance with the applicable standards.
April 13, 2021	SSCB issues review of the EPA Method 7E NO_X testing of combustion turbine ES-1A conducted on November 11, 2020, and December 18, 2020. The results demonstrated compliance with the applicable standards.
September 8, 2021	Jeff Harris, Raleigh Regional Office (RRO) conducts facility compliance inspection. Facility appeared to be operating in compliance with all permit requirements.
May 5, 2022	SSCB issues review of the EPA Method 7E NO_X testing of combustion turbine ES-1B conducted on November 10, 2021. The results demonstrated compliance with the applicable standards.
August 4, 2022	Jeff Harris, RRO conducts facility compliance inspection. Facility appeared to be operating in compliance with all permit requirements.
September 12, 2022	DAQ/Technical Services Section issues Notice of Violation (NOV) to NCSU for failure to exercise proper operation and maintenance practices (i.e., excessive continuous emissions monitor downtime) regarding boiler ES-4A, in violation of Section 2.1 D.3.i and Section 3, General Condition F of Air Permit 02977T25.
September 30, 2022	NCSU sends letter to DAQ responding to the NOV, acknowledging the issues raised, and detailing the corrective actions NCSU will undertake to prevent future instances.
May 23, 2023	Jeff Harris, RRO conducts facility compliance inspection. Facility appeared to be operating in compliance with all permit requirements.
February 13, 2024	DAQ publishes public notice announcing that NCSU and the NC Environmental Management Commission agree to a special order by consent (SOC) to address the expiration of Air Permit No. 02977T25. Under this SOC, NCSU agrees to comply with the terms of Permit No. 02977T25 until DAQ issues a new air quality permit, and to pay a civil penalty in the amount of $4000.00.
February 28, 2024	Air Permit No. 02977T25 expires, terminating NCSU's right to operate. Because NCSU did not submit a renewal application at least six months prior to expiration, NCSU is not covered under the application shield.

March 14, 2024	Public notice and comment period for SOC ends.
March 18, 2024	DAQ transmits SOC (File No. SOC-2024-002) to NCSU.
April 9, 2024	DAQ acknowledges receipt of payment of $4,000 from NCSU for the SOC.
May 2, 2024	RRO issues a NOV/Notice of Recommendation for Enforcement (NRE) to NCSU for the exceedance of the nitrogen oxide emissions limit for the combustion turbine (ID No. ES-1A), established by 40 CFR Part 60, Subpart KKKK.
May 17, 2024	NCSU responds to NOV/NRE, stating that a follow-up stack test was conducted on February 1, 2024 (DAQ Tracking No. 2024-052ST). The follow-up test results demonstrated compliance with the applicable permit requirements. Consultation with the turbine manufacturer did not identify any abnormalities with the operation of the turbine. A review of the initial test process with the testing company did not identify a basis for the exceedance in the initial stack test.

In summary, no compliance issues have been observed during facility compliance inspections since the previous permit renewal. During that time, NSCU was issued an NOV for excessive continuous emissions monitor downtime for a boiler and has taken action to prevent subsequent monitoring issues. NCSU also failed to submit its permit renewal application in a timely fashion. This required the issuance of an SOC to allow the facility to operate during the period between permit expiration and the issuance of a new permit.

No exceedances of permit emission limits have been observed during this time period. Continued compliance will continue to be monitored through facility inspections, review of stack testing reports, and review of required reports.

15. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0518(b), the U.S. EPA will have a 45-day review period. In general, as agreed by DAQ and EPA Region 4, EPA's 45-day review period will run concurrent with the 30-day comment period unless advised otherwise. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit, and each final permit shall be provided to EPA. Also, pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above.

There are no affected states or local programs within 50 miles of NCSU.

Notice of the DRAFT Title V Permit to Affected States ran from XXXX, 2024, to XXXX, 2024. ***Insert discussion of any comments received from Affected States or Local Programs.***

Public Notice of the DRAFT Title V Permit ran from XXXX, 2024, to XXXX, 2024. ***Insert discussion of any public comments received.***

The U.S. EPA's 45-day review period ran concurrent with the 30-day Public Notice, from XXXX, 2024, to XXXX, 2024. ***Insert discussion of any comments received from EPA and U.S. EPA Region 4 regarding the DRAFT Title V Permit.***

16. Other Regulatory Considerations

Professional Engineer's Seal: No professional engineer's seal was required for Permit Application No. 9200290.23A.

Zoning Consistency Determination. NCSU submitted a zoning consistency determination request form signed by Travis R. Crane, Assistant Planning Director for the City of Raleigh, which states that in accordance with state law, the city is prohibited from regulating this facility.

Permit Fee: A permit fee in the amount of $3,327 was submitted by NCSU.

Emergency Affirmative Defense Provisions. 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.

As a consequence of this EPA action to remove these provisions from 40 CFR 70.6(g), states and local agencies that have adopted similar affirmative defense provisions in their Part 70 operating permit programs will need 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.

NCDAQ 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. This has been done with this permit renewal.

[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 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).

17. Recommendations

DAQ has reviewed the permit application for North Carolina State University located in Raleigh, Wake County to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. DAQ recommends the issuance of Air Permit No. 02977T26 upon completion of the public participation and EPA review periods.

APPENDIX A

Estimated Emissions for New Emergency Generators Added to NCSU Permit

Pollutant	IES-163E (diesel, 150 kW)	IES-164E (diesel, 175 kW)	IES-165E (gas, 22 kW)	IES-166E (gas, 50 kW)	IES-168E (diesel, 300 kW)	IES-169E (diesel, 350 kW)	IES-170E (diesel, 125 kW)	IES-171E (diesel, 60 kW)	IES-172E (diesel, 250 kW)	Total Emissions, Gas-fired Engines	Total Emissions, Diesel-fired Engines
PM, ton/yr	1.85E-02	2.16E-02	5.40E-06	1.10E-05	2.56E-01	6.34E-02	1.55E-02	7.64E-03	3.31E-02	1.64E-05	4.16E-01
PM10, ton/yr	1.85E-02	2.16E-02	5.40E-06	1.10E-05	2.56E-01	6.34E-02	1.55E-02	7.64E-03	3.31E-02	1.64E-05	4.16E-01
PM2.5, ton/yr	1.85E-02	2.16E-02	6.94E-04	1.41E-03	2.56E-01	6.34E-02	1.55E-02	7.64E-03	3.31E-02	2.10E-03	4.16E-01
NOx, ton/yr	3.51E-01	4.11E-01	1.73E-01	3.51E-01	3.60E+00	1.90E+00	2.94E-01	1.45E-01	6.49E-01	5.24E-01	7.35E+00
CO, ton/yr	9.25E-02	1.08E-01	7.04E+00	1.43E+01	7.77E-01	1.08E+00	7.73E-02	3.82E-02	1.41E-01	2.13E+01	2.31E+00
SO2, ton/yr	6.81E-04	7.96E-04	4.12E-05	8.37E-05	1.41E-03	2.28E-03	5.69E-04	2.81E-04	1.13E-03	1.25E-04	7.15E-03
VOC, ton/yr	1.85E-02	2.16E-02	9.09E-03	1.85E-02	2.87E-01	9.99E-02	1.55E-02	7.64E-03	3.51E-02	2.76E-02	4.85E-01
*Largest single HAP, lb/yr	9.29E-01	1.09E+00	7.40E+00	1.50E+01	1.92E+00	3.12E+00	7.76E-01	3.84E-01	1.55E+00	2.24E+01	9.77E+00
Total HAP, lb/yr	2.96E+00	3.46E+00	1.01E+01	2.05E+01	6.12E+00	9.94E+00	2.48E+00	1.22E+00	4.94E+00	3.06E+01	3.11E+01

*Lead is the largest single HAP emitted from diesel-fired engines; formaldehyde is the largest single HAP emitted from natural gas-fired engines.

APPENDIX B

Sources Listed in NCSU Permit
Section 2.1, Emission Source(s) Specific Limitations and Conditions, Subsections A through H

A. One natural gas/No. 2 fuel oil-fired boiler (ID No. ES-02), located at Building No. 029

B. Seven natural gas/No. 2 fuel oil-fired boilers including:
- Boilers (ID Nos. ES-27 and ES-28), located at Building 705A
- Boilers (ID Nos. ES-31, ES-32 and ES-39), located at Building No. 302
- Boiler (ID No. ES-45) with low-NO_x burner equipment, located at Building 705A and
- Boiler (ID No. ES-61), located at Building No. 302

C. Ten natural gas/No. 2 fuel oil-fired boilers including:
- Boilers (ID Nos. ES-46 and ES-47), located at Building No. 171
- Boilers (ID Nos. ES-48 and ES-49), located at Building No. 172
- Boilers (ID Nos. ES-50 and ES-51), located at Building No. 173
- Boiler (ID No. ES-53), located at Building No. 174
- Boilers (ID Nos. ES-54 and ES-55), located at Building No. 172F
- Boiler (ID No. ES-25B), located at Building No. 129

and

Eighteen natural gas-fired boilers including:
- Boilers (ID Nos. ES-01B and ES-02B), located at Building No. 730
- Boilers (ID Nos. ES-04B and ES-05B), located at Building No. 731
- Boiler (ID No. ES-06B), located at Building No. 083
- Boiler (ID No. ES-07B), located at Building No. 166
- Boiler (ID No. ES-08B), located at Building No. 164B
- Boiler (ID No. ES-09B), located at Building No. 163
- Boiler (ID No. ES-11B), located at Building No. 048
- Boiler (ID No. ES-12B), located at Building No. 133
- Boiler (ID No. ES-13B), located at Building No. 781A
- Boiler (ID No. ES-14B), located at Building No. 210
- Boilers (ID Nos. ES-17B and ES-18B), located at Building No. 710
- Boiler (ID No. ES-20B), located at Building No. 444A
- Boiler (ID No. ES-21B), located at Building No. 444B
- Boiler (ID No. ES-22B), located at Building No. 129
- Boiler (ID No. ES-23B), located at Building No. 158B

D. Two natural gas/No. 2 fuel oil-fired boilers (ID Nos. ES-3A and ES-4A), each boiler equipped with dual-fuel low-NOx burners, located at Building No. 029

E. Sixty diesel-fired emergency generators including:
- Generator (ID No. ES-11), located at Building No. 720A
- Generator (ID No. ES-17), located at Building No. 029
- Generator (ID No. ES-21), located at Building No. 710
- Generator (ID No. ES-33), located at Building No. 302
- Generator (ID No. ES-36), located at Building No. 300A
- Generator (ID No. ES-38), located at Building No. 215
- Generator (ID No. ES-56), located at Building No. 075
- Generator (ID No. ES-58), located at Building No. 301
- Generator (ID No. ES-59), located at Building No. 308
- Generator (ID No. ES-05E), located at Building No. 047
- Generator (ID No. ES-06E), located at Building No. 730
- Generator (ID No. ES-07E), located at Building No. 731

- Generator (ID No. ES-08E), located at Building No. 058
- Generator (ID No. ES-09E), located at Building No. 700
- Generator (ID No. ES-10E), located at Building No. 309
- Generator (ID No. ES-15E), located at Building No. 054
- Generator (ID No. ES-16E), located at Building No. 072
- Generator (ID No. ES-19E), located at Building No. 055
- Generator (ID No. ES-22E), located at Building No. 120
- Generator (ID No. ES-23E), located at Building No. 048
- Generator (ID No. ES-26E), located at Building No. 782B
- Generator (ID No. ES-30E), located at Building No. 713
- Generator (ID No. ES-36E), located at Building No. 170A
- Generator (ID No. ES-40E), located at Building No. 238
- Generator (ID No. ES-42E), located at Building No. 024
- Generator (ID No. ES-45E), located at Building No. 129
- Generator (ID No. ES-47E), located at Building No. 173
- Generator (ID No. ES-48E), located at Building No. 112A
- Generator (ID No. ES-49E), located at Building No. 025
- Generator (ID No. ES-53E), located at Building No. 058A
- Generator (ID No. ES-55E), located at Building No. 315
- Generator (ID No. ES-57E), located at Building No. 021
- Generator (ID No. ES-61E), located at Building No. 117
- Generator (ID No. ES-63E), located at Building No. 733
- Generator (ID No. ES-64E), located at Building No. 078
- Generator (ID No. ES-66E), located at Building No. 040
- Generator (ID No. ES-67E), located at Building No. 118
- Generator (ID No. ES-68E), located at Building No. 271A
- Generator (ID No. ES-69E), located at Building No. 271E
- Generator (ID No. ES-71E), located at Building No. 113B
- Generator (ID No. ES-73E), located at Building No. 128
- Generator (ID No. ES-74E), located at Building No. 063
- Generator (ID No. ES-75E), located at Building No. 087
- Generator (ID No. ES-76E), located at Building No. 095
- Generator (ID No. ES-80E), located at Building No. 166
- Generator (ID No. ES-82E), located at Building No. 113
- Generators (ID Nos. ES-83E and ES-97E), located at Building No. 051
- Generator (ID No. ES-84E), located at Building No. 171
- Generator (ID No. ES-85E), located at Building No. 172
- Generator (ID No. ES-86E), located at Building No. 174
- Generator (ID No. ES-87E), located at Building No. 705A
- Generator (ID No. ES-99E), located at Building No. 135
- Generator (ID No. ES-102E), located at Building No. 164C
- Generator (ID No. ES-103E), located at Building No. 250A
- Generator (ID No. ES-106E), located at Building No. 018
- Generator (ID No. ES-108E), located at Building No. 094
- Generator (ID No. ES-109E), located at Building No. 135F
- Generators (ID Nos. and ES-110E), located at Building No. 084
- Generator (ID No. ES-114E), located at Building No. 038
- Generator (ID No. ES-120E), located at Building No. 042

and

Eleven natural gas-fired emergency generators including:

- Generator (ID No. ES-25), located at Building No. 782A
- Generator (ID No. ES-24E), located at Building No. 076
- Generator (ID No. ES-62E), located at Building No. 081

- Generator (ID No. ES-79E), located at Building No. 712
- Generator (ID No. ES-88E), located at Building No. 034
- Generator (ID No. ES-94E), located at Building No. 068
- Generator (ID No. ES-95E), located at Building No. 210
- Generator (ID No. ES-104E, located at Building No. 172F
- Generator (ID No. ES-105E), located at Building No. 444
- Generator (ID No. ES-111E), located at Building No. 712
- Generator (ID No. ES-122E), located at Building No. 165A

F. Thirteen diesel-fired emergency generators including:
- Generator (ID No. ES-57), located at Building No. 300C
- Generator (ID No. ES-60), located at Building No. 782C
- Generator (ID No. ES-62), located at Building No. 782A
- Generator (ID No. ES-63), located at Building No. 086
- Generator (ID No. ES-37E), located at Building No. 060
- Generator (ID No. ES-50E), located at Building No. 096
- Generator (ID No. ES-91E), located at Building No. 067
- Generator (ID No. ES-98E), located at Building No. 762A
- Generator (ID No. ES-107E), located at Building No. 032A
- Generator (ID No. ES-115E), located at Building No. 050
- Generator (ID No. ES-116E), located at Building No. 039
- Generator (ID No. ES-117E), located at Building No. 067
- Generator (ID No. ES-163E), located at Building No. Plant Sciences

and natural gas-fired emergency generator (ID No. ES-118E), located at Building No. 105

G. Two natural gas/No. 2 fuel oil-fired internal combustion turbines equipped with dual-fuel dry low-NO_x combustors and two heat recovery steam generators (HRSGs) equipped with dual-fuel low-NOx duct burners (ID Nos. ES-1A and ES-1B), located at Building No. 086; and

One natural gas/No. 2 fuel oil-fired internal combustion turbine with heat recovery steam generator (HRSG), equipped with natural gas-fired low-NOx duct burners (ID No. ES-5A), located at Building No. 705A

H. Daniels Hall Wood Shop (ID No. ES-137) and Associated Bagfilter (ID No. CD-137), Located at Building No. 038; and
Leazar Hall Wood Shop (ID No. ES-138) and Associated Bagfilter (ID No. CD-138), Located at Building No. 018

APPENDIX C
Air Toxics Emission Limits for Sources at North Carolina State University

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
ES-1A and ES-1B	Combustion Turbines including Heat Recovery Steam Generator, located at Building No. 086 *Emissions Rates for Each Source*	Acrolein	5.97E-4	Lb/hr
		Benzene	4.5E1	Lb/yr
		Beryllium	2.53E-1	Lb/yr
		1,3 Butadiene	1.31E1	Lb/yr
		Cadmium	3.92	Lb/yr
		Formaldehyde	6.62E-2	Lb/hr
		Manganese	1.77	Lb/24 hr
		Mercury	2.69E-3	Lb/24 hr
		Nickel	1.03E-2	Lb/24 hr
ES-46	Boiler, located at Building No. 171	Beryllium	8.54E-2	Lb/yr
		Cadmium	8.54E-2	Lb/yr
		Formaldehyde	1.11E-3	Lb/hr
		Manganese	4.68E-4	Lb/24 hr
		Mercury	2.34E-4	Lb/24 hr
		Nickel	2.34E-4	Lb/24 hr
ES-47 ES-48 ES-49 ES-50 ES-51	Boilers, located at Building Nos. 171, 172, and 173 *Emissions Rates for Each Source*	Beryllium	1.1E-1	Lb/yr
		Cadmium	1.1E-1	Lb/yr
		Formaldehyde	1.44E-3	Lb/hr
		Manganese	6.05E-4	Lb/24 hr
		Mercury	3.01E-4	Lb/24 hr
		Nickel	3.02E-4	Lb/24 hr
ES-52 and ES-53	Boilers, located at Building No. 174 *Emissions Rates for Each Source*	Beryllium	7.73E-2	Lb/yr
		Cadmium	7.73E-2	Lb/yr
		Formaldehyde	1.01E-3	Lb/hr
		Manganese	4.23E-4	Lb/24 hr
		Mercury	2.12E-4	Lb/24 hr
		Nickel	2.12E-4	Lb/24 hr
ES-54 and ES-55	Boilers, located at Building No. 172F *Emissions Rates for Each Source*	Beryllium	9.86E-2	Lb/yr
		Cadmium	9.86E-2	Lb/yr
		Formaldehyde	1.29E-3	Lb/hr
		Manganese	5.4E-4	Lb/24 hr
		Mercury	2.7E-4	Lb/24 hr
		Nickel	2.7E-4	Lb/24 hr
ES-01B and ES-02B	Boilers, located at Building No. 730 *Emissions Rates for Each Source*	Benzene	6.76E-2	Lb/yr
		Beryllium	3.86E-4	Lb/yr
		Cadmium	3.54E-2	Lb/yr
		Formaldehyde	2.76E-4	Lb/hr
		n-Hexane	1.59E-1	Lb/24 hr
		Manganese	3.35E-5	Lb/24 hr
		Mercury	2.29E-5	Lb/24 hr
		Nickel	1.85E-4	Lb/24 hr
ES-04B and ES-05B	Boilers, located at Building No. 731 *Emissions Rates for Each Source*	Benzene	3.79E-2	Lb/yr
		Beryllium	2.16E-4	Lb/yr
		Cadmium	1.98E-2	Lb/yr
		Formaldehyde	1.54E-4	Lb/hr
		n-Hexane	8.89E-2	Lb/24 hr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
		Manganese	1.88E-5	Lb/24 hr
		Mercury	1.28E-5	Lb/24 hr
		Nickel	1.04E-4	Lb/24 hr
ES-06B and ES-23B	Boilers, located at Building Nos. 083 and 158B *Emissions Rates for Each Source*	Benzene	7.21E-3	Lb/yr
		Beryllium	4.12E-5	Lb/yr
		Cadmium	3.78E-3	Lb/yr
		Formaldehyde	2.94E-5	Lb/hr
		n-Hexane	1.69E-2	Lb/24 hr
		Manganese	3.58E-6	Lb/24 hr
		Mercury	2.45E-6	Lb/24 hr
		Nickel	1.98E-5	Lb/24 hr
ES-07B	Boiler, located at Building No. 166	Benzene	5.95E-2	Lb/yr
		Beryllium	3.4E-4	Lb/yr
		Cadmium	3.12E-2	Lb/yr
		Formaldehyde	2.43E-4	Lb/hr
		n-Hexane	1.4E-1	Lb/24 hr
		Manganese	2.95E-5	Lb/24 hr
		Mercury	2.02E-5	Lb/24 hr
		Nickel	1.63E-4	Lb/24 hr
ES-08B	Boiler, located at Building No. 164B	Benzene	6.85E-2	Lb/yr
		Beryllium	3.92E-4	Lb/yr
		Cadmium	3.59E-2	Lb/yr
		Formaldehyde	2.79E-4	Lb/hr
		n-Hexane	1.61E-1	Lb/24 hr
		Manganese	3.4E-5	Lb/24 hr
		Mercury	2.32E-5	Lb/24 hr
		Nickel	1.88E-4	Lb/24 hr
ES-09B	Boiler, located at Building No. 163	Benzene	2.71E-2	Lb/yr
		Beryllium	1.55E-4	Lb/yr
		Cadmium	1.42E-2	Lb/yr
		Formaldehyde	1.1E-4	Lb/hr
		n-Hexane	6.35E-2	Lb/24 hr
		Manganese	1.34E-5	Lb/24 hr
		Mercury	9.18E-6	Lb/24 hr
		Nickel	7.41E-5	Lb/24 hr
ES-11B	Boiler, located at Building No. 048	Benzene	8.66E-2	Lb/yr
		Beryllium	4.95E-4	Lb/yr
		Cadmium	4.53E-2	Lb/yr
		Formaldehyde	3.53E-4	Lb/hr
		n-Hexane	2.03E-1	Lb/24 hr
		Manganese	4.29E-5	Lb/24 hr
		Mercury	2.94E-5	Lb/24 hr
		Nickel	2.37E-4	Lb/24 hr
ES-12B	Boiler, located at Building No. 133	Benzene	2.52E-2	Lb/yr
		Beryllium	1.44E-4	Lb/yr
		Cadmium	1.32E-2	Lb/yr
		Formaldehyde	1.03E-4	Lb/hr
		n-Hexane	5.93E-2	Lb/24 hr
		Manganese	1.25E-5	Lb/24 hr
		Mercury	8.56E-6	Lb/24 hr
		Nickel	6.92E-5	Lb/24 hr
ES-13B	Boiler, located at Building No. 781A	Benzene	5.23E-2	Lb/yr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
		Beryllium	2.99E-4	Lb/yr
		Cadmium	2.74E-2	Lb/yr
		Formaldehyde	2.13E-4	Lb/hr
		n-Hexane	1.23E-1	Lb/24 hr
		Manganese	2.59E-5	Lb/24 hr
		Mercury	1.77E-5	Lb/24 hr
		Nickel	1.43E-4	Lb/24 hr
ES-17B and ES-18B	Boilers, located at Building No. 710 *Emissions Rates for Each Source*	Benzene	9.02E-2	Lb/yr
		Beryllium	5.15E-4	Lb/yr
		Cadmium	4.72E-2	Lb/yr
		Formaldehyde	3.68E-4	Lb/hr
		n-Hexane	2.12E-1	Lb/24 hr
		Manganese	4.47E-5	Lb/24 hr
		Mercury	3.06E-5	Lb/24 hr
		Nickel	2.47E-4	Lb/24 hr
ES-20B and ES-21B	Boilers, located at Building Nos. 444A and 444B, respectively *Emissions Rates for Each Source*	Benzene	8.48E-2	Lb/yr
		Beryllium	4.84E-4	Lb/yr
		Cadmium	4.44E-2	Lb/yr
		Formaldehyde	3.46E-4	Lb/hr
		n-Hexane	1.99E-1	Lb/24 hr
		Manganese	4.2E-5	Lb/24 hr
		Mercury	2.88E-5	Lb/24 hr
		Nickel	2.32E-4	Lb/24 hr
ES-22B	Boiler, located at Building No. 129	Beryllium	8.41E-2	Lb/yr
		Cadmium	8.41E-2	Lb/yr
		Formaldehyde	1.1E-3	Lb/hr
		Manganese	4.61E-4	Lb/24 hr
		Mercury	2.3E-4	Lb/24 hr
		Nickel	2.3E-4	Lb/24 hr
ES-23B	Boiler, located at Building No. 158B	Benzene	7.21E-3	Lb/yr
		Beryllium	4.12E-5	Lb/yr
		Cadmium	3.78E-3	Lb/yr
		Formaldehyde	2.94E-5	Lb/hr
		n-Hexane	1.69E-2	Lb/24 hr
		Manganese	3.58E-6	Lb/24 hr
		Mercury	2.45E-6	Lb/24 hr
		Nickel	1.98E-5	Lb/24 hr
ES-24B	Boiler, located at Building No. 317A	Benzene	3.61E-3	Lb/yr
		Beryllium	2.06E-5	Lb/yr
		Cadmium	1.89E-3	Lb/yr
		Formaldehyde	1.47E-5	Lb/hr
		n-Hexane	8.47E-3	Lb/24 hr
		Manganese	1.79E-6	Lb/24 hr
		Mercury	1.22E-6	Lb/24 hr
		Nickel	9.88E-6	Lb/24 hr
ES-25B	Boiler, located at Building No. 129	Benzene	2.53E-2	Lb/yr
		Beryllium	1.45E-4	Lb/yr
		Cadmium	3.68E-2	Lb/yr
		Formaldehyde	4.81E-4	Lb/hr
		n-Hexane	5.93E-2	Lb/24 hr
		Manganese	2.02E-4	Lb/24 hr
		Mercury	1.01E-4	Lb/24 hr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
		Nickel	6.92E-5	Lb/24 hr
ES-26B	Boiler, located at Building No. 710A	Benzene	2.71E-3	Lb/yr
		Beryllium	1.55E-5	Lb/yr
		Cadmium	1.42E-3	Lb/yr
		Formaldehyde	1.1E-5	Lb/hr
		n-Hexane	6.35E-3	Lb/24 hr
		Manganese	1.34E-6	Lb/24 hr
		Mercury	9.18E-7	Lb/24 hr
		Nickel	7.41E-6	Lb/24 hr
ES-11	Generator, located at Building No. 720A	Acrolein	7.4E-5	Lb/hr
		Benzene	6.38E1	Lb/yr
		Formaldehyde	7.41E-4	Lb/hr
ES-17 and ES-33	Generators, located at Building Nos. 029 and 302 *Emissions Rates for Each Source*	Acrolein	5.55E-5	Lb/hr
		Benzene	4.79E1	Lb/yr
		Formaldehyde	5.55E-4	Lb/hr
ES-21	Generator, located at Building No. 710	Acrolein	5.18E-5	Lb/hr
		Benzene	4.47E1	Lb/yr
		Formaldehyde	5.18E-4	Lb/hr
ES-25	Generator, located at Building No. 782A	Acrolein	5.92E-5	Lb/hr
		Benzene	5.1E1	Lb/yr
		Formaldehyde	5.93E-4	Lb/hr
ES-36	Generator, located at Building No. 300A	Acrolein	9.25E-5	Lb/hr
		Benzene	7.98E1	Lb/yr
		Formaldehyde	9.26E-4	Lb/hr
ES-38	Generator, located at Building No. 215	Acrolein	6.66E-5	Lb/hr
		Benzene	5.74E1	Lb/yr
		Formaldehyde	6.67E-4	Lb/hr
ES-56	Generator, located at Building No. 075	Acrolein	4.44E-5	Lb/hr
		Benzene	3.83E1	Lb/yr
		Formaldehyde	4.44E-4	Lb/hr
ES-57	Generator, located at Building No. 300C	Acrolein	7.4E-5	Lb/hr
		Benzene	6.38E1	Lb/yr
		Formaldehyde	7.41E-4	Lb/hr
ES-58 and ES-59	Generators, located at Building No. 301 *Emissions Rates for Each Source*	Acrolein	8.14E-5	Lb/hr
		Benzene	7.02E1	Lb/yr
		Formaldehyde	8.15E-4	Lb/hr
ES-60	Generator, located at Building No. 308	Acrolein	4.07E-5	Lb/hr
		Benzene	3.51E1	Lb/yr
		Formaldehyde	4.07E-4	Lb/hr
ES-05E ES-10E ES-15E	Generators, located at Building Nos. 047, 309 and 054, respectively *Emissions Rates for Each Source*	Acrolein	2.6E-4	Lb/hr
		Benzene	2.3E1	Lb/yr
		1,3 Butadiene	9.65E-1	Lb/yr
		Formaldehyde	3.32E-3	Lb/hr
ES-06E ES-19E	Generators, located at Building Nos. 730 and 055, respectively *Emissions Rates for Each Source*	Acrolein	3.04E-4	Lb/hr
		Benzene	2.69E1	Lb/yr
		1,3 Butadiene	1.13	Lb/yr
		Formaldehyde	3.88E-3	Lb/hr
ES-07E	Generator, located at Building No. 731	Acrolein	3.37E-5	Lb/hr
		Benzene	2.9E1	Lb/yr
		Formaldehyde	3.37E-4	Lb/hr
ES-08E		Acrolein	3.7E-5	Lb/hr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
ES-09E ES-16E ES-26E ES-99E	Generators, located at Building Nos. 058, 700, 072, 782B, and 135, respectively *Emissions Rates for Each Source*	Benzene	3.19E1	Lb/yr
		Beryllium	9.77E-6	Lb/yr
		Cadmium	8.96E-4	Lb/yr
		Formaldehyde	3.7E-4	Lb/hr
		n-Hexane	4.02E-3	Lb/24 hr
		Manganese	8.48E-7	Lb/24 hr
		Mercury	5.8E-7	Lb/24 hr
		Nickel	4.69E-6	Lb/24 hr
ES-22E ES-36E ES-40E ES-42E ES-74E ES-87E	Generators, located at Building Nos. 120, 170A, 238, 024, G253, 063, and 705A, respectively *Emissions Rates for Each Source*	Acrolein	2.17E-4	Lb/hr
		Benzene	1.92E1	Lb/yr
		1,3 Butadiene	8.04E-1	Lb/yr
		Formaldehyde	2.77E-3	Lb/hr
ES-23E ES-30E ES-109E	Generators, located at Building Nos. 048, 713, and 135F, respectively *Emissions Rates for Each Source*	Acrolein	3.47E-4	Lb/hr
		Benzene	3.07E1	Lb/yr
		1,3 Butadiene	1.29	Lb/yr
		Formaldehyde	4.43E-3	Lb/hr
ES-24E	Generator, located at Building No. 076	Benzene	7.7E-2	Lb/yr
		Beryllium	4.4E-4	Lb/yr
		Cadmium	4.03E-2	Lb/yr
		Formaldehyde	3.14E-4	Lb/hr
		n-Hexane	1.81E-1	Lb/24 hr
		Manganese	3.82E-5	Lb/24 hr
		Mercury	2.61E-5	Lb/24 hr
		Nickel	2.11E-4	Lb/24 hr
ES-45E	Generator, located at Building No. 129	Acrolein	1.3E-4	Lb/hr
		Benzene	1.15E1	Lb/yr
		1,3 Butadiene	4.82E-1	Lb/yr
		Formaldehyde	1.66E-3	Lb/hr
ES-46E ES-57E ES-80E	Generators, located at Building Nos. 111, 021, and 166, respectively *Emissions Rates for Each Source*	Acrolein	3.04E-5	Lb/hr
		Benzene	2.69	Lb/yr
		1,3 Butadiene	1.13E-1	Lb/yr
		Formaldehyde	3.88E-4	Lb/hr
ES-47 ES-61E ES-84E ES-85E ES-86E	Generators, located at Building Nos. 173, 117, 171, 172, and 174, respectively *Emissions Rates for Each Source*	Acrolein	5.21E-5	Lb/hr
		Benzene	4.6	Lb/yr
		1,3 Butadiene	1.93E-1	Lb/yr
		Formaldehyde	6.65E-4	Lb/hr
ES-48E	Generator, located at Building No. 112A	Acrolein	5.56E-5	Lb/hr
		Benzene	4.91	Lb/yr
		1,3 Butadiene	2.06E-1	Lb/yr
		Formaldehyde	7.09E-4	Lb/hr
ES-49E ES-108E	Generators, located at Building Nos. 025, and 094, respectively *Emissions Rates for Each Source*	Acrolein	6.95E-5	Lb/hr
		Benzene	6.14	Lb/yr
		1,3 Butadiene	2.57E-1	Lb/yr
		Formaldehyde	8.86E-4	Lb/hr
ES-53E	Generator, located at Building No. 058A	Acrolein	2.26E-4	Lb/hr
		Benzene	1.99E1	Lb/yr
		1,3 Butadiene	8.36E-1	Lb/yr
		Formaldehyde	2.88E-3	Lb/hr
ES-55E		Acrolein	2.17E-5	Lb/hr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
ES-66E	Generators, located at Building Nos. 315 and 040, respectively *Emissions Rates for Each Source*	Benzene	1.92	Lb/yr
		1,3 Butadiene	8.04E-2	Lb/yr
		Formaldehyde	2.77E-4	Lb/hr
IES-56E ES-68E ES-69E ES-73E ES-82E ES-83E ES-120E	Generators, located at Building Nos. 088, 0271A, 271E, 128, 113, 051, and 042, respectively *Emissions Rates for Each Source*	Acrolein	2.6E-5	Lb/hr
		Benzene	2.3	Lb/yr
		1,3 Butadiene	9.65E-2	Lb/yr
		Formaldehyde	3.32E-4	Lb/hr
ES-62E	Generator, located at Building No. 081	Benzene	3.42E-3	Lb/yr
		Beryllium	1.95E-5	Lb/yr
		Cadmium	1.79E-3	Lb/yr
		Formaldehyde	1.39E-5	Lb/hr
		n-Hexane	8.03E-3	Lb/24 hr
		Manganese	1.7E-6	Lb/24 hr
		Mercury	1.16E-6	Lb/24 hr
		Nickel	9.37E-6	Lb/24 hr
ES-63E	Generator, located at Building No. 733	Acrolein	2.87E-5	Lb/hr
		Benzene	2.53	Lb/yr
		1,3 Butadiene	1.06E-1	Lb/yr
		Formaldehyde	3.66E-4	Lb/hr
ES-64E ES-75E ES-76E	Generators, located at Building Nos. 078, 087, and 095, respectively *Emissions Rates for Each Source*	Acrolein	1.74E-4	Lb/hr
		Benzene	1.53E1	Lb/yr
		1,3 Butadiene	6.43E-1	Lb/yr
		Formaldehyde	2.22E-3	Lb/hr
ES-71E ES-110E	Generators, located at Building Nos. 113B, and 084, respectively *Emissions Rates for Each Source*	Acrolein	8.68E-5	Lb/hr
		Benzene	7.67	Lb/yr
		1,3 Butadiene	3.22E-1	Lb/yr
		Formaldehyde	1.11E-3	Lb/hr
ES-67E	Generator, located at Building No. 118	Acrolein	1.74E-5	Lb/hr
		Benzene	1.53	Lb/yr
		1,3 Butadiene	6.43E-2	Lb/yr
		Formaldehyde	2.22E-4	Lb/hr
ES-79E ES-94E	Generators, located at Building Nos. 712 and 068, respectively	Benzene	2.14E-2	Lb/yr
		Beryllium	1.22E-4	Lb/yr
		Cadmium	1.12E-2	Lb/yr
		Formaldehyde	8.72E-5	Lb/hr
ES-79E ES-94E	Generators, located at Building Nos. 712 and 068, respectively	n-Hexane	5.02E-2	Lb/24 hr
		Manganese	1.06E-5	Lb/24 hr
		Mercury	7.25E-6	Lb/24 hr
		Nickel	5.86E-5	Lb/24 hr
ES-88E	Generator, located at Building No. 034	Benzene	2.57E-3	Lb/yr
		Beryllium	1.47E-5	Lb/yr
		Cadmium	1.34E-3	Lb/yr
		Formaldehyde	1.05E-5	Lb/hr
ES-88E ES-93E	Generator, located at Building No. 034 Generator, located at Building No. 062	n-Hexane	6.02E-3	Lb/24 hr
		Manganese	1.27E-6	Lb/24 hr
		Mercury	8.7E-7	Lb/24 hr
		Nickel	7.03E-6	Lb/24 hr
		Benzene	5.64E-3	Lb/yr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
		Beryllium	3.22E-5	Lb/yr
		Cadmium	2.96E-3	Lb/yr
		Formaldehyde	2.3E-5	Lb/hr
ES-93E ES-95E	Generator, located at Building No. 062 Generators, located at Building Nos. 210	n-Hexane	1.33E-2	Lb/24 hr
		Manganese	2.8E-6	Lb/24 hr
		Mercury	1.91E-6	Lb/24 hr
		Nickel	1.55E-5	Lb/24 hr
		Acrolein	8.68E-5	Lb/hr
		Benzene	7.67	Lb/yr
		Beryllium	9.77E-5	Lb/yr
		1,3 Butadiene	3.22E-1	Lb/yr
ES-95E ES-97E	Generators, located at Building Nos. 210 Generator, located at Building No. 051	Cadmium	8.96E-3	Lb/yr
		Formaldehyde	1.11E-3	Lb/hr
		n-Hexane	4.02E-2	Lb/24 hr
		Manganese	8.48E-6	Lb/24 hr
		Mercury	5.8E-6	Lb/24 hr
		Nickel	4.69E-5	Lb/24 hr
		Acrolein	6.51E-5	Lb/hr
		Benzene	5.75	Lb/yr
		1,3 Butadiene	2.41E-1	Lb/yr
		Formaldehyde	8.31E-4	Lb/hr
ES-102E	Generator, located at Building No. 164C	Acrolein	1.74E-5	Lb/hr
		Benzene	1.53	Lb/yr
		1,3 Butadiene	6.43E-2	Lb/yr
		Cadmium		Lb/yr
ES-102E ES-103E ES-106E ES-104E	Generator, located at Building No. 164C Generators, located at Building Nos. 250A and 018, respectively Generator, located at Building No. 172F	Formaldehyde	2.22E-4	Lb/hr
		Acrolein	2.6E-5	Lb/hr
		Benzene	2.3	Lb/yr
		1,3 Butadiene	9.65E-2	Lb/yr
		Formaldehyde	3.32E-4	Lb/hr
ES-104E	Generator, located at Building No. 172F	Benzene	1.03E-2	Lb/yr
		Beryllium	5.86E-5	Lb/yr
		Cadmium	5.37E-3	Lb/yr
		Formaldehyde	4.18E-5	Lb/hr
ES-104E ES-105E	Generator, located at Building No. 172F Generator, located at Building No. 444	n-Hexane	2.41E-2	Lb/24 hr
		Manganese	5.09E-6	Lb/24 hr
		Mercury	3.48E-6	Lb/24 hr
		Nickel	2.81E-5	Lb/24 hr
		Benzene	1.62E-2	Lb/yr
		Beryllium	9.28E-5	Lb/yr
		Cadmium	8.51E-3	Lb/yr
		Formaldehyde	6.62E-5	Lb/hr
ES-105E ES-111E	Generator, located at Building No. 444 Generator, located at Building No. 712	n-Hexane	3.82E-2	Lb/24 hr
		Manganese	8.05E-6	Lb/24 hr
		Mercury	5.51E-6	Lb/24 hr
		Nickel	4.45E-5	Lb/24 hr
		Benzene	2.57E-2	Lb/yr
		Beryllium	1.47E-4	Lb/yr
		Cadmium	1.34E-2	Lb/yr
		Formaldehyde	1.05E-4	Lb/hr
ES-111E	Generator, located at Building No. 712	n-Hexane	6.02E-2	Lb/24 hr

Source ID	Description	Toxic Air Pollutant	Emission Rate	Unit
ES-114E	Generator, located at Building No. 038	Manganese	1.27E-5	Lb/24 hr
		Mercury	8.7E-6	Lb/24 hr
		Nickel	7.03E-5	Lb/24 hr
		Acrolein	1.3E-5	Lb/hr
		Benzene	1.15	Lb/yr
		1,3 Butadiene	4.82E-2	Lb/yr
		Formaldehyde	1.66E-4	Lb/hr
ES-122E	Generator, located at Building No. 165A	Benzene	1.71E-3	Lb/yr
		Beryllium	9.77E-6	Lb/yr
		Cadmium	8.96E-4	Lb/yr
		Formaldehyde	6.97E-6	Lb/hr
ES-122E	Generator, located at Building No. 165A	n-Hexane	4.02E-3	Lb/24 hr
		Manganese	8.48E-7	Lb/24 hr
		Mercury	5.8E-7	Lb/24 hr
		Nickel	4.69E-6	Lb/24 hr