Facility Name: **University of Georgia**
City: Athens
County: Clarke
AIRS #: 04-13-059-00059 Application #: 820437

Date SIP Application Received: October 2, 2024
Date Title V Application Received: October 2, 2024
Permit No: 8221-059-0059-V-04-2

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Introduction

This narrative is being provided to assist the reader in understanding the content of the referenced SIP permit to construct and proposed operating permit amendment. Complex issues and unusual items are explained in simpler terms and/or greater detail than is sometimes possible in the actual permit. This permit is being issued pursuant to: (1) Sections 391-3-1-.03(1) and 391-3-1-.03(10) of the Georgia Rules for Air Quality Control, (2) Part 70 of Chapter I of Title 40 of the Code of Federal Regulations, and (3) Title V of the Clean Air Act Amendments of 1990. The following narrative is designed to accompany the draft permit and is presented in the same general order as the permit. This narrative is intended only as an adjunct for the reviewer and has no legal standing. Any revisions made to the permit in response to comments received during the EPA review process will be described in an addendum to this narrative.

I. Facility Description

A. Existing Permits

Table 1 below lists the current Title V permit, and all administrative amendments, minor and significant modifications to that permit, and 502(b)(10) attachments.

Table 1: Current Title V Permit and Amendments

Permit/Amendment Number	Date of Issuance	Description
8221-059-0059-V-04-0	April 7, 2020	Title V Renewal
8221-059-0059-V-04-1	March 15, 2021	Installation of Boiler B004

B. Regulatory Status

1. PSD/NSR/RACT

The University of Georgia is a PSD major source because it has potential emissions of NO_x and CO greater than 100 tons per year and it is one of the 28 named source categories under PSD (Fossil-fuel fired boilers or combination thereof totaling more than 250 MMBtu per hour heat input). Portions of the facility were constructed prior to promulgation of the PSD regulation.

2. Title V Major Source Status by Pollutant

Table 2: Title V Major Source Status

Pollutant	Is the Pollutant Emitted?	If emitted, what is the facility's Title V status for the Pollutant?		
		Major Source Status	Major Source Requesting SM Status	Non-Major Source Status
PM	Yes			✓
PM_{10}	Yes			✓
$PM_{2.5}$	Yes			✓
SO_2	Yes			✓
VOC	Yes			✓
NO_x	Yes	✓		
CO	Yes	✓		
TRS	No			
H_2S	No			
Individual HAP	Yes			✓
Total HAPs	Yes			✓

Existing Condition 2.1.1 limits HAP emissions so that the University of Georgia is not a major source for HAPs.

II. Proposed Modification

A. Description of Modification

The University of Georgia plans to replace Boiler B002 with a new 99.999 MMBtu/hr boiler (designated B002A) at the university's Central Steam Plant (CSP). Boiler B002A will primarily burn natural gas with distillate fuel oil used as backup fuel. As a result of the demolition work necessary to remove B002, Boilers B001 and B003 will be temporarily shutdown to allow workers safe access to B002 and its associated piping. In order to meet campus steam demand during this demolition and construction period, a 99.9 MMBtu/hr temporary boiler (designated B002T) will be used to maintain CSP operational flexibility. Boiler B002T will exclusively burn natural gas. Per 391-3-1-.03(6)(b)(15), temporary boilers like B002T are exempt from permitting if the temporary boiler remains on site for 180 days or fewer. The construction schedule for this project may require that Boiler B002T be onsite for more than 180 days, so this boiler is included in this permit amendment. A 30-day public advisory expired November 8, 2024.

B. Emissions Change

Emission calculations are included in Appendix C of Application 820437. Note that Boiler B002T is incorrectly referred to as Boiler B002B in Appendix C. Both boilers are assumed to operate for 8,760 hours per year. Boiler B002A is assumed to fire distillate fuel oil for 10% of its operating time (876 hours per year). Boiler B002A is classified as a gas-fired boiler in 40 CFR 63 Subpart JJJJJJ, therefore, it may only fire fuel oil "during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training on liquid fuel. Periodic testing, maintenance, or operator training on liquid fuel shall not exceed a combined total of 48 hours during any calendar year."

The following are calculation conducted as part of the review of Application 820437. All emission factors for fuel oil combustion are taken from AP-42 Section 1.3 – "Fuel Oil Combustion" and are in units of pounds per thousand gallons (lb/10^3 gal) of fuel oil burned. All emission factors for natural gas combustion, except for NO_x, are taken from AP-42 Section 1.4 – "Natural Gas Combustion" are in units of pounds per million standard cubic feet (lb/MMscf) of natural gas burned. The NO_x emission factor is calculated using Equation 19-1 in EPA Method 19. The boiler vendors have guaranteed an emission rate of 30 ppm at 3% oxygen while burning natural gas so that the boilers comply with Georgia Rule (lll). The NO_x emission factor is calculated as follows:

$$EF_{NOx} = 30\ ppm \times \frac{8{,}710\ dscf}{MMBtu} \times \frac{1.194 \times 10^{-7} lb/scf}{ppm} \times \left(\frac{20.9}{20.9 - 3}\right)$$

Where 8,710 dscf/MMBtu is the F-factor for natural gas from Table 19-2 in Method 19, and 1.194 x 10^{-7} (lb/scf)/ppm is a conversion factor for NO_x from Table 19-1 in Method 19. This emission factor is converted to units of lb/MMscf as follows:

$$EF_{NOx} = \frac{0.0364\ lb}{MMBtu} \times \frac{1{,}020\ MMBtu}{MMscf} = 37\ lb/MMscf$$

All of the factors used in calculating potential emissions and the results are summarized in the following table.

Natural Gas Heating Value: 1,020 Btu/scf
Fuel Oil Heating Value: 140 MMBtu/10^3 gal

Boiler	**B002A**		**B002T**
Fuel	**Fuel Oil**	**Natural Gas**	
Heat Input (MMBtu/hr)	99.999		99.999
Operating Time (hr/yr)	8,760		8,760
Percent of time on Fuel Oil	10		0
Operating Time Fuel (hr/yr)	876	7,884	8,760
Natural Gas Usage (MMscf/yr)		772.9	858.8
Annual Natural Gas Heat Input (MMBtu/yr)		788,392	875,991
Fuel Oil Usage (10^3 gal/yr)	625.7		
Emission Factors (lb/10^3 gal for fuel oil combustion and lb/MMscf for natural gas combustion)			
PM	3.3	7.6	
SO_2	71*	0.6	
VOC	0.34	5.5	
NO_x	20	37	
CO	5	84	
Lead	9×10^{-9}	0.0005	
Total HAPs	0.044	1.89	
Max Individual HAP	0.0033 (POM)	1.80 (hexane)	
Emissions (tons per year)			
PM	1.03	2.94	3.26
SO_2	22.21	0.23	0.26
VOC	0.11	2.13	2.36
NO_x	6.26	14.30	15.89
CO	1.56	32.46	36.07
Lead	2.8×10^{-9}	1.9×10^{-4}	2.15×10^{-4}
Total HAP	0.01	0.73	0.81
Max Individual HAP	0.001	0.70	0.77

* Fuel oil SO_2 emission factor is 142S, where S is the sulfur content in weight percent. Condition 3.2.2 limits the sulfur of fuel oil burned in B002A to no more than 0.5%.

In Table 3-1 of Application 820437, the five-year past actual emission data was included for the boiler that is being replaced, B002. This past actual emission data is summarized in the following table:

Pollutant	**B002 Five Year Average Past Actual Emissions (tpy)**
PM	0.7
SO_2	0.1
VOC	0.5
NO_x	26.7
CO	8.0
Lead	0.000048

Table 3 summarizes the emissions change due to shutting down Boiler B002 and adding Boilers B002B and B002T. These calculations assume that both boilers will continue to operate simultaneously. However, B002T is a temporary boiler to be used during the construction of B002A, and "UGA expects B002T to be onsite for no more than one year" (page 3-1 of Application 820437).

Table 3: Emissions Change Due to Modification

Pollutant	Is the Pollutant Emitted?	Net Actual Emissions Increase (Decrease) (tpy)	Net Potential Emissions Increase (Decrease) (tpy)
PM	Yes	6.5	6.5
PM_{10}	Yes	6.5	6.5
$PM_{2.5}$	Yes	6.5	6.5
SO_2	Yes	22.6	22.6
VOC	Yes	4.1	4.1
NO_x	Yes	9.8	9.8
CO	Yes	62.1	62.1
TRS	N/A		
H_2S	N/A		
Individual HAP	Yes	0	0
Total HAPs	Yes	0	0

C. PSD/NSR Applicability

As shown in the following table, the future potential emissions of boilers B002A and B002T are less than the PSD significance threshold for all pollutants. This project, therefore, is not subject to PSD review.

Pollutant	Future Potential Emissions (tpy)	PSD Significance Threshold (tpy)	Exceeds PSD Significance Threshold?
PM	7.23	25	No
PM_{10}	7.23	15	No
$PM_{2.5}$	7.23	10	No
SO_2	22.70	40	No
VOC	4.60	40	No
NO_x	36.45	40	No
CO	70.09	100	No
Lead	0.00041	0.6	No

III. Facility Wide Requirements

A. Emission and Operating Caps

There are no changes to the facility wide emission and operating caps.

B. Applicable Rules and Regulations

There are no changes in the facility-wide applicable rules and regulations.

C. Compliance Status

The company did not indicate any noncompliance issues in its application.

D. Permit Conditions

No changes are needed to facility-wide conditions.

IV. Regulated Equipment Requirements

A. Brief Process Description

This permit is for a 99.9 MMBtu/hr natural gas-fired boiler with fuel oil used as a backup fuel (to replace a similar boiler) and a temporary 99.9 MMBtu/hr natural gas-fired boiler. Steam and heat from the boilers are used to support the activities of the university.

B. Equipment List for the Process

Emission Units		Applicable Requirements/Standards	Air Pollution Control Devices	
ID No.	Description		ID No.	Description
B002A	Steam Plant – 99.999 MMBtu/hr, Victory Energy Model Boiler (natural gas and fuel oil)	391-3-1-.02(2)(d) 391-3-1-.02(2)(g) 391-3-1-.02(2)(lll) 40 CFR 60 Subpart A 40 CFR 60 Subpart Dc	N/A	None
B002T	Steam Plant – 99.9 mmBtu/hr, Nationwide Boiler Inc. Boiler (natural gas)	391-3-1-.02(2)(d) 391-3-1-.02(2)(g) 391-3-1-.02(2)(lll) 40 CFR 60 Subpart A 40 CFR 60 Subpart Dc	N/A	None

C. Equipment & Rule Applicability

Emission and Operating Caps

There are no changes to emission and operating caps in this permit amendment.

Applicable Rules and Regulations

All of the rules and regulations that apply to the replacement boiler and the temporary boiler already apply to the university. For clarity, all of the rules that apply to Boiler B002A and B002T are included in this narrative.

40 CFR 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Subpart Dc applies to steam generating units that commenced construction after June 9, 1989 and have a heat input capacity between 10 and 100 MMBtu/hr. Boilers B002A and B002T will be subject to Subpart Dc. Because Boiler B002A will be capable of burning distillate fuel oil, an initial performance test for visible emissions (VE) will be required. Periodic VE testing while burning fuel oil must be performed per the schedule described in 40 CFR 60.47c. No testing is required while burning natural gas. Monthly fuel consumption recordkeeping requirements also apply to the boilers.

40 CFR 63 Subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

Subpart JJJJJJ regulates emissions from boilers located at an area source of HAP emissions. Boilers B002A and B002T meet the definition of gas-fired boilers, so, per 63.11195(e), the University is not subject to Subpart JJJJJJ.

391-3-1-0.2(2)(d) – Fuel-Burning Equipment

Rule (d) limits emission of particulate matter from sources that meet the definition of "fuel-burning equipment". Boilers B002A and B002T are subject to Rule (d). These boilers have a particulate matter limit based on the equation in 391-3-1-.02(2)(d)2.(ii). Additionally, 391-3-1-.02(2)(d)3 limits visible emissions from the boilers to no greater than 20% opacity except for one six-minute period of not more than 27% opacity. Because the boilers will burn only natural gas or distillate fuel oil, compliance with the PM and opacity limit will easily be achieved.

391-3-1-.02(2)(g) – Sulfur Dioxide

Rule (g) applies to all "fuel burning" sources which includes boilers B002A and B002T. Per 391-3-1-.02(2)(g)2, fuel burning sources below 100 MMBtu/hr are limited to a fuel sulfur content of 2.5 percent. The boilers will burn natural gas or distillate fuel oil which has a sulfur content much lower than the level allowed by this rule.

Georgia Rule 391-3-1-.02(2)(lll) – NO_x Emissions from Fuel-Burning Equipment

Rule (lll) limits the emissions of NO_x from stationary sources in certain counties, including Clarke County, during the ozone season. The rule applies to fuel burning equipment with a heat input greater than or equal to 10 MMBtu that are constructed after May 1, 1999. Boilers B002A and B002T will be subject to this rule.

D. Permit Conditions

Condition 3.2.1 which established a fuel sulfur limit of 1.3 percent for Boilers B001 and B002 was modified to remove Boiler B002.

Condition 3.2.2 was updated to include boiler B002A. This condition limits the fuels that can be fired in Boilers B001, B002A, B003, and B004 to natural gas and distillate fuel oil. The condition allows these boilers to meet the definition of gas-fired boiler and avoid the requirements of 40 CFR 63 Subpart JJJJJJ.

Condition 3.3.1 was updated to include Boilers B002A and B002T. This condition establishes that boilers B002A, B002T, B004, B006, and B007 are subject to 40 CFR 60 Subpart Dc.

Condition 3.3.2 was updated to include Boiler B002A. This condition limits opacity from Boilers B002A and B004 while burning fuel oil per the requirements of Subpart Dc.

Condition 3.3.3 was updated to include Boiler B002A. This condition specifies that fuel oil burned in B002A and B004 is distillate fuel oil per the requirements of Subpart Dc.

Condition 3.4.1 was updated to remove Boiler B002. This condition establishes the PM limit for Boilers B001 (which was constructed before 1972) in accordance with Georgia Rule (d)1.(ii).

Condition 3.4.2 was updated to include Boilers B002A and B002T. This condition includes the allowed PM emissions for Boilers B002A, B002T, B003, B004, B006, and B007 per Georgia Rule (d)2(ii).

Condition 3.4.8 was updated to remove Boiler B002. This condition establishes visible emission limit from Boilers B001, the emergency generators, and from spray paint booth SB01 in accordance with Georgia Rule (b).

Condition 3.4.9 was updated to include Boilers B002A and B002T. This condition limits the NO_x emissions from Boilers B002A, B002T, and B004 during the ozone season per Georgia Rule (lll).

V. Testing Requirements (with Associated Record Keeping and Reporting)

Subpart Dc requires initial test for visible emissions for boilers capable of firing fuel oil. This test requirement is included in new Condition 4.2.2 for Boiler B002A.

VI. Monitoring Requirements (with Associated Record Keeping and Reporting)

Subpart Dc requires records of fuels burned in boilers. Condition 5.2.4 which requires fuel consumption meters (or other approved protocol) was updated to include Boilers B002A and B002T.

Condition 5.2.5 was updated to include Boilers B002A and B002T. This condition includes the monitoring requirements due to Georgia Rule (lll). These specific monitoring requirements are specified in the Division's Procedures for Testing and Monitoring Sources of Air Pollutants, Section 2.119.

Subpart Dc requires VE monitoring for boilers firing fuel oil. VE monitoring is not required when firing only natural gas. Conditions 5.2.6 through 5.2.8 which contain Subpart Dc requirements for monitoring opacity during fuel oil firing were updated to include Boiler B002A and references to new test requirement in Condition 4.2.2.

VII. Other Record Keeping and Reporting Requirements

Condition 6.1.7 was updated to include remove Boiler B002 and add Boilers B002A and B002T where where applicable.

Condition 6.2.1 was updated to include Boilers B002A and B002T. This condition requires monthly records of natural gas and fuel oil consumed per the requirements of Subpart Dc.

Condition 6.2.7 was updated to remove Boiler B002 and include Boilers B002A and B002T. This condition requires the facility to maintain monthly records of the amount of natural gas and fuel oil consumed in boilers and waste incinerators. These records are used in Conditions 6.2.8 through 6.2.10 to calculate HAP emissions.

Condition 6.2.14 was updated to remove Boiler B002 and include Boiler B002A. This condition requires records of all instances fuel oil was fired in boiler B001, B002A, B003, and B004. This a standard condition for facilities avoiding 40 CFR 63 Subpart JJJJJJ.

VIII. Specific Requirements

A. Operational Flexibility

No changes.

B. Alternative Requirements

No changes.

C. Insignificant Activities

No changes.

D. Temporary Sources

No changes.

E. Short-Term Activities

No changes.

F. Compliance Schedule/Progress Reports

No changes.

G. Emissions Trading

No changes.

H. Acid Rain Requirements/CAIR/CSPAR

No changes.

I. Prevention of Accidental Releases

No changes.

J. Stratospheric Ozone Protection Requirements

No changes.

K. Pollution Prevention

No changes.

L. Specific Conditions

No changes.

Addendum to Narrative

The 45-day EPA review started on month day, year and ended on month day, year. Comments were/were not received by the Division.

//If comments were received, state the commenter, the date the comments were received in the above paragraph. All explanations of any changes should be addressed below.//