



Statement of Basis

Minor Air Quality Permit

**Augustana College
Sioux Falls, South Dakota**

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1.0 Operational Description

On May 15, 1996, Augustana College in Sioux Falls, South Dakota, was issued its minor air quality operating permit (#28.0102-01) for the operation of three steam boilers and two emergency electrical generators. The permit included federally enforceable operating restrictions on the three boilers in order to limit sulfur dioxide emissions below the major source threshold for the Title V air quality operating permit program.

Augustana was issued a renewed minor air quality permit on October 12, 2004. During the term of this permit, the permit was revised as follows:

- On December 14, 2007, Augustana’s permit was modified to add one boiler and one generator.
- On February 29, 2008, Augustana’s permit was modified to permit to add one boiler and one generator.
- On March 31, 2008, Augustana’s permit was administratively amended to change responsible official, facility contact and permit contact information.

Augustana was issued a renewed minor air quality permit on November 4, 2009. During the term of this permit, the permit was revised as follows:

- On November 12, 2013, Augustana submitted an application to add one generator to its permit.
- March 14, 2014, Augustana’s permit was modified to add an emergency generator.

On September 9, 2014, the department received a renewal application for Augustana’s minor air quality operating permit.

1.1 Existing Equipment

Table 1-1 provides a description of the permitted equipment at Augustana College’s facility in Sioux Falls as listed in the March 14, 2014, minor air quality permit #28.0102-01.

Table 1-1 – Equipment Information

Unit	Description	Maximum Operating Rate	Control Device
#1	North Boiler – 1972 Kewanee steam boiler, model 7L291-KG02, fired with natural gas and distillate oil	22.1 MMBtus/hr heat input	Not applicable
#2	South Boiler – 1977 Kewanee steam boiler, model 7L291-KG02, fired with natural gas and distillate oil	22.1 MMBtus/hr heat input	Not applicable
#3	Boiler #3 – 1988 Kewanee steam boiler, model M335 KX, fired with natural gas and distillate oil	4.2 MMBtus/hr heat input	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
#4	Generator #1 – 1991 Caterpillar emergency electrical generator, model 3516, fired with distillate oil	1600 kilowatts heat output	Not applicable
#6	Hurst Boiler - 2006 Hurst low pressure steam boiler, model #0650199, fired by natural gas and fueled with distillate oil.	200 horsepower heat output	Not applicable
#7	Generator #2 - 2006 Caterpillar emergency generator, model #SR4B-GD. This unit is fired with distillate oil.	2,148 kilowatts heat output	Not applicable
#8	Generator #3 – 1988 Caterpillar combustion ignition emergency generator, model #3116. This unit is fired with distillate oil.	113 kilowatts heat output	Not applicable

2.0 New Source Performance Standards

DENR reviewed the following new source performance standards (NSPS) to determine if Augustana College is applicable to the following NSPS at this time.

2.1 Standards Applicable to Engines

There are two new source performance standards for stationary reciprocating compression ignition (CI) internal combustion engines (ICE). The two standards are applicable to the following engines:

1. 40 CFR Part 60, Subpart IIII is applicable to compression ignition engines that commence 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 (NFPA) fire pump engine after July 1, 2006 or are modified or reconstructed after July 11, 2005; and
2. 40 CFR Part 60, Subpart JJJJ is applicable to spark ignition engines that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:
 - a. On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 horsepower (except lean burn engines with a maximum engine power greater than or equal to 500 horsepower and less than 1,350 horsepower);
 - b. On or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 horsepower and less than 1,350 horsepower;
 - c. On or after July 1, 2008, for engines with a maximum engine power less than 500 horsepower;
 - d. On or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 kilowatts (25 horsepower); or
 - e. Owners and operators of stationary SI ICE that commence modification or reconstruction after June 12, 2006.

In accordance with 40 CFR § 60.4219, a compression ignition means a type of stationary internal combustion engine that is not spark ignition engine. Spark ignition means relating to a gasoline, natural gas, or liquefied petroleum gas fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle.

Unit #4 and Unit #8 were constructed and manufactured prior to 2005 and are not subject to this subpart. Unit #7 was manufactured after 2005 and is considered a compression ignition engine. Therefore, Unit #7 is subject to this subpart.

Based upon the informational sheets submitted in the February 28, 2007 application, Unit #7 has a displacement of 69 liters, with 16 cylinders or 4.3 liters displacement per cylinder, and an electrical output of 2,148 kilowatts (kW). Unit #7 is considered emergency stationary CI ICE with a displacement less than 10 liters per cylinder, have a maximum engine power greater than 37 kW, and is not a fire pump. As noted in 40 CFR § 60.4205(a) owner and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards of listed in Table 2-1 below.

Table 2-1 - Emission Standards

Maximum engine power	Emission standards for stationary pre-2007 model year engines with a displacement of <10 liters per cylinder g/KW-hr (g/HP-hr) ¹			
	HC	NO _x	CO	PM
KW>560 (HP>750)	1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)

¹ - g/KW-hr: grams per kilowatts-hour and g/HP-hr: grams per horsepower-hour.

Based upon the manufacturer performance data submitted, Table 2-2 below summarizes the manufacturer's limits do not exceed emission limits for the generator set in Subpart IIII.

Table 2-2 - Generator Emissions

Pollutant (g/KW-hr) ¹	HC	NO _x	CO	PM
Unit #7	1.3	9.2	11.4	0.54

¹ - g/KW-hr: grams per kilowatts-hour.

Therefore, Unit #7 is capable of operating the generator in compliance with the emission standards in 40 CFR § 60.4205(a).

2.2 Standards Applicable to Boilers

There are three New Source Performance Standards for fossil fuel-fired steam boilers. The three standards are applicable to the following steam boilers:

1. 40 CFR Part 60, Subpart D: applicable to a steam generator with a maximum operating rate of 250 million Btus per hour or more and commenced construction after August 17, 1971;

2. 40 CFR Part 60, Subpart Db: applicable to a steam generator with a maximum operating rate of 100 million Btus per hour or more and commenced construction after June 19, 1984; and
3. 40 CFR Part 60, Subpart Dc: applicable to a steam generator with a minimum design heat input capacity equal to or greater than 10 million Btus per hour but less than or equal to 100 million Btus per hour and commenced construction after June 9, 1989.

Unit #1, #2, and #3 were constructed prior to 1989 and have a heat input less than 100 million Btus. Therefore these three boilers are not applicable to these subparts. Unit #6 was built after June 9, 1989; however the heat input for Unit #6 is less than 10 million Btu per hour. Therefore, Unit #6 is not applicable these new source performance standards.

3.0 New Source Review

ARSD 74:36:10:01 states that New Source Review (NSR) regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. Augustana College is located in Sioux Falls, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, Augustana College is not subject to NSR review.

4.0 Prevention of Significant Deterioration (PSD)

Any stationary source which emits or has the potential to emit 250 tons per year or more of any air pollutant is considered a major source and is subject to prevention of significant deterioration (PSD) requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). Any stationary source which emits or has the potential to emit 100 tons per year or more of any air pollutant and is one of the 28 named PSD source categories is subject to PSD requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). The following is a list of regulated pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO₂);
5. Nitrogen oxides (NO_x);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases. Augustana is not one of the 28 named PSD source categories; therefore, its PSD threshold for pollutants is 250 tons per year, except for greenhouse gas emissions.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program and Title V air quality operating permit program. Under the Clean Air Act, PSD and Title V air quality operating permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases, would greatly increase the number of facilities requiring a PSD review or Title V air quality operating permit. Based on administrative necessity, EPA increased these thresholds through the “Tailoring Rule.”

On May 13, 2010, EPA issued the final version of the “Tailoring Rule” for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

The US Supreme Court heard challenges to EPA’s “Tailoring Rule”. On June 24, 2014, the Supreme Court decided greenhouse gases may not be regulated under the PSD program unless the facility requires a PSD permit for the other regulated air pollutants.

4.1 Potential Emissions

The Department uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, the Department relies on manufacturing data, material balance, EPA’s Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant’s application, or other methods to determine potential air emissions.

Potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application and assuming the unit operates every hour of every day of the year, while using the fuel that will emit the greatest emissions. Potential emissions are not realistic of the actual emissions and are used only to identify which air quality permit and requirements are applicable.

4.2 Generator – Criteria Air Pollutants

The emission factors for each applicable pollutant are derived from the Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1). Unit #4 and Unit #7 are considered large stationary diesel engines as the rated power for the engines is greater than 600 horsepower. Unit #8 is considered an industrial stationary diesel engine as the rated power for this engine is less than 600 horsepower. Table 4-1 shows the specific pollutant emission factors associated with the engine classification while burning distillate oil. The emission factors are from Table 3.4-1, 3.4-3, and 3.4-4, October 1996 for large generators. The emission factors for industrial generators are from Table 3.3-1, October 1996.

Table 4-1 – Emission Factors for Stationary Internal Combustion Engines for Distillate Oil

Unit	Pounds per million Btu					
	TSP	PM ₁₀	SO ₂ ^a	NO _x	VOCs	CO
Large Engines	0.0697	0.0573	1.01 x S ₁	3.2	0.082	0.85
Industrial Engines ^{b,c}	0.3	0.3	0.29	4.41	0.4	0.95

^a –The permit contact confirmed that the facility uses distillate oil with ultra-low sulfur.

^b - TOC is by weight 9% methane and 91% nonmethane, therefore the VOCs was calculated by multiplying the TOC (.91) by 0.35.

^c -10 = particulate matter less than or equal to 10 μm aerodynamic diameter. All particulate is assumed to be # 1 μm in size.

The application indicates that the generators will be used for emergency use only. Therefore, the emergency generators' potential emissions will be based on operating each unit 500 hours per year. Equation 4-2 calculates the generators' potential emissions of each pollutant based on the heat input found using equation 4-1, the emission factor in Table 4-1, and 500 operating hours per year.

The emission factors are based on the heat input of the unit in million Btus per hour. Equation 4-1 calculates the heat input for the emergency generators.

Equation 4-1 – Heat Input Calculations

$$HeatInput \left[\frac{MMBtu}{hr} \right] = \left(\frac{OperatingRate[kw] * 3410 \left[\frac{Btu}{kw * hp} \right]}{10^6 \left[\frac{Btu}{MMBtu} \right] * 35\%} \right)$$

Unit #4 has a heat input of 15.6 MMBtu/hr. Unit #7 has a heat input of 20.9 MMBtu/hr. Unit #8 has a heat input of 1.1 MMBtu/hr.

Equation 4-2 – Generator potential emissions

$$\text{Potential} \left[\frac{\text{tons}}{\text{yr}} \right] = \text{input capacity} \left[\frac{\text{MMBtu}}{\text{hr}} \right] \times \text{emission factor} \left[\frac{\text{lbs}}{\text{MMBtu}} \right] \times 500 \left[\frac{\text{hr}}{\text{yr}} \right] \div 2000 \left[\frac{\text{lb}}{\text{ton}} \right]$$

Table 4-2 summarizes the potential uncontrolled emissions from the emergency generators located at the facility.

Table 4-2 - Potential Uncontrolled Emissions from Emergency Generator (tons per year)

Unit	Pollutant						
	TSP	PM ₁₀	PM _{2.5}	SO ₂	NO _x	VOCs	CO
#4	0.27	0.22	0.22	0.01	12.5	0.32	3.32
#7	0.36	0.30	0.30	0.01	16.7	0.43	4.44
#8	0.09	0.09	0.09	0.08	1.21	0.09	0.26

4.3 Boiler – Criteria Air Pollutants

The air pollutant emission factors for boilers are derived from EPA’s AP-42 – Fifth Edition. Boilers are classified according to their design capacity. AP-42 states that small boilers have a heat input capacity less than 100 million Btus per hour. Based on the boiler’s heat input capacity listed in the application, the boilers are classified as small boilers. Emission factors for natural gas were derived from Table 1.4-1, Table 1.4-2, and Table 1.4-3. Emission factors for distillate oil were derived from Table 1.3-1, Table 1.3-3, and Table 1.3-4. The emission factors for the boilers are summarized in Table 4-3.

Table 4-3 – Uncontrolled Emission Factors for Boilers

Pollutant	TSP	PM ₁₀	PM _{2.5}	SO ₂ ^{1,2}	NO _x	CO	VOCs
Natural Gas (lbs/MMBtus) ³	0.007	0.007	0.007	0.0006	0.1	0.08	0.005
#2 Fuel Oil (lbs/MMBtus) ⁴	0.014	0.014	0.014	1.01*S	0.17	0.035	0.002

¹ - S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.

² - The permit contact confirmed that the facility uses distillate oil with ultra-low sulfur.

² - To convert from pounds per million standard cubic feet to pounds per million Btus, divide the emission factor by 1,020 Btus per standard cubic foot; and

³ - To convert from pounds per 1,000 gallons to pounds per million Btus, divide by 140.

The application provides the heat input of Unit #1, #2 and #3. Equation 4-3 was used to calculate the heat input for Unit #6.

Equation 4-3 – Heat Input Calculations

$$\text{HeatInput} \left[\frac{\text{MMBtu}}{\text{hr}} \right] = \left(\frac{\text{OperatingRate} [\text{hp}] * 33446 \left[\frac{\text{Btu}}{\text{hr} * \text{hp}} \right]}{10^6 \left[\frac{\text{Btu}}{\text{MMBtu}} \right] * 80\%} \right)$$

The heat input for Unit #6 is 8.4 MMBtus/hr.

Equation 4-4, the appropriate emission factor from Table 4-3, and heat input were used to calculate the potential emissions from the boilers fired by natural gas and #2 fuel oil for all pollutants.

Equation 4-4 – Uncontrolled Emission Calculations

$$\text{Uncontrolled Emissions} \left[\frac{\text{tons}}{\text{year}} \right] = \left(\frac{\text{Emission Factor} \left[\frac{\text{pounds}}{\text{MMBTU}} \right] * \text{Annual Operations} \left[\frac{\text{hr}}{\text{year}} \right] * \text{Heat Input} \left[\frac{\text{MMBtu}}{\text{hr}} \right]}{2000 \left[\frac{\text{pounds}}{\text{tons}} \right]} \right)$$

Table 4-4 summarizes the uncontrolled emissions from Unit #1, #2, #3 and Unit #6 fired by natural gas and #2 fuel oil.

Table 4-4 – Total Uncontrolled Emissions from Boilers

Natural Gas	TSP	PM10	PM2.5	SO ₂	NO _x	CO	VOCs
Unit #1	0.68	0.68	0.68	0.06	9.68	7.74	0.48
Unit #2	0.68	0.68	0.68	0.06	9.68	7.74	0.48
Unit #3	0.13	0.13	0.13	0.01	1.84	1.47	0.09
Unit #6	0.26	0.26	0.26	0.02	3.68	2.94	0.18
#2 Fuel Oil	TSP	PM10	PM2.5	SO ₂	NO _x	CO	VOCs
Unit #1	1.36	1.36	1.36	0.15	16.5	3.39	0.19
Unit #2	1.36	1.36	1.36	0.15	16.5	3.39	0.19
Unit #3	0.26	0.26	0.26	0.03	3.13	0.64	0.04
Unit #6	0.52	0.52	0.52	0.06	6.25	1.29	0.07

4.4 Facility Potential Emissions

Table 4-5 summarizes Augustana’s potential uncontrolled emissions from their operations.

Table 4-5– Facility Potential Uncontrolled Emissions (tons per year) ¹

Unit	Pollutant						
	TSP	PM10	PM2.5	SO _x	NO _x	CO	VOC
#1 – Distillate Oil	1.36	1.36	1.36	0.15	16.5	3.39	0.19
#2 – Distillate Oil	1.36	1.36	1.36	0.15	16.5	3.39	0.19
#3 – Distillate Oil	0.26	0.26	0.26	0.03	3.13	0.64	0.04
#6 – Distillate Oil	0.52	0.52	0.52	0.06	6.25	1.29	0.07
#4	0.27	0.22	0.22	0.01	12.5	0.32	3.32
#7	0.36	0.30	0.30	0.01	16.7	0.43	4.44
#8	0.09	0.09	0.09	0.08	1.21	0.09	0.26
Facility Totals:	4.0	4.0	4.0	0.5	73.0	10.0	9.0

¹ – Facility Totals were calculated using the worst case scenario for each boiler, distillate oil.

4.5 PSD Summary

Augustana's potential criteria pollutant emissions are less than 250 tons per year. Therefore, Augustana is considered a minor source and is not applicable to the PSD program. Based on the US Supreme Court's decision and because Augustana's is not applicable to the PSD program, a review for greenhouse gas emissions is not warranted or required.

Augustana uses distillate oil with ultra-low sulfur content. The reduced sulfur content lowers the potential amount of sulfur emissions to less than 100 tons per year. Therefore, Augustana will no longer be required to have a limit on the annual amount of distillate oil usage and all record keeping and reporting requirements will no longer be necessary.

5.0 National Emission Standards for Hazardous Air Pollutants

The Department reviewed the national emission standards for hazardous standards and determined Augustana is not applicable to any standards under 40 CFR Part 61.

6.0 Maximum Achievable Control Technology Standards

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

6.1 Potential HAP Emissions

The Department uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

6.2 Generator - Potential HAP Emissions

AP-42, Table 3.3-2, October 1996 and Table 3.4-3 and 3.4-4, October 1996, list the hazardous air pollutants emission factors for an industrial engine at 0.00379 pounds per million Btus and 0.00149 pounds per million Btus for large generators.

The conversion factor was derived from AP-42, Appendix A, page A-29, January 1995, and already accounts for the efficiency of the unit. Using Equation 4-2, the hazardous air pollutant emission factors, the heat input, and assuming 500 hours of operation per year, the potential hazardous air pollutant emissions for the emergency generators are included in Table 6-1.

Table 6-1 – Potential HAP Emissions (Ton/Year)

Unit	HAPs
#4	0.01
#7	0.01
#8	0.00

6.3 Boiler - Potential HAP Emissions

Each boiler at Augustana is fired with natural gas and distillate oil. The hazardous air pollutant emission factor for firing the boilers burning natural gas is derived from AP-42, Table 1.4-3, 7/98 and is 1.91 pounds per cubic foot. In order to obtain the uncontrolled emissions in units of tons per year it is necessary to convert the emission factor from a volume basis to an energy basis. A factor of 1,020 Btus per standard cubic foot will be used.

The hazardous air pollutant emission factor for firing the boilers with #2 fuel oil is derived from AP-42, Table 1.3-3, 5/10 and is 0.34 pounds per 1,000 gallons. A factor of 140 Btus per 1,000 gallons will be used to convert the emission fact from a volume basis to an energy basis.

Equation 4-4 was used to calculate the potential emissions from the boilers fired with natural gas and distillate oil. Table 6-2 summarizes the hazardous air pollutants from each boiler.

Table 6-2 Potential HAP Emissions (Ton/Year)

Natural Gas	HAPs
Unit #1	0.18
Unit #2	0.18
Unit #3	0.03
Unit #6	0.07
#2 Fuel Oil	HAPs
Unit #1	0.23
Unit #2	0.23
Unit #3	0.04
Unit #6	0.09

6.4 Facility Potential Emissions

Table 6-3 summarizes Augustana’s potential hazardous air pollutant emissions from their operations.

Table 6-3– Facility Potential Uncontrolled Emissions (tons per year) ¹

Unit	Pollutant
	HAPs
#1 – Distillate Oil	0.23
#2 – Distillate Oil	0.23
#3 – Distillate Oil	0.04
#6 – Distillate Oil	0.09
#4	0.01

#7	0.01
#8	0.00
Facility Totals:	0.6

¹ – Facility Totals were calculated using the worst case scenario for each boiler, distillate oil.

When fueled with natural gas or #2 fuel oil, the potential hazardous air pollutant emissions are less than the major source threshold under the Title V air quality operating permit program. Therefore, Augustana is considered an area source for hazardous air pollutants.

DENR reviewed the MACT standard under 40 CFR 63 and determined the following may be applicable.

6.5 Standards Applicable to Engines

Subpart ZZZZ is applicable to any existing, new, or reconstructed stationary reciprocating internal combustion engines located at a major or area source of hazardous air pollutant emissions, excluding stationary reciprocating internal combustion engines being tested at a stationary reciprocating internal combustion engines test cell/stand.

Generators constructed prior to June 12, 2006 are considered existing generators. Unit #4 and Unit #8 were constructed before 2006 and are located at an area source. However, according to EPA’s Memorandum “Guidance Regarding Definition of Residential, Commercial, and Institutional Emergency Stationary RICE in the NESHAP for Stationary RICE” released on August 9, 2010, the facility is considered an institutional business. An emergency generator operated at an institutional facility is exempt from the requirements of Subpart ZZZZ Section 63.6585(f)3. The applicant identifies that the emergency generator can demonstrate compliance with the exemption requirements of Subpart ZZZZ. Therefore, Unit #4 and Unit #8 are not applicable to Subpart ZZZZ.

6.6 Standards Applicable to Boilers

There are two maximum achievable control technology standards for boilers. The two standards are applicable to the following engines:

1. Subpart JJJJJ is applicable to any new or existing industrial, commercial and institutional boiler located at an area source of hazardous air pollutants. A new boiler is defined as a boiler where construction was commenced after June 4, 2010 and the boiler meets the applicability criteria at the time construction was commenced. An existing boiler is defined as a boiler where construction or reconstruction occurred prior to June 4, 2010. The subpart excludes boilers that are residential boilers according to the definition.
2. Subpart DDDDD is applicable to any new or existing industrial, commercial and institutional boiler located at a major source of hazardous air pollutants. A new boiler is defined as a boiler where construction was commenced after June 4, 2010 and the boiler meets the applicability criteria at the time construction was commenced. An existing boiler is defined as a boiler where construction or reconstruction occurred prior to June 4, 2010.

Augustana's potential to emit is less than 10 tons per year for a single HAP and less than 25 tons per year for a combination of HAPs. Therefore, Augustana is an area source and none of the boilers are not applicable to Subpart DDDDD. Each boiler is considered a residential boiler as defined by Subpart JJJJJ in 40 CFR 63.11195(i). Therefore, Unit #1, Unit #2, Unit #3 and Unit #6 are not applicable to Subpart JJJJJ.

7.0 State Requirements

7.1 Permit Type

According to ARSD 74:36:05:03, a facility is required to obtain a Title V air quality permit if the source has the potential to emit more than 100 tons of a criteria pollutant (nitrogen oxide, volatile organic compounds, PM10, carbon monoxide, lead and ozone), has the potential to emit more than 10 tons of a single hazardous air pollutant, and has the potential to emit more than 25 tons of any combination of a hazardous air pollutants, or is applicable to a New Source Performance Standard or a MACT standard. Augustana's emissions of the criteria pollutants are less than 100 tons per year, and hazardous air pollutant emissions are less than 10 tons per year for a single hazardous air pollutant and 25 tons per year of any combination of hazardous air pollutant. Therefore, a Title V air quality permit is not required due to the criteria pollutant emissions.

The New Source Performance Standard applicable to the facility was promulgated under section 111 of the Clean Air Act. However, 40 CFR § 60.4200(c), an area source (minor) is not required to obtain a Title V permit if the only reason for the Title V permit is the requirement of Subpart IIII or Subpart JJJJJ. Therefore, A Title V air quality permit is not required due to a federal standard.

Any source operating in South Dakota that meets the definition of a minor source under the ARSD 74:36:04:02 are required to obtain a minor air quality permit. In accordance with ARSD 74:36:04:02.01, a minor source is exempt from obtaining a minor source operating permit if the source has the potential to emit 25 tons per year or less of any criteria pollutant, except lead, before the application of control equipment. Augustana has the potential to emit criteria pollutants greater than 25 tons per year. Therefore, Augustana is still required to have a minor air quality permit for the operations at this facility.

7.2 State Air Emission Limits

Total suspended particulate and sulfur dioxide emission limits are applicable to fuel burning units. Augustana's operations involve fuel burning units. Unit #7 already has federal limits for particulate matter and sulfur dioxide and therefore the state emissions limits do not apply. The total suspended particulate and sulfur dioxide emission limits for fuel burning units are derived from ARSD 74:36:06:02.

The maximum heat input values for Unit #3, #6 and #8 are less than 10 million Btus per hour. Based on ARSD 74:36:06:02(1)(a), the state's total suspended particulate emission limit for fuel burning units with a heat input capacity less than 10 million Btus per hour may not exceed 0.6 of particulate matter per million Btus of heat input.

The maximum heat input values for Unit #1, #2, and #4 are greater than 10 million Btus per hour. Equation 7-1, derived from ARSD 74:36:06:02(1)(b), is used to calculate the state's total suspended particulate emission limit for fuel burning units with a heat input capacity greater than 10 million Btus per hour. Where H is the heat input in millions of Btus per hour.

Equation 7-1 – State Total Suspended Particulate Emission Limit

$$E = 0.811H^{-0.131}$$

Where:

E = the allowable particulate emissions rate in pounds per million Btus of heat; and

H = heat input in millions of Btus per hour.

In accordance with ARSD 74:36:06:02(2), the sulfur dioxide emission limit for a fuel burning unit is 3.0 pounds per million Btus heat input. Therefore the sulfur dioxide emission limit for each unit will be 3.0 pounds per million Btus heat input.

Tables 7-1 and 7-2 compare the applicable state total suspended particulate and sulfur dioxide limits with the potential total suspended particulate and sulfur dioxide emission rates

Table 7-1 - Total Suspended Particulate Limit Comparison

Unit	Total Suspended Particulate (lbs/MMBtus)	
	Potential Emission Rate	Emission Limit
#1	0.01	0.5
#2	0.01	0.5
#3	0.01	0.6
#4	0.07	0.6
#6	0.01	0.6
#8	0.3	0.6

Table 7-2 - Sulfur Dioxide Limit Comparison

Unit	Sulfur Dioxide (lbs/MMBtus)	
	Potential Emission Rate	Emission Limit
#1	0.002	3.0
#2	0.002	3.0
#3	0.002	3.0
#4	0.002	3.0
#6	0.002	3.0
#8	0.3	3.0

Based on the comparison, Augustana College is capable of operating each unit in compliance with the state air emission limits.

7.3 State Restrictions on Visible Emissions

Visible emissions are applicable to any unit that discharges to the ambient air. In accordance with ARSD 74:36:12, a facility may not discharge into the ambient air more than 20 percent opacity for all units. Augustana College must control the opacity at less than 20 percent for each unit.

8.0 Recommendation

Augustana College will be required to operate within the requirements stipulated in the following regulations under the minor air quality permit program:

- ARSD 74:36:04 – Operating Permits for Minor Sources;
- ARSD 74:36:06 – Regulated Air Pollutant Emissions;
- ARSD 74:36:07 – New Source Performance Standards;
- ARSD 74:36:08 – National Emission Standards for Hazardous Air Pollutants; and
- ARSD 74:36:12 – Control of Visible Emissions.

Based on the information submitted in the air quality permit application, the department recommends that Augustana College's existing minor permit be renewed. Any questions on this review should be directed to April Soukup, Engineer I, Department of Environment and Natural Resources.