Statement of Basis

Title V Air Quality Operating Permit Renewal

South Dakota State University

Brookings, South Dakota

South Dakota Department of Environment and Natural Resources

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1.0 Operational Description

1.1 Background

On March 26, 1998, the South Dakota State University (SDSU) was issued Title V air quality operating permit #28.2201-06M for their operations in Brookings, South Dakota. The "M" at the end of the permit number identified the facility as having a medical waste incinerator. The South Dakota Department of Environment and Natural Resources (DENR) no longer use that type of identification so the permit number will be changed to #28.2201-06.

SDSU was permitted to operate four small industrial boilers in a centralized boiler plant. The units provided high temperature hot water for space heating which was distributed to various buildings on campus through underground piping. Boiler #4, #5 and #6 were coal-fired stoker units capable of operating on coal or natural gas and Boiler #7 was fired just by natural gas. SDSU also was permitted to operate a 1994 Advanced Combustion Systems incinerator located in the Animal Disease Research and Diagnostic Laboratory. SDSU requested exemption from the new source performance standards for a hospital/medical/infectious waste incinerator (40 CFR Part 60 Subpart Ce) as a co-fired combustor. The incinerator is used mainly to dispose of animal carcasses (pathological waste) used for research and disease investigations.

The Title V air quality operating permit was revised several times during the lifetime of the permit. The revisions consisted of adding Boiler #8 fired with natural gas and distillate oil. SDSU requested fuel use restrictions to avoid a Prevention of Significant Deterioration (PSD) review. Boiler #8 was restricted to consuming less than or equal to 1,100,000 gallons of distillate oil per 12-month period.

On May 29, 2007, SDSU's Title V air quality operating permit was renewed. In the statement of basis for this renewal, two existing boilers which were not included in the existing Title V air quality operating were identified as insignificant. The following identifies the two boilers which were included in the application DENR received March 1, 2002:

1. 2001 Hurst firebox boiler, model #S45-X-37.5-30W, fired with natural gas and distillate oil. The maximum design capacity is 1.6 million Btu per hour heat input; and
2. 2001 Hurst firebox boiler, model #S45-X-37.5-30W, fired with natural gas and distillate oil. The maximum design capacity is 1.6 million Btu per hour heat input.

These two units will also be looked at to determine if they are still considered insignificant.

1.2 Existing Operations

Table 1.1 provides a description of the permitted units, operations, and processes derived from SDSU's existing Title V air quality operating permit issued May 29, 2007.

Table 1.1 – Description of Existing Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device(s)
#1	Boiler #4 – 1948 Babcock & Wilcox	38.0 million Btu	Mechanical collector

Unit	Description	Maximum Operating Rate	Control Device(s)
	steam boiler with spreader stoker dump grates, model #FF-15-NAA, fired with natural gas.	per hour heat output	and a 1992 Zurn pulse jet type baghouse
#2	Boiler #5 – 1960 Babcock & Wilcox steam boiler with spreader stoker dump grates, model #FP-18-N44, fired with bituminous coal and natural gas.	50.0 million Btu per hour heat output	Mechanical collector, 1992 Zurn cyclone and 1992 Zurn pulse jet type baghouse
#3	Boiler #6 – 1968 Babcock & Wilcox steam boiler with spreader stoker dump grates, model #FP-18-NAA, fired with bituminous coal and natural gas.	50.0 million Btu per hour heat output	Mechanical collector, 1992 Zurn cyclone and 1992 Zurn pulse jet type baghouse
#4	Boiler #7 – 1982 Kewanee steam boiler, model #H3S400G, fired with natural gas.	13.0 million Btu per hour heat output	Not applicable
#5	Boiler #8 – 1999 Johnston steam boiler, model #PFTA-1500-4LG150S, equipped with a low NOx burner. The unit is fired with natural gas and distillate oil.	1,500 horsepower	Not applicable
#6	1994 ADR Advanced Combustion Systems single chambered incinerator, model #CA-1000, fired with natural gas.	200 pounds per hour	Not applicable

1.3 Permit renewal application

On February 16, 2012, SDSU submitted an application to renew its Title V air quality operating permit. The application was supplemented on March 15, 2012, February 27, 2015, June 29, 2015, and September 8, 2015.

In the June 29, 2015 application, SDSU identified that Boiler #4 and #7 were demolished and removed from the Central Heating Plant. In addition SDSU ceased burning coal in Boiler #5 and #6 and will only burn natural gas in the future. Finally, SDSU submitted applications for the emergency generators on campus which are displayed in Table 1.2. Additional information on the emergency generators was collected during an air quality inspection in July 2016.

Table 1.2 – Emergency Generators

Unit	Location	Generator	Type	Maximum	
				Kilowatts	MMBtu/hr
#9	Administration East	2011 Generac	Spark	150	1.5
#10	Administration West	2015 Generac	Spark	170	1.7
#11	Animal Resource Wing	2004 Caterpillar	Compression	700	6.8
#12	Animal Science Complex #1	1976 Caterpillar	Compression	100	1.0
#13	Animal Science Complex #2	2013 Generac	Compression	60	0.6
#14	Central Heating Plant	1990 Onan	Compression	500	4.9
#15	Daktronics Engineering Hall #1	2008 Yamaha	Spark	3.5	0.03
#16	Daktronics Engineering Hall #2	2008 Yamaha	Spark	6	0.06

Unit	Location	Generator	Type	Maximum	
				Kilowatts	MMBtu/hr
#17	Daktronics Engineering Hall #3	2008 Kohler	Spark	12	0.1
#18	Daktronics Engineering Hall #4	2010 Kohler	Spark	15	0.2
#19	Facilities and Services	1989 Kohler	Compression	200	2.0
#20	Northern Plains Biostress	1992 Onan	Compression	250	2.4
#21	Performing Arts Center	2002 Onan	Compression	35	0.3
#22	Physical Education Center	1972 Caterpillar	Compression	80	0.8
#23	Wagner Hall	1972 Onan	Spark	35	0.3
#24	University Student Union	2004 Caterpillar	Compression	60	0.6
#25	SDSU UPD & Stadium	2014 Caterpillar	Compression	200	2.0
#26	Swine Unit	2016 MTU Onsite Power	Compression	80	0.8
#27	Cow/Calf Unit	2013 Kohler	Compression	62	0.6

Each emergency generator is listed by its maximum heat output in kilowatts. Equation 1-1 was used to convert kilowatts to a heat input rate of million Btu per hour using the kilowatt ratings in Table 1.2, a conversion factor of 3.413×10^3 and assuming each generator has an efficiency capacity of 35%. The results can be viewed in Table 1.2.

Equation 1-1 – Converting heat output to heat input

$$Heat\ input \frac{MMBtus}{hour} = \frac{Heat\ output(kilowatts) \times 3{,}413 \frac{Btus/hr}{kilowatt}}{35\% \times 10^6 \frac{Btus}{MMBtus}}$$

The application was considered complete on August 11, 2016.

1.4 Construction permit

On May 9, 2012, SDSU was issued air quality construction permit #28.2201-06-01C for the construction and operation of Boiler #9 and #10 each fired with natural gas and distillate oil. In the June 29, 2015, application, SDSU requested that Boiler #9 (Unit #7) and #10 (Unit #8) be incorporated in the Title V air quality operating permit. Table 1.3 provides the specifications for the new equipment as identified in the construction permit.

Table 1.3 – Description of Permitted Units, Operations, and Processes in Construction Permit

Unit	Description	Maximum Operating Rate	Control Device
#7	Boiler #9 – 2012 Victory Energy steam boiler, model D Type Water Tube DT-3-64, equipped with a low NOx burner and flue gas recirculation. The unit is fired with natural gas and distillate oil.	76.2 million Btu per hour heat input	Not applicable
#8	Boiler #10 – 2012 Victory Energy steam boiler, model D Type Water Tube DT-2-44, equipped with a low NOx burner and	41.1 million Btu per hour heat input	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
	flue gas recirculation. The unit is fired with natural gas and distillate oil.		

2.0 New Source Performance Standards

DENR reviewed the federal new source performance standards in 40 CFR Part 60 and determined that the following may be applicable.

2.1 Incinerator

The New Source Performance Standard under ARSD 74:36:07:06, as referenced to 40 CFR Part 60 Subpart E is applicable to incinerators that have the potential to incinerate more than 50 tons of material per day and commenced construction or modification after August 17, 1971. Equation 2-1 calculates the daily incineration rate for SDSU's incinerator.

Equation 2-1 – Daily incineration rate

$$Daily\ Incineration\ Rate = \frac{200\ \frac{lbs}{hour} \times 24\frac{hours}{day}}{2{,}000\frac{lbs}{ton}} = 2.4\ \frac{tons}{day}$$

The incinerator has a potential capacity of 2.4 tons per day; therefore, it is not applicable to Subpart E.

2.2 Existing Hospital/Medical/Infectious Waste Incinerator

The New Source Performance Standard under ARSD 74:36:07:06.01, as referenced to 40 CFR Part 60, Subpart Ce is applicable to each hospital/medical/infectious waste incinerator that commenced construction on or before June 20, 1996. A hospital/medical/infectious waste incinerator means any device that combusts any amount of hospital waste and/or medical/infectious waste.

The medical waste incinerator at SDSU was constructed before June 20, 1996. Therefore, Subpart Ce is applicable to SDSU's medical waste incinerator. However, a unit is exempt from Subpart Ce if the combustor only burns pathological waste, low-level radioactive waste, and/or chemotherapeutic waste. SDSU does burn some hospital/medical/infectious waste and is not eligible under this exemption.

Another exemption is available for co-fired combustors that limit the amount of hazardous/medical/infectious waste to less than 10% by weight of the total waste combusted. SDSU fits the definition of a co-fired combustor because it burns more than one type of solid waste. SDSU stated in their permit application that it would burn less than 10% hospital/medical/infectious waste.

The permit will be drafted to ensure SDSU burns less than 10% hospital/medical/infectious waste and is exempt from Subpart Ce. To demonstrate compliance with the operational limit, SDSU will be required to maintain records of the type of waste and weight of all waste burned in the incinerator. SDSU will be required to report on a calendar quarter basis the amount of each type of waste burned and the percentage of that type of waste compared to the total waste burned in the incinerator.

2.3 New Hospital/Medical/Infectious Waste Incinerator

The New Source Performance Standard under ARSD 74:36:07:06.02, as referenced to 40 CFR Part 60, Subpart Ec is applicable to each hospital/medical/infectious waste incinerator that commenced construction after June 20, 1996. A hospital/medical/infectious waste incinerator means any device that combusts any amount of hospital waste and/or medical/infectious waste.

The medical waste incinerator at the SDSU was constructed before June 20, 1996. Therefore, Subpart Ec is not applicable.

2.4 Standards Applicable to Boilers

There are three New Source Performance Standards for fossil fuel-fired boilers which are:

1. ARSD 74:36:07:02, as referenced to 40 CFR Part 60, Subpart D: applicable to a steam generator with a maximum operating rate of 250 million Btu per hour or more and commenced construction after August 17, 1971;
2. ARSD 74:36:07:04, as referenced to 40 CFR Part 60, Subpart Db: applicable to a steam generator with a maximum operating rate of 100 million Btu per hour or more and commenced construction after June 19, 1984; and
3. ARSD 74:36:07:05, as referenced to 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 Btu per hour but less than or equal to 100 million Btu per hour and commenced construction after June 9, 1989.

The boilers operated at SDSU were constructed after August 17, 1971, but have a maximum operating rate less than 250 million Btu per hour. Therefore, the boilers are not subject to Subpart D.

Boiler #5 and #6 were constructed prior to June 19, 1984 and are not subject to Subpart Db or Dc. Boiler #8, #9, #10, and the two insignificant activity boilers were all constructed after June 9, 1989, but have a maximum design operating rate less than 100 million Btu per hour and are therefore, not subject to Subpart Db.

Boiler #8 has a maximum operating rate of 60.5 million Btu per hour heat input. Therefore, Boiler #8 is subject to Subpart Dc. Boiler #9 and #10 have a maximum operating rate of 76 and 41 million Btu per hour, respectively. Therefore Boiler #9 and #10 are subject to Subpart Dc. The two insignificant activity boilers are rated at less than 10 million Btu per hour heat input and not subject to Subpart Dc.

In accordance with 40 CFR § 60.43c (d)(4), only Boiler #8 is applicable to the particulate limit

since it was constructed prior to February 28, 2005. Boiler #9 and #10 were constructed in 2012 and are not required to meet the particulate limit.

2.5 Standards Applicable to Engines

There are two new source performance standards for stationary reciprocating 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 (CI) internal combustion 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 (SI) internal combustion 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.

Table 2.1 provides a list of emergency engines with compression ignition operated at SDSU. SDSU has 12 emergency engines that are compression internal combustion engines and four of them are subject to Subpart IIII.

Table 2.1 – Emergency Engines - Compression

Unit	Location	Generator	Subject to Subpart IIII
#11	Animal Resource Wing	2004 Caterpillar	No
#12	Animal Science Complex #1	1976 Caterpillar	No
#13	Animal Science Complex #2	2013 Generac	Yes
#14	Central Heating Plant	1990 Onan	No
#19	Facilities and Services	1989 Kohler	No
#20	Northern Plains Biostress	1992 Onan	No
#21	Performing Arts Center	2002 Onan	No

Unit	Location	Generator	Subject to Subpart IIII
#22	Physical Education Center	1972 Caterpillar	No
#24	University Student Union	2004 Caterpillar	No
#25	SDSU UPD & Stadium	2014 Caterpillar	Yes
#26	Swine Unit	2016 MTU Onsite Power	Yes
#27	Cow/Calf Unit	2013 Kohler	Yes

Unit #13, the 2013 Generac emergency engine operated at the Animal Science Complex #2 is rated at 60 kilowatts (93 horsepower). The specifications for model SD060 is a displacement of 4.5 liters and 4 cylinders or a displacement of 1.1 liters per cylinder. The manual for the Generac engine, Model SD060, identifies it as EPA certified with EPA's family number DFPXL05.5DTD. The application identifies the following emission rates which are in compliance with the requirements for this age and size engine:

1. Nonmethane hydrocarbon plus nitrogen oxide = 4.3 grams per kilowatt-hour;
2. Particulate matter = 0.34 grams per kilowatt-hour; and
3. Carbon monoxide = 1.3 grams per kilowatt-hour.

Unit#25, #26, and #27 are also certified with EPA's family number EPKXL07.0PW1, GJDXL04.5119, and DJDXL04.5141, respectively.

Table 2.2 provides a list of emergency engines with spark ignition operated at SDSU. SDSU has seven emergency generators that are spark ignition and all but one is subject to Subpart JJJJ.

Table 2.2 – Emergency Engine – Spark Ignition

Unit	Location	Generator	Subject to Subpart JJJJ
#9	Administration East	2011 Generac	Yes
#10	Administration West	2011 Generac	Yes
#15	Daktronics Engineering Hall #1	2008 Yamaha	Yes
#16	Daktronics Engineering Hall #2	2008 Yamaha	Yes
#17	Daktronics Engineering Hall #3	2010 Kohler	Yes
#18	Daktronics Engineering Hall #4	2010 Kohler	Yes
#23	Wagner Hall	1972 Onan	No

Table 2.3 provides the specification for each spark ignition emergency engine subject to Subpart JJJJ. Unit #15 and #16 are portable units converted to stationary units.

Table 2.3 – Spark Ignition Emergency Engine Specifications (Natural Gas)

Unit	Generator	Engine Size		EPA Certified Family Number
#9	2011 Generac	150 kilowatts	201 horsepower	BGNXB06.82C3
#10	2011 Generac	150 kilowatts	201 horsepower	FEDIB0X6.8WSG
#15	2008 Yamaha	3.5 kilowatts	5 horsepower	[1]
#16	2008 Yamaha	6 kilowatts	8 horsepower	8YMXS.3572EA
#17	2010 Kohler	12 kilowatts	16 horsepower	AKHXS.7252NA
#18	2010 Kohler	15 kilowatts	20 horsepower	APSIB1.602ED

[1] – Based on a review of the owner's manual for the 2008 Yamaha 5 horsepower engine, the engine should have an EPA tag that identifies the engine as EPA certified but the tag was removed when the engine was converted to a stationary source.

2.6 Other New Source Performance Standards

DENR reviewed the remaining New Source Performance Standards and determined there were no other applicable standards for this facility.

3.0 New Source Review

ARSD 74:36:10:01 notes that New Source Review regulations apply to areas of the state designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. SDSU is located in Brookings, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, SDSU is not subject to the New Source Review permit program.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air 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 (SO_2);
5. Nitrogen oxides (NOx);
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. SDSU is not one of the 28 named PSD source categories; therefore, the major source threshold under the PSD program is 250 tons per year.

On June 23, 2014, the Supreme Court of the United States issued a ruling that the EPA could not require facilities to obtain a Prevention of Significant Deterioration program permit based solely on greenhouse gas emissions. The Supreme Court of the United States ruling states that in order for a Prevention of Significant Deterioration program evaluation for greenhouse gas to occur, a facility must trigger one of the major source thresholds for another regulated pollutant before a greenhouse gas emission can be considered under the Prevention of Significant Deterioration permitting program. This ruling applies to both new Prevention of Significant Deterioration program sources as well as major source modifications.

4.1 Potential to Emit for Criteria Air Pollutants

DENR 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 manufacturer 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.

4.1.1 Boiler Criteria Air Pollutant Emission Factors

The maximum design operating rate of Unit #2 and #3 is identified as 50 million Btu per hour heat output and needs to be converted to heat input. According to SDSU's application received December 6, 1995, the efficiency rating of the two boilers is 75%. Equation 4-1 was used to convert heat output to heat input for Unit #2 and #3 and the results displayed in Table 4.1.

Equation 4-1 – Converting from Heat Output to Heat Input

$$Heat\ input \frac{MMBtus}{hour} = \frac{Heat\ output \frac{MMBtu}{hour}}{Efficiency\ Rating}$$

The maximum design operating rate (heat input) for Unit #5 is derived in SDSU's application received November 12, 2002 and is displayed in Table 4.1. The maximum design operating rate (heat input) for Unit #7 and #8 were derived from the application received June 29, 2015 and displayed in Table 4.1. The maximum operating rate (heat input) for the two insignificant activity boilers were derived from the application received March 1, 2002 and displayed in Table 4.1.

Table 4.1 – Heat Input Rating for Boilers

Unit #	Heat Output	Efficiency Rating	Heat Input
#2	50 million Btu per hour	75%	66.7 million Btu per hour
#3	50 million Btu per hour	75%	66.7 million Btu per hour
#5			60.5 million Btu per hour
#7			76.2 million Btu per hour
#8			41.1 million Btu per hour
[1]			1.6 million Btu per hour
[1]			1.6 million Btu per hour

[1] – Represents the two insignificant activities boilers.

Table 4.2 summarizes the results of the most recent performance test for Units #5 and #8.

Table 4.2 – Performance Test Results at SDSU

Unit	Date	Pollutant	Emission Rate	Operating Rate
#5 (natural gas)	January 20, 2000	Nitrogen oxide	3.0 pounds per hour	48,600 pounds of steam per hour
#5 (distillate oil)	January 21, 2000	Nitrogen oxide	15.6 pounds per hour	47,250 pounds of steam per hour
#8 (distillate oil)	February 2, 2016	Particulate matter	0.18 pounds per hour or 0.0045 pounds per million Btu	35,267 pounds of steam per hour
		Nitrogen oxide	5.1 pounds per hour or 0.13 pounds per million Btu	

A performance test for particulate matter was conducted on Unit #2 and #3 in 2008 while burning bituminous coal. Since these units are no longer burning coal, those stack performance tests are no longer applicable and were not listed in Table 4.2.

For air pollutants from the boilers that were a performance test was not conducted, DENR derived emission factors from EPA's AP-42 document. Natural gas emission factors for boilers are located in Table 1.4-1 and 1.4-2 in Chapter 1.4 – Natural Gas Combustion. The boilers are considered small boilers under EPA's AP-42 document and the emission factors are summarized in Table 4.3.

Table 4.3 – Natural Gas Emission Factors for Small Boilers (lbs/MMcf)[1]

PM	PM10/PM2.5	SO_2	NOx	Low NOx Burner	CO	VOC
7.6	5.7	0.6	100	50	84	5.5

[1] – "lbs/MMcf" means pounds per million standard cubic feet.

Equation 4-2 was used to convert the emission factors in Table 4.3 from pounds per million standard cubic feet to pounds per million Btu assuming a natural gas heating value of 1,020 million Btu per million standard cubic feet. The results are displayed in Table 4.3.

Equation 4-2 – Emission factors (pounds per million Btu)

$$Emission\ Factor\ \frac{pounds}{MMBtus} = \frac{Emission\ Factor\ \frac{pounds}{MMcf}}{1{,}020\ \frac{MMBtus}{MMcf}}$$

Table 4.3 – Natural Gas Emission Factors (pounds per million Btu)

PM	PM10/PM2.5	SO_2	NOx	Low NOx Burner	CO	VOC
0.0075	0.0056	0.0006	0.098	0.049	0.082	0.0054

Distillate oil emission factors for boilers are located in Table 1.3-1, 1.3-3, and 1.3-6 in Chapter

1.3 – Fuel Oil Combustion of EPA's AP-42 document. The boilers have a heat input rating less than 100 million Btu per hour and the emission factors are summarized in Table 4.4.

Table 4.4 – Fuel Oil Emission Factors for Small Boilers (pounds per thousand gallons)

PM	PM10	PM2.5	SO_2 [1]	NOx	CO	VOC [2]
2.0	1.0	0.25	7.1	20.0	5.0	0.2

[1] – Sulfur content of distillate oil is assumed to be 0.05% by weight; and
[2] – Volatile organic compound emission factor is equivalent to the nonmethane total organic compound emission factor in EPA's AP-42 document.

Equation 4-3 was used to convert the emission factors in Table 4.4 from pounds per thousand gallons to pounds per million Btu assuming the heating value for distillate oil is 140 MMBtu per 1,000 gallons. The results are displayed in Table 4.5.

Equation 4-3 – Emission factors (pounds per million Btu)

$$Emission\ Factor\ \frac{pounds}{MMBtus} = \frac{Emission\ Factor\ \frac{pounds}{1{,}000\ gallons}}{140\ \frac{MMBtu}{1{,}000\ gallons}}$$

Table 4.5 – Distillate Oil Emission Factors (pounds per million Btu)

PM	PM10	PM2.5	SO_2	NOx	CO	VOC
0.014	0.007	0.002	0.051	0.143	0.036	0.001

Equation 4-4, the appropriate heat input values in Table 4.1 and the appropriate emission factor in "pounds per million Btu" were used to calculate potential emissions. Equation 4-5 and the appropriate emission rate in Table 4.2 were used to calculate emissions based on emission factor in "pounds per hour." The results are displayed in Table 4.8.

Equation 4-4 – Potential Emissions for Emission Factors (pounds per million Btu)

$$Potential\ Emissions\ \frac{tons}{year} = \frac{Emission\ Factor\ \frac{lbs}{MMBtus} \times heat\ input\ \frac{MMBtu}{hr} \times 8{,}760\ \frac{hrs}{year}}{2{,}000\ \frac{lbs}{ton}}$$

Equation 4-5 – Potential Emissions for Emission Factors (pounds per hour)

$$Potential\ Emissions\ \frac{tons}{year} = \frac{Emission\ Factor\ \frac{lbs}{hour} \times 8{,}760\ \frac{hours}{year}}{2{,}000\ \frac{lbs}{ton}}$$

4.1.2 Compression Ignition Engine Emission Factors

DENR derived emission factors for the internal combustion engines from AP-42. Distillate oil emission factors for internal combustion engines are located in Table 3.3-1 located in Chapter 3.3 – Gasoline and Diesel Industrial Engines. The emission factors are summarized in Table 4.6.

Table 4.6 – Diesel Engine Emission Factors (pounds per million Btu)

PM [1]	PM10 [1]	PM2.5 [1]	SO_2	NOx	CO	VOC
0.31	0.31	0.31	0.29	4.41	0.95	0.36

[1] – All particulate is assumed to be less than or equal to 1 micrometer in size.

Equation 4-6, the emission factors in Table 4.6, and the heat input rating (million Btu per hour) in Table 1.2 were used to calculate the potential criteria air pollutant emissions from the compression ignition engines (see Table 4.8). The potential emissions for the emergency engines are based on 500 hours per year.

Equation 4-6 – Potential Emissions for Emergency Engines (pounds per million Btu)

$$Potential\ Emissions\ \frac{tons}{year} = \frac{Emission\ Factor\ \frac{lbs}{MMBtus} \times heat\ input\ \frac{MMBtus}{hr} \times 500\ \frac{hrs}{year}}{2{,}000\ \frac{lbs}{ton}}$$

4.1.3 Spark Ignition Engine Emission Factors

There are no criteria air pollutant emission factors for spark ignition internal combustion engines in AP-42. DENR assumed the criteria air pollutant emission factors for natural gas fired boiler would be similar to spark ignition internal combustion engines (see Table 4.3).

Equation 4-4, the emission factors in Table 4.3, and the heat input rating (million Btu per hour) in Table 1.2 were used to calculate the potential criteria air pollutant emissions from the spark ignition engines (see Table 4.8).

4.1.4 Potential Emissions from Incinerator

SDSU primarily burns animal tissue in the incinerator. DENR could not find emission factors for burning pathological/animal wastes. Therefore, DENR will use the emission factors for a medical waste incinerator since SDSU does burn some of that type of waste. The emission factors for the incinerator are derived from Table 2.3-1, 2.3-2, and 2.3-3 in EPA‘s AP-42 document. The emission factors are displayed in Table 4.7.

Table 4.7 – Incinerator Emission Factors (pounds per ton)

PM	PM10 [1]	PM2.5 [1]	SO_2	NOx	CO	VOC
4.67	3.04	2.02	2.17	3.56	2.95	0.30

[1] – Table 2-3-15 in EPA’s AP-42 document identifies the percentage of particulate that is particulate 10 microns in diameter or less (PM10) and particulate matter 2.5 microns in diameter or less (PM2.5) as 65% and 43.3%, respectively.

Based on Equation 2-1, the daily incineration rate for the incinerator is 2.4 tons per day. The daily rate multiplied by 365 days per year equates to 876 tons per year. Equation 4-7, the emission factors in Table 4.7, and the annual incineration rate of 876 tons per year was used to calculate the potential emissions from the incinerator. The results are displayed in Table 4.8.

Equation 4-7 – Potential Emissions from Incinerator

$$Emissions\,\frac{tons}{year} = \frac{Emission\ Factor\ \frac{lbs}{ton} \times 876\,\frac{tons}{yr}}{2{,}000\,\frac{lbs}{ton}}$$

4.2 PSD Summary

Table 4.8 provides a summary of the potential criteria air pollutant emissions from the units operated by SDSU.

Table 4.8 – Potential Criteria Air Pollutant Emissions

Unit	TSP	PM10	PM2.5	SO2	NOx	VOC	CO
#2	2.2	1.6	1.6	0.2	28.6	1.6	24.0
#3	2.2	1.6	1.6	0.2	28.6	1.6	24.0
#5 [1]	3.7	1.9	1.5	13.5	68.3 [2]	1.4	21.7
#6	2.1	1.3	0.9	1.0	1.6	0.1	1.3
#7 [1]	4.7	2.3	1.9	17.0	47.7	1.8	27.4
#8 [1]	2.5	1.3	1.0	9.2	23.4 [2]	1.0	14.8
[3]	0.1	0.0	0.0	0.4	1.0	0.0	0.6
[3]	0.1	0.0	0.0	0.4	1.0	0.0	0.6
Gas Generators [4]	0.0	0.0	0.0	0.0	0.4	0.0	0.3
Diesel Generators [5]	1.8	1.8	1.8	1.1	25.1	2.1	5.4
Total	**19**	**12**	**10**	**43**	**225**	**10**	**120**

[1] – Unit #5, #7, and #8 are fueled with natural gas or distillate oil. The fuel that produces the greatest amount of emissions is displayed;
[2] – The potential emission is based on the stack test results in Table 4.2 while burning distillate oil;
[3] – Boilers considered insignificant activities in the past;
[4] – The combined maximum capacity for the natural gas fired internal combustion engines is 3.9 pounds per million Btu; and
[5] – The combined maximum capacity of the diesel fired internal combustion engines is 22.8 pounds per million Btu.

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

In SDSU's existing Title V air quality operating permit Unit #8 is restricted on the amount of distillate it can burn in a 12-month period to avoid a PSD review. At that time, SDSU was burning coal in some of its boilers and the sulfur content of the distillate oil was much higher than it is today. Currently, SDSU is no longer burning coal and the sulfur content of the distillate oil is assumed to be less than or equal to 0.05% by weight. Sulfur dioxide emissions from Unit #8 have never exceeded the sulfur dioxide limit in the permit based on the distillate oil limit. In addition, Unit #8's potential sulfur dioxide emissions currently are less than 10 tons per year (see Table 4.8). Therefore, DENR is not including the distillate oil restrictions for Unit #8 in the draft

permit and the associated permit requirements.

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed the National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR Part 61 and determined there are no NESHAP standards applicable to SAPA.

6.0 Maximum Achievable Control Technology Standards

6.1 Potential Hazardous Air Pollutants

A major source of hazardous air pollutant (HAP) emissions is any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit any single HAP at a rate of 10 tons or more per year or any combination of HAPs at a rate of 25 tons or more per year.

6.1.1 Boiler HAP Emission Factors

DENR derived hazardous air pollutant emission factors from EPA's AP-42 document. Natural gas emission factors for boilers are located in Table 1.4-3 and 1.4-4 in Chapter 1.4 – Natural Gas Combustion. The boilers are considered small boilers under EPA's AP-42 document and the emission factors are summarized in Table 6.1. Equation 4-2 was used to convert the emission factors from pounds per million standard cubic feet to pounds per million Btu assuming a natural gas heating value of 1,020 million Btu per million standard cubic feet. The results are displayed in Table 6.1.

Table 6.1 – Natural Gas HAP Emission Factors for Small Boilers [1]

Total HAP		Single HAP		
lbs/MMcf	**lbs/MMBtu**		**lbs/MMcf**	**lbs/MMBtu**
1.89	0.00185	Hexane	1.8	0.00176
		Formaldehyde	0.075	0.0000735
		1,3-Butadiene	0.0	0.0

[1] – "lbs/MMcf" means pounds per million standard cubic feet and "lbs/MMBtu" means pounds per million Btu.

Distillate oil hazardous air pollutant emission factors for boilers are located in Table 1.3-9 and 1.3-10 in Chapter 1.3 – Fuel Oil Combustion of EPA's AP-42 document. The boilers have a heat input rating less than 100 million Btu per hour and the emission factors are summarized in Table 6.2. Equation 4-3 was used to convert the emission factors in Table 6.2 from pounds per thousand gallons to pounds per million Btu assuming the heating value for distillate oil is 140,000 Btu per gallon.

Table 6.2 – Distillate Oil HAP Emission Factors for Small Boilers [1]

Total HAP		Single HAP		
lbs/10^3 gallons	**lbs/MMBtu**		**lbs/10^3 gallons**	**lbs/MMBtu**
0.0773	0.000552	Hexane	0.0	0.0
		Formaldehyde	0.061	0.000436
		1,3-Butadiene	0.0	0.0

[1] – "lbs/MMBtu" means pounds per million Btu.

Equation 6-1, the appropriate heat input values in Table 1.1 and the appropriate emission factor in "pounds per million Btu" were used to calculate potential emissions. The results are displayed in Table 6.5.

Equation 6-2 – Potential Emissions for Emission Factors (pounds per million Btu)

$$Potential\ Emissions\ \frac{tons}{year} = \frac{Emission\ Factor\ \frac{lbs}{MMBtus} \times heat\ input\ \frac{MMBtu}{hr} \times 8{,}760\ \frac{hrs}{year}}{2{,}000\ \frac{lbs}{ton}}$$

6.1.2 Compression Ignition Engine Emission Factors

Internal combustion engine hazardous air pollutant emission factors for compression ignition are located in Table 3.3-2 in Chapter 3.3 – Gasoline and Diesel Industrial Engines of EPA's AP-42 document. The emission factors are summarized in Table 6.3.

Table 6.3 – Distillate Oil HAP Emission Factors for Compression Engines [1]

Total HAP	Single HAP	
lbs/MMBtu		**lbs/MMBtu**
0.0078	Hexane	0.0
	Formaldehyde	0.0
	1,3-Butadiene	0.00391

[1] – "lbs/MMBtu" means pounds per million Btu.

The combined maximum operating rate for all of the compression ignition engines from Table 1.2 is 22.8 million Btu per hour. Equation 4.4, the combined heat input rating of 22.8 million Btu per hour, and the emission factor in Table 6.3 were used to calculate the potential hazardous air pollutant emissions from the compression engines (see Table 6.5).

6.1.3 Spark Ignition Engine Emission Factors

There are no hazardous air pollutant emission factors for spark ignition internal combustion engines in AP-42. DENR assumed the hazardous air pollutant emission factors for natural gas fired boiler would be similar to spark ignition internal combustion engines (see Table 6.1).

The combined maximum operating rate for all of the compression ignition engines from Table 1.2 is 3.9 million Btu per hour. Equation 4.4, the combined heat input rating of 3.9 million Btu per hour, and the emission factor in Table 6.1 were used to calculate the potential hazardous air pollutant emissions from the compression engines (see Table 6.5).

6.1.4 Potential Emissions from Incinerator

SDSU mainly burns medical waste primarily made up of animal tissue. DENR search the web for emission factors since there were none available in EPA's AP-42 document. An agency in California completed some rough emission factors for burning human remains; last updated July 15, 2013. The emission factors are summarized in Table 6.4. Mercury was not included since the document indicates mercury is from teeth fillings and one would not expect that in animal carcasses.

Table 6.4 – Incinerator Emission Factors

Hazardous Air Pollutant	Emission Rate
Acetaldehyde	0.0015 pounds per ton charged
Arsenic	0.00058 pounds per ton charged
Benzene	0.00072 pounds per ton charged
Beryllium	0.000020 pounds per ton charged
Cadmium	0.00016 pounds per ton charged
Chromium (total)	0.00051 pounds per ton charged
Formaldehyde	0.00040 pounds per ton charged
Hydrogen Chloride	0.86 pounds per ton charged
Hydrogen Fluoride	0.0073 pounds per ton charged
Lead	0.00098 pounds per ton charged
Nickel	0.00057 pounds per ton charged
PAH's	0.000052 pounds per ton charged
Selenium	0.00065 pounds per ton charged
Toluene	0.0099 pounds per ton charged
Xylene	0.0028 pounds per ton charged
Zinc	0.00052 pounds per ton charged
Total	**0.8867 pounds per ton charged**

[1] – Table 2-3-15 in EPA's AP-42 document identifies the percentage of particulate that is particulate 10 microns in diameter or less (PM10) and particulate matter 2.5 microns in diameter or less (PM2.5) as 65% and 43.3%, respectively.

Equation 4-5 and the emission factors in Table 6.4 were used to calculate hazardous air pollutant emissions from the incinerator. The results are summarized in Table 6.5.

6.2 HAP Emissions Summary

Table 6.5 provides a summary of the potential hazardous air pollutant emissions from SDSU's operations.

Table 6.5 – Potential HAP Emissions

Unit	Total HAP	Single HAP		
		Hexane	Formaldehyde	1,3-Butadiene
#2	0.4	0.4	0.0	0.0
#3	0.4	0.4	0.0	0.0
#5	0.5	0.5	0.1	0.0
#6	0.4	0.0	0.0	0.0
#7	0.6	0.6	0.2	0.0

Unit	Total HAP	Single HAP		
		Hexane	Formaldehyde	1,3-Butadiene
#8	0.3	0.3	0.1	0.0
[1]	0.0	0.0	0.0	0.0
[1]	0.0	0.0	0.0	0.0
Gas Generators [2]	0.0	0.0	0.0	0.0
Diesel Generators [3]	0.0	0.0	0.0	0.0
Total	**3**	**2**	**0**	**0**

[1] – The two insignificant activity boilers;
[2] – The combined maximum capacity for the natural gas fired internal combustion engines is 3.9 pounds per million Btu; and
[3] – The combined maximum capacity of the diesel fired internal combustion engines is 22.8 pounds per million Btu.

The potential to emit is less than 10 tons of a single hazardous air pollutant, and has the potential to emit less than 25 tons of any combination of hazardous air pollutants. Therefore, SDSU is considered an area source for hazardous air pollutants.

DENR reviewed the Maximum Achievable Control Technology Standards and determined the following need to be reviewed further to determine if they are applicable to SDSU's operations.

6.3 Standards for Stationary Reciprocating Internal Combustion Engines

Subpart ZZZZ establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) for stationary reciprocating internal combustion engines at area and major sources of hazardous air pollutants. All of the emergency generators, except existing institutional emergency engines located at an area source of hazardous air pollutant emissions that does not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the following reasons:

1. Emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3;
2. Operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency; and
3. Supply power as part of a financial arrangement with another entity.

SDSU is an area source and the emergency generators do not operator or contractually obligated. An existing emergency engine at an area source is that commenced construction before June 12, 2006. Table 6.6 identifies the emergency engines and if it is subject to Subpart ZZZZ.

Table 6.6 – Emergency Engines Subject of Subpart ZZZZ

Unit	Location	Generator	Subject to Subpart ZZZZ
#9	Administration East	2011 Generac	Yes
#10	Administration West	2011 Generac	Yes

Unit	Location	Generator	Subject to Subpart ZZZZ
#11	Animal Resource Wing	2004 Caterpillar	No
#12	Animal Science Complex #1	1976 Caterpillar	No
#13	Animal Science Complex #2	2013 Generac	Yes
#14	Central Heating Plant	1990 Onan	No
#15	Daktronics Engineering Hall #1	2008 Yamaha	Yes
#16	Daktronics Engineering Hall #2	2008 Yamaha	Yes
#17	Daktronics Engineering Hall #3	2010 Kohler	Yes
#18	Daktronics Engineering Hall #4	2010 Kohler	Yes
#19	Facilities and Services	1989 Kohler	No
#20	Northern Plains Biostress	1992 Onan	No
#21	Performing Arts Center	2002 Onan	No
#22	Physical Education Center	1972 Caterpillar	No
#23	Wagner Hall	1972 Onan	No
#24	University Student Union	2004 Caterpillar	No
#25	SDSU UPD & Stadium	2014 Caterpillar	Yes
#26	Swine Unit	2016 MTU Onsite Power	Yes
#27	Cow/Calf Unit	2013 Kohler	Yes

In accordance with 40 CFR § 63.6595(c), a unit subject to 40 CFR Part 60, Subpart IIII or JJJJ and 40 CFR Part 63, Subpart ZZZZ, must meet the applicable requirements in Subpart IIII or JJJJ. All of the emergency generators subject to Subpart ZZZZ are applicable to either Subpart IIII or JJJJ.

6.4 Standards for Industrial, Commercial, and Institutional Boilers and Process Heaters

Subpart DDDDD establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) for industrial, commercial, and institutional boilers and process heaters located at major sources of HAP. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and work practice standards.

SDSU is an area source, therefore, not subject to this subpart.

6.5 Standards for Industrial, Commercial, and Institutional Boilers

Subpart JJJJJJ establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) for industrial, commercial, and institutional boilers located at an area source of HAP. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and work practice standards.

A unit is existing if it was commenced construction on or before June 4, 2010. The remaining units are considered new. Unit #2, #3, and #5 are considered existing units. Unit #7 and #8 are considered new. In accordance with 40 CFR § 63.11195(e), Unit #2 and #3 are exempt from this subpart because they are considered a gas-fired boiler.

Unit #5, #7, and #8 use natural gas primarily and diesel as a backup currently, but would switch

to diesel primarily if it was cheaper to use. If diesel was used as the primary fuel, this subpart would be applicable. The requirements for diesel will be included in the permit if that were to occur.

6.6 Other Maximum Achievable Control Technology Standards

DENR reviewed the remaining Maximum Achievable Control Technology Standards and determined there were no other applicable standards for this facility.

7.0 State Requirements

Any source operating in South Dakota that meets the requirements of the Administrative Rules of South Dakota (ARSD) 74:36:05:03 is required to obtain a Title V air quality operating permit. SDSU's potential to emit is greater than the major source threshold under the Title V air quality permit program for nitrogen oxide and carbon monoxide. SDSU is also applicable to federal New Source Performance Standards and Maximum Achievable Control Technology Standards. Therefore, SDSU is required to obtain a Title V air quality operating permit.

7.1 Insignificant Activities

In accordance with ARSD 74:36:05:04.01, insignificant activities are not required to be included in a Title V air quality operating permit. Table 7.1 provides a list of insignificant activities and the reason the unit meets the definition of an insignificant activity.

Table 7.1 – List of insignificant activities

Unit	Description	Citation
#11	Administration West	§ 74:36:05:04.01(7) and (8)
#12	Animal Resource Wing	§ 74:36:05:04.01(7) and (8)
#14	Central Heating Plant	§ 74:36:05:04.01(7) and (8)
#19	Facilities and Services	§ 74:36:05:04.01(7) and (8)
#20	Northern Plains Biostress	§ 74:36:05:04.01(7) and (8)
#21	Performing Arts Center	§ 74:36:05:04.01(7) and (8)
#22	Physical Education Center	§ 74:36:05:04.01(7) and (8)
#23	Wagner Hall	§ 74:36:05:04.01(7) and (8)
#24	University Student Union	§ 74:36:05:04.01(7) and (8)
	Insignificant activity boiler 1	§ 74:36:05:04.01(7) and (8)
	Insignificant activity boiler 2	§ 74:36:05:04.01(7) and (8)

7.2 State Emission Limits

7.2.1 Particulate Emission Limits

In accordance with ARSD 74:36:06:01, a unit that must comply with a total suspended particulate matter emission limit under the New Source Performance Standards, Maximum Achievable Control Technology Standards, the Acid Rain Program, or the Prevention of Significant Deterioration Program is exempt from having to meet the state's total suspended

particulate matter emission limits. Unit #8, #13, #25, #26, and #27 are required to meet a particulate emission limit in 40 CFR Part 60, Subpart IIII and not applicable to the state's particulate limit.

ARSD 74:36:06:02(1) and 74:36:06:03(1), establish state emission limits for total suspended particulate matter. In accordance with ARSD 74:36:06:02(1)(a), a fuel burning unit with heat input value less than 10 million Btu per hour may not exceed 0.6 pounds of particulate emissions per million Btu of heat input. This limit applies to Unit #9, #10, and #15 through #19, (see Table 7.2).

In accordance with ARSD 74:36:06:02(1)(b), a fuel burning unit with a heat input value equal to or greater than 10 million Btu per hour may not exceed the particulate emission limit determined using Equation 7-1. Unit #2, #3, #5, and #7 are applicable to this limit. The particulate emission limits are displayed in Table 7.2.

Equation 7-1 – State particulate limit for Units over 10 million Btu

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

Where:

- E = allowable emission rate in pounds per million Btu of heat input; and
- H = maximum heat input, in million Btu per hour.

In accordance with ARSD 74:36:06:03(1)(a), a processing unit with a maximum operating rate up to 60,000 pounds per hour may not exceed the particulate emission limit determined using Equation 7-2. Unit #6 has a process rate of 200 pounds per hour and is applicable to this limit. The particulate emission limits are displayed in Table 7.2.

Equation 7-2 – State particulate limit for Units over 10 million Btu

$$E = 4.10P^{0.11}$$

Where:

- E = allowable emission rate in pounds per hour; and
- P = Process weight rate, in tons per hour.

Table 7.2 provides a comparison of the state emission limit to the potential emissions to determine if the units are in compliance with the state emission limits.

Table 7.2 – State particulate matter emission limit

Unit	Emission Rate	State Emission Limit	Compliance
#2	0.007 pounds per MMBtu	0.5 pounds per MMBtu	Yes
#3	0.007 pounds per MMBtu	0.5 pounds per MMBtu	Yes
#5	0.007 pounds per MMBtu	0.5 pounds per MMBtu	Yes
#6	0.5 pounds per hour [1]	3.2 pounds per hour	Yes
#7	0.007 pounds per MMBtu	0.5 pounds per MMBtu	Yes
#9	0.007 pounds per MMBtu	0.6 pounds per MMBtu	Yes
#10	0.007 pounds per MMBtu	0.6 pounds per MMBtu	Yes
#15	0.007 pounds per MMBtu	0.6 pounds per MMBtu	Yes
#16	0.007 pounds per MMBtu	0.6 pounds per MMBtu	Yes

Unit	Emission Rate	State Emission Limit	Compliance
#17	0.007 pounds per MMBtu	0.6 pounds per MMBtu	Yes
#18	0.007 pounds per MMBtu	0.6 pounds per MMBtu	Yes
#19	0.3 pounds per MMBtu	0.6 pounds per MMBtu	Yes

[1] – 200 pounds per hour (Table 1.1) / 2,000 pounds per ton x 4.67 pounds per ton (Table 4.7) = 0.5 pounds per hour.

7.2.2 Sulfur Dioxide Emission Limits

In accordance with ARSD 74:36:06:01, a unit that must comply with a sulfur dioxide emission limit under the New Source Performance Standards, Maximum Achievable Control Technology Standards, the Acid Rain Program, or the Prevention of Significant Deterioration Program is exempt from having to meet the state's sulfur dioxide emission limit. Unit #5, #7, #8, #13, #25, #26, and #27 are required to meet a sulfur dioxide limit in 40 CFR Part 60 and not applicable to the state's sulfur dioxide limit.

In accordance with ARSD 74:36:06:02(2), South Dakota's sulfur dioxide emission limits for a fuel burning and processing units is 3.0 pounds per million Btu heat input. Based on past experience with natural gas fired units, SDSU's fuel burning and process equipment are capable of meeting the state's sulfur dioxide emission limit.

7.3 Visible Emission Limit

In accordance with 74:36:12:01, the owner or operator may not discharge into the ambient air from a single unit of emissions an air pollutant of a density equal to or greater than that designated as 20 percent opacity. Based on DENR's experience with SDSU's operations are capable of complying with the state's visible emission limit.

7.4 Performance Testing

The stack testing results for SDSU are displayed in Table 4.2. DENR is not requiring any additional testing on the fuel burning units or incinerator to demonstrate compliance with the particulate or sulfur dioxide emission limits because the units are fired with natural gas with distillate oil as a backup.

7.5 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality operating permit. SAPA's application was received in November 2011. Therefore, compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a

source to be classified as a major source.

None of the units have the potential to emit equal to or greater than the potential uncontrolled emissions and there are no air pollution control devices used to comply with an emission limit. The air pollution controls on Boiler #5 and #6 were installed to comply with the state's particulate limit when the units burned coal. Boiler #5 and #6 only burn natural gas and the current air pollution controls are not necessary to meet the state's particulate limit. Therefore, compliance assurance monitoring is not applicable.

7.6 Periodic Monitoring

Periodic monitoring is required for each emission unit subject to an applicable requirement at a source subject to Title V of the federal Clean Air Act. SDSU is required to meet state particulate matter, sulfur dioxide, and visible emission limits.

SDSU is not going to be required to conduct periodic monitoring for the state's particulate matter, sulfur dioxide, and visible emission limits for the units while burning natural gas. Based on experience, SDSU will not have any problems meeting the state's emission limits while using natural gas. Periodic visibility requirements will be required while burning distillate oil.

SDSU will be required to comply with all of the periodic monitoring required in 40 CFR Part 60 Subpart Dc, IIII and JJJJ.

7.7 Air Fees

Title V sources are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants that are charged are particulate matter, sulfur dioxides, nitrogen oxides, volatile organic compounds and hazardous air pollutants. The actual emissions are calculated by DENR and are based on information provided by the owner or operator.

7.8 State Only Medical Waste Requirements

The existing Title V air quality operating permit for SDSU included state only requirements for medical waste incinerators derived from ARSD 74:35 – Medical Waste. This Article was repealed in September 2011 because DENR adopted the federal rules for medical waste incinerators. Although some of the conditions will be incorporated in the draft permit to ensure the unit is operating properly and continuously complying with the conditions of the Title V air quality operating permit, the authority for the requirement will be appropriately changed.

8.0 Recommendation

Any source operating in South Dakota that meets the requirements of the Administrative Rules of South Dakota (ARSD) 74:36:05:03 is required to obtain a Title V air quality operating permit. A major source is defined as having the potential to emit greater than 100 tons per year of a criteria air pollutant or greater than or equal to 10 tons per year of a single hazardous air

pollutant, or greater than or equal to 25 tons per year of a combination of hazardous air pollutants. A source that is required to comply with federal New Source Performance Standards or Maximum Achievable Control Technology Standards for hazardous air pollutants must also obtain a Title V air quality operating permit.

SDSU's potential nitrogen oxide and carbon monoxide emissions are greater than the major source threshold under the Title V air quality operating permit program. In addition, SDSU is required to meet several New Source Performance Standards. Therefore, SDSU is required to obtain a Title V air quality operating permit and is subject to the following regulations:

1. ARSD 74:36:05 – Operating Permits for Part 70 Sources;
2. ARSD 74:36:06 – Regulated Air Pollutant Emissions;
3. ARSD 74:36:07 – New Source Performance Standards;
4. ARSD 74:36:11 – Performance Testing;
5. ARSD 74:36:12 – Control of Visible Emissions; and
6. ARSD 74:37:01 – Air Emission Fees.

DENR recommends that SDSU's Title V air quality operating permit be renewed. Questions pertaining to this permit recommendation should be directed to Earl Berg, Engineer II, Air Quality Program.