

The seal of the State of South Dakota is a circular emblem with a serrated outer edge. It features a central landscape scene with a river, a windmill, and a lighthouse. The text "STATE OF SOUTH DAKOTA" is written around the top inner edge, and "GREAT SEAL" is written around the bottom inner edge. The year "1889" is at the bottom. A banner across the top of the inner circle reads "UNDER GOD THE PEOPLE RULE".

STATEMENT OF BASIS

Minor Air Quality Permit

**Millerdale Hutterite Brethren
Miller, South Dakota**

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1.0 Operational Equipment

On May 2, 2014 Millerdale Hutterite Brethren near Miller, South Dakota submitted a minor air quality operating permit application for the operation of one non-emergency generator.

1.1 Proposed Equipment

Table 1-1 provides a description of the non-emergency generator at Millerdale Hutterite Brethren's facility near Miller, SD as listed in the May 2, 2014, minor air quality application.

Table 1-1 – Equipment Information

Description	Maximum Operating Rate	Control Device
Non-emergency Generator –2002, Detroit Diesel, model #750ROZDA, compression ignition, fired with distillate oil.	1,120 horsepower or 835 kilowatts	Oxidation Catalyst

2.0 New Source Performance Standards

DENR reviewed the following New Source Performance Standards (NSPS) to determine if Millerdale Hutterite Brethren's generator is applicable to the following NSPS:

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.

The non-emergency generator was constructed and manufactured prior to 2006. Therefore, the non-emergency generator is not subject to either of these subparts.

2.2 Other NSPS Standards

DENR reviewed the other New Source Performance Standards and determined that there are no other applicable 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. Millerdale Hutterite Brethren is located near Miller, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, Millerdale Hutterite Brethren 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. Millerdale Hutterite Brethren 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 assume 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). The non-emergency generator is considered a large stationary diesel engine as the rated power for this engine is greater 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.

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

Pollutant	Pounds per million Btu					
	TSP	PM ₁₀	SO ₂ ^a	NO _x	VOCs	CO
Non-emergency generator	0.0697	0.0573	1.01 x S ₁	3.2	0.082	0.85

^a –The sulfur dioxide emission factor is based on the sulfur content of the fuel in percent. The sulfur content was assumed to be 15 parts per million or 0.0015 percent.

The application indicates that the generator will be used for non-emergency use. Therefore, the non-emergency generators' potential emissions will be based on operating each unit 8,760 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 8,760 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 generator.

Equation 4-1 – Heat Input Calculations

$$HeatInput \left[\frac{MMBtu}{hr} \right] = \left(\frac{OperatingRate[hp] * 2543.5 \left[\frac{Btu}{hr * hp} \right]}{10^6 \left[\frac{Btu}{MMBtu} \right] * 35\%} \right)$$

Unit #1 has a heat input of 8.1 MMBtu/hr.

Equation 4-2 – Generator potential emissions

$$Potential \left[\frac{tons}{yr} \right] = input\ capacity \left[\frac{MMBtu}{hr} \right] * emission\ factor \left[\frac{lbs}{MMBtu} \right] * 8760 \left[\frac{hr}{yr} \right] \div 2000 \left[\frac{lb}{ton} \right]$$

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

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

Unit	TSP	PM ₁₀	SO ₂	NO _x	VOCs	CO
Non-emergency generator	2.5	2.0	0.1	114	2.9	30.2

Millerdale Hutterite Brethren agreed to accept enforceable limit to restrict the operation of the generator to no more than 3,858 hours during any 12-month period to maintain nitrogen oxide emissions below the major source threshold for the Title V air quality permit program. Equation 4-3 calculates the potential nitrogen oxide emissions based on the federally enforceable operational limit and nitrogen emission limit of 50 tons per year from the non-emergency generator.

Equation 4-3: Nitrogen Oxide Emissions Based on Operational Limit

$$E_{NO_x} = \text{EmissionRate} \frac{lb}{MMBtu} \times \text{heat input capacity} \frac{MMBtus}{hr} \times 3,858 \frac{hrs}{yr} / 2,000 \frac{lbs}{ton}$$

$$E_{NO_x} = 3.2 \frac{lb}{MMBtu} \times 8.1 \frac{MMBtu}{hr} \times 3,858 \frac{hr}{yr} \div 2,000 \frac{lbs}{ton}$$

$$E_{NO_x} \text{ Limit} = 50 \frac{tons}{yr}$$

The operational limit of 3,858 hours per calendar year is sufficient to maintain potential nitrogen oxide emissions equal to or less than 50 tons per 12-month rolling period. A potential emission limit at this level will allow the Millerdale Hutterite Brethren to forgo an hourly emission limit for nitrogen oxide and stack testing requirements because the potential emissions are maintained below 50% of the major source threshold for the Title V air quality permit program.

4.3 PSD Summary

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

5.0 National Emission Standards for Hazardous Air Pollutants

The Department reviewed the national emission standards for hazardous standards and determined Millerdale Hutterite Brethren 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 Potential HAP Emissions – Generator

AP-42, Table 3.4-3 and 3.4-4, October 1996, list the hazardous air pollutants emission factor as 0.00149 pounds per million Btus for large generators.

Using Equation 4-2, the hazardous air pollutant emission factor, the heat input, and assuming 8,760 hours of operation per year per non-emergency generator, the potential hazardous air pollutant emissions for the non-emergency generator are calculated and summarized in Table 6-1.

Table 6-1 – Potential HAP Emissions (tons per year)

Unit	HAPs
Non-emergency generator	0.05

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 a hazardous air pollutants. Therefore, Millerdale Hutterite Brethren is considered an area source for hazardous air pollutants.

DENR reviewed the Maximum Achievable Control Technology Standards under 40 CFR Part 63 and determined the following may be applicable to Millerdale Hutterite Brethren.

6.3 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.

The non-emergency generator is applicable to federal regulation. The non-emergency generator was constructed prior to 2006 and has the following applicability's:

1. Existing area source (manufactured prior to June 12, 2006);
2. Non-emergency, non-black start, compression ignition engine;
3. Not related to oil and gas production;
4. Greater than 500 horsepower; and
5. Displacement of less than 30 liters per cylinder.

6.4 Other MACT Standards

DENR reviewed the other Maximum Achievable Control Technology (MACT) and determined there are no other applicable standards.

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. Millerdale Hutterite Brethren's emissions of criteria air pollutants are greater than 100 tons per year for nitrogen oxides. Millerdale Hutterite Brethren has accepted an enforceable limit of 3,858 operating hours to limit the nitrogen oxide emissions to 50 tons per year. Therefore, a Title V air quality permit is not required due to the criteria pollutant emissions.

The MACT Standard applicable to the facility was promulgated under section 112 of the Clean Air Act. However, ARSD 74:36:07:88 and 40 CFR § 63.6585 (d), 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 40 CFR Part 63 Subpart ZZZZ. 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. Millerdale Hutterite Brethren's nitrogen oxide emissions are greater than 25 tons per year. Therefore, Millerdale Hutterite Brethren is required to have a minor air quality permit for the operations at this facility.

7.2 State Particulate Emission Limits

Total suspended particulate limits are applicable to fuel burning units. Millerdale Hutterite Brethren's generator is a fuel burning unit. The total suspended particulates for fuel burning units are derived from ARSD 74:36:06:02.

The state limits are based on the heat input of the unit in million Btus per hour. Equation 4-1 found the heat input of the non-emergency generator to be 8.1 MMBtu/hr. In accordance with ARSD 74:36:06:02(1)(a), a fuel burning unit with heat input value less than 10 million Btus per hour may not exceed 0.6 pounds of particulate emissions per million Btu of heat input. This limit applies to the non-emergency generator. Based on Table 4-1, the total suspended particulate matter emission rate for the non-emergency generator is 0.07 pounds per million Btus. Therefore, the total suspended particulate matter emission rates in Table 4-1 indicate compliance with the state's total suspended particulate matter emission limit.

7.3 Sulfur Dioxide Emissions

In accordance with ARSD 74:36:06:02(2), South Dakota's sulfur dioxide emission limit for a fuel burning unit is 3.0 pounds per million Btus heat input. The sulfur dioxide emission factor for the non-emergency generator is 0.0015 pounds per million Btus and demonstrates compliance with the state's sulfur dioxide emission limit.

7.4 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. Millerdale Hutterite Brethren must control the opacity at less than 20 percent for the non-emergency generator.

8.0 Recommendation

Millerdale Hutterite Brethren will be required to operate the generator within the requirements stipulated in the following regulations and they are required to obtain a minor air quality permit:

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

Based on the above findings, Millerdale Hutterite Brethren is not required to obtain a construction permit or a Title V air quality operating permit. Millerdale Hutterite Brethren has accepted enforceable limits and is required to obtain a minor air quality permit. The non-emergency generator is subject to 40 CFR Part 63, Subpart ZZZZ and must meet those requirements if the generator is constructed prior to 2006. Questions regarding this permit review should be directed to April Soukup, Engineer I.