Statement of Basis

Title V Air Quality Operating Permit Renewal

3M - Aberdeen
Aberdeen, South Dakota

South Dakota Department of Environment and Natural Resources

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1.0 Background

3M Company's (3M) operations in Aberdeen, South Dakota, are separated into two primary divisions. One division cuts and rolls large adhesive stock into marketable units; and the other division manufactures respirator masks and air filters. The primary standard industrial classification (SIC) code for the facility is 2297, Miscellaneous Textile Goods – Nonwoven Fabrics. The secondary SIC code is 2672, Converted Paper and Paperboard Products, Except Containers and Boxes – Coated and Laminated Paper, Not Elsewhere Classified.

On November 13, 2007 3M was issued a renewed operating permit with the permit number 28.3301-03. This permit was amended on September 11, 2012 to add two new scrubbers that replaced the existing external scrubbers on Units #4 and #5.

On May 14, 2012, the Department of Environment and Natural Resources (DENR) received and application to renew its Air Quality permit that expired on November 13, 2012. On January 7, 2014, DENR received additional information from 3M. This application was considered complete on February 10, 2014.

1.1 Existing Equipment

Table 1-1 provides a list of the units presently permitted which was taken from the current Title V air quality operating permit last modified and issued September 11, 2012.

Table 1-1 Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#1	Manufacturing line AM-1, a 1993 solventless pressure sensitive tape manufacturing line. The manufacturing line includes extruders, a coating station, and curing processes. The manufacturing line has two exhaust points.	Maximum throughput of 1,200 pounds per hour.	Not Applicable
#2	Manufacturing line AM-2, a 2001 solventless pressure sensitive tape manufacturing line. The manufacturing line includes extruders, a coating station, and curing processes. The manufacturing line has two exhaust points.	Maximum throughput of 2,750 pounds per hour.	Not Applicable
#3	One Industrial Process Cooling Tower with three cells.	Not Applicable	Not Applicable
#4	BOC Edwards Thermal Processing Unit.	10.3 pounds per hour of perfluorinated compound gas.	Wet Scrubber

Unit	Description	Maximum Operating Rate	Control Device
#5	BOC Edwards Thermal Processing Unit #2.	10.3 pounds per hour of perfluorinated compound gas.	Wet Scrubber
#6	Boiler #1 - 1984 Cleaver-Brooks steam boiler, model number CB200-400, fired with natural gas and distillate oil.	17 million Btus per hour heat input	Not Applicable
#7	Boiler #2 - 1995 Johnston Boiler Company steam boiler, model number PFTA400-4LG300S, fired with natural gas and distillate oil.	16.8 million Btus per hour heat input	Not Applicable
#8	Boiler #3 - 1974 Bryan steam boiler, model number L72W1-FD, fired with distillate oil.	3.9 million Btus per hour heat input.	Not Applicable

1.2 Insignificant Sources

3M has submitted a list of insignificant sources. DENR has reviewed the list and determined the following will be considered insignificant sources:

1. Laboratory equipment used exclusively for chemical or physical analysis.
2. MiniMaker – five UV lamps
3. 1.2 MMBtus per hour Natural gas water heater for eyewash boiler No. 1
4. 1.2 MMBtus per hour Natural gas water heater for eyewash boiler No. 2
5. 1.2 MMBtus per hour Fulton boilerNo.1
6. 1.2 MMBtus per hour Fulton boilerNo.2
7. 1.2 MMBtus per hour Fulton boilerNo.3
8. Hot melt adhesive station
9. Foam laminator
10. Splitter 5 spot
11. AM-1 bulk adhesive storage
12. Polypropylene repelletizer and recycling
13. TPE/Kraton Extruder
14. Molding line
15. AE-1 Extruder
16. AE-2 Extruder
17. AE-3 Extruder
18. AE-4 Extruder
19. AE-5 Extruder
20. AE-6 Extruder
21. AE-7 Extruder
22. 560 gallon 1975 Diesel Storage Tank

23. 50,000 gallon 1974 Fuel Oil Tank #1
24. 50,000 gallon 1974 Fuel Oil Tank #2
25. 1,000 gallon 1999 Diesel Tank #1
26. 1,000 gallon 1995 Diesel Tank #2
27. Cooling Tower Ozone

In 3M's application the facility listed an emergency generator and a gasoline storage and dispensing activities as insignificant activities. These activities are possibly applicable to federal standards and will be added to the proposed changes section of this document. Additionally the tanks listed will be reviewed for applicability to the New Source Performance Standards for tanks.

1.3 Proposed Changes

3M has requested that the following units in table 1-2 be added to their operating permit

Table 1-2 Proposed Units

Proposed Unit Number	Description	Maximum Operating Rate	Control Device
#9	Emergency Generator #1, Cummins Model: NTA-855-G3, Manufactured: October 1994, Distillate oil fired	535 horsepower	Not Applicable
#10	Firewater Pump #1, Cummins Model: NTA-855-F2, Manufactured: June 1974, Distillate Oil fired	340 horsepower	Not Applicable
#11	Polypropylene Resin Pellet Silo A 1991 3M custom, 180,000 pound capacity	2,050 pounds per hour	Not Applicable
#12	Polypropylene Resin Pellet Silo B 2007 3M custom, 180,000 pound capacity	2,050 pounds per hour	Not Applicable
#13	Boilerhouse Emergency Generator, Allis Chalmers Model:17000 Manufactured: 1974 Distillate oil fired	250 horsepower	Not applicable
#14	Gasoline storage tank and gasoline dispensing	560 gallons	Not Applicable

Unit #3 is a cooling tower. It was considered a permitted unit because it was considered applicable to 40 CFR 63 Subpart Q - National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers. However Subpart Q is only applicable to major sources for Hazardous Air Pollutants. Therefore Unit #3's permitted unit status will be reviewed pending evaluation Hazardous Air Pollutant emissions in section 6 of this document.

3M has also requested DENR to consider allowing Units #6 and #7 be considered a gas fired boilers as defined in 40 CFR 63 Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.

Finally 3M has changed its responsible official to Nadine Gropp from Keith Kelble. Nadine took over the position of Plant Manager and DENR was notified on July 22, 2014.

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to this facility. The following may be applicable.

2.1 Standards Applicable to Boilers

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

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 more than 100 million Btus per hour 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.

3M has three boilers at its facility. Units #6 and #8 were built in 1984 and 1974, respectively and operate at less than 100 Million Btus per hour. Therefore, these two boilers are not applicable to any of these subparts.

Unit #7 was built in 1995 and has a maximum operating rate of 16.8 Million Btus per hour. Therefore this boiler is applicable to subpart Dc. 3M's permit will contain conditions for the following situation:

1. The boiler has greater than 10 Million Btus per hour but less than 30 Million Btus per hour of heat input;
2. It's Natural gas or distillate oil (diesel fuel) fired; and
3. Uses a fuel supplier certification.

2.2 Standards Applicable to Storage Tanks

There are three New Source Performance Standards for storage vessels. The three standards are applicable to the following storage vessels:

1. 40 CFR Part 60 Subpart K: applicable to storage vessels for petroleum liquids capable of storing greater than 40,000 gallons and commenced construction after June 11, 1973 but prior to May 19, 1978;
2. 40 CFR Part 60 Subpart Ka: applicable to storage vessels for petroleum liquids capable of storing greater than 40,000 gallons and commenced construction after May 18, 1978; and
3. 40 CFR Part 60 Subpart Kb: applicable to storage vessels for volatile organic liquids capable of storing 75 cubic meters (approximately 19,813 gallons) or greater and commenced construction after July 23, 1984.

3M has six tanks at their facility. Only two of them have a capacity greater than 19,813 gallons. Both tanks were constructed in 1974 and are possibly applicable to Subpart K. However both tanks contain fuel oil which is not defined as a petroleum liquid under subpart K. Therefore, these subparts are not applicable.

2.3 Standards of Performance for Pressure-Sensitive Tape and Label Coating Operations

40 CFR Part 60 Subpart RR is applicable to facilities whose coating operations fit the following description:

1. Facility where each coating line used in the manufacture of pressure sensitive tape and label materials.
2. Any affected facility which inputs to the coating process 45 Mg (50 tons) of VOC or less per 12 month period is not subject to the emission limits of 40 CFR§60.442(a), however, the affected facility is subject to the requirements of all other applicable sections of this subpart. If the amount of VOC input exceeds 45 Mg (50 tons) per 12 month period, the coating line will become subject to §60.442(a) and all other sections of this subpart.
3. Facility which begins construction, modification, or reconstruction after December 30, 1980.

Units #1 and #2 will be used to manufacture pressure sensitive tape. Unit #1 was constructed in 1993 and Unit #2 was constructed in 2001. Units #1 and #2, both have the potential volatile organic inputs of 105.1 tons and 240.9 tons VOC per year, respectively. Therefore, Units #1 and #2 are applicable to this subpart including the emission limits in 40 CFR 60.442(a)

3M has stated that they will comply with the subpart emission limits based on the mass of VOC per mass of coating solids applied. Therefore, permit conditions will be written specifically for this method of compliance.

2.4 Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

DENR review of the NSPS determined 40 CFR Part 60, Subpart IIII may be applicable. Subpart IIII is applicable to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that:

1. 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 fire pump engine after July 1, 2006;
2. Modify or reconstruct their stationary CI ICE after July 11, 2005.

All three engines were constructed prior to 2006 deadlines and have not been modified or reconstructed. Therefore, these engines are not applicable to this subpart.

2.5 Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

DENR review of the NSPS determined 40 CFR Part 60, Subpart JJJJ may be applicable. For the purposes of this subpart, the date construction commences is the date the engine is ordered by the owner or operator. Subpart JJJJ is applicable to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

1. 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);
2. 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;
3. On or after July 1, 2008, for engines with a maximum engine power less than 500 horsepower;
4. On or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 kilowatts (25 horsepower); or
5. Owners and operators of stationary SI ICE that commence modification or reconstruction after June 12, 2006.

All three engines are compression ignition and therefore are not applicable to this subpart.

2.6 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards that might be applicable to 3M.

3.0 New Source Review

In accordance with ARSD 74:36:10:01, the new source review 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. This facility is located in Aberdeen, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, 3M is not subject to new source review.

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 (TSP);
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.

3M is not one of the 28 named PSD source categories. Therefore, the major source threshold for the criteria air pollutants is 250 tons per year.

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.

4.1 Potential Criteria Pollutant Emissions Summary

Table 4-1 contains a summary of the potential emissions of Criteria Pollutants. Calculation methods can be found in Appendix A.

Table 4-1 Criteria Pollutant Potential Emissions Summary

Unit	TSP	PM10	PM2.5	SO_2	NO_x	VOC	CO
#1						4.12	
#2						7.80	
#4					2.15	12.61	4.16
#5					2.15	12.61	4.16
#6	1.04	0.52	0.52	0.04	10.42	0.37	5.96
#7	1.03	0.52	0.52	0.04	10.30	0.37	5.89
#8	0.24	0.12	0.03	0.00	2.39	0.03	0.68
#9	0.30	0.30	0.30	0.28	4.15	0.34	0.89
#10	0.19	0.19	0.19	0.18	2.63	0.21	0.58
#11	3.59	3.59	3.59				
#12	3.59	3.59	3.59				
#13	0.14	0.14	0.14	0.13	1.95	0.16	0.42
#14						0.07	
IN SIG	0.18	0.18	0.18	0.02	2.63	0.05	2.10
Total	**10**	**9**	**9**	**1**	**39**	**39**	**25**

1- Insignificant Sources

3M has the potential to emit less than 250 tons of any one Criteria Pollutant. Therefore 3M is considered a minor source under the PSD permitting program for Criteria Pollutants.

4.2 Greenhouse Gas Emissions

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. Since the 3M does not require a PSD permit, a review of the greenhouse gases is not be required. However, DENR did calculate greenhouse gas emissions in Appendix A.

5.0 National Emission Standards for Hazardous Air Pollutants (HAPs)

DENR reviewed 40 CFR Part 61 to determine 3M's applicability to any of the subparts of this section and determined there are no applicable emissions.

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 Hazardous Air Pollutant (HAP) Emissions

Table 6-1 contains a summary of potential HAP emissions. Appendix A includes the calculation methods.

6-1 Potential HAPs Emissions Summary

Unit	HAP
#1	0.61
#2	1.18
#4	3.20
#5	3.20
#6	0.15
#7	0.15
#8	0.01
#9	0.04
#10	0.02
#11	
#12	
#13	0.02
#14	0.07
IN SIG	0.05
Total	**9**

1-Insignificant Sources

3M has the potential to emit 9 tons of total HAPs; this is below the single source pollutant major source threshold. Therefore 3M is considered a minor source for HAPs.

DENR reviewed Maximum Achievable Control Technology Standards under 40 CFR Part 63 and determined the following may be applicable to 3M.

6.2 Industrial Process Cooling Towers

DENR's review of 40 CFR Part 63, Subpart Q shows it is applicable to new and existing industrial process cooling towers that are operated with chromium-based water treatment chemicals and is a major source for hazardous air pollutants under the Title V air quality operating permit program or an integral part of a major source. 3M is not a major source of hazardous air pollutants. Therefore, this subpart is not applicable.

DENR incorrectly required all facilities with industrial process cooling towers to meet this requirement and will remove the requirements (i.e., Unit #3 from Table 1-1 and permit condition 11.1) from the Title V air quality operating permit for 3M since it is not applicable.

6.3 Gasoline Distribution Facilities

DENR's review of 40 CFR Part 63, Subpart R shows that it applies to facilities operating bulk gasoline terminals. In this subpart bulk gasoline terminal is defined as a facility having a through put of 19,974 gallons (75,700 Liters) a day receiving its gasoline by pipeline, train or ship. 3M receives its gasoline from trucks and does not have the capability of achieving that level of throughput. Therefore 3M is not applicable to this subpart

6.4 Organic Liquids Distribution: (Non-Gasoline)

DENR's review of 40 CFR Part 63, Subpart EEEE shows that it applies to (non-gasoline) organic liquid distribution at major sources of HAPs. 3M is a minor source of HAPs and therefore not subject to this rule.

6.5 Stationary Reciprocating Internal Combustion Engines

DENR's review of 40 CFR Part 63, Subpart ZZZZ shows it may be applicable.
An affected source is 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 (40 CFR § 63.6590).
3M has three compression ignition reciprocating internal combustion engines at its facility (Units #9, #10, and #13). All three were constructed before the deadlines laid out in 40 CFR 60 Subpart IIII and must comply with the requirements of this subpart. The three units are applicable to the following specification:

1. Area source
2. Existing emergency engine
3. Compression ignition
4. Not contractually obligated
5. Not an emergency engine at an institution, commercial, or residential

6. Does not meet the emission standards for a non-emergency engine

6.6 Gasoline Distribution Bulk Terminals Bulk Plants and Pipeline

DENR's review of 40 CFR Part 63, Subpart BBBBBB show that it applies only to bulk gasoline terminal, pipeline breakout station, pipeline pumping station, or a bulk gasoline plant. 3M does not transport gasoline by pipeline, does not receive gasoline by pipeline, ship, or barge, and does not ship gasoline. Therefore this subpart is not applicable to 3M

6.7 Gasoline Dispensing Facilities

DENR's review of 40 CDR Part 63, Subpart CCCCCC shows it may be applicable. 3M has a tank and dispensing that fit the definition of gasoline dispensing facilities. This tank is relatively small (540 gallons) and has a monthly throughput of less than 10,000 gallons. Therefore the permit will contain conditions for the following set of circumstances:

1. Existing Tank at an area source for HAP emissions;
2. Monthly Throughput of less than 10,000 gallons; and
3. Not applicable to any more stringent standards for the affected source.

6.8 Industrial, Commercial, and Institutional Boilers and Process Heaters

DENR's review of 40 CFR Part 63, Subpart DDDDD shows that it applies to industrial, commercial, and institutional boilers and process heaters located at a major source of hazardous air pollutant emissions. 3M is considered an area source of hazardous air pollutants and is not subject to this subpart.

6.9 Industrial, Commercial, and Institutional Boilers – Area Source

DENR's review of 40 CFR Part 63, Subpart JJJJJJ shows it applies to all new or existing industrial, commercial, and institutional boilers located at an area source of hazardous air pollutants.

3M has three boilers that are potentially applicable to this subpart. However, 3M has requested that two of them, Unit #6 and #7, be considered gas fired. In accordance with 40 CFR 63.11195 (e) a gas fired boiler is not subject this subpart. A gas-fired boiler is defined as "…any boiler that burns gaseous fuels not combined with any solid fuels, burns liquid fuel only during periods of gas curtailment, gas supply emergencies, or periodic testing on liquid fuel." Units #6 and #7 will not be subject to this subpart so long as they meet these conditions. 3M's permit will contain conditions outlining this requirement as well as what is needed to switch back to using distillate oil outside of the instances listed above.

Unit #8 does not have the option of being fired with a gaseous fuel. As such it is not considered gas fired and it applicable to this subpart. 3M's permit will contain conditions for following conditions:

1. Boiler rated at less than 10 MMBtus per hour;
2. No emission controls; and
3. No continuous emission monitoring system.

6.10 Other MACT Standards

DENR reviewed the other Maximum Achievable Control Technology Standards and determined there are no other standards applicable to this ethanol plant.

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. 3M must comply with federal New Source Performance Standards Subpart Dc and RR both of which do not contain a Title V exemption in either the state or federal rules. Therefore, 3M is required to obtain a Title V air quality operating permit.

7.1 State Restrictions on Visible Emissions

Visible emissions are applicable to units that discharge into 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. 3M must control the opacity at less than 20 percent for all units.

7.2 State Particulate Emission Limits

Table 7-1 contains a summary of the applicable state particulate in accordance with ARSD 74:36:06.

Table 7-1 State Total Suspended Particulate Limit

Unit	Total Suspended Particulate		In Compliance?
	Potential Emission Rate	Emission Limit	
#6	0.0 pounds per MMBtus	0.6 pounds per MMBtus	Yes
#7	0.0 pounds per MMBtus	0.6 pounds per MMBtus	Yes
#8	0.0 pounds per MMBtus	0.6 pounds per MMBtus	Yes
#9	0.0 pounds per MMBtus	0.6 pounds per MMBtus	Yes
#10	0.0 pounds per MMBtus	0.6 pounds per MMBtus	Yes
#11	0.0 pounds per hour	4.2 pounds per hour	Yes
#12	0.0 pounds per hour	4.2 pounds per hour	Yes
#13	0.0 pounds per MMBtus	0.6 pounds per MMBtus	Yes

7.3 State Sulfur Dioxide Emission Limits

Table 7-2 contains a summary of the applicable state particulate in accordance with ARSD 74:36:06.

Table 7-2 State Sulfur Dioxide Limit

Unit	Sulfur Dioxide		In Compliance?
	Potential Emission Rate	Emission Limit	
#6	0.0 Pounds per MMBtus	3.0 pounds per MMBtus	Yes
#8	0.0 Pounds per MMBtus	3.0 pounds per MMBtus	Yes
#9	0.0 Pounds per MMBtus	3.0 pounds per MMBtus	Yes
#10	0.0 Pounds per MMBtus	3.0 pounds per MMBtus	Yes
#13	0.0 Pounds per MMBtus	3.0 pounds per MMBtus	Yes

7.4 Performance Tests

In accordance with ARSD 74:36:11:02, the Secretary of DENR may require a performance test if necessary to demonstrate compliance with the state's emission limits. At this time, DENR does not believe a performance test is warranted. However, permit conditions will be included in the draft permit that will allow DENR to require a performance test if DENR believes a performance test is necessary in the future to demonstrate compliance.

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 Title V air quality permit. 3M's application was received after April 20, 1998. Therefore, compliance assurance monitoring would be 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.

3M does not have any units that meet this definition. Therefore, compliance assurance monitoring is not applicable.

7.6 Periodic Monitoring

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the Federal Clean Air Act. 3M is required to meet the following requirements:

1. State Visible Emission Limits;
2. State Total Suspended Particulate Limits;
3. State Sulfur Dioxide Limits;

4. New Source Performance Standards for Boilers New Source Performance Standards for Pressure-Sensitive Tape and Label Coating Operations;
5. Maximum Achievable Performance Technology for Reciprocating Internal Combustion Engines;
6. Maximum Achievable Performance Technology for Gasoline Dispensing Facilities; and
7. Maximum Achievable Performance Technology for Industrial, Commercial, and Institutional Boilers –Area Sources

Periodic monitoring required for New Source Performance Standards and Maximum Achievable Control Technology's will detail the required periodic monitoring for each subpart. The state limits will employ periodic monitoring as follows:

1. Periodic monitoring for visible emissions and particulate matter emissions will be based on periodic visible emission readings or evaluations. In addition, periodic monitoring of particulate matter emissions will consist of the proper operation and maintenance of all pollution control devices;
2. Periodic monitoring of sulfur dioxide emissions for units burning natural gas is not required based on the sulfur content in pipeline quality natural gas.
3. Periodic Monitoring of sulfur dioxide emission for units burning distillate oil will be accomplished by tracking the sulfur content of the fuel. 3M will be required to obtain a fuel suppliers certificate for each load of distillate oil.

7.7 Air Fees

Sources subject to the Title V air quality operating permit program 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 charged for are particulate matter, sulfur dioxides, nitrogen oxides, volatile organic compounds, and hazardous air pollutants. The actual emissions are calculated by DENR based on operational information provided by the source.

8.0 Recommendation

Based on the above findings, 3M is required to operate within the requirements stipulated in 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 Standard;
4. ARSD 74:36:08 – National Emission Standards for Hazardous Air Pollutants;
5. ARSD 74:36:12 – Control of Visible Emissions; and.
6. ARSD 74:37:01 – Air Emission Fees.

Based on the information submitted in the air quality permit application, DENR recommends conditional approval to renew 3M's Title V air quality operating permit. Any questions pertaining to this permit recommendation should be directed to John Conklin, Engineer I.

Appendix A
Potential Emission and State Emission Limit Calculations

A.1 Emission Factors

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 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.

The emission factors for each unit were derived as follows:

1. Units #1 and #2 emission factors were taken from previous 3M applications.
2. Unit #3 was not included as no emission factor was found, and the emissions are considered negligible.
3. The uncontrolled emission factors for Units #4 and #5 were derived from a stack test on the abatement system pilot project at its Saint Paul, Minnesota facility. The stack test represents the emissions after the abatement system but before the use of the wet scrubber.
4. Units #9, #10, and #13 emissions factors are taken from AP-42, Chapter 3.3.
5. Units #11 and #12 emission factors are taken from AP-42, Chapter 6.6 using a maximum process rate of 2,050 pounds per hour (lbs/hr).

The potential uncontrolled emission factors for criteria air pollutants and hazardous air pollutants (HAPs) are summarized in Table A-1.

Table A-1 Uncontrolled Emission Factors (lbs/hr)

Units	TSP	PM10	PM2.5	SO_2	NO_x	VOC	CO	HAP
#1	-	-	-	-	-	0.94	-	0.14
#2	-	-	-	-	-	1.78	-	0.27
#4	-	-	-	-	0.49	2.88	0.95	0.73
#5	-	-	-	-	0.49	2.88	0.95	0.73
#9[1]	1.18	1.18	1.18	1.1	16.6	1.35	3.57	0.16
#10[2]	0.75	0.75	0.75	0.70	10.5	0.85	2.31	0.09
#11	0.82	0.82	0.82	-	-	-	-	-
#12	0.82	0.82	0.82	-	-	-	-	-
#13[3]	0.55	0.55	0.55	0.51	7.8	0.62	1.67	0.07

[1]-This was adjusted from AP-42 Table 3.3-1 (lbs/hp-hr) multiplied by the generators 535 horsepower;
[2]-This was adjusted from AP-42 Table 3.3-1 (lbs/hp-hr) multiplied by the fire pumps 340 horsepower; and
[3]- This was adjusted from AP-42 Table 3.3-1 (lbs/hp-hr) multiplied by the generators 250 horsepower.

Units #6 and #7 are boilers that can be fired with either natural gas or distillate oil. Therefore there is an emission factor, given from AP-42, for each fuel type. These values can be found in Table A-2. Unit # 8 is only fired with distillate oil and the emission factors for distillate oil in

Table A-2 are used to calculate potential emissions. The emission factor is in pounds per quantity of fuel consumed and are converted to pounds per million British thermal units (MMBtus) using a factor of 1,020 MMBtus per million cubic feet for natural gas and 140 MMBtus per 1,000 gallons for distillate oil.

3M requested that Units #6 and #7 be considered gas fired boilers, and will only burn distillate oil in these units at times of natural gas curtailment, supply interruption, startups, and periodic testing. Since this limitation still allows for combustion of distillate oil the highest possible emission factor will still be used in the calculations in order to represent the worst possible scenario.

Table A-2 Uncontrolled Boiler Emission Factors (lbs/MMBtus)

Fuel Source	TSP	PM10	PM2.5	SO2	NOX	VOC	CO	HAP
Natural Gas	0.007	0.007	0.007	0.0006	0.1	0.005	0.08	0.002
Distillate Oil	0.014	0.007	0.002	0.00002[1]	0.14	0.002	0.04	0.0003

[1]-Distillate oil is assumed to be ultra-low sulfur or 15 ppm sulfur content.

DENR also calculated greenhouse gas emissions from the fuel burning units using the emission factors for greenhouse gases from fuel burning units taken from the chapters in AP-42 mentioned earlier. Units #7 and #8 emission factors will come from the natural gas and distillate oil (see Table A-3). A carbon dioxide equivalent (CO_{2e}) must be calculated. This is done by multiplying methane (CH_4) emissions by 21 and nitrous oxide (N_2O) emission by 310.

Table A-3 Greenhouse Gas Emission Factors for Units #6, #7, and #8 (lbs/MMBtus)

Fuel Source	CO_2	CH_4	N_2O	CO_{2e}
Natural Gas	117.6	0.0023	0.0022	118.3
Distillate Oil	159.3	0.002	0.002	160

Greenhouse gas emission factors for Unit #9, #10, and #13 are displayed in Table A-4. CH_4 and N_2O data is not given in the AP-42 for internal combustion engines and are considered negligible.

Table A-4 Greenhouse Gas Emission Factors for Unit #9, #10, and #13 (lbs/hr)

Unit	CO_2	CO_{2e}
#9[1]	615.3	615
#10[2]	391	391
#13[3]	287.5	288

[1]-This was adjusted from AP-42 Table 3.3-1 (lbs/hp-hr) multiplied by the generators 535 horsepower;
[2]-This was adjusted from AP-42 Table 3.3-1 (lbs/hp-hr) multiplied by the fire pumps 340 horsepower; and
[3]- This was adjusted from AP-42 Table 3.3-1 (lbs/hp-hr) multiplied by the generators 250 horsepower.

Units #4 and #5 utilizes a perflourocarbon, octaflouropropane, which is considered a greenhouse gas. The majority of the emissions from this gas are destroyed through a voluntary abatement /wet scrubber system. However according to 3M, 1 ton of emissions still exist for each unit and will need to be accounted for in the CO_{2e} calculations. In order to reach equivalency with carbon

dioxide the emissions must be multiplied by 8,830 or unit emits 8,830 tons per year of greenhouse gases.

A.2 Potential Emissions

Potential emissions are calculated assuming the unit runs every hour of every day of the year (8,760 hours). The exception to this is in the case of an emergency generators and fire pumps, where the potential operation is assumed to be 500 hours a year.

Equation A-1 is used to calculate the potential emissions for the units at 3M using the emission factors in Table A-1.

Equation A-1 Potential Emissions for Units #1, #2, #4, #5, #9,#10, #11, #12, #13

$$Potential\ \frac{tons}{yr} = Emission\ factor\ \frac{lbs}{hr} \times potential\ hours\ \frac{hrs}{yr} \div 2{,}000\ \frac{lbs}{ton}$$

Equation A-2 is used to calculate potential uncontrolled emissions from the boilers. The emission factors in Equation A1-2 are the maximum from the natural gas and distillate oil options in both Tables A-2 and A-3.

Equation A-2 Potential Emissions for Units #6, #7, and #8

$$Potential\ \frac{tons}{yr} = Emission\ factor\ \frac{lbs}{MMBtus} \times max\ heat\ input\ \frac{MMBtus}{hr} \times 8{,}760\ \frac{hrs}{yr} \div 2{,}000\ \frac{lbs}{ton}$$

It should be noted that 3M has 5 boilers that burn natural gas and are considered insignificant activities. These insignificant activities have been reviewed for all PSD pollutants with the exception of greenhouse gases. As greenhouse gases are now required to be evaluated they will be included in the CO_{2e} evaluation. These sources will be considered as one source with all of the heating values added together (i.e., 6.0 MMBtus per hour) and will collectively be listed as "IN SIG" in the results.

Additionally Unit #14 includes a tank and dispensing activities. These emissions were estimated in 3M's application using both the EPA's Tanks 4.0.9 software and AP-42 Chapter 5.2 (gasoline dispensing). The HAP emissions are considered equal to the VOC emissions as they are relatively small and all HAPs in gasoline would be included in the VOC emissions.

The results of the above equations are summarized in Table A-5.

Table A-5 Potential Emissions Summary (tons per year)

Unit	TSP	PM10	PM2.5	SO_2	NO_x	VOC	CO	HAP	CO_{2e}
#1						4.12		0.61	
#2						7.80		1.18	
#4					2.15	12.61	4.16	3.20	8,830
#5					2.15	12.61	4.16	3.20	8,830
#6	1.04	0.52	0.52	0.04	10.42	0.37	5.96	0.15	11,913.60

Unit	TSP	PM10	PM2.5	SO_2	NO_x	VOC	CO	HAP	CO_{2e}
#7	1.03	0.52	0.52	0.04	10.30	0.37	5.89	0.15	11,773.44
#8	0.24	0.12	0.03	0.00	2.39	0.03	0.68	0.01	2,733.12
#9	0.30	0.30	0.30	0.28	4.15	0.34	0.89	0.04	153.75
#10	0.19	0.19	0.19	0.18	2.63	0.21	0.58	0.02	97.75
#11	3.59	3.59	3.59						
#12	3.59	3.59	3.59						
#13	0.14	0.14	0.14	0.13	1.95	0.16	0.42	0.02	72
#14						0.07		0.07	
IN SIG	0.18	0.18	0.18	0.02	2.63	0.05	2.10	0.05	3,108.92
Total	**10**	**9**	**9**	**1**	**39**	**39**	**25**	**9**	**47,513**

A.3 State Emission Limits

The State of South Dakota has state limits for particulate matter and sulfur dioxide in addition to the federal standards. The standards for fuel burning units are based on fuel input as opposed to output. However 3M has given the work output values in horsepower for its reciprocating internal combustion engines. Therefore these values will have to be converted to a heat input. In order to do this an efficiency of 35 percent will be assumed, Equation A-3 will be used in order to do the conversion.

Equation A-3 Output to Input Conversion

$$Input\left(\frac{MMBtus}{Hour}\right) = Output\,(HP) \times 0.746\,\frac{kilowatts}{HP} \times 0.0034\,\frac{MMBtus}{kWh} \div 35\%$$

Table A-5 contains a summary of the results of applying Equation A-3.

Table A-5 Horsepower Output to Heat Input Conversion

Unit	Horsepower	MMBtus per hour
#9	535	3.88
#10	340	2.46
#13	250	1.81

Total suspended particulate emission limits are applicable to fuel burning units and process units. 3M's operations involve fuel burning units and process units.

The total suspended particulate emission limits for fuel burning units are derived from ARSD 74:36:06:02. The maximum heat input value for all fuel burning units with a heat input of less than 10 MMBtus per hour is 0.6 pounds per MMBtus. This particulate emission limit is applicable to Units #8, #9, #10, and #13. For units burning fuels that have a heat input of more than or equal to 10 MMBtus per hour is estimated using Equation A-4. This particulate emission limit is applicable to Units #6 and #7.

Equation A-4 Particulate Emissions Limit ≥10MMBtus per hour

$$EmissionLimit\left[\frac{pounds}{MMBtus}\right] = 0.811 \times HeatInput^{-0.131}$$

The particulate emission limits for process units are derived from ARSD 74:36:06:03(1). Equation 7-2, taken from ARSD 74:36:06:03(1)(a), is used to calculate the state limit of particulate emissions for each process unit with operating rates less than or equal to 30 tons per hour. 3M's process units do not have a capacity to process more than 30 tons per hour. Therefore Equation A-4 will be used to set state limit for particulate emission from Units #10 and #11.

Equation A-4 State Particulate Emission Limit for Process Units ≤ 30 tons per hour

$$E_{TSP} = (4.10 \times P^{0.67})$$

Where:

- E_{TSP} = Emission limit for total suspended particulate matter, in pounds per hour; and
- P = Design process rate, in tons per hour.

Table A-6 summarized the results of the state particulate emission limit equations. The potential emission rate in pounds per hour for processes is based on the annual emissions in Table A-4 multiplied by 2,000 pounds per ton and divided by 8,760 hours per year. For the fuel burning units with emission factors in Table A-1, the potential emission rate is based on the emission factor in Table A-1 divided by the maximum heat input value for the appropriate unit. For the fuel burning units with emission factors in Table A-2, it's the emission factor since it is in the appropriate units.

Table A-6 State Total Suspended Particulate Limit

Unit	Total Suspended Particulate	
	Potential Emission Rate	**Emission Limit**
#6	0.0 pounds per MMBtus	0.6 pounds per MMBtus
#7	0.0 pounds per MMBtus	0.6 pounds per MMBtus
#8	0.0 pounds per MMBtus	0.6 pounds per MMBtus
#9	0.3 pounds per MMBtus	0.6 pounds per MMBtus
#10	0.3 pounds per MMBtus	0.6 pounds per MMBtus
#11	0.8 pounds per hour	4.2 pounds per hour
#12	0.8 pounds per hour	4.2 pounds per hour
#13	0.3 pounds per MMBtus	0.6 pounds per MMBtus

In accordance with ARSD 74:36:06:02(2) and ARSD 74:36:06:03(2), the permitted units may not emit sulfur dioxide emissions to the ambient air in an amount greater than three pounds of sulfur dioxide per million Btus of heat input. Table A-7 provides a comparison of the sulfur dioxide emission limit versus the potential sulfur dioxide emission rate. The potential emission rate is based on the same methods used to determine the potential particulate emission rate.

Table A-7 State Sulfur Dioxide Limit

Unit	Sulfur Dioxide	
	Potential Emission Rate	**Emission Limit**
#6	0.0 Pounds per MMBtus	3.0 Pounds per MMBtus
#8	0.0 Pounds per MMBtus	3.0 Pounds per MMBtus
#9	0.3 Pounds per MMBtus	3.0 Pounds per MMBtus
#10	0.3 Pounds per MMBtus	3.0 Pounds per MMBtus
#13	0.3 Pounds per MMBtus	3.0 Pounds per MMBtus