

AIR EMISSION PERMIT NO. 05300011- 001

IS ISSUED TO

NRG Energy Center Minneapolis LLC

NRG Energy Center Minneapolis
816 4th Avenue South
Minneapolis, Hennepin County, MN 55404

The emission units, control equipment and emission stacks at the stationary source authorized in this permit are as described in the following permit application(s):

| | |
|---------------------------------|--------------------|
| Permit Type | Application Date |
| Total Facility Operating Permit | September 15, 1995 |

This permit authorizes the permittee to operate the stationary source at the address listed above unless otherwise noted in Table A. The permittee must comply with all the conditions of the permit. Any changes or modifications to the stationary source must be performed in compliance with Minn. R. 7007.1150 to 7007.1500. Terms used in the permit as defined in the state air pollution control rules unless the term is explicitly defined in the permit.

Permit Type: Federal; Part 70

Issue Date: September 9, 2002

Expiration: September 9, 2007

All Title I Conditions do not expire.

Ann M. Foss
Major Facilities Section Manager
Majors and Remediation Division

for Karen A. Studders
Commissioner
Minnesota Pollution Control Agency

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4. Formula For Calculating NRG Energy Center Minneapolis
Main Plant SO₂ Emissions

NOTICE TO THE PERMITTEE:

Your stationary source may be subject to the requirements of the Minnesota Pollution Control Agency's (MPCA) solid waste, hazardous waste, and water quality programs. If you wish to obtain information on these programs, including information on obtaining any required permits, please contact the MPCA general information number at:

| | |
|--------------------|----------------|
| Metro Area | (651) 296-6300 |
| Outside Metro Area | 1-800-657-3864 |
| TTY | (651) 282-5332 |

The rules governing these programs are contained in Minn. R. chs. 7000-7105. Written questions may be sent to: Minnesota Pollution Control Agency, 520 Lafayette Road North, St. Paul, Minnesota 55155-4194.

Questions about this air emission permit or about air quality requirements can also be directed to the telephone numbers and address listed above.

PERMIT SHIELD:

Subject to the limitations in Minn. R. 7007.1800, compliance with the conditions of this permit shall be deemed compliance with the specific provision of the applicable requirement identified in the permit as the basis of each condition. Subject to the limitations of Minn. R. 7007.1800 and 7017.0100, subp. 2, notwithstanding the conditions of this permit specifying compliance practices for applicable requirements, any person (including the Permittee) may also use other credible evidence to establish compliance or noncompliance with applicable requirements.

FACILITY DESCRIPTION:

This facility produces steam for district heating and cooling. It is composed of three separate fossil fuel-fired boiler plants that are considered a single facility under the federal new source review permitting program. These plants are known as the Energy Center Minneapolis Main Plant, the Baker Boiler Plant, and the Soo Line Boiler Plant.

The facility is located in Air Quality Control Region (AQCR) 131 (the seven county Twin Cities metropolitan area). Circa 1990 computer modeling analysis identified the facility as a major contributor to the (former) sulfur dioxide nonattainment status of AQCR 131. An Amended Findings and Order issued June 30, 1993, (that superseded the original May 27, 1992, Findings and Order), imposed numerous limits and restrictions on the facility in order to restrict emissions of sulfur dioxide and bring AQCR 131 into attainment with the sulfur dioxide national ambient air quality standards. Requirements from the Order are incorporated into this permit.

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Table A contains limits and other requirements with which your facility must comply. The limits are located in the first column of the table (What To do). The limits can be emission limits or operational limits. This column also contains the actions that you must take and the records you must keep to show that you are complying with the limits. The second column of Table A (Why to do it) lists the regulatory basis for these limits. Appendices included as conditions of your permit are listed in Table A under total facility requirements.

Subject Item:**Total Facility**

| What to do | Why to do it |
|--|--|
| Modeling: Any increase in SO2 emissions above the modeled conditions associated with the emission units in the State Implementation Plan (SIP), shall be modeled at the new predicted SO2 emission rates to determine the impact on the SO2 national ambient air quality standards (NAAQS). | Title I Condition: State Implementation Plan for SO2 |
| CHANGES NOT REQUIRING A MODIFICATION OF THE SIP - The Permittee is authorized to make changes to the Facility without obtaining a modification as long as the change does not do or result in any of the following: 1. an exceedance of any sulfur dioxide emission limit in this permit; 2. an increase in the overall sulfur dioxide emissions from the Facility; 3. a physical change in the equipment that affects the stack parameters described in the Appendix of this permit; 4. a violation of any of the requirements in Minn. R. 7007.1150 through Minn. R. 7007.1500. | Title I Condition: State Implementation Plan for SO2 |
| CHANGES REQUIRING A MODIFICATION OF THE SIP: 1. any modification that causes a decrease in the stack gas volumetric flow rate, stack gas exit temperature, or stack height below that described in the Appendix of this permit; 2. any modification that causes an increase in the stack exit diameter above that described in the Appendix of this permit; or 3. any construction or modification of Facility structures that increase the effective structural dimensions as they are used in the building wake effects algorithm in the ISC Air Dispersion Model, or its successor. | Title I Condition: State Implementation Plan for SO2 |
| General Operating and Maintenance Requirements for the SIP: The Permittee shall operate and maintain the process equipment described in the Appendix according to the parameters set forth in the Appendix. These parameters were used in the computer modeling performed to demonstrate that the SO2 maintenance area will maintain compliance with the SO2 NAAQS. | Title I Condition: State Implementation Plan for SO2 |
| The Permittee shall maintain a file or files of information on the design, construction and operation of each emission facility, emission source, fuel system, stack, structures pertinent to modeling for downwash, and any other information required to conduct sulfur dioxide ambient air quality modeling of emission from the facility. The file or files shall also include all information required to demonstrate that emission units, stack/vents, and monitoring equipment identified in this permit are installed as described in this permit. | Title I Condition: State Implementation Plan for SO2 |
| Sulfur Dioxide Emissions And Operating Records: The Permittee shall generate and maintain records containing information to demonstrate compliance with emission limitations and operating requirements specified in this permit. In order to demonstrate compliance with the emission limitations, fuel oil sulfur content restrictions, and residual oil use limitations, the Permittee shall retain the following records at the Main Plant for the emission units described in this permit: 1. a record of all emission units operating at any one time and the applicable total facility SO2 emission limit for that time, as described in the chart in the Appendix of this permit; 2. all performance and compliance stack testing measurements and operating conditions during performance and compliance tests as required by Minn. R. ch. 7017; | Title I Condition: State Implementation Plan for SO2 |

(Continued in next requirement)

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

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|--|---|----|----------------------|----|----------------------|----|------------------------|----|------------------------|----|------------------------|-----|------------------------------------|-----|------------------------------------|------|--|
| <p>Sulfur Dioxide Emissions And Operating Records:</p> <ol style="list-style-type: none"> all CEM emissions data, including data from the diluent and fuel oil flow monitors. all monitoring device calibration checks. all adjustments and maintenance performed on the monitoring systems. certification information as required by Minn. R. ch. 7017 and 40 CFR part 60 appendices B and F, as applicable. percent uptime of the CEMs on a daily average basis. interruption of natural gas service as described in GP 001 requirement "Fuel During CE 005 Breakdown"; distillate fuel oil supplier certifications and residual fuel oil sulfur content data, as specified in requirements titled "Distillate Fuel Oil Supplier Certification" and "Determination of Residual Fuel Oil Sulfur Content", respectively, in this Total Facility subject item in table A of this permit. | Title I Condition: State Implementation Plan for SO ₂ | | | | | | | | | | | | | | | | |
| <p>Distillate Fuel Oil Supplier Certification: The Permittee shall obtain a fuel receipt from the supplier for each distillate fuel oil delivery to the facility, containing the following information:</p> <ol style="list-style-type: none"> The name of the fuel oil supplier; The date of the fuel oil delivery; A certification that the delivered fuel oil meets the properties of No. 1, No. 1 Low Sulfur, No. 2, or No. 2 Low Sulfur fuel oil as defined in the current version of ASTM D 396 Standard Specification For Fuel Oils. <p>The current version of D 396-01 specifies a sulfur content of 0.5% by weight for No. 1 and No. 2 fuel oils (determined according to ASTM Test Method D 129), and a sulfur content of 0.05% by weight for No. 1 Low Sulfur and No. 2 Low Sulfur fuel oils (determined according to ASTM Test Method D 2622).</p> <p>A receipt containing the information described in items 1 and 2 meets the requirements of 40 CFR Section 60.49b(r).</p> | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of 40 CFR Section 60.49b(r) | | | | | | | | | | | | | | | | |
| <p>Determination of Residual Fuel Oil Sulfur Content - The Permittee may determine residual fuel oil sulfur content by using either of the following methods:</p> <ol style="list-style-type: none"> Each day that residual fuel oil is combusted, the Permittee shall collect a sample from each storage tank that supplies residual fuel oil to the Facility emission units. The sample shall be collected according to ASTM Method D 270 and analyzed to determine the sulfur content using the ASTM test method specified in ASTM D 396 for determining sulfur content in residual fuel oil. The results shall be recorded and dated. Obtain a fuel receipt from the fuel supplier for each residual fuel oil delivery to the facility that states: <ol style="list-style-type: none"> the name of the fuel supplier the date of the fuel oil delivery; the residual oil sulfur content is less than or equal to 1.5 percent by weight. <p>Note: This requirement does not meet the EU 004 requirement for determining CE 005 inlet SO₂ emission rates.</p> | Title I Condition: State Implementation Plan for SO ₂ | | | | | | | | | | | | | | | | |
| <p>Emission Unit Operating Limit: The Permittee may not operate the Soo Line Boiler Plant boilers (EU 005, EU 006, and EU 007), Baker Boiler Plant boilers (EU 008, EU 009, EU 010), and Main Plant emergency generators (EU 021 and EU 022) above the following rated heat input capacities (in mmBtu/hr):</p> <table> <tbody> <tr> <td>Soo Boiler 1/EU 005:</td><td>40</td></tr> <tr> <td>Soo Boiler 2/EU 006:</td><td>64</td></tr> <tr> <td>Soo Boiler 3/EU 007:</td><td>64</td></tr> <tr> <td>Baker Boiler 1/EU 008:</td><td>80</td></tr> <tr> <td>Baker Boiler 5/EU 009:</td><td>54</td></tr> <tr> <td>Baker Boiler 6/EU 010:</td><td>125</td></tr> <tr> <td>Main Emergency Generator 1/EU 021:</td><td>9.7</td></tr> <tr> <td>Main Emergency Generator 2/EU 022:</td><td>11.9</td></tr> </tbody> </table> | Soo Boiler 1/EU 005: | 40 | Soo Boiler 2/EU 006: | 64 | Soo Boiler 3/EU 007: | 64 | Baker Boiler 1/EU 008: | 80 | Baker Boiler 5/EU 009: | 54 | Baker Boiler 6/EU 010: | 125 | Main Emergency Generator 1/EU 021: | 9.7 | Main Emergency Generator 2/EU 022: | 11.9 | Title I Condition: State Implementation Plan for SO ₂ |
| Soo Boiler 1/EU 005: | 40 | | | | | | | | | | | | | | | | |
| Soo Boiler 2/EU 006: | 64 | | | | | | | | | | | | | | | | |
| Soo Boiler 3/EU 007: | 64 | | | | | | | | | | | | | | | | |
| Baker Boiler 1/EU 008: | 80 | | | | | | | | | | | | | | | | |
| Baker Boiler 5/EU 009: | 54 | | | | | | | | | | | | | | | | |
| Baker Boiler 6/EU 010: | 125 | | | | | | | | | | | | | | | | |
| Main Emergency Generator 1/EU 021: | 9.7 | | | | | | | | | | | | | | | | |
| Main Emergency Generator 2/EU 022: | 11.9 | | | | | | | | | | | | | | | | |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

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|---|--|
| Continuous Emissions Monitoring (CEM) Requirements: 1. Each CEM required in GP 001, GP 002, or EU 004 shall be capable of measuring SO2 emissions in pounds per hour and pounds per million Btu. 2. Each CEM required in GP 001, GP 002, or EU 004 must be operated so as to maintain a 90 percent uptime based on quarterly reporting periods. 3. The Permittee shall maintain and calibrate each CEM and all other systems necessary to provide continuous monitoring required under GP 001, GP 002, and EU 004, in accordance with equipment manufacturer's recommendations and instruction, and (if applicable) 40 CFR part 60, Appendix F. | Title I Condition: State Implementation Plan for SO2 |
| Recordkeeping: Retain all records at the stationary source for a period of five (5) years from the date of monitoring, sample, measurement, or report including those requirements that correspond with a "Title I Condition: State Implementation Plan for SO2" requirement. Records which must be retained at this location include all calibration and maintenance records, all original recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Records must conform to the requirements listed in Minn. R. 7007.0800, subp. 5(A). | Title I Condition: State Implementation Plan for SO2; meets requirements of Minn. R. 7007.0800, subp. 5(C) |
| Deviations from requirements cited as "Title I Condition: State Implementation Plan for SO2" shall be reported semiannually with the Semiannual Deviations Report required by this permit. Reporting for these conditions shall occur even if there were no deviations for the reporting period. | Title I Condition: State Implementation Plan for SO2 |
| Operation and Maintenance Plan: Retain at the stationary source an operation and maintenance plan for all air pollution control equipment. At a minimum, the O & M plan shall identify all air pollution control equipment and shall include a preventative maintenance program for that equipment, a description of (the minimum but not necessarily the only) corrective actions to be taken to restore the equipment to proper operation to meet applicable permit conditions, a description of the employee training program for proper operation and maintenance of the control equipment, and the records kept to demonstrate plan implementation. | Minn. R. 7007.0800, subp. 14 and Minn. R. 7007.0800, subp. 16(J) |
| Limits set as a result of a performance test (conducted before or after permit issuance) apply until superseded as specified by Minn. R. 7017.2025 following formal review of a subsequent performance test on the same unit. | Minn. R. 7017.2025 |
| Performance Testing: Conduct all performance tests in accordance with Minn. R. ch. 7017 unless otherwise noted in Tables A, B, and/or C. | Minn. R. ch. 7017 |
| Performance Test Notifications and Submittals: Performance Tests are due as outlined in Tables A and B of the permit. See Table B for additional testing requirements. Performance Test Notification (written): due 30 days before each Performance Test Performance Test Plan: due 30 days before each Performance Test Performance Test Pre-test Meeting: due 7 days before each Performance Test Performance Test Report: due 45 days after each Performance Test Performance Test Report - Microfiche Copy: due 105 days after each Performance Test | Minn. R. 7017.2030, subp. 1-4 and Minn. R. 7017.2035, subp. 1-2 |
| Monitoring Equipment Calibration: Annually calibrate all required monitoring equipment (any requirements applying to continuous emission monitors are listed separately in this permit). | Minn. R. 7007.0800, subp. 4(D) |
| Operation of Monitoring Equipment: Unless otherwise noted in Tables A, B, and/or C, monitoring a process or control equipment connected to that process is not necessary during periods when the process is shutdown, or during checks of the monitoring systems, such as calibration checks and zero and span adjustments. If monitoring records are required, they should reflect any such periods of process shutdown or checks of the monitoring system. | Minn. R. 7007.0800, subp. 4(D) |
| Circumvention: Do not install or use a device or means that conceals or dilutes emissions, which would otherwise violate a federal or state air pollution control rule, without reducing the total amount of pollutant emitted. | Minn. R. 7011.0020 |
| Shutdown Notifications: Notify the Commissioner at least 24 hours in advance of a planned shutdown of any control equipment or process equipment if the shutdown would cause any increase in the emissions of any regulated air pollutant. If the owner or operator does not have advance knowledge of the shutdown, notification shall be made to the Commissioner as soon as possible after the shutdown. However, notification is not required in the circumstances outlined in Items A, B and C of Minn. R. 7019.1000, subp. 3. At the time of notification, the owner or operator shall inform the Commissioner of the cause of the shutdown and the estimated duration. The owner or operator shall notify the Commissioner when the shutdown is over. | Minn. R. 7019.1000, subp. 3 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

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|---|--|
| Breakdown Notifications: Notify the Commissioner within 24 hours of a breakdown of more than one hour duration of any control equipment or process equipment if the breakdown causes any increase in the emissions of any regulated air pollutant. The 24-hour time period starts when the breakdown was discovered or reasonably should have been discovered by the owner or operator. However, notification is not required in the circumstances outlined in Items A, B and C of Minn. R. 7019.1000, subp. 2. At the time of notification or as soon as possible thereafter, the owner or operator shall inform the Commissioner of the cause of the breakdown and the estimated duration. The owner or operator shall notify the Commissioner when the breakdown is over. | Minn. R. 7019.1000, subp. 2 |
| Notification of Deviations Endangering Human Health or the Environment: As soon as possible after discovery, notify the Commissioner or the state duty officer, either orally or by facsimile, of any deviation from permit conditions which could endanger human health or the environment. | Minn. R. 7019.1000, subp. 1 |
| Notification of Deviations Endangering Human Health or the Environment Report: Within 2 working days of discovery, notify the Commissioner in writing of any deviation from permit conditions which could endanger human health or the environment. Include the following information in this written description: 1. the cause of the deviation; 2. the exact dates of the period of the deviation, if the deviation has been corrected; 3. whether or not the deviation has been corrected; 4. the anticipated time by which the deviation is expected to be corrected, if not yet corrected; and 5. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the deviation. | Minn. R. 7019.1000, subp. 1 |
| Operation Changes: In any shutdown, breakdown, or deviation that would cause an increase in the emission of any regulated air pollutant, the Permittee shall immediately take all practical steps to modify operations to reduce the emission of any regulated air pollutant. The Commissioner may require feasible and practical modifications in the operation to reduce emissions of air pollutants. No emissions units that have an unreasonable shutdown or breakdown frequency of process or control equipment shall be permitted to operate. | Minn. R. 7019.1000, subp. 4 |
| Air Pollution Control Equipment: Operate all pollution control equipment whenever the corresponding process equipment and emission units are operated, unless otherwise noted in Table A. | Minn. R. 7007.0800, subp. 2; Minn. R. 7007.0800, subp. 16(J) |
| Fugitive Emissions: Do not cause or permit the handling, use, transporting, or storage of any material in a manner which may allow avoidable amounts of particulate matter to become airborne. Comply with all other requirements listed in Minn. R. 7011.0150. | Minn. R. 7011.0150 |
| Application for Permit Amendment: If a permit amendment is needed, submit an application in accordance with the requirements of Minn. R. 7007.1150 through Minn. R. 7007.1500. Submittal dates vary, depending on the type of amendment needed. | Minn. R. 7007.1150 through Minn. R. 7007.1500 |
| Extension Requests: The Permittee may apply for an Administrative Amendment to extend a deadline in a permit by no more than 120 days, provided the proposed deadline extension meets the requirements of Minn. R. 7007.1400, subp. 1(H). | Minn. R. 7007.1400, subp. 1(H) |
| Recordkeeping: Maintain records describing any insignificant modifications (as required by Minn. R. 7007.1250, subp. 3) or changes contravening permit terms (as required by Minn. R. 7007.1350, subp. 2), including records of the emissions resulting from those changes. | Minn. R. 7007.0800, subp. 5(B) |
| Noise: The Permittee shall comply with the noise standards set forth in Minn. R. 7030.0010 to 7030.0080 at all times during the operation of any emission units. This is a state only requirement and is not enforceable by the EPA Administrator or citizens under the Clean Air Act. | Minn. R. 7030.0010 - 7030.0080 |
| The Permittee shall comply with the General Conditions listed in Minn. R. 7007.0800, subp. 16. | Minn. R. 7007.0800, subp. 16 |
| Inspections: The Permittee shall comply with the inspection procedures and requirements as found in Minn. R. 7007.0800, subp. 9(A). | Minn. R. 7007.0800, subp. 9(A) |
| Emission Inventory Report: due 91 days after end of each calendar year following permit issuance (April 1). To be submitted on a form approved by the Commissioner. | Minn. R. 7019.3000 through Minn. R. 7019.3010 |
| Emission Fees: due 60 days after receipt of an MPCA bill. | Minn. R. 7002.0005 through Minn. R. 7002.0095 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Subject Item: GP 001 Main Plant Boilers 1, 2, 3, & 4**Associated Items:** EU 001 Main Plant Boiler 1

EU 002 Main Plant Boiler 2

EU 003 Main Plant Boiler 3

EU 004 Main Plant Boiler 4

SV 001 Main Plant Boiler 1/CE 001 Multiclone

SV 002 Main Plant Boilers 2 & 3/CE 002 & CE 003 Multiclones

SV 003 Main Plant Boiler 4/CE 004 Multiclone & CE 005 Scrubber

| What to do | Why to do it |
|--|---|
| Sulfur Dioxide: less than or equal to the applicable limit listed in the table titled "ENERGY CENTER MINNEAPOLIS SULFUR DIOXIDE EMISSION LIMITS" in the Appendix in this permit, when fuel oil is combusted in any GP 001 emission unit. | Title I Condition: State Implementation Plan for SO2 |
| Fuel During CE 005 Breakdown: If the Permittee experiences a breakdown of the wet scrubber (CE 005), the Permittee shall switch to burning natural gas or distillate fuel oil in the affected boiler (EU 004). If the Permittee determines that a potential exists to violate the 24-hour GP 001 SO2 emission limit, the Permittee shall begin the process of shifting load to the standby plant(s) (Baker Boiler Plant and/or the Soo Line Boiler Plant). The standby plant(s) may require up to 20 hours before they become available for commercial service. The Permittee is allowed this time to complete the load shift without being considered in violation of the SIP provided the Permittee uses the lowest sulfur-bearing distillate fuel oil available from its supplier until the standby plant(s) is available for commercial service. | Title I Condition: State Implementation Plan for SO2 |
| GP 001 Sulfur Dioxide Monitoring: The Permittee shall use a Continuous Monitoring System to calculate 1-hour, 3-hour rolling average, 24-hour rolling average, and 365-day rolling average SO2 emissions from GP 001 emission units when oil is combusted in any GP 001 emission unit. Total GP 001 emissions shall be calculated in pounds of SO2 per hour, once each hour when oil is combusted in any GP 001 emission unit. The equation in the Appendix of this permit shall be used to calculate hourly SO2 emissions. The Permittee shall either use CEMs, or a continuous fuel use monitor in combination with vendor certification or fuel sampling to determine SO2 emissions from EU 001, EU 002, and EU 003, in pounds per hour and pounds per million Btu. The Permittee shall use the SO2 CEM required under Subject Item EU 004 in Table A of this permit, to determine EU 004 SO2 emissions, in pounds per hour and pounds per million Btu. | Title I Condition: State Implementation Plan for SO2 |
| Permitted Fuel Types: Pipeline natural gas, distillate fuel oil with a maximum sulfur content of 0.5% by weight, and residual fuel oil with a maximum sulfur content of 1.5% by weight, for EU 001, EU 002, EU 003, and EU 004. The Permittee shall follow these Table A applicable requirements, as appropriate: 1. requirements in subject item Total Facility titled "Distillate Fuel Oil Supplier Certification" and "Determination of Residual Fuel Oil Sulfur Content", 2. requirement in subject item EU 004 titled "CE 005 Inlet SO2 Monitoring During Residual Fuel Oil Combustion". | Title I Condition: State Implementation Plan for SO2 |
| Fuel Type and Fuel Usage Recordkeeping: The Permittee shall record the type and quantity of each fuel combusted in each GP 001 emission unit during each hour of operation. | Title I Condition: State Implementation Plan for SO2; Minn. R. 7007.0800, subp. 4 and 5 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Subject Item: GP 002 Baker and Soo Line Plant Boilers

Associated Items: EU 005 Soo Line Plant Boiler 1
EU 006 Soo Line Plant Boiler 2
EU 007 Soo Line Plant Boiler 3
EU 008 Baker Plant Boiler 1
EU 009 Baker Plant Boiler 5
EU 010 Baker Plant Boiler 6
SV 004 Soo Line Boilers 1, 2, & 3
SV 005 Baker Plant Boilers 1 & 5
SV 006 Baker Plant Boiler 6

| What to do | Why to do it |
|---|--|
| EMISSION AND OPERATING LIMITS | hdr |
| Sulfur Dioxide: less than or equal to 0.6 lbs/million Btu heat input using 1-Hour Average when burning distillate fuel oil. This limit applies individually to each emission unit in GP 002. | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of Minn. R. 7011.0545 and Minn. R. 7011.0550 |
| Total Particulate Matter: less than or equal to 0.4 lbs/million Btu heat input . This limit applies individually to each emission unit in GP 002. | Minn. R. 7011.0545 |
| Opacity: less than or equal to 20 percent opacity except for one six-minute period per hour of not more than 60 percent opacity. This limit applies individually to each emission unit in GP 002. | Minn. R. 7011.0510, subp. 2 |
| Permitted Fuel Types: Pipeline natural gas, and distillate fuel oil with a maximum sulfur content of 0.5% by weight. Refer to the Total Facility subject item in Table A of this permit for requirements pertaining to fuel supplier certification. | Title I Condition: State Implementation Plan for SO ₂ |
| Distillate Fuel Oil Usage Limits: The Permittee is limited to combusting the following amounts of distillate oil in GP 002 boilers: Soo Line Boiler Plant (EU 005, EU 006, and EU 007): 1,157,100 gallons per year total, on a 12-month rolling sum basis Baker Boiler Plant (EU 008, EU 009, and EU 010): 1,178,562 gallons per year total, on a 12-month rolling sum basis | Title I Condition: State Implementation Plan for SO ₂ |
| MONITORING AND RECORDKEEPING | hdr |
| Fuel Type Recordkeeping: The Permittee shall record the type of fuel combusted in each GP 002 emission unit during each hour. | Title I Condition: State Implementation Plan for SO ₂ ; Minn. R. 7007.0800, subp. 4 and 5 |
| GP 002 Fuel Use Monitoring: The Permittee shall monitor fuel use by logging into the Continuous Monitoring System installed at the Main Plant. | Title I Condition: State Implementation Plan for SO ₂ ; Minn. R. 7007.0800, subp. 4 and 5 |
| Distillate Fuel Oil Usage Recordkeeping: By the 15th day of each month the Permittee shall calculate and record: 1. the total distillate fuel oil usage (in gallons per month) for the previous month for the Soo Line Boiler Plant; 2. the total distillate fuel oil usage (in gallons per month) for the previous month for the Baker Boiler Plant; 3. the distillate fuel oil usage (in gallons per year) for the previous 12-month period for each plant. | Title I Condition: State Implementation Plan for SO ₂ ; Minn. R. 7007.0800, subp. 4 and 5 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Subject Item: GP 003 Main Plant Pump and Fan IC Engines

Associated Items: EU 011 Main Plant IC Engine for Chilled Water Pump 2/SV 007
EU 012 Main Plant IC Engine for Chilled Water Pump 3/SV 007
EU 013 Main Plant IC Engine for Chilled Water Pump 4/SV 007
EU 014 Main Plant IC Engine for Chilled Water Pump 5/SV 007
EU 015 Main Plant IC Engine for Chilled Water Pump 6/SV 007
EU 016 Main Plant IC Engine for Condenser Pump 1/SV 007
EU 017 Main Plant IC Engine for Condenser Pump 2/SV 007
EU 018 Main Plant IC Engine for Condenser Pump 3/SV 007
EU 019 Main Plant IC Engine for Cooling Tower Fan 1/SV 008
EU 020 Main Plant IC Engine for Cooling Tower Fan 2/SV 009

| What to do | Why to do it |
|--|--|
| Permitted Fuel: Pipeline natural gas only | Title I Condition: State Implementation Plan for SO2 |
| Opacity: less than or equal to 20 percent opacity once operating temperatures have been attained, for each GP 003 emission unit. | Minn. R. 7011.2300, subp. 1 |
| Sulfur Dioxide: less than or equal to 0.5 lbs/million Btu heat input for each GP 003 emission unit. | Minn. R. 7011.2300, subp. 2 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Subject Item: GP 004 Main Plant Emergency Generators**Associated Items:** EU 021 Main Plant Emergency Generator 1/SV 007

EU 022 Main Plant Emergency Generator 2 (1661 hp)/SV 010

| What to do | Why to do it |
|--|--|
| Sulfur Dioxide: less than or equal to 0.5 lbs/million Btu heat input for each GP 004 emission unit. | Title I Condition: State Implementation Plan for SO ₂ ; Minn. R. 7011.2300, subp. 2 |
| Opacity: less than or equal to 20 percent opacity once operating temperatures have been attained, for each GP 004 emission unit. | Minn. R. 7011.2300, subp. 1 |
| Permitted Fuel: Distillate Fuel Oil with a maximum sulfur content of 0.5% by weight. Refer to the Total Facility subject item in Table A of this permit for requirements pertaining to fuel supplier certification. | Title I Condition: State Implementation Plan for SO ₂ |
| Operating Hours: less than or equal to 1000 hours/year for EU 022. | Title I Condition: To limit NO _x emissions to less than the significant level under 40 CFR Section 52.21 |
| Recordkeeping - EU 022 Operating Hours: During any day of EU 022 operation, the Permittee shall record those daily operating hours. By the 15th day of each month, the Permittee shall calculate and record the total operating hours for the previous month and for the previous 12-month period. | Title I Condition: To limit NO _x emissions to less than the significant level under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Subject Item: GP 005 Main Plant Boilers 1, 2, & 3**Associated Items:** EU 001 Main Plant Boiler 1

EU 002 Main Plant Boiler 2

EU 003 Main Plant Boiler 3

SV 001 Main Plant Boiler 1/CE 001 Multiclone

SV 002 Main Plant Boilers 2 & 3/CE 002 & CE 003 Multiclones

| What to do | Why to do it |
|---|--|
| GP 005 LIMITS AND OPERATING REQUIREMENTS | hdr |
| Sulfur Dioxide: less than or equal to 1.6 lbs/million Btu heat input using 1-Hour Average when burning residual fuel oil. This limit applies individually to EU 001, EU 002, and EU 003. | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of Minn. R. 7011.0545 and Minn. R. 7011.0550 |
| Sulfur Dioxide: less than or equal to 0.6 lbs/million Btu heat input using 1-Hour Average when burning distillate fuel oil. This limit applies individually to EU 001, EU 002, and EU 003. | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of Minn. R. 7011.0545 and Minn. R. 7011.0550 |
| Total Particulate Matter: less than or equal to 0.1 lbs/million Btu heat input . This limit applies individually to EU 001 and EU 002. | Minn. R. 7007.0800, subp. 2; meets requirements of Minn. R. 7011.0545 |
| Total Particulate Matter: less than or equal to 0.1 lbs/million Btu heat input for EU 003. | Minn. R. 7011.0550 |
| Opacity: less than or equal to 20 percent opacity except for one six-minute period per hour of not more than 60 percent opacity. This applies individually to EU 001, EU 002, and EU 003. | Minn. R. 7011.0510, subp. 2 and Minn. R. 7011.0515, subp. 2 |
| Fuel Use Restriction - EU 001, EU 002, and EU 003: Only one of these three emission units is permitted to combust residual fuel oil at any time. When one of these emission units is combusting residual fuel oil, the other two emission units must either combust natural gas or not operate. The Permittee shall follow the fuel type recordkeeping requirement in GP 001. | Title I Condition: State Implementation Plan for SO ₂ |
| GP 005 PERFORMANCE TESTING REQUIREMENTS | hdr |
| Performance Test: due 180 days after Permit Issuance to individually measure opacity and particulate matter emissions from EU 001, EU 002, and EU 003, while combusting residual fuel oil. | Minn. R. 7017.2020, subp. 1 |
| Refer to Total Facility Performance Test Notifications and Submittals for additional performance testing requirements. | |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

Subject Item: EU 004 Main Plant Boiler 4

Associated Items: CE 004 Multiple Cyclone w/o Fly Ash Reinjection - Most Multiclones

CE 005 Wet Scrubber - High Efficiency w/Lime Slurry

GP 001 Main Plant Boilers 1, 2, 3, & 4

MR 001 SO₂

MR 002 NO_x

MR 003 Opacity

MR 004 Oxygen

SV 003 Main Plant Boiler 4/CE 004 Multiclone & CE 005 Scrubber

| What to do | Why to do it |
|--|--|
| EMISSION LIMITS | hdr |
| Sulfur Dioxide: less than or equal to 0.16 lbs/million Btu heat input on a one hour rolling average, when burning residual fuel oil. This limit applies at all times including periods of startup, shutdown, and malfunction. | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of 40 CFR Sections 60.42b(d)(1) and 60.42b(g) |
| Sulfur Dioxide: less than or equal to 0.50 lbs/million Btu heat input on a one hour average, when burning distillate fuel oil. This limit applies at all times including periods of startup, shutdown, and malfunction. | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of 40 CFR Sections 60.42b(d) and 60.42b(g) |
| Note: CE 005 is bypassed when EU 004 is combusting distillate fuel oil. | |
| Nitrogen Oxides: less than or equal to 0.10 lbs/million Btu heat input when burning natural gas, calculated daily on a 30-day rolling average. This standard applies at all times including periods of startup, shutdown, or malfunction. | Title I Condition: BACT limit for NO _x emissions from a major modification under 40 CFR Section 52.21; meets requirements of 40 CFR Sections 60.44b(a) and (h) |
| Nitrogen Oxides: less than or equal to 0.20 lbs/million Btu heat input when burning distillate fuel oil, calculated daily on a 30-day rolling average. This standard applies at all times including periods of startup, shutdown, or malfunction. | Title I Condition: BACT limit for NO _x emissions from a major modification under 40 CFR Section 52.21; meets requirements under 40 CFR Sections 60.44b(a) and (h) |
| Nitrogen Oxides: less than or equal to 0.30 lbs/million Btu heat input when burning residual fuel oil, calculated daily on a 30-day rolling average. This standard applies at all times including periods of startup, shutdown, or malfunction. | Title I Condition: BACT limit for NO _x emissions from a major modification under 40 CFR Section 52.21; meets requirements under 40 CFR Sections 60.44b(a) and (h) |
| Total Particulate Matter: less than or equal to 0.078 lbs/million Btu heat input when burning residual fuel oil. This standard applies at all times except during periods of startup, shutdown, or malfunction. | Title I Condition: PM limit to avoid major modification status under 40 CFR Section 52.21 |
| Particulate Matter < 10 micron: less than or equal to 0.037 lbs/million Btu heat input when burning residual fuel oil. | Title I Condition: PM ₁₀ limit to avoid major modification status under 40 CFR Section 52.21 |
| Opacity: less than or equal to 20 percent opacity based on 6-minute average, except for one 6-minute period per hour of not more than 27% opacity. This standard applies at all times except during periods of startup, shutdown, or malfunction. | 40 CFR Sections 60.43b(f) and (g) |
| Fuel Usage: less than or equal to 3250000 gallons/year using 12-month Rolling Sum for Residual Fuel Oil, or Fuel Usage: less than or equal to 866334 gallons/year using 12-month Rolling Sum for Distillate Fuel Oil. If both residual and distillate fuel oil are burned in the same 12-month period, residual fuel oil and distillate fuel oil usage shall be limited in order to meet the following equation: $(3.75 \times AD) + AR = \text{or less than } 3,250,000 \text{ gallons}$ where: AD = Actual 12-month distillate fuel oil usage (gallons) AR = Actual 12-month residual fuel oil usage (gallons) | Title I Condition: Limit to avoid major modification status for SO ₂ under 40 CFR Section 52.21 |
| Annual Capacity Factor For Fuel Oil: Less than or equal to 23.9%, based on a 12-month rolling average. | Minn. R. 7007.0800, subp. 2 based on 40 CFR Section 60.42b(d)(1) |
| CONTINUOUS MONITORING REQUIREMENTS | hdr |
| General Continuous Monitoring Requirements: All continuous emission monitoring (CEM) systems required under 40 CFR part 60 subpart Db are subject to the applicable requirements of 40 CFR Section 60.13. | 40 CFR Section 60.13(a) |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

| | |
|---|--|
| <p>QA Plan: Develop and implement a written quality assurance plan that covers each CEMS, if not yet done so. If no plan currently exists or if the current plan does not fulfill the requirements of 40 CFR part 60, Appendix F, the plan shall be:</p> <ol style="list-style-type: none"> 1 developed/revised 2. be on site; and, 3. available for inspection. <p>Items 1, 2, and 3 shall be completed within 180 days after permit issuance. The plan shall contain all of the information required by 40 CFR part 60, Appendix F, Section 3.</p> | Minn. R. 7017.1170, subp. 2; 40 CFR part 60, Appendix F, section 3 |
| <p>The Permittee shall calibrate, maintain, and operate a continuous emission monitoring system for sulfur dioxide and oxygen, and record the output of the systems when combusting any fuel, in accordance with 40 CFR Section 60.47b.</p> <p>When combusting residual oil, the SO₂ and O₂ concentrations shall be measured at both the inlet and the outlet of CE 005. When combusting distillate oil, the Permittee does not use CE 005 to meet the applicable SO₂ standard, and therefore, no inlet SO₂/O₂ monitoring is necessary.</p> <p>The Permittee shall obtain emission data for at least 75% of the operating hours in at least 22 out of 30 successive boiler operating days. The CEM shall calculate SO₂ emissions in lb/mmBtu heat input and in lb/hr.</p> <p>As an alternative to operating CEMs, the Permittee may follow the procedures in 40 CFR Sections 60.47b(b)(1) for fuel sampling and analysis, or in (2) for Method 6B SO₂ performance testing. Additional requirements are specified in 40 CFR Section 60.47b.</p> | Title I Condition: State Implementation Plan for SO ₂ ; 40 CFR Sections 60.47b(a), (b), and (c) |
| <p>The Permittee shall calibrate, maintain, and operate a continuous emission monitoring system (CEM) for measuring EU 004 nitrogen oxides emissions, the opacity of EU 004 emissions, and shall record the output of the systems.</p> <p>The nitrogen oxides monitoring system shall be operated and data recorded during all periods of operation of EU 004 except for continuous monitoring system breakdowns and repairs. Data is recorded during calibration checks, and zero and span adjustments. Additional requirements are specified in 40 CFR Section 60.48b.</p> | 40 CFR Sections 60.48b(a), (b), and (c) |
| <p>Continuous Operation: CEMS must be operated and data recorded during all periods of emission unit operation including periods of emission unit start-up, shutdown, or malfunction except for periods of acceptable monitor downtime. This requirement applies whether or not a numerical emission limit applies during these periods. A CEMS must not be bypassed except in emergencies where failure to bypass would endanger human health, safety, or plant equipment.</p> <p>Acceptable monitor downtime includes reasonable periods as listed in Items A, B, C and D of Minn. R. 7017.1090, subp. 2.</p> | 40 CFR Section 60.13(e), Minn. R. 7017.1090, subp. 1 |
| <p>NOx Emissions Data When NOx CEM Is Not Operating: When NOx emission data is not obtained because the NOx CEM experiences a breakdown, repairs, calibration checks and zero and span adjustments, NOx emissions data will be obtained by using standby NOx CEMs, US EPA Methods 7 or 7A, or other approved reference methods to provide emission data for a minimum of 75 percent of the operating hours in each steam generating unit operating day, in at least 22 out of 30 successive steam generating unit operating days.</p> | 40 CFR Section 60.48b(f) |
| <p>CEMS QA/QC: The owner or operator (Permittee) of an affected facility (EU 004) is subject to the performance specifications listed in 40 CFR 60, Appendix B and shall operate, calibrate, and maintain each CEMS according to the QA/QC procedures in 40 CFR pt. 60, Appendix F as amended and maintain a written QA/QC program available in a form suitable for inspection.</p> | 40 CFR pt. 60, Appendix F; 40 CFR Section 60.13(a) |
| <p>CEMS Relative Accuracy Test Audit (RATA): due before end of each year following CEM Certification Test. Follow the procedures in 40 CFR pt. 60, Appendix F.</p> | 40 CFR pt. 60, Appendix F, section 5.1.1; Minn. R. 7017.1170, subp. 5 |
| <p>RATA Notification: due 30 days before CEMS RATA.</p> | Minn. R. 7017.1180, subp. 2 |
| <p>RATA Results Summary: due 30 days after end of each calendar quarter in which the CEMS RATA was conducted.</p> | Minn. R. 7017.1180, subp. 3 |
| <p>CEMS Daily Calibration Drift (CD) Test: The CD shall be quantified and recorded at zero (low level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) gas concentrations at least once daily. The CEMS shall be adjusted whenever the CD exceeds twice the specification of 40 CFR pt. 60, Appendix B. 40 CFR pt. 60, Appendix F shall be used to determine out-of-control periods for CEMS.</p> | 40 CFR pt. 60, Appendix F, section 4.1; 40 CFR Section 60.13(d)(1); Minn. R. 7017.1170, subp. 3 |
| <p>Cylinder Gas Audit (CGA): due before end of each calendar quarter following CEMS certification test. A CGA is not required during any calendar quarter in which a RATA was performed.</p> | 40 CFR pt. 60, Appendix F, section 5.1.2; Minn. R. 7017.1170, subp. 4 |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

| | |
|--|---|
| CGA Results Summary: due 30 days after end of each calendar quarter following CGA. | Minn. R. 7017.1180, subp. 1 |
| Recordkeeping: The owner or operator must retain records of all CEMS monitoring data and support information for a period of five years from the date of the monitoring sample, measurement or report. Records shall be kept at the source. | Minn. R. 7017.1130; 40 CFR Section 60.7(f) |
| OPERATING REQUIREMENTS Note: Additional operating requirements for EU 004 are listed in Subject Item GP 001 in Table A of this permit. | hdr |
| Fuel Requirements During CE 005 Breakdown: If the Wet Scrubber (CE 005) experiences a breakdown while EU 004 is combusting residual fuel oil, the Permittee shall switch to combusting natural gas or distillate fuel oil. | Title I Condition: State Implementation Plan for SO ₂ ; meets requirements of 40 CFR Section 60.42b(i) |
| Control Equipment Operation: When combusting natural gas or distillate fuel oil, the Permittee is not required to operate or route exhaust gases from EU 004 to the Multiclone (CE 004) or the Wet Scrubber (CE 005). | Minn. R. 7007.0800, subp. 2 |
| MONITORING, RECORDKEEPING, AND REPORTING Note: Additional monitoring and recordkeeping requirements for EU 004 are listed in Subject Item GP 001 in Table A of this permit. | hdr |
| CE 005 Inlet SO ₂ Monitoring During Residual Fuel Oil Combustion: When EU 004 combusts residual fuel oil, the Permittee shall follow the sampling and analysis procedures in 40 CFR part 60 Appendix A Method 19 Section 12.5.2.2 for determining the sulfur dioxide emission rate to the inlet of the wet scrubber (CE 005). | 40 CFR Section 60.47b(b)(1) |
| Records of Startup, Shutdown, or Malfunction: Any owner or operator subject to the provisions of this part shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative. | 40 CFR Section 60.7(b) |
| Daily Fuel Usage Recordkeeping: The Permittee shall record and maintain records of the amounts of each fuel combusted during each day. | 40 CFR Section 60.49b(d) |
| Fuel Oil Usage Recordkeeping: By the 15th day of each month the Permittee shall: 1. calculate and record the residual fuel oil usage (in gallons per month) for the previous month and the previous 12-month period; 2. calculate and record the distillate fuel oil usage (in gallons per month) for the previous month and the previous 12-month period; 3. calculate and record the residual fuel oil limit (ROL) for the previous 12-month period (if any distillate fuel oil was combusted during the previous 12 months) using the following equation previously described in this Subject Item: ROL = 3250000 - (3.75 x AD) AD = actual distillate fuel oil usage during the previous 12 months | Title I Condition: Limit to avoid major modification status for SO ₂ under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 4 and 5 |
| Annual Capacity Factor Recordkeeping: The Permittee shall calculate and record the annual capacity factor individually for residual oil, distillate oil, and natural gas for each calendar quarter. The annual capacity factor is determined on a 12-month rolling average basis with a new annual capacity factor calculated at the end of each calendar month. | 40 CFR Section 60.49b(d) |
| Opacity Recordkeeping: The Permittee shall maintain records of opacity. | 40 CFR Section 60.49b(f) |
| NO _x Quarterly Reporting: The Permittee shall submit a quarterly report containing the information recorded under 40 CFR Section 60.49b(g). All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter. | 40 CFR Section 60.49b(i) |
| Nitrogen Oxides Recordkeeping: The Permittee shall maintain records for each steam generating unit operating day (SGUOD): 1. calendar date; 2. average hourly NO _x emission rates in lb/mmBtu; 3. 30-day rolling average NO _x emission rate in lb/mmBtu calculated at the end of each SGUOD for the preceding 30 SGUODs; 4. identification of the SGUODs when the calculated 30-day average NO _x emission rates are in excess of the standards in this permit, with reasons for such emissions as well as corrective actions taken; 5. identification of SGUODs for which NO _x data have not been obtained, with reasons for not obtaining sufficient data and a description of corrective actions taken; 6. identification of times when emissions data have been excluded from the calculation of average emission rates and the reasons for excluding data; | 40 CFR Section 60.49b(g) |
| (continued below) | |

TABLE A: LIMITS AND OTHER REQUIREMENTS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

| | |
|--|--|
| <p>7. identification of the "F" factor used for calculations, method of determination, and type of fuel combusted;</p> <p>8. identification of the times when the pollutant concentration exceeded full span of the NOx CEM;</p> <p>9. description of any modifications to the NOx CEM system that could affect the ability of the CEM to comply with Performance Specification 2 or 3 (in appendix B of part 60);</p> <p>10. results of daily CEMs drift tests and quarterly accuracy assessments as required under appendix F, Procedure 1 (of part 60).</p> | 40 CFR Section 60.49b(g) |
| <p>SO2 Quarterly Reporting: The Permittee shall submit a quarterly report containing the records made under 40 CFR 60.49b(k) for every calendar quarter. All quarterly reports shall be postmarked by the 30th day following the end of each calendar quarter.</p> | 40 CFR Section 60.49b(j) |
| <p>SO2 Emissions Data Reporting: The Permittee shall report the following information:</p> <p>1. calendar dates covered in the reporting period;</p> <p>2. each 30-day rolling average SO2 emission rate in lb/mmBtu measured during the reporting period (ending with the last 30-day period in the quarter), reasons for noncompliance, and description of corrective actions taken;</p> <p>3. identification of each SGUOD that oil was combusted and for which SO2 or diluent (O2) data have not been obtained by an approved method for at least 75% of the operating hours in the SGUOD, justification for not obtaining sufficient data, and description of corrective actions taken;</p> <p>4. identification of times when emissions data have been excluded from the calculation of average emission rates, justification for excluding data, and description of corrective action taken if data have been excluded for periods other than those during which oil was not combusted in the steam generating unit;</p> <p>(continued below)</p> | 40 CFR Section 60.49b(k) |
| <p>5. identification of the "F" factor used for calculations, method of determination, and type of fuel combusted;</p> <p>6. identification of times when hourly averages have been based on manual sampling methods;</p> <p>7. identification of the times when the pollutant concentration exceeded full span of the SO2 CEM;</p> <p>8. description of any modifications to the SO2 CEM system that could affect the ability of the CEM to comply with Performance Specification 2 or 3 (in appendix B of part 60);</p> <p>9. results of daily CEMs drift tests and quarterly accuracy assessments as required under appendix F, Procedure 1 (of part 60);</p> <p>10. the annual capacity factor of each fuel fired as required by 40 CFR Section 60.49b(d).</p> | 40 CFR Section 60.49b(k) |
| <p>SO2 Emissions Data Reporting - Minimum Amount of Data Not Obtained: For any calendar quarter when the Permittee does not obtain the minimum amount of data required under Section 60.47b(f), the following information is reported to the Administrator in addition to that required under Section 60.49b(k):</p> <p>1. the number of hourly averages available for outlet emission rates and inlet emission rates;</p> <p>2. the standard deviation of hourly averages for the outlet emission rates and inlet emission rates, as determined in part 60, appendix A, Method 19, section 7;</p> <p>3. the lower confidence limit for the mean outlet emission rate and the upper confidence limit for the mean inlet emission rate, as calculated in Method 19, section 7;</p> <p>4. the ratio of the lower confidence limit for the mean outlet emission rate and the allowable emission rate, as determined in Method 19, section 7.</p> | 40 CFR Section 60.49b(m) |
| <p>Opacity Quarterly Reporting: The Permittee shall submit excess emission reports for any calendar quarter during which there were excess opacity emissions. If there are no excess emissions during the calendar quarter, the Permittee shall submit a report semiannually stating that no excess emissions occurred during the semiannual reporting period.</p> | 40 CFR Section 60.49b(h) |
| <p>PERFORMANCE TESTING</p> | hdr |
| <p>Performance Test: due 180 days after Permit Issuance to measure particulate matter emissions while combusting residual fuel oil.</p> <p>Refer to the Total Facility 'Performance Test Notifications and Submittals' requirement for additional performance testing requirements.</p> | <p>Title I Condition: to avoid major modification status under 40 CFR Section 52.21; Minn. R. 7017.2020, subp. 1</p> |
| <p>Performance Test: due 180 days after Permit Issuance to measure particulate matter <10 microns while combusting residual fuel oil.</p> <p>Refer to the Total Facility 'Performance Test Notifications and Submittals' requirement for additional performance testing requirements.</p> | <p>Title I Condition: to avoid major modification status under 40 CFR Section 52.21; Minn. R. 7017.2020, subp. 1</p> |

TABLE B: SUBMITTALS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC
Permit Number: 05300011 - 001

Table B lists most of the submittals required by this permit. Please note that some submittal requirements may appear in Table A or, if applicable, within a compliance schedule located in Table C. Table B is divided into two sections in order to separately list one-time only and recurrent submittal requirements.

Each submittal must be postmarked or received by the date specified in the applicable Table. Those submittals required by parts 7007.0100 to 7007.1850 must be certified by a responsible official, defined in Minn. R. 7007.0100, subp. 21. Other submittals shall be certified as appropriate if certification is required by an applicable rule or permit condition.

Send any application for a permit or permit amendment to:

Permit Technical Advisor
Permit Section
Air Quality Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Also, where required by an applicable rule or permit condition, send to the Permit Technical Advisor notices of:

- accumulated insignificant activities,
- installation of control equipment,
- replacement of an emissions unit, and
- changes that contravene a permit term.

Unless another person is identified in the applicable Table, send all other submittals to:

Supervisor
Compliance Determination Unit
Air Quality Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Send submittals that are required to be submitted to the U.S. EPA regional office to:

Mr. George Czerniak
Air and Radiation Branch
EPA Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

Send submittals that are required by the Acid Rain Program to:

U.S. Environmental Protection Agency
Clean Air Markets Division
1200 Pennsylvania Avenue NW (6204N)
Washington, D.C. 20460

TABLE B: ONE TIME SUBMITTALS OR NOTIFICATIONS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

| What to send | When to send | Portion of Facility Affected |
|---------------------------------------|--|------------------------------|
| Application for Permit Reissuance | due 180 days before expiration of Existing Permit | Total Facility |
| Computer Dispersion Modeling Protocol | due 1,096 days after Permit Issuance for emission of NOx and PM10. This protocol will describe the proposed modeling methodology and input data, in accordance with MPCA modeling guidance for Title V air dispersion modeling analyses. This is a state-only requirement and is not enforceable by the EPA Administrator or citizens under the Clean Air Act. | Total Facility |
| Computer Dispersion Modeling Results | due 1,462 days after Permit Issuance for emission of NOx and PM10. The results shall be submitted after the MPCA has reviewed and approved the modeling protocol. The submittal should adhere to MPCA modeling guidance for Title V air dispersion modeling analyses. This is a state-only requirement and is not enforceable by the EPA Administrator or citizens under the Clean Air Act. | Total Facility |
| Testing Frequency Plan | due 60 days after Initial Performance Test for opacity and particulate matter. The plan shall specify an opacity and particulate matter testing frequency for each emission unit (EU 001, EU 002, and EU 003), based on the test data and MPCA guidance. Future performance tests based on one-year (12-month), 36-month, and 60-month intervals, or as applicable, shall be required upon written approval of the MPCA. | GP005 |
| Testing Frequency Plan | due 60 days after Initial Performance Test for particulate matter and PM10. The plan shall specify particulate matter and PM10 testing frequencies based on the test data and MPCA guidance. Future performance tests based on one-year (12-month), 36-month, and 60-month intervals, or as applicable, shall be required upon written approval of the MPCA. | EU004 |

TABLE B: RECURRENT SUBMITTALS

09/09/02

Facility Name: NRG Energy Center Minneapolis LLC

Permit Number: 05300011 - 001

| What to send | When to send | Portion of Facility Affected |
|---|---|------------------------------|
| Excess Emissions/Downtime Reports (EER's) | due 30 days after end of each calendar quarter following Initial Startup of the Monitor. The EER shall indicate all periods of monitor bypass and all periods of exceedances of the limit including exceedances allowed by an applicable standard, i.e. during startup, shutdown, and malfunctions. | EU004 |
| Semiannual Deviations Report | due 30 days after end of each calendar half-year following Permit Issuance. The first semiannual report submitted by the Permittee shall cover the calendar half-year in which the permit is issued. The first report of each calendar year covers January 1 - June 30. The second report of each calendar year covers July 1 - December 31. If no deviations have occurred, the Permittee shall submit the report stating no deviations. The Report shall include deviations from requirements cited as "Title I Condition: State Implementation Plan for SO ₂ ". If there were no deviations to Title I Conditions, the Permittee shall submit the report stating no deviations to Title I Conditions: State Implementation Plan for SO ₂ . | Total Facility |
| Compliance Certification | due 31 days after end of each calendar year following Permit Issuance (for the previous calendar year). The Certification shall be submitted on a form approved by the Commissioner, both to the Commissioner and to the US EPA regional office in Chicago. This report covers all deviations experienced during the calendar year. | Total Facility |

APPENDIX

Facility Name: **NRG - Energy Center Minneapolis (ECM)**

Permit Number: **05300011-001**

1. ENERGY CENTER MINNEAPOLIS SULFUR DIOXIDE EMISSION LIMITS¹

The following table applies when any Main Plant boiler (GP 001 composed of EU 001, EU 002, EU 003, and EU 004) combusts fuel oil. The table specifies the applicable GP 001 sulfur dioxide emission limit (SDEL), in pounds of sulfur dioxide per hour, for any possible fuel oil operating scenario at the Permittee's Energy Center Minneapolis facility.

An "X" in the column beneath the listed boiler(s) indicates the boiler(s) is operating on fuel oil during the applicable averaging period. A blank space in the column beneath the listed boiler(s) indicates that the boiler(s) is not operating on fuel oil during the applicable averaging period.

| Main Plant Boilers 1, 2, 3, 4 (EU 001, 002, 003, 004) | Baker Plant Boiler 1 (EU 008) | Baker Plant Boiler 5 (EU 009) | Baker Plant Boiler 6 (EU 010) | Soo Line Plant Boilers 1-3 (EU 005, 006, 007) | 1-hour SO ₂ limit | 3-hour rolling average SO ₂ limit | 24-hour rolling average SO ₂ limit | 365-rolling average SO ₂ limit |
|---|-------------------------------|-------------------------------|-------------------------------|---|------------------------------|--|---|---|
| X | | | | | 524 | 524 | 407 | |
| X | X | | | | 503 | 519 | 407 | |
| X | | X | | | 510 | 520 | 407 | |
| X | | | X | | 496 | 520 | 407 | |
| X | X | X | | | 489 | 515 | 407 | |
| X | X | | X | | 475 | 514 | 380 | |
| X | | X | X | | 482 | 516 | 407 | |
| X | X | X | X | | 461 | 510 | 299 | |
| X | | | | X | 524 | 478 | 395 | |
| X | X | | | X | 503 | 472 | 395 | |
| X | | X | | X | 510 | 474 | 395 | |
| X | | | X | X | 496 | 473 | 395 | |
| X | X | X | | X | 489 | 468 | 395 | |
| X | X | | X | X | 475 | 468 | 360 | |
| X | | X | X | X | 482 | 469 | 393 | |
| X | X ² | X ² | X ² | X ² | 461 | 464 | 278 | 142 ² |

¹ Actual emissions are calculated once each hour, regardless of the averaging period. For the 3-hour and 24-hour emissions rates, the calculated individual one-hour rates are averaged for the averaging period. For the 365-day rolling hourly average, hourly values for each day are used to calculate a daily hourly average, and then the most recent 365 daily hourly average values are averaged to determine the 365-day rolling hourly average. NOTE: When a fuel oil operating scenario change occurs during an averaging period, a new weighted average SDEL shall be calculated every hour based on the combination of boiler(s) operating on fuel oil during that hour.

² the 365-day rolling average limit applies when any Main Plant boiler burns oil in a 365-day period, regardless if any Soo or Baker boiler burns oil too

2. PARAMETERS RELIED UPON FOR MODELING FOR ENERGY CENTER MINNEAPOLIS

| Stack/ Vent Number ¹ | Emission Unit and Description | Stack Height (Feet) | Stack Diameter (Feet) | Stack Flow Rate (acfm) | | Exit Temperature (°F) | | Modeled & Maximum Heat Input (mmBtu/hr) | | Monitoring Methodology | Permitted Fuels ² | |
|------------------------------------|--|---------------------------|-----------------------------|---------------------------|--------|-----------------------------|-----|--|------|--|---------------------------------|--|
| SV 001 | EU 001 Main Boiler 1 | 160 | 4.9 | 77,000 | | 340 | | 233 | | Fuel Flow Meter/ Fuel Certification or Analysis | NG, DO, RO | |
| SV 002 | EU 002 Main Boiler 2 | 160 | 6.9 | 152,000 | | 340 | | 233 | | Fuel Flow Meter/ Fuel Certification or Analysis | NG, DO, RO | |
| | EU 003 Main Boiler 3 | | | | | | | 233 | | | | |
| SV 003 | EU 004/CE 005 Main Boiler 4 w/scrubber | 160 | 4.9 | 70,350 | | 300 | | 240 NG 233 DO/RO | | SO2 CEM | NG, DO, RO | |
| SV 004 | EU 005 Soo Boiler 1 | 265 | 5.67 | 53,900 | | 600 | | 40 NG 38 DO | | Fuel Certification | NG, DO | |
| | EU 006 Soo Boiler 2 | | | | | | | 64 NG 62 DO | | | | |
| | EU 007 Soo Boiler 3 | | | | | | | 64 NG 62 DO | | | | |
| SV 005 | EU 008/Baker Boiler 1 | 180 | 8.0 | 38,500 | | 600 | | 80 NG 77 DO | | Fuel Certification | NG, DO | |
| | EU 009 Baker Boiler 5 | | | | | | | 54 NG 52 DO | | | | |
| SV 006 | EU 010 Baker Boiler 6 | 180 | 6.0 | 38,500 | | 340 ³ | | 125 NG 121 DO | | Fuel Certification | NG, DO | |
| SV 007 | EU 011 & 012 Cooling Water (CW) Pumps 2 & 3 | 84 | 3.0 | 1100 each | 22,000 | 350 each | 400 | 2.5 each | 44.7 | None | EU 011 through EU 018 NG | |
| | 2200 each | | | 350 each | | 5.0 each | | | | | | |
| | EU 021 Em. Generator 1 | | | 7500 | | 950 | | 9.7 | | Fuel Certification | EU 021 DO | |
| SV 008 | EU 019 Main Plant Cooling Tower Fan 1 Engine | 85 | 0.25 | 550 | | 1125 | | 1.5 | | None | NG | |
| SV 009 | EU 020 Main Plant Cooling Tower Fan 2 Engine | 85 | 0.25 | 550 | | 1125 | | 1.5 | | None | NG | |
| SV 010 | EU 022 Main Plant Emergency Generator 2 | 84 | 1.17 | 9,507 | | 986 | | 11.9 | | Fuel Certification | DO | |

¹All stacks discharge up, and are not capped

²NG = natural gas; DO = distillate oil; RO = residual oil

³Originally listed as 600°F in June 30, 1993 Amended Order, but corrected February 2002 with data from Permittee

3. INSIGNIFICANT ACTIVITIES REQUIRED TO BE LISTED

Required by Minn. R. 7007.1300, subp. 4

Fuel Storage Tanks:

| Main Plant | Soo Line Plant | Baker Boiler Plant |
|--------------------|-------------------|---------------------|
| 150 mgal No. 6 oil | 25 mgal No. 2 oil | 13.8 mgal No. 2 oil |
| 150 mgal No. 2 oil | 25 mgal No. 2 oil | 22 mgal No. 2 oil |
| 20 mgal No. 2 oil | | |
| 8 mgal gasoline | | |
| 8 mgal gasoline | | |

4. FORMULA FOR CALCULATING NRG ENERGY CENTER MINNEAPOLIS MAIN PLANT SO₂ EMISSIONS

NRG Minneapolis Main Plant Boilers SO₂ lb/hr =

$$\left[\left(\frac{2}{100} \times \sum_{j=1}^h (\text{oil flow})_j (\text{oil density})_j (\text{wt.\% sulfur})_j \right) + (\text{NG flow})(0.6 \text{ lb SO}_2 / \text{mmcf}) \right] + \text{boiler 4 SO}_2 \text{ CEM}$$

where $h = 2$ (total residual fuel oil and total distillate fuel oil to Boilers 1, 2, and 3) for each hour that oil is combusted in any GP 001 emission unit

NG and oil fuel flow is determined by fuel metering of natural gas, distillate fuel oil, and residual fuel oil to Boilers 1, 2, and 3 (EU 001, EU 002, and EU 003)

Oil is measured in gallons per hour, and natural gas is measured in million cubic feet per hour (mmcf/hr)

Density of residual oil is 8.75 lb/gallon

Density of distillate oil is 7.25 lb/gallon

% sulfur by weight for residual fuel oil is 1.5%

% sulfur by weight for distillate oil is 0.5%

Boiler 4 (EU 004) SO₂ CEM = lb/hr SO₂ emissions from boiler 4 measured by CEM

TECHNICAL SUPPORT DOCUMENT
For
DRAFT AIR EMISSION PERMIT NO. 05300011-001

This technical support document is for all the interested parties of the draft permit. The purpose of this document is to set forth the legal and factual basis for the draft permit conditions, including references to the applicable statutory or regulatory provisions.

1. General Information

1.1. Applicant and Stationary Source Location:

| Owner and Operator Address and Phone Number | Facility Address (SIC Code: 4961) |
|---|--|
| NRG Energy Center Minneapolis LLC 3650 IDS Center 80 South 8 th Street Minneapolis, Minnesota 55402 (612) 436-4105 | 816 4th Avenue South Minneapolis Hennepin County (612) 349-6087 |

1.2. Description of the facility

This facility produces steam for district heating and cooling. It is composed of three separate fossil fuel-fired boiler plants that are considered a single facility under new source review. These plants are known as the Energy Center Minneapolis Main Plant, the Baker Boiler Plant, and the Soo Line Boiler Plant.

The facility is located in Air Quality Control Region (AQCR) 131 (the seven county Twin Cities metropolitan area). Circa 1990 computer modeling analysis identified the facility as a major contributor to the (former) sulfur dioxide nonattainment status of AQCR 131. An Amended Findings and Order issued June 30, 1993 (that superseded the original May 27, 1992, Findings and Order), imposed numerous limits and restrictions on the facility in order to restrict emissions of sulfur dioxide and bring AQCR 131 into attainment with the sulfur dioxide national ambient air quality standards. Requirements from the Order are incorporated into the draft permit, so that the permit may replace the Order after the permit is issued.

1.3 Description of any changes allowed with this permit issuance

No changes are authorized by this permit. However, this facility was identified as a major contributor of SO₂ emissions in the (former) Minneapolis SO₂ nonattainment area, and therefore a June 30, 1993, Amended Findings and Order was issued and incorporated into Minnesota's SIP, as part of the redesignation process. Requirements of the Order are carried over into the draft permit, so that the permit can replace the Order in the SIP.

1.4 Description of all amendments issued since the issuance of the last total facility permit and to be included in the Part 70 Permit.

| Permit Number and Issuance Date | Action Authorized |
|--|--|
| April 12, 1993 138A-92-OT-2 Amendment 1 | Revision of boiler No. 4 (EU 004) fuel oil usage restriction requirement |
| July 29, 1993 138A-92-OT-2 Amendment 2 | Installation of Main Plant Emergency Generator No. 2 (EU 022) and inclusion of the revised SO ₂ emission limit table from the June 20, 1993, Amended Findings of Fact and Order |
| October 8, 1993 138A-92-OT-2 Amendment 3 | Amendment to acknowledge change of ownership |

1.5. Facility Emissions:

Table 1. Total Facility Potential to Emit Summary:

| | PM tpy | PM ₁₀ tpy | SO ₂ tpy | NO _x tpy | CO tpy | VOC tpy | Pb tpy | All HAPs tpy |
|--|-----------|-------------------------|------------------------|------------------------|-----------|------------|-----------|--------------------|
| Total Facility Limited Potential Emissions | 89.97 | 67.61 | 646.28 | 1680 | 438.35 | 38.66 | 0.01 | 8.4 |
| Total Facility Actual Emissions* | 6.78 | 5.22 | 317.67 | 354.63 | 85.41 | 7.86 | 0 | NR |

* 1999 emission inventory

Table 2. Facility and Permit Classification

| Classification | Major/Affected Source | *Synthetic Minor | *Minor |
|------------------------|--|------------------|---------------------------------|
| PSD | SO ₂ , NO _x , CO | | PM, PM ₁₀ , VOC, Pb |
| NAAR | NA | NA | NA |
| Part 70 Permit Program | SO ₂ , NO _x , CO | | PM ₁₀ , VOC, Pb, HAP |

* Refers to potential emissions that are less than those specified as major by 40 CFR 52.21, 40 CFR pt. 51 Appendix S, and 40 CFR pt. 70.

2. Regulatory and/or Statutory Basis

Summary of Regulatory and/or Statutory Basis of the Emission or Operational Limit

Regulatory Overview of Facility

| Subject Item | Applicable Regulations | Comments: |
|----------------|--|---|
| Total Facility | Title I Conditions: State Implementation Plan for SO ₂ | Emission unit operating restrictions, fuel oil certifications/sampling and analysis, recordkeeping, and deviations reporting |
| Total Facility | Title I Conditions: State Implementation Plan for SO ₂ | Restrictions on changing facility parameters used in SO ₂ modeling, restrictions on increasing SO ₂ emissions, and operation and maintenance requirements. |
| GP 001 | Title I Conditions: State Implementation Plan for SO ₂ | Main Plant boilers SO ₂ limits for various total facility fuel oil combustion scenarios, and fuel type and sulfur content restrictions. |
| GP 002 | Title I Condition: State Implementation Plan for SO ₂ | Individual SO ₂ limits for EU 005 through EU 010. Fuel type and sulfur limits, and recordkeeping. |
| GP 003 | Title I Condition: State Implementation Plan for SO ₂ | Fuel restricted to pipeline natural gas only |
| GP 004 | Title I Condition: State Implementation Plan for SO ₂ Title I Condition: to avoid major modification status under 40 CFR § 52.21 | SO ₂ emission and fuel oil sulfur content limits Operating hours limit and recordkeeping for EU 022 |
| GP 005 | Title I Condition: State Implementation Plan for SO ₂ Minn. R. 7007.0800 | SO ₂ emission limits and fuel use restrictions EU 001 and EU 002 PM limit equal to value in 7011.0550. These are existing indirect heating equipment that were previously permitted (1992) as new IHE. Limit was retained, but citation changed because units not subject to 7011.0550. |
| EU 004 | Title I Condition: State Implementation Plan for SO ₂ Title I Condition: 40 CFR § 52.21(j) BACT | SO ₂ lb/mmBtu short term emission limits when burning fuel oil BACT NOx limits for each fuel type |

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| | | |
|--|---|--|
| | Title I Condition: to avoid major modification under 40 CFR § 52.21(b)(2)(i) 40 CFR part 60 subp. Db | PM and PM ₁₀ limits, and fuel oil usage limits to restrict PM, PM ₁₀ , and SO ₂ emissions to less than significant Opacity limit, emissions monitoring, recordkeeping, and reporting |
|--|---|--|

3. Technical Information

3.a. Title I SO₂ SIP Conditions: This facility was identified as a major contributor of SO₂ emissions in the (former) Minneapolis SO₂ nonattainment area, and therefore a June 30, 1993, Amended Findings and Order was issued as part of the redesignation process. Requirements of the Order are carried over into the draft permit, so that the permit can replace the Order in the SIP.

There were eight exhibits attached to the Order. The content of some have been retained, and the content of others have been replaced by Minn. Rules that were promulgated after the Order was issued. The following exhibits were referenced by the Order:

1. Facility Description – content retained
2. Performance Test Handout – content replaced by Minn. R. ch. 7017
3. Excess Emission Reporting Form – currently in use
4. Boiler Test Plan – content replaced by Minn. R. ch. 7017
5. Continuous Emission Monitor Requirements – content replaced by Minn. R. ch. 7017.
6. Continuous Emission Monitor Survey – content replaced by Minn. R. ch. 7017.
7. Continuous Emission Monitor Requirements – content replaced by Minn. R. ch. 7017
8. Sulfur Dioxide Emission Calculation Equation – content revised/corrected

The Order required records retention for six years. However, five years retention is the accepted norm for Orders, and is the requirement in Minn. R. 7007.0800, subp. 5. Therefore, the total facility requirement for records retention is five years.

Also note that an error was found in the Amended Order. The exhaust temperature for Baker Boiler 6 (EU 010) was incorrectly cited as 600° F. The correct value is 340° F, and the correction has been made in the Appendix attached to the draft permit.

3.b. Total Facility: PM₁₀ and NO_x modeling are required. This is based on the revised (June 9, 2001) title V modeling guidance memo that says that if one of the three pollutants triggers the modeling requirement, then modeling for the other two must also be done (if permitted emissions exceed 100 tpy), even if the actual emissions are below the individual trigger thresholds. 1999 emission inventory reports emissions of 317.7 tons SO₂, 354.6 tons NO_x, and 5.2 tons PM₁₀. Note that SO₂, which is the trigger, does not need modeling as this was done about 10 years ago for the SO₂ SIP order and redesignation plan. Dennis Becker confirmed that the SO₂ modeling does not need repeating.

3.c. GP 001 SO₂ Equation: The equation to calculate SO₂ lb/hr from the main plant boilers 1 – 4 was revised/corrected.

The original equation as shown in exhibit 8 of the Amended Findings and Order (June 30, 1993) was:

SO₂ mass emissions (lb/hr)

$$= \frac{2}{100} X \left[\sum_{i=1}^n (fuel\ flow)_i (fuel\ density)_i \right] X \left\{ \sum_{j=1}^h \frac{(fuel\ flow)_j (fuel\ density)_j (\% sulfur)_j}{\left[\sum_{k=1}^n (fuel\ flow)_k (fuel\ density)_k \right]} \right\}$$

$$= \frac{2}{100} X (fuel\ flow)(fuel\ density)(\% sulfur)$$

Baker and Soo Line Plants, n = 1 for distillate fuel oil

Main Plant Boilers 1, 2, and 3; h = 3, for natural gas, residual fuel oil, and distillate fuel oil.

The revised/corrected equation is:

NRG Minneapolis Main Plant Boilers SO₂ lb/hr =

$$\left[\left(\frac{2}{100} X \sum_{j=1}^h (oil\ flow)_j (oil\ density)_j (wt.\% sulfur)_j \right) + (NG\ flow)(0.6 lbSO_2 / mmcf) \right] + boiler\ 4\ SO_2\ CEM$$

where $h = 2$ (total residual fuel oil and total distillate fuel oil to Boilers 1, 2, and 3) for each hour that oil is combusted in any GP 001 emission unit

NG and oil fuel flow is determined by fuel metering of natural gas, distillate fuel oil, and residual fuel oil to Boilers 1, 2, and 3 (EU 001, EU 002, and EU 003)

Oil is measured in gallons per hour, and natural gas is measured in million cubic feet per hour (mmcf/hr)

Density of residual oil is 8.75 lb/gallon (*this seems high but NRG's supplier, Ashland, provided this data and NRG has agreed to use it*)

Density of distillate oil is 7.25 lb/gallon

% sulfur by weight for residual fuel oil is 1.5%

% sulfur by weight for distillate oil is 0.5%

Boiler 4 SO₂ CEM = lb/hr SO₂ emissions from boiler 4 measured by CEM

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3.d. GP 001: SO₂ emission chart for lb/hr limits – the 142 lb/hr 365-day rolling average limit applies when any Main Plant boiler burns oil, regardless if none, any, or all Soo or Baker Plant boilers burn oil. The 142 lb/hr limit was determined through modeling all boilers burning oil, but no additional operating scenario ‘annual’ lb/hr SO₂ limits were determined because the Permittee wanted to limit the complexity of applicable SO₂ limits, and was comfortable with the 142 lb/hr limit. The Permittee indicates that EU 001, 002, and 003 SO₂ emissions are determined using fuel flow and fuel analysis data, and for EU 004 are measured using an SO₂ CEM.

Also in the Amended Order there was a requirement to switch from residual oil to natural gas if the CE 005 scrubber breaks down. The Permittee could only burn distillate oil in EU 004 if natural gas was curtailed during a scrubber breakdown. This requirement was initially carried over into the draft permit in GP 001 and EU 004, but was removed at the request of the Permittee. Removal of this requirement is acceptable because distillate oil is a permitted fuel for boiler 4, there are limits for SO₂ emissions on a lb/hr basis for boiler 4 distillate oil combustion and the total facility, and it is unnecessarily restrictive to prohibit EU 004 from combusting distillate oil just because natural gas is available when the scrubber breaks down.

3.e. GP 002: Baker and Soo boilers burn only natural gas and distillate fuel oil. No performance testing is required for these boilers because these boilers are primarily fueled with natural gas, with distillate fuel oil for backup, and, they are infrequently operated.

3.f. GP 005: Main plant boilers 1 and 2 (EU 001 and EU 002) PM limit – 1992 permit listed the applicable PM limit based on New Indirect Heating Equipment rule. Boilers 1 and 2 are existing boilers, however the 0.1 lb/mmBtu limit was retained and the citation was changed from 7011.0550 to 7007.0800, subp. 2.

This was done because dispersion modeling conducted in 1991 for the Main Plant Boilers used a PM/PM₁₀ emission concentration of 0.03 lb/mmBtu. The 0.03 lb/mmBtu PM/PM₁₀ value was calculated using the AP-42 emission factor for residual oil combustion, and 75% control efficiency for the multiclone on each boiler. The modeling information and results were submitted in an October 1991 document titled “Air Emission Facility Application For Permit Modification Minneapolis Energy Center, Inc. Minneapolis, Minnesota” prepared by HDR, Inc. in Association with Labno Environmental and McVehil-Monnett. In chapter 5, there is the Ambient Air Quality Analysis for SO₂ and other regulated pollutants. In Section 5.9 Table 5-14, the following 24-hour impacts were determined by modeling:

stack 1 (boiler 1): 3.85 ug/m³
stack 2 (boiler 4): 4.24 ug/m³
stack 3 (boilers 2 and 3): 0.86 ug/m³

Total is ~9 ug/m³ which is less than the significant impact level.

It is not known why the 1992 PSD permit did not limit all four boilers to 0.03 lb/mmBtu, but at this time, the 1992 limits for boilers 1 and 2 (and 3) will be retained at 0.1 lb/mmBtu. The draft permit requires PM₁₀ emissions modeling, and if modeling predicts a PM₁₀ NAAQS violation due to PM/PM₁₀ emissions at the rates proposed in this draft permit, the PM limits will need to be reduced to avoid a PM₁₀ NAAQS violation.

PM and opacity testing are required while combusting residual oil, because (uncontrolled) PM potential emissions based on AP-42 are 0.114 lb/mmBtu.

3.g. EU 004 1-hr SO₂ Limit: Replaced the 0.6 lb/mmBtu 1-hr distillate oil SO₂ limit with 0.5 lb/mmBtu 1-hr limit because 0.6 lb/mmBtu does not meet the 0.5 lb/mmBtu 30-day rolling average Db limit in all circumstances. Note that inlet monitoring to the scrubber is not required when burning distillate oil because the scrubber is bypassed when distillate oil or natural gas is combusted. The SO₂ CEM is used for SO₂ compliance determination while combusting distillate oil.

3.h. EU 004 Worst Case Limited SO₂ PTE:

866,334 gallons distillate oil @ 0.14 mmBtu/gallon = 121,286.8 mmBtu/yr

3,250,000 gallons residual oil @ 0.15 mmBtu/gallon = 487,500 mmBtu/yr

from distillate oil --- 0.5 lb/mmBtu * 121,286.8 mmBtu/yr = 30.3 tpy SO₂ from distillate oil

from residual oil --- 0.16 lb/mmBtu * 487,500 mmBtu/yr = 39 tpy SO₂ from residual oil

Therefore, worst case SO₂ from oil is with residual oil. At 233 mmBtu/hr capacity on oil, boiler 4 can burn residual oil for 487,500 mmBtu/yr ÷ 233 mmBtu/hr = 2092.3 hr/yr. This leaves 6667.7 hr/yr (1,600,248 mmBtu/yr) remaining to combust natural gas.

With remaining heat input from natural gas, SO₂ from gas is

240 mmBtu/hr * 6667.7 hr/yr * 0.6 lb/mmBtu * mmBtu/10⁶ Btu * 10⁶ Btu/mmBtu * ton/2000 lb = 0.46 tpy

Therefore total worst case limited SO₂ PTE from boiler 4 is 39.46 tpy.

3.i. EU 004 Annual Capacity Factor Limit: Added boiler 4 annual capacity factor limit (23.9%) to avoid percent reduction of SO₂ requirement in subp. Db - 23.9% is the factor calculated using existing permit (1992) permitted fuel oil usage. Unrestricted Boiler 4 capacity on fuel oil is 233 mmBtu/hr * 8760 hr/yr = 2,041,080 mmBtu/yr

$$\frac{487,500 \text{ mmBtu/yr}}{2,041,080 \text{ mmBtu/yr}} = 23.9\% \text{ ACF for fuel oil}$$

3.j. EU 004 Residual Oil/Distillate Oil Usage Equation: can't burn 866,334 gallons of distillate oil and 3.25 mmgal of residual oil in the same 12-month period per the following equation in the 1992 permit:

$$MR = AR + 3.75 AD$$

MR = 12-month residual oil limit

AR = actual residual oil use in any 12-month period

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AD = actual distillate oil use in any 12-month period

For clarification, the equation was revised to the following:

$$(3.75 \times AD) + AR = \text{or less than } 3,250,000 \text{ gallons}$$

where:

AD = Actual 12-month distillate fuel oil usage (gallons)

AR = Actual 12-month residual fuel oil usage (gallons)

MR was replaced by it's limit of 3.25 mmgal/yr

3.k. EU 004 PM and PM₁₀ emission limits: Boiler 4 was permitted as a PSD nonmajor modification for PM and PM₁₀. However, the 1992 permit that authorized installation of boiler 4 did not contain PM and PM₁₀ limits to restrict PM/PM₁₀ emissions from exceeding the 15/25 tpy significant emission thresholds (there was only the subp. Db limit of 0.1 lb/mmBtu for oil combustion when using SO₂ control equipment). The 1995 part 70 permit application proposed PM/PM₁₀ emission limits of 0.09 and 0.045 lb/mmBtu, respectively, for residual oil combustion. Annual emissions at these concentrations will be 21.94 tpy PM and 10.97 tpy PM₁₀ from 3.25 mmgal residual oil.

Based on AP-42 (Sept 1998 ch. 1.3) filterable PM emission factor of 2.0 lbs PM/1000 gallons distillate oil, PM emissions from distillate oil are

$$2.0 \text{ lb/m gal} * 866.334 \text{ mgal/yr} * \text{ton}/2000 \text{ lb} = 0.87 \text{ tpy filterable PM from distillate oil}$$

Therefore, PM and PM₁₀ emissions from residual oil are worst case compared to distillate oil.

Using 7/98 AP-42 ch. 1-4 factors, PM/PM₁₀ emissions from NG combustion at 1,600,248 mmBtu/yr heat input =

$$7.6 \text{ lb/mmcf} * 10^6 \text{ Btu/mmBtu} * \text{cf}/1050 \text{ Btu} * \text{mmcf}/10^6 \text{ cf} * 1,600,248 \text{ mmBtu/yr} * \text{ton}/2000 \text{ lb} = 5.79 \text{ TPY.}$$

No credit is given for the cyclone when combusting natural gas (scrubber is bypassed when burning natural gas) due to the very small particle size.

So, based on the proposed 0.09 and 0.045 lb/mmBtu proposed PM/PM₁₀ limits, worst case total boiler 4 limited PM emissions would be 21.94 (fuel oil) + 5.79 (natural gas) = 27.73 tpy which exceeds the 25 tpy significant emission threshold. Total boiler 4 PM₁₀ limited emissions would be 10.97 (fuel oil) + 5.79 (natural gas) = 16.76 tpy, which exceeds the 15 tpy significant emission threshold. Therefore, residual oil PM and PM₁₀ limits will have to be less than the proposed 0.09 and 0.045 lb/mmBtu limits.

For PM, 25 tpy – 5.79 tpy from NG = 19.21 tpy for PM from residual oil

$$19.21 \text{ ton/yr} * 2000 \text{ lb/ton} * \text{yr}/3,250,000 \text{ gallons} * \text{gallon}/0.15 \text{ mmBtu} = 0.07881 \text{ lb/mmBtu}$$

rounded down to 0.078 lb/mmBtu

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For PM₁₀, 15 tpy – 5.79 from NG = 9.21 tpy for PM₁₀ from residual oil

$9.21 \text{ ton/yr} * 2000 \text{ lb/ton} * \text{yr}/3,250,000 \text{ gallons} * \text{gallon}/0.15 \text{ mmBtu} = 0.03778 \text{ lb/mmBtu}$ rounded down to 0.037 lb/mmBtu

Note: 9/98 AP-42 emission factors for uncontrolled residual fuel oil indicate that PM/PM₁₀ emissions are a function of sulfur content. At 1.5% S by wt, the uncontrolled filterable PM factor is calculated at 17.02 lb/1000 gal (27.66 tpy), and the uncontrolled filterable PM₁₀ factor is calculated at 12.1 lb/1000 gal (19.66 tpy). AP-42 also contains equations to calculate factors when a scrubber is used, assuming 94% control efficiency. It appears that using the scrubber when combusting residual oil should provide adequate PM/PM₁₀ control to meet PM/PM₁₀ limits less than those proposed in the 1995 application.

Note that the continuous opacity monitor will be used as a surrogate monitor for PM/PM₁₀ emissions. The relationship between opacity and PM/PM₁₀ emissions will be determined by the required PM/PM₁₀ performance testing

3.l. EU 004 BACT limits are 0.10 lb/mmBtu for NG, 0.20 lb/mmBtu for distillate oil, and 0.30 lb/mmBtu for residual oil. However, Db NO_x limits are as follows:

NG - 0.10 for low heat release rate and 0.20 for high heat release rate

Distillate oil - same as NG

Residual oil - 0.30 for low heat release and 0.40 for high heat release

The boiler is high heat release; the distillate oil limit is set the same as the Db standard. The NG limit and residual oil NO_x limits are more restrictive than the Db limit.

3.m. EU 004 Subp. Db distillate oil SO₂ emissions monitoring: the facility does not use and does not need to use the wet scrubber to meet the SO₂ limit while burning distillate oil. Therefore, there is no “inlet” scrubber SO₂ monitoring required when combusting distillate oil. However, the SO₂ CEM on boiler 4 must be operated to show compliance with the 0.5 lb/mmBtu SO₂ limit, when combusting distillate oil (as well as residual oil).

3.n. CE 005: NRG uses NaOH for the reagent in CE 005 scrubber.

3.o. Comments received during public notice or EPA 45-day review period: No comments were received during the 30-day public comment period or the EPA 45-day review period.

4. Conclusion

Based on the information provided by the NRG, the MPCA has reasonable assurance that the proposed operation of the emission facility, as described in the Air Emission Permit No. 05300011-001 and this technical support document, will not cause or contribute to a violation of applicable federal regulations and Minnesota Rules.

Staff Members on Permit Team: Marshall M. Cole, Jenny Reinertsen (peer review), Stuart Arkley, Kathleen Winters, Rhonda Land

Attachments: Emission Calculations; June 30, 1993, Amended Findings and Order

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