



STATE OF IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor  
Toni Hardesty, Director

November 30, 2009

Tom Hornyak  
Manager, Environmental Permitting  
Southeast Idaho Energy, LLC  
621 17<sup>th</sup> Street, Suite 1640  
Denver, CO 80293

RE: Facility ID No. 077-00029, Southeast Idaho Energy, LLC, American Falls  
Final Permit Letter

Dear Mr. Hornyak:

The Department of Environmental Quality (DEQ) is issuing Permit to Construct (PTC) No. P-2009.0127 to Southeast Idaho Energy, LLC (SIE) to revise PTC No. P-2008.0066 to incorporate permit conditions you requested based on a settlement agreement, for the Power County Advanced Energy Center (PCAEC) near American Falls, in accordance with IDAPA 58.01.01.200 through 228 (Rules for the Control of Air Pollution in Idaho).

This permit is based on your permit application received on October 19, 2009. This permit is effective immediately. This permit does not release SIE from compliance with all other applicable federal, state, or local laws, regulations, permits, or ordinances.

In accordance with IDAPA 58.01.01.313.01.b, you are required to submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source or commencing operation. Pursuant to General Provision 5 of your permit, it is required that Construction and Operation Notification be provided. Please provide this information as listed to DEQ's Pocatello Regional Office, 444 Hospital Way #300, Pocatello, Idaho, 83201, Fax: (208) 236-6168.

Pursuant to IDAPA 58.01.23, you, as well as any other entity, may have the right to appeal this final agency action within 35 days of the date of this decision. However, prior to filing a petition for a contested case, I encourage you to contact Morrie Lewis at (208) 373-0502 or [Morrie.Lewis@deq.idaho.gov](mailto:Morrie.Lewis@deq.idaho.gov) to address any questions or concerns you may have with the enclosed permit.

Sincerely,

A handwritten signature in black ink that reads "Mike Simon".

Mike Simon  
Stationary Source Program Manager  
Air Quality Division

MS\ML

Project No. P-2009.0127

Enclosures



**Air Quality  
PERMIT TO CONSTRUCT  
State of Idaho  
Department of Environmental Quality**

**PERMIT No.:** P-2009.0127  
**FACILITY ID No.:** 077-00029  
**AQCR:** 61      **CLASS:** A      **ZONE:** 12  
**SIC:** 2873/2819      **NAICS:** 325311  
**UTM COORDINATES (km):** 344.1, 4735.4

**1. PERMITTEE**

Southeast Idaho Energy, LLC

**2. PROJECT**

PSD permit to construct revision - Power County Advanced Energy Center

|   |   |                                  |                     |
|---|---|----------------------------------|---------------------|
| <b>3. MAILING ADDRESS</b><br>621 17 <sup>th</sup> Street, Suite 1640            | <b>CITY</b><br>Denver                             | <b>STATE</b><br>CO               | <b>ZIP</b><br>80293 |
| <b>4. FACILITY CONTACT</b><br>Tom Hornyak                                       | <b>TITLE</b><br>Manager, Environmental Permitting | <b>TELEPHONE</b><br>303.953.4297 |                     |
| <b>5. RESPONSIBLE OFFICIAL</b><br>Matt Lee                                      | <b>TITLE</b><br>Executive Vice President          | <b>TELEPHONE</b><br>303.953.4333 |                     |
| <b>6. EXACT PLANT LOCATION</b><br>Lamb Weston Road, American Falls, Idaho 83211 |   | <b>COUNTY</b><br>Power           |                     |

**7. GENERAL NATURE OF BUSINESS & KINDS OF PRODUCTS**

Coal/petcoke gasification to produce agricultural fertilizer products

**8. PERMIT AUTHORITY**

This permit is issued according to the Rules for the Control of Air Pollution in Idaho, IDAPA 58.01.01.200 through 228, and pertains only to emissions of air contaminants regulated by the state of Idaho and to the sources specifically allowed to be constructed or modified by this permit.

This permit (a) does not affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to damage to person or property caused by, resulting from, or arising out of the design, installation, maintenance, or operation of the proposed equipment; (c) does not release the permittee from compliance with other applicable federal, state, tribal, or local laws, regulations, or ordinances; (d) in no manner implies or suggests that the Department of Environmental Quality (DEQ) or its officers, agents, or employees, assume any liability, directly or indirectly, for any loss due to damage to person or property caused by, resulting from, or arising out of design, installation, maintenance, or operation of the proposed equipment.

In accordance with 40 CFR 52.21(r)(2), this permit will expire if construction has not begun within 18 months of its issue date, if construction is suspended for 18 months or more, or if construction is not completed in a reasonable time. DEQ may extend the 18-month period upon a satisfactory showing that an extension is justified.

This permit has been granted on the basis of design information presented with its application. Changes in design, equipment or operations may be considered a modification. Modifications are subject to DEQ review in accordance with IDAPA 58.01.01.200 through 228 of the Rules for the Control of Air Pollution in Idaho.

MORRIE LEWIS, PERMIT WRITER  
DEPARTMENT OF ENVIRONMENTAL QUALITY

MIKE SIMON, STATIONARY SOURCE PROGRAM MANAGER  
DEPARTMENT OF ENVIRONMENTAL QUALITY

|                               |                   |
|-------------------------------|-------------------|
| <b>DATE MODIFIED/REVISED:</b> | November 30, 2009 |
| <b>DATE ISSUED:</b>           | February 10, 2009 |

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## Acronyms, Units, and Chemical Nomenclature

|                       |  |
|-----------------------|--|
| acfm                  | actual cubic feet per minute   |
| AFS                   | AIRS Facility Subsystem  |
| AGR                   | acid gas removal   |
| AIRS                  | Aerometric Information Retrieval System  |
| AN                    | ammonium nitrate   |
| AQCR                  | Air Quality Control Region   |
| ASTM                  | American Society for Testing and Materials   |
| BACT                  | Best Available Control Technology  |
| BMP                   | best management practices  |
| Btu                   | British thermal unit   |
| CAA                   | Clean Air Act  |
| CEMS                  | continuous emission monitoring system  |
| CFR                   | Code of Federal Regulations  |
| CI                    | compression-ignition   |
| CO                    | carbon monoxide  |
| CO <sub>2</sub>       | carbon dioxide   |
| COMS                  | continuous opacity monitoring system   |
| COS                   | carbonyl sulfide   |
| DEQ                   | Department of Environmental Quality  |
| EPA                   | U.S. Environmental Protection Agency   |
| °F                    | degrees Fahrenheit   |
| FGR                   | flue gas recirculation   |
| GE                    | GE Energy  |
| gpm                   | gallons per minute   |
| g/dscm                | grams per dry standard cubic meter   |
| gr/dscf               | grains (1 lb = 7,000 grains) per dry standard cubic foot   |
| H <sub>2</sub>        | hydrogen   |
| H <sub>2</sub> S      | hydrogen sulfide   |
| HAP                   | hazardous air pollutants   |
| Hg                    | mercury  |
| hp                    | horsepower   |
| ICE                   | internal combustion engine   |
| IDAPA                 | a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act |
| K                     | degrees Kelvin   |
| km                    | kilometers   |
| kW                    | kilowatts  |
| lb/hr                 | pounds per hour  |
| m                     | meters   |
| m/sec                 | meters per second  |
| MACT                  | Maximum Achievable Control Technology  |
| µg/m <sup>3</sup>     | micrograms per cubic meter   |
| MMBtu                 | million British thermal units  |
| MMscf                 | million standard cubic feet  |
| MW or MW <sub>e</sub> | megawatts of electrical output   |
| NESHAP                | National Emission Standards for Hazardous Air Pollutants   |
| NFPA                  | National Fire Protection Association   |
| ng/J                  | nanograms per Joule  |
| NH <sub>3</sub>       | ammonia  |
| NMHC                  | non-methane hydrocarbons   |

|                  |  |
|------------------|--|
| NO <sub>2</sub>  | nitrogen dioxide   |
| N <sub>2</sub> O | nitrous oxide  |
| NO <sub>x</sub>  | nitrogen oxides  |
| NSPS             | New Source Performance Standards   |
| NSR              | New Source Review  |
| O <sub>2</sub>   | oxygen   |
| O&M              | Operations & Maintenance   |
| OxCat            | oxidation catalyst   |
| P&ID             | pipng and instrumentation diagrams   |
| PCAEC            | Power County Advanced Energy Center  |
| PEMS             | predictive emission monitoring system  |
| petcoke          | petroleum coke   |
| PM               | particulate matter   |
| PM <sub>10</sub> | particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers |
| ppm              | parts per million  |
| ppmv             | parts per million by volume  |
| PSA              | pressure swing adsorber  |
| PSD              | Prevention of Significant Deterioration  |
| psi              | pounds per square inch   |
| psig             | pounds per square inch gauge   |
| PTC              | permit to construct  |
| PTE              | potential to emit  |
| scf              | standard cubic feet  |
| SCR              | selective catalytic reduction  |
| SIC              | Standard Industrial Classification   |
| SIE              | Southeast Idaho Energy, LLC  |
| SIP              | State Implementation Plan  |
| SO <sub>2</sub>  | sulfur dioxide   |
| SO <sub>x</sub>  | sulfur oxides  |
| SRC##            | emission source number   |
| SSM              | Startup, Shutdown, and Scheduled Maintenance Plan  |
| syngas           | synthesis gas  |
| TBD              | to be determined   |
| TPD              | tons per calendar day  |
| TPH              | tons per hour  |
| T/yr             | tons per any 12 consecutive calendar months  |
| UTM              | Universal Transverse Mercator  |
| VOC              | volatile organic compounds   |
| WSA              | wet gas sulfuric acid (process)  |
| ZLDS             | zero liquid discharge system   |

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER: P-2009.0127**

|                   |                             |                                  |
|-------------------|-----------------------------|----------------------------------|
| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

**1. PERMIT TO CONSTRUCT SCOPE**

**Purpose**

- 1.1 This is a PSD permit to construct (PTC) for a new major NSR facility, Southeast Idaho Energy’s (SIE) Power County Advanced Energy Center (PCAEC). The primary processes at this facility are gasification of coal, petcoke, and alternative feedstocks to produce ammonia, urea, urea ammonium nitrate (UAN), and elemental sulfur for sale. Saleable byproducts from the processes include slag or frit from the gasifiers.
- 1.2 Those permit conditions that have been modified or revised by this permitting action are identified by a date citation located directly under the permit condition and on the right hand margin. All other terms and conditions remain the same as in initial PTC No. P-2008.0066, issued on February 10, 2009.
- 1.3 This PTC revises PTC No. P-2008.0066, issued on February 10, 2009.

**Regulated Sources**

- 1.4 Table 1.1 lists all sources of regulated emissions in this PTC.

**Table 1.1 SUMMARY OF REGULATED SOURCES**

| <b>Permit Section</b> | <b>Source Descriptions</b>  | <b>Control Equipment Descriptions</b>   |
|-----------------------|---|---|
| 3                     | Feedstocks and Fluxant Storage and Handling   | Enclosures<br>Baghouses<br>Covered conveyors and transition points<br>Water Sprays or equivalent (fluxant only)<br>BMP for fugitive PM/PM <sub>10</sub>   |
| 4                     | Natural Gas-Fired Heaters<br>ASU Regen Heater<br>Gasifier Heaters #1 and #2   | None  |
| 5                     | Diesel-fired Emergency Generators<br>2 MW Emergency Generator<br>500 kW Emergency Generator (Fire Pump)   | None  |
| 6                     | Steam Superheater Boiler<br>Package Boiler (used for startup and shutdown only)   | Low-NO <sub>x</sub> burner, SCR, and OxCat<br>Low-NO <sub>x</sub> burner, FGR, SCR, and OxCat   |
| 7                     | Gasification Island<br><br><u>Startup:</u><br>Sour Water Scrubber<br>Activated Carbon Beds<br><br><u>Normal Operations:</u><br>Sour Water Scrubber<br>Activated Carbon Beds<br><br>AGR Stream 1: Claus Sulfur Recovery Unit<br>AGR Stream 2: CO <sub>2</sub> Vent<br>AGR Stream 3: Syngas | <u>Startups:</u><br>Amine Scrubber (used for up to 13 startups on coal or petcoke)<br>Gasifier Flare<br><br>BMP for fugitive CO<br><br>AGR Stream 1: None (no emission points)<br>AGR Stream 2: Thermal Oxidizer<br>AGR Stream 3: None (no emission points) |
| 8                     | Ammonia and Urea Plants (purge gases)   | Process Flare   |
| 8                     | Urea Melt Plant Vent Stack  | None  |
| 8                     | Urea Granulation<br>Wet Scrubber  | Drift and mist eliminators  |
| 9                     | Nitric Acid Plant, tailgas  | Extended absorption and SCR for NO <sub>x</sub><br>Catalytic decomposition for N <sub>2</sub> O   |

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER: P-2009.0127**

|                   |                             |                                  |
|-------------------|-----------------------------|----------------------------------|
| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

**Table 1.1 SUMMARY OF REGULATED SOURCES**

| <b>Permit Section</b> | <b>Source Descriptions</b>                    | <b>Control Equipment Descriptions</b>  |
|-----------------------|---|--|
| 9                     | Ammonium Nitrate/ UAN Plant<br>Wet Scrubber   | Drift and mist eliminators and condenser   |
| 10                    | Diesel, Nitric Acid, and UAN Tank Storage     | None   |
| 10                    | Ammonia Tank Storage                          | Ammonia Storage Flare  |
| 11                    | ZLDS and Cooling Tower                        | Drift/mist eliminators   |
| 12                    | Slag Storage and handling                     | Transferred from process wet into 3-sided bunker<br>BMP for fugitive PM/PM <sub>10</sub> |
| 12                    | Granular urea storage, transfers, and loadout | Humidity-controlled warehouse storage  |
| 12                    | Elemental sulfur storage                      | None   |

**[November 30, 2009]**

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER: P-2009.0127**

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| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

**2. FACILITY-WIDE CONDITIONS**

***Definitions***

2.1 For the purposes of this permit, the following terms used in this permit shall be defined as follows:

- 2.1.1 ***Commencement of operations***, for the purposes of determining when a Tier I application must be submitted in accordance with IDAPA 58.01.01.313.01.b, means the earliest initial startup date for any emission source at the facility.
- 2.1.2 ***Malfunction*** is defined in 40 CFR 60.2 for NSPS purposes, and means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. *Malfunction* shall have the same meaning when used for any other purpose in this permit.
- 2.1.3 ***Startup (Initial)*** is defined in 40 CFR 60.2 for the purposes of NSPS notification, reporting, and performance testing, and means the first time that an affected facility is set in operation for any purpose. *Initial startup* of any unit has the same meaning for the purpose of submitting required plans or procedures to DEQ.
- 2.1.4 ***Startup*** is defined in IDAPA 58.01.01.006, and means the normal and customary time period required to bring air pollution control equipment or an emission unit, including process equipment, from a nonoperational status into normal operation.

***Requirement to Modify PTC Permit: Incorporate O&M Manual, CO Fugitive BMP Plan, and SSM Plan Enforceable Provisions***

2.2 Within 180 days after initial startup, the permittee shall submit a complete application to DEQ to modify the conditions of this permit to incorporate the enforceable provisions of the information described in:

- All bulleted items in Permit Condition 2.3 (O&M Manual) for each device specified in that permit condition,
- All bulleted items in Permit Condition 7.13.1 (Fugitive CO BMP Plan), and
- Permit Condition 7.10.1 (SSM Plan).

**[November 30, 2009]**

***Operations & Maintenance (O&M) Manual***

2.3 At least 60 days before the initial start-up of each of the following control equipment, the permittee shall have developed and submitted to DEQ for review and comment an Operations and Maintenance (O&M) manual that describes the procedures that will be followed to comply with General Provision 2 of this permit and the manufacturer specifications for the following control equipment:

- Baghouses are used to control particulate emissions from rail unloading, handling, and storage of feedstocks. If bag leak detection systems are not provided, the O&M manual shall contain requirements for monthly see/no see visible emissions inspections of the baghouses. The inspections shall occur during daylight hours and under normal operating conditions. Visible emissions inspections for silo baghouses shall be conducted while material is being transferred at normal operating rates into the silo(s). If bag leak detection systems are used, the manual shall include appropriate provisions for inspection, maintenance, and testing of these systems.

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER: P-2009.0127**

|                   |                             |                                  |
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| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

- Fluxant water spray system(s) (if used), including alternative practices to be used during freezing condition
- Flue gas recirculation (FGR) system for reducing NO<sub>x</sub> from the package boiler
- Selective catalytic reduction (SCR) system for reducing NO<sub>x</sub> from the steam superheater boiler and the package boiler
- Oxidation catalyst (OxCat) for reducing CO emissions from the steam superheater boiler and the package boiler
- Sour water scrubber for removing trace metals and sulfides from the syngas
- Activated carbon beds for removing mercury from the syngas
- Amine scrubber used to decrease sulfur compounds in the syngas prior to flaring in the Gasifier Flare
- Flares, including the:
  - Gasifier flare
  - Process flare serving the ammonia and urea production plants
  - Ammonia storage flare
- Thermal oxidizer used to treat remaining H<sub>2</sub>S, COS, and CO in the CO<sub>2</sub>-rich stream from the AGR (AGR Stream 2)
- Extended absorption and SCR system(s) serving the nitric acid plant for the control of NO<sub>x</sub> emissions
- Catalytic decomposition (or equivalent) for reducing N<sub>2</sub>O emissions from the nitric acid plant
- Drift and mist eliminators and a condenser for the ammonium nitrate neutralizer vent
- Urea granulation process scrubber used to control PM/PM<sub>10</sub> emissions

**[November 30, 2009]**

2.4 The O&M manual, or if submitted in sections, each O&M submittal, shall contain a certification by a responsible official. Any changes to the manual shall be submitted to DEQ for review and comment within 15 days of the change. The O&M manual shall remain on site at all times and shall be made available to DEQ representatives upon request. At a minimum the following items shall be included in the manual:

- The manufacturer's recommended minimum (and, if necessary, maximum) values that shall be maintained for any of the operating parameters required to be monitored during performance testing, as listed in the applicable section of this permit.
- The scheduled frequency for routine inspection, maintenance, and routine repair/replacement.
- Parameters to be addressed during inspections and routine maintenance, and indicators signaling that the equipment should be repaired or replaced.
- Parameters that will be documented for inspections, maintenance, and corrective actions. The permittee shall maintain records of the results of inspections in accordance with General Provision 7.

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER: P-2009.0127**

|                   |                             |                                  |
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| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

The operating and monitoring requirements specified in the O&M manual are incorporated by reference into this permit and are enforceable permit conditions.

***Fugitive Emissions***

- 2.5 All reasonable precautions shall be taken to prevent fugitive dust from becoming airborne in accordance with IDAPA 58.01.01.650-651. In determining what is reasonable, consideration will be given to factors such as the proximity of dust-emitting operations to human habitations and/or activities and atmospheric conditions that might affect the movement of particulate matter.
- 2.5.1 Some of the reasonable precautions include, but are not limited to, the following, where practical:
  - Use of Water or Chemicals. Use of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land.
  - Application of Dust Suppressants. Application of asphalt, oil, water, or suitable chemicals to, or covering of, dirt roads, material stockpiles, and other surfaces which can create dust.
  - Use of Control Equipment. Installation and use of hoods, fans, fabric filters, or equivalent systems to enclose and vent the handling of dusty materials. Adequate containment methods should be employed during sandblasting or other operations.
  - Covering of Trucks. Covering of open bodied trucks transporting materials likely to give rise to airborne dusts.
  - Paving. Paving of roadways and their maintenance in a clean condition.
  - Removal of Materials. Prompt removal of earth or other stored material from streets.
- 2.5.2 The permittee shall monitor and maintain records of the frequency and the method(s) used (e.g., water, chemical dust suppressants) to reasonably control fugitive dust emissions.
- 2.5.3 The permittee shall conduct a quarterly facility-wide inspection of potential sources of fugitive emissions, during daylight hours and under normal operating conditions, to ensure that the methods used to reasonably control fugitive emissions are effective. If fugitive emissions are not being reasonably controlled, the permittee shall take corrective action as expeditiously as practicable. The permittee shall maintain records of the results of each fugitive emissions inspection. The records shall include, at a minimum, the date of each inspection and a description of the following: the permittee’s assessment of the conditions existing at the time fugitive emissions were present (if observed), any corrective action taken in response to the fugitive emissions, and the date the corrective action was taken.
- 2.5.4 The permittee shall maintain records of all fugitive dust complaints received. The permittee shall take appropriate corrective action as expeditiously as practicable. The records shall include, at a minimum, the date that each complaint was received and a description of the following: the complaint, any corrective action taken, and the date the corrective action was taken.

***Visible Emissions (Opacity)***

- 2.6 The permittee shall not discharge any air pollutant to the atmosphere from any point of emission for a period or periods aggregating more than three minutes in any 60-minute period which is greater than 20% opacity as determined by procedures contained in IDAPA 58.01.01.625. These provisions shall not apply when the presence of uncombined water, nitrogen oxides, and/or chlorine gas is the only reason for the failure of the emission to comply with the requirements of this section.

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| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

The permittee shall conduct a monthly facility-wide inspection of potential sources of visible emissions, during daylight hours and under normal operating conditions. Visible emissions inspections for silo baghouses shall be conducted while material is being transferred at normal operating rates into the silo(s). Visible emissions inspections are not required for any baghouse stack if the baghouse is equipped with a bag leak detection system that provides continuous monitoring for baghouse performance.

- 2.7 The visible emissions inspection shall consist of a see/no see evaluation for each potential source. If any visible emissions are present from any point of emission, the permittee shall either take appropriate corrective action as expeditiously as practicable or perform a Method 9 opacity test in accordance with the procedures outlined in IDAPA 58.01.01.625. A minimum of 30 observations shall be recorded when conducting the opacity test. If opacity is greater than 20% for a period or periods aggregating more than three minutes in any 60-minute period, the permittee shall take all necessary corrective action and report the exceedance in accordance with IDAPA 58.01.01.130-136. The permittee shall maintain records of the results of each visible emissions inspection and each opacity test when conducted. The records shall include, at a minimum, the date and results of each inspection and test and a description of the following: the permittee's assessment of the conditions existing at the time visible emissions are present (if observed), any corrective action taken in response to the visible emissions, and the date corrective action was taken.

***Odors***

- 2.8 The permittee shall not allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids to the atmosphere from the PCAEC in such quantities as to cause air pollution.
- 2.9 The permittee shall maintain records of all odor complaints received. The permittee shall take appropriate corrective action as expeditiously as practicable. The records shall include, at a minimum, the date that each complaint was received and a description of the following: the complaint, any corrective action taken, and the date the corrective action was taken.

***Open Burning***

- 2.10 The permittee shall comply with the requirements of the Rules for Control of Open Burning, IDAPA 58.01.01.600-616.

***Fuel-burning Equipment***

- 2.11 In accordance with IDAPA 58.01.01.676 and 677, the permittee shall not discharge PM to the atmosphere from any fuel-burning equipment in excess of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume for gas fuels, 0.050 gr/dscf of effluent gas corrected to 3% oxygen by volume for liquid fuels, and for fuel-burning equipment with a maximum rated input of 10 MMBtu/hr or more, shall not discharge PM in excess of 0.050 gr/dscf of effluent gas corrected to 8% oxygen for coal.

**AIR QUALITY PERMIT TO CONSTRUCT NUMBER: P-2009.0127**

|                   |                             |                                  |
|-------------------|-----------------------------|----------------------------------|
| <b>Permittee:</b> | Southeast Idaho Energy, LLC | <b>Facility ID No. 077-00029</b> |
| <b>Location:</b>  | American Falls, Idaho       |                                  |

***Fuel Oil and Feedstock Specifications***

- 2.12 No person shall sell, distribute, use, or make available for use in any fuel-burning source, any of the following fuel containing more than the following percentages of sulfur (IDAPA 58.01.01.725-729):
- ASTM Grade 1 fuel oil - 0.3% by weight.
  - ASTM Grade 2 fuel oil - 0.5% by weight.
  - ASTM Grades 4, 5 and 6 fuel oil - 1.75% by weight.
  - Any coal containing greater than 1.0% sulfur by weight.
- 2.13 Stationary Compression-Ignition (Diesel) Nonroad Engine Fuels (NSPS, Subpart IIII, 40 CFR 60.4207):
- Beginning October 1, 2007, for engines subject to 40 CFR 60 Subpart IIII, no person shall use any distillate fuel oil that contains more than 500 parts per million (0.05% by weight) of sulfur, and has either a cetane index less than 40 or a maximum aromatic content of 35 volume percent.
  - Beginning October 1, 2010, for engines subject to 40 CFR 60 Subpart IIII and which have a displacement less than 30 liters per cylinder, no person shall use any distillate fuel oil that contains more than 15 parts per million (0.015% by weight) of sulfur, and has either a cetane index less than 40 or a maximum aromatic content of 35 volume percent.
- 2.14 The sulfur content of the coal, petcoke, alternative feedstocks, and fluxant, as blended, shall not exceed 6.0% sulfur by weight on an as-received basis, except as modified by a performance test as specified in Permit Condition 7.8.
- [November 30, 2009]**
- 2.15 The permittee shall maintain documentation of supplier verification of fuel oil, coal, alternative feedstocks, and petcoke sulfur content and fuel oil cetane index or maximum aromatic content on an as-received basis, and in accordance with General Provision 7.
- [November 30, 2009]**
- 2.16 Alternative feedstocks shall not contain hazardous waste as defined in IDAPA 58.01.01.006.56.
- [November 30, 2009]**

***Source Testing Outside Permit Requirements***

- 2.17 The permittee may conduct source testing to evaluate changes to a process or control equipment including, but not limited to, a feed rate or production increase, change in feedstock parameters (e.g., sulfur content), or control equipment operational change, as follows:
- Each source test shall be conducted in accordance with a DEQ-approved test protocol and in accordance with IDAPA 58.01.01.157.
  - If the source test results demonstrate an exceedance of an existing emissions limit, an excess emissions report must be submitted to DEQ.
  - The permittee shall monitor and record parameters relevant to the changes being evaluated and the parameters specified in Permit Condition 3.9.3.

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- After conducting the test, the source:
  - Shall return to compliance with existing permit restrictions until the appropriate permitting action is taken to change the operational restrictions, if the source test results demonstrate an exceedance of an existing emissions limit; or
  - May continue to operate at the new operational parameters achieved during the source test, if the source test results demonstrate compliance with applicable existing emission limits.
  - Within 30 days following the date in which a performance test required by this permit is concluded, the permittee shall submit to DEQ a performance test report. The written report shall include a description of the process, identification of the test method(s) used, equipment used, all process operating data collected during the test period, and test results, as well as raw test data and associated documentation, including any approved test protocol.

**[November 30, 2009]**

***New Tier I Source Requirement***

- 2.18 In accordance with IDAPA 58.01.01.313.01.b, the permittee shall submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source or commencing operation.

***Reports and Certifications***

- 2.19 Any reporting required by this permit shall comply with General Provision 9. Any reporting required by this permit shall be submitted to the DEQ Regional Office address shown in Table 2.1.

***NSPS, 40 CFR 60 Subpart A – General Provisions***

- 2.20 Generally applicable reporting, recordkeeping and notification requirements of Subpart A of the New Source Performance Standards (NSPS, 40 CFR 60) are included in Table 2.1. The summary for 40 CFR 60 Subpart A, as well as other NSPS summaries throughout this permit, are provided to highlight the NSPS notification and recordkeeping requirements for affected facilities and are not intended to be a comprehensive listing of all general provisions requirements or specific requirements that may apply. Should there be a conflict between an NSPS summary and the NSPS, the NSPS shall govern. The permittee is encouraged to read all of 40 CFR 60 Subpart A. The CFR are available on-line at: <http://www.gpoaccess.gov/cfr/index.html>.



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**Table 2.1 NSPS SUBPART A (40 CFR 60) SUMMARY OF GENERAL PROVISIONS FOR AFFECTED FACILITIES**

| <b>Section</b>                 | <b>Section Title</b>                                   | <b>Summary of Section Requirements</b>   |
|--------------------------------|--|--|
| 60.11(a),(b), (c), (d),and (g) | Compliance with Standards and Maintenance Requirements | <ul style="list-style-type: none"> <li>• Other than opacity standards, where performance tests are required compliance with standards is determined by methods and procedures established by 40 CFR 60.8.</li> <li>• Compliance with NSPS opacity standards shall be determined by Method 9 of Appendix A. The owner or operator may elect to use continuous opacity monitoring system (COMS) measurements in lieu of Method 9 provided notification is made at least 30 days before the performance test.</li> <li>• At all times, including periods of startup, shutdown, and malfunction to the extent practicable, the operator shall maintain and operate any affected facility and air pollution control equipment consistent with good air pollution control practices.</li> <li>• For the purposes of determining compliance with standards any credible evidence may be used if the appropriate performance or compliance test procedure has been performed.</li> </ul> |
| 60.12                          | Circumvention  | No owner or operator shall build, erect, install or use any article or method, including dilution, to conceal an emission which would otherwise constitute a violation.  |
| 60.13                          | Monitoring Requirements                                | All COMS and CEMS shall conform to the reporting, calibration and data reduction requirements specified in detail by this section. Reporting requirements include submitting performance evaluations reports within 60 days of the evaluations required by this section, and submitting results of the performance evaluations for the COMS within 10 days before a performance test if using COMS to determine compliance with opacity during a performance test instead of Method 9 of Appendix A.   |
| 60.14                          | Modification   | <ul style="list-style-type: none"> <li>• Physical or operational changes to source types that are regulated by a NSPS which result in an increase in hourly emissions to which a standard applies is considered a modification (unless expressly exempted the NSPS). Modified sources become subject to the NSPS standards.</li> <li>• Note that in accordance with IDAPA 58.01.01.201 no owner or operator may commence a modification without first obtaining a permit to construct unless the modification is exempted from the need to obtain a permit in accordance with IDAPA 58.01.01.220-223.</li> </ul>   |

***NESHAP, 40 CFR 61 and 63, Reports and Notifications***

2.21 Reports and notifications required by NESHAP (40 CFR 61 and 63) for delegated and non-delegated standards are required to be submitted to both EPA and DEQ (67 FR 3106, 1/23/02). The permittee shall submit NESHAP reports and notifications to the EPA and to the DEQ Regional Office at the addresses provided in Table 2.1.

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**3. FEEDSTOCK STORAGE AND HANDLING**

**3.1 Process Description**

Coal and petcoke will be delivered by rail in dedicated unit trains or manifest trains. Alternative feedstocks will be delivered by truck. A rotary dumper or equivalent system will be used to unload the feedstock from each railcar into an enclosed pit. From the pit, a belt feeder system will transfer the feedstocks to an enclosed conveyor, which will transport the feedstock to storage silos or other covered storage technologies. The silos will be Eurosilo or similar technology, a covered fuel storage system that includes dust suppression equipment. Silo storage will be sized to provide a minimum of 30 days' worth of feedstock. The feedstocks will be delivered by conveyors from the silos to the coal grinding structure, and then conveyed to the coal preparation area where it will be crushed or ground into smaller pieces. The crushed feedstock will be conveyed to milling equipment, which contains steel rods or equivalent technology to further break down the feedstock's particle size. Water and fluxant will be added during the milling process to produce slurry, which will be pumped to a main slurry tank after having been screened to remove large particles. Particulate emissions from materials transfer, storage silo vents, conveyor transfer points, and feedstock grinding and milling will be controlled by enclosures, using a rotary dumping system or equivalent and baghouses as described in Table 3.1.

Fluxant (typically limestone, silica/sand, or iron ore) will be received by truck or rail, and will be stored in an enclosed silo or other covered storage technology. Emissions from the fluxant storage silo vent(s) will be controlled by baghouse(s)/cartridge filter(s). The fluxant will be blended with the feedstock using a weight belt feeder system or equivalent technology. When it is not subject to freezing, water sprays will be used to control fugitive dust emissions from fluxant unloading, silo filling, and loading into the rod mill hopper. During freezing conditions, alternate methods for controlling these fugitive emissions will be used. Conveyors transferring fluxant will be covered and will have enclosed transition points.

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**3.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 3.1 FEEDSTOCK STORAGE AND HANDLING DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>   | <b>Control Equipment Descriptions</b>   | <b>Emissions Point</b>   |
|--|---|--|
| <b>Fluxant Handling</b><br>Railcar Unloading (see SRC01), or<br>Truck Unloading (fugitives)<br>Hopper to Fluxant Silo(s) (fugitives and silo vent)<br>Silo(s) to Rod Mill Hopper (fugitives) | Covered conveyor(s) with enclosed transition points. Enclosed transition points include providing a connecting boot or equivalent for truck unloading.<br><br>Water sprays or equivalent, minimum 75% control for fugitives.<br><br>Fully enclosed storage silo(s) or equivalent, with<br><br><u>Silo vent baghouse/cartridge filter:</u><br>Mfr/Model: TBD<br>PM/PM <sub>10</sub> Control: 99% | <u>Stack Parameters, Fluxant Storage Vent(s)</u><br><u>Baghouse/Cartridge Filter:</u><br>Stack Height: TBD<br>Exit Diameter: TBD<br>Orientation: TBD<br>Exit flow rate: TBD<br>Exit Velocity: TBD<br>Exit Temperature: Ambient |

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**Table 3.1 FEEDSTOCK STORAGE AND HANDLING DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>   | <b>Control Equipment Descriptions</b>   | <b>Emissions Point</b>   |
|--|---|--|
| <b>Feedstock Handling</b>  |   |  |
| <u>Railcar Unloading (SRC01)</u><br>Manufacturer: TBD<br>Model: TBD<br>Max Capacity: 5,000 TPH max unloading rate<br>Operations: 8,760 hr/yr   | Rotary dumping system or equivalent.<br>Railcar unloading structure with restricted end door openings.<br>Enclosure is at negative pressure during transfers.<br><u>High-efficiency Baghouse:</u><br>Mfr/Model: TBD<br>PM/PM <sub>10</sub> Control: 99% | <u>Stack Parameters, SRC01:</u><br>Stack Height: 10.0 m (32.8 ft)<br>Exit Diameter: 1.2 m (3.9 ft)<br>Orientation: vertical<br>Exit flow rate: 20,000 acfm<br>Exit Velocity: 10 m/sec<br>Exit Temperature: Ambient   |
| Railcar Hopper – Railcar Conveyor (SRC02)<br>Railcar Conveyor to Silo Conveyors (SRC03)<br>Silo Conveyor – Stacker Conveyors (SRC04)<br>Manufacturer: TBD<br>Model: TBD<br>Max Capacity: 5,000 TPH max rate (each)<br>Operations: 8,760 hr/yr (each)                       | Covered conveyors with enclosed transition points.<br><u>High-efficiency Baghouse (each):</u><br>Mfr/Model: TBD<br>PM/PM <sub>10</sub> Control: 99%   | <u>Stack Parameters, SRC02, SRC03, and SRC04:</u><br>Stack Height: 5.0 m (16.4 ft) (SRC02, SRC03)<br>Stack Height: 2.0 m (6.6 ft) (SRC04)<br>Exit Diameter: 1.2 m (3.9 ft)<br>Orientation: vertical<br>Exit flow rate: 20,000 acfm<br>Exit Velocity: 10 m/sec<br>Exit Temperature: Ambient |
| Feedstock Storage: Silos 1, 2, and 3 (SRC06, SRC07, and SRC05)<br>Manufacturer: Eurosilo or equivalent<br>Model: TBD<br>Max Fill Rate: 5,000 TPH (each)<br>Operations: 8,760 hr/yr (each)  | <u>Baghouses (1 for each silo):</u><br>Mfr/Model: TBD<br>PM/PM <sub>10</sub> Control: 99%   | <u>Silo Vent Parameters SRC06, SRC07, SRC05:</u><br>Vent Stack Height: 57.0 m<br>Exit Diameter: 1.2 m (3.9 ft)<br>Orientation: vertical<br>Exit flow rate: 20,000 acfm<br>Exit Velocity: 10 m/sec<br>Exit Temperature: Ambient   |
| Silo 1 Reclaimer to Reclaim Conveyor 1 (SRC08)<br>Silo 2 Reclaimer to Reclaim Conveyor 2 (SRC09)<br>Silo 3 Reclaimer to Reclaim Conveyor 3 (SRC10)<br>Manufacturer: TBD<br>Model: TBD<br>Max Capacity: 105 TPH max unloading rate (each)<br>Operations: 8,760 hr/yr (each) | Covered conveyors with enclosed transition points.<br><u>Baghouses (1 for each reclaimer):</u><br>Mfr/Model: TBD<br>PM/PM <sub>10</sub> Control: 99%  | <u>Stack Parameters: SRC08, SRC09, and SRC10</u><br>Stack Height: 53.0 m<br>Exit Diameter: 1.2 m (3.9 ft)<br>Orientation: vertical<br>Exit flow rate: 20,000 acfm<br>Exit Velocity: 10 m/sec<br>Exit Temperature: Ambient  |
| Reclaim Conveyor to Rod Mill Hopper #1 (SRC11)<br>Reclaim Conveyor to Rod Mill Hopper #2 (SRC12)<br>Manufacturer: TBD<br>Model: TBD<br>Max Capacity: 105 TPH max unloading rate (each)<br>Operations: 8,760 hr/yr  | Covered conveyors with enclosed transition points.<br><u>Baghouses (1 for each hopper):</u><br>Mfr/Model: TBD<br>PM/PM <sub>10</sub> Control: 99%   | <u>Stack Parameters: SRC11 and SRC12</u><br>Stack Height: 10.0 m<br>Exit Diameter: 1.2 m (3.9 ft)<br>Orientation: vertical<br>Exit flow rate: 20,000 acfm<br>Exit Velocity: 10 m/sec<br>Exit Temperature: Ambient  |

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**Emissions Limits**

**3.3 Emission Limits**

Particulate matter and PM<sub>10</sub> emissions from any baghouse stack, or any other stack, vent, or functionally equivalent opening associated with fluxant handling and feedstock railcar unloading, conveying, storage, or processing (e.g., grinding, milling, and screening) shall not exceed the pounds per hour limits listed in Table 3.2. These emission limits shall apply at all times.

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**Table 3.2 EMISSION LIMITS FOR FEEDSTOCK HANDLING POINT SOURCES**

| Source ID No.                                      | Description   | Emission Limits   |
|--|---|---|
| (TBD)  | Fluxant Silo or equivalent  | PM: 0.002 lb/hr<br>PM <sub>10</sub> : 0.002 lb/hr                               |
| SRC01  | Feedstock<br>Railcar Unloading  | BACT PM: 0.09 lb/hr<br>BACT PM <sub>10</sub> : 0.04 lb/hr                       |
| SRC02<br>SRC03<br>SRC04<br>SRC05<br>SRC06<br>SRC07 | Feedstock<br>Railcar Hopper to Railcar Conveyor<br>Railcar Conveyor to Silo Conveyors<br>Silo Conveyor to Stacker Conveyors<br>Silo 3 Vent<br>Silo 1 Vent<br>Silo 2 Vent  | Each Source:<br><br>BACT PM: 0.09 lb/hr<br>BACT PM <sub>10</sub> : 0.04 lb/hr   |
| SRC08<br>SRC09<br>SRC10<br>SRC11<br>SRC12          | Feedstock<br>Silo 1 Reclaimer to Reclaim Conveyor<br>Silo 2 Reclaimer to Reclaim Conveyor<br>Silo 3 Reclaimer to Reclaim Conveyor<br>Reclaim Conveyor to Rod Mill Hopper 1<br>Reclaim Conveyor to Rod Mill Hopper 2 | Each Source:<br><br>BACT PM: 0.002 lb/hr<br>BACT PM <sub>10</sub> : 0.001 lb/hr |

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**3.4 Opacity Limit (BACT for Particulate Matter)**

Particulate matter emissions from any baghouse stack, or any other stack, vent, or functionally equivalent opening associated with feedstock railcar unloading, conveying, storage, or processing (e.g., grinding, milling, and screening) shall not exceed 5 percent opacity. Method 9 of Appendix A to 40 CFR 60 and the procedures in 40 CFR 60.11 shall be used to determine opacity. This opacity standard shall apply at all times except during periods of startup, shutdown, or malfunction.

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**3.5 Opacity Limit (NSPS, 40 CFR 60, Subpart Y)**

In accordance with 40 CFR 60.251(c), on and after the date on which the performance test required to be conducted by 40 CFR 60.8 is completed, an owner or operator subject to the provisions of this subpart shall not cause to be discharged into the atmosphere from any coal processing and conveying equipment, coal storage system, or coal transfer and loading system processing coal, gases which exhibit 20 percent opacity or greater. Method 9 of Appendix A to 40 CFR 60 and the procedures in 40 CFR 60.11 shall be used to determine opacity. In accordance with 40 CFR 60.11(c), the opacity standard shall apply at all times except during periods of startup, shutdown, or malfunction.

**Operating Requirements**

**3.6 Control Equipment – BACT for Particulate Matter**

The permittee shall:

- Construct and maintain enclosures as described in Table 3.1 to control PM and PM<sub>10</sub> emissions from feedstock and fluxant unloading, conveying, storage, and processing (i.e., grinding, milling, and screening);
- Install, operate, and maintain baghouses to control PM and PM<sub>10</sub> emissions from feedstock unloading, conveying, storage, and processing (i.e., grinding, milling, and screening), and

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baghouse(s) or cartridge filter(s) to control particulate emissions from fluxant silo filling. The control devices shall be operated at all times when material is being transferred or processed.

- Install and maintain water sprays or equivalent to provide control for fugitive particulate emissions from fluxant unloading, conveying, and storage. If used, water sprays shall be operated in accordance with the O&M manual, and alternative equivalent controls shall be used during freezing conditions.

**[November 30, 2009]**

***Monitoring and Recordkeeping Requirements***

**3.7 Feedstock Analysis**

3.7.1 Prior to the initial startup that includes feeding slurry containing any blend of coal, petcoke, alternative feedstocks, and fluxant to either gasifier, the permittee shall characterize each feedstock by obtaining analysis results for representative composite samples from the feedstock supplier or shall sample and analyze each feedstock to determine the concentration of the following substances:

- Sulfur content.
- Metals: Arsenic, Cadmium, Chromium (total and hexavalent), Cobalt, Lead, Manganese, Mercury, and Nickel.
- Any additional information necessary to ensure compliance with Permit Condition 2.16.

3.7.2 Sampling and analysis shall be conducted in accordance with EPA Reference Methods or other method approved by DEQ.

3.7.3 The permittee shall obtain analysis results for the substances listed in Permit Condition 3.7.1 for representative samples of each feedstock prior to acceptance of coal, petcoke, alternative feedstocks, or fluxant from a mine or supplier.

3.7.4 The permittee shall obtain analysis results for the substances listed in Permit Condition 3.7.1 for representative samples of feedstock at least every two years.

3.7.5 Records of the information required by this permit condition and records detailing the sampling method; sample identification; sampling date, time, and location; laboratory results; and any laboratory QA analysis shall be maintained in accordance with General Provision 7.

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**3.8 Initial Performance Tests for Particulate Matter**

3.8.1 **NSPS, 40 CFR 60, Subpart Y.** In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the affected facility (i.e., coal transfer and loading systems, coal storage systems, and coal processing and conveying equipment) will be operated, but not later than 180 days after initial startup of such facility, the owner or operator of such facility shall conduct performance test(s) to demonstrate compliance with the 20% opacity limit specified in Permit Condition 3.5. Tests shall be conducted for all baghouse stacks, vents, or equivalent openings associated with any coal processing and conveying equipment, coal storage system, or coal transfer and loading system processing coal at the PCAEC.

Opacity shall be determined using Method 9 of Appendix A to 40 CFR 60 and the procedures in 40 CFR 60.11. For purposes of determining initial compliance, the minimum total time of observations shall be 3 hours (30 6-minute averages).

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3.8.2 **BACT Compliance.** Not later than 180 days after initial startup of the feedstock handling facility, the permittee shall conduct performance test(s) to demonstrate compliance with the PM and PM<sub>10</sub> pound per hour limits and opacity limits specified in Permit Conditions 2.6, 3.3, and 3.4. Tests shall be conducted for all baghouse stacks, vents, or equivalent openings associated with coal, petcoke, alternative feedstocks, and fluxant handling at the PCAEC.

Opacity shall be determined using Method 9 of Appendix A to 40 CFR 60. For purposes of determining initial compliance, the minimum total time of observations shall be 3 hours (30 6-minute averages).

The permittee is encouraged to submit a source testing protocol to DEQ for approval 30 days prior to conducting the performance test. The source test shall be conducted under “worst case normal” conditions as required by IDAPA 58.01.01.157 and General Provision 6, and the source test report shall contain documentation that the test was conducted under these conditions. General Provision 6 includes notification requirements, testing procedures and reporting requirements.

The permittee shall monitor and record the following during each performance test:

- The material handling operation (e.g., unloading, conveying, silo-filling, grinding/milling),
- Type of material (petcoke, coal and coal rank, alternative feedstock, or type of fluxant),
- Moisture content of the feedstock on an as-received basis, and
- Material throughput in tons per hour for the material handling operations associated with the stack or vent being tested.

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**3.9 Periodic Performance Tests for Particulate Matter**

3.9.1 The permittee shall conduct performance tests at a frequency of no less than once every five years to demonstrate compliance with the PM and PM<sub>10</sub> pound per hour limits and opacity limits specified in Permit Conditions 2.6, 3.3, 3.4, and 3.5.

3.9.2 The permittee is encouraged to submit a source testing protocol to DEQ for approval 30 days prior to conducting the performance test. With prior DEQ approval, periodic testing may be conducted on representative baghouses in lieu of testing all baghouses associated with feedstocks handling. The source test shall be conducted under “worst case normal” conditions as required by IDAPA 58.01.01.157 and General Provision 6, and the source test report shall contain documentation that the test was conducted under these conditions. General Provision 6 includes notification requirements, testing procedures and reporting requirements.

3.9.3 The permittee shall monitor and record the following during each performance test:

- The material handling operation (e.g., unloading, conveying, silo-filling, grinding/milling),
- Type of material (petcoke or coal and coal rank, and alternative feedstocks),
- Moisture content of the feedstock on an as-received basis, and
- Material throughput in tons per hour for the material handling operations associated with the stack being tested.

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***Reporting Requirements***

**3.10 Construction and Initial Startup Notification (NSPS, 40 CFR 60, Subpart A, General Provisions)**

For the affected facility subject to NSPS, 40 CFR 60 Subpart Y, which includes coal processing and conveying equipment, coal storage system, or coal transfer and loading system processing coal at the PCAEC, the permittee shall submit notification of the date that construction commences (postmarked no later than 30 days after such date), and the date of initial startup (postmarked no later than 15 days after such date), in accordance with 40 CFR 60.7(a)(1) and 60.7(a)(3).

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**4. NATURAL GAS-FIRED HEATERS**

**4.1 Process Description**

The Air Separation Unit (ASU) regen heater will be used to regenerate the molecular sieves in the ASU. The gasifier heaters will be used to preheat the gasifiers at startup. Once the gasifiers have been preheated, the heater for the gasifier being operated in production mode will be shut down, and the heater for the gasifier being operated in standby mode will continue to be operated at a level necessary to maintain the standby gasifier at the appropriate temperature.

**4.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 4.1 NATURAL GAS-FIRED HEATERS DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>   | <b>Control Equipment Descriptions</b> | <b>Emissions Point</b>  |
|--|---------------------------------------|---|
| <u>ASU Regen Heater</u><br>Manufacturer: TBD<br>Model: TBD<br>Max Heat Input: 100,000 Btu/hr<br>Fuel: Natural Gas<br>Operations: 8,760 hr/yr   | None                                  | <u>Stack Parameters, SRC13:</u><br>Stack Height: 4.0 m (13.1 ft)<br>Exit Diameter: 0.05 m (0.16 ft)<br>Orientation: vertical<br>Exit flow rate: 37 acfm<br>Exit Velocity: 9.0 m/sec<br>Exit Temperature: 355 K (179.3°F)  |
| <u>Gasifier Heater #1 and Gasifier Heater #2:</u><br>Manufacturer: TBD<br>Model: TBD<br>Startup: 25.5 MMBtu/hr avg (each)<br>Standby: 9 MMBtu/hr avg (each)<br>Fuel: Natural Gas<br>Operations: 8,760 hr/yr (each) | None                                  | <u>Gasifier Heater Vent #1 and Vent #2</u><br><u>Stack Parameters, SRC14, SRC15:</u><br>Stack Height: 51.8 m (170 ft)<br>Exit Diameter: 0.5 m (1.64 ft)<br>Orientation: vertical<br>Exit flow rate: 5,309 acfm<br>Exit Velocity: 15.3 m/sec<br>Exit Temperature: 811 K (1000.1°F) |

**[November 30, 2009]**

***Operating Requirements***

**4.3 Heater Fuels and Operating Practices**

4.3.1 The ASU regen heater and the gasifier heaters shall be operated using:

- Natural gas, exclusively; and
- Good combustion practices at all times.

4.3.2 The use of natural gas exclusively and good combustion operating practices are considered BACT for CO, NO<sub>x</sub>, PM, and PM<sub>10</sub> for the ASU Regen heater, and Gasifier Heater #1 and #2.

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**5. DIESEL-FIRED EMERGENCY ENGINE GENERATORS**

**5.1 Process Description**

A nominal 2,000 kW (2 MW) emergency engine generator will supply backup power to the facility when the utility power supply is interrupted. A nominal 500 kW emergency engine generator or a National Fire Protection Association (NFPA) 20-certified fire pump engine will supply power for pumping water to the facility's fire suppression systems.

**5.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued.

**Table 5.1 DIESEL-FIRED EMERGENCY ENGINE GENERATOR DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>  | <b>Control Equipment Descriptions</b> | <b>Emissions Point</b>   |
|---|---------------------------------------|--|
| <u>2,000 kW (2 MW) Emergency Engine Generator</u><br>Manufacturer: Caterpillar or equivalent<br>Model: TBD<br>Max Rating: Nominal 2 MW output<br>Displacement: < 10 liters per cylinder<br>Emissions: Minimum EPA Tier 2<br>Fuel: Distillate fuel oil (Diesel)<br>Operations: Maximum 100 hr/yr   | None                                  | <u>Emergency Generator Stack Parameters, SRC25:</u><br>Stack Height: 10.1 m (33.0 ft)<br>Exit Diameter: 0.6 m (2.0 ft)<br>Orientation: vertical<br>Exit flow rate: 15,136 acfm<br>Exit Velocity: 24.5 m/sec<br>Exit Temperature: 679 K (762.5°F)           |
| <u>500 kW Emergency Engine Generator (Fire Pump)</u><br>Manufacturer: Caterpillar or equivalent<br>Model: Nominal 500 kW output<br>Displacement: < 10 liters per cylinder<br>Emissions:<br>EPA Tier 3 (for a generator not meeting NFPA 20)<br>40 CFR 60, Subpart IIII (NFPA 20 fire pump)<br>Fuel: Distillate fuel oil (Diesel)<br>Operations: Maximum 100 hr/yr | None                                  | <u>Firewater Pump Engine Generator Stack Parameters, SRC26:</u><br>Stack Height: 4.6 m (15.0 ft)<br>Exit Diameter: 0.3 m (1.0 ft)<br>Orientation: vertical<br>Exit flow rate: 3,842 acfm<br>Exit Velocity: 24.9 m/sec<br>Exit Temperature: 779 K (942.5°F) |

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***Emissions Limits***

**5.3 Emission Limits (NSPS, 40 CFR 60, Subpart IIII)**

The emissions from the diesel-fired emergency engine generators shall not exceed the limits shown in Table 5.2, in accordance with 40 CFR 60.4205(b). The use of diesel engines certified to meet the Subpart IIII emission standard for the applicable model and year is considered BACT for CO, NO<sub>x</sub>, PM, and PM<sub>10</sub> for these sources.

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**Table 5.2 EMERGENCY ENGINE GENERATOR EXHAUST EMISSIONS LIMITS (40 CFR 60, SUBPART III)**

| <b>Emission Unit</b>  | <b>Regulation</b>                                  | <b>NMHC + NO<sub>x</sub><sup>a</sup><br/>(g/kW-hr)</b> | <b>CO<br/>(g/kW-hr)</b> | <b>PM<br/>(g/kW-hr)</b> |
|---|--|--|-------------------------|-------------------------|
| Emergency Engine Generator, Nominal 2,000 kW                    | 40 CFR 89.112, Table 1, kW > 560: Tier 2           | 6.4  | 3.5                     | 0.20                    |
| Emergency Generator (Fire Pump), Nominal 500 kW:                |  |  |                         |                         |
| NFPA 20-certified fire pump engine, Ordered in 2008 or earlier. | 40 CFR 60, Subpart III, Table 4<br>130 < kW < 560: | 10.5   | 3.5                     | 0.54                    |
| NFPA 20-certified fire pump engine, Ordered in 2009 or later.   |  | 4.0  | ---                     | 0.20                    |
| Emergency Engine Generator, 500 kW                              | 40 CFR 89.112, Table 1<br>450 ≤ kW ≤ 560: Tier 3   | 4.0  | 3.5                     | 0.20                    |

<sup>a</sup> NMHC = Non-methane hydrocarbons

**5.4 Opacity Limit (NSPS, 40 CFR 60, Subpart III)**

In accordance with 40 CFR 60.4205(b) and 40 CFR 89.113, exhaust opacity from emergency engine generator(s) that are not NFPA 20-certified fire pump engines shall not exceed 20 percent during the acceleration mode, 15 percent during the lugging mode, and 50 percent during the peaks in either the acceleration or lugging modes. Opacity levels shall be measured and calculated as set forth in 40 CFR part 86, subpart I.

**5.5 Opacity Limit (IDAPA 58.01.01.625)**

The exhaust from the emergency engine generator(s) and fire pump engine generator shall not exceed the 20% opacity limit specified in Permit Condition 2.6.

**Operating Requirements**

**5.6 Allowable Fuels (NSPS, 40 CFR 60, Subpart III)**

The emergency generators shall combust only diesel fuel meeting the requirements of Permit Condition 2.13, in accordance with 40 CFR 60.4207(a) and (b).

**5.7 Maximum Hours of Operation**

The operation of each emergency generator shall not exceed a maximum of 100 hours in any consecutive 12-calendar month period for maintenance checks. Any operation other than maintenance and testing (subject to the 100 hour per year maximum) and emergency operation, is prohibited in accordance with 40 CFR 60.4211(e).

**5.8 Engine Generator Operation and Maintenance (NSPS, 40 CFR 60, Subpart III)**

- 5.8.1 The permittee shall operate and maintain the emergency generators according to the manufacturer's written instructions or procedures developed by the permittee that are approved by the engine manufacturer, over the entire life of the engine, in accordance with 40 CFR 60.4206 and 4211(a).
- 5.8.2 The permittee may only change those settings that are permitted by the manufacturer, in accordance with 40 CFR 60.4211(a).

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**5.9 Other Requirements for Owners and Operators (NSPS, 40 CFR 60, Subpart IIII)**

The permittee shall comply with the deadlines specified in 40 CFR 60.4208(a) through (g).for installing and importing stationary compression-ignition internal combustion engines (i.e., diesel engines), except for stationary diesel engines that have been modified or reconstructed or that were removed from one existing location and reinstalled at a new location as specified in 40 CFR 60.4208(h).

**5.10 Engine Generator Replacement (NSPS, 40 CFR 60, Subpart IIII)**

The owner or operator of a 2007 model year and later stationary CI ICE that must comply with the emission standards specified in 60.4205(b), and the owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to the fire pump engine rating in Table 3 to Subpart IIII that must comply with the emission standards specified in 60.4205(c), must comply by purchasing an engine certified to the emission standards of 40 CFR 60.4205(b) for the same model year and maximum engine power (or in the case of fire pumps, NFPA nameplate engine power), in accordance with 40 CFR 60.4211(c).

***Monitoring and Recordkeeping Requirements***

**5.11 Fuel Monitoring and Recordkeeping**

The permittee shall monitor and record fuel oil sulfur content and cetane index or maximum aromatic content in accordance with Permit Condition 2.15.

**5.12 Compliance Monitoring (NSPS, 40 CFR 60, Subpart IIII)**

The permittee shall install a non-resettable hour meter on each diesel engine prior to startup of the diesel engines, in accordance with 40 CFR 60.4209(a).

**5.13 Operating Hours Monitoring**

The permittee shall monitor and record the operating hours and reason(s) for operation of each emergency engine generator and/or fire pump engine on a monthly basis, summing the monthly totals for the previous consecutive 12-calendar month period, to demonstrate compliance with the annual hour limit specified in Permit Condition 5.7. Records of this information shall be maintained in accordance with General Provision 7.

***Testing Requirements***

**5.14 Testing Requirements for Owners and Operators (NSPS, 40 CFR 60, Subpart IIII)**

Any performance tests on the diesel engines shall be conducted according to the paragraphs of 40 CFR 60.4212(a) through (d).

***Reporting Requirements***

**5.15 Notification, Reports, and Records for Owners and Operators (NSPS, 40 CFR 60, Subpart IIII)**

5.15.1 In accordance with 40 CFR 60.4214(b), the initial notification described in 40 CFR 60.7(a)(1) is not required for emergency engine generators.

5.15.2 In accordance with 40 CFR 60.7(a)(3), the permittee shall submit notification of the date of initial startup of each emergency engine generator (postmarked no later than 15 days after such date).

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**6. STEAM SUPERHEATER BOILER AND PACKAGE BOILER**

**6.1 Process Description**

Various processes throughout the plant will produce and consume steam at different pressure levels through chemical reactions, process equipment, and heating/cooling needs.

A natural gas-fired package boiler will be used to produce steam during startup and shutdown. A similarly-sized steam superheater boiler will be used to produce and/or superheat steam during normal operations. The steam superheater boiler will be operated on natural gas or a mix of natural gas and project fuel gas (i.e., tailgas from the pressure swing adsorber (PSA)). The steam superheater boiler will be installed in the package boiler structure. The stacks for these two boilers will be co-located. During the transition between startup and normal operations, and from normal operations to shutdown, the boiler operations will be balanced, i.e., as steam production in one boiler increases the steam production in the other boiler will be decreased to maintain a steady steam production rate.

**6.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 6.1 STEAM SUPERHEATER BOILER AND PACKAGE BOILER DESCRIPTIONS**

| Emissions Unit(s) / Process(es)   | Control Equipment Descriptions   | Emissions Point   |
|---|--|---|
| <u>Steam Superheater Boiler</u><br>Manufacturer: TBD<br>Model: TBD<br>Max Rating: 250 MMBtu/hr heat input<br>Heat Release Rate: (High or Low, TBD)<br><u>Max. Operations:</u> 8,760 hr/yr at full rating<br>(combined with Package Boiler hours)<br>Fuel: Natural Gas (max 250 MMBtu/hr)<br>Heat Content: 1,020 Btu/scf<br>Sulfur Content: 2.0 gr/100 dscf<br>PSA Tailgas (max 250 MMBtu/hr)<br>Heat Content: ~250 Btu/scf<br>Sulfur Content: 25 ppmv | <u>Low-NO<sub>x</sub> burner and</u><br><u>Selective Catalytic Reduction (SCR)</u><br>Manufacturer/Model: TBD<br>Purpose: NO <sub>x</sub> reduction<br>Efficiency: 97% control for NO <sub>x</sub><br>Ammonia slip: ≤ 10 ppmv (dry),<br>corrected to 15% O <sub>2</sub><br><br><u>Oxidation Catalyst (OxCat)</u><br>Manufacturer: TBD<br>Model: TBD<br>Purpose: CO reduction<br>Efficiency: 20 ppmv corrected to 3% O <sub>2</sub>   | <u>Steam Superheater Stack Parameters, SRC31:</u><br>Stack Height: 33.5 m (109.9 ft)<br>Exit Diameter: 1.8 m (5.9 ft)<br>Orientation: vertical<br>Exit flow rate: 52,282 acfm<br>Exit Velocity: 10.3 m/sec<br>Exit Temperature: 422 K (299.9°F) |
| <u>Package Boiler</u><br>Manufacturer: TBD<br>Model: TBD<br>Max Rating: 250 MMBtu/hr heat input<br>Heat Release Rate: (High or Low, TBD)<br><u>Max. Operations:</u> 8,760 hr/yr at full rating<br>(combined with Steam Superheater Boiler hours)<br>Fuel: Natural Gas Only<br>Sulfur Content: 2.0 gr/100 dscf   | <u>Low-NO<sub>x</sub> burner, and</u><br><u>Flue Gas Recirculation (FGR)</u><br>Purpose: NO <sub>x</sub> reduction<br>Efficiency: 95% control for NO <sub>x</sub><br><br><u>Selective Catalytic Reduction (SCR)</u><br>Manufacturer: TBD<br>Model: TBD<br>Purpose: NO <sub>x</sub> reduction<br>Efficiency: 97% control for NO <sub>x</sub><br>Ammonia slip: ≤ 10 ppmv (dry),<br>corrected to 15%<br><br><u>Oxidation Catalyst (OxCat)</u><br>Manufacturer: TBD<br>Model: TBD<br>Purpose: CO reduction<br>Efficiency: 20 ppmv corrected to 3% O <sub>2</sub> | <u>Package Boiler Stack Parameters, SRC24:</u><br>Stack Height: 33.5 m (110 ft)<br>Exit Diameter: 1.8 m (5.9 ft)<br>Orientation: vertical<br>Exit flow rate: 52,282 acfm<br>Exit Velocity: 10.3 m/sec<br>Exit Temperature: 422 K (299.9°F)      |

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**Emissions Limits**

**6.3 Emissions Limits – BACT**

6.3.1 The emissions from the steam superheater boiler and the package boiler (affected facility) shall not exceed any corresponding emissions rate limits listed in Table 6.2.

**Table 6.2 STEAM SUPERHEATER BOILER AND PACKAGE BOILER EMISSIONS LIMITS<sup>1</sup>**

| Source Description  | PM                     |                   | PM <sub>10</sub> <sup>2</sup> |                   | SO <sub>2</sub>    |                   | NO <sub>x</sub>       |                   | VOC   |                   | CO                    |                   |
|---|------------------------|-------------------|-------------------------------|-------------------|--------------------|-------------------|-----------------------|-------------------|-------|-------------------|-----------------------|-------------------|
|   | lb/hr <sup>3</sup>     | T/yr <sup>4</sup> | lb/hr <sup>3</sup>            | T/yr <sup>4</sup> | lb/hr <sup>3</sup> | T/yr <sup>4</sup> | lb/hr <sup>3</sup>    | T/yr <sup>4</sup> | lb/hr | T/yr <sup>4</sup> | lb/hr <sup>3</sup>    | T/yr <sup>4</sup> |
| BACT Limit:<br>250 MMBtu/hr Package Boiler and<br>250 MMBtu/hr Steam Superheater,<br>combined       | 0.0052<br>lb/<br>MMBtu | ---               | 0.0052<br>lb/<br>MMBtu        | ---               | ---                | ---               | 0.006<br>lb/<br>MMBtu | ---               | ---   | ---               | 0.015<br>lb/<br>MMBtu | ---               |
| Secondary Limits:<br>250 MMBtu/hr Package Boiler and<br>250 MMBtu/hr Steam Superheater,<br>combined | 1.3                    | 5.7               | 1.3                           | 5.7               | 1.4                | 6.3               | 1.5                   | 6.6               | 1.0   | 4.4               | 3.8                   | 16.5              |

- 1) In the absence of any other credible evidence, compliance is assured by complying with this permit's operating, monitoring and record keeping requirements.
- 2) Particulate matter with and aerodynamic diameter less than or equal to a nominal ten (10) micrometers including condensable particulate as defined in IDAPA 58.01.01.006.81.
- 3) As determined by source test methods prescribed by IDAPA 58.01.01.157.
- 4) Tons per any consecutive 12-calendar month period.

6.3.2 The lb/MMBtu and pounds per hour respective NO<sub>x</sub>, PM, and PM<sub>10</sub> emissions limits in Table 6.2 are BACT emissions limits for the control of NO<sub>x</sub>, PM, and PM<sub>10</sub> emissions from the steam superheater boiler and the package boiler, based on the use of the control equipment specified in Permit Condition 6.10.

6.3.3 BACT emissions limits for the control of CO emissions from the steam superheater boiler and the package boiler are 0.074 lb/MMBtu and 18.5 lb/hr, based on the use of good combustion practices.

6.3.4 The lb/MMBtu and pounds per hour respective CO emissions limits in Table 6.2 are based on the use of the control equipment specified in Permit Condition 6.11 for the control of CO emissions from the steam superheater boiler and the package boiler. Compliance with the CO emissions limits in Table 6.2 shall be deemed compliance with the BACT emissions limits in Permit Condition 6.3.3.

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**6.4 Standard for Particulate Matter (NSPS, 40 CFR 60, Subpart Db)**

6.4.1 The Subpart Db provisions in this permit condition apply only when burning only PSA tailgas or a mixture of PSA tailgas and natural gas in the steam superheater boiler.

6.4.2 Emissions. On and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8, whichever date comes first, the permittee shall not cause to be discharged into the atmosphere from the boiler stack any gases that contain PM in excess of the following, in accordance with 40 CFR 60.43b(h)(1) and (h)(2):

- 13 ng/J (0.030 lb/MMBtu) heat input, or
- 22 ng/J (0.051 lb/MMBtu) heat input and 0.2 percent of the combustion concentration (99.8 percent reduction).

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6.4.3 Opacity.

- On and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8, whichever date comes first, the permittee shall not cause to be discharged into the atmosphere from the steam superheater boiler stack any gases that exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity, in accordance with 40 CFR 60.43b(f).
- If the permittee elects to install, calibrate, maintain, and operate a continuous emissions monitoring system (CEMS) for measuring PM emissions from the steam superheater boiler stack and are subject to a federally enforceable PM limit of 0.030 lb/MMBtu or less, the steam superheater boiler is exempt from this opacity limit, in accordance with 40 CFR 60.43b(f).

6.4.4 The PM and the opacity standards under 60.43b apply at all times, except during periods of startup, shutdown, and malfunction, in accordance with 40 CFR 60.43b(g) and 60.46b(a).

**6.5 Opacity Limit (IDAPA 58.01.01.625)**

The emissions from the package boiler and steam superheater boiler stacks shall not exceed the 20% opacity limit specified in Permit Condition 2.6.

**6.6 Particulate Matter Limit (IDAPA 58.01.01.676)**

Emissions of particulate matter from the package boiler and steam superheater boiler stacks shall not exceed the limits specified in Permit Condition 2.11, i.e., shall not exceed 0.015 gr/dscf of effluent gas corrected to 3% oxygen when burning only natural gas, PSA tailgas, or a mixture of natural gas and PSA tailgas.

**6.7 Standard for Nitrogen Oxides (NSPS, 40 CFR 60, Subpart Db)**

6.7.1 On and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8, whichever date comes first, the NO<sub>x</sub> emissions from the package boiler and steam superheater boiler stacks shall not exceed any corresponding emissions rate limits listed in Table 6.3.

**Table 6.3 NO<sub>x</sub> EMISSION RATE LIMITS (NSPS)**

| <b>Boiler Fuel</b>             | <b>Applicable Regulation</b>                     | <b>NO<sub>x</sub> Emission Limit (expressed as NO<sub>2</sub>)</b> |
|--------------------------------|--|--|
| When burning only natural gas  | 60.44b(a)(1)(i)<br>Low heat release rate         | 43 ng/J (0.10 lb/MMBtu)  |
| When burning only natural gas  | 60.44(a)(1)(ii)<br>High heat release rate        | 86 ng/J (0.20 lb/MMBtu)  |
| When burning only PSA tail gas | 60.44b(a)(3)(vi)<br>Coal-derived synthetic fuels | 210 ng/J (0.50 lb/MMBtu)   |

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**Table 6.3 NO<sub>x</sub> EMISSION RATE LIMITS (NSPS)**

| <b>Boiler Fuel</b>  | <b>Applicable Regulation</b>                 | <b>NO<sub>x</sub> Emission Limit (expressed as NO<sub>2</sub>)</b>  |
|---|--|---|
| When burning a mix of natural gas and PSA tail gas  | 60.44b(b)<br>Heat release rate not specified | $E_n = \frac{(EL_g \times H_g) + (EL_c \times H_c)}{(H_g + H_c)}$ <p>Where:<br/>                     E<sub>n</sub> = NO<sub>x</sub> emission limit in ng/J or lb/MMBtu,<br/>                     EL<sub>g</sub> = Natural gas emission limit:<br/>                     EL<sub>c</sub> = Coal (PSA tailgas) emission limit<br/>                     H<sub>g</sub> = 30-day* heat input from combustion of natural gas, and<br/>                     H<sub>c</sub> = 30-day* heat input from combustion of coal (PSA tailgas).<br/>                     *Per 44b(i), emission limits in this subpart are determined on a rolling 30-day average</p> |
| When burning a mix of natural gas and PSA tail gas, and natural gas comprises > 30% of the 30-day heat input. | 60.44b(1)(2)<br>Low heat release rate        | $E_n = \frac{(0.10 \times H_g) + (0.20 \times H_r)}{(H_g + H_r)}$ <p>Where:<br/>                     E<sub>n</sub> = NO<sub>x</sub> emission limit in ng/J or lb/MMBtu<br/>                     H<sub>g</sub> = 30-day heat input from combustion of natural gas<br/>                     H<sub>r</sub> = 30-day heat input from combustion of any other fuel (PSA tailgas only)</p>  |

6.7.2 The NO<sub>x</sub> emission limits under 60.44b apply at all times, including periods of startup, shutdown, or malfunction, in accordance with 40 CFR 60.44b(h).

**Operating Requirements**

**6.8 Steam Superheater Boiler and Package Boiler Operations**

- 6.8.1 The Package Boiler shall combust only natural gas.
- 6.8.2 The Package Boiler shall be operated only during startup and shutdown. During the transition between startup and normal operations, and from normal operations to shutdown, when both the Package Boiler and the Steam Superheater Boiler are operating, the combined heat input to the boilers shall not exceed 250 MMBtu/hr.
- 6.8.3 The Steam Superheater Boiler shall combust only natural gas, PSA tailgas, or a mixture of natural gas and PSA tailgas.

**6.9 Standard for Sulfur Dioxide – Fuel SO<sub>2</sub> Emission Rate (NSPS, 40 CFR 60, Subpart Db)**

- 6.9.1 In accordance with 40 CFR 60.42b(k)(2), the permittee shall not combust any fuel with a potential SO<sub>2</sub> emission rate in excess of 140 ng/J (0.32 lb/MMBtu) in the package boiler or steam superheater boiler.
- 6.9.2 The SO<sub>2</sub> emission limits under 60.42b apply at all times, including periods of startup, shutdown, or malfunction, in accordance with 40 CFR 60.44b(g) and 60.45b(a).
- 6.9.3 In accordance with 40 CFR 60.48b(j)(2), the permittee shall not combust any fuel with a potential SO<sub>2</sub> emission rate in excess of 26 ng/J (0.060 lb/MMBtu) in the package boiler or steam superheater boiler, or shall monitor for opacity in accordance with Permit Condition 6.14.

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**6.10 Control Equipment for NO<sub>x</sub>**

- The package boiler and the steam superheater boiler shall each use low-NO<sub>x</sub> burners, exclusively.
- The permittee shall install, maintain, and operate a flue gas recirculation (FGR) system that achieves the NO<sub>x</sub> emission limits specified in this permit for the package boiler stack.
- The FGR system shall be operated at all times when the package boiler is operating.
- The permittee shall install, maintain, and operate a selective catalytic reduction (SCR) system that achieves the NO<sub>x</sub> emission limits specified in this permit for the steam superheater boiler and package boiler stacks.
- SCR Ammonia Slip shall not exceed 10 ppmv (dry), converted to 15% oxygen.
- The SCR system shall be operated at all times when the steam superheater boiler is operating and at all times when the package boiler is operating.

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**6.11 Control Equipment for CO**

- The permittee shall install, maintain, and operate an oxidation catalyst (OxCat) system that achieves the CO emission limits specified in this permit for the steam superheater boiler stack and the package boiler stack.
- The OxCat system shall be operated at all times when the steam superheater boiler or the package boiler is operating.

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***Monitoring and Recordkeeping Requirements***

**6.12 Reporting Period (NSPS, 40 CFR 60, Subpart Db)**

- 6.12.1 In accordance with 40 CFR 60.49b(v), with prior EPA and DEQ approval, the permittee may submit electronic copies of required reports on a quarterly basis.
- 6.12.2 In accordance with 40 CFR 60.49b(w), the reporting period for reports required by 40 CFR 60, Subpart Db is each 6 month period. Reports shall be postmarked by the 30<sup>th</sup> day following the end of the reporting period.

**6.13 Fuel Combustion Monitoring and Recordkeeping (NSPS, 40 CFR 60, Subpart Db)**

- 6.13.1 In accordance with 40 CFR 60.49b(d)(1), the permittee shall record and maintain records of the amounts of each fuel combusted during each day in the package boiler and the steam superheater boiler and calculate the annual capacity factor for each boiler individually for coal (PSA tailgas) and natural gas for the reporting period. The annual capacity factor is determined on a 12-calendar month rolling average basis with a new annual capacity factor calculated at the end of each calendar month.
- 6.13.2 In accordance with 40 CFR 60.41b (Definitions), the annual capacity factor means the ratio between the actual heat input to a steam generating unit from the natural gas and PSA tailgas, as applicable, during a calendar year and the potential heat input to the steam generating unit had it been operated for 8,760 hours during a calendar year at the maximum steady state design heat input capacity.

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6.13.3 The permittee shall calculate the 30-day heat input based on the amounts of each fuel combusted each day, and shall determine which NO<sub>x</sub> emission limit specified in Table 6.3 that applies to the 30-day period.

**6.14 Emissions Monitoring for PM – Opacity (NSPS, 40 CFR 60, Subpart Db)**

If fuel with a potential SO<sub>2</sub> emission rate in excess of 26 ng/J (0.060 lb/MMBtu) will be combusted in the package boiler or steam superheater boiler, the permittee shall:

- Install, calibrate, maintain, and operate a COMS for measuring opacity of emissions discharged from the boiler stack. The output of the system shall be recorded; or
- Install, calibrate, maintain, and operate a CEMS for measuring PM discharged from the boiler stack. The output of the system shall be recorded; or
- Conduct a performance test using Method 9, in accordance with specified procedures and applicable schedule, in accordance with 40 CFR 60.48b(a).

**6.15 Emissions Monitoring for NO<sub>x</sub> – CEMS or PEMS (NSPS, 40 CFR 60, Subpart Db)**

6.15.1 The permittee shall maintain NO<sub>x</sub> emission records for each steam generating unit operating day in accordance with 60.49b(g).

6.15.2 Compliance with the NO<sub>x</sub> emission limits under 60.44b shall be determined on a 30-day rolling average basis, in accordance with 40 CFR 60.44b(i).

6.15.3 In accordance with 40 CFR 60.48b(g)(1) or (g)(2), the permittee shall comply with (1) or (2) below:

- (1) NO<sub>x</sub> CEMS. In accordance with 40 CFR 60.48b(b)(1), install, calibrate, maintain, and operate a continuous emissions monitoring system (CEMS) for measuring NO<sub>x</sub> and O<sub>2</sub> (or CO<sub>2</sub>) emissions discharged to the atmosphere from the package boiler stack and steam superheater boiler stack, and shall record the output of the system.
  - a. In accordance with 40 CFR 60.48b(c), the NO<sub>x</sub> CEMS shall be operated and data recorded during all periods of operation of the package boiler and steam superheater boiler except for continuous monitoring system breakdown and repairs. Data shall be recorded during calibration checks and zero and span adjustments.
  - b. In accordance with 40 CFR 60.48b(d), the 1-hour average NO<sub>x</sub> emission rates measured by the continuous NO<sub>x</sub> monitor required by paragraph (b) of this section and required under 60.13(h) shall be expressed in ng/J or lb/MMBtu heat input and shall be used to calculate the average emission rates under 60.44b. The 1-hour averages shall be calculated using the data points required under 60.13(h)(2).
  - c. In accordance with 40 CFR 60.48b(e), the procedures under 60.13 shall be followed for installation, evaluation, and operation of the continuous monitoring systems.
  - d. In accordance with 40 CFR 60.48b(e)(2), when combusting coal (PSA tailgas) or natural gas, the span value for NO<sub>x</sub> shall be determined using the procedures listed in 60.48b(e)(2).
  - e. In accordance with 40 CFR 60.48b(e)(3), all span values computed under paragraph 60.48b(e)(2)(i) for combusting mixtures of regulated fuels are rounded to the nearest 500 ppm. Span values computed under paragraph 60.48b(e)(2)(ii) shall be rounded off according to Section 2.1.2 in Appendix A to 40 CFR 75.

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- f. In accordance with 40 CFR 60.48b(f), when NO<sub>x</sub> emission data are not obtained because of CEMS breakdowns, repairs, calibration checks, and zero and span adjustments, emission data will be obtained by using standby monitoring systems, Method 7 or Method 7A of Appendix A to 40 CFR 60, 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.
- (2) **NO<sub>x</sub> Predictive Emissions Monitoring System (PEMS)**. In accordance with 40 CFR 60.48b(g)(2), monitor steam generating unit operating conditions and predict NO<sub>x</sub> emission rates as specified in a plan submitted to DEQ for approval pursuant to 60.49b(c). The permittee shall submit the plan to DEQ for approval within 360 days of the initial startup of the boiler for which the PEMS will apply. In accordance with 60.49b(c), the plan shall identify the operating conditions to be monitored under 60.48b(g)(2) and the records to be maintained under 60.49b(j). If the plan is approved, the permittee shall maintain records of predicted NO<sub>x</sub> emission rates and the monitored operating conditions, including steam generating unit heat input in MMBtu/hr, identified in the plan. The plan shall:
  - a. Identify the specific operating conditions to be monitored and the relationship between these operating conditions and NO<sub>x</sub> emission rates (i.e., ng/J or lb/MMBtu heat input). Steam generating unit operating conditions include, but are not limited to, the degree of staged combustion (i.e., the ratio of primary air to secondary and/or tertiary air) and the level of excess air (i.e., flue gas O<sub>2</sub> level).
  - b. Include the data and information that the owner or operator used to identify the relationship between NO<sub>x</sub> emission rates and these operating conditions; and
  - c. Identify how these operating conditions, including steam generating unit heat input in MMBtu/hr, will be monitored under 60.48b(g) on an hourly basis by the permittee during the period of operation of the package boiler and steam superheater boiler, the quality assurance procedures or practices that will be employed to ensure that the data generated by monitoring these operating conditions will be representative and accurate; and the type and format of the records of these operating conditions, including steam generating unit heat input, that will be maintained by the permittee under 60.49b(j).

**6.16 Emissions Monitoring for CO – CEMS or PEMS**

- 6.16.1 The permittee shall maintain CO emission records for each steam generating unit operating day.
- 6.16.2 Compliance with the CO emission limits in Permit Condition 6.3 shall be determined on a 30-day rolling average basis.
- 6.16.3 The permittee shall comply with (1) or (2) below:
  - (1) **CO CEMS**. Install, calibrate, maintain, and operate a continuous emissions monitoring system (CEMS) for measuring CO emissions discharged to the atmosphere from the steam superheater boiler stack and the package boiler stack, and shall record the output of the system.
    - a. The CO CEMS shall be operated and data recorded during all periods of operation of the steam superheater boiler and the package boiler except for continuous monitoring system breakdown and repairs. Data shall be recorded during calibration checks and zero and span adjustments.
    - b. The 1-hour average CO emission rates measured by the continuous CO monitor shall be expressed in ng/J or lb/MMBtu heat input and shall be used to calculate the average emission rates.

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- c. When CO emission data are not obtained because of CEMS breakdowns, repairs, calibration checks, and zero and span adjustments, emission data will be obtained by using standby monitoring systems 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.
- (2) CO Predictive Emissions Monitoring System (PEMS). Monitor steam generating unit operating conditions and predict CO emission rates as specified in a plan submitted to DEQ for approval. The permittee shall submit the plan to DEQ for approval within 360 days of the initial startup of the boiler for which the PEMS will apply. The plan shall identify the operating conditions to be monitored and the records to be maintained. If the plan is approved, the permittee shall maintain records of predicted CO emission rates and the monitored operating conditions, including steam generating unit heat input in MMBtu/hr, identified in the plan. The plan shall:
- a. Identify the specific operating conditions to be monitored and the relationship between these operating conditions and CO emission rates (i.e., ng/J or lb/MMBtu heat input). Steam generating unit operating conditions include, but are not limited to, the degree of staged combustion (i.e., the ratio of primary air to secondary and/or tertiary air) and the level of excess air (i.e., flue gas O<sub>2</sub> level).
  - b. Include the data and information that the owner or operator used to identify the relationship between CO emission rates and these operating conditions; and
  - c. Identify how these operating conditions, including steam generating unit heat input in MMBtu/hr, will be monitored on an hourly basis by the permittee during the period of operation of the steam superheater boiler and the package boiler; the quality assurance procedures or practices that will be employed to ensure that the data generated by monitoring these operating conditions will be representative and accurate; and the type and format of the records of these operating conditions, including steam generating unit heat input, that will be maintained by the permittee.

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**6.17 Fuel Potential SO<sub>2</sub> Emission Rate Monitoring (NSPS, 40 CFR 60, Subpart Db)**

- 6.17.1 In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the package boiler or steam superheater boiler will be operated, but not later than 180 days after the initial startup of the boiler(s), the permittee shall demonstrate compliance with the applicable potential fuel SO<sub>2</sub> emission rate limit specified in Permit Condition 6.9.
- 6.17.2 In accordance with 40 CFR 60.45b(k) and 60.49b(r), the permittee shall develop and submit a site-specific fuel analysis plan to DEQ for review and approval no later than 60 days before the date you intend to demonstrate compliance with the applicable potential fuel SO<sub>2</sub> emission rate limit specified in Permit Condition 6.9. Each fuel analysis plan shall include a minimum initial requirement of weekly testing and each analysis report shall contain, at a minimum, the following information:
  - (i) The potential sulfur emissions rate of the representative fuel mixture in ng/J and lb/MMBtu heat input;
  - (ii) The method used to determine the potential sulfur emissions rate of each constituent of the mixture. For natural gas a fuel receipt or tariff sheet is acceptable;
  - (iii) The ratio of different fuels in the mixture; and

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- (iv) The owner or operator can petition DEQ to approve monthly or quarterly sampling in place of weekly sampling.

**6.18 Particulate Matter and NO<sub>x</sub>, Initial Performance Test (NSPS, 40 CFR 60, Subpart Db)**

6.18.1 In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the package boiler or steam superheater boiler will be operated, but not later than 180 days after the initial startup of the boiler(s), the permittee shall conduct performance test(s) to demonstrate compliance with the applicable:

- PM and opacity limits listed in Permit Condition 6.4, and
- Applicable NO<sub>x</sub> emission limits listed in Permit Condition 6.7.

6.18.2 The Package Boiler shall combust only natural gas. In accordance with 40 CFR 60.46b(d), PM performance testing shall be conducted while burning the maximum amount of PSA tailgas expected to be mixed with natural gas during normal operations, and shall be conducted in accordance with the procedures and reference methods in 60.46b(d). If a PM CEMS is used in lieu of conducting Methods 5, 5B, or 17 of Appendix A to 40 CFR 60, compliance shall be determined in accordance with 60.46b(j)(1) through (j)(13).

6.18.3 In accordance with 40 CFR 60.46b(c), NO<sub>x</sub> performance testing shall be conducted for both the package boiler and the steam superheater boiler in accordance with:

- 60.46b(e) The initial performance test required under 40 CFR 60.8 shall be conducted using the continuous monitoring system (i.e., a NO<sub>x</sub> CEMS or DEQ-approved NO<sub>x</sub> PEMS),
- (e)(1) For the initial compliance test, NO<sub>x</sub> from the steam generating unit are monitored for 30 successive steam generating unit operating days and the 30-day average emission rate is used to determine compliance with the NO<sub>x</sub> emission standards under 60.44b. The 30-day average emission rate is calculated as the average of all hourly emissions data recorded by the monitoring system during the 30-day test period.
- (e)(2) when combusting PSA tailgas or a mix of PSA tailgas and natural gas, and
- (e)(4) when combusting only natural gas.

6.18.4 After the initial performance test, periodic testing for PM and NO<sub>x</sub> to demonstrate compliance with the emission limits listed in Permit Condition 6.18.1 shall be conducted at least once every five (5) years, or as requested by DEQ. The permittee is encouraged to submit a source testing protocol for approval 30 days prior to conducting the performance test. Notifications, testing procedures and reporting shall be done in accordance with General Provision 6.

**6.19 Performance Testing**

6.19.1 Within 180 days after the initial startup of the package boiler and the steam superheater boiler, the permittee shall conduct a performance test on the package boiler and the steam superheater boiler stacks to demonstrate compliance with:

- The lb/MMBtu and pound per hour PM, PM<sub>10</sub> (including condensables), CO, NO<sub>x</sub> and SO<sub>2</sub> emission limits listed in Permit Condition 6.3;
- The 20% opacity limit listed in Permit Conditions 6.5 and 2.6; and
- The PM limit of 0.015 gr/dscf of effluent gas corrected to 3% oxygen listed in Permit Condition 6.6.

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Nothing in this condition shall be construed to mean that the performance tests for the package boiler and the steam superheater boiler must be conducted on the same date or at the same time.

- 6.19.2 The averaging period shall be as determined by source test methods prescribed by IDAPA 58.01.01.157.
- 6.19.3 The permittee shall test in accordance with IDAPA 58.01.01.157 and the conditions of this permit including the operating requirements for the package boiler and steam superheater boiler, and General Provision 6. The source test shall be conducted under “worst case normal” conditions as required by IDAPA 58.01.01.157 and General Provision 6. For any boiler intended to operate on a mix of natural gas and PSA tailgas, the performance test shall be conducted while burning the maximum amount of PSA tailgas expected to be combined with natural gas during normal operations. The source test report shall contain documentation that the test was conducted under these conditions.

The permittee is encouraged to submit a source testing protocol for approval 30 days prior to conducting the performance test. General Provision 6 includes notification requirements, testing procedures and reporting requirements.

The permittee shall monitor and record the following during the performance test:

- The potential SO<sub>2</sub> emission rate in lb/MMBtu of the natural gas and of the PSA tailgas,
- The heat input in MMBtu/scf of the natural gas and of the PSA tailgas,
- The flow rate in MMscf per hour of natural gas and of PSA tailgas,
- For any SCR unit, the amount of ammonia slip in ppmv (dry), converted to 15% oxygen.
- For a boiler FGR system, the flue gas recirculation rate, by temperature measurement or by oxygen measurement.

- 6.19.4 After the initial performance test, periodic testing to demonstrate compliance with the emission limits listed in Permit Condition 6.19.1 shall be performed at least once every five (5) years, or as requested by DEQ.

***Reporting Requirements***

**6.20 Initial Startup Report (NSPS, 40 CFR 60, Subpart Db)**

- 6.20.1 In accordance with 60.49b(a), the permittee shall submit notification of the date of initial startup, as provided by 40 CFR 60.7. This notification shall include the information described in 40 CFR 60.49b(a).
- 6.20.2 In conjunction with the initial startup notification, the permittee shall include the calculated heat release rate in Btu/hr-ft<sup>3</sup> when operating on only natural gas, and when operating on a mix of natural gas and PSA tailgas for the boiler being started up. The heat release rate for mixes of natural gas and PSA tailgas shall be provided for a range of mixtures, including but not limited to, mixtures containing natural gas and 10%, 30%, 50%, 70%, and 90% PSA tailgas by volume.

**6.21 Initial Performance Test and CEMS Evaluation Reports (NSPS, 40 CFR 60, Subpart Db)**

- 6.21.1 In accordance with 60.49b(b), the permittee shall submit the performance test data from the initial performance test and the performance evaluation of the CEMS using the applicable performance specifications in 40 CFR 60, Appendix B.

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6.21.2 In accordance with 60.46b(j)(14), if the permittee installs and operates a PM CEMS, the permittee shall report the test data to the EPA.

**6.22 NO<sub>x</sub> Emissions (CEMS/PEMS) Reporting**

In accordance with 60.49b(i), the permittee shall submit reports containing the NO<sub>x</sub> emission records for each steam generating unit operating day. The reports shall include the information listed in 60.49b(g).

**6.23 CO Emissions (CEMS/PEMS) Reporting**

The permittee shall submit annual reports containing the CO emissions records for each steam generating unit operating day. The reports shall include the information required in Permit Condition 6.16.

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**6.24 Excess Emissions (NSPS, 40 CFR 60, Subpart Db)**

- 6.24.1 In accordance with 60.49b(h)(1) and (h)(2), the permittee shall submit excess emission reports for any excess emissions of opacity (when burning PSA tailgas or a mixture of PSA tailgas and natural gas), and NO<sub>x</sub> (when burning any permitted gaseous fuel) that occurred during the reporting period.
- 6.24.2 In accordance with 60.49b(h)(3), excess emissions of opacity are defined as all 6-minute periods during which the average opacity exceeds the opacity standards under 60.43b(f).
- 6.24.3 In accordance with 60.49b(h)(4), excess NO<sub>x</sub> emissions are defined as any calculated 30-day rolling average NO<sub>x</sub> emission rate, as determined under 60.46b(e), that exceeds the applicable emission limits listed in Table 6.3 of this permit.

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**7. GASIFICATION ISLAND**

**7.1 Process Description**

Two GE Quench gasifiers (or equivalent) will be installed. A single gasifier will operate at a time, while the other gasifier will be held in hot standby using a natural gas-fired heater (see Section 4, Natural Gas-Fired Heaters). Oxygen from the air separation unit (ASU) and a slurry of coal/petcoke/alternative feedstocks, fluxant, and water are fed to the gasifier, where a reaction takes place to form two main products: synthetic gas (syngas) and slag. Full-load feed rates of solid feedstocks (coal/petcoke/alternative feedstocks/fluxant) will range from 2,000 to 5,000 tons per day, as the feed rate to maintain the gasifier at the required temperature will depend on the quality of the feedstock. Part-load feed rates will be based on the operating limitations of the gasifier, which is dependent upon the quality of the feedstock. Typical gasifiers have a turndown rate of about 50 percent.

Syngas Composition

The syngas is composed primarily of hydrogen (H<sub>2</sub>), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>) and water vapor, plus small amounts of hydrogen sulfide (H<sub>2</sub>S), carbonyl sulfide (COS), nitrogen, ammonia (NH<sub>3</sub>), argon, and methane (CH<sub>4</sub>). Unreacted feedstock still in solid form, called char, will also be entrained in the hot syngas. The gasifier operating temperature is well above the melting point of most ash constituents that may be present in the feedstock. These metals may be entrained in the syngas. Due to the conditions in the gasifier, almost all of the sulfur is present as H<sub>2</sub>S and COS, and the lack of nitrogen significantly reduces the formation of nitrogen oxides (NO<sub>x</sub>).

Syngas Cleanup Train

The *quench section of the gasifier* cools the syngas and also serves as a particulate removal step. The syngas and molten slag exit the bottom of the gasifier and into the quench vessel.

After the quench, the syngas is *scrubbed with sour water* to remove trace metals and chlorides. “Sour” indicates that the water contains sulfur compounds. Most of the ammonia remaining in the syngas, along with a small portion of the CO<sub>2</sub> and H<sub>2</sub>S are removed with this water. The sour water is then condensed out of the syngas and sent to the sour water treatment unit.

After the sour water scrubber, the syngas will pass through *activated carbon beds*, which will be set up to remove mercury. Typical mercury adsorbers operate such that most of the mercury remaining in the syngas is captured in the activated carbon. After passing through the activated carbon adsorbers, the syngas is sent to the water-gas shift reactors.

*Startups/Upsets:* During startups and upsets of the gasifier that use petcoke or coal as fuel or feedstocks, the syngas will first pass through the sour water scrubber, the activated carbon beds, and an amine scrubber to reduce the sulfur content, and then will be sent to the gasifier flare.

During startups and upsets of the gasifier that use sulfur-free alcohol-based fuels, such as methanol, the syngas will first pass through the sour water scrubber, and then will be sent to the gasifier flare.

Normal Operations:

During steady-state operations, after the initial syngas treatment (quench, sour water scrubber, and activated carbon beds), the syngas will undergo a *sour water-gas shift* reaction to maximize the amount of hydrogen for ammonia production and to convert most of the remaining COS in the syngas to H<sub>2</sub>S to maximize sulfur removal in a later step.

Selexol® *acid gas removal* (AGR) technology will be used to remove the H<sub>2</sub>S from the syngas and to separate the CO<sub>2</sub> from the hydrogen stream. Several gas streams are produced by the acid gas removal unit:

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AGR Stream 1. The acid gas waste stream consisting primarily of H<sub>2</sub>S and CO<sub>2</sub> will be routed to a Claus sulfur recovery unit to remove the H<sub>2</sub>S before being exhausted to the atmosphere. Tailgas produced in the Claus unit will be recycled to the inlet of the AGR unit, which eliminates the emission points typically associated with a Claus unit. The sulfur removed using the Claus unit is in the form of elemental sulfur, a saleable product.

AGR Stream 2. Two acid gas waste streams consisting primarily of CO<sub>2</sub> will be produced from the AGR unit. One will be reused as feedstock for the urea process, and the other will be treated in a thermal oxidizer before being exhausted to the atmosphere. The thermal oxidizer will provide a minimum 95% control for the H<sub>2</sub>S and COS (which will be oxidized to SO<sub>2</sub>) and CO (which will be oxidized to CO<sub>2</sub>) remaining in this gas stream.

AGR Stream 3. From the AGR unit, this stream of hydrogen-rich syngas goes to a pressure swing adsorber (PSA) unit, where the hydrogen is separated from the other syngas components, producing a very pure stream of hydrogen. This hydrogen stream is sent to the ammonia synthesis loop.

The remaining syngas, or “PSA tailgas,” may be used in a “maximum recycle mode” or as supplemental fuel to the boilers. A majority of this tailgas may be recycled to the water-gas shift reactors so that the H<sub>2</sub> can be used in fertilizer production. In addition, up to 100% of the PSA tailgas may be used to supplement natural gas being burned in the steam superheater boiler.

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**7.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 7.1 GASIFICATION ISLAND DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>   | <b>Control Equipment Descriptions</b>   | <b>Emissions Point</b>                     |
|--|---|--|
| Gasifier #1 and Gasifier #2<br><u>Gasifier and Quench Vessel</u><br>Manufacturer/Model:<br>GE Quench gasifier or equivalent<br>Capacity:<br>Up to 5,000 TPD<br>coal/petcoke/alternative<br>feedstocks blend<br>Feedstock:<br>Maximum 6% sulfur<br>coal/petcoke/alternative<br>feedstocks blend<br>Feedstocks/fluxant wet slurry<br>O <sub>2</sub> (from the ASU) | Control: BMP for fugitive CO designed to quantify and minimize fugitive emissions of CO as defined below. | Fugitive (pipe/valve leak) emissions only. |

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**Table 7.1 GASIFICATION ISLAND DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>  | <b>Control Equipment Descriptions</b>   | <b>Emissions Point</b>  |
|---|---|---|
| <p>Syngas Cleanup Train:</p> <p><u>Sour Water Scrubber</u><br/>                     Manufacturer/Model: TBD<br/>                     Scrubbing media: sour water</p> <p><u>Activated Carbon Beds</u><br/>                     Manufacturer/Model: TBD<br/>                     Purpose: Mercury removal<br/>                     Design Efficiency: 95% removal</p> | <p><u>Startup/Upsets:</u><br/> <u>Amine Scrubber (during startups on coal or petcoke):</u><br/>                     Manufacturer/Model:TBD<br/>                     Feedstock: sour syngas from the carbon beds<br/>                     Purpose: Control sulfur compound emissions<br/>                     Scrubber Parameters: TBD<br/>                     Design Efficiency: 95% removal (as SO<sub>2</sub>)</p> <p><u>Gasifier Flare:</u><br/>                     Flare type: smokeless<br/>                     Pilot fuel: natural gas<br/>                     Flare gas: sweet syngas<br/>                     Maximum capacity: ~900,000 lb/hr of syngas<br/>                     Operations: 8,760 hr/yr on natural gas pilot<br/>                     Syngas flaring only during startup, shutdown, and upsets<br/>                     Design Efficiency: 98% for CO</p> <p><u>Normal Operations:</u><br/>                     Control: None (no emission points).<br/>                     BMP for fugitive CO.</p> | <p><u>Gasifier Flare Stack Parameters, SRC16:</u><br/>                     Stack Height: 65.0 m (213.3 ft)<br/>                     Exit Diameter: 0.38 m (0.92 ft)<br/>                     Orientation: vertical<br/>                     Exit flow rate: 182 acfm<br/>                     Exit Velocity: 20.0 m/sec<br/>                     Exit Temperature: 1,273 K (1,832 °F)</p> <p>Fugitive (pipe/valve leak) emissions only.</p> |
| <p>Syngas Cleanup Train:</p> <p><u>Acid Gas Removal Unit</u><br/>                     AGR Stream 1: H<sub>2</sub>S and CO<sub>2</sub></p> <p><u>Claus Sulfur Recovery Unit</u><br/>                     Manufacturer: TBD<br/>                     Model: TBD<br/>                     Tailgas: Hydrotreater to Sour Shift inlet</p>                                | <p>Control: None (no emission points)</p>   | <p>Fugitive (pipe/valve leak) emissions only.</p>   |
| <p>Syngas Cleanup Train:</p> <p><u>Acid Gas Removal Unit</u><br/>                     AGR Stream 2: CO<sub>2</sub> Vent (CO, H<sub>2</sub>S, and COS/VOC)</p>   | <p><u>Thermal Oxidizer:</u><br/>                     Mfr/Model: CSM Worldwide or equivalent<br/>                     Maximum Capacity: 300,000 lb/hr CO<sub>2</sub><br/>                     Burner Type: Direct-fired<br/>                     Rating: 9 MMBtu/hr<br/>                     Fuel: Natural gas<br/>                     Catalyst:<br/>                     Type: Low-Temperature Life: ~3-5 years<br/>                     Cleaning Frequency: ~ 6 months<br/>                     Cleaning Method: offsite regeneration<br/>                     Operations: 8,760 hr/yr<br/>                     Design Efficiency: 95% for CO, COS, and H<sub>2</sub>S</p>  | <p><u>AGR Stream 2: CO<sub>2</sub> Vent Stack Parameters, SRC17</u><br/>                     Stack Height: 52.0 m (171 ft)<br/>                     Exit Diameter: 1.34 m (4.4 ft)<br/>                     Orientation: vertical<br/>                     Exit flow rate: 54,000 acfm<br/>                     Exit Velocity: 18.0 m/sec<br/>                     Exit Temperature: 359 K (186.5 °F)</p>                                   |
| <p>Syngas Cleanup Train:</p> <p><u>Acid Gas Removal Unit</u><br/>                     AGR Stream 3: Syngas<br/> <u>Syngas Stream:</u><br/>                     H<sub>2</sub> (90 mole %),<br/>                     CO<sub>2</sub> (5 mole %),<br/>                     CO, methane, inerts, and<br/>                     &lt; 1 ppm H<sub>2</sub>S and COS</p>      | <p>Control: None (no emission points)</p>   | <p>Fugitive (pipe/valve leak) emissions only.</p>   |
| <p>Syngas Cleanup Train:</p> <p><u>Pressure Swing Adsorber (PSA)</u></p>  | <p>None (no emission points).</p>   | <p>Fugitive (pipe/valve leak) emissions only.</p>   |

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**Emissions Limits**

**7.3 Definitions**

For purposes of this section, these terms are defined as follows:

“**Covered CO<sub>2</sub>**” is defined as carbon dioxide associated with the gasification of coal and petcoke, as measured and reported according to terms defined further below.

“**Captured CO<sub>2</sub>**” is defined as the portion of Covered CO<sub>2</sub> that is captured and sent to a destination for permanent sequestration.

“**Covered CO<sub>2</sub> Emissions**” are defined as any release of Covered CO<sub>2</sub> to the atmosphere, as measured and reported according to terms defined further below.

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**7.4 Emissions Limits – Criteria Pollutants**

The CO, NO<sub>x</sub>, and SO<sub>2</sub> emissions from the AGR Stream 2: CO<sub>2</sub> Vent stack and fugitive emissions shall not exceed any corresponding emissions rate limits listed in Table 7.2. The pounds per hour CO and NO<sub>x</sub> emissions limits are BACT limits.

**Table 7.2 GASIFICATION ISLAND CRITERIA POLLUTANT EMISSIONS LIMITS<sup>1</sup>**

| Source Descriptions                | PM    |                   | PM <sub>10</sub> <sup>2</sup> |                   | SO <sub>2</sub> |                   | NO <sub>x</sub>    |                   | VOC   |                   | CO                 |                   |
|------------------------------------|-------|-------------------|-------------------------------|-------------------|-----------------|-------------------|--------------------|-------------------|-------|-------------------|--------------------|-------------------|
|                                    | lb/hr | T/yr <sup>4</sup> | lb/hr                         | T/yr <sup>4</sup> | lb/hr           | T/yr <sup>4</sup> | lb/hr <sup>3</sup> | T/yr <sup>4</sup> | lb/hr | T/yr <sup>4</sup> | lb/hr <sup>3</sup> | T/yr <sup>4</sup> |
| AGR Stream 2: CO <sub>2</sub> Vent | ---   | ---               | ---                           | ---               | 3.8             | 16.5              | 0.9                | 3.9               | ---   | ---               | 8.7                | 38.0              |
| Fugitive emissions <sup>5</sup>    | ---   | ---               | ---                           | ---               | ---             | ---               | ---                | ---               | ---   | ---               | ---                | 31                |

- 1) In the absence of any other credible evidence, compliance is assured by complying with this permit's operating, monitoring and record keeping requirements.
- 2) Particulate matter with and aerodynamic diameter less than or equal to a nominal ten (10) micrometers including condensable particulate as defined in IDAPA 58.01.01.006.81.
- 3) As determined by source test methods prescribed by IDAPA 58.01.01.157.
- 4) Tons per any consecutive 12-calendar month period.
- 5) Defined as fugitive emissions between the outlet of the gasifier/quench vessel and the outlet of the final CO-shift reactor. Compliance to be demonstrated by implementing the Fugitive CO Best Management Practices Plan as required in Permit Condition 7.13.

[November 30, 2009]

**7.5 Emission Limit – CO<sub>2</sub>**

The CO<sub>2</sub> emissions from the AGR Stream 2: CO<sub>2</sub> Vent shall not exceed any corresponding emissions rate limits listed in Table 7.3. The permittee, in cooperation with the Sierra Club and the Idaho Conservation League, petitioned the IDEQ to include a CO<sub>2</sub> emissions limit for CO<sub>2</sub> emissions originating from the AGR Stream 2: CO<sub>2</sub> Vent point source. The permittee accepted this CO<sub>2</sub> emissions limit and agreed to make it an enforceable provision. Annual CO<sub>2</sub> emissions from the AGR Stream 2: CO<sub>2</sub> Vent exceeding the CO<sub>2</sub> emissions limit in Table 7.3 shall be a violation of this permit condition.

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**Table 7.3 GASIFICATION ISLAND CO<sub>2</sub> EMISSIONS LIMITS<sup>1</sup>**

| Source Description                 | CO <sub>2</sub> <sup>3,4</sup> |
|------------------------------------|--------------------------------|
|                                    | T/yr <sup>2</sup>              |
| AGR Stream 2: CO <sub>2</sub> Vent | 756,000                        |

- 1) In the absence of any other credible evidence, compliance is assured by complying with this permit's operating, monitoring and record keeping requirements.
- 2) Tons per any consecutive 12-calendar month period.
- 3) CO<sub>2</sub> emissions limits become effective on the CO<sub>2</sub> Compliance Date as required in Permit Condition 7.6.
- 4) CO<sub>2</sub> is defined as CO<sub>2</sub> associated with the gasification of coal and petcoke. To the extent that the PCAEC utilizes a blend of feedstocks, the carbon content of the fuels shall be tracked, and the CO<sub>2</sub> emissions limits shall apply only to the carbon associated with coal and petcoke.

**[November 30, 2009]**

**7.6 CO<sub>2</sub> Compliance Date**

The CO<sub>2</sub> emissions limits in Permit Condition 7.5 shall become effective on the fifth anniversary of Mechanical Completion for the PCAEC (“CO<sub>2</sub> Compliance Date”). Mechanical Completion shall mean that the installation and construction of the PCAEC has been completed, the equipment and systems are capable of safe, normal operations, and the PCAEC is ready for start-up and testing.

By the CO<sub>2</sub> Compliance Date, the permittee shall limit Covered CO<sub>2</sub> Emissions from the AGR Stream 2: CO<sub>2</sub> Vent by at least 58% (by weight) of Covered CO<sub>2</sub>, to no more than 756,000 tons of CO<sub>2</sub> per year expressed as a twelve consecutive month rolling sum (“CO<sub>2</sub> Limit”). Covered CO<sub>2</sub> in excess of the CO<sub>2</sub> Limit shall be captured and sent to a destination for use in Enhanced Oil Recovery (EOR) and permanent sequestration (“Captured CO<sub>2</sub>”). The annual CO<sub>2</sub> limit is based on a 58% reduction of Covered CO<sub>2</sub> from the AGR Stream 2: CO<sub>2</sub> Vent point source at full capacity.

**[November 30, 2009]**

**7.7 CO<sub>2</sub> Interim Offset Requirement**

During the period between Mechanical Completion and the Compliance Date (“Interim Period”), if the permittee is not otherwise in compliance with the CO<sub>2</sub> Limit, the permittee shall purchase greenhouse gas offsets (“Required CO<sub>2</sub> Offsets”) on an annual basis equivalent to the difference between 58% of its Covered CO<sub>2</sub> (equal to 1.1 million tons per year of CO<sub>2</sub>) and the amount of Captured CO<sub>2</sub>.

Required CO<sub>2</sub> Offsets shall be federal or state regulated offsets. If a federal or state regulatory program is not in effect, SIE shall purchase offsets identified within the general region where the facility is located and as approved by DEQ. If such regional offsets are not available, the permittee shall secure offsets through the California Climate Action Registry, the Gold Standard, the Voluntary Carbon Standard, the Chicago Climate Exchange, the Regional Greenhouse Gas Initiative, or other such nationally recognized voluntary program as approved by DEQ.

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***Operating Requirements***

**7.8 Gasifier Feedstock**

- 7.8.1 The permittee shall install, calibrate, and operate a means to monitor and record the weight of the coal, petcoke, alternative feedstocks, and fluxant fed to the gasifier, individually and combined, in tons per day.
- 7.8.2 Solid feedstock to the gasifiers shall not contain more than:
- 6.0% sulfur by weight as blended, based on the as-received sulfur content of the coal, petcoke, alternative feedstocks, and fluxant,
  - or
  - The sulfur content of the solid feedstock blend used to produce the syngas for any performance test conducted within the previous five year period that demonstrated compliance with applicable SO<sub>2</sub> emission limits for the wet sulfuric acid plant (if installed), and the SO<sub>2</sub> emissions from the gasifier flare when burning syngas and for worst-case normal operating conditions.
- 7.8.3 The sulfur content of the solid feedstock shall be calculated based on the as-received sulfur content of the coal, petcoke, alternative feedstocks, and fluxant.
- 7.8.4 The amount of coal, petcoke, and alternative feedstocks fed to the gasifiers shall not exceed 5,000 tons per day of blended coal, petcoke, and alternative feedstocks; and 250 tons per day of fluxant.
- 7.8.5 The operating level of the gasifier(s) shall not at any time exceed the actual working capacity of the syngas cleanup train.
- 7.8.6 Planned startups of the gasifier that use coal and petcoke as fuel shall be limited to 13 events in any rolling 12-month period.
- 7.8.7 Planned startups of the gasifier that use sulfur-free alcohol-based fuels, including methanol, shall not count toward the limit of 13 events in Permit Condition 7.8.6.

**[November 30, 2009]**

**7.9 Syngas Cleanup Train**

- 7.9.1 The permittee shall install, maintain, and operate a syngas cleanup train during startup or shutdown operations as follows:
- A sour water scrubber to remove metals and chlorides from the syngas stream,
  - Activated carbon beds with a minimum design efficiency of 95% for mercury removal to reduce mercury in the syngas stream.
  - An amine scrubber with a minimum 95% design efficiency for sulfur compounds (COS and H<sub>2</sub>S as SO<sub>2</sub>) to treat the syngas stream prior to being flared, and
  - An elevated flare (the gasifier flare) that:
    - Meets all applicable requirements of 40 CFR 60.18;
    - Is served by a pilot that burns natural gas exclusively;
    - Is operated at all times in accordance with good combustion practices; and

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- A system shall be installed, maintained, and operated that will record the date, time, duration of each occurrence of venting of syngas to the flare, and total flow of syngas and pilot gas in scfm to the flare, whenever syngas is vented to the gasifier flare; and
- During startup and shutdown, operating the gasifier flare in accordance with this permit condition is considered BACT for this source.
- Syngas that has not passed through any part of the syngas cleanup train shall not be flared except when a malfunction precludes the safe processing of the syngas in the cleanup train.

7.9.2 The permittee shall install, maintain, and operate a syngas cleanup train during normal operations as follows:

- A sour water scrubber to remove metals and chlorides from the syngas stream,
- Activated carbon beds with a minimum design efficiency of 95% for mercury removal to reduce mercury in the syngas stream.
- An acid gas removal (AGR) system to remove sulfur compounds from the syngas.
  - Sulfur compounds from the H<sub>2</sub>S-rich stream from the AGR unit (AGR Stream 1) shall be removed using a Claus sulfur recovery unit.
    - Tailgas from the Claus sulfur recovery unit shall be treated and returned to the inlet of the acid gas removal (AGR) unit.
  - The portion of the CO<sub>2</sub>-rich stream from the AGR (AGR Stream 2) that is not recycled to the AGR process or routed to the urea process shall be sent through a thermal oxidizer with a minimum design destruction efficiency of 95% for CO and for sulfur compounds including H<sub>2</sub>S and COS, before being exhausted to the atmosphere.

7.9.3 The syngas cleanup train shall be operated at all times when the gasifier(s) are being operated.

7.9.4 The syngas cleanup train described in this permit condition is considered BACT for CO, NO<sub>x</sub>, PM, and PM<sub>10</sub>.

**[November 30, 2009]**

**7.10 Startup, Shutdown, and Scheduled Maintenance (SSM) Plan**

7.10.1 In accordance with IDAPA 58.01.01.133.02, the permittee shall develop and submit a Startup, Shutdown, and Scheduled Maintenance (SSM) Plan that meets the requirements of Sections 133.02 and 133.03. The plan shall include, but not be limited to procedures necessary to:

- Minimize the frequency of gasifier shutdowns (thereby reducing the number of startups),
- Prevent the occurrence of malfunctions,
- Prevent the flaring of acid gas or other gases containing sulfur compounds, and
- Minimize the quantity of emissions of all pollutants at all times, including periods of startup, shutdown, malfunction, and scheduled maintenance.

7.10.2 The permittee shall submit the SSM Plan to DEQ for review and comment not later than 60 days prior to the initial startup of either of the gasifiers.

7.10.3 The procedures and other actions described in the SSM plan are incorporated by reference into this permit as enforceable permit conditions.

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***Monitoring and Recordkeeping Requirements***

**7.11 Throughput Monitoring**

The permittee shall monitor and record the following information, on a daily basis:

- Each amount of coal, petcoke, alternative feedstocks, and fluxant fed to the gasifiers, in tons per day.
- The total amount of coal, petcoke, alternative feedstocks, and fluxant fed to the gasifiers, in tons per day.
- The sulfur content of the feedstock blend fed to the gasifiers, in percent by weight. The sulfur content of the feedstock blend shall be calculated based on the as-received sulfur content and amount fed that day for each of the feedstocks.
- Records of this information shall be maintained in accordance with General Provision 7.

**[November 30, 2009]**

**7.12 Gasifier Flare Testing and Monitoring**

7.12.1 Within 10 days of initial startup of any of the units in the gasification island, the permittee shall conduct tests consistent with 40 CFR 60.18 to confirm that the gasifier flare is being operated using good combustion practices.

7.12.2 The permittee shall maintain the records of the gasifier flare parameters listed in Permit Condition 7.9.1 in accordance with General Provision 7.

**7.13 Fugitive CO BMP Plan**

7.13.1 At least 60 days before initial startup of the gasifiers, the permittee shall have developed and submitted to DEQ for review and comment a best management practices plan (BMP) designed to quantify and reduce fugitive emissions of CO. The Fugitive CO BMP plan shall include the following, at a minimum:

- Identify each equipment component potentially subject to fugitive CO emissions that is located between the outlet of the gasifier/quench vessel and the outlet of the final CO-shift reactor.
- Develop methodologies to quantify annual fugitive emissions of CO necessary to demonstrate compliance with the fugitive emissions limit in Table 7.2 of Permit Condition 7.4.
- Provide a means to physically identify each of these components in the plant. Physically tagging each component is not required if the equipment is clearly identified on current as-built piping and instrumentation diagrams (P&ID) or other design drawings.
- Define observed parameter(s) that constitute a leak from each equipment component (e.g., visible liquid, misting, or clouding; a sound such as hissing; a smell; or measured CO level in ppm).
- The scheduled frequency for routine inspections.
- Requirements for attempting repairs as soon as practicable after a leak is detected. Repair attempts should include, but not be limited to, tightening or replacing bonnet bolts, tightening packing gland nuts, and injecting lubricant into lubricated packing.
- If the repair of any component is technically infeasible without a process shutdown, provide a means for documenting the needed repair, the reason that the repair must be delayed, for scheduling the repair for the next available planned shutdown, and for closing out the repair item.

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- A schedule for post-repair monitoring and inspection to ensure that a “leak” as defined in the Fugitive CO BMP Plan is no longer occurring.
- Recordkeeping requirements including, but not limited to, equipment components subject to fugitive CO monitoring; inspection and repair records that include the date, time, identity of the inspector, leak detection method used, inspection results, repair(s) attempted, and the date and nature of repair(s).

7.13.2 These records shall be maintained in accordance with General Provision 7.

7.13.3 The permittee shall maintain and implement the Fugitive CO BMP Plan.

7.13.4 The work practices described in the Fugitive CO BMP Plan constitute BACT for controlling fugitive CO emissions.

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**7.14 Syngas Monitoring**

7.14.1 Within 60 days of the initial startup of either gasifier, the permittee shall obtain and analyze representative samples of the syngas stream that is being vented to the gasifier flare. Sampling shall be conducted during one representative one-hour period during startup conditions when syngas is being flared. The sample report shall include, but not be limited to, the source(s), type, and amount of the solid feedstock being fed to the gasifier during the test, operating parameters for the sour water scrubber, activated carbon beds, and amine scrubber, the syngas and natural gas flow rates in scfm, the combined heating value of the gas(es) being combusted, the visible emissions observed from the flare using Method 22 of Appendix A to 40 CFR 60, the concentration of sulfur compounds as SO<sub>2</sub>, and the concentration of compounds containing the toxic metals listed in Permit Condition 3.7.1.

7.14.2 After the initial sampling and analysis, the permittee shall obtain and analyze representative samples of the syngas stream being vented to the gasifier flare within 60 days of a change in the source of the feedstock. Sampling shall be conducted during one representative one-hour period during startup conditions when syngas is being flared. The sample report shall include the same information, at a minimum, as described in Permit Condition 7.14.1. If there has been no change in feedstock, the permittee shall conduct such sampling at least once in every two year period.

**7.15 CO<sub>2</sub> Volumetric Flow Monitoring – CMS and DAHS**

7.15.1 The facility shall be subject to any applicable federal or state greenhouse gas emissions monitoring and reporting requirements in effect when the facility commences operation. In the absence of federal or state greenhouse gas monitoring requirements that apply to the facility upon commencement of operation, the permittee shall install a continuous volumetric flow meter (CMS) on the AGR Stream 2 CO<sub>2</sub> Vent and on all major inlets and outlets entering or leaving the AGR unit with an automated data acquisition and handling system (DAHS) for direct measurement, and will treat the flow as being 100% CO<sub>2</sub> for purposes of demonstrating compliance with the CO<sub>2</sub> emissions limit. The permittee shall measure CO<sub>2</sub> emissions at least every 15 minutes and average hourly using the daily volumetric data, a 100% CO<sub>2</sub> concentration by volume, and the density of pure CO<sub>2</sub> at the stack to atmosphere temperature and pressure.

7.15.2 The permittee shall substitute for missing volumetric flow data from the CMS and DAHS required in Condition No. 7.15.1 using the procedures of paragraphs (a) or (b) of this condition:

- (a) In the event that only the flow meter on the AGR Stream 2: CO<sub>2</sub> Vent fails, the permittee shall use necessary data from all inlet and outlet flow meters and steady state mass balance(s) to determine the missing volumetric flow rate of CO<sub>2</sub> to atmosphere; or

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- (b) In the event, that an additional flow meter fails concurrent with the AGR Stream 2: CO<sub>2</sub> Vent flow meter, the permittee shall determine substitute volumetric flow data as follows:
- (1) During the first 720 quality-assured monitor operating hours following initial certification at a particular unit or stack location (*i.e.*, the date and time at which quality-assured data begins to be recorded by a CEMS flow meter at that location), or (when implementing these procedures for a previously certified CO<sub>2</sub> monitoring system flow meter) during the 720 quality-assured monitor operating hours preceding implementation of the standard missing data procedures in paragraph (a) of this section, the permittee shall provide substitute volumetric flow according to the procedures in 40 CFR 75.31(d) for determining volumetric flow.
  - (2) Upon completion of 720 quality-assured monitor operating hours using the initial missing data procedures of 40 CFR 75.31(d), the permittee shall provide substitute data for CO<sub>2</sub> concentration volumetric flow, in accordance with the procedures in 40 CFR 75.33(c)(1) through (4) and (6) for determination of volumetric flow rate for emission sources that do not produce electrical or thermal output (nonload-based).
- (c) In all cases, (a) and (b), the permittee shall use the substitute volumetric flow data, a CO<sub>2</sub> concentration of 100% by volume, and the density of pure CO<sub>2</sub> at the stack temperature and pressure to determine the hourly mass flow rate of CO<sub>2</sub> to atmosphere.

**[November 30, 2009]**

***Notification and Reporting Requirements***

7.16 The permittee shall require its CO<sub>2</sub> off-taker(s) to develop semi-annual reports documenting compliance with Measurement, Monitoring, and Verification Plans ("MMV Reports"). The permittee shall submit copies of MMV Reports to DEQ every six months.

**[November 30, 2009]**

7.17 The facility will be subject to any applicable federal or state greenhouse gas emissions reporting requirements in effect when the facility commences operation. In the absence of federal or state greenhouse gas reporting requirements that apply to the facility upon commencement of operation, the permittee shall submit a monthly report to DEQ of the twelve consecutive month rolling sum of CO<sub>2</sub> emissions from the AGR Stream 2: CO<sub>2</sub> Vent, based upon the direct measurement of CO<sub>2</sub> collected by the installed flow meter. This report shall include total CO<sub>2</sub> emissions and a breakdown of CO<sub>2</sub> emissions by feedstock to account for emissions attributable to coal and petcoke. The permittee shall maintain records of the data used to generate the reported emissions for five years.

**[November 30, 2009]**

7.18 The permittee shall submit reports of the amount of greenhouse gas offsets purchased ("Required CO<sub>2</sub> Offsets") as required by Permit Condition 7.7 on an annual basis.

**[November 30, 2009]**

7.19 The permittee shall furnish DEQ written notification of the CO<sub>2</sub> Compliance Date and the date of Mechanical Completion as defined in Permit Condition 7.6, within fifteen days after such date.

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**8. AMMONIA AND UREA PLANTS**

**8.1 Process Description**

Ammonia is produced by combining the high-purity hydrogen stream from the Selexol® AGR unit with high-purity nitrogen from the ASU. Using the Haber process, hydrogen and nitrogen are reacted over an iron catalyst to produce ammonia. The hot ammonia stream that results is cooled through a series of heat exchangers and flash vessels. The off-gases from these flash vessels is recycled to the front of the ammonia process, with a portion being purged, to the process flare (also called the ammonia flare), to prevent the buildup of inert gases such as argon in the circulating gas system. The synthesis loop will have a capacity of approximately 2,000 tons per day of ammonia. Most of the ammonia will be used to produce urea, nitric acid, ammonium nitrate, and UAN. The portion of the ammonia that is not used to produce these products is sent to the ammonia refrigeration system, stored in tanks, and will be sold as a product.

Urea will be produced using Stamicarbon technology, or another similar commercially available process, from ammonia and from purified CO<sub>2</sub> from the Selexol® AGR unit. In an intermediate step, urea leaving the decomposers is concentrated in the evaporation section of the process into a melt. Off-gases from this step are recycled to the water handling system within the urea process. The urea process results in a liquid stream of urea, with process off-gases vented to the process flare (also referred to as the ammonia flare).

Granulated urea will be produced using Uhde technology, or similar commercially proven technology. In the granulator, the urea solution is injected from the bottom through dispensers that atomize it upwards into a bed of moving particles. These moving particles are fines that have been recycled from the process and are the seed particles that begin the growth of the granules. Formaldehyde is used as a seeding agent for this process. The granules form via accretion, a process in which tiny droplets solidify onto the seed particles. When the liquid solidifies, heat is released.

The granules that form flow out of the granulator to a fluid bed cooler that uses air as the cooling medium. The granules are then lifted by a bucket elevator to the screening section. Here screening takes place to separate the granules that are the correct size from smaller particles. The on-spec granules are sent to a second air-cooler for further cooling prior to being sent to humidity-controlled storage, which prevents the final product from caking.

The smaller particles are split into fines and coarse material. The fines are recycled directly to the granulator as seed particles, while the coarse material is first crushed and then used as seed particles.

The urea spray is aided by fluidization air, which flows through the product layer and is exhausted at the top of the granulator. The air exiting the granulator and the coolers contains some urea dust, which is removed using a wet scrubber. Ammonia in the urea feed solution will be released in the granulator and will be somewhat reduced by absorption in the wet scrubber.

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### 8.2 Control Equipment Descriptions

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 8.1 AMMONIA AND UREA PLANTS DESCRIPTION**

| Emissions Unit(s) / Process(es)   | Control Equipment Descriptions   | Emissions Point  |
|---|--|--|
| <u>Ammonia Synthesis Loop and Refrigeration System</u><br><br>Capacity: ~2,000 tons per day (ammonia)   | <u>Process Flare:</u><br>Flare type: smokeless<br>Pilot fuel: natural gas<br><br>Flare gas:<br>Ammonia system purge gases and urea process off-gases | <u>Process Flare Stack Parameters, SRC21:</u><br>Stack Height: 52.0 m (171 ft)<br>Exit Diameter: 0.43 m (1.4 ft)<br>Orientation: vertical<br>Exit flow rate: 252 acfm<br>Exit Velocity: 20.0 m/sec<br>Exit Temperature: 1,273 K (1,832 °F)<br><br>Fugitive (pipe/valve leak) emissions.          |
| Urea Process:<br>Stamicarbon or equivalent.<br>Urea reactor vessel, steam stripper, decomposers, evaporator(s), ammonia receiver/condenser, carbamate absorber/condensers, multi-stage compressor(s), pumps, valves, piping, and instrumentation.<br><br>Capacity: 2,400 tons per day (liquid solution) | Process Flare: (see above)   | <u>Urea Melt Plant Vent Stack Parameters, SRC23:</u><br>Stack Height: 34.0 m (112 ft)<br>Exit Diameter: 1.22 m (4.0 ft)<br>Orientation: vertical<br>Exit flow rate: 136,900 acfm<br>Exit Velocity: 55.3 m/sec<br>Exit Temperature: 318 K (112.7 °F)<br><br>Fugitive (pipe/valve leak) emissions. |
| <u>Urea Granulation:</u><br>Uhde or equivalent.<br>Capacity: 1,800 tons per day granulated urea<br><br><u>Wet Scrubber</u><br>Manufacturer: TBD<br>Model: TBD<br>Purpose: PM/PM <sub>10</sub> capture/recycling<br>Scrubber Parameters: TBD<br>Design Efficiency: 98%                                   | <u>Wet Scrubber:</u><br>Drift and mist eliminators   | <u>Granulation Vent Stack Parameters, SRC19:</u><br>Stack Height: 40 m (131ft)<br>Exit Diameter: 1.8 m (6.0 ft)<br>Orientation: vertical<br>Exit flow rate: 296,500 acfm<br>Exit Velocity: 53.3 m/sec<br>Exit Temperature: 323 K (121.7°F)<br><br>Fugitive (pipe/valve leak) emissions.          |

**[November 30, 2009]**

### ***Emissions Limits***

#### 8.3 Emissions Limits

The PM and PM<sub>10</sub> emissions from the urea granulation stack shall not exceed any corresponding emissions rate limits listed in Table 8.2.

**Table 8.2 AMMONIA AND UREA PLANT EMISSIONS LIMITS**

| Source Description                               | PM                      |      | PM <sub>10</sub>        |      | SO <sub>2</sub> |      | NO <sub>x</sub> |      | VOC   |      | CO    |      |
|--|-------------------------|------|-------------------------|------|-----------------|------|-----------------|------|-------|------|-------|------|
|  | lb/hr                   | T/yr | lb/hr                   | T/yr | lb/hr           | T/yr | lb/hr           | T/yr | lb/hr | T/yr | lb/hr | T/yr |
| BACT Limits:<br>Urea Granulation Vent Stack      | 0.011 lb/ton of product | ---  | 0.005 lb/ton of product | ---  | ---             | ---  | ---             | ---  | ---   | ---  | ---   | ---  |
| Secondary Limits:<br>Urea Granulation Vent Stack | 20.5                    | ---  | 9.0                     | 39.4 | ---             | ---  | ---             | ---  | ---   | ---  | ---   | ---  |

- 1) In the absence of any other credible evidence, compliance is assured by complying with this permit's operating, monitoring and record keeping requirements.
- 2) Particulate matter with and aerodynamic diameter less than or equal to a nominal ten (10) micrometers including condensable particulate as defined in IDAPA 58.01.01.006.81.
- 3) As determined by source test methods prescribed by IDAPA 58.01.01.157.
- 4) Tons per any consecutive 12-calendar month period.

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|                   |                             |                                  |
|-------------------|-----------------------------|----------------------------------|
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| <b>Location:</b>  | American Falls, Idaho       |                                  |

***Operating Requirements***

**8.4 Production Limits**

The production of granular urea shall not exceed the greater of:

- 1,800 tons per day,  
or
- The daily production of granular urea achieved for any performance test conducted within the previous five year period that demonstrated compliance with applicable PM and PM<sub>10</sub> BACT emission limits listed in Table 8.2 for the urea granulation vent stack.

**8.5 Process Flare**

The permittee shall install, maintain, and operate a flare to control emissions of ammonia and hazardous gases purged from the ammonia and urea processes. The process flare shall be an elevated flare that:

- Meets all applicable requirements of 40 CFR 60.18;
- Is served by a pilot that burns natural gas exclusively;
- Is operated at all times in accordance with good combustion practices; and
- A system shall be installed, maintained, and operated that will record the date, time, duration of each occurrence of venting of gases to the flare, and total flow of vented gases and pilot gas in scfm to the flare, whenever process gas is vented to the process flare.

**8.6 Urea Process Scrubbing System**

The wet scrubber that is an integral part of the urea granulation production process shall be designed to achieve a minimum efficiency of 98% for capture and recycling of PM/PM<sub>10</sub> urea dust from the air in the granulator and coolers.

**[November 30, 2009]**

***Monitoring and Recordkeeping Requirements***

**8.7 Production Monitoring and Recordkeeping**

The permittee shall monitor and record the production of granular urea in tons per day. Records of this information shall be maintained in accordance with General Provision 7.

**8.8 Monitoring and Recordkeeping (NSPS, 40 CFR 60, Subpart VVa)**

The permittee shall comply with the applicable monitoring and recordkeeping requirements of 40 CFR 60.480a through 60.489a for the urea process unit, i.e., for all components assembled and connected by pipes or ducts to process raw materials and to produce urea as an intermediate or final product that are in VOC service. For the purposes of Subpart VVa, the urea process unit includes any feed, intermediate and final product storage vessels (except as specified in 40 CFR 60.482-1(g)), product transfer racks, and connected ducts and piping. In accordance with 60.481a, a process unit includes all equipment, meaning each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, and flange or other connector in VOC service and any devices or systems required under Subpart VVa.

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**8.9 Initial Performance Tests (NSPS, 40 CFR 60, Subpart VVa)**

In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which urea process unit will be operated, but not later than 180 days after the initial startup of the urea process unit, the permittee shall conduct performance test(s) for the affected facility in accordance with the test methods and procedures specified in 40 CFR 60.485a.

***Reporting Requirements***

**8.10 Construction and Initial Startup Notification (NSPS, 40 CFR 60, Subpart A, General Provisions)**

The permittee shall submit notification of the date that construction commences (postmarked no later than 30 days after such date), and the date of initial startup (postmarked no later than 15 days after such date), in accordance with 40 CFR 60.7(a)(1) and 60.7(a)(3).

**8.11 Reporting (NSPS, 40 CFR 60, Subpart VVa)**

In accordance with 40 CFR 60.487a, the permittee shall submit semiannual reports to the EPA (until such time as DEQ is delegated this NSPS) beginning 6 months after the initial startup date. Information included in the semiannual reports shall comply with 60.487a.

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**9. NITRIC ACID AND AMMONIUM NITRATE/UAN PLANTS**

**9.1 Process Description**

The project will manufacture urea ammonium nitrate (UAN) for sale. Nitric acid and ammonium nitrate are intermediate products that are required to manufacture UAN, which is made by combining ammonium nitrate solution with urea solution produced in the urea plant.

Nitric acid is produced by reacting ammonia from the ammonia plant with oxygen (from the ambient air) and water. The nitric acid plant will produce weak nitric acid at a concentration of about 57 percent, which will be stored in a tank or sent directly to the ammonium nitrate process. Tailgas produced in the nitric acid plant will consist mainly of nitrogen, oxygen, and carbon dioxide. The tailgas is cooled, used to run an air compressor turbine, and then mixed with abatement air. The tailgas passes through a selective catalytic reduction (SCR) system to reduce the NO<sub>x</sub> before being exhausted to the atmosphere.

Ammonium nitrate is produced by reacting nitric acid in a neutralizer/scrubber where ammonia from the ammonia plant is added to neutralize the nitric acid. The liquid that forms is ammonium nitrate and water, and the vapor is primarily water and CO<sub>2</sub>. A stream of the ammonium nitrate and water is taken from the neutralizer and mixed with a portion of the nitric acid feed. This liquid is used to scrub the vapor before leaving the neutralizer/scrubber. The vapor is then sent to a process condensate tank, where it is cooled, and most of the water is condensed. The remaining gas, consisting primarily of CO<sub>2</sub> and some steam, is vented from the process condensate tank. The ammonium nitrate is then mixed with urea to form a UAN solution. The UAN is sent to storage tanks to be shipped out by rail or truck for sale.

**9.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 9.1 NITRIC ACID AND AMMONIUM NITRATE/UAN PLANTS DESCRIPTION**

| Emissions Unit(s) / Process(es)   | Control Equipment Descriptions   | Emissions Point  |
|---|--|--|
| <u>Nitric Acid Plant</u><br>Manufacturer/Provider: Weatherly or equivalent<br>Capacity: ~575 TPD of nitric acid | <u>Extended Absorption and SCR:</u><br>Manufacturer: TBD<br>Model: TBD<br>Operating Parameters: TBD<br>Purpose: NO <sub>x</sub> control<br>Efficiency: 90% for NO <sub>x</sub><br>(0.6 lb NO <sub>x</sub> /ton pure acid)<br>Ammonia slip: ≤ 10 ppmv (dry),<br>corrected to 15% O <sub>2</sub><br>Catalytic Decomposition (or equivalent):<br>Manufacturer: TBD<br>Model: TBD<br>Operating Parameters: TBD<br>Purpose: N <sub>2</sub> O control<br>Efficiency: max 300 ppmv N <sub>2</sub> O | <u>Nitric Acid Tailgas Stack Parameters, SRC20:</u><br>Stack Height: 58.0 m (190 ft)<br>Exit Diameter: 1.16 m (3.8 ft)<br>Orientation: vertical<br>Exit flow rate: 60,500 acfm<br>Exit Velocity: 27.1 m/sec<br>Exit Temperature: 400 K (260.3 °F)<br>Fugitive (pipe/valve leak) emissions. |

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**Table 9.1 NITRIC ACID AND AMMONIUM NITRATE/UAN PLANTS DESCRIPTION**

| Emissions Unit(s) / Process(es)   | Control Equipment Descriptions            | Emissions Point  |
|---|---|--|
| <u>Ammonium Nitrate/UAN Plant</u><br>Manufacturer/Provider: Weatherly or equivalent<br>Capacity: ~715 TPD of ammonium nitrate<br>~1,600 TPD of UAN<br><br>A wet scrubber is integral to the process, but must be designed to recover and recycle a minimum of 90% of PM/PM <sub>10</sub> present within the process. The wet scrubber will be equipped with drift and mist eliminators. | Drift and mist eliminators, and condenser | <u>AN Neutralizer Vent Stack Parameters, SRC29:</u><br>Stack Height: 16.0 m (52.5 ft)<br>Exit Diameter: 0.3 m (1.0 ft)<br>Orientation: vertical<br>Exit flow rate: 14,123 acfm<br>Exit Velocity: 91.4 m/sec<br>Exit Temperature: 344 K (159.5 °F)<br><br>Fugitive (pipe/valve leak) emissions. |

**[November 30, 2009]**

**Emissions Limits**

**9.3 Emissions Limits**

The PM, PM<sub>10</sub>, and NO<sub>x</sub> emissions from the nitric acid tailgas stack and the ammonium nitrate neutralizer vent shall not exceed any corresponding emissions rate limits listed in Table 9.2.

**Table 9.2 NITRIC ACID PLANT AND AMMONIUM NITRATE/UAN PLANT EMISSIONS LIMITS<sup>1</sup>**

| Source Description                            | PM                 |                   | PM <sub>10</sub>   |                   | SO <sub>2</sub> |      | NO <sub>x</sub>                        |                   | VOC   |                   | CO    |                   | N <sub>2</sub> O |
|---|--------------------|-------------------|--------------------|-------------------|-----------------|------|--|-------------------|-------|-------------------|-------|-------------------|------------------|
|   | lb/hr <sup>3</sup> | T/yr <sup>4</sup> | lb/hr <sup>3</sup> | T/yr <sup>4</sup> | lb/hr           | T/yr | As noted <sup>3</sup>                  | T/yr <sup>4</sup> | lb/hr | T/yr <sup>4</sup> | lb/hr | T/yr <sup>4</sup> | ppmv             |
| BACT Limits:<br>Nitric Acid Tailgas Vent      | ---                | ---               | ---                | ---               | ---             | ---  | 50 ppmv and<br>0.6 lb/ton <sup>5</sup> | ---               | ---   | ---               | ---   | ---               | ---              |
| Secondary Limits:<br>Nitric Acid Tailgas Vent | ---                | ---               | ---                | ---               | ---             | ---  | 14.4 lb/hr                             | 63.0              | ---   | ---               | ---   | ---               | ---              |
| Catalytic Decomposition system                | ---                | ---               | ---                | ---               | ---             | ---  | ---                                    | ---               | ---   | ---               | ---   | ---               | 300              |
| AN Neutralizer Vent                           | 1.5                | ---               | 1.5                | 6.5               | ---             | ---  | ---                                    | ---               | ---   | ---               | ---   | ---               | ---              |

- 1) In the absence of any other credible evidence, compliance is assured by complying with this permit's operating, monitoring and record keeping requirements.
- 2) Particulate matter with and aerodynamic diameter less than or equal to a nominal ten (10) micrometers including condensable particulate as defined in IDAPA 58.01.01.006.81.
- 3) As determined by source test methods prescribed by IDAPA 58.01.01.157.
- 4) Tons per any consecutive 12-calendar month period.
- 5) Emission rate based on a BACT Limit of 0.6 lbs of NO<sub>x</sub> per ton of pure acid.

**[November 30, 2009]**

**9.4 Emissions Limits for the Nitric Acid Production Unit (NSPS, 40 CFR 60, Subpart G)**

In accordance with 40 CFR 60.72(a), on and after the date on which the performance test required to be conducted by 60.8 is completed, emissions from the nitric acid production unit shall not:

- Contain nitrogen oxides, expressed as NO<sub>2</sub>, in excess of 1.5 kg per metric ton of acid produced (3.0 lb per ton), the production being expressed as 100 percent nitric acid.
- Exhibit 10% opacity or greater.

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***Operating Requirements***

**9.5 Nitric Acid Tailgas and AN Neutralizer Control Equipment**

- 9.5.1 The permittee shall install, maintain, and operate an extended absorption system and a selective catalytic reduction (SCR) system to control NO<sub>x</sub> emissions from the nitric acid production unit tailgas.
- 9.5.2 The extended absorption system and NO<sub>x</sub> SCR system shall be operated at all times when the nitric acid production unit is being operated.
- 9.5.3 The ammonia slip for the SCR system shall not exceed 10 ppmv (dry) converted to 15% oxygen.
- 9.5.4 The Catalytic Decomposition system (or equivalent) shall be operated at all times when the nitric acid production unit is being operated to achieve an N<sub>2</sub>O emission rate of 300 ppmv or less.
- 9.5.5 The scrubber that is integral to the ammonium nitrate neutralizer process must be designed to capture and recycle a minimum of 90% of the PM/PM<sub>10</sub> within the process.

**[November 30, 2009]**

***Monitoring and Recordkeeping Requirements***

**9.6 Production Rate and Operating Hours Monitoring, Nitric Acid Plant (NSPS, 40 CFR 60, Subpart G)**

In accordance with 40 CFR 60.73(c) the permittee shall record the daily production rate and hours of operation for the nitric acid production unit (NSPS, 40 CFR, Subpart G). Records shall be maintained in accordance with General Provision 7.

**9.7 Emissions Monitoring for NO<sub>x</sub> for the Nitric Acid Production Unit (40 CFR 60, Subpart G)**

- 9.7.1 In accordance with 40 CFR 60.73(a), the permittee shall install, calibrate, maintain, and operate a continuous monitoring system for measuring nitrogen oxides (NO<sub>x</sub>) emissions from the nitric acid production unit. The pollutant gas mixtures under Performance Specification 2 and for calibration checks under 60.13 of this part shall be nitrogen dioxide (NO<sub>2</sub>). The span value shall be 500 ppm of NO<sub>2</sub>. Method 7 of Appendix A to 40 CFR 60 shall be used for the performance evaluations under 60.13(c). Acceptable alternative methods to Method 7 are given in 60.74(c).
- 9.7.2 In accordance with 40 CFR 60.73(b), the permittee shall establish a conversion factor for the purpose of converting monitoring data into units of the applicable standard (kg/metric ton, lb/ton).
  - The conversion factor shall be established by measuring emissions with the continuous monitoring system concurrent with measuring emissions with the applicable reference method tests.
  - The conversion factor shall be reestablished during any performance test under 40 CFR 60.8 or any continuous monitoring system performance evaluation under 40 CFR 60.13.

**9.8 Initial Performance Test, Nitric Acid Production Unit (NSPS, 40 CFR 60, Subpart A)**

In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the nitric acid production unit will be operated, but not later than 180 days after the initial startup of the nitric acid production unit, the permittee shall conduct performance test(s) to demonstrate compliance with the:

- NO<sub>x</sub> and opacity limits listed in Permit Condition 9.4.

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**9.9 Initial Performance Test, AN Neutralizer Vent**

Performance testing on the AN Neutralizer Vent shall be performed concurrently with the initial performance test required by Permit Condition 9.8.

The performance test shall measure the PM emission rate in pounds per hour to demonstrate compliance with the PM emissions limit in Permit Condition 9.3. The performance test shall be conducted using the AN-MOD5 performance test method as indicated in Appendix B to EPA-450/3-81-002, “Ammonium Nitrate Manufacturing Industry – Technical Document”, and in accordance with IDAPA 58.01.01.157 and General Provision 6.

**[November 30, 2009]**

***Reporting Requirements***

**9.10 Construction and Initial Startup Notification (NSPS, 40 CFR 60, Subpart A, General Provisions)**

The permittee shall submit notification of the date that construction of the nitric acid production unit commences (postmarked no later than 30 days after such date), and the date of initial startup of the nitric acid production unit (postmarked no later than 15 days after such date), in accordance with 40 CFR 60.7(a)(1) and 60.7(a)(3).

**9.11 Excess Emissions Reporting for Nitric Acid Production Unit (NSPS, 40 CFR 60, Subpart G)**

In accordance with 40 CFR 60.73(d) for the purpose of reports required under 60.7(c), periods of excess emissions from the nitric acid production unit that shall be reported are defined as any 3-hour period during which the average NO<sub>x</sub> emissions (arithmetic average of three contiguous 1-hour periods) as measured by a continuous monitoring system exceed the standard listed in Permit Condition 9.4.

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**10. DIESEL, AMMONIA, NITRIC ACID, AND UAN TANK STORAGE**

**10.1 Process Description**

Diesel fuel for the emergency engine generators will be delivered by truck and stored in horizontal fuel tanks.

Ammonia produced in the ammonia synthesis loop will be used in the next steps of the fertilizer production process or will be stored onsite before being shipped offsite for sale. The ammonia storage facility will consist of two insulated tanks at atmospheric pressure with refrigeration systems to maintain the ammonia at the required temperature of -33°F. In the refrigeration system, ammonia vapor is compressed by electrically-powered storage compressors from the top of the tank and condensed by fresh cooling water. Expansion of the compressed ammonia provides the refrigeration necessary to maintain the low temperatures. The condensed liquid ammonia is returned to the storage tanks. The refrigeration unit will include redundant equipment to ensure the refrigeration system is always in operation.

Nitric acid from the nitric acid production unit will either be stored in a tank and/or fed to the ammonium nitrate production process.

Urea ammonium nitrate produced in the UAN plant will be stored on site in one of four storage tanks. The tanks will be at atmospheric pressure. UAN will be loaded into railcars or tanker trucks directly from the tanks.

**10.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued.

**Table 10.1 FUEL AND LIQUID PRODUCT TANK STORAGE DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>  | <b>Control Equipment Descriptions</b> | <b>Emissions Point</b> |
|---|---------------------------------------|------------------------|
| Emergency Engine Generator Fuel Tank<br><u>Tank 19, Diesel Storage Tank</u><br>Contents: #2 Diesel fuel<br>Capacity: 3,000 gallons<br>Turnovers: 1 per year<br>Type: Horizontal<br>Shell length: 10.0 ft<br>Shell Diameter: 7.50 ft<br>Paint: Gray/Light<br>Paint Condition: Good | None.                                 | Tank vent(s)           |
| Emergency Fire Pump Engine Fuel Tank<br><u>Tank 18, Diesel Storage Tank</u><br>Contents: #2 Diesel fuel<br>Capacity: 500 gallons<br>Turnovers: 1 per year<br>Type: Horizontal<br>Shell length: 5.0 ft<br>Shell Diameter: 5.0 ft<br>Paint: Gray/Light<br>Paint Condition: Good     | None.                                 | Tank vent(s)           |

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**Table 10.1 FUEL AND LIQUID PRODUCT TANK STORAGE DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>  | <b>Control Equipment Descriptions</b>  | <b>Emissions Point</b>   |
|---|--|--|
| <u>Ammonia Storage Tanks (2)</u><br>Capacity: 204,000 barrels (each)<br>(6.426 million gallons each)<br>Type: Vertical fixed roof<br>Insulated atmospheric pressure tanks<br>Size: Shell height 41 ft, Diameter 45 ft<br>Service Equipment: Ammonia compressors<br>Fuel: Electric utility | <u>Ammonia Storage Flare</u><br>Flare type: smokeless (air or steam assist required only if unassisted flare produces smoke).<br>Pilot fuel: natural gas | <u>Ammonia Storage Flare Parameters, SRC27:</u><br>Stack Height: 18.29 m (60.0 ft)<br>Exit Diameter: 0.20 m (0.66 ft)<br>Orientation: vertical<br>Exit flow rate: 129 acfm<br>Exit Velocity: 20.0 m/sec<br>Exit Temperature: 1,273 K (1,832°F) |
| <u>Nitric Acid Storage Tank</u><br>Capacity: 16,000 barrels<br>(504,000 gallons)<br>Type: Vertical fixed roof<br>Atmospheric pressure tank<br>Size: Shell height 45 ft, Diameter 50 ft  | None.  | Tank vent(s)   |
| <u>UAN Storage Tanks (4)</u><br>Contents: UAN<br>Capacity: 110,000 barrels (each)<br>(4.5 million gallons each)<br>Type: Vertical fixed roof<br>Atmospheric pressure tanks<br>Size: Shell height 42 ft, Diameter 130 ft   | None.  | Tank vent(s)   |

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**Operating Requirements**

**10.3 Ammonia Storage**

- 10.3.1 The ammonia storage tanks shall include a nitrogen cover gas in the headspace of the tank, and shall be vented to the ammonia storage flare.
- 10.3.2 The ammonia storage flare shall be an elevated flare that:
- Meets all applicable requirements of 40 CFR 60.18;
  - Is served by a pilot that burns natural gas exclusively;
  - Is operated at all times in accordance with good combustion practices; and
  - A system shall be installed, maintained, and operated that will record the date, time, duration of each occurrence of venting of ammonia to the flare, and total flow of vented ammonia and pilot gas in scfm to the flare, whenever ammonia is vented to the ammonia storage flare.

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| <b>Location:</b>  | American Falls, Idaho       |                                  |

**11. ZERO LIQUID DISCHARGE SYSTEM (ZLDS) AND COOLING TOWER**

**11.1 Process Description**

Blowdown water from the bottom of the ammonia stripper in the sour water scrubber system, as well as other wastewaters from the project, will be sent to the Zero Liquid Discharge System (ZLDS). A typical ZLD system may include a brine concentrator, which heats and evaporates the water. The water vapor is compressed and condensed, with the high-quality distillate water being recycled to the plant. The concentrated brine is sent to a rotary drum dryer/crystallizer. Here, the remaining water is evaporated, which leaves a solid filter cake material.

The cooling tower will use a wet, mechanical forced-draft design, incorporating seven cells. As the cooling water is used remove heat from various plant processes, it is heated from approximately 75°F to 95°F, which can vary depending upon ambient temperature conditions. The warm cooling water is pumped to the top of a cooling tower cell, and water flows over a series of cooling baffles as gravity pulls it to the basin. As air is forced through the baffles by mechanical fans, a portion of the warm water evaporates, effectively cooling the remaining water supply. During this process, some water droplets and mist are entrained in the airflow and leave the cooling tower in the form of drift and mist. Since a cooling tower tends to concentrate dissolved solids (within set design parameters), this entrained water becomes a source of particulate matter emissions.

**11.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued. Minimum capture efficiencies for control equipment reflect approximate control levels.

**Table 11.1 ZLDS AND COOLING TOWER DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>   | <b>Control Equipment Descriptions</b>  | <b>Emissions Point</b>  |
|--|--|---|
| <u>Zero Liquid Discharge System</u><br><br><u>Wastewater treatment system cooling tower</u><br>Manufacturer:<br>SPX Cooling Technologies or equivalent<br>Type: TBD<br>Cooling Water Flow Rate: 985 gpm<br>TDS: 50,000 mg/L        | <u>Drift/mist eliminators</u><br>PM/PM <sub>10</sub> limited to max 0.001% of total circulating water flow.  | <u>ZLDS Cooling System "Stack" Parameters, SRC30:</u><br>Stack Height: 8.0 m (26.4 ft)<br>Exit Diameter: 2.3 m (7.54 ft)<br>Orientation: vertical<br>Exit flow rate: 235,387 acfm<br>Exit Velocity: 27.1 m/sec<br>Exit Temperature: 317 K (110.9 °F)        |
| <u>Cooling Tower</u><br><br><u>Plant water cooling system tower.</u><br>Manufacturer:<br>SPX Cooling Technologies or equivalent<br>Type: Mechanical Draft Cooling Tower<br>Cooling Water Flow Rate: 121,000 gpm<br>TDS: 5,000 mg/L | <u>Drift/mist eliminators</u><br>PM/PM <sub>10</sub> limited to max 0.0005% of total circulating water flow. | <u>Cooling Tower "Stack" Parameters, SRC22:</u><br>Stack Height: 13.0 m (42.6 ft)<br>Equivalent Exit Diameter: 22.6 m (74.1 ft)<br>Orientation: vertical<br>Exit flow rate: 1,289,000 acfm<br>Exit Velocity: 8.3 m/sec<br>Exit Temperature: 303 K (85.7 °F) |

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**Emissions Limits**

**11.3 Emissions Limits**

11.3.1 The PM and PM<sub>10</sub> emissions from the ZLDS cooling system stack and the plant water cooling tower shall not exceed any corresponding emissions rate limits listed in Table 11.2.

**Table 11.2 ZLDS AND COOLING TOWER EMISSIONS LIMITS**

| Source Description              | PM                                     |                   | PM <sub>10</sub>                       |                   | SO <sub>2</sub> |      | NO <sub>x</sub> |      | VOC   |      | CO    |      |
|---------------------------------|--|-------------------|--|-------------------|-----------------|------|-----------------|------|-------|------|-------|------|
|                                 | lb/hr <sup>3</sup>                     | T/yr <sup>4</sup> | lb/hr <sup>3</sup>                     | T/yr <sup>4</sup> | lb/hr           | T/yr | lb/hr           | T/yr | lb/hr | T/yr | lb/hr | T/yr |
| BACT Limits: ZLDS               | 0.001% of total circulating flow rate  | ---               | 0.001% of total circulating flow rate  | ---               | ---             | ---  | ---             | ---  | ---   | ---  | ---   | ---  |
| Secondary Limits: ZLDS          | 0.3                                    | 1.1               | 0.3                                    | 1.1               | ---             | ---  | ---             | ---  | ---   | ---  | ---   | ---  |
| BACT Limits: Cooling Tower      | 0.0005% of total circulating flow rate | ---               | 0.0005% of total circulating flow rate | ---               | ---             | ---  | ---             | ---  | ---   | ---  | ---   | ---  |
| Secondary Limits: Cooling Tower | 1.5                                    | 6.6               | 1.5                                    | 6.6               | ---             | ---  | ---             | ---  | ---   | ---  | ---   | ---  |

- 1) In the absence of any other credible evidence, compliance is assured by complying with this permit's operating, monitoring and record keeping requirements.
- 2) Particulate matter with an aerodynamic diameter less than or equal to a nominal ten (10) micrometers including condensable particulate as defined in IDAPA 58.01.01.006.81.
- 3) As determined by source test methods prescribed by IDAPA 58.01.01.157.
- 4) Tons per any consecutive 12-calendar month period.

11.3.2 Emissions from the ZLDS cooling system stack and the cooling tower shall not exceed the applicable process weight rate limit specified in IDAPA 58.01.01.700-701.

**Operating Requirements**

**11.4 Drift/Mist Eliminator Operation**

The permittee shall operate the respective drift/mist eliminator control devices at all times when the ZLDS and cooling tower are being operated.

**11.5 Cooling Water Solids Content and Flow Rate**

The total solids content and flow rate of the water being cooled in the ZLDS and cooling tower shall not exceed the maximum level present during any performance test in the previous five year period that demonstrated compliance with the applicable emissions and opacity limits for that source.

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***Monitoring and Recordkeeping Requirements***

**11.6 Cooling Water Solids Content and Flow Rate Monitoring**

The permittee shall monitor and record the total solids content and flow rate of the water being cooled in the ZLDS and cooling tower on a daily basis, to ensure compliance with Permit Condition 11.5.

**11.7 PM and PM<sub>10</sub> Emission Compliance Testing**

11.7.1 Within 180 days after the initial startup of the ZLDS and cooling tower, whichever occurred first, the permittee shall conduct a performance test on the ZLDS cooling tower stack and cooling tower to demonstrate compliance with:

- The BACT and pound per hour PM and PM<sub>10</sub> (including condensables) emission limits specified in Table 11.2,
- The applicable process weight rate limit specified in Permit Condition 11.3.2, and
- The opacity limit specified in Permit Condition 2.6.

11.7.2 PM emissions shall be determined using Method 5 of Appendix A to 40 CFR 60. PM<sub>10</sub> emissions shall be determined using Methods 5 and 202 of Appendix A to 40 CFR 60, unless prior approval has been received from DEQ to use alternative procedures. Opacity shall be determined in accordance with the procedures specified in IDAPA 58.01.01.625.

11.7.3 The permittee is encouraged to submit a source testing protocol to DEQ for approval 30 days prior to conducting the performance test. The source test shall be conducted under “worst case normal” conditions as required by IDAPA 58.01.01.157 and General Provision 6, and the source test report shall contain documentation that the test was conducted under these conditions. General Provision 6 includes notification requirements, testing procedures and reporting requirements.

The permittee shall monitor and record the following during each performance test, at a minimum:

- The total solids content of the water,
- Circulating water flow rate, in gallons per minute, and
- Exhaust flow in acfm (per cell, for the cooling tower).

**11.8 Periodic Performance Tests for Particulate Matter**

The permittee shall conduct performance tests on the ZLDS cooling system stack and the cooling tower at a frequency of no less than once every five years to demonstrate compliance with:

- The BACT and pound per hour PM and PM<sub>10</sub> (including condensables) emission limits specified in Table 11.2,
- The applicable process weight rate limit specified in Permit Condition 11.3.2, and
- The opacity limit specified in Permit Condition 2.6.

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**12. SLAG AND SOLID PRODUCT HANDLING**

**12.1 Process Description**

The *quench section of the gasifier* cools the syngas and also serves as a particulate removal step. The syngas and molten slag exit the bottom of the gasifier and into the quench vessel. The molten slag solidifies and settles into a water bath at the bottom of the quench vessel through a lockhopper. The solidified slag then exits the bottom of the quench vessel as slurry. The coarse slag is separated from the fine slag. The fines, which contain a large amount of unreacted carbon, are treated and may be recycled back to the slurry-preparation area. The coarse slag is transferred to the slag storage pile on conveyors. Most of the recovered water is recycled through a proprietary black/grey water system.

Granular urea will be stored in humidity controlled warehouse(s) before being bulk-loaded into railcars or tractor trailers. Elemental sulfur will be stored in tanks.

**12.2 Control Equipment Descriptions**

The information contained in the table below summarizes the design basis upon which the permit has been issued.

**Table 12.1 SLAG AND SOLID PRODUCT HANDLING DESCRIPTION**

| <b>Emissions Unit(s) / Process(es)</b>             | <b>Control Equipment Descriptions</b>  | <b>Emissions Point</b>                   |
|--|--|--|
| Slag Storage and Handling                          | Gasifier slag is transferred wet to the storage pile.<br>Storage pile enclosed on 3 sides.<br>BMP for fugitive PM/PM <sub>10</sub> . | Fugitives                                |
| Granular Urea Storage, Transfers, and Bulk Loadout | Storage in humidity-controlled warehouse.  | Negligible PM/PM <sub>10</sub> fugitives |
| Elemental Sulfur Storage                           | Storage tank(s)  | No emissions of regulated pollutants.    |

**[November 30, 2009]**

***Operating Requirements***

**12.3 Fugitive Dust Control**

Fugitive dusts from these sources shall be controlled in accordance with Permit Condition 2.5.

***Monitoring and Recordkeeping Requirements***

**12.4 Fugitive Dust Monitoring**

Fugitive dust inspections and recordkeeping for these sources shall be conducted in accordance with Permit Condition 2.5.

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**13. PERMIT TO CONSTRUCT GENERAL PROVISIONS**

***General Compliance***

1. The permittee has a continuing duty to comply with all terms and conditions of this permit. All emissions authorized herein shall be consistent with the terms and conditions of this permit and the Rules for the Control of Air Pollution in Idaho. The emissions of any pollutant in excess of the limitations specified herein, or noncompliance with any other condition or limitation contained in this permit, shall constitute a violation of this permit and the Rules for the Control of Air Pollution in Idaho, and the Environmental Protection and Health Act, Idaho Code §39-101, et seq.  

**[Idaho Code §39-101, et seq.]**
  
2. The permittee shall at all times (except as provided in the Rules for the Control of Air Pollution in Idaho) maintain in good working order and operate as efficiently as practicable, all treatment or control facilities or systems installed or used to achieve compliance with the terms and conditions of this permit and other applicable Idaho laws for the control of air pollution.  

**[IDAPA 58.01.01.211, 5/1/94]**
  
3. Nothing in this permit is intended to relieve or exempt the permittee from the responsibility to comply with all applicable local, state, or federal statutes, rules and regulations.  

**[IDAPA 58.01.01.212.01, 5/1/94]**

***Inspection and Entry***

4. Upon presentation of credentials, the permittee shall allow DEQ or an authorized representative of DEQ to do the following:
  - a. Enter upon the permittee’s premises where an emissions source is located or emissions related activity is conducted, or where records are kept under conditions of this permit;
  - b. Have access to and copy, at reasonable times, any records that are kept under the conditions of this permit;
  - c. Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit; and
  - d. As authorized by the Idaho Environmental Protection and Health Act, sample or monitor, at reasonable times, substances or parameters for the purpose of determining or ensuring compliance with this permit or applicable requirements.

**[Idaho Code §39-108]**

***Construction and Operation Notification***

5. The permittee shall furnish DEQ written notifications as follows in accordance with IDAPA 58.01.01.211:
  - a. A notification of the date of initiation of construction, within five working days after occurrence;
  - b. A notification of the date of any suspension of construction, if such suspension lasts for one year or more;
  - c. A notification of the anticipated date of initial start-up of the stationary source or facility not more than sixty days or less than thirty days prior to such date;

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- d. A notification of the actual date of initial start-up of the stationary source or facility within fifteen days after such date; and
- e. A notification of the initial date of achieving the maximum production rate, within five working days after occurrence - production rate and date.

**[IDAPA 58.01.01.211, 5/1/94]**

***Performance Testing***

- 6. If performance testing (air emissions source test) is required by this permit, the permittee shall provide notice of intent to test to DEQ at least 15 days prior to the scheduled test date or shorter time period as approved by DEQ. DEQ may, at its option, have an observer present at any emissions tests conducted on a source. DEQ requests that such testing not be performed on weekends or state holidays.

All performance testing shall be conducted in accordance with the procedures in IDAPA 58.01.01.157. Without prior DEQ approval, any alternative testing is conducted solely at the permittee's risk. If the permittee fails to obtain prior written approval by DEQ for any testing deviations, DEQ may determine that the testing does not satisfy the testing requirements. Therefore, at least 30 days prior to conducting any performance test, the permittee is encouraged to submit a performance test protocol to DEQ for approval. The written protocol shall include a description of the test method(s) to be used, an explanation of any or unusual circumstances regarding the proposed test, and the proposed test schedule for conducting and reporting the test.

Within 30 days following the date in which a performance test required by this permit is concluded, the permittee shall submit to DEQ a performance test report. The written report shall include a description of the process, identification of the test method(s) used, equipment used, all process operating data collected during the test period, and test results, as well as raw test data and associated documentation, including any approved test protocol.

**[IDAPA 58.01.01.157, 4/5/00]**

***Monitoring and Recordkeeping***

- 7. The permittee shall maintain sufficient records to ensure compliance with all of the terms and conditions of this permit. Records of monitoring information shall include, but not be limited to the following: (a) the date, place, and times of sampling or measurements; (b) the date analyses were performed; (c) the company or entity that performed the analyses; (d) the analytical techniques or methods used; (e) the results of such analyses; and (f) the operating conditions existing at the time of sampling or measurement. All monitoring records and support information shall be retained for a period of at least five years from the date of the monitoring sample, measurement, report, or application. Supporting information includes, but is not limited to, all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation and copies of all reports required by this permit. All records required to be maintained by this permit shall be made available in either hard copy or electronic format to DEQ representatives upon request.

**[IDAPA 58.01.01.211, 5/1/94]**

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***Excess Emissions***

8. The permittee shall comply with the procedures and requirements of IDAPA 58.01.01.130-136 for excess emissions due to startup, shutdown, scheduled maintenance, safety measures, upsets and breakdowns.

**[IDAPA 58.01.01.130-136, 4/5/00]**

***Certification***

9. All documents submitted to DEQ, including, but not limited to, records, monitoring data, supporting information, requests for confidential treatment, testing reports, or compliance certification shall contain a certification by a responsible official. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

**[IDAPA 58.01.01.123, 5/1/94]**

***False Statements***

10. No person shall knowingly make any false statement, representation, or certification in any form, notice, or report required under this permit, or any applicable rule or order in force pursuant thereto.

**[IDAPA 58.01.01.125, 3/23/98]**

***Tampering***

11. No person shall knowingly render inaccurate any monitoring device or method required under this permit or any applicable rule or order in force pursuant thereto.

**[IDAPA 58.01.01.126, 3/23/98]**

***Transferability***

12. This permit is transferable in accordance with procedures listed in IDAPA 58.01.01.209.06.

**[IDAPA 58.01.01.209.06, 4/11/06]**

***Severability***

13. The provisions of this permit are severable, and if any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

**[IDAPA 58.01.01.211, 5/1/94]**