

STATEMENT OF BASIS

To: Reviewers
Through: Lori Bocchino, Operating Permit Program Manager
From: William Tillman/Maggie Endres, Operating Permit Program
Subject: Draft Operating Permit 3-1-127, Dyno Nobel, Inc., Cheyenne Plant
Date: May 14, 2012 (*amended June 29, 2012 to add amended permit MD-1502A*)

Attached is a draft renewal Wyoming Air Quality Standards and Regulations (WAQSR) Ch 6, Sec 3 operating permit for the Dyno Nobel Inc., Cheyenne Plant. The facility includes an ammonia plant, four nitric acid plants, a high density ammonium nitrate (HIDAN) plant, low density ammonium nitrate (LODAN) plant, and a urea plant. Equipment at the plant includes natural gas engines, boilers, evaporators, and prill towers. The ammonia plant, #1 and #2 nitric acid plants, HIDAN plant, and urea plant were originally constructed prior to the effective date of Ch 6, Sec 2 permitting requirements.

Permitting History: All permits/waivers are listed chronologically to document the permitting history. Those listed in this first paragraph have no remaining requirements. Division letter (4/23/82): allowed installation of a flare for the atmospheric storage facility. CT-564 (7/27/84): was issued for the expansion of the ammonia and CO₂ plants, and construction of the #3 nitric acid plant and LODAN plant.

MD-70 (7/27/87): allowed replacement of the #2 auxiliary boiler in the ammonia plant, and sets limits for NO_x emissions for the boiler.

MD-94 (10/11/88): allowed construction of a White Superior natural gas fired engine (P045). There are no remaining requirements.

OP-191 (10/31/88): allowed operation of the plants as permitted under CT-564. The #3 nitric acid plant is required to maintain and operate a continuous monitoring system for NO_x emissions, and is also subject to the requirements of 40 CFR 60 Subpart G. An opacity limit is set for the LODAN prill tower, and the permittee is required to operate and maintain an opacity monitor at the exhaust vent of the prill tower. Emission limits are set for new and existing point sources. (The HIDAN prill tower (P224) and cooling drum (P226) listed in this permit have since been removed from service.)

The permits listed in this paragraph have no remaining requirements. MD-111 (10/20/89): allowed the replacement of the #1 auxiliary (#1-Aux) boiler. MD-134 (1/28/91): was issued to for the installation of a parallel neutralizer at the HIDAN plant. MD-140 (5/6/91): permitted an increase in acid production from the #3 nitric acid plant and allowed a firing rate increase for the ammonia plant reformer.

MD-166 (3/3/92): allowed for an increase in urea production but limits production of urea prills. This permit also limits ammonia emissions from the urea Hotwell scrubber vent.

Waiver (6/3/1992): allows the #3 nitric acid plant to increase its acid production to 580 ton per day (TPD). The waiver also sets limits on NO_x emissions from the acid plant.

Waiver 6/18/92: increases the firing rate and sets NO_x emission limits from the ammonia plant reformer.

Waiver (5/24/93): increases the operating hours and sets NO_x emission limits for the #1-Aux boiler.

Waiver (6/29/93): allowed modification of the HIDAN evaporator to a vacuum system. There are no remaining requirements.

Division letter (12/5/94): allowed the HIDAN neutralizer permitted by MD-134 to vent the ammonia emissions to the HIDAN prill tower. There are no remaining requirements.

Waiver AP-W86 (6/21/96): authorized installation of an emergency generator powered by a Ford LSG natural gas fired engine. The waiver limits the annual operating hours.

MD-336 (10/8/97): allowed modification of operations to increase daily acid production at the #1 and #2 nitric acid plants, install catalytic controls on the White Superior engine installed under MD-94, and raise the stack height of two Cooper Bessemer engines (P042 and P043). The permit also sets NO_x and CO emissions limits for the three engines, and NO_x limits for the #1 and #2 nitric acid plants.

AP-WV9 (6/22/99): was issued for the installation of a diesel powered Caterpillar 3306B engine to drive the emergency firewater pump. The waiver limits the annual hours of use.

Waiver (9/1/99): requires the permittee to notify the Division in writing whenever any of the three acid plants were shutdown, the cause of the shutdown, and when the plant was restarted.

Waiver AO-FT0 (3/10/00): allowed the construction of an 8,000 gallon hydrochloric acid tank.

Waiver (12/12/00): was issued for the construction of a reverse osmosis wastewater treatment unit. The system did not operate effectively and has now been discontinued.

Waiver AP-0251(11/12/02): allowed the replacement of one of the two neutralizers in the HIDAN plant. (The permittee sent a letter to the Division on March 12, 2009 stating that the backup neutralizer had been permanently removed from service.). The waiver sets a production limit of 375 TPD of ammonium nitrate from the HIDAN plant and also requires the use of a scrubber on the neutralizer to reclaim ammonia contaminated condensate with no venting to the atmosphere.

Waiver AP-1493(3/22/04): was issued for the replacement of an emergency generator. The replacement unit was not constructed.

MD-1502(12/19/06) allowed expansion of the facility to include a #4 nitric acid plant, and replacement of the east and west engines with Cummins engines (P046 and P047). A #2 LODAN neutralizer and evaporator was built, but additional plans for construction of a #2 LODAN plant and restoration of two Indeck boilers have been cancelled. Permit requirements include NO_x and CO limits and testing for the Cummins engines, maintaining the engines and air pollution equipment, and monitoring the control equipment. Equipment monitoring includes operating and maintaining a thermocouple to measure the inlet catalyst temperature and a device to measure pressure drop across the catalyst. Requirements for the #4 acid plant include a daily production limit, opacity and NO_x emissions limits, weekly visual observations, and compliance with 40 CFR 60 Subpart GG. Opacity and particulate limits, weekly visual observations, and testing are required for the #2 neutralizer and evaporator.

The waivers listed in this paragraph have no remaining requirements. Waiver AP-7611 (5/7/08): allowed storage of urea ammonium nitrate solution in two storage tanks. Startup notification was submitted. Waiver AP-7832 (8/14/08): allowed construction of an emulsion blending plant. Startup notification was submitted. Waiver AP-8774 (12/16/08): authorized operation of the #1 auxiliary boiler for an additional 300 hours.

Waiver wv-11691 (3/30/11): allows replacement of the existing ammonia storage tank and associated flare, with a new tank and a new flare. Changes to the system were proposed later, and, where applicable, the requirements of this waiver are the same as those for wv-13115 listed below. Upon completion of the project discussed below, wv-11691 will be superseded by wv-13115.

Waiver wv-12045 (6/6/11): modified the plant by installation of a new horizontal production unit and associated handling and ventilation equipment, including an exhaust stack, at the emulsion plant building. The permittee is required to operate and maintain the expander and equipment. The exhaust stack is required to have no visible emissions. Weekly visual observations shall be performed.

Waiver wv-12653 (11/3/11): waived the permitted production limit for the #4 acid plant for a period of 30 days, in order for testing to be conducting to determine the actual plant rate.

Waiver wv-13115 (3/15/12): allowed modifications to the new ammonia tank permitted under wv-11691, including installation of a block valve to the new flare (also permitted under wv-11691), and resetting two pressure relief valves for safety reasons. Requirements include: one of the pressure relief valves on the tank be routed to the new flare; operate and maintain the flare; use of a thermocouple and continuous recording device on the flare to detect the presence of a flame; maintaining records of duration and times during active operation when the flame is not present; and smokeless operation of the flare. Upon completion of the modifications, wv-11691 will be superseded by this waiver.

Waiver wv-13189 (3/16/12): authorized temporary operation of six diesel generators during a turnaround.

Permit MD-1502A (6/19/12): amended MD-1502 to add clarifying language, including clarification that corrective action for the pressure drop across the catalyst would be at at 100% load, plus or minus 10%. Submission of test results was administratively changed from 30 days to 45 days, to be consistent with other permits.

Applicable Requirements

In addition to the permit requirements listed above, sources at the facility are subject to the visible emission limits set forth in WAQSR Chapter 3, Section 2. The startup heater is limited to NO_x emissions of 0.23 lb/MMBtu heat input under Chapter 3, Section 3.

The permittee must also comply with any applicable requirements from the following Ch 5, Sec 2 New Source Performance Standards, and 40 CFR Part 60:

Subpart G for *Nitric Acid Plants* (#3 and #4 nitric acid plants).

Subpart JJJJ for *Stationary Spark Ignition Internal Combustion Engines* (Affected engines are defined at §60.4230 of the subpart),

and from the following Chapter 5, Section 3 National Emission Standards for Hazardous Air Pollutants, and 40 CFR Part 63:

Subpart ZZZZ for *Stationary Reciprocating Internal Combustion Engines* (All engines are subject to any applicable requirements from Subpart ZZZZ, which now includes requirements for existing, as well as new or reconstructed engines).

The boilers are not subject to 40 CFR 63 Subpart JJJJJ because they fire on natural gas.

Periodic Monitoring

Visible Emissions: Periodic monitoring of visible emissions from the Foster Wheeler furnace (P005), five compressor engines (P042, P043, P045, P046, and P047), Ford LSR engine, #1 and #2 auxiliary boilers (P444 and P445), start-up heater, and urea auxiliary boiler (P450) shall consist of ensuring natural gas is the sole fuel source. Visible emissions monitoring for the LODAN wash tower (P287), #2 LODAN neutralizer and evaporator (N001), and urea evaporator (P382), and urea prill tower (P391) shall consist of weekly Method 9 opacity readings. The LODAN prill tower (P268) has a continuous opacity monitor. Monitoring of visible emissions from the nitric acid plants (P143, P169, P189 and N005) shall consist of

weekly observations. Visible emissions monitoring for the John Deere, Caterpillar 3306B, and Caterpillar 3406BDIT diesel fired engines shall consist of visual observations during periodic availability assurance tests, at least semi-annually. The two ammonia flares (S-101 and S-102) shall be monitored for any times either flare exhibits visible emissions for more than 5 minutes (although no visible emissions are expected from the flares). No visible emissions are expected from the carbon bed desulfurizers (P002), ammonia storage tanks (ST-102 and ST-103), primary cooling tower (P455), Litwin compressor vent (P458), #4 nitric acid cooling tower (P429), HIDAN neutralizer (V-230), #1 LODAN cooling tower (P459), urea plant Hotwell scrubber (P342) or AkzoNobel horizontal expander.

Particulate Emissions: The LODAN prill tower and wash tower, and the #2 LODAN neutralizer and evaporator are all subject to the requirements of compliance assurance monitoring (CAM) for particulate emissions and shall be tested annually to confirm the CAM indicator ranges and compliance with permitted limits. For CAM, the permitted shall monitor the motor amperage of pumps daily. Particulate monitoring for the urea prill tower shall consist of Reference Method testing annually, while the urea evaporator shall be tested once every five years.

NO_x and CO Emissions: NO_x and CO emissions from the north and south Cooper engines will be monitored at least semi-annually. NO_x and CO emissions from the White Superior Creole engine and the east and west Cummins engines will be monitored at least annually. The East and West compressor engines also require monthly monitoring of the inlet catalyst temperature and the pressure drop across the catalyst for each engine as indicated by permit MD-1502. Periodic monitoring for NO_x emissions from the Foster Wheeler furnace and the #2-Aux boiler shall be performed annually, and at least every five years for the #1-Aux boiler. The #1 and #2 nitric acid plants are subject to CAM for NO_x emissions and will be tested annually to confirm the CAM indicator ranges and compliance with permitted limits. Permit OP-191 requires continuous emissions monitors (CEMs) for NO_x emissions for the #3 and #4 nitric acid plants. The urea auxiliary boiler shall be tested at least once every five years for NO_x emissions.

The startup heater is fuel burning equipment as defined in WAQSR Chapter 1. This uncontrolled unit emits oxides of nitrogen (NO_x) in relatively small quantities (3.4 tons per year of NO_x if operated full time). In the absence of more stringent permit limits, the NO_x emission limit for fuel burning equipment defaults to 0.23 pounds per million BTUs (lb/MMBtu) for sources constructed before April 9, 1973. Generally, small fuel burning sources like these units are uncontrolled and operate at a steady state; emission variations are not likely. AP-42 emission factors were developed by the EPA to help estimate the quantity of a pollutant from a given source type. In developing an AP-42 emission factor, emission data is averaged from sources of similar size and type, and the emission factor is then assigned a reliability rating based on quality and quantity of the data used. The rating scale runs from A to E with an A rating providing the highest quality. The AP-42 emission factor for small units (less than 100 MMBtu/hr) is 0.1 lb/MMBtu with a B rating. Considering the amount of data evaluated to develop the AP-42 emission factor and considering that the WAQSR Ch 3, Sec 3 emission limit is twice the AP-42 value, the Division feels it is extremely unlikely this source will operate out of compliance and considers further testing to be uneconomical.

Since ammonia is neither a criteria pollutant nor a hazardous air pollutant (HAP), and emissions are less than one ton per year, the Division will not require monitoring of the ammonia emissions from the urea Hotwell unit (P342).