

CONSTRUCTION PERMIT
PREVENTION OF SIGNIFICANT DETERIORATION APPROVAL

Draft

PERMITTEE

Exolon-ESK Company.
Attn: Mr. Armand Ladage
R.R. 1, Box 200A-ESK Road (875E)
Hennepin, Illinois 61327

<u>Application No.:</u> 01010018	<u>I.D. No.:</u> 155801AAC
<u>Applicant's Designation:</u> Heater	<u>Date Received:</u> January 9, 2001
<u>Subject:</u> Heater for the existing Sulferox System	
<u>Date Issued:</u> March 15, 2001	<u>Expiration Date:</u> See Condition 2a

Location: R.R 1, Box 200A-ESK Road (875E), Putnam, Hennepin

Permit is hereby granted to the above-designated Permittee to CONSTRUCT air pollution control equipment consisting of a Heater to enhance the existing Sulferox® System to improve Hydrogen Sulfide (H₂S) removal from four existing silicon carbide furnace group, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

In conjunction with this permit, approval is given with respect to the Prevention of Significant Deterioration of Air Quality Regulations (PSD) to construct and operate the above referenced project, in that the Illinois Environmental Protection Agency (Agency) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et. seq., the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the following findings and the conditions, which follow:

- 1a. Exolon-ESK Company has requested a construction permit for a natural gas fired heater, to enhance existing Sulferox® System. The addition of the heater to this air pollution control equipment is expected to enhance removal sulfur compounds emissions from the silicon carbide furnace group by maintaining the activity level of the Sulferox® solution.
- b. The purpose of this project is to evaluate the design, operability and effectiveness of the Sulferox® System with a heater that will improve the sulfur compounds removal efficiency, to better control emissions from four silicon carbide furnace groups.

- c. After the temporary period of operation allowed by this permit, the Permittee will be required to operate the Sulferox® System in accordance with the requirements of permit 95060060.
2. Exolon-ESK Company is located in Hennepin Township in Putnam County. The area is designated attainment for sulfur dioxides (SO₂).
3. The project is subject to PSD review for sulfur dioxides (SO₂), because the installation and operation of the Sulferox® System will increase SO₂ emissions. In particular, the Sulferox® System will have to be taken out of service while it is connected to the heater.
- 4a. After reviewing the materials submitted by Exolon-ESK Company, the Illinois EPA has determined that the project, as proposed, would (i) be in compliance with applicable Board emission standards and (ii) as a temporary project utilizing Best Available Control Technology (BACT).
- b. Because this project is considered temporary, an air quality analysis was not required.
5. The Illinois EPA has determined that the project, as proposed, would comply with applicable Illinois Air Pollution Control Regulations and the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21.
6. A copy of the application and the Illinois EPA's formal review of the application and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and an opportunity to examine this material and to submit comments and to request a public hearing on this matter.

The Illinois EPA is issuing this approval subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization by Illinois EPA.

Conditions

1. Standard conditions for issuance of construction permits, attached hereto and incorporated herein by reference, shall apply, unless superseded by the following conditions.

Best Available Control Technology

- 2a. This permit authorizes construction of a small (less than 5 million Btu/hour heat input) natural gas fired heater as additional improvement to the Sulferox® System and operation of the Sulferox® System for a period of one year from issuance date for the general purpose of evaluating this measure as a means to improve control of sulfur compounds emissions from four existing silicon carbide furnace groups.

- b. The off-gas from the silicon carbide furnaces shall be collected and oxidized by a flare or other combustion device prior to discharge to the atmosphere to convert hydrogen sulfide and other sulfur compounds in the off-gas to sulfur dioxide, water and carbon dioxide and the carbon monoxide in the off-gas to carbon dioxide.
- c. The silicon carbide furnaces shall be equipped with an enhanced sulfur removal system, including associated heater, to process the off gas to remove hydrogen sulfide prior to oxidation.
 - i. Except as provided below the removal system shall remove at least 80 percent of the sulfur contained in the off-gas and hydrogen sulfide content of the off-gas prior to combustion shall not exceed 500 ppm.
 - ii. Operation of the silicon carbide furnaces without the sulfur removal system is allowed during startup, shutdown, maintenance and malfunction for up to 21 days (504 hours) per year based on a running total of monthly data as allowed by existing permit 95060068.
 - A. For the purpose of this provision, the definition of "malfunction" at 40 CFR 60.2 shall apply.
 - B. "Maintenance" means the carrying out of activities to keep equipment in proper operating condition, including inspection, adjustment, lubrication, cleaning, and repair and replacement of component. Maintenance may occur while equipment, which can be coordinated with equipment turndown or shutdown for other reasons.
 - iii. A. For the specific purpose of the installation of the heater, operation without the sulfur removal is also allowed for a maximum of five days (120 hours). No more than three furnace groups shall operate during this time.
 - B. The enhanced sulfur removal system operation for up to additional 240 hours with out the sulfur removal system if needed for as a result of the shakedown or evaluation of the system.
- d. The enhanced sulfur removal system shall be constructed in conformance with good air pollution practice to minimize emissions, consistent with the objective of evaluating the effect of the heater, including the following:
 - i. The Permittee shall maintain a written evaluation plan for the performance of the enhanced Sulferox® System.
 - ii. The Sulferox® System shall be installed and maintained with spares for critical pumps, air blowers, reliable operating instrumentation, and other features, which might reasonably be used to minimize the frequency and duration of malfunctions.

- iii. The operating level of the silicon carbide furnaces shall be reduced as soon as practicable to 3 furnaces during outage of the sulfur removal system related to malfunction. If a fourth furnace cannot be completely shutdown due to the potential loss of pressure from process generated gases and subsequent collapse of the plastic tarp enclosing the process, then the electricity to the fourth furnace shall be maintained at a level reasonably necessary to maintain tarp integrity.
 - iv A. Notice of routine major maintenance shall be submitted to the Agency 10 days before the start of such maintenance, or as soon as practicable if 10 days notice cannot be provided. Such notice shall provide a description, explanation, and schedule for the intended maintenance activities.
 - B. Notice of malfunctions which are longer than one hour in duration shall be submitted to the Agency as soon as practicable but not more than 10 days after the start of malfunction. Such notice shall provide the date, time, duration, description, and explanation of the malfunction.
- 3a. A mist eliminator or other pretreatment system shall be operated to remove particulate matter from the off gas-prior to entering the sulfur removal system.
- b i. There shall be no visible emissions of particulate matter from any building or operation at the source.
 - ii. Emissions of particulate matter from all stacks on material handling and processing equipment shall not exceed 0.015 grains per dry standard cubic feet.
 - iii. Finished products of the silicon carbide operation shall only be moved in trucks or railroad cars that are covered or enclosed.

Conditions 2 and 3 addresses Best Available Control Technology, as required by Section 165 of the Clean Air Act.

- 4a. Open storage piles, roadways, parking facilities and other points of potential fugitive particulate matter emissions at the source shall be maintained and treated to significantly control such emissions.
- b. The Permittee shall follow the written operating program submitted with this application describing the points of potential fugitive particulate matter emissions and the practices used to reduce such emissions.
- 5a. The emissions of Sulfur Dioxides (SO₂) from silicon carbide furnaces shall not exceed the following limits:
- i. Uncontrolled emissions shall not exceed 2,400 lb/hr, based on 100 percent conversion of sulfur containing compounds in the off gas stream to SO₂.

- ii. Controlled emissions shall not exceed 422 lb/hr when the sulfur removal system is operating.
 - iii. Annual emissions including outage of the control equipment shall not exceed 1,326 tons/yr. This limit is based on operation without the sulfur removal system at 2,400 lbs/hr for 864 hours in a year as allowed by this permit. This represent additional 360 hours of operation per year without the Sulferox® System for shakedown of the enhanced system with an additional 432 tons of SO₂ emissions.
- b. Total emissions from the silicon carbide furnaces shall comply with the existing limits established by permit 95060068, as follow:
- i. Emissions of carbon monoxide shall be less than 75.0 pounds/hour or below detectible levels.
 - ii. Emissions of reduced sulfur compounds, including hydrogen sulfide shall be less than 11.0 pounds/hour or below detectible levels and 39.8 ton/yr.
 - iii. Emissions of nitrogen oxides shall be less than 36.0 pounds/hour.
 - iv. Emissions of particulate matter shall not exceed 22.5 pound/hour, and 23.3 ton/yr.
- c. Emissions of nitrogen oxides from the heater shall not exceed 0.3 lb/hour and 1.3 tons/year.
- 6a. Within 180 days of initial startup of the enhanced Sulferox® System, the following tests shall be conducted by an approved testing service, during conditions, which are representative of maximum emissions from the silicon carbide furnaces.

The hydrogen sulfide, carbonyl sulfide and carbon disulfide concentrations and mass flow rates in the off-gas before and after the sulfur removal system.

- b. The following methods and procedures shall be used to the extent practicable for testing of emissions: Refer to 40 CFR 60, Appendix A for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Hydrogen Sulfide, Carbonyl Sulfide and Carbon Disulfide	USEPA Method 15

To the extent that a different method is deemed necessary, the Permittee shall submit a description of the test method to the Agency for approval prior to using such test method.

- c. The Permittee shall submit a written test plan to the Illinois EPA for review and comment if a significant change in the procedures for this testing is planned from the procedures followed in previous testing. This plan shall be submitted at least 30 days prior to the actual date of testing and include the following information as a minimum:
 - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.
 - ii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for the furnace and the heater modifying the sulfur removal system will be determined.
 - iii. The specific determinations of emissions and operation, which are intended to be made, including sampling and monitoring locations.
 - iv. The test method(s), which will be used, with the specific analysis method, if the method can be used with different analysis methods.
 - v. Any minor change in standard methodology proposed to accommodate the specific circumstances of testing, with justification.
- d. The Permittee shall notify the Illinois EPA prior to conducting these measurements to enable the Illinois EPA to observe testing. Notification for the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 5 working days prior to the actual date of the test. The Illinois EPA may accept shorter advance notice if it does not interfere with the Illinois EPA's ability to observe testing.
- e. Copies of the Final Report(s) for these tests shall be submitted to the Illinois EPA within 30 days after the test results are compiled and finalized. These reports shall include as a minimum:
 - i. A summary of results
 - ii. General information
 - iii. Description of test method(s), including description of sampling points, sampling train, analysis equipment, and test schedule
 - iv. Detailed description of the test conditions, including:
 - A. Process information, i.e., mode(s) of operation, process rate, e.g. number of furnace groups operating,

- B. Control equipment information, i.e., equipment condition and operating parameters during testing, and
 - C. A discussion of any preparatory actions taken, i.e., inspections, maintenance and repair.
 - D. H2S concentration measured by monitoring.
- v. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration.
- vi. Conclusions.
- f. Submittals of information shall be made as follows:
- i. Submittal of Test Plan - one copy to The Compliance Unit.
 - ii. Notice of Test - one copy to Source Emission Specialist, one copy to the Regional Office.
 - iii. Final Report - one copy to Source Emission Specialist, one copy to the Regional Office, and one copy to Permit Section.
- 7a. The Permittee shall install, maintain and operate instruments for the operating parameter of the sulfur removal, including the temperature of the Sulferox® solution.
- b. The Permittee shall install maintain and operate a continuous emission monitoring system (CEMS) on the exhaust of the off-gas oxidation system for emission of SO₂ to the atmosphere from the silicon carbide furnaces.
8. The Permittee shall maintain records of the following items to allow the Agency to review compliance with the requirements in Condition 2 through 5.
- a. Records, on hour-by-hour basis, of the number of furnaces operating (generating off-gas) and the status of the sulfur removal and oxidation systems.
 - b. Records of the measurements and monitoring conducted pursuant to condition 8.
 - c. The following records shall be kept on at least a monthly basis:
 - i. Use of petroleum coke (ton), with sulfur content (average wt. %).
 - ii. Silicon carbide production (ton).
 - iii. Sulfur compounds generated in off based upon emission factors developed from emissions testing (ton sulfur).
 - iv. Sulfur recovered by sulfur removal with the heater system (ton).

- v. Sulfur dioxide emissions (ton).
 - vi. Duration of furnace operation without the sulfur removal system (total hours and hours during startup, shutdown, maintenance or malfunction respectively) and without the oxidation system (total hours).
- d. Logs of operating time for the capture system (i.e. bypass directly to flare), pretreatment and sulfur removal systems, and monitoring equipment.
- e. Maintenance logs for the capture system, pretreatment and sulfur removal system, detailing all routine and non-routine maintenance performed, including dates and duration of any outages.
- 9a. All records and logs required by this permit shall be retained at a readily accessible location at the source for at least five years from the date of entry and shall be made available for inspection and copying by the Illinois EPA upon request. Any records retained in an electronic format (e.g., computer) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA request for records during the course of a source inspection.
- b. The Permittee shall notify the Illinois EPA within 5 days of the initial startup of the enhanced Sulferox® System.
- c. On a quarterly basis, the Permittee shall submit a written report summarizing experience with the Sulferox® System with the heater, including the range of sulfur compounds emissions achieved under different configurations and the rest of the control system, with supporting information. These reports shall include a summary of the records kept pursuant to condition 8. These reports shall be submitted within 45 days of the end of the calendar quarter.
- If there is an exceedance of the requirements of this permit as determined by the records required by this permit, the Permittee shall submit a report to the Illinois EPA's Compliance Section in Springfield, Illinois within 30 days after the exceedance. The report shall include the emissions released in accordance with the recordkeeping requirements, a copy of the relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.
11. With the annual report required by 35 Ill. Adm. Code 201.302, the Permittee shall report:
- a. The Source's emissions of SO₂ and PM with supporting calculations.
 - b. The maximum sulfur content of the off-gas as determined by the CEM.
 - c. Any exceedance of applicable requirements, with date, duration, description of exceedance and explanation, not reported pursuant to Condition 11.

12a. Any required reports and notifications concerning equipment operation, emissions testing, or a monitoring system shall be sent to the Illinois EPA at the following address unless otherwise indicated:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276
Telephone: 217/782-5811 Fax: 217/524-4710

A copy of all required reports and notifications, except the Annual Emission Report required by 35 Ill. Adm. Code, shall also be sent to the Illinois EPA at the following address:

Illinois Environmental Protection Agency
Division of Air Pollution Control
5415 North University
Peoria, Illinois 61614
Telephone: 309/693-5461 Fax: 309/693-5467

13a. This permit does not relieve the Permittee of the responsibility to comply with all applicable local, state and federal requirements which are part of Illinois' State implementation Plan, as well as all other applicable local, state and federal requirements.

14a. Within 30 days of issuance of this permit, the Permittee shall submit a revised fee (292-CAAPP) for its CAAPP application reflecting the new allowable emission rate of this permit.

b. The Permittee shall submit a compliance assurance-monitoring (CAM) Plan as part of its revision to CAAPP application to address the changes allowed by this permit if required by 40 CFR 64.

If you have any questions concerning this permit, please contact Ricardo Ng at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

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cc: Region 2