

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
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Project Summary for a
Construction Permit Application from
ExxonMobil Oil Corporation for
The Second Phase of Its NSR Controls Project
at Its Existing Refinery in
Channahon, Illinois

Site Identification No.: 197800AAA
Application No.: 09040008

Illinois EPA Contacts

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Important Dates:

Application Received: April 6, 2009
Public Comment Period Begins: August 10, 2009
Public Comment Period Closes: September 9, 2009

I. INTRODUCTION

ExxonMobil Oil Corporation ("ExxonMobil") has applied for a construction permit for installation of a Selective Catalytic Reduction (SCR) control system on the Fluid Catalytic Cracking (FCC) Unit to control its emissions of nitrogen oxides (NO_x). This permit also addresses other changes at or related to the FCC Unit.

The Illinois EPA has reviewed the application and made a preliminary determination that this application meets applicable requirements. Accordingly, the Illinois EPA has prepared a draft of the air pollution control construction permit that it would propose to issue for this project. However, before issuing this permit, the Illinois EPA is holding a public comment period to receive written comments on the proposed issuance of this permit and the terms and conditions of the draft permit.

II. PROJECT DESCRIPTION

The FCC Unit is a continuous operation that uses a fluidized catalyst to convert larger molecules into smaller molecules by a "cracking" process. This enables various intermediate streams at the refinery that contain molecules that are otherwise too large to be used for production of higher quality products, to be directed into such products, notably gasoline. The SCR System will control emissions of NO_x by treating the exhaust gas from the catalyst regeneration process of the FCC Unit using a catalytic reaction and ammonia. The ammonia for the SCR System will be handled in a new ammonia receiving and storage facility. An SCR System must be installed on the FCC Unit pursuant to a Consent Decree¹. Among other matters, this Consent Decree addresses alleged violations of New Source Review (NSR) involving FCC Units.

This Consent Decree sets forth a phased approach to additional emission control equipment that must be installed at the Joliet refinery. Accordingly, Exxon Mobil outlined a phased approach to the installation of the emission control equipment required by the Consent Decree in a previous permit application. In addition, this previous application specifically addressed the control equipment initially required to be installed by the Consent Decree. The resulting permit, Construction Permit 06100002, addressed the initial phase of Exxon Mobil's program to comply with the Consent Decree, i.e., the installation of a scrubber on the FCC Unit for control of emissions of sulfur dioxide (SO₂), as well as a tail gas clean up unit on the South Sulfur Recovery Unit, to also improve control of SO₂ emissions. Given that the SCR system would be located upstream of the scrubber in the control train for the FCC Unit, that permit also allowed for construction of the framework for the SCR system in conjunction with the construction of the scrubber. The combination of Construction Permit 06100002 and this permit are considered to address a single project at the source.

In addition to the installation of the SCR System on the FCC Unit, physical changes will be made to the FCC Unit to enable it to operate at its physical capacity and enable increased utilization of the unit. A mechanical stop on the main air blower will be removed. This will enable more air flow into the catalyst regenerator of the FCC Unit, increasing its operating rate. Also, an on-line cleaning system will be installed for the wet gas compressors at the FCC Unit, which will use a water-solvent cleaning solution to remove deposits from compressor rotors. This on-line system will enable cleaning while

¹ *United States of America, State of Illinois, State of Louisiana, and the State of Montana v. Exxon Mobil Corporation and ExxonMobil Oil Corporation*, United States District Court for the Northern District of Illinois, No. 05 C 5809.

compressors are in operation, rather than having to take compressors out of service for cleaning.

Certain operational and physical constraints at upstream and downstream units, including the Crude, Coker and Selective Hydrogenation Units, that relate to the FCC Unit will also be removed. Higher operational limits for the Crude Unit and Coker Unit, consistent with their design capacity, will enable additional feed material to be produced for the FCC Unit. Physical changes to the Selective Hydrogenation Unit will enable this unit to handle its byproduct gas stream without sending the stream to the FCC Unit. This will lower the backpressure on the FCC Unit's main air blower, also helping enable the blower to function at its full capacity.

These changes to the FCC Unit and other units at the refinery will result in an increase in the volume of acid gas, which is primarily hydrogen sulfide, which must be processed. Changes will be made to the North Train of the Sulfur Recovery Unit (NSRU) to enable the source to fully and reliably process this additional acid gas.

This project will involve installation of piping and associated components and new wastewater drain systems. The potential exists for volatile organic material (VOM) emissions to occur from leaks associated with this equipment. These emissions will be controlled by the established inspection and repair programs.

III. APPLICABLE EMISSION STANDARDS

All emission sources in Illinois must comply with Illinois Pollution Control Board emission standards. The Board's emission standard represents the basic requirements for sources in Illinois. With the exception of the new Crude Unit Water Overspray System, new fugitive components and new Individual Drain Systems (IDS), all other affected units are existing. With the exception of Title I limits, this permit would not affect applicable requirements for these existing units which requirements are established in the Clean Air Act Permit Program (CAAPP) permit for the source or in subsequent construction permits for the projects at the source, whose requirements have not yet been included in the CAAPP permit for the source.

For the new components and IDS, the Permittee would be required to comply with the established requirements for components (valves, flanges, etc.) and IDS associated with this project, as identified in the source's CAAPP permit, for all new or modified components and IDS affected by this project. In particular, for new components would be subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) for Petroleum Refineries, 40 CFR 63 Subpart CC, which requires a leak detection and repair program. The new IDS would be subject to New Source Performance Standards (NSPS) for VOC Emissions From Petroleum Refinery Wastewater Systems, 40 CFR 60 Subpart QQQ, which requires an inspection and repair program.

The new Crude Unit Water Overspray System, would be subject to the state's visible emissions rule which prohibits the emission of smoke or other particulate matter with an opacity greater than 30 percent into the atmosphere from any emission unit.

IV. EVALUATION OF THE CHANGE IN EMISSIONS

The emissions increases for this project are significant for purposes of the NSR rules. As a consequence, ExxonMobil has chosen to evaluate the net change in emissions at the refinery. This evaluation involves summing all increases and decreases for the project as well as other

increases and decreases that have occurred over the contemporaneous² time period. The results of this evaluation show that the net changes in emissions for this project will be less than significant. In fact, the addition of controls for this project result in large decreases of SO₂ and NO_x emissions. A summary of this evaluation follows (A detailed table can be found in Attachment 2 of the draft permit):

	Change In Emissions (Tons/Year)					
	NO _x	CO	SO ₂	PM	PM ₁₀	PM _{2.5}
Project Increases	527.58	186.25	938.98	63.18	57.51	29.91
Project Decreases	-961.46	-136.99	-14,916.61	-51.56	-51.56	-34.65
Project Subtotal:	-433.88	49.26	-13,977.63	11.62	5.95	-4.74
Contemporaneous Changes	35.53	27.55	-330.00	1.47	1.47	1.47
Overall Net Change:	-398.36	76.81	-14,307.63	13.08	7.41	-3.28
Significance Threshold	40	100	40	25	15	10
Greater Than Significant?	No	No	No	No	No	No

V. CONTENTS OF PERMIT

The permit contains appropriate conditions for implementation of the applicable state and federal standards for VOM emissions from the units affected by this project. These standards require ongoing monitoring and recordkeeping to verify continuing compliance.

VI. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that this proposed project meets all applicable state and federal air pollution control requirements, subject to the conditions proposed in the draft permit.

Comments are requested by the Illinois EPA on this proposed issuance of a permit for installation of an SCR control system on the FCC Unit and other changes at or related to the FCC Unit. If substantial public concern is shown in this matter the Illinois EPA will consider holding a public hearing in accordance with 35 IAC Part 166.

² The contemporaneous time period for PSD pollutants is April 2002 through January 2011. The contemporaneous time period for Nonattainment Area NSR pollutants subject to 35 IAC Part 203 is October 2001 through January 2011. The contemporaneous time period for Nonattainment Area NSR pollutants subject to 40 CFR 51 Appendix S is April 2002 through January 2011.