

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY  
BUREAU OF AIR, PERMIT SECTION  
1021 N. GRAND AVENUE EAST  
P.O. BOX 19276  
SPRINGFIELD, ILLINOIS 62794-9276  
217/782-2113

PROJECT SUMMARY  
FOR A CONSTRUCTION PERMIT APPLICATION  
FROM ARCHER DANIELS MIDLAND CO.  
FOR A NEW GAS FIRED BOILER  
AT PEORIA, ILLINOIS

Site Identification No.: 143065AJE  
Application No.: 04090046  
Date Received: September 15, 2004

Schedule

Public Comment Period Begins: November 11, 2004  
Public Comment Period Closes: December 11, 2004

Illinois EPA Contacts

Permit Analyst: Manish Patel  
Community Relations Coordinator: Brad Frost

## **I. INTRODUCTION**

Archer Daniels Midland Company (ADM) has proposed to construct a new gas fired boiler at its grain processing facility at Peoria. The construction of the boiler requires a permit from the Illinois EPA because of its associated air emissions.

## **II. PROJECT DESCRIPTION**

The proposed project will include one 382 mmBtu/hr rated capacity natural gas fired boiler with low-NO<sub>x</sub> burners and flue gas recirculation system. ADM expects that addition of this boiler will reduce the burden on the existing natural gas-fired boilers and facilitate improved maintenance practices for the existing coal-fired boilers to provide reliable steam supply for use in the grain processes at the plant and not to increase overall steam generation at the plant. However, ADM has accounted for a small increase in plant throughput and process emissions in conjunction with this project.

Emissions of carbon monoxide (CO), nitrogen oxide (NO<sub>x</sub>), particulate matter/particulate matter less than 10 microns (PM/PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>) and volatile organic material (VOM) would result from the combustion of fuel in the boiler.

The principal air contaminants emitted from the proposed boiler would be NO<sub>x</sub> and CO. NO<sub>x</sub> can be formed thermally by combination of oxygen and nitrogen in the air at the temperatures at which fuel is burned. Thermal NO<sub>x</sub> is formed during the operation of all common high temperature combustion processes including boilers. NO<sub>x</sub> can also be formed from the combination of any nitrogen in the fuel with oxygen. This is not relevant for burning of natural gas, which contains minimal amounts of nitrogen. Factors affecting NO<sub>x</sub> formation from a boiler include design, ambient conditions, boiler load, and fuel types. The NO<sub>x</sub> emissions from the proposed boiler will be controlled with ultra low-NO<sub>x</sub> burners and flue gas recirculation system. Low-NO<sub>x</sub> combustors lower NO<sub>x</sub> formation by controlling flame turbulence and staging the mixing of fuel and combustion air.

CO is formed by the incomplete combustion of fuel. CO is associated with most combustion processes and is found in measurable amounts in boiler exhaust. VOM and PM/PM<sub>10</sub> are also emitted as a result of incomplete combustion of fuel. SO<sub>2</sub> is found only in trace amounts from combustion of natural gas.

CO and VOM emissions are controlled by providing adequate fuel residence time and high temperature in combustion zone to ensure complete combustion. PM/PM<sub>10</sub> are controlled by proper combustion control and firing natural gas fuel, which has negligible ash content.

## **III. PROJECT EMISSIONS**

The annual emissions from the boiler would be limited to 38.5 tons of NO<sub>x</sub>, 90 tons of CO, 12.8 tons of PM/PM<sub>10</sub>, 9.3 tons of VOM, and 1.0 ton of SO<sub>2</sub>, consistent with information in the application submitted by ADM. These limits are based on the short term emission rates guaranteed by the manufacturer of the boiler and continuous operation of the boiler at its

maximum rated capacity. Actual annual emissions of the boiler would be less than these limits to the extent that the actual utilization of the boiler will not be on a continuous basis.

The annual increase in emissions from the other units at the source that may be affected by this project would be limited to 1.4 tons of NO<sub>x</sub>, 9.75 tons of CO, 2.0 tons of PM/PM<sub>10</sub>, 30.2 tons of VOM, and 38.5 ton of SO<sub>2</sub>. These limits ensures that potential emissions impact of the new boiler including these projected increases in emissions from the other units are less than the Prevention of Significant Deterioration of Air Quality (PSD) significant emission increase thresholds.

#### **IV. APPLICABLE EMISSION STANDARDS**

All emission sources in Illinois must comply with the Illinois Pollution Control Board's emission standards. The Board's emission standards represent the basic requirements for sources in Illinois. The proposed boiler will readily comply with the applicable state standards (35 Ill. Adm. Code: Subtitle B).

The boiler is also subject to the federal New Source Performance Standards (NSPS), 40 CFR 60 Subpart Db, for Industrial-Commercial-Institutional Steam Generating Units. This standard addresses NO<sub>x</sub> emission from gas boiler limiting NO<sub>x</sub> emissions to 0.2 lb/mmBtu of actual heat input on a 30-day rolling average. The boiler is also subject to National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR 63, Subpart DDDDD, for Industrial, Commercial, and Institutional Boilers and Process Heaters. This standard addresses CO emissions from gas boiler limiting CO emissions to 400 ppmvd on a 30-day rolling average. The Illinois EPA is administering NSPS and NESHAP in Illinois on behalf of the United States EPA under a delegation agreement. The project should readily comply with these standards. The application indicates NO<sub>x</sub> emissions would be no more than 0.023 lb/mmBtu and 74 ppm of CO.

#### **V. APPLICABLE REGULATORY PROGRAMS**

This project is not considered a major project under the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. This is because the potential emissions from the proposed boiler and small increase from other units at the source, as addressed by the permit, would be less than the significant emission increase thresholds for PSD, i.e., NO<sub>x</sub>, SO<sub>2</sub> and VOM are limited to less than 40 tons/year; CO emissions are limited to less than 100 tons/year and PM/PM<sub>10</sub> emissions are limited to less than 15 tons/year.

The boiler would qualify as budget unit and be subject to applicable requirements of Illinois' NO<sub>x</sub> Trading Program, i.e. 35 IAC Part 217, Subpart U. By November 30 of each year, ADM would have to hold NO<sub>x</sub> allowances for the NO<sub>x</sub> emissions of the boiler during the preceding seasonal control period (May 1 to September 30).

#### **VI. DRAFT PERMIT**

The conditions of the draft permit for the project contain limitations and requirements for the boiler to help assure that the project complies with applicable regulatory requirements.

The draft permit includes enforceable limits on emissions and operation for the boiler to assure that project remains below the levels at which it would be considered major for PSD. In addition to limiting annual emissions, the permit also includes limits on short term emissions, and a limitation on the capacity of the boiler. The permit also generally requires that good air pollution control practice be used to minimize emissions.

The permit also establishes appropriate compliance procedures for the boiler, including requirements for emission testing, monitoring, recordkeeping, and reporting. Continuous monitoring of NO<sub>x</sub> and CO emissions are required for the boiler which will confirm actual levels of operation. Emission testing is required as part of the initial shakedown and operation of the boiler after completion of construction.

These measures are being imposed to assure that the emissions of the boiler are accurately tracked to confirm compliance with the applicable short-term standards and annual emission limits.

With respect to increases in emissions from other units at the source that may be affected by this project, to ensure compliance with applicable emission limits, the draft permit requires ADM to conduct recordkeeping and reporting as specified by the PSD rules for modifications to existing units. This includes records for past actual emissions and future projected emissions and notification if a significant increase in actual emissions occurs.

## **VII. REQUEST FOR COMMENTS**

It is the Illinois EPA's preliminary determination that the draft permit meets all applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue this permit.

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions of the draft permit.