

7-1-97

## FACT SHEET

### **PROPOSED REVISION OF STANDARDS OF PERFORMANCE FOR NITROGEN OXIDE EMISSIONS FROM NEW FOSSIL-FUEL FIRED STEAM GENERATING UNITS AND PROPOSED REVISIONS TO REPORTING REQUIREMENTS FOR STANDARDS OF PERFORMANCE FOR NEW FOSSIL FUEL-FIRED STEAM GENERATING UNITS**

#### TODAY'S ACTION...

- Today, the Environmental Protection Agency (EPA) is proposing changes to the existing new source performance standard for emissions of nitrogen oxides (NO<sub>x</sub>) from new utility boilers (electric utility steam generating units) and new industrial boilers (industrial steam generating units).
- The proposed changes to the existing standards for NO<sub>x</sub> emissions would reduce the NO<sub>x</sub> emission limits for both utility and industrial boilers to reflect the performance of best demonstrated technology.
- The proposed revisions for utility boilers would also change the form of the revised NO<sub>x</sub> emission limit for new utility boilers to an output-based format to promote energy efficiency and pollution prevention.

#### BACKGROUND

- Nitrogen dioxide belongs to a family of poisonous, highly reactive gases called oxides of nitrogen. These gases form when fuel is burned at high temperatures, and come principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers.
- A suffocating, brownish gas, nitrogen dioxide is a strong oxidizing agent that reacts in the atmosphere to form corrosive nitric acid. It also plays a major role in the atmospheric reactions that produce ground-level ozone, the primary constituent of smog.
- Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections such as influenza. The effects of short-term exposure are still unclear, but continued or frequent exposure to concentrations higher than those normally found in the ambient air may cause increased incidence of acute respiratory disease in children.
- Under the Clean Air Act, EPA is required to set “new source performance standards” to

ensure that emissions from newly built or reconstructed facilities meet strict limits. These limits are generally more stringent than emission limits set for existing facilities already in operation.

- The Clean Air Act also authorizes EPA to establish an acid rain program to reduce the adverse effects of acidic deposition on natural resources, ecosystems, materials, visibility, and public health. The principal sources of the acidic compounds are emissions of sulfur dioxide and nitrogen oxides from the combustion of fossil fuels. The Clean Air Act requires EPA to establish and, in the wake of new technology, revise standards of performance for emissions of nitrogen oxides from electric utility and non-utility fossil fuel-fired steam generating units.

### **WHAT ARE THE HEALTH AND ENVIRONMENTAL BENEFITS OF TODAY'S ACTION?**

- The revised NO<sub>x</sub> emission limits that EPA is proposing for newly built or refurbished utility boilers and industrial boilers would reduce the projected growth in NO<sub>x</sub> emissions by approximately 42 percent from levels allowed under the current standards.
- Emissions of nitrogen oxides from sources such as power plants contribute significantly to the formation of ground-level ozone and acid rain. In addition, recent studies indicate that nitrogen deposition is contributing to the acidification of sensitive lakes and streams and to the eutrophication of the Chesapeake Bay and other coastal waters. Eutrophication can result in a number of problems including: an increase in nuisance and toxic algae blooms, oxygen depletion in water causing decreased populations of fish, and the detrimental “shading” or reduction of light to vital aquatic plants.

### **HOW DID EPA DETERMINE THE REVISED EMISSION LIMITS?**

- The control technologies available for reducing NO<sub>x</sub> emissions can be grouped into two different groups: combustion control and flue gas treatment. Combustion controls reduce NO<sub>x</sub> emissions by suppressing NO<sub>x</sub> formation during the combustion process. Flue gas treatment controls are add-on controls that reduce NO<sub>x</sub> emissions after combustion has occurred.
- Two commercially available flue gas treatment technologies are selective non-catalytic reduction (SNCR) and selective catalytic reduction (SCR). In the SNCR system, ammonia or urea is injected into the flue gas to reduce NO<sub>x</sub> to nitrogen (N<sub>2</sub>) and water. Selective catalytic reduction is accomplished by injecting ammonia into the flue gas in the presence of a catalyst (a substance that increases the rate at which chemicals react). The catalyst promotes reactions that convert NO<sub>x</sub> to N<sub>2</sub> and water at higher removal efficiencies and at lower flue gas temperatures than required for SNCR.

- After considering available performance data and performing a variety of cost analyses, EPA based the revised NO<sub>x</sub> emission limit for electric utility boilers and industrial boilers (regardless of fuel type) on coal-firing and the performance of SCR control technology, in combination with combustion controls. EPA chose SCR as the basis for revising the NO<sub>x</sub> emission limits due to its relatively high NO<sub>x</sub> removal efficiency.
- In selecting a single proposed revised NO<sub>x</sub> emission limit, EPA attempted not to limit the control options available for compliance, but to provide flexibility for cheaper and less energy intensive control technologies (i.e., by allowing the use of clean fuels for reducing NO<sub>x</sub> emissions). In addition, EPA proposed a standard it believes achieves the best balance between control technology and environmental, economic, and energy considerations.

### **WHAT IS AN OUTPUT-BASED FORMAT AND HOW DOES IT PROMOTE POLLUTION PREVENTION?**

- EPA Administrator, Carol Browner, has established pollution prevention as one of EPA's highest priorities. One of the opportunities for pollution prevention lies in simply using energy efficient technologies to minimize the generation of emissions. EPA investigated ways to promote energy efficiency in utility plants by changing the way in which facilities regulate flue gas NO<sub>x</sub> emissions. Therefore, in an effort to promote energy efficiency in utility steam generating facilities, EPA is proposing an output-based standard.
- Traditionally, utility NO<sub>x</sub> emissions have been controlled on the basis of boiler input energy (lb of NO<sub>x</sub>/million Btu heat input). However, input-based limitations allow units with low operating efficiency to emit more NO<sub>x</sub> per megawatt (MWe) of electricity produced than more efficient units. Considering two units of equal capacity, under current regulations, the less efficient unit will emit more NO<sub>x</sub> because it uses more fuel to produce the same amount of electricity. One way to regulate mass emissions of NO<sub>x</sub> and plant efficiency is to express the NO<sub>x</sub> emission standard in terms of output energy. Thus, an output-based emission standard would provide a regulatory incentive to enhance unit operating efficiency and reduce NO<sub>x</sub> emissions.

### **HOW IS EPA PROVIDING FLEXIBILITY TO INDUSTRY IN TODAY'S ACTION?**

- In selecting a single revised NO<sub>x</sub> emission limit, EPA tried not to limit the control options available for compliance, but to provide flexibility for cheaper and less energy intensive control technologies (i.e., by allowing the use of clean fuels for reducing NO<sub>x</sub> emissions).
- The proposed revisions also include some flexibility in reporting and recordkeeping requirements by allowing facilities to submit electronic quarterly reports in lieu of the written reports required under the current rule.

## **WHO WOULD BE AFFECTED BY TODAY'S ACTION?**

- The proposed standards would revise the NO<sub>x</sub> emission limits for new utility boilers and new industrial boilers. EPA estimates that 17 new utility boilers and 381 new industrial boilers will be constructed in the next 5 years. Only those utility and industrial boilers for which construction is commenced after the date of proposal would be affected by the proposed revisions.

## **HOW DOES TODAY'S ACTION AFFECT SMALL BUSINESSES?**

- The new source performance standards promulgated in 1990 for small industrial boilers contained no emission limit for NO<sub>x</sub> emissions from these facilities. EPA concluded that the cost to implement national NO<sub>x</sub> standards for these small units is sufficiently high and does not warrant their adoption. This review did not provide any additional information to indicate that the original conclusion is inappropriate. Therefore, EPA is not proposing NO<sub>x</sub> standards for small units at this time.

## **WHAT IS THE COST OF IMPLEMENTING TODAY'S ACTION?**

- The cost and environmental impacts of the proposed revisions are expressed as incremental differences between the impacts of utility and industrial boilers complying with the proposed revisions and these units complying with the current emission standards.
- The revised NO<sub>x</sub> standards would increase the capital costs for new boilers because the implementation of either SNCR or SCR requires additional hardware.
- EPA estimates that 17 new utility boilers and 381 new industrial boilers will be constructed over the next 5 years and would be subject to the revised standards. EPA estimates the nationwide increase in annualized costs in the 5th year following proposal for the projected new electric utility boilers subject to the revised standards would be about \$40 million.
- The estimated annualized cost impact of \$40 million assumes that all planned coal-fired units remain coal-fired and employ either SCR or SNCR. This represents an increase of about 1.3 mills/kwh in annual costs, or an increase of about 2 percent in the cost of generating electricity for these units.
- The nationwide increase in annualized costs for new industrial boilers subject to the revised standards would be about \$40 million in the 5th year following proposal. This is based on the assumption that no affected unit switches fuel type as the result of the revision. This represents an average increase of about 2 percent in the cost of producing steam for new units.

- EPA projects the cost of the revised NO<sub>x</sub> standards for utility boilers would be about \$1,500/ton of NO<sub>x</sub> removed. For industrial boilers, EPA projects the cost of the revised NO<sub>x</sub> standards will be about \$2,000/ton of NO<sub>x</sub> removed.

**FOR FURTHER INFORMATION...**

- Anyone with a computer and a modem can download the proposed rule from the Clean Air Act Amendments bulletin board (under "Recently Signed Rules") on EPA's Technology Transfer Network (TTN) by calling (919) 541-5742. For further information about how to access the bulletin board, call (919) 541-5384. You can also access the TTN directly through the World Wide Web at: (<http://ttnwww.rtpnc.epa.gov/>). For information concerning specific aspects of this project, contact Mr. James Eddinger, Combustion Group, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, (919) 541-5426.
- EPA's Office of Air and Radiation's homepage on the Internet contains a wide range of information on many air pollution programs and issues. The Office of Air and Radiation's home page address is: (<http://www.epa.gov/oar/>).