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FACT SHEET

FINAL REVISION OF STANDARDS OF PERFORMANCE FOR NITROGEN OXIDE EMISSIONS FROM NEW FOSSIL-FUEL FIRED STEAM GENERATING UNITS

TODAY'S ACTION...

- ! The Environmental Protection Agency (EPA) is issuing final revisions to the existing new source performance standard for emissions of nitrogen oxides (NO_x) from new utility boilers (electric utility steam generating units) and new industrial boilers (industrial steam generating units).
- ! The final revisions to the existing standards for NO_x emissions will reduce the NO_x emission limits for both utility and industrial boilers to reflect the performance of best demonstrated technology.
- ! The final revisions for utility boilers will also change the form of the revised NO_x emission limit for new utility boilers to an output-based format to promote energy efficiency and pollution prevention. An output-based format links the emission limit to the amount of electricity generated rather than to the fuel used for combustion.
- ! The revisions will be effective 60 days after publication in the Federal Register.

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.
- ◆ The regional transport and deposition of nitrogen oxides can result in adverse environmental effects such as acidic deposition and eutrophication. This occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life. Nitrogen dioxide 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 requires EPA to establish and, in the wake of new technology, revise standards of performance. EPA last revised the new source performance standards for emissions of NO_x from utility boilers (fossil fuel-fired electric steam generating units) in 1979 and industrial boilers (fossil fuel-fired industrial steam generating units) in 1986.
- ! Because of progress in control technologies since that time, on July 9, 1997, EPA proposed revisions to these standards of performance for both utility and industrial boilers. The Agency committed to a court-ordered schedule to finalize the revisions by September 3, 1998 after responding to issues raised by the commenters on the proposal.

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

- ! EPA’s final revised NO_x emission limits will reduce the projected growth in NO_x emissions by approximately 42 percent (45,800 tons/year) 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 costal 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.

WHAT ARE THE REVISED REQUIREMENTS?

- ! The final revisions change the format and reduce the numerical NO_x emission limit for new utility boilers. Specifically, the new emission limit is 1.6 lbs of NO_x per Megawatt hour of energy output (gross output). This emission limit was changed from an input-

based format (where emissions are linked to the fuel used) to an output-based format (where emissions are linked to the amount of energy generated) to promote energy efficiency and pollution prevention.

- ! For existing utility boilers that would become subject to the standards due to a modification or reconstruction, EPA revised the NO_x emission limit to be consistent with the requirement for new units, but expressed the emission limit in an equivalent input-based format (0.15 lbs of NO_x/million Btu).
- ! For new and existing industrial boilers that are subject to the standards, EPA lowered the standard to 0.20 lbs of NO_x/million Btu.

HOW DID EPA DETERMINE THE REVISED EMISSION LIMITS?

- ! The control technologies available for reducing NO_x emissions can be grouped into two different categories: combustion control and flue gas treatment. Combustion controls reduce NO_x emissions by suppressing NO_x formation during the combustion process. Flue gas treatment controls are add-on controls that reduce NO_x 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_x to nitrogen (N₂) 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_x to N₂ 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_x 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_x emission limits due to its relatively high NO_x removal efficiency.
- ! In selecting a single revised NO_x 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_x emissions). In addition, EPA believes the final revision 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_x emissions. Therefore, in an effort to promote energy efficiency in utility steam generating facilities, EPA is promulgating an output-based standard.

- ! Traditionally, utility NO_x emissions have been controlled on the basis of boiler input energy which is linked to the amount of fuel used for combustion (lb of NO_x/million Btu heat input). However, input-based limitations allow units with low operating efficiency to emit more NO_x 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_x because it uses more fuel to produce the same amount of electricity. One way to regulate mass emissions of NO_x and plant efficiency is to express the NO_x emission standard in terms of output energy. Thus, an output-based emission standard will provide a regulatory incentive to enhance unit operating efficiency and reduce NO_x emissions.

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

- ! In selecting a single revised NO_x 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_x emissions).

- ! The final revisions also include some flexibility in reporting and recordkeeping requirements by allowing facilities to submit electronic quarterly reports in place of the written reports required under the current rule.

WHO WOULD BE AFFECTED BY TODAY'S ACTION?

- ! The final standards would revise the NO_x 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 final 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_x emissions from these facilities. EPA concluded that the cost to implement national NO_x 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 promulgating NO_x standards for small units at this time.

WHAT IS THE COST OF IMPLEMENTING TODAY'S ACTION?

- ! The cost and environmental impacts of the final revisions are expressed as incremental differences between the impacts of utility and industrial boilers complying with the revisions and these units complying with the current emission standards.
- ! The revised NO_x 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 that 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. This estimate 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 also 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_x standards for utility boilers would be about \$1,500/ton of NO_x removed. For industrial boilers, EPA projects the cost of the revised NO_x standards will be about \$2,000/ton of NO_x removed.

FOR FURTHER INFORMATION...

- ! Anyone with Internet access can obtain the final revisions through EPA's website on

the World Wide Web under “recent actions” at: <http://www.epa.gov/ttn/oarpg> For further information about the revisions, contact Mr. James Eddinger of EPA's Office of Air Quality Planning and Standards at (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/>).