NEW SOURCE REVIEW UNDER THE CLEAN AIR ACT:

Ripe For Reform

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As currently applied, the New Source Review program wastes resources and can retard environmental progress. It should be replaced with more effective and efficient environmental policies.

The Bush administration, like the Clinton administration before it, is considering significant changes in the rules and guidance implementing a Clean Air Act requirement that new or upgraded facilities be cleaner than old ones. These changes would clarify the circumstances under which upgrade or maintenance projects at existing plants trigger this provision. Environmentalists (and some in Congress), who fear that the new guidance will also make it easier to modernize existing plants without installing new pollution control equipment, have cried foul, saying that the Clean Air Act's New Source Review (NSR) program is the cornerstone of meaningful environmental regulation of power plants and other major emissions sources.

In our view, critics of NSR reform are wrong on their own terms. As currently applied, NSR wastes resources and can retard environmental progress. To assure sustainable environmental progress, NSR should be replaced with more effective and efficient environmental policies. Here we discuss the inefficiencies inherent in NSR and briefly outline several more promising policy approaches that address the problems caused by the distinction between new and old plants.

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WHAT IS NSR?

The NSR program applies to any new source whose potential emissions at full utilization are high enough to qualify it as a major source[1]. The program also applies to any modification at an existing major source that results in an emissions increase. In addition to securing a permit prior to commencing construction or modification, sources subject to NSR must achieve emissions rates that reflect the performance of the best-available emissions control technology. NSR sources located in areas that do not meet national ambient air quality standards are also required to secure offsets for their emissions.

The NSR requirement under the Clean Air Act dates back to the 1970s. The lawyers and engineers who wrote the act thought they could secure greater environmental progress by imposing tougher emissions standards on new power plants (and certain other emissions sources) than on old ones. The theory was that emissions would fall as old plants were retired and replaced by retrofitting control equipment. But experience over the past 25 years has shown that this approach is both excessively costly and environmentally counterproductive. The reason for this is that companies are motivated to keep old (and dirty) plants operating and to hold back on investments in new (and cleaner) power generation technologies.

NSR AND NEW PLANTS

NSR can create perverse environmental incentives, especially when major technology advances make new plants much cleaner than old ones. A recent analysis by Byron Swift illustrates how NSR requirements can impede the adoption of clean and efficient energy technologies, such as combined heat and power (CHP) systems. In a modern CHP system, fuel is burned in a turbine to generate electricity, and the waste heat from combustion, which in conventional stand-alone generation systems is vented to the atmosphere, is used in commercial or industrial processes at the site. A new CHP installation using a gas-fired turbine with low-nitrogen oxide burners and no end-of-pipe emissions controls substantially reduces nitrogen oxide emissions from levels that would result from the continued operation of an existing onsite boiler to provide process heat and an offsite power plant to provide power. CHP also allows for a substantial reduction in the total primary energy input required to meet heat and power needs, yielding economic benefits and lower carbon dioxide emissions.

Unfortunately, NSR rules pose a substantial deterrent to the spread of CHP technology. Potential users of CHP, typically existing industrial or commercial facilities with old onsite boilers, are subject to an uncertain and time-consuming NSR permitting process. In addition, NSR rules require the application of end-of-pipe control technology to an already clean turbine with very low emissions. This requirement can significantly increase the cost of a CHP project and removes only a small amount of pollution, resulting in a very high cost per ton of removal — upwards of $25,000 by Swift's estimate, or 25 to 75 times the cost of emissions reductions available from existing sources.

In addition to delaying capital stock turnover, NSR can also promote environmentally perverse decisions regarding the use of new capacity. For example, new coal-fired power plants built following passage of the 1977 Clean Air Act Amendments are required to build and operate scrubbers to remove sulfur dioxide emissions. However, the costs of running scrubbers were high enough that new coal-fired plants were more expensive to operate than many existing ones, which were not regulated under a new source standard.

1 The cut-off value used to determine whether a source is major generally varies between 10 and 100 tons of emissions per year, depending on the source category and the severity of any air quality problem where the source is located.

Under these conditions, utilities reduced output from their new, scrubbed units while operating older plants at full capacity during off-peak seasons and time periods.

By reversing the usual preference for maximizing use of the most modern capacity, differentiated regulation sharply reduced the environmental benefits resulting from the mandated investment in expensive scrubbing equipment. This part of the story, at least, has a happy ending: the sulfur dioxide emissions trading program implemented under the Clean Air Act Amendments of 1990, which is discussed below, overcame the inefficiencies in sulfur dioxide regulation associated with NSR-type programs.

NSR AND EXISTING PLANTS

NSR applies to existing plants only if they make a major modification that results in a net increase in emissions. This approach has several serious problems. First, although old plants typically emit the lion's share of total pollution in any sector, NSR does not provide a continuous and effective incentive for emissions reductions at these plants. As a result, many of the most cost-effective emissions reduction opportunities are simply not exploited. Second, because the lengthy and costly NSR process is triggered by a "modification," the NSR program actually provides a disincentive for improvements and efficiency upgrades at old plants. Since adjusting the existing equipment to perform better can be a major source of pollution reductions as well as cost savings, the chilling effect of NSR can be both economically and environmentally harmful. Third, NSR creates a highly uncertain environment with high transaction costs for business.

The finding of a major modification inevitably raises tricky issues in situations where changes are made to an existing plant. The combination of delay cost, control technology costs, and the cost of emissions offsets create a powerful incentive for existing sources to avoid triggering NSR.

The decision to apply for an NSR permit rests with the plant owner. Routine maintenance, repair, and replacement activities are recognized as falling outside the scope of the NSR program, but the line separating these activities from a physical change that would be covered by the NSR process is subject to uncertain and changing interpretation. Several high-profile enforcement actions against major electric utilities were initiated in 1999, alleging that the utilities had evaded NSR requirements by improperly classifying major upgrade and life-extension projects as activities that do not count as major modifications under EPA's regulations.

Existing plants can also avoid triggering NSR requirements by demonstrating that a modification, even if otherwise major, does not increase emissions. For steam-electric generating units, actual emissions before the change are compared with projected emissions after the change to determine whether a modification increases emissions. Modifications that allow a plant to produce more electricity per unit of fuel burned can lead to an increase in its projected future emissions, because better efficiency will often result in higher projected utilization. Such projects can trigger NSR, even if they reduce emissions in the region, considering induced changes in the utilization of other facilities. Facilities other than steam-electric generating plants, which under current rules must compare their potential emissions at maximum operating rates after the actual change to actual emissions before it, face an even higher hurdle in demonstrating that a modification causes no increase in emissions.

The current interpretation of NSR discourages companies from maintaining their existing facilities. Plant owners contemplating maintenance activities

must weigh the possible loss of considerable regulatory advantage if the work crosses a murky line between upkeep and improvement. Protracted, costly, and time-consuming legal wrangling is inevitable over whether maintenance activities have crossed a threshold sufficient to justify forcing an old plant to meet new plant standards. In the electricity sector, the deferral of maintenance compromises generation plant reliability, and thereby increases the risk of outages.

WHAT CAN BE DONE?

Although environmental regulation is often necessary to achieve emissions reductions, research has shown that the NSR process unnecessarily drives up costs (not just for the electricity companies, but also for their customers and shareholders) and can result in worse environmental quality than would have occurred if firms did not face this disincentive to invest in new, cleaner technologies. NSR is reminiscent of the misguided 1970s effort to regulate differentially the price of old and new oil, which likewise created perverse incentives and spawned innumerable lawsuits. Congress and the administration responded by replacing that unworkable policy. It is time to take similar action with NSR. Both short- and long-run changes are needed.

The ultimate solution is a level playing field that motivates both old and new plants to cut emissions in order to achieve clearly defined environmental objectives. The best approach is to cap total pollution emissions and use an allowance trading system to assure that any emissions increases at one plant are balanced by offsetting reductions at another. The sulfur dioxide program in the 1990 Clean Air Act, which has successfully achieved targeted emissions reductions with a minimum of litigation, can serve as a model.

No matter how emissions are initially allocated across plants, the owners of existing plants and those who wish to build new ones will then face the correct incentives with respect to retirement decisions, investment decisions, and decisions regarding the use of alternative fuels and technologies to reduce pollution. Requirements for localities to meet ambient air quality standards would remain in effect, preventing a concentration of emissions allowed under the cap in any geographic region that would conflict with needs to protect public health with an adequate margin of safety.

Of course, emitters and environmentalists may have different views regarding stringency—which pollutants should be capped and at what levels. As we seek to craft policies to replace NSR, it will be important to weigh carefully the arguments presented by both sides regarding the environmental advantages and costs of alternative targets. To date, the evidence suggests that it is both feasible and desirable to set caps that would substantially reduce emissions of nitrogen oxides, sulfur dioxide, and mercury from their current levels.

As Congress puts caps for the relevant pollutants in place, NSR should be phased out. In the meantime, and for sectors and pollutants where cap-and-trade systems are not established, explicit NSR thresholds—such as spending more than 3 to 5% of a plant's value on maintenance procedures—should be set to reduce disincentives for maintenance that result from uncertainty. Other issues also need to be addressed as part of this process, including the choice of time period for measuring actual emissions prior to a physical change that could trigger NSR, the scope of opportunities to use an emissions bubble
combining several point sources in applying NSR, and ways to apply more uniform rules for comparing before and after emissions in all sectors.

Where to set investment thresholds and how to resolve these other issues are matters of dispute between industry and environmentalists, as both sides seek

leverage for upcoming debates in Congress. Neither side comes to the table with completely clean hands. But this short-run maneuvering should not detract attention from the importance of clearing up the current ambiguities in the NSR program.

Finally, some of the problems with NSR can be ameliorated by improved design in other parts of the regulatory program in order to explicitly recognize the importance of capital stock turnover to both environmental and economic progress. One idea along these lines is to allow the owner of a major emissions source affected by a new environmental standard the option of a somewhat longer period to bring the facility into compliance in exchange for a firm and enforceable commitment to retire the facility following the extension. The short-run environmental cost of such a policy arises from the possibility of a modest delay in reductions of the targeted pollutant.

However, retirement of an old facility, once it occurs, will often result in larger reductions in the targeted pollutant, as well as significant reductions in other emissions. For example, a new gas-fired power plant that would most likely replace an existing coal plant under today's market conditions would have substantially lower emissions of sulfur dioxide, nitrogen oxides, mercury, particulates, and carbon dioxide than the coal plant, even when the latter is retrofitted with advanced emissions controls. Thus, it is quite possible that the retirement option, if taken, can produce positive results—both from an environmental and an economic perspective—by helping to accelerate the replacement of dirty old plants with clean new ones.

It is not only possible, but also eminently reasonable to be both a strong advocate for environmental protection and a strong advocate for the elimination of NSR and its replacement with more cost-effective policies. And that is where the evidence leads us.

For More Information:

Edison Electric Institute. 2001. Straight Talk About Electric Utilities and New Source Review. (http://www.eei.org/issues/enviro/nsr/straight.pdf, accessed April 19, 2002). Lays out the concerns of major coal-burning utilities in a position paper.

Spitzer, Elliot. 2002. Press Statement by the New York Attorney General on the President's Air Policies. (http://www.oag.state.ny.us/press/2002/feb/feb14b_02.html, accessed April 19, 2002). Addresses environmental concerns.

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U.S. Energy Information Administration. 2002. Analysis of Strategies for Reducing Multiple Emissions from Power Plants: Sulfur Dioxide, Nitrogen Oxides, and Carbon Dioxide, SR/OIAF/2000-05, December. (http://www.eia.doe.gov/oiaf/servicerpt/powerplants/footnotes.html, accessed April 19, 2002). Provides an assessment of the potential impact on electricity markets of current NSR enforcement actions against coal-fired power plants.

U.S. Environmental Protection Agency (EPA), 2001 NSR 90-Day Review Background Paper, June 2001. (www.epa.gov/air/nsr-review/nsr-review.pdf, accessed April 19, 2002). Provides background on the NSR program and its implementation, and summarizes publicly available data related to the impact of the program on investment in electric generation and petroleum refining facilities and related environmental controls. EPA's technical NSR website can be found at http://www.epa.gov/ttn/ (accessed April 19, 2002).