NEW SOURCE REVIEW: REPORT TO THE PRESIDENT

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Overview

The New Source Review (NSR) program is one of many programs created by the Clean Air Act to reduce emissions of air pollutants – particularly "criteria pollutants" that are emitted from a wide variety of sources and have an adverse impact on human health and the environment. Other key programs include the Title IV Acid Rain Program, "MACT" standards and other air toxics standards, New Source Performance Standards, the 22-state NO_x "SIP Call," the Regional Haze Program, numerous mobile source programs, and other state and local SIP-based emissions standards. Government officials from both major political parties and industry groups have expressed the belief that the NSR program is unnecessarily complicated and often serves as an unnecessary obstacle to environmentally beneficial projects in the energy sector, such as those that improve energy reliability and efficiency and promote the use of renewable resources.

The President's National Energy Policy Development Group asked EPA to investigate whether the NSR program does, in fact, have such impacts. The Agency's review of the NSR program was broad-based. EPA held four public hearings, had individual meetings with over 100 groups representing the public, industry and State and local agencies, and reviewed over 130,000 comments from private citizens, environmental groups, state officials and industry representatives.

With regard to the energy sector, EPA finds that the NSR program has not significantly impeded investment in new power plants or refineries. For the utility industry, this is evidenced by significant recent and future planned investment in new power plants. Lack of construction of new greenfield refineries is generally attributed to economic reasons and environmental restrictions unrelated to NSR.

As applied to existing power plants and refineries, EPA concludes that the NSR program has impeded or resulted in the cancellation of projects which would maintain and improve reliability, efficiency and safety of existing energy capacity. Such discouragement results in lost capacity, as well as lost opportunities to improve energy efficiency and reduce air pollution.

For the refining and other industries, EPA concludes that NSR as applied to existing plants discourages projects that would have provided needed capacity or efficiency improvements and would not have increased air pollution – in fact in some cases air pollution may have decreased. EPA believes this can result in lost capacity or foregone opportunities to increase capacity without increasing emissions.

Finally, with regard to environmental protection, EPA concludes that preventing emissions of pollutants covered by NSR does result in significant environmental and public health benefits. Specifically quantifying the NSR program's contribution to these benefits is very difficult because of the variety of Clean Air Act programs that address these pollutants and because there is no tracking by any government agency of the reductions in emissions that sources make due to the program. Moreover, EPA recognizes that the Agency does not currently have other information that would be necessary to

quantify risk reduction benefits associated with the program. However, EPA believes that the inability to make exact estimates does not mean that the benefits of the NSR program are insignificant. EPA also believes, however, that for particular industry sectors the benefits currently attributed to NSR could be achieved much more efficiently and at much lower cost through the implementation of a multi-pollutant national cap and trade program. In particular the President's Clear Skies initiative is a much more certain and effective way of achieving emissions reductions from the power generation sector.

For virtually the entire history of the NSR program, representatives of industry, state and local agencies, and environmental groups have worked with EPA on developing improvements to the NSR program. These efforts came to a head in 1996, when EPA proposed a rule to "reform" the NSR program. Even after the proposal, stakeholders have invested countless hours in trying to find ways to make the program better. Based on the conclusions of this study and the recommendations from the State Governors and Environmental Commissioners[1] and other stakeholders, EPA now plans to finish the task of improving and reforming the NSR program.

I. The Charge to EPA

In its May, 2001 National Energy Policy Report, the National Energy Policy Development (NEPD) Group recommended that the Administrator of the Environmental Protection Agency (EPA), in consultation with the Secretary of Energy and other Federal agencies, "review New Source Review regulations, including administrative interpretations and implementation, and report to the President within 90 days on the impact of the regulations on investment in new utility and refinery generation capacity, energy efficiency, and environmental protection." Consistent with this recommendation, EPA conducted its examination and is now issuing this report. This report describes EPA's conclusions about the impacts of NSR on these three issues based on its review of the available information and comments.

II. Background

EPA assembled an interagency team for this project, including representatives from the Department of Energy (DOE), Department of the Interior (DOI), Office of Management and Budget (OMB), White House Council on Environmental Quality (CEQ), and the National Economic Council (NEC). In consultation with this group, EPA prepared a background paper, which was released on June 22, 2001 (EPA Background Paper). This paper described available data relevant to the three issues EPA was charged with reporting on: investment in utility and refinery capacity, energy efficiency, and environmental protection. The background paper included EPA's own data, as well as data provided in a supporting report by ICF Consulting Inc. (ICF Report), which summarized ICF's survey of the available literature and public statements on NSR issues. The background paper presented the data to facilitate public comment, and to provide the opportunity for external reviewers to provide additional relevant data. The background paper did not draw conclusions or make recommendations.

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[1] *See*, Resolution Number 01-12, Environmental Council of States on Reform of the New Source Review Regulations dated August 28, 2001, National Governors Association Policy Position, NR-18 Comprehensive National Energy Policy; Section 18.6.

Following the background paper's release, EPA initiated an intensive public outreach effort, consisting of three components: (1) a 30-day public comment period; (2) a series of four public hearings held in locations across the country; and (3) a series of meetings with more than 100 stakeholder groups, including environmental organizations, industry representatives, and State and local governments. During this public outreach period, EPA received written comments from over 130,000 individuals and organizations. A total of 255 people testified at the four hearings. All of the materials received during the public outreach period, including written comments, transcripts of the hearings, and attendance lists and written materials in connection with the stakeholder meetings, are available in public docket number A-2001-19 at the EPA's Office of Air and Radiation Docket and Information Center.

This report discusses the statutory and regulatory provisions of the New Source Review (NSR) pre-construction permitting program. While the report explains the views of many parties regarding the requirements of the NSR program, it is not intended to affect the NSR program or actions that EPA has taken to implement or enforce the NSR program[2]. This report does not substitute for statutory provisions or regulations, nor is it a guidance document reflecting EPA's interpretation of statutory or regulatory provisions. Its purpose is to summarize information that EPA has received relating to the NSR program and to report on EPA's findings concerning whether the NSR program has affected investment in new utility and refinery generation capacity, energy efficiency, and environmental protection.

New Source Review

EPA is strongly supportive of the goals of the NSR permitting program, whose basic requirements are established in parts C and D of Title I of the Clean Air Act (CAA). The purpose of the NSR program is to protect public health and welfare, as well as national parks and wilderness areas, as new sources of air pollution are built and when existing sources are modified in a way that significantly increases air pollutant emissions. Specifically, NSR's purpose is to ensure that when new sources are built or existing sources undergo major modifications: (1) air quality improves if the change occurs where the air currently does not meet federal air quality standards; and (2) air quality is not significantly degraded where the air currently meets federal standards. The fundamental philosophy underlying the NSR program is that a source should install modern pollution control equipment when it is built (for new sources) or when it makes a major modification (for existing sources). Congress believed that incorporating pollution controls into the design and construction when new units are built, or when major modifications occur, is generally more efficient than adding on controls after construction.

The NSR program is by no means the primary regulatory tool to address air pollution from existing sources. The Clean Air Act provides for several other public health-driven and visibility-related control efforts: for example, the National Ambient Air Quality Standards Program implemented through enforceable State Implementation Plans, the NO_X SIP Call, the Acid Rain Program, the Regional Haze

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[2] Note that many parties submitted comments concerning issues unrelated to the NEPD's recommendation for EPA to review on the impact of the regulations on investment in new utility and refinery generation capacity, energy efficiency, and environmental protection. For example, numerous parties offered comments as to the merits of pending NSR enforcement cases. This report does not summarize issues unrelated to the NEPD's charge.

Program, etc. Thus, while NSR was designed by Congress to focus particularly on sources that are newly constructed or that make major modifications, Congress provided numerous other tools for assuring that emissions from existing sources are adequately controlled. For example, the national cap on $S0_2$ emissions established under the Acid Rain Program applies to all existing electricity generating units, without regard to the date of construction or whether a given source has been modified.

NSR operates by requiring a source to obtain a permit prior to construction or major modification. The permit establishes various actions that the source must undertake to control its emissions of air pollution. However, NSR only applies if the construction project will emit air pollution that exceeds threshold levels established in the NSR regulations. For a new source, NSR is triggered only if the potential emissions qualify as major. For an existing major source making a modification, NSR is only triggered if the modification will result in a significant net increase in emissions.

The major NSR program comprises two separate parts: Nonattainment NSR and Prevention of Significant Deterioration (PSD).[3] These two programs have separate requirements to address the differing air quality planning needs in the areas where they apply. Nonattainment NSR applies in areas where air is unhealthy to breathe - i.e. where the established national ambient air quality standards (NAAQS) for a CAA criteria pollutant are not being met. These areas are called nonattainment areas. Nonattainment NSR for major sources of certain pollutants also applies in the federally designated ozone transport region (OTR), which consists of eleven northeastern States and Washington, D.C.[4] PSD applies to major sources located in areas where air quality is currently acceptable - i.e., where the NAAQS for CAA criteria pollutants are being met. These are called attainment areas. Because nonattainment areas have poorer air quality, nonattainment NSR requirements are generally more stringent than PSD requirements.

III. Impact on Investment in New and Existing Utility and Refinery Generation Capacity and Energy Efficiency

The EPA begins by examining the question of whether the NSR program has an impact on investment in projects that would increase or preserve utility and refinery generation capacity or that would improve energy efficiency. We received extensive comments on this issue, reflecting widely varying views on whether there is an impact and, if so, on its nature and extent.

In general, comments made by both the electric utility industry and the petroleum refining industry consistently assert that the NSR program has a significant and adverse impact on investment in expanding and preserving capacity, as well as on energy efficiency.[5] These commenters assert that the

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[3] The term NSR usually refers to the overall program, but is sometimes also used as shorthand to refer to nonattainment NSR, which may be a source of confusion. In this document, we will use NSR to refer to the general program (both nonattainment NSR and PSD), and will use nonattainment NSR when referring specifically to NSR for nonattainment areas.

[4] Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Washington, D.C.

[5] These comments were consistently raised by companies representing virtually all types (*e.g.*, coal-fired; oil-fired or gas-fired) and sizes of electric generating facilities. *See*, *e.g.*, Comments of the Clean Energy Group (CEG) [II-D-291]; Comments of the Utility Air Regulatory Group (UARG) [II-

program is in need of fundamental reform. Other industries (as discussed in Section IV below) made similar assertions, as did some State permitting authorities. These commenters said that investment is hindered by (1) regulatory uncertainty and lack of flexibility resulting from alleged recent policy "re-interpretations" related to the applicability of the program's requirements; and (2) the added costs and delays imposed by the NSR process.[6] Other commenters, including environmental groups and some State and local permitting authorities, expressed the opposite view. They assert that NSR does not appear to be significantly hindering such investment, adding that NSR has resulted in large benefits to the environment while allowing for increased energy and/or fuel supplies.[7] One environmental commenter does not believe that there is sufficient information to conclude that NSR is a primary factor driving decisions to invest or not to invest in capacity.[8]

This section discusses our conclusions based on a review of the available data and comments received regarding investment in new capacity and energy efficiency. Because the issues associated with new and modified source permitting differ, this paper will discuss separately the impact on new sources and the impact on existing sources undergoing changes.

A. New Sources

Focusing first on the impacts of NSR on investment in new capacity, the EPA finds that NSR does not appear to have a significant impact on investment in new utility or refinery plants. The discussion below indicates that, for utilities, significant new capacity has been permitted in recent years and substantial additional greenfield capacity is planned. For refiners, decisions about whether to construct new greenfield refineries are primarily driven by economic and environmental considerations. It does not appear that NSR has a significant impact on these considerations.

1. *Utilities*

D-303]; Comments of Class of '85 Regulatory Response Group (Class of '85 Group) [II-D-268]; Comments of National Rural Electric Cooperative Associations (NRECA) [II-D-322]. The members of these groups, as well as individual utilities that filed comments expressing the same conclusion, span the entire United States. *See, e.g.*, Comments of Northeast Utilities Service Company (NUSCO) [II-D-331]; Comments of Cinergy [II-D-270]; Comments of Sunflower Electric Power Corporation [II-D-292]; Comments of Tri-State Generation and Transmission Association [II-D-335]; Comments of West Associates [II-D-216]; Comments of Salt River Project (SRP) [II-D-320]. Even waste-to-energy facilities agreed with this conclusion. *See e.g.*, Comments of American Ref-Fuel [II-D-214]. The refining industry offered similar comments. *See* NPRA Letter to Stephanie Daigle, EPA, 7/23/2001.

[6] See comments by Michigan Department of Environmental Quality, representing a workgroup including Alabama, Michigan, North Carolina, South Carolina, Virginia and West Virginia permitting staff. [II-E-09].

[7] For other State comments, see STAPPA/ALAPCO, [II-D-313], CARB [II-D-468], RAPCA [II-D-302], Wisconsin, Missouri, et. al. For environmental groups, see, Clean Air Task Force [II-D-236], NRDC, Sierra Club [II-D-437], et. al.

[8] See Natural Resources Defense Council (NRDC) comments [II-D-267] at 1.

For electric utilities, significant new sources were permitted in recent years (dominated by natural gas-fired systems) and more are planned. The background paper noted current plans of certain companies to bring into service units producing more than 120 Gigawatts (GW) in the coming years. An analysis by the NorthBridge group, prepared for the Clean Air Task Force, uses RDI's NewGen database to estimate that it is likely that 214 GW - and possibly as much as 400 GW - of new generating capacity will come online before 2005, based on a survey of data on plants at various stages of development.[9] Several State commenters presented similar data. For example, New Jersey stated that it had permitted over 2500 MW of new electric generation since July 1999, and had proposed to approve another 1700 MW in July of 2001[10]. Another 5800 MW of applications were under review, and another 2000 MW of projects were in the pre-application meeting stage. These projects cover 22 facilities and 49 units. This 12,000 MW will result in a 60% increase over the 18,000 MW of existing generating capacity in New Jersey.[11] Other States and environmental group commenters presented similar data.[12] Although most of these projects will be subject to NSR, the program does not appear to be hindering their development.

In general, the DOE's experience is that far more capacity is planned than is ever actually realized. As it related to the analysis by the NorthBridge group, the DOE projects in its 2001 Annual Energy Outlook that only a small fraction of the capacity estimates by NorthBridge will actually come on line by 2005. For the period of 1999 to 2005, DOE estimates the following:

- Overall generation will increase from 3386 billion kilowatt-hours (BKWH) to 3810 BKWH.
- Overall capacity will increase by 74 GW (from 745 gigawatts (GW) to 819 GW).
- For coal-fired power plants, capacity will decrease slightly (from 306 GW to 301 GW), while generation increases from 1833 BKWH to 2085 BKWH, as existing units increase their hours of operation.
- For gas-fired plants, combined-cycle units will increase in capacity from 20 GW to 50 GW, while generation increases from 371 BKWH to 584 BKWH.

While these data indicate continued expansion in new generating capacity, some industry commenters assert that NSR can nevertheless introduce costs and delays to the process of bringing new generating units online, as well as have an impact on fuel supply flexibility. Utilities cited implementation of the requirements for preconstruction monitoring, modeling, and consultation with

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[9] This 214 GW increase would represent a 30 percent increase over the current installed capacity level, and would restore national reserve margins to about 25 percent, from a low of 8 percent in 1999.

[10] See New Jersey DEP comments [II-D-310].

[11] The State of Kentucky, in fact, put a hold on any new permit applications for electrical generation sources until it can analyze the environmental impacts of the large volume of pending permit applications.

[12] See, e.g., California Air Resources Board (CARB) [II-D-468], Georgia Department of Natural Resources (DNR) [II-D-341], Wisconsin DNR [II-G-71], STAPPA/ALAPCO [II-D-303], Clean Air Task Force [II-D-236], NRDC [II-D-267] and other similar comments.

Federal Land Managers, saying that the processing time by Federal, State and local governments and potential permit appeals can result in significant costs and delays in obtaining a permit. In particular, industry commenters, as well as some State permitting authorities, attribute a significant portion of the delay in obtaining NSR permits to the large body of NSR guidance that has been issued over the course of many years, by both EPA and State agencies administering delegated programs. This guidance frequently is case-specific in nature. Many commenters consider the guidance to be ambiguous and, in some cases, inconsistent.

Among the various aspects of the NSR program that industry commenters more specifically identified as concerns for new sources included the following:

- How to determine which emissions control technologies qualify as best available control technology ("BACT") or lowest achievable emissions rate ("LAER") technology using EPA's "top down" policy and the Agency's BACT/LAER clearinghouse.

- Procedural concerns about guidance issued by Federal Land Managers related to permitting near Class I areas.

- The limitation on construction activities prior to issuance of a permit, which is of particular concern when (1) the permit undergoes lengthy appeals processes, or (2) the climate is cold and the construction season is thus shorter.

- The cost and availability of offsets in nonattainment areas. Commenters, particularly in California and New York, noted that shortages in available offsets have the potential to significantly increase the cost of NSR permitting in certain limited areas. Permitting authority commenters noted that offsets represent from 1-6 % of the cost of a new power plant.[13]

Commenters further stated that NSR control requirements affect fuel supply choices for new installations. They point out that the cost of air pollution control represents a much greater proportion of the cost of construction at coal-fired facilities than at gas-fired plants.[14] Operation and maintenance costs are also higher. They believe this discourages investment in new coal-fired plants.

Other stakeholders offered a different view. Several State and local permitting authorities noted that the NSR process can generally be accomplished in a reasonable time, and within the same time frame as the other elements involved in planning of a typical electric generator project.[15] Some States reported acceleration of permitting times for new utility sources consistent with that reported in

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[13] STAPPA/ALAPCO comments [II-D-313] at 6.

[14] The primary air pollution control requirement commonly imposed on natural gas combustion is selective catalytic reduction, which adds about $30 per kilowatt to the cost of a combined cycle generation system. New pulverized coal systems require electrostatic precipitators or fabric filters for particulate matter control, scrubbers for sulfur dioxide control, selective catalytic reduction for nitrogen oxide control, and perhaps additional control technology for air toxics. Cumulatively, the systems needed for coal-based generation cost over $200 per kilowatt, and add about 20% to the cost of a new coal-fired system. For a 1000 MW unit, these translate into a cost of $200 million.

[15] See, e.g., STAPPA [II-D-313] at 3, New Jersey DEP [II-D-310] at 2.

the EPA Background Paper.[16] One State commenter suggested that the perception that NSR is lengthy, cost-intensive, and uncertain is really not the norm, though it can be true in exceptional cases.[17]

In EPA's experience, NSR has, in some individual cases, impeded new power projects. However, as a general matter, available information indicates that NSR typically does not represent a significant barrier to the construction of new electricity plants. As for the impact of NSR on fuel choices for new facilities, EPA notes that NSR typically does not require significantly greater levels of control at new coal-fired plants than the recently updated NSPS for large electric generating units. Thus, NSR itself is not the only driver with regard to air pollution control costs at new coal-fired units and does not appear to significantly influence fuel choices at new facilities.

2. *Refineries*

As noted earlier, the construction of new "greenfield" petroleum refineries in the near future seems unlikely for various economic and regulatory reasons, primarily unattractive profit margins. Industry has reported that the rates of return for refineries have averaged about 5 percent in the last decade, roughly equivalent to the return from a passbook savings account, but with much greater risk. As a result, building new plants at new sites is highly unlikely.[18] The EPA agrees with this assessment. Moreover, while any new refinery would be required to obtain an NSR permit, the available information does not indicate that NSR permitting is among the most significant impediments to the construction of new refineries. Refinery commenters indicate that any additional U.S. refinery capacity must come from either efficiency improvements or expansion at existing refineries (discussed below).

B. Existing Sources

The vast majority of concerns about NSR raised during the review pertained to existing sources. As discussed below, the EPA believes that commenters have identified areas where NSR can discourage investment in both preserving and maintaining utility and refinery generating capacity as well as in improving energy efficiency and expanding capacity.

1. *Utilities*

With respect to existing sources, comments from across the spectrum of the utility industry consistently asserted that the NSR program imposes significant burdens on the utility practices necessary to maintain the safety, availability, efficiency and reliability of the electricity supply at existing sources. They further assert it can have a highly negative impact on the nation's power supply. The result, they conclude, is that the program hinders investment in projects intended to expand and preserve generating capacity at existing electric generation units. In addition, as discussed below, many utility commenters believe that the current NSR program has actively discouraged efficiency

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[16] See CARB [II-D-468]at 4.

[17] Wisconsin DNR comments [II-G-71] at 1.

[18] See, Testimony of the National Petrochemical and Refiners Association (NPRA) before the Senate Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety on Apr. 5, 2001.

improvement projects, which they believe not only can have net environmental benefits, but also can provide an effective short-term response to tight reserve margins at many locations in the United States. On the other hand, environmental groups do not believe that there is sufficient information to conclude that NSR is the primary factor driving decisions to invest in new capacity at existing sources or that, absent NSR, significant investments would have been made that are presently not being made in recapturing lost existing capacity due to deterioration of equipment. This section examines more closely the capacity issues at electric utilities, followed by the energy efficiency issues.

a. Impact on Utility Projects to Maintain the Availability, Reliability, and Safety of the Electric Power Supply

(i) *NSR Applicability*

The utility industry comments predominantly focused on the exclusion from major NSR permitting requirements for activities that represent "routine maintenance, repair and replacement." They asserted that, in recent years, EPA has narrowed its interpretation of this exclusion to the point where NSR potentially applies to repair and replacement activities that are customarily undertaken within the industry to assure the availability, reliability, and safety of power plant operations. Commenters believe that under such an interpretation NSR would be required whenever the work involved: (1) a component that is replaced infrequently in the life of an industrial facility; (2) a component that is large and expensive (in absolute terms); or (3) a replacement component that is better designed and will improve the availability or efficiency of the facility.

Thus, according to the utility commenters, because electricity generation units are inherently large, complex, and expensive (in absolute terms), most power plant repair and replacement activity would not be covered by the exclusion. Because of the costs and potential delays associated with NSR, they believe that this has discouraged activities intended to maintain the reliability, availability, and safety of existing power plants; and/or has required generators to limit the output of their power plants to avoid triggering NSR, regardless of their capacity, in order to maintain the units during their normal useful lives. NSR costs and delays are of particular concern to commenters for such changes at existing units because (1) while certain projects might be relatively inexpensive absent NSR, they believe the cost of controls resulting from NSR can make them cost-prohibitive to undertake, which, in turn, can adversely affect the availability and reliability of plant operations and discourage such projects, and (2) they believe that units may need to be offline until permitting can occur, so delays in permitting can have significant impacts on energy supply through lost generation during this time.

Although utilities stated that NSR-required controls are expensive relative to the gains associated with projects that might trigger NSR, other commenters noted that these costs are small compared to the company's revenue. The Clean Air Task Force submitted a study by MSB Energy Associates performed on a sample of 51 existing coal-fired utility units. The study concludes that if these units triggered NSR and had to install BACT-level controls, the cost would be modest relative to the size and revenue level of the companies.[19] In the commenters' view, this impact is exchanged for significant environmental benefits, estimated at 2.8 million tons per year of sulfur dioxide (SO_2) (22% of

[19] See Clean Air Task Force Comments [II-D-236], Appendix D.

all power plant SO_2 emissions in the U.S.) and 1.0 million tons per year of NO_X (19% of all power plant NO_X emissions in the U.S.).

According to industry, thousands of repair and replacement projects are undertaken by facilities each year and that, as a result, NSR permitting is potentially triggered early in the life of virtually every electric utility plant, and then repeatedly thereafter.[20] The industry commenters submitted information about the types of projects they stated that they typically undertake, which they maintain are required to ensure reliability, availability, or safety of their facilities, but which they believe EPA would classify as non-routine and therefore would potentially be subject to NSR if they resulted in a significant net emissions increase.[21]

For example, a survey undertaken by the Tennessee Valley Authority (TVA) reported the frequency with which particular repair and replacement projects are undertaken within the electric utility industry.[22] The TVA survey covered approximately 20% of the electric utility industry -- 219 units totaling about 80,000 MW -- and included a review of case studies and statistics regarding cyclone replacement, balanced-draft conversion, reheater replacement, and economizer replacement. For example, their survey states that, at the 190 units in the survey that had reheaters, there were 213 reheater replacement projects (some reheaters were replaced more than once). At the 202 units in the survey that had economizers, there were 98 economizer replacement projects. For both components, replacements occurred as early as 5 years after initiation of a unit's commercial operation, or as late as 40 to 50 years. Similarly, at 151 boilers originally constructed as forced draft systems, utilities replaced 79 systems with balanced draft systems, primarily to address "equipment degradation, maintenance problems, health and safety concerns, and pollution control requirements."[23] Finally, the TVA survey reported that, since 1979, 300 cyclones out of 701 had been replaced at the 96 electricity-generating stations in the United States powered by cyclone boilers. UARG similarly reported a more complete, recent census of the entire coal-fired steam electric generating industry.[24] This census sought industry-wide information regarding the frequency of maintenance, repair and replacement activities that they believe EPA considers non-routine. The census results are reported to show:

- The industry has undertaken tens of thousands of such maintenance, repair or replacement activities;
- Every unit in the industry has undertaken such activities;
- Approximately 50% of the units in the industry will have undertaken such activity within five years of the unit's in-service date;
- Each unit in the industry undertakes on average annually at least one such activity.

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[20] UARG Comments [II-D-303] at 29-32.

[21] UARG Comments [II-D-303] Attachment C.

[22] *See* Jerry Golden, TVA, *Routine Maintenance of Electric Generating Stations* (February 2000) ("TVA 2000 Report"), *described in* UARG Comments [II-D-303] at 29-31.

[23] TVA 2000 Report at 25.

[24] UARG Comments [II-D-303] at 31-32.

In short, in the view of many industry commenters, an inappropriately narrow routine maintenance exclusion would not exclude many common maintenance projects. According to these commenters, this would leave nearly every coal-fired generating unit in a constant state of obligation to evaluate whether each of these numerous projects would trigger NSR, and if so, whether the costs associated with NSR (including, if applicable, the costs of add-on controls and potential downtime) would render such projects cost-prohibitive. As discussed below, if such projects are found to be cost prohibitive, commenters predict steady deterioration of existing capacity, and limited investment in the recovery of such capacity at existing sources. Many industry commenters echoed this conclusion and asserted that the situation is unacceptable and must be corrected to reflect the real environment surrounding routine maintenance within the electrical utility industry.[25]

On the other hand, environmental group commenters and some permitting authorities felt that the routine maintenance exclusion is appropriate. They believed that a less narrow exclusion would allow the exception to swallow the rule. In this vein, commenters expressed concerns that large-scale capital projects, such as major life extension projects, should not qualify as routine.[26] One of these commenters expressed concern that a facility could be virtually rebuilt without triggering NSR under industry's preferred interpretations of the routine maintenance exemption[27].

After reviewing the comments, the EPA notes that there are differing opinions amongst the commenters about the appropriate scope of the routine maintenance exemption and the resulting NSR impacts. In determining whether an activity is "routine" for purposes of being excluded from NSR, EPA consistently has taken a case-by-case approach, weighing the nature, extent, purpose, frequency and cost of the work, as well as other relevant factors. Nevertheless, the Agency recognizes that many industry commenters expressed uncertainty about the scope of the routine exclusion and argued that this uncertainty will cause them to delay or forego projects critical to maintaining the availability, reliability and safety of their facilities. In light of the volume of anecdotal evidence presented, the EPA concludes that concern about the scope of the routine maintenance exclusion is having an adverse impact on projects that affect availability, reliability, efficiency, and safety. Changes to the NSR program that add to the clarity and certainty of the scope of the routine maintenance exclusion will improve the process by reducing the unintended consequences of discouraging worthwhile projects that are in fact outside the scope of NSR.

(ii) *Energy Impacts*

According to utility commenters, the energy impact of an inappropriately narrow NSR routine maintenance exclusion would be adverse and potentially quite significant. In addition, the industry commenters stated that an inappropriately narrow exclusion would leave many activities potentially

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[25] NRECA Comments [II-D-322] at 14-15; *see also* Class of '85 Group Comments [II-D-268] at 9 ("Electric generating plant personnel have been placed in the untenable position of not being able to correct and improve the reliability and efficiency of their plants, resulting in compromised safety to plant employees and the general public, without risking an enforcement action."); Dairyland Comments (II-D-324) at 4 (EPA's current "interpretation may compromise the reliability and efficiency of existing plants and could undermine the preservation of a diverse energy supply.").

[26] See, e.g., RAPCA [II-D-302], Adirondack Council [II-D-136], Public Citizen [II-D-327].

[27] Public Citizen [II-D-327].

subject to NSR. This circumstance, they believe, would result in limited alternatives for utility managers. They describe three alternatives.

First, utilities could go through the NSR pre-construction permitting process. The principal complaints against this alternative were protracted processing delays and the attendant costs, including the costs of pollution control retrofits.[28] In addition, commenters feared that, if the interpretation of routine were to be narrowed, thousands of projects would trigger NSR per year, and would result in even more substantial delays by flooding the permit process with more permit applications than it has the capacity to process quickly.

Second, a company could accept enforceable emissions limits (through a "minor" NSR permit) in the form of a cap on emissions from the affected units.[29] Commenters stated, however, that acceptance of such a cap would require a utility to limit the affected unit's hours of operation and production rates to representative emission levels just prior to the change, which could restrict the electricity supply in a particular area.[30] Commenters also could limit emissions by adding pollution control technology, but commenters felt this was also not a workable NSR avoidance strategy because it also could be infeasible, cost-prohibitive, and would only be a temporary solution.[31] Moreover, commenters stated that the delays associated with the minor NSR process required to create the limit still severely impact a unit's ability to replace components necessary to get back online quickly after a forced outage.[32] For example, when a turbine rotor shaft cracks or slag falls and destroys a boiler floor, the utility must repair the component as quickly as possible and restore the unit to service. Commenters claim that, if the necessary repairs were not considered routine maintenance, repair and replacement, the repair could not be made until the source obtained an NSR permit. In the meantime, the commenters believe that the utility could lose the entire capacity of the unit, which could endanger the stability of the electrical grid and create a risk of regional blackouts. [33]

Commenters also argued that avoiding NSR by accepting caps on emissions through operational limits would constrain electrical system operators' flexibility to deliver necessary electricity at the least cost. In this regard, several utilities analyzed their systems to estimate the restrictions on their ability to produce electricity, had what they consider to be a narrow interpretation of the routine exclusion been applied over the last twenty years and had the utilities elected to obtain minor NSR permits limiting generation to recent levels in every instance they undertook certain replacement projects.

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[28] *See, e.g.*, Class of '85 Group Comments [II-D-268] at 9-10.

[29] Commenters also complained of delays in the minor NSR permitting process (an average of 3-8 months in one utility's service area.) *See* Jerry L. Golden & Donald P. Houston, TVA, *Impacts of EPA's Reinterpretation of New Source Review Requirements -- Potential Loss of Generating Capability on the TVA System,* at 8 (July 19, 2001) ("TVA 2001 Report") (Attachment E to UARG Comments [II-D-303]).

[30] *See* UARG Comments at 39-42; *see also* EPA Background Paper at 7.

[31] *See* UARG comments at 39-42.

[32] See, e.g., Class of '85 Group Comments [II-D-268] at 7, TVA 2001 report at 7 (Attachment E to UARG Comments [II-D-303]).

[33] *See, e.g., id.*

For example, TVA (serving approximately 2.3 million homes in the Tennessee River Valley),[34] reported that, over the last twenty years, it would have lost 32% of its coal system's energy capability, or 34 million megawatt-hours (MW-hr) annually. In a similar analysis, the Southern Company found that, by the year 2000, it would have had an energy shortfall of 57.5 million MW-hr, and that it would not have been able to meet 38% of its customer demand.[35] Similarly, First Energy estimated that it would have lost 39% of its coal-fired generating capacity between 1981 and 2000.[36] West Associates (a western utility with a younger fleet of generating units) estimated a loss of 27% of generating capacity of one of its plants just in the next six years. West Associates also estimated that, after 10 years of operation under this "cap system," the Western System Coordinating Council (WSCC) would have lost 65 million MW-hr of generating capacity, or the equivalent of 32 power plants with a net capacity of 250 MW each.[37] The National Rural Electric Cooperative Association (NRECA) estimated that, in one maintenance cycle, the loss of capability for the approximately 21,000 MW of cooperative-owned plants would be 12% to 24%.[38] Nationally, using this analysis method, one commenter stated that it would take 200 new 500 megawatt power plants just to make up the lost capacity, that is, to stay at the current levels of available supply.[39] Maximizing the utilization of existing generation capacity can be critical to ensuring the ability of utilities to meet consumer demand in peak periods.

Third, according to industry commenters, a company could simply choose not to undertake the needed maintenance, repair and replacement projects in question, so as to avoid triggering NSR. They believe this would result in a loss of electricity generating capacity, because delayed and foregone maintenance leads to a decrease in availability and reliability.

In addition, commenters suggest that such a decrease also could have a negative impact on the energy efficiency of the unit and the overall efficiency of a utility system. This is because, if a larger utility unit becomes unavailable during a period when it would have been utilized to meet consumer demand, then multiple smaller, less efficient units often must be utilized in its place.[40] One utility commented that only through maintenance of highly efficient low-cost baseline generation is the retirement of more inefficient units possible.[41] The commenter asserted that less efficient units are more costly to operate and generally produce more pollution per unit of electric output.

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[34] TVA 2001 report at 12-14.

[35] Southern Company, *The Dismantling of Energy Supply Capacity Through New Source Review* (Attachment D to UARG Comments [II-D-303]).

[36] First Energy Comments [II-D-261] at 1.

[37] West Associates Comments [II-D-216] at 7.

[38] NRECA Comments [II-D-322] at 7. Other commenters that submitted similar analyses include: Minnesota Power Comments [II-D-165] (25% lost production); Dairyland Comments [II-D-324] at 7 (41% lost generating capacity); SRP Comments [II-D-320] at 6 (18.5% loss).

[39] *See* UARG Comments [II-D-303] at 39.

[40] *See* Ralph L. Roberson & Richard D. McRanie, Thoughts *on Power Plant Efficiency*, at 7 (Attachment F to UARG Comments [II-D-303]) (RMB Report); *see also* Class of '85 Group Comments [II-D-268] at 5-6 (noting that utilization of base-loaded units displaces less efficient, more polluting plants).

[41] First Energy Comments [II-D-261] at 1.

EPA notes that the possible energy impacts predicted by industry commenters appear to flow from the industry's reported uncertainty regarding the scope of the routine maintenance exclusion. Consistent with our conclusion in the previous section of this report, we conclude that concern about the scope of the routine maintenance exclusion is having an adverse impact on projects that would improve the reliability and availability of existing electric generating facilities. We also note that, when catastrophic forced outages have occurred in the past, the Agency has consistently worked with industry and State and local permitting authorities to allow the facility to get the unit back and running quickly.

B. Impact on Efficiency Improvement Projects

(i) *NSR Applicability*

With respect to the issue of energy efficiency, a significant number of industry commenters stated that an inappropriately narrow routine maintenance, repair and replacement exclusion would prevent electricity generators from taking advantage of opportunities to improve their generating efficiency. One measure of such efficiency is "heat rate," or the amount of fuel-bound energy required to produce a unit of electrical power (typically expressed in million BTU per kW-hr). Improving an electric unit's efficiency – *e.g.*, its heat rate -- means that less fuel is required to produce the same amount of electrical power, reducing pollution per unit of production output. Alternatively, improved efficiency may allow a unit to produce more electricity for the same amount of fuel burned (*i.e.*, with no greater amount of emissions). New electric generation technologies often lead to energy efficiency improvements, but industry raised concerns that applying these new technologies (*i.e.*, replacing boiler or turbine components with components of better design and materials) often could trigger NSR – in some cases even if the unit's emissions rate does not increase – because the source uses the more efficient unit more than it used the old one.

These commenters stated that the turbine blade project that was the subject of the Detroit Edison applicability determination is a good example of such a project.[42] Industry reports that, under a voluntary self-reporting program initiated by the Energy Information Administration (EIA), utilities have reported numerous projects that are expected to increase efficiency.[43] Commenters cited as examples projects ranging from load optimization programs and improved boiler controls to replacing turbine blades and rotors, to upgrades or replacements of components like superheaters and condensers. [44]

Industry commenters noted that EPA views such energy efficiency projects as the Detroit Edison turbine blade upgrade as "markedly different from the frequent, inexpensive, necessary, and

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[42] EPA Background Paper at 28.

[43] RMB Report at 6 (Attachment F to UARG Comments [II-D-303]).

[44] Industry commenters state that most energy efficiency improvements can be linked with tangible benefits to the environment and that unless the power source is in close proximity to the process in which energy efficiency is improved, the emissions benefits are not necessarily local. If the power source is a grid, it may not be possible to predict where all the benefits will occur, nor what their magnitude would be. Nevertheless, commenters believe that energy efficiency should be an important aspect of meeting national air pollution goals because the energy saved is energy that would have otherwise been generated.

incremental maintenance and replacement" of deteriorated components and, therefore, not within the scope of the routine maintenance exclusion.[45] Industry commenters expressed concern that this could result in the discouragement of energy efficiency improvements because they could be subject to NSR. For utilities, this is a particular concern in any jurisdiction that has not incorporated the WEPCO rule emission increase methodology because the "actual-to-potential" test applies in these jurisdictions.[46] In non-WEPCO jurisdictions, and in all jurisdictions for non-utility activities, industry commenters said that NSR could apply to any project that both corrects availability/reliability problems and improves efficiency (because of the belief that any project that corrects availability/reliability problems could result in an emissions increase under the actual-to-potential test), and to any efficiency improvement project at a unit that is not at the very top of a system's loading order. Even for units that are at the top of the loading order of a particular system, like Detroit Edison's Monroe units, industry commenters expressed concern about whether any efficiency improvement could be shown not to increase emissions, because an efficiency improvement almost always makes the improved unit more attractive to run.

Utility commenters stated that the Detroit Edison applicability determination discourages utilities from undertaking efficiency improvement projects.[47] They suggested that utilities are likely to forego efficiency improvements in order to avoid the uncertainty, delays and potential costs associated with NSR applicability. One commenter sought to illustrate this point in responding to the EPA Background Paper's inquiry regarding whether NSR applicability alters the economics of efficiency improvement projects by evaluating a typical turbine efficiency improvement project. This evaluation showed that such a project would cost approximately $937,000 for a 250 MW unit, and would be expected to yield additional revenues of $21.5 million (present value). For such a unit, however, the commenter determined that NSR applicability would result in expensive retrofits, with a capital cost (*i.e.*, excluding operation and maintenance of the retrofits) approximating $68.4 million.[48]

Industry commenters said that discouraging efficiency improvement projects also results in more emissions than if the projects could go forward without NSR. They argue that, on a megawatt basis, efficiency improvements reduce pollution,[49] and that, even if utilization increases at the unit with improved efficiency, the dynamics of economic dispatch of electric generating units mean that the increased utilization at that unit necessarily displaces less efficient, and therefore more-polluting, plants.[50] Thus, the industry concludes that discouraging efficiency improvements almost always results in higher emissions than if these improvements had been made. As an example, the Detroit Edison case was again cited, where the use of the more efficient blades would have permitted each generating unit to produce the same amount of electricity as it had in 1994 while burning 112,635 fewer tons of coal. The

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[45] EPA Background Paper at 28 (citing Detroit Edison Applicability Determination, May 23, 2000).

[46] Under EPA's "WEPCO rule," NSR is not triggered for existing utility sources unless there is a significant net increase in actual emissions using an actual to predicted future actual methodology.

[47] *See, e.g.*, Class of '85 Group Comments [II-D-268] at 5; UARG Comments [II-D-303] at 45.

[48] *See* Comments of Xcel Energy [II-D-213] at 6-7.

[49] EPA Background Paper at 28.

[50] *See* Class of '85 Group Comments [II-D-268] at 5-6; *see also* FirstEnergy Comments [II-D-261] at 1-2.

result, according to commenters, would have been a reduction of 1,826 tons per year (tpy) in SO_2 emissions, 1,402 tpy in NO_X emissions, and 259,111 tpy in carbon dioxide (CO_2) emissions, assuming that input design parameters (maximum heat input and fuel consumption specifications) remained the same. Detroit Edison estimated that more than 1,000 other electric utility units in the United States have the capability to achieve similar reductions through similar turbine blade replacements and other projects; thus, extrapolating based upon these estimates, they predict that by encouraging the adoption of blading efficiency improvements, CO_2 emissions would be reduced by 81 million tons per year or more, provided input design parameters (maximum heat input and fuel consumption specifications) remained the same. They predict that SO_2 and NO_X emissions would also be reduced significantly.

In contrast, commenters from environmental groups believe that NSR treats energy efficiency improvement projects appropriately. They stated that NSR only applies when a project results in an emissions increase and that the types of projects discussed above where significant reductions are achieved would not trigger NSR. However, if an energy efficiency project also results in a significant emissions increase, these commenters felt that it would be inappropriate to exempt the increase from review under NSR.[51] One commenter also questioned whether NSR is the predominant factor in influencing a decision about whether to proceed with an efficiency project, noting that some analysts believe that the regulation of utility rates – and specifically their treatment of cost recovery – has lessened the incentive for heat rate improvements.[52]

In reviewing the information regarding energy efficiency projects, the EPA concludes that NSR may discourage some energy efficiency improvements. EPA notes that as long as utilization remains constant, energy efficiency improvements can result in significant emissions reductions. Such projects would not trigger NSR if there were not a significant emissions increase.[53] Because such projects are not subject to the NSR regulations, NSR generally has a negligible impact in such cases. However, as noted above, energy efficiency improvements are often associated with increases in utilization, because the more efficient generating units are dispatched more often. Efficiency improvements can also result in an increase in capacity or availability. In such cases, there can be local emissions increases that trigger NSR if the projects are not routine maintenance. For example, in Detroit Edison, if a five percent increase in operation were to result, actual increases on the order of 800 tons of NO_X and 2000 tons of SO_2 would occur. Even if these emissions increases occur at the same time as emissions decrease somewhere else, some commenters expressed concerns about the localized impacts of potentially large emissions increases, and felt that review under NSR was needed to address them.

Congress provided that where physical changes at a plant result in significant increases in air pollution, these plants should go through NSR and take steps to control emissions. Even if a physical change is relatively inexpensive when compared to the cost of the controls that are projected to result from NSR, the change could still result in emissions increases that Congress believed should undergo review. However, as noted in the example turbine efficiency improvement project above, and echoed throughout many comments, the costs associated with NSR, particularly the costs to retrofit pollution controls, can render these projects uneconomical. Thus, the EPA finds that NSR discourages some

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[51] See, e.g., July 20 testimony of John Walke, NRDC.

[52] NRDC Comments [II-D-267].

[53] This was the case in Detroit Edison, where there was no expected increase and therefore the proposed project did not trigger NSR. [See Detroit Edison Applicability Determination]

types of energy efficiency improvements when the benefit to the company of performing such improvements is outweighed by the costs to retrofit pollution controls or to take measures necessary to avoid a significant net emissions increase. The EPA recognizes the need to promote the development of efficient and more environmentally friendly designs.

On the other hand, it is also clear that a wide range of activities at an electric utility can have energy efficiency benefits, from everyday maintenance to major capital projects. In general, the EPA encourages efficiency improvements wherever feasible. However, the scope and magnitude of some of the kinds of changes, their impact on recovering capacity that had been lost to deterioration of equipment, their impact on significantly extending the life of the boiler, turbine, etc., and the resulting significant emissions increase, necessitates that certain projects which may result in efficiency improvements, must be reviewed under NSR. Though projects of this magnitude still may go forward once their air quality impacts are addressed, the EPA finds that NSR can discourage companies from undertaking them.

(ii) *Energy Impacts*

The ICF report in support of the EPA Background Paper referred to various data, such as those of the National Coal Council (NCC) May 2001 report, which estimate that repairs and replacements that improve efficiency at existing coal-fired facilities could result in an increase in capacity of 5% to 10%. Applied across the entire coal-fired electric generation capacity of the United States (over 300 GW) this would result in an additional capacity of 15,000-30,000 MW. This is the equivalent to 30-60 new 500 MW plants or enough power for 10-20 million homes.

Similarly, as noted in the EPA Background Paper, the NCC report found that coal-fired units over 20 years of age had been substantially derated, and concluded that: "If all existing conditions resulting in a derating could be addressed, approximately 20,000 MWs of increased capacity could be obtained from regaining lost capacity due to unit deratings." Likewise, the NCC reported that 20,000 MW of additional capacity could be gained by "increasing heat input and/or electrical output from [existing] generating equipment." Moreover, the NCC found that this restoration and increase of capacity from existing units could only be economically viably pursued by the facility owners if, among other factors, the increased availability and/or electrical output would clearly not trigger NSR. Other industry representatives supported this estimate.

Conversely, environmental group commenters expressed the view that such investments are not as profitable as investments in completely new electric generation capacity and that this is why the industry is not pursuing them, as opposed to NSR being the major impediment.[54] They also estimate that the emissions reductions from efficiency improvement projects would be small compared to the reductions that would be achieved if NSR applied.

In conclusion, for the utility industry, with respect to existing sources, and in contrast to new sources, the EPA finds that the available information indicates that the NSR program is having an adverse impact on investment in both electric generation capacity and energy efficiency. While there are only limited data that prove that NSR has resulted in the cancellation of otherwise economical

[54] Clean Air Task Force comments [II-D-236] at 49 and App. C.

projects of either type, a significant number of industry commenters presented a variety of projects at existing sources that could have increased capacity, improved reliability, or enhanced efficiency, but were made uneconomical due to delays and costs associated with NSR. The EPA finds many of these cases to be credible and based on real-world examples, and believes that they demonstrate that NSR has an adverse impact on such investment at existing sources. It is reasonable to conclude that the foregone investment has resulted in foregone capacity increases through decreased reliability and availability that are not recovered, and through foregone efficiency improvements.

2. *Refineries*

Turning to the question of NSR impacts on investment in capacity at existing refineries, the EPA finds that the comments again highlight areas where NSR may adversely impact investment in capacity and energy efficiency projects. These areas are examined further in this section in order to assess their nature and extent.

Refinery commenters observe that the refining industry differs considerably from the electric utility industry in several respects. For example, it is operating much closer to full capacity than the utility industry, and it is not transitioning from an economically regulated basis to a market basis. Even while operating at very high utilization rates, commenters noted that the industry must be able to respond rapidly to changes in raw material availability, market demands, and environmental requirements. API explained that, "[r]efiners are required by law to make adjustments to fuel specifications from one season to another, produce fuels meeting multiple specifications in various regions of the country, and reconfigure to refine cleaner burning low sulfur diesel and gasoline, all while being able to supply fuels to meet constantly changing customer demand."[55] API suggested that these requirements necessitate frequent and rapid responses that may involve changes to a refinery's facilities and processes. Moreover, they note that, to meet demand for petroleum products and avoid market disruptions that can lead to shortages and price volatility, the refining industry must be able to maintain the availability, reliability, and safety of its facilities. NPRA's comments noted, "Refining operations are continuous and complex. They depend on the simultaneous operation of many individual, but inter-related, pieces of equipment ("units"). A delay or inability to change or improve operations of a single unit can have a significant cumulative impact on the refinery's ability to produce the fuels that its customers, and the national economy, rely upon."[56] To meet increasing demand without major construction of new refining facilities, commenters believe that the industry must improve the efficiency of its existing facilities, and it must engage in what one industry commenter described as a "continuous incremental improvement in production capacity."[57] Finally, as noted in the Background Paper, and above, with no new refineries likely to be built in the near future, assessing the impact of NSR on existing sources is particularly critical.

As with utilities, refineries maintain that the exclusion for "routine maintenance repair and replacement" has been narrowed by EPA in recent years and undercuts their ability to respond quickly to market changes and raw material availability. In addition, refinery industry commenters expressed concern about the test used to determine whether a change results in an emissions increase at non-utility

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[55] API Comments [II-D-134] at 1-2.
[56] *See* NPRA Comments [II-E-27]at 2.
[57] *See* BP America comments [II-D-307] at 2.

source categories (i.e., the "actual to potential" test). In the view of many refinery commenters, the NSR program has the effect of constraining the industry's ability to (1) expand domestic refining capacity, (2) increase the supply of cleaner burning fuels, and (3) enhance energy efficiency.[58] The commenters said that under the NSR program, numerous common activities at a refinery – whether required to respond to demand changes, to repair or replace a broken piece of equipment, to improve efficiency, to expand refining capacity, or even to respond to environmental requirements – are potentially subject to NSR permitting.[59] One industry commenter states that hundreds of such activities are undertaken each year at existing U.S. refineries.[60] According to commenters, the lengthy, costly, and uncertain nature of the current NSR permitting process discourages those activities to which it potentially applies, or at least introduces significant delays in and constraints on the ability of the operator to make the required changes in an efficient and timely manner.

Refining industry commenters also noted that, in their opinion, the NSR emissions increase test for non-utilities (the "actual-to-potential" comparison) presumes that virtually any activity at a refinery increases emissions within the meaning of NSR, even if the activity were, in fact, to result in decreased actual emissions.[61] Thus, these commenters stated that, of the activities undertaken at a given refinery, only those activities ultimately deemed to constitute "routine maintenance, repair or replacement" might avoid NSR. However, according to industry commenters, few activities beyond the most mundane maintenance activities that may be undertaken each year at a given facility would be deemed "routine" under the NSR regulations.[62] One commenter maintained that the NSR program would apply NSR to any change that: (a) results in an increase in capacity or capacity utilization of an existing process unit; or (b) increases the efficiency or lowers the unit operating costs; or (c) extends the useful life of that unit ..."[or (d)] increase[s] unit reliability."[63] According to industry, these are precisely the types of activities that U.S. refineries must constantly undertake to meet demand and minimize fuel supply disruptions and price volatility. Moreover, commenters suggest that the use of an actual-to-potential test encourages industry to maximize current actual emissions within permit limits, rather than providing incentives for emissions reductions.[64]

Industry commenters provided a list of activities that they reportedly undertake to maintain reliability, improve efficiency, and expand capacity that, in their view, are typically undertaken in the industry but, nevertheless, are potentially subject to NSR under the current program.[65] According to industry, the potential applicability of NSR, which they believe could encompass virtually any given project, tends to discourage operators from undertaking particular projects because NSR would add

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[58] NPRA letter to Stephanie Daigle, EPA, 7/23/2001.

[59] *See* API Comments [II-D-134] at 2; ExxonMobil Comments [II-D-418] at 2; NPRA Comments [II-E-27] at 3.

[60] *See* Marathon Ashland Petroleum LLC (MAP) Comments [II-D-253] at 2.

[61] *See, e.g.*, ExxonMobil Comments [II-D-418] at 11(commenting that actual-to-potential test "fabricate[s] emission increases" where no increases actually occur).

[62] *See* ExxonMobil Comments [II-D-418] at 12; BP America Comments [II-D-307] at 2; MAP Comments [II-D-253] at 2.

[63] *See* BP America Comments [II-D-307] at 2.

[64] NPRA Comments [II-E-27] at Attachment 1, No. 1.

[65] See, e.g., NPRA comments [II-D-400] and API comments [II-D-134].

significant delays and costs.[66] Industry commenters observed that the EPA Background Paper's estimate for the length of time typically necessary to obtain an NSR permit did not include the time spent prior to submittal of a complete application. If such time is included, the length of the NSR permitting process in the experience of refinery commenters is at least 7 to 22 months, excluding any post-issuance appeals and challenges.[67] An industry commenter further predicted that, if the listed activities are viewed as non-routine, the refining industry, as well as other U.S. industries, would experience much longer lead times in obtaining NSR permits than already occur.[68]

Like utilities, refiners also raised the concern that there would be limited options for projects that are potentially subject to NSR.[69] They described three options. First, the operator could seek to obtain an NSR permit, accepting the delays, uncertainties, and potentially significant costs that commenters say are associated with such permits.[70] Alternatively, an operator could seek to "avoid" NSR by limiting emissions to past, actual levels through a minor NSR permit (a permit which, according to industry, can take 3-12 months to obtain), thus giving up refinery capacity and "deprive[ing] the source of the 'headspace' between actual and allowable emissions that is crucial to long-term operating flexibility and the ability to respond quickly to changes in demand."[71] A third option would be to simply cancel the project, and forego the projected benefit that was the reason for the project in the first place.

Overall, the comments submitted by refinery and other commenters during this review process emphasize their belief that by imposing significant costs and delays, the NSR program discourages investment in projects that are necessary to maintain the reliability of existing refineries, improve their efficiency, expand capacity, and respond flexibly to rapidly changing consumer demand for petroleum products. According to one commenter, what the industry most needs is certainty and flexibility in its efforts to meet both the energy needs of the Nation and environmental requirements.[72]

In contrast, NRDC's comments suggest that poor return on investment is more important than environmental considerations (of which NSR is only a small part, and is not specifically named by sources examined in the EPA Background Paper) in any decisions not to invest in new capacity.[73] They point to information presented in the Background Paper showing that, in recent years, there has been significant investment in refinery capacity at existing sources.

As discussed above for utilities, the EPA notes that for refineries there are also differences of opinion amongst the commenters about the scope of the routine maintenance exclusion and the resulting impacts. In determining whether an activity is "routine" for purposes of being excluded from NSR, EPA consistently has taken a case-by-case approach, weighing the nature, extent, purpose, frequency and cost of the work, as well as other relevant factors. However, EPA acknowledges, as it did for utilities,

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[66] NPRA Comments [II-E-27]at 2.
[67] *See* API comments [II-D-134] at 8.
[68] *See* ExxonMobil Comments [II-D-418] at 16.
[69] *See* BP America Comments [II-D-307] at 2.
[70] *See id.*; *see also* ExxonMobil Comments [II-D-418] at 18 (noting both the cost and scheduling impacts of NSR on project economics).
[71] *See* BP America Comments [II-D-307] at 2-3.
[72] *See* API Comments [II-D-134] at 2.
[73] NRDC comments [II-D-267]at 5.

that the comments report significant uncertainty about the scope of the "routine" exemption. Such uncertainty can result in the delay or cancellation of projects. Changes to the NSR program that add to the clarity and certainty of the scope of the routine maintenance exclusion will improve the process by reducing the unintended consequences of discouraging worthwhile projects that are in fact outside the scope of NSR.

A key difference between utilities and refineries is the fact that refineries use the "actual-to-potential test" for determining NSR applicability, while utilities generally do not. The EPA has reviewed a number of examples where projects could have provided capacity increases or energy efficiency improvements, and likely could have done so without increasing actual emissions, and in some cases the projects appear likely to decrease actual emissions. Such projects, if they occur at units operating below capacity, could trigger NSR or, at least, trigger a need to cap the units below capacity or install pollution controls to avoid NSR. Again, the determination of whether a change results in an emissions increase is a case-by-case determination, but the EPA believes that the commenters' examples make a credible case that some capacity or efficiency projects that do not increase *actual* emissions are not undertaken because they trigger NSR under the actual-to-potential test. Although the information is mostly anecdotal in nature, the EPA believes that the information presented is based on real world experience, and makes a credible case that some projects are not going forward in part because of NSR. The EPA believes that this results in lost refining capacity, or foregone opportunities to increase capacity without increasing emissions.

IV. Impact on Industries Other than Electric Utilities and Petroleum Refineries

In addition to the information supplied to EPA by utility and refinery commenters, the Agency received numerous comments from other industries regarding the NSR program's impact on energy use, efficiency, and capacity. These comments came principally from a variety of industry associations and coalitions of manufacturers representing the automobile, aerospace, chemical, electronics, food, aluminum and steel, packaging, paper, printing, pharmaceutical, and other manufacturing sectors. Like the utility and refining industries, these commenters were primarily concerned with the current application of the NSR program to existing sources. They noted many anecdotal instances where projects would have reduced energy demand and/or increased energy efficiency, but were abandoned because of NSR permitting delays and/or costs associated with the retrofit of existing equipment with the BACT or LAER emissions controls mandated by NSR rules. Other commenters presented similar examples of pollution control and pollution prevention projects abandoned because of potential NSR applicability. According to the commenters, the cancellation of projects that would have improved energy efficiency or decreased pollution means that NSR is having an adverse impact on investment in both energy efficiency and environmental protection.

Among the general concerns voiced by commenters in addition to pollution control costs were claims that (1) the NSR program is complex and gives rise to uncertainty and associated delays, (2) it hinders flexibility for industry to quickly make needed changes, and (3) that it results in the loss of production capacity where NSR is triggered based on the application of the actual-to-potential test, even if emissions will not actually increase. Furthermore, commenters argued that if a source wants to

avoid NSR, it faces the undesirable outcome of accepting new emissions limits in the NSR permit that, according to commenters, effectively reduce a plant or unit's productive capacity.[74]

A. NSR Applicability

1. *Routine Maintenance, Repair & Replacement*

As with utilities and refineries, many commenters from other industry sectors focused on the NSR "routine maintenance, repair and replacement" exclusion. Like the industries discussed above, they believe that EPA has narrowed the exclusion in recent years. Thus, they stated this was the day-to-day largest problem in maintaining the availability, reliability, and safety of production equipment.[75] In particular, commenters asserted that projects involving repair or replacement components incorporating "state-of-the-art" improvements in materials or design may be subject to NSR since they may not qualify as routine maintenance, or may result in more efficient utilization of fuel and/or raw materials that may potentially increase a facility's emissions. For instance, at one plant, a company states that it elected not to replace spray nozzles in a process dryer, even though it determined that significant energy savings could result, because it concluded that the new Teflon coated nozzles would not be equivalent parts and, therefore, the project would not be exempt from NSR as routine. According to the commenter, the new nozzles would have resolved the repeated need to replace the existing equipment, and may have provided a safer and more reliable operating environment.[76]

Similarly, commenters complained that NSR application discouraged engineering design innovations that provide better quality and control assurances during sometimes-dangerous production processes. One example, provided by the chemical industry, was the installation of a temperature regulating system on a thermal jacket around a dryer that is equipped with a heated jacket that uses a temperature control system in the jacket. The temperature control system works by regulating the flow of steam or hot liquids similar to radiator fluids in the jacket that surrounds the dryer. The current system uses an older design and is relatively ineffective because of the system's wide temperature variation, which causes risks of explosion and lengthens the drying process time. Both problems could be eliminated with the installation of a temperature regulating system, which would also reduce energy demands on the process by 20%. Although work is often performed on the jacket regulating system, the company suggested that it did not go forward with the change because work on the temperature regulating system, utilizing a unique new system, would not be considered "routine."[77]

It was also suggested that application of the NSR program impeded the ability of companies to undertake projects to ensure the reliability of their equipment that might also result in significant energy efficiency gains. Commenters presented a number of examples of such projects, including examples

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[74] *See, e.g.*, Comments of NEDA/CARP [II-D-272] at 9-10.
[75] *See, e.g.*, FPA Comments [II-D-271] at 2-3.
[76] NEDA/CARP Comments [II-D-272] Attachment A, Example # 1.
[77] NEDA/CARP Comments [II-D-272] Attachment A, Example # 4. According to this example, only 2 tons per year of regulated emissions would have resulted from the change, but potential emissions could have increased over 100 TPY of VOC because operation of an incinerator with a 98% control efficiency voluntarily installed by the company is not considered to be "federally enforceable."

from the chemical, packaging, aluminum and general manufacturing sectors. One illustration from the American Forest and Paper Association described replacement of outdated analog controllers at a series of six batch digesters. The original controllers were no longer manufactured, although new digital controllers, costing approximately $50,000, are capable of receiving inputs from the digester vessel temperature, pressure and chemical/steam flow. The new controllers would have more precisely filled and pressurized digesters with chips, chemicals and steam (whereas the old controllers added materials in timed sequence), thus bringing a batch digester on line faster. However, the source determined that under the NSR program this project would not be considered to be routine because, although repairs to the analog system might have been frequent at the company involved, replacement of the system with a digitalized, computerized system would not qualify as "routine."[78]

As with utilities and refineries, EPA notes that there are widely differing views on the scope of the routine maintenance exclusion on other industries. As before, we therefore conclude that concern about the scope of the routine maintenance exclusion is having an adverse impact for industries outside the energy sector. It also is credible to conclude that projects have been discouraged that might have been economically and/or environmentally beneficial without increasing actual emissions. Changes to the NSR program that add to the clarity and certainty of the scope of the routine maintenance exclusion will improve the process by reducing the unintended consequences of discouraging worthwhile projects that are in fact outside the scope of NSR.

2. *Pollution Prevention Projects*

Another series of examples provided by commenters from the manufacturing sector involved pollution prevention projects, many with significant energy savings potential. Pollution prevention projects at manufacturing facilities may qualify for exemption under the NSR program. This determination is made on a case-by-case basis under EPA's 1994 guidance which addresses pollution control projects and NSR applicability. Although this guidance was intended to create incentives for industry to undertake such projects, some comments suggested that it might actually discourage such projects. One example comes from the chemical industry. In that case, a chemical facility considered installation of a new, more efficient CFC refrigeration system. Completion of this project, according to the commenter, would have resulted in decreased CFC emissions and less electricity demand, reducing overall emissions from the facility's power generating plant. However, this project would not have qualified for the pollution control project exclusion because the primary purpose of the project was not to reduce emissions. Therefore, because the project otherwise would have triggered NSR, the company elected not to undertake it. [79]

In a second example, an aerospace company suggested that it was unable to avoid NSR, using EPA's 1994 pollution control project policy, because the purpose of a particular project was to improve energy efficiency, although significant pollution control benefits would also have resulted. The company had proposed to speed up its manufacturing process (for parts and subassemblies) by using a new adhesive that would dry (or cure) faster. The company stated that the project would have resulted in pollution prevention both because the new adhesive had a lower volatile organic compound (VOC) content than the one in use and because more parts could be processed in less time, consuming less

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[78] AFPA Comments [II-E-15], Tab 3, Case in Point # 4.
[79] Comments of American Chemistry Council [II-D-416] example 1.

energy overall. However, this project could not qualify for the pollution control project exclusion because its purpose was to improve efficiency, rather than to abate pollution and because the new adhesive system would have increased the utilization of production equipment at the plant. Because the project otherwise would have triggered NSR applicability, the company declined to make the change.[80]

EPA believes that these examples indicate that NSR is having an adverse impact on some pollution control and prevention projects.

B. Energy Efficiency

The Agency also received a number of industry comments explaining the NSR program's effect on energy efficiency and demand. These comments suggest that the delays and costs associated with NSR have discouraged the adoption or implementation of various energy conservation and efficiency measures. Examples provided by commenters included efforts to conserve fuel and programs that will result in energy demand reductions at major industrial plants. The commenters allege that, in many cases, the projects would ultimately reduce actual emissions, but nonetheless trigger NSR under the actual-to-potential test.

For instance, NSR was cited as a principal reason for not undertaking energy efficiency projects for the installation of heat exchangers and overfire air by various manufacturing sectors including the electronics and appliance industries, plastics, and paper industries. Heat exchangers recover heat from boiler flue gas streams to heat water used in the system's deaerator units. By preheating the water used in the deaerator units, the heat exchanger reduces the steam needed to run the deaerators. This increases the overall efficiency of the boiler house and reduces fuel usage. It also reduces annual boiler emissions. At a plastics plant, a commenter pointed out that installation of a heat exchanger would be expected to reduce natural gas consumption by 7.5 percent, NO_X emissions by 7.5 percent, SO_2 emissions by 5.8 percent and carbon monoxide (CO) emissions by 7.6 percent, particulate matter (PM) emissions by 9 percent, and VOC emissions by 9.3 percent. The project achieves these benefits through pollution prevention rather than add-on controls.[81] In this case, the industry applicant sought exclusion from NSR applicability under the pollution control project exclusion. However, this project did not qualify as a pollution control project because its primary purpose was not pollution control or prevention. Moreover, because the boilers required back-up firing with oil during the winter to ensure operation, the "actual to potential" emission test would have caused the project to trigger NSR. To avoid the installation of new controls that would be mandated as the result of NSR applicability, the source states that it is considering burning more fuel oil over the next two years to increase base level of emissions (actual emissions).

Another example from a boiler at a pulp and paper mill illustrates a similar problem. According to the comment, the mill's industrial boiler currently experiences extensive, internal erosion as a result of the carryover of solids such as sand and wire from the burning of tire-derived fuel, and burned bark particles, which have led to decreased boiler efficiency. As a result, the mill proposed to install a new overfire air system to allow for more complete combustion of the bark fuel. By getting more heating value from the same amount of bark burned, less natural gas would be required to provide

[80] NEDA/CARP Comments [II-D-272] Attachment A, Example # 14.
[81] NEDA/CARP Comments [II-D-272] Attachment A, Example # 15.

supplemental heat at an annual natural gas savings of about $1 million (in July, 2001 dollars). According to the comment, future actual emissions of NO_X, CO and VOCs would decrease after completion of this project. However, because the boiler is currently operating below its rated capacity, the potential emissions after completion of the project would increase over past actual emissions, triggering NSR. The commenter estimates that the cost of NSR controls would be $17 million.[82] At the time this project was under consideration, the relevant company estimated that the annual savings in natural gas usage equated to roughly 200 million cubic feet of natural gas. This amount of gas has a heating value of approximately 0.2 trillion Btu.

The Department of Energy has estimated that overfire systems could be installed on 20 percent of the 200 coal fired boilers in the industry, resulting in 680,000 MW-hr in energy savings annually. Additional energy savings reportedly are possible if overfire air provides similar benefits in wood-fired systems. Potential reductions in NO_X, $S0_2$, CO, PM, VOCs and other pollutants such as mercury would accompany such energy savings.

Commenters also expressed a need for operational flexibility, and asserted that NSR delays can limit such flexibility, with the result that if changes are projected to trigger NSR, even changes that improve energy efficiency, they are no longer economically viable. Because some industries must make rapid changes in their product lines it is very difficult for them to manage NSR compliance. One such example was provided by the flexible packaging industry. In that case, the industry has been moving steadily toward the replacement of solvent-based inks and coatings with water-based inks and coatings in the production of packaging for foods, drugs, cosmetics, and other household goods. However, certain product orders reportedly require, from time-to-time, solvent-based inks or coatings, and these operations are required to operate large thermal oxidizers by their permits. In addition many of the low VOC coatings contain materials that can poison a thermal oxidizer's catalyst. Therefore, the plant asked its permitting agency to change its permit to run the oxidizer only when it runs VOC-based coatings.[83]

In this instance, the operator calculated that the change could save approximately 15,000 cubic feet of gas and 650 kWh of electricity each day. However, the commenter felt that the change would probably be a change in the plant's method of operation, triggering NSR, even though actual emissions were expected to be reduced by the change. Because of the nature of its operations, involving product batches sometimes constituting only hours of a day's run, the company did not feel it could accept limits on its hours of operation. Therefore, the project, which according to the commenter was conceived as a way to create large energy savings, did not go forward.[84]

A number of commenters claimed to have abandoned energy conservation projects because they determined that NSR would apply and make the project cost-prohibitive. For instance, at one commenter's automobile assembly plant, the company wanted to eliminate one shift of a two-shift operation due to downward market fluctuations. This would have resulted in a reduction of roughly 30% (0.4 billion cubic feet) of annual natural gas usage in the plant's boilers, ovens, thermal oxidizers and other fuel combustion equipment at a cost savings of greater than $2 million dollars annually. In

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[82] AFPA Comments [II-E-15], Tab 3, Case in Point # 1.
[83] FPA Comments [II-D-271] at 6-7.
[84] *Id.*

addition, electrical power consumption would have been reduced by roughly 10%, at a cost savings of greater than $700,000 annually. In order to accommodate this change, however, the facility needed to install certain pieces of equipment, consisting mostly of assembly motors to increase the production capability of a single shift by two automobiles per hour. According to the comment, because of the actual-to-potential test, and the source's reluctance to take a cap limiting it to one-shift operation, the project would have triggered NSR and the project would no longer have been economically viable.[85]

Overall, the comments received from industries other than utilities and refineries also provide additional evidence suggesting that the current NSR program is having an adverse impact on energy efficiency by discouraging projects that may improve energy efficiency, or may increase capacity and reliability without actually increasing pollutant emissions. In some cases it may even be discouraging projects that decrease emissions, because of the "actual-to-potential" test used for these industries.

V. Impact on Environmental Protection

Overall, EPA believes that preventing emissions of pollutants covered by NSR does result in significant environmental and public health benefits. Attempting to specifically quantify the NSR program's contribution to these benefits is very difficult because of the variety of Clean Air Act programs that address these pollutants and because there is no tracking by any government agency of the reductions in emissions that sources make due to the NSR program. Moreover, EPA recognizes that measuring risk reduction benefits associated with any given reduction in emissions requires complex risk assessments that would, in turn, require more specific information than has been gathered in the context of this review.

We note that NSR is implemented in the context of several other significant Clean Air Act programs. Available information indicates that these other programs result in substantial emissions reductions. For example, the Title IV Acid Rain Program has reduced SO_2 emissions from the electric utility industry by more than 7 million tons per year. The Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements will ultimately achieve NO_x reductions of 2.8 million tons per year. Standards for highway heavy-duty vehicles and engines will reduce NO_x emissions by 2.6 million tons per year. Standards for non-road diesel engines are anticipated to reduce NO_x emissions by about 1.5 million tons per year. The NO_x "SIP Call" will reduce NO_x emissions by over 1 million tons per year. Altogether, these and other similar programs achieve emissions reductions that far exceed those attributable to the NSR program. Moreover, most of these other programs are much more efficient, streamlined, and simple than NSR because they do not entail the same resource-intensive, case-by-case review that is required under NSR.

It would be very difficult to estimate or quantify the benefits of the NSR program. However, EPA believes that the inability to make exact estimates does not mean that these benefits are insignificant or nonexistent. Notably, industry concerns about NSR focused almost exclusively on problems associated with applying the program to existing sources. These comments illustrated a potential dichotomy in that the benefits of the NSR program are largely attributable to new sources while the existing sources reportedly are more burdened by the program.

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[85] NEDA/CARP Comments [II-D-272] Attachment A, Example # 12.

Electric utilities and petroleum refineries are significant sources of air emissions. The major regulated air pollutants emitted from power plants are SO_2, NO_X, PM, and mercury. Refineries primarily emit SO_2 and NO_X, as well as VOCs. Based on 2000 emissions, the electric utility industry is the single largest source of SO_2 emissions and the second largest source of NO_X emissions (on road mobile sources are the largest). In 2000, the electric utility industry emitted 11.2 million tons of SO_2, 5.1 million tons of NO_X, and 302,000 tons of PM. In 1999, refineries emitted 479,000 tons of SO_2, 299,000 tons of NO_X and 161,200 of volatile organic compounds. Emissions of these pollutants from all sectors in 1999 totaled 18.9 million tons SO_2, 25.4 million tons NO_X, 18.1 million tons VOC, and 23.7 million tons PM.

There is a significant body of scientific literature linking air pollution to several health effects. These include: premature mortality, chronic asthma and increased asthma attacks, chronic and acute bronchitis, other chronic respiratory diseases and damage, increased airway responsiveness to stimuli, inflammation in the lung, respiratory cell damage, premature aging of the lungs, increased susceptibility to respiratory infection, decreased lung function, developmental effects, infant mortality, low birth weight, cancer, decreased time to onset of angina, other cardiovascular effects. Additional effects include decreased worker productivity; increased emergency room visits for respiratory and cardiovascular effects, and more hospital admissions for respiratory and cardiac diseases.[86]

Potential effects beyond human health effects include direct damage to plants and forests, decreased yields for crops and forest products, damage to ecosystem functions, decreased visibility, corrosion and soiling of buildings and monuments, eutrophication (i.e., explosive algae growth leading to a depletion of oxygen in the water), acidic deposition and acidification of water bodies, and impacts on recreational demand from damaged aesthetics and decreased visibility.

The EPA Background Paper provided some preliminary estimates of the amount of emissions prevented by the NSR program for all industries in "clean" areas (e.g., emissions that would have otherwise occurred from construction/modification). The NSR program in such clean areas is known as the PSD program. The Paper stated that for the period 1997 through 1999, new or modified source compliance with PSD for all industries prevented approximately 1.4 million tons of air pollution from being emitted per year. The vast majority of these reductions are attributable to the application of NSR

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[86]In response to public requests for more such information, the Agency has added to the docket some general benefits information about reductions in emissions of pollutants likely to be impacted by the NSR regulations. (A) U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Regulatory Impact Analysis for the NO_X SIP call, FIP, and Section 126 Petitions: Volume 1, Cost and Economic Impacts. September, 1998. Located on the Internet at www.epa.gov/ttn/oarpg/otag/sipriav1.zip; (B) U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Regulatory Impact Analysis for the NO_X SIP call, FIP, and Section 126 Petitions: Volume 2, Health and Welfare Benefits. December, 1998. Located on the Internet at www.epa.gov/ttn/oarpg/otag/sipriav2.zip; (C) U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Regulatory Impact Analysis for the Final Regional Haze Rule. April, 1999. Located on the Internet at www.epa.gov/ttn/oarpg/t1/reports/riaes.pdf; and (D) U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Regulatory Impact Analysis for the Final Section 126 Petition Rule. December, 1999. Located on the Internet at www.epa.gov/ttn/oarpg/t1/reports/126fn0.pdf.

to new gas fired electric generating units. The Background Paper also reported that this number underestimates total emission reductions because it does not include estimates of emissions prevented in nonattainment areas through nonattainment NSR permitting requirements during that same time period.

Several commenters reiterated this position and noted that as a general rule these reductions would be greater because the control requirements are more stringent and the offset requirements essentially result in a net emissions decrease. Although EPA agrees that there are additional emission reductions that result from compliance with the offsets requirements of nonattainment NSR program, at this time the Agency does not have information quantifying those emissions reductions. Finally, other commenters noted that the EPA Background Paper failed to address the emission reductions of SO_2 and NO_X that occur as a result of sources reducing their emissions so as to avoid the applicability of NSR altogether. On the other hand, since SO_2 emissions from the utility industry are capped by the Title IV acid rain program, NSR does not produce overall net reduction in SO_2 emissions from the industry. Similarly, in nonattainment areas, Title I effectively caps emissions of the nonattainment pollutant. To a degree, the same is true for seasonally or geographically limited cap and trade programs, such as the "NO_X SIP call." Furthermore, as noted below, industry commenters note that these estimates of emission reductions attributed to NSR do not account for foregone emissions reductions that they allege would have occurred in the absence of NSR's disincentives to proceed with projects that increase efficiency.[87]

A large number of commenters, primarily citizens and environmental groups, expressed strong support for the benefits that derive from reducing emissions from these industrial sectors, either by installing pollution reduction controls on new sources as they are built, or on existing sources as they are modified. Many groups argued that the public health threat from the air emissions of power plants and refineries is urgent and further reductions are needed. Noting environmental justice concerns, one commenter stated that 80 percent of the refineries in the Texas oil refinery communities are either populated by minority citizens or contain significant minority representation and reported that approximately three million minority citizens live in these Texas communities.

The EPA Background Paper also presented previous estimates of the health benefits per ton of pollutant reduced for SO_2 and NO_X emissions based on a study of emissions at utilities. The work cited in the EPA Background Paper is based on the benefits of reducing premature mortality associated with long-term exposure to PM. However, many citizen and environmental group commenters requested a more detailed discussion of additional health benefits like the avoidance of reduced lung function, asthma attacks, lost work days and premature death, which have been linked to these air pollutants. For example, one commenter representing 43 environmental groups cited a study by Abt Associates presenting their estimate that national power plant emissions accounted for more than 6,000 asthma attacks, 30,000 premature deaths, and 5 million lost work days per year, noting that elderly people with respiratory disease and children are at the greatest risk.

Commenters requested that EPA present information on the benefits due to avoided emissions of other pollutants, including pollutants that are reduced collaterally when criteria pollutants are

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[87] First Energy Corporation testimony on NSR, 7/10/2001, stated that current interpretations of NSR would have prevented projects now resulting in a reduction of 40,000 TPY of SO_2 and NO_X emissions.

controlled (e.g., mercury). One commenter notes that EPA documents identify coal-fired power plants as the largest industrial emitters of mercury, another pollutant with well-documented health and environmental effects. Thus, without addressing the benefits that derive from reductions of these pollutants as well, several commenters argue that the EPA Background Paper significantly underestimates public health and environmental benefits of NSR.

Many commenters also mentioned numerous other benefits that result from lower emissions from power plants and refineries. They presented information about impacts primarily of power plant emissions on the environment, particularly in National Parks. For example, several groups provided information regarding the adverse impact of power plant emissions in particular on visibility in National Parks. Some commenters also note that ground level ozone (smog) not only impacts vegetation (more than 50 species of plants and trees allegedly harmed by ozone), but also the health of visitors to National Parks. Additionally, commenters note the impact of SO_2 and NO_X emissions on the formation of acid rain and its impact on ecosystems (e.g., red spruce decline, fish killed). Finally, many commenters were also concerned about CO_2 emissions and their potential to affect climate, and believed that NSR plays a role in preventing these emissions as well. Commenters urged EPA to discuss the benefits generally of reduced emissions in all these areas more explicitly, and quantify them as they relate to the NSR program.

In addition, several commenters noted that in nonattainment areas, a source's failure to reduce emissions through NSR places the burden on other sources to reduce emissions. In other words, because the State has to reduce emissions somewhere in order to attain air quality standards, it will target other sources (e.g., construction activities), or even consumers in order to create those reductions. Even in attainment areas, compliance with PSD requirements can help maintain the area's ability to continue to grow.

Some state and local governments supported the role NSR plays in preventing emissions from new and modified sources.[88] They believe, based on their experience, that without NSR, emissions from new and modified sources would severely interfere with their efforts to attain and maintain air quality standards. While there are several important programs that reduce emissions from existing sources, they felt NSR was a critical complementary program because it minimized emissions from new sources.

Some commenters also expressed support for the technology-forcing aspect of the NSR program, arguing that it is the only CAA program that automatically mirrors improvements in control technology over time, and therefore encourages continued development of cleaner technology. Commenters urged EPA to estimate the benefits of this effect as well.

Industry commenters felt that the current NSR program actually acts as a barrier to improved environmental protection in certain instances. Although NSR is only triggered when emissions increase, these commenters argued that the way EPA calculates an increase in emissions can actually have the effect of subjecting a project to NSR that would decrease actual emissions. Because of the delay and costs associated with applying NSR to a project, NSR renders these environmentally beneficial projects uneconomical, and they may be rejected. Similarly, again because of the way that NSR

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[88] *See, e.g.* STAPPA/ALAPCO comments.

calculates emissions increases, several industry commenters noted an incentive to keep actual emissions high because the closer actual emissions are to a source's maximum capacity to emit, the less likely it is to trigger NSR.

VI. Conclusion

Based upon the information examined during this review of the NSR program, there appears to be little incremental impact of the program on the construction of new electricity generation and refinery facilities but a more dramatic impact on investment in utility and refinery generating capacity and energy efficiency at existing utility and refinery plants. Looking at industry as a whole, there also is clear evidence of NSR's benefits for environmental protection.

With respect to environmental protection, the EPA finds that NSR is not designed to play the primary role in reducing emissions from existing sources. In fact, for pollutants covered by a national cap and trade program (such as the Title IV acid rain program), the NSR program does not necessarily produce any overall emissions reductions. Furthermore, EPA believes that in particular industry sectors – especially the utility sector – the benefits currently attributed to NSR could be achieved much more efficiently and at much lower cost through the implementation of a multi-pollutant national cap and trade program.

Nevertheless, the NSR program plays a role in attainment and maintenance of the NAAQS, particularly with regard to new sources. It helps ensure that as industry continues to grow and expand, air quality is managed appropriately (i.e., by helping assure that clean areas do not worsen and that dirty areas get cleaner). It also helps to protect sensitive areas like national parks and wilderness areas, and promotes new and more effective pollution controls. As described in this report, and thoroughly detailed in the comments and other references provided, NSR also provides health and ecological benefits.

With respect to new facilities, the NSR program's principal impacts are in the form of delays and additional costs, but there is little evidence that these delays and costs are preventing new source construction in the utility industry. Indeed there is substantial evidence that significant new generating capacity is being brought online within normal time frames for planning such projects.

With respect to the maintenance and operation of existing utility generation capacity, there is more evidence of adverse impacts from NSR. Credible examples were presented of cases in which uncertainty about the exemption for routine activities has resulted in delay or cancellation of projects which sources say are done for the purposes of maintaining and improving the reliability, efficiency and

safety of existing energy capacity.[89] Such discouragement results in lost capacity, as well as lost opportunities to improve energy efficiency and reduce air pollution.

There appeared to be little impact of NSR on planning for new greenfield refineries, because new refineries are not being built for economic and environmental reasons unrelated to NSR. For existing refineries, the points raised above about the routine maintenance exclusion apply equally well to refineries as they do for utilities – the EPA observed that commenters expressed uncertainty about the application of the exclusion to any particular project. Existing refineries, however, face an additional issue: the actual-to-potential emissions test. The EPA found credible examples of projects at existing units that would have provided needed capacity or efficiency improvements and would likely not have increased – and in some cases may have decreased – actual emissions. Due to the actual-to-potential test, such projects, if they occur at units operating below capacity, could trigger NSR unless the company committed to continue operating the units below capacity or installed pollution controls. The EPA believes that this potentially results in lost refining capacity, or foregone opportunities to increase capacity without increasing emissions, which could contribute to price volatility and shortages in fuel supply.[90]

With respect to energy efficiency, the EPA recognizes that the NSR program applies to certain projects that have the effect of increasing efficiency (e.g., projects that increase electricity output for a given fuel input). The ordinary costs and permitting times associated with NSR may, in the EPA's judgment, result in the delay or cancellation of certain projects that could improve energy efficiency. EPA encourages energy efficiency improvements wherever feasible. However, the EPA notes that some changes that improve energy efficiency also can result in significant emissions increases that have adverse air quality impacts that must be reviewed, even though the proposed project could reduce regional or national emissions. Thus, of the universe of possible efficiency improvements, the appropriate focus of the NSR program is on those that are non-routine and that significantly increase emissions. At non-utility source categories, the "actual to potential" emissions test can discourage efficiency improvement projects even where there would not be an increase in actual emissions. It is clear that some of these efficiency improvements can still go forward (by going through NSR or taking steps to avoid NSR); however, it also is clear that others are in fact canceled due to the costs and delays associated with NSR.

As noted at the beginning of this report, representatives of industry, state and local agencies, and environmental groups have worked with EPA for over a decade on developing improvements to

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[89] Very few commenters provided sufficiently detailed examples for EPA to make definitive judgements as to whether the given projects would have been considered nonroutine or ultimately triggered NSR. As a result, EPA cannot quantify the number of projects affected or the corresponding impacts on capacity, reliability, efficiency, safety, or other relevant factors. Based on the information presented, it appears unlikely that many of the examples discussed would trigger NSR either because they would qualify for the routine exclusion or they would not increase emissions significantly. Nevertheless, the anecdotal information was sufficient to support our conclusions with regard to the overall impact of the NSR program.

[90] The EPA notes that its conclusions for refiners are equally valid for the numerous non-utility/non-refinery sources that commented during the review.

the NSR program. Our findings in this report ratify a longstanding and broadly-held belief that parts of the NSR program can and should be improved. For example, we conclude above that changes to NSR that add to the clarity and certainty of the scope of the routine maintenance exclusion will improve the program by reducing the unintended consequences of discouraging worthwhile projects that are in fact outside the scope of NSR. For these reasons, EPA is recommending a number of changes to the NSR program that will address the concerns raised during this NSR review as well as many other concerns presented to EPA about NSR over the past decade.