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October 7, 2008

Via U.S. Mail and Email to johnson.stephen@epa.gov

The Honorable Stephen Johnson
Administrator, U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington DC, 20460

Re: Notice of Intent to Sue for Violation of Nondiscretionary Duty to Review New Source Performance Standard for Nitric Acid Plants Every Eight Years Under Section 111 of Clean Air Act

Dear Administrator Johnson:

On behalf of our clients Sierra Club and Environmental Integrity Project ("EIP"), and pursuant to 42 U.S.C. § 7604(b)(2), we are writing to provide you with notice of our intent to sue the U.S. Environmental Protection Agency ("EPA") for its failure to review the new source performance standard ("NSPS") for nitric acid plants set forth in 40 C.F.R. Subpart G at least once every eight years, as required under 42 U.S.C. § 7411(b)(1)(B). The persons giving notice by means of this letter are:

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I. BACKGROUND

Congress created the NSPS program as part of the Clean Air Act amendments of 1970.[1] Under this program, EPA is required to promulgate federal "standards of performance" as a means to control air pollution from "new" stationary sources within various listed categories.[2] Nitric acid

[1] See Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1683 (Dec. 31, 1970).

[2] Clean Air Act, 42 U.S.C. § 7411 (b)(1)(B).

plants are considered "new" if they were constructed, modified, or reconstructed after EPA issued its proposed NSPS regulation for nitric acid plants in August 1971.[3]

The "standard of performance" required by the Clean Air Act is a "standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated."[4] In common parlance, the NSPS must be based upon "best demonstrated technology" or "BDT."[5]

II. EPA HAS VIOLATED ITS MANDATORY DUTY TO REVIEW THE NSPS FOR NITRIC ACID PLANTS AT LEAST ONCE EVERY EIGHT YEARS.

The Clean Air Act provides that EPA "shall, at least every 8 years, review" the NSPS for each industrial source category listed in its regulations.[6] It is well established that this type of language creates a mandatory duty to act. Indeed, when the Clean Air Act sets forth a "bright-line rule for agency action," such as a deadline for periodic reviews, "there is no room for debate—congress has prescribed a categorical mandate that deprives EPA of all discretion over the timing of its work."[7]

As noted above, the NSPS for nitric acid plants was promulgated in 1971.[8] The information available to us indicates that EPA has only reviewed this NSPS twice — once in 1979 and once in 1984.[9] As the last review was conducted twenty-four years ago, a review of Subpart G is now

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[3] See 42 U.S.C. § 7411(a)(2), (b)(1); Review of Standards of Performance for New Stationary Sources – Nitric Acid Plants, 49 Fed. Reg. 13654, 13654 (Apr. 5, 1984); Part 60 – Standards of Performance for New Stationary Sources, 36 Fed. Reg. 24876, 24876 (Dec. 23, 1971).

[4] 42 U.S.C. § 7411(a)(1) (emphasis added).

[5] See, e.g., Tenn. Valley Auth. v. Whitman, 336 F.3d 1236, 1244 n.14 (11th Cir. 2003), reh'g denied 82 Fed. Appx. 220 (11th Cir. 2003), cert. denied 541 U.S. 1030 (2004) (explaining that "[t]he NSPS program requires that the EPA issue federal performance standards based upon the best demonstrated technology ...") (emphasis added).

[6] 42 U.S.C. § 7411(b)(1)(B).

[7] American Lung Ass'n. v. Reilly, 962 F.2d 258, 263 (2d Cir. 1992) (citing Sierra Club v. Thomas, 828 F.2d 783, 791 (D.C. Cir. 1987)). See Envtl. Defense Fund v. Thomas, 870 F.2d 892, 897 (2d Cir. 1989), cert. denied 1989 (explaining that the "revision provisions" of the Clean Air Act that "include stated deadlines should, as a rule, be construed as creating non-discretionary duties" and holding that EPA had a nondiscretionary duty to make a formal decision as to whether or not it would revise the NAAQS for sulfur oxides) (internal citations omitted).

[8] See Part 60, 36 Fed. Reg. at 24876, 24881.

[9] See generally Review, 49 Fed. Reg. 13654; EPA OAQPS, REVIEW OF NEW SOURCE PERFORMANCE STANDARDS FOR NITRIC ACID PLANTS, EPA-450/3-84-011 (Apr. 1984); Review of Standards of Performance for New Stationary Sources: Nitric Acid Plants, 44 Fed. Reg. 35265 (June 19, 1979); MARVIN DRABKIN, A REVIEW OF STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES – NITRIC ACID PLANTS, EPA-450/3-79-013 (Mar. 1979).

sixteen years overdue.[10] Accordingly, EPA is in violation of its nondiscretionary duty to review Subpart G at least once every eight years.[11]

The foregoing establishes that EPA has clearly violated a nondiscretionary duty within the meaning of 42 U.S.C. § 7604(a)(2) and 40 C.F.R. § 54.3(a). The remainder of this notice letter will explain why it will not be acceptable for EPA to conduct a cursory review, to determine that no review is necessary, or to delay its review any further. Moreover, for the reasons discussed below, EPA must ultimately revise the existing NSPS for nitric acid plants to reflect the current best demonstrated technology for controlling nitrogen oxide ("NO_x") emissions, as well as to incorporate a new standard based on the best demonstrated technology for controlling nitrous oxide ("N_2O") emissions.[12]

III. THE EXISTING NO_x STANDARD IS IN NEED OF REVIEW AND REVISION.

A. The Existing NO_x Standard Is Based on Outdated Technology That No Longer Constitutes the Best Demonstrated Technology.

In promulgating the 1971 standard for nitric acid plants, EPA relied heavily on a study of catalytic reduction control technology that was published in 1966, i.e., data that is now forty-two years old.[13] According to this data, the existing standard requires NO_x emissions to be reduced by roughly 93 percent below the emissions produced by an uncontrolled facility.[14] Although

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[10] Since 1971, EPA has made no changes to the NO_x emission standard in 40 C.F.R. § 60.72, nor has it added standards for any other pollutants. EPA has issued a few technical and clarifying amendments to Subpart G. See, e.g., Standards of Performance for New Stationary Sources – Amendments to Test Methods and Procedures, 54 Fed. Reg. 6660, 6666 (Feb. 14, 1989) (consolidating and clarifying provisions of §§ 60.73 and 60.74 relating to test methods and emphasizing that "[t]his rulemaking does not impose emission measurement requirements beyond those specified in the current regulations, nor does it change any emission standard"). However, none of these changes demonstrate that EPA has conducted the necessary "review" or made an appropriate "revision" of the substantive NO_x standard within the meaning of the Clean Air Act.

[11] The Clean Air Act establishes only one exemption to the eight-year review requirement, which is not applicable here. Under the Act, EPA "need not review any [performance] standard" if EPA "determines that such review is not appropriate in light of readily available information on the efficacy of such standard." 42 U.S.C. § 7411(b)(1)(B). Our research has not disclosed any notice of such a determination in the Federal Register. Moreover, we submitted a FOIA request to EPA seeking records relating to "reviews of the NSPS requirements for nitric acid plants" in August 2008. EPA's response in September 2008 did not identify or provide records relating to any such determination.

[12] See 42 U.S.C. § 7411(b)(1)(B) (providing that EPA "shall, at least every 8 years, review and, if appropriate, revise" the NSPS for each industrial source category listed in its regulations) (emphasis added).

[13] See EPA OFFICE OF AIR PROGRAMS, BACKGROUND INFORMATION FOR PROPOSED NEW-SOURCE PERFORMANCE STANDARDS: STEAM GENERATORS, INCINERATORS, PORTLAND CEMENT PLANTS, NITRIC ACID PLANTS, SULFURIC ACID PLANTS, Tech. Report No. EPA/APTD-0711, at 39, 42 (Aug. 1971) (referencing Gerstle, R.W. and R.F. Peterson, U.S. DHEW, PHS, Division of Air Pollution, *Atmospheric Emissions from Nitric Acid Manufacturing Processes*, PHS Public. No. 999-AP-27 (1966)).

[14] See id. at 38.

EPA has since conducted two reviews, the 1971 performance standard for nitric acid plants has never been revised.[15]

In 1991, however, EPA issued a report discussing the various control technologies that were available at that time for controlling NO_x emissions from nitric acid plants.[16] The report explained that "[s]everal control technologies have been demonstrated that reduce NO_x emissions from nitric acid manufacturing plants," including "(1) extended absorption, (2) nonselective catalytic reduction, and (3) selective catalytic reduction."[17] The report also concluded that these three technologies achieved average reductions of roughly 95 to 98 percent, which substantially exceeds the 93 percent reduction required under the 1971 standard.[18] The 1991 report further observed that "[a]ll three of these control techniques are suitable for new and existing plant applications."[19]

Seven years later, in 1998, EPA revised its Air Pollutant Emission Factors reference document for nitric acid plants.[20] The following excerpts show that technologies readily available ten years ago were capable of achieving substantially greater NO_x reductions than the existing standard requires:

Average Emission Factor kg (NO_x) / Mg (100% HNO_3)[21]	
Existing NSPS	1.5
Extended absorber	0.590
Extended absorber with caustic scrubber	0.920

Average Emission Factor lb (NO_x) / ton (100% HNO_3)[22]	
Existing NSPS	3.0
Extended absorption	1.179
Extended absorber with caustic scrubber	1.84

[15] The existing NSPS prohibits nitric acid plants from emitting "nitrogen oxides, expressed as NO_2, in excess of 1.5 kg per metric ton of acid produced (3.0 lb per ton), the production being expressed as 100 percent nitric acid." 40 C.F.R. § 60.72(a)(1) (2008).

[16] See generally EPA OAQPS, ALTERNATIVE CONTROL TECHNIQUES DOCUMENT – NITRIC AND ADIPIC ACID MANUFACTURING PLANTS, EPA-450/3-91-026 (Dec. 1991). This report was not prepared in connection with an NSPS review for nitric acid plants. Instead, it was meant to "provide[] technical information for use by State and local agencies to control NOx emissions from nitric and adipic acid manufacturing facilities." Id. at 2-1.

[17] Id. at 5-1 (emphasis added).

[18] See id. at 5-31.

[19] Id. at 5-1.

[20] See EPA OAQPS, COMPILATION OF AIR POLLUTANT EMISSION FACTORS, VOLUME I: STATIONARY POINT AND AREA SOURCES, AP-42 (5th ed. Jan. 1995), Ch. 8.8 Nitric Acid (rev. Feb. 1998).

[21] See id. (Attachment) PACIFIC ENVTL. SERVS., BACKGROUND REPORT AP-42 SECTION 5.9, NITRIC ACID (Jan. 1996), at 27, tbl. 4.2-1.

[22] See id. at 28, tbl. 4.2-1.

These are just a few examples from a wealth of information demonstrating that the NSPS for nitric acid plants is outdated and in need of both review and revision.

Under the Clean Air Act, when it becomes apparent that emission reductions "beyond those required by the standards ... are achieved in practice," then EPA "shall ... consider" the reductions achieved in practice when revising the NSPS for a particular source category.[23] As explained above, there is ample evidence that many members of the nitric acid industry are achieving greater reduction than the existing NSPS requires. This indicates that the 1971 standard is outdated and does not reflect the best demonstrated technology.

As discussed above, EPA has a mandatory duty to review the NSPS for nitric acid plants. In doing so, it must take into account the data showing that many members of the nitric acid industry routinely achieve greater reduction in practice than the existing standard requires. We anticipate that EPA's review will, in fact, show that further advancements in technology have taken place since the 1990s and that even greater NO_x reductions are now readily achievable. More generally, EPA must conduct a thorough review of all of the control technologies that have been developed or improved since its last review in 1984, and it must do so without any further delay.

Ultimately, EPA must revise the performance standard for nitric acid plants to ensure that it is based on the "best system of emission reduction ... adequately demonstrated."[24] The fact that there are several readily available technologies capable of reducing NO_x emissions beyond what is required under the existing NSPS provides strong evidence that the existing standard is inadequate.

B. The Adverse Impacts of NO_x Are Much Greater Than Previously Known, and Other Air Programs Are Not Adequately Addressing Them.

Although the NSPS program uses a technology-based, rather than health-based, approach for controlling air pollution, the fundamental goal of the NSPS program is to reduce air pollution which "may reasonably be anticipated to endanger public health or welfare."[25] In the twenty-four years since the NSPS for nitric acid plants was last reviewed, EPA's understanding of the adverse health and welfare impacts from NO_x, particularly as a precursor to fine particulate matter and ground-level ozone, has improved dramatically.

For instance, at the time of the 1984 review, the national ambient air quality standard ("NAAQS") for particulate matter did not distinguish between fine and coarse particulate matter. During the 1990s, however, it became clear that the existing NAAQS was not adequate to protect human health and that fine particulates posed distinct and significant health risks. As EPA has explained,

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[23] 42 U.S.C. § 7411(b)(1)(B).

[24] Id. § 7411(a)(1).

[25] Id. § 7411(b)(1)(A).

> By 1996, evidence had accumulated that suggested day-to-day exposures to ambient particulate matter (PM) at or near the level of the then current National Ambient Air Quality Standards (NAAQS) were eliciting significant human health effects in the U.S. population, including hospitalizations and attributable deaths. This evidence led to the promulgation of PM NAAQS in 1997 that included new standards for PM smaller than 2.5 μm in aerodynamic diameter ($PM_{2.5}$).[26]

Remaining uncertainties and concerns led to substantial federal funding for additional research.[27] Based on several years of intensive research thereafter, EPA concluded that there was even stronger evidence that "ambient $PM_{2.5}$, alone and in combination with other pollutants, is causally linked with cardiovascular, respiratory, and lung cancer associations observed in epidemiologic studies," particularly for vulnerable subpopulations, such as the elderly, children, asthmatics, and people with preexisting heart or lung conditions.[28] Accordingly, in 2006, EPA revised the 1997 NAAQS for fine particulate matter to make it more protective of human health.[29] Similar advances have been made in EPA's understanding of the health and welfare impacts associated with ground-level ozone, for which NO_x emissions are also a precursor.[30]

Despite EPA's increasing scientific understanding of the adverse health and welfare impacts resulting from NO_x precursor emissions, however, federal and state regulatory programs have not adequately addressed these problems. Today, 208 counties remain in nonattainment for the $PM_{2.5}$ standard, and 293 counties are in nonattainment for the ozone 8-hour standard.[31] EPA attempted to bring many of these areas into attainment by adopting the Clean Air Interstate Rule ("CAIR") in 2005.[32] Unfortunately, the D.C. Circuit recently vacated CAIR in its entirety, creating a great deal of uncertainty and leaving NO_x inadequately regulated for the foreseeable future.[33]

In addition, contrary to EPA's findings in its 1997 and 2006 rulemakings regarding the distinct and serious health problems associated with $PM_{2.5}$, EPA has recently waived and delayed compliance with the $PM_{2.5}$ NAAQS for new major sources subject to the new source review

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[26] EPA OFFICE OF RESEARCH AND DEVELOPMENT, PARTICULATE MATTER RESEARCH PROGRAM: FIVE YEARS OF PROGRESS, EPA 600/R-04/058, at 1 (July 2004).

[27] See id.

[28] National Ambient Air Quality Standards for Particulate Matter, 71 Fed. Reg. 61144, 61153 (Oct. 17, 2006).

[29] See id. at 61161.

[30] See, e.g., EPA OFFICE OF RESEARCH AND DEVELOPMENT, AIR QUALITY CRITERIA FOR OZONE AND RELATED PHOTOCHEMICAL OXIDANTS, EPA 600/R-05/004aF (Feb. 2006).

[31] See Nonattainment Areas Map – Criteria Air Pollutants, http://www.epa.gov/air/data/nonat.html?us~usa~United%20States (last visited Sept. 22, 2008).

[32] See Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule), 70 Fed. Reg. 25162, 25162 (May 12, 2005).

[33] See North Carolina v. EPA, 531 F.3d 896, 901 (D.C. Cir. July 11, 2008).

("NSR") program.[34] This decision has been criticized as unlawful and as posing a serious threat to the health of millions of Americans.[35]

In short, there is overwhelming scientific evidence of serious health and welfare impacts from NO_x precursor emissions, and federal and state programs are not adequately regulating these emissions. Both of these circumstances underscore the importance of reviewing and updating the NO_x standard for nitric acid plants within the NSPS program.

C. The Existing NO_x Standard Does Not Cover Plants Producing Strong Nitric Acid.

The NSPS for nitric acid plants only governs "weak nitric acid" plants, i.e., those producing acid "which is 30 to 70 percent in strength."[36] Given the improvements in control technology and scientific understanding of the health and welfare impacts resulting from NO_x emissions that have arisen in the past twenty-four years, as discussed above, EPA should expand its rule to cover all of the nitric acid plants in the United States.

IV. AS PART OF ITS REVIEW, EPA MUST CONSIDER LIMITING N_2O EMISSIONS FROM NITRIC ACID PLANTS, AND IT MUST ULTIMATELY REVISE THE NSPS TO INCLUDE AN N_2O STANDARD.

In addition to NO_x, nitric acid plants emit substantial quantities of nitrous oxide ("N_2O"), which has become a concern in recent years because of its climate change impacts. EPA is obligated to regulate a source category under the NSPS program if it "contributes significantly" to "air pollution which may reasonably be anticipated to endanger public health or welfare."[37] For the reasons discussed below, N_2O emissions from nitric acid plants easily satisfy both of these criteria. Moreover, there is abundant evidence that N_2O control technologies are both technically and economically feasible. Thus, EPA has an obligation to, first, consider NO_x controls as part of its NSPS review for nitric acid plants and, then, to establish an N_2O standard at the conclusion of its review.

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[34] See Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$), 73 Fed. Reg. 28321 (May 16, 2008).

[35] See Natural Resources Defense Council v. EPA, Civ. No. 08-1250, Environmental Petitioners' Motion for Stay Pending Review (D.C. Cir. Aug. 18, 2008).

[36] 40 C.F.R. §§ 60.70, 60.71 (2008).

[37] 42 U.S.C. § 7411(b)(1)(A).

It should be noted that EPA has routinely set NSPS standards for non-criteria pollutants in the past, indicating that its NSPS reviews are not limited solely to criteria pollutants.[38] It has also been common practice for EPA to consider new pollutants beyond those covered by the original regulation.[39] Thus, a pollutant's omission from the original NSPS promulgation for a particular source category does not preclude EPA from considering it during an eight-year review.

A. Climate Change Endangers Public Health and Welfare.

In May of 2008, the federal government issued two scientific reports detailing the public health and welfare impacts of climate change.[40] The following are just a few examples of the impacts that multiple federal agencies have concluded are already occurring and will continue to occur as a result of climate change:

Heat Stress-Related Deaths: "It is *very likely* that heat-related morbidity and mortality will increase over the coming decades .... High temperatures tend to exacerbate chronic health conditions. An increased frequency and severity of heat waves is expected, leading to more illness and death, particularly among the young, elderly, frail, and poor."[41]

Infectious Diseases: "Climate change is *likely* to increase the risk and geographic spread of vector-borne infectious diseases, including Lyme disease and West Nile virus."[42]

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[38] See, e.g., Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources – Municipal Waste Combustors, 60 Fed. Reg. 65387, 65416 (Dec. 19, 1995) (setting cadmium emission standards for municipal waste combustors); Standards of Performance for New Stationary Sources – Flexible Vinyl and Urethane Coating and Printing, 49 Fed. Reg. 26884, 26893 (June 19, 1984) (setting VOC emission standards for flexible vinyl and urethane coating and printing industry); Standards of Performance for New Stationary Sources – Kraft Pulp Mills, 43 Fed. Reg. 7568, 7573 (Feb. 23, 1978) (setting total reduced sulfur standards for kraft pulp mills); Standards of Performance for New Stationary Sources – Primary Aluminum Industry, 41 Fed. Reg. 3826, 3828 (Jan. 26, 1976) (setting fluoride emission standards for aluminum reduction plants).

[39] See, e.g., Standards of Performance for Petroleum Refineries, 72 Fed. Reg. 27178, 27180 (May 14, 2007) (setting a new NO_x emission standard for fluid catalytic cracking units, which previously were regulated only for sulfur oxide); Standards of Performance for Stationary Combustion Turbines, 70 Fed. Reg. 8314, 8320-21 (Feb. 18, 2005) (considering whether to establish limits for CO, VOC, and PM emissions for stationary combustion turbines for the first time); Standards of Performance for New Stationary Sources; Industrial-Commercial-Institutional Steam Generating Units, 49 Fed. Reg. 25102, 25106-07 (June 19, 1984) (considering whether to set new standards for CO and SO2 emissions for certain steam generating units).

[40] See NATIONAL SCIENCE AND TECHNOLOGY COUNCIL, SCIENTIFIC ASSESSMENT OF THE EFFECTS OF GLOBAL CLIMATE CHANGE ON THE UNITED STATES (May 2008); U.S. CLIMATE CHANGE SCIENCE PROGRAM, THE EFFECTS OF CLIMATE CHANGE ON AGRICULTURE, LAND RESOURCES, WATER RESOURCES, AND BIODIVERSITY IN THE UNITED STATES, SYNTHESIS AND ASSESSMENT PRODUCT (May 2008).

[41] NSTC, SCIENTIFIC ASSESSMENT, at 14 (emphasis in original).

[42] Id. at 15 (emphasis in original).

Air Pollutant-Related Diseases: "In studies holding pollution emissions constant, climate change was found to lead to increases in regional ground-level ozone pollution in the United States and other countries. It is well-documented that breathing air containing ozone can reduce lung function, increase susceptibility to respiratory infection, and contribute to premature death in people with heart and lung disease."[43]

Storms and Flooding: "Coastal population increases together with *likely* increases in hurricane rainfall and wind speeds and greater storm surge due to sea level rise will continue to increase coastal vulnerabilities in the Southeast and Gulf Coast. Urban centers that were once assumed to have a high adaptive capacity remain vulnerable to extreme events such as hurricanes."[44]

Drought and Water Shortages: "Less reliable supplies of water are expected to create challenges for managing urban water systems as well as for industries that depend on large volumes of water."[45]

Wildfires: "[W]ildfires have increased in extent and severity in recent years and are *very likely* to intensify in a warmer future. At the same time, the population has been expanding into fire-prone areas, increasing society's vulnerability to wildfire. ... Wildfires, with their associated decrements to air quality and pulmonary effects, are likely to increase in frequency, severity, distribution, and duration in the Southeast, the Intermountain West and the West."[46]

Societal Disturbances: "Globally, the most vulnerable industries, settlements, and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially in places that are being rapidly urbanized. Poor communities can be especially vulnerable, particularly those concentrated in high-risk areas."[47]

In light of this overwhelming body of evidence and scientific consensus, the U.S. Supreme Court recently acknowledged that "[t]he harms associated with climate change are serious and well recognized" and that "EPA's steadfast refusal to regulate greenhouse gas emissions presents a risk of harm to Massachusetts that is both 'actual' and 'imminent.'"[48] Moreover, it is well known that EPA has, in fact, prepared a comprehensive endangerment finding that would serve as a basis for regulating greenhouse gas emissions, but that it has not yet been released to the public.[49]

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[43] Id.

[44] Id. at 14 (emphasis in original).

[45] Id. at 12.

[46] Id. at 14-16 (emphasis in original).

[47] Id. at 13.

[48] Massachusetts v. EPA, 127 S.Ct. 1438, 1455 (2007).

[49] See, e.g., Letter from Rep. Henry Waxman, Chairman of the Comm. on Oversight and Gov't Reform, to Stephen Johnson, EPA Administrator (Mar. 13, 2008), available at http://oversight.house.gov/documents/20080310110952.pdf.

In short, the endangerment to public health and welfare from climate change is undeniable, and EPA will not be able to issue a legitimate non-endangerment finding. Accordingly, this factor weighs heavily in favor of a review and revision of the NSPS for nitric acid plants to incorporate an N_2O emission standard.

B. Nitric Acid Plants Contribute Significantly to Climate Change.

EPA's own website, and the numerous documents and reports compiled therein, proclaim the importance of nitrous oxide as a greenhouse gas.[50] For instance, EPA has determined that nitrous oxide is 310 times as potent as carbon dioxide in terms of its global warming potential,[51] and it has observed that "[n]itrous oxide's chemical characteristics and interactions in the atmosphere contribute to its significance as a greenhouse gas."[52] Moreover, EPA estimates that N_2O is the third largest contributor to U.S. greenhouse gas emissions after carbon dioxide and methane.[53]

Similarly, EPA reports point to the nitric acid industry as being one of the most important sources of N_2O emissions in the United States. Nitric acid production is, by far, the largest industrial source of N_2O emissions.[54] And, overall, it is the third largest source of N_2O emissions, after agricultural soil management and mobile source combustion.[55]

Accordingly, nitric acid plants contribute significantly to climate change and the harmful effects discussed above, and this factor weighs in favor of a review and revision of the NSPS for nitric acid plants.

C. It Is Technically and Economically Feasible to Reduce N_2O Emissions from Nitric Acid Plants.

Under the Clean Air Act, a standard of performance must be "achievable" and it must "take into account the cost of achieving such reduction."[56]

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[50] See, e.g., EPA, Nitrous Oxide, http://www.epa.gov/nitrousoxide/index.html (last visited Sept. 25, 2008); EPA, Nitrous Oxide: Science, http://www.epa.gov/nitrousoxide/scientific.html (last visited Sept. 25, 2008).

[51] See EPA, GLOBAL MITIGATION OF NON-CO_2 GREENHOUSE GASES, at 1-3 (June 2006).

[52] EPA, Nitrous Oxide: Science, http://www.epa.gov/nitrousoxide/scientific.html (last visited Sept. 25, 2008).

[53] See EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990 – 2006, at ES-5 to ES-6, tbl. ES-2 (April 15, 2008).

[54] See id. at 4-2, tbl. 4-1.

[55] See id. at ES-5, tbl. ES-2.

[56] 42 U.S.C. § 7411(a)(1). The standard of performance should also take into account "any nonair quality health and environmental and energy requirements." Id. Our research has shown that the adverse environmental impacts and energy requirements of N_2O controls are negligible.

1. Technical Feasibility

The legal standard for what constitutes best demonstrated technology is very broad. For instance, courts have "recognized that section 111 'looks toward what may fairly be projected for the regulated future, rather than the state of the art at present.'"[57] In the case of N_2O emissions from nitric acid plants, however, it is not necessary to look toward the future. According to EPA's own reports, the following seven technologies have already been shown to reduce N_2O emissions during the nitric acid production process:

Name / Description	N_2O Reduction Efficiency (approx.)[58]
Non-selective catalytic reduction ("NSCR")	80-90%
Grand Paroisse high temperature catalytic reduction method	78%
BASF high temperature catalytic reduction method	80%
Norsk Hydro high temperature catalytic reduction method	90%
HITK high temperature catalytic reduction method	100%
Krupp Uhde low temperature catalytic reduction method	95%
ECN low temperature selective catalytic reduction with propane addition	95%

NSCR systems were widely installed in nitric acid plants between the years 1971 to 1977 as a means to control NO_x emissions, and they are presently used by about 20 percent of nitric acid plants in the United States.[59] NSCR's control of N_2O emissions, along with NO_x, has been a coincidental side benefit. Nevertheless, the fact that these systems have been successfully operated by many nitric acid plants for thirty years or more demonstrates the technical feasibility of controlling N_2O emissions from nitric acid plants.

Moreover, numerous countries outside the U.S. have successfully implemented a variety of N_2O control techniques in order to comply with their obligations under the Kyoto Protocol.[60] For instance, as part of a program analogous to the NSPS program, the European Commission determines the "best available techniques" or "BAT" for various industries based on a comprehensive data review and exchange process.[61] For the nitric acid industry, the European Commission has determined that BAT involves the achievement of specified emission levels

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[57] Lignite Energy Council v. EPA, 198 F.3d 930, 934 (D.C. Cir. 1999) (quoting Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 391 (D.C. Cir. 1973)).

[58] See EPA, INTERNATIONAL ANALYSIS OF METHANE AND NITROUS OXIDE ABATEMENT OPPORTUNITIES: REPORT TO ENERGY MODELING FORUM, WORKING GROUP 21, at Appendix C: Nitric Acid Production Sector (June 2003); EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS, at 4-19 to 4-20.

[59] EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS, at 4-20.

[60] A technology may be "adequately demonstrated" based on evidence drawn from other industries or other countries. See Lignite, 198 F.3d at 934 n.3.

[61] See, e.g., EUROPEAN COMMISSION, DIRECTORATE-GENERAL JOINT RESEARCH CENTRE, INTEGRATED POLLUTION PREVENTION AND CONTROL, REFERENCE DOCUMENT ON BEST AVAILABLE TECHNIQUES FOR THE MANUFACTURE OF LARGE VOLUME INORGANIC CHEMICALS – AMMONIA, ACIDS AND FERTILISERS (Dec. 2006).

(0.12 – 0.6 kg/ton 100% HNO_3, or 20 – 100 ppmv, for new facilities; and 0.12 – 1.85 kg/ton 100% HNO_3, or 20-300 ppmv, for existing facilities) through the application of a combination of the following techniques and control technologies: (1) optimizing the filtration of raw materials; (2) optimizing the mixing of raw materials; (3) optimizing the gas distribution over the catalyst; (4) monitoring catalyst performance and adjusting the campaign length; (5) optimization of the NH_3/air ratio; (6) optimizing the pressure and temperature of the oxidation step; (7) N_2O decomposition by extension of the reactor chamber in new plants; (8) catalytic N_2O decomposition in the reactor chamber; and (9) combined NO_x and N_2O abatement in tail gases.[62]

In short, it is indisputable that N_2O reductions are technically feasible. In its review, EPA will have many different options to choose from in determining which technology constitutes BDT. Moreover, EPA's review may very well identify additional technologies and strategies beyond those described above.

2. Economic Feasibility

It is equally clear that control technologies for N_2O are economically feasible. In a 2006 report, EPA sets forth detailed data for three types of N_2O emission control technology which shows that they are very cost-effective, as summarized below:

Control Technology	**Total Capital Cost (per ton CO_2 equiv.)**	**Operating & Maintenance[63] Cost (per ton CO_2 equiv.)**
High-temperature catalytic reduction	$2.18 to $3.27	$0.14 to $0.22
Low-temperature catalytic reduction	$3.27 to $3.55	$0.27 to $1.91
NSCR	$6.27	$0.16

Similarly, the European Commission's BAT analysis for various catalytic N_2O reduction strategies showed that these technologies are very cost-effective, ranging from 0.71 to 0.87 Euro ($1.04 to $1.28) per ton of CO_2 equivalent.[64]

These costs are quite low compared to the cost of reducing other pollutants. For example, according to EPA, the overall costs associated with the wet scrubbers commonly used to control SO_2 emissions from power plants and other facilities ranges from $200 to $500 per ton of SO_2 for larger units, and from $500 to $5,000 per ton of SO_2 for smaller units, in 2001 dollars.[65]

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[62] See id. at iv.

[63] EPA, GLOBAL MITIGATION, at IV-7 to IV-8.

[64] See EUROPEAN COMMISSION, REFERENCE DOCUMENT, at 124-25.

[65] See EPA CICA, AIR POLLUTION CONTROL TECHNOLOGY FACT SHEET: FLUE GAS DESULFURIZATION, EPA-452/F-03-034 (2003), available at http://www.epa.gov/ttn/catc/dir1/ ffdg.pdf.

The cost-effectiveness of N_2O controls is further demonstrated by the fact that they are in use, not only in Europe and the United States, but also at nitric plants in developing countries, such as China, Pakistan, Chile, South Africa, South Korea, and Egypt.[66]

D. EPA Must Revise Subpart G to Control N_2O Emissions from Nitric Acid Plants.

For all the reasons discussed above, (i) climate change endangers public health and welfare; (ii) N_2O emissions from nitric acid plants substantially contribute to the climate change problem; and (iii) numerous control technologies and strategies designed to reduce N_2O emissions at nitric acid plants are both technically and economically feasible. This compelling information not only triggers EPA's obligation to consider N_2O emissions in its review of the NSPS for nitric acid plants, it supports the actual adoption of such a standard at the conclusion of EPA's review process. While the review will surely develop these issues in more detail, EPA will not be able to provide a valid, reasoned basis for declining to incorporate an N_2O emission standard in its revised regulation.

V. PROMPT ACTION IS NEEDED BECAUSE THE NITRIC ACID INDUSTRY IS LIKELY TO EXPAND SUBSTANTIALLY IN THE NEXT 5 TO 10 YEARS.

Nitric acid is the principle ingredient in ammonium nitrate, a fertilizer used to grow corn. U.S. corn production is skyrocketing to meet the recent demand for corn-based ethanol.[67] More specifically, ethanol production increased from 3 billion gallons in 2003 to over 6 billion gallons in 2007.[68] Before the enactment of the Energy Independence and Security Act ("EISA") in December 2007, ethanol production was projected to reach 12 billion gallons by 2010, 13 billion by 2015, and over 14 billion by 2017.[69] Under the EISA, the U.S. government has now mandated ethanol production of at least 15 billion gallons by 2015, which represents an increase of 2 billion gallons over the previous estimate for this date.[70] In response to the EISA, EPA has increased the renewable fuel standard ("RFS") for 2008 from 4.66 to 7.76 percent.[71]

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[66] See, e.g., UNITED NATIONS FCCC PROJECTS – PROJECT 1820: CHONGQING FUYUAN (HIGH PRESSURE) N2O ABATEMENT PROJECT SUMMARY (China), PROJECT 0752: OMNIA FERTILIZER LIMITED NITROUS OXIDE (N_2O) REDUCTION PROJECT (South Africa), PROJECT 0557: CATALYTIC N2O ABATEMENT PROJECT IN THE TAIL GAS OF THE NITRIC ACID PLANT OF THE PAKARAB FERTILIZER LTD. (PVT) IN MULTAN, PAKISTAN (Pakistan), available at http://cdm.unfccc.int/Projects/registered.html; UHDE, REFERENCES OF ENVINOX SYSTEMS (April 2008) (South Korea, Egypt, Pakistan, Chile, South Africa).

[67] U.S. Dept. Agric., AGRICULTURAL PROJECTIONS TO 2017, at 22 (Feb. 2008), available at http://www.ers.usda.gov/Publications/OCE081/OCE20081.pdf.

[68] See id.

[69] See id. at 22-23.

[70] See id. at 23.

[71] Compare Renewable Fuel Standard Under Section 211(o) of the Clean Air Act as Amended by the Energy Policy Act of 2005, 72 Fed. Reg. 66171, 66173 (Nov. 27, 2007) with Revised Renewable Fuel Standard for 2008, Issued Pursuant to Section 211(o) of the Clean Air Act as Amended by the Energy Independence and Security Act of 2007, 73 Fed. Reg. 8665, 8667 (Feb. 14, 2008).

The market for nitric acid and related chemicals to fertilize these new corn crops is likewise experiencing rapid growth. For instance, Terra Industries has been operating at nearly maximum capacity at its three U.S. nitric acid plants, and it is planning to reopen a fourth facility in Louisiana.[72] According to Terra's CEO, Mike Bennett, "[t]he market views this as something more than simply a one-year or one-quarter phenomenon but rather a very extended cycle of higher crop production as farmers globally do there [*sic*] best to rebuild grain inventories."[73] Other nitrogen-based fertilizer companies have been reporting similar trends and ramped-up operations.[74]

For several years, high natural gas prices limited U.S. nitric acid plants' ability to meet the demands of the ethanol boom. More recently, however, natural gas production in the U.S. has increased dramatically, prices have fallen, and these trends are projected to continue through at least 2014.[75] Longer-term projections show natural gas prices in the U.S. continuing to fall through 2020.[76] The increasing availability and lower prices of natural gas in the U.S. will help facilitate expansion in the nitrogenous fertilizer industry. In addition, the high cost of transporting nitric acid and ammonia over long distances from foreign suppliers creates a strong demand for locally produced fertilizer, and this will reinforce the growth of the U.S. nitric acid industry.[77]

In light of the nitric acid industry's projected growth over the next five to ten years and beyond, prompt action is necessary to prevent additional harm to human health and welfare from the resulting increase in NO_x and N_2O emissions.

VI. CONCLUSION

Accordingly, EPA is subject to a clear statutory mandate to conduct a review of the NSPS for nitric acid plants. Moreover, strong evidence indicates that EPA's review of the existing NSPS for nitric acid plants will reveal the need for significant revisions. The existing standards for NO_x do not reflect best demonstrated technology, and there is a compelling need to reduce NO_x emissions in the U.S. in order to protect public health and welfare. In addition, the looming

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[72] See Dave Dreeszen, Sioux City Journal, *High Crop Demand Ups Terra Profits* (Sept. 16, 2008)

[73] Id.

[74] See, e.g., LSB INDUSTRIES, INC., ANNUAL REPORT (2007), available at http://www.lsb-okc.com/PDFs/LSB_2007AnnualReport.pdf; CF INDUSTRIES, ANNUAL REPORT (2007), available at http://media.corporate-ir.net/media_files/irol/19/190537/Reports/2007CFIAnnualReporta.pdf.

[75] See U.S. DEPT. ENERGY, ENERGY INFO. ADMIN., ENERGY IN BRIEF (June 11, 2008), available at http://tonto.eia.doe.gov/energy_in_brief/natural_gas_production.cfm; U.S. DEPT. ENERGY, MONTHLY NATURAL GAS PRODUCTION REPORT (Aug. 29, 2008), available at http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_monthly/current/pdf/ngm_all.pdf; U.S. DEPT. ENERGY, ANNUAL ENERGY OUTLOOK, DOE/EIA-0383 (June 2008), available at http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2008).pdf.

[76] See U.S. DEPT. ENERGY, ANNUAL ENERGY OUTLOOK.

[77] See U.S. DEPT. AGRIC., IMPACT OF RISING NATURAL GAS PRICES ON U.S. AMMONIA SUPPLY, at 12 (Aug. 2007) (explaining that "[a]mmonia is a hazardous material and it must be transferred in refrigerated vessels or in pressurized containers").

threat of climate change, combined with readily available and inexpensive N_2O controls, weighs heavily in favor of including an N_2O standard in the revised rule. Accordingly, on behalf of Sierra Club and EIP, we intend to sue EPA to compel compliance with its mandatory duty to review the NSPS for nitric acid plants set forth in 40 C.F.R. Subpart G.

If you have any questions or would like to discuss this matter further, please contact us by telephone at (802) 831-1630, or by email at tclemmer@vermontlaw.edu or pparenteau@vermontlaw.edu.

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