US EPA ARCHIVE DOCUMENT

GE Power Systems

John G. Rice
Executive Vice President and Chief Operating Officer

General Electric Company
1 River Road, Bldg. 37 - 6th Flr.
Schenectady, NY 12345

September 18, 2000

Ms. Pamela J. Smith
Information Transfer and Program Integration Division (MD-12)
Office of Air Quality Planning and Standards
US Environmental Protection Agency
Research Triangle Park, North Carolina 27711

Re: COMMENTS ON EPA'S DRAFT GUIDANCE ON BACT FOR NOx CONTROL ON COMBINED CYCLE TURBINES

Dear Ms. Smith:

Attached to this letter you will find General Electric Company's comments on EPA's Draft Guidance on BACT for NOx Control at Combined Cycle Turbines ("Draft Guidance"). General Electric, as the leading global manufacturer of high efficiency, low emission gas turbines, has substantial expertise to offer US EPA regarding emissions and emission control systems for gas turbines. As you know, GE is the world's leader in the development of pollution prevention technologies for such turbines, and has devoted its considerable resources and expertise to develop the only heavy duty gas turbine system capable of guaranteed emissions of nitrogen oxides (NOx) at 9 parts per million (ppm) or less. We ask that you carefully consider these comments in revising the Draft.

The Draft Guidance is essential to level the playing field and overcome unfortunate disincentives and barriers suddenly erected in front of GE's DLN technology by a series of EPA regional level decisions beginning approximately one year ago. Unfortunately, while the Draft Guidance duly analyzes the many environmental and energy benefits of this breakthrough technology and recognizes that it may constitute Best Available Control Technology (BACT), it falls short of providing the clear direction necessary to ensure that appropriate consideration will be given to all relevant environmental impacts in permit-by-permit decision making processes. These comments urge EPA to make key amendments necessary for the Guidance to achieve its objectives.

GE has worked closely and cooperatively for many years with the US Department of Energy to design the world's most efficient and lowest NOx emitting gas turbines. While other gas turbine manufacturers have declined to invest in new technologies to achieve the pollution prevention goals set by DOE's Advanced Turbine Systems Program, GE has invested over $100 million to develop its Dry Low NOx technology. GE developed an innovative product which prevents pollution at its source, thereby furthering not only the national energy goals set by DOE , but also meeting one of EPA's primary objectives. GE's DLN gas turbines produce nearly 50% lower NOx emissions than the next best alternative without the need for costly, efficiency-

reducing post combustion control technologies which have other detrimental environmental effects.

We believe this remarkable engineering achievement is exactly the kind of public/private collaborative innovation that should be encouraged and rewarded by EPA, not discouraged by shortsighted implementation of policies seeking the lowest possible emissions from each new add-on control, regardless of collateral environmental impacts or overarching national environmental and energy policy objectives.

As recognized in EPA's Draft Guidance, GE's DLN technology achieves low NOx emissions without the negative environmental impacts associated with SCR end-of-pipe controls. These impacts include: damage to aquatic resources as a result of nitrogen loading when ammonia is emitted from SCR units, increased production of fine particulates, ammonia compounds that negatively impact human health, transport of the hazardous chemical ammonia through residential areas, and the required disposal of spent waste catalyst. The demonstrated environmental benefits of GE's DLN system, where single-digit emissions are achieved through pollution prevention, are far more positive than the negative impacts associated with applying selective catalytic reduction.

The alternative direction taken in some permits over the past year– requiring end of pipe controls on every gas turbine, no matter how clean to start with - will discourage manufacturers from pursuing the goals of the Pollution Prevention Act and national energy efficiency policies by stifling further investment in source control and pollution prevention. Furthermore, such an approach is contrary to the mandates of the Clean Air Act, which ***requires*** individual, case-by-case analysis of the energy, environmental and economic impacts of any selected control technology.

As EPA recognizes in the Draft Guidance, "source controls" at 9 ppm NOx also maximize the potential environmental and economic benefits of gas fueled combined cycle systems, allowing the displacement of older, dirtier coal fired boilers that produce many more NOx emissions and other hazardous pollutants.

As detailed in our comments, GE strongly believes that convincing confirmation by EPA that 9 ppm NOx emissions without post combustion controls qualifies as BACT for gas fired combined cycle systems will produce the maximum long term environmental benefits for the country. GE has been working with EPA, DOE and others to ensure that private investment will continue to flow to pollution prevention. We hope EPA will continue to encourage efforts in this direction and make the modest changes to the Draft Guidance necessary to accomplish that goal.

Sincerely,

John Rice

Cc: Ellen Brown
Office of Policy Analysis and Review
US Environmental Protection Agency
1200 Pennsylvania Avenue
Washington, DC 20460

Ms. Abbie Lane
Product Manager Advanced Turbine Systems
U.S. Dept. of Energy
National Energy Technology Lab
3610 Collins Ferry Rd.
Morgantown, WV 26507-0880

Mr. William Harnett, Director
Information Transfer and Program Integration Division
U.S. EPA Office of Air Quality Planning & Standards
Mail Drop 12
Research Triangle Park, NC 27711

COMMENTS OF GENERAL ELECTRIC COMPANY ON THE ENVIRONMENTAL PROTECTION AGENCY'S DRAFT GUIDANCE ON BACT FOR NOX CONTROL AT COMBINED CYCLE TURBINES

65 *Fed Reg.* 50202 (August 17, 2000)

SEPTEMBER 18, 2000

Submitted by

John G. Rice
Executive Vice President and Chief Operating Officer
GE Power Systems
One River Road – Building 37-6th Floor
Schenectady, NY 12345

James A. Sevinsky
Sr. Counsel – Environment, Health & Safety
GE Power Systems
One River Road – Building 43
Schenectady, NY 12345
(518) 385-8080

Matthew O. Tanzer
EHS Counsel – Air Programs
General Electric Company
3135 Easton Turnpike
Fairfield, CT 06431
(203) 373-3512

Charles H. Knauss
Swidler Berlin Shereff Friedman, LLP
3000 K Street, NW
Suite 300
Washington, DC 20007
(202) 424-7644

Richard D. Wilson
Vice President
National Environmental Strategies
2600 Virginia Avenue
Suite 600
Washington, DC 20037
(202) 333-2524

Comments of General Electric Company
on the Environmental Protection Agency's Draft Guidance
on BACT for NOx Control at Combined Cycle Turbines

65 *Fed Reg.* 50202 (August 17, 2000)

The General Electric Company appreciates this opportunity to comment on EPA's Draft Guidance on Best Available Control Technology (BACT) for NOx Control at Combined Cycle Turbines ("Draft Guidance").

GE is a large diversified manufacturing and services company. It manufactures a wide array of consumer and industrial goods – from aircraft engines, lighting products, and efficient electric generation, distribution and control systems, to appliances, locomotives, medical equipment, and high grade thermoplastics. Of specific relevance to the Draft Guidance, GE's Power Systems business is the developer and manufacturer of a breakthrough pollution prevention technology for Gas Turbines (GT) called Dry Low-NOx (DLN). This technology results in emissions of nitrogen oxides (NOx) from Gas Turbines of less than 9 parts per million (ppm) without add-on controls.

GE supports the apparent intent and goal of the guidance to restore integrity to the case-by-case decisionmaking process for determining BACT, and to give due consideration to the full range of BACT factors that favor DLN turbines without Selective Catalytic Reduction (SCR). GE also appreciates the considerable effort by Agency officials to bring this issue forward and the Agency's careful analysis of the many relevant environmental factors. GE reluctantly concludes, however, that the current Draft Guidance falls short in providing authorities with objective, bright-line criteria to obtain fair consideration of those BACT factors favoring DLN without SCR. This conclusion is based on GE's experience in working closely with potential turbine customers and permitting authorities as they face the ambiguities of the permitting process. It is also based on more recent conversations, anecdotal in nature, which suggest that the overall lack of clarity in the Draft Guidance must be addressed to give permit applicants and permitting authorities confidence that the Agency will consider 9ppm as BACT for DLN turbines. This is especially true when considering a number of recent comments from EPA regions on applications that objected to draft State BACT determinations in the 9ppm range. *See* **Appendix** A.

GE feels particularly strongly about this issue given the company's history in working closely with both the Department of Energy and EPA in developing the world's lowest NOx emitting gas turbines. *See* **Appendix** B. When investing over $100 million to develop and produce this innovative technology that can reduce NOx emissions by over 50 percent compared to the next best alternative, GE reasonably relied on the 9ppm goals of the Advanced Turbine System (ATS) program. In fact, up to one year ago, 9ppm was the acceptable NOx emissions standard to achieve in BACT determinations. Over 30 DLN turbines have been successfully permitted at this level. It was only in late 1999, when EPA Region IV issued a notice of its intent to appeal a draft State BACT determination endorsing 9ppm, that expectations changed. EPA must recognize that Region IV's comments and subsequent comments on other BACT

determinations have had the effect of establishing a new de facto BACT emission level of 3.5ppm. If EPA is to reverse this policy, it must send a clear and convincing message in this guidance that, based on the general review of the environmental factors, and when considering the cost differential, the Agency has concluded that either 9ppm or 3.5ppm can be considered BACT for DLN turbines in attainment areas.

The following comments on the Draft Guidance are divided into three major sections. The comments begin with a brief summary of the Draft Guidance and the elements of the guidance that GE supports. Principal among these is the Draft Guidance's inclusive and detailed discussion of the environmental benefits and disbenefits of installing SCR on DLN turbines. GE believes that these environmental factors are well developed and supported in the Draft Guidance, and that permitting authorities should rely upon this discussion in making BACT determinations. This section is then followed by an overview discussion of why the guidance is needed, based on a review of statutory requirements and the environmental policy objectives of EPA and the Congress to promote pollution prevention and to encourage greater integration among environmental programs.

The document closes with several recommended changes to the Draft Guidance that GE believes are essential if the guidance is to have the intended effect and be useful in practice. Foremost among these changes is the elimination of categorical statements in the Draft Guidance asserting that SCR is considered BACT in "most cases" for gas turbines, including DLN turbines. These statements directly conflict with the history of permits up until very recently and the otherwise laudable objective of the Draft Guidance to allow permitting authorities the flexibility to make case-by-case determinations of BACT. Such determinations must be based on a careful consideration of many factors, including the various beneficial and adverse environmental impacts, not a single chosen technology or emission standard. The inclusion of these statements may lead many permitting authorities to conclude that the only BACT option for DLN turbines is SCR, absent herculean or unusually complex demonstrations to the contrary, thereby frustrating the very purpose of the guidance.

I. GE Supports the Overall Purpose and Intent of the Guidance

GE would like to express its support for the overall purpose and intent of this guidance. The Draft Guidance attempts to define a decisionmaking framework for determining what is BACT for NOx control for DLN Gas Turbines in attainment areas. Recent permitting decisions have suggested that SCR is presumptively considered BACT for many natural gas combined-cycle turbines for electric generation. However, the production of inherently cleaner, lower NOx emitting turbines, such as the DLN gas turbines, has thrown into question the relatively small, incremental benefits of SCR when weighed against its cost and potential adverse environmental impacts. *See* **Appendix** C. In conformance with the statutory mandates of the Clean Air Act, which require permitting authorities to consider the environmental, energy, and economic concerns against the environmental benefits of control technologies, such as SCR, this guidance attempts to develop the elements of a decision framework for permitting authorities to allow them to weigh, on a case-by-case basis, the incremental environmental benefits of SCR on DLN turbines against a number of known adverse "collateral" impacts. Given a weighing of these

factors, the guidance seeks to provide permitting authorities with the flexibility to conclude that the 9ppm level of NOx emissions level achieved by DLN turbines represents BACT.

GE supports the following elements of the guidance:

A. The Draft Guidance recognizes the importance of considering the energy, environmental, and economic impacts, and other costs in determining BACT.

The guidance recognizes the value and importance of weighing the potential environmental benefits and disbenefits of any new control technology in determining BACT. Specifically, the guidance reinforces the view that new control technologies that reduce emissions of one pollutant cannot be considered BACT without a full evaluation of the potential impact of that control technology on the environment. By necessity, this requires permitting authorities to consider and weigh a number of environmental impacts in determining BACT. As the guidance states, this is especially true when the reduction in potential emissions from the control technology is small:

> In the case of DLN turbines with and without SCR, the change in NOx emissions (approximately 5.5 ppm of NOx) is small in comparison to NOx emissions from other types of combustion power plants, and therefore, it is important to compare the impacts from this increment of NOx emissions to the small amount of ammonia slip emissions that result from the use of SCR (often less than 5 to 10 ppm of ammonia). (Page 9 of attachment to Draft Guidance.)

In addition, as required by the Act, the guidance confirms that these potential environmental benefits/disbenefits should also be considered on a case-by-case basis in light of the costs of the control technology as well as "other costs" in making a BACT determination. As stated in the Draft Guidance:

> Thus a permitting authority could appropriately conclude that BACT in a specific case was DLN turbines without additional controls for a combined cycle gas turbine if a case-by-case assessment of the environmental, energy, and economic impacts demonstrates that the collateral impacts associated with a control technology such as SCR outweighed the benefits of additional NOx reduction. (Page 4 of the Draft Guidance Cover Memorandum.)

Unfortunately, as discussed below, the Draft Guidance errs by suggesting that this assessment of the energy, environmental, and economic impacts is discretionary for permitting authorities, and that the Act merely "allows" permitting authorities the option to weigh these factors. Such statements directly conflict with the requirements of the statute and with existing implementing guidance that clearly *compel* permitting authorities to undertake this kind of case-by-case analysis.

B. The Draft Guidance emphasizes the importance of an assessment of collateral impacts when a control system results directly in the release of pollutants that are not currently regulated under the Act.

As reported in the Draft Guidance, the EPA Environmental Appeals Board has explained that the definition of BACT has been interpreted to mean that "if application of a control system results directly in the release (or removal) of pollutants that are not currently regulated under the Act, the net environmental impact of such emissions is eligible for consideration in making the BACT determination." *Kawaihae*, 7 E.A.D. at 116, citing *In re North County Resource Recovery Associates*, 2 E.A.D. 229, 230 (Adm'r 1986). The Draft Guidance recognizes and confirms the importance and necessity of considering the net environmental impacts in any BACT determination involving the use of SCR, including the disbenefits of ammonia emissions.

C. The Draft Guidance confirms that permitting authorities must consider environmental factors broadly in assessing collateral impacts and in making a BACT determination.

With regard to a BACT determination for DLN turbines, the Draft Guidance provides a detailed discussion of an encompassing list of environmental factors that must be considered. These include:

- **The relatively small incremental reductions in NOx achieved.** As the Draft Guidance states, the incremental benefits of SCR on DLN turbines in reducing NOx emissions is small:

  > At DLN turbines, the reduction in NOx emissions that can be achieved with the use of SCR is small (approximately 5.5 ppm of NOx) in comparison to NOx emissions reduction that can be achieved with SCR at other types of turbines and roughly equivalent to the small amount of ammonia slip that may be emitted (often less than 5 ppm to 10 ppm of ammonia.) (Page 2 of the Draft Guidance Cover Memorandum.)

- **The increase in ammonia releases as the result of imposing SCR.** The Draft Guidance lists a number of important and detrimental environmental impacts from increases in ammonia releases that must be considered, especially in light of the fact that the amount of NOx reduction expected from the use of SCR on DLN gas turbines is roughly equal to, if not lower than, the amount of ammonia slip that may be emitted.[1] Foremost among these is the potential for ammonia emissions to increase ambient fine particle matter concentrations that can adversely affect public

[1] There is a considerable amount of uncertainty in measuring the amount of ammonia slip. GE's evaluation shows that the amount of NH3 slip in new and clean combined cycle plants is 7.2 ppm or higher and increases with hours of operation. Therefore, EPA appears to underestimate the current effect of nitrogen loading from ammonia to the ecosystem.

health, and reduce visibility. These impacts must be weighed against any potential benefits from NOx reductions on public health, welfare and visibility.

In addition, increases in ammonia emissions can also lead to increases in acidic deposition on terrestrial soils and surface waters, and eutrophication of surrounding lakes and water bodies. In fact, as the Draft Guidance itself notes on page 17, if a nitrogen balance is performed, it will show that the nitrogen loading to the ecosystem is greater with SCR than without it. Finally, ammonia emissions also raise concerns for global warming and stratospheric ozone depletion that must be weighed.

- **Safety and economic penalties and disruptions arising from the handling of ammonia.** The guidance states that one of the frequently cited concerns associated with SCR is the potential danger of handling ammonia. As the Draft Guidance states, ammonia is identified by EPA as an "extremely hazardous substance." It is toxic if swallowed or inhaled and it can irritate or burn the skin, eyes, nose or throat. In addition, the guidance states that ammonia vapors may form an explosive mixture with air. A recent accidental ammonia release in Fort Edwards, New York underscores the hazards of handling ammonia. In that incident, because of potential safety concerns, New York authorities evacuated residents from their homes for three days. *See* **Appendix** D. In many communities, when faced with the choice between large quantities of concentrated ammonia or slightly increased NOx emissions, local and state authorities and community leaders prefer the small increment in NOx emissions to the risks attendant with the constant presence and loading/unloading of bulk ammonia.

- **Waste issues resulting from the impact of disposing of the spent SCR catalyst.** The Draft Guidance also states that spent SCR catalyst will require disposal at its end of life, adding to landfill burdens and impacting another environmental medium. It is important to note that SCR catalyst materials typically contain heavy metal oxides such as vanadium and/or titanium. Currently, vanadium pentoxide is the most commonly used SCR catalyst and is identified by EPA as an "Extremely Hazardous Material." Although the actual amount of active material on the catalyst is small, the quantity of waste associated with SCR catalysts is large. DLN turbines, in contrast, eliminate the creation of these wastes, because it is an inherently clean technology.

- **The impact of encouraging more electricity production from dirtier plants.** Last, but certainly not least, is the potential unintended adverse impact of imposing unnecessary SCR costs on DLN turbines. A higher cost structure for DLN turbines will encourage greater electricity production from less costly older, coal and oil burning power plants. As the guidance itself states:

> Finally, the modest benefits in terms of NOx reductions that can be achieved by putting SCR on a DLN natural gas combined cycle power plant are further limited by the dynamics of the electricity market. If

> SCR is required on a new DLN turbine, the added capital and operating costs of SCR may mean that more electricity will be produced by dirtier plants. This could occur because fewer of these plants will be built and because less electricity will be generated from those that are built. Therefore, total NOx emissions, could increase, not decrease, as a result of requiring SCR on these plants, as would emissions of SO2, CO2, and mercury on a national or regional basis. (Page 3 of the Draft Guidance Cover Memorandum.)

As the attachment to the Draft Guidance states, the potential for overall NOx emissions to increase (along with SO2, CO2 and mercury) was confirmed by a recent EPA report, *Analysis of Emissions Reduction Options for the Electric Power Industry*, published in 1999. Using the Integrated Planning Model, the report predicted that a policy that requires SCR on DLN turbines shows an overall increase in NOx emissions, thus negating the potential environmental benefits ascribed to SCR.

D. The Draft Guidance clearly states that by taking into account these collateral impacts, the permitting authority may reject specific control technologies (*i.e.*, SCR).

Upon consideration of these collateral impacts (environmental, energy, and cost), the Draft Guidance clearly indicates that individual permitting authorities may reject SCR as BACT for DLN turbines.

> Thus a permitting authority could appropriately conclude that BACT in a specific case was DLN turbines without additional controls for a combined cycle gas turbine if a case-by-case assessment of the environmental, energy, and economic impacts demonstrates that the collateral impacts associated with a control technology such as SCR outweighed the benefits of additional NOx reduction. (Page 4 of the Draft Guidance Cover Memorandum.)

This conclusion is correct in light of the statutory requirement for BACT to represent a case-by-case analysis and in light of the substantive discussion of environmental factors included in the Draft Guidance. As discussed later on in our comments, we also believe that the specific and detailed analysis provided in the Draft Guidance regarding the trade-offs between NOx reductions and collateral impacts from SCR is sufficient on its face for permitting authorities to rely on in arriving at such a conclusion. EPA should clarify the guidance to eliminate any chance that permitting authorities may think that additional, detailed studies regarding the impacts of ammonia on a specific microenvironment are necessary to effectuate the guidance. Rather, to the extent the environmental tradeoffs for a specific unit are similar in magnitude to those discussed in the Draft Guidance, the Draft Guidance should clarify that permitting authorities may rely on the EPA analysis of environmental factors summarized in the Draft Guidance. Instead of conducting detailed new scientific studies, permitting authorities would only have to show how the specific conditions of their application meet the conditions discussed in the guidance. *See* **Appendix** E. To facilitate discussion on this important issue, we have

provided in Appendix E a sample decisionmaking matrix/checklist for permitting authorities to use when conducting this case-by-case evaluation.

E. The Draft Guidance anticipates that permitting authorities will undertake case-by-case analysis.

The guidance emphasizes that the permitting authorities will determine BACT based on a case-by-case evaluation. The guidance recognizes that environmental factors may vary from one plant to another and that it is up to the permitting authority to make a decision that makes sense in light of the individual conditions and constraints presented. The importance of providing states with this discretionary authority is underscored in a May 20, 1999 letter from John Seitz:

> In determining BACT and LAER, as in implementing other aspects of the PSD or NSR programs, the State exercises considerable discretion. Thus, EPA lacks authority to take corrective action merely because the Agency disagrees with a State's lawful exercise of discretion in making BACT and LAER or related determinations. **[Enclosure A from a May 20, 1999 letter to STAPPA/ALAPCO on Title I/Title V Interface Issues.]**

The Draft Guidance must remind permitting authorities of the importance of case-by-case analysis and confirm that such analysis is required under the Act. This is important because some EPA regions appear to have conducted only a cursory analysis of the environmental impacts and other factors, and dictated that SCR was BACT merely because it may remove a few additional parts per million of NOx.[2]

II. Why the Guidance is Needed

GE believes the guidance is crucial in order to properly implement the mandates of the Clean Air Act in making BACT determinations. Section 169 of the Clean Air Act requires permitting authorities to establish "[a]n emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility." (43 U.S.C. § 7479(3)) Without a case-by-case analysis of the environmental impacts described in this Draft Guidance, and an analysis of the energy and economic impacts, permitting authorities would not be fulfilling the requirements of the Act. Recent actions by certain EPA Regions suggest that they have concluded *a priori* that a specific emission level (namely, 3.5 ppm) is BACT for new gas turbines, without consideration of statutorily mandated criteria such as cost and other environmental impacts. Such prejudgment of

[2] Again, however, EPA should clarify that additional, detailed studies regarding the impacts of NOx and ammonia on a specific microenvironment are not necessary to effectuate the guidance. Rather, permitting authorities may rely on the analysis already performed by EPA and summarized in the Draft Guidance when evaluating specific project proposals. *See* **Appendix** E.

the outcome for any emission source is contrary to the case-by-case determination process required by the Clean Air Act and its implementing regulations.

GE also believes that the guidance is essential from a policy perspective. The absence of such directives from EPA could result in costly decisions that are counterproductive for the environment and that conflict with EPA's larger policy objectives. Narrow interpretations of technology-forcing requirements could lead permitting authorities to require as BACT any new technology that leads to improvements in emission reductions, regardless of how small those improvements are, and regardless of offsetting adverse environmental factors that may outweigh the intended improvements.[3] This is clearly a counterproductive result that must be prevented.

Furthermore, as EPA has concluded in other environmental programs, narrow programmatic decisions that ignore the potential substitution risks to the environment can simply transform one environmental problem into another. For instance, we know that water pollution controls can result in increased air pollution problems. Similarly, waste disposal options, such as trash-to-steam plants, must now be evaluated carefully in light of their potential impact on air emissions and water contamination. Given our improved understanding of the overall impacts of environmental controls and the propensity of controls to transfer releases from one medium to another, the Congress and the Agency have correctly moved to require an in-depth analysis of substitution risks when making regulatory decisions. Examples include the analysis of substitution risks required under the Safe Drinking Water Act when determining maximum contaminant levels, and the recent recognition that air deposition in the Great Lakes may need to be addressed when establishing Total Maximum Daily Loads (TMDLs). It not only makes sense that BACT determinations should follow this important trend, but it is also required by the forward-thinking statutory definition of BACT.[4]

The growing recognition of the problem of pollution transfers has been an important factor in EPA's decision to promote pollution prevention over other control options in the hierarchy of potential responses to environmental problems, and to encourage permitting authorities to consider pollution prevention in the context of permitting decisions. As Administrator Browner stated in June 1993:

> The mainstream activities at EPA such as regulatory development permitting, inspections, and enforcement, must reflect our commitment

[3] Even if the environmental impacts of two options are comparable, GE believes that EPA should, as a policy matter, give preference to inherently clean technologies that meet the Agency's and Congress's pollution prevention goals. Unless the Agency clarifies this preference in permitting decisions, it risks undermining its own pollution prevention initiatives.

[4] As defined in the statute, "[t]he term 'best available control technology' means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production, processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology' result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act." 43 U.S.C. § 7479(3).

to reduce pollution at the sources, and minimize the cross-media transfer of waste. *See* **Appendix** F.

Similar conclusions also compelled Congress to pass the Pollution Prevention Act of 1990. The Act stresses that pollution should be prevented at the source whenever feasible. In fact, one finding in the Act is particularly relevant to this BACT permitting decision process: "The opportunities for source reduction are often not realized because existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction; existing regulations do not emphasize multi-media management of pollution." 42 U.S.C. 1301(a)(3). Even the Clean Air Act has pollution prevention as one its goals: "A primary goal of this Act is to encourage or otherwise promote reasonable Federal, State, and local governmental actions, consistent with the provisions of this Act, for pollution prevention." 42 U.S.C. § 7401(c).

Without this guidance, EPA would be encouraging BACT determinations that are in direct conflict with its own policies on pollution prevention and its broader environmental goals to stop pollution at its source. Even more damaging is the message to producers and investors in new inherently cleaner technologies. Without this guidance, the producers and investors of new technologies could easily conclude that that EPA does not seriously weigh the advantages of inherently clean technologies over traditional pollution control technologies.

The DLN turbine case is a dramatic example of why the BACT permitting decisionmaking process must be properly implemented to avoid environmentally counterproductive results. As EPA has confirmed in its guidance, imposing SCR on DLN turbines yields only small incremental reductions in NOx emissions over the 9ppm level achieved by DLN turbines. Weighing against these slight NOx reductions is an array of adverse environmental impacts, including roughly comparable increases in ammonia emissions and fine particulates, scientifically demonstrated harm to nearby ecosystems through eutrophication, new safety problems created by the handling of ammonia, and incremental waste problems created by the need to dispose of spent SCR catalysts.

While these adverse environmental factors are at least comparable to the predicted environmental gains from the application of SCR to DLN turbines, they reflect only a part of the predicted adverse environmental impacts of using SCR. As the guidance states, the blind imposition of costly new control requirements on already relatively clean technologies can have significant adverse impacts on the market for those technologies by substantially increasing their costs, as well as discouraging investment in their development. If EPA had publicly indicated that post-combustion control devices would be required regardless of advancements made in source reduction, then technology advancements such as water and steam injection and more recent Dry Low NOx combustion would never have been developed and NOx emissions would have remained at uncontrolled levels in the range of 175ppm with natural gas and 250ppm with oil. If such advancements in technology had never been developed, the global environment would not reflect the improvements achieved to date and would continue to deteriorate. In the specific case of DLN turbines, as EPA itself has noted, the potential disbenefits of requiring SCR include the incentivizing of greater electricity production from coal-burning power plants, which

will have the end result of a net increase in NOx emissions. This, in of itself, throws into question any justification for the use of SCR on DLN turbines. The associated increased emissions of SO2, CO2 and mercury from coal combustion also reinforce the downsides of requiring SCR.

As a national strategy, GE believes that promoting efficient, inherently clean combined cycle power plants is a far more effective means to improve air quality in both attainment and non-attainment areas than blindly chasing every decreasing incremental reduction of a single pollutant through add-on devices to low emission units. This post-combustion control philosophy is showing diminishing returns in terms of its impact on national air quality while driving the cost of electricity higher. Gas turbine combined cycle power plants equipped with DLN combustors have emission levels less than *one-fifth* of the new 1998 NSPS levels for new boilers. Also, the thermal efficiencies of the combined cycle plants are twice as high as most boiler efficiencies. Maximizing power generation from the use of combined cycle power plants will reduce emissions from the power industry and should be promoted especially for combined heat and power applications. This cleaner technology must be encouraged, not disincentivized by weighing the technology down further with add-on controls.

III. Significant Changes to the Draft Guidance Are Required to Assure Compliance with the Act and to Assure Implementation.

While GE supports the overall intent of the Draft Guidance, GE believes that significant changes are essential in order to assure compliance with the Act and to make the guidance implementable. Specifically GE recommends the following modifications to the guidance:

A. The Draft Guidance should remove any impediments, including categorical statements, which might discourage permitting authorities from fully weighing environmental and cost considerations in making case-by-case BACT determinations.

At several points the Draft Guidance cover memorandum states that in "most cases" BACT for controlling NOx emissions from combined cycle natural gas turbines, including DLN turbines, is achieved by SCR. Categorical statements such as this prejudge the individual case-by-case analysis required by the Clean Air Act and EPA regulations and guidance. They also conflict with the substantive evidence provided in the Draft Guidance which demonstrates that the adverse environmental effects, most notably the ammonia releases and the predicted of net increases in NOx emissions with SCR, are likely to offset any expected benefits for 9ppm DLN turbines. GE strongly recommends that the Agency delete these statements from the guidance due to their inconsistency with the objectives of the guidance and the substantive evidence included on expected adverse environmental effects of SCR when applied to inherently low polluting DLN turbines. Such statements are laced throughout the first paragraph of the Draft Guidance Cover Memorandum from John Seitz.

B. The Draft Guidance should clarify that permitting authorities are required under the Clean Air Act to undertake a case-by-case analysis of the energy, environmental, and economic impacts before making a BACT determination.

As stated, above, § 169 of the Clean Air Act clearly requires permitting authorities to undertake a case-by-case analysis of the energy, environmental, and economic impacts in determining BACT. Specifically, § 169 requires permitting authorities to establish "[a]n emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility." (43 U.S.C. § 7479(3)) Statements in the Draft Guidance, such as those on page 3 that suggest the Clean Air Act "allows" permitting authorities to weigh these factors, should be corrected. Without a case-by-case analysis of the environmental impacts described in this Draft Guidance, and an analysis of the energy and economic impacts, permitting authorities would not be fulfilling the requirements of the Act. The Draft Guidance should state this clearly and not provide permitting authorities with the impression that such an analysis is discretionary in nature.

C. The Draft Guidance should state that recent BACT decisions requiring SCR do not establish precedents for future BACT determinations because they do not include a full weighing of the collateral factors as described in the Draft Guidance.

In 1998 and 1999, State permitting authorities, with at least tacit EPA approval, issued BACT determinations for dozens of DLN turbines that did *not* require SCR. This pattern, however, abruptly changed in late 1999, when EPA Region IV commented on Florida's draft BACT determination for the Kissimmee Utility Authority. *See* **Appendix** A. Florida had reasonably decided that 9ppm represented BACT and did not require SCR in the final BACT determination for the DLN turbine. EPA Region IV's comments in this high-profile case, with its threat to override the State decision and delay a permit, forced the State of Florida to reverse its initial case-by-case analysis and intimidated the project sponsor into avoiding the time and expense of suffering an EPA challenge. *See* **Appendix** G. EPA Region IV and other EPA regions then followed this decision up with comments on several other draft BACT decisions seeking the same endpoint. This heavy-handed EPA approach will chill the willingness of project sponsors to seek permits for DLN at 9ppm alone, since, for many such projects, the delays inherent in challenges to a State decision by an EPA region are economically draining.

Given that the Draft Guidance comes on the heels of this recent spate of EPA decisions, permit comments and informal guidance by regional staff, it is incumbent on the Agency to state in the Draft Guidance that these decisions do not establish a precedent for future BACT determinations because they did not include a full weighing of environmental factors and other collateral factors as catalogued and described for the first time in this guidance. Unless this is stated clearly, these recent decisions suddenly imposing SCR on DLN turbines, when coupled with the categorical statements on the use of SCR cited above, will continue to chill permit applicants and permitting authorities from undertaking the case-by-case analysis required under the Act.

In addition, in an effort to further support the case-by-case decisionmaking and consideration of appropriate BACT factors, GE also recommends that the Draft Guidance state explicitly that the decision by any one permittee to install SCR on a DLN turbine does not by implication mean that BACT for all DLN turbines includes SCR. A decision by one permittee -- whether voluntary or forced by fear of permit delays -- by definition depends on factors unique to the company that are not necessarily representative of average conditions in the electric utility industry.

D. EPA should note that the Draft Guidance is only applicable when the cost differentials (between a regular turbine with SCR and a DLN turbine with SCR) are reasonable.

The Clean Air Act defines BACT as the "maximum degree of reduction" which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable. While the Draft Guidance focuses on environmental factors, it is clear from the discussion included in the Guidance that "collateral factors" also include cost considerations in conformity with the statutory provision. Recent examples demonstrate that the costs of application of SCR to DLN turbines can vary considerably and cost substantially more than a regular gas turbine with SCR.

Accordingly, the Draft Guidance should clarify that the need to weigh environmental impacts discussed in the Guidance is only necessary when the cost-effectiveness of reducing NOx emissions on a DLN turbine with SCR is comparable to the cost-effectiveness of reducing NOx emissions at a traditional GT plant. In those instances, however, when the environmental impacts are comparable and the costs of requiring SCR on DLN turbines are anticipated to be significantly higher, GE believes that SCR should also be rejected. If at some point in the future, the advent of a new technology makes it possible to achieve a 3.5 ppm NOx level without adverse environmental impacts and at a comparable cost, then that technology should be considered. Even then, however, permitting authorities would still have to carefully evaluate the small incremental improvements against broader pollution prevention goals and the potential for higher cost turbines to encourage greater electricity production from oil and coal burning plants.

E. The Draft Guidance should be easily implementable and provide sources and permitting authorities with meaningful choices.

EPA's Draft Guidance creates uncertainty as to whether it requires the applicant to conduct a myriad of new scientific studies to support a decision to reject SCR on the basis of environmental concerns. EPA should clarify that this is not the intent of the Draft Guidance. It is difficult to imagine how the Agency, with all its resources, could definitively assess the numerous environmental implications of such relatively small changes in emissions on the many endpoints discussed in the Draft Guidance. For this reason, expecting permit applicants to conduct specific impact studies and requesting permitting authorities to review these studies exceeds any reasonable assessment of their capabilities. Such requirements could effectively prevent any applicant with a DLN turbine from seeking or obtaining a BACT determination that does not include SCR. Therefore, GE strongly recommends that the guidance confirm that

appropriate references to the discussion included in the Guidance will suffice to support a permitting authority's decision that BACT for a DLN gas turbine does not include SCR, or that a very limited number of comparisons of emissions data will suffice to make the demonstration required. Instead of conducting detailed new scientific studies, permitting authorities would only have to show how the specific conditions of their application compare to the conditions discussed in the guidance. A sample matrix/checklist of factors for permitting authorities to use is included in Appendix E. The expectation of more elaborate studies will render the guidance practically meaningless.

F. The Draft Guidance should clearly note the current limitations of ammonia-free, add-on NOx control technologies.

Because of the potential adverse environmental effects of using SCR to control NOx, some commenters on draft BACT determinations have raised the possibility of requiring ammonia-free NOx control technologies, such as SCONOX and SCOSOX. While these control technologies may evolve overtime, the Draft Guidance should clearly describe the limitations of these technologies, both in terms of their cost and their demonstrated applicability to the larger sized turbines being permitted today.

Control devices that reduce NOx without the use of ammonia are currently being demonstrated on two small sized turbines and are still in the development phase. These turbines include a 5MW Solar Taurus and a 25MW GE LM2500 unit. Demonstration and applicability of these control devices on heavy-duty turbines have not been attempted as of yet. Therefore, the applicability of these control devices on larger, full scale turbines is not currently available, practiced, or demonstrated. Given the considerable public interest in this issue, the Draft Guidance should note the early stage of development of these new technologies as well as the potential cost and energy penalties associated with their use.

Appendices

A. Regional EPA Letters Commenting on draft State BACT determinations:

- ✓ January 4, 2000 letter from EPA Region IV to South Carolina on BACT for Santee Cooper Rainey Generating Station
- ✓ November 8, 1999 letter from EPA Region IV on KUA to the Florida DEP
- ✓ October 1999 letter from EPA Region IV to Florida on Draft Permit for Lake Worth Generation, LLC
- ✓ November 1999 letter from Region IV to Florida on PSD permit for Gainesville Regional Utility
- ✓ May 7, 1999 letter from Florida to Region IV on Duke Energy New Smyrna Beach Project
- ✓ October 27, 1999 letter from Florida to EPA Region IV on SCR *vs* DLN on Combined Cycle Units in Ozone Attainment Areas

B. DOE Statement of Cooperative Agreement Objectives on the Utility Advanced Turbine Systems Technology Readiness

C. GE Power Systems slide presentation to EPA on January 24, 2000

D. The Associated Press, Monday, August 30, 2000

E. Proposed Matrix/Checklist of Environmental Factors for BACT Determinations

F. EPA Administrator Carol Browner's Memorandum to All Employees, "Pollution Prevention Policy Statement: New Directions for Environmental Protection." June 15, 1993

G. Florida State's Final Determination on KUA