

**REVIEW OF REGULATORY REQUIREMENTS
RELATING TO OPERATION OF EMERGENCY GENERATORS
FOR DEMAND RESPONSE**

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ABSTRACT

This report comprises a review of regulatory requirements relating to operation of emergency and back-up generators for participation in demand response programs or in other peak-shaving modes of operation. It seeks to provide environmental permitting guidance to facilities wishing to pursue such operation.

Deployment of emergency generators for their primary use, i.e., during times when power from the electric grid is not available, is exempt from most permitting and air emissions requirements. This allows operation of such units during system-wide or localized power outages. However, operating these units in pre-outage conditions, in order to reduce electric system load at times of high demand, alters their regulatory standing and voids their exempt status for most purposes. With the advent of electric demand response programs, there has been some uncertainty and confusion over the permitting implications of using generators for demand response. Securing the appropriate regulatory approvals is a pre-condition for legitimate operation in any demand response mode.

This report reviews important components of New York State, Federal and selected local regulatory requirements, and offers guidance on regulatory applicability and on environmental permitting options for demand response applications. The report points to the conclusion that the regulatory implications of demand response are most easily managed for facilities eligible for lower levels of State air permitting. This includes currently exempt facilities and those that qualify for a facility Registration, and, to a lesser extent, those with State Facility Permits. Larger facilities subject to Title V permits must address a more daunting array of regulatory requirements stemming from such operation, suggesting the need for careful evaluation of project costs and benefits.

The report also previews pending regulatory changes relating to distributed generation (DG) sources, and offers a preliminary assessment of the implications of these changes for demand response operation.

Key Words: Generator operation for demand response
 Permitting
 Applicable regulations

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SUMMARY

INTRODUCTION

This report reviews and summarizes New York State, Federal, and local (New York City and Westchester County) air regulatory requirements pertaining to operation of on-site emergency generators for demand response.¹ This regulatory guidance is relevant because, as detailed below, all facilities engaging in such operation must secure appropriate air emissions permits.

In response to reserve capacity shortfalls during periods of high electric demand, the New York Independent System Operator (NYISO) and several Transmission Owners have implemented discretionary electric demand response programs. One program component is load curtailment through short-term electric reductions on the part of end-use customers. Another program element, and the focus of this analysis, is the operation of on-site generators to serve facility load, thereby freeing system capacity for other users. In most cases, the primary role of these generator units continues to be providing power for critical facility loads in the event of loss of power from the electric grid. In that emergency power role, such units would typically be exempt from air permitting and pollutant emissions standards. Running such units in pre-outage conditions, when called upon by the demand response program operator, voids that exempt status and subjects the facility to permitting and other regulatory requirements.

In addition, some owners have opted to use on-site generators for peak-shaving, to reduce their load during periods of high system demand and correspondingly high time-of-use charges. This mode of operation, whether or not such facilities participate in demand response programs, subjects the facility to permitting requirements.

The two modes of operation -- in formal demand response programs or for owner-initiated peak-shaving -- are for ease of reference both termed “demand response” in this report.

This report provides an overview of potentially applicable requirements that must be evaluated for specific applications. It outlines relevant air permitting categories and suggests options for incorporating demand response generators into new or existing permits. This information is intended as general regulatory guidance, with the understanding that facility-specific circumstances require further evaluation.

¹ For ease of reference, the subject equipment is referred to as generators or emergency generators, although this group is understood to include units classified as “back-up” or “standby” generating equipment.

It is important to note that significant shifts are underway in regulatory standards applicable to distributed generation (DG) sources, including emergency generators used for demand response. These changes, expected to be promulgated later this year, may render some information contained herein moot and/or inaccurate. This guide addresses current regulatory requirements as of April 2004. The report also provides, where feasible, information on anticipated regulatory changes.

The report's Introduction (Section 1) discusses the context for concern with generator permitting and briefly describes the demand response programs of the New York State Energy Research and Development Authority (NYSERDA). New York State requirements are addressed in Section 2. Although Federal requirements take legal precedence over State standards when they conflict, most air permitting and regulatory provisions are implemented and/or enforced by the State. State regulations thus have the most direct bearing on the activities addressed by this report. State requirements are also likely to be the primary regulatory drivers for small-to-midsize sources most likely to seek guidance in this document.

Federal requirements are the subject of Section 3. In general, relevant federal programs apply to larger sources, so that facilities below a certain size threshold may not require detailed information. The exception to this is emission standards applicable to combustion turbines that meet certain size and installation date thresholds, which are subject to federal New Source Performance Standards (NSPS).

Information on local requirements in New York City and Westchester County is provided in Section 4. The focus on the downstate area reflects the expectation that this area will see the greatest level of activity in demand response efforts. The scope of this report does not allow comprehensive attention to all local regulations in the State, nor can it provide detail on regulatory requirements even in this limited locale. The report instead seeks to highlight the basic regulatory structure and identify areas for additional attention.

Section 5 is a Resource Index that provides readers with Web links and other relevant information to further pursue topics addressed herein.

The following is a brief overview of key points from Sections 2 (NYS requirements), 3 (federal requirements), and 4 (local requirements). In the interests of conciseness, terms are not exhaustively defined in the overview. The reader should refer to the appropriate section for a more detailed discussion of the topic.

NEW YORK STATE REQUIREMENTS

Key concepts of NYS air regulatory requirements include the following:

- An area's attainment status for "criteria" air pollutants is a key determinant of regulatory applicability.
- Major source thresholds and applicability are based on a source's "Potential to Emit" (PTE), rather than on actual emissions.
- Permitting levels in New York include exempt, Registration, State Facility Permit, and Title V Permit, in ascending order of complexity.
- Facilities that intend to operate previously exempt emergency generators for demand response must obtain new permits or modify existing permits to address generator operation.
- Sources classified as major for NO_x emissions (generally, larger facilities) are subject to NO_x emission limits known as NO_x RACT (Reasonably Available Control Technology). Diesel-fired emergency generating units may require control technology to comply with these standards. Variances from the standards are sometimes available.
- The demand response program protocol implemented by the NYISO is applicable to their Emergency Demand Response Program (EDRP) and other demand response programs. It includes NO_x limits that apply to all pre-1995 units. The NYISO protocol also limits such operation to 200 hours per year and mandates use of ultra-low sulfur (ULS) fuel (where identified by NYSERDA as available).
- All oil-burning combustion equipment is subject to a particulate matter (PM) limit of 0.1 lb per mmBtu of heat input.

FEDERAL REQUIREMENTS

Federal environmental programs potentially applicable to demand response generators include:

- New Source Performance Standards – Standards are applicable to larger combustion (gas) turbines installed after 1977. These rules include NO_x and SO₂ standards and limits on fuel sulfur content.

- MACT Standards for HAP – Emission limits for Hazardous Air Pollutants (HAP) at major sources must reflect application of Maximum Achievable Control Technology (MACT). MACT limits for internal combustion engines and combustion turbines have recently been promulgated.

LOCAL REQUIREMENTS

A limited review of New York City and Westchester County air permitting requirements has been conducted. A key finding is that in New York City, the Department of Environmental Protection (DEP), Building Department and Fire Department all have responsibilities and jurisdiction related to siting and operation of power generating equipment, whether for use in emergency or demand response modes.

KEY CONCLUSIONS

This assessment of permitting and other regulatory requirements yields several findings:

- The regulatory implications of moving from exempt to permitted generator operation are less onerous for facilities eligible for lower levels of State air permitting. Sources that are currently exempt or subject to Registration can most readily incorporate permitted generator operation. Sources with a State Facility Permit (SFP) may also be able to transition to permitted operation without major impediments, although the time needed to modify their SFP will likely exceed that required for lower regulatory levels. Title V facilities face the most daunting regulatory challenges, as their major source status translates to substantially expanded regulatory applicability for both Federal and State requirements.
- Interpretation of environmental regulations can be challenging. It is important to understand the full regulatory impact before undertaking significant investments relating to demand response. Potential demand response participants are encouraged to seek assistance as needed in assessment of their specific circumstances.
- The regulatory trend is toward more stringent limits applied to operation of on-site power generation sources. These shifts in the regulatory arena could result in projects that are currently judged to be viable becoming subject to more restrictive requirements in the future. Where operation for demand response is being planned, this highlights the need for careful evaluation.

SECTION 1 INTRODUCTION

This report reviews and summarizes New York State, Federal, and, to a limited extent, local air regulatory requirements pertaining to operation of on-site emergency generators for demand response. This review has been conducted in the context of ongoing programs incentivizing demand response participation. Relevant programs are administered by NYSERDA and the New York Independent System Operator (NYISO), as well as Transmission Owners around the State.

NYSERDA's Program Opportunity Notice (PON) No. 835 governs the current cycle for the Peak Load Reduction Program. One of four major program components is Dispatchable Emergency Generator Initiatives (DEGI). This program provides support for measures to enable existing emergency/backup generators in the Con Edison service territory only to offload all, or a percentage of their electric capacity requirements to their own generators, in response to a communication from the NYISO's reliability-based demand response programs² or similar Transmission Owner programs. Incentives are offered for measures to improve generator energy and environmental performance, as well as for modifications and services to enable more reliable and efficient operation.

Efforts to clarify and guide permitting and regulatory compliance for generator operation are complicated at present by ongoing shifts in the regulatory arena. The New York State Department of Environmental Conservation (DEC) is developing standards and procedures applicable to "Distributed Generation" (DG) sources. Promulgation of a final rule is not anticipated before Fall 2004. Other State and Federal regulatory changes relevant to generator operation are also underway. This guide is intended to outline current regulatory requirements, while also providing, where feasible, an overview of anticipated changes.

Again, it must be emphasized that the materials contained herein are for general regulatory guidance only. Interested parties are advised to seek additional information, using the resources and contacts suggested in the Resources Index, or in consultation with in-house environmental staff or firms specializing in regulatory compliance assistance.

² NYISO's reliability-based programs include the Emergency Demand Response Program (EDRP) and the Installed Capacity Special Case Resources (ICAP SCR) program. For information on NYISO programs, visit their Web site at www.nyiso.com.

SECTION 2 NEW YORK STATE REQUIREMENTS

PERMITTING APPLICABILITY

Potential to Emit and Attainment Status

Comparing a facility's Potential to Emit (PTE) with emissions thresholds that delineate major source status is the primary basis for assessing regulatory applicability. Potential to Emit (PTE) is defined as "the maximum capacity of [a]...source to emit any regulated air pollutant under its physical and operational design." (6 NYCRR 200.1(bj)) Potential to Emit is typically calculated as the emissions resulting from full load operation throughout the year, i.e. for 8,760 hours per year.³ Facility PTE is comprised of the combined PTE of all emission sources at the facility, including sources that are exempt from permitting. It is important to distinguish this emission potential from the emissions levels that a facility has actually experienced, which will often be substantially lower.

The second factor driving permitting applicability is a region's status with respect to attainment of Federal National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants.⁴ All areas of New York State are in attainment with NAAQS for lead and sulfur dioxide. New York City, along with Nassau and Westchester Counties, had previously been considered as being in nonattainment for carbon monoxide. The area has recently been designated as having achieved attainment status. New York County (Manhattan) is the sole area of the State that is in nonattainment status for particulate matter with an aerodynamic diameter of 10 microns or less, or PM₁₀.⁵

The criteria pollutant ground-level ozone is a product of the interaction of precursor pollutants, oxides of nitrogen (NO_x) (also a criteria pollutant) and volatile organic compounds (VOC). As such, emissions of the precursors are regulated to control ground-level ozone concentrations. The downstate area of New York, including Long Island, New York City, Westchester and Rockland Counties and the lower part of Orange County, is classified as a severe ozone

³ In some cases, a source's Potential to Emit would be based on less than 8,760 hours per year of operation. For example, the operational threshold for exempt emergency generators is 500 hours per year. This threshold level of 500 hours would thereby be acceptable for use in calculating the PTE of such generators.

⁴ Criteria pollutants established by the Federal Clean Air Act include lead, nitrogen dioxide, particulate matter, sulfur dioxide, carbon monoxide, and ground level ozone. There are separate standards based on the aerodynamic diameter (in microns) of particulate matter, for PM₁₀ and PM_{2.5}.

⁵ NAAQS for PM_{2.5} (fine particulate matter) have also been promulgated by the U.S. Environmental Protection Agency (EPA), but attainment designations have not yet been fully implemented.

nonattainment area. The remainder of Orange County, along with Putnam and Dutchess Counties, is a moderate ozone nonattainment area. There are several marginal nonattainment areas in the State, including the Capital District, the Buffalo area, Jefferson County, and the summit of Whiteface Mountain in the Adirondacks. The remainder of the State is in attainment for ozone, but due to the State's position within the ozone transport region (OTR), the entire State is treated for some regulatory purposes as being nonattainment for ozone.⁶

An area's attainment designation is a determinant of the emissions threshold that constitutes "major source" status for permitting applicability. A region's nonattainment status means that a lower threshold of emissions applies in determining whether a facility in that region is a major source. Again, these thresholds relate to Potential to Emit, rather than actual emissions. The major source threshold is generally 100 tons per year (TPY) for attainment pollutants; that is the threshold that applies Statewide for lead, sulfur dioxide, particulate matter, and carbon monoxide. For NO_x and VOC, the major source thresholds are 100 TPY and 50 TPY, respectively, throughout the State except for the severe nonattainment area. In the severe nonattainment area, the major source thresholds are 25 TPY each for NO_x and VOC.

The lower major source threshold for NO_x in the severe nonattainment area makes NO_x the "regulatory driver" for many types of combustion sources, meaning that NO_x PTE and actual emissions levels will be the primary determinant of permitting and other air regulatory requirements. For that reason, and in the interests of conciseness, this report often focuses on NO_x emissions. This is not, however, meant to imply that other contaminants are not relevant; all criteria pollutants must be considered in evaluating regulatory applicability.

Comparing a facility's Potential to Emit to the relevant major source emissions thresholds is the key to determining regulatory applicability. The following discussion of air permitting levels provides an overview of this process. It should also be noted that the NYS Environmental Facilities Corporation (EFC) can provide direct assistance in assessing regulatory and permitting applicability. Information on contacting EFC can be found in Section 5 – Resources Related to New York State Requirements.

⁶ Current attainment designations for ground level ozone are based on 1-hour average ambient levels. EPA has proposed a more stringent 8-hour average standard, but its implementation has been delayed by legal challenges. Attainment designations for the 8-hour standard are expected to be promulgated in mid-2004, and may entail changes in attainment status for some areas in New York.

Air Permitting Levels

Air permitting requirements are addressed in Part 201 of Title 6, New York Code of Rules and Regulations (6 NYCRR). Facilities may be exempt from permitting if: 1) all emissions sources at the facility fall within the categories specified in Subpart 201-3 as exempt or trivial; and 2) facility-wide emissions, including those from exempt sources, are below the major source emissions threshold for each criteria pollutant.⁷

Registration may be available to small facilities with low levels of emissions. Eligibility for registration is addressed at 6 NYCRR 201-4. Registrations have a short application form, and typically entail the lowest level of compliance requirements.

For sources that are not eligible to obtain registrations, but are also not required to have Title V permits, the State Facility Permit (SFP) (Subpart 201-5) would be the relevant permitting level. SFP sources often have a PTE exceeding major source thresholds, but have actual emissions below the threshold, allowing them to adopt permit conditions that cap their emissions below the threshold levels. Such sources are known as “synthetic minors”. Although a facility’s exempt sources need not be listed in an SFP application (as they must be in Title V applications), exempt source emissions must be accounted for in applicability determinations and in establishing and maintaining permit caps. SFP compliance and monitoring requirements are usually somewhat less stringent than those for Title V permits, and typically focus on documenting compliance with relevant emissions caps.

Title V permits (Subpart 201-6) are the most comprehensive level of permitting, and encompass all emissions sources at a facility. Title V permits apply to sources for which the PTE for any regulated contaminant exceeds the major source threshold. Title V permits require annual compliance certification reports and generally entail the most significant level of monitoring and reporting for permit compliance.

The concept of “hollow permit” must also be considered in assessing permitting level. A facility comprised entirely of emissions sources that are individually exempt based on size or operational parameters can nonetheless be subject to permitting if the facility-wide PTE exceeds major source threshold levels. Note that in calculating PTE for an exempt source, it is generally acceptable to

⁷ The term “exempt” as used in this report is understood to include sources categorized as either exempt or trivial under 6 NYCRR 201-3.

base PTE on operational levels tied to exemption criteria. In the case of emergency generators, for example, PTE can be calculated based on 500 hours of operation per year (rather than the typical assumed value of 8,760 hours per year), since that is the operational level that defines the exemption.

If total facility PTE exceeds the relevant major source threshold, a permit must be obtained, even though each source is individually exempt. This is known as a “hollow permit.” The level of permit required is determined in the manner described above, and the facility can cap emissions as discussed below.

Exempt Generators

Electric generators can be exempt from permitting, based on size or operational limitations. Internal combustion engine generators and combustion turbines below certain size thresholds are exempted from permitting by 6 NYCRR 201-3.2(c)(3). Internal combustion engines fired by either diesel fuel or natural gas are exempt if they have a maximum mechanical power rating of less than 200 horsepower (hp) (~ 148 kW) if located in the severe ozone nonattainment area, or less than 400 hp (~296 kW) elsewhere in the State. Combustion turbines (“gas turbines” per the regulations) with a heat input at peak load of less than 10 mmBtu/hr (~ 600 kW) are likewise exempt from permitting. (All size thresholds given here are single unit capacity; the existence of multiple units has no relevance to exemption based on size.) This exemption based on size trumps other considerations discussed below that may void a generator’s exempt status. Units that do not exceed the size thresholds listed here are always exempt from permitting. (A caveat on this is the possible need for a hollow permit; see discussion above.)

Units that qualify as emergency power generating units are exempted from permitting under 6 NYCRR 201-3.2(c)(6). Eligibility as an emergency power generating unit is tied to the definition in 6 NYCRR Subpart 227-2(b)(7). This section defines an exempt “emergency power generating stationery internal combustion engine” as one that operates only when the usual sources of power are not available, for no more than 500 hours per year. The 500 hours must encompass both emergency operation and routine maintenance and exercising of the unit. The exempt unit definition explicitly excludes units used for peak-shaving generation.

The emergency unit exemption has been interpreted by DEC to exclude from eligibility all generators used for demand response, either at the request of the NYISO, electric provider, or

transmission owner, or at the facility owner's initiative. The emergency unit exemption is void for any demand response operation, regardless of the number of hours in which the generator is operated each year.

Demand response via on-site generator operation thereby subjects a facility to air permitting requirements. Facilities with existing permits are required to modify their permits to add the generators as a permitted source. Sources otherwise exempt from permitting are required to obtain a registration or air permit for such operation of generators.

PERMITTING OPTIONS

Permitting actions required for generator operation vary depending on the current regulatory status of the facility. Typical requirements for each level of permitting, pursuant to **current** DEC regulations, are described below. Please note that the general term "permitting" as used here is meant to encompass both the registration process, available to smaller sources, and the two levels of air permit. Although it is understood that New York's air registration process is deemed a ministerial activity not covered under Uniform Procedures regulations, and thereby does not comprise a "permit" per se, the term "permitting" is used for ease of reference.

Exempt Sources

A facility is exempt from permitting if all emissions sources at the facility fall within the exempt and trivial source definitions in Subpart 201-3 and if facility-wide emission potential does not exceed major source levels. This could, for example, be the case if a facility's combustion sources are comprised of boilers with heat input of less than 10 mmBtu/hr and generators limited to use during power outages, and where there are no significant process source emissions, (e.g. surface coating, printing, fuel storage, laboratory chemical use, etc.) at the facility. An exempt facility that elects to participate in a demand response/generator operation program will become subject to permitting.

Registration

Registration is simpler than permitting, and typically requires a one-page application form and one-page data sheet. In order to be eligible, facilities must be capable of "capping by rule," which means they can show that their actual emissions (as opposed to potential emissions) are less than

50% of the major source threshold in their area for any regulated pollutant.⁸ In the downstate region, for example, this 50% level would be 12.5 TPY of NO_x. Elsewhere in the State, the 50% level would be 50 TPY of NO_x. This emissions threshold pertains to **anticipated emissions from all facility sources** under the new mode of operation, i.e. with the operation of a demand response generator. The calculation of expected emissions must therefore account for all exempt sources, such as small boilers, emergency-only generators, and size-exempt generators, as well as demand response generators.

A registration cannot include formal permit conditions capping emissions below a specified level, and typically there might not be operating experience in a demand response mode to document that actual emissions will be below cap-by-rule thresholds. In the absence of such a record, registration applications must demonstrate that at the expected level of operation, total facility emissions of all criteria pollutants would not exceed the relevant 50% threshold. After issuance, operating records must be maintained and must document that emissions were within this limit.

A caveat on eligibility for a registration is that for sources not currently holding a registration or air permit, DEC may require submission of an application at the State Facility permit level in order to gather appropriate source and emissions data for the facility. Upon review of the application, the agency would issue a registration to eligible sources. This requirement has generally been waived for applications related to the State's Coordinated Demand Reduction Program, with demand response participants allowed to submit a registration application with supplemental calculations and data. DEC will offer guidance on whether a registration application is allowed on a case-by-case basis.

Facilities currently holding a registration for other facility emissions sources must include the generator in the registration if demand response participation is planned (unless the generator falls under the size exemption threshold). The facility must file a modified registration application, with calculations demonstrating the ability to meet the cap-by-rule emissions threshold at the expected level of operation. Allowable generator capacity and hours of operation would be determined by the increment remaining within the cap-by-rule level after boilers or other emissions sources are accounted for. In the case of currently registered facilities, DEC might review past actual emissions from the facility's permitted sources to determine

⁸ The cap-by-rule concept is intended to allow facilities with low levels of emissions to have the benefits (i.e. eligibility for lower permitting levels) of an emissions cap without the procedures otherwise required to

whether there is a sufficient margin to remain within the cap when anticipated generator operation is included.

If the cap-by-rule threshold cannot be met at the level of operation anticipated for all emissions sources, the facility would be required to obtain, at a minimum, a State Facility Permit.

State Facility Permit

Facilities that are not required to obtain a Title V permit, but are not eligible for registration because their actual emissions exceed the cap-by-rule level, would need to obtain a State Facility Permit (SFP). SFP candidates are usually facilities whose Potential to Emit exceeds the major source threshold, but whose actual or anticipated emissions are below this level, allowing the facility to accept an emissions cap.

Facilities that are currently exempt or hold a registration could be required to upgrade to an SFP on the basis of participation in a demand response program. If the expected level of generator operation would cause the facility to exceed the relevant cap-by-rule threshold but remain under the major source emissions threshold, the facility could adopt an emissions cap under an SFP. As with a cap-by-rule threshold, compliance with such a permit cap must account for emissions from all sources at the facility, whether exempt, trivial, or permitted.

If an existing SFP holder opts to participate in demand response, their permit must be modified to add the subject generator as a regulated source. Generator emissions must be accounted for in determining compliance with an existing emissions cap. If appropriate, the cap could be revised as part of the permit modification, to allow generator operation for demand response.

Proposed permit caps are subject to requirements for public notice and 30-day public comment period. From the date of DEC's receipt of a complete SFP application, the agency estimates that permit issuance could require 2 to 3 months.

Title V Permit

Facilities whose PTE exceeds the major source threshold for any regulated contaminant, and who cannot cap emissions below that threshold, are required to obtain a Title V permit. Title V permit applications must list the number and location of exempt sources, such as emergency generators,

establish and monitor a legally enforceable permit cap.

although at present they need not provide detailed information on these sources. Title V permits must also account for emissions from exempt and trivial sources (as defined in Section 201-3) in determining regulatory applicability.

Some aspects of the Title V permit process may affect the ability to obtain timely approval for operation in a demand response program. Once a Title V application is deemed complete by DEC, the draft permit is put out for a 30-day public comment period. Following the comment period, public input is addressed and DEC decides whether to deny the permit or prepare a Proposed Permit for EPA review. EPA has 45 days to review the Proposed Permit, after which DEC makes a final decision on permit issuance or denial. Title V permits must be renewed every five years. DEC estimates that the time required for permit issuance is 4 to 6 months from the date of a complete application.

Existing Title V sources that need to modify their permits to add a previously exempt generator must submit a modified Title V application covering all permitted and exempt sources at the facility. The application is subject to standard review and notice procedures. Exempt, registered, and SFP sources could be required to upgrade to a Title V permit if the contemplated level of demand response operation would cause total facility emissions to exceed the major source threshold. Such sources would need to submit a Title V application that encompassed all permitted and exempt sources at the facility.

NO_x RACT COMPLIANCE

NO_x RACT Applicability

Major stationary sources of NO_x are those that have NO_x Potential to Emit of 25 TPY in the downstate severe ozone nonattainment area and PTE of 100 TPY elsewhere in the State. Major sources of NO_x must use Reasonably Available Control Technology (RACT) to control NO_x emissions from stationary combustion sources, per the requirements of 6 NYCRR 227-2. The generating unit size thresholds for NO_x RACT applicability are identical to those for permitting: the standards apply only to internal combustion engines greater than 200 hp in the severe ozone area or 400 hp elsewhere and to combustion turbines greater than 10 mmBtu/hr heat input. (Again, these are single unit capacities.)

Most Title V facilities are also subject to NO_x RACT requirements. SFP, registration, and exempt sources are not subject to NO_x RACT, because major source status for NO_x would render such

sources ineligible for the lower level of permitting or exemption. NO_x RACT considerations are therefore applicable only to the subset of potential program participants that are Title V sources.

RACT standards for stationary internal combustion engines are at Section 227-2.4(f) and for combustion turbines at 227-2.4(e). Emergency power generating internal combustion engines, defined as being for use only during power outages, and for less than 500 hours per year, are exempt from RACT standards. However, units “used for peak shaving generation,” which DEC interprets as any units operating for demand response, **are subject to NO_x RACT standards.**

There is no comparable exemption from NO_x RACT for emergency-only combustion turbines, likely reflecting the infrequency with which this technology is used for emergency or stand-by applications.

NO_x RACT/Title V Interface

As noted above, NO_x RACT applicability is generally limited to Title V sources because facilities that are major NO_x sources are also subject to Title V permitting. Sources with existing Title V permits are already required to be in compliance with NO_x RACT for permitted stationary combustion sources, including boilers exceeding 20 mmBtu/hr heat input (10 mmBtu/hr threshold for boilers using #6 oil in the severe ozone nonattainment area). Participation in a demand response program voids the NO_x RACT exemption available to emergency-only engine generators. Demand response engine generators must therefore be brought into compliance with NO_x RACT standards for internal combustion engines.

Sources upgrading to a Title V permit for demand response participation or any other purpose would become subject to NO_x RACT for all of their stationary combustion sources. They would, for example, have to bring boilers into compliance with NO_x RACT emission limits, which could entail combustion and/or post-combustion retrofits. The potentially costly ramifications of such a permit upgrade suggest the need for a thorough evaluation in such circumstances.

Information on NO_x RACT standards for engines and combustion turbines, plus a discussion of monitoring requirements and economic/technical variances from compliance, are included in Appendix 1 to this report. The description in Appendix 1 reflects revisions (effective 2/11/04) to the NO_x RACT standards in Subpart 227-2. The new emission standards go into effect on 4/1/05. The amendments ratchet RACT limits downward for gas- and oil-fired engines, with the new

limits reducing allowable emissions by about 75% for oil-fired engines, compared to current limits, and for gas-fired engines by 25-50%. Economic variances are still available. The amendments clarify that exempt generator use extends to operation for testing and maintenance purposes.

NO_x STANDARDS AND OTHER OPERATING LIMITS IN NYISO PROTOCOL

The program manual for the Emergency Demand Response Program (EDRP) of the New York Independent System Operator (NYISO) includes environmental protocols that apply to both direct participation in the EDRP and to participation in other demand response programs regulated by the New York Public Service Commission. Operation of demand response generators is limited to periods when participants are activated by the NYISO or by the Transmission Owner (TO) in response to a localized distribution emergency. Operation under such programs is limited to 200 hours per year. The protocol also includes NO_x emission limits for generators of model year 1994 and earlier. Such generators must demonstrate, either by testing or by unit-specific manufacturer's data, that NO_x emissions do not exceed 35 lb/MWh.⁹ Generators of model year 1995 and later are assumed to be compliant with this limit.

Fuel requirements in the NYISO protocol are discussed below in the section on Fuel Sulfur Compliance.

PARTICULATE EMISSIONS COMPLIANCE

Oil-fired stationary combustion sources are subject to a State Implementation Plan particulate matter (PM) limit of 0.1 lb/mmBtu of heat input. It is likely that some diesel-fired engines, particularly those of less than 500 kW rated capacity, are unable to meet the 0.1 lb/mmBtu standard without use of emission controls. Unit-specific evaluation may be required.

There are currently no PM standards applicable to gas-fired combustion units.

Proposed standards applying to distributed generation (DG) sources, including demand response generators, may necessitate the use of particulate filters on oil-fired engines and turbines in order to comply with the applicable standard. Low-sulfur fuel may also be required to limit PM emissions. As detailed below, DG standards are slated for promulgation in 2004.

⁹ Note that the 35 lb/MWh standard is substantially less stringent than NO_x RACT standards. Units subject to NO_x RACT must comply with the RACT limit under 6 NYCRR Subpart 227-2.

FUEL SULFUR COMPLIANCE

Current State Regulations

Subpart 225-1 of 6 NYCRR specifies allowable sulfur-in-fuel limits in all regions of New York State. These limits are not detailed here, as lower limits for demand response programs (see below) take precedence. It should be noted that DEC-issued permits will contain only those fuel sulfur limits stipulated in Subpart 225-1. The NYISO limits detailed below do not appear in State air permits, but are nonetheless applicable to all demand response program participants.

Demand response Protocol Requirements

The environmental protocol applicable to participants in the NYISO's Emergency Demand Response Program (EDRP) and comparable programs requires that wherever supplies are available for delivery, program participants using diesel-fueled emergency generators will combust ultra-low sulfur (ULS) diesel in all program generators. The fuel is required for both program participation and non-program equipment testing, and applies to all tank fills made in the calendar year of program participation. NYSERDA is charged with responsibility for determining where supplies are available for purposes of this requirement.

Emergency State regulations implemented in 2001, and which have since expired, mandated a maximum sulfur content of 30 parts per million (ppm) by weight for fuel used in demand response generators. The current NYISO protocol does not specify a sulfur content limit that constitutes ULS fuel. The 30 ppm level is generally regarded as compliant with NYISO requirements. This is equivalent to a sulfur content of 0.003%.

A limited number of fuel providers in the downstate region have been able to make an ULS product available. NYSERDA has issued its finding for 2004 stating that ULS diesel fuel is available for sale in New York City, Long Island, and Westchester, Rockland, Putnam and Dutchess Counties. The remainder of the State has been deemed to be exempt from the ULS fuel requirement for 2004.

Changes in Fuel Sulfur Regulation

Modifications to State regulations currently proposed will benchmark the fuel sulfur standard for oil-fired demand response generators to the relevant standard for on-road diesel fuel. Federal Clean Air Act requirements specify that on-road diesel fuel must by 6/1/06 comply with a

maximum sulfur content standard of 15 ppm by weight. Implementation of this standard will thereby lower allowable diesel oil sulfur content by 50%, compared to the currently available ULS product.

NEW SOURCE REVIEW APPLICABILITY

The State New Source Review (NSR) program comprises 6 NYCRR Subpart 231-2. NSR can apply to facilities at any permitting level. The stringent and potentially costly emissions controls and offsets that apply to NSR projects create a strong incentive to cap new source emissions below NSR applicability thresholds.

The New Source Review applicability regulations are quite complex and not easily reduced to a few simply stated rules. Although there are many possible sets of circumstances, the following guidelines generally hold for the specified scenarios. For existing non-major facilities, if emissions of NO_x and VOC from a demand response source added as a new emission unit can be capped below 100 TPY and 50 TPY, respectively, in non-severe areas and below 25 TPY in severe areas, the facility would not be subject to NSR. For existing major facilities, if emissions of NO_x and VOC from a demand response source added as a new emission unit can be capped below the significant net emission increase thresholds of 40 TPY for any non-severe area and 25 TPY for any severe area, then the facility would not be subject to NSR. Note that threshold levels for “new” emissions must generally account for all emissions sources added within a five-year contemporaneous period. Given the complexity of the New Source Review requirements and because other source project scenarios are possible, it is recommended that facility representatives contact DEC, or otherwise obtain professional guidance, to assess New Source Review applicability for their specific situation.

New or modified emissions sources subject to NSR must implement Lowest Achievable Emission Rate (LAER) control technology and must purchase or otherwise obtain emissions offsets. LAER is defined as the most effective control technology demonstrated in practice, without regard to cost. As such, LAER shifts over time and must be evaluated on a case-by-case basis.

The emissions offsets required for NSR compliance are marketable commodities reflecting a reduction in one facility’s actual air emissions, which is purchased by another facility to offset its new emissions. The required offset ratio is linked to an area’s nonattainment status; it is 1.3-to-1 in the severe ozone nonattainment area and 1.15-to-1 elsewhere in New York.

For additional discussion of the intent and terminology of the federal requirements underlying New York's New Source Review program, see Appendix 2 to this report.

FUTURE DIRECTIONS

A DEC rule-making process to develop regulations appropriate to the use of distributed generation sources is currently underway. An overall objective of the process is to ensure that, over time, distributed generation resources are at least as clean as the central station power being displaced, and that it does not contribute to a worsening of air quality. A preliminary assessment suggests the following key changes to regulation of distributed generation (DG) sources:

- Distributed generation sources would be divided into categories based on function and unit installation date, with a unit's classification driving applicable emissions limits. Proposed functional categories include:
 - Emergency power units, which operate when the normal sources of power are not available, for testing, or for fire-fighting. Maximum operation is 500 hours per year.
 - Non-emergency units, which include all demand response and baseload units. These are all generators that operate when power is still available from the grid. Units must obtain the appropriate level of air permit.
- New DG sources would be subject to the most stringent NO_x standards, with all non-emergency source technologies subject to the same limit. For new compression engines, even emergency units would be regulated under the DG rule, facing a two-tiered NO_x limit, for those installed before, and those installed on or after, 1/1/09.
- NO_x standards for existing units would be limited to non-emergency units. The standards that will apply to existing combustion turbines and engines parallel the NO_x RACT standards that were in effect until new, lower RACT limits were promulgated in 2/04.
- The DG NO_x standards would apply to units that are not subject to a more stringent standard, e.g. new NO_x RACT limits or New Source Review requirements.
- New and existing oil-fired sources would have to meet a particulate matter (PM) limit of 0.1 lb/mmBtu heat input. The use of ultra low sulfur fuel would likely be needed to achieve compliance.

- Fuel sulfur content would not be explicitly limited in the DG rule, but would be addressed in a separate rulemaking for Subpart 225-1.
- Standards for emissions of carbon monoxide (CO) would apply to new DG sources.
- Emissions of air toxics would be controlled primarily through limits on particulate emissions.
- Changes to the existing permitting process or timetable, which have EPA approval, are not currently anticipated.

SECTION 3 FEDERAL REQUIREMENTS

NEW SOURCE PERFORMANCE STANDARDS

Federal New Source Performance Standards (NSPS) apply to air emissions from only one type of emergency generator installation. Standards found at 40 CFR 60 Subpart GG are applicable to stationary gas turbines, also known as combustion turbines. Units typically utilize natural gas or distillate oil. Pertinent requirements include:

- Affected units: > 600 kW (10 mmBtu/hr heat input) installed after 1977. (For units < 6,000 kW, some standards apply only to units installed after 1982.) Standards may also apply if an existing unit is modified, if this results in an increase in the emissions rate or emissions of a new pollutant.
- Emergency units are exempt from requirements only when operation is limited to periods when utility power is not available.
- Limits emissions of NO_x and SO₂.
- Fuel sulfur content limited to 0.8% as compliance alternative to emissions rate limit.
- Sulfur and nitrogen content of fuel must be monitored.

There are no comparable NSPS standards that apply to internal combustion engine generators.

Compliance procedures for NSPS are noted on NYS registration or permit applications, and a copy of the application is typically filed with the U.S. Environmental Protection Agency (EPA) Region 2 headquarters in New York City (see Resources Index). The NYS registration or permit will then become the means for monitoring compliance with applicable Federal requirements. Follow-up reports and submissions, to the extent required by the Federal regulations, should similarly be submitted to both EPA and the appropriate regional office of the New York State Department of Environmental Conservation.

NESHAP/MACT STANDARDS

The U.S. Environmental Protection Agency is obligated under the Clean Air Act to implement national emission standards for hazardous air pollutants (NESHAP) for many categories of emission sources. NESHAP are applicable to major sources of hazardous air pollutants (HAP), which are sources with potential to emit more than 10 TPY of a single HAP or 25 TPY of a combination of HAPs. The standards must reflect application of Maximum Achievable Control Technology (MACT) requirements for major sources of hazardous air pollutants.

It is anticipated that NESHAP/MACT standards for engines and combustion turbines will have limited applicability for potential demand response participants, most of which are not major sources of HAP. Facilities at which emission sources are primarily combustion units such as boilers and/or emergency generators would not be likely to emit HAPs at a major source level. It is possible that industrial participants could be major HAP sources from industrial processes.

Standards for internal combustion engines are applicable to new, reconstructed, and some existing units over 500 horsepower located at major HAP sources. Emergency power/limited use units are excluded from applicability, with limited use defined to include operation for less than 50 hours per year in non-emergency situations. (Emergency situations are those where the primary power source is inoperable.)

Standards for combustion turbines apply to all new and some existing units over 1,000 kW in size at major sources of HAP. Sources may comply by installing CO control measures or by reducing formaldehyde emissions. Emergency/limited use units are excluded.

NEW SOURCE REVIEW

New sources of emissions (at either new or existing facilities) are subject to requirements that are designed both to preserve existing ambient air quality in areas with acceptable pollutant levels, and to allow improvement in areas not currently in attainment with national standards. New Source Review regulations and terminology are quite complex. A brief discussion of this topic has been included in Appendix 2 to this report. Section 2 (New York State Requirements) also includes a short review of New York's NSR-implementing regulations. Most facilities seeking to permit generators for limited use in demand response programs will not be subject to NSR requirements, as long as they cap emissions below NSR thresholds.

SECTION 4 LOCAL REQUIREMENTS

CITY OF NEW YORK

Air Emissions

The City of New York Department of Environmental Protection (DEP) administers air quality permitting for generator installations in the five boroughs of New York City. (New York State air emissions and air permitting requirements also apply within New York City.) Sources must submit DEP applications, where required. The DEP air program is handled within the Bureau of Air, Noise & Hazardous Materials.

Sources up to 350,000 Btu/hr heat input are exempt from NYC air permitting. Sources between 350,000 Btu/hr and 2.8 mmBtu/hr heat input¹⁰ are required to submit a one-page air registration application. Above the 2.8 mmBtu/hr size threshold, a “work permit and certificate of operation” is required for most sources. The certificate of operation is based on information in the work permit and is issued after passing a DEP field inspection.

Emergency generators that have operated strictly in traditional emergency mode (i.e. only upon the loss of utility power, or for routine testing) have not been subject to the work permit/certificate requirement above the 2.8 mmBtu/hr size threshold (although the permit fee structure has been differentiated by unit size). Such generators have been eligible for the one-page registration regardless of size. Generators operated outside of the traditional emergency mode, e.g. for peak shaving/demand response, have, however, been required to obtain a work permit/certificate if they exceeded the 2.8 mmBtu/hr threshold.

With the advent of demand response programs, DEP has agreed to act in concert with the State on air permitting, contingent on receipt by DEP of adequate information on generator installations in New York City. Emergency demand response generators that have complied with State requirements will be required to complete the registration process, but it will be handled as an administrative action, rather than as a permit review and approval.

For information on resources and contacts, see the Resources Index.

¹⁰ Heat input capacity of 350,000 Btu/hr is equivalent to a generator output capacity of approximately 21 kW for combustion turbines and 33 kW for engine generators. Heat input capacity of 2.8 mmBtu/hr is equivalent to output of about 164 kW for combustion turbines and 263 kW for engine generators.

Building Code and Tanks Registration

The City of New York Department of Buildings administers the building code and tanks registration processes. These requirements do not vary based on whether a generating unit operates in a strictly emergency mode or in a demand response program. An application for installation of a generator and any associated fuel tanks must be reviewed and approved by the Building Department before installation can occur. Existing generators preparing to operate for demand response should therefore already have this permit in place. Permit applications are reviewed for compliance with the City building code, including fire safety and spill protection provisions. DOB forms are available on-line; see the Resources Index for information.

Fire Department

The New York City Fire Department administers Fire Prevention Directives and generally oversees, in coordination with the Department of Buildings, matters relating to fire safety within New York City. There are regulations pertaining to gas supply and fuel storage in buildings. Their jurisdiction also extends to circuitry for emergency generators used for life safety purposes. Such generators must, if used in a demand response program, be configured to serve emergency circuits in the event of loss of utility power. Typically, demand response generators will be set up to also serve non-emergency circuits when in a demand response mode.

The Fire Department has specified that before life safety generators can be interconnected with non-emergency circuits, an application for reconsideration must be filed with the Department of Buildings Bureau of Electrical Control. The application must detail all proposed modifications and new equipment/devices. Installation must be in conformance with the Building Code, including Section 12-01 (emergency power systems), and with applicable requirements from National Fire Protection Association (NFPA) Standard 110, pertaining to emergency and standby power systems. Regular load testing is required, as is automatic cutout on occupant optional load when the generator's fuel supply drops below the 6-hour level.

WESTCHESTER COUNTY

The Westchester County Department of Health administers an air permitting process for emissions sources within the County, pursuant to the County Sanitary Code. Emergency or stand-by generators of any size that operate automatically upon loss of utility power are exempt from permitting. If, however, generators are used at any time other than during a power outage, the units are considered to be peak-shaving and are subject to permitting.

The County uses NYSDEC application forms and a two-step Permit to Construct/Certificate to Operate (PC/CO) process no longer in use by the State. The two-step process is applicable even to existing installations that do not currently have a permit, as for example, when a generator installed for emergency purposes is now proposed for use in demand response.

In addition to the Permit to Construct application form, applicants must file an Environmental Assessment Form and detailed plans and specifications stamped by a licensed professional engineer, along with supporting calculations of projected emissions. The Department reviews the Permit to Construct application for compliance with all requirements. Upon issuance of a Permit to Construct, an existing installation would then submit “as-built” plans, stamped by a PE. The Department will conduct a site visit in determining whether to issue a Certificate to Operate. The Department estimates that the PC/CO process for existing installations could be completed in about one month, provided that all filings are complete.

Forms and instructions can be obtained from the Department of Health. (See Resources Index in Section 5 for additional information.)

The County interacts with DEC during the permit review process to ensure coordination between the State and local permits. The County will not issue a permit without assurance that the State has issued or intends to issue a permit, and will not contravene any State permitting requirement. In all cases, the more stringent requirements prevail.

**SECTION 5
RESOURCES INDEX**

RESOURCES RELATED TO NEW YORK STATE REQUIREMENTS

New York State Department of Environmental Conservation. On the Web at www.dec.state.ny.us.

Central Office located at: NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233-3250
Air Division at 518-402-8452

DEC Regional Office contacts: On DEC Web site, click on Services/Regional Offices.

NYS Environmental Regulations. On DEC Web site, click on Services/Environmental Regulations/Chapter III - Air Resources.

NYS Air Permit Application Forms. On DEC Web site, click on Services/DEC Permits/UPA Permits/Air Pollution Control Permit Programs/Down-loadable Application Forms.

Distributed Generation Rule Making Project. Information and materials relating to the Distributed Generation Rule Making can be obtained by contacting John Barnes, P.E., DEC, at 518-402-8396, or at jdbarnes@gw.dec.state.ny.us.

Citation for List of Hazardous Air Pollutants. (As defined by Federal Clean Air Act.) 6 NYCRR 200.1(ai). See above regarding accessing regulations on the Web.

NYS Environmental Facilities Corp. Provides free, confidential technical assistance for small businesses for compliance with Federal or State air emission requirements. The program can help in determining the applicability of various regulations and in assessing the appropriate level of permitting required. On the Web at www.nysefc.org/Small Business Assistance. You can also call the Small Business Assistance Program (SBAP) hotline at 800-780-7227.

NYS Energy Research and Development Authority. On the Web at www.nyserda.org/demandresponse.html. For more information, contact Peter Savio (ext. 3334) or Chris Smith (ext. 3360) at 518-892-1090.

NYS Empire State Development. Small Business Environmental Ombudsman Program assists with environmental compliance. Call 1-800-STATE NY (782-8369) or email at environment@empire.state.ny.us. On the Web at www.empire.state.ny.us/Doing Business in

New York/Productivity, Energy & Environment/Environmental Assistance/Small Business Compliance.

New York Independent System Operator. On the Web at www.nyiso.com. For environmental/operational rules relating to Emergency Demand Response Program, click on home page link for the Market Data Exchange (MDEX). After registering as a MDEX user, select Committees/Business Issues Committee/Price-Responsive Load Working Group.

RESOURCES RELATED TO FEDERAL REQUIREMENTS

United States Environmental Protection Agency: On the Web at www.epa.gov.

Region 2 office at: U.S. Environmental Protection Agency
290 Broadway
New York, NY 10007-1866
www.epa.gov/region02/
Phone: 212-637-3000
Fax: 212-637-3526

New Source Performance Standards: See 40 CFR Part 60 Subpart GG (for stationary gas turbines). On the EPA site at www.epa.gov, click on Laws, Regulations & Dockets/Code of Federal Regulations/CFR Database/Retrieve CFR sections by citation.

Technology Transfer Network. Technology information database maintained by EPA. On the Web at www.epa.gov/ttn. Resources include the Clearinghouse for Inventories and Emission Factors (CHIEF) for emissions information by technology, and NAAQS, for information on ambient air quality standards.

Diesel Fuel Requirements. See 40 CFR 80.500(a) and 80.520 (a)(1). See NSPS above for Web link to regulatory language.

Information on MACT (Maximum Achievable Control Technology) Standards. On the Web at www.epa.gov/fedrgstr/EPA-AIR/index/html. Internal combustion engines on 12/19/02; combustion turbines on 1/14/03.

RESOURCES RELATED TO LOCAL REQUIREMENTS

New York City Department of Environmental Protection. On the Web at www.nyc.gov. Click on Contact Us/key members/Christopher O. Ward, Commissioner, Dept. of Environmental Protection. The web site also provides general information on permitting requirements (click on City Agencies/Mayoral Agencies/Environmental Protection/Help Center/Business/Smart Business). You can contact DEP's Environmental Economic Development Assistance Unit (EEDAU) at 718-595-4436 or 4541 for compliance assistance or copies of regulations. Assistance with application processes can be obtained by calling 718-595-3855 and asking to speak with an engineer.

New York City Department of Buildings. Forms are available on the City web site at www.nyc.gov (click on City Agencies/Mayoral Agencies/Buildings, Dept. of/Resources/DOB Forms). Assistance and information can be obtained by calling 212-312-8900.

New York City Building Code. On the Web at www.nyc.gov/html/dob/html/code.html.

Westchester County Department of Health. Information and assistance with air permitting can be obtained by calling the County Engineer at 914-813-5150.

GENERALLY APPLICABLE RESOURCES

Pace Energy Project. Clean Distributed Generation: Local Siting, Permitting and Codes Guidebook. Available mid-2003 at www.law.pace.edu/energy/documents.html

Ozone Transport Commission. Model rules and other information on pollutant emissions in the Northeastern U.S. On the Web at www.sso.org/otc

The Regulatory Assistance Project. Model regulations for control of emissions from distributed generation sources. On the Web at www.raponline.org

Service Providers for Air Emissions Testing of Generators for Demand response Programs.

W. A. Kraft Corp.
601 Cambridge Ave.
Syracuse, NY 13211-0265
Frank Scalise
Business: 315-455-6200
Mobile: 315-374-7674
Fax: 315-455-6300
E-mail: fscalise@kraftpower.com
Website: www.kraftpower.com

Avogadro Environmental Corp.
3353 Gun Club Road, Suite 300
Nazareth, Pennsylvania 18064
George Wagner, President
Tom Weber, Senior Program Manager
Phone: 610-837-7626
Fax: 610-837-7672
E-mail: tweber@avogadro.net
Website: avogadro@nni.com

ENSR Environmental
6601 Kirkville Road
Syracuse, New York 13057
Mark Distler, Vice President
Phone: 315-432-0506 x. 128
Fax: 315-437-0509
Website: www.ensr.com
E-mail: mdistler@ensr.com

GPS Labs
47 Birchwood Drive
New Windsor, New York 12553
Gus Palentino
Phone: 845-561-2453
Mobile: 845-894-4888
Fax: 845-892-6167
E-mail: gusibm@aol.com

Affiliated Environmental Services NJ, Inc.
450 South River Road
Hackensack, New Jersey 07651
Larry Jones, Project Manager
Phone: 201-931-0313
Fax: 201-931-0318
AESinc@aol.com

Detail Associates
300 Grand Avenue
Englewood, New Jersey 07631-4355
Stephen Jaraczewski, President
Phone: 201-569-6708
Fax: 201-569-4378
E-mail: sjara@aol.com
Website: www.daienviro.com

TRC Environmental
5 Waterside Crossing
Windsor, CT 06095
Raymond Potter, Manager, Environmental
Measurement Group
Phone: 860-298-9692
Fax: 860-298-6399
E-mail: Rpotter@trcsolutions.com
Website: www.trcsolutions.com

APPENDIX 1
NO_x RACT STANDARDS AND VARIANCES

NO_x RACT Standards

Internal combustion engines. New, lower limits for NO_x RACT for engines were promulgated on 2/11/04, and will take effect on 4/1/05. The applicable emission limit is based on whether the unit is classified as a rich burn or lean burn engine, and on what fuel is fired. The existing standards and those soon to take effect are as follows:

- 1) For rich burn internal combustion engines:
 - a. 2.0 grams per brake horsepower-hour (g/bhp-hr) through 3/31/05;
 - b. 1.5 g/bhp-hr beginning 4/1/05.
- 2) For lean burn internal combustion engines:
 - a. Spark-ignited sources firing gas:
 - i. 3.0 g/bhp-hr through 3/31/05;
 - ii. 1.5 g/bhp-hr beginning 4/1/05.
 - b. Compression ignition sources:
 - i. 9.0 g/bhp-hr through 3/31/05;
 - ii. 2.3 g/bhp-hr beginning 4/1/05.

The regulations define lean burn engines as those operated so that oxygen in the engine exhaust is 1.0% or more, by volume on a dry basis. All other units are rich burn. Diesel-fired emergency units are most typically lean burn units, with exhaust gas oxygen content of about 10%. They employ compression ignition, and are thus subject to the somewhat higher limit on NO_x emissions. Many gas-fired units are also lean burn, with exhaust O₂ of about 2-3%; these units utilize spark ignition, and are subject to a 1.5 gram limit beginning 4/1/05.

Combustion Turbines. NO_x RACT limits for combustion turbines (simple cycle) greater than 10 mmBtu/hr heat input are as follows:

1. 50 ppmvd, corrected to 15% oxygen, for gas-only; or
2. 100 ppmvd, corrected to 15% oxygen, for multi-fuel-capable units.

Unit Conversions. The emission rates used in the NO_x RACT limits can readily be converted to units based on power output, or on fuel/heat input. The following conversions assume an engine generator efficiency of 32% and a combustion turbine efficiency of 23%.

9 g/bhp-hr = 2.5 lb/mmBtu heat input = 26.6 lb/MWh
3 g/bhp-hr = 0.83 lb/mmBtu heat input = 8.9 lb/MWh
2.3 g/bhp-hr = 0.64 lb/mmBtu heat input = 6.8 lb/MWh
2 g/bhp-hr = 0.55 lb/mmBtu heat input = 5.9 lb/MWh
1.5 g/bhp-hr = 0.42 lb/mmBtu heat input = 4.4 lb/MWh
50 ppmvd, corrected to 15% oxygen = 0.18 lb/mmBtu = 2.7 lb/MWh
100 ppmvd, corrected to 15% oxygen = 0.39 lb/mmBtu = 5.8 lb/MWh

Monitoring Requirements

Larger combustion sources subject to NO_x RACT must install continuous emissions monitoring systems (CEMS) to monitor and document compliance with emissions limits. Smaller NO_x RACT sources are not subject to CEMS requirements, but must conduct stack testing using approved procedures to demonstrate compliance with applicable limits.

Economic/Technical Variances

The NO_x RACT regulations (at 227-2.5(c)) include among compliance options the opportunity to demonstrate that the applicable limits are not economically or technically feasible. DEC can set a higher source-specific limit, which upon approval from EPA becomes the alternative RACT limit for that source. Procedures for such a demonstration are further detailed in DEC Air Guide-20, addressing Economic and Technical Analysis for RACT. AG-20 indicates \$3,000 per ton of reduced NO_x emissions is the upper economic limit of RACT. (DEC has indicated that this value will be adjusted upward to reflect inflation.) In other words, a facility will not be required to implement any emission reduction or control technique whose cost exceeds the relevant threshold. AG-20 specifies that several emission reduction techniques must be evaluated, including those that could reduce emissions from current levels although not to the RACT limit. If lesser control measures fall within the upper economic limit, and a full reduction to the RACT limit exceeds that cost threshold, the lesser control measures could be judged to constitute RACT for that source.

For applications where anticipated hours of operation are limited, as in most demand response programs, the correspondingly lower emission reduction potential increases the likelihood that control costs will exceed the upper economic limit. For example, reducing NO_x emissions from 3.2 lb/mmBtu (EPA's standard emission factor for uncontrolled NO_x emissions from a large-bore

engine generator) to the newly enacted RACT level of 0.64 lb/mmBtu for a 2,000 kW diesel-fired engine generator operated 200 hours per year would yield 5.47 tons per year of reduced emissions. At an inflation-adjusted cost threshold of \$4,000 per ton of reduced emissions, that would indicate that any control technique whose cost exceeds \$21,900 would not be economically feasible for this facility. The post-combustion controls needed to achieve an emissions rate reduction of this magnitude (selective catalytic reduction) substantially exceed this cost level.

This calculation illustrates that the magnitude of potential emissions reductions from application of NO_x RACT controls to limited-use demand response generators may be low, which would entail a correspondingly low cost threshold for economically feasible controls.

APPENDIX 2 FEDERAL NEW SOURCE REVIEW PROGRAM

Overview

Federal clean air laws have established National Ambient Air Quality Standards (NAAQS) for six “criteria” pollutants: lead, nitrogen dioxide, particulate matter, sulfur dioxide, carbon monoxide, and ground level ozone. These standards set maximum acceptable levels in ambient air for each pollutant. States and geographic areas within States are evaluated on the basis of whether air quality within the region meets the NAAQS for each pollutant, and are designated as being in attainment, or nonattainment, of the standards. There are several levels of nonattainment, depending on the degree of variance from the standard, ranging from marginal to extreme nonattainment. States must implement plans to bring all areas into attainment by dates specified in the Federal statutes.

A region’s attainment status determines the emissions limits and other regulations that will apply to new emissions sources that are proposed. Such new sources may be entirely new facilities, or they may be additions or modifications at existing facilities. New sources of emissions are regulated with the dual objectives of preserving the acceptable air quality of areas currently in attainment and of ensuring that nonattainment areas are able to make progress toward achieving attainment.

Prevention of Significant Deterioration

New source permitting in attainment areas comprises the Prevention of Significant Deterioration (PSD) program. PSD review is triggered by installation of a “major” source of emissions or modification of an existing major source that results in a “significant” increase in emissions. The applicability thresholds are based on the new source’s “Potential to Emit” (PTE), which can generally be defined as potential emissions assuming operation at full output for an entire year.

The relevant PTE threshold for PSD applicability at new facilities is generally 250 tons per year (TPY), although for certain categories of NO_x sources, the threshold is 100 TPY. (The lower threshold group includes facilities with fossil fuel boilers with a combined heat input \geq 250 mmBtu/hour.) The PSD threshold for modifications is an emissions increase of 40 TPY.

The required standard of emissions control for PSD sources is Best Available Control Technology, or BACT. BACT means the emissions control method that achieves the greatest emission

reduction within a pre-determined criterion for cost per ton of emissions reduction. This standard is thereby case-specific, and changes over time as control technologies evolve.

PSD is relevant in New York State for those criteria pollutants for which all or most areas of the State are in attainment status. For reasons described more fully in Section 2, PSD does not apply to NYS emissions of NO_x or Volatile Organic Compounds (VOC), which are precursors to criteria pollutant ground-level ozone. (More stringent requirements apply instead for these pollutants.) Because New York County (Manhattan) is in nonattainment status for PM₁₀ (particulate matter with a diameter ≤ 10 microns), PSD would not apply for PM₁₀ in that county. Elsewhere in the State, and for all other criteria pollutants, PSD review would apply for projects that meet the threshold conditions.

Nonattainment New Source Review (NSR)

Permitting of new sources in nonattainment areas is subject to more stringent emissions control requirements, as well as mandated emissions offsets, and is generally applicable at lower thresholds of new emissions than PSD. Because NSR applies Statewide in New York for NO_x and VOC, and has been implemented through State regulations (6 NYCRR Subpart 231-2), a more detailed discussion of its requirements has been included in the Section 2 of the report.