NSR Engineering Evaluation

CT Department of Energy and Environmental Protection
Bureau of Air Management

Company Name:	Iroquois Gas Transmission System, L.P.	**Permit No.**:	028-0029 & 028-0030
Equipment Location:	78 High Meadow Road, Brookfield, CT 06804	**Date App Received**:	3/2/2020
Mailing Address:	One Corporate Drive, Suite 600, Shelton, CT 06484	**SIMS No.**:	202003147 & 202003148
Contact Person:	Mr. Michael. Kinik	**Date Prepared**:	7/29/2025
Contact Title:	Senior Director, Operations	**Prepared By:**	James Grillo
Contact Phone:	203-925-7223	**Single or Multiple Units:**	Multiple
Contact Email:	Michael_kinik@iroquois.com	**Permit Type:**	New NSR
Ozone:	severe non-attainment	**Premises Size:**	Major
PM2.5:	attainment	**Equipment Size:**	Minor
Equipment Description	Two Solar Model Taurus 70 Turbines with SoLoNOx and CO Oxidation Catalyst	**TV Permit Number:**	028-0029-TV
Step 1: Complete all the fields above Step 2: Generate Eval Step 3: Update Fields		**Registered under -33a or -33b?**	N/A
		Applicant Subject to EJ Statute?	No

Introduction

Reason for Application:

Iroquois Gas Transmission System, L.P. (owner)/Iroquois Pipeline Operating Company (operator, Iroquois) proposed the ExC Project at the Brookfield Compression Station in Brookfield, Connecticut. The *project* involves the following:

- Construction and operation of two new Solar Turbines, Inc. Model Taurus 70 (or Equivalent) with SoLoNO$_x$ and CO Oxidation Catalyst (Application Nos. 202003147 & 202003148 - Covered in this evaluation)
- Construction and operation of a new non-permitted emergency power generator with oxidation catalyst and installation of an oxidation catalyst to an existing non-permitted emergency power generator. The oxidation catalyst will control VOC and CO emissions. Collateral conditions for the operation of these two engines with oxidation catalyst are contained in the permit's.
- Minor Modifications to Permit Nos. 028-027 and 028-0028 (Application Nos. 202003146 & 202003805 - Processed in a separate transaction)

On 1/25/21, Iroquois submitted an amendment to the permit applications including potential emissions calculations for the new emergency generator, which are below 15 tons or more per year of any individual air pollutant, therefore a permit is not required pursuant to RCSA §22a-174-3a(a)(1)(D).

The application package was amended various times as shown below in Table A.

Table A:Amendments to the Application Package

Amendment Date	Changes Made to:
04/13/20	• Main Application Form (Page 10) • Attachment A, Executive Summary (Pages 13 & 15) • Backup calculations (Pages 61, 62 & 65) • Attachment I, Prevention of Significant Deterioration Program Form (Pages 82, 85, 94 & 97) • Attachment L, Ambient Impact Analysis Form (Page 100) • Attachment P, Copy of Response to Request for Natural Diversity Data Base (NDDB) State Listed Species Review Form (Pages 115 & 116) • Refined Modeling Report
08/31/20	• Attachment E210, Air Pollution Control Equipment Supplemental Application Form (Pages 34-42) • Attachment E212, Unit Emissions Supplemental Application Forms (Pages 43, 44, 115 & 116) • Attachment G, BACT (Pages 45-104 & 117-176)
07/29/25	• CTDEEP Maximum Allowable Stack Concentration (MASC) Calculator
01/25/21	• Abridged Package • Full Application Mark-Up • Main Application Form (Page 1) • Attachment A, Executive Summary (Pages 13 & 15) • Attachment E212, Unit Emissions Supplemental Application Forms (Pages 53 & 56) • DEEP CO2 Equivalents Calculators (Pages 55 & 60) • Backup calculations (Pages 61, 62, 64 & 65) • Attachment F, Premises Information Form (Pages 72, 73 & 74) • Attachment H, Major Modification Determination Form (Page 77) • Attachment I, Prevention of Significant Deterioration Program Form (Pages 82, 83, 85, 94, 95 & 97) • Attachment J, Non-Attainment Review Form (Pages 88, 90, 94, 95 & 97) • Attachment L, Ambient Impact Analysis Form (Page 100) • Attachment G, BACT (Pages 148-155) • Refined Modeling Report
02/9/21	• Abridged Packaged • Full Application Mark-Up • Attachment E212, Unit Emissions Supplemental Application Forms (Pages 53 & 56) • DEEP CO2 Equivalents Calculators (Pages 55 & 60) • Backup calculation (Pages 61 & 64) • Attachment F, Premises Information Form (Pages 73 & 74) • Attachment I, Prevention of Significant Deterioration Program Form (Pages 83, 85, 95 & 97)
11/24/21	• Department requested additional BACT for Electric Motor Driven (EMD) compressors

8/20/21	• Attachment G2: Cost/Economic Impact Analysis for NO_x and CO • Appendix G2: Detailed BACT Costs for NO_x and CO
04/8/22	EMD Compressor BACT • Attachment G2: Cost/Economic Impact Analysis for NO_x and CO • Appendix G2: Detailed BACT Costs for NO_x and CO
03/18/24	• 40 CFR Part 60 Subpart OOOOb Responses
03/25/24	• Letter to Tracy Babidge, Bureau Chief
06/13/24	• Re-BACT/Major Modification Update Request by DEEP (06/13/24) • Request for extension by Iroquois (06/17/24) • Follow-Up Letter for 06/26/24 meeting (04/17/24) • Re-BACT/Major Modification Extension (08/22/24)
01/31/25	• Updated BACT • Revised Attachment H – Major Modification Determination Form • Revised Attachment J – Non-Attainment Review Form • Facility Wide NOx Cap
03/04/25	• Revised BACT & 2-year average emissions data
05/02/25	• Revised Attachment H – Major Modification Form and Facility Wide NOx Cap
06/18/25	• Revised Ambient Impact Analysis
07/25/25	• Revised NDDB Approval Letter Issued
07/29/25	• Ambient Impact Analysis Approval

Regulatory Applicability:

A New Source Review (NSR) permit is required for each turbine pursuant to Section 22a-174-3a(a)(1)(D) of the Regulations of Connecticut State Agencies (RCSA) since each turbine has potential emissions of 15 tons or more per year for NOx and CO emissions.

Two Solar Turbines, Inc. Model Taurus 70 (or Equivalent) with SoLoNO$_x$ and CO Oxidation Catalyst

Pollutant	Combined PTE (TPY)	Proposed Combined Emissions (TPY)
PM/PM$_{10}$/PM$_{2.5}$	7.4	6.8
SOx	1.12	1.03
NOx	75.96	24.4
CO	46.24	1.65
VOC	0.02	0.02
GHG	89,316	81,718

1. State Regulatory Review

- **PM & Opacity Emissions:** Pursuant to RCSA §22a-174-18, there are particulate and opacity limitations for the turbines. The proposed opacity and allowable particulate emissions rates are at least as stringent as the applicable regulatory limits.

- **SO$_2$ Emissions:** No applicable SO$_2$ limitation.

- **NOx Emissions:** Pursuant to RCSA §22a-174-22e(d)(4)(C), these units are subject to an emissions limit of 40 ppmvd @ 15% O$_2$, daily block average. The BACT limit has been determined to be 9 ppmvd @ 15% O$_2$ and is discussed in Section 3 below.

- **VOC & CO Emissions:** There are no state regulatory emissions limits for VOC and CO for the proposed sources.

- **Hazardous Air Pollutants:** Calculations submitted demonstrate that all of the proposed sources are in compliance with RCSA §22a-174-29 maximum allowable stack concentrations (MASC) for all identified HAP at this time.

2. NSPS Requirements

These turbines are subject to New Source Performance Standards Part 60 Subpart KKKK and a NOx emissions concentration of 25 ppmvd @ 15% O_2. As stated earlier, the BACT emissions limit for NOx has been determined to be 9 ppmvd @ 15% O_2.

The new turbines are also subject to New Source Performance Standards Part 60 Subpart OOOOb. Subpart OOOOb requirements were previously addressed by the applicant in a submittal dated March 18, 2004 and all applicable requirements will be incorporated into the facility Title V Permit in separate permitting transaction.

Pollutant	Regulatory Citation & Standard		Permit Allowable
$PM/PM_{10}/PM_{2.5}$	§18(e)(1)	0.10 lb/MMBtu	0.01 lb /MMBtu
SO_x	§19	N/A	N/A
	CGS §16a-21a	N/A	N/A
NO_x	§22e(d)(4)(C) 40 CFR Part 60 Subpart KKKK	40 ppmvd @ 15% O_2 25 ppmvd @ 15% O_2	9 ppmvd @ 15% O_2
VOC	§20	N/A	N/A
CO	N/A	N/A	N/A
HAP	§29	MASC	ASC<MASC

Are all HAPs in compliance with RCSA §22a-174-29?	Yes		
Is the equipment subject to the Clean Air Interstate Rule (CAIR)?	No		
Is the equipment subject to the Acid Rain Program?	No		
Is the equipment subject to any NSPS?	Yes	40 CFR Part 60	KKKK; OOOOb;
Is the equipment subject to any NESHAPS?	No	40 CFR Part 61	Subpart
		40 CFR Part 63	Subpart

3. Best Available Control Technology (BACT) Review (Attachment G of NSR Application)

Pollutant	Potential Emissions from Proposed Equipment (for both units) (TPY)	BACT Utilized	BACT Emissions Rate (lb/hr)	Allowable Permit Emissions from Proposed Equipment (for both units combined) (TPY)
NO_x	75.96	Advanced SoLoNO_x (9 ppm) alone	3.04	24.4
CO	46.24	CO oxidation catalyst (25 ppm to 0.25 ppm)	0.21	1.65

Comments:

A BACT analysis was required for NO_x and CO pursuant to RCSA §22a-174-3a(j) since potential emissions for each pollutant are greater than 15 tons/year.

On 8/31/20, Iroquois amended the permit applications by revising potential emission calculations and submitting a BACT analysis for NO_x and CO.

On 7/28/21 Ms. Galo emailed Tim Barnes, Environmental Services Manager for Iroquois, requesting that Iroquois amend their BACT analysis to include electric gas compressors as a BACT option because electric gas compressors could be a technically feasible option for some gas compression facilities. The amended BACT analysis shall include this technology and the resultant narrative outlining why this technology is, or is not, technically feasible for the Iroquois facility.

On 8/20/21, Iroquois submitted the supplemental BACT analysis considering electric drive or electric motor drive (EMD) compressors for the proposed natural gas compressor units.

On 11/24/21, Jaimeson Sinclair, Director of the Engineering and Technical Services Division, sent Mr. Barnes a letter requesting additional information regarding the EMD and supplemental BACT.

On 4/8/22, 01/31/25, and 03/04/25, Iroquois submitted additional BACT information.

The Applicant's BACT analysis was based on the EPA's recommended Top-Down five step process in determining BACT:

- Step 1: Identify all potential control technologies for the pollutant.
- Step 2: Determine the technical feasibility of each control technology and eliminate any that are infeasible.
- Step 3: Rank all feasible technologies. *(If the top technology is chosen no further analysis is required)*
- Step 4: Evaluate the most effective technology based on economic, energy and environmental factors. The most effective technology can be dismissed if it were to cause unacceptable economic, energy or environmental effects. The next most effective technology is then evaluated, and this process continues until a technology is selected as BACT.
- Step 5: Selection of the most effective technology not eliminated in Steps 2 – 4 as BACT.

The Department's determination of BACT was based on the information provided in the application of identified similar natural gas compression projects throughout the country and the following:

- Review of the potential emissions and minimum regulatory requirements.
- Review of the EPA RACT/BACT/LAER Clearinghouse, internet searches, and other state permits to identify various control methods.

- Review of the technical feasibility of each control method.
- Rank the control technologies using a "top-down" approach, where energy, economic and environmental impacts are used to determine the best control technology for the project.

In some cases, the analysis has identified alternative methods of control technologies (i.e. electric motor driven compression) or lower emissions rates for some pollutants. The Applicant has shown that these alternate methods of control while technically feasible are cost prohibitive, or where lower emissions rates have been identified, are either cost prohibitive or technically difficult and/or infeasible and are discussed below.

NOx BACT: The NO_x BACT analysis considered the following control technologies which were eliminated or proposed as BACT as shown in Tables B and C below.

Step 1: Identify all potential control technologies for the pollutant:

NOx Combustion Controls

- Diffusion flame combustors
- Advanced SoLoNOx™ at nine PPM NOx
- Conventional SoLoNOx™ at 25 PPM NOx - Minimum BACT Floor (i.e. NSPS limit)

Post-Combustion Controls

- EMx™/SCONOx
- Selective non-catalytic reduction (SNCR)
- Selective catalytic reduction (SCR)
- Electric Motor Compressor Driver
- Fuel limitation

Step 2: Technical Feasibility

All of the above combustion control technologies are technically feasible, however the diffusion flame combustor turbine technology cannot meet the NSPS emissions limits without the use of post combustion controls such as SCR. Technical feasibility of post-combustion controls is discussed further below:

- Advanced SoLoNOx™ at 9 ppm NOx has been shown to be technically feasible and is currently utilized in other similar compressor units in Connecticut and throughout the country. There are no additional environmental impacts (i.e. emissions from other pollutants or transfers of pollutant to other environmental media) from this technology and limited operating impacts such as increased electrical requirements or significant changes to the premises infrastructure. The cost for this technology has been determined to be $2,300/ton removed and is considered economically feasible.
- The applicant identified EMx™/SCONOx as a potential technology for NOx control. The Department's review of this technology determined that it is no longer available for new installations. (see electronic mail from Miratech)
- Selective non-catalytic reduction (SNCR) is typically used for boiler NOx control but at temperatures far exceeding the exhaust gas temperatures of the proposed Solar turbines. Therefore, this technology was eliminated as being technically infeasible.
- Selective catalytic reduction (SCR) is technically feasible for dry low NOx combustion turbines such as the proposed units for this application. However, there are technical challenges to operating SCR systems in a simple cycle mode like the proposed units.

Connecticut has several Solar Taurus turbines operating with SCR and NOx emission limits in the 2.0 - 2.5 ppm range. However, all of these units are operating in combined heat and power mode (CHP), unlike the proposed units which will be operated in simple cycle mode. Turbines operating in CHP mode have constant load/steady state operation, and reduced exhaust temperatures because a significant amount of heat is removed from the exhaust gas in the heat recovery steam generator (HSRG) before entering the SCR for NOx reduction. The proposed units will operate based on demand for natural gas at the ends of the pipeline which could mean variable loads from 50-100% of maximum rated capacity and/or frequent startup and shutdowns, which is not ideal for SCR control systems. Additionally, the use of SCR technology typically operates best with exhaust gases in the 450 - 850 ^{0}F range but can operate as high as 1,200 ^{0}F with additional modification. The higher exhaust temperature of the proposed units would require additional tempering air to cool the exhaust gas, decreasing the removal efficiency due to lower NOx concentrations and increasing costs to achieve an approximate incremental reduction of 7.7 tons/year (each unit) of NOx emissions relative to the proposed BACT emissions profile for these units.

The use of SCR also has additional environmental impacts that need to be considered. Ammonia itself is designated as extremely hazardous by the Occupational Health and Safety Administration (OSHA) but typically operators of SCR technology use aqueous ammonia at a concentration of no more than 19% which is not considered hazardous, or urea can be used. Regardless of which reactant is utilized, the byproduct of the post-SCR control is gaseous ammonia and/or ammonium salts typically emitted in the 5 ppm range. Gaseous ammonia is a regulated hazardous air pollutant in Connecticut and ammonium salts are regulated as fine particulate matter each having potential negative environmental and public health impacts. In addition, there would be a need for storage of either ammonia or urea on site. None of these impacts are present with the proposed advanced SoLoNOx control system as BACT.

Regardless of the technical challenges and environmental impacts for using SCR to control NOx emissions, the cost per ton removed for the top post-combustion technology has been determined to be economically infeasible for the proposed project:

- Advanced SoLoNOx with SCR (3.375 ppm) with a cost of $40,000/ton removed
- Conventional SoLoNOx with SCR (7 ppm) with a cost of $46,700/ton removed
  (Note: The BACT analysis (pg. 11 of 178) discusses 5 ppm as an option, however it was confirmed by the applicant that the 5 ppm was a typographical error, and 7 ppm is the correct emissions concentration)

- On November 24, 2021 the Department specifically requested that Iroquois evaluate Electric Motor Compressor Driver (EMD) technology based on a 2016 Environmental Appeals Board (EAB) decision for the Arizona Public Services Company appeal. A consistent theme in the clarifying decisions and case law is that the permit reviewing authority *"is required to meaningfully consider an alternative before dismissing it as an impermissible redesign of the project and should not rely on prior EAB determinations as an "automatic off-ramp"…and that [p]ermit issuers generally have broad discretion in conducting BACT determinations, but they are strongly discouraged from categorizing emissions control options as 'impermissible redesign' without first taking the requisite 'hard look' at the project."*

  Therefore, in order to ensure that all options for natural gas compression at this site are evaluated and pursuant to the Arizona Public Services Company EAB determination, the Department required additional review for EMD compressors.

  While potentially technically feasible, the applicant determined that there are significant economic and environmental impacts to consider. The applicant has stated that the required upgrades to the electrical system at the site could take up to three years and therefore they deemed the technology as technically infeasible because it would significantly impact their in-service date to provide contracted natural gas supplies.

  The other issue with upgrading the facilities electrical capacity to accommodate EMD's is cost. The expected cost effectiveness has been estimated to be greater than $400,000/ton removed.

Iroquois submitted documentation showing that the following site infrastructure upgrades work are required:

- Installation of 1.5 miles of new transmission line on existing power poles
- Increase the site's maximum demand load from 247.7 kW to 920 kW
- Installation of two primary metered services versus the one secondary service currently at the site
- Installation of a new duct bank structure along with an overhead circuit coming from the closest substation that will provide sufficient capacity and redundancy for the new service
- Installation of additional high voltage infrastructure at the substation requiring the acquisition of additional adjacent land

In addition, to the greater costs per ton of potential pollutants reduced as shown in Table B below, there would be substantial and undesirable incremental energy and environmental impacts. The increased energy impacts, due to installing EMDs instead of natural gas-fired turbines, would be due primarily to reliance on distant electricity generation out of their control. The purchased power would experience significant energy dissipation losses as it travels through a series of transmission lines, transformers, substations, and other equipment required to reduce higher voltage to the lower voltage required to power the EMDs. The use of EMDs would also involve an increase in indirect air pollutant emissions from upstream power generation. The total distribution and transmission infrastructure upgrades are estimated to cost between $45 to $50 million, not including contingencies that could substantially increase the cost of the proposed project.

Table B: EMD Compressor Cost to Remove NO_x and CO

Technology	Pollutant	Cost to Remove Pollutant
EMD	NO_x	$440,400/ton
Turbine with Advanced SoLoNOx (9 ppm)	NO_x	$2,300/ton
EMD	CO	$657,600/ton
Turbine (oxidation catalyst (1.0 ppm) 99% reduction from uncontrolled emissions	CO	$9,800/ton

In a similar case, City of Quincy vs Massachusetts Department of Protection (DEP) (Docket No. 21-1131), on 12/17/21, the First Circuit court affirmed the decision of the Massachusetts DEP reaffirming the issuance of an air permit to Algonquin Gas Transmission, LLC for a natural gas compressor station in Weymouth, Massachusetts, holding that the agency's actions were not arbitrary or capricious. DEP had previously approved Algonquin's plans to power the Weymouth station using a natural gas-fired turbine, which emitted nitrogen oxides. In a prior appeal, the City of Quincy, the Towns of Braintree and Hingham, and a group of citizens (collectively, the City) and other petitioners established that the DEP did not follow its own procedures when it eliminated an electric motor as a possible alternative to the gas-fired turbine, and the First Circuit remanded the case. On remand, DEP again concluded that an electric motor was not what Massachusetts regulations call the "best available control technology" (BACT) for the new compressor station and reaffirmed the air permit at issue. The First Circuit affirmed the DEP's decision after remand, holding that substantial evidence supported the decision and that the agency's determination was not arbitrary and capricious.

Even though the EMD compressors are technically feasible on a high level evaluation, as discussed above, the applicant determined that they are technically infeasible and cost prohibitive for these sources and therefore eliminated as BACT for NO_x and CO. This determination also applies to the CO BACT discussed later in this technical evaluation.

Table C below details the cost, environmental, technical, and energy impacts associated with each of the identified post-combustion controls for NOx emissions. In order to obtain lower emissions levels with the use of SCR, there are clear disadvantages for this project. The use of SCR was eliminated because of the culmination of the issues associated with it, not just for cost.

Table C: NO_x BACT Analysis Review of Technologies

Technology Type	Selected/Eliminated (Reason)
Advanced SoLoNO$_x$ (9 ppm) with Selective Catalytic Reduction (SCR) to 3.75 ppm	Eliminated $40,000/ton removed-Economically Infeasible Additional Environmental Impacts – ammonia/fine particulate emissions, technical issues with exhaust temperatures operating range above SCR catalyst, energy impacts
Conventional SoLoNO$_x$ (25 ppm) with SCR to 7 ppm	Eliminated $46,700/ton removed-Not Economically Feasible and additional Environmental Impact – ammonia/fine particulate emissions, technical issues with exhaust temperatures operating range above SCR catalyst, energy impacts
Advanced SoLoNO$_x$ (9 ppm) alone	**Selected** **Economically feasible at $2,300 per ton. No additional Environmental Impact,**
Diffusion Flame Combustors (non-SoLoNO$_x$, 250 ppm) with SCR to 25 ppm	Eliminated ($83,334/ton removed - Not Economically Feasible and additional Environmental Impact – ammonia/fine particulate emissions, technical issues with exhaust temperatures operating range above SCR catalyst, energy impacts
Conventional SoLoNO$_x$ (25 ppm) alone	Eliminated (Environmentally Inferior (i.e. NO$_x$ emissions of 25 ppm versus 9 ppm for selected option))
Water Injection	Eliminated (Not Technically Feasible)
EMx SCONO$_x$ Catalyst	Eliminated (No longer available)
Selective Non-Catalytic Reduction (SCNCR)	Eliminated (Not Technically Feasible)
Electric drive or electric motor drive (EMD) compressors	Eliminated (Not Economically and not technically Feasible)

Table D below, clearly shows that the incremental cost associated with SCR compared to the chosen control technology is not economically feasible.

Table D: Incremental NO_x BACT Analysis Review of Technologies

Technology Type	Incremental Cost When Compared to Selected BACT
Advanced SoLoNO$_x$ (9 ppm) with Selective Catalytic Reduction (SCR) to 3.75 ppm	>$150,000/ton removed

The applicant has also proposed taking an 8.5% reduction in allowable fuel consumption, based on the maximum rated capacity of each turbine in addition to the above discussed pollution control technologies.

Department's NOx BACT Determination

The Department did not identify any additional NOx control technologies, other than what has been discussed and dismissed above, for similar and representative equipment operating as natural gas compressors.

The Department did identify several simple cycle Solar turbines operating in Alaska as electrical generating units that use SCR to achieve a NOx emissions rate of 7 ppm @ 15% O_2. As discussed previously, simple cycle turbines operating as power generators, where loads are typically consistent and not cycled on-off, operate completely differently than a natural gas compressors turbine. A power generator is not an exact

comparison to a compressor turbine, nor should they be used as an absolute determination of BACT. More importantly, the applicant has shown that the incremental cost associated using SCR to go from the proposed 9 ppm to 3.75 ppm for NOx is greater than $150,000/ton removed. (Table D). Therefore, the incremental cost to achieve 7 ppm with SCR would be even higher and also considered to be economically infeasible.

The Department did conduct further review of the advanced SoLoNOx/SCR based on the Atlantic Coast Pipeline, LLC project located in Buckingham County, VA. Additionally, the Department requested technical background information from the State of Virginia. The Virginia project was proposed with several emissions units with one of them that was an identical Solar 70, to be used as a natural gas compressor with an emissions limit of 3.75 ppm for NOx. The US Court of Appeals for the Fourth Circuit vacated those permits in January of 2020 and the project was cancelled. Those permits were vacated because of Environmental Justice concerns, which this project is not subject to, and because the State of Virginia did not at least review electric motor compressors as they believed requiring the use of electric driven units would "redefine the source". After the permits were vacated by the court Atlantic Coast Pipeline, LLC did not pursue the project further. While 3.75 ppm is purported to be an achievable NOx emissions limit on paper for the Solar Taurus 70 operating as a natural gas compressor based on the Virginia permits, that level of emission control has not been proven in practice for these units. Additionally, the use of SCR to achieve 3.75 ppm emissions limit was dismissed for various reasons. (see Table C above)

The Department also reviewed EPA's newly proposed but not yet promulgated NSPS (New Source Performance Standard 40 CFR Part 60 Subpart KKKKa). EPA published this proposed new rule in the Federal Register on December 13, 2024 and subsequently, reopened the comment period from March 25, 2025 to April 15, 2025. The rule has two subcategories for "small combustion turbines" (i.e. $\leq$ 250 MMBtu/hr) with the following emissions limits:

- $\leq$ 40% capacity factor, with a NOx emissions limit of 25 ppm
- $\geq$ 40% capacity factor, with a NOx emissions limit of 3 ppm

The rule is not final and therefore is not currently applicable. Therefore, it is not considered BACT. Notwithstanding that fact, EPA's evaluation of the incremental costs associated with rule demonstrates that the incremental costs of installing SCR on a gas turbine that already achieves an emission rate less than 25 ppm by means of combustion controls like advanced SoLoNOx are exceedingly high.

The Department also reviewed the NOx emission requirements for similar equipment for the South Coast Air Quality Management District (SCAQM) and San Joaquin Valley Air Pollution Control District (Valley Air District).

SCAQM Rule 1134 requires that all natural gas compressor turbines have NOx emissions less than 3.5 ppm @ 15% O_2, 3-hour average. The Valley Air Rule 4703, Tier 3 NOx emissions are required to be less than 5 ppm @ 15% O_2, 3-hour average. It should be noted that these emissions concentrations cannot be attained on a Solar Taurus 70 turbine without the use of SCR control technology and the BACT analysis has shown that the use of SCR for <u>these</u> proposed natural gas compressor turbines is cost prohibitive. Additionally, SCAQM confirmed that the natural gas compressor companies moved away from using combustion turbines once the 3.5 ppm NOx limit went into effect and now use internal combustion engines for natural gas compressors. (see electronic mail dated 07/28/2025)

Therefore, based on the above, the Department agrees with the applicant's BACT analysis that all other identified control technologies are either technically or economically prohibitive for NOx control and that BACT for these proposed Solar Taurus 70 is the use of Advanced SoLoNOx with an emissions concentration of 9 ppmvd @ 15% O_2 and an annual 8.5% fuel reduction on each turbine.

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CO BACT

The CO BACT analysis was evaluated similarly to the NOx BACT above. In the case of CO emissions, the applicant chose the use of oxidation catalyst which was identified as the top control technology and therefore no additional analysis was conducted.

Table E: CO BACT Analysis Review of Technologies

Technology Type	Selected/Eliminated (Reason)	Impact
Advanced SoLoNO$_x$ with CO oxidation catalyst (25 ppm to 1.0 ppmvd)	Selected (This is the top control option and is both technically and economically feasible.)	The overall pollution reduction efficiency is 99%.
Advanced SoLoNO$_x$ alone/Good Combustion Practices (25 ppm)	Eliminated (Baseline CO BACT option)	
Electric drive or electric motor drive (EMD) compressors	Eliminated (Economically Infeasible as discussed in the NOx BACT analysis)	

Department's CO BACT Determination

The Department did not identify any additional CO control technologies for similar equipment operating as natural gas compressors and agrees that the use of oxidation catalyst is the top control technology for these units.

Therefore, the Department agrees with the applicant's BACT proposal for CO emissions is the use of the Solar Taurus 70 with Advanced SoLoNOx with oxidation catalyst with an emissions concentration of 1.0 ppmvd @ 15% O_2.

The NO_x and CO BACT limits for Iroquois' turbines are also within the range of permit limits for similar equipment permitted within the last five years as shown below in Table E below.

Table E: Comparison of NO_x and CO Limits for Similar Equipment for Last Five Years (i.e. 2015-2020)

Year of Permit Issuance	Permit No.	Company Name	City, State	Equipment	NO_x Limit (ppmvd @15% O2)	CO Limit (ppmvd @ 15% O2)
Proposed new Units	**028-0029 and 028-0030**	**Iroquois Gas Transmission System, L.P.**	**Brookfield, CT**	**2-Solar Turbines, Inc. Model Taurus 70 (or equivalent) Turbine with SoLoNOx and CO Oxidation Catalyst, Unit No. B1**	**9**	**1.0**

2018	043-0035	Algonquin Gas Transmissions, LLC	Cromwell, CT	Solar Taurus Model 60-7802 Turbine (simple cycle) with Oxidation Catalyst and SoLoNox	9	25
2018	043-0036	Algonquin Gas Transmissions, LLC	Cromwell, CT	Solar Centaur 50-6102 Turbine (simple cycle) with Oxidation Catalyst and SoLoNox	9	25
2017	034-0007 and 034-0008	Algonquin Gas Transmissions, LLC	Chaplin, CT	2-Solar Taurus 60-7802 Turbine (simple cycle) with Oxidation Catalyst and SoLoNox	9	1.25
2017	034-0009	Algonquin Gas Transmissions, LLC	Chaplin, CT	Solar Centaur 50-6202 Turbine (simple cycle) with Oxidation Catalyst and SoLoNox	9	1.25
2017	14-0029	Algonquin Gas Transmissions, LLC	Oxford, CT	Solar Taurus 60 Turbine (simple cycle) with Oxidation Catalyst and SoLoNox	9	1.25
2015	043-0031	Algonquin Gas Transmissions, LLC	Cromwell, CT	Solar Mars 100-16002S4 Turbine (simple cycle) with Oxidation Catalyst and SoLoNox	9	25
2015	AQ0083CPT06	Agrium U.S. Inc.	Kenai, AK	5-Natural Gas Fired Combustion Electrical Generating Turbines	7	50

Major Modification Analysis (Attachment H of NSR Application)

Iroquois' ExC Project at the Brookfield Compression Station involves the following:

- Minor Modifications to Permit Nos. 028-0027 and 028-0028 (Application Nos. 202003146 & 202003805)
- Construction and operation of two Solar Turbines, Inc. Model Taurus 70 (or Equivalent) with SoLoNO$_x$ and CO Oxidation Catalyst (Application Nos. 202003147 & 202003148)
- Construction and operation of a new gas fired internal combustion power generator.

Since the Iroquois facility is considered a major source of air pollution, an analysis of whether or not the *project* would constitute a major modification pursuant to RCSA §22a-174-1(61) [40 CFR §51.165.(a)(1)(xii)(A)-(E)] is required.

Table F: Total Project Emissions Increase

Pollutant	Emission Decreases Due to Modification to Permit Nos. 028-0027 & 028-0028	Emissions for Two New Turbines	Emissions for One New Emergency Generator	Total Project Emissions Increase/Decrease
PM/PM$_{10}$/PM$_{2.5}$	0	6.8	0.243	+7.04
SO$_2$	0	1.03	0.036	+1.07
NO$_x$ (ozone)	0	24.4	0.5	+24.9
VOC	0	0.02	3.4E-04	+0.02
CO (with Oxidation Catalyst)	-21.4	1.65	0.76	-18.99

Table G: Major Modification Determination

Pollutant	Facility Currently Major for Pollutant?	Significance Levels (Table 3a(k)-1)	Is the Total Project Emissions Increase and the Net Emissions Increase Equal or Greater than the Significance Levels? (Table 3a(k)-1)	If Yes, explain why.
PM	☐	**25**	Choose one.	
PM$_{10}$	☐	**15**	Choose one.	
PM$_{2.5}$	☐	**10**	Choose one.	
SO$_2$	☐	**40**	Choose one.	
NO$_x$ (ozone)	☒	**25**	No	
NO$_x$ (NAAQS)	☒	**40**	No	
VOC	☐	**25**	Choose one.	

CO	☐	**100**	Choose one.	
Pb	☐	**0.6**	Choose one.	
Other:				
	☐	**25**	Choose one.	

Comments:
The total project emissions increase for Iroquois' project is the sum of the emissions increases due to the modifications to Permit Nos. 028-0027 and 028-0028, the proposed emissions for the two new turbines and the proposed emissions for the new generator as shown above in Table F.

The addition of the two new turbines and one gas fired engine is not a major modification, in-of-itself, as defined in RCSA §22a-174-1(61) and shown above in Table G because the total project NO_x emissions (24.9 tons) are less than the major modification threshold or significance level of 25 tons/yr. However, the *project* also includes the two existing turbines (Permit Nos. 028-0027 and 028-0028) and the actual vs. future potential emissions from those units must be included in the analysis. The permitted allowable NOx emissions for the existing units are 17.1 and 22 tons, respectively (39.1 tons combined) for each existing unit. Based on the applicant's submittal on May, 2, 2025, the combined past actual 2-year average has been determined by the Department to be 13.71 tons/year.

Pursuant to §22a-174-1(63)(A) and 40 CFR §51.165.(a)(1)(v)(A), *major modification* means any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act, where *significant* is considered to be 25 tons/yr for NOx emissions.

Pursuant to 40 CFR §51.165.(a)(1)(vi)(A), *net emissions* increase means the amount by which the sum of the following exceeds zero:
(1) Any increase in actual emissions from a particular physical change or change in the method of operation at a stationary source; and
(2) Any other increases and decreases in actual emissions at the source that are contemporaneous with the particular change and are otherwise creditable.

Simply stated, the potential NOx increases from the *project* cannot exceed 25 tons/year.

Since the existing units have operated significantly below their allowable emissions, the premises-wide increase due to this project must include any potential emissions increases from these existing units because it is unknown if they could be utilized more frequently (i.e. de-bottlenecking) due the addition of the new units and potentially cause a significant net emissions increase for the *project*. Therefore, in order to prevent a major modification from occurring, the premises-wide NOx emissions must be limited to 38.6 tons/year. This facility-wide NOx emissions cap includes the emissions from all of the NOx emitting sources at the facility.

Ambient Air Quality Impact Analysis (Attachment L of NSR Application)

Review Type	Conduct If…	Emissions/Analysis	Dates
Refined Modeling	…allowable emissions for all equipment being permitted contemporaneously exceed any of the limits to the right →	☐ $PM_{10} \geq 15$ TPY ☐ SOx ≥ 15 TPY ☐ $PM_{2.5} \geq 10$ TPY ☐ NOx ≥ 40 TPY ☐ CO ≥ 100 TPY ☐ Pb ≥ 0.6 TPY ☐ Total Dioxins ≥ 0.6E-7 TPY	Date Sent: 06/18/2025 Date Approved: 07/29/2025

Comments:

The application states that the following reviews were required: Stack Height review for SO_2 and CO; and screening analysis for PM_{10}, $PM_{2.5}$, and NO_x. Iroquois submitted refined modeling analyses for review.

On 4/13/20, Trinity Consultants, Iroquois' modeling consultants, submitted and updated refined modeling analysis because Iroquois decided to equip the new and existing emergency generators with oxidation catalyst.

On 1/25/21, Trinity Consultants submitted a revised refined modeling analysis to correct a discrepancy in the calculation of sulfur dioxide (SO_2) emissions from the proposed turbines.

On 2/22/21, the refined modeling analyses was sent to the Technical Services group for review.

On March 6, 2024, the Environmental Protection Agency (EPA) published in the Federal Register a National Ambient Air Quality Standard (NAAQS) final rule that reduced the primary annual $PM_{2.5}$ standard from 12.0 $\mu g/m^3$ to 9.0 $\mu g/m^3$. This new NAAAQS had an effective date of May 6, 2024. Therefore, a new modeling referral was sent to the Technical Services group on June 18, 2025. The Department's review has concluded that the *project* as discussed above will not cause or contribute to a violation with the applicable National Ambient Air Quality Standards and Prevention of Significant Deterioration increments for SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO. (see memo from S. Sampieri, dated 07/28/2025)

Emissions Testing Requirements and CEM

Stack Testing			
Does the Permit Require Stack Testing?		Yes *If no, move to CEM section.*	
If this was a permit modification, did stack testing requirements change from the last issued permit?		N/A *If no, move to CEM section.*	
Pollutant	Frequency	Test Due Date	Reason for Test
NO_x	According to 40 CFR Part 60 Subpart KKKK	According to 40 CFR Part 60 Subpart KKKK	40 CFR Part 60 Subpart KKKK RCSA 22a-174-22e
CO	Five years from previous stack test	180 days after initial startup	Permit Compliance
CEM			
Does the Permit require CEM?		No	
Pollutants that require CEM			

Permit Fee(s) (Double Click to edit)

Equipment Size	○ Major	◉ Minor
Permit Type	New Emission Unit w/PTE > 15 TPY	
Permit Fee	$3,250	ea.
Municipality	☐ Yes	
# of Permits/Applications	2	$6,500
Application Fee Submitted	☑ Yes	-$1,880
Was Permit Fee paid with Application Fee?	☐ Yes	0
Additional Application Fees ($1750 Each)		
	Quantity	
BACT Review	0	$0
LAER Review	0	$0
Money Owed		**$4,620**

Additional Operating Restrictions

- Iroquois requested that the permits for the two new turbines have an annual 500-hour startup and shutdown limit for the four turbines on the premises. The request was granted.
- The Allowable Annual emissions are combined for both units and includes and represent an 8.5% reduction in annual fuel use as part of the BACT determination. However, the permits allow either of the units to operate at 8,760 hours/year for operational flexibility as long as the combined annual emissions limits are not exceeded. The existing emergency engine and proposed new emergency engine are limited to 500 annual hours of operation, combined. Collateral conditions for the operation of the oxidation catalyst and annual hours of operation for these engines have been incorporated into the permits.

Administrative Attachments

Is the Equipment…	Yes/No	If Yes, Then Attach…
… in the Coastal Boundary and is the application for a new permit or a modification of an existing permit where the physical foot print of the subject activity is modified?	No	…a copy of the completed Coastal Consistency Review Form (DEEP-APP-004) and a copy of the forwarding letter to this evaluation together with any response received from OLISP.
… on federally recognized Indian lands?	No	…copies of any correspondence between DEP and the Indian Lands contacts.
…in a Natural Diversity Database Area?	Yes	…copies of the applicant's correspondence to and from the NDDB.
…subject to conservation/preservation restrictions?	No	… proof that the holder of such restriction was notified of the application and that the applicant is in compliance with the restriction.
…major for federal HAPs?	No	… email and any correspondence with the DPH.
…subject to RCSA §22a-174-22e?	Yes	… email sent to Mike LaFleur letting him know facility may need to revise/submit NOx compliance plan.

Is the Equipment…	Yes/No	If Yes, Then Attach…
…combusting coal, waste oil, tires, recycled materials, construction/demolition debris, wood products, biological waste or any other non-fossil fuel that may contain or emit toxic air pollutants?	No	… email and any correspondence with the DPH.
…a new fossil fuel fired unit that serves a generator with a nameplate capacity of 15 MW or greater or is a new fossil fuel fired boiler or indirect heat exchanger with a maximum heat input capacity of 250 MMBTU or more?	No	…email sent to P&S NOx Budget Program.
…required to post a notice Certification pursuant to CGS §22a-6l?	No	…documentation that notice was posted.

Compliance History Review

Was the SIMS Enforcement Report run and reviewed for this applicant?	Yes
Were other bureaus contacted to resolve any outstanding enforcement actions shown in the SIMS Report?	No
What is the date on the Enforcement Section's review of air compliance email?	7/28/2025
Was the compliance record reviewed in accordance with the Environmental Compliance History Policy?	Yes

Recommendation

Before granting of a permit the Commissioner must determine that the Applicant will comply with the requirements of RCSA §22a-174-3a(d)(3):

(A) Construct and operate such stationary source or modification in accordance with the permit, and operate such stationary source or modification in accordance with all applicable and relevant emission limitations, statutes, regulations, schedules for stack tests, and other order of the commissioner. In the event a conflict exists between the permit and another state or federally enforceable statute, regulation or order of the commissioner, the most stringent provision shall apply;

The draft permits specify emissions limitations, stack testing requirements and the authority of the Commissioner to revise these conditions, if necessary. The draft permits also require the Applicant to construct and operate the facility in accordance with all applicable requirements. The Applicant has certified the permit applications. The Applicant has demonstrated to the satisfaction of the Department, as required by applicable law, that it will construct and operate the facility in accordance with all relevant emissions limitations, stack test requirements and any other requirement of the commissioner.

(B) Operate such stationary source or modification without preventing or interfering with the attainment or maintenance of any applicable ambient air quality standards or any Prevention of Significant Deterioration increments under subsection (k) of this section;

The Applicant has submitted an ambient air quality analysis as required under RCSA §22a-174-3a(k). The Department has determined that compliance with the draft permits will not cause or contribute to the significant violation of any applicable ambient air quality standard or PSD increments.

(C) Operate such stationary source or modification without preventing or interfering with the attainment or maintenance of any National Ambient Air Quality Standard in any other state and without interfering with the application of the requirements in any other state's implementation plan, adopted pursuant to section 110 of the Act;

The Applicant's ambient impact analysis, which was reviewed by the Department, has demonstrated that compliance with terms and conditions of the draft permits will not significantly impact air quality, interfere with the attainment of any NAAQS or the SIP for any other state.

(D) Operate such stationary source or modification in accordance with all applicable emission standards and standards of performance pursuant to 40 CFR Parts 60, 61, and 63, as may be amended from time to time;

The proposed sources for this project are subject to a New Source Performance Standards (NSPS) 40 CFR Part 60 Subpart KKKK. The draft permits reference the relevant requirements to ensure that the applicable standards are complied with. The facility's Title V permit, once modified, will incorporate all of the relevant Subpart KKKK requirements for these new units. The BACT review has reduced the allowable Subpart KKKK NOx emissions for these sources from 25 ppmvd to 9 ppmvd @15% O_2.

The new turbines are also subject to New Source Performance Standards Part 60 Subparts OOOOb. Subpart OOOOb applicable requirements will be incorporated into the facility Title V Permit in separate permitting transaction. All applicable requirements will be added to the Title V permit at when applicable.

(E) Install:

(i) sampling ports of a size, number and location as the commissioner may reasonably require, (ii) instrumentation to monitor and record emission and other parameter data as the commissioner may require, and (iii) such other sampling and testing facilities as the commissioner may require;

The draft permits include requirements to conduct stack testing, and to make and keep records to show continual compliance with the permits, where applicable. Compliance with these requirements will result in the installation of sampling ports, monitoring instrumentation and stack testing as the commissioner requires.

(F) As the commissioner may require, conduct stack tests at the expense of such owner or operator, in accordance with subsection (e) of this section, and in accordance with permit conditions and methods prescribed by the commissioner. Such stack tests shall demonstrate, to the commissioner's satisfaction, that the requirements of each and every applicable permit or order of the commissioner for such stationary source or modification are being met and that such stationary source or modification complies with the Regulations of Connecticut State Agencies and federal requirements;

The draft permits set forth the requirements for initial/recurring stack emissions testing and specifies that the commissioner retains the right to revise these requirements to demonstrate compliance.

(G) Pay all fees required by the Department within forty-five (45) days of receipt of a tentative determination of the commissioner;

The Applicant has paid all the application fees and the remaining permit fees must be paid before final permit issuance.

(H) Incorporate Best Available Control Technology (BACT), as directed by the commissioner, for greenhouse gases and each air pollutant listed in Table 3a(k)-(1) of subsection (k) of this section subject to, and in accordance with, subsection (j) of this section;

The Applicant submitted BACT determinations for NOx and CO as the potential emissions from each of these pollutants exceeds 15 ton/year. The Department has concluded that BACT for NOx and CO is the use of Advanced SoLoNOx and oxidation catalyst. Draft permits have incorporated emissions limits and/or pollution control equipment that meet the requirements of BACT and CO, where applicable.

(I) Incorporate the lowest achievable emission rate (LAER), as directed by the commissioner, for each air pollutant subject to, and in accordance with, subsection (l) of this section;

These sources are not subject to non-attainment and LAER review.

(J) Incorporate the maximum available control technology (MACT), as directed by the commissioner, for each air pollutant subject to, and in accordance with, subsection (m) of this section;

The proposed sources and the premises are a minor source of federal hazardous air pollutants (HAP) and therefore will not be subject to RCSA §22a-174-3a(d)(3)(J).

(K) As required by the commissioner, install monitoring equipment and perform monitoring to demonstrate compliance with any permit provision. Such monitoring may include, but not be limited to, continuous emission monitoring (CEM);

The draft permits require the Applicant to install appropriate parameter monitoring equipment to ensure compliance with permit conditions. The proposed draft permits require the installation of appropriate monitoring equipment. Failure to install and operate the equipment in accordance with the permits would result in a violation of law and be subject to enforcement action and considerable monetary penalties.

(L) Provide the commissioner with current information regarding air pollutant emissions from such stationary source or modification, and in accordance with the commissioner's request, submit updated and current information regarding air pollutant emissions from any other stationary sources located on the applicable premises;

The Applicant has provided detailed information on the expected emissions from these sources. The draft permits contain monitoring, record keeping and stack testing requirements to show compliance with the emissions limits contained in the permit.

(M) Comply with any applicable maximum allowable stack concentration or other emission limitation of section 22a-174-29 of the Regulations of Connecticut State Agencies, as may be amended;

The draft permits require that each emission of HAP not exceed any applicable MASC, and that the Applicant comply with RCSA §22a-174-29 at all times. The draft permits contain record keeping requirements to show compliance with the applicable MASC.

(N) Demonstrate that the emission limitation required of such stationary source or modification for the control of any air pollutant shall not be affected by that portion of the stack height of such stationary source or modification that exceeds good engineering practice stack height or by any other dispersion technique;

The minimum allowable stack height specified in all of the permits are equal to or below GEP stack heights. Therefore, the emissions limits required of each stationary source are not affected by any portion of the stack height of such stationary source that actually exceeds good engineering practice stack height or by any other dispersion technique.

(O) Comply with an approved operation and maintenance plan submitted pursuant to subsection (c)(2) of this section;

The commissioner's determination of appropriate operation and maintenance requirements for these sources are specified in the draft permit rather than in an optional, separate plan submitted pursuant to RCSA §22a-174-3a(c)(2). The Applicant must comply with these permit requirements or will be subject to enforcement action for violating the permit and RCSA §22a-174-3a.

(P) Have completed and submitted, on forms prescribed by the commissioner, a pre inspection questionnaire, if requested to do so by the commissioner, which describes the equipment, processes and materials used;

A pre-inspection questionnaire has not been requested of the Applicant. The NSR applications and additional requested information provide all of the information required to issue the Tentative Determination and draft permits.

(Q) Make the permit available at the subject premises throughout the period that such permit is in effect; and

The draft permits require that the Applicant keep copies of the final permits on the premises at all times and be available for inspection during regular working hours.

(R) Comply with the applicable provisions of this section and any other applicable regulations, permits or orders of the commissioner for such stationary source or modification.

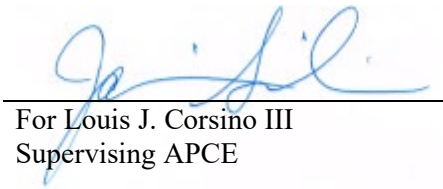
The draft permits do not relieve the Permittee of the responsibility to conduct, maintain and operate the regulated activity in compliance with all applicable requirements of any federal, municipal or other state agency. Nothing in the permits shall relieve the Applicant of other obligations under applicable federal, state and local law.

A public notice would normally not be required for the proposed minor modifications to the existing compressor permits, (SIMS Nos. 202003146 and 202003805), pursuant to RCSA §22a-174-2a(e)(6) because the requested changes are minor and there will be no increase in emissions. However, these minor modifications will be included in the Tentative Determination notice for the two new combustion turbines discussed in this technical evaluation because they are part of the same *project* with respect to the major modification determination discussed herein.

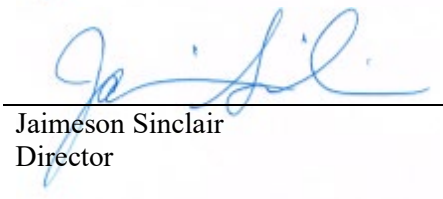
Based on the information submitted by the applicant, this engineering evaluation and the compliance history review, the granting of a permit is recommended for Iroquois Gas Transmission System, L.P..

/s/James Grillo	**07/29/2025**
James Grillo APCE	Date

Approvals



	7/29/2025
For Louis J. Corsino III Supervising APCE	Date



	7/29/2025
Jaimeson Sinclair Director	Date