IROQUOIS GAS TRANSMISSION SYSTEM, L.P.

08/09 EXPANSION PROJECT

DRAFT
RESOURCE REPORT 9

AIR AND NOISE QUALITY

PUBLIC

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RESOURCE REPORT 9 – AIR AND NOISE QUALITY
FERC ENVIRONMENTAL CHECKLIST

Part 380 – Minimum Filing Requirements for Environmental Reports	Company Compliance or Inapplicability of Requirement
Describe existing air quality in the vicinity of the Project § 380.12 (k)(1)).	Section 9.1
Quantify the existing noise levels (day-night sound level (Ldn) and other applicable noise parameters) at noise-sensitive areas and at other areas covered by relevant state and local noise ordinances (§ 380.12 (k)(2)).	Sections 9.4, Attachments A and C
Quantify existing and proposed emissions of compressor equipment, plus construction emissions, including nitrogen oxides (NO_x) and carbon monoxide (CO), and the basis for these calculations. Summarize anticipated air quality impacts for the Project. (§ 380.12 (k)(3)).	Section 9.2
Describe the existing compressor units at each station where new, additional, or modified compression units are proposed, including the manufacturer, model number, and horsepower of the compressor units. For proposed new, additional, or modified compressor units include the horsepower, type and energy source (§ 380.12 (k)(4)).	Resource Report 1 and Section 9.2.4
Identify any nearby noise-sensitive area by distance and direction from the proposed compressor unit building / enclosure (§ 380.12 (k)(4)).	Sections 9.4 and Attachment B and D
Identify any applicable state or local noise regulations (§ 380.12 (k)(4)).	Sections 9.4
Calculate the noise impact at noise-sensitive areas of the proposed compressor unit modifications or additions, specifying how the impact was calculated, including manufacturer's data and proposed noise control equipment (§ 380.12 (k)(4)).	Sections 9.4

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9.0 AIR AND NOISE QUALITY

Iroquois Gas Transmission System, L.P. (Iroquois) proposes to construct its 08/09 Expansion Project in three phases. Phase 1 involves installing three sections of 36 inch diameter pipeline loops and associated facilities. The pipeline loops would be installed parallel to existing pipeline segments downstream of Iroquois' Boonville, Wright and Brookfield Compressor Stations in the Town of Boonville, Oneida County, New York, the Town of Wright, Schoharie County, New York and the Town of Newtown, Fairfield County, Connecticut.

Phase 2 involves installing a natural gas pipeline compressor station (the Milford Compressor Station) in the City of Milford, New Haven County, Connecticut. The station would incorporate two 10,310 nominal horsepower (HP) natural gas-fueled turbo-compressors and associated buildings and auxiliary equipment.

Phase 3 involves installing a second 10,310 nominal HP natural gas fueled turbo-compressor at Iroquois' Brookfield Compressor Station in the Town of Brookfield, Fairfield County, Connecticut. The original compressor station will include a 7,700 HP natural gas-fueled turbo-compressor. The second turbo-compressor would be housed in a new separate compressor building.

This report describes potential air quality and noise impacts due to construction and operation of the proposed pipeline loops and compressors. It describes proposed fuel-burning equipment, potential air pollutant and noise emissions, and air quality impacts along with control and mitigation measures.

Compilation of this report, environmental and regulatory analyses, equipment performance and emissions calculations, station design and equipment selection advice from an air permitting perspective were provided by Ronald E. Schroeder, P.E. of Quonset Environmental Associates, Middletown, Rhode Island. Noise measurements, projections and analyses were provided by Anthony R. Bontomase, Lewis S. Goodfriend and Associates, Whippany, New Jersey.

9.1 EXISTING AIR QUALITY AND REGULATIONS

The most recently published reports of ambient air quality monitoring data were reviewed to define existing air quality in all construction areas. Individual air quality monitoring sites were chosen based on their proximity to and representation of air quality in the vicinity of Boonville and Wright, New York and Newtown, Milford and Brookfield Connecticut. Specific monitoring site locations are referenced below.

9.1.1 Federal Class I Areas

Federal regulations (40 CFR 81.401 through 81.437) list those mandatory Federal Class I areas, established under the Clean Air Act Amendments of 1977, where the U.S. Environmental Protection Agency ("EPA") Administrator, in consultation with the Secretary of the Interior, has determined visibility to be an important value. The listing of areas where visibility is an important value represents an evaluation of significant international parks, national wilderness areas, and national parks.

There are no Federal Class I areas that could be affected by the proposed 08/09 Expansion Project. The closest Class I areas are located in the States of New Hampshire (the Great Gulf Wilderness and the

Presidential Range – Dry River Wilderness Areas), New Jersey (the Brigantine Wilderness Area) and Vermont (the Lye Brook Wilderness Area).

9.1.2 Federal and State Ambient Air Quality Standards

The EPA has established National Ambient Air Quality Standards ([NAAQS], 40 CFR Part 50) that set maximum concentrations for certain "criteria" air pollutants. The States of Connecticut and New York have standards that are at least as stringent as the national standards and in most cases adopt the national standards. State standards may affect some pollutants in addition to the criteria pollutants. Air pollutants for which standards have been established include sulfur dioxide (SO2), particulate matter (PM), carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), lead (Pb), volatile organic compounds (VOC), hydrocarbons (HC) and dioxins. The NAAQS and State standards are listed in Table 9.1.2-1.

TABLE 9.1.2-1: NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS (AAQS)

Pollutant	Averaging Period	AAQS ($\mu g/m^3$)	AAQS (PPM)
Carbon Monoxide (CO)	1-Hour 8-Hour	40,000 10,000	35 9.0
Dioxins	8-Hour Annual	0.001 0.007	NA
Hydrocarbons (HC)	3-Hour	N/A	0.24
Lead (Pb)	3-Month	1.5	N/A
Nitrogen Dioxide (NO_2)	Annual	100	0.05
Ozone (O3)	1-Hour 8-Hour	235 160	0.12 0.08
Inhalable Particulate Matter (PM10)	24-Hour Annual	150 50	N/A N/A
Fine Particulate Matter (PM2.5)	24-Hour Annual	65 15	N/A N/A
Total Suspended Particulates	12-Hour 24-Hour	75 250	NA NA
Sulfur Dioxide (SO2)	3-Hour 24-Hour Annual	1,300 365 80	0.5 0.14 0.03
Volatile Organic Compounds (VOC)	3-Hour	160	0.24

- Connecticut Ambient Air Quality Standards (RCSA 22a-174-24) and EPA's 2005 Annual Report on Air Quality in New England, August 2006. And the 2005 New York State Ambient Air Quality Report and Official Codes, Rules and Regulations of the State of New York, Title 6, Chapter III, Air Resources, Subpart 257 Air Quality Standards.
- $\mu g/m^3$ = micrograms per cubic meter; PPM = parts per million
- Hydrocarbons and Total Suspended Particulates values represent New York State standards.
- PM2.5 refers to fine particulate matter having an aerodynamic diameter of 2.5 microns or smaller. PM10 refers to inhalable particulate matter having an aerodynamic diameter of 10 microns or smaller. One micron is one millionth of a meter.
- Hydrocarbons and Total Suspended Particulates values represent New York State standards.

- PM2.5 refers to fine particulate matter having an aerodynamic diameter of 2.5 microns or smaller. PM10 refers to inhalable particulate matter having an aerodynamic diameter of 10 microns or smaller. One micron is one millionth of a meter.
- The CT DEP currently requires demonstrating compliance with this 65 microgram per cubic meter standard. Epa recently adopted a lesser standard of 35 micrograms per cubic meter. Modeling methods and guidance have yet to be established or adopted for this new standard.
- Volatile organic compound and dioxin values represent Connecticut standards.

9.1.3 Compliance with the State Implementation Plans

Federal regulations (40 CFR 51) require states to submit State Implementation Plans (SIPs) for review and approval by the EPA. A SIP must address and comply with minimum requirements describing measures to attain compliance with National Ambient Air Quality Standards. These measures affect certain stationary and mobile sources. They can involve:

- Emission controls,
- Fuel standards,
- Vehicle maintenance and inspection programs,
- Exhaust stack height requirements,
- Monitoring of ambient air quality,
- Monitoring and testing of air pollution sources,
- Review of proposed new and modified stationary sources of air pollution,
- Federally mandated schedules for states to comply with air quality standards, and
- Public participation and other requirements.

Installation and operation of the proposed Boonville and Wright, NY and Newtown, CT pipeline loops and the Brookfield and Milford Compressor Stations would comply with New York State's and Connecticut's SIPs by complying with all applicable air pollution control regulations. Compliance with applicable vehicle, fuel and coatings regulations would be the responsibility of vehicle manufacturers and fuel and coating product suppliers and distributors. Iroquois requires and monitors compliance with these regulations through construction contract requirements, specifications and inspections.

A SIP must address and comply with minimum requirements describing the measures it takes to attain compliance with National Ambient Air Quality Standards. SIP regulations applicable to designing and operating stationary sources of air pollutant emissions are not expected to apply to the proposed pipeline loops. These regulations pertain to stack heights, potential impacts on surrounding air quality, facility design, equipment selection, potential emissions, emission controls, performance testing and continuing monitoring of operations with record keeping. Iroquois does not anticipate the need to submit any air permit applications for the proposed pipeline loops.

SIP measures affect both stationary and mobile sources. The proposed Milford and Brookfield Compressor Stations would comply with Connecticut's Implementation Plan by satisfying air permit application submittal, review and approval requirements. These affect the proposed stack heights, potential impacts on surrounding air quality, station design, equipment selection and potential emissions, emission controls, stack testing and continuing monitoring of operations with record-keeping.

9.1.4 Compliance with General Conformity Regulations

EPA's General Conformity regulations for federal actions can be found at 40 CFR 51 Subpart W and 40 CFR 93 Subpart B. The intent and purpose of these regulations are to ensure that federal actions are consistent with SIPs for attaining air quality standards. Federal actions, in addition to activities undertaken, supported or funded by federal agencies, may include proposed activities requiring approvals or permits from federal agencies. Iroquois' proposed 08/09 Expansion Project requires the FERC's approval of Iroquois' application for a Certificate of Public Convenience and Necessity Authorizing the Construction and Operation of Facilities to Provide Service under Section 7 of the Natural Gas Act.

The General Conformity regulations only apply to proposed projects that would exceed "significant" emissions levels in locations that have not attained compliance with National Ambient Air Quality Standards (NAAQS). "Significant" is defined in the regulations as exceeding certain "de minimis" thresholds that equate to major source thresholds applicable to the areas potentially affected by proposed projects. In the cases of Oneida (Boonville) and Schoharie (Wright) Counties, New York, which are "moderate" ozone non-attainment areas, these thresholds equate to 100 tons per year (TPY) of potential nitrogen oxide (NOx) emissions, 50 TPY of volatile organic compound (VOC) emissions and 100 TPY of other criteria pollutants.

In the case of Fairfield (Brookfield and Newtown) County, Connecticut, which is a "severe" ozone non-attainment area and a fine particulate matter (PM2.5) non-attainment area, these thresholds equate to 100 TPY of potential PM2.5 emissions and 25 TPY of the ozone precursor pollutants NOx and VOC. The threshold for other potential criteria pollutant emissions, including sulfur dioxide (SO2) and carbon monoxide (CO), is 100 tons per year.

In the case of New Haven County (Milford), which is a "serious" ozone non-attainment area and a fine particulate matter (PM2.5) non-attainment area, these thresholds equate to 100 tons per year of potential PM2.5 emissions and 50 tons per year of the ozone precursor pollutants nitrogen oxides (NOx) and volatile organic compounds (VOC). The threshold for other potential criteria pollutant emissions, including sulfur dioxide (SO2) and carbon monoxide (CO), is 100 tons per year.

In all project areas, the threshold is 10 tons per year for any particular hazardous air pollutant (HAP), and 25 tons per year for any combination of HAPs.

Iroquois' estimates of potential air pollutant emissions due to construction and operation of the three pipeline loops and two compressors are included in Section 9.2 of this report. Combined potential emissions due to construction and operation of the Boonville, Wright and Newtown pipeline loops over construction periods of no more than several months each are expected to be less than 10 tons per year per pipeline loop of any particular pollutant and any combination of HAPs.

Combined potential emissions due to operation and construction of the second Brookfield turbo-compressor are expected to be less than 25 tons per year of NOx and VOC and less than 100 tons per year of PM. Combined potential emissions due to construction and operation of the Milford compressor station are expected to be less than 50 tons of NOx and VOC and less than 100 tons of PM. None of the potential air pollutant emissions exceed the General Conformity regulations "significance" thresholds.

For comparison, EPA approved New York State's and Connecticut's SIPs after reviewing their "transportation conformity budgets" of anticipated NOx and VOC emissions. EPA found the State budgets to be adequate for attaining the NAAQS and approved the SIPs[1,2]. Potential NOx and VOC emissions due to construction and operation of each phase of the 08/09 Expansion Project are equivalent to a small fraction of one percent of the SIP budgets on a daily basis.

Construction and operation of the proposed pipeline loops do not appear to have the potential to affect Connecticut's or New York State's attainment of the NAAQS and appear to be consistent with the SIPs. This is true not only due to the insignificant percentage of potential construction emissions as compared with the transportation conformity budgets, but especially since the proposed mobile vehicle and equipment sources are only to be operated temporarily during the construction period. It would not be appropriate to consider the potential emissions associated with construction vehicles and equipment to have any incremental affect on compliance with the SIP or the transportation conformity budgets, because many, if not most, of these same or similar vehicles and equipment would have been, and would continue to be, in operation on other projects prior to and following the proposed construction projects. For the Brookfield and Milford Compressor Stations, this is also supported by documented results of air quality dispersion modeling of continuous station operations. The latter have been submitted to the CT DEP and must be reviewed and approved by the CT DEP prior to issuance of the required construction and operation air permits.

The General Conformity regulations include a presumption of conformity even for major facilities that would be reviewed and permitted under New Source Review stationary source air permitting regulations. Potential air pollutant emissions associated with construction and operation of the proposed Boonville, Wright and Newtown pipeline loops and those of the proposed Brookfield and Milford compressors would not trigger major source federal or State air permitting requirements for stationary sources. The required air permits for the proposed Brookfield and Milford permanent compression facilities will be reviewed under federal and State regulations applicable to new minor sources and modifications and therefore would be consistent with SIP requirements

In addition to stationary sources, Connecticut's and New York State's SIPs regulate mobile sources of potential air pollutant emissions such as construction vehicles and equipment. Construction of the proposed facilities would result in potential emissions associated with mobile construction and passenger vehicle and equipment engine exhaust, as well as construction vehicle and equipment fugitive dust emissions and emissions due to preparing and coating pipeline facilities.

Connecticut's SIP is based on federal and State regulations that apply to emissions from mobile construction vehicles and equipment, as well as to coating of pipeline facilities. A summary of

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[1] Federal Register, February 4, 2002, Page 5170-5194
[2] Federal Register: January 20, 2004, Volume 69, Number 12, Pages 2711-2712

Connecticut's SIP can be found on EPA's online Web site[3]. Iroquois' proposed Newtown pipeline loop and the Brookfield and Milford compressors would comply with the SIP as required by the following regulations, where applicable:

- RCSA 22a-174-4, "Source Monitoring, Record Keeping, Reporting and Authorization of Inspection of Air Pollution Sources"
- RCSA 22a-174-20, "Control of Organic Compound Emissions" (Coatings)
- RCSA 22a-174-23, "Control of Odors"
- RCSA 22a-174-24, "Connecticut Primary and Secondary Ambient Air Quality Standards"
- RCSA 22a-174-27, "Emission standards and on-board diagnostic test requirements for periodic motor vehicle inspection and maintenance"
- RCSA 22a-174-28, "Oxygenated Gasoline"
- RCSA 22a-174-36, "Low Emission Vehicles"
- RCSA 22a-174-36a, "Heavy Duty Diesel Engines"
- One-Hour Ozone Attainment Demonstration and Attainment Date Extension for the Greater Connecticut Ozone Non-attainment Area
- Federal regulations pertaining to mobile sources and vehicles found at 40 CFR 85, 86, 89 and 90

Likewise, New York State's SIP is based on federal and State regulations that apply to emissions from mobile construction vehicles and equipment, as well as to coating of pipeline facilities. A summary of New York State's SIP can be found on EPA's online Web site[4]. Iroquois' proposed Boonville and Wright pipeline loops would comply with the SIP as required by the following regulations where applicable:

- Codes, Rules and Regulations of New York State (NYCRR) Part 217: Motor Vehicle Emissions and inspections
- NYCRR Part 218: Emission Standards for Motor Vehicles and Motor Vehicle Engines
- NYCRR Part 225: Fuel Composition and Use
- NYCRR Part 205: Architectural and Industrial Maintenance Coatings

[3] http://www.epa.gov/ne/topics/air/sips/ne_sip_summaries.html

[4] http://www.epa.gov/region02/air/sip/summaries_ny/index.html

- 1-Hour Ozone Attainment Demonstration State Implementation Plan and 2007 Transportation Conformity Budgets
- Federal regulations pertaining to mobile sources and vehicles found at 40 CFR 85, 86, 89 and 90

It is important to note that since many of the potential air pollutant emission sources associated with building the proposed facilities are construction vehicles and equipment or involve products manufactured or supplied by others, compliance with the regulations cited above primarily would be outside of Iroquois' direct control and responsibility. Contractor vehicle owners and operators would be responsible for complying with State vehicle inspection regulations for the vehicles and equipment that they own or lease, and vehicle manufacturers would be responsible for complying with engine emission limits. Fuel and coating manufacturers and suppliers would be responsible for complying with requirements applicable to fuel and coating specifications. Iroquois would require its contractors to comply with applicable regulations through its contractual agreements and through periodic on-site environmental inspection.

Section 9.3 of this Resource Report describes steps Iroquois would take to minimize and mitigate potential air pollutant emissions due to construction and operations.

9.1.5 EPA Clean Construction Recommendations

The US EPA's Clean Construction Web site lists information about several emissions reduction strategies and technologies. Iroquois evaluated EPA's recommended emission reduction strategies for construction equipment. EPA's Web site lists a number of potential strategies for retrofitting diesel engines to improve emissions performance and to reduce potential emissions. Strategies include:

1. Switching to advanced fuels, such as ultra-low sulfur diesel (ULSD), biodiesel, liquid petroleum gas, or compressed natural gas,
2. Retrofit installation of engine and vehicle emissions reduction technologies such as:
    a. Diesel particulate filters
    b. Diesel oxidation catalysts
    c. Closed crankcase ventilation
    d. Selective catalytic reduction
    e. Exhaust gas recirculation,
3. Replacing old engines or vehicles with newer, cleaner models,
4. Reducing the amount of engine idling time, and
5. Repair and proper maintenance.

Some of these strategies may be recommended for federal activities involving long term operation of diesel vehicles and equipment that are owned and operated by a project proponent. This is not the case for construction of Iroquois' proposed facilities. The majority of construction vehicles and equipment would be provided by contractors and subcontractors who own or lease the vehicles. Many passenger vehicles would be owned and operated by individual contract employees commuting to the construction sites.

Exhaust emissions from diesel- and gasoline-fueled construction equipment and vehicle engines would be minimized by federal design standards imposed at the time of manufacture of the vehicles and would comply with EPA mobile emission regulations (40 CFR Part 85). Emissions also would be controlled by purchasing commercial gasoline and diesel fuel products whose specifications are controlled by State and federal air pollution control regulations applicable to fuel suppliers and distributors.

Selection of any fuel and emission control alternatives, replacement of vehicles and equipment, and repair and maintenance would be outside of Iroquois' control for the majority of construction vehicles and equipment. For the limited number of smaller vehicles and equipment that Iroquois owns or leases itself, Iroquois would comply with State and federal regulations applicable to fuel and engine specifications, inspection and maintenance. It is Iroquois' practice to lease only late-model vehicles. These primarily consist of passenger automobiles and pickup trucks.

Section 9.3.1 of this Resource Report describes a number of practical and proven methods to minimize and mitigate potential construction emissions. These pertain primarily to potential fugitive dust, surface coating and abrasive blasting emissions.

9.1.6 Air Permitting Requirements

9.1.6.1 Boonville, Wright and Newtown Pipeline Loops

Potential air pollutant emissions are not anticipated from operation of the Boonville, Wright and Newtown pipeline loops, since there would be no permanent stationary fuel-burning or pollutant-emitting equipment associated with normal pipeline operations.

As proposed, construction and operation of the pipeline loops are not expected to trigger any federal or State air permitting requirements. Operation of the pipeline loops is not expected to emit any continuous or frequent air pollutant emissions.

Since there would be no new or existing stationary sources of air pollutant emissions affected by construction or operation of the pipeline loops, regulatory control requirements including Reasonably Available Control Technology (RACT), Best Available Control Technology (BACT), Maximum Achievable Control Technology (MACT) and Lowest Achievable Emission Rate (LAER) controls would not apply.

Pipeline operation can involve infrequent, short duration venting and/or purging of natural gas to the atmosphere for maintenance, safety and other purposes. These emissions cannot be predicted or quantified at this time, but they would be limited in quantity and may be minimized as described later in this report.

In Connecticut, projects involving fifteen tons or more of natural gas venting require an agency approval application process and advanced notifications. Smaller one-time projects and certain routine ongoing activities do not require prior approvals, but may require prior notifications and information to be submitted in advance. Iroquois maintains internal procedures to ensure compliance with these requirements.

In New York State, no notifications are required by regulations or permits for planned, unplanned or emergency natural gas venting from pipelines. New York regulations exempt "simple asphyxiants", including methane and ethane, which comprise approximately 95 percent of Iroquois' natural gas mixture by weight. The regulations also exempt trace constituents of regulated pollutants, such as volatile organic compounds (VOCs) at concentrations of less than one percent by weight. VOCs include propane, butane, pentane, and heavier natural gas hydrocarbon compounds. Iroquois' natural gas mixture currently contains less than one percent of VOCs by weight. The remainder of Iroquois' natural gas mixture is comprised of unregulated compounds including carbon dioxide and nitrogen.

9.1.6.2 Compressor Facilities

9.1.6.2.1 General

Since the proposed Brookfield and Milford compressors would be considered a minor modification and a minor source of air pollutant emissions, respectively, regulatory control requirements including Reasonably Available Control Technology (RACT) and Lowest Achievable Emission Rate (LAER) controls would not be required. RACT applies to major existing sources. LAER applies to major new sources in non-attainment areas.

Even though the proposed compressors would be a minor modification and a minor source, Connecticut's regulations require the application of Best Available Control Technology (BACT) to the proposed turbines since potential emissions of NOx, CO and PM exceed 15 tons per year. BACT is defined as follows:

> "... an emission limitation, including a limitation on visible emissions, based upon the maximum degree of reduction for each applicable air pollutant emitted from any proposed stationary source or modification which the commissioner, on a case-by-case basis, determines is achievable in accordance with section 22a-174-3a of the Regulations of Connecticut State Agencies. BACT may include, without limitation, the application of production processes, work practice standards or available methods, systems, and techniques, including fuel cleaning or treatment, the use of clean fuels, or innovative techniques for the control of such air pollutant."

Proposed projects of this type can be subject to both federal and State air quality regulations that impose various requirements and specific emission standards for expected pollutant discharges. These regulations include:

- National Ambient Air Quality Standards (NAAQS);

- Prevention of Significant Deterioration (PSD) Regulations;

- New Source Review Regulations;
- New Source Performance Standards (NSPS);
- Best Available Control Technology; and/or
- State Requirements for Permits to Construct and Operate Stationary Sources.

How these regulations and requirements apply to any specific proposal depends on the source's potential to emit regulated pollutants and the source's location relative to sensitive air quality areas, such as areas that have not attained compliance with ambient air quality standards (non-attainment areas).

Based on the quantities of pollutants potentially to be emitted from the proposed turbo-compressors, the associated air permit applications are subject to the following requirements:

- Review of ambient air quality monitoring data representing the vicinity of the new source using existing meteorological data ;
- An assessment of the proposed turbines' compliance with federal New Source Performance Standards (NSPS) for stationary gas turbines;
- Application of Best Available Control Technology for potential NOx, CO and PM emissions;
- An analysis of the proposed buildings and exhaust stack heights with respect to Good Engineering Practice (GEP) stack height regulations;

Air quality impact analyses submitted as part of Iroquois' air permit applications demonstrate that potential emissions from the proposed compressor facilities would not cause or exacerbate a violation of ambient air quality standards or Prevention of Significant Deterioration (PSD) increments.

9.1.6.2.2 Milford

As proposed, operation of the Milford Compressor Station is expected to emit less than the major source thresholds of 50 TPY of NO_X and VOC and 100 TPY of CO and other pollutants. Therefore the proposed station would be regulated as a minor source under Connecticut and federal definitions.

9.1.6.2.3 Brookfield

As proposed, operation of the second Brookfield turbo-compressor is expected to emit less than the major source thresholds of 25 TPY of NO_X and VOC and 100 TPY of CO and other pollutants. Since potential emissions due to the previously permitted turbine and station also do not exceed these thresholds, the proposed turbo-compressor would be considered a minor source modification under Connecticut and federal definitions. To be regulated as a major source or modification, potential emissions due to the proposed second turbo-compressor would themselves have to exceed major source thresholds, or the previously permitted station would have had to exceed these thresholds.

9.1.7 Existing Air Quality and Trends

The EPA has divided the country into areas known as Air Quality Control Regions (AQCRs). For each criteria pollutant, each AQCR is designated as being either in "attainment" or "non-attainment" of the NAAQS based on ambient air quality measurements collected by state and local agencies.

9.1.7.1 Boonville, New York

The proposed Boonville pipeline loop would be located in the Town of Boonville, Oneida County, New York, which is part of the Central New York Intrastate AQCR 158.

Based on measurements by the New York State DEC, Oneida County is designated as "attainment" for all criteria pollutants except ozone. Air quality data from monitoring stations representative of the vicinity of the Boonville pipeline loop, which are presented in Table 9.1.7-1, show compliance with all ambient air quality standards. Despite the fact that background concentrations of ozone precursors comply with ambient air quality standards, the area is considered an ozone non-attainment area because it happens to be located within the larger multi-state Northeast Ozone Transport Area. The project area is classified as a "moderate" ozone non-attainment area.

Nitrogen oxides (NOx) and volatile organic compounds (VOC) are ozone precursors, meaning that ozone can be formed in the atmosphere under certain conditions in the presence of these pollutants. As shown in Table 9.2.1.1, potential NOx emissions are less than one quarter of one ton over the entire construction period. This is approximately 0.14 percent of the applicable NOx major source threshold. Potential VOC emissions are substantially less than this. These insignificant and temporary potential construction emissions do not threaten to cause or contribute to a local violation of these air quality standards. As represented in Table 9.1.7-1, even conservative NOx and ozone background concentrations indicate that air standards would not be affected adversely by construction.

Carbon monoxide (CO), like NOx, is an insignificant potential pollutant resulting from construction of the proposed Boonville loop as shown in Table 9.2.1.1. And Table 9.1.7-1 shows that existing background ambient CO concentrations are a small percentage of the corresponding CO standards.

Table 9.2.1.1 shows that potential particulate matter (PM) emissions are greater than NOx or CO emissions, but still very small at approximately 5.5 tons over the entire construction period. These are driven primarily by very conservative estimates of uncontrolled fugitive dust emissions from construction equipment and vehicles. (Actual dust emissions would be controlled by suppression techniques involving water and/or lime applications in accordance with wetlands and other applicable regulations.) Though less than the ambient air quality standards, conservative PM2.5 background concentrations representing the project area do represent a substantial percentage of the PM2.5 standards as shown in Table 9.1.7-1. However, the small and temporary estimated potential construction emissions do not threaten to cause or contribute to a local violation of these air quality standards.

Existing sulfur dioxide and lead background ambient concentrations represent even smaller percentages of their corresponding standards than the pollutants described above, and potential emissions of these pollutants are not significant, as described in Section 9.2.1.

The rest of this section discusses NOx (as an ozone precursor), CO and PM2.5 emissions in greater detail, since these are the most significant pollutants associated with the proposed project based on potential emissions and existing ambient background concentrations.

Ozone is formed by various photochemical reactions of volatile organic compounds with oxides of nitrogen on days with bright sunshine and warm temperatures. Non-attainment of the ozone standard is a regional concern which is not limited to any one specific area. Ozone may be transported over great distances and local violations are often the result of such transport. Control strategies are generally based on regional hydrocarbon emission controls. Ozone is a colorless gas that is a major constituent of smog. High altitude ozone is beneficial because it shields the earth from the sun's ultraviolet radiation. Ground level ozone is harmful because it reacts with the mucus membranes of the respiratory system and causes inflammation.

The US EPA reports that ozone concentrations have declined on average between 1997 and 2005[5]. This overall decline is due to State and regional reductions in NOx and VOC emissions due to the implementation of a number of emission reduction programs aimed primarily at automobiles, fuels and stationary sources. Variations in weather conditions are a major factor influencing ozone levels, since it is formed more readily during warm, sunny days when the air is still. Years with cooler, windier and/or cloudier than average summers produce less ground-level ozone.

Less volatile gasoline is now required in all Northeastern states during the warmer months of the year. This is deemed to have contributed significantly toward lower ambient ozone concentrations. The VOCs that continue to form ozone primarily come from vehicle and industrial exhaust as well as evaporation of gasoline, solvents and paints, and many other sources. Construction of the proposed Boonville pipeline loop would not emit a significant amount of hydrocarbons (VOCs).

The various State and federal regulations applicable to construction vehicles and equipment described elsewhere in this report would minimize and mitigate potential NOx and VOC ozone precursor air pollutant emissions.

Carbon monoxide (CO) is an odorless and colorless gas that is the product of incomplete burning of carbon in fuels from automobiles, buses, trucks, small engines, boilers and some industrial processes. High concentrations can be found in confined spaces such as parking garages, poorly ventilated tunnels, or traffic intersections, especially during peak hours. Unhealthy CO concentrations can weaken the heart's contractions and lower the amount of oxygen carried by the blood, and are dangerous for people with chronic heart disease.

The New York State DEC reports historic air quality trends for carbon monoxide (CO) in New York[6]. These trends show a decrease in existing ambient CO concentrations. Since 1995 existing ambient background CO concentrations have decreased by more than 28 percent. Decreases are attributed to national controls for motor vehicle emissions, and reductions from large industrial facilities[7]. These

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[5] "Weather Makes a Difference: 8-Hour Ozone Trends for 1997-2005" (New York), US Environmental Protection Agency Office of Air and Radiation, August 2006.
[6] http://www.dec.state.ny.us/website/dar/baqs/aqreport/05arr7.html#r7co
[7] US EPA "Air Trends" Web page, October 3, 2006, http://www.epa.gov/air/urbanair/co/effrt1.html

strategies impose progressively more stringent emission standards for new motor vehicles and the introduction of cleaner gasoline. A major contributor to the decreased CO levels has been national standards that have considerably reduced emissions of CO and other pollutants from motor vehicles, including tailpipe emissions, new vehicle technologies, and clean fuels programs. Since 1970, CO emissions from on-road vehicles (e.g.: cars, motorcycles, light- and heavy-duty trucks) have been reduced by over 40 percent. The greatest reductions have been in emissions from cars (nearly 60 percent). State and federal regulations applicable to construction vehicles and equipment described elsewhere in this report would minimize and mitigate potential CO emissions.

Concentrations of inhalable particulate matter with diameters of 10 microns or less (PM10) have decreased since 1990[8] (25 percent nationally) and are well below State and federal ambient air quality standards in the project area. More stringent fine particulate matter (PM2.5) standards were implemented more recently in 1997 and have declined an average of seven percent nationally[9]. Fine particulates have diameters of 2.5 microns or less and can be inhaled more deeply into the lungs than PM10. PM2.5 concentrations also are substantially less than ambient air quality standards in the project area, although they approach 80 percent of the annual standard. Unhealthy concentrations of PM2.5 can aggravate existing heart and lung diseases and can damage lung tissue, especially in the elderly and children[10]. The primary sources of PM2.5 emissions include diesel-fueled vehicles, oil-fueled power plants and many other industries and sources. Construction of the proposed Boonville pipeline loop would not be a significant or permanent source PM2.5 emissions. Estimates of potential PM emissions are very conservative because they represent uncontrolled fugitive dust from construction vehicle and equipment on disturbed and unpaved surfaces. Iroquois' construction procedures require environmental inspectors to monitor actual fugitive dust conditions and to suppress dust, when appropriate, using water and/or lime applications in accordance with applicable wetlands and other regulations. The referenced US EPA "Air Trends" Web site describes existing air quality and trends in greater detail.

[8] http://www.epa.gov/cgi-bin/broker?_service=data&_debug=0&_program=dataprog.maptest7.sas&parm=81102&stfips=36
[9] US EPA "Air Trends" Web page, October 3, 2006, http://www.epa.gov/airtrends/pm.html
[10] http://dep.state.ct.us/airmonitoring/pollutants.htm

TABLE 9.1.7-1: BOONVILLE EXISTING AMBIENT AIR QUALITY MONITORING DATA[1]

Pollutant	Averaging Period	Maximum Concentration[2]	Percent of NAAQS
Sulfur Dioxide[3] (SO_2)	3-Hour 24-Hour Annual	12.0 PPB 8.2 PPB 0.9 PPB	2.4 5.8 3.0
Nitrogen Oxides[4] (NO_2)	Annual	0.036 PPM	72.0
Particulates[19] (PM-10)	24-Hour Annual	0.0 μg/m^3 13.0 μg/m^3	0.0 26.0
Particulates[5] (PM-2.5)	24-Hour Annual	40.5 μg/m^3 11.4 μg/m^3	62.3 76.0
Carbon Monoxide[6] (CO)	1-Hour 8-Hour	3.2 PPM 2.3 PPM	9.1 25.5
Lead[7] (Pb)	3-Month	0.01 μg/m^3	0.7
Ozone[19](0_3)	1-Hour 8-Hour	0.085 PPM 0.068 PPM	70.8 85.0

[1] New York State Ambient Air Quality Report, 2005, http://www.dec.state.ny.us/website/dar/baqs/aqreport/index.html. This is the most recent available ambient air quality monitoring data at the time of this report. For the purposes of this report only, background concentrations shown in this table conservatively represent the greatest concentration measured at the specified air monitoring stations. For air permitting and air quality modeling purposes, for some pollutants and averaging periods, states use the second-greatest values, a percentile less than 100 percent or an average of more than one reading to represent actual background concentrations.

[2] PPM = parts per million. μg/m3 = micrograms per cubic meter.
[3] Site 2167-03, Nick's Lake (DEC Region 6).
[4] Site 7093-10, Public School 59 (DEC Region 2)
[5] Site 3202-01, Utica (DEC Region 6).
[6] Site 3301-22, Syracuse (Region 7)
[7] Site 7097-02, Susan Wagner (Region 2)

9.1.7.2 Wright, New York

The proposed Wright pipeline loop would be located in the Town of Wright, Schoharie County, New York, which is part of the Hudson Valley Intrastate AQCR 161.

Based on measurements by the New York State DEC, Schoharie County is designated as "attainment" for all criteria pollutants except ozone. Air quality data from monitoring stations representative of the vicinity of the Wright pipeline loop, which are presented in Table 9.1.7-2, show compliance with all ambient air quality standards. The area is considered an ozone non-attainment area because it is located within the larger multi-state Northeast Ozone Transport Area. The project area is classified as a "moderate" ozone non-attainment area.

Nitrogen oxides (NOx) and volatile organic compounds (VOC) are ozone precursors, meaning that ozone can be formed in the atmosphere under certain conditions in the presence of these pollutants. As shown in Table 9.2.2-1, potential NOx emissions are less than one tenth of one ton over the entire construction period. This is approximately 0.06 percent of the applicable NOx major source threshold. Potential VOC emissions are substantially less than this. These insignificant and temporary potential construction emissions do not threaten to cause or contribute to a local violation of these air quality standards. As represented in Table 9.1.7-2, even conservative NOx background concentrations indicate that air standards would not be affected adversely by construction.

Carbon monoxide (CO), like NOx, is an insignificant potential pollutant resulting from construction of the proposed Wright loop as shown in Table 9.2.2-1. And Table 9.1.7-2 shows that existing background ambient CO concentrations are a small percentage of the corresponding CO standards.

Table 9.2.2-1 shows that potential particulate matter (PM) emissions are greater than NOx or CO emissions, but still very small at approximately 2.2 tons over the entire construction period. These are driven primarily by very conservative estimates of uncontrolled fugitive dust emissions from construction equipment and vehicles. (Actual dust emissions would be controlled by suppression techniques involving water and/or lime applications in accordance with wetlands and other applicable regulations.) Though less than the ambient air quality standards, conservative PM2.5 background concentrations representing the project area do represent a substantial percentage of the PM2.5 standards as shown in Table 9.1.7-2. However, the small and temporary estimated potential construction emissions do not threaten to cause or contribute to a local violation of this air quality standard.

Existing sulfur dioxide and lead background ambient concentrations represent even smaller percentages of their corresponding standards than the pollutants described above, and potential emissions of these pollutants are not significant, as described in Section 9.2.2.

Section 9.1.7.1 describes NOx (as an ozone precursor), CO and PM2.5 emissions in greater detail for the proposed Boonville pipeline loop project area. Those descriptions apply equally to the proposed Wright pipeline loop project area. These are the most significant pollutants associated with the proposed project based on potential emissions and existing ambient background concentrations.

TABLE 9.1.7-2: WRIGHT EXISTING AMBIENT AIR QUALITY MONITORING DATA[1]

Pollutant	**Averaging Period**	**Maximum Concentration[2]**	**Percent of NAAQS**
Carbon Monoxide[3] (CO)	1-Hour 8-Hour	3.5 PPM 2.6 PPM	10.0 28.9
Lead[4] (Pb)	3-Month	0.01 µg/m^3	0.7
Nitrogen Oxides[5] (NO_2)	Annual	0.030 PPM	60.0
Ozone[8](0_3)	1-Hour 8-Hour	0.103 PPM 0.08 PPM	85.8 100.0
Particulates[6] (PM-2.5)	24-Hour Annual	46.3 µg/m^3 12.4 µg/m^3	71.2 82.7
Particulates[7] (PM-10)	24-Hour Annual	0.0 µg/m^3 14.0 µg/m^3	0.0 28.0
Sulfur Dioxide[8] (SO_2)	3-Hour 24-Hour Annual	27.0 PPB 23.0 PPB 5.0 PPB	5.4 16.4 16.7

[1] New York State Ambient Air Quality Report, 2005, http://www.dec.state.ny.us/website/dar/baqs/aqreport/index.html. Background concentrations conservatively represent the greatest concentration measured.
[2] PPM = parts per million. µg/m3 = micrograms per cubic meter.
[3] Site 4601-05, Schenectady (DEC Region 4)
[4] Site 7097-01, Susan Wagner (DEC Region 2)
[5] Site 7093-10, Public School 59 (DEC Region 2)
[6] Site 0101-13, Albany Co. HD (DEC Region 4).
[7] Site 1001-02, Hudson (DEC Region 4)
[8] Site 0101-33, Loudonville (DEC Region 4).

9.1.7.3 Newtown, Connecticut

The proposed Newtown pipeline loop would be located in the Town of Newtown, Fairfield County, Connecticut, which is part of the New York, New Jersey and Long Island AQCR.

Based on measurements by the CT DEP, Fairfield County is designated as "attainment" for all criteria pollutants except ozone and fine particulate matter. Air quality data from monitoring stations representative of the vicinity of the proposed Newtown pipeline loop, which are presented in Table 9.1.7-3, show compliance with all non-ozone NAAQS. The project area is classified as a "severe" ozone non-attainment area.

Nitrogen oxides (NOx) and volatile organic compounds (VOC) are ozone precursors, meaning that ozone can be formed in the atmosphere under certain conditions in the presence of these pollutants. As shown in Table 9.2.3-1, potential NOx emissions are less than one tenth of one ton over the entire construction period. This is approximately 0.16 percent of the applicable NOx major source threshold. Potential VOC emissions are substantially less than this. These insignificant and temporary potential construction emissions do not threaten to cause or contribute to a local violation of these air quality standards. As represented in Table 9.1.7-3, even the conservative NOx background concentration indicates that this air standard would not be affected adversely by construction. The Newtown project area background air quality has been struggling to comply with the ozone standards. Table 9.1.7-3 indicates ozone concentrations exceeding these standards. The State implements many methods to reduce ozone concentrations and, in time, to comply with the standards. These methods, among others, include permitting, emission controls and monitoring for many major and minor contributing sources within the ozone non-attainment area. Potential NOx and VOC emissions due to construction of the proposed Newtown pipeline loop are so insignificant and short-lived that they are even less than thresholds that trigger some permitting requirements applicable to minor sources, and they do not present a likelihood of significantly contributing to or causing a violation of the local ozone standards.

Carbon monoxide (CO), like NOx, is an insignificant potential pollutant resulting from construction of the proposed Newtown loop as shown in Table 9.2.3-1. And Table 9.1.7-3 shows that existing background ambient CO concentrations are a minor percentage of the corresponding CO standards.

Table 9.2.3-1 shows that potential particulate matter (PM) emissions are greater than NOx or CO emissions, but still small at approximately 8.5 tons over the entire construction period. These are driven primarily by very conservative estimates of uncontrolled fugitive dust emissions from construction equipment and vehicles. (Actual dust emissions would be controlled by suppression techniques involving water and/or lime applications in accordance with wetlands and other applicable regulations.)

Although the US EPA has designated the project area, in combination with 22 other counties and multiple states surrounding New York City, to be a fine particulate matter (PM2.5) non-attainment area, existing background PM2.5 concentrations representative of the project area are less than corresponding air quality standards. The Connecticut Department of Environmental Protection (DEP) provided technical analyses and recommended that EPA designate the entire State of Connecticut as having attained the PM2.5 ambient air quality standards. Nonetheless, EPA ruled in 2004 that Fairfield County would be included as part of the multi-state PM2.5 non-attainment area. Both the Governor of Connecticut and the Commissioner of the Connecticut DEP have asked EPA to reconsider its ruling.

Though less than ambient air quality standards, PM2.5 concentrations representing the project area do represent a substantial percentage of the PM2.5 standards as shown in Table 9.1.7-3. Still, the small, temporary and conservatively estimated potential PM emissions due to construction of the Newtown pipeline loop do not threaten to cause or contribute to a local violation of the PM standards.

Existing sulfur dioxide and lead background ambient concentrations represent even smaller percentages of their corresponding standards than the pollutants described above, and potential emissions of these pollutants are not significant, as described in Section 9.2.3.

The rest of this section discusses NOx (as an ozone precursor), CO and PM2.5 emissions in greater detail, since these are the most significant pollutants associated with the proposed project based on potential emissions and existing ambient background concentrations.

Ozone is formed by various photochemical reactions of volatile organic compounds with oxides of nitrogen on days with bright sunshine and warm temperatures. Non-attainment of the ozone standard is a regional concern which is not limited to any one specific area. Ozone may be transported over great distances and local violations are often the result of such transport. Control strategies are generally based on regional hydrocarbon emission controls. Ozone is a colorless gas that is a major constituent of smog. This pollutant alone contributes to the majority of unhealthy air quality days in CT, as measured by the Air Quality Index (AQI). High altitude ozone is beneficial because it shields the earth from the sun's ultraviolet radiation. Ground level ozone is harmful because it reacts with the mucus membranes of the respiratory system and causes inflammation.

The Connecticut DEP describes historic air quality trends for ozone and other pollutants[26]. The number of days exceeding the 1-hour ozone standard in Connecticut has declined considerably over the past 30 years. The 1-hour standard is currently used for regulatory purposes. The more stringent 8-hour standard is more protective of public health. In the late 1970's and early 1980's, Connecticut experienced as many as 85 days that exceeded these standards each year. In more recent years, the ozone standards have been exceeded on less than ten days each year. This overall decline is due to the implementation of a number of emission reduction programs aimed at automobiles, fuels and stationary sources. Connecticut continues to experience ozone concentrations in excess of the standards during the summer months.

Less volatile gasoline is now required in all Northeastern states during the warmer months of the year. This is deemed to have contributed significantly toward lower ambient ozone concentrations. The VOCs that continue to form ozone primarily come from vehicle and industrial exhaust as well as evaporation of gasoline, solvents and paints, and many other sources.

Carbon monoxide (CO) is an odorless and colorless gas that is the product of incomplete burning of carbon in fuels from automobiles, buses, trucks, small engines, boilers and some industrial processes. High concentrations can be found in confined spaces such as parking garages, poorly ventilated tunnels, or traffic intersections, especially during peak hours. Unhealthy CO concentrations can weaken the

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[26] Connecticut DEP Bureau of Air Quality, "Air Quality Trends – Ozone", http://dep.state.ct.us/airmonitoring/trends/ozonetrends.htm

heart's contractions and lower the amount of oxygen carried by the blood, and are dangerous for people with chronic heart disease.

The Connecticut DEP describes historic air quality trends for carbon monoxide (CO)[27]. These trends show a decrease in existing ambient CO concentrations. The greatest concentrations were observed in the late 1970's. Decreases are attributed to reductions in traffic congestion in urban areas following implementation of various traffic flow improvements. No exceedences of the CO standard have been measured anywhere in Connecticut since the late 1980's. Improvements also are due to other pollution reduction strategies implemented on the State and federal levels. These strategies impose progressively more stringent emission standards for new motor vehicles and the introduction of cleaner gasoline in the mid 1990's. A major contributor to the decreased CO levels was Connecticut's adoption of an inspection and maintenance program for motor vehicles in 1983. State and federal regulations applicable to construction vehicles and equipment described elsewhere in this report would minimize and mitigate potential CO emissions.

Concentrations of inhalable particulate matter with diameters of 10 microns or less (PM10) have decreased 45 percent since 1985 and are well below State and federal ambient air quality standards. More stringent fine particulate matter (PM2.5) standards were implemented more recently in 1997. Fine particulates have diameters of 2.5 microns or less and can be inhaled more deeply into the lungs than PM10. Unhealthy concentrations of PM2.5 can aggravate existing heart and lung diseases and can damage lung tissue, especially in the elderly and children[28]. The primary sources of PM2.5 emissions include diesel-fueled vehicles, oil-fueled power plants and many other industries and sources.

The referenced 2005 Annual Report on Air Quality in New England describes existing air quality and trends in greater detail.

[27] http://dep.state.ct.us/airmonitoring/trends/cotrends.htm
[28] http://dep.state.ct.us/airmonitoring/pollutants.htm

TABLE 9.1.7-3: NEWTOWN EXISTING AMBIENT AIR QUALITY MONITORING DATA[1]

Pollutant	Averaging Period	Maximum Concentration[2]	Percent of NAAQS
Sulfur Dioxide[3] (SO_2)	3-Hour 24-Hour Annual	0.023 PPM 0.017 PPM 0.0033 PPM	4.6 12.1 11.0
Nitrogen Oxides[4] (NO_2)	Annual	0.217 PPM	43.4
Particulates[5] (PM-10)	24-Hour Annual	51.0 µg/m^3 22.7 µg/m^3	34.0 45.4
Particulates[3] (PM-2.5)	24-Hour Annual	57.7 µg/m^3 13.43 µg/m^3	88.8 89.5
Carbon Monoxide[6] (CO)	1-Hour 8-Hour	2.6 PPM 1.9 PPM	7.4 21.1
Lead[7] (Pb)	3-Month	0.02 µg/m^3	1.3
Ozone[3] (0_3)	1-Hour 8-Hour	0.158 PPM 0.110 PPM	131.7 137.5

[1] EPA’s 2005 Annual Report on Air Quality in New England, August 2006 (http://www.epa.gov/region01/lab/reportsdocuments.html). Background concentrations conservatively represent the greatest concentration measured.
[2] PPM = parts per million. µg/m3 = micrograms per cubic meter.
[3] Site 09-001-1123 Danbury.
[4] Site 09-009-0027 New Haven
[5] Site 09-009-2123 Waterbury
[6] Site 09-009-0025 New Haven
[7] The last lead measurement was at Waterbury in 2002. Connecticut discontinued lead monitoring in late 2002

9.1.7.4 Milford, Connecticut

The two nominal 10,310 horsepower (HP) turbines proposed for the Milford Compressor Station would be located in New Haven County, Connecticut, which is part of the Greater Connecticut (ozone) and New Haven, Meriden and Waterbury (CO) AQCRs.

Based on measurements by the CT DEP, New Haven County is designated as "attainment" for all criteria pollutants except ozone and fine particulate matter. Air quality data from monitoring stations representative of the vicinity of the Milford Compressor Station, which are presented in Table 9.1.7-4, show compliance with all non-ozone NAAQS. The project area is classified as a "serious" ozone non-attainment area. This designation affects how the proposed project is regulated and controlled under air permitting regulations.

Nitrogen oxides (NOx) and volatile organic compounds (VOC) are ozone precursors, meaning that ozone can be formed in the atmosphere under certain conditions in the presence of these pollutants. As a percentage of applicable major source thresholds NOx is the most significant potential pollutant resulting from operation of the proposed turbo-compressors as described more in Section 9.2.2. VOC is not.

Carbon monoxide (CO), like NOx, is a significant potential pollutant resulting from operation of the proposed turbo-compressors. Existing background ambient CO concentrations are a minor percentage of the corresponding CO standards.

Potential particulate matter (PM) emissions are less than NOx or CO. Although the US EPA has designated the project area, in combination with 22 other counties and multiple states surrounding New York City, to be a fine particulate matter (PM2.5) non-attainment area, existing background PM2.5 concentrations representative of the project area are less than corresponding air quality standards. The Connecticut Department of Environmental Protection (DEP) provided technical analyses and recommended that the EPA should designate the entire State of Connecticut as having attained the PM2.5 ambient air quality standards. Nonetheless, EPA ruled in 2004 that New Haven County would be included as part of the multi-state PM2.5 non-attainment area. Both the Governor of Connecticut and the Commissioner of the Connecticut DEP have asked EPA to reconsider its ruling. Though less than ambient air quality standards, PM2.5 concentrations representing the project area do represent a substantial percentage of the PM2.5 standards as shown in Table 9.1.7-4.

Existing sulfur dioxide and lead background ambient concentrations represent small percentages of their corresponding standards, and potential emissions of these pollutants are not significant, as described in Section 9.2.2.

Section 9.1.7.3 describes NOx (as an ozone precursor), CO and PM2.5 emissions in greater detail for the proposed Newtown pipeline loop project area. These are the most significant pollutants associated with the proposed project based on potential emissions and existing ambient background concentrations. That section applies equally to the proposed Milford station.

TABLE 9.1.7-4: MILFORD EXISTING AMBIENT AIR QUALITY MONITORING DATA[36]

Pollutant	**Averaging Period**	**Maximum Concentration[37]**	**Percent of NAAQS**
Sulfur Dioxide[38] (SO_2)	3-Hour 24-Hour Annual	0.037 PPM 0.023 PPM 0.0059 PPM	7.4 16.4 19.7
Nitrogen Oxides[39] (NO_2)	Annual	0.0217 PPM	43.4
Particulates[40] (PM-10)	24-Hour Annual	41.0 μg/m^3 20.3 μg/m^3	27.3 40.6
Particulates[5] (PM-2.5)	24-Hour Annual	46.8 μg/m^3 14.37 μg/m^3	72.0 95.8
Carbon Monoxide[41] (CO)	1-Hour 8-Hour	2.6 PPM 1.9 PPM	7.4 21.1
Lead[42] (Pb)	3-Month	0.02 μg/m^3	1.3
Ozone[4] (0_3)	1-Hour 8-Hour	0.119 PPM 0.085 PPM	99.2 106.3

9.1.7.5 Brookfield, Connecticut

The nominal 10,310 horsepower (HP) second turbine proposed for the Brookfield Compressor Station would be located in Fairfield County, Connecticut, which is part of the New York, New Jersey and Long Island AQCR.

Based on measurements by the CT DEP, Fairfield County is designated as "attainment" for all criteria pollutants except ozone and fine particulate matter. Air quality data from monitoring stations representative of the vicinity of the Brookfield Compressor Station, which are presented in Table 9.1.7-5, show compliance with all non-ozone NAAQS. The project area is classified as a "severe" ozone non-attainment area. This designation affects how the proposed project is regulated and controlled under air permitting regulations.

[36] EPA's 2005 Annual Report on Air Quality in New England, August 2006 (http://www.epa.gov/region01/oeme/AnnualReport2005.pdf). This is the most recent available ambient air quality monitoring data.
[37] PPM = parts per million. μg/m3 = micrograms per cubic meter. Connecticut maximum hourly concentrations are based on the 2nd highest values recorded during the year.
[38] Site 09-009-0012 Bridgeport
[39] Site 09-009-0027 New Haven
[40] Site 09-009-0010 Bridgeport. The annual PM2.5 standard is a 3-year average.
[41] Site 09-009-0025 New Haven
[42] The last lead measurement was at Waterbury in 2002. Connecticut discontinued lead monitoring in late 2002.

Nitrogen oxides (NOx) and volatile organic compounds (VOC) are ozone precursors, meaning that ozone can be formed in the atmosphere under certain conditions in the presence of these pollutants. As a percentage of applicable major source thresholds NOx is a significant potential pollutant resulting from operation of the proposed turbo-compressor as described more in Section 9.2.2. VOC is not.

Carbon monoxide (CO), like NOx, is a significant potential pollutant resulting from operation of the proposed turbo-compressor, but represents a smaller percentage of its major source threshold. Existing background ambient CO concentrations are a small percentage of the corresponding CO standards.

Potential particulate matter (PM) emissions are less than NOx or CO. Although the US EPA has designated the project area, in combination with 22 other counties and multiple states surrounding New York City, to be a fine particulate matter (PM2.5) non-attainment area, existing background PM2.5 concentrations representative of the project area are less than corresponding air quality standards. The Connecticut Department of Environmental Protection (DEP) provided technical analyses and recommended that EPA designate the entire State of Connecticut as having attained the PM2.5 ambient air quality standards. Nonetheless, EPA ruled in 2004 that Fairfield County would be included as part of the multi-state PM2.5 non-attainment area. Both the Governor of Connecticut and the Commissioner of the Connecticut DEP have asked EPA to reconsider its ruling. Though less than ambient air quality standards, PM2.5 concentrations representing the project area do represent a substantial percentage of the PM2.5 standards as shown in Table 9.1.7-5.

Existing sulfur dioxide and lead background ambient concentrations represent even smaller percentages of their corresponding standards, and potential emissions of these pollutants are not significant, as described in Section 9.2.2.

Section 9.1.7.3 describes NOx (as an ozone precursor), CO and PM2.5 emissions in greater detail for the proposed Newtown pipeline loop project area. These are the most significant pollutants associated with the proposed project based on potential emissions and existing ambient background concentrations. That section applies equally to the proposed Brookfield second compressor.

TABLE 9.1.7-5: BROOKFIELD EXISTING AMBIENT AIR QUALITY MONITORING DATA[1]

Pollutant	**Averaging Period**	**Maximum Concentration[2]**	**Percent of NAAQS**
Sulfur Dioxide[3] (SO_2)	3-Hour 24-Hour Annual	0.027 PPM 0.018 PPM 0.004 PPM	5.40 12.9 13.3
Nitrogen Oxides[4] (NO_2)	Annual	0.022 PPM	44.0
Particulates[5] (PM-10)	24-Hour Annual	51.0 $\mu g/m^3$ 22.7 $\mu g/m^3$	34.0 45.4
Particulates[5] (PM-2.5)	24-Hour Annual	44.4 $\mu g/m^3$ 14.2 $\mu g/m^3$	68.3 94.7
Carbon Monoxide[6] (CO)	1-Hour 8-Hour	2.6 PPM 1.9 PPM	7.43 21.1
Lead[7] (Pb)	3-Month	0.02 $\mu g/m^3$	1.33
Ozone[3] (0_3)	1-Hour 8-Hour	0.146 PPM 0.110 PPM	122 137

[1] EPA's 2005 Annual Report on Air Quality in New England, August 2006 (http://www.epa.gov/region01/oeme/AnnualReport2005.pdf). This is the most recent available ambient air quality monitoring data.
[2] PPM = parts per million. µg/m3 = micrograms per cubic meter. Based on most recently published data available in 2006. Connecticut maximum hourly concentrations are based on the 2nd highest values recorded during the year.
[3] Site 09-001-1123 Danbury. The annual PM2.5 standard is a 3-year average.
[4] Site 09-009-0027 New Haven
[5] Site 09-009-2123 Waterbury
[6] Site 09-009-0025 New Haven
[7] The last lead measurement was at Waterbury in 2002. Connecticut discontinued lead monitoring in late 2002

9.2 POTENTIAL IMPACTS OF THE PROPOSED PROJECT ON AIR QUALITY

9.2.1 Pipeline Loops Construction - General

There are no existing fuel-burning or air pollutant emitting facilities that would be affected or modified by installing the proposed Boonville, Wright and Newtown pipeline loops. All potential air quality impacts would be from building and operating the proposed loops.

The proposed loops potentially would generate air pollutant emissions through temporary construction activities. Continuous or frequent potential air pollutant emissions are not anticipated from operation of the loops, since there would be no permanent stationary fuel-burning or air pollutant-emitting equipment associated with pipeline operations.

Pipeline operation and maintenance can involve infrequent, short-duration venting and/or purging of natural gas to the atmosphere for maintenance, safety or other purposes. These emissions cannot be predicted or quantified at this time, but they would be limited in quantity and would involve only natural gas emissions, which contain less than one percent of regulated non-methane/non-ethane volatile organic compounds (VOC). The vast majority of the natural gas mixture would be methane. The quantity of VOC emitted would depend on the pipeline segment length and pressure to be vented or purged.

9.2.1.1 Boonville Loop Construction

Iroquois has prepared the following tables summarizing estimated potential emissions of construction-related air pollutants:

9.2.1.1-1 Combined Potential Construction Emissions – Boonville Loop

9.2.1.1-2 Potential Construction Vehicle Types, Quantities and Operating Periods – Boonville Loop

9.2.1.1-3 Potential Construction Vehicle Exhaust Emissions – Boonville Loop

9.2.1.1-4 Potential Construction Vehicle Fugitive Dust Emissions – Boonville Loop

9.2.1.1-5 Potential Surface Coating Emissions – Boonville Loop

9.2.1.1-6 Potential Abrasive Blasting Emissions – Boonville Loop

Mitigation and reduction measures for each type and source of potential air pollutant emission are described in a subsequent section.

The tables do not represent continuing annual emissions from operating any permanent facilities. The tabulated air quality impacts represent only potential emissions over the construction period of less than three months.

Table 9.2.1.1-1 summarizes the small amounts of combined potential criteria air pollutant emissions from construction. Of these, the predominant pollutants are comprised of particulate matter.

As shown above in Table 9.1.7-1, the existing ambient background concentrations of all of the criteria pollutants potentially emitted by this project are a fraction of the corresponding National Ambient Air Quality Standards. Of the small amount of air pollutants potentially to be emitted during construction, inhalable (PM10) and fine (PM2.5) particulate matter appear to be the most significant from the standpoint of their relative, though minor, percentage of major source thresholds (about 5 percent for PM10) and ambient air quality standards (about 76 percent for PM2.5). The amounts of other pollutants potentially emitted during construction are substantially less than particulate matter, as are their relative percentages of major source thresholds and air quality standards.

The conservatively estimated background annual PM2.5 concentration representative of the vicinity of the proposed Boonville loop is 11.4 micrograms per cubic meter (ug/m3), or about 76 percent of the corresponding NAAQS. The 24-hour PM2.5 concentration is 40.5 ug/m3 or about 62 percent of the standard for that averaging period. These are based on greatest overall measurements in an area where existing background air quality is expected to be at least as poor as the project area. Yet even the selected conservative background concentrations appear to be small enough to allow the anticipated small and short-lived potential construction impacts without exceeding air quality standards. For the purposes of this report only, background concentrations conservatively represent the greatest concentrations measured at the nearest pollutant monitoring stations. For air permitting and air quality modeling purposes, for some pollutants and averaging periods, states use the second-greatest measurements, a percentile less than 100 percent, or an average of more than one measurement to represent actual background concentrations.

Construction of the Boonville pipeline loop would generate emissions from construction equipment and vehicles as well as worker passenger vehicles. The two tables associated with vehicle and equipment emissions tabulate potential emissions of various air pollutants from anticipated on-road and off-road construction and passenger vehicles.

Construction and passenger vehicle and equipment emissions were estimated by applying emission factors developed using the latest EPA models (i.e. "Mobile6.2" and "Non-Road Version 2005" Models) to represent the construction area during the 2008 construction period, and assuming an average 2006 vehicle model year for the various vehicle types summarized in the attached tables.

The modeled emission factors were then applied to the expected quantities and types of vehicles to be operated for the anticipated hours of operation each day, week and month of construction.

TABLE 9.2.1.1-1: COMBINED POTENTIAL CONSTRUCTION EMISSIONS – BOONVILLE LOOP

	Tons of Potential Air Pollutant Emissions						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Vehicle and Equipment Exhaust	0.025	0.012	0.012	0.128	0.140	0.0003	0.003
Vehicle and Equipment Fugitive Dust	0.0	5.319	1.038	0.0	0.0	0.0	0.0
Surface Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Preparation Abrasive Blasting	0.0	0.20	0.020	0.0	0.0	0.0	0.0
Project Total	0.025	5.534	1.071	0.128	0.140	0.0003	0.003
Percent of Major Source Threshold	0.05%	5.5%	1.1%	0.1%	0.14%	0.0003%	0.0029%

TABLE 9.2.1.1-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – BOONVILLE LOOP

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Off-Road Vehicles and Equipment								
Air Compressors	1	10	6	4.3	0	0	2.5	645
Backhoes/Tire Hoes	1	10	6	4.3	0	0	2.5	645
Bore/Drill Rigs	2	10	6	4.3	0	0	2.5	645
Cement & Mortar Mixers	1	10	6	4.3	0	0	0.5	129
Compactors	1	10	6	4.3	0	0	0.5	129
Concrete/Industrial Saws								0
Cranes/Booms	1	10	5	4.3	0	0	2.5	538
Crawler Tractor/Dozers	1	10	6	4.3	0	0	2.5	645
Crushing/Proc. Equipment								0
Dozers	3	10	6	4.3	0	0	2.5	645
Dumper/Tender Trucks	1	10	6	4.3	0	0	2.5	645
Excavators	1	10	6	4.3	0	0	2.5	645
Gas Compressors								0
Generator Sets	1	10	6	4.3	0	0	2.5	645
Graders								0
Hydro Power Units								0
Loaders								0
Off-Highway Tractors	1	10	6	4.3	0	0	2.5	645
Other Construction Equipment								0
Other Off-highway Trucks								0
Pavers								0

TABLE 9.2.1.1-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – BOONVILLE LOOP

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Paving Equipment								0
Pipe Side Booms	4	10	6	4.3	0	0	2.5	645
Pressure Washers								0
Pumps	3	10	6	4.3	0	0	2.5	645
Rollers								0
Rough Terrain Forklifts								0
Rubber Tire Loaders	1	10	6	4.3	0	0	2.5	645
Scrapers								0
Signal Boards/Light Plants	4	24	7	4.3	0	0	2.5	1,806
Skid Steer Loaders								0
Tampers/Rammers								0
Track Hoes	7	10	6	4.3	0	0	2.5	645
Trenchers								0
Welding Rigs	6	10	6	4.3	0	0	2.5	645
On-Road Vehicles								0
Passenger Cars								0
Gasoline Pickup and Delivery Trucks	10	10	6	4.3	0	0	2.5	645
Float Truck								0
Lowboy Truck	1	10	6	4.3	0	0	2.5	645
Winch Truck	1	10	6	4.3	0	0	2.5	645
Diesel Pickup Trucks	8	10	6	4.3	0	0	2.5	645
Total of All Vehicles	60							14,212
Total of Off-road Vehicles	40							11,632
Total of On-road Vehicles	20							2,580

TABLE 9.2.1.1-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – BOONVILLE LOOP

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Off-Road Vehicles and Equipment							
Air Compressors	3.80E-04	3.03E-04	2.94E-04	1.67E-03	3.78E-03	3.68E-06	4.53E-05
Backhoes/Tire Hoes	1.30E-03	8.85E-04	8.58E-04	5.69E-03	6.03E-03	5.39E-06	1.55E-04
Bore/Drill Rigs	1.90E-04	1.40E-04	1.36E-04	7.86E-04	2.22E-03	1.65E-06	2.26E-05
Cement & Mortar Mixers	9.73E-07	6.85E-07	6.64E-07	3.92E-06	8.55E-06	6.44E-09	1.16E-07
Compactors	1.45E-06	1.46E-06	1.41E-06	9.34E-06	1.28E-05	1.36E-08	1.73E-07
Cranes/Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Crawler Tractor/Dozers	4.47E-04	3.93E-04	3.81E-04	2.64E-03	6.47E-03	6.79E-06	5.32E-05
Crushing/Proc. Equipment	2.70E-05	2.00E-05	1.94E-05	1.19E-04	3.58E-04	3.30E-07	3.22E-06
Dozers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dumper/Tender Trucks	1.17E-05	7.15E-06	6.94E-06	4.48E-05	3.94E-05	3.41E-08	1.40E-06
Excavators	5.26E-04	4.65E-04	4.51E-04	2.70E-03	6.99E-03	8.18E-06	6.27E-05
Gas Compressors	3.50E-08	4.01E-08	3.89E-08	2.83E-07	4.32E-07	5.84E-10	4.17E-09
Generator Sets	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Graders	1.32E-04	1.11E-04	1.08E-04	5.99E-04	1.76E-03	2.04E-06	1.57E-05
Hydro Power Units	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Off-Highway Tractors	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Construction Equipment	3.83E-04	3.11E-04	3.01E-04	2.24E-03	6.82E-03	7.00E-06	4.57E-05
Other Off-highway Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pavers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paving Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	1.64E-05	1.12E-05	1.09E-05	7.01E-05	1.03E-04	8.66E-08	1.95E-06
Pressure Washers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pumps	5.76E-04	4.30E-04	4.17E-04	2.31E-03	4.71E-03	3.98E-06	6.86E-05

TABLE 9.2.1.1-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – BOONVILLE LOOP

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Rollers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rough Terrain Forklifts	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rubber Tire Loaders	6.57E-04	5.77E-04	5.59E-04	3.76E-03	9.06E-03	8.91E-06	7.83E-05
Scrapers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Signal Boards/Light Plants	3.82E-04	2.43E-04	2.36E-04	1.43E-03	2.63E-03	2.50E-06	4.55E-05
Skid Steer Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Surfacing Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tampers/Rammers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Track Hoes	9.09E-03	6.19E-03	6.01E-03	3.98E-02	4.22E-02	3.78E-05	1.08E-03
Trenchers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Welding Rigs	3.81E-03	2.27E-03	2.20E-03	1.54E-02	1.18E-02	1.12E-05	4.54E-04
Subtotal Off-road Vehicles and Equipment	**1.8E-02**	**1.2E-02**	**1.2E-02**	**7.9E-02**	**1.0E-01**	**1.0E-04**	**2.1E-03**
On-Road Vehicles							
Passenger Cars	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Gasoline Pickup and Delivery Trucks	5.01E-04	8.29E-05	8.04E-05	2.07E-02	2.36E-03	4.71E-05	5.80E-05
Float Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lowboy Truck	1.33E-03	0.00E+00	0.00E+00	9.60E-03	1.33E-02	3.20E-05	1.76E-04
Winch Truck	1.33E-03	0.00E+00	0.00E+00	9.60E-03	1.33E-02	3.20E-05	1.76E-04
Diesel Pickup Trucks	4.15E-03	0.00E+00	0.00E+00	9.20E-03	6.29E-03	1.22E-04	3.46E-04
Subtotal On-road Vehicles	**7.3E-03**	**8.3E-05**	**8.0E-05**	**4.9E-02**	**3.5E-02**	**2.3E-04**	**7.6E-04**
Combined Total	**0.025**	**0.012**	**0.012**	**0.128**	**0.140**	**0.0003**	**0.003**

Fugitive dust emissions may be generated from excavation and vehicle traffic on unpaved or disturbed access and construction land surfaces. Potential fugitive dust emissions documented in Table 9.2.1.1-4 were estimated using guidance from EPA's "AP-42", 5th Edition, Volume 1, Chapter 13, Section 13.2.3, recommended emission factors for construction operations, and AP-42 Table 13.2-1. The assumptions underlying the calculations are shown. It is significant to note that the EPA method for estimating fugitive emissions in Table 9.2.1.1-4 does not consider the mitigating effects of dust monitoring and control planned by Iroquois during construction of the proposed Boonville pipeline loop. Actual dust emissions are expected to be significantly less than the potential emissions represented in the table.

There would be no potential surface coating VOC or HAP emissions as documented in Table 9.2.1.1-5. The two proposed coating product alternatives shown in the table contain no volatile organic compound or hazardous air pollutant components.

Potential abrasive blasting emissions documented in Table 9.2.1.1-6 were estimated using guidance from the EPA's AP-42, 5th Edition, Volume 1, Chapter 13, Section 13.2.6, recommended emission factors for abrasive blasting, and AP-42 Table 13.2-1.

TABLE 9.2.1.1-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – BOONVILLE LOOP					
Assumptions			**Typical Range**		
Soil Moisture		7.90%	2.2-16.8		
Soil Silt		8.50%	3.8-15.1		
Average Heavy Construction Vehicle Miles per Hour		5.0			
Average Other Vehicle Miles per Hour on site		15.0			
Hours per Day		10			
Average Heavy Construction Vehicle Weight (tons)		30	2-290		
Tons of Soil per Scraper Load		25			
Tons of Soil per Dump Truck Load		25			
			Fugitive Dust Pounds per Hour		
Site Preparation			**TSP**	**PM10**	**PM2.5**
	Dozers		8.02E+00	6.49E-01	8.42E-01
	Graders		4.21E-04	1.11E-03	1.31E-05
	Scrapers		1.01E+02	6.06E+01	3.13E+00
	Scrapers		2.16E+00	2.46E-01	3.77E-02
	Scrapers		1.00E+00	6.48E-02	3.10E-02
	Dumper/Tender Trucks		2.16E+00	2.46E-01	3.77E-02
	Compactors		4.21E-04	1.11E-03	1.31E-05
General Construction					
	Total non-Site Prep Vehicles (Other Vehicles)		6.48E+00	7.37E-01	1.13E-01
Site Preparation		**Hours/Year**			
			TSP	**PM10**	**PM2.5**
	Dozers	645	2.59E+00	2.09E-01	2.72E-01
	Graders	0	0.00E+00	0.00E+00	0.00E+00
	Scrapers Removing Topsoil 1/3 of Hours	0	0.00E+00	0.00E+00	0.00E+00
	Scrapers In Travel 1/3 of Hours	0	0.00E+00	0.00E+00	0.00E+00
	Scrapers Unloading Topsoil 1/3 of Hours	0	0.00E+00	0.00E+00	0.00E+00
	Dumper/Tender Trucks	645	6.96E-01	7.92E-02	1.21E-02
	Compactors	129	2.72E-05	7.13E-05	8.42E-07
General Construction					
	Total non-Site Prep Vehicles (Other Vehicles)	12792.5	4.14E+01	4.71E+00	7.23E-01
Total Fugitive Dust Tons			**47.51**	**5.32**	**1.038**

TABLE 9.2.1.1-5: POTENTIAL SURFACE COATING EMISSIONS - BOONVILLE LOOP		
Coating Product Alternatives	Denso Protal 7200	Fusion Bonded Epoxy
Square Inches to Coat	2,200,000	
Thickness (mils)	30	14
Specific Gravity	1.53	1.44
Total Pounds of Product	3,646	1,601
	Pounds	**Tons**
HAPs	**0**	**0**
VOCs	**0**	**0**

TABLE 9.2.1.1-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – BOONVILLE LOOP

		Emission Factors Lb per 1000 Lbs of Abrasive					
		TSP	**PM10**	**PM2.5**	**HAPs**		**TSP #/1000#**
Blasting Media (Y/N)						Wind Speed	
Sand?	N	NA	NA	NA		5	27
Metallic Shot?	N	NA	NA	NA		10	55
Black Beauty Coal Slag Grit?	Y	6.48	3.12	0.31		9.60	52.11
Other?	N	NA	NA	NA		15	91
Wind Speed (5, 10, 15 MPH)	9.6						
Amount of blasting media (pounds)	130,000						
Tons of PM Emissions		**0.42**	**0.20**	**0.020**	**0.00**		
Blasting Methods (Y/N)							
Air pressure?	y						
Centrifugal wheel?	n						
Water pressure?	n						
Control Methods (Y/N)							
Enclosures?	n						
Vacuum blaster?	n						
Drapes?	n						
Wet Blasting?	n						
Reclaim system?	n						
Target Surface							
Existing	n						
New	y						
Syracuse, NY Average Wind Speeds	M/S	MPH					
March	5	11.18					
April	4.89	10.94					
May	4.3	9.62					
June	3.84	8.59					
July	3.75	8.39					

TABLE 9.2.1.1-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – BOONVILLE LOOP								
August	3.66	8.19						
September	3.86	8.63						
October	4.08	9.12						
November	4.68	10.47						
December	4.86	10.87						
Average for Construction Season	4.29	9.60						

Blasting is not anticipated for this project. If blasting were required, it is not known what the extent of blasting might be. Therefore, it is not possible to predict or quantify potential particulate matter emissions due to rock blasting at this time. The EPA provides guidance methods for estimating most types of air pollutant emissions. And EPA does provide a method for estimating blasting emissions for Western surface coal mines. EPA recommends, however, that this method should not be used for estimating emissions from other types of blasting activities due to the dissimilarities of blasting techniques, materials blasted and the size of blasting areas. The EPA has not developed methods for estimating emissions from other rock blasting activities, including pipeline or other construction blasting, due to the lack of available, reliable, and representative test data.

9.2.1.2 Wright Loop Construction

Iroquois has prepared the following tables summarizing estimated potential emissions of construction-related air pollutants:

9.2.1.2-1 Combined Potential Construction Emissions – Wright Loop

9.2.1.2-2 Potential Construction Vehicle Types, Quantities and Operating Periods – Wright Loop

9.2.1.2-3 Potential Construction Vehicle Exhaust Emissions – Wright Loop

9.2.1.2-4 Potential Construction Vehicle Fugitive Dust Emissions – Wright Loop

9.2.1.2-5 Potential Surface Coating Emissions – Wright Loop

9.2.1.2-6 Potential Abrasive Blasting Emissions – Wright Loop

Mitigation and reduction measures for each type and source of potential air pollutant emission are described in a subsequent section.

The tables do not represent continuing annual emissions from operating any permanent facilities. The tabulated air quality impacts represent only potential emissions over the approximately one month construction period.

Table 9.2.1.2-1 summarizes the small amounts of combined potential criteria air pollutant emissions from construction. Of these, the predominant pollutants are comprised of particulate matter.

As shown above in Table 9.1.7-2, the existing ambient background concentrations of all of the criteria pollutants potentially emitted by this project are a fraction of the corresponding National Ambient Air Quality Standards. Of the small amount of air pollutants potentially to be emitted during construction, inhalable (PM10) and fine (PM2.5) particulate matter appear to be the most significant from the standpoint of their relative, though minor, percentage of major source thresholds (about 2 percent for PM10) and ambient air quality standards (about 83 percent for PM2.5). The amounts of other pollutants potentially emitted during construction are substantially less than particulate matter, as are their relative percentages of major source thresholds and air quality standards.

The conservatively estimated background annual PM2.5 concentration representative of the vicinity of the proposed Wright loop is 12.4 micrograms per cubic meter (ug/m3), or about 83 percent of the corresponding NAAQS. The 24-hour PM2.5 concentration is 46.3 ug/m3 or about 71 percent of the standard for the 24-hour averaging period. These are based on the greatest overall measurements in an area where existing background air quality is expected to be at least as poor as the project area. Yet even the selected conservative background concentrations appear to be small enough to allow the anticipated small and short-lived potential construction impacts without exceeding air quality standards. For the purposes of this report only, background concentrations conservatively represent the greatest concentrations measured at the nearest pollutant monitoring stations. For air permitting and air quality modeling purposes, for some pollutants and averaging periods, states use the second-greatest measurements, a percentile less than 100 percent, or an average of more than one measurement to represent actual background concentrations.

Construction of the Wright pipeline loop would generate emissions from construction equipment and vehicles as well as worker passenger vehicles. The two tables associated with vehicle and equipment emissions tabulate potential emissions of various air pollutants from anticipated on-road and off-road construction and passenger vehicles.

Construction and passenger vehicle and equipment emissions were estimated by applying emission factors developed using the latest EPA models (i.e. "Mobile6.2" and "Non-Road Version 2005" Models) to represent the construction area during the 2008 construction period, and assuming an average 2006 vehicle model year for the various vehicle types summarized in the attached tables.

The modeled emission factors were then applied to the expected quantities and types of vehicles to be operated for the anticipated hours of operation each day, week and month of construction.

TABLE 9.2.1.2-1: COMBINED POTENTIAL CONSTRUCTION EMISSIONS – WRIGHT LOOP

	Tons of Potential Air Pollutant Emissions						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Vehicle and Equipment Exhaust	0.010	0.005	0.005	0.051	0.056	0.000004	0.001
Vehicle and Equipment Fugitive Dust	0.0	2.156	0.420	0.0	0.0	0.0	0.0
Surface Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Preparation Abrasive Blasting	0.0	0.03	0.003	0.0	0.0	0.0	0.0
Project Total	0.010	2.195	0.428	0.051	0.056	0.000004	0.001
Percent of Major Source Threshold	0.02%	2.2%	0.4%	0.1%	0.06%	0.0%	0.0%

TABLE 9.2.1.2-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – WRIGHT LOOP

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Months Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Off-Road Vehicles and Equipment								
Air Compressors	1	10	6	4.3	0	1.0	0	258
Backhoes/Tire Hoes	1	10	6	4.3	0	1.0	0	258
Bore/Drill Rigs	2	10	6	4.3	0	1.0	0	258
Cement & Mortar Mixers	1	10	6	4.3	0	0.5	0	129
Compactors	1	10	6	4.3	0	0.5	0	129
Concrete/Industrial Saws	0	0	0	0.0	0	0.0	0	0
Cranes/Booms	1	10	5	4.3	0	1.0	0	215
Crawler Tractor/Dozers	1	10	6	4.3	0	1.0	0	258
Crushing/Proc. Equipment	0	0	0	0.0	0	0.0	0	0
Dozers	3	10	6	4.3	0	1.0	0	258
Dumper/Tender Trucks	1	10	6	4.3	0	1.0	0	258
Excavators	1	10	6	4.3	0	1.0	0	258
Gas Compressors	0	0	0	0.0	0	0.0	0	0
Generator Sets	1	10	6	4.3	0	1.0	0	258
Graders	0	0	0	0.0	0	0.0	0	0
Hydro Power Units	0	0	0	0.0	0	0.0	0	0
Loaders	0	0	0	0.0	0	0.0	0	0
Off-Highway Tractors	1	10	6	4.3	0	1.0	0	258
Other Construction Equipment	0	0	0	0.0	0	0.0	0	0
Other Off-highway Trucks	0	0	0	0.0	0	0.0	0	0
Pavers	0	0	0	0.0	0	0.0	0	0

TABLE 9.2.1.2-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – WRIGHT LOOP

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Months Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Paving Equipment	0	0	0	0.0	0	0.0	0	0
Pipe Side Booms	4	10	6	4.3	0	1.0	0	258
Pressure Washers	0	0	0	0.0	0	0.0	0	0
Pumps	3	10	6	4.3	0	1.0	0	258
Rollers	0	0	0	0.0	0	0.0	0	0
Rough Terrain Forklifts	0	0	0	0.0	0	0.0	0	0
Rubber Tire Loaders	1	10	6	4.3	0	1.0	0	258
Scrapers	0	0	0	0.0	0	0.0	0	0
Signal Boards/Light Plants	4	24	7	4.3	0	1.0	0	722
Skid Steer Loaders	0	0	0	0.0	0	0.0	0	0
Tampers/Rammers	0	0	0	0.0	0	0.0	0	0
Track Hoes	7	10	6	4.3	0	1.0	0	258
Trenchers	0	0	0	0.0	0	0.0	0	0
Welding Rigs	6	10	6	4.3	0	1.0	0	258
On-Road Vehicles	0	0	0	0.0	0	0.0	0	0
Passenger Cars	0	0	0	0.0	0	0.0	0	0
Gasoline Pickup and Delivery Trucks	10	10	6	4.3	0	1.0	0	258
Lowboy Truck	1	10	6	4.3	0	1.0	0	258
Winch Truck	1	10	6	4.3	0	1.0	0	258
Diesel Pickup Trucks	8	10	6	4.3	0	1.0	0	258
Total of All Vehicles	60							5,839
Total of Off-road Vehicles	40							4,807
Total of On-road Vehicles	20							1,032

TABLE 9.2.1.2-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS - WRIGHT LOOP

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Off-Road Vehicles and Equipment							
Air Compressors	1.52E-04	1.21E-04	1.18E-04	6.69E-04	1.51E-03	1.47E-06	1.81E-05
Backhoes/Tire Hoes	5.19E-04	3.54E-04	3.43E-04	2.28E-03	2.41E-03	2.16E-06	6.19E-05
Bore/Drill Rigs	7.59E-05	5.61E-05	5.44E-05	3.14E-04	8.88E-04	6.59E-07	9.04E-06
Cement & Mortar Mixers	9.73E-07	6.85E-07	6.64E-07	3.92E-06	8.55E-06	6.44E-09	1.16E-07
Compactors	1.45E-06	1.46E-06	1.41E-06	9.34E-06	1.28E-05	1.36E-08	1.73E-07
Cranes/Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Crawler Tractor/Dozers	1.79E-04	1.57E-04	1.52E-04	1.06E-03	2.59E-03	2.72E-06	2.13E-05
Crushing/Proc. Equipment	1.08E-05	8.01E-06	7.77E-06	4.77E-05	1.43E-04	1.32E-07	1.29E-06
Dozers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dumper/Tender Trucks	4.68E-06	2.86E-06	2.78E-06	1.79E-05	1.58E-05	1.37E-08	5.58E-07
Excavators	2.10E-04	1.86E-04	1.81E-04	1.08E-03	2.79E-03	3.27E-06	2.51E-05
Gas Compressors	1.40E-08	1.61E-08	1.56E-08	1.13E-07	1.73E-07	2.34E-10	1.67E-09
Generator Sets	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Graders	5.26E-05	4.44E-05	4.31E-05	2.40E-04	7.03E-04	8.15E-07	6.27E-06
Hydro Power Units	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Off-Highway Tractors	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Construction Equipment	1.53E-04	1.24E-04	1.20E-04	8.97E-04	2.73E-03	2.80E-06	1.83E-05
Other Off-highway Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pavers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paving Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	6.56E-06	4.48E-06	4.34E-06	2.80E-05	4.13E-05	3.46E-08	7.82E-07
Pressure Washers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pumps	2.30E-04	1.72E-04	1.67E-04	9.24E-04	1.88E-03	1.59E-06	2.75E-05

TABLE 9.2.1.2-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS - WRIGHT LOOP

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Rollers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rough Terrain Forklifts	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rubber Tire Loaders	2.63E-04	2.31E-04	2.24E-04	1.50E-03	3.63E-03	3.56E-06	3.13E-05
Scrapers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Signal Boards/Light Plants	1.53E-04	9.72E-05	9.42E-05	5.74E-04	1.05E-03	9.98E-07	1.82E-05
Skid Steer Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Surfacing Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tampers/Rammers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Track Hoes	3.64E-03	2.48E-03	2.40E-03	1.59E-02	1.69E-02	1.51E-05	4.33E-04
Trenchers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Welding Rigs	1.52E-03	9.07E-04	8.80E-04	6.16E-03	4.72E-03	4.47E-06	1.82E-04
Subtotal Off-road Vehicles and Equipment	**7.2E-03**	**4.9E-03**	**4.8E-03**	**3.2E-02**	**4.2E-02**	**4.0E-05**	**8.6E-04**
On-Road Vehicles							
Passenger Cars	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Gasoline Pickup and Delivery Trucks	2.00E-04	3.32E-05	3.22E-05	8.28E-03	9.45E-04	1.88E-05	2.32E-05
Float Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lowboy Truck	5.30E-04	0.00E+00	0.00E+00	3.84E-03	5.33E-03	1.28E-05	7.06E-05
Winch Truck	5.30E-04	0.00E+00	0.00E+00	3.84E-03	5.33E-03	1.28E-05	7.06E-05
Diesel Pickup Trucks	1.66E-03	0.00E+00	0.00E+00	3.68E-03	2.52E-03	4.88E-05	1.38E-04
Subtotal On-road Vehicles	**0.003**	**3.3E-05**	**3.2E-05**	**2.0E-02**	**1.4E-02**	**9.3E-05**	**3.0E-04**
Combined Total	**0.01**	**0.005**	**0.005**	**0.051**	**0.056**	**0.0001**	**0.001**

Fugitive dust emissions may be generated from excavation and vehicle traffic on unpaved or disturbed access and construction land surfaces. Potential fugitive dust emissions documented in Table 9.2.1.2-4 were estimated using guidance from EPA's "AP-42", 5th Edition, Volume 1, Chapter 13, Section 13.2.3, recommended emission factors for construction operations, and AP-42 Table 13.2-1. The assumptions underlying the calculations are shown. It is significant to note that the EPA method for estimating fugitive emissions in Table 9.2.1.2-4 does not consider the mitigating effects of dust monitoring and control planned by Iroquois during construction of the proposed Wright pipeline loop. Actual dust emissions are expected to be significantly less than the potential emissions represented in the table.

There would be no potential surface coating VOC or HAP emissions as documented in Table 9.2.1.2-5. The two proposed coating product alternatives shown in the table contain no volatile organic compound or hazardous air pollutant components.

Potential abrasive blasting emissions documented in Table 9.2.1.2-6 were estimated using guidance from the EPA's AP-42, 5th Edition, Volume 1, Chapter 13, Section 13.2.6, recommended emission factors for abrasive blasting, and AP-42 Table 13.2-1.

TABLE 9.2.1.2-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – WRIGHT LOOP

Assumptions							
				Typical Range			
	Soil Moisture		7.90%	2.2-16.8			
	Soil Silt		8.50%	3.8-15.1			
	Average Heavy Construction Vehicle Miles per Hour		5				
	Average Other Vehicle Miles per Hour on site		15				
	Hours per Day		10				
	Average Heavy Construction Vehicle Weight (tons)		30	2-290			
	Tons of Soil per Scraper Load		25				
	Tons of Soil per Dump Truck		25				
				Fugitive Dust Pounds per Hour			
Site Preparation				**TSP**	**PM10**	**PM2.5**	
Dozers				8.02E+00	6.49E-01	8.42E-01	
Graders				4.21E-04	1.11E-03	1.31E-05	
Scrapers	Removing Topsoil			1.01E+02	6.06E+01	3.13E+00	
Scrapers	In Travel			2.16E+00	2.46E-01	3.77E-02	
Scrapers	Unloading Topsoil			1.00E+00	6.48E-02	3.10E-02	
Dumper/Tender Trucks				2.16E+00	2.46E-01	3.77E-02	
Compactors				4.21E-04	1.11E-03	1.31E-05	
Backhoes/Tire Hoes				2.16E+00	2.46E-01	2.46E-02	

TABLE 9.2.1.2-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – WRIGHT LOOP

Assumptions							
Crawler Tractor/Dozers				2.16E+00	2.46E-01	2.46E-02	
Excavators				2.16E+00	2.46E-01	2.46E-02	
General Construction				**TSP**	**PM10**	**PM2.5**	
	Total non-Site Prep Vehicles (Other Vehicles)			6.48E+00	7.37E-01	1.13E-01	
				Fugitive Dust Tons			
Site Preparation			**Hours/Year**				
Dozers			258	1.03E+00	8.38E-02	1.09E-01	
Graders			0	0.00E+00	0.00E+00	0.00E+00	
Scrapers	Removing Topsoil 1/3 of Hours		0	0.00E+00	0.00E+00	0.00E+00	
Scrapers	In Travel 1/3 of Hours		0	0.00E+00	0.00E+00	0.00E+00	
Scrapers	Unloading Topsoil 1/3 of Hours		0	0.00E+00	0.00E+00	0.00E+00	
Dumper/Tender Trucks			258	2.79E-01	3.17E-02	4.86E-03	
Compactors			129	2.72E-05	7.13E-05	8.42E-07	
Backhoes/Tire Hoes			258	2.79E-01	3.17E-02	3.17E-03	
Crawler Tractor/Dozers			258	2.79E-01	3.17E-02	3.17E-03	
Excavators			258	2.79E-01	3.17E-02	3.17E-03	
General Construction							
	Total non-Site Prep Vehicles (Other Vehicles)		5194.4	1.68E+01	1.91E+00	2.93E-01	
Total Fugitive Dust Tons				**19.25**	**2.16**	**0.420**	

TABLE 9.2.1.2-5: POTENTIAL SURFACE COATING EMISSIONS - WRIGHT LOOP

Coating Product Alternatives	Denso Protal 7200	Fusion Bonded Epoxy
Square Inches to Coat	380,000	
Thickness (mils)	30	14
Specific Gravity	1.53	1.44
Total Pounds of Product	630	277
	Pounds	**Tons**
HAPs	**0**	**0**
VOCs	**0**	**0**

TABLE 9.2.1.2-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – WRIGHT LOOP

		Emission Factors Lb per 1000 Lbs of Abrasive						
		TSP	**PM10**	**PM2.5**	**HAPs**		**TSP #/1000#**	
Blasting Media (Y/N)						Wind Speed		
Sand?	n	NA	NA	NA	NA	5	27	
Metallic Shot?	n	NA	NA	NA	NA	10	55	
Black Beauty Coal Slag Grit?	y	6.48	3.12	0.31	NA	9.84	53.83	
Other?	n	NA	NA	NA	NA	15	91	
Wind Speed (5, 10, 15 MPH)	9.84							
Amount of blasting media (pounds)	22,000							
Tons of PM Emissions		**0.07**	**0.03**	**0.003**	**0.00**			
Blasting Methods (Y/N)								
Air pressure?	y							
Centrifugal wheel?	n							
Water pressure?	n							
Control Methods (Y/N)								
Enclosures?	n							
Vacuum blaster?	n							
Drapes?	n							
Wet Blasting?	n							
Reclaim system?	n							

TABLE 9.2.1.2-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – WRIGHT LOOP

Target Surface								
Existing	n							
New	y							
Albany, NY Average Wind Speeds	M/S	MPH						
March	5.16	11.54						
April	5.08	11.36						
May	4.44	9.93						
June	4.15	9.28						
July	3.88	8.68						
August	3.8	8.50						
September	3.94	8.81						
October	4.19	9.37						
November	4.61	10.31						
December	4.74	10.60						
Average for Construction Season	4.40	9.84						

Blasting is not anticipated for this project. If blasting were required, it is not known what the extent of blasting might be. Therefore, it is not possible to predict or quantify potential particulate matter emissions due to rock blasting at this time. The EPA provides guidance methods for estimating most types of air pollutant emissions. And EPA does provide a method for estimating blasting emissions for Western surface coal mines. EPA recommends, however, that this method should not be used for estimating emissions from other types of blasting activities due to the dissimilarities of blasting techniques, materials blasted and the size of blasting areas. The EPA has not developed methods for estimating emissions from other rock blasting activities, including pipeline or other construction blasting, due to the lack of available, reliable, and representative test data.

9.2.1.3 Newtown Loop Construction

Iroquois has prepared the following tables summarizing estimated potential emissions of construction-related air pollutants:

9.2.1.3-1 Combined Potential Construction Emissions – Newtown Loop

9.2.1.3-2 Potential Construction Vehicle Types, Quantities and Operating Periods – Newtown Loop

9.2.1.3-3 Potential Construction Vehicle Exhaust Emissions – Newtown Loop

9.2.1.3-4 Potential Construction Vehicle Fugitive Dust Emissions – Newtown Loop

9.2.1.3-5 Potential Surface Coating Emissions – Newtown Loop

9.2.1.3-6 Potential Abrasive Blasting Emissions – Newtown Loop

Mitigation and reduction measures for each type and source of potential air pollutant emission are described in a subsequent section.

The tables do not represent continuing annual emissions from operating any permanent facilities. The tabulated air quality impacts represent only potential emissions over the approximately one and a half month construction period.

Table 9.2.1.3-1 summarizes the small amounts of combined potential criteria air pollutant emissions from construction. Of these, the predominant pollutants are comprised of particulate matter.

As shown above in Table 9.1.7-3, the existing ambient background concentrations of all of the criteria pollutants potentially emitted by this project are a fraction of the corresponding National Ambient Air Quality Standards. Of the small amount of air pollutants potentially to be emitted during construction, inhalable (PM10) and fine (PM2.5) particulate matter appear to be the most significant from the standpoint of their relative, though minor, percentage of major source thresholds (about 8 percent for PM10) and ambient air quality standards (about 89 percent for PM2.5). The amounts of other pollutants potentially emitted during construction are substantially less than particulate matter, as are their relative percentages of major source thresholds and air quality standards.

The conservatively estimated background annual PM2.5 concentration representative of the vicinity of the proposed Newtown loop is 13.4 micrograms per cubic meter (ug/m3), or about 89 percent of the corresponding NAAQS. The 24-hour PM2.5 concentration is 57.7 ug/m3 or about 89 percent of the standard for that averaging period. These are based on measurements in an area where existing background air quality is expected to be at least as poor as the project area. Yet even the selected conservative background concentrations appear to be small enough to allow the anticipated small and short-lived potential construction impacts without exceeding air quality standards. For the purposes of this report only, background concentrations conservatively represent the greatest concentrations measured at the nearest pollutant monitoring stations. For air permitting and air quality modeling purposes, for some pollutants and averaging periods, states use the second-greatest measurements, a percentile less than 100 percent, or an average of more than one measurement to represent actual background concentrations.

Construction of the Newtown pipeline loop would generate emissions from construction equipment and vehicles as well as worker passenger vehicles. The two tables associated with vehicle and equipment emissions tabulate potential emissions of various air pollutants from anticipated on-road and off-road construction and passenger vehicles.

Construction and passenger vehicle and equipment emissions were estimated by applying emission factors developed using the latest EPA models (i.e. "Mobile6.2" and "Non-Road Version 2005" Models) to represent the construction area during the 2008 construction period, and assuming an average 2006 vehicle model year for the various vehicle types summarized in the attached tables.

The modeled emission factors were then applied to the expected quantities and types of vehicles to be operated for the anticipated hours of operation each day, week and month of construction.

TABLE 9.2.1.3-1: COMBINED POTENTIAL CONSTRUCTION EMISSIONS – NEWTOWN LOOP

	Tons of Potential Air Pollutant Emissions						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Vehicle and Equipment Exhaust	0.007	0.002	0.002	0.043	0.041	0.0002	0.001
Vehicle and Equipment Fugitive Dust	0.00	8.448	1.418	0.0	0.0	0.0	0.0
Surface Coating	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Surface Preparation Abrasive Blasting	0.00	0.06	0.006	0.0	0.0	0.0	0.0
Project Total	0.01	8.5	1.4	0.043	0.041	0.0002	0.001
Percent of Major Source Threshold	0.03%	8.5%	1.4%	0.4%	0.16%	0.0002%	0.0%

TABLE 9.2.1.3-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS –NEWTOWN LOOP

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Months Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Off-Road Vehicles and Equipment								
Air Compressors	1	10	6	4.3	0	0	1.5	387
Backhoes/Tire Hoes	1	10	6	4.3	0	0	1.5	387
Bore/Drill Rigs	2	10	6	4.3	0	0	1.5	387
Cement & Mortar Mixers	1	10	6	4.3	0	0	0.5	129
Compactors	1	10	6	4.3	0	0	0.5	129
Concrete/Industrial Saws								0
Cranes/Booms	1	10	5	4.3	0	0	1.5	323
Crawler Tractor/Dozers	1	10	6	4.3	0	0	1.5	387
Crushing/Proc. Equipment								0
Dozers	3	10	6	4.3	0	0	1.5	387
Dumper/Tender Trucks	1	10	6	4.3	0	0	1.5	387
Excavators	1	10	6	4.3	0	0	1.5	387
Gas Compressors								0
Generator Sets	1	10	6	4.3	0	0	1.5	387
Graders								0
Hydro Power Units								0
Loaders								0
Off-Highway Tractors	1	10	6	4.3	0	0	1.5	387
Other Construction Equipment								0
Other Off-highway Trucks								0
Pavers								0

TABLE 9.2.1.3-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS –NEWTOWN LOOP

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Months Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Paving Equipment								0
Pipe Side Booms	4	10	6	4.3	0	0	1.5	387
Pressure Washers								0
Pumps	3	10	6	4.3	0	0	1.5	387
Rollers								0
Rough Terrain Forklifts								0
Rubber Tire Loaders	1	10	6	4.3	0	0	1.5	387
Scrapers								0
Signal Boards/Light Plants	4	24	7	4.3	0	0	1.5	1,084
Tampers/Rammers								0
Track Hoes	7	10	6	4.3	0	0	1.5	387
Trenchers								0
Welding Rigs	6	10	6	4.3	0	0	1.5	387
On-Road Vehicles								0
Passenger Cars								0
Gasoline Pickup and Delivery Trucks	10	10	6	4.3	0	0	1.5	387
Float Truck								0
Lowboy Truck	1	10	6	4.3	0	0	1.5	387
Winch Truck	1	10	6	4.3	0	0	1.5	387
Diesel Pickup Trucks	8	10	6	4.3	0	0	1.5	387
Total of All Vehicles	60							8,630
Total of Off-road Vehicles	40							7,082
Total of On-road Vehicles	20							1,548

TABLE 9.2.1.3-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – NEWTOWN LOOP

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Off-Road Vehicles and Equipment							
Air Compressors	3.07E-05	2.45E-05	2.37E-05	1.35E-04	3.05E-04	2.97E-07	3.66E-06
Backhoes/Tire Hoes	1.78E-04	1.21E-04	1.17E-04	7.78E-04	8.24E-04	7.38E-07	2.12E-05
Bore/Drill Rigs	2.60E-05	1.92E-05	1.86E-05	1.08E-04	3.04E-04	2.26E-07	3.10E-06
Cement & Mortar Mixers	2.22E-07	1.56E-07	1.51E-07	8.92E-07	1.95E-06	1.47E-09	2.64E-08
Compactors	1.87E-07	1.28E-07	1.24E-07	7.99E-07	1.18E-06	9.87E-10	2.23E-08
Cranes/Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Crawler Tractor/Dozers	1.53E-05	1.05E-05	1.01E-05	5.63E-05	2.23E-04	2.13E-07	1.83E-06
Crushing/Proc. Equipment	7.33E-05	6.44E-05	6.25E-05	4.34E-04	1.06E-03	1.11E-06	8.74E-06
Dozers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dumper/Tender Trucks	5.33E-04	3.63E-04	3.52E-04	2.33E-03	2.47E-03	2.21E-06	6.35E-05
Excavators	5.31E-07	3.25E-07	3.15E-07	2.03E-06	1.79E-06	1.55E-09	6.33E-08
Gas Compressors	7.19E-05	6.36E-05	6.17E-05	3.69E-04	9.56E-04	1.12E-06	8.57E-06
Generator Sets	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Graders	6.92E-05	4.76E-05	4.61E-05	2.63E-04	5.34E-04	4.54E-07	8.25E-06
Hydro Power Units	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Off-Highway Tractors	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Construction Equipment	9.35E-06	7.89E-06	7.65E-06	6.25E-05	1.36E-04	1.20E-07	1.11E-06
Other Off-highway Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pavers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paving Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	2.93E-04	2.58E-04	2.50E-04	1.74E-03	4.25E-03	4.46E-06	3.50E-05
Pressure Washers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pumps	4.65E-05	3.47E-05	3.37E-05	1.87E-04	3.81E-04	3.21E-07	5.54E-06

TABLE 9.2.1.3-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – NEWTOWN LOOP

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Rollers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rough Terrain Forklifts	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rubber Tire Loaders	8.98E-05	7.88E-05	7.65E-05	5.14E-04	1.24E-03	1.22E-06	1.07E-05
Scrapers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Signal Boards/Light Plants	5.22E-05	3.32E-05	3.22E-05	1.96E-04	3.60E-04	3.41E-07	6.22E-06
Skid Steer Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Surfacing Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tampers/Rammers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Track Hoes	1.24E-03	8.47E-04	8.21E-04	5.45E-03	5.77E-03	5.16E-06	1.48E-04
Trenchers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Welding Rigs	3.08E-04	1.83E-04	1.78E-04	1.24E-03	9.53E-04	9.03E-07	3.67E-05
Subtotal Off-road Vehicles and Equipment	**3.04E-03**	**2.2E-03**	**2.1E-03**	**1.4E-02**	**2.0E-02**	**1.9E-05**	**3.6E-04**
On-Road Vehicles							
Passenger Cars	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Gasoline Pickup and Delivery Trucks	3.01E-04	4.98E-05	4.83E-05	1.24E-02	1.42E-03	2.83E-05	3.48E-05
Float Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lowboy Truck	7.95E-04	0.00E+00	0.00E+00	5.76E-03	8.00E-03	1.92E-05	1.06E-04
Winch Truck	7.95E-04	0.00E+00	0.00E+00	5.76E-03	8.00E-03	1.92E-05	1.06E-04
Diesel Pickup Trucks	2.49E-03	0.00E+00	0.00E+00	5.52E-03	3.78E-03	7.32E-05	2.08E-04
Subtotal On-road Vehicles	**4.4E-03**	**5.0E-05**	**4.8E-05**	**2.9E-02**	**2.1E-02**	**1.4E-04**	**4.5E-04**
Combined Total	**0.01**	**0.002**	**0.002**	**0.043**	**0.041**	**0.0002**	**0.001**

Fugitive dust emissions may be generated from excavation and vehicle traffic on unpaved or disturbed access and construction land surfaces. Potential fugitive dust emissions documented in Table 9.2.1.3-4 were estimated using guidance from EPA's "AP-42", 5th Edition, Volume 1, Chapter 13, Section 13.2.3, recommended emission factors for construction operations, and AP-42 Table 13.2-1. The assumptions underlying the calculations are shown. It is significant to note that the EPA method for estimating fugitive emissions in Table 9.2.1.3-4 does not consider the mitigating effects of dust monitoring and control planned by Iroquois during construction of the proposed Newtown pipeline loop. Actual dust emissions are expected to be significantly less than the potential emissions represented in the table.

There would be no potential surface coating VOC or HAP emissions as documented in Table 9.2.1.3-5. The two proposed coating product alternatives shown in the table contain no volatile organic compound or hazardous air pollutant components.

Potential abrasive blasting emissions documented in Table 9.2.1.3-6 were estimated using guidance from the EPA's AP-42, 5th Edition, Volume 1, Chapter 13, Section 13.2.6, recommended emission factors for abrasive blasting, and AP-42 Table 13.2-1.

TABLE 9.2.1.3-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – NEWTOWN LOOP

Assumptions							
				Typical Range			
	Soil Moisture		7.90%	2.2-16.8			
	Soil Silt		8.50%	3.8-15.1			
	Average Heavy Construction Vehicle Miles per Hour		5				
	Average Other Vehicle Miles per Hour on site		20				
	Hours per Day		8				
	Average Heavy Construction Vehicle Weight (tons)		150	2-290			
	Tons of Soil per Scraper Load		25				
	Tons of Soil per Dump Truck Load		25				
				Fugitive Dust Pounds per Hour			
Site Preparation				**TSP**	**PM10**	**PM2.5**	
Dozers				8.02E+00	6.49E-01	8.42E-01	
Graders				4.21E-04	1.11E-03	1.31E-05	
Scrapers	Removing Topsoil			1.01E+02	6.06E+01	3.13E+00	
Scrapers	In Travel			4.46E+00	5.07E-01	7.77E-02	
Scrapers	Unloading Topsoil			1.00E+00	6.48E-02	3.10E-02	
Dumper/Tender Trucks				4.46E+00	5.07E-01	7.77E-02	
Compactors				4.21E-04	1.11E-03	1.31E-05	
Backhoes/Tire Hoes				4.46E+00	5.07E-01	5.07E-02	

TABLE 9.2.1.3-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – NEWTOWN LOOP

Assumptions							
Crawler Tractor/Dozers				4.46E+00	5.07E-01	5.07E-02	
Excavators				4.46E+00	5.07E-01	5.07E-02	
Track Hoes				4.46E+00	5.07E-01	5.07E-02	
General Construction	Total non-Site Prep Vehicles (Other Vehicles)			1.78E+01	2.03E+00	3.11E-01	
				Fugitive Dust Tons			
Site Preparation			**Hours/Year**	**TSP**	**PM10**	**PM2.5**	
Dozers			387	1.55E+00	1.26E-01	1.63E-01	
Graders			0	0.00E+00	0.00E+00	0.00E+00	
Scrapers	Removing Topsoil		0	0.00E+00	0.00E+00	0.00E+00	
Scrapers	In Travel		0	0.00E+00	0.00E+00	0.00E+00	
Scrapers	Unloading Topsoil		0	0.00E+00	0.00E+00	0.00E+00	
Dumper/Tender Trucks			387	8.62E-01	9.81E-02	1.50E-02	
Compactors			129	2.72E-05	7.13E-05	8.42E-07	
Backhoes/Tire Hoes			387	8.62E-01	9.81E-02	9.81E-03	
Crawler Tractor/Dozers			387	8.62E-01	9.81E-02	9.81E-03	
Excavators			387	8.62E-01	9.81E-02	9.81E-03	
Track Hoes			387	8.62E-01	9.81E-02	9.81E-03	
General Construction	Total non-Site Prep Vehicles (Other Vehicles)		7,727	6.89E+01	7.83E+00	1.20E+00	
Total Fugitive Dust Tons				**74.71**	**8.45**	**1.418**	

TABLE 9.2.1.3-5: POTENTIAL SURFACE COATING EMISSIONS - NEWTOWN LOOP		
Coating Product Alternatives	Denso Protal 7200	Fusion Bonded Epoxy
Square Inches to Coat	650,000	
Thickness (mils)	30	14
Specific Gravity	1.53	1.44
Total Pounds of Product	1,077	473
	Pounds	**Tons**
HAPs	**0**	**0**
VOCs	**0**	**0**

TABLE 9.2.1.3-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – NEWTOWN LOOP

		Emission Factors Lb per 1000 Lbs of Abrasive						
		TSP	**PM10**	**PM2.5**	**HAPs**		**TSP #/1000#**	
Blasting Media (Y/N)						Wind Speed		
Sand?	n	NA	NA	NA		5	27	
Metallic Shot?	n	NA	NA	NA		10	55	
Black Beauty Coal Slag Grit?	y	17.31	3.12	0.31		12.38	72.12	
Other?	n					15	91	
Wind Speed (5, 10, 15 MPH)	12.38							
Amount of blasting media (pounds)	36,000							
Tons of PM Emissions		**0.31**	**0.06**	**0.006**	**0.00**			
Blasting Methods (Y/N)								
Air pressure?	y							
Centrifugal wheel?	n							
Water pressure?	n							
Control Methods (Y/N)								
Enclosures?	n							
Vacuum blaster?	n							
Drapes?	n							
Wet Blasting?	n							
Reclaim system?	n							

TABLE 9.2.1.3-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – NEWTOWN LOOP

Target Surface									
Existing	n								
New	y								
Bridgeport, CT Average Wind Speeds	M/S	MPH							
March	6.31	14.11							
April	6.17	13.80							
May	5.46	12.21							
June	5.03	11.25							
July	4.78	10.69							
August	4.87	10.89							
September	5.31	11.88							
October	5.51	12.32							
November	5.91	13.22							
December	6	13.42							
Average for Construction Season	5.54	12.38							

Blasting may be required for this project, although the extent of blasting is unknown at this time. Therefore, it is not possible to quantify potential particulate matter emissions due to rock blasting at this time. The EPA provides guidance methods for estimating most types of air pollutant emissions. And EPA does provide a method for estimating blasting emissions for Western surface coal mines. EPA recommends, however, that this method should not be used for estimating emissions from other types of blasting activities due to the dissimilarities of blasting techniques, materials blasted and the size of blasting areas. The EPA has not developed methods for estimating emissions from other rock blasting activities, including pipeline or other construction blasting, due to the lack of available, reliable, and representative test data.

9.2.2 Pipeline Loops Operation

Pipeline operation and maintenance can involve infrequent, short duration venting and/or purging of natural gas to the atmosphere for maintenance, safety and other purposes. These emissions cannot be predicted or quantified at this time, but they would be limited in quantity and would involve only natural gas emissions, which contain less than one percent of regulated non-methane/non-ethane volatile organic compounds (VOC). The vast majority of vented gas would be methane. The quantity of VOC emitted would depend on the pipeline segment length and pressure to be vented or purged.

9.2.3 Compressor Stations Construction

9.2.3.1 Milford Station

Iroquois has prepared the following tables summarizing estimated potential emissions of construction-related air pollutants:

9.2.3.1-1 Combined Potential Construction Emissions – Milford Station

9.2.3.1-2 Potential Construction Vehicle Types, Quantities and Operating Periods – Milford Station

9.2.3.1-3 Potential Construction Vehicle Exhaust Emissions – Milford Station

9.2.3.1-4 Potential Construction Vehicle Fugitive Dust Emissions – Milford Station

9.2.3.1-5 Potential Surface Coating Emissions – Milford Station

9.2.3.1-6 Potential Abrasive Blasting Emissions – Milford Station

Mitigation and reduction measures for each type and source of potential air pollutant emission are described in a subsequent section.

The tables do not represent continuing annual emissions from operating any permanent facilities. The tabulated air quality impacts represent only potential emissions over the approximately nine-month construction period.

Table 9.2.3.1-1 shows that the combined potential criteria air pollutant emissions over the nine-month construction period are very small.

As shown above in Table 9.1.7-4, the existing ambient background concentrations of most of the pollutants listed in Table 9.2.3.1-1 are a minor fraction of the corresponding National Ambient Air Quality Standards (NAAQS). Fine particulate matter concentrations are the exception. The fine particulate matter (PM2.5) 24-hour and annual background air quality concentrations are about 72 and 96 percent of the NAAQS, respectively. Ambient background concentrations of all of the other pollutants listed in Table 9.2.3.1-1 are less than half of the NAAQS. These are based on monitoring in areas where existing background air quality is expected to be at least as poor as the project area. Since potential construction emissions of PM2.5, and all other pollutants with NAAQS, are substantially less than ten tons each over the limited construction period, all of the selected background concentrations appear to be small enough to allow potential construction impacts without exceeding air quality standards. Potential emissions of this small magnitude, if they were associated with a permanent stationary source rather than temporary mobile construction vehicles and equipment, would still be exempt from State air permitting requirements.

Construction of the Milford Compressor Station would generate emissions from construction equipment and vehicles as well as worker passenger vehicles. The two tables associated with vehicle and equipment emissions tabulate potential emissions of various air pollutants from anticipated on-road and off-road construction and passenger vehicles.

Construction and passenger vehicle and equipment emissions were estimated by applying emission factors developed using the latest EPA models (i.e. "Mobile6.2" and "Non-Road Version 2005" Models) to represent the construction area during the 2008 construction period, and assuming an average 2006 vehicle model year for the various vehicle types summarized in the following tables.

The modeled emission factors were then applied to the expected quantities and types of vehicles to be operated for the anticipated hours of operation each day, week and month of construction.

TABLE 9.2.3.1-1: COMBINED POTENTIAL CONSTRUCTION EMISSIONS – MILFORD STATION

	Tons of Potential Air Pollutant Emissions						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Vehicle and Equipment Exhaust	0.002	0.000	0.000	0.009	0.009	0.0001	0.000
Vehicle and Equipment Fugitive Dust	0.0	5.11	0.70	0.0	0.0	0.0	0.0
Surface Coating	0.004	0.0	0.0	0.0	0.0	0.0	0.14
Surface Preparation Abrasive Blasting	0.0	0.02	0.002	0.0	0.0	0.0	0.0
Project Total	0.006	5.13	0.70	0.009	0.009	0.0001	0.142

TABLE 9.2.3.1-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – MILFORD STATION

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Off-Road Vehicles and Equipment								
Air Compressors	1	2	5	4	3	3	2	320
Backhoes/Tire Hoes	1	3	5	4	3	3	2	480
Bore/Drill Rigs	1	4	4	1	1	0	0	16
Cement & Mortar Mixers	1	4	2	2	2		0	32
Compactors	6	4	2	1	1	1	1	24
Concrete/Industrial Saws	1	1	1	1	1	1	0	2
Cranes/Booms	1	6	4	4	3	3	2	768
Crawler Tractor/Dozers								0
Crushing/Proc. Equipment								0
Dozers								0
Dumper/Tender Trucks	2	8	2	4	2	1	1	256
Excavators	1	4	2	4	2	1	1	128
Gas Compressors								0
Generator Sets	1	8	5	4	3	3	2	1,280
Graders	1	8	5	1	1	0	1	80
Hydro Power Units								0
Loaders								0
Off-Highway Tractors								0
Other Construction Equipment								0
Other Off-highway Trucks							1	0
Pavers	1	8	2	1		0	1	16

TABLE 9.2.3.1-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – MILFORD STATION

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Paving Equipment	1	8	2	1		0		0
Pipe Side Booms							1	0
Pressure Washers	1	2	2	2	1	1	1	24
Pumps	2	8	5	4	1	1	0	320
Rollers	1	8	2	4	1	1		128
Rough Terrain Forklifts								0
Rubber Tire Loaders								0
Scrapers	1	8	5	1	1	0	1	80
Skid Steer Loaders								0
Surfacing Equipment								0
Tampers/Rammers								0
Track Hoes								0
Trenchers								0
Welding Rigs	2	8	5	4	1	1	1	480
On-Road Vehicles								0
Passenger Cars	15	0.2	5	4	3	3	2	32
Gasoline Pickup / Delivery Trucks	2	1	5	4	3	3	3	180
Float Truck								0
Lowboy Truck	1	1	3	4	3	1	1	60
Winch Truck								0
Diesel Pickup Trucks	3	4	5	4	3	3	2	640
Total of All Vehicles	47							5346
Total of Off-road Vehicles	26							4434
Total of On-road Vehicles	21							912

TABLE 9.2.3.1-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – MILFORD STATION

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Off-Road Vehicles and Equipment							
Air Compressors	2.54E-05	2.02E-05	1.96E-05	1.12E-04	2.53E-04	2.46E-07	3.03E-06
Backhoes/Tire Hoes	2.20E-04	1.50E-04	1.46E-04	9.65E-04	1.02E-03	9.15E-07	2.63E-05
Bore/Drill Rigs	5.37E-07	3.97E-07	3.85E-07	2.22E-06	6.28E-06	4.66E-09	6.40E-08
Cement & Mortar Mixers	5.50E-08	3.87E-08	3.75E-08	2.21E-07	4.83E-07	3.64E-10	6.55E-09
Compactors	2.09E-07	1.42E-07	1.38E-07	8.92E-07	1.31E-06	1.10E-09	2.49E-08
Cranes/Booms	5.10E-09	5.14E-09	4.99E-09	3.29E-08	4.49E-08	4.77E-11	6.08E-10
Crawler Tractor/Dozers	3.66E-05	2.49E-05	2.42E-05	1.34E-04	5.32E-04	5.07E-07	4.36E-06
Crushing/Proc. Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dozers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dumper/Tender Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Excavators	7.03E-07	4.29E-07	4.16E-07	2.69E-06	2.37E-06	2.05E-09	8.38E-08
Gas Compressors	2.38E-05	2.10E-05	2.04E-05	1.22E-04	3.16E-04	3.70E-07	2.84E-06
Generator Sets	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Graders	2.29E-04	1.57E-04	1.53E-04	8.70E-04	1.77E-03	1.50E-06	2.73E-05
Hydro Power Units	3.72E-06	3.14E-06	3.04E-06	1.69E-05	4.96E-05	5.76E-08	4.43E-07
Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Off-Highway Tractors	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Construction Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Off-highway Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pavers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paving Equipment	3.47E-07	3.15E-07	3.06E-07	1.86E-06	4.14E-06	4.56E-09	4.13E-08
Pipe Side Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pipe Side Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pressure Washers	1.39E-07	8.07E-08	7.83E-08	4.87E-07	1.10E-06	9.00E-10	1.66E-08
Pumps	2.56E-05	1.91E-05	1.86E-05	1.03E-04	2.10E-04	1.77E-07	3.06E-06

TABLE 9.2.3.1-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – MILFORD STATION

	Tons						
Vehicle and Equipment Type	**VOC**	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Rollers	7.53E-06	7.12E-06	6.91E-06	4.42E-05	8.48E-05	9.13E-08	8.98E-07
Rough Terrain Forklifts	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rubber Tire Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Scrapers	3.40E-06	3.25E-06	3.16E-06	2.52E-05	5.85E-05	6.21E-08	4.05E-07
Signal Boards/Light Plants	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Skid Steer Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Surfacing Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tampers/Rammers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Track Hoes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trenchers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Welding Rigs	1.27E-04	7.57E-05	7.34E-05	5.14E-04	3.94E-04	3.73E-07	1.52E-05
Subtotal Off-road Vehicles and Equipment	**7.05E-04**	**4.8E-04**	**4.7E-04**	**2.9E-03**	**4.7E-03**	**4.3E-06**	**8.4E-05**
On-Road Vehicles							
Passenger Cars	2.34E-05	4.85E-06	4.70E-06	9.76E-04	1.29E-04	2.08E-06	2.72E-06
Gasoline Pickup and Delivery Trucks	2.80E-05	4.63E-06	4.49E-06	1.16E-03	1.32E-04	2.63E-06	3.24E-06
Float Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lowboy Truck	1.23E-04	0.00E+00	0.00E+00	8.93E-04	1.24E-03	2.98E-06	1.64E-05
Winch Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel Pickup Trucks	1.54E-03	0.00E+00	0.00E+00	3.42E-03	2.34E-03	4.54E-05	1.29E-04
Subtotal On-road Vehicles	**0.002**	**9.5E-06**	**9.2E-06**	**6.4E-03**	**3.8E-03**	**5.3E-05**	**1.5E-04**
Combined Total	**0.002**	**0.0005**	**0.0005**	**0.009**	**0.009**	**0.0001**	**0.0002**

Fugitive dust emissions may be generated from excavation and vehicle traffic on unpaved or disturbed access and construction land surfaces. Potential fugitive dust emissions documented in Table 9.2.3.1-4 were estimated using guidance from EPA's "AP-42", 5th Edition, Volume 1, Chapter 13, Section 13.2.3, recommended emission factors for construction operations, and AP-42 Table 13.2-1. The assumptions underlying the calculations are shown. It is significant to note that the EPA method for estimating fugitive emissions in Table 9.2.3.1-4 does not consider the mitigating effects of dust monitoring and control planned by Iroquois for the Milford Compressor Station Project. Actual dust emissions are expected to be significantly less than the potential emissions represented in the table.

Potential surface coating emissions documented in Table 9.2.3.1-5 were developed conservatively by assuming that 100 percent of all volatile and hazardous air pollutants would be emitted to the atmosphere.

Potential abrasive blasting emissions documented in Table 9.2.3.1-6 were estimated using guidance from the EPA's AP-42, 5th Edition, Volume 1, Chapter 13, Section 13.2.6, recommended emission factors for abrasive blasting, and AP-42 Table 13.2-1.

TABLE 9.2.3.1-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – MILFORD STATION

Assumptions				**Typical Range**			
	Soil Moisture		7.90%	2.2-16.8			
	Soil Silt		8.50%	3.8-15.1			
	Average Heavy Construction Vehicle Miles per Hour		5				
	Average Other Vehicle Miles per Hour on site		20				
	Hours per Day		8				
	Average Heavy Construction Vehicle Weight (tons)		150	2-290			
	Tons of Soil per Scraper Load		50				
	Tons of Soil per Dump Truck Load		100				
				Fugitive Dust Pounds per Hour			
Site Preparation				**TSP 30**	**TSP 15**	**PM10**	**PM2.5**
	Dozers			8.02	0.87	0.65	0.84
	Graders			0.00	0.00	0.00	0.00
	Scrapers	Removing Topsoil		101.00	101.00	60.60	3.13
	Scrapers	In Travel		4.46	NA	0.51	0.08
	Scrapers	Unloading Topsoil		2.00	0.22	0.13	0.06
	Dumper/Tender Trucks			4.46	NA	0.51	0.08
	Compactors			0.00	0.00	0.00	0.00

TABLE 9.2.3.1-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – MILFORD STATION

General Construction							
	Total non-Site Prep Vehicles (Other Vehicles)			17.82	NA	2.03	0.31
Site Preparation			**Hours/Year**	**TSP 30**	**TSP 15**	**PM10**	**PM2.5**
	Dozers		0	0.0	0.0	0.0	0.0
	Graders		80	1.69E-05	7.37E-05	4.42E-05	5.22E-07
	Scrapers	Removing Topsoil 1/3 of Hours	26.7	1.35	1.35	8.08E-01	4.17E-02
	Scrapers	In Travel 1/3 of Hours	26.7	5.94E-02	0.0	6.76E-03	1.04E-03
	Scrapers	Unloading Topsoil 1/3 of Hours	26.7	2.67E-02	2.88E-03	1.73E-03	8.27E-04
	Dumper/Tender Trucks		256	5.70E-01	0.0	6.49E-02	9.95E-03
	Compactors		24	5.06E-06	2.21E-05	1.33E-05	1.57E-07
General Construction							
	Total non-Site Prep Vehicles (Other Vehicles)		4170	37.2	0.0	4.23	6.48E-01
Total Fugitive Dust Tons				**39.16**	**1.35**	**5.11**	**7.02E-01**

TABLE 9.2.3.1-5: POTENTIAL SURFACE COATING EMISSIONS – MILFORD STATION		
Coating Product	Denso Protal 7125	
# Welds	100	
Cans per Weld	1	
Liters per Can	2	
Pounds per Can	4	
Total Pounds of Product	400	
	Pounds	Tons
Combined Potential Emissions	291	0.15
HAPs	284	0.14
VOCs	7	0.004
HAP Breakdown		
Styrene	120	
n,n diethylaniline	4	
dibutylphthalate	160	

TABLE 9.2.3.1-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – MILFORD STATION

		Emission Factors Lb per 1000 Lbs of Abrasive						
		TSP	**PM10**	**PM2.5**	**HAPs**		**TSP #/1000#**	
Blasting Media (Y/N)						Wind Speed		
Sand?	n	NA	NA	NA		5	27	
Metallic Shot?	n	NA	NA	NA		10	55	
Metallic Grit?	y	17.31	3.12	0.31		12.38	72.12	
Other?	n					15	91	
Wind Speed (5, 10, 15 MPH)	12.38							
Amount of blasting media (pounds)	10,000							
Tons of PM Emissions		**0.09**	**0.02**	**0.002**	**0.00**			
Blasting Methods (Y/N)								
Air pressure?	y							
Centrifugal wheel?	n							
Water pressure?	n							
Control Methods (Y/N)								
Enclosures?	n							
Vacuum blaster?	n							

TABLE 9.2.3.1-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – MILFORD STATION									
Drapes?	n								
Wet Blasting?	n								
Reclaim system?	n								
Target Surface									
Existing	n								
New	y								
Bridgeport, CT Average Wind Speeds	M/S	MPH							
March	6.31	14.11							
April	6.17	13.80							
May	5.46	12.21							
June	5.03	11.25							
July	4.78	10.69							
August	4.87	10.89							
September	5.31	11.88							
October	5.51	12.32							
November	5.91	13.22							
December	6	13.42							
Average for Construction Season	5.54	12.38							

Blasting is not anticipated for this project. If blasting were required, it is not known what the extent of blasting might be. Therefore, it is not possible to predict or quantify potential particulate matter emissions due to rock blasting at this time. The EPA provides guidance methods for estimating most types of air pollutant emissions. And EPA does provide a method for estimating blasting emissions for Western surface coal mines. EPA recommends, however, that this method should not be used for estimating emissions from other types of blasting activities due to the dissimilarities of blasting techniques, materials blasted and the size of blasting areas. The EPA has not developed methods for estimating emissions from other rock blasting activities, including pipeline or other construction blasting, due to the lack of available, reliable, and representative test data.

9.2.3.2 Brookfield 2nd Turbo-Compressor

Iroquois has prepared the following tables summarizing estimated potential emissions of construction-related air pollutants:

9.2.3.2-1 Combined Potential Construction Emissions – Brookfield 2nd Turbo-Compressor

9.2.3.2-2 Potential Construction Vehicle Types, Quantities and Operating Periods – Brookfield 2nd Turbo-Compressor

9.2.3.2-3 Potential Construction Vehicle Exhaust Emissions – Brookfield 2nd Turbo-Compressor

9.2.3.2-4 Potential Construction Vehicle Fugitive Dust Emissions – Brookfield 2nd Turbo-Compressor

9.2.3.2-5 Potential Surface Coating Emissions – Brookfield 2nd Turbo-Compressor

9.2.3.2-6 Potential Abrasive Blasting Emissions – Brookfield 2nd Turbo-Compressor

Mitigation and reduction measures for each type and source of potential air pollutant emission are described in a subsequent section.

The tables do not represent continuing annual emissions from operating any permanent facilities. The tabulated air quality impacts represent only potential emissions over the approximately nine-month construction period.

Table 9.2.3.2-1 shows that the combined potential air pollutant emissions over the nine month construction period are very small.

As shown above in Table 9.1.7-5, the existing ambient background concentrations of most of the pollutants listed in Table 9.2.3.2-1 are a minor fraction of the corresponding National Ambient Air Quality Standards (NAAQS). Particulate matter concentrations are the exception. The fine particulate matter (PM2.5) 24-hour and annual background air quality concentrations are about 68 and 95 percent of the NAAQS, respectively. Ambient background concentrations of all of the other pollutants listed in Table 9.2.3.2-1 are less than half of the NAAQS. These are based on monitoring in areas where existing background air quality is expected to be at least as poor as the project area. Since potential construction emissions of PM2.5, and all other pollutants with NAAQS, are substantially less than ten tons each over the limited construction period, all of the selected background concentrations appear to be small enough to allow potential construction impacts without exceeding air quality standards. Potential emissions of this small magnitude, if they were associated with a permanent stationary source rather than temporary mobile construction vehicles and equipment, would still be exempt from State air permitting requirements.

Construction of the second Brookfield turbo-compressor would generate emissions from construction equipment and vehicles as well as worker passenger vehicles. The two tables associated with vehicle and equipment emissions tabulate potential emissions of various air pollutants from anticipated on-road and off-road construction and passenger vehicles.

Construction and passenger vehicle and equipment emissions were estimated by applying emission factors developed using the latest EPA models (i.e. "Mobile6.2" and "Non-Road Version 2005" Models) to represent the construction area during the 2009 construction period, and assuming an average 2007 vehicle model year for the various vehicle types summarized in the attached tables.

The modeled emission factors were then applied to the expected quantities and types of vehicles to be operated for the anticipated hours of operation each day, week and month of construction.

TABLE 9.2.3.2-1: COMBINED POTENTIAL CONSTRUCTION EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR							
	Tons of Potential Air Pollutant Emissions						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs[50]**
Vehicle and Equipment Exhaust	0.002	0.0006	0.0005	0.010	0.010	0.0001	0.0002
Vehicle and Equipment Fugitive Dust	0.0	5.29	0.7290	0.0	0.0	0.0	0.0
Surface Coating	0.004	0.000	0.000	0.0	0.0	0.0	0.142
Surface Preparation Abrasive Blasting	0.0	0.02	0.002	0.0	0.0	0.0	0.0
Project Total	0.006	5.3	0.73	0.010	0.010	0.0001	0.142

[50] There is no National Ambient Air Quality Standard for hazardous air pollutants.

TABLE 9.2.3.2-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – BROOKFIELD 2ND TURBO-COMPRESSOR

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Off-road Vehicles								
Air Compressors	1	2	5	4	3	3	2	320
Backhoes/Tire Hoes	1	3	5	4	3	3	2	480
Bore/Drill Rigs	1	4	4	1	1	0	0	16
Cement & Mortar Mixers	1	4	2	2	2	0	0	32
Compactors	6	4	2	1	1	1	1	24
Concrete/Industrial Saws	1	1	1	1	1	1	0	2
Cranes/Booms	1	6	4	4	3	3	2	768
Crawler Tractor/Dozers								0
Crushing/Proc. Equipment								0
Dozers								0
Dumper/Tender Trucks	2	8	2	4	2	1	1	256
Excavators	1	4	2	4	2	1	1	128
Gas Compressors								0
Generator Sets	1	8	5	4	3	3	2	1,280
Graders	1	8	5	1	1	0	1	80
Hydro Power Units								0
Loaders								0
Off-Highway Tractors								0
Other Construction Equipment								0

TABLE 9.2.3.2-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – BROOKFIELD 2ND TURBO-COMPRESSOR

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Other Off-highway Trucks								0
Pavers	1	8	2	1	0	0	1	16
Paving Equipment	1	8	2	1	0	0	1	16
Pipe Side Booms								0
Pressure Washers	1	2	2	2	1	1	1	24
Pumps	2	8	5	4	1	1	1	480
Rollers	1	8	2	4	1	1	0	128
Rough Terrain Forklifts								0
Rubber Tire Loaders								0
Scrapers	1	8	5	1	1	0	1	80
Signal Boards/Light Plants								0
Skid Steer Loaders								0
Surfacing Equipment								0
Tampers/Rammers								0
Track Hoes								0
Trenchers								0
Welding Rigs	2	8	5	4	1	1	1	480
On-road Vehicles								0
Passenger Cars	15	0.2	5	4	3	3	2	32
Gasoline Pickup and Delivery Trucks	2	1	5	4	3	3	3	180
Float Truck								0

TABLE 9.2.3.2-2: POTENTIAL CONSTRUCTION VEHICLE TYPES, QUANTITIES AND OPERATING PERIODS – BROOKFIELD 2ND TURBO-COMPRESSOR

Vehicle and Equipment Type	Average Quantity Operating per Day	Hours per Day	Days per Week	Weeks In Use per Month	Months Used Apr-Jun	Month s Used Jul-Sep	Months Used Oct-Dec	Sum of Hours
Lowboy Truck	1	1	3	4	3	1	1	60
Winch Truck								0
Diesel Pickup Trucks	3	4	5	4	3	3	2	640
Total of All vehicles	47							5,522
Total of Off-road Vehicles	26							4,610
Total of On-road Vehicles	21							912

TABLE 9.2.3.2-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR							
	Tons						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Off-road Equipment Type							
Air Compressors	2.39E-05	1.96E-05	1.90E-05	1.11E-04	2.47E-04	2.53E-07	2.85E-06
Backhoes/Tire Hoes	2.12E-04	1.49E-04	1.45E-04	9.55E-04	1.00E-03	9.36E-07	2.53E-05
Bore/Drill Rigs	5.18E-07	3.81E-07	3.70E-07	2.16E-06	6.15E-06	4.77E-09	6.17E-08
Cement & Mortar Mixers	5.36E-08	3.79E-08	3.67E-08	2.20E-07	4.75E-07	3.72E-10	6.39E-09
Compactors	3.43E-07	3.55E-07	3.45E-07	2.29E-06	3.20E-06	3.52E-09	4.08E-08
Concrete/Industrial Saws	9.07E-08	6.26E-08	6.07E-08	3.41E-07	1.33E-06	1.35E-09	1.08E-08
Cranes/Booms	1.39E-04	1.26E-04	1.22E-04	8.47E-04	2.02E-03	2.26E-06	1.65E-05
Crawler Tractor/Dozers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Crushing/Proc. Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dozers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dumper/Tender Trucks	9.06E-05	8.38E-05	8.13E-05	4.87E-04	1.20E-03	1.52E-06	1.08E-05
Excavators	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Gas Compressors	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Generator Sets	5.70E-05	4.99E-05	4.84E-05	2.70E-04	7.55E-04	9.42E-07	6.79E-06
Graders	2.65E-07	2.16E-07	2.10E-07	1.21E-06	2.67E-06	2.74E-09	3.16E-08
Hydro Power Units	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Off-Highway Tractors	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Construction Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Off-highway Trucks	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pavers	5.95E-08	5.55E-08	5.38E-08	3.39E-07	6.45E-07	6.98E-10	7.09E-09

TABLE 9.2.3.2-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR

	Tons						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Paving Equipment	2.89E-06	2.62E-06	2.54E-06	1.76E-05	4.21E-05	4.72E-08	3.44E-07
Pipe Side Booms	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pressure Washers	1.36E-07	7.91E-08	7.67E-08	4.81E-07	1.10E-06	9.27E-10	1.62E-08
Pumps	3.73E-05	2.81E-05	2.73E-05	1.53E-04	3.13E-04	2.74E-07	4.45E-06
Rollers	7.14E-06	7.01E-06	6.80E-06	4.35E-05	8.23E-05	9.34E-08	8.51E-07
Rough Terrain Forklifts	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rubber Tire Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Scrapers	3.25E-06	3.18E-06	3.08E-06	2.47E-05	5.62E-05	6.35E-08	3.88E-07
Signal Boards/Light Plants	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Skid Steer Loaders	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Surfacing Equipment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Tampers/Rammers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Track Hoes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trenchers	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Welding Rigs	1.22E-04	7.39E-05	7.17E-05	5.01E-04	3.94E-04	3.85E-07	1.45E-05
Subtotal Off-road Equipment	6.96E-04	5.44E-04	5.28E-04	3.42E-03	6.13E-03	6.79E-06	8.30E-05
On-road Vehicle Types							
Passenger Cars	2.34E-05	4.85E-06	4.70E-06	9.76E-04	1.29E-04	2.08E-06	2.72E-06
Gasoline Pickup and Delivery Trucks	2.80E-05	4.63E-06	4.49E-06	1.16E-03	1.32E-04	2.63E-06	3.24E-06
Float Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Lowboy Truck	1.23E-04	0.00E+00	0.00E+00	8.93E-04	1.24E-03	2.98E-06	1.64E-05

TABLE 9.2.3.2-3: POTENTIAL CONSTRUCTION VEHICLE EXHAUST EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR

	Tons						
	VOC	**PM10**	**PM2.5**	**CO**	**NOx**	**SO2**	**HAPs**
Winch Truck	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel Pickup Trucks	1.54E-03	0.00E+00	0.00E+00	3.42E-03	2.34E-03	4.54E-05	1.29E-04
Subtotal On-road Vehicles	1.72E-03	9.48E-06	9.19E-06	6.45E-03	3.84E-03	5.31E-05	1.51E-04
Combined Total	**0.002**	**0.0006**	**0.0005**	**0.010**	**0.010**	**0.0001**	**0.0002**

Fugitive dust emissions may be generated from excavation and vehicle traffic on unpaved or disturbed access and construction land surfaces. Potential fugitive dust emissions documented in Table 9.2.3.2-4 were estimated using guidance from EPA's "AP-42", 5th Edition, Volume 1, Chapter 13, Section 13.2.3, recommended emission factors for construction operations, and AP-42 Table 13.2-1. The assumptions underlying the calculations are shown. It is significant to note that the EPA method for estimating fugitive emissions in Table 9.2.3.2-4 does not consider the mitigating effects of dust monitoring and control planned by Iroquois during construction of the second Brookfield turbo-compressor. Actual dust emissions are expected to be significantly less than the potential emissions represented in the table.

Potential surface coating emissions documented in Table 9.2.3.2-5 were developed conservatively by assuming that 100 percent of all volatile and hazardous air pollutants would be emitted to the atmosphere.

Potential abrasive blasting emissions documented in Table 9.2.3.2-6 were estimated using guidance from the EPA's AP-42, 5th Edition, Volume 1, Chapter 13, Section 13.2.6, recommended emission factors for abrasive blasting, and AP-42 Table 13.2-1.

TABLE 9.2.3.2-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – BROOKFIELD 2ND TURBO-COMPRESSOR

Assumptions				Range			
	Soil Moisture	7.90%		2.2-16.8			
	Soil Silt	8.50%		3.8-15.1			
	Average Heavy Construction Vehicle Miles per Hour	5					
	Average Other Vehicle Miles per Hour on site	20					
	Hours per Day	8					
	Average Heavy Construction Vehicle Weight (tons)	150		2-290			
	Tons of Soil per Scraper Load	50					
	Tons of Soil per Dump Truck Load	100					
				Fugitive Dust Pounds per Hour			
Site Preparation				**TSP 30**	**TSP 15**	**PM10**	**PM2.5**
	Dozers			8.02E+00	8.66E-01	6.49E-01	8.42E-01
	Graders			4.21E-04	1.84E-03	1.11E-03	1.31E-05
	Scrapers	Removing Topsoil		1.01E+02	1.01E+02	6.06E+01	3.13E+00
	Scrapers	In Travel		4.46E+00	NA	5.07E-01	7.77E-02
	Scrapers	Unloading Topsoil		2.00E+00	2.16E-01	1.30E-01	6.20E-02
	Dumper/Tender Trucks			4.46E+00	NA	5.07E-01	7.77E-02
	Compactors			4.21E-04	1.84E-03	1.11E-03	1.31E-05
	General Construction						

TABLE 9.2.3.2-4: POTENTIAL CONSTRUCTION VEHICLE FUGITIVE DUST EMISSIONS (UNCONTROLLED) – BROOKFIELD 2ND TURBO-COMPRESSOR

	Total non-Site Prep Vehicles (Other Vehicles)			17.8	NA	2.0	0.3
				Fugitive Dust Tons			
Site Preparation			**Hours/Year**	**TSP 30**	**TSP 15**	**PM10**	**PM2.5**
	Dozers		0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Graders		80	1.69E-05	7.37E-05	4.42E-05	5.22E-07
	Scrapers	Removing Topsoil 1/3 of Hours	26.7	1.35E+00	1.35E+00	8.08E-01	4.17E-02
	Scrapers	In Travel 1/3 of Hours	26.7	5.94E-02	0.00E+00	6.76E-03	1.04E-03
	Scrapers	Unloading Topsoil 1/3 of Hours	26.7	2.67E-02	2.88E-03	1.73E-03	8.27E-04
	Dumper/Tender Trucks		256	5.70E-01	0.00E+00	6.49E-02	9.95E-03
	Compactors		24	5.06E-06	2.21E-05	1.33E-05	1.57E-07
General Construction							
	Total non-Site Prep Vehicles (Other Vehicles)		4,346	3.87E+01	0.00E+00	4.40E+00	6.75E-01
Total Fugitive Dust Tons				**40.73**	**1.35**	**5.286**	**0.7290**

TABLE 9.2.3.2-5: POTENTIAL SURFACE COATING EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR

Coating Product	Denso Protal 7125	
# Welds	100	
Cans per Weld	1	
Liters per Can	2	
Pounds per Can	4	
Total Pounds of Product	400	
	Pounds	Tons
Combined Potential Emissions	291	0.15
HAPs	284	0.14
VOCs	7	0.004
HAP Breakdown		
Styrene	120	
n,n diethylaniline	4	
dibutylphthalate	160	

TABLE 9.2.3.2-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR

		Abrasive Blasting Emissions					
		Emission Factors #/1000 # abrasive					
		TSP	PM10	PM2.5	HAPs		TSP #/1000#
Blasting Media (Y/N)						Wind Speed	
Sand?	n	NA	NA	NA		5	27
Metallic Shot?	n	NA	NA	NA		10	55
Metallic Grit?	y	6.48	3.12	0.31		8.40	43.51
Other?	n					15	91
Wind Speed (5, 10, 15 MPH)	8.40						
Amount of blasting media (pounds)	10,000						
Tons of PM Emissions		**0.03**	**0.02**	**0.002**	**0.00**		
Blasting Methods (Y/N)							
Air pressure ?	y						
Centrifugal wheel?	n						
Water pressure?	n						
Control Methods (Y/N)			Target Surface				
Enclosures?	n		Existing	n			
Vacuum blaster?	n		New	y			
Drapes?	n						

TABLE 9.2.3.2-6: POTENTIAL ABRASIVE BLASTING EMISSIONS – BROOKFIELD 2ND TURBO-COMPRESSOR

Wet Blasting?	n						
Reclaim system?	n						
Hartford, CT Average Wind Speeds	M/S	MPH					
April	4.52	10.11					
May	4	8.95					
June	3.7	8.27					
July	3.45	7.72					
August	3.29	7.36					
September	3.37	7.54					
October	3.58	8.01					
November	3.94	8.81					
December	3.97	8.88					
Average for Construction Season	3.76	8.40					

Blasting is not anticipated for this project. If blasting were required, it is not known what the extent of blasting might be. Therefore, it is not possible to predict or quantify potential particulate matter emissions due to rock blasting at this time. The EPA provides guidance methods for estimating most types of air pollutant emissions. And EPA does provide a method for estimating blasting emissions for Western surface coal mines. EPA recommends, however, that this method should not be used for estimating emissions from other types of blasting activities due to the dissimilarities of blasting techniques, materials blasted and the size of blasting areas. The EPA has not developed methods for estimating emissions from other rock blasting activities, including pipeline or other construction blasting, due to the lack of available, reliable, and representative test data.

9.2.4 Compressor Stations Operation

9.2.4.1 General

Operation of the proposed Milford compressor station and the Brookfield second turbo-compressor would result in emission to the atmosphere of nitrogen oxides, carbon monoxide, particulate matter and small amounts of sulfur dioxide and/or hydrocarbons. One of the three most significant air pollutants is nitrogen oxides (NOx), which are formed in the high-temperature, high-pressure, and excess air environment found in natural gas-fired turbines. The term "nitrogen oxides" is used to represent the composite atmospheric concentration of the numerous forms of nitrogen oxides. Of those forms, nitric oxide (NO) and nitrogen dioxide (NO_2) are the most significant air contaminants. NO is the primary form produced by combustion. Under normal operating conditions, the presence of NO_2 is minimal in the flue gases. However, after NO is exhausted to the atmosphere, it is oxidized to NO_2 as it disperses downwind of the stack in the presence of lower temperatures and an abundance of oxygen.

A significant amount of carbon monoxide (CO) and particulate matter (PM) also would be emitted potentially from the proposed turbines. Gas turbine CO and PM emissions are usually a result of incomplete combustion when there is insufficient residence time at high temperature to complete hydrocarbon oxidation.

Much smaller amounts of hydrocarbons (HC) or volatile organic compounds (VOC) would be emitted. HC and VOC emissions also are the result of incomplete combustion. Sulfur dioxide (SO_2) emissions are proportional to the sulfur content of the natural gas fuel, and are consequently quite small.

9.2.4.2 Milford Station

The existing annual average NO_2 concentration representative of the vicinity of the Milford Compressor Station is approximately 0.022 parts per million (PPM), or about 43 percent of the NAAQS. This is based on monitoring in an area where air quality is expected to be at least as poor as the project area. There are no active ambient air monitors for NO_2 in the City of Milford. Even the selected conservative background concentration is small enough to allow growth without exceeding air quality standards. Impacts from the proposed station have been documented in the referenced “Air Quality Dispersion Modeling Analysis” to be sufficiently small to demonstrate compliance with all NAAQS and PSD increments. Those ambient air quality impact estimates have been submitted to, and must be reviewed and approved by, the Connecticut DEP prior to their issuance of the required air permits.

Performance and emissions data representative of the proposed turbines indicate that the 10,310 horsepower (nominal) units would have the key parameters summarized in Table 9.2.4.2-1. Table 9.2.4.2-2 tabulates potential emissions of the turbines in combination with emissions from auxiliary fuel-burning equipment. Combined station potential emissions are compared with major source thresholds for each pollutant. In no event would potential emissions exceed major source thresholds. Potential emissions of the proposed natural gas turbines are based on incorporating "dry low NO_X" (or lean pre-mix) combustors with continuous service at maximum load conditions, and at the annual lower boundary ambient temperature of zero degrees Fahrenheit. Similarly, all other fuel-burning equipment, except for the auxiliary power unit, is assumed to operate at full load 24 hours per day 365 days per year. The auxiliary power unit would be restricted to operating only during periodic testing, maintenance, or when purchased electrical power is interrupted. Potential auxiliary power unit emissions represent operations at full load no more than 300 hours per year.

TABLE 9.2.4.2-1: PROPOSED MILFORD TURBINES – SUMMARY OF KEY PARAMETERS

Turbine Make and Model	Horsepower (ISO/Station)	NOx Emissions (Grams/HP-HR)	CO Emissions (Grams/HP-HR)	NOx Tons per Year	CO Tons per Year	Annual Hours of Operation
Proposed Turbines[51] To Be Determined	10,310 Nominal	0.20	0.20	19.5	19.8	8,760

TABLE 9.2.4.2-2: COMBINED MILFORD STATION POTENTIAL AIR POLLUTANT EMISSIONS

	Tons per Year				
Pollutant	**NOx**	**CO**	**VOC**	**PM**	**SO2**
Proposed Turbines (2)	46.7	47.4	2.8	32.6	0.6
Auxiliary Power Unit	0.32	0.32	0.1	0.04	0.001
Control Building Heat	0.11	0.05	0.007	0.01	0.001
Seal Gas Leakage	NA	NA	11.3	NA	NA
Domestic Water Heater	0.03	0.014	0.002	0.003	0.0002
Total	**47.2**	**47.8**	**14.1**	**32.7**	**0.6**
Major Source Thresholds	**50**	**100**	**50**	**100**	**100**
Percentages of Thresholds	**94**	**48**	**28**	**33**	**1**

The proposed turbine exhaust stacks and gases would have the following preliminary annual average design characteristics:

Stack height = 50 ft (15.2 m)

Stack area = 28.3 ft^2 (2.63 m^2)

Exit velocity = 74.1 ft/sec (22.6 m/sec)

[51] These values are for each turbine; not combined for both turbines. The manufacturer, model number, ISO and station horsepower of the proposed turbines are to be determined through a competitive procurement process. The proposed turbines may be manufactured by Solar Turbines, Inc. or equivalent.

Exit temperature = 920°F (766 °K)

Iroquois has applied to the CT DEP to for a Permit to Construct and a Permit to Operate the proposed turbines at the Milford Compressor Station. In preparation for submitting the air permit application, Iroquois performed air emissions dispersion modeling analyses of the proposed turbines' potential impacts on air quality.

An ambient air quality impact analysis was performed in accordance with CTDEP guidance provided in US EPA's "Guideline on Air Quality Models" (US EPA, 2005a) and "Ambient Impact Analysis Guideline (CTDEP, January 1989)". The ambient air quality impact analysis was performed using air pollutant dispersion models approved by the EPA and CT DEP, which are appropriate to the proposed installation and surrounding terrain. The analyses represent flue gas characteristics of the proposed turbines over a comprehensive and conservative range of possible ambient temperatures (i.e.: zero°, 52°, and 100° Fahrenheit), and turbine load conditions (i.e.: 50%, 75%, and 100% of the maximum power rating). Building and station design parameters were modeled to support the State air permit application. Modeling was based on a "worst case" involving conservative assumptions. As more detailed project design evolves, station parameters should be no worse, from an air permitting perspective, than the modeled worst case. The purpose of the analysis was to evaluate the proposal by estimating the maximum ambient air concentrations of nitrogen dioxide (NO_2), particulate matter (PM_{10}), sulfur dioxide (SO_2), and carbon monoxide (CO) and hazardous air pollutants (HAPs). Maximum ambient air quality impacts were compared with EPA Significant Impact Levels (SILs). Potential HAP emissions were compared with the DEP's "maximum allowable stack concentrations" to demonstrate compliance.

For each potential air pollutant whose modeled impacts are greater than SILs, the combined concentrations of the modeled facility impacts plus background concentrations and possible contributions from off-site major sources within the significant impact area were evaluated. This is referred to as "cumulative impact analysis", and it is discussed in greater detail in the referenced air quality dispersion modeling analysis submitted to the DEP in support of Iroquois' air permit application. Only short-term PM_{10} (24-hour) impacts exceed SILs, although they are well below ambient air quality standards. Therefore, as required, Iroquois requested offsite major source PM_{10} data from the Connecticut DEP. The DEP responded that there were no major PM_{10} sources within the significant impact area of the proposed Milford Station. Therefore, Iroquois' short-term PM_{10} cumulative impact analysis documented compliance with all air quality standards based on the cumulative impacts of the proposed Milford Station and minor sources within the project area. Minor source impacts are represented by ambient background concentrations measured and reported by the State. Iroquois has documented that the proposed Milford Compressor Station would satisfy air quality requirements and the State Implementation Plan. Eventual approval of Iroquois' air permit application must be based on review and approval of Iroquois' air quality analysis, which represents the station design at the time of submitting Iroquois' permit application. Any subsequent significant station design or equipment changes could require a revised or supplemental analysis to be submitted for CT DEP review and approval.

9.2.4.3 Brookfield 2nd Turbo-Compressor

The existing annual average NO_2 concentration representative of the vicinity of the Brookfield Compressor Station is approximately 0.022 parts per million (PPM), or about 44 percent of the NAAQS. This is based on monitoring in an area where air quality is expected to be at least as poor as the project area. There are no active ambient air monitors for NO_2 in the Town of Brookfield. Even the selected conservative background concentration is small enough to allow growth without exceeding air quality standards. Impacts from the proposed source are expected to be sufficiently small to demonstrate compliance with all NAAQS and PSD increments. Ambient impact estimates will be reviewed and approved by the Connecticut DEP prior to their approval of the required air permit.

Performance and emissions data representative of the proposed turbine indicate that the proposed 10,310 horsepower (nominal) unit would have the key parameters summarized in Table 9.2.4.3-1. Table 9.2.4.3-2 tabulates potential emissions of the proposed turbine compared with major source thresholds for each pollutant. In no event would potential emissions exceed major source or major modification thresholds. Potential emissions of the proposed natural gas turbine are based on incorporating "dry low NO_X" (or lean pre-mix) combustion with continuous service at maximum load conditions, and at the annual lower boundary ambient temperature of zero degrees Fahrenheit.

TABLE 9.2.4.3-1: PROPOSED BROOKFIELD 2ND TURBINE – SUMMARY OF KEY PARAMETERS[52]

Turbine Make and Model	Horsepower (ISO/Station)	NOx Emissions (Grams/HP-HR)	CO Emissions (Grams/HP-HR)	NOx Tons per Year	CO Tons per Year	Annual Hours of Operation
Proposed Turbine[53] To Be Determined	10,310 Nominal	0.20	0.20	19.75	20.06	8,760

TABLE 9.2.4.3-2: PROPOSED BROOKFIELD 2ND TURBINE POTENTIAL AIR POLLUTANT EMISSIONS[54]

	Tons per Year				
Pollutant	**NOx**	**CO**	**VOC**	**PM**	**SO2**
Proposed Turbine	23.0	23.4	1.3	16.1	0.3
Major Source and Major Modification Thresholds	25	100	25	100	100
Percentages of Thresholds	92	23	5	16	< 1

The proposed turbine exhaust stack and gases would have the following preliminary annual average design characteristics:

Stack height	=	50 ft (15.2 m)
Stack area	=	28.27 ft^2 (2.63 m^2)
Exit velocity	=	74 ft/sec (23 m/sec)
Exit temperature	=	918°F (765 °K)

[52] This table represents ISO standard operating conditions.
[53] The manufacturer, model number, ISO and station horsepower of the proposed turbine are to be determined through a competitive procurement process. The proposed turbine may be manufactured by Solar Turbines, Inc. or equivalent. Actual turbine exhaust stack design characteristics may differ based on completion of required air quality impact modeling.
[54] This table represents operating at full load at site conditions and zero degrees Fahrenheith ambient temperature.

Iroquois has applied to the CT DEP for a Permit to Construct and a Permit to Operate the proposed second turbine at the Brookfield Compressor Station. In preparation for submitting the air permit application, Iroquois performed air emissions dispersion modeling analyses of the proposed turbine's potential impacts on air quality.

An ambient air quality impact analysis was performed in accordance with CT DEP guidance provided in its "Ambient Impact Analysis Guideline" (DEP, January 1989) and US EPA's "Guideline on Air Quality Models" (US EPA, 2005a). The ambient air quality impact analysis was performed using air pollutant dispersion models approved by the EPA and CT DEP, which are appropriate to the proposed installation and surrounding terrain. The analysis represents flue gas characteristics of the proposed turbine over a comprehensive and conservative range of possible ambient temperatures (i.e.: zero^{o}, 52^{o}, and 100^{o} Fahrenheit), and turbine load conditions (i.e.: 50%, 75%, and 100% of the maximum power rating). Building and station design parameters were modeled to support the State air permit application. To this end, modeling was based on a "worst case" involving conservative assumptions. As more detailed project design evolves, station parameters should be no worse, from an air permitting perspective, than the modeled worst case. The purpose of the analysis was to evaluate the proposal by estimating the maximum ambient air concentrations of nitrogen dioxide (NO_2), particulate matter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO) and hazardous air pollutants (HAPs). Maximum criteria pollutant ambient air quality impacts were compared with EPA Significant Impact Levels (SILs). Potential hazardous air pollutant emissions were compared with the DEP's "maximum allowable stack concentrations" to demonstrate compliance. For each potential criteria air pollutant whose modeled impacts are greater than SILs, the combined concentrations of the modeled facility impacts plus background concentrations and possible contributions from major off-site sources within the significant impact area are evaluated.

The overall maximum annual NO_2 and the 24-hour and annual PM_{10} concentrations are above their respective SILs. Therefore, a cumulative modeling analysis was required to demonstrate compliance with the NAAQS and PSD increment for these pollutants and averaging periods.

Modeled impacts for CO and SO_2 emissions were below their respective SILs. Therefore, no further analysis was required for CO and SO_2 and compliance with the NAAQS and PSD increments is demonstrated for these pollutants.

Iroquois requested and obtained major NO_2 source data from the CT DEP. There were no major PM sources within the Brookfield Station significant impact area. Modeled NO_2 impacts due to emissions from the proposed combustion turbine and the major NO_2 source provided by CT DEP were combined. Because there are no major PM_{10} background emission sources within 50 km of the Brookfield compressor station, cumulative modeling was not required for PM_{10}.

As shown in the referenced air quality impact analysis, the maximum concentrations are less than their respective PSD increments, thus demonstrating compliance. Compliance with the NAAQS requires that an ambient background component be summed with the modeled concentration. Based on the modeling results reported in Iroquois' air quality impact analysis, Iroquois has demonstrated that potential air pollutant emissions from the proposed combustion turbine will not cause, nor contribute to a violation of the NAAQS or PSD increments.

Eventual approval of Iroquois' air permit application requires review and approval of its air quality impact analysis representing the station design at the time of submitting the application. Any subsequent significant station design or equipment changes could require a revised or supplemental analysis to be submitted for CT DEP review and approval.

9.3 MEASURES TO MITIGATE POTENTIAL AIR QUALITY IMPACTS

9.3.1 Construction

As described above, construction would generate potential air pollutant emissions of particulate matter, nitrogen oxides, carbon monoxide, volatile organic compounds, sulfur dioxide and hazardous air pollutants. These impacts 1) would be temporary and of limited duration, 2) would occur only as a result of construction activities, and 3) would not significantly increase ambient air pollutant concentrations. Potential impacts would be mitigated and minimized as described below.

Exhaust emissions from diesel- and gasoline-fueled construction equipment and vehicle engines would be minimized by federal design standards imposed at the time of manufacture of the vehicles and would comply with EPA mobile emission regulations (40 CFR Part 85). Emissions also would be controlled by purchasing commercial gasoline and diesel fuel products whose specifications are controlled by State and federal air pollution control regulations applicable to fuel suppliers and distributors.

Fugitive dust emissions may be generated from excavation and vehicle traffic on unpaved or disturbed access and construction land surfaces. Iroquois' inspectors are instructed to monitor and determine when dust suppression techniques may be required, and would direct the construction contractor to implement mitigating controls when necessary. These typically would involve the application of water and/or lime in accordance with applicable regulations, and with consideration of any affected wetlands or water bodies.

Potential surface coating and abrasive blasting emissions would be minimized by purchasing and installing most piping and structural components that have been prepared and coated in shops prior to shipment to the construction site. Onsite surface preparation and coating activities generally would be limited to surfaces where pre-coated components are joined together. Surface coating products in Connecticut would comply with the Connecticut DEP's regulations for the "Control of Organic Compound Emissions" (Regulations of Connecticut State Agencies Section 22a-174-20). Surface coating products in New York state would comply with the DEC's regulations for the Prevention and Control of Air Contamination and Air Pollution, Part 205, "Architectural and Industrial Maintenance Coatings". These regulations limit the amount of volatile and hazardous constituents in surface coating products.

Coal slag or metal grit surface preparation blasting media would be used to reduce particulate matter emissions substantially as compared with potential emissions using typical sand blasting media.

Any substantial rock encountered during trenching activities would be removed using one of several techniques, possibly including rock blasting. If used, blasting charges would be kept to the minimum required to break up the rock. Mats made of heavy steel mesh or other materials would be effective in minimizing scattering of rock and particulate matter and would be used as necessary.

Contractors and employees would be encouraged to minimize vehicle and equipment idling time to the extent practical during construction activities.

9.3.2 Operation

9.3.3 Pipeline Loops Operation

Iroquois' written natural gas venting procedures require steps to be taken to minimize the amount and duration of potential VOC emissions to the atmosphere. The amount of venting emissions would be proportional to several factors including the gas pressure during venting and the diameter and length of pipe segment or equipment being vented. Iroquois would attempt to minimize the amount of pipe to be vented and purged by isolating affected segments from the rest of the pipeline system to the extent that it may be feasible and/or by reducing the pipeline pressure prior to venting.

9.3.4 Compressor Stations Operation

The proposed turbine emissions control technology involves dry low NOx (lean pre-mixed or "SoLoNOx") combustion. Since the proposed minor source turbines potentially are expected to emit more than fifteen tons per year (TPY) of individual regulated air pollutants (i.e.: NOx, CO and PM), Connecticut air pollution control regulations require Best Available Control Technology (BACT) for these pollutants.

Iroquois prepared BACT determinations to support its Brookfield and Milford air permit applications to the Connecticut DEP. Based on those determinations, Iroquois is proposing dry low NOx control technology, which, at 15 PPM NOx, 25 PPM CO and approximately 41 PPM PM, would be as stringent as any pertinent and applicable BACT precedents nationwide. With the proposed low NOx turbine combustors, BACT is achieved with normal engine maintenance and operation according to the manufacturer's recommendations while consuming only pipeline quality natural gas fuel. Iroquois' BACT determinations considered all pertinent BACT precedents from at least the previous five years as listed in the EPA's BACT Clearinghouse.

In addition to emitting NOx, CO and PM at concentrations no greater than BACT, Iroquois' analyses of potential impacts to ambient air quality are based on meteorological data, protocols, and models which have the approval of the CTDEP. The results of the air quality analyses document that the proposed projects would neither cause nor contribute to violations of air quality standards, nor consume more than the emissions increments allowed for new or modified sources.

Turbine performance testing following initial start-up and at least biennially, according to federal turbine standards, would provide further monitoring that permit emission limits are satisfied, and that modeling parameters represent the actual installations and operations.

9.4 NOISE QUALITY

9.4.1 Pipeline Facilities: Pipeline Looping Construction Noise

The 08/09 Expansion Project will include three gas pipeline looping projects near the Brookfield, Wright and Boonville compressor stations:

- Boonville Pipeline Looping Construction Noise – 5.6 miles near Boonville compressor station (Drawings P-100-1-D-50-038A, -039A, -040A, -041A, and -042A)

- Wright Pipeline Looping Construction Noise – 0.81 miles of pipeline near Wright compressor station (Drawings P-100-1-D-50-069A and -070A)

- Newtown Pipeline Looping Construction Noise – 1.6 miles of pipeline near Brookfield compressor station (Drawings P-100-1-D-50-131A, -132A and -133A)

The pipeline "looping" construction will require construction equipment to install pipeline infrastructure below ground by removing and replacing earthen materials as well as removing and replacing small sections of roadways. The type of construction equipment expected to be used for this project is similar to that used for typical highway construction and is expected to result in noise similar to that produced by typical highway construction projects. Due to this similarity, the evaluation of the expected construction noise associated with the 08/09 Expansion pipeline looping projects was based upon the Federal Highway Administration's (FHWA) Roadway Construction Noise Model ("RCNM").

9.4.1.1 Existing Noise Quality

Portions of the pipeline looping projects include construction work near residential dwellings in the vicinity of the compressor stations. Lewis S. Goodfriend and Associates ("LSG&A") has visited Iroquois' Boonville, Wright and Brookfield compressor station sites over the past two years to perform noise monitoring on the sites and in the nearby communities for reasons relating to other Iroquois projects. These noise surveys involved 24-hour sound level monitoring along the perimeters of the sites and short duration sound pressure level measurements at various locations in the surrounding communities. All measurement equipment is categorized at Type 1 per ANSI standards and is factory calibrated annually and field verified. The details regarding the measurement equipment, procedures, locations and results have been provided in previous reports submitted to the FERC. This section includes several tables summarizing the measurement locations and A-weighted Leq sound level results from the most recent noise surveys near the Boonville, Wright and Brookfield compressor station sites. Specifically, Tables 9.4.1.1-1 and 9.4.1.1-2 summarize the measured sound levels at and near the Boonville and Wright compressor stations in May 2006 and November 2006, respectively. Section 9.4.3.1 and Table 9.4.3.1-1 include a summary and discussion of the measurement locations and measurement results from the February 2006 noise survey near the proposed Brookfield compressor station representing the Newtown pipeline loop project area.

TABLE 9.4.1.1-1: MEASURED HOURLY AND 15 MINUTE A-WEIGHTED DAYTIME & NIGHTTIME LEQ AND LDN SOUND LEVELS (DB RE: 20 PA) AND THE NEAREST NSAS TO THE BOONVILLE COMPRESSOR STATION, 24-25 MAY, 2006

Measurement Location	**Nearest NSA Location and Description**	**Daytime Leq Sound Level, dB(A)**	**Nighttime Leq Sound Level, dB(A)**	**Measured or Estimated L_{dn}, dB(A)**
1A, North of Station	1 House on Route 12, North of Oneida County Line	43-50	44-52	55
2A, Southwest of Station	2 House on IGTS Right-of-Way	41-49	39-50	51
3A Southeast of Station	3 House on Route 12, Directly Southeast of the IGTS Station	47-53	46-54	57
4A, Across Street from 42 East Road	4 House at 42 East Road, West of IGTS Station	52	35	51-55*
5A 3179 East Road	5 House at 3179 East Road	42	39	-
6A 7105 Kerwin Road	6 House at 7105 Kerwin Road	47	36	-
7A Near Residence at 3480 Devoe Road	7 House at 3480 Devoe Road, Adjacent to Mill Creek	47	45	-

* Based upon data from 24 hour measurement location 2A
- No 24 measurement made at or near this location

Field notes taken during the measurements near the Boonville compressor station in May 2006 indicate that various noise sources contributed to the measured sound pressure levels at different locations. At all locations, the noise produced by occasional aircraft and vehicle traffic noise from Route 12 could be heard. The influence of these transportation related noise sources on the measured sound pressure levels was less during the nighttime hours and at locations further from roadways. Measured sound levels at Locations 1A, 2A, and 3A were influenced by the audible noise from the turbine/compressor building. In addition, the noise from a dog barking and running water were clearly audible at locations 2A and 7A, respectively. Data logs acquired after the measurement period indicate that the turbine and gas compressor were operating at no less than 99% capacity during the measurement period.

TABLE 9.4.1.1-2: MEASURED HOURLY AND 10 MINUTE A-WEIGHTED DAYTIME & NIGHTTIME LEQ AND LDN SOUND LEVELS (DB RE: 20 PA) AND THE NEAREST NSAS TO THE WRIGHT COMPRESSOR STATION, 6-7 NOVEMBER, 2006

Measurement Location Used as Basis for Sound Levels	Nearest NSA Location or Property Line Description	Daytime L_{eq} Sound Level, dB(A)	Nighttime L_{eq} Sound Level, dB(A)	Measured or Estimated L_{dn}, dB(A)
1A, North of Station	1 North Property Line	41 - 48	41 - 47	50
2A, East of Station	2 East Property Line	36 – 37+	36 – 38+	43+
3A, West of Station	3 West Property Line	52*-63	61-63	68
4A, Driveway of 355 Westfall Road	4 House at 355 Westfall Rd. Northwest of Station	40	40	^
5A, Across the Street from 249 Westfall Road	5 House at 249 Westfall Road, Northeast of Station	39	33	^
6A, Driveway of 262 Kump Road	6 House at 262 Kump Rd, South of Station	40	32	^

+ Data includes 15 dB(A) reduction for difference between measurement location & property line
* Low value due to reduced pressure in Tennessee Gas pipeline
^ Not able to accurately estimate L_{dn} with short duration measurement data

Field notes recorded during the acoustical measurements near the Wright compressor station indicate that the noise sources contributing to measured nighttime sound levels at all community locations included infrequent vehicular traffic on surrounding roadways, occasional aircraft, distant train horns, and trickling water. Noise sources during the daytime measurements also included birds and occasional dog barks. Measured sound levels at Locations 1A, 2A and 3A were influenced by the noise from the turbine/compressor buildings as well as the Tennessee Gas Pipeline equipment. Specifically, the sound level data measured at Location 3A, is dominated by the noise from the Tennessee Gas Pipeline equipment and does not accurately reflect the noise produced by the Iroquois compressor station. The sound level data measured towards the east of the turbine buildings was dominated by the turbine/compressor and gas cooler noise as the location is only 90 feet from the compressor building.

Section 9.4.3.1 includes a summary of the measurement locations and measurement results from the February 2006 noise survey near the proposed Brookfield compressor station.

9.4.1.2 Construction Noise Evaluation

The types of construction equipment expected to be used for this project are similar to those used for typical highway construction. Due to this similarity, the evaluation of the expected construction noise associated with the 08/09 Expansion Project pipeline looping projects was based upon the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM). This computer modeling software includes a standard list of construction noise sources and their maximum measured or specified A-weighted sound levels at a distance of 50 feet. Each noise source in the data base also includes an "acoustical use factor" which represents the percentage of time that the equipment will operate at the maximum sound level.

LSG&A used the RCNM noise source database with the typical construction equipment "spread", including equipment types and length of time in use, provided by Iroquois in order to customize the noise source inputs into the RCNM. Table 9.4.1.2-1 below summarizes the construction equipment description and specifications included in the RCNM.

TABLE 9.4.1.2-1: : MAXIMUM SOUND LEVELS (L_{MAX}) OF THE 08/09 NEWTOWN LOOPING CONSTRUCTION VEHICLES INCLUDED IN THE RCNM MODEL

Vehicle Type or Construction Noise Source	Quantity In Operation per Day	Acoustical Use Factor (%)	Specification Lmax at 50 ft, dB(A)	Actual Measured Lmax at 50 ft, dB(A)
Bore/Drill Rigs	2	25	85	84
Air Compressor	1	20	80	78
Cranes/Booms	1	8	85	81
Pipe Side Booms	4	8	85	81
Dumper/Tender Trucks	1	20	84	76
Excavators	1	24	85	81
Backhoe/Tire Hoes	1	24	80	78
Off-Highway Tractors	1	8	84	n/a
Cement & Mortar Mixers	1	12	85	79
Compactor	1	4	80	83
Crawler Tractor/Dozer	1	24	85	82
Dozers	3	24	85	82
Track Hoes	7	24	85	82
Generator Sets	1	25	82	81
Pumps	3	25	77	81
Welding Rigs	6	20	73	74
Gasoline Pickup and Delivery Truck	10	6	55	75
Lowboy Truck	1	8	55	75
Winch Truck	1	8	55	75
Diesel Pickup Truck	8	8	55	75
Rubber Tire Loader	1	12	85	82
Signal Boards/Light Plants	4	-	-	-

The maximum sound levels (L_{max}) data shown in the table is based upon information provided in the RCNM which was most similar to the equipment or vehicle type included in the Iroquois construction "spread". The data shown in Table 9.4.1.2-1 was used as the input data in the RCNM and when differences between the specification L_{max} sound level and actual measured L_{max} occurred, the higher of the two was used in the model.

The construction operations for the 08/09 Expansion Project Newtown pipeline looping project will occur 6 days per week for as much as 10 hours per day, generally during the daytime hours between 7:00 AM and 5:00 PM. Due to a limitation in the number of noise sources able to be included in the RCNM, multiple identical vehicles were combined into a single noise source with a commensurate increase in the L_{max} sound level it produces. The acoustical use factor was also modified to include the expected percentage of time during a day that a particular piece of equipment would be operated and the use factor in the RCNM database. Using the data in Table 9.4.1.2-1, the RCNM model computes the hourly L_{eq} sound level at specific distances, resulting from the given construction spread. Since the construction operations will be limited to daytime hours, the construction will not influence the nighttime hourly L_{eq}

sound levels. Due to the length of the pipeline looping extents and the varied distances to noise sensitive areas, the existing daytime and nighttime L_{eq} is expected to vary but be similar to the sound levels measured during LSG&A's most recent noise survey (see Tables 9.4.1.1-1 & -2 and Section 9.4.3.1). All distances between the pipeline and residences were taken from the drawings provided by Iroquois.

Table 9.4.1.2-2 shows a summary of the calculated L_{eq} sound levels from the RCNM, the measured daytime and nighttime L_{eq} sound level range without construction and the resulting daytime and nighttime sound levels (L_{dn}) at various distances from the construction site.

TABLE 9.4.1.2-2: RCNM CALCULATED HOURLY L_{EQ} SOUND LEVELS AT VARIOUS DISTANCES FROM THE PIPELINE LOOPING CONSTRUCTION

Distance from Construction Spread to Noise Sensitive Receiver, feet		**Hourly Daytime Sound Levels**		**Total Expected Daytime L_{eq}, dB(A)**	**Nighttime L_{eq}, dB(A)**
		RCNM Calculated L_{eq}, dB(A)	**Measured Daytime Ambient L_{eq}, dB(A)**		
Nearest Residences to Boonville Loop	50	89.6	41-53	89.6	35-54
	63	87.6		87.6	
	125	81.6		81.6	
Nearest Residences to Wright Loop	70	86.6	36-48	86.6	32-47
	150	80.0		80.0	
	220	76.7		76.7	
	400	71.5		71.5	
Nearest Residences to Newtown Loop	75	86.0	39-59	86	43-56
	100	83.5		84	
	300	74.0		74	
	390	71.7		72	
General Specified Distances	500	69.5	36-59 (total range of L_{eq} data above)	70	32-56 (total range of L_{eq} data above)

The distances shown in Table 9.4.1.2-2 which are less than 500 feet, represent the four nearest residential dwellings to the proposed pipeline loop. Even though the RCNM calculations provide results to the tenth of a decibel, the reported L_{eq} sound levels in Table 9.4.1.2-2 are estimates of the expected construction noise levels as the actual sound levels are expected to vary based upon the construction activity and the movements of mobile noise sources. Noise from construction activity is typically exempted from most municipal and state noise regulations as long as it occurs during typical daytime work hours. The construction activities will be scheduled to minimize the noise impact on the nearest residences and all equipment will include reasonable exhaust mufflers to reduce sound emissions.

9.4.2 Compressor Facilities: Milford Compressor Station

Iroquois proposes to operate a new compressor station in Milford, Connecticut. This analysis estimates the sound levels for the two new turbines and compressors and other associated equipment at the nearest property lines and noise sensitive areas. The projected sound levels resulting from the compressor station operation are compared with the applicable federal and State noise codes and the results of the recent noise survey describing the existing acoustical environment.

9.4.2.1 Noise Sensitive Areas and Site Noise Survey

The proposed compressor station is located along the eastern shore of the Housatonic River and is bordered by the Metro Transit Authority railroad and several industrial properties. The surrounding land is generally level ground including meadows, wetlands and forested areas with gradual changes in elevations. Access to this site is via New Oronoque Road. The proposed station equipment is just north and west of the existing metering station equipment. Residential uses are more than 1000 feet from the site and are located generally north, east and south of the site. The Merritt Parkway is approximately 3000 feet north of the site.

Using aerial photographs and tax maps, numerous noise sensitive areas were identified within a one-half mile radius of the Milford site. Noise sensitive areas include residential uses and are located to the north, east and south of the site. In order to maintain a reasonable number of noise measurement locations, only the nearest three NSA’s and four nearest property lines are individually identified as noise receptors. The NSAs and property lines were selected to include the nearest receptor in all directions from the proposed site, except the west (due to the wide river boundary to the west). The nearest noise receptor to the proposed compressor station equipment is the residence located at the end of Old Oronoque Road. This residence is about 1200-feet north of the proposed compressor station equipment. Additional residences are located further to the northeast, east and southeast along Cornfield and Hay Stack Roads.

LSG&A conducted a sound level survey on September 26 & 27, 2001 at the proposed site of the Milford compressor station in preparation for a compressor station addition which was terminated in 2002. A more recent noise survey was performed by LSG&A on November 20 & 21, 2006. The complete summary report from LSG&A is provided as Attachment A. The purpose of the 2006 survey was to document the existing sound levels near the metering station and in the neighboring community in order to address and anticipate the FERC’s requests for information regarding noise impacts associated with the proposed compressor station. Three measurement locations were selected along the perimeter of the Milford metering station site for 24 hour noise monitoring. The seven nearest NSAs, or property lines and their descriptions and the distances between the NSA property line and the turbine/compressor stack are summarized in Table 9.4.2.1-1, below. The three 24-hour monitors were programmed to measure hourly L_{eq} and L_{90} (steady background ambient) over a 24-hour period. Additional ambient noise measurements were performed at three locations which were selected to represent the nearest noise sensitive areas to the proposed compressor station.

The short term measurements were performed in the community for 15 minutes each during both daytime and nighttime hours. The measurement locations were selected to characterize the existing acoustical environment at the adjacent properties and at the nearest NSAs to the proposed compressor station. The number of identified NSAs and sound level measurement locations were limited to a total of six to maintain a reasonable number of measurement locations, while characterizing the acoustical environment in various directions from the site at or near the NSAs. An aerial photograph showing the measurement locations, property lines and NSAS is provided in the Attachments of this Resource Report.

Field notes taken during the measurement period indicate that the predominant noise sources at each measurement location were traffic noise from local roads and the Merritt Parkway. Other noise sources in the area include industrial activity from surrounding facilities, brush and leaves rustling in the wind, birds chirping, trains passing by on the railroad tracks, and occasional aircraft overhead. Measurements were taken during periods without precipitation or excessive wind.

Using the 24 hour and short duration measurement data acquired during 1 and 2 February 2006, it is possible to estimate the daytime and nighttime L_{eq} or L_{eq} range, as well as the L_{dn}, representing the existing acoustical environment at each of the nearest three NSAs and property lines. Table 9.4.2.1-2 shows a summary of the measured and estimated daytime and nighttime L_{eq} sound levels as well as the L_{dn} at the representative NSAs and property lines. Since it was not possible to access private property and not feasible to perform 24-hour measurements at all the community locations, the data reported in the table are based upon the measured data acquired at the measurement location closest to the NSA or property line. The calculated L_{dn} sound levels shown in the table are based upon a constant daytime and nighttime L_{eq} sound level (as shown in the table), which do not include the influence of short duration train events. Table 9.4.2.1-2 shows a summary of the measured daytime and nighttime L_{eq} sound levels as well as the L_{dn} at the representative NSA.

TABLE 9.4.2.1-1: SUMMARY OF SOUND LEVEL MEASUREMENT LOCATIONS DURING THE 20-21 NOVEMBER 2006 SOUND SURVEY AND THE REPRESENTATIVE NSAS OR PROPERTY LINES IN THE VICINITY OF THE PROPOSED MILFORD

Noise Measurements					**NSA or Property Line Represented**			
Measurement Location		**Location Description**	**Direction (Relative to Turbine)**	**Distance to Turbine Stack (feet)**	**NSA or Property Line Represented**	**NSA or Property Line Description**	**Direction Relative to Site**	**Distance to Turbine Stack (feet)**
Short Term Measurements	1A	**Community:** At the southwest end of the cul-de-sac on Old Oronoque Road.	North	1500	1	Resident at end of Old Oronoque Road	North	1500
	2A	**Community** End of Raton Drive, northwest end of the cul-de-sac	East	1300	2	Cornfield Road & Private Road Residences	East	1700
	3A	**Community:** West side of road, near 45 and 55 Hay Stack Road	South East	2250	3	Hay Stack Road Residences	South East	1900
24 Hour Monitoring	*4A-5A	**On IGTS Site:** West side of site, (50 feet east of New Oronoque Road)	West	60	4	Industrial Use Property Line	West	140
					5	Industrial Use	South	180
	6A	**On IGTS Site:** East edge of the site, just west of the railroad track berm.	East	200	6	Industrial Use Property Line	East	290
	7A	**On IGTS Site:** North end of site, (50 feet South of New Oronoque Road)	North	270	7	Industrial Use Property Line	North	350

COMPRESSOR STATION

*Measurement Location 4A-5A is a single location used to represent two property lines.

TABLE 9.4.2.1-2: MEASURED HOURLY AND 15 MINUTE A-WEIGHTED DAYTIME & NIGHTTIME L_{EQ} AND L_{DN} SOUND LEVELS AT THE NEAREST NSA_S AND PROPERTY LINES TO THE MILFORD METERING STATION, 20-21 NOVEMBER 2006

Measurement Location	NSA or Property Line Location # and Description	Daytime L_{eq} Sound Level, dB(A)	Nighttime L_{eq} Sound Level, dB(A)	Measured or Estimated L_{dn}, dB(A)
1A, cul-de-sac on Old Oronoque Road	**1** Resident at end of Old Oronoque Road	**48**	**45**	**52#**
2A, End of Raton Drive	**2** Cornfield Road & Private Road Residences	**47**	**38**	**57**^
3A Near 45 and 55 Hay Stack Road - West side of road	**3** Hay Stack Road Residences	**42**	**35***	**57**^
4A-5A West side of site, (50 feet east of New Oronoque Road)	**4** Industrial Use Property Line Towards West	**43-61**	**40-56**	**58**
	5 Industrial Use Property Line Towards West	**43-61** (same as 4A)	**40-56** (same as 4A)	**58**
6A, East edge of the site, just west of the railroad track berm.	**6** Industrial Use Property Line Towards East	**44-65**	**41-56**	**59**
7A North of site, (50 feet South of New Oronoque Road)	**7** Industrial Use Property Line Towards North	**48-62**	**47-57**	**59**

^ Assumed similar to the measured 24-hour data near end of Raton Drive in 2001.
* L_{90} used in place of L_{eq} due to short term high sound level event during measurement period
# L_{dn} calculated assuming all daytime and nighttime L_{eq} sound levels as shown

Previous 24 hour noise monitoring was performed by LSG&A in September 2001, at the end of Raton Drive (Location 2A) and near current Location 7A. The 2001 measurements resulted in an L_{dn} of 57 dB(A) and 67 dB(A) at Locations 2A and 7A, respectively. The 2001 data for Location 7A, resulting in the L_{dn} of 67 dB(A) were significantly influenced by short duration events caused by railroad activity and the vehicles at the nearby industrial uses and on the local roads. Comparing the 2001 and 2006 data, the existing acoustical environment has not changed significantly in the past five years. The results from the 2001 noise survey were previously submitted to the FERC in Resource Report 9 in Docket No. CP02-52 for an application which was eventually withdrawn.

9.4.2.2 Noise Impact and Sound Level Projections

Iroquois has conducted preliminary noise modeling for the Milford, Connecticut site as part of the 08/09 Expansion Project. The station's anticipated equipment configuration has been used, along with a property line acoustical design goal to predict the station sound level contribution at the property lines and NSAs.

The basis for the Milford compressor station design includes:

- Two Solar T-70, 10,000 HP gas turbines with gas compressors
- Caterpillar G3412, 375 KW auxiliary power unit (a smaller 240 KW unit is currently planned)
- Turbine, Compressor and Control Building service equipment

However, the compressor station design is still in progress and the equipment selections, layout and building designs have not been finalized. Without complete equipment descriptions and acoustical data, as well as specific construction and installation details, it is not possible to do a thorough noise evaluation to determine the magnitude and frequency spectra of the future sound levels. In order to evaluate the noise from the proposed compressor station, a property line acoustical design goal was selected which will meet the limits of the State of Connecticut and the FERC standards at the nearest property line and NSA, respectively. Then, using a list of expected noise sources, the maximum allowable sound level from each individual piece of equipment or noise source can be calculated.

The acoustical design goal is based upon the most stringent requirements of the Connecticut State Noise Control and FERC guidelines. Specifically, the acoustical design goal for this site is 51 dB(A) L_{eq} and 55 dB(A) L_{dn} at the nearest NSA. Since the compressor station's noise emissions are relatively constant over time when in full operation, the 55 dB(A) L_{dn} FERC requirement can also be stated as 47 dB(A), L_{eq}. Therefore, the acoustical design goal for this site is an hourly L_{eq} sound level of 47 dB(A) from all compressor station equipment at the nearest NSA, located at the end of Old Oronoque Road, approximately 1500 feet from the center of the turbine/compressor installations. Furthermore, with the compressor station's sound levels at a constant 47 dB(A) L_{eq}, or lower, at the nearest NSA, the resulting L_{dn} can be calculated to be approximately 54 dB(A), or lower. The daytime and nighttime L_{eq} and the L_{dn} sound levels at other NSAs further from the site are expected to be below 47 dB(A) L_{eq} and 55 dB(A) L_{dn} due to the increased distance that will reduce the property line sound pressure levels from the equipment.

By using the preliminary site layout, the noise specification data for the proposed turbine equipment, the proposed compressor station's general equipment list, and an acoustical design goal of 47 dB(A) $L_{eq,}$ or lower, at the nearest NSA, the maximum allowable A-weighted sound level produced by each piece of equipment or noise source can be calculated. This method assumes an equal noise contribution from all noise sources without manufacturer noise specifications. Table 9.4.2.2-1 shows a list of facility equipment or noise sources at the proposed compressor station and their respective distances to the property line and nearest NSA, as well as the allowable sound level produced at each location and at a standard distance of

300 feet, the property line towards the west and at NSA 1. The proposed turbine/compressor packages will be provided by the manufacturer and will include appropriate noise control to produce an L_{eq} sound level of 57 dB(A) or less at 300 feet.

The sound level specifications for the equipment in Table 9.4.2.2-1 are subject to change based upon the final facility design. However the overall design specification for the entire facility will remain at 47 dB(A) L_{eq} and 55 dB(A) L_{dn}, or lower.

As part of Docket No. CP02-31-002 this compressor station's sound pressure level contributions will be further evaluated as the design of the facility progresses. The evaluation will use representative vendor data and standard acoustical calculation methods to determine if the selected equipment will meet the noise specification. The calculations will include attenuation from hemispherical radiation but will not include attenuation losses for foliage and topography. If a piece of equipment cannot meet the noise specification described, alternate vendors will be contacted and/or specific noise control measures will be explored to reduce the property line sound levels to meet the design goal. Noise control measures may include:

- Turbine air intake silencer
- Turbine combustion exhaust stack silencer
- Turbine/compressor building acoustical louvers or silencers for building penetrations
- Turbine compartment cooling intake and discharge silencers
- Rooftop and grade level noise barriers for transformers, air handling equipment, etc.
- Sound insulation specifications for various building façades
- Acoustical louvers or silencers for various building penetrations and auxiliary power unit
- Acoustical lagging for gas scrubbers, filter separators, valves and other exposed piping.
- Blow down silencers

Until the equipment is selected, the facility design is finalized, accurate octave band noise data is available and noise control details are calculated, the frequency spectra of the projected sound pressure levels cannot be determined.

9.4.2.3 Projected Compressor Station Sound Levels

The compressor station sound level criterion was selected so that the total station noise, operating at full capacity, would not exceed the FERC requirements and applicable State noise code. The compressor station equipment will be selected and designed in order to result in projected sound levels associated with the proposed compressor station which will be 47 dB(A) L_{eq} and 54 dB(A) L_{dn}, or lower, at the nearest NSA property line (Old Oronoque Road). It is expected that the L_{eq} sound levels produced by the compressor station operation will be lower at all other NSAs further from the equipment. Table 9.4.2.3-1 compares the predicted compressor station noise levels with the existing measured ambient sound levels from November 2006. The sound levels produced by the compressor station are expected to meet all State, local noise requirements and be below the FERC 55 dB(A) L_{dn} requirement. Furthermore, the noise emissions from the compressor station are not expected to significantly change the existing L_{dn} sound levels at the NSAs. Until the facility equipment and design is finalized and accurate octave band noise data is acquired, the frequency spectra of the projected sound pressure levels cannot be determined.

TABLE 9.4.2.2-1: EQUIPMENT AND NOISE SOURCE LIST FOR NEW COMPRESSOR STATION INCLUDING DISTANCES FROM NEAREST NOISE SENSITIVE AREA AND NEAREST PROPERTY LINE, MILFORD COMPRESSOR STATION

Equipment or Noise Source	Maximum dB(A) at 300 feet	West Property Line		NSA 1	
		Approx. Distance (feet)	dB(A)	Approx. Distance (feet)	dB(A)
Turbine #1 Components: Combustions Air Intake, Exhaust Stack & Lube Oil Cooler	57	130	64	1500	43
Turbine #2 Components: Combustions Air Intake, Exhaust Stack & Lube Oil Cooler	57	100	67	1500	43
Compressor/Turbine Building #1 (walls, roof & louvers)	46	130	54	1380	33
Compressor/Turbine Building #2 (walls, roof & louvers)	47	100	56	1440	33
Control Building Equipment	45	80	57	1200	33
Domestic Gas Building (walls, roof, & louvers)	47	215	50	1475	33
Meter Building (walls, roof, & louvers)	46	265	47	1350	33
Electrical Transformer #1	45	200 (estimated)	49	1200 (estimated)	33
Electrical Transformer #2	45	200 (estimated)	49	1200 (estimated)	33
Total Expected L_{eq} Sound Levels, dB(A)	**61**		**69**		**47**
Expected Day-Night, L_{dn} Sound Level, dB(A)					**54**
Auxiliary Power Unit Exhaust*	53	80	64	1200	42
Auxiliary Power Unit Enclosure*	53	80	64	1200	42
Auxiliary Power Unit Cooler*	53	80	64	1200	42
Total APU Sound Levels, dB(A)	58		69		46

*Auxiliary Power Unit (APU) evaluated separately since most site equipment does not operate when APU operates.

Table 9.4.2.3-1: Measured Hourly and 15 Minute A-weighted Daytime and Nighttime L_{eq} and L_{dn} Sound Levels (dB re: 20 Pa) at the NSAs Compared with the Expected L_{eq} and L_{dn} Sound Levels from the Proposed Milford COMPRESSOR STATION, MILFORD, Connecticut, IGTS 08/09 Expansion Project

Measurement Location	NSA or Property Line Location # and Description	Existing Measured Sound Levels, dB(A)			Distance (feet)	Expected Compressor Station dB(A)	
		L_{eq} Day	L_{eq} Night	L_{dn}		L_{eq}	L_{dn}
1A cul-de-sac on Old Oronoque Road	**1** Resident at end of Old Oronoque Road	**48**	**45**	**52#**	**1500**	**47**	**54**
2A, End of Raton Drive	**2** Cornfield Road & Private Road Residences	**47**	**38**	**57^**	**1700**	**46**	**53**
3A Near 45 and 55 Hay Stack Road - West side of road	**3** Hay Stack Road Residences	**42**	**35**	**57^**	**1900**	**45**	**52**

^ Assumed similar to the measured 24-hour data near end of Raton Drive in 2001.
# L_{dn} calculated assuming all daytime and nighttime L_{eq} sound levels as shown and does not reflect contribution from train activity or other short duration high sound level events.

9.4.2.4 Applicable Noise Codes

The Federal Energy Regulatory Commission, Section 157.206, Standard Conditions, state that the noise attributable to any new gas compressor station, station addition, compression added to an existing station, or any modification, upgrade or update to an existing station, must not exceed a day-night sound level of 55 dB(A) at any pre-existing noise-sensitive area. In general the operation of the equipment at a compressor station, under non-emergency conditions is relatively constant over time. Based on this assumption, the L_{dn} requirement can be translated into a constant L_{eq} sound level of 47 dB(A) for an entire 24 hour period.

The Connecticut Noise Control Regulations specify that the maximum sound level emanating from a Class C (business) emitter, measured during the nighttime hours (10:00 PM-to-7:00 AM), at any Class A (residential) receiving property line, may not exceed 51 dB(A). The daytime limits of the regulation are increased by 10 dB(A) to 61 dB(A). The Connecticut Noise Control Regulations also limits the peak sound pressure levels of an impulsive sound, infrasonic and ultrasonic noises, as well as prominent discrete tones. The normal operation of the proposed equipment is not expected to produce any sounds that would fall under this portion of the regulation. Emergency blow downs and use of pressure release valves are considered protective or safety devices and are rare operations and would be part of the exclusions in Section 1.7 (f). The Town of Milford, Connecticut does not maintain any quantitative limits regarding noise.

9.4.3 Compressor Facilities: Brookfield Compressor Station

The information provided in this section summarizes the noise survey results, applicable noise codes, noise sensitive areas, and projected noise levels with regard to the proposed compressor addition in Brookfield, Connecticut. In addition to the approved compressor station project (Docket No. CP02-31-002) at this site, Iroquois proposes to operate an additional compressor and gas cooler at the High Meadow Road site in Brookfield, Connecticut. This analysis predicts the sound levels for the new compressor and gas cooler facilities in addition to the previously approved compressor and gas cooler and compares these projected sound levels to the applicable federal, State and municipal noise codes and the existing acoustical environment.

9.4.3.1 Noise Sensitive Areas (NSAs) and Site Noise Survey

The approved and proposed compressor stations will be located in a residential area with gradual and steep changes in topography, scattered hills, meadows and wetlands. Site access is by High Meadow Road which climbs a steep hill along the east property line. The proposed site is just north of an Algonquin Gas metering station and near a former sand and gravel extraction site. There are residential areas located in all directions from the proposed site. A railroad line runs along the southwest property line, SR-25 is about 2,500-feet northeast and I-84 is about 3,000-feet south.

Using aerial photographs and tax maps, numerous noise sensitive areas were identified within a one-half mile radius of the Brookfield site. Noise sensitive areas within a one-half mile radius are mostly residential uses and are located in the Towns of Brookfield and Newtown. In order to maintain a reasonable number of noise measurement locations, only the nearest seven NSA’s are individually identified. The seven nearest NSAs were selected to include the nearest receptor in all directions from the proposed site. The nearest noise receptor to the proposed compressor station equipment is the residence located at 67 High Meadow Road. This residence is about 250-feet north of the metering station and 420-feet east of the proposed turbine/compressor exhaust stack. Additional residences are located further to the north on High Meadow Road and to the south, east and west on small residential cul-de-sac side streets. A school is located about 2,000 feet north of the site.

LSG&A conducted a sound level survey on October 10 & 11, 2001 for a proposed compressor station. However, a more complete and recent noise survey was performed by LSG&A on February 1 & 2, 2006. The complete report from LSG&A, summarizing the 2006 findings is provided as an Attachment. The purpose of the 2001 survey was to document the existing sound levels near the metering station. The purpose of the 2006 survey was the same, but was a more thorough survey in order to respond to the FERC data request in January 2006 for the approved compressor station. Since the measured sound levels and noise sources during the 2006 and 2001 surveys were similar, only the results of the most recent survey are discussed in detail in this report. Three measurement locations were selected on High Meadow Road, along the perimeter of the Brookfield metering station site for 24 hour noise monitoring. Four additional locations in the nearby community were selected to perform 15 minute ambient noise measurements during daytime and nighttime hours.

The seven nearest NSAs and the representative noise measurement locations and their descriptions and distances to the midpoint between the approved and proposed turbine/compressor stack are summarized in Table 9.4.3.1-1, below.

TABLE 9.4.3.1- 1: SUMMARY OF SOUND LEVEL MEASUREMENT LOCATIONS DURING 1-2 FEBRUARY 2006 SOUND SURVEY AND THE REPRESENTATIVE NSAS OR PROPERTY LINES IN NEAR OF THE PROPOSED BROOKFIELD COMPRESSOR STATION ADDITION

Noise Measurements					NSA or Property Line Represented			
Location		Location Description	Direction (Relative to Turbine)	Distance to Turbine Stack (feet)	NSA or Property Line	NSA or Property Line Description	Direction Relative to Site	Distance to Turbine Stack (feet)
24 Hour Monitoring	1A	**On IGTS Site:** Across from 67 High Meadow Road, IGTS fence, near gate	North East	420	1	67 High Meadow Road	North East	440
	2A	**On IGTS Site:** Southeast of 20 High Meadow Road, along IGTS fence line.	North West	1150	2	20 High Meadow Road	North West	1150
	3A	**On IGTS Site:** End of High Meadow Rd, near southeast edge of IGTS site.	South East	840	3	Black Swan Court	South	950
Short Term Measurements	4A	**Community:** At 20 and 21 Hunting Ridge Rd, southeast end of cul-de-sac.	North	1220	4	20 & 21 Hunting Ridge Road	North	900
	5A	**Community:** In front of 9 + 16 Patricia Ln, at west end of cul-de-sac.	East	1180	5	9 & 16 Patricia Lane	East	840
	6A	**Community:** Along Dairy Farm Dr, at the crossing of the Algonquin ROW	West	1410	6	Dairy Farm Road	West	1000
	7A	**Community:** In front of 16 Edna Court, at the southeast end of the cul-de-sac	North West	1820	7	16 Edna Court	North West	1470
					8	Whisconier Middle School	N-NWest	2125
					9	Valley Presbyterian Church	N-NWest	2570

All directions and distances are relative to the approximate geometric center of the Market Access and 08/08 turbine/compressor buildings.

The noise monitors at Locations 1A, 2A and 3A were programmed to measure the hourly L_{eq} and L_{90} (steady background ambient) over a 24-hour period. Additional ambient noise measurements were performed at four locations which were selected to represent the nearest noise sensitive areas to the proposed compressor station.

The short term measurements were performed in the community for 15 minutes each during both daytime and nighttime hours. The measurement locations were selected to characterize the existing acoustical environment at the nearest NSAs to the proposed compressor station. The number of identified NSAs and sound level measurement locations were limited to a total of seven to maintain a reasonable number of measurement locations, while characterizing the acoustical environment in various directions from the site at or near the NSAs. An aerial photograph showing the measurement locations, property lines and NSAS is provided in an attachment to this resource report as Drawing No. SK-ENV-E-07-021.

Field notes recorded during the measurements indicate that the predominant noise source at all measurement locations was the distant traffic noise from Interstate Route 84 and Route 25. It was observed that the lowest L_{eq} sound levels were typically during the mid-day to afternoon hours and generally highest during the overnight and commuter hours. It is likely that the elevated nighttime sound levels are caused by a combination of meteorological conditions and a higher volume of nighttime truck traffic. Other noise sources in the area included local vehicle traffic on residential streets, dogs barking, birds chirping, and occasional aircraft overhead. Although a railroad separates the IGTS Brookfield site from the NSAs to the south, no railroad activity was observed during the measurement period. Measurements were taken during periods without precipitation or excessive wind.

Using the 24 hour and short duration measurement data acquired during 1 and 2 February 2006, it is possible to estimate the daytime and nighttime L_{eq} sound levels or L_{eq} range, as well as the L_{dn}, representing the existing acoustical environment at each of the nearest NSAs. Table 9.4.3.1-2 shows a summary of the measured and estimated daytime and nighttime L_{eq} sound levels as well as the L_{dn} at the representative NSAs. Since it was not possible to access private property and not feasible to perform 24-hour measurements at all the community locations, the data reported in Table 9.4.3.1-2 are based upon the measured data acquired at the measurement location closest to the NSA or property line. The estimated L_{dn} sound levels shown in Table 9.4.3.1-2 are based upon measured data from the 24-hour noise monitors.

TABLE 9.4.3.1-2: MEASURED HOURLY AND 15 MINUTE A-WEIGHTED DAYTIME & NIGHTTIME L_{EQ} AND L_{DN} SOUND LEVELS (DB RE: 20μPA) AT THE NEAREST NSAS TO THE BROOKFIELD METERING STATION, 1-2 FEBRUARY, 2006

Measurement Location	NSA Location # and Description	Daytime L_{eq} Sound Level, dB(A)	Nighttime L_{eq} Sound Level, dB(A)	Measured or Estimated L_{dn}, dB(A)
1A, Across from 67 High Meadow Rd.	**1** 67 High Meadow Rd.	**47-57**	**51-56**	**59**
2A, Across from 20 High Meadow Rd.	**2** 20 High Meadow Rd.	**42-59**	**44-51**	**55**
3A End of High Meadow Rd	**3** Black Swan Court	**39-55**	**49-55**	**58**
4A, Near 20 & 21 Hunting Ridge Rd.	**4** Hunting Ridge Road	**43**	**44**	☟**55**^
5A Near 9 & 16 Patricia Lane	**5** Patricia Lane	**42**	**50**	☟**58**#
6A, Gas Line R.O.W. on Dairy Farm Rd.	**6** Dairy Farm Road	**59***	**37**	☟ **58^**
7A, 16 Edna Court	**7** Edna Court	**43**	**43**	☟**55**#

* Local vehicle traffic on Dairy Farm Road noted as influence on measurement.
^ Assumed Similar to data at measurement Location 2A
# Assumed similar to data at measurement Location 3A

Previous 24-hour noise monitoring was performed by LSG&A in October 2001 at two locations and resulted in a measured L_{dn} of 63 dB(A) and 57 dB(A) at Locations 1 and 2, respectively (similar to Locations 1A and 2A in February 2006). The data for Location 1, resulting in the L_{dn} of 63 dB(A), was significantly influenced by short duration events occurring in only two hours of data which may have been caused by railroad activity. Adjusting the hourly data to remove these transient sources results in a new calculated L_{dn} of 59 dB(A). Based upon the 2001 and 2006 data, it is clear that the existing acoustical environment has remained relatively unchanged in the past five years.

9.4.3.2 Noise Impact Assessment and Sound Level Projections

Iroquois has conducted preliminary noise modeling for the Brookfield, Connecticut site as part of the MarketAccess Project. Additional modeling has been completed for the additional equipment proposed as part of the 08/09 Expansion Project as well. The station's anticipated equipment additions for the 08/09 Expansion Project have been used, along with a property line design goal and manufacturer's noise specifications to predict the total compressor station equipment sound level contributions at the nearest noise sensitive area.

The basis for the 08/09 Brookfield compressor station addition design includes:

- Solar T-60, 7,700 HP gas turbine, with gas compressor installed within a building
- Hudson Products Inc. 4 bay, (8 fan) gas cooler
- Caterpillar G3412, 375 KW auxiliary power unit (a smaller 240 KW unit is currently proposed)

However, the compressor station addition is still in the design phase and the final equipment selections, layout and building designs have not been completed at this time. Without accurate equipment descriptions and acoustical data, as well as specific construction and installation details, it is not possible to do a thorough noise evaluation to accurately determine the magnitude and frequency spectra of the future sound levels. In order to evaluate the noise from the proposed compressor station addition, a property line acoustical design goal was selected which will meet the limits of the State of Connecticut, Town of Brookfield and the FERC standards at the nearest NSA. Then, using a list of expected noise sources and manufacturer sound level specifications, the maximum allowable sound level from each individual piece of equipment or noise source can be calculated. This analysis method included equipment associated with the compression facilities proposed under this Project as well as the approved compressor station.

Specifically, the acoustical design goal for the total noise emissions from all proposed and approved compressor station equipment is 45 dB(A), or lower, at the nearest NSA, located at 67 High Meadow Road, approximately 420 feet from the additional turbine/compressor exhaust stack. Furthermore, with the compressor station's sound levels at a constant 45 dB(A) L_{eq}, or lower, at the nearest NSA, the resulting L_{dn} can be calculated to be approximately 52 dB(A), or lower. The daytime and nighttime L_{eq} and the L_{dn} sound levels due to the compressor station, at other NSAs further from the site are expected to be below 45 dB(A) L_{eq} and 55 dB(A) L_{dn}.

By using the 08/09 Expansion Project and Market Access site layout, the proposed compression facilities' general equipment list, manufacturer noise specifications for equipment, and an acoustical design goal of 45 dB(A) $L_{eq,}$ or lower, at the nearest NSA, the maximum allowable A-weighted sound level produced by each piece of equipment or noise source can be calculated. This method assumes an equal noise contribution from all noise sources without manufacturer noise specifications. Table 9.4.3.2-1 shows a list of facility equipment or noise sources at the proposed compressor station and their respective distances to the property line of the nearest NSA, as well as the allowable property line sound level produced. The proposed and approved turbine/compressor packages will be provided by the manufacturer and will include appropriate noise control to produce an L_{eq} sound level of 42 dB(A) or less at 345 feet and 435 feet, respectively. Due to limitations on feasible noise control for the gas cooler, the gas cooler's noise specification will be 35 dB(A) at 330 feet.

Based on the 45 dB(A) L_{eq}, property line sound level limit, manufacture noise specifications, the allowable A-weighted sound level produced by each individual piece of equipment described in Table 9.4.3.2-1, at the distances shown in Table 9.4.3.2-1, is 27 dB(A), L_{eq}.

TABLE 9.4.3.2-1: EQUIPMENT AND NOISE SOURCE LIST FOR NEW COMPRESSOR STATION INCLUDING DISTANCES TO NEAREST NOISE SENSITIVE AREA, BROOKFIELD COMPRESSOR STATION, BROOKFIELD, CONNECTICUT, IGTS 08/09 EXPANSION PROJECT

Equipment or Noise Source		Sound Level Specification dB(A) at 330 feet	Property Line of NSA 1	
			Approximate Distance, (feet)	dB(A)
Proposed Equipment	**Turbine Components:** Combustion Air Intake, Exhaust Stack, Enclosure Vents & Lube Oil Cooler	42 (at 345 feet)	380	41
	Gas Cooler	35	400	33
	Turbine / Compressor Building	25	345	25
	Compressor Unit Control Enclosure	25	315	25
	Control Building	24	290	25
	Transformer	24	300	25
	Gas Building	19	175	25
	Flow Control Equipment	27	440	25
	Algonquin Gas Building	24	280	25
	Filter Separator Skid	26	380	25
Approved Equipment	**Turbine Components:** Combustion Air Intake, Exhaust Stack, Enclosure Vents & Lube Oil Cooler	42 (at 435 feet)	435	42
	Gas Cooler	35	450	32
	Transformer, Compressor Unit Control Enclosure, Turbine / Compressor Bldg & Control Bldg.	various	various	25
Total Expected L_{eq} Sound Levels, dB(A)				**45**
Expected Day-Night, L_{dn} Sound Level, dB(A)				**52**
Auxiliary Power Unit Exhaust*		41	400	40
Auxiliary Power Unit Enclosure*		41	400	40
Auxiliary Power Unit Cooler*		41	400	40
Total APU Sound Levels, dB(A)		46	400	45

The sound level specifications for the equipment in Table 9.4.3.2-1 are subject to change based upon the final facility design. However the overall design specification for the entire facility will remain at 45 dB(A) L_{eq} and 55 dB(A) L_{dn}, or lower at the nearest NSA.

As part of Docket No. CP02-31-002 and the proposed compressor facility modifications, the total compressor-station sound pressure levels will be further evaluated as the design of the facility progresses. The evaluation will use representative vendor data and standard acoustical calculation methods to determine if the selected equipment will meet the noise specification. The calculations will include attenuation from hemispherical radiation but will not include attenuation losses for foliage and topography. If a piece of equipment cannot meet the noise specification described, alternate vendors will be contacted and/or specific noise control measures will be explored to reduce the property line sound levels to meet the design goal. Noise control measures may include:

- Turbine air intake silencer
- Turbine combustion exhaust stack silencer
- Turbine/compressor building acoustical louvers or silencers for building penetrations
- Turbine compartment cooling intake and discharge silencers
- Low noise fan selection, air inlet and discharge attenuators for cooler
- Rooftop and grade level noise barriers for transformers, air handling equipment, etc.
- Sound insulation specifications for various building façades
- Acoustical louvers or silencers for various building penetrations and auxiliary power unit
- Acoustical lagging for gas scrubbers, filter separators, valves and other exposed piping.
- Blow down silencers

Until the equipment is selected, the facility design is finalized, accurate octave band noise data is available and noise control details are calculated, the frequency spectra of the projected sound pressure levels cannot be determined.

9.4.3.3 Projected Compressor Station Sounds Levels

The sound level criterion for the proposed and approved compressor facilities at this site was selected so that the total station noise, operating at full capacity, would not exceed the FERC requirements and applicable State and municipal noise codes. The compressor station equipment will be selected and designed to result in total projected sound levels which will be 45 dB(A) L_{eq} and 55 dB(A) L_{dn}, or lower, at the nearest NSA property line at 67 High Meadow Road. It is expected that the L_{eq} and L_{dn} sound levels produced by the compressor station operation will be lower at all other NSAs further from the equipment. Table 9.4.3.3-1 compares the predicted total approved and proposed compressor station noise levels with the existing measured ambient sound levels measured in February 2006. The sound levels produced by the compressor station are expected to meet all State, local noise requirements and be below the FERC 55 dB(A) L_{dn} requirement at all NSAs and receiving property lines. Furthermore, the noise emissions from the compressor station are not expected to significantly change the existing L_{dn} sound levels at the NSAs.

Until the facility equipment and design is finalized and accurate octave band noise data is acquired, the frequency spectra of the projected sound pressure levels cannot be determined.

9.4.3.4 Applicable Noise Codes

The applicable noise regulation pertaining to the FERC and the State of Connecticut are summarized earlier in Section 9.4.2.4. The Town of Brookfield Noise Ordinance, Section 242-601, Technical Standards, provides quantitative limits to the noise levels based upon the noise emitter zone and noise receptor zone. Specifically, the effective A-weighted sound level limit, as measured at a point approximately 1 foot beyond the emitters' boundary and within a residential receptor's premises, is 45 dB(A) during nighttime hours (7:30 PM to 7:30 AM, Sunday through Saturday, with exceptions).

Based on the applicable noise limits described above, the effective limits for the noise levels produced by the proposed and approved compressor station equipment is 45 dB(A) at the nearest receiving property line. By meeting the State and Town Brookfield limits, the FERC 55 dB(A) L_{dn} limit will be met implicitly.

TABLE 9.4.3.3-1: MEASURED HOURLY AND 15 MINUTE A-WEIGHTED DAYTIME AND NIGHTTIME L_{EQ} AND L_{DN} SOUND LEVELS (DB RE: 20 PA) AT THE NSAS COMPARED WITH THE EXPECTED L_{EQ} AND L_{DN} SOUND LEVELS FROM THE PROPOSED AND APPROVED BROOKFIELD COMPRESSOR STATION, BROOKFIELD, CONNECTICUT, IGTS 08/09 EXPANSION PROJECT

Location	**NSA or Property Line Location # and Description**	**Measured Sound Levels, dB(A)**			**Distance (feet)**	**Expected Compressor Station dB(A)**	
		L_{eq} Day	**L_{eq} Night**	**L_{dn}**		**L_{eq}**	**L_{dn}**
1A	**1** 67 High Meadow	47-57	51-56	59	420	45	52
2A	**2** 20 High Meadow	42-59	44-51	55	1150	36	43
3A	**3** Black Swan Ct	39-55	49-55	58	950	38	45
4A	**4** 20 & 21 Hunting Ridge Road	43	44	☟ 55[#]	900	39	46
5A	**5** 9 & 16 Patricia Lane	42	50	☟ 58^	840	39	46
6A	**6** Dairy Farm Road	59*	47	☟ 58^	1000	38	45
7A	**7** 16 Edna Court	43	43	☟55[#]	1470	34	41
	8 Whisconier Middle School	43	43	☟55[#]	2125	31	38
	9 Valley Presbyterian Church	43	43	☟55[#]	2570	30	37
Town of Brookfield (L_{eq}) and FERC Noise Requirements (L_{dn}), dB(A)						45	55

9.5 REFERENCES

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United States Code of Federal Regulations, Title 40, Part 50, National Primary and Secondary Ambient Air Quality Standards, U.S. Government Printing Office, Washington, DC.

United States Code of Federal Regulations, Title 40, Part 51, Prevention of Significant Deterioration of Air Quality, Section 51.166, U.S. Government Printing Office, Washington, DC.

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United States Code of Federal Regulations, Title 40, Part 51 Subpart W and Part 93 Subpart B, Determining Conformity of General Federal Actions to State or Federal Implementation Plans