IROQUOIS GAS TRANSMISSION SYSTEM, L.P.

08/09 EXPANSION PROJECT

DRAFT
RESOURCE REPORT 10

ALTERNATIVES

PUBLIC

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RESOURCE REPORT 10 – ALTERNATIVES
FERC ENVIRONMENTAL CHECKLIST

Part 380 Appendix A – Minimum Filing Requirements for Environmental Reports	Company Compliance or Inapplicability of Requirement
Address the "no action" alternative (§ 380.12 (l)(1)).	Section 10.1
For large Projects, address the effect of energy conservation or energy alternatives to the Project (§ 380.12 (l)(1)).	Section 10.1.1 Section 10.1.2
Identify system alternatives considered during the identification of the Project and provide the rationale for rejecting each alternative (§ 380.12 (l)(1)).	Section 10.2
Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g. wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route (§ 380.12 (l)(3)).	Section 10.3
Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site (§ 380.12 (l)(3)).	Section 10.4

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10.0 ALTERNATIVES

This resource report describes the alternatives that have been considered for the 08/09 Expansion Project. Section 10.1 details the no-action alternative. Section 10.2 discusses system alternatives, and Section 10.3 evaluates route alternatives. Section 10.4 provides additional information relative to aboveground facilities. Section 10.5 cites the references used in preparation of this resource report.

Phase I of the 08/09 Expansion Project consists of three natural gas pipeline loop segments located along Iroquois Mainline pipeline. The preferred routes for the three loop segments have been selected based on an extensive alternative routing analysis. The primary objective of the alternatives analysis was to provide natural gas service to KeySpan in a manner that avoids and minimizes potential adverse environmental effects to the greatest extent practicable. Given the settings within the Project areas, Iroquois also heavily considered the need to minimize the disruption to the affected communities with respect to traffic and existing land use impacts. Overall, Iroquois evaluated looping options based on potential environmental impacts, existing land usage and construction safety and feasibility considerations. Iroquois considered loop route alternatives in accordance with the FERC routing guidelines as set forth in 18 CFR Part 380.15. This guidance recommended that Iroquois follow existing corridors wherever feasible, minimize adverse impacts to the extent practicable and meet the economic and engineering criteria of Iroquois and its customers.

Phase II of the 08/09 Expansion Project consists of the construction of a new natural gas compressor station located along Iroquois Mainline pipeline in the City of Milford, CT. The preferred site for the Milford Compressor Station has been selected based on an extensive alternative siting analysis. The primary objective of the alternatives analysis was to locate the compressor station in a manner that either avoids or minimizes potential adverse environmental effects to the greatest extent practicable. Given the industrial setting of the project area, Iroquois also considered the need to minimize the disruption to the nearby residential communities with respect to traffic and land use impacts. Overall, Iroquois evaluated site options based on potential environmental impacts, existing land usage and construction safety and feasibility considerations. Iroquois considered site alternatives in accordance with the FERC guidelines as set forth in 18 CFR Part 380.15.

Phase III of the 08/09 Expansion Project consists of the addition of compression and gas cooling facilities at the Brookfield Compressor Station in the Town of Brookfield, CT. The primary objective of the alternatives analysis was to locate the additional compressor station facilities in a manner that either avoids or minimizes potential adverse environmental effects to the greatest extent practicable. Given the disturbed nature of the site, previous FERC approval of a compressor station in Brookfield for the MarketAccess Project (FERC Docket CP02-31-002) and avoidance of significant adverse environmental impacts, Iroquois determined that adding compression and cooling facilities at the Brookfield Compressor Station is preferable to constructing a new compressor station at an alternative location. Overall, Iroquois evaluated other site options based on potential environmental impacts, existing land usage and construction safety and feasibility considerations.

10.1 NO ACTION ALTERNATIVE

The "no-action" alternative in relation to the 08/09 Expansion Project would avoid the temporary environmental impacts associated with the pipeline installation and compressor station construction. However, this alternative would result in the elimination of this additional natural gas supply to the KeySpan system, the effects of which would include the inability of KeySpan to improve its natural gas distribution system on Long Island, a significant delay in response to additional natural gas demand by residents and businesses on Long Island. To supply gas to its end-users, KeySpan would have to locate

alternative sources of natural gas that would, at a minimum, require similar or greater facilities to those proposed by this Project to be built at another location. The potential impacts of this Project would not be alleviated, but simply transferred to another location and likely increased. Therefore, since the environmental impacts would not be lessened and the purpose and need of the Project would remain, the no-action alternative is not considered a viable alternative.

10.1.1 Energy Conservation

Reduction in the need for additional energy usage is the preferred alternative wherever possible. Conservation of energy reduces the demand for the limited and over-utilized fossil fuel reserves. Energy conservation is also strongly advocated by both federal and state authorities. KeySpan presently has programs in place that strongly encourage energy conservation. Even with these programs, there remains a need for additional natural gas that would be provided with the construction of this proposed project.

Energy conservation as a solution to natural gas supply shortages in this region would involve large-scale public education efforts, significant incentives, and governmental intervention. This process of implementing energy conservation measures would take years to complete and, even if successful, would only partially offset the demand for increased natural gas supplies. Energy conservation alone is not a viable alternative to the proposed Project.

10.1.2 Energy Alternatives

Use of alternative fuels to supply the KeySpan would potentially result in adverse environmental impacts due to increased air pollutant emissions otherwise minimized through the use of natural gas. In general, alternative energy sources for Iroquois customers include oil, coal, biomass and nuclear fuels. State and federal air pollution control regulations indirectly promote the use of clean fuels to minimize adverse air quality impacts. The regulations were instituted to improve both air quality and the quality of life. Use of these alternative hydrocarbon energy sources would unnecessarily increase adverse air quality impacts, and these increased impacts would conflict with State and federal long-term energy environmental policies aimed toward attaining ambient air quality standards.

10.1.2.1 Wind

Wind power currently is not a viable option for providing the projected power needs in the region. Even if wind energy were available, wind generation cannot be precisely scheduled, based on demand. Hence, wind energy would not be able to provide the projected needs for the region as reliably and in the quantity that would be provided by natural gas.

10.1.2.2 Solar Power

Solar power is not an obvious alternative to natural gas in this region due to climactic conditions. Use of renewable resources, such as solar power, are not being developed at a pace fast enough to provide for the projected energy needs in the nation or the region.

10.1.2.3 Geothermal Power

Geothermal energy is available only at tectonic plate boundaries or at volcanic hotspots. Due to a lack of these features in the Project area, geothermal energy would not be available for development as an alternative to natural gas.

10.1.2.4 Coal

Coal is a viable alternative energy source, but compared to natural gas it necessitates increased environmental impacts from its extraction point to its combustion as a fuel. Coal is associated with significant mine pollution control problems and reclamation issues, as well as storage problems, acid rain, and costly pollution controls at the burner. Therefore, coal does not represent a preferred alternative for replacing the natural gas to be supplied by the proposed Project.

10.1.2.5 Oil

While oil is a viable alternative energy source for meeting future power generation needs in the Project area, oil has no advantage over natural gas, and oil necessitates increased environmental impacts in transportation and at the burner. For these reasons, particularly for facilities designed to use natural gas, oil would not be a preferable alternative to the natural gas to be supplied by the proposed Project.

10.1.2.6 Nuclear

The use of nuclear energy is not considered to be a viable option for meeting the projected demand for energy in the region. Any contemplated new nuclear facilities would not be able to provide energy in time to meet the energy need of KeySpan.

10.1.2.7 Electric Generation

The region does not have a high potential for hydroelectric power generation, even using low head/low power technologies. As a result, hydroelectric power would not be available for development in the region as an alternative to the natural gas supplied by the 08/09 Expansion Project.

Electrical energy is a second-tier energy source, meaning that electrical energy is generated from first-tier energy sources, such as natural gas, coal, oil, biomass, nuclear, geothermal, hydraulic head, wind, and solar radiation. For this reason, use of electrical energy is precluded from being a viable alternative to the natural gas to be supplied by the proposed Iroquois Project.

10.1.2.8 Fuel Cells

Fuel cells are a developing alternative for generating electricity more directly and cleanly from fossil fuels or hydrogen. Small-scale fuel cell research and development is active, but reliable fuel cell systems representing an equivalent magnitude to the proposed project are not expected to be available or cost effective in the near future.

10.1.2.9 Other Energy Sources

Other alternative fuel sources available include using LNG and propane/air storage and vaporization. Though both alternatives have the potential to meet their project objectives of (1) increasing the maximum peak hourly flow capability; (2) meeting design-day gas supply requirements; and (3) alleviating low pressure problems on their Long Island distribution system, KeySpan determined that these alternatives were not viable due to such factors as siting constraints, increased environmental impacts, and the time required to develop these alternatives. Therefore, supplying adequate volumes of natural gas through the construction of the proposed 08/09 Expansion Project is the preferred option.

10.2 SYSTEM ALTERNATIVES

10.2.1 Existing Capacity

System alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed natural gas pipeline systems to meet the stated purpose and need. System options involve the transportation of the equivalent amount of incremental natural gas volumes by the expansion of existing pipeline systems or by the construction and operation of other new pipeline systems. A viable system alternative would make it unnecessary to construct all or part of the proposed Project, although some modifications or additions to existing pipeline or construction of entirely new pipeline system could be required to allow for the transportation of the additional natural gas.

The following evaluation criteria were used for selecting reasonable and potentially environmentally preferable system alternatives to the Iroquois Project:

- Technical and economic feasibility and practicality
- Significant environmental advantage over the proposed Project
- Ability to meet the Project objective to satisfy increased demand for natural gas, given that alternative energy sources or conservation are not able to satisfy this demand.

10.2.1.1 Pipeline Facilities

To increase the throughput capacity of a natural gas pipeline, a pipeline operator (such as Iroquois) can "loop" the existing pipeline, or add compression, or use a combination of compression and looping. As natural gas travels down the pipeline, pressure declines with distance. Compressor stations are used to restore pressure and increase pipeline capacity beyond that of the pipe alone. The term looping refers to placing additional segments of pipeline, parallel and connected to the existing pipeline. These segments act to reduce the rate of pressure drop in the pipe due to friction, and thereby increase the throughput capacity of the pipeline. Compressor stations can also be added to restore pipeline pressures more frequently along the pipeline, again thereby increasing the throughput capacity of the pipeline. The choice of how much loop to add, versus how much compressor horsepower is primarily an economic determination, that is optimized with such factors as, hydraulic requirements, pipeline reliability, constructability, environmental impact, and public impact.

In general, pipeline looping has been proven to be an extremely efficient and effective means of increasing natural gas delivery. The pipeline looping proposed in the 08/09 Expansion Project is the first looping on the Iroquois pipeline system. Iroquois considered additional compression as an alternative to each of the three proposed pipeline looping segments; however pipeline looping provides advantages over additional compression relative to reduced emissions, increased reliability, reduced operation and maintenance cost, and reduced fuel consumption. As such, Iroquois has concluded, based on hydraulic modeling, engineering analysis and environmental evaluation, that the optimal locations for the looping segments are those presented within Phase I of the Project.

The following provides an evaluation of Iroquois system alternatives for the various pipeline loop segments proposed within Phase I of the 08/09 Expansion Project.

10.2.1.1.1 Boonville Loop Segment

While Iroquois investigated various system alternatives for this loop segment, the only potentially feasible alternative would be the installation of a new compressor station at Mannheim, NY (approximately 3.0 miles upstream of Mainline Valve 11). The siting and construction of a new

compressor station would necessitate significantly higher operating costs, increased emissions, and relatively lower levels of reliability due to outages for required maintenance. The siting and construction of a new compressor station would have significantly greater cost implications and environmental effects than the proposed Boonville loop segment.

A new compressor station in Manheim, NY would require approximately 7,700 horsepower and consume approximately 1,420 Dth/day of fuel. Such a station would be roughly equivalent in construction cost to that of the proposed loop segment, but additional operating costs would be up to $4 million per year due to the fuel consumed (assuming a monthly average of the New York City Gate Prices as published in Gas Daily for the 12 month period ending March 1, 2007 of $7.65/Dth) and due to higher levels of required maintenance. The proposed loop will generate zero emissions, whereas a compressor station in Manheim would generate approximately 17 tons of NOx per year. The proposed Boonville loop segment provides a significant cost and environmental advantage over a potential Manheim Compressor Station for Iroquois' 08/09 Expansion Project.

10.2.1.1.2 Wright Loop Segment

While Iroquois investigated various system alternatives for this loop segment, the only potentially feasible alternative to this loop segment would be installing additional compression and cooling at the existing Iroquois Dover Compressor Station (Mainline Valve 21A) in Dover, NY. This would require approximately 7,700 horsepower and consume approximately 1,420 Dth/day of fuel. The addition of a new compressor at the Dover Compressor Station would cost a minimum of $30 million (approximately five times the cost of the proposed loop) as well as in excess of $4 million per year in operating costs due to the fuel consumed (assuming a monthly average of the New York City Gate Prices as published in Gas Daily for the 12 month period ending March 1, 2007 of $7.65/Dth) and due to higher levels of required maintenance. The proposed Wright loop segment will generate zero emissions, whereas an additional compressor at the Dover Compressor Station would generate approximately 17 tons of NOx per year. The proposed Wright loop segment provides a significant cost and advantage over the addition of another compressor at the Dover Compressor Station while minimizing environmental impacts.

10.2.1.1.3 Newtown Loop Segment

While Iroquois investigated various system alternatives for this loop segment, the only potentially feasible alternative to this loop segment would be installing additional compression beyond that already proposed at the proposed Milford Compressor Station (Mainline Valve 32) in Milford, CT which is currently proposed within Phase II of the 08/09 Expansion Project. This additional compression would add approximately 20,000 HP and would result in exceeding the threshold for regulation as a minor emissions source by the Connecticut Department of Environmental Protection unless much more stringent "Lowest Achievable Emission Rate" (LAER) NOx controls were installed in addition to the proposed "Best Available Control Technology" (BACT) low NOx combustors required for the minor source station proposed.. The additional compression would consume approximately 3,200 Dth/day, costing Iroquois' shippers an additional $9 million per year in fuel (assuming a monthly average of the New York City Gate Prices as published in Gas Daily for the 12 month period ending March 1, 2007 of $7.65/Dth).

Construction of an additional 20,000 horsepower at Milford would add other incremental costs as compared to the proposed pipeline looping (two Solar Titans would be required versus two Solar T70's as proposed). Because an additional 20,000 horsepower at Milford would otherwise result in a "major" emission source as defined by CT DEP, the installation of a Selective Catalytic Reduction ("SCR") system would be required. SCR equipment would have an estimated initial capital cost of more than $3

million and an estimated annual operating cost of more than $2.5 million[1]. In addition, potentially prohibitive LAER and major source requirements include incremental public safety (due to SCR ammonia storage), reliability, schedule and other impacts that would be minimized by the proposed minor source Milford Compressor Station. As such, the proposed Newtown loop segment provides a significant cost and environmental advantage over the addition of 20,000 HP at the proposed Milford Compressor Station.

10.2.1.2 Aboveground Facilities

10.2.1.2.1 Milford Compressor Station

To increase the throughput capacity of a natural gas pipeline, a pipeline operator (such as Iroquois) can "loop" the existing pipeline, or add compression, or use a combination of compression and looping. As natural gas travels down the pipeline, pressure within the pipe declines with distance. Compressor stations are used to restore pressure and increase pipeline capacity beyond that of the pipe alone. The term looping refers to placing additional segments of pipeline, parallel and connected to the existing pipeline. These segments act to reduce the rate of pressure drop in the pipe due to friction, and thereby increase the throughput capacity of the pipeline. Compressor stations can also be added to restore pipeline pressures more frequently along the pipeline, again thereby increasing the throughput capacity of the pipeline. The choice of how much loop to add, versus how much compressor horsepower is primarily an economic determination, that is optimized with such factors as, hydraulic requirements, pipeline reliability, constructability, environmental impact, and public impact.

Iroquois investigated various system alternatives for the Milford compressor station. The only potentially feasible alternative to this compressor station would be installing additional loop between the proposed Brookfield Transfer Compressor Station, which is part of the 08/09 Expansion Project, and the Connecticut shoreline at the Long Island Sound. However, this additional loop would add approximately 24 miles to the currently proposed 1.64 miles of Newtown loop segment. Construction of the additional loop would cost approximately $150 million. Installation of this additional loop would be through high population density areas, as well as areas that impact the Long Island Sound.

10.2.1.2.2 Brookfield Compressor Station

Eliminating the Brookfield Compressor Station has no viable alternatives because the Algonquin Gas Transmission system operates at a lower pressure than the Iroquois Gas Transmission System. To physically transfer gas volumes from the Algonquin system, as proposed by Keyspan and outlined in Resource Report 1, onto the Iroquois system compression facilities are required at a location where the two pipelines are adjacent to each other. The proposed Brookfield Compressor Station will be a transfer compressor and transfer lower pressure Algonquin gas volumes onto Iroquois' higher pressure system. Addition of looping or compression at other sites is also not a viable alternative because it does not address the need to physically transfer gas volumes for the Algonquin system to Iroquois' natural gas transmission system.

10.2.2 Potential Islander East Lateral

The Islander East Pipeline Project as proposed by Islander East Pipeline, L.L.C. (Islander East is an equally owned, limited liability company formed between subsidiaries of Spectra Energy and KeySpan Energy) involves the proposed construction of approximately 50 miles of new 24-inch diameter pipeline and other facilities to deliver new volumes of natural gas from Spectra's facilities in Connecticut to the

[1] Costs are in 2006 dollars.

KeySpan distribution system on Long Island, NY. Islander East Pipeline received a Certificate of Public Convenience and Necessity from FERC on September 18, 2002; however, Islander East is currently in litigation with the State of Connecticut over denial of State approvals. The outcome and timing of the litigation is uncertain; therefore, it is unlikely that these facilities could be available in time to meet the energy need of KeySpan.

10.3 ROUTE ALTERNATIVES

10.3.1 Pipeline Facilities

Several alternatives to the proposed loop segments were evaluated as part of the planning and design process for this project. The alternatives analysis was based on environmental and land use impacts as well as permanent easement acquisitions and overall project costs.

10.3.1.1 Methodology and Rationale for Alternative Route Selection

Iroquois has concluded, based on hydraulic modeling, engineering analysis and environmental evaluation, that the optimal locations for the looping segments are those identified in Resource Report 1. The selection of the major route alternatives discussed in Section 10.3.1.2 was dictated by several factors.

- Determination of most cost effective of technical solution (i.e. loop versus compression)
- Development of routing criteria
- Identification of potential routing alternatives
- Collection of data relative to each alternative
- Evaluation of potential environmental and land use impacts
- Evaluation of routing alternatives against routing criteria

Sources of existing information such as field reconnaissance, aerial photography, topographic maps from the United States Geological Survey, and National Wetland Inventory maps were used during the route identification and evaluation processes.

In evaluating the routing options for the required segments of pipeline loop, it was evident that given Iroquois' existing pipeline, the loop segments should be co-located with the existing pipeline right-of-way to the maximum extent possible. The use of co-location as a principle design element by Iroquois is necessitated not only by FERC guidelines which stress the corridor concept, but also due to the existing land use characteristics in the areas of the loop segments. The utility corridor created by Iroquois' existing pipeline, minimizes further environmental impacts, pubic disturbance, as well as construction costs. Siting pipeline facilities along existing corridors reduces the establishment of new corridors in previously undisturbed areas, while limiting the number of affected landowners.

Section 10.3.1.2 examines the major route alternatives identified during the project planning stage not selected due to factors such as greater environmental impact, increased numbers of directly affected landowners and potential disruptions to communities during the construction of the Project facilities. In general, the effects of the Project on environmental resources in the project area were determined to be essentially equivalent, and none of the alternatives examined appear to have sensitive environmental resources that would preclude the Project from receiving the necessary permits and approvals for construction and operation.

The main determinants used to select the preferred route over the other routes evaluated pertained to minimizing the number of affected landowners, constructability issues and Iroquois' desire to limit the extent of disruption on the communities potentially being affected during construction.

10.3.1.2 Major Route Alternatives

During the alternatives analysis conducted for the Project, major alternatives were examined in an attempt to minimize impacts along the loops segment alignments. For graphical representation of the alternative alignments considered during the siting process for the loop segments, please refer to Volume III – Appendix J.

Moving all of the looping downstream of the Brookfield Compressor Station would require an additional 29.4 miles of loop and increase the estimated project cost by approximately $182.3 million. The total looping downstream of the Brookfield Compressor Station would be approximately 31 miles.

This looping would parallel the existing mainline between the Brookfield Compressor Station and the Connecticut shoreline at the Long Island Sound. The loop would have to traverse through areas of high density population, as well as, impacting the Long Island Sound watershed area. This alternative was not considered feasible relative to cost or environmental impact avoidance.

10.3.1.2.1 Boonville Loop

Iroquois examined moving the Boonville loop downstream of the Wright Compressor Station which would require an additional 0.2 miles of loop while increasing the cost by an estimated $1.24 million. This alternative would increase the Wright Loop from 1.0 miles to approximately 6.9 miles in length.

The proposed 36-inch pipeline parallels the existing 30-inch Iroquois Mainline pipeline for the entire length of the proposed Boonville loop segment. The proposed loop segment begins approximately 1.4 miles downstream of the existing Iroquois Boonville Compressor station. Ease of constructability, minimal environmental impact and maintaining adequate distance from existing residences are favorable attributes of the proposed loop segment. The proposed Boonville loop segment starts at an existing Iroquois mainline valve assembly (MLV-8), providing a convenient location for the proposed valve/tie-in assembly. The proposed loop segment also avoids a railroad crossing which exists in the area between the Boonville Compressor Station and the start of the proposed Boonville loop.

10.3.1.2.2 Wright Loop

Iroquois examined moving the Wright Loop downstream of the Brookfield Compressor Station (Newtown looping segment) which would require an additional 4.36 miles of loop in Newtown and increase the estimated project cost by approximately $27.03 million. The Newtown loop segment would subsequently increase from 1.64 miles to 6.0 miles.

The proposed 36-inch pipeline parallels the existing 24-inch Iroquois Mainline pipeline for the entire length of the proposed Wright loop segment. The proposed loop segment begins immediately downstream of the existing Iroquois Wright Compressor station. Ease of constructability, minimal environmental impact and maintaining adequate distance from existing residences are favorable attributes of the proposed loop segment. The proposed Wright loop segment starts at an existing Iroquois mainline valve assembly (MLV-14), providing a convenient location for the proposed valve/tie-in assembly.

10.3.1.2.3 Newtown Loop

Immediately downstream of the proposed Brookfield Compressor station and into the Town of Newtown, the Iroquois pipeline parallels two existing Algonquin pipelines for a length of approximately two miles. Adding a fourth pipeline would require acquisition of right-of-way on residential property. At this time, Iroquois has chosen to avoid acquisition of new right-of-way in this area. Between the proposed Iroquois Brookfield compressor station and the Housatonic River Crossing in Shelton, Connecticut, the proposed Newtown pipeline loop segment represents the area of least residential impact. The majority of the proposed looping section is shielded by a natural tree barrier. Iroquois owns approximately one mile of the proposed 1.64 miles of proposed looping. As such, Iroquois would utilize land it already owns for the looping segment and greatly minimize residential impacts. The additional 0.64 mile of land is owned by the State of Connecticut, the Town of Newtown, a private land trust, and private landowners. Moving the Newtown loop further downstream toward Monroe, Shelton, or Milford, Connecticut impacts the Long Island Sound watershed area, requiring special permitting and construction techniques, resulting in a longer schedule for approvals and increased project costs. The proposed Newtown loop segment ends immediately adjacent to an existing road, providing a convenient location for the proposed valve/tie-in assembly.

Iroquois also considered locating this proposed loop section upstream of the proposed Brookfield Compressor station; however, this scenario would almost double the length of necessary looping to 3.1-miles instead of the proposed 1.64 miles in Newtown. Additionally, the looping would increase the pressure at the proposed Brookfield Compressor Station and consequently increase the horsepower requirements in Brookfield. As such, this alternative would increase environmental impact and construction costs.

The proposed 36-inch pipeline parallels the existing 24-inch Iroquois Mainline pipeline for the entire length of the proposed Newtown loop segment. The proposed loop segment begins approximately 9.5 miles downstream of the Iroquois Brookfield Compressor station, which will be constructed prior to the proposed 08/09 Expansion Project as part of the Iroquois MarketAccess Project. Ease of constructability, minimal environmental impact, adequate distance from existing residences, and hydraulic efficiency are favorable attributes of the proposed loop segment.

10.3.1.3 Minor Route Variations or Deviations

As proposed, the various preferred loop segment routes optimize the Project economics and constructability while minimizing impact to the environment. When evaluating minor alternative routes or minor route deviations, no particular route or deviation changed, avoided or minimized environmental conditions or potential impacts over the preferred alignments (i.e., the few available corridors considered for alternative route deviations impacted similar communities or existing conditions in the region). Additionally, any minor alternative routes/minor deviations would add additional length to the proposed pipeline, thus leading to potential increases in Project costs and environmental impacts.

A minor route variation was considered for the Newtown loop segment. Based on a landowner comment, Iroquois considered moving the start of the loop segment downstream approximately 800 feet. This is not feasible because it would require access to the valve site along the existing right-of-way down a slope. In addition, the 800 feet would need to be added to the end of the loop segment. The terrain immediately downstream of the proposed project ending point is not feasible for a tie-in valve location due to the steep slope. Iroquois proposes to mitigate this landowner concern using tree/shrub screening for the proposed valve site at the beginning of the loop segment. Therefore, changing the beginning location for this loop segment is not deemed to be necessary.

Additionally, another variation was considered for the Newtown loop segment. Based on Newtown's First Selectman Rosenthal's comments as read by Robert Sibley at the June 19, 2007 FERC Scoping Session held at the Brookfield High School, Iroquois was asked to evaluate the feasibility of relocating the looping section to the opposite side of the existing mainline in an attempt to locate the looping segment further away from residents at the end of Canterbury Lane in Newtown, Connecticut. Iroquois conducted a field review of this request and felt it was impractical for several reasons. First and foremost, the topography of the land on the opposite side of the pipeline did not lend itself to pipeline construction due to steep and undulating slopes. Moreover, this would place the pipeline on land that Iroquois does not own or control and would necessitate a crossing of the mainline, at some point, to regain access to Iroquois land. Such a crossing is also not practical due to the existing ledge conditions would create a difficult bore beneath Iroquois' existing mainline.

10.3.1.4 Alternative Aboveground Facility Sites

The only aboveground facilities proposed within Phase I of the 08/09 Expansion Project are valve / tie-in assemblies at each end of the three pipeline loop segments. These valve assemblies are considered minor aboveground facilities, and, therefore no additional alternatives analysis is required for the siting of these facilities. For discussion of the alternatives to the major aboveground facilities proposed within the 08/09 Expansion Project, please refer to section 10.4.

10.4 ALTERNATIVE ABOVEGROUND FACILITY SITES

10.4.1 Milford Compressor Station

Alternatives on the existing Iroquois system were evaluated to effectuate the delivery of the specified natural gas volumes for this Project. The system flow analysis conducted for the Project determined that the overall optimal system design would include the pipeline loop segments proposed in Phase I, additional compression at Brookfield, CT and a new compressor station adjacent to the existing Iroquois meter station on the property owned by Iroquois in Milford, CT. This site was previously proposed as a compressor station site by Iroquois as part of the ELI Project in Docket No. CP02-52 and was reviewed by the Commission in the Draft Environmental Impact Statement issued in that docket. Utilizing this property avoids the clearing of any forest habitat and avoids impacts to wetlands, watercourses and significant wildlife habitats. Expanding the existing facilities at the Milford site was determined to be the preferred alternative to minimize environmental and community impacts as opposed to purchasing and developing a new site location along the existing Iroquois Mainline.

The location of the proposed compressor station allows Iroquois to utilize a site that has all of the following benefits, which are summarized below by resource report:

Resource Report 1 – General Project Description

- Iroquois owns the property where the compressor station is proposed.
- The entire site was previously disturbed through prior industrial land use and construction of the adjacent railroad bed and; therefore, all of the area Iroquois proposes to utilize has been previously disturbed and remains vacant.
- Iroquois has existing pipeline facilities and a meter station at this site, thereby avoiding the need to construct additional pipeline facilities.

- The location of the site on the property allows Iroquois to utilize and upgrade an existing access off New Oronoque Road rather than construct an entirely new access road to the site.

Resource Report 2 – Water Use and Quality

- The size of the project site and presence of Iroquois' pipeline system has allowed Iroquois to design the development plan outside of federal and state wetland areas and waterbodies.
- The project site is outside of any EPA-designated sole source aquifer and is not located in a State designated aquifer protection area.
- Bedrock outcrops or near surface bedrock are not expected to be encountered during construction. Therefore, no mitigation due to blasting is expected to be required for any nearby private water supply wells.

Resource Report 3 – Vegetation and Wildlife

- Forest habitat clearing is limited to minor early-successional saplings dominated by Russian olive, a non-native, invasive species. No impacts to mature forest habitat will occur.
- Non-forested vegetative habitats in the project area are limited to mowed lawn, successional old-field and successional shrubland. The successional old field/shrubland habitat is dominated by species, such as common reed (*Phragmites australis*), goldenrod (*Solidago* spp.), and Russian olive (*Elaeagnus umbellate*), which are relatively low with respect to wildlife habitat value.
- Significant impacts to sensitive environmental resources are not expected. Iroquois has received confirmation from the U.S. Fish and Wildlife Service ("USFWS") and the Connecticut Department of Environmental Protection ("CTDEP") – Natural Diversity Database that the project area does not contain known populations of federally or state listed threatened or endangered species or significant habitats located in the vicinity of the project site (Tur 2007 and McKay 2007).

Resource Report 4 – Cultural Resources

- There have been no sensitive cultural resources identified. The Connecticut State Historic Preservation Office has determined that the construction of the compressor station at this site will have no effect upon Connecticut's archeological heritage. No mitigation measures are required with respect to sensitive cultural resources for this site.

Resource Report 5 – Socioeconomics

- Iroquois does not anticipate impacts on the local infrastructure. The station will have an on-site well and septic system, thus no water or sewer connections to municipal systems are involved. New Oronoque Road will not have to be improved to accommodate the station.
- No residences or businesses would be displaced by this project, as Iroquois owns the property.
- The site is relatively close to temporary housing for construction crews, as it is close to hotel accommodations along Interstate I-84.
- The location of the station at this site does not constitute a disproportionate impact on minorities, low-income communities, or Native American populations.

Resource Report 6 – Geologic Resources

- The site does not appear to possess geologic hazards (i.e. significant seismic activity, landslides, land subsidence).
- The site will not affect existing or future mineral extraction operations.
- The site does not appear to have near surface bedrock or bedrock outcrops, thus blasting is unlikely.
- Significant paleontological resources are unlikely to be encountered given its previous land disturbance and geology.

Resource Report 7 - Soils

- Project site does not encompass agricultural fields, residential lands or wetlands.
- The Natural Resources Conservation Service does not map prime farmland soils at this site.
- No significant erosion potential exists at this site, as it is relatively level.

Resource Report 8 – Land Use and Aesthetics

- The location of the site within an existing industrial area allows Iroquois to minimize visual impacts.
- There will be no modifications to the existing land use of the property.
- No planned residential or commercial developments have been identified by the City of Milford in the Project's vicinity.

Resource Report 9 – Air and Noise Quality

- The results of the air quality analysis document that construction of the compressor station at the project site would not cause or contribute to violations of air quality standards, or consume more than the emissions increments allowed for new sources.
- The compressor station equipment will be selected and designed to result in projected sound levels associated with the proposed compressor station and gas coolers which will be 55 dB(A) Ldn, or lower, at the nearest NSA property line. It is expected that the Leq sound levels produced by the compressor station operation will be less than 55 dB(A) Ldn at all other further NSAs and typically below the ambient hourly Leq sound levels measured at each NSA. Furthermore, 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) Ldn requirement.

Resource Report 11 – Reliability and Safety

- The safety and reliability of the proposed compressor station would meet or exceed Office of Pipeline Safety standards, regardless of the site selected.

Resource Report 12 – PCB Contamination

- The project does not involve the replacement, abandonment by removal or abandonment in-place of pipeline facilities determined to have polychlorinated biphenyls (PCBs) in excess of 50 parts per million ("ppm") in pipeline liquids. This situation does not differ by site.

Resource Report 13 – Additional Information Related to LNG Facilities

- Project does not involve the construction of a Liquefied Natural Gas facility. This situation does not differ by site.

10.4.2 Brookfield Compressor Station

As part of the MarketAccess Project (Docket No. CP02-31-002), Iroquois presented numerous site alternatives to the proposed location off High Meadow Road in Brookfield. These alternative sites are summarized below and depicted on figure 10.4-1 in Volume III – Appendix J. In the Supplemental Final Environmental Impact Statement and Certificate issued by FERC for the MarketAccess Project, the proposed location off High Meadow Road was determined to be the most suitable location relative to environmental and community impact minimization. Additionally, as the Brookfield Compressor Station facility will be transfer compressor facility, proximity of the site to Algonquin's system is a requirement.

10.4.2.1 Alternative Sites in Newtown, CT

Four alternative sites in Newtown, Connecticut were reviewed by Iroquois and FERC as part of the Docket No. CP02-31 proceeding for the MarketAccess Project. A brief description of each site is provided below, and graphic depictions of the locations are provided in Figure 10.4-1 in Volume III – Appendix J.

10.4.2.1.1 Site 1

Site 1 is approximately 80 acres in size located about one-half mile downstream (east of the approved Brookfield Compressor Station site). It is bordered by and visible from Connecticut Route 25 (CT RT 25) to the east and Farrell Road to the west. This site was found to generally consist of a large wet meadow and red maple swamp adjacent to a steep, forested hillside. Sufficient land area was not available on this site given the expansive wetland system and presence of residential properties adjacent to the pipeline ROW, including on the hillside. Also, the CTDEP (2005) identified a substantial portion of this site as state-listed rare species habitat.

10.4.2.1.2 Site 2

Site 2 is approximately 120 acres in size and located approximately one mile downstream (east) of the preferred location. The site is located between Route 25 and Butterfield Road. During the proceeding for the MarketAccess Project, it was determined through site investigations that this property was in the process of being developed for residential purposes and was no longer a viable alternate site due to the lack of sufficient land area.

10.4.2.1.3 Site 3

Site 3 is located between Butterfield Road and Georges Hill Road, approximately two miles downstream (east) of the approved compressor station location. This site is characterized by strong topographic relief and would involve extensive grading and filling to allow construction of any compressor station facilities. It is primarily undeveloped forest with a stream and wetland complex along the southeastern corner of the near Georges Hill Road, although relatively new homes are present in locations along the existing Iroquois Mainline ROW in this area. Iroquois discounted this alternative during the MarketAccess proceeding because the amount of developable area was considered too small to construct the required compressor station and the greater impacts to environmental resources than the High Meadow Road site.

10.4.2.1.4 Site 4

Site 4 is approximately 55 acres in size and located approximately three miles downstream (east) of the approved location along the west side of Hanover Road. A railroad abuts a portion of the southern site boundary, and a large wetland complex dominates the eastern half of the site.

Iroquois discounted this alternative because the amount of developable area was considered too small to construct the required compressor station and because of the potential impacts to environmental resources. Also, extensive blasting may be needed to contend with the outcrops and shallow bedrock, which could affect nearby residences along Hanover Road.

10.4.2.2 Vale Road – Brookfield, CT

In FERC Docket No. CP02-31, the Town identified an alternative site for the Commission to consider. This alternative site, which is approximately 45 acres in size, is a smaller site than the proposed High Meadow Road site and; therefore, it may not provide a better buffer, visual or otherwise, from any future development in the area. Construction of an additional compressor station at the Vale Road site would impact forest resources, result in permanent wetland alteration, potentially impact two known cultural resource sites and affect new landowners. In the SFEIS for the MarketAccess Project, FERC determined that "…construction and operation of the Brookfield Compressor Station and related facilities at the proposed High Meadow Road site can be accomplished in a safe and reliable manner. Therefore we do not recommend use of the Vale Road alternative site…" (FERC 2006).

10.4.2.3 Preferred Location

The location of the proposed compressor station modifications allows Iroquois to utilize a site that has all of the following benefits:

- Iroquois owns the property where the compressor station is proposed.
- The entire site was previously disturbed through prior industrial land use.
- Iroquois has existing facilities at this site, thereby avoiding the need to construct new facilities at a different location.
- The location of the site on the property allows Iroquois to utilize the existing access road approved in the certification of the Brookfield Compressor Station.
- The size of the project site and presence of Iroquois' pipeline system has allowed Iroquois to design the development plan outside of federal and state wetland areas and waterbodies.
- The project site is outside of any EPA-designated sole source aquifer and is not located in a State designated aquifer protection area.
- Bedrock outcrops or near surface bedrock are not expected to be encountered during construction. Therefore, no mitigation due to blasting is expected to be required for any nearby private water supply wells.
- The proposed modifications will not adversely affect wildlife, wildlife habitats or rare species.
- There have been no sensitive cultural resources within the Project area.
- There will be no modifications to the existing land use of the property.

- The results of a pending air quality analysis will accompany and support Iroquois' application for an air permit to the CT DEP. The analysis must document to the DEP's satisfaction that construction of the compressor station modifications at the project site would not cause or contribute to violations of air quality standards, or consume more than the emissions increments allowed for new sources. The CT DEP must concur with this determination prior to issuing a final air permit to construct and operate the proposed station modification.
- The compressor station equipment will be selected and designed to result in projected sound levels associated with the proposed compressor station modifications which will be 45 dB(A) Leq and 52 dB(A) Ldn, or lower, at the nearest NSA property line. It is expected that the Leq sound levels produced by the compressor station operation will be less than 45 dB(A) Leq at all other further NSAs and typically below the ambient hourly Leq sound levels measured at each NSA. Furthermore, 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) Ldn requirement.

10.5 REFERENCES

FERC, 2002a. Islander East Pipeline Project, Final Environmental Impact Statement. Docket Number CP01-384-000. Washington, D.C.

FERC, 2002b. Eastern Long Island Extension Project. Docket Number CP02-52-000. Washington, D.C.

FERC, 2006. NE-07 Project, Supplemental Final Environmental Impact Statement. Docket Number CP02-31-002 (MarketAccess Project). Washington, D.C.