# Long Island Local Reliability Interface Transfer Capability Test
# To be Applied as part of Interconnection Studies
# Effective Date: March 1, 2015

## I. Introduction

As per Attachments S, X and Z of the NYISO's Open Access Transmission Tariff ("OATT"), the NYISO offers Energy Resource Interconnection Service to proposed generation and merchant transmission facilities under the Large Facility Interconnection Procedures and Small Generator Interconnection Procedures (collectively, the "Interconnection Procedures") in compliance with the NYISO Minimum Interconnection Standard ("MIS"). All Large Facilities and Small Generating Facilities wishing to sell Energy and Ancillary Services in the NYISO markets must interconnect in compliance with the NYISO MIS. The NYISO evaluates an Interconnection Request for compliance with the MIS throughout the interconnection study process. The interconnection studies conducted under the Interconnection Procedures are conducted in accordance with requirements and guidelines of the Applicable Reliability Councils, and the Transmission District, to which the facility proposed to interconnect ("Applicable Reliability Standards"). The interconnection study process includes short circuit/fault duty, steady state (thermal and voltage) and stability analyses designed to identify the Attachment Facilities, Distribution Upgrades and System Upgrade Facilities (SUFs) required for the reliable interconnection of Large Facilities and Small Generating Facilities to the New York State Transmission System or to the Distribution System in compliance with the NYISO MIS. Note that, under the NYISO Interconnection Procedures, the term Distribution System does not include LIPA's distribution facilities.

As per Attachment S of the NYISO OATT, the Class Year Interconnection Facilities Study ("Class Year Study") is the process used to identify and cost allocate the System Upgrade Facilities that are required to ensure that New York State Transmission System facilities are sufficient to reliably serve existing load and meet load growth and changes in load patterns. The Class Year Study evaluates projects for compliance with NYSRC Reliability Rules, NPCC Basic Design and Operating Criteria, NERC Planning Standards, NYISO rules, practices and procedures, and the Connecting Transmission Owner criteria included in FERC Form No. 715 (collectively "Applicable Reliability Requirements").

This Long Island Local Reliability Interface Transfer Capability Test shall be considered as an Applicable Reliability Standard under Attachments X and Z of the NYISO OATT and as an Applicable Reliability Requirement under Attachment S of the OATT because it is a local Transmission District (i.e. Connecting Transmission Owner) reliability criterion. The Long Island Power Authority ("LIPA") considers preservation of the transfer capability of LIPA's internal interfaces to be essential to ensure the reliability and integrity of the LIPA transmission system. The purpose of this testing requirement is to ensure LIPA's transmission's system reliability and integrity is not jeopardized as a result of proposed resource additions and that LIPA internal interface transfer capabilities are maintained to support the system load on Long Island (Zone K), within certain constraints. The criterion will be used to assess proposed generation, merchant

transmission or other power resources interconnecting to the Long Island Power Authority's (LIPA's) electric transmission system. Application of this criterion will be performed in conjunction with the NYISO's Minimum Interconnection Standard (MIS) procedure as part of the NYISO interconnection study process, particularly the System Reliability Impact Study (SRIS) and the Class Year Study processes. Upgrades identified through application of this local reliability criterion shall be considered SUFs under the NYISO MIS.

This criterion and associated testing requirements do not supersede formal study requirements of the NYISO Large Facility Interconnection Process, but rather serves as an additional study requirement for any proposed interconnection within LIPA system. The analysis will identify system reinforcements necessary on the LIPA system in order for a project to interconnect and to ensure LIPA's internal interface transfer capabilities are maintained to support the system load.

## II. Assumptions and Interface Definitions

1. Common study assumptions for this study are as follows:

   A. The impact of a Project will be assessed at the maximum proposed summer output level, as specified by the Project developer in their Interconnection Request (up to summer name plate rating, or Dependable Maximum Net Capability (DMNC) if available, whichever is higher) regardless of project technology. It shall consider all supplemental power output associated with facility/technology (e.g., duct firing for generators with such capability, etc.).

   B. Based on the location of the Project, all other resources within a specific Long Island region(s) will be dispatched at a level that reflects forced outage rates. Renewable type resources such as solar and wind may be dispatched at less than full output, consistent with NYISO practices.

   C. Project power factor shall be based on reactive capability curve and reactive needs of system.

   D. The impact of the proposed Project will be evaluated for summer peak load conditions.

   E. Thermal analysis will be conducted to assess the reliability impact, with and without the Project.

   F. The following thermal criteria should be utilized:

| System Condition | Maximum Allowable Facility Loading |
|---|---|
| Pre-contingency | Summer Normal Rating |
| Post-contingency | Summer LTE Rating |

   Normal transfer criteria and contingency testing (N-1) will apply.

G. Phase angle regulators (PARs), switched shunts, and load tap changing (LTC) transformers will be modeled as regulating pre-contingency and non-regulating post-contingency. PARs associated with the Lake Success to Jamaica (901) and Valley Stream to Jamaica (903) inter ties will be held constant to maintain the power wheel to Con Edison (286 MW). PARs associated with the Y49 inter tie may be adjusted, depending upon the location of the Project and the LIPA interface(s) being tested (refer to Table 1). The PAR associated with the NNC inter tie may be adjusted, depending upon the location of the Project and the LIPA interface(s) being tested (refer to Table 1). However, maximum normal Northport Interface power exit capabilities will be observed. In addition to PARs on ties, the LIPA system has several internal PARs that can be used to maximize generator exit capability (e.g., Barrett and Northport bus) and one at the Pilgrim substation that balances flows on the 138 kV and 69 kV systems. When assessing the system, the PARs schedules should be optimized to allow maximum transfers. These schedules can vary based on the transfer test being performed. Once set however, the angles shall be maintained for testing contingency impacts for that scenario.

H. HVDC Inter ties. The Neptune HVDC power flow will be held constant to a specific base case level, generally full import capability. The Cross Sound Cable (CSC) power flow will typically be dispatched at full import capability, but may be adjusted depending upon the location of the Project and the LIPA interface(s) being tested (refer to Table 1).

I. If applicable, SVC (Static VAR Compensators) and FACTS (Flexible AC Transmission Systems) devices will be set to zero pre-contingency and allowed to operate to full range post-contingency.

J. Load forecast uncertainty (LFU) is incorporated into the evaluation for Part 2 of the deterministic load flow interface transfer test to account for the future load variations. Refer to Table 1 within Section III, column entitled “Steps for Testing Process”.

K. All major assumptions will be documented in the study report.

2. Major Definitions section:

- CLR – Central Load region, geographically Eastern Nassau and Western Suffolk Counties
- NNC – Northport to Norwalk Harbor 138 kV inter tie to New England
- DMNC – Dependable Maximum Net Capability, maximum expected net capacity from the resource (excludes use by the resource not transferred to the grid, e.g., station service)
- LFU – Load Forecast Uncertainty – Increase in peak demand, according to the latest load forecast.

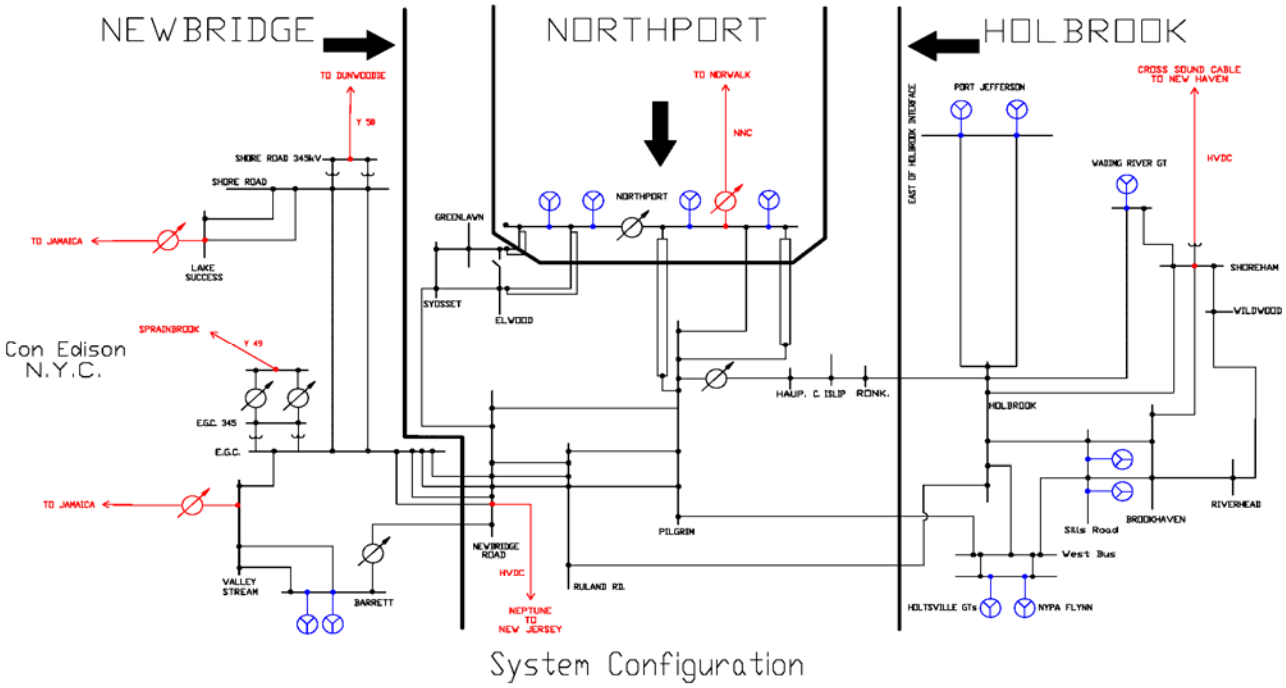
3. LIPA Interfaces - The Long Island Local Reliability Interface Transfer Capability Test is designed to insure that LIPA internal interface transfer capabilities are

maintained to support the system load on Long Island (Zone K), within certain constraints. This involves the transfer of power output of resources within LIPA's load centers (West, Central, East, and Northport), as well as tie line capability (i.e., to insure support from LIPA ties are unaffected). The Long Island Local Reliability Interface Transfer Capability Test maximizes transfer capability West to East as well as East to West (depending on location of target resource) to assure no bottling and that all resources can reliably serve the system load such that the internal interface capability is sufficient to allow the output of all resources in one load center to be transferred to the adjacent load center. When a new unit is being considered, the unit should be evaluated based on its location.

For example, a unit located East of Holbrook would be tested using two different tests. For the Part 1 test, generation East of Holbrook would be dispatched along with CSC, and generation and imports in the remaining regions would be reduced as needed. For the Part 2 test, LFU would be applied to the total system load, and all generation units in the East of Holbrook and Central and Northport region would be dispatched. Generation in the West of Newbridge region would be reduced as needed. Table 1 within Section III summarizes the required resource dispatches and application of LFU, reflecting the location of the Project.

The following diagram shows LIPA major facilities and interfaces.

## LIPA System and Transmission Interfaces




4. This section offers definitions of LIPA interfaces as noted above and in the LIPA T&D Planning Criteria and Guidelines. Implementation of this procedure is based on the ability to transfer the output of resources across LIPA's internal interfaces.

    A. The Central Load Region (CLR) is generally defined as Eastern Nassau and Western Suffolk area as bounded by the Newbridge and Holbrook interfaces, where almost half of the LIPA system load is located. Interface exports and imports are defined relative to the flow of energy to and from the CLR (interface export is the flow into the CLR; interface import is a flow out of the CLR). The primary path for power transfers to LIPA's CLR is across three internal transmission interfaces: Newbridge Road, Northport and Holbrook. The paths comprising these interfaces are used to transfer power from LIPA interconnections (off-Island sources) and major generating facilities such as Northport, Barrett, Far Rockaway, Glenwood, Port Jefferson, Holtsville and Shoreham/Wading River to the LIPA CLR.

    B. The Northport Region/Interface is used to define the amount of power from the Northport Power Station and imports over the Northport to Norwalk Harbor (NNC) interconnection to New England (Northeast Utilities) that can be transferred to the LIPA system.

The Northport interface is comprised of the flow across the following circuits:

Northport – Pilgrim (138-677 A&B)
Northport – Pilgrim (138-679 A&B)
Northport – Pilgrim (138-672)
Northport – Elwood (138-678 A&B)
Northport – Elwood (138-681 A&B)

C. The Newbridge Region/Interface is defined by an imaginary north-south line running just west of the Syosset, Newbridge Road and Bellmore substations. It is used to define the amount of power from western Long Island generators and imports over the Consolidated Company of New York (Con Edison) ties that can be transferred to the LIPA CLR.

This interface is comprised of the flow across the following circuits:

East Garden City – Newbridge Road (138-462)
East Garden City – Newbridge Road (138-463)
East Garden City – Newbridge Road (138-465)
East Garden City – Newbridge Road (138-467)
Freeport – Newbridge Road (138-461)
Mitchell Gardens – Newbridge Road (69-475)
Meadowbrook – Newbridge Road (69-466)
Oyster Bay -- Syosset (69-533)
Jericho – Newbridge (69-474)
Baldwin – Bellmore (69-459)
Roosevelt – Bellmore (33-421)
Meadowbrook – Bellmore (33-432 & 33-433)
Merrick – Bellmore (33-417)

D. The Holbrook Region/Interface is used to define the amount of generation that can be transferred from generating sites located in the area east of a north-south imaginary line just west of Port Jefferson and Holbrook substations.

This interface is comprised of the flow across the following circuits:

Holbrook – Ronkonkoma (138-875)
Holbrook – Ruland Road (138-882)
West Bus – Pilgrim (138-881)
Port Jefferson – Stony Brook (69-877)
Holbrook – Nesconset (69-673)
Holbrook – MacArthur (69-859)
West Bus – Patchogue (69-841)
Holbrook – Bohemia (69-775)

## III. Testing Process

Deterministic Load Flow

Table 1 below summarizes the testing process for LIPA's internal interfaces. In all cases the new resource is dispatched at the maximum proposed summer output level, as specified by the Project developer in their Interconnection Request (up to summer name plate rating, or Dependable Maximum Net Capability (DMNC) if available, whichever is higher). The testing below is based on the existing LIPA system generation and load profile and the test methodology will need to revisited if a significant shift in generation and or load pattern occurs.

TABLE 1 – LIPA Internal Interface Testing Process

| Steps for Testing Process | New Resource Location (New resource dispatched at maximum proposed summer output level) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Newbridge Interface | | | | Central/Northport Interface | | | | Holbrook Interface | | | |
| | Remaining Generation Dispatch | | | LFU | Remaining Generation Dispatch | | | LFU | Remaining Generation Dispatch | | | LFU |
| | West of Newbridge | Central/ Northport | East of Holbrook | | West of Newbridge | Central/ Northport | East of Holbrook | | West of Newbridge | Central/ Northport | East of Holbrook | |
| Part 1 | Reflecting forced outage rates (Y49 / Y50 Imports Max) | Reduced | Reduced | N/A | Reduced | Reflecting forced outage rates (NNC Import Optimized) | Reduced | N/A | Reduced | Reduced | Reflecting forced outage rates (CSC Import Max) | N/A |
| Part 2 | N/A (see Note 2) | | | N/A | Reduced (Net Imports > 0) | Reflecting forced outage rates (NNC Import Optimized) | Reflecting forced outage rates (CSC Import Max) | Apply LFU System Wide | Reduced (Net Imports > 0) | Reflecting forced outage rates (NNC Import Optimized) | Reflecting forced outage rates (CSC Import Max) | Apply LFU System Wide |

Notes:

1. Both the Part 1 test and the Part 2 test need to be performed, depending upon the location of the Project. Results and criteria violations shall be documented for both Parts. System upgrades shall be identified to mitigate the most severe of the Part 1 or Part 2 tests.
2. For the Part 2 test: Given the present LIPA system generation and load profile, stressing the Holbrook Interface and the Central/Northport Interface is not required for a Project located in the Newbridge Region. The Part 2 test is required for Projects located in the Central/Northport and Holbrook regions to ensure interface transfer capabilities are maintained to support the system load.
3. Given the conservative nature of the Part 2 test, an increase in LIPA system load will be implemented (load forecast uncertainty).
4. For Projects located in the Holbrook region or the Central/Northport region, the Part 2 test allows for a reduction in West of Newbridge generation dispatch and a reduction in Con Edison – LIPA import levels. Net Con Edison – LIPA import levels would be maintained at zero MW or greater (Y49 + Y50 flow - wheel to Con Edison shall be maintained greater than 0 MW).

Internal interface transfer capabilities shall be maintained to support the system load on Long Island (Zone K), within certain constraints, such that a new resource output can be transferred to the load without creating any system normal or contingency overloads. If thermal criteria violations are identified, or if internal interface transfer limitations are identified, then system upgrades to mitigate those limitations will be identified and considered.

## IV. Summary

The Long Island Power Authority ("LIPA") considers preservation of the transfer capability of LIPA's internal interfaces to be essential to ensure the reliability and integrity of the LIPA transmission system. The purpose of this testing requirement is to ensure LIPA's transmission's system reliability and integrity is not jeopardized as a result of proposed resource additions and that LIPA internal interface transfer capabilities are maintained to support the system load on Long Island (Zone K), within certain constraints.

Any resource addition to Long Island transmission system shall be tested as outlined above to ensure the reliability of the system is maintained. Upgrades identified through application of this local reliability criterion shall be considered SUFs under the NYISO MIS.

## V. References

1) LIPA T&D Planning Criteria and Guidelines

http://www.lipower.org/pdfs/company/projects/energyplan10/energyplan10-e6.pdf

2) NYISO Tariffs - Open Access Transmission Tariff (OATT) - 25 OATT Attachment S; Rules To Allocate Responsibility for the Cost of New Interconnection Facilities

http://www.nyiso.com/public/markets_operations/documents/tariffviewer/index.jsp