NEW YORK INDEPENDENT SYSTEM OPERATOR

MANUAL 23

Transmission Expansion and Interconnection Manual

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Revision History

Version	Date	Revisions
2.1	**10/30/2015**	**Additional updates are being made to this manual, including updates to reflect revisions to Attachments S, X and Z of the OATT effective February 18, 2013 (FERC Docket Nos. ER13-588-001 & ER13-588-002) and revisions to Attachments X and Z effective February 14, 2014 (FERC Docket No. ER14-627-000)** **Global** ➢ Reformatted per new template to standardize presentation ➢ Standardized labeling and numbering of graphical and tabular material **Section 2.4.2** ➢ Update the MW threshold for Requiring a Transmission System Impact Study (SIS) **Section 2.4.3** ➢ Elimination of redundant language **Attachment C** ➢ Removed and updated all cross-references. Incorporated into the Transmission Congestion Contracts Manual **Attachment D** ➢ Corrected footnote cross-references
2.0	**11/01/2012**	**Significant update and rewrite**
1.0	**09/01/1999**	**Initial Release**

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1. INTRODUCTION

The New York Independent System Operator, Inc.'s (NYISO's) Open Access Transmission Tariff (OATT) includes processes for parties to pursue construction of new facilities proposed to become part of the New York State (NYS) Transmission System (transmission expansions), and interconnection of new generation, load, and merchant transmission facilities to the NYS Transmission System (Interconnections). [Note that *Interconnection* also includes new interconnections of small generators to FERC-jurisdictional distribution.] The purpose of this Transmission Expansion and Interconnection Manual (TEI Manual) is to provide interested parties with a road map of the NYISO's transmission expansion and interconnection processes. The manual also will describe the transmission study criteria, guidelines, procedures and practices used in these processes. Other NYISO documents related to these processes are included as attachments to this manual.

The scope of this manual is limited to the processes and procedures pertaining to applications for, and performance of, studies related to the NYISO transmission expansion and interconnection processes, which potentially lead to the construction, installation, and commercial operation of new generation, load, or transmission facilities that become part of, or connected to, the NYS Transmission System. Business topics related to commercial operation or rights that may pertain to transmission expansions or new interconnections are not covered in this manual, except by reference.

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2. TRANSMISSION EXPANSION PROCESS

2.1 Introduction

The NYISO Transmission Expansion process is described in Sections 3.7 and 4.5 of the OATT. The processes described in each of these sections are identical, but Section 3.7 relates to requests for Firm Point-to Point Transmission Service, and Section 4.5 relates to requests for Network Integration Transmission Service. This section of the manual will walk through that process and cite references to the OATT and other documents that cover various topics related to the process.

2.2 What is a Transmission Expansion?

A transmission expansion is the addition or modification of facilities of the NYS Transmission System that may be proposed or requested by an Eligible Customer under Sections 3.7 or 4.5 of the OATT for the purpose of creating incremental transfer capability, or to address reliability or other operational concerns. The Transmission Expansion process applies to upgrades or additions of facilities owned by the New York Transmission Owners (NYTOs). Transmission projects developed by entities that are not Transmission Owner signatories to the ISO Related Agreements – defined as Merchant Transmission Facilities under Attachment X of the OATT - fall under the Interconnection process rather than the Transmission Expansion process (see Section 3 – Interconnection Process). The Transmission Expansion process does not apply to Attachment Facilities, System Upgrade Facilities (SUFs), or System Deliverability Upgrades (SDUs) identified in the Interconnection process.

2.3 Information about the Transmission Expansion Process

2.3.1 Who can initiate a transmission expansion?

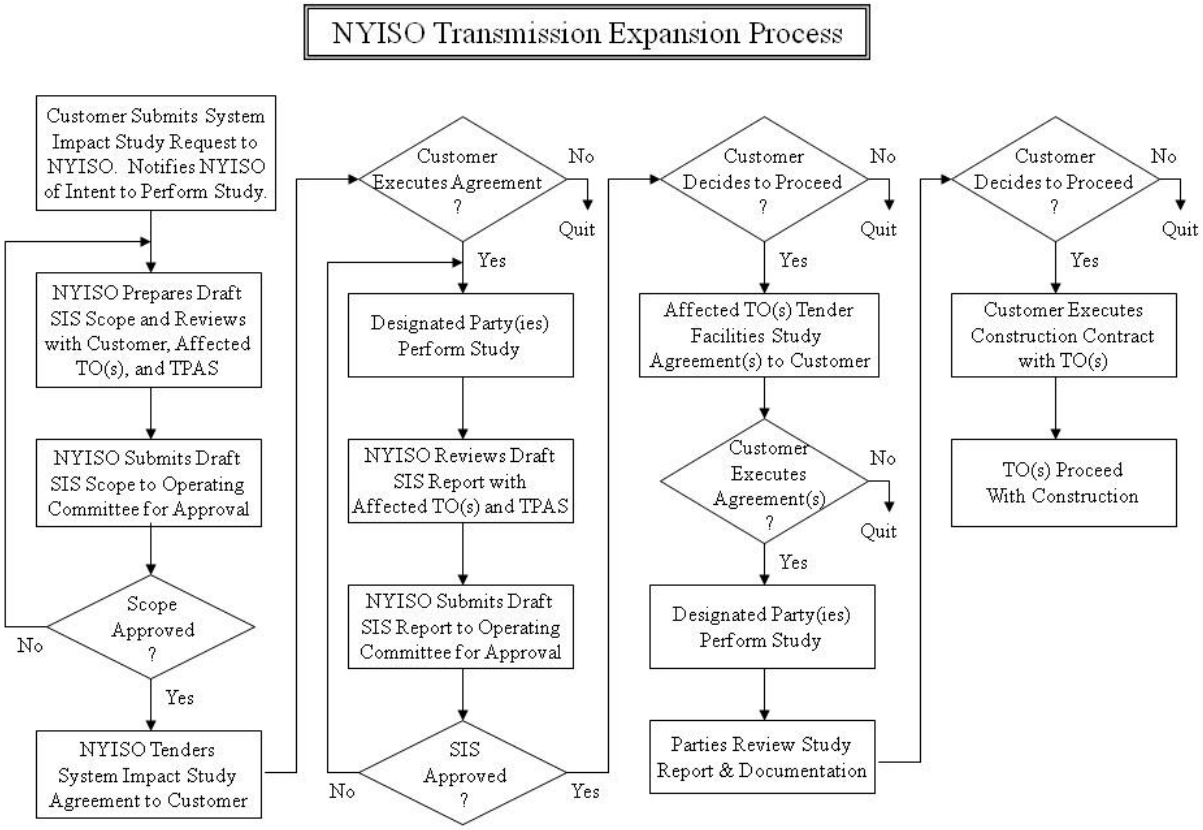
A transmission expansion may be initiated by any Eligible Customer as that term is defined in the OATT.

2.3.2 Scope and Basic Steps of the NYISO Process

The NYISO Transmission Expansion process includes studies to evaluate and identify the new facilities that would be included in the transmission expansion, and procedures for moving forward with construction, installation and operation of the new facilities from the standpoint of the NYISO and the applicable Transmission Owners. The NYISO process does not include licensing, permitting, or other processes that may be required by governmental authorities or other entities outside the NYISO process.

At a high level, the basic steps of the NYISO Transmission Expansion Process are shown in the process diagram below. These basic steps will be covered in more detail in subsequent sections.

Figure 2-1 Overview of the NYISO Transmission Expansion Process



2.3.3 What costs are involved?

First, the Eligible Customer ("Customer") would be required to reimburse the NYISO and Affected Transmission Owner(s) for their respective costs for the System Impact Study and Facilities Study. The Customer confirms agreement to pay these costs by executing the respective study agreements. (See Sections 3.7.2 and 4.5.2 of the OATT regarding System Impact Study costs and Sections 3.7.4 and 4.5.4 regarding Facilities Study costs.)

Following the studies, if the Customer decides to go forward with the transmission expansion, the Customer will be required to pay the applicable facilities costs and construction costs under the terms of the construction contract(s) executed with the affected Transmission Owner(s) and the constructing entity, if other than the affected Transmission Owner(s). (See the last paragraphs of Sections 3.7.4 and 4.5.4 of the OATT.)

2.3.4 How long does it take?

The time frames for the NYISO to meet its obligations regarding the System Impact Study are outlined in Sections 3.7.3 and 4.5.3 of the OATT. The time frames for the affected Transmission Owner(s) to meet various obligations regarding the Facilities Study are outlined in Sections 3.7.4 and 4.5.4 of the OATT.

Section 3.7.6 of the OATT states that, "the Transmission Owner(s), in coordination with the ISO, shall use due diligence to add necessary facilities or upgrade their transmission systems within a reasonable time." The construction contract(s) would include a schedule of milestones for the construction of facilities related to the transmission expansion.

2.3.5 Who is involved in the process?

The Customer, NYISO and affected Transmission Owner(s) are the primary parties involved in the scoping and performance of the System Impact Study and the Facilities Study. In some cases, the Customer and affected Transmission Owner may be the same party. Also, each of the parties may hire consultants or other third parties to perform or assist in parts of the study for which the party is responsible. The NYISO Transmission Planning Advisory Subcommittee (TPAS) and Operating Committee are involved in the System Impact Study step of the process. Operating Committee approval of the System Impact Study scope and the System Impact Study report are requirements of the process under the OATT and the ISO Agreement. TPAS reviews each of those items prior to submittal to the Operating Committee.

The Customer and affected Transmission Owners are the primary parties involved in the construction phase of the process. NYISO is not involved in the construction of the transmission expansion, except to approve certain related scheduled outages as may be required.

NYISO determines the award of incremental TCCs, if any, related to the transmission expansion.

2.4 System Impact Study

Reference: Sections 3.7.1 through 3.7.3, and Sections 4.5.1 through 4.5.3, of the OATT; and Sections 18.01 and 18.02 of the ISO Agreement.

2.4.1 Purpose of the System Impact Study

The main purpose and objective of the System Impact Study is to identify facilities that could be constructed to meet an objective defined by the Customer requesting the study and confirm that all applicable reliability criteria would be met. Under the OATT, the Customer's objective may be to create incremental transfer capability resulting in incremental TCCs, or to address reliability or other operational concerns.

In practice, Customers' study requests have taken two basic forms, each having a somewhat different objective. In the first form, the Customer may have a specific proposed transmission project with specific facilities in mind. In that case, the objective of the

System Impact Study is to evaluate the Customer's proposal to determine whether it may result in any violations of applicable reliability criteria that may require modifications or additions to the Customer's proposal, and, if applicable, determine the incremental transfer capability due to the proposed project.

In the second form of study request, the Customer may state the objective(s) they wish to achieve (e.g., amount of incremental transfer capability between two points or areas, or reliability or operational concern), in which case the objective of the System Impact Study is to identity facility additions or modifications that could be constructed to achieve the Customer's objective(s) and satisfy all applicable reliability criteria.

2.4.2 What transmission projects require a System Impact Study?

Merchant transmission projects fall under the Interconnection process (see Section 3) rather than the Transmission Expansion process, and therefore are not subject to a System Impact Study under the Transmission Expansion process.

For other proposed transmission projects, a System Impact Study is required for projects that may either reduce the Transfer Capability of any NYISO interface by more than 10 MW, or increase the Transfer Capability of any NYISO interface by more than 25 MW. For this purpose, NYISO interfaces are the ten major internal interfaces that define the inter-zonal boundaries and the four Inter-ISO interfaces. Proposed transmission projects expected to not reduce interface Transfer Capability by more than 10 MW and not increase interface Transfer Capability by more than 25 MW are not required to undergo a NYISO System Impact Study, but may be subject to study or review by the affected Transmission Owner(s).

Generally, a System Impact Study would be required for transmission projects that involve additions, upgrades, or reconfigurations of transmission facilities at voltage levels of 115 kV or above. Also, a System Impact Study generally would be required for projects that involve the addition of non-generation devices or equipment to the transmission system at voltage levels of 115 kV or above for the purpose of increasing transfer capability, or addressing reliability or other operational concerns. Such devices and equipment include, but are not limited to: capacitors, reactors, Static VAr Compensators (SVCs), Static Compensators (STATCOMs), and Special Protection Systems (SPSs). The System Impact Study is NYISO's mechanism for conducting an (NPCC) Area assessment for a proposed new or modified SPS in advance or as part of the NPCC SPS review process (per NPCC Directory #7 Special Protection Systems).

2.4.3 System Impact Study Procedures

The basic steps of the System Impact Study process are outlined in Figure 2-12.1 of this manual. Additional information regarding each of the steps follows.

1. Customer Submits a Study Request to the NYISO

The Customer initiates the process by submitting a Study Request to the NYISO. The Study Request must be in writing – usually in the form of a letter, but an email is acceptable. The Study Request should be sent to:

Steven Corey
New York Independent System Operator
10 Krey Boulevard
Rensselaer, New York 12144
Email: scorey@nyiso.com

In the Study Request, the Customer should be specific regarding their objectives and/or proposal to be evaluated. The Customer also must specify whether it intends to conduct all or part of the System Impact Study itself.

Upon receiving a Study Request, NYISO reviews the request and contacts the Customer to acknowledge the request, and to request clarification or additional information as necessary. NYISO also provides a copy of the Study Request to the affected Transmission Owner(s), if other than the Customer. NYISO adds the request to its list of Interconnection Requests and Transmission Projects (aka., the "NYISO Interconnection Queue") with a queue position based on the date of receipt of the Study Request.

2. Preparation of a draft Scope for the System Impact Study

If it wishes, the Customer may submit an initial draft Scope for the System Impact Study to the NYISO for review and comment. Otherwise, the NYISO usually prepares the initial draft Scope using a standard form. In any case, NYISO's standard procedure is to first coordinate a review of the draft scope among the parties (Customer, NYISO and affected Transmission Owner(s)), then TPAS. The review process for the Scope is often iterative, and usually takes about a month to complete.

If necessary, the NYISO may hold a Scoping Meeting with the other parties to discuss and resolve any questions or issues regarding the Study Request or the draft Scope. NYISO normally seeks to obtain agreement among the parties on the draft Scope before submitting it to TPAS.

The scope specifies whether a full or a partial SIS is required[1]. A full SIS is required for proposed transmission projects that are expected to affect the transfer capability of one or more transmission interfaces, including the interfaces between New York and other Control Areas, by 80 MW or more. Transmission Projects for which the greatest impact on the transfer capability of any interface is expected to be less than 80 MW require only a partial SIS. The requirements for a full versus partial SIS are the same except that an assessment of the impact of the project on interface transfer limits that is required for a full SIS, is not required for a partial SIS.

3. Operating Committee approval of the Study Scope

Following TPAS review, NYISO submits the proposed System Impact Study Scope to the Operating Committee for consideration for approval.

If the Operating Committee were to not approve the proposed Scope, and the Customer wishes to continue to pursue their Study Request, NYISO would

[1] From New York Independent System Operator System Reliability Impact Study Criteria and Procedures, Revision 1, approved May 23, 2001. Portions of those criteria and procedures have been incorporated in this manual as applicable.

coordinate with the parties and TPAS to revise and resubmit the Scope to the Operating Committee.

4. NYISO Prepares and Tenders a System Impact Study Agreement to the Customer

Upon Operating Committee approval of the Study Scope, NYISO prepares and tenders a System Impact Study agreement to the Customer. NYISO uses a standard form of the study agreement (see Attachment B of this manual), with information provided by the Customer included in the agreement as applicable. (See Sections 3.7.2 or 4.5.2 of the OATT regarding the System Impact Study Agreement and Cost Reimbursement.)

Normally either the NYISO or Customer is designated as being responsible for conducting the entire System Impact Study and preparing the initial draft study report and supporting documentation, but it's possible for the NYISO and Customer to each take responsibility for portions of the study. These arrangements must be specified in the System Impact Study agreement.

5. Customer Executes the Study Agreement

After NYISO has tendered the System Impact Study agreement to the Customer, the Customer must execute the study agreement and return it to the NYISO within fifteen (15) days. Otherwise, the Study Request shall be deemed withdrawn. (See Sections 3.7.1 or 4.5.1 of the OATT.)

6. Designated Party(ies) Performs Study

If NYISO is designated to perform all or portions of the study, NYISO may contract a Transmission Owner or consultant to perform all or part of the study on NYISO's behalf. Such arrangements normally require a separate agreement or contract between NYISO and the Transmission Owner or consultant. If multiple parties are involved in performing the study, normally one of the parties is designated as the lead party for the study.

Regardless of who performs the System Impact Study, NYISO normally provides the starting base cases (power flow, stability, and short circuit base cases) to be used for the study. NYISO develops and maintains "standard" base cases that are used as the starting point for various transmission and interconnection studies, such as a System Impact Study.

In some cases, a System Impact Study (or portion thereof) may use a base case developed by a Transmission Owner or a consultant. In such cases, any base cases and related documentation must be provided to the NYISO as part of the documentation for the study.

Generally, base cases and related documentation pertaining to a System Impact Study may be exchanged between the NYISO and the applicable affected NYTOs without special arrangements.

If the Customer or their consultant requires one or more base cases from the NYISO in order to perform all or part of the study, the Customer or their consultant must submit a "CEII Request Form" to the NYISO, which must include an executed Non-Disclosure Agreement. A CEII Request Form and Non-Disclosure Agreement is available from the NYISO web site at the link below.

http://www.nyiso.com/public/webdocs/services/customer_relations/CEII_Request_Form/CEII_Request_Form_and_NDA_complete.pdf

Special arrangements would be required if the Customer or their consultant were to require one or more base cases developed by a Transmission Owner to perform all or part of the study.

The party(ies) performing the study must do so in accordance the approved System Impact Study Scope and Section 10 of the OATT (Attachment D - Methodology for Completing a System Impact Study). Additional information regarding the criteria, procedures and guidelines that pertain to the performance of NYISO transmission and interconnection studies, such as a System Impact Study, is provided in Section 4 of this manual and related Attachments.

Upon completion of the study, the responsible party(ies) must prepare an initial draft report and related documentation for the study. If multiple, parties perform the study, the lead party is responsible for compiling the various parts into a single draft study report. If the lead party is other than the NYISO, the lead party shall submit the initial draft study report and related documentation to the NYISO.

7. Review and Revision of Study as Necessary

Review of a System Impact Study normally proceeds in two steps: review by the parties (Customer, NYISO, and affected Transmission Owner(s)), then review by the TPAS. NYISO, or the lead party on behalf of the NYISO, provides copies of the draft study report (and related documentation as appropriate) to the other parties (Customer and affected Transmission Owner(s)) for review. NYISO coordinates the review process, including resolution of any issues that may arise between the parties. Normally the lead party is responsible for incorporating agreed upon revisions to the study report.

Upon completion of the first step of review by the parties, NYISO provides the draft study report to the TPAS for review in accordance with NYISO committee procedures. TPAS normally discusses the study at the next scheduled TPAS meeting and considers whether to recommend the study to the Operating Committee. During its review, TPAS members may raise substantive issues or request additional information or analyses. If so, the parties may consider extending the study, or making substantive changes, and submitting a revised draft study report to TPAS at a later date. In any case, if necessary, the draft study report is revised to reflect any changes resulting from the TPAS review.

8. Operating Committee Approval of the System Impact Study

Following completion of TPAS review, and if the Customer so desires, NYISO submits the draft study report to the Operating Committee for consideration for approval in accordance with NYISO committee procedures. The Operating Committee normally considers approval of the study at the next scheduled Operating Committee meeting. If the Operating Committee approves the System Impact Study, the study is considered to be completed. However, if the System Impact Study is not approved by the Operating Committee, the parties may consider extending the study to address the issues raised by the Operating Committee. Ultimately, the Customer must decide whether or not to continue the study at this juncture. If the Customer wishes to dispute the Operating Committee's decision, the Customer may do so through the NYISO dispute resolution process.

9. Settlement of the System Impact Study Costs

Upon completion of the System Impact Study, or termination of the study by the Customer, NYISO prepares and issues an invoice to the Customer for settlement of the NYISO's study costs in accordance with the System Impact Study agreement. If NYISO contracted a Transmission Owner and/or consultant to perform all or parts of the study on NYISO's behalf, those costs would be included as part of the NYISO's study costs.

2.5 Facilities Study

Reference: Sections 3.7.4 and Section 4.5.4 of the OATT.

After completion of the System Impact Study, the Customer may elect to proceed with the next major step of the process, the Facilities Study. The Facilities Study for a transmission expansion primarily involves the Customer and the affected Transmission Owner(s). Unlike an Interconnection Facilities Study, NYISO is not a party to the Facilities Study agreement for a transmission expansion, and has only a supporting role - to cooperate with the affected Transmission Owner(s) in performing transmission expansion Facilities Studies.

2.5.1 Purpose of the Facilities Study

The main purpose and objective of the Facilities Study is to provide to the Customer good faith estimates of the cost and time to construct the new facilities identified in the System Impact Study. If applicable, the Facilities Study also may provide a nonbinding estimate of the feasible TCCs that may result from the construction of the new facilities.

2.5.2 Facilities Study Procedures

See Sections 3.7.4 and 4.5.4 of the OATT.

2.5.3 Facilities Study Modifications

See Section 3.7.5 of the OATT.

2.6 Construction

Reference Sections 3.7.4 and 4.5.4 of the OATT (last paragraph of each).

After completion of the Facilities Study, the Customer may elect to proceed with the construction of the Facilities described in the Facilities Study by: 1) entering into a construction contract with the affected Transmission Owner(s), and with the entity that will construct the facilities, if other than the affected Transmission Owner(s), and 2) provide each affected Transmission Owner security acceptable to the Transmission Owner for the cost of the new facilities or upgrades.

2.7 Award of Incremental TCCs

If applicable, an award of incremental TCCs for a transmission expansion would be determined in accordance with the guidelines specified in the Transmission Congestion Contracts Manual, and in accordance with Attachment M of the OATT. The Transmission Congestion Contracts Manual is available from the NYISO web site at the link below.

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

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3. INTERCONNECTION PROCESS

3.1 Introduction

The NYISO "Interconnection process" actually consists of three processes that apply to proposed interconnections of Large Facilities, Small Generators, and Load, respectively. Large Facilities include Large Generating Facilities (generating facilities that have a Generating Facility Capacity of more than 20 MW) and Merchant Transmission Facilities. Small Generators are generating facilities no larger than 20 MW. The sections of the OATT that pertain to each of these types of proposed interconnection are summarized in Table 3-1 below.

Table 3-1 Sections of the OATT Related to the Interconnection Process

Type of Proposed Facility	Pertinent Sections of the OATT
Large Facility (i.e., Large Generating Facility or Merchant Transmission Facility)	Sections 3.9 and 4.5.8 Section 30 (Attachment X) Section 25 (Attachment S)
Small Generator	Sections 3.11 and 4.5.9 Section 32 (Attachment Z) Section 25 (Attachment S)
Load	Sections 3.9 and 4.5.8

This section of the manual will walk through each of these processes and cite references to the OATT and other documents that cover various topics related to the interconnection processes.

3.2 What is an Interconnection?

In the context of this manual, an Interconnection refers to the connection of a new generating facility, merchant transmission facility, or load to the NYS Transmission System; or to increase the capacity of, or make a material modification to the operating characteristics of, an existing generating facility or merchant transmission facility that is interconnected to the NYS Transmission System. For Small Generators, Interconnections may include interconnections to FERC-jurisdictional distribution facilities. (See definition of **Interconnection Request** in Attachment X and Attachment Z of the OATT.)

Note that the OATT contains a definition of a term, **Interconnection or Interconnection Points ("IP")** that refers to NYCA tie lines, which is different than the term used in the above OATT references and this manual.

3.3 Large Facility Interconnection Procedures (LFIP)

3.3.1 Basic Information about the LFIP

3.3.1.1 What projects are subject to the LFIP?

All new Large Generating Facilities and Merchant Transmission Facilities that are proposed to interconnect to the NYS Transmission System are subject to the LFIP. Also, projects to increase the capacity of an existing Large Generating Facility or Merchant Transmission Facility that is interconnected to the NYS Transmission System, or to make a material modification to the operating characteristics of such Large Facilities, also are subject to the LFIP. (See definition of **Interconnection Request** in Attachment X.)

In addition to the above general requirement, there are additional rules for determining when a Large Facility Interconnection Request is required under certain circumstances as follows (see also Section 3.3.4 re. Materiality Determinations):

- Capacity increase to an existing Large Facility –

  The rule that determines whether a capacity increase falls under the Large Facility or Small Generator procedures is based on the resultant total capacity of the generating facility after the increase. If the resultant capacity is greater than 20 MW, the capacity increase falls under the LFIP. But if the resultant capacity is 20 MW or less, the capacity increase does not fall under the LFIP, but may fall under the Small Generator procedures (see Section 3.4 of this manual). (See Section 3.3.4)
- Material modification to an existing Large Facility (See Section 3.3.4)
- Reactivation of a deactivated Large Facility (See Section 3.3.4)
- Modifications to an existing Interconnection Request (See Section 3.3.4)
- Multiple sites or Points of Interconnection –

  Site, as the term is used in Section 30.3.1 of Attachment X, refers to the property where a proposed new Large Facility will be constructed, or the location of an existing Large Facility proposed to be modified. Point of Interconnection, as defined in Section 30.1 of Attachment X, means *the point ... where the Attachment Facilities* (associated with a proposed Large Facility) *connect to the New York State Transmission System*.

  Per Section 30.3.1 of Attachment X, a Developer proposing a project involving multiple sites would need to submit a separate Interconnection request for each site. A Developer may submit multiple Interconnection Requests for a single site. A Developer proposing to evaluate one site to connect at two or more different voltage levels would need to submit a separate Interconnection Request for each different voltage level.

  A new Large Facility with multiple Points of Interconnection (POIs) may be evaluated under one Interconnection Request provided that the proposed POIs are at the same voltage level and in reasonable proximity to each other. Interconnection to separate bus sections of the same substation, or interconnection to both circuits of a double circuit line, are examples of multiple POIs allowed to be evaluated under a single Interconnection Request.

Alternative POIs are different that multiple POIs. Alternative POIs are mutually exclusive alternative interconnection proposals for the same project. Reasonable alternative POI(s) can be evaluated under a single Interconnection Request. (See Sections 30.6.1 and 30.10 of Attachment X.) However, ultimately the Developer can choose only one alternative to proceed to an Interconnection Facilities Study. A Developer may submit separate Interconnection Requests to evaluate alternative POIs for the same project.

3.3.1.2 Types of Interconnection Service

Per Section 30.3.2 of Attachment X, NYISO offers two types of interconnection service:

- Energy Resource Interconnection Service (ERIS)
- Capacity Resource Interconnection Service (CRIS)

Developers of proposed interconnection projects must take ERIS at a minimum to go forward, but have the option to take CRIS or partial CRIS. ERIS allows projects to interconnect and participate in the NYISO energy and ancillary services markets, but not the capacity market. CRIS (or partial CRIS) allows projects to participate in the NYISO capacity market.

To receive ERIS, a proposed Large Facility must go through the required interconnection studies, including the Class Year Facilities Study, accept its Project Cost Allocation for System Upgrade Facilities (SUFs), and pay cash or post Security for those costs. To receive CRIS, a Large Facility must additionally go through the Class Year Deliverability Study, accept its determined Deliverable MWs and/or accept its Project Cost Allocation for System Deliverability Upgrades (SDUs) and pay cash or post Security for those costs, as applicable. (See Attachment S)

3.3.1.3 What costs are involved?

The costs involved in the NYISO LFIP process include:

- $10,000 nonrefundable application fee;
- Various deposits that are applied toward study costs (see Table 3-2 below);
- The NYISO's and the Connecting Transmission Owner's actual study costs for each of the interconnection studies, including the cost allocation for the Class Year Facilities Study costs (typically around $300,000 in total per project, but can vary widely for individual projects);
- Project Cost Allocation for SUFs and allocated Headroom payments for SUFs, as applicable (if project goes forward with ERIS);
- Project Cost Allocation for SDUs and Headroom payments for SDUs, as applicable (if project goes forward with CRIS).

Table 3-2 Deposits Associated with the NYISO LFIP

Process Step	Deposit Amount	When Required	Applied Toward
Interconnection Request	**$30,000 required initial deposit**	**With the Interconnection Request (IR)**	**Feasibility Study (1)**

Interconnection Request	**$10,000 optional additional deposit (2)**	**With the IR**	**System Reliability Impact Study (SRIS)**
Feasibility Study	**$30,000 additional deposit if required (3)**	**With return of the signed Feasibility Study Agreement**	**Feasibility Study (1)**
SRIS	**$40,000 or $120,000 as applicable (4)**	**With return of the signed SRIS Agreement**	**SRIS**
Class Year Facilities Study	**$100,000**	**With return of the signed Facilities Study Agreement**	**Facilities Study**

Notes:

(1) The Parties (Developer, NYISO and Connecting Transmission Owner) may mutually agree to forgo the Feasibility Study, in which case the initial deposit is applied toward the SRIS and the additional Feasibility Study deposit is not applicable.

(2) The Developer may opt to pay an additional $10,000 with the IR in lieu of demonstration of Site Control. Demonstration of Site Control is required with return of the SRIS Agreement, so this deposit is applied toward the SRIS.

(3) The additional deposit is required if NYISO is responsible for performing the entire Feasibility Study. This deposit is not required if the Developer hires a consultant to perform the analytical portion of the study.

(4) $120,000 deposit is required if NYISO is responsible for performing the entire study. $40,000 deposit is required if the Developer hires a consultant to perform the analytical portion of the study.

3.3.1.4 How long does it take?

The time frames for the NYISO to meet its obligations regarding the LFIP are outlined in Attachments X and S, and summarized in the table in Attachment D of this manual. The overall time to complete the interconnection studies and Interconnection Agreement is typically about three years, but can vary for individual projects.

3.3.1.5 Who is involved in the process?

The Developer, NYISO and Connecting Transmission Owner(s) are the primary parties involved throughout the interconnection process. Each of the parties may hire consultants or other third parties to perform or assist in parts of the studies for which the party is responsible. The NYISO Transmission Planning Advisory Subcommittee (TPAS) and Operating Committee are involved in the System Reliability Impact Study and Class Year Facilities Study steps of the process. Operating Committee approval of the System Reliability Impact Study scope and the System Reliability Impact Study report are requirements of the process under Attachment X of the OATT. Operating Committee approval also is required for the Annual Transmission Baseline Assessment (ATBA), Annual Transmission Reliability Assessment (ATRA), and the Deliverability Study for each Class Year Facilities Study under Attachment S of the OATT. TPAS reviews each of those items prior to submittal to the Operating Committee. The Interconnection Projects Facilities Study Working Group (IPFSWG) also is involved in the Class Year Facilities Study process.

The Developer and Connecting Transmission Owner(s) are the primary parties involved in the construction phase of the process. If applicable, Affected System Operators also may be involved in the construction phase. NYISO is not involved in the construction of

interconnection facilities, except to approve certain related scheduled outages as may be required.

Developers must register any new facilities with the NYISO in advance of going in-service, even for testing. The Developer, NYISO and applicable Transmission Owner(s) must coordinate arrangements for initial operation of the new facilities.

3.3.2 Large Facility Interconnection Request

A Developer proposing to interconnect a new Large Facility to the NYS Transmission System, or increase the capacity of, or make a material modification to an existing Large Facility, must submit an Interconnection Request to the NYISO in the form of Appendix 1 of the LFIP, along with the required $10,000 non-refundable application fee, $30,000 refundable study deposit, and either demonstration of Site Control, or an additional $10,000 deposit in lieu of demonstration of Site Control. See Section 30.3 of Attachment X regarding Interconnection Requests. Section 30.3.3.1 lists the basic requirements for a valid Interconnection Request.

The form for a Large Facility Interconnection Request is available from the NYISO web site at the following link.

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

3.3.3 Basic Steps of the LFIP

The steps of the LFIP are described in Attachment X and summarized in the table in Attachment D of this manual. The steps of the process are described in more detail in the following sections.

3.3.3.1 Initial Processing of a New Interconnection Request

Upon receipt of a new Large Facility Interconnection Request (LFIR), NYISO performs the following initial processing steps within five (5) business-days of receipt of the LFIR. NYISO sends an acknowledgement notice to the Developer and provides a copy of the LFIR to the Connecting Transmission Owner (CTO, i.e., the Transmission Owner with whose system the project is proposed to interconnect). In some cases, the NYISO will identify on a preliminary basis which Transmission Owner will be the CTO if it is unclear from the LFIR, subject to later confirmation or correction. NYISO assigns the new LFIR a Queue Position based on the date and sequence it was received per Section 30.4.1 of Attachment X.

NYISO performs an initial review of the LFIR and determines whether it is valid (i.e., satisfies the requirements of an LFIR per Sections 30.3.1 and 30.3.3.1 of Attachment X), or deficient in some way. If the LFIR is determined to be deficient, NYISO sends a deficiency notice to the Developer, giving the Developer an opportunity to cure the deficiency per Section 30.3.3.3 of Attachment X. If the deficiency is cured within the ten business-day cure period, the LFIR is deemed valid by NYISO and proceeds through the interconnection process. If not, NYISO initiates withdrawal of the LFIR under Section 30.3.6 of Attachment X.

After NYISO has determined an LFIR to be valid, NYISO provides an acknowledgement of this determination to the Developer and CTO along with the form for a Feasibility Study Agreement (FESA), and schedules a Scoping Meeting with the Developer and CTO normally to be held within 30 days of receipt of the LFIR.

3.3.3.2 Scoping Meeting

After the initial processing has been completed, NYISO holds a Scoping Meeting with the Developer and CTO per Section 30.3.3.4 of Attachment X, which is the first formal meeting between the Parties in the interconnection process. In practice, Scoping Meetings generally are held via teleconference, as are most of the meetings in the process. The purpose of the Scoping Meeting is to discuss the interconnection options for the proposed project, exchange information regarding the project and the local transmission system to which the project may interconnect, identify the potential feasible Points of Interconnection (POIs), and to discuss the arrangements for the first interconnection study, which normally is the Feasibility Study.

A couple of topics discussed during the Scoping Meeting are: whether to forego the Feasibility Study and proceed directly to a System Reliability Impact Study (SRIS); and which party or parties will perform the study, or various portions of the study. Section 30.6.1 of Attachment X allows the Feasibility Study to be foregone if mutually agreed to by the Parties (i.e., NYISO, CTO and Developer). However, if the Parties agree to forego the Feasibility Study, certain evaluations that would have been required in the Feasibility Study may need to be addressed in the SRIS.

NYISO has overall responsibility for the performance of all interconnection studies under the LFIP, and may elect to perform all or portions of any given study. However, Section 30.13.4 of Attachment X gives NYISO discretion to request the CTO to perform all or portions of a study, or to utilize a third party (e.g., an engineering consultant) to perform all or portions of a study. In considering using a third party, either NYISO or the Developer may enter into the third party contract, at the NYISO's discretion. The various options for performing the first interconnection study for a new LFIR are discussed at the Scoping Meeting.

The Parties may reach agreement on some or all options required to proceed forward with the first interconnection study at the Scoping Meeting. However, if agreement has not been reached on all options, the Developer must provide their decisions or proposals on any outstanding issues to the NYISO within five (5) business-days following the Scoping Meeting. Upon receipt of the Developer's input, NYISO will begin preparation of the applicable study agreement for review and execution by the Parties.

3.3.3.3 Interconnection Feasibility Study (Feasibility Study or FES)

The process for performing the Feasibility Study is outlined in Section 30.6 of Attachment X. The basic steps are:

- Preparation and execution of the Feasibility Study Agreement (FESA);
- Performance of the study, including completion of all required tasks and review of the study report and documentation by the Parties;
- The study report meeting.

The purpose and objectives of the Feasibility Study are to: develop a conceptual design for the proposed interconnection, evaluate the impact of the project on the pre-existing electric system at and in electrical proximity to the POI, preliminarily identify the CTO Attachment Facilities and any System Upgrade Facilities (SUFs) that would be required to interconnect the project to the system in a reliable manner, and develop nonbinding good faith estimates of the cost and time to construct the required facilities. The Developer may request evaluation of one or a limited number of alternative POIs in the same Feasibility Study, but that must be specified during or within 5 business-days following the Scoping Meeting and specified in the FESA. Any proposed alternative POIs must be reasonably consistent with the project site specified in the LFIR.

Under Section 30.6.2 of Attachment X, the Feasibility Study is a preliminary evaluation of the impact of the project and its proposed interconnection on the pre-existing electric power system. The Feasibility Study evaluates ERIS only and does not evaluate CRIS. (CRIS is evaluated at the Facilities Study step only, see Section 3.3.3.6 below.) The Feasibility Study includes power flow analysis and short-circuit analysis, but does not include stability analysis. (Stability analysis is performed at the SRIS and Facilities Study steps, see sections below.)

The FESA is prepared, tendered, and executed in accordance with Section 30.6.1 of Attachment X. The FESA specifies the scope of work, terms and arrangements for completing the study and payment of study costs. The FES scope of work ("FES Scope") is initially prepared by the NYISO following a standard template consistent with Section 30.6.2 of Attachment X. The FES Scope is reviewed by the Parties, and the final FES Scope gets attached as an exhibit to the FESA. After NYISO tenders the FESA to the Developer, the Developer must return the executed FESA to the NYISO within 30 calendar days after its receipt along with the additional $30,000 deposit, if such deposit is required. Otherwise, NYISO initiates withdrawal of the LFIR under Section 30.3.6 of Attachment X.

After the FESA has been fully executed by the Parties, the responsible Parties proceed to perform the Feasibility Study in accordance with Sections 30.6.2 and 30.6.3 of Attachment X and the FESA. NYISO serves as overall coordinator for the study, including coordination of review of the draft Feasibility Study report and associated documentation by the Parties. NYISO prepares the initial power flow and short circuit base cases to be used for the FES following the requirements outlined in Section 30.6.2 of Attachment X and the FES Scope. Other parties involved in the study that need the power flow and/or short circuit base cases must request the base cases from the NYISO following the NYISO CEII request procedures. A CEII Request Form and NDA are available from the NYISO web site at the following link.

http://www.nyiso.com/public/webdocs/services/customer_relations/CEII_Request_Form/CEII_Request_Form_and_NDA_complete.pdf

Upon completion of all the study tasks, including review of the draft study report and supporting documentation, NYISO provides the final Feasibility Study report to the Developer and CTO and schedules a study report meeting with the Developer and CTO per Section 30.6.3.1 of Attachment X. The study report meeting serves the

dual purpose of reviewing the final Feasibility Study results and discussion of the scope and arrangements for the SRIS. If any electric system(s) other than the CTO's may be affected by the proposed interconnection (Affected Systems), NYISO invites the Affected System Operator(s) to the Feasibility Study report meeting to participate in the discussion of the SRIS. It is this point of the NYISO interconnection process that Affected System Operators become involved.

3.3.3.4 Interconnection System Reliability Impact Study (SRIS)

Upon completion of the Feasibility Study (or if the Parties had agreed to forego the Feasibility Study), the next step is the SRIS. Unlike the Feasibility Study in which only the three Parties are involved, the SRIS also involves any Affected System Operators and the NYISO committees (TPAS and the Operating Committee). Operating Committee review and approval of the SRIS satisfies the requirements of Section 18.02 of the ISO Agreement.

The process for performing the SRIS is outlined in Section 30.7 of Attachment X. The basic steps are:

- Preparation and execution of the System Reliability Impact Study Agreement (SRISA);
- In coordination with the SRISA, preparation, review and Operating Committee approval of the study scope of work (SRIS Scope);
- Performance of the study, including completion of all required tasks and review of the study report and documentation by the Parties and any Affected System Operators;
- The study report meeting between the Parties (NYISO, CTO, and Developer) and any Affected System Operators;
- Presentation of the SRIS report to the TPAS for review, followed by presentation of the SRIS report to the Operating Committee for approval.

The purpose and objectives of the SRIS are to: again evaluate the impact of the project on the pre-existing electric system (based on the conceptual interconnection design from the Feasibility Study), re-evaluate and revise as necessary the list of CTO Attachment Facilities and any SUFs identified in the Feasibility Study, and re-evaluate and revise as necessary the nonbinding good faith estimates of the cost and time to construct the required facilities. If the Feasibility Study was not performed, the SRIS would be the first study for the project, and the SRIS scope would include development of the conceptual design for the proposed interconnection if such design was not previously specified by the Developer.

If one or more alternative POI(s) were evaluated in the Feasibility Study, the Developer must specify which POI is to be evaluated in the SRIS. Only one POI may be evaluated in the SRIS. If the Developer wishes to evaluate alternative POI(s) at the SRIS step of the interconnection process, the Developer may request a reasonable number of Optional Interconnection Studies (OISs) to be performed concurrently with the SRIS per Section 30.10 of Attachment X. (See Section 3.3.3.5 below)

Under Section 30.7.3 of Attachment X, the SRIS is an evaluation of the impact of the project and its proposed interconnection on the pre-existing electric power system. The assessments performed in the SRIS are more extensive than the Feasibility Study. The

SRIS includes power flow analysis and short-circuit analysis (similar to, but generally more extensive than the Feasibility Study), and stability analysis (not included in the Feasibility Study). Like the Feasibility Study, the SRIS evaluates ERIS only and does not evaluate CRIS. (CRIS is evaluated at the Facilities Study step only, see Section 3.3.3.6 below.)

The SRISA is prepared, tendered, and executed in accordance with Sections 30.7.1 and 30.7.2 of Attachment X. The SRISA specifies the scope of work, terms and arrangements for completing the study and payment of study costs. After NYISO tenders the SRISA to the Developer, the Developer must return the executed SRISA to the NYISO within 30 calendar days after its receipt along with demonstration of Site Control and the required deposit. Otherwise, NYISO initiates withdrawal of the LFIR under Section 30.3.6 of Attachment X. NYISO reviews the documentation of Site Control provided by the Developer and may initiate withdrawal of the LFIR if the documentation is not adequate.

Concurrently and in coordination with the SRISA, the SRIS Scope is initially prepared by the NYISO following a standard template consistent with Section 30.7.3 of Attachment X, reviewed by the Parties, any Affected System Operators, and TPAS, and approved by the Operating Committee. The approved SRIS Scope gets attached as an exhibit of the SRISA. The scope specifies whether a full or a partial SRIS is required.[2] A full SRIS is required for Large Facility projects 80 MW or greater in size. Projects less than 80 MW in size require only a partial SRIS. The requirements for a full versus partial SRIS are the same except that an assessment of the impact of the project on interface transfer limits that is required for a full SRIS, is not required for a partial SRIS.

After the SRISA has been fully executed by the Parties and the Operating Committee has approved the SRIS Scope, the responsible Parties proceed to perform the SRIS in accordance with Sections 30.7.3 and 30.7.4 of Attachment X, the SRISA, and the approved SRIS Scope. NYISO serves as the overall coordinator for the study, including coordination of review of the draft SRIS report and associated documentation by the Parties and any Affected System Operators. NYISO prepares the initial power flow, short circuit and stability base cases to be used for the SRIS following the requirements outlined in Section 30.7.3 of Attachment X and the SRIS Scope. Other parties involved in the study that need the power flow, short circuit and/or stability base cases must request the base cases from the NYISO following the NYISO CEII request procedures. A CEII Request Form and NDA are available from the NYISO web site at the following link.

http://www.nyiso.com/public/webdocs/services/customer_relations/CEII_Request_Form/CEII_Request_Form_and_NDA_complete.pdf

Upon completion of all the study tasks, including initial review of the draft study report and documentation, NYISO provides the draft SRIS report to the Developer and CTO and schedules a study report meeting with the Developer and CTO per Section 30.7.5 of Attachment X.

Following the study report meeting, NYISO arranges for submittal of the SRIS report to TPAS for review and consideration for recommendation for Operating Committee approval. If the SRIS was not performed by NYISO staff, NYISO staff prepares and

[2] From New York Independent System Operator System Reliability Impact Study Criteria and Procedures, Revision 1, approved May 23, 2001. Portions of those criteria and procedures have been incorporated in this manual as applicable.

submits a "NYISO Review Report" to accompany the SRIS report, to summarize NYISO staff's review and conclusions regarding the SRIS. If one or more OISs were performed concurrently with the SRIS, the Developer must designate which of the SRIS and/or OIS(s) to submit to TPAS, and TPAS will review and consider each submitted SRIS or OIS separately on its own merit.

Following TPAS review, NYISO arranges for submittal of the SRIS report to the Operating Committee for consideration for approval. If one or more OISs were performed concurrently with the SRIS, the Developer must designate which study (SRIS or OIS) to submit to the Operating Committee as "the" SRIS – the Operating Committee does not approve alternative interconnection studies for the same project. Upon Operating Committee approval of the SRIS, the SRIS for that project is considered to be completed.

3.3.3.5 Optional Interconnection Study (if requested)

As indicated above, a Developer may request an OIS (or a reasonable number of OISs) to be performed concurrently with the Developer's SRIS per Section 30.10 of Attachment X. The concept of an OIS is to provide a mechanism for the Developer to continue to consider and evaluate an alternative POI during the SRIS step of the interconnection process.

The Developer may submit an OIS request on or before the later of Operating Committee approval of the SRIS scope or execution of the SRISA. NYISO will not accept an OIS request after the SRIS has begun.

Each OIS is considered a separate study, requiring a separate agreement (OIS Agreement), scope, and deposit. The OIS is performed in conjunction with, and as a sensitivity to, the SRIS. The OIS essentially follows the same procedural steps as the SRIS up to submittal of the study report to the Operating Committee for approval. As stated above, following TPAS review of the SRIS and/or OIS(s) performed for a project, the Developer must designate which study (SRIS or OIS) to submit to the Operating Committee as "the" SRIS.

3.3.3.6 Interconnection Facilities Study (Class Year Facilities Study)

After completion of the SRIS, the next step is the Facilities Study, which is performed under the umbrella of the NYISO Class Year Facilities Study (CYFS) process described in Section 30.8 of Attachment X and Attachment S of the OATT. The Class Year Facilities Study (CYFS) is conducted for a set of projects have met the eligibility requirements for entry into a Class Year and either were required or elected to do so. Certain small generator projects also may be required or elect to be included in a Class Year under Attachment Z of the OATT.

3.3.3.6.1 Class Year Eligibility Requirements

The Class Year eligibility requirements for Large Facilities are defined in Section 25.6.2.3 (and associated subsections) of Attachment S. A project must meet two milestones to be eligible to be included in a CYFS: (i) Operating Committee approval of its SRIS and (ii) satisfaction of a regulatory milestone. (See Sections 25.6.2.3.1 and 25.6.2.3.2 of Attachment S for additional details and requirements related to the regulatory milestones and required notices to the NYISO once a project has an SRIS approved by the Operating Committee.)

3.3.3.6.2 Basic Steps of the Facilities Study

For each project in the Class Year, the basic steps of the Facilities Study process as outlined in Section 30.8 of Attachment X are as follows:

- Preparation and execution of the Facilities Study Agreement (FSA);
- Performance of the CYFS by the NYISO and other parties as coordinated by the NYISO, in accordance with Section 30.8.3 of Attachment X and the procedures set forth in Attachment S;
- A study report meeting is held between the NYISO, CTOs, Affected Transmission Owners, and the Developers to review the CYFS results.
- Presentation of the CYFS report to the TPAS for review, followed by presentation of the CYFS report to the Operating Committee for approval.
- Decision and settlement process;
- Payments or security postings for accepted system upgrade cost allocations.

Starting with the results of the individual System Reliability Impact Studies (SRISs) performed for each of the Class Year Projects, the CYFS is a more detailed evaluation and identification of all Connecting Transmission Owners' Attachment Facilities (CTOAFs) and System Upgrade Facilities (SUFs) that would be required for the reliable interconnection of the Class Year Projects, along with estimates of the cost and time for procurement, construction, and installation of those facilities. And, beginning with Class Year 2007, the CYFS includes evaluation of the deliverability of proposed capacity for those Class Year Projects requesting Capacity Resource Interconnection Service (CRIS) and any System Deliverability Upgrades (SDUs) that would be required to make that proposed capacity fully deliverable.

The CYFS actually consists of several separate studies grouped into two general "Parts" as follows:

"**Part 1 Studies:**" The CYFS includes a Part 1 study for each project in the Class to identify the CTOAFs and Local SUFs involved in the direct connection of the Project to the pre-existing electric system. The Local SUFs addressed in a Part 1 Study include new transmission facilities that may be required, such as a new 3-breaker ring bus to connect into an existing line, and system protection and communication SUFs. These "Part 1 Studies" are generally performed independently of each other. Each study includes a design and preliminary engineering of the identified CTOAFs and Local SUFs, and develops estimations of cost and time to construct those facilities.

NYISO seeks the assistance of the connecting Transmission Owners (CTOs) for much of the "Part 1 Studies". The CTOs may opt to use consultants for some of this work. If a CTO prefers, NYISO may hire a consultant to perform this work.

"**Part 2 Studies:**" The CYFS Part 2 studies include the Annual Transmission Baseline Assessment (ATBA), the Annual Transmission Reliability Assessment (ATRA), and the Class Year Deliverability Study. The ATBA evaluates the pre-existing baseline system before the Class Year projects are included and identifies any SUFs and associated cost estimates for that system. The ATRA evaluates the condition with the Class Year projects added to the baseline system, identifies the SUFs required for the Class Year projects collectively, and then performs a design, preliminary engineering, and estimation of cost

and time to construct for each SUF. The ATRA addresses all SUFs required for the Class Year projects, including SUFs identified in the Part 1 studies. The ATBA and ATRA determine the "cost allocation" of the SUFs between the Transmission Owners and the Class Year project Developers, and the ATRA determines the cost allocation among the CY Developers, in accordance with Attachment S (these assessments are performed under the Minimum Interconnection Standard, MIS).

The Class Year Deliverability Study (CYDS) evaluates the deliverability of CRIS requested by the Developers for the Class Year projects , determines the amount of requested CRIS that would be deliverable without SDUs, if any, and identifies the SDUs that would be required to make the requested CRIS fully deliverable. For each SDU identified, a detailed study is performed as necessary to develop a design and cost estimate for the SDU. Similar to the ATBA and ATRA performed to determine the cost allocation for SUFs, the CYDS includes an ATBA-D and ATRA-D to determine the cost allocation for SDUs among the CY Developers, in accordance with Attachment S (these assessments are performed under the Deliverability Interconnection Standard, DIS). Also, when requested, the CYDS includes a deliverability evaluation for proposed different location CRIS transfers.

NYISO conducts most of the analyses for the "Part 2 Studies", but may use one or more consultants to perform portions of those studies, and also will review and incorporate results of additional studies performed by Transmission Owners, when such studies are appropriate to evaluate CY projects' potential impacts.

The major steps of the CYFS include:

1. Preparation of Base Cases for the ATBA and ATRA – This entails requesting updates of information from the TOs, neighboring ISOs, and Developers and preparation of power flow, stability, and short circuit base cases for the ATBA and ATRA. This includes data for modeling each of the projects in the Class Year.
2. Part 1 Studies – These entail identification, design and preliminary engineering of the CTOAFs and Local SUFs, their integration with the Developer's proposed facilities and with the existing system, for each Class Year project. It also includes estimation of the cost and time to construct the CTOAFs and Local SUFs for each project. The Part 1 Study for an individual project may begin in advance of the ATBA and ATRA.
3. Re-evaluation and Identification of SUFs (ATBA, ATRA), under MIS – This step involves reviewing the individual SRISs for the Class Year projects, conducting thermal, voltage, stability, and short circuit analyses, as necessary and appropriate, to re-evaluate the collective impact of the projects, to re-evaluate the need and adequacy of any previously identified SUFs, and to make any necessary adjustments for the final identification and specification of SUFs needed for the Class Year projects.
4. Development of cost allocation and time estimates for SUFs – This task entails engineering and estimations of the cost and time to construct each of the SUFs identified in the previous two steps. Information from the Part 1 Studies is used as applicable.
5. Deliverability Study – identification of SDUs under DIS, as described above.

6. Compilation of study results and preparation of draft CYFS reports – NYISO has overall responsibility for the CYFS report(s) and provision of the report(s) to the Class Developers and other parties as appropriate. NYISO expects the CTOs or consultants to prepare reports or portions of the CYFS report for which they had contractual responsibility. The SUFs identified via ATRA, ATBA, and the SUFs summary from the individual Part 1 Studies are documented in a "Class Year Facilities Studies SUF Report" (the SUF Report). The SDUs identified via ATRA-D and ATBA-D are documented in a "Class Year Facilities Studies Deliverability Report" (the Deliverability Report). Both reports along with the supporting appendices will go through the Transmission Planning Advisory Committee (TPAS) and Operating Committee (OC) review and approval process.

7. Review and Approval – This step includes the following sub-steps:

a. NYISO schedules a Report Meeting with the Interconnection Projects Facilities Study Working Group (IPFS WG) (group formed at the beginning of each class, by invitation sent to TPAS and OC members, comprised of Class Developers, CTOs, and other interested parties), to be held within 10 business days (2 weeks) of distribution of the applicable draft CYFS report(s).

b. After the Report Meeting, NYISO SUF and Deliverability Reports (and their supporting appendices) submits the two draft CYFS to TPAS for review and action at its next meeting.

c. As soon as possible after the TPAS meeting, NYISO submits the draft CYFS SUF and Deliverability Reports to the Operating Committee for approval at their next meeting.

8. Decision Period and Cost Settlement - After Operating Committee approval of the CYFS report, the process enters a 30 calendar-day initial decision period during which the Class Developers are given the choice to accept or reject their respective cost allocation for SUFs as summarized in the CYFS SUF Report, and separately, cost responsibility for any SDUs as summarized in the Deliverability Report. If any Developers reject their cost allocation for SUFs, the associated projects are removed from the Class. Any Developers that accept their cost allocation for SUFs, but reject their cost responsibility for SDUs, remain in the Class, but would be only eligible for partial CRIS up to the amount determined to be deliverable, if any. If necessary, NYISO re-evaluates the SUFs (and re-evaluates deliverability and associated SDUs as necessary) for the remaining Class projects, makes any necessary adjustments, and issues a revised CYFS Round "n" Addendum Report (where "n" is the number of iterations until all remaining Class Developers accept SUF cost allocation) following the schedule set forth in Attachment S.

The Class Year Facilities Study is considered completed once all Part 1 and 2 Study reports have been completed, all Developers (or remaining Developers) have accepted their respective cost allocations for SUFs (and SDUs as applicable) as presented in the OC-approved CYFS SUF and Deliverability Reports or subsequent Round Addendum Reports, and posted security for SUFs and SDUs as applicable.

3.3.3.7 Large Facility Interconnection Agreement

After completion of the requisite interconnection studies, the next step of the interconnection process is to develop, negotiate, and execute an Interconnection Agreement. The form of the NYISO Standard Large Generator Interconnection Agreement (LGIA) is contained in Appendix 6 of Attachment X. The LGIA is a three-party agreement between the Developer, NYISO and CTO. Interconnection Agreements for Merchant Transmission Facilities are developed from the LGIA with appropriate modifications, subject to approval by FERC.

Procedures pertaining to the LGIA are covered in Section 30.11 of Attachment X. Normally the NYISO and CTO tender the LGIA to the Developer following completion of the Developer decision process described in Section 25.8 of Attachment S. However, the Developer may request to begin development and negotiation of the LGIA at any time after execution of the Facilities Study Agreement. Execution of the LGIA prior to completion of the Class Year Facilities Study process may be possible, but if so, certain commitments from the Developer would be required in the LGIA.

Another option available to Developers prior to executing an LGIA is that, under Section 30.9 of Attachment X, the Developer may request an Engineering & Procurement ("E&P") Agreement with the CTO.

3.3.3.8 Construction, Installation, Registration and Operation

After execution of the Interconnection Agreement, the next and final major step of the interconnection process is to proceed with detailed engineering, construction, installation, registration, testing, and operation of the project in accordance with the Interconnection Agreement. Procedures pertaining to the construction of the CTO's Attachment Facilities and System Upgrades are covered in Section 30.12 of Attachment X.

Prior to testing and operation of a new generating facility or merchant transmission facility, the Developer (owner/operator) of the new facility must register the new facility with the NYISO through the NYISO Customer Registration process. The Developer should initiate the registration process at least six (6) months prior to the anticipated date of initial interconnection and energization of the new facility to the NYCA electric system. Information and material regarding NYISO Customer Registration is available from the NYISO web site at

http://www.nyiso.com/public/markets_operations/services/nyiso_registration/index.jsp

3.3.4 Materiality Determinations

This section of the manual provides an overview of the criteria and procedures for making materiality determinations.

3.3.4.1 Background

Under the NYISO Large Facility Interconnection Procedures (LFIP), in Attachment X of the OATT, there are two circumstances that require NYISO to make a materiality determination (i.e., whether a modification is material):

1. **Changes to an Existing Large Facility**: When a Developer proposes change(s) to an existing Large Facility, NYISO must determine whether the change(s) are material modifications to the operating characteristics of the existing Large Facility such that the Facility owner is required to submit a new Interconnection Request and undergo Interconnection Studies under the LFIP. Change(s) determined to be non-material do not require the Developer to submit a new Interconnection Request or undergo NYISO Interconnection Studies.
2. **Changes to a Project Currently in the Interconnection Process**: When a Developer of a Large Facility project (i.e., a project in the NYISO interconnection process) reports changes to any information provided in the project's Interconnection Request, NYISO must determine whether the proposed change(s) is a Material Modification such that the project would lose its Queue Position and be required to submit a new Interconnection Request to pursue the modified project. Changes determined to be non-material can be accommodated under the existing Interconnection Request and the modified project may continue through the NYISO Interconnection process under its current queue position.

3.3.4.2 Details

3.3.4.2.1 A. Materiality Evaluation of Changes to Existing Large Facilities

Existing Large Facilities must provide the NYISO with prior notice of any changes to the facility including differences from what was studied in the interconnection process or reflected in an interconnection agreement (*see, e.g.*, Article 6.1 of Appx. 4 to Attachment X (the *pro forma* Interconnection Facilities Study Agreement); Articles 5.8, 5.19, 24.3, 24.4 of Appx. 6 to Attachment X (the *pro forma* Large Generator Interconnection Agreement)).

The NYISO will review the changes to determine whether such changes require the facility owner to submit a new Interconnection Request. Under Attachment X of the NYISO OATT, an Interconnection Request is required if a facility owner seeks "to increase the capacity of, or make a material modification to the operating characteristics of, an existing Large Generating Facility or Merchant Transmission Facility that is interconnected with the New York State Transmission System" (see Section 30.1 of Attachment X (definition of "Interconnection Request") and Section 30.3.1 of Attachment X). The Developer shall be responsible for the cost of any such changes to the facility, including the cost of studying the impact of the proposed change.

Proposed changes to a project while the project is in the interconnection process will be reviewed as discussed in Section 3.3.4.2.2, *infra*.

1. Increase in Capacity to an Existing Large Facility

   Under the LFIP, any increase in capacity to an existing Large Facility requires a submission of new Interconnection Request. The LFIP does not provide for a review of the materiality of such increases. In this context, "capacity" refers to the capability of the facility to produce or transmit MWs at a given ambient temperature and does not refer to the facility's level of Capacity Resource Interconnection Service ("CRIS"). Also in this context, an "increase" includes those increases resulting from physical changes to the Large Facility or capability

that a facility has that exceeds the capability reflected in the interconnection process.

2. Modifications to the Operating Characteristics of an Existing Large Facility

Modifications to existing facilities interconnected with the NYS Transmission System other than increases in capacity, discussed above, must be reviewed by the NYISO to determine whether the change constitutes a material modification to the facility's operating characteristics.

Material modifications refer to changes to the equipment, the configuration of equipment, or the Point of Interconnection of an existing Large Facility that result in a material difference in the defining electrical characteristics of the Large Facility in a manner adverse to system reliability. Material adverse difference in electrical characteristics is defined in terms of: Stability Impact, Voltage Impact, Thermal Impact, or Short Circuit Impact. Modifications that would result in an adverse impact that is at least a de minimus impact (as defined in Section 25.6.2.6.1 of Attachment S) are considered material. Modifications that would not cause any adverse impacts that are at least de minimus are non-material.

In considering a materiality request, the change(s) shall be presumed to be a material and require a new Interconnection Request. The facility owner can rebut this presumption by providing information and/or analysis with its request to support a finding that the change(s) are non-material.

Like-and-kind replacements or refurbishments of existing equipment that is worn or damaged (e.g., maintenance) are not material modifications and do not require materiality determinations.

3. Reactivated Units

If a previously existing facility intends to reactivate, the facility will be considered an "existing facility" requiring a new Interconnection Request if three (3) years or more have passed from the date listed in the Gold Book as the retirement[3] date for such facility. Reactivation of a previously existing facility before such three (3) year time period has passed will not be considered a new interconnection requiring a new Interconnection Request if the facility and its interconnection to the NYS Transmission System are intact and have not undergone any material modifications since the facility was last active. If, however, the facility or its interconnection have been compromised or undergone a material modification since the facility was last active, or if the facility will require a material modification to reactivate, the reactivated facility and its interconnection will be considered a new interconnection requiring a new Interconnection Request.

4. Process for Reviewing Modifications to an Existing Large Facility

When an owner (or Developer) reports a change to an existing Large Facility, NYISO will make a determination as to whether the change is material requiring the submission of a new Interconnection Request. In addition, an owner/Developer considering a change(s) to an existing Large Facility may submit a request to NYISO to make a determination as to whether the proposed change(s) is material, or non-material (a "materiality request"). A materiality request must be submitted

[3] For purposes of this manual, "retirement" includes facilities whose status is characterized as retirement, mothball, reserve shutdown, protective layup or standby.

in writing, preferably in the form of a letter (although an email is acceptable), and should be sent to:

Steven Corey
New York Independent System Operator
10 Krey Boulevard
Rensselaer, New York 12144
Email: scorey@nyiso.com

- NYISO may request additional information or analysis from the owner/Developer to assist in NYISO's materiality evaluation. Such additional information and analysis is usually required for change(s)/proposed change(s) of equipment, configuration of equipment, or Point of Interconnection.
- NYISO will notify the Connecting Transmission Owner (CTO) of the change(s)/proposed change(s) and solicit the CTO's input regarding the materiality of the change(s). NYISO will review the information provided by the owner/Developer and the input from the CTO, and will evaluate whether the change(s)/proposed change(s) will result in a material difference in the defining electrical characteristics of the Large Facility in a manner adverse to system reliability. Based on this evaluation, NYISO will make its determination regarding the materiality of the change(s)/proposed change(s).
- NYISO will notify the owner/Developer of its materiality determination and will advise the owner/Developer of the next scheduled Transmission Planning Advisory Subcommittee (TPAS) meeting. If the change(s) are proposed change(s), the owner/Developer may withdraw the proposed change(s) at this point. If the owner/Developer wishes to proceed, NYISO Staff will report its determination to TPAS for discussion, review and confirmation.
- NYISO Staff or TPAS will report the results of this process to the Operating Committee.
- If the change(s) are proposed change(s) and are determined to be material, the owner/Developer must submit an Interconnection Request in accordance with Attachment X to pursue the change. If the change(s) are determined to be non-material, the owner/Developer need not submit an Interconnection Request nor undergo NYISO Interconnection Studies with respect to the change(s).

3.3.4.2.2 Evaluation of Changes to a Proposed Large Facility Being Evaluated in the Interconnection Process

This section applies to projects that meet the following criteria: (1) they have not completed all required Interconnection Studies; or (2) they have completed all required Interconnection Studies, but do not have an executed Interconnection Agreement. Section 30.4.4 of Attachment X requires Large Facilities in the NYISO interconnection queue to provide to the NYISO, in writing, notice of any modification to information provided in the Interconnection Request. The NYISO will review these modifications to determine whether such changes constitute Material Modification under Attachment X that require the Developer to submit a new Interconnection Request.

Attachment X defines Material Modification as "those modifications that have a material impact on the cost or timing of any Interconnection Request with a later queue priority date" (see Section 30.1 of Attachment X).

Attachment X further provides, in Section 30.4.4, guidance regarding the materiality of certain modifications. Under this section, there are specific changes to a proposed Large Facility in the interconnection process that are permitted without loss of Queue Position and without a materiality evaluation. These automatically permitted changes include certain extensions of Commercial Operation Dates and certain changes made early in the study process (see Sections 30.4.4.1, 30.4.4.2 and 30.4.4.5 of Attachment X).

The NYISO must review other changes and determine whether they are Material Modifications. Below are examples of project changes subject to a materiality evaluation:

- Reduction in MW size except as permitted by Section 30.4.4.1 or 30.4.4.2 of Attachment X;
- Increases in maximum MW output for Energy Resource Interconnection Service;
- Changes in technical parameters associated with Large Facility or related equipment except as permitted by Section 30.4.4.1 or 30.4.4.2 of Attachment X;
- Change in interconnection configuration except as permitted by Section 30.4.4.1 of Attachment X; and
- Extensions in the Commercial Operation Date beyond that permitted automatically, without a materiality review, by Section 30.4.4.5 of Attachment X.

For purposes of considering a materiality request for a change to a proposed Large Facility in the interconnection process, the NYISO will consider whether the proposed change(s) adversely impact the cost or timing of projects with a later queue priority date (per the Attachment X definition of "Material Modification"). If the NYISO's evaluation indicates that the change(s)/proposed change(s) do have such an adverse impact, the change(s)/proposed change(s) will be found to be Material Modification(s). Conversely, change(s)/proposed change(s) are not material if such change(s) do not adversely impact cost or timing of projects with a later queue priority date.

In this context, "cost" refers to a project's cost allocation for interconnection facilities (i.e., System Upgrade Facilities (SUFs) or System Deliverability Upgrades (SDUs). "Timing" refers to a project's scheduled in-service date (i.e., Does the proposed change adversely affect the schedule of a project with a later queue priority date?) "Impact" is based on a comparison of the circumstances of the previously proposed project with vs. without the change(s)/proposed change(s). "Later queue priority date" generally means projects that are lower in the queue, but NYISO also takes projects' Class Year status into consideration.

3.3.4.2.3 Process for Reviewing Change(s) to a Proposed Large Facility in the Interconnection Process

Section 30.4.4 of Attachment X requires Large Facilities in the NYISO Interconnection Queue to provide to the NYISO, in writing, notice of any modification to information

provided in the Interconnection Request. Developers must therefore provide the NYISO with notice of actual changes to the project and are urged to also provide the NYISO with notice of contemplated changes for review prior to pursuing such changes. Indeed, Section 30.4.4.3 of Attachment X specifically allows a Developer to request NYISO to make a materiality determination for project change(s) under consideration in advance of such change being pursued, scoped and/or implemented.

The notice must be submitted in writing, preferably in the form of a letter (although an email is acceptable), and should be sent to:

Steven Corey
New York Independent System Operator
10 Krey Boulevard
Rensselaer, New York 12144
Email: scorey@nyiso.com

- Such notice should be accompanied by a revised APPENDIX 1 TO LFIP – INTERCONNECTION REQUEST form.
- NYISO may request additional information or analysis from the Developer to assist in NYISO's materiality determination. NYISO will notify the Connecting Transmission Owner (CTO) of the change(s)/proposed change(s) and will solicit the CTO's input regarding the materiality of the change(s). NYISO will review the information provided by the Developer and will evaluate the input provided by the CTO, and will evaluates whether the change(s)/proposed change(s) could have an adverse impact on the cost or timing of any project with a later queue priority date (per above criteria). Based on this evaluation, NYISO will make its determination regarding the materiality of the change(s)/ proposed change(s).
- NYISO will notify the Developer of its determination and will advise the Developer of the next scheduled TPAS meeting. The Developer may withdraw the proposed modification at this point. If the Developer wishes to proceed, NYISO Staff will report its materiality determination to TPAS for information. NYISO Staff or TPAS will report the results of the determination to the Operating Committee.
- If the change(s) are contemplated or proposed change(s), NYISO will request the Developer to confirm the changes.
- If the change(s)/proposed change(s) are determined to be a Material Modification, the Developer may elect to either withdraw the changes, or submit a new Interconnection Request in accordance with Attachment X to pursue the changes further. For a material increase in size, the Developer may retain the current Interconnection Request at the current size, and submit a new Interconnection Request for the increase.
- Changes determined to be non-material can be accommodated under the existing Interconnection Request and the modified project will continue through the NYISO Interconnection process under its current queue position.

3.4 Small Generator Interconnection Procedures (SGIP)

3.4.1 Basic Information about the SGIP

3.4.1.1 What projects are subject to the SGIP?

The SGIP is contained in Attachment Z of the OATT. From the standpoint of size, the SGIP applies to proposed small generator facilities 20 MW or less in size. The SGIP would apply to a proposal to increase the capability of an existing generation facility if the resultant size of the facility is 20 MW or less. However, a proposal to increase the capability of an existing generation facility would fall under the LFIP if the resultant size of the facility is more than 20 MW, even though the incremental increase in capability may be less than 20 MW.

A threshold issue for a small generator project is whether the project falls under the NYISO's or the local Transmission Owner's interconnection process. Two basic factors determine the jurisdiction of the small generator project: the type of facility to which the project proposes to interconnect, and whether the output of the generator would only serve local load, or whether all or some of the output of the generator may be available for wholesale sales under a FERC-approved tariff. A small generator project would fall under the NYISO SGIP if: (1) the small generator proposes to interconnect to either the NYS Transmission System, or FERC-jurisdictional distribution, and (2) at least some of its output may be available to the wholesale market. A small generator project proposed to interconnect to non-FERC jurisdictional distribution and/or whose output would only serve local load would not fall under the SGIP. All small generator interconnections to the Long Island Power Authority (LIPA) distribution system fall under the LIPA interconnection process and are not subject to the SGIP (see Section 32.1.1.1 of Attachment Z).

The SGIP covers three separate processes for three categories of small generator projects:

- Fast Track Process – for proposed generating facilities 2 MW or less that meet certain qualifications (see Section 32.2 of Attachment Z).
- Study Process – for proposed generating facilities greater than 2 MW up to 20 MW, or smaller generator projects than don't qualify for the Fast Track Process (see Section 32.3 of Attachment Z).
- Inverter-Based Generating Facility no larger than 10 kW (see Appendix 5 of Attachment Z).

Proposed small generating facilities 2 MW or less typically do not fall under the SGIP because usually such projects either interconnect to non-FERC jurisdictional distribution, or would only serve local load on a non-wholesale basis. Most small generator projects that are subject to the SGIP fall under the Study Process.

3.4.1.2 Types of Interconnection Service

Similar to Large Facilities, a proposed Small Generating Facility must elect and be evaluated for Energy Resource Interconnection Service (ERIS), and may elect and be evaluated for Capacity Resource Interconnection Service (CRIS) per Section 32.1.1.7 of

Attachment Z. Small Generation Facilities of 2 MW or less are not required to undergo a deliverability evaluation to receive CRIS.

3.4.1.3 What Costs are involved?

The costs involved in the NYISO SGIP process include:

- For Interconnection Requests submitted under the Fast Track Process (for generator projects 2 MW or less in size that qualify) a $500 nonrefundable processing fee is required. For Interconnection Requests submitted under the Study Process (for generator projects larger than 2 MW, or smaller projects that don't qualify for the Fast Track Process), a $1,000 deposit toward the cost of the feasibility study is required. (see Attachment Z – Appendix 2);
- The NYISO's and the Connecting Transmission Owner's actual study costs for each of the interconnection studies performed. (The actual study costs vary significantly for individual projects);
- The cost (or cost allocation) of any CTO Attachment Facilities, System Upgrade Facilities, and/or System Deliverability Upgrades identified in the interconnection studies, as applicable.

3.4.1.4 How long does it take?

The time frames for the NYISO to meet its obligations regarding the SGIP are outlined in Attachments Z and S, and summarized in the table in Attachment E of this manual. The overall time to complete the interconnection studies and Interconnection Agreement is typically one to two years, but can vary for individual projects.

3.4.1.5 Who is involved in the process?

The Developer (referred to as the **Interconnection Customer** in Attachment Z), NYISO and Connecting Transmission Owner (CTO) are the primary parties involved throughout the interconnection process. One or more Affected Systems may be involved is necessary. (See Section 32.4.9 of Attachment Z)

NYISO committees and working groups generally are not involved in small generator interconnection studies. By exception, if a small generator project is required to undergo a NYISO Class Year Facilities Study process, or requests to undergo a Class Year Deliverability Study in order to be evaluated for CRIS, the IPFSWG, TPAS, and the Operating Committee are involved in NYISO Class Year studies. (See Sections 32.1.1.7 and 32.3.5.3.2 of Attachment Z, and Section 3.3.1.5 of this manual.)

3.4.2 Small Generator Interconnection Request

A Developer proposing to interconnect a new Small Generating Facility to the NYS Transmission System or the FERC-jurisdictional Distribution System, or increase the capacity of, or make a material modification to the operating characteristics of, an existing Small Generating Facility, must submit an Interconnection Request to the NYISO in the form of Appendix 2 of the SGIP, along with the required processing fee or study deposit, and demonstration of Site Control. (See Attachment Z – Appendix 1 regarding definitions

of terms, Section 32.1.3 of regarding Interconnection Requests, and Section 32.1.5 regarding Site Control.)

Developers proposing to interconnect an Inverter-Based Small Generating Facility no larger than 10 kW should refer to Appendix 5 of Attachment Z; although such small inverter-based facilities generally do not fall under the NYISO SGIP.

The Small Generator Interconnection Request forms are available from the NYISO web site at the following link.

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

3.4.3 Basic Steps of the SGIP

The steps of the SGIP are described in Attachment Z and summarized in the table in Attachment E of this manual.

3.4.4 Small Generator Interconnection Studies

The interconnection studies for small generators are described in Section 32.3 of Attachment Z. The small generation interconnection studies may include a feasibility study, a system impact study, and/or a facilities study. At the facilities study step, a small generator project may be required to undergo either a small generator facilities study, or a Class Year Facilities Study (see Section 32.3.5.3.2 of Attachment Z). Which, if any, of these studies are required is dependent upon the specific circumstances of the proposed small generator project and the transmission or distribution facility to which the small generator is proposed to interconnect. Depending on circumstances, a small generator project may require one, two, three, or no interconnection studies. Plans for the first interconnection study to be performed for a project are discussed at the Scoping Meeting (see Section 32.3.2 of Attachment Z). Thereafter, plans for any subsequent interconnection study are discussed among the parties upon conclusion of the interconnection study in progress. The applicable study agreement must be prepared and executed for each interconnection study to be performed. The forms for the three types of small generator interconnection study agreements appear in Appendices 6 through 8 of Attachment Z.

3.4.5 Small Generator Interconnection Agreement

After completion of the requisite interconnection studies, the next step of the small generator interconnection process is to develop, negotiate, and execute an Small Generator Interconnection Agreement (SGIA). The SGIA is a three-party agreement between the NYISO, CTO and the Interconnection Customer. The procedures pertaining to the SGIA are covered in Section 32.4.8 of Attachment Z. The form of the SGIA is contained in Appendix 9 of Attachment Z.

3.4.6 Construction, Installation, Registration, and Operation

After execution of the Interconnection Agreement, the next and final major step of the interconnection process is to proceed with detailed engineering, construction, installation,

registration, testing, and operation of the project in accordance with the Interconnection Agreement.

Prior to testing and operation of a new small generating facility, the Developer (owner/operator) of the new facility must register the new facility with the NYISO through the NYISO Customer Registration process. The Developer should initiate the registration process at least six (6) months prior to the anticipated date of initial interconnection and energization of the new facility to the NYCA electric system. Information and material regarding NYISO Customer Registration is available from the NYISO web site at

http://www.nyiso.com/public/markets_operations/services/nyiso_registration/index.jsp

3.4.7 Modification of the Interconnection Request

See Section 32.1.4 of Attachment Z regarding modification of a small generator Interconnection Request.

3.5 Load Interconnection Procedures

The procedures regarding proposed Load interconnections are covered in Sections 3.9 and 4.5.8 of the OATT.

Applicability – Under procedures approved by the NYISO Operating Committee,[4] the NYISO Load interconnection procedures apply to Load interconnections that are either: a) greater than 10 MW connecting at a voltage level of 115 kV or above, or b) 80 MW or more connecting at a voltage level below 115 kV. Proposed Load interconnections that fall outside these criteria are not subject to the NYISO procedures, but instead fall under the Transmission Owner's procedures.

The basic steps of the NYISO procedures regarding a proposed Load interconnection are as follows:

1. Request for Interconnection Study – An Eligible Customer submits its Load interconnection proposal to the NYISO. Oftentimes the Transmission Owner to whose system the customer wishes to interconnect submits the interconnection proposal to the NYISO on behalf of the customer. (See Sections 3.9.1 or 4.5.8.1 of the OATT.)
2. Performance of Technical Studies – NYISO performs a system impact study in cooperation with the Connecting Transmission Owner. The procedures and requirements for the system impact study for a proposed Load interconnection are similar to those for a proposed transmission expansion (see Section 2.4.3 of this manual).
3. Interconnection Agreement – After receiving approval of the proposed interconnection and making payment to the NYISO and Transmission Owner for the cost of the technical studies, the Eligible Customer may elect to continue with the proposed interconnection by entering into an interconnection agreement with

[4] From New York Independent System Operator System Reliability Impact Study Criteria and Procedures, Revision 1, approved May 23, 2001. Portions of those criteria and procedures have been incorporated in this manual as applicable.

the connecting Transmission Owner. NYISO is not a party to interconnection agreements for Load interconnections. (See Sections 3.9.3 and 4.5.8.3 of the OATT.)

3.6 Interconnection Study Methodology

3.6.1 Minimum Interconnection Standard Technical Assumptions[5]

The technical assumptions used when conducting an SRIS or other Interconnection Study under the Minimum Interconnection Standard are as follows:

1. The objective of an Interconnection is to provide access to the transmission system, and does not necessarily include or require providing service across the transmission system. The Customer proposing the Interconnection may separately request a System Impact Study under Sections 3.7 or 4.5 of the OATT to evaluate a transmission expansion or upgrade, but this would not be considered part of the Interconnection Study. As a part of its ongoing transmission system review process, including its Locational Capacity Requirements Studies, NYISO will review and update local capacity requirements.
2. Any potential adverse reliability impact identified by the Interconnection Study that can be managed through the normal operating procedures of the NYISO and/or CTO will not be identified as a degradation of system reliability or noncompliance with the NERC, NPCC, or NYSRC reliability standards. It is assumed that the owners and operators of the proposed facilities will be subject to, and shall abide by, the applicable NYISO and/or CTO's operating procedures.
3. It is assumed that the proposed facilities will not directly result in the retirement or decommissioning of any existing facilities other than those that may be specifically identified as part of the project. Any subsequent retirement or decommissioning of existing facilities shall be considered a separate matter.

3.6.2 Cost Allocation Procedures (Per Class 2001 Settlement Agreement)

The following Cost Allocation Procedures were developed in compliance with the Non-Financial Settlement Agreement in Docket Nos. EL02-125-000 and EL02-125-001. They are reproduced here in Section 3.6.2 in their entirety, in the form approved by the NYISO Operating Committee on May 26, 2005.

3.6.2.1 Introduction

These Cost Allocation Procedures implement the terms of a recent FERC settlement[6] involving members of the Class Years 2001 and 2002. These Procedures will apply to the

[5] From New York Independent System Operator System Reliability Impact Study Criteria and Procedures, Revision 1, approved May 23, 2001. Portions of those criteria and procedures have been incorporated in this manual as applicable.

Catch Up Class Year and future class years, unless amended. They provide detail regarding the models, data bases, study processes, and analytical methods utilized by the NYISO in the administration of the Attachment S of the OATT. They also establish mechanisms to increase the transparency of the cost allocation process.

3.6.2.2 Models, Data Bases and Analytical Methods

3.6.2.2.1 Models and Data Bases

Attachment S requires the NYISO to use in its cost allocation studies models, data bases, and analytical methods that have been developed through North American Electric Reliability Council (NERC), Northeast Power Coordinating Council (NPCC), New York State Reliability Council (NYSRC), inter-ISO, or NYISO stakeholder processes.

The Existing System Representation is the foundation for both the ATBA and the ATRA. It is intended to provide an accurate description of the facilities that will constitute the power system for the next five-year period. The NYISO develops the Existing System Representation by making certain changes to its planning models and data bases (i.e. power flow, stability, short circuit, and Multi-Area Reliability Simulation or MARS) to comply with Attachment S. The result of these changes is that the Existing System Representation includes (1) all generation and transmission facilities identified in the NYISO's most recent Load and Capacity Data Report as existing as of January 1 of the Class Year, excluding those facilities that are subject to cost allocation but for which Class Year cost allocations have not been accepted; (ii) all planned generation and merchant transmission projects that have accepted their cost allocation in a prior Class Year, and any System Upgrade Facilities associated with those projects; (iii) all generation and transmission retirements and derates identified in the most recent Load and Capacity Data Report as scheduled to occur during the five year period; and (iv) all other changes to existing facilities, other than changes that are subject to cost allocation but for which Class Year cost allocations have not been accepted, that are identified in the Load and Capacity Data Report or reported by Market Participants to the NYISO as scheduled to occur during the five year period.

System Upgrade Facilities ("SUFs") for which cost allocation have been accepted in a prior Class Year cost allocation process are represented in the Existing System Representation in the year of their anticipated in-service date. In addition, the SUFs listed on the attached Appendix A will be included in the Existing System Representation, and will be shown as in-service in the first year of the cost allocation study planning period and in each subsequent year. The NYISO will continue to represent these facilities in this way unless they are cancelled or otherwise not in service by January 1, 2010. Beginning with the Class Year 2010, if some or all of these SUFs are not yet in service, the NYISO will determine the date when the facilities will be in service and represent them according to its determination.

3.6.2.2.2 Process for Updating Models and Data Bases

Attachment S requires the NYISO to utilize the most current versions of the data bases and models that are available at the time the NYISO is first required to use such data to perform

[6] These Procedures are developed in compliance with the Non-Financial Settlement Agreement in Docket Nos. EL02-125-000 and EL02-125-001. Approved by the NYISO Operating Committee on May 26, 2005.

the cost allocation studies for a given Class Year. Beginning on January 1 of the Class Year, the NYISO sends notices to Transmission Owners, generation owners, and other suppliers seeking information to update the data reported in the Load and Capacity Data Report. The NYISO also contacts the neighboring Control Area Operators/ISOs/RTOs to obtain information to update the planning models of their respective systems. The NYISO uses the information received in response to its requests to update its planning models (i.e. power flow, stability, short circuit, and MARS) and create the Existing System Representation. Note that, since a power flow case must balance generation and load, at least some generation included in the Existing System Representation is generally required to be modeled off-line in the power flow base case. However, all generation and transmission facilities included in the Existing System Representation are modeled as in-service in the short circuit base case. The NYISO will complete the data collection phase of the process in time to present the results to TPAS at its regularly scheduled meeting in March. The NYISO will start the cost allocation studies for a Class Year following that presentation.

The NYISO will not modify the selected version of the data bases and models during the course of the cost allocation studies for a Class Year except: (1) as may be required by Attachment S, the NYISO Tariffs, an order of the Commission, or to address an emergency interconnection not subject to the cost allocation process in a prior year and determined by the NYISO to be necessary to satisfy Applicable Reliability Requirements in the first year of the five year cost allocation study planning period, or (2) to correct material errors in the data bases and models. An error will be considered material if it has the potential to impact the identification of System Upgrade Facilities and associated costs determined during the cost allocation process. For example, an error in the representation of the bulk power system will likely be considered material and will require correction.

3.6.2.2.3 Study Processes and Analytical Methods

These NYISO-established study processes and analytical methods include:

1. **Thermal Analysis**

   Thermal analysis is an analytical method used to evaluate and compute the transfer limits of the transmission system for a given base case condition from the stand point of the thermal criteria described in rule B-R1 of the NYSRC Reliability Rules. Starting with a power flow base case, the NYISO uses a standard linear power flow analysis program, such as the PTI PSS/E TLTG Activity or the PTI MUST program, to evaluate and determine the normal and emergency transfer limits of the transmission system from the stand point of the thermal criteria. The thermal transfer limit of an interface is the maximum power transfer achievable without causing either a pre-contingency or post-contingency overload of any transmission facility. For the cost allocation, the NYISO performs this thermal analysis for two power flow base cases, for the ATBA and ATRA, respectively.

2. **Voltage Analysis**

   Voltage analysis is an analytical method used to evaluate system voltage performance and to compute the transfer limits of the transmission system for a given base case condition from the stand point of the voltage criteria described in rule B-R2 of the NYSRC Reliability Rules. Starting with a power flow base case,

the NYISO uses the PTI PSS/E Power Flow program to evaluate and determine the transfer limits of the transmission system from the stand point of the voltage criteria. The methodology used by the NYISO in this analysis is described in NYISO Transmission Planning Guideline #2-0, *Guideline for Voltage Analysis and Determination of Voltage-Based Transfer Limits*. For the cost allocation, the NYISO performs this voltage analysis for the two power flow base cases, for the ATBA and ATRA, respectively.

3. Stability Analysis

Stability analysis is an analytical method used to evaluate system stability performance and compute the transfer limits of the transmission system for a given base case condition from the stand point of the stability criteria described in rule B-R3 of the NYSRC Reliability Rules. Starting with a stability base case, which essentially is a power flow base case with dynamics models added, the NYISO creates several transfer "test" cases and uses the PTI PSS/E Stability program to evaluate the stability performance of the system for various potentially limiting design criteria contingencies at the various transfer levels in order to determine the transfer limits of the transmission system from the stand point of the stability criteria. The methodology used by the NYISO for this analysis is described in NYISO Transmission Planning Guideline #3-0, *Guideline for Stability Analysis and Determination of Stability-Based Transfer Limits*. For the cost allocation, the NYISO performs this stability analysis for the two power flow base cases for the ATBA and ATRA, respectively.

The results of the above described thermal, voltage and stability analyses are combined to determine the overall transfer limits of the transmission system based on the most limiting or the thermal, voltage, or stability criteria.

4. Resource Adequacy Analysis

Resource adequacy analysis, or "resource reliability analysis" as it is called in Attachment S, is an analytical method used to evaluate the loss of load expectation (LOLE) of one or more areas of the power system, and thereby determine the adequacy of generation, transmission and demand-side resources within or available to the area (or areas) from the stand point of the Resource Adequacy Design Criteria described in Section 3.0 of the NPCC *Basic Criteria for Design and Operation of Interconnected Power Systems*. The NYISO uses the GE Multi-Area Reliability Simulation (MARS) program for this analysis. For the cost allocation, and specifically the ATBA, the NYISO develops a MARS model of the New York State based on the Existing System Representation, and uses the MARS program evaluate the adequacy of resources within each of the various areas (or zones) within New York State relative to the NPCC resource adequacy criteria. In the event that this analysis indicates that the Existing System does not meet the resource adequacy criteria, additional analysis is performed to evaluate the adequacy of possible feasible generic solutions to meet the criteria. This type of analysis is not used in the ATRA.

5. Short Circuit Analysis

Short circuit analysis is an analytical method used to evaluate fault current levels at various buses across the system and to determine whether any equipment (e.g.

circuit breakers) may be overdutied for the modeled system representation in violation of rule B-R7 of the NYSRC Reliability Rules. Unlike a power flow base case that must balance generation and load, thereby generally requiring at least some generation to be modeled off-line, a short circuit base case typically models all generation and transmission facilities represented in the case as in-service. The methodology used by the NYISO for this analysis is described in NYISO G*uideline for Fault Current Assessment*. The Transmission Owner's criteria are used to determine whether or not a specific piece of equipment is overdutied. For the cost allocation, the NYISO performs this short circuit analysis for the two short circuit base cases, for the ATBA and ATRA, respectively. In the event that this analysis indicates that the ATBA or ATRA base case does not meet the applicable criteria, additional analysis is performed to evaluate and determine the System Upgrade Facilities needed to meet the criteria.

3.6.2.3 NYISO Obligations to Facilitate Communications

3.6.2.3.1 Posting of TPAS Meeting Minutes

The NYISO will post the minutes of TPAS meetings on the NYISO website. These minutes will be posted under TPAS meeting materials on the NYISO's web site.

3.6.2.3.2 Electronic Work Room

The NYISO will maintain a secure web posting platform (i.e., an electronic "work room") on which items subject to TPAS review will be posted. The electronic work room will allow Market Participant comments and NYISO responses thereto to be posted.

3.6.2.3.3 Submission of Market Participant Comments

As described in Section 3.6.2.4 below, TPAS and the TPAS Working Group will review various aspects of the cost allocation process for a Class Year. Market Participants shall submit their comments and information to the NYISO by utilizing the electronic work room.

The NYISO will not rely on or utilize any information not made available to TPAS, or the TPAS Working Group for the Class Year, at least three (3) business days in advance of any TPAS, or TPAS Working Group, meeting at which review of a matter permitted in Section 3.6.2.4 occurs. Market Participants can make their comments or information available to TPAS or the TPAS Working Group by submitting them through the electronic work room in accordance with the requirements specified herein. However, the NYISO may consider or utilize information that qualifies as Confidential Information under the NYISO's tariffs or that constitutes Critical Energy Infrastructure Information pursuant to any law or regulation without first making it available to TPAS or the TPAS Working Group.

3.6.2.3.4 Establishment of TPAS Working Group

The NYISO will work with TPAS to establish and facilitate a Market Participant Working Group within TPAS to focus on each Class Year cost allocation. The Working Group will consist of those stakeholders with significant interest in the cost allocation process for the

given Class Year, such as developers with Class Year projects and impacted Transmission Owners.

3.6.2.4 TPAS Involvement in Study Process

3.6.2.4.1 TPAS Review of Study Inputs

The NYISO will present to TPAS for TPAS review all study inputs prior to the NYISO beginning any cost allocation study. The study inputs presented to TPAS will include a description of the adjacent control area system representation that the NYISO proposes to adopt.

3.6.2.4.2 TPAS Review of Completed Studies

Upon completion of a study, the NYISO will present the results of the study to TPAS and TPAS will have the opportunity to review those results. The studies included in this review are the Annual Transmission Baseline Assessment and the Annual Transmission Reliability Assessment.

3.6.2.4.3 TPAS Involvement in Selection of Generic Facilities

In certain circumstances, the NYISO must develop generic facilities to complete the ATBA. See Attachment S of the NYISO's OATT, Section 25.6.1.2. This will occur if the existing transmission and generation facilities, combined with previously approved and accepted System Upgrade Facilities, are insufficient to meet the Applicable Reliability Requirements on a year by year basis.

Under Section 25.6.1.2.6 of Attachment S, the NYISO must submit proposed generic solutions to an independent expert for review. TPAS will identify the qualifications necessary for independent experts that will be selected. Prior to selecting an independent expert, the NYISO will present the candidates' credentials to TPAS for its review.

The NYISO will submit to TPAS for its review the NYISO's generic solutions (generation and/or transmission), including any options considered and rejected by the NYISO, as well as proposals made by any Market Participant, as permitted under Attachment S.

The TPAS Working Group will review the comments of the independent expert reviewer retained pursuant to Attachment S. To facilitate this process, the NYISO will post the Comments of the independent expert to the electronic work room, including all drafts of the expert reviewer's reports provided to the NYISO.

3.6.2.4.4 TPAS Working Group Review of Estimates

The NYISO will present to the TPAS Working Group for its review all cost information and all other data used or relied upon in developing cost estimates required under Attachment S. These estimates include the costs of the System Upgrade Facilities identified in the ATBA (Section 25.6.1.1) and those identified in the ATRA (Section 25.6.2).

3.6.2.4.5 TPAS Review of Draft and Final Cost Allocation Reports

The NYISO will present to TPAS for its review all draft and final cost allocation reports.

3.6.2.5 Information Presented to Operating Committee

The NYISO will compile the record of TPAS Working Group and TPAS members' comments submitted during the cost allocation process for the Class Year and the NYISO's responses to these comments. The NYISO will make these comments available to the Operating Committee with the cost allocation report for each Class Year allocation.

3.6.3 NYISO Test Procedure for Evaluating Power Factor Requirements for Wind Generation Interconnection Projects

This section of the manual describes the NYISO's procedure to: 1) determine whether or not a wind generation interconnection project ("Wind Project") should be required to comply with a power factor standard to ensure the safety or reliability of the transmission system, and if so, 2) determine whether or not the PFS would be sufficient, or if insufficient, 3) determine the power factor range at the POI that would be needed to ensure the safety or reliability of the transmission system.

3.6.3.1 Background

FERC Order No. 661 does not require wind generation plants to comply with a power factor standard unless the transmission provider determines, on a case-by-case basis in a system impact study, that such compliance is needed to ensure the safety or reliability of the transmission system. When such a need has been demonstrated, FERC has adopted a standard power factor range of 0.95 leading and 0.95 lagging (+/- 0.95) at the Point of Interconnection (POI) for wind plants (the "Pro Forma Standard" or "PFS"). In addition, if the transmission provider determines that the PFS is insufficient, FERC Order No. 661-A allows the transmission provider to file a non-conforming agreement to essentially request the FERC's approval for a wider power factor range, again, on a case-by-case basis.

3.6.3.2 Details

Test Approach, Concepts and Assumptions

As directed by the FERC, this test procedure will be performed as part of, or in conjunction with the NYISO's Interconnection System Reliability Impact Study (SRIS) performed for the Wind Project. This test procedure will be integrated with the NYISO's standard SRIS practices and procedures.

Power flow analysis will be used to perform the evaluations required by this test procedure. In an SRIS, several power flow cases are used in the performance of thermal and voltage analysis.

The SRIS uses a number of pre-project base cases intended to simulate a range of "representative" system conditions, typically: a summer peak load case, a winter peak load case, and a spring light load case. For each pre-project base case, the SRIS uses a corresponding post-project "change" case. Contingency analysis is performed on all these cases to evaluate the thermal and voltage performance of the transmission system with respect to applicable reliability standards, with and without the project, thereby assessing the incremental impact the project may have on system reliability.

The post-project power flow cases model the project in accordance with the information provided by the Developer for the SRIS, including any reactive power (VAr) capability that may be proposed with the project ("proposed VAr capability"). For wind power projects, for example, certain types of wind generators are designed to provide some amount of VAr capability. Therefore, the model for wind projects that use those types of generators would include the VAr capability inherent in the generator design. And if the Developer were to include another form of VAr capability as part of the project, such as a shunt capacitor bank, that too would be included in the model. Since the SRIS is conducted on the basis of project information provided by the Developer, any subsequent change to the project after the SRIS has been completed that the NYISO determines may have a material impact on the SRIS results, would require re-study of the SRIS, or at least those portions that may be affected by the change. Such re-study would include redo of this test procedure as necessary.

The test procedure has up to three basic steps as follows:

1. Determine whether the proposed VAr capability for the Wind Project would be sufficient to ensure the safety or reliability of the transmission system, or whether the Wind Project should be required to comply with a power factor standard. If the latter,
2. Determine whether or not the PFS would be sufficient. If not,
3. Determine the power factor range at the POI that would be needed to ensure the safety or reliability of the transmission system.

Normally these steps would be performed sequentially, since the results of each step determine the need to perform the subsequent step(s).

The test procedure will be based on the following concepts and assumptions:

- The test results will be determined on the basis of voltage performance of the transmission system.
- The impact of a Wind Project on transmission system voltage performance will be based on the combined impact of adding the project to the system at its maximum megawatt (MW) output and the corresponding assumed generation redispatch modeled in the power flow case.
- If the Wind Project has a significant impact on transmission system voltage performance, the potential for such impact can be detected at the POI and/or the adjacent buses connected to the POI (the "adjacent buses"). Conversely, if the Wind Project is shown to have an insignificant impact on voltage performance at the POI and the adjacent buses, it can be assumed that the Wind Project would have an insignificant impact on the voltage performance of the rest of the transmission system as well. The rationale for evaluation of the adjacent buses is that, in general, injecting active power into a bus (such as injecting power from a new generator at the POI) may or may not have a significant effect on the voltage at the POI itself. However, the power injection will change the power flows on transmission facilities (lines or transformers) connected to the POI, which may result in a significant change in voltage at one or more of the remote end terminals (i.e. the adjacent buses) of those facilities. Therefore, the adjacent buses should be considered in this evaluation.

- For the purpose of this test procedure, a change in voltage at the POI or the adjacent buses of greater than +/- 0.5% of nominal voltage (+/- 0.005 Per Unit) will be considered significant.
- If the Wind Project, with due consideration of any proposed VAr capability, is shown to have a significant impact on voltage at the POI or adjacent buses, either up or down on a pre-contingency basis, or in the direction of the voltage change on a post-contingency basis, it is reasonable to conclude that such impact has the potential to cause or contribute to a significant adverse impact on transmission system voltage performance (e.g. voltage limit violations, or adverse impact on power quality) at the extreme ends of the range of possible system conditions. This "significant incremental impact" approach is consistent with the scope and intent of an SRIS and reflects the fact that the SRIS is not a "design study." In a typical design study, the analyst would develop many more power flow cases than are used in an SRIS, in an attempt to capture the full range of possible local system conditions over a full range of time frames, such as: maximum and minimum local load and/or line flow conditions, local maintenance outage conditions, various seasons (e.g. summer, winter, spring), time-of-day (e.g. day-time vs. night-time), day-of-week (e.g. week-day vs. week-end or holiday), etc. Adding all this analysis to an SRIS would significantly alter the nature of the study and substantially increase the time and cost to complete the study. Therefore, because an SRIS, by its inherent nature, is not a design study, the "significant incremental impact" approach described herein is appropriate.
- The Wind Project would be required to provide additional VAr capability (i.e. comply with a power factor standard) when necessary to mitigate a significant impact on transmission system voltage performance due to the Wind Project. The Wind Project would not be required to provide additional VAr capability to address a pre-existing voltage performance issue, but would be required to provide additional VAr capability only if found to have a significant incremental impact on transmission system performance.

3.6.3.3 Step 1 Test Procedure

The first step of the test procedure is to determine whether or not the Wind Project should be required to provide additional VAr capability to ensure the safety or reliability of the transmission system. As a matter of convention, a "positive result" of this test will mean that the Wind Project would be required to provide additional VAr capability, and a "negative result" will mean the Wind Project would not be required to provide additional VAr capability.

A number of tests will be required to complete this step. A positive result of any test performed for this step will be considered an overall positive result of this step, resulting in a determination that the Wind Project will be required to provide additional VAr capability, and no additional tests for this step would be necessary. Therefore, all tests performed for this step would need to yield a negative result in order for the overall result of this step to be negative, resulting in a determination that the Wind Project would not be required to provide additional VAr capability.

Pre-contingency Tests:

A series of pre-contingency tests will be performed on each of the pre-project and corresponding post-project power flow cases (Summer Peak Load, Winter Peak Load, and Spring Light Load) as follows:

1. Modify each of the post-project cases as necessary to use the proposed VAr capability that was modeled as part of the Wind Project to regulate voltage at the POI bus at, or as near as possible, to the value in the corresponding pre-project base case.
2. For each case, compute the change in voltage at the POI bus and adjacent buses in the pre-project case vs. the corresponding post-project case. (Ordinarily a POI bus would not exist in a pre-project case if the proposed interconnection is on a line rather than a substation. However, in preparing the base cases for an SRIS, it is a standard practice of the NYISO to insert a POI bus into the pre-project base cases for a proposed line connection. This does not affect the results of analysis performed on the pre-project cases, but conveniently provides a POI bus in the pre-project case where otherwise one would not exist.)
3. If the voltage change at the POI bus for any pair of cases is significant (i.e. greater than +/- 0.005 Per Unit), the result of that test is positive. If not, check the adjacent buses. If the voltage change at an adjacent bus is significant and not all the proposed VAr capability has been used, use the remaining VAr capability to try to mitigate the voltage change at the adjacent bus. If the VAR capability is insufficient to mitigate any significant voltage changes observed at the adjacent buses, the result of the test is positive. But if the proposed VAr capability is found to be sufficient to mitigate any significant voltage changes at the POI bus and adjacent buses, the test result is negative. As previously stated, a positive result for any case will be considered an overall positive test result.

Post-Contingency Tests:

If the pre-contingency test results are negative, a series of post-contingency tests will be performed on the pre-project and post-project power flow cases as follows. (If the pre-contingency test results were positive, the post-contingency tests are not needed):

1. Identify the “critical” contingencies from the voltage analysis performed in the SRIS for the pre-project and post-project cases. The critical contingencies include the contingencies that result in the greatest voltage increase or decrease at the POI and/or adjacent buses. At least two critical contingencies should be identified for each pre-project and post-project case: the contingency that causes the greatest voltage increase and the contingency that causes the greatest voltage decrease. Normally only one contingency in each direction would be identified as the worst case, but it’s possible that more than one contingency may be identified as critical due to their relative impacts on different buses. The critical contingencies identified in the post-project cases may be the same or different than those identified in the corresponding pre-project case.
2. Modify each of the post-project, critical contingency cases as necessary to use the proposed VAr capability that was modeled as part of the Wind Project to regulate

voltage at the POI bus at, or as near as possible, to the value in the corresponding pre-project pre-contingency base case.

3. Compute the change in post-contingency voltage at the POI bus and adjacent buses in the pre-project critical contingency case vs. the corresponding post-project critical contingency case. Note that the critical contingencies that result in a voltage increase vs. those that result in a voltage decrease must be compared separately.
4. If the voltage change at the POI bus or adjacent buses for any pair of cases is significant and adverse (i.e. greater than 0.005 Per Unit in the direction of the voltage change in the applicable pre-project critical contingency case), the result of that test is positive. If not, the test result is negative. As previously stated, a positive result for any case will be considered an overall positive test result.

Overall Result of this Step:

If the results of either the pre-contingency tests or the post-contingency test are positive, the overall Step 1 result is positive, indicating that the Wind Project should be required to provide additional VAr capability. Otherwise, the overall Step 1 result is negative, indicating the Wind Project should not be required to provide additional VAr capability. If the overall Step 1 result is positive, it will be necessary to perform Step 2 of this test procedure. But if the overall result of Step 1 is negative, it would not be necessary to perform the subsequent steps of this test procedure.

3.6.3.4 Step 2 Test Procedure

The second step of the test procedure is to determine whether or not the FERC PFS (a power factor range of +/- 0.95 at the POI) would be sufficient. As a matter of convention, a "positive result" of this test will mean that the PFS would be sufficient. A "negative result" will mean the PFS would not be sufficient to ensure the safety or reliability of the transmission system.

Pre-contingency Tests:

If the overall result of the pre-contingency tests in Steps 1 was negative, it would not be necessary to perform pre-contingency tests in this step. Essentially, the objective of this test is to determine whether the PFS VAr capability is sufficient to mitigate significant voltage changes at the POI and adjacent buses observed in Step 1. The procedure for this step is as follows:

1. Modify each of the post-project cases (Summer Peak Load, Winter Peak Load, and Spring Light Load) to model the Wind Project as having VAr capability that meets the PFS. Note that, since the PFS is +/- 0.95 at the POI, the VAr capability for the generator will likely require a power factor range at the generator terminals significantly greater than +/- 0.95. This will result in a set of "post-project with PFS" cases.
2. Rerun the power flow for each post-project case, using the PFS reactive capability of the project to regulate voltage at the POI bus at its pre-project level, and determine whether or not the significant voltage changes identified in Step 1 have been mitigated in all cases.

3. If the overall conclusion of this analysis is that the PFS would be adequate to mitigate the previously observed significant impact of the Wind Project on pre-contingency transmission system voltage, the result of this test would be positive. Otherwise, the result would be negative.

Post-Contingency Test:

If the overall result of the post-contingency tests in Step 1 was negative, it would not be necessary to perform post-contingency tests in this step. Essentially, the objective of this test is to determine whether the PFS VAr capability is sufficient to mitigate significant adverse voltage changes at the POI and adjacent buses observed in Step 1. The procedure for this test is as follows:

1. For those cases that showed a significant adverse impact in Step 1, modify the post-project critical contingency power flow cases to model the Wind Project as having VAr capability that meets the PFS.
2. Rerun the power flow for each of the "critical" contingencies, using the PFS reactive capability of the project to regulate voltage at the POI bus at its pre-contingency schedule, and determine whether or not all significant adverse impacts identified in Step 1 have been fully mitigated in all cases.
3. If the overall conclusion of this analysis is that the PFS would be adequate to mitigate the previously observed significant adverse impact of the Wind Project on post-contingency transmission system voltage performance, the result of this test would be positive. Otherwise, the result would be negative.

Overall Result of Step 2:

In this case, the results of both the pre-contingency and post-contingency test must be positive for the overall Step 2 result to be positive, indicating that meeting the PFS would be sufficient. If the results of either the pre-contingency test or post-contingency test are negative, the overall Step 2 result would be negative, indicating that the PFS is insufficient to mitigate the adverse impact of the Wind Project on transmission system voltage performance.

3.6.3.5 Step 3 Test Procedure

The third step of this test procedure, if required, is to determine the power factor range at the POI would be needed to ensure the safety or reliability of the transmission system. The procedure for this step is as follows:

1. Increase the VAr capability modeled for the Wind Project in the post-project cases by incremental amounts and repeat the previous critical pre-contingency and/or post-contingency analyses until the previously observed significant adverse impact on transmission system voltage performance has been mitigated.
2. Express the determined VAr requirement in terms of power factor range at the POI.

3.6.4 Modeling of Dual Yard Units at the Astoria East and West 138 kV Station in Interconnection Studies

This section of the manual describes the modeling of dual yard units at the Astoria East and West 138 kV Station in interconnection studies.

3.6.4.1 Background

Attachments S, X, and Z of the NYISO's OATT establish the interconnection studies required for proposed generation and merchant transmission projects. Existing facilities, including generation, must be modeled in the base cases used for these interconnection studies according to applicable requirements. Astoria Generating Company L.P. ("AGC") owns steam units Astoria 3, 4, and 5 (the "Dual Yard Units"). AGC has two distinct Points of Interconnection for each of the Dual Yard Units. Specifically, these units can connect to either the Astoria East 138 kV substation or the Astoria West 138 kV substation. Each unit can be connected to only one of these substations at a time. The connection point for each of these units in operations changes from time to time in response to the system conditions at that time. This document describes how these units will be modeled in the base cases used for interconnection studies.

3.6.4.2 Details

For purposes of all interconnection studies, the three dual yard units (Astoria 3, 4, and 5) will be modeled in a single, normal configuration. Under this configuration, Astoria 3 and Astoria 5 will be modeled at the Astoria West 138 kV substation and Astoria 4 will be modeled at the Astoria East 138 kV substation. This configuration will be modeled in all base cases used for interconnection studies, including power flow, short circuit and stability base cases. All interconnection facilities required for a proposed project, including System Upgrade Facilities and System Deliverability Upgrades, will be determined based upon this single configuration of Astoria 3, 4 and 5. The use of this single configuration in interconnection studies will be revisited if AGC proposes, through the interconnection process as applicable, any changes to the Dual Yard Units which affects any of their dual yard capability.

The configuration of these units in operations may change based on system conditions and consistent with any applicable operating protocol.

3.6.5 Deliverability Study Methodology

3.6.5.1 Overview

The methodology for the Class Year Deliverability Study and cost allocation for CRIS is defined in Section 25.7 of Attachment S of the OATT. The Class Year Deliverability Study procedures are outlined in Section 25.7.7 of Attachment S. A brief summary of the Deliverability methodology follows.

The Deliverability rules and tests are applied to NYCA transmission facilities in three categories: Byways, Highways, and Other Interfaces. (Per Att. S §25.7.2)

- Highways are the upstate inter-zonal interfaces, namely: Dysinger East, West Central, Volney East, Moses South, Central East/Total East, UPNY-SENY and UPNY-ConEd (and in series Bulk Power System facilities).
- Other Interfaces – Interfaces into New York capacity regions, Zone J and Zone K, and external ties into the New York Control Area.
- Byways – Facilities that are not Highways or Other Interfaces (i.e., all other transmission facilities within the NYCA).

The Deliverability Study includes three types of deliverability tests: 1) deliverability test for Highways and Byways, 2) "no harms" test for Highways, and 3) "no-harms" test for Other Interfaces.

- Deliverability test for Highways and Byways – Evaluates whether CRIS (current and requested) is deliverable within each of the three Capacity Regions (ROS-Rest of State, LI-Long Island and NYC-New York City), or results in Highway and/or Byway overloads (i.e., bottled capacity). (Per Att. S §25.7.8 except 25.7.8.2.14)
- No-harms test for Highways – evaluates whether requested CRIS degrades transfer capability (i.e., emergency transfer limit) of a Highway interface by more than a de minimus level (lesser of 25 MW or 2% of base transfer capability identified in the ATBA) and results in an increase of NYCA LOLE (determined in ATBA) of .01 or more. (Per Att. S §25.7.8.2.14)
- Deliverability test (i.e., no harms test) for Other Interfaces – Evaluates whether requested CRIS degrades transfer capability (i.e., emergency transfer limit) of any Other Interface by more than a de minimus level (lesser of 25 MW or 2% of base transfer capability identified in the ATBA). (Per Att. S §25.7.9)

Base case assumptions, modeling and conditioning steps for deliverability testing are described in Section 25,7 8 2 of Attachment S.

For deliverability testing, Emergency transfer criteria and testing is performed in conformance with NYSRC rules consistent with that used in the NYISO Comprehensive Reliability Planning Process studies (e.g., RNA). (Per Att. S §25.7.8.2.5)

3.6.5.2 Evaluation of Transfers of Deliverability Rights

Proposed transfers of CRIS between different locations are required to be evaluated in a Class Year Deliverability Study in accordance with Section 25.9.5 of Attachment S. The methodology for evaluation of CRIS transfers is as follows.[7]

Background

Evaluation of CRIS transfers occurs under the NYISO Class Year Facilities Study process, as part of the Class Year Deliverability Study.

The Class Year Deliverability Study consists of:

- $ATBA_D$ – Evaluation of deliverability of Existing System (without Class Year Projects)

[7] Source: Evaluation of Transfers of Deliverability Rights, a presentation to the NYISO Interconnection Issues Task Force, March 12, 2010.

- $ATRA_D$ – Evaluation of deliverability of system with Class Year Projects added
- If necessary, evaluation and identification of System Deliverability Upgrades (SDUs) to mitigate the incremental impact of Class Year Projects on deliverability.

CRIS transfers are evaluated at the ATRAD step.

Review of Deliverability Test:

The "Deliverability Test" actually consists of up to three assessments:

- Evaluation of overloads on Byways and Highways, where applicable
- Evaluation of impact on Emergency Transfer Limit of "Other Interfaces" (i.e., Inter-Capacity Region Tie-lines)
- If applicable, evaluation of impact on Emergency Transfer Limits for ROS Interfaces and resultant impact on LOLE.

The Class Year ATBA and ATRA cases are "conditioned" to create the $ATBA_D$ and $ATRA_D$ cases.

The Deliverability Test is performed on the $ATBA_D$ and $ATRA_D$ cases.

If the ATRAD case is found undeliverable, the incremental impact of the Class Year Projects is determined by the difference between the two cases.

Process for Evaluating Deliverability for a Proposed Transfer of CRIS:

Example: The parties submit a proposed transfer of 100 MW of CRIS from Existing Facility "Unit A" to New Facility "Unit B"

- "Unit B" must be in the Class Year.
- The $ATBA_D$ case includes Unit A, including the 100 MW of CRIS proposed to be transferred ($CRIS_T$). The $ATBA_D$ case does not include Unit B or any Class Year Projects.
- The Deliverability Test is performed on the ATBAD case, which may or may not find deliverability issues.
- Step 1 – Create the $ATRA_{D1}$ case and evaluate deliverability for that case.
  - The $ATRA_{D1}$ case models Unit A with the $CRIS_T$, and models all Class Year Projects, including Unit B, with their proposed capacity.
  - This step evaluates the deliverability of the Class Year Projects without the proposed transfer.
  - If Unit B is found deliverable for this test, the transfer is allowable.
  - Otherwise, proceed to Step 2.
- Step 2 – Create $ATRA_{D2}$ case and evaluate deliverability for that case.
  - The $ATRA_{D2}$ case is created from $ATRA_{D1}$ by removing $CRIS_T$ from Unit A.
  - This step re-evaluates the deliverability of the Class Year Projects, this time with the proposed transfer.
  - If Unit B is found deliverable for this test, the transfer is allowable.
  - Otherwise, proceed to Step 3.

- Step 3 – Create $ATRA_{D3}$ case, evaluate deliverability for that case, and compare the relative deliverability of $ATRA_{D3}$ vs. $ATRA_{D2}$.
  - The $ATRA_{D3}$ case is created from ATRAD1 by removing the amount of capacity requested from Unit B (New Facility). Note that $CRIS_T$ is modeled on Unit A (Old Facility) in this case.
  - Comparing $ATRA_{D3}$ to $ATRA_{D2}$ evaluates the effect of the transfer on deliverability.
  - If deliverability is not degraded (going from $ATRA_{D3}$ to $ATRA_{D2}$), the transfer is allowable.
  - If deliverability is fractionally degraded, NYISO will evaluate whether a transfer of a partial amount of $CRIS_T$ may be allowed with no degradation to deliverability compared to case $ATRA_{D3}$.
  - If no amount of $CRIS_T$ is transferable without causing a degradation of deliverability, the transfer is not allowable.

Table 3-3 Review of Cases to Evaluate Transfer:

Case	Unit A $CRIS_T$	Unit B CAP_T	
$ATRA_{D1}$	100	100	Evaluates deliverability of Class Year Projects w/o transfer
$ATRA_{D2}$	0	100	Evaluates deliverability of Class Year Projects with transfer
$ATRA_{D3}$	100	0	Comparing $ATRA_{D2}$ to $ATRA_{D3}$ evaluates the impact of the transfer on deliverability.

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4. TRANSMISSION PLANNING CRITERIA AND GUIDELINES

4.1 Introduction

NYISO does not have its own reliability criteria and for transmission studies, but rather NYISO recognizes and applies the applicable reliability criteria and standards of NERC, NPCC, NYSRC and the local Transmission District(s) for transmission expansion and interconnection studies. NYISO has developed and implemented various procedures and methods used in the performance of such studies. This section will summarize the criteria, procedures, and methods used by the NYISO in conducting transmission and interconnection studies.

4.2 Applicable Reliability Criteria and Standards

The reliability criteria and standards used by the NYISO for transmission and interconnection studies are documented in Part 4 the NYISO *Annual Transmission Planning and Evaluation Report (FERC Form No. 715 or FERC 715)*, which is updated and filed on April 1 each year. Part 4 of the FERC 715 identifies the Transmission Planning Reliability Criteria used by NYISO and the NYTOs. The reliability criteria listed in the NYISO 2012 FERC 715 Report (the most recent as of the date of this manual) are as follows:

- NERC Reliability Standards – specifically NERC Transmission Planning Standards TPL-001, TPL-002, TPL-003 and TPL-004;
- NPCC Regional Reliability Reference Directory #1 *Design and Operation of the Bulk Power System (Directory #1)* and Regional Reliability Reference Directory #12 *Under frequency Load Shedding Program Requirements (Directory #12)*;
- NYSRC Reliability Rules for Planning and Operating the New York State Power System;
- NYTO documents pertaining to transmission planning criteria and/or guidelines;
- NYTO documents pertaining to interconnection requirements and procedures.

The most recent NYISO FERC 715 report and related documents are available from the NYISO web site at the following link.

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

In general, transmission and interconnection studies apply the applicable reliability criteria and standards that are in effect at the time of the start of the study.

4.3 NYISO Transmission Planning Guidelines

NYISO has developed and implemented a number of guidelines related to and used in NYISO transmission and interconnection studies. These guidelines were developed and implemented as standalone documents, but included as attachments to the TEI Manual.

These attachments are considered part of the TEI Manual, and therefore subject to approval along with approval of the manual, but also may be revised and approved as separate documents.

The guidelines attached to this TEI Manual are as follows:

1. **NYISO Transmission Planning Guideline #1-1, Guideline for System Reliability Impact Studies** (included as Attachment F. This is a revision of NYISO Transmission Planning Guideline #1-0, September, 28, 1999, that was included as Attachment D in the original TEI Manual.)
2. **NYISO Transmission Planning Guideline #2-1, Guideline for Voltage Analysis and Determination of Voltage-Based Transfer Limits** (included as Attachment G. This is a revision of NYISO Transmission Planning Guideline #2-0, September 28, 1999, that was included as Attachment E in the original TEI Manual.)
3. **NYISO Transmission Planning Guideline #3-1, Guideline for Stability Analysis and Determination of Stability-Based Transfer Limits** (included as Attachment H. This is a revision of NYISO Transmission Planning Guideline #3-0, September 28, 1999, that was included as Attachment F in the original TEI Manual.)
4. **NYISO Guideline for Fault Current Assessment**, revised June 8, 2009 (included as Attachment I. This is a revision of the original NYISO Guideline for Fault Current Assessment, January 30, 2003.)
5. **NYISO Transmission Planning Guideline #5-0, Guideline for Application of High-Speed Autoreclosing**, July 25, 2002 (included as Attachment J).

Attachment A. (Discontinued)

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Attachment B. General Form of NYISO Study Agreement

Section 3 to OATT

System Impact Study Agreement

_____Project

1. This Study Agreement ("Agreement"), dated as of _____, 20__, is entered into, by and between the New York Independent System Operator, Inc. ("NYISO"), and ("Customer") pursuant to Section 3 of the NYISO Open Access Transmission Tariff ("OATT"). Customer and NYISO each may be referred to as a "Party," or collectively as the "Parties."

2. The NYISO has determined that the Customer is an Eligible Customer as defined in Section 3 of the OATT and that the Customer has submitted request for a System Impact Study ("Study").

3. The draft scope of work for the Study ("Study Scope") is attached hereto as Exhibit 1. This draft Study Scope is subject to the approval of the NYISO's Operating Committee.

4. Study Participants, Estimated Cost and Time for Completion of the Study.

4.1 The Customer or its consultant will perform the Study pursuant to the Study Scope approved by the NYISO's Operating Committee and will provide to the NYISO a draft Study report. The NYISO will review the draft Study report. The NYISO shall also coordinate with and obtain input from the Transmission Owners within the New York Control Area ("Transmission Owners") as necessary and appropriate.

4.2 The Customer will provide the draft Study report to the NYISO within 60 calendar days from the later of (1) Operating Committee approval of the Study Scope, or (2) the date both parties have executed this Agreement. Failure of the Customer to provide the draft Study report by this date will result in the removal of the project from the NYISO queue and the termination of this Agreement.

4.3 The NYISO estimates that the total cost for NYISO and Transmission Owner Study work under Agreement will not exceed $50,000. The NYISO estimates that it will complete its review of the draft Study report within 30 days from its receipt from the Customer.

5. Customer Obligations and Rights

5.1 The Customer agrees to pay to the NYISO the actual costs incurred by the NYISO and Transmission Owners in the performance and review of the Study.

5.2 The Customer agrees to make arrangements for any non-New York transmission owner(s) that may ultimately affect the outcome of the Study or subsequent project proposal, to participate in the Study. If requested by the Customer, the NYISO shall undertake reasonable efforts to assist the Customer in making such arrangements in accordance with Section 3.14 of the OATT. Should the Customer fail to make such arrangements, the NYISO shall proceed with the Study based on the information and data it has regarding the system(s) of non-New York transmission owner(s), but neither the NYISO nor the New York Transmission Owners shall be held liable for any erroneous or inaccurate results due to incomplete or inaccurate information and data pertaining to the system(s) of non-New York transmission owner(s).

5.3 The Customer has the right to terminate the Study and this Agreement at any time. In such case, the Customer shall promptly notify the NYISO of such termination and is liable to pay any actual Study costs incurred by the NYISO or Transmission Owner as of the date of such notification. Also, in such case, the NYISO shall not be required to provide a report of any partial Study results to the Customer.

6. NYISO Obligations

6.1 The NYISO agrees to assign the appropriate priority to the Study and enter it into the NYISO Queue in accordance with Section 3.10 of the OATT.

6.2 Upon initiation of the Study, the NYISO agrees to use due diligence to review the draft Study report within the time estimated. If the NYISO is unable to complete the review of the draft Study report within that period, the NYISO shall notify the Customer of such delay and the reason(s) why additional time is needed, and shall provide an estimate of when the review can be completed.

6.3 If requested, the NYISO agrees to provide reasonable assistance to the Customer in making arrangements for the participation of non-New York Transmission Owner(s) that may impact the outcome of the Study in accordance with Section 3.14 of the OATT.

7. Confidentiality

The Customer acknowledges that the Study will be listed on the NYISO's Study Queue, which is available to the public. Unless otherwise required by applicable law, rule, or regulation, the NYISO agrees to maintain the confidentiality of any and all information and data provided by the Customer for the Study, for as long as the Customer maintains such confidentiality. However, the Study Scope and the final Study Report will be made available to the NYISO's Transmission Planning Advisory Subcommittee and Operating Committee and posted on the NYISO's website. The Customer acknowledges that the NYISO has a responsibility to provide, or make available, system modeling data

associated with approved transmission and generation projects to neighboring Control Areas and NPCC and to provide modeling data of proposed projects to other parties pursuant to the requirements of the NYISO OATT.

8. Any notice or request made to or by either Party regarding this Agreement shall be made to the representative of the other Party as indicated below.

NYISO: _____
_____
_____
_____

Customer: _____
_____
_____
_____

9. Miscellaneous

9.1 Accuracy of Information. Except as Customer may otherwise specify in writing when providing information to the NYISO under this Agreement, Customer represents and warrants that the information it provides to NYISO shall be accurate and complete as of the date the information is provided. Customer shall promptly provide NYISO with any additional information needed to update information previously provided.

9.2 Disclaimer of Warranty. In preparing the Study, the Party preparing such study and any subcontractor consultants employed by it shall have to rely on information provided by the other Parties, and possibly by third parties, and may not have control over the accuracy of such information. Accordingly, neither the Party preparing the Study nor any subcontractor consultant employed by that Party makes any warranties, express or implied, whether arising by operation of law, course of performance or dealing, custom, usage in the trade or profession, or otherwise, including without limitation implied warranties of merchantability and fitness for a particular purpose, with regard to the accuracy, content, or conclusions of the Study. Customer acknowledges that it has not relied on any representations or warranties not specifically set forth herein and that no such representations or warranties have formed the basis of its bargain hereunder.

9.3 Limitation of Liability. In no event shall any Party or its subcontractor consultants be liable for indirect, special, incidental, punitive, or consequential damages of any kind including loss of profits, arising under or in connection with

this Agreement or the Study or any reliance on the Study by any Party or third parties, even if one or more of the Parties or its subcontractor consultants have been advised of the possibility of such damages. Nor shall any Party or its subcontractor consultants be liable for any delay in delivery or for the non-performance or delay in performance of its obligations under this Agreement.

9.4 Term and Termination. This Agreement shall be effective from the date hereof and unless earlier terminated in accordance this Agreement, shall continue in effect for a term of one year or until the Study is approved by the NYISO Operating Committee, whichever event occurs first Customer or NYISO may terminate this Agreement upon the withdrawal of Customer's request for a System Impact Study.

9.5 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to any choice of laws provisions.

9.6 Severability. In the event that any part of this Agreement is deemed as a matter of law to be unenforceable or null and void, such unenforceable or void part shall be deemed severable from this Agreement and the Agreement shall continue in full force and effect as if each part was not contained herein.

9.7 Counterparts. This Agreement may be executed in counterparts, and each counterpart shall have the same force and effect as the original instrument.

9.8 Amendment. No amendment, modification or waiver of any term hereof shall be effective unless set forth in writing signed by the Parties hereto.

9.9 Survival. All warranties, limitations of liability and confidentiality provisions provided herein shall survive the expiration or termination hereof.

9.10 Independent Contractor. NYISO shall at all times be deemed to be an independent contractor and none of its employees or the employees of its subcontractors shall be considered to be employees of Customer as a result of this Agreement.

9.11 No Implied Waivers. The failure of a Party to insist upon or enforce strict performance of any of the provisions of this Agreement shall not be construed as a waiver or relinquishment to any extent of such party's right to insist or rely on any such provision, rights and remedies in that or any other instances; rather, the same shall be and remain in full force and effect.

9.12 Successors and Assigns. This Agreement, and each and every term and condition hereof, shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and assigns.

IN WITNESS WHEREOF, NYISO and Customer have caused this Agreement to be duly executed by their respective officers as of the day and year designated below.

New York Independent System Operator, Inc.

By: _____

Name: _____

Title: _____

Date: _____

_____

By: _____

Name: _____

Title: _____

Date: _____

Exhibit 1

Draft System Impact Study Scope

Attachment C. (Discontinued)

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Attachment D. Steps in the NYISO Large Facility Interconnection Process[8]

(Applicable to Generating Facilities above 20 MW and Merchant Transmission)

(Revised 10/15/2010)

Step	Description / Action	By Whom	By When
A.	**Interconnection Request (IR)**		
1.	Submittal of Interconnection Request to NYISO with $10,000 application fee, $30,000 study deposit, and demonstration of Site Control or additional $10,000 deposit. *(§30.3.1 & 30.3.3.1)*	Developer	N/A
2.	Determine validity or deficiencies of IR. Acknowledgment of IR and notification of Connecting Transmission Owner (CTO). *(§30.3.3.2)*	NYISO	within 5 b-days of receipt of IR
3.	If notified of deficiencies, provide additional required information to the NYISO. *(§30.3.3.3)*	Developer	within 10 b-days of receipt of notice[9]
B.	**Feasibility Study (FES)**		
4.	Provide form Feasibility Study Agreement (FESA) to Developer and CTO. *(§30.6.1)*	NYISO	simultaneously with acknowledgment of valid IR (see step 2)
5.	Schedule Scoping Meeting with Developer and CTO. *(§30.3.3.4)*	NYISO	within 10 b-days of receipt of valid IR
6.	Hold Scoping Meeting. *(§30.3.3.4)*	NYISO, CTO & Developer	within 30 c-days of receipt of valid IR
	As a result of the Scoping Meeting, the NYISO, CTO and Developer may agree to forego the FES and proceed directly to the System Reliability Impact Study. *(§30.6.1, ¶4)*		
7.	Designation of Point(s) of Interconnection (POI). *(§30.6.1)*	Developer	within 5 b-days of Scoping Meeting
8.	Tender FESA to Developer. *(§30.6.1)*	NYISO & CTO	within 5 b-days of designation of POI
9.	Deliver executed FESA, additional $30,000 deposit if NYISO is performing the study, and required technical data to NYISO. *(§30.6.1)*	Developer	within 30 c-days of receipt of FESA[9]

[8] Summary of the basic steps described in Attachment X - NYISO Standard Large Facility Interconnection Procedures. See Attachment X for specific requirements and permissible exceptions to these requirements, if any.

[9] Failure to provide required items to the NYISO within the allotted time shall be considered withdrawal of the Interconnection Request.

Step	Description / Action	By Whom	By When
10.	Conduct study and provide FES report to Developer. *(§30.6.2 & 30.6.3)*	NYISO (& CTO)	within 45 c-days of receipt of executed FESA (or by the ECD[10])
11.	Schedule and hold study report meeting with Developer and CTO. Invite Affected Systems. (§30.6.3.1)	NYISO	within 10 b-days of provision of study report to Developer
C.	**System Reliability Impact Study (SRIS)**		
12.	Provide form SRIS Agreement (SRISA) to Developer and CTO. (§30.7.1)	NYISO	simultaneously with delivery of FES report (see step 10)
13.	Provide cost and time estimates for completion of the SRIS to Developer. (§30.7.1)	NYISO	within 3 b-days of FES results meeting
14.	Execute SRISA and deliver executed SRISA, demonstration of site control, and the required deposit to the NYISO. (§30.7.2)	Developer	within 30 c-days of receipt of SRISA[11]
15.	If Developer fails to provide demonstration of site control, notify Developer of deficiency. (§30.7.2)	NYISO	within 5 b-days of receipt of executed SRISA.
16.	If notified of a deficiency, provide additional required information to the NYISO. (§30.7.2)	Developer	within 10 b-days of receipt of notice[11]
17.	Prepare a Scope for the SRIS with the Developer, CTO, and Affected Systems. Submit the Scope to TPAS for review and to the OC for approval. (§30.7.3)	NYISO	as soon as possible after receipt of executed SRISA and required technical data
18.	Conduct study in coordination with the CTO and Affected Systems and provide SRIS report to Developer. (§30.7.3 & 30.7.4)	NYISO	within 90 c-days of receipt of executed SRISA (or by the ECD)
18b.	Optional Interconnection Study (OIS) – If requested, execute an OIS Agreement with the Developer and conduct the OIS concurrently with the SRIS. (§30.10)	NYISO	within the timeframe specified in the OIS Agreement
19.	Schedule and hold SRIS report meeting with Developer and CTO. Invite Affected Systems. (§30.7.5)	NYISO	within 10 b-days of provision of study report to Developer
20.	Submit SRIS report to TPAS for review and to the OC for approval. (§30.7.4)	NYISO	Upon agreement of the Parties with the study results.
D.	**Facilities Study (FS) and Cost Allocation**		
21.	Provide FS Agreement (FSA) to Developer confirmed to be an Eligible Developer and CTO. (§30.8.1)	NYISO	30 c-days prior to start date of next Class Year, or earlier upon request.

[10] ECD = Estimated Completion Date
[11] Failure to provide required items to the NYISO within the allotted time shall be considered withdrawal of the Interconnection Request.

Step	Description / Action	By Whom	By When
22.	Execute FSA and deliver executed FSA, required technical data, and deposit (greater of $100,000 or estimated monthly cost) to the NYISO. Also deliver executed FSA and technical data to CTO. (§30.8.1)	Developer	by start date of Class Year or within 30 c-days of receipt of FSA[9]
	After execution of the FSA, the Developer may request negotiation of the terms of the draft Interconnection Agreement (LGIA) and appendices. (§30.11.2)	NYISO, CTO & Developer	not more than 60 c-days after tender of the final FS report
23.	Conduct Class Year FS in coordination with the CTO and Affected Systems and provide FS report to Developers. (§30.8.2 & 30.8.3)	NYISO	within the timeframe per Attachment S (or by the ECD)
24.	Schedule and hold study report meeting with Class Year Developers and CTOs. Invite Affected Systems. (§30.8.4)	NYISO	within 10 b-days of provision of study report to Developer
25.	Submit the Class Year FS report and Cost Allocations to TPAS for review and to the OC for approval. (Att S, §25.6.1.1, 25.6.2 and 25.7.7)	NYISO	Upon completion of the final draft FS report.
26.	Notice to NYISO regarding Acceptance or Non-Acceptance of Project Cost Allocation. (Att S, §25.8.2)	Each Class Year Developer	within 30 c-days of OC approval of FS report
27.	If one or more Developers do not accept their cost allocation, perform rounds of re-study and Decision Periods as necessary. (Att S, §25.8.2 - 25.8.4)	NYISO and Remaining Developers	per Attachment S
	Engineering & Procurement (E&P) Agreement (Optional) (§30.9.)	Developer & CTO	Prior to execution of an Interconnection Agreement
E.	**Interconnection Agreement**		
28.	Tender a form Interconnection Agreement (LGIA) with draft appendices to each generator Developer that accepted their Project Cost Allocation. (§30.11.1)	NYISO & CTO	As soon as practicable upon completion of the Attachment S Developer decision process.
29.	Execute and return completed draft LGIA appendices to the NYISO and CTO. (§30.11.1)	Developer	within 30 c-days of tender by NYISO & CTO
	If negotiations of the LGIA fail, Developer has options to request filing an unexecuted LGIA or Dispute Resolution. (§30.11.2)		
30.	Provide final LGIA to Developer. (§30.11.2)	NYISO & CTO	within 15 b-days of completion of negotiation process

Step	Description / Action	By Whom	By When
31.	Provide to NYISO and CTO: (a) evidence of continued Site Control, or post $250,000 additional security, (b) evidence of achievement of milestones. (§30.11.3)	Developer	within 15 b-days of receipt of the final LGIA from the NYISO & CTO.
32.	Provide to the NYISO and CTO either executed originals of the LGIA, or a written request to file an unexecuted LGIA.[12] (§30.11.3)	Developer	within 60 c-days of tender of the completed draft LGIA appendices
33.	File the LGIA with the FERC. (§30.11.3)	NYISO & CTO	within 10 b-days of receipt of executed LGIA or request to file unexecuted LGIA.
F.	**Commencement of Interconnection Activities - Construction**		
34.	Proceed in accordance with the terms of the LGIA subject to modification by the FERC. (§30.11.4)	NYISO, CTO & Developer	Upon filing of the LGIA with the FERC
35.	Proceed with construction of facilities in accordance with Section 30.12 of Attachment X.	CTO & Developer	by Developers' in-service dates or as agreed

[12] If Developer fails to either execute the LGIA, request filing an unexecuted LGIA, or initiate Dispute Resolution within 60 calendar days after terminating negotiations, or within 60 days of tender of the completed draft LGIA appendices, the Developer's Interconnection Request shall be deemed withdrawn.

Attachment E. Steps in the NYISO Small Generator Interconnection Process[13]

(Applicable to Generating Facilities up to 20 MW)

(Revised 10/15/2010)

Step	Description / Action (Relevant Section of NYISO OATT Attachment Z)	By Whom	By When
	Pre-Application – respond to informal requests for information from prospective Interconnection Customers, as appropriate. *(§32.1.2)*	NYISO (& Connecting Transmission Owner (CTO))	N/A
A.	**Interconnection Request (IR) (§32.1.3)**		
1.	Submittal of IR (or Application) to NYISO, with the applicable fee or deposit and documentation of Site Control *(§32.1.3 & 32.1.5).*	Interconnection Customer (IC)	N/A
2.	Date and time-stamp and send copy to the Connecting Transmission Owner (CTO).	NYISO	Upon receipt of IR.
3.	If IR is to interconnect to distribution facilities, consult with CTO to determine whether the NYISO SGIP applies. Notify the IC if the SGIP do not apply. *(§32.1.3.1)*	NYISO	It is the NYISO's policy that this action will be taken as soon as practically possible after receipt of IR.
4.	Notify IC of receipt of the IR.	NYISO	Within 3 business days of receipt of IR.
5.	Consult with the CTO, and determine whether the IR is complete or incomplete. Notify IC of result. If incomplete, list additional information required.	NYISO	Within 10 business days of receipt of IR.
6.	If notified that IR is incomplete, provide required additional information to the NYISO or request an extension of time.	IC	Within 10 business days of receipt of notice of incomplete IR.[14]
7.	If IC provides additional information for an initially incomplete IR, review information and notify IC whether IR is now complete or incomplete.	NYISO	Upon completion of review of additional information.

[13] Summary of the basic steps described in the NYISO's Open Access Transmission Tariff (OATT) at Attachment Z - NYISO Small Generator Interconnection Procedures. These procedures were approved by FERC Orders issued on February 20, 2007, and June 29, 2007. This document only provides a high-level summary of the small generator interconnection procedures. It is not intended as a substitute for Attachment Z. For complete information, you should consult Attachment Z, which is available for review on the NYISO's website.

[14] Failure to provide required items to the NYISO within the allotted time shall be considered withdrawal of the Interconnection Request.

Step	Description / Action (Relevant Section of NYISO OATT Attachment Z)	By Whom	By When
8.	Upon NYISO's determination that IR is complete, then proceed to the following steps. If IR is for: • Generator <= 2 MW connecting to distribution (and not an inverter <= 10 kW), **go to Step B – Fast Track Process** • Generator > 2 MW and/or connecting to transmission, **go to Step C – Study Process** • An invert-based facility <= 10 kW, go to **Step D – 10 kW Inverter Process**		
B.	**Fast Track Process (§32.2)**		
9.	In consultation with the CTO, and using the screens set forth in §32.2.2.1, perform an Initial Review of the project as follows and notify the IC of the results. *(§32.2.2)*	NYISO	Within 15 business days of notice of complete IR.
10.	If the proposed interconnection passes the screens, provide an executable interconnection agreement (IA) to the IC and CTO. *(§32.2.2.2)*	NYISO	Within 5 business days of completion of initial review.
11.	If the proposed interconnection fails the screens, consult with the CTO and Affected Systems as appropriate, and determine whether the project may nevertheless be interconnected consistent with applicable SGIP standards. *(§32.2.2.3)*	NYISO	During the initial review.
12.	If NYISO determines that the project may be interconnected consistent with applicable SGIP standards, even if the interconnection fails the screens, provide an executable IA to the IC and CTO. *(§32.2.2.3)*	NYISO	Within 5 business days of determination.
13.	If the proposed interconnection fails the screens and NYISO determines that the IR cannot be approved without modifications or further study, notify and provide documentation to the IC. *(§32.2.3)*	NYISO	Within 5 business days of determination.
14..	If determined that the IR cannot be approved without modifications or further study, as noted in Step 13 above, offer to hold a Customer Options Meeting with the IC and CTO to determine what further steps are needed for the project to interconnect. *(§32.2.3)*	NYISO	Within 10 business days of determination that the IR cannot be approved.
15.	At the Customer Options Meeting, one of the following items may be pursued: a) CTO offer to modify their facilities/system; or b) NYISO offer to perform supplemental review; or c) NYISO offer to continue evaluation of the IR under the Study Process. *(§§32.2.3.1 – 32.2.3.3)*	CTO or NYISO	With NYISO notice of determination, or at the Customer Options Meeting, as applicable.
16.	If IC agrees to a Supplemental Review, IC provides written agreement and deposit[15] for estimated NYISO & CTO costs to the NYISO. *(§32.2.4)*	IC	Within 15 business days of NYISO's offer.

[15] In accordance with §32.2.4, IC must pay any costs in excess of the deposit within 20 business days, If the deposit exceeds invoiced costs, NYISO will return that excess within 20 business days of the invoice without interest.

Step	Description / Action (Relevant Section of NYISO OATT Attachment Z)	By Whom	By When
17.	NYISO performs supplemental review in consultation with the CTO and determines whether the project can be interconnected safely and reliably (with or without modifications) or not. *(§32.2.4)*	NYISO	Within 10 business days of receipt of deposit.
18.	If NYISO determines that the project can be interconnected either: a) without modifications, or b) with modifications to the Small Generating Facility, or c) with modifications to the CTO's system, NYISO provides an executable IA to the IC and CTO. *(§§32.2.4.1.1 – 32.2.4.1.3)*	NYISO	Either: a) within 5 business days of determination, or b) within 5 business days of receiving IC's written agreement, or c) within 10 business days.
19.	If NYISO determines that the project cannot be interconnected safely and reliably even with modifications, then evaluation of the IR continues under the Study Process (Step C below). *(§32.2.4.1.4)*		
C.	**Study Process (§32.3)**		
20.	NYISO first contacts the IC, and then the CTO, to determine if there is mutual agreement to omit the Scoping Meeting and proceed directly to a FES. If the Parties agree to omit the Scoping Meeting, go to Step 23. *(§32.3.2.3)*	NYISO	Upon determination that IR is complete, or Project fails the Fast Track evaluation, as applicable.
21.	Schedule a Scoping Meeting to be held within 10 business days after the IR has been deemed complete, or as otherwise mutually agreed to by the Parties. *(§32.3.2.1)*	NYISO	Upon Parties' decision to hold a Scoping Meeting.
22.	Hold Scoping Meeting. The Parties discuss whether NYISO should: a. perform a feasibility study (FES), or b. proceed to a system impact study (SIS), or c. proceed to a facilities study (FS), or d. proceed to an IA. *(§32.3.2.2)*	NYISO, CTO & IC	As scheduled by the Parties (see Step 21, above).
	If Parties agree to proceed directly to an SIS, ***go to Step 27****.* *If Parties agree to proceed directly to a FS,* ***go to Step 31****.* *If Parties agree to proceed directly with an IA,* ***go to Step 36****.* *Otherwise, proceed with a FES.*		
23.	Provide a feasibility study agreement (FESA), with outline of scope and cost estimate, to IC and CTO. *(§32.3.2.2)*	NYISO	Within 5 business days of scoping meeting or agreement to omit meeting, as applicable.
24.	Return executed FESA and deposit ($1,000 or 50% of estimated cost) to NYISO. *(§§32.3.2.3, 32.3.3.2)*	IC	Within 15 business days of receipt of FESA.[15]
25.	Conduct study and provide FES report to IC. *(FESA §10.0)*	NYISO (& CTO)	Within 30 business days of receipt of executed FESA.

Step	Description / Action (Relevant Section of NYISO OATT Attachment Z)	By Whom	By When
	If the FES identifies any potential adverse system impacts due to the project, proceed with a SIS. ***Go to Step 27****. (§32.3.3.5)*		
26.	If the FES shows no potential for adverse system impacts, contact the IC and CTO to discuss whether to waive the SIS. Also, if no additional facilities are required, the Parties discuss whether to proceed with an IA. (§32.3.3.4)	NYISO	Within 5 business days of completion of the FES.
	If Parties agree to waive the SIS and proceed to a FS, ***go to Step 31****.* *If Parties agree no additional facilities are required and proceed with an IA,* ***go to Step 36****.* *Otherwise, proceed with a SIS.*		
27.	Provide a system impact study agreement (SISA), with outline of scope and cost estimate, to IC and CTO. Depending on circumstances, the SISA may be for a Distribution SIS, a Transmission SIS, or both. *(§§32.3.2.3, 32.3.4.2, 32.3.4.3)*	NYISO	Within 5 business days of scoping meeting or completion of the FES in most cases. Within 15 business days, however, if FES only shows need for a Distribution SIS.
28.	Return executed SISA and deposit for the estimated cost of the SIS to the NYISO. *(§32.3.4.6)*	IC	Within 30 business days of receipt of SISA.[16]
29.	Conduct the SIS in coordination with the CTO, and any Affected Systems as applicable, and transmit the results to the IC. *(SISA § 9.0)*	NYISO	Within 30 business days of full execution of the SISA for a Distribution SIS and/or within 45 business days for a transmission SIS.
30.	Prepare and issue a SIS report to the IC and CTO. *(§32.3.5.1)*	NYISO	Within 5 business days on completion of the required SIS(s).
31.	Provide an executable facilities study agreement (FSA), with outline of scope and cost estimate, to IC and CTO. *(§§32.3.2.2, 32.3.3.4, 32.3.5.1)*	NYISO	Within 5 business days of the scoping meeting, completion of the FES, or completion of the SIS, as applicable.
32.	Return the executed FSA and deposit for the estimated costs of the FS to the NYISO, or request an extension of time. *(§32.3.5.2, FSA § 6.0)*	IC	Within 30 business days of receipt of FSA.[16]
33.	Conduct FS (non-Class Year) in coordination with the CTO, and any Affected Systems as applicable, and provide FS report the IC. *(FSA § 7.0)*	NYISO	Within 30 business days w/o Upgrades, within 45 business days with Upgrades.

[16] Failure to provide required items to the NYISO within the allotted time shall be considered withdrawal of the Interconnection Request.

Step	Description / Action (Relevant Section of NYISO OATT Attachment Z)	By Whom	By When
34.	If an Interconnection Study determines that the Project requires or contributes toward the need for System Upgrade Facilities (SUFs), include the Project in the next Class Year to determine the IC's cost responsibility under Attachment S. *(§32.3.5.3.2)*	NYISO	Per the applicable Class Year schedule.
35.	If the IC of a project larger than 2 MW elects Capacity Resource Interconnection Service (CRIS), include the Project in the next Class Year Deliverability Study to determine the IC's cost responsibility for System Deliverability Upgrades (SDUs) under Attachment S. *(§32.3.5.3.2)*	NYISO	Per the applicable Class Year schedule.
	The IC may elect to proceed forward with an IA pending the outcome of the Class Year cost allocation process. *(§§32.3.5.3.3, 32.3.5.3.4)*		
36.	Provide an executable IA to the IC and CTO. *(§§32.2.2.2, 32.2.2.3, 32.2.4.1.1-32.2.4.1.3, 32.3.2.2, 32.3.3.4, 32.3.5.7)*	NYISO	Within 5 business days of completion of the FS and IC agreement to pay for required Facilities, or various earlier points in the process as applicable.
37.	Sign and return the IA to the NYISO, or request the NYISO to file an unexecuted IA with the FERC. *(§32.4.8)*	IC	Within 30 business days of receipt of the executable IA, or other mutually agreeable timeframe. [17]
38.	File IA with FERC, if required.	NYISO and CTO	Upon execution or upon request to file unexecuted IA with FERC.
D.	**10 kW Inverter Process** (See Appendix 5 of Attachment Z of the OATT)		

[17] Failure to provide required items to the NYISO within the allotted time shall be considered withdrawal of the Interconnection Request.

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Attachment F. NYISO Transmission Planning Guideline #1-1

SUBJECT: Guideline for System Reliability Impact Studies

REFERENCES:

- *NYSRC Reliability Rules for Planning and Operating the New York Bulk Power System*
- *NYISO Transmission Expansion and Interconnection Manual*

PURPOSE: To provide guidelines for conducting System Reliability Impact Studies for proposed transmission and generation projects, and presenting the results of such studies to the Operating Committee for their review and confirmation that all applicable reliability criteria would be met.

1. INTRODUCTION

This guideline is to be followed by NYISO Staff, Transmission Owners, or Third-Parties in order to provide a complete analysis for review by the Operating Committee. All proposed transmission and generation projects that could significantly impact the Interface Transfer Capability of the NYS Transmission System, or could significantly impact the reliability of the New York Bulk Power System, shall receive this thorough analysis. Proposed transmission and generation projects that would have local impact only (would only impact the system of the local Transmission Owner) are generally the responsibility of the affected Transmission Owner, and would not normally be reviewed by the Operating Committee.

2. REPORT OUTLINE

The report presented to the Operating Committee for review shall include:

2.1 Introduction

A brief description of the background, purpose, and objectives of the study.

2.2 Description of Project

A description of the proposed project and any alternatives that may be under consideration. A detailed description of proposed generation and/or transmission facilities and associated equipment, and discussion of the rationale for the chosen design and specifications of such facilities and equipment. Maps and one-line diagrams depicting the new and modified facilities and their connections to the existing system.

2.3 Criteria, Methodology, and Assumptions

A detailed statement of criteria used, including any exceptions or supplements to the NYSRC Reliability Rules. The study scope and a description of how the study was conducted, including the cases, scenarios, critical assumptions, and modeling of the new or modified facilities. (Normally the study scope is prepared prior to conducting the study.)

2.4 Analysis Results

2.4.1 Impact on Base System Conditions

A summary of the significant impacts of the proposed project on base system conditions (generation dispatch, power flows, voltage, equipment loadings, etc.) based on the pre- and post-project power flow cases.

2.4.2 Impact on System Performance and Transfer limits

a) Thermal Analysis Results

A summary of the thermal analyses conducted and the impact of the project on normal and emergency thermal transfer limits. Provide analysis output from which the transfer limits were determined.

b) Voltage Analysis Results

A summary of the voltage analyses conducted, impact of the project on system voltage performance and voltage-based transfer limits if more limiting than the emergency thermal transfer limits. Provide analysis output from which the voltage-based transfer limits were determined, or that alternatively demonstrate that the voltage limits are not more limiting than the emergency thermal limits.

c) Stability Analysis Results

A summary of the stability analyses conducted, impact of the project on system stability performance and stability-based transfer limits if more limiting than the emergency thermal transfer limits or voltage-based transfer limits. Provide analysis output from which the stability-based transfer limits were determined, or that alternatively demonstrate that the stability limits are not more limiting than the emergency thermal or voltage-based transfer limits.

d) Overall Impact on Transfer limits

A summary of the overall impact of the project on transfer limits based on the more limiting of the thermal, voltage, or stability-based transfer limits.

2.4.3 Impact on Fault Duties

2.5 Conclusions

The conclusion(s) of the study, particularly as they pertain to the stated objectives of the study.

3. RESPONSIBILITIES

3.1 The project proponent(s) are responsible for the cost of the study**.**

3.2 The NYISO Staff, Transmission Owner(s), or other entity commissioned to conduct the study shall be responsible for conducting the required analyses and submitting a detailed report (following the above guidelines) to the NYISO and other Study Participants (generally the affected Transmission Owners and Neighboring Control Areas) for review**.**

3.3 The NYISO Staff (if they did not conduct the study) and the other Study Participants shall review the report and provide comments, if any, to the party that conducted the study. All reasonable efforts will be made to address or otherwise resolve the comments**.**

3.4 The NYISO Staff shall submit the study report, along with any comments and recommendations, to the Operating Committee**.**

4. PERIODIC REVIEW

This guideline shall be reviewed triennially to determine whether revisions are required.

Approved by the Operating Committee
on 10/18/2012

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Attachment G. NYISO Transmission Planning Guideline #2-1

SUBJECT: Guideline for Voltage Analysis and Determination of Voltage-Based Transfer Limits

REFERENCES:

- *NYSRC Reliability Rules for Planning and Operating the New York Bulk Power System*
- *NYISO Transmission Expansion and Interconnection Manual*
- *NYISO Emergency Operations Manual*

PURPOSE: This guideline defines the procedure required for the determination, approval and implementation of voltage-based transfer limits used in transmission planning studies of the New York State bulk power system.

1. INTRODUCTION

1.1 The determination of interface transfer limits requires the consideration of thermal, voltage and stability limitations. When voltage conditions establish the controlling transfer limit, the specification of allowable pre-contingency and post-contingency voltage ranges at a substation does not necessarily ensure that the bulk power system is in a state in which voltage collapse cannot occur for a small increase in power transfer level; therefore, a test procedure is required to establish a margin of safety in planning the bulk power system when voltage-based transfer limits are being determined. The limits determined by this procedure are to be used as a guideline for planning study purposes to prevent those conditions indicative of a system voltage collapse.

1.2 It is the intent that this guideline be used in conjunction with or as part of criteria to be developed for maintaining adequate reactive reserve in planning the NYS bulk power system.

1.3 This guideline may not be applicable when establishing voltage-based transfer levels across the NYS bulk power system for studies to be utilized by external systems in planning their future requirements.

2. PROCEDURE

2.1 Unless specified otherwise for a particular study, the post-contingency voltage limits contained in Table A.2 of the NYISO Emergency Operations Manual shall be used.

2.2 For those interfaces where interface power transfer levels may be constrained by voltage considerations, "Voltage versus Interface Transfer Level" curves shall be developed. In the development of these curves, due consideration shall be given to

active and reactive generation dispatch, appropriate contingencies, status of reactive devices, generating unit and transmission line maintenance outage conditions and load modeling.

2.3 After examination of the relevant curves, a determination of the point identifying the "tip of the nose curve" shall be made. This point is the theoretical maximum transfer level achievable before sustaining voltage instability or collapse. In power flow analysis, this point is the highest transfer level for which a solution can be achieved.

2.4 Once the "tip of the nose curve" point has been identified, the resultant transfer level at that point shall be reduced by five percent. This reduced transfer level is then compared to that transfer level obtained by applying the applicable post-contingency low voltage limit. To ensure that a voltage-based transfer limit is determined with a safe margin, the lower of the two power transfer levels from the foregoing comparison is to be selected as the interface transfer limit.

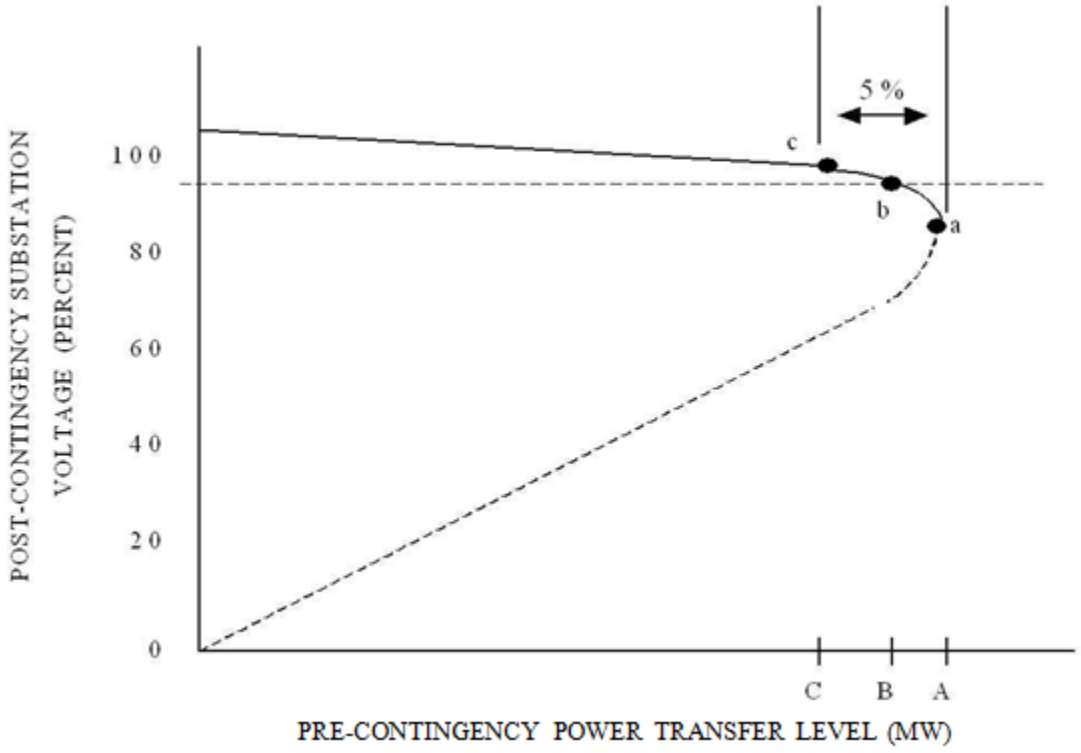
2.5 Exhibit I depicts a condition in which the allowable transfer level is controlled by the location of the "tip of the nose curve" rather than the post-contingency voltage limit.

3. PERIODIC REVIEW

This guideline shall be reviewed triennially to determine whether revisions are required.

Approved by the Operating Committee
on 10/18/2012

Figure G-1 Exhibit I - Voltage-Limited Power Transfer



(1) Small letters **a**, **b** & **c** denote points on the curve where:

- **a** is the point referred to as the "tip of the nose curve", or the "critical point" on the edge voltage instability or collapse;
- **b** is the point where the curve crosses the post-contingency low voltage limit, 95% in this example;
- **c** is the point where the transfer is 5% below the tip of the nose curve.

(2) Capital letters **A**, **B** & **C** denote power transfer levels corresponding to points **a**, **b** & **c** on the curve.

(3) In this example, **C** would be the voltage-based transfer limit of the transmission interface. In general, the voltage-based transfer limit is the lower of points **B** and **C**.

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Attachment H. NYISO Transmission Planning Guideline #3-1

SUBJECT: Guideline for Stability Analysis and Determination of Stability-Based Transfer Limits

REFERENCES:

- *NYSRC Reliability Rules for Planning and Operating the New York Bulk Power System*
- *NYISO Transmission Expansion and Interconnection Manual*
- *NYISO Transmission Planning Guideline #2-1, Guideline for Voltage Analysis and Determination of Voltage-Based Transfer Limits*

PURPOSE: This guideline is used in the evaluation of stability simulation analysis results and the determination of stability-based transfer limits ("stability limits") for New York State transmission interfaces.

1. INTRODUCTION

1.1 This guideline is provided to promote a common understanding when evaluating the results of stability simulations. In determination of stability limits, all significant assumptions used in the analysis shall be reported along with the study results.

1.2 The NYISO shall be responsible for determining the appropriate transfer levels for NYS transmission interfaces to be utilized by external systems in planning their future requirements.

1.3 The fundamental concept of power system stability is really a single characteristic of bulk power system performance and any subdivisions are designated because of the application of appropriate analytical methods to be employed for the relevant time frame under review. For purposes of analysis, overall power system stability can be subdivided into three major classifications:

a) A power system is "steady-state stable" for a particular steady-state operating condition if, following any small disturbance, it reaches a steady-state operating condition which is identical or close to its initial operating condition. For such a condition, a small disturbance is defined as a gradual disturbance thereby allowing the equations that describe the dynamics of the power system to be linearized;

b) A power system is "transiently stable" for a particular sudden disturbance if, following that disturbance, it reaches an acceptable steady-state operating condition; and

c) "Long-term stability" is related to the long-term behavior of the bulk power system and, in particular, of its overall response as evidenced by its mean frequency.

The evaluation of stability results requires consideration of:

- transfer level;
- relay systems; and
- load modeling.

2. TRANSFER LEVEL

The determination of interface transfer limits requires the consideration of thermal, voltage and stability limitations. When determining a stability limit, a margin also shall be applied to the power transfer level to allow for uncertainties associated with system modeling. This margin shall be the larger of ten percent of the highest stable transfer level simulated or 200 MW. The margin also shall be applied in establishing a stability limit for faults remote from the interface for which the power transfer limit is being determined.

To confirm that power transfer levels will not be restricted by a stability constraint, the stability simulation shall be initially conducted at a value of at least ten percent above the controlling thermal or voltage-based transfer limit. The voltage-based transfer limit ("voltage transfer limit") shall be determined in accordance with NYISO Transmission Planning Guideline #2, "Guideline for Voltage Analysis and Determination of Voltage-Based Transfer Limits." If a converged powerflow cannot be achieved at this higher transfer level, then the stability simulation shall be conducted at the highest achievable transfer level above the voltage transfer limit. If the stability simulation at that level is deemed to be stable, then voltage control facilities in the form of capacitive compensation shall be artificially added to the powerflow case to achieve a convergence at a transfer level equal to the voltage transfer limit divided by 0.90. This procedure ensures that the application of the margin does not result in the determination of a "stability limit" that is lower than the voltage transfer limit when the restriction is actually due to voltage. The amount and location of any such artificially added capacitive compensation shall be reported in the study results.

Stability limits shall be determined for interfaces on an independent basis. In doing so, it is recognized that interfaces for which the stability limit is not being determined may exceed their thermal, voltage or stability transfer capabilities.

To assess the stability performance of the bulk power system, system stability and generator unit stability shall be considered.

2.1 System Stability

Overall power system stability is that property of a power system which ensures that it will remain in operating equilibrium through normal and abnormal

conditions. The bulk power system shall be deemed unstable if, following a disturbance, the stability analysis indicates increasing angular displacement between various groups of machines characterizing system separation. Further, a power system exhibits "oscillatory instability" (sustained or cumulative oscillations) for a particular steady-state operating condition if, following a disturbance, its instability is caused by insufficient damping torque.

For a stability simulation to be deemed stable, oscillations in angle and voltage must exhibit positive damping within ten seconds after initiation of the disturbance. If a secondary mode of oscillation exists within the initial ten seconds, then the simulation time shall be increased sufficiently to demonstrate that successive modes of oscillation exhibit positive damping before the simulation may be deemed stable.

2.2 Generator Unit Stability

A generator is in synchronous operation with the network to which it is connected if its average electrical speed (the product of its rotor angular velocity and the number of pole pairs) is equal to the angular frequency of the alternating current network voltage.

For those cases where the stability simulation indicates generator unit instability, the NYISO shall determine whether a power transfer limit shall be invoked or whether the unit instability shall be considered to be acceptable. To determine whether the generator unit instability may be deemed acceptable, the stability simulation shall be re-run with either the generator unit in question tripped due to relay action or modeled unstable to assess such impact on overall bulk power system performance. The result of this latter simulation shall determine whether a stability-based transfer limit shall be applied at the simulated power transfer level.

3. RELAY SYSTEMS

3.1 Representation

As many relays as possible should be modeled in stability simulations to ensure adequate system representation. Due to possible computer program limitations, priority should be given to the higher voltage levels. If there is not enough capability to represent protective devices down to the 115-kV level, cases which show the potential of relay action at the higher voltage level should be re-run with the protective devices modeled down to the 115-kV level in the vicinity of the potential trip.

Power swing relays should be monitored especially when there is a fault of long duration or a major loss of generation or load.

3.2 Relay Margin

In evaluating the relay actions of a stability simulation, margins shall be incorporated in relay characteristics to help determine possible trips that may lead to instability or cascading system outages. A ten percent margin should be added to the relay impedance characteristics for modeling in stability studies.

3.3 Performance

To assist in the evaluation of stability simulations, the following terminology for a relay performance index ("RPI") shall be used.

a) Safe (RPI = 1)

The apparent impedance trajectory, after fault clearing, remains outside all expanded zones of protection

b) Possible Relay Trip (RPI = 2)

The apparent impedance trajectory, after fault clearing, enters the expanded second or third zone for more than two thirds of their respective time delays; and

c) Likely Relay Trip (RPI = 3)

The apparent impedance trajectory, after fault clearing:

- enters the expanded zone 1; or
- enters the expanded zone 2 and times-out to trip signal; or
- enters the expanded zone 2 or 3 of both terminals simultaneously on a permissive trip relay scheme

For those cases where there is a "possible" or "likely" relay trip, the stability simulation shall be re-run to simulate the loss of the facility caused by the relay actuation and the system performance shall be evaluated based on these results. Simulations may not need to be re-run if the actual relay systems under consideration apply blinders or directional units to block tripping.

When a stability simulation would be classified stable by machine rotor angle swings but marginal or unstable due to relay action, the individual study participants shall notify their respective system protection organizations for further evaluation of the potential for this line tripping.

4. LOAD MODELING

It is recognized that the load model can have a significant impact on the stability performance of the bulk power system. Until more definitive information is obtained, a primary load model comprised of 100% constant impedance for both active and reactive power load shall be used for the New York Control Area (NYCA). For systems outside the NYCA, the load model deemed appropriate by those systems shall be used. Since

there is uncertainty regarding the dynamic load characteristics of the NYCA, marginal stability simulations shall be re-run using an alternate NYCA load model comprised of 50% constant impedance and 50% constant current for the active power component and 100% constant impedance for the reactive power component. If the results are still marginal or unstable the simulation shall be deemed unstable.

5. PERIODIC REVIEW

This guideline shall be reviewed triennially to determine whether revisions are required.

Approved by the Operating Committee
on 10/18/2012

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Attachment I. NYISO Transmission Planning Guideline #4-1

NYISO Guideline for Fault Current Assessment

Introduction

This document outlines a recommended approach for fault current assessment using the ASPEN OneLinerTM and ASPEN Batch Short-CircuitTM programs with the NYISO State-wide short circuit representation. Use of programs other than ASPEN OneLinerTM is not recommended at this time as the NYISO representation uses equipment short-circuit models in ASPEN format that are not readily available in other programs. Fault current assessment is necessary in several areas of power system analysis, including:

- Evaluation of circuit breaker interrupting capabilities
- Dynamics analysis
- Fault levels to assess reclosing cycles and impact of the reclosing on circuit breaker duty.

Operation of circuit breakers within specified fault interruption capabilities is essential for safe and reliable production, transmission, and delivery of electrical energy within the NYISO Interconnected transmission system.

Breaker adequacy assessments involve two complementary evaluations:

i that of fault interrupting duties expected to exist due to planned system changes, and

ii appraisal of present operating capabilities of the circuit breakers, including associated relay times.

Both evaluations involve judgment and, therefore, are guided by long-standing industry practices and standards[18].

The NYISO State-wide short circuit representation base case was developed with the assistance and cooperation of the transmission owner representatives on the NYISO System Protection Advisory Subcommittee (SPAS), and is maintained by the NYISO Transmission Studies Staff in accordance with the "Procedure for Developing and Maintaining the NYISO Short Circuit Representation" and the NYISO "Manual for System Analysis Data". The State-wide base case representation is maintained in ASPEN One Liner^{TM} format and provides a uniform representation to perform fault current analysis of the NYISO transmission system as required for various NYISO operations and planning studies.

Fault Current Calculations

The NYISO shall employ the methodology detailed below, consistent with the system conditions being studied, when evaluating short circuit currents on New York State transmission system facilities.

[18] This guideline should serve a screening tool in determining whether interrupting devices would experience short circuit currents in excess of their interrupting ratings. The final determination of interrupting equipment short circuit duty is the responsibility of the equipment owner, and it is recommended their analysis be performed based on applicable ANSI/IEEE standards.

A. The following system-wide assumptions shall normally be applied to the base case representation for NYISO analysis[19]:

- All generating units are in service. Synchronous machines (e.g., generators, synchronous condensers, and large motor groups) are modeled using subtransient saturated reactance (X_{dv}"). Machine zero-sequence reactance (X_{0v}) generally is not required in short-circuit studies because the GSU transformer HV/LV windings are normally specified with YG/Δ connections, blocking the flow of machine zero-sequence currents during system faults; if not readily available, generator X_{0v} may be omitted for generators connected to YG/Δ GSUs.
- Transmission line models include positive- and zero-sequence inductive impedances. Negative-sequence impedance is equal to the positive-sequence impedance and hence not entered separately. Zero-sequence mutual impedances between mutually-coupled line sections, such as those on common rights-of-way, are also included. Positive-sequence mutuals are normally ignored, but can be combined with line impedance in some situations, if needed. Capacitive admittances of lines (line charging), both positive- and zero-sequence, are omitted.
- Initially, fault levels will be determined with all transmission lines that are normally in service represented as such, and those transmission lines that are normally open (e.g. a "normally open" bus tie) shall be represented as such. However, all reasonably realizable system configurations that yield the highest fault current shall be considered, consistent with local operating practice and procedure as determined by the NYISO. System facilities represented in the studies reflect information obtained from equipment vendors, design records, and operating data (or best estimates) processed into suitable models using proven tools and techniques. Since resistance values are generally more difficult to secure than reactance values, although both are important in breaker duty assessments, References 1-4 can be used to estimate typical X/R ratios for principal system components.
- All transformers are modeled using leakage reactance and load-loss based resistances corresponding to the present or planned operating no-load tap positions (NLTCs), as appropriate. Tap ratios for load-tap changers (LTCs) are assumed to be 1:1 (or center tap); phase-angle regulating transformers are assumed on the lowest impedance setting (typically center tap and / or 0-degree shift), and magnetizing branches are omitted. Impedances of mismatched, single-phase transformers operating in a common bank are averaged. Transformer positive- and negative-sequence impedances are identical, and zero-sequence impedances are assumed identical to positive-sequence impedances unless test data indicate otherwise. All windings are modeled with proper winding/grounding connections, keeping in mind that some GSU transformers operate with ungrounded neutrals to reduce fault duties. Fixed tap and GSU transformers should be represented on the no load tap ratio consistent with the connecting transmission owner practice, or the normal operating condition if tap

[19] All generating units shall be in service, unless they are retired or are not commercially viable (e.g. stand-by diesel generators reserved for system restoration).

and impedance data are readily available; otherwise they shall be represented on nominal.

- Fault levels will be determined with all fault current limiting series reactors that are normally in service represented as such, and those series reactors that are normally by-passed shall be represented as such. Load current-limiting series reactors are represented only if switched permanently into service. Series capacitors are bypassed during close-in faults that exceed the capacitor normal rating (consistent with the series element protection); otherwise, they remain in service.
- All loads, shunt capacitors, and shunt reactors are ignored except those shunts used in the representation of three winding transformers. Static VAr Compensators, Static Shunt or Series Compensators (FACTs devices), traditional HVdc converters, and other power-electronic devices are normally omitted, except that any transformers integrating these facilities into a power system are included. Voltage Source Converter HVdc is represented as an equivalent generator source, where appropriate.
- Each equipment owner may use their own engineering judgment in selection of the applied pre-fault voltages based on their experience, and reference these selections in their resulting analysis. It is, however, NYISO practice that all generator internal voltages be set at 1.0 p.u. and no phase displacement due to load (i.e., "Linear Network Solution" pre-fault starting conditions assumed[20]).

B. The following types of faults shall be considered:
   - Three Line to Ground
   - Double Line to Ground
   - Single Line to Ground

   All faults are assumed to be a zero-impedance (bolted) fault with no current limiting effect due to the fault itself.

C. Fault currents through each interrupting device shall be analyzed for the following fault conditions under all normal system and single contingency system configurations:
   - Bus Fault
   - Close-in Line-end Open Fault

   Individual breaker analysis will be performed consistent with the station breaker arrangement.

References

[1] ANSI/IEEE C37.5-1979, "IEEE Guide for Calculation of Fault Currents for Application of AC High-Voltage Circuit Breakers Rated on a Total Current Basis."

[2] ANSI/IEEE C37.04-1979, "IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis."

[20] ASPEN OneLiner Linear Network Solution starting conditions (f.k.a. "Flat Generator" are defined as all generator internal voltages at unity (1.0 p.u.), and all transformer taps set per this Guideline.

[3] ANSI/IEEE C37.010-1979 and -1999, "IEEE Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis."

[4] IEEE 399-1997IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis

Approved by the Operating Committee on 10/18/2012

Attachment J. NYISO Transmission Planning Guideline #5-0

SUBJECT: NYISO Guideline on Application of High-Speed Autoreclosing

REFERENCES: *NPCC Guideline for the Application of Autoreclosing to the Bulk Power System (B-1)*

PURPOSE: The purpose of this document is to establish a consistent guideline for the proper application of autoreclosing, particularly high-speed autoreclosing, on the New York Bulk Power Transmission System. This guideline applies to overhead transmission facilities. It does not apply to underground transmission facilities. The various considerations and issues that need to be addressed in selecting high-speed (20 to 44 cycles) versus delayed (ranging from 1.5 to 30 seconds) autoreclosing, are discussed.

1. INTRODUCTION

Autoreclosing may be applied to quickly restore transmission lines to service subsequent to automatic tripping of their associated circuit breakers due to electrical faults. Experience dictates that many faults on the bulk power overhead transmission system are temporary in nature. Thus, the judicious use of autoreclosing can greatly reduce the duration of outages. Automatic restoration of outaged lines minimizes the need to redispatch the power system and/or declare system emergencies. Successful autoreclosing can enhance stability margins and overall system reliability. However, unsuccessful autoreclosing into a permanent fault may adversely affect system stability and careful consideration must be given to its application on a case by case basis.

2. DISCUSSION.

The following key issues should be evaluated before implementing high-speed autoclosing:

- Special attention must be given to applications on lines in close proximity to generators. Unrestricted usage of high-speed autoreclosing may risk major generator shaft fatigue damage; therefore high-speed autoreclosing should not be applied without specific study to assure its safety. Different autoreclosing relay methods are available, such as delayed autoreclosing of 10 seconds or more.
- Not all transmission lines terminate in substations owned by the same party; therefore coordination is imperative since installing high-speed autoreclosing on only one end provides no benefit. In cases where high-speed autoreclosing exists on one end only with delayed reclosing or no autoreclosing on the other terminus and analysis supports that no adverse system impact exists as a result of unsuccessful high-speed autoreclosing, a coordinated implementation of autoreclosing at both line termini should be employed. In cases such as this, breakers may need to be evaluated also.

- In all new and/or modified applications of high-speed autoreclosing, each case should be evaluated on an individual basis to determine that no adverse effect to system stability is introduced.
- In cases where unsuccessful high-speed autoreclosing results in an unstable or undamped system condition, thus becoming the most limiting contingency and requiring a reduction in transfer capability, high-speed autoreclosing benefits should be carefully evaluated.
- The application of high-speed autoreclosing may be more appropriate than delayed autoreclosing for those locations where facility outage(s) results in large angle system separation.
- In transmission corridors where multiple transmission circuits are subjected to known/ documented high isokeraunic levels or intense storm/lightning activity, the application of high-speed autoreclosing needs to be assessed differently. In this case, the benefits of decreasing multiple concurrent outages due to the temporary nature of the faults and maintaining system integrity must be weighed against the probability of autoreclosing into a permanent fault. If for the application postulated, studies determine that no ill effect from unsuccessful high-speed autoreclosing is demonstrated, then the use of high-speed autoreclosing may be deemed to be beneficial.
- With the advent of new technology, the use of selective autoreclosing, in which high-speed autoreclosing is blocked for multi-phase faults, may be available.

3. PERIODIC REVIEW

This guideline will be reviewed triennially by TPAS to determine whether revisions are required.

Approved by the Operating Committee
on July 25, 2002