

- Consolidated Edison Company of New York

Developer Welcome Kit



Legal Disclaimer

This document is for informational purposes only. Consolidated Edison Company of New York shall not be held liable for indirect, special, incidental, punitive or consequential damages of any kind including loss of profits, arising under or in connection with the use of this Developer Welcome Kit.

Introduction

This Developer Welcome Kit has been compiled by the Consolidated Edison Company of New York, Inc (Con Edison) Interconnection Services Group to provide developers of generator and transmission projects with general guidelines for connecting proposed facilities to Con Edison's electric transmission system. This Welcome Kit contains a general schedule and provides key points of information to assist developers in the development of their interconnection plans.

The information contained in the Welcome Kit is not intended to cover all details and aspects of a proposed interconnection plan, and is subject to change without notice. This document does not address contractual matters such as property ownership, leasing, easements, scheduling, permitting and billing. The project developer assumes all costs for the design, construction, inspection, analysis, maintenance, operations, monitoring, permitting, and all associated facilities required to satisfy the technical and regulatory requirements for connection to the Con Edison transmission system. This document is not intended as a design specification or an instruction manual.

The recipients of the Welcome Kit shall retain the information for their sole use.

The information provided in the Welcome Kit shall be handled in accordance with the confidentiality provisions specified in Section 30.13.1 of Attachment X and Section 32.4.5 of Attachment Z of the OATT.

The NYISO Interconnection Process

As Con Edison is a member of the New York Independent System Operator (NYISO), all proposed connections to the New York transmission system are governed by the NYISO Open Access Transmission Tariff (OATT).

Attachment X of the OATT applies to large generation (>20 MW) projects and merchant transmission projects that seek market-based compensation. Attachment P of the OATT applies to transmission projects that seek cost of service compensation. Attachment Z of the OATT is applicable to generation projects no larger than 20 MW.

The NYISO OATT prescribes a number of technical system studies that are required to evaluate the potential impact of a new facility's interconnection to the New York transmission system. These system studies are performed to ensure that the proposed project does not have an adverse impact on the performance of the New York State Bulk Power System, and to allocate cost responsibility for necessary upgrades to mitigate any potential adverse impacts uncovered.

The performance of these studies is the responsibility of the NYISO, which may subcontract Con Edison to perform certain aspects of a particular study. Studies performed for previous projects can be obtained from the NYISO.

Below are two simplified flow charts of the Large Facility Interconnection Process (Attachment X of the NYISO OATT) and the Transmission Interconnection Procedures (Attachment P of the NYISO OATT). This is intended to serve as a general guide to the Interconnection Process with notes that pertain to Con Edison. For more details, Developers should consult the most current NYISO Open Access Transmission Tariff.

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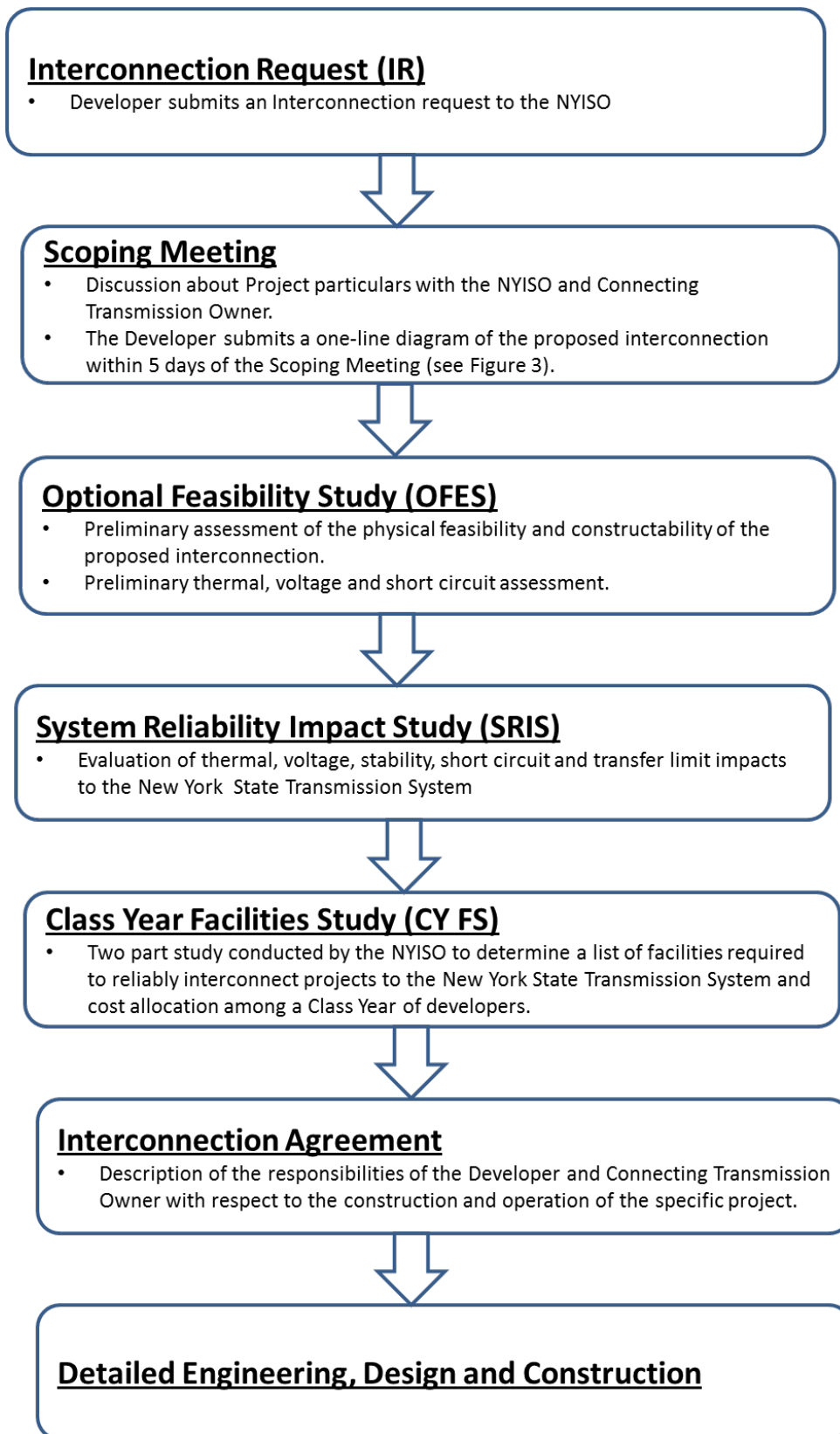


Figure 1. A simplified flow chart of the Attachment X process.

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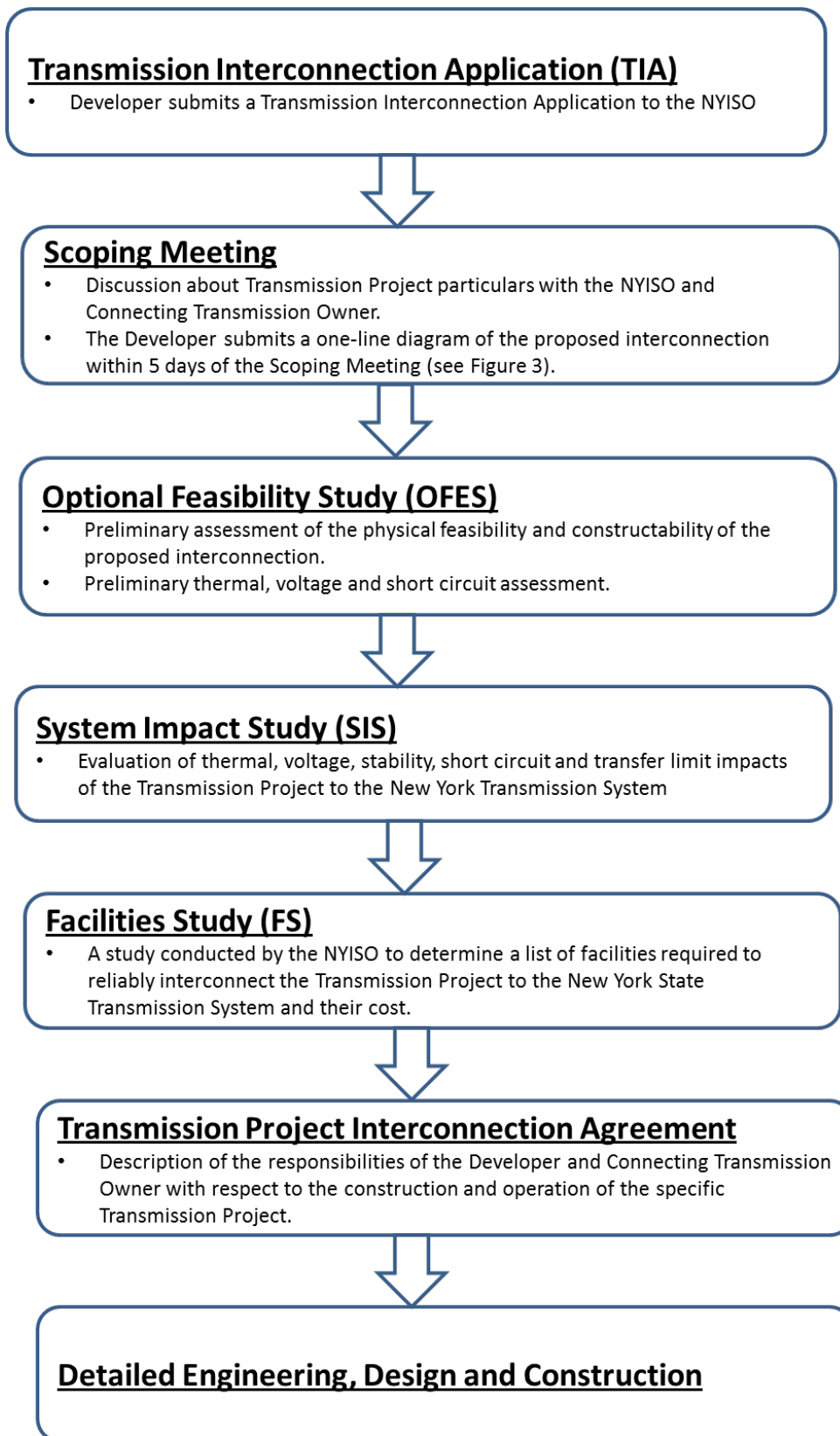


Figure 2. A simplified flow chart of the Attachment P process.

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Connection of proposed developer projects to the Con Edison electric transmission system must meet established reliability, environmental and safety standards. The interconnection plan must conform to NERC, NPCC and NYSRC standards. These standards are publicly available and can be obtained by contacting the relevant organization. All proposed facilities must comply with the latest city, state and federal environment and safety laws and regulations, as well as all applicable Con Edison standards, procedures and specifications. The following key Transmission Planning standards of Con Edison are provided as an appendix:

- Con Edison System Design Criteria, TP-7100, "Transmission Planning Criteria";
- Con Edison Performance Requirements, TP-8100, "Performance Requirements for Inverter-Based Generation".

Please contact the NYISO on matters relating to the Interconnection Process and associated studies. For issues specific to the Con Edison system, please contact the Con Edison representatives below.

Contacts – Con Edison

Vitaly Spitsa
spitsav@coned.com
(212) 460 – 6227
4 Irving Place – Room 13-NW
NY, NY 10003

Ly Dang
dangl@coned.com
(212) 460-3557
4 Irving Place – Room 13-NW
NY, NY 10003

Key Points of Information

- It is the developer's responsibility to suggest one or more points of interconnection for evaluation. Con Edison will review the feasibility of designated points of interconnection but will not propose a point of interconnection.
- One line diagram(s) provided by the developer should show the substation affected by the interconnection, clearly identify the bus section to which the Developer's Attachment Facilities will be connected, the isolating circuit breakers and disconnect switches. Where extensions or other modifications of an existing substation are proposed, please show the existing equipment in black and the new equipment in red (see diagram in Figure 3 below).

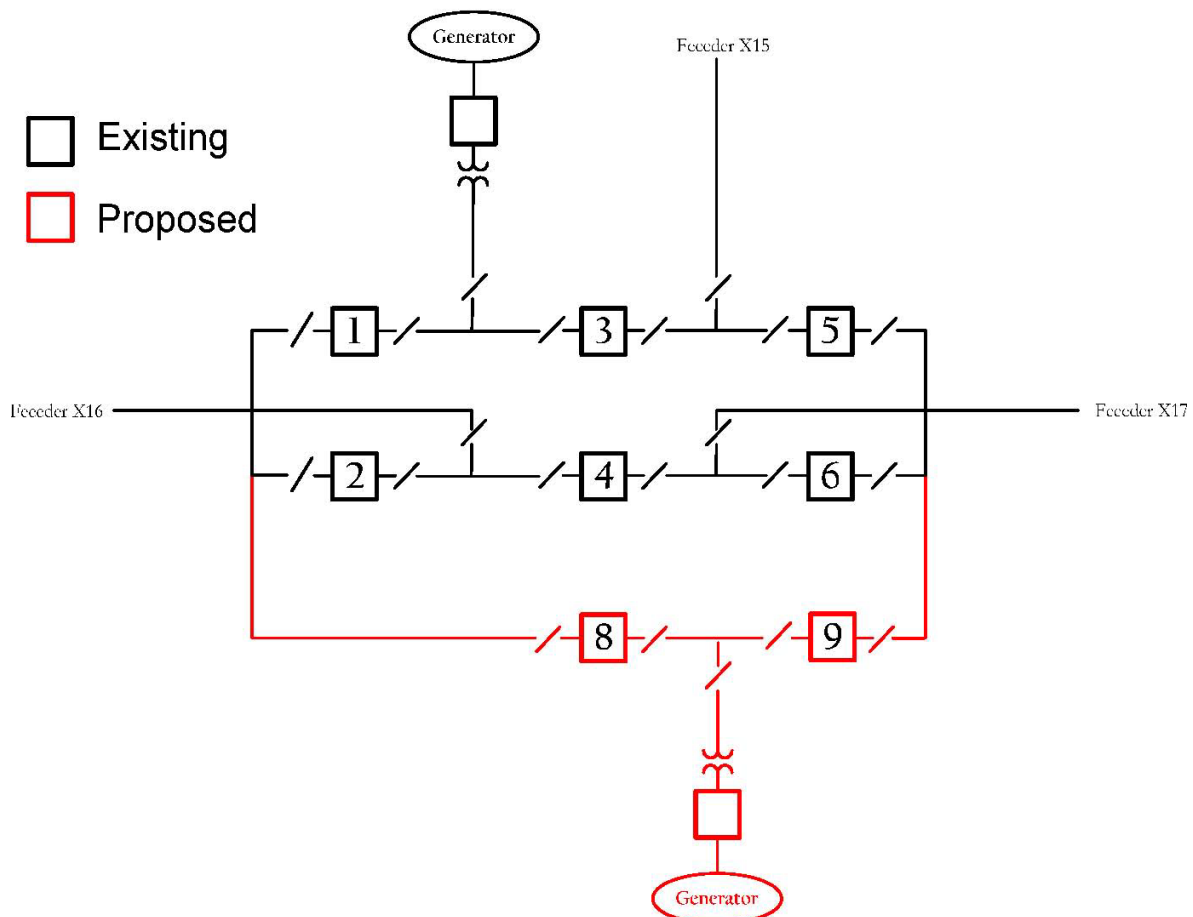


Figure 3. An example of a conceptual one-line diagram

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which is acceptable for an evaluation.

- There may also be instances when it is not considered prudent or practical to further expand an existing substation. For example, when a ring bus grows beyond a certain size, the probability increases that during multiple system events the substation could become fragmented into multiple pieces thereby losing its level of reliability.
- The final design should consider the possibility that any piece of equipment to be installed may fail. The design and construction of the interconnection and the required equipment should be done so that a failure will disrupt the station to the least possible extent and will not jeopardize station nor system reliability. Particular attention should be given to the space requirements for on-site repair, maintenance activities of existing equipment, or removal of any failed equipment.
- Con Edison's Central Engineering specification CE-ES-2002 provides the following checklist for Transmission Substation Design:
 - Primary and secondary voltage to be used
 - System studies
 - Substation capacity, current and future
 - Future expansion needs
 - BIL rating of equipment
 - Number of transmission feeder positions, initial and final
 - Size and layout of station property
 - Air insulated versus SF6 bus (Momentary rating of bus)
 - Maintenance requirements including equipment testing
 - Electrical clearances
 - Light and power requirements including Standby Diesel Generator and Mobile Generator Quick Connect requirements
 - Grounding design
 - Control room layout
 - 125 VDC system requirements
 - Cable and trench layout
 - Metering scheme
 - Roadway layout
 - Primary and secondary voltage relaying schemes
 - Aesthetic appearance of station
 - Type of primary transmission cables
 - One line high tension drawing
 - Accuracies of current transformers
 - Lighting design
 - Security protection
 - Type of structure
 - Number and location of shunt/series reactors
 - Environmental aspects, Oil Water Separator sizing and location
 - Type of circuit switchers and interrupters (Interrupting rating)
 - Type of metal clad switchgear

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- Transformer MVA rating and % impedance
- Circuit breaker ratings (Continuous and short circuit)
- Phase angle regulators
- Bus configuration (Ring or breaker and half)
- Automation / SCADA / HMI, Alarms requirements
- Communications / IR requirements
- Spare parts inventory assessment
- Lightning / Surge protection
- Corporate Security, Cyber Security

While the NYISO's Large Facility Interconnection procedures do not specifically address these, Con Edison requires all tasks on the above checklist to be completed before the substation configuration can be accepted as final.

- Upon the submission of a valid Interconnection Request or Transmission Application Form to the NYISO, Con Edison will allow a developer supervised access to the desired interconnecting Substation for the purpose of a site visit and technical evaluation, upon the execution of all agreements required between Con Edison and the project developer.
- Con Edison requires developers to make available, electronic copies of all photographs taken during substation visits at the end of the visit. These will be reviewed and those images that are deemed acceptable for release by Con Edison may be kept by the developer. These photographs constitute confidential information and are required to be maintained as such.
- The designation of, and the costs for, System Upgrade Facilities (SUFs) and Attachment Facilities (AFs) for merchant generation and transmission projects seeking interconnection pursuant to Attachment X of the OATT are determined during the NYISO Class Year Cost Allocation and Facilities Study consistent with NYISO tariff. As part of the Part 1 Study portion of the Facilities Study, Con Edison provides a cost estimate for required local SUFs and Connecting Transmission Owner Attachment Facilities (CTO-AF).
- The designation of, and the costs for, Network Upgrade Facilities (NUFs) and Attachment Facilities (AFs) for transmission projects seeking interconnection pursuant to Attachment P of the OATT are determined during the Facilities Study consistent with NYISO tariff. Con Edison provides a cost estimate for required local NUFs and Connecting Transmission Owner Attachment Facilities (CTO-AF).
- New York State Reliability Rules require certain gas-fired units in New York City to burn oil at a minimum level on high load days. Consequently, new gas-fired units to be installed in New York City must have dual fuel

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capability. Additionally, new or re-powered generating projects interconnecting to the Con Edison gas transmission system must have automatic fuel switching capability to allow a switch over to liquid fuel when required due to certain gas system contingencies.

- New generators connecting to Con Edison's transmission system will be required to possess black start capability if Con Edison's analysis indicates that the new project would provide system restoration benefits.

Specification Request Form

Below is a list of Con Edison specifications (CE-ES-2002, Standard Engineering Design Guidelines for Area Substations, Transmission Substations and PURS Facilities) that project Developers may wish to consult in performing their preliminary design and analyses of interconnection plans. Upon the submission of a valid Interconnection Request to the NYISO, a copy of these specifications can be obtained by forwarding the list, with required specifications checked, to Con Edison, along with an executed copy of the confidentiality agreement included in this Developer Welcome Kit. These specifications do not constitute the complete list of Con Edison specifications that may be pertinent to a particular interconnection design.

<u>Specification Number</u>	<u>Specification Title</u>	<u>Check</u>
CE – ES – 2002 – I	General Requirements	<input type="checkbox"/>
CE – ES – 2002 – 1	Control and Instrumentation	<input type="checkbox"/>
CE – ES – 2002 – 2	Relay Protection	<input type="checkbox"/>
CE – ES – 2002 – 3	Communication Facilities	<input type="checkbox"/>
CE – ES – 2002 – 4	DC Power Supply System	<input type="checkbox"/>
CE – ES – 2002 – 5	Cable and Raceway Systems	<input type="checkbox"/>
CE – ES – 2002 – 6	120/208 Volt Light and Power Supply	<input type="checkbox"/>
CE – ES – 2002 – 10	Substation Grounding	<input type="checkbox"/>
CE – ES – 2002 – 11	Inter-Utility Metering	<input type="checkbox"/>
CE – ES – 2002 – 12	Capacitor Banks	<input type="checkbox"/>
CE – ES – 2002 – 15	69, 138 and 345 kV Circuit Breakers	<input type="checkbox"/>
CE – ES – 2002 – 18	Power Transformers, Phase Angle Regulators Series Reactors and Shunt Reactors	<input type="checkbox"/>
CE – ES – 2002 – 21	Fire Protection	<input type="checkbox"/>
CE – ES – 2002 – 22	Potential Transformers	<input type="checkbox"/>
CE – ES – 2002 – 23	Lightning Protection	<input type="checkbox"/>
CE – ES – 2002 – 30	Circuit Switchers and Circuit Interrupters	<input type="checkbox"/>
CE – ES – 2002 – 31	Disconnect Switches, Ground Switches and High Voltage Bus	<input type="checkbox"/>
CE – ES – 2002 – 32	Current Transformers	<input type="checkbox"/>
CE – ES – 2002 – 33	Coupling Capacitor Potential Devices and Voltage Transformers	<input type="checkbox"/>
CE – ES – 2002 – 38	Foundations	<input type="checkbox"/>

Appendices

1. Con Edison System Design Criteria, TP-7100, "Transmission Planning Criteria".
2. Con Edison Performance Requirements, TP-8100, "Performance Requirements for Inverter-Based Generation"
3. Con Edison Drawing #303032, Typical One Line Diagram of a Breaker-and-a-Half Design.
4. Con Edison Drawing #303033, Typical One Line Diagram of a Ring Bus Design.