August 7, 2008

Florida Power & Light Company's New England Division (FPL-NED)

Transmission Planning Studies and Transmission Projects

Seabrook Substation Reliability Upgrade Project

FPL-NED is currently in the preliminary planning and implementation phase of a planned Reliability Upgrade Transmission Project involving its 345kV Seabrook Transmission Substation. The objective of this Reliability Upgrade Transmission Project is to substantially improve the reliability of: i) the connectivity, performance and system protection of the (3) – 345kV transmission lines (Sect. 363-Seabrook to Scobie Line, Sect. 369-Seabrook to Timber Swamp/Newington Line, and Sect. 394-Seabrook to Ward Hill Line) which 345kV lines interconnect through the Seabrook; ii) components of the Seabrook Transmission Substation; and iii) the interconnection of the Seabrook Nuclear Generating Station to the New England Transmission System. The improved reliability will be accomplished by replacing certain existing equipment with new, state of the art equipment, as well as the addition of new, modern equipment and changes in substation topology that will provide additional needed redundancy to the electric circuitry of the Seabrook Transmission Substation.

The planned Reliability Upgrade Transmission Project at the Seabrook Transmission Substation will provide regional benefits in the form of decreasing the potential for, and frequency of, unplanned transmission line outages, as well as unplanned outages of the Seabrook Nuclear Generating Station. In addition, this Reliability Upgrade Transmission Project will allow for future maintenance of certain Seabrook Transmission Substation components to be performed with less likelihood of a need for transmission line outages or an outage of the Seabrook Nuclear Generating Station. Currently, there are limited opportunities for maintenance of Seabrook Transmission Substation equipment without requiring either transmission line outages or an outage of the Seabrook Nuclear Generating Station.

This Reliability Upgrade Transmission Project is estimated to cost approximately $30 million and is expected to involve the replacement of and addition to both Pool Transmission Facilities (PTF) and Non-Pool Transmission Facilities (NPTF). Those portions of this Reliability Upgrade Transmission Project that involve replacement of existing equipment will be maintenance work. Other portions of this Reliability Upgrade Transmission Project that involve the addition of new equipment and components, or that involve changing the topology of the Seabrook Transmission Substation, are considered to constitute a new transmission project and therefore, may be subject to the Regional and Local Transmission Planning Process as defined in Attachment K of the ISO-New England (ISO-NE) Tariff. If required by ISO-NE, the Reliability Upgrade Transmission

New England Division

Seabrook Substation Reliability Improvement Project

Overview

Seabrook 345-kV Substation (S/S), located in Seabrook, New Hampshire, is a major bulk power transmission system facility and a critical node on the ISO-New England (ISO-NE) transmission grid. The substation was originally built in 1982 with a gas insulated substation (GIS) design (first generation technology) and consists of eight circuit breakers. The substation is owned, maintained and operated by Florida Power and Light Company - New England Division (FPL-NED). As shown in Figure 1 below, the circuit breakers at Seabrook S/S are arranged in a breaker and one half scheme with connections for five key transmission elements: Line 394 (Ward Hill – Tewksbury); Line 363 (Scobie Pond) and Line 369 (Timber Swamp – Newington); the reserve auxiliary transformers (RATs) and generator step up transformers (GSUs) used to interconnect the 1318 MW nuclear power station and unit auxiliary transformer (UAT).

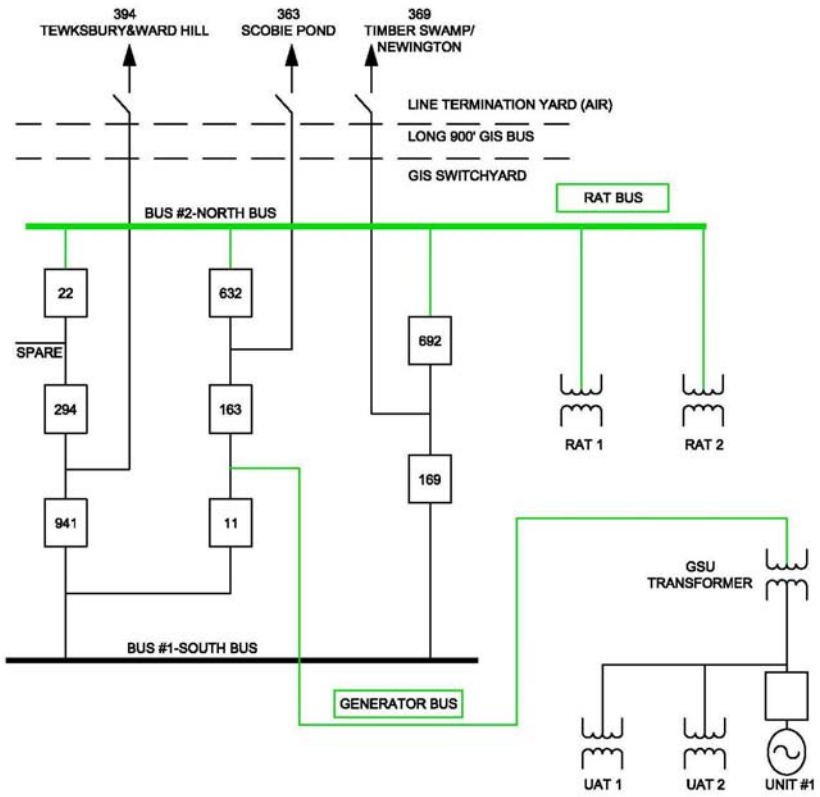


Figure 1 – Existing Seabrook 345-kV Substation

Needs Assessment

FPL-NED has implemented and continues to exercise a rigorous maintenance program on the Seabrook Substation. However, the substation is 26 years old and equipment failures experienced during the past two years have affected availability of the transmission lines and nuclear station causing 26 days of unplanned outages since February 2007. Component failures on the rupture discs, switch rods and connections involving the RATs and GSUs have caused recent station outages. These events have caused FPL-NED to undertake assessments of the substation equipment and design arrangement (topology) to determine what system improvements can be achieved with the following objectives:

- Improve reliability of the Seabrook 345-kV Substation by implementing equipment upgrades.
- Begin construction of Stage 1 in March, 2009 to be completed during the next nuclear refueling outage in October, 2009, with Stage 2 of construction scheduled for completion during the subsequent refueling outage in April 2011.
- Minimize impacts on the three 345-kV transmission lines and 1318 MW nuclear power station.

The existing substation design of the Seabrook S/S which has the RATs connected directly to Bus No. 2 is not optimal and poses reliability concerns as well as operational limitations. In the event a fault occurs simultaneous with a breaker failure (eg. 632, and/or 692) then one of the 345-kV lines and the RATs will be lost. Due to the direct connection to Bus No. 2, the failure of the RAT will also result in an outage of Bus No. 2 which severely lowers the reliability performance of the station. This design configuration has limited operating flexibility that does not allow for efficient and effective maintenance of substation equipment. Table 1 below demonstrates the impact on substation reliability performance of the RAT connection onto Bus No. 2. Design modifications are needed to move the RAT connection into a dedicated terminal position within the substation which will substantially improve the reliability of the Seabrook 345-kV Substation.

Condition	Fault	Action	Result
All Facilities In-service	RAT Failure with Stuck 692 Breaker	Trips 369 (to Timber Swamp)	Loss of 345-kV transmission line
	RAT Failure with Stuck 632 Breaker	Trips 363 (to Scobie Pond)	Opens NNE-Scobie + 394 Interface Facility
	Fault on Line 369 with Stuck 692 Breaker	Trips Bus No. 2 and RAT	May require backdown of Seabrook generator
	Fault on Line 363 with Stuck 632 Breaker	Trips Bus No. 2 and RAT	May require backdown of Seabrook generator
Breaker 941 Open	RAT Failure	Open Breaker 22, 632, and 692 and Isolates Line 394	Opens NNE-Scobie +394 and North-South Interface Facility
Breaker 169 Open	RAT Failure	Open Breaker 22, 632, and 692 and Isolates Line 369	Loss of 345-kV transmission line
Breaker 163 Open	RAT Failure	Open Breaker 22, 632, and 692 and Isolates Line 363	Opens NNE-Scobie + 394 Interface Facility

Table 1 - List of Contingencies Involving RAT and Bus No. 2

NRC design requirements for Seabrook Nuclear Generating Station require that the Seabrook 345-kV Substation provide for independent and redundant paths to ensure an available off-site power supply for "N-2" contingency conditions. These are codified in the NRC-approved Technical Specifications (Tech. Specs.) and Unit Final Safety Analysis Report (UFSAR). In addition, loss of either off-site power connection (UAT or RAT) places the generating station in an immediate Limited Condition of Operation (LCO). The LCO can require station back down which may have undesired effects on grid reliability and wholesale market prices.

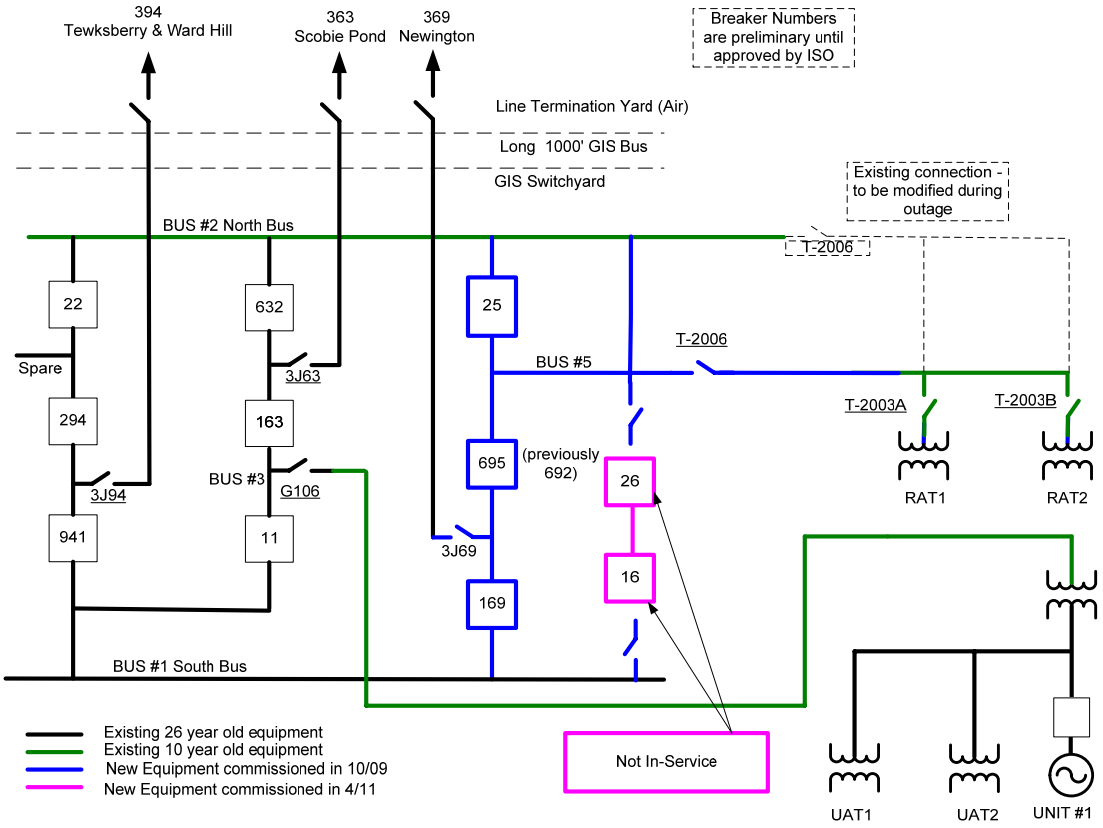
A second reliability concern is the generator connection which shares a breaker bay with Line 363. The Seabrook generator is the largest single unit in New England, New York and Canadian Maritimes control areas. A fault on Line 363 with a failed breaker or relay misoperation results in the Seabrook generator being tripped. In addition, maintenance on Breaker 163 with a fault on either Line 394 or 369 with a stuck breaker also trips the 1318 MW Seabrook generator.

Condition	Fault	Action	Result
All Facilities In-service	363 Fault with Stuck 163 Breaker	Trips 1318 MW Generator	Largest source loss in Northeast region
Breaker 163 Open	Fault on Line 394 and Stuck 941 Breaker	Trips 1318 MW Generator	Largest source loss in Northeast region
	Fault on Line 369 and Stuck 169 Breaker	Trips 1318 MW Generator	Largest source loss in Northeast region
Breaker 11 Open	Fault on Line 363 and Stuck 632 Breaker	Trips 1318 MW Generator and RAT	Remove both offsite power supplies and largest source loss in Northeast region

Table 2 – List of Contingencies Tripping the Seabrook Generator

FPL-NED recommends modifications to improve substation reliability for the transmission lines, 1318 MW generator and offsite power supply for the nuclear station. In addition, condition assessments of the entire switchyard are underway, switch rods are being replaced and proposals are being prepared to add GIS equipment monitoring and failure detection systems.

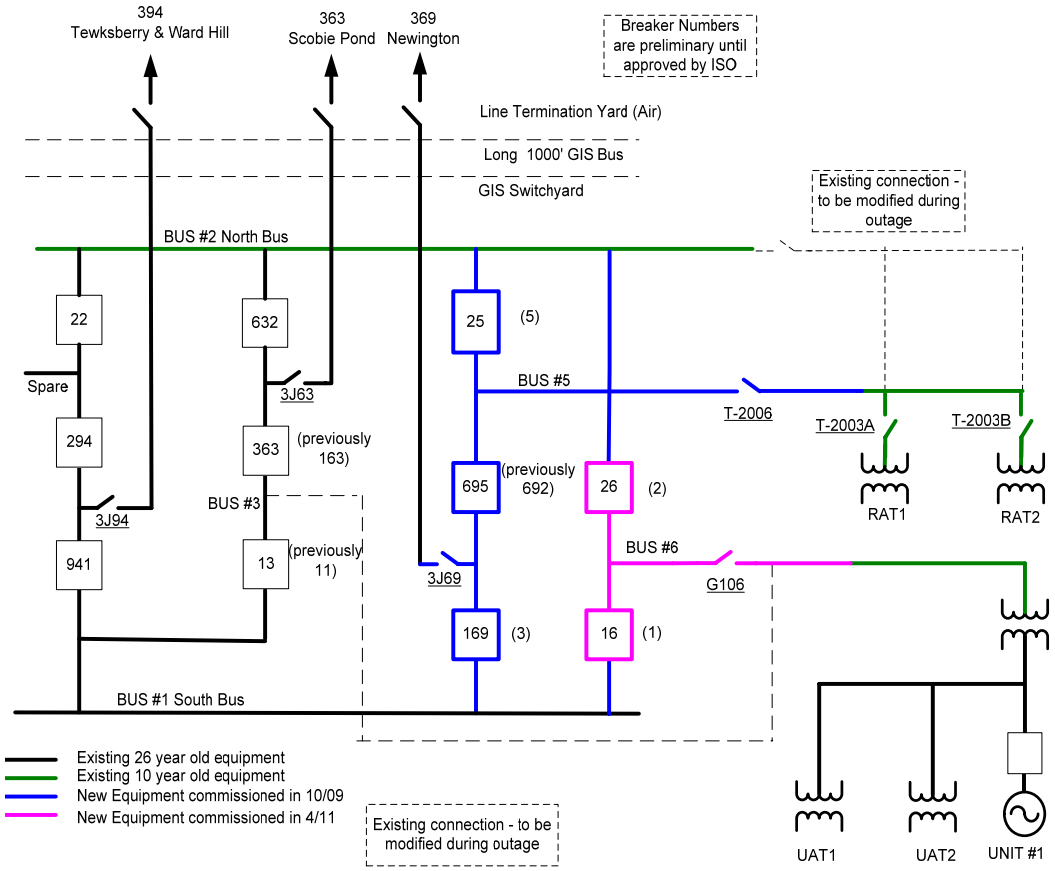
Preferred Alternative
Seabrook Substation Reliability Project
October, 2009 – Stage 1



Total Estimated Cost: $30M for Stage 1 and Stage 2

Figure 2 – Stage 1 Reliability Improvements

Preferred Alternative cont'd
Seabrook Substation Reliability Project
April, 2011 - Stage 2



Total Estimated Cost: $30M for Stage 1 and Stage 2

Figure 3 – Stage 2 Reliability Improvements

Solution Study-

In considering the need to replace less reliable components of the GIS and modify the Seabrook S/S topology to address the concerns with the existing design, several alternatives were investigated. The main goal of the Seabrook Substation Reliability Improvement Project is to improve the reliability of the five key transmission elements interconnected at Seabrook Substation by the completion of the work comprising Stage 1 of the project during the October 2009 refueling outage, followed by completion of Stage 2 of the project during the following refueling outage scheduled for April 2011. Due to off-site power requirements, most work (e.g. cutover and commissioning of new facilities) on the substation must be completed during station refueling outages. The proposed design should support and promote the reliability of the New England Transmission System and conform to ISO-NE Planning Procedure No. 9, "Major Substation Bus Arrangement Application Guidelines". This Planning Procedure specifies substation bus arrangements that are considered reliable and good utility practice as applied to substations undergoing a significant modification. The modified design should simplify substation switching to safely isolate facilities and equipment with minimum impact on power flows.

Preferred Alternative – Two Breaker Replacements and Three New Breakers

The preferred alternative is to install five new GIS breakers; three new breaker positions and two replacements (692 and 169). As shown in Figures 2 and 3, above, depicting the substation modifications that will be completed during Stage 1 (October 2009) and during Stage 2 (April 2011), this configuration moves the offsite power supply through the RATs off Bus No. 2 into a breaker and half bay and establishes a separate bay for the generator connection.

This creates two dedicated busses, improves reliability of the five key transmission elements interconnected at Seabrook S/S and increases availability of the largest unit in the region. The modified design provides separation of an electrical fault on the RATs combined with a breaker failure or breaker maintenance condition from impacting flows on facilities associated with two critical northern New England transmission interfaces: North-South and Northern New England-Scobie plus Section 394. Additionally, this design separates the generator and Line 363 from impacting flows on the other following an electrical fault combined with a 163 Breaker failure. This design also allows more flexibility for clearances to perform future maintenance and upgrades outside of the nuclear power station refueling outages. The design modification is consistent with Good Utility Practice for stations interconnecting nuclear power generating equipment by providing reliable off-site power supply through "N-2" contingency conditions.

The Seabrook Substation Reliability Improvement Project will be accomplished in 2 Stages over 2 Seabrook Plant refueling outages.

Stage 1 of Project

Stage 1 of the Seabrook Substation Reliability Improvement Project (Project) will be accomplished in the March 2009 to October 2009 fueling outage of the Seabrook Plant. The scope of work to be performed in Stage 1 of the Project will be as follows:

i) Foundation and the structure to house equipment/breakers will be constructed.

ii) 5 breakers will be installed/mounted on the structure and all breakers will be connected between Bus #1 and Bus #2. Two breakers (i.e., 695 and 169) will be replacements of existing breakers and an additional 3 new breakers will be mounted and connected.[1)]

iii) Under Stage 1, all 5 breakers will be installed, but only 3 breakers (695, 169, and a new breaker 25) will be commissioned and put into service; and

iv) The existing Reserve Auxiliary Transformers (RATS) will be disconnected from Bus #2 and re-routed/reconnected, see Bus #5 on following drawing. A new disconnect switch (T-2006) will be installed in the new bus serving the RATS.

Stage 2 of Project

Stage 2 of the Project will be accomplished during the Apri 2011 refueling outage of the Seabrook Plant.

The scope of work to be performed in Stage 2 of the Project will be as follows:

i) The Generator Step-up (GSU) transformers will be disconnected from its existing location (between breakers 11 and 163) and re-routed/reconnected to previously (Stage 1) installed breakers 16 and 26.

ii) Breakers 16 and 26 will be commissioned and placed in-service; and in an additional disconnect switch (G-106) will be installed in the GSU bus (Bus #6).

Note: [1)] Breakers numbers are preliminary.

P. O. Box 029311, Miami, FL 33102-9311

FPL

October 7, 2008

Mr. Don Gates
Chairman, Reliability Committee
ISO New England
One Sullivan Road
Holyoke, MA 01040-2481
United States of America

Subject: **Transmission Facilities Proposed Plan Application (PPA) for the Seabrook Substation Reliability Improvement Project (FPLC-08-T01)**

Dear Don:

In accordance with Section I.3.9 of the ISO New England Transmission, Markets and Services Tariff, Florida Power & Light Company (FPL, a.k.a. FPL-NED) hereby submits the following Transmission Facilities Proposed Plan Application reporting the notice of intent to construct and change facilities (69 kV and above) for the Seabrook Substation Reliability Improvement Project:

FPLC -08-T01	**Seabrook Substation:** Replace two existing and add three new breakers and gas-insulated substation (GIS) buswork and relocate the reserve auxiliary transformers (RATs) and generator step-up (GSU) connections.

FPL believes that the proposed changes reflected in the PPA outlined above will not have a significant adverse effect upon the stability, reliability or operating characteristics of the Transmission Owner's transmission facilities, the transmission facilities of another Transmission Owner, or the system of a Market Participant. FPL requests approval of this PPA under the ISO New England Planning Procedure PP5-1. The Project has in service dates of October, 2009 and April, 2011, reflecting that the total project will be implemented in two stages.

Sincerely

W. C. Locke, Jr., Manager, Transmission Services
Florida Power & Light Company

TRANSMISSION FACILITIES PROPOSED PLAN APPLICATION

1. Applicant Florida Power & Light Company (a.k.a. FPL-NED) Date October 7, 2008 .

2. Type of Facility Seabrook Substation - Replace two existing and add three new breakers and gas-insulated substation (GIS) buswork and relocate the reserve auxiliary transformers (RATs) and generator step-up (GSU) connections.
   In-Service Date Phase I – 10/2009 and Phase II – 4/2011

3. Transmission Line and/or Substations

   a. From _____ To _____
   (Terminal - Name - Location) (Terminal - Name - Location)

   b Third Terminal or tap (if any) _____
   (Name - Location)

   c. Distance - Overhead _____ miles. Underground _____ miles. Design Voltage _____ KV

   Conductor Size _____ Initial Operation _____ KV

   d. Proposed Relaying:
   Type of line relaying
   Backup relaying
   Stuck breaker
   Special protective relaying schemes

4. Transformer Rating _____ MVA HV _____ KV LV _____ KV Tertiary _____ KV

   Parameters in percent on a 100 MVA Base

   Resistance _____-R Reactance _____ -X

5. Attach simplified one line diagram(s) of transmission and/or substations with breaker configuration, indicating existing and proposed additions or changes on construction.

   Comments –The Seabrook Reliability Improvement Project will be constructed in two phases. Phase I will add the five new breakers (replace two existing breakers), a portion of buswork, and relocate of the RATs off Bus #2 into their new bay position. Phase II will complete the connection of the new double breaker bay for the GSU and relocate the GSU connection.

6. Reliability Studies

Short Circuit:	Completed	☐	Planned	☐	Not Needed	☒	Explanation Attached ☒
Load Flow:	Completed	☐	Planned	☐	Not Needed	☒	Explanation Attached ☒
Stability:	Completed	☐	Planned	☐	Not Needed	☒	Explanation Attached ☒
Other _____	Completed	☐	Planned	☐	Not Needed	☐	Explanation Attached ☐

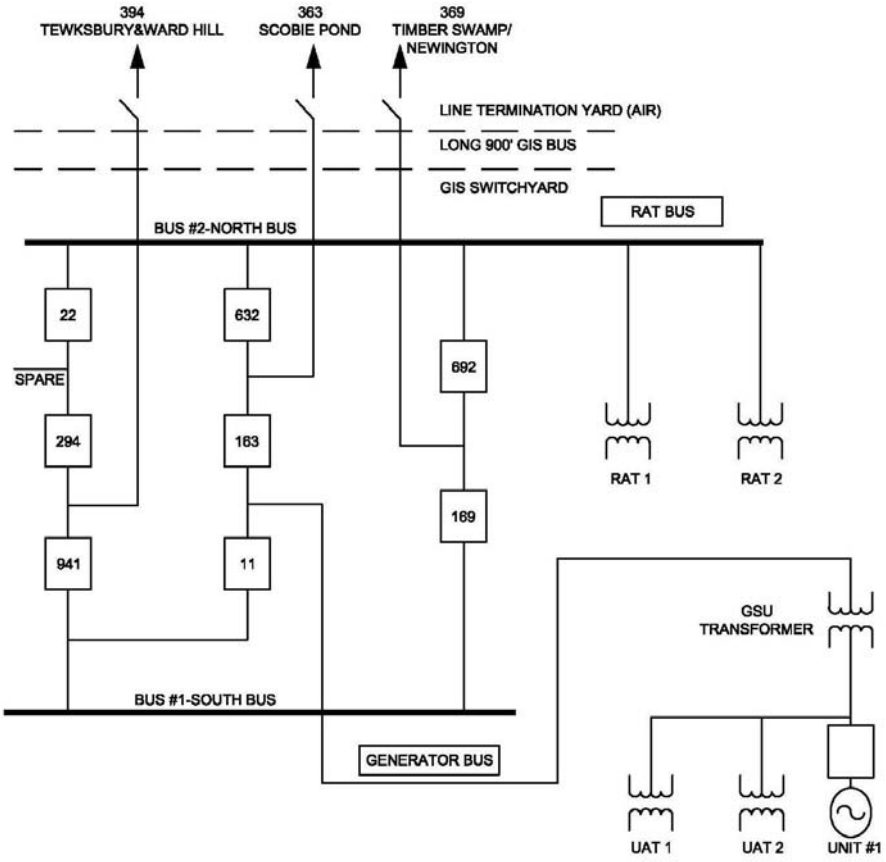
7. a. If this Application is associated with a Generation Proposed Plan Application, identify the Generator Proposed Plan Application(s) and the Governance Participant(s) responsible for submitting it. No ☐

   b. Has the Generation Proposed Plan Application(s) been submitted? Yes No
   If "No", when will the Application(s) be submitted?

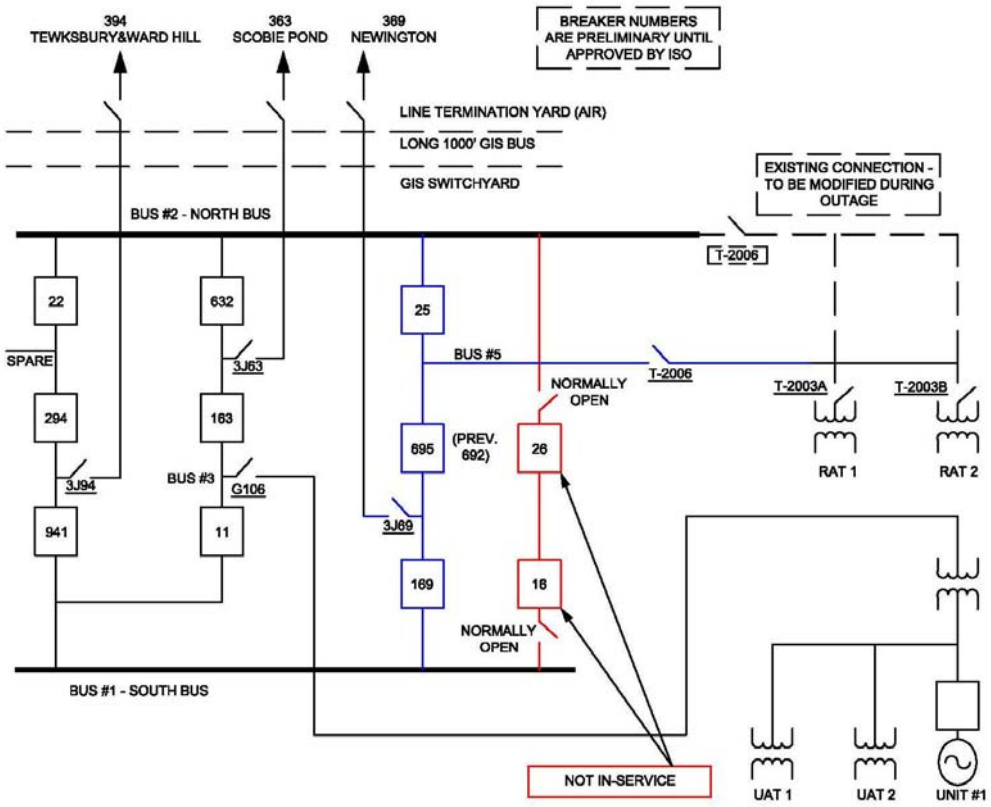
Explanation for Providing No Studies:

The Seabrook Reliability Improvement Project involves minor system topology and no transmission or generation addition or changes with the exception of eliminating one stuck breaker (163) contingency at Seabrook S/S which involved the Seabrook 1318 MW generator and Line 363.

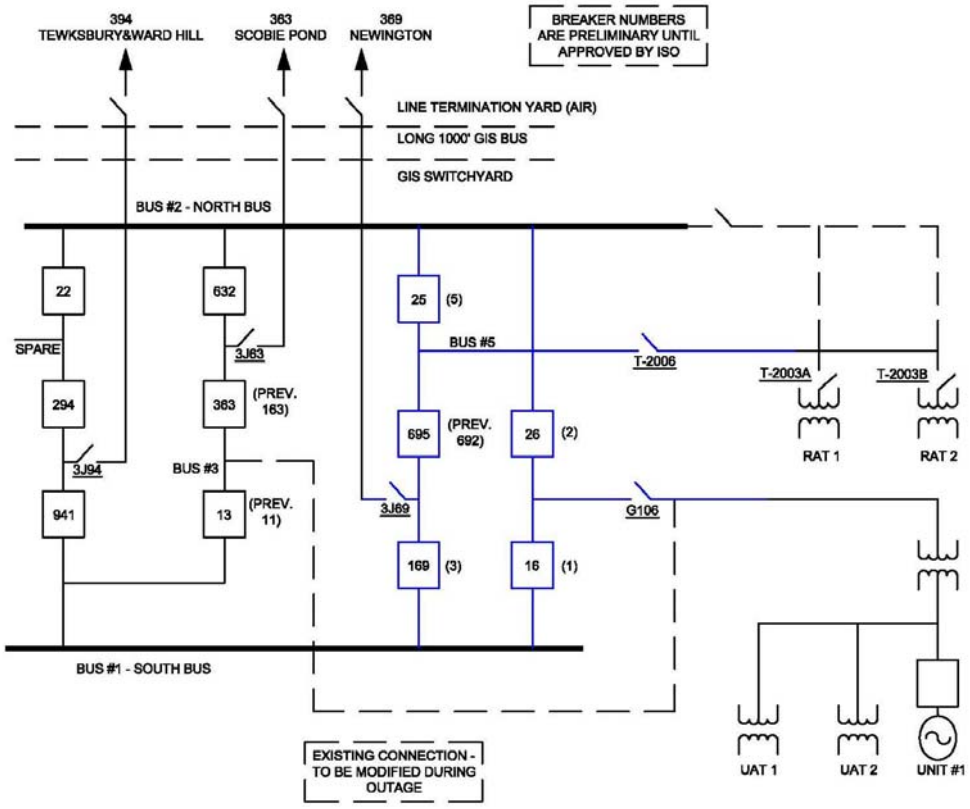
Existing Seabrook S/S



Stage 1 Seabrook S/S (Completion by end of 10/09 Refueling Outage)



Stage 2 Seabrook S/S (Completion by end of 4/11 Refueling Outage)



Project at the Seabrook Transmission Substation will follow the Attachment K Planning Process and the other ISO-NE Tariff requirements and procedures.

FPL-NED intends to implement this Reliability Upgrade Transmission Project on a schedule that permits cutover and energization during the planned refueling outage of the Seabrook Nuclear Generating Station scheduled to occur during October 2009. Meeting this schedule will require significant pre-cutover work including construction and installation / placement of substantially all new equipment. By accomplishing as much work as possible before the October 2009 refueling outage, essentially only work involving cutover from the old equipment and existing configuration to the new equipment and new configuration will remain to be done during the compressed time frame associated with the short-duration outage.

It is estimated that all regulatory approvals and permits, as well as completion of the Attachment K review and approval process will need to be completed by no later than March 1, 2009 so that pre-cutover work and construction can commence during March 2009.

FPL-NED's preliminary recommended design for its Reliability Upgrade Transmission Project involves the following (refer to the one-line diagrams shown below):

Pre-October 2009 Outage Work

1. Install five new 345kV circuit breakers and associated gas insulated bus work on an elevated platform directly on top of the existing Seabrook Transmission Substation. These new breakers and bus will be connected to the existing station operating busses to create two new operating bays.

2. The first bay will incorporate three breakers in a breaker and a half arrangement. Two of the breakers (breakers 3 and 4) will be connected to the 369 (Seabrook to Newington Line) prior to the refueling outage. The third breaker (breaker 5) in this bay will be used to connect between bus #2 and the RAT transformers during the upcoming refueling outage.

3. The second bay will consist of two breakers (breakers 1 and 2) which will be connected to the bus #1 and bus #2 and the Generator Step Up Transformer during the refueling outage.

4. Installation of new protective relay and control panels and associated cabling and cable trays / conduits will be preinstalled prior to the refueling outage.

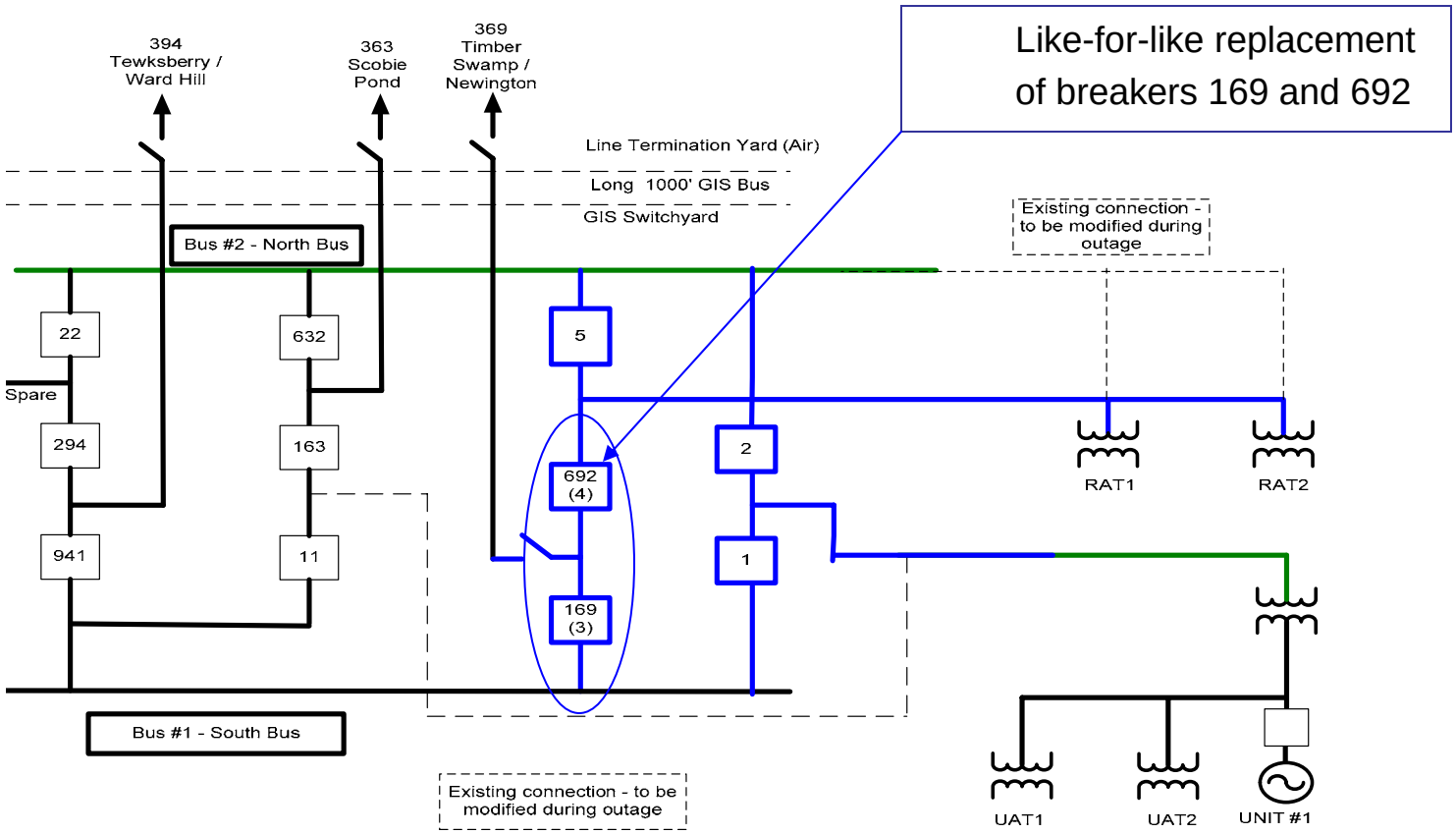
Work During October 2009 Refuel Outage

1. Connect the five breakers to the existing station operating bus #1 and bus #2.
2. Reconfigure connection of the Seabrook Nuclear Generating Station main Generator Step-up Transformer from its current connection between existing 345kV GIS Circuit Breakers 11 and 163 to a new connection point between the two new 345kV GIS Circuit Breakers labeled 1 and 2.

3. Disconnect existing 345kV GIS Circuit Breakers 169 and 692 and connect new replacement 345kV GIS Circuit Breakers labeled 3 and 4.
4. Reconfigure connection of the Seabrook Nuclear Generating Station's two RAT from their current connection directly to Seabrook Transmission Substation Bus No. 2 to a new connection point between the new additional 345kV GIS Circuit Breakers labeled 4 and 5.
5. Testing, commissioning and energization of new equipment and reconfigured Seabrook Transmission Substation

Further details will be determined and posted, as appropriate, as part the ongoing planning and study phases of this project proceed.

Proposed Seabrook Transmission Substation
Reliability Upgrade Transmission Project



Benefits to the New England Transmission System from FPL-NED's proposed Seabrook Substation Reliability Upgrade Project

FPL-NED's 345kV Seabrook Substation is one of the more critical substations in New England. It is a Pool-Transmission Facility and part of the New England Bulk Power System. The Seabrook Substation serves to connect (3) major 345kV transmission lines, namely, the Seabrook to Ward Hill 394 Line, the Seabrook to Scobie 363 Line and the Seabrook to Timber Swamp/Newington 369 Line. The Seabrook Substation is an integral part of the North-South Interface and the Northern New England – Scobie plus Line 394 Interface. The Seabrook Substation also serves to interconnect the 1,318 MW Seabrook Nuclear Generating Station, the largest single generating resource in New England.

FPL-NED has proposed a project (the Seabrook Reliability Improvement Project) involving certain modifications to the configuration of the Seabrook Substation, as well as the replacement of certain equipment which will provide incremental reliability improvements in the near term. FPL-NED has proposed to implement these upgrades in October 2009 during the next scheduled refueling outage of the Seabrook Nuclear Generating Station.

The Seabrook Reliability Improvement Project will improve the reliability of the Seabrook Substation, reliability of the (3) 345kV transmission lines discussed above, as well as the reliability of the interconnection of the Seabrook Nuclear Generating Station. Some of the benefits to be realized by implementation of the Seabrook Reliability Improvement Project are:

1. Relocation of Reserve Auxiliary Transformers (RAT)
    a. Eliminates need to open breakers connecting the 3-345kV transmission lines to Bus No. 2 in order to perform maintenance on RAT and/or RAT Bus
    b. Eliminates opening breakers connecting the 3-345kV transmission lines to Bus No. 2 during RAT or RAT Bus faults

2. Relocation of Generator Step Up Transformer (GSU)
    a. Eliminates tripping the Seabrook to Scobie 363 Transmission Line for a stuck breaker condition on faults of the GSU or the GSU bus.

3. Replacing existing Breaker Nos. 169 and 692 and associated bus work which connect the Seabrook to Timber Swamp/Newington 369 Transmission Line:
    a. Improves reliability of connection of the 369 line by way of having new state of the art GIS equipment
    b. Reduces maintenance costs by reducing time to complete comprehensive maintenance from 5-6 weeks to 5-6 days

4. Other Regional Benefits: Proposed project provides significant economic benefits to the New England Region by way of reducing hours of exposing New England customers to outages of Seabrook Generation and thus the loss of low cost energy which serves to significantly reduce energy costs over the entire region.