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References

1. CROP.32001 Transmission Outages
2. CROP.34001 Double C Confidential
3. CROP.34007 Contingency Analysis
4. CROP.45002 Auditing
5. M/LCC 13 - ISO and LCC Communication Practices
6. OP 19 - Transmission Outages

Procedure Background

The process documented in this CROP provides the ISO System Operator guidance to perform the Operational Planning Analysis required by NERC IRO-008 and TOP-002.

In this procedure “TOG” is an all-inclusive term for: TOG Stability, TOG Text, TOG SPS, and TOG temporary.

The word Unit is inclusive to all dynamic reactive equipment found under the “UNIT” display in EMS applications Powerflow, STCA, RTNET, RTCA, and CAJR.

Control Room Operators, NERC certified at the RC level, determine valid contingencies after analysis of the STCA output

Many of the SPS devices have been incorporated into the STCA software. By selecting the “RAS/ACS Directory” icon, the Control Room Operator can assess which RAS/ACS was incorporated in the STCA software analysis. RAS/ACS Devices in red are Active and have been triggered in the base case or during contingency analysis. The term **Remedial Action Scheme** (**RAS**) and its definition has been adopted by NPCC in place of the term **Special Protection System** (**SPS**). For existing documentation, the term **RAS** or **SPS** may be used. Not all EMS displays will have the SPS term replaced with RAS/ACS.

Type I, Type II and Limited Impact (LI) RAS are defined in NPCC Directory #7.

The Non-Field RAS/ACS display identifies “Special Processed contingencies” modeled in the ISONE EMS software that are are not categorized as an actual RAS or ACS. These “Special Processed contingencies” are for modeling purposes only and may include but are not limited to: ECCS loads at Nuclear Power Stations, NSTAR Cable Ratings or identifying conditions being met to allow reclosing on the New Brunswick tie lines.

Nuclear station voltage monitoring

Nuclear station voltage monitoring is included in STCA to comply with NPIRs. The following contingencies will be evaluated by the "Non-Field SPS's" feature of the STCA software: MIL2, MIL3, and SBRK. The modeling of these contingencies, in conjunction with the Non-Field SPS programming, provide an indication that post-contingent station voltage limits will be exceeded following a unit trip with the addition of Emergency Core Cooling System (ECCS) loads.
The NPIR voltage setpoints are programmed into the SPS logic and will trigger an "LV" indication if the Low Voltage limit is exceeded. A "WLV" Warning Low Voltage limit, set 2kV above the Low Voltage limit, is provided to alert the Operator of a potential problem. Upon an exceedance of either limit, the applicable CTGY ID will be displayed in the "Special Processed contingencies that triggered an SPS" column of the "Contingency Branch Violations" STCA EMS display with an indicator for the limit violated (LV or WLV) to the right.

Reclosing badge

A flow bandwidth is required when reclosing either 390/3016, 3001, or 396 lines. STCA monitors this bandwidth through the use of Non-Field SPSs that measure the flow between NB and NE. Special Process Contingency badges in STCA provide an indication if reclosing is allowed. If reclosing is or isn't allowed, the applicable CTGY ID will be displayed in the "Special Processed contingencies that triggered an SPS" column of the "Contingency Branch Violations" STCA EMS display with an indication of (RECL) to the right, accompanied by a "Reclosure allowed" or "Reclosure not allowed" message on the display.

STCA

STCA has a Solution Control panel that allows the user to select different modes of operation. The modes of operation are as follows:

- **Default mode - Unit MVAr, Shunt Switching and Xfmr Tapping**: Has the same settings as RTCA. It will allow STCA to use Units on AVR, Shunt Devices on AVR and Xfmrs on AVR in the contingency solution. Used for all studies, except for ones involved with CAJR.
- **Enable Unit MVAr Control**: Has the same setting as CAJR. It will allow STCA to only use Units on AVR in the contingency solution. Used for studies associated with CAJR.
- **Enable Unit MVAr and Shunt Switching**: It will allow STCA to use Units on AVR and Shunt Devices on AVR in the contingency solution. No defined use requirement at this time.
- **Enable Unit MVAr and Xfmr Tapping**: It will allow STCA to use Units on AVR and Xfmrs on AVR in the contingency solution. No defined use requirement at this time.
- **Enable Unit MVAr, Phase shifter changing (Maintain MW sched)**: It will allow STCA to use Units on AVR and Phase shifters on AWR in the contingency solution. Represents CAJR post contingent flows with Phase shifter brought back to schedule.
- **Apply All**: It will allow STCA to use Units on AVR, Shunt Devices on AVR, Xrmrs on AVR, and phase shifters on AWR in the contingency solution. Used to mimic RTCA with phase shifter brought back to schedule.

STCA Flat Start status:

- Non Flat Start is normally selected. It utilizes the bus voltages and phase angles that were solved for by RTNET.
- Flat Start is selected when a user manually alters the basecase bus structure or makes a lot of load and generation changes; the basecase might solve more easily from a flat start than from the voltages and angles of the previous solution. Setting the Flat Start flag will: resets the bus voltages and phase angles to their reference values (initialize all voltages to 1.0 PU and all angles to zero degrees).

Voltage Node

Actions to relate a voltage exceedance nodal indication to its corresponding network topology component:

- ❑ Click the "PWR" button to access Powerflow;
- ❑ Click "Analyst Displays" from the menu;
- ❑ Select "Network Topology Model";
- ❑ Locate the applicable station;
- ❑ Identify the location of the node at the station

The Security Operator uses the following criteria to evaluate transmission contingencies and to determine if remedial actions are needed:

- OP-19 and Appendices
- M/LCC 15 and Attachments
- TOGs
- EMS results from but **NOT** limited to the following:

- Powerflow
- Study Time Contingency Analysis (STCA)
- Interface Limits Calculator (ILC)
- Double C

See Attachment 2 – Voltage And Reactive Resources for identifying and studying voltage support reactive devices

Common Procedure Information

A. Any ISO-NE qualified Control Room Operator has the authority to take actions required to comply with NERC Reliability Standards. A qualified ISO-NE Control Room Operator has met the following requirements:
   1. Have and maintain a NERC certification at the RC level (per R.1 of PER-003-2)
   2. Applicable Requirements of PER-005-2
   3. Approved to cover a Control Room Operator shift position by the Manager, Control Room Operations
   4. Is proficient at the current qualified level.

B. Real time operation is defined as the current hour and the current hour plus one.

C. Future hours are those beyond real time operation.

D. All verbal communications with Local Control Centers (LCC), neighboring Reliability Coordinators/Balancing Authorities (RC/BA), Designated Entities (DE), Demand Designated Entities (DDE) and/or SCADA centers shall be made on recorded phone lines unless otherwise noted.

E. For all communications:
   1. Use the Basic Protocol for All Operational Communications as prescribed in M/LCC 13.
   2. Use 'ISO New England' or 'New England'. Refrain from using 'ISO'.
   3. Use Asset ID's when communicating with DE/DDEs.
   4. Use three-part communication in all situations where its use will enhance communications.

F. Primary responsibilities are stated for each step within the procedure, but any ISO Control Room Operator qualified at that position or higher can perform the step. The Primary Responsibility may be delegated to an Operator in a lower qualified position, but the responsibility for its completion remains with the identified individual.

G. The use of “ensure” within this document means that a verification has been performed and if the item is not correct, corrective actions will be performed.

Procedure

Condition(s) to perform this section:

- **Performed nightly.**

Section 1 : Peak Case Set Up

Step 1.1 Primary Responsibility: Security Operator

Access Powerflow.

Step 1.2 Primary Responsibility: Security Operator

Ensure GENREF Options are selected.

Instructions

To select new Powerflow Options:

- ❑ Stop Powerflow [failure to stop Powerflow could result in a corrupt clone];
- ❑ Select the appropriate Option Set;
- ❑ Select "YES" in the pop up dialogue box;
- ❑ Verify Options indicated in the "Active Options Set" well are correct;
- ❑ Start Powerflow.

Notes

- The current Options Set selected will be displayed in the Active Options Set well.
- There are currently three sets of Powerflow Options:
  - CONTROL_ROOM_GENREF: used when retrieving and studying a basecase.
  - CONTROL_ROOM_RTNET: used when taking a snapshot of real time or a save case of real time
  - CONTROL_ROOM_CAJR: used when taking a snapshot of real time and studying CAJR contingencies.

Step 1.3 Primary Responsibility: Security Operator

Retrieve the next day's OSD1 save case.

Instructions

Perform the following:

- ❑ Stop Powerflow [failure to stop Powerflow could result in a corrupt clone];
- ❑ Click the "CASE DIR" button;
- ❑ Find the applicable save case from the “OUTSCHED” directory;
- ❑ Right click on the save case, then click the "Retrieve..." text;
- ❑ Click “OK”;
- ❑ Start Powerflow.

Notes

- At 1330 the D2 Outage Coordinator provides the Security Operator a turnover of the next day’s OSD1 save case. No further changes will be made to the save case by Outage Coordination.
- If a saved case is retrieved and run with the incorrect options, the saved case would need to be retrieved again.

Step 1.4 Primary Responsibility: Security Operator

Determine if the date and time in the "Time of Study:" well is correct for the save case study being performed.

Notes

The time entered should be representative of the time for which the study is being performed (typically the peak hour).

Step 1.4.1 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The "Time of Study:" is NOT correct.**

Enter a new date and time in the "Time of Study:" well.

Notes

- The date entered in the "Time of Study:" well should be the date the study is for.
- The time entered in the "Time of Study:" well should be representative of the study time (clock time **NOT** hour ending).
- Powerflow has Load Area fractional (Parent Fraction MW) values for six defined times: 0000, 0400, 0800, 1200, 1600, and 2000.
- Powerflow will interpolate a Parent Fraction MW amount, using the Parent Fraction MW values at the six times, to determine the Load Area MW values based on the NEPEX Load.
- When a time is entered in the "Time of Study:" well, Powerflow will distribute the NEPEX load to the children load areas in a linear fashion.

Step 1.5 Primary Responsibility: Security Operator

Ensure all outages (Category A and B) for the next day are modeled out of service using the one-line displays and Out List.

Instructions

- ❑ Modify breakers, disconnects, and switches (analog points) by toggling it to the desired position on the one-line display.
- ❑ Model a line or section of a line out of service that does **NOT** have analog points on the one-line by setting the remove flag for that line or section of a line on the Line tab for the Network Line/Transformer Summary display.
- ❑ Model a transformer out of service that does **NOT** have analog points on the one-line by setting the remove flag for that transformer on the Transformers tab for the Network Line/Transformer Summary display.

To modify the AVR status of a dynamic reactive resource in Powerflow:

- ❑ Click the “UNIT” button;
- ❑ Click the “MVAR and Voltage Regulation Data” tab;
- ❑ Locate the resource;
- ❑ Modify the AVR flag to the desired status.

To modify the AVR or PSS status of a dynamic reactive resource in ILC Related Devices:

- ❑ Access ILC Powerflow;
- ❑ Click on the “Related Displays” menu;
- ❑ Select “Related Devices - Runbacks/Pre-ctg info” menu item;
- ❑ Locate the item;
- ❑ Click on the status text to change the status.

Step 1.6 Primary Responsibility: Security Operator

Check the abnormal limits for the OSD1 case.

Instructions

Access the abnormal limits by clicking the “ABBR LIM” button.

Step 1.6.1 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The entered abnormal limit value is NOT correct.**

Update the entered abnormal limit value.

Step 1.6.2 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **An abnormal limit needs to be removed.**

Remove the abnormal limit.

Instructions

Remove the abnormal limit by:

- ❑ Clicking the "Restore" toggle button;
- ❑ Clicking the "Copy Branch Limit" toggle button.

Step 1.7 Primary Responsibility: Security Operator

Modify the Baker and Waltham phase shifters tap position to match the RTNET position.

Instructions

To modify phase shifter MW flow using tap position:

- ❑ Click the “LINE” button;
- ❑ Click the “Phase Shifters” tab;
- ❑ Locate the phase shifter;
- ❑ Enter the desired tap position in the “Tap” well. Use the same number for all components associated with that phase shifter.

Notes

- MW flow for a phase shifter can be modified by using a tap position value or a MW Regulation Target value. The value in the Sensitivity (MW/degree) column for the phase shifter will indicate the MW change associated with one tap position change.
- For Powerflow to accept the tap position you must use the enter key.

Step 1.8 Primary Responsibility: Security Operator

Set the Blissville, Sandbar and Saco Valley phase shifters to regulate at approximately a 0 MW float.

Instructions

To regulate to a MW value perform the following:

- ❑ Click the “LINE” button;
- ❑ Click the “Phase Shifters” tab;
- ❑ Locate the phase shifter;
- ❑ Set the AWR flag;
- ❑ Set the Manual Flag;
- ❑ Enter a Regulation Target MW value in the “MW” well;
- ❑ If desired, enter a Regulation Target Deviation value in the “Deviation” well.

Notes

- MW flow for a phase shifter can be modified by using a tap position value or a MW Regulation Target value.
- When using a MW Regulation Target, the tap position will be modified by Powerflow to attempt to make the Solved MWs as close as possible to the MW Regulation Target value +/- the Deviation value.
- For the STCA Mode “Enable Unit MVAr, phase shifter changing (maintain MW sched)” to operate properly, a phase shifter needs to be placed on AWR and a MW Regulation Target used.

Step 1.9 Primary Responsibility: Security Operator

Retrieve generator output data from the SCRA case.

Instructions

Perform the following:

- ❑ Click “SCRA COPY”;
- ❑ Enter the peak information using “hh*mmdd” format; use the quotation marks;
- ❑ Click “Import RSC Data”.

Step 1.10 Primary Responsibility: Security Operator

Run Topper.

Instructions

Run Topper by:

- ❑ Clicking the "Input Setup..." button;
- ❑ Clicking the "Reset Component Status & Rebuild Buses" button on the Input Setup display pop up;
- ❑ Clicking “OK” to close the Input Setup display pop up.

Notes

- **NOT** performing this step can cause your retrieved case to have a MW mismatch or indications of voltage issues.
- It will display "TOPPER RAN" in the "Last Result:" well.
- Clicking the “Reset Component Status & Rebuild Buses” button will: reset switching device statuses and component Restore/Remove flags and rebuild the bus model for the new state

Step 1.11 Primary Responsibility: Security Operator

Run Powerflow.

Step 1.12 Primary Responsibility: Security Operator

Enter the ISO-NE load for the expected peak hour.

Instructions

Enter the ISO-NE load as follows:

- ❑ Click the “LD AREA” button;
- ❑ Set the “Manual” checkbox for the NEPEX Load Area;
- ❑ Enter the load in the “Modeled MW” well
  - ❑ Peak Load = Load Forecast - Losses

Notes

- Peak Load Forecast obtained from the SCRA.
- Losses obtained from Network Area and Company Summary.

Step 1.13 Primary Responsibility: Security Operator

Modify the zonal load percentages.

Instructions

To manually enter the zonal load percentages published in the GRT:

- ❑ Go to the Network Load Summary by clicking the “LD AREA” button;
- ❑ Set the “Manual %” checkbox for each of the 8 load areas showing NEPEX as its parent load area;
- ❑ Enter the zonal percentage in the well that opens for each of the load areas in the “Manual MW%” column;
- ❑ Ensure that the sum of all NEPEX load area percentages add up to 100% by checking the % value for the NEPEX load area.

Step 1.14 Primary Responsibility: Security Operator

Enter peak hour schedules for neighboring areas.

Instructions

To enter schedules for a peak study case:

- ❑ Click the "AREA" button
- ❑ Click the "Area Transaction" tab

NY:

- ❑ Add ROSETON, SHOREHAM (CSC), and NRTHPORT (NNC) schedules from the SCRA
- ❑ Enter the combined NY value in the "Scheduled MW" well for NYPP

NB:

- ❑ Enter the SALBRYNB schedules from the SCRA in the "Scheduled MW" well for NBEPC

HQTE:

- ❑ Add Phase II (HQ_P1_P2) and Highgate (HQHIGATE) schedules from the SCRA
- ❑ Enter the combined HQTE value in the "Scheduled MW" well for HQ

Step 1.14.1 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The schedule for with NNC needs to modeled.**

Model the schedule for the NNC.

Instructions

Perform the following:

- ❑ Click the "LINE" button;
- ❑ Click the "Phase Shifters" tab;
- ❑ Go to the "NRTHPORT" station;
- ❑ Set the AWR flag (PS01);
- ❑ Set the Manual flag;
- ❑ Enter the MW schedule in the Regulation Target "MW" well.

Step 1.14.2 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The schedule for the CSC needs to be modeled.**

Model the schedule for the CSC

Instructions

For CSC **Exports** to NY perform the following:

- ❑ Access the HALVARSN one-line display:
  - ❑ Close the BT_PS switch, if open;
  - ❑ Open the CSCSRC_PS, if closed;
  - ❑ Open the CSCSNK_PS, if closed.
- ❑ Access the SHOREHAM one-line display:
  - ❑ Open the BT_PS N.O. switch, if closed;
  - ❑ Close the CSCSRC_PS, if open;
  - ❑ Close the CSCSNK_PS, if open.
- ❑ Click the "LD AREA" button;
- ❑ Click the "Loads" tab;
- ❑ Go to the SHOREHAM station:
  - ❑ Set the MW Man flag for CSCSRC load;
  - ❑ Set the MW Man flag for CSCSNK load;
  - ❑ Enter a negative schedule value in the CSCSRC "MW Calculated" well;
  - ❑ Enter a positive schedule value in the CSCSNK "MW Calculated" well.

For CSC **Import** from NY perform the following:

- ❑ Access the HALVARSN one-line display:
  - ❑ Open the BT_PS switch, if closed;
  - ❑ Close the CSCSRC_PS, if open;
  - ❑ Close the CSCSNK_PS, if open.
- ❑ Access the SHOREHAM one-line display:
  - ❑ Close the BT_PS N.O. switch, if open;
  - ❑ Open the CSCSRC_PS, if closed;
  - ❑ Open the CSCSNK_PS, if closed.
- ❑ Click the "LD AREA" button;
- ❑ Click the "Loads" tab;
- ❑ Go to the HALVARSN station:
  - ❑ Set the MW Man flag for CSCSRC load;
  - ❑ Set the MW Man flag for CSCSNK load;
  - ❑ Enter a negative schedule value in the CSCSRC "MW Calculated" well;
  - ❑ Enter a positive schedule value in the CSCSNK "MW Calculated" well.

Step 1.14.3 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The schedule for Highgate needs to be modeled.**

Model the schedule for Highgate.

Instructions

Perform the following:

- ❑ Click the "UNIT" button;
- ❑ Locate the "HQHI" unit (you can enter HQ in the command line and use F12 to bring up HQHIGATE);
- ❑ Enter the Highgate schedule in the "MW Output" well.

Step 1.14.4 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The schedule for Phase II needs to be modeled.**

Model the schedule for Phase II.

Instructions

Perform the following:

- ❑ Click the "UNIT" button;
- ❑ Locate the "HQP2" unit (you can enter HQ in the command line and use F12 to bring up HQ_P1_P2);
- ❑ Enter the Phase II schedule in the "MW Output" well.

Step 1.14.5 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The schedule for NB needs to be modeled.**

Model the schedule for NB.

Instructions

Perform the following:

- ❑ Click the "UNIT" button;
- ❑ For the unit "COLESON" enter one third of the NB schedule; added to the value that was originally populated and balance between the three units at COLESON in the "MW Output" well;
- ❑ For the unit "NOVASCOT"enter one third of the NB schedule; added to the value that was originally populated in the "MW Output" well;
- ❑ For the unit "EEL_RV" enter one third of the NB schedule; added to the value that was originally populated in the "MW Output" well.

Notes

- Above is the typical distribution of the NB schedule.
- Depending on the NB schedule, additional units may be required to help balance the generation dispatch in NB and prevent unsolved contingencies due to an improper reactive dispatch/voltage profile in NB.

Step 1.15 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The schedule for NB is > 700 MW and DPL needs to be armed.**

Model the DPL arming.

Instructions

Perform the following to model DPL arming:

- ❑ Click the "UNIT" button;
- ❑ Navigate to the "SALNB_T" station for the "DPL" Unit;
  - ❑ Enter the amount of DPL arming MW in the "MW Output" well for the DPL unit;
  - ❑ Enter the amount of DPL arming MW as a **NEGATIVE** value in the "MW Output" well for the DPLL unit.

Notes

The DPL arming MW value used in this step will be the same value used when setting up the DPL ARMED MW in ILC Related Devices Display (Step 2.4.1)

Step 1.16 Primary Responsibility: Security Operator

Ensure the generator/DARD pump output matches the SCRA output.

Notes

Combined Cycle generators (1x1 or 2x1) normally do **NOT** match the SCRA value.

Step 1.17 Primary Responsibility: Security Operator

Model New Brunswick Load Loss (NBLL).

Instructions

Perform the following to model NBLL:

- ❑ Click the "UNIT" button;
- ❑ Navigate to the "MOCTON" station for the NBLL unit;
  - ❑ Enter 325 in the "MW Output" well for the NBLG unit;
  - ❑ Enter -325 in the "MW Output" well for the NBLL unit.

Notes

- **NOT** performing this step can impact the limits calculated by ILC. The NBLL value is used as an adder in TOGs.
- 325 MW is the maximum native load for NB; values higher than that are driven by transaction flows with NB to HQ or NS.

Step 1.18 Primary Responsibility: Security Operator

Ensure Must Run Generation requirements are reflected in the Powerflow generation dispatch.

Instructions

Use the one-line display to close or open the breakers associated with the generator to place it in service or remove it from service.

Step 1.19 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **A dynamic reactive resource has an AVR out of service and is NOT modeled out of service.**

Update the AVR status for a dynamic reactive resource.

Instructions

To modify the AVR status of dynamic reactive resource in Powerflow:

- ❑ Click the "UNIT" button;
- ❑ Click the "MVAR and Voltage Regulation Data" tab;
- ❑ Locate the resource;
- ❑ Modify the AVR flag to the desired status.

To modify the AVR or PSS status of a dynamic reactive resource in ILC Related Devices:

- ❑ Access ILC Powerflow'
- ❑ Click on the "Related Displays" menu'
- ❑ Select "Related Devices - Runbacks/Pre-ctg info" menu item'
- ❑ Locate the item'
- ❑ Click on the status text to change the status.

Step 1.20 Primary Responsibility: Security Operator

Ensure the "Load" transformer and generator output at Nine Dragons (9DRAGONS) and Sappi Hinckly (SAPHINCK) are matched.

Notes

To match the load use COGN generator at 9DRAGONS and SPH1 and SPH2 generators at SAPHINCK.

Step 1.21 Primary Responsibility: Security Operator

Run Powerflow.

Step 1.22 Primary Responsibility: Security Operator

Balance the case by adjusting internal generation.

Notes

This is done to account for losses and to put tie lines on schedule.

Step 1.23 Primary Responsibility: Security Operator

Rename and save the peak case.

Instructions

Rename and save the peak case by:

- ❑ Changing the name of the case in the “Network Data Description” field on the Powerflow Study display;
- ❑ Clicking the “CASE DIR” button;
- ❑ Clicking the “Save” button in the CTRLROOM Case Type;
- ❑ Entering the case name in the “Case Title:” well;
- ❑ Clicking “OK”

Step 1.24 Primary Responsibility: Security Operator

Notify the Senior System Operator the peak case is ready and request a peer check.

Condition(s) to perform this section:

- **Performed nightly.**

Section 2 : Base Case and First Contingency Evaluation

Step 2.1
Primary Responsibility: Security Operator

Check for thermal and voltage base case violations.

Step 2.2
Primary Responsibility: Security Operator

Copy the NSTAR Cable limits into Powerflow ILC by clicking the "Copy Clone of RTNET ILC" button on the Powerflow Study main page.

Step 2.3
Primary Responsibility: Security Operator

Modify ILC Powerflow to match the expected conditions for the next day.

Notes

This would be, but **NOT** limited to, skipping boundaries, disabling or enabling configurations, or modifying manual limits.

Step 2.4
Primary Responsibility: Security Operator

Review ILC Powerflow summary for exceedances while noting tight interfaces and arming threshold flows.

Step 2.4.1
Primary Responsibility: Security Operator

Update the ILC Powerflow Related Devices display.

Notes

- This would be, but **NOT** limited to, SPS Arming statuses, SPS Arming amounts, AVR/PSS statuses, Chester SVC output.
- Devices with “blue” data are required to be manually updated by the Operator based on the actual value in the study case.

Step 2.5
Primary Responsibility: Security Operator

Adjust generation, reactive devices, or both to alleviate base case and ILC Powerflow exceedances.

Step 2.6
Primary Responsibility: Security Operator

Re-save the peak study case.

Step 2.7 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **If not already performed for the shift.**

Retrieve the most recent contingency database in STCA.

Instructions

To retrieve the most recent contingency database in STCA:

- ❑ Click “STCA”;
- ❑ Click the "CASE DIR" button;
- ❑ Find the most recent contingency database from the “CTGS” directory;
- ❑ Right click on the title, then click the "Retrieve..." text;
- ❑ Click “OK”.

Notes

- The STCA savecases will have a format that starts with “EMS” followed by the current EMS Model, and may also contain a letter identifier for each subsequent revision of the database.
- This ensures all contingencies are active and being evaluated when performing studies.

Step 2.8 Primary Responsibility: Security Operator

Copy the peak study case to STCA.

Step 2.9 Primary Responsibility: Security Operator

Select the appropriate “Active Mode:” for the pass being performed.

Instructions

From the Solution Controls field:

- ❑ First pass select: “Default mode”
- ❑ Second pass select: “Enable Unit MVAr Control”
- ❑ Third pass select: “Enable Unit MVAr, Phase shifter changing (maintain MW sched)”

Notes

“Default mode” is the normal selection.

Step 2.10 Primary Responsibility: Security Operator

Ensure the appropriate Start is selected.

Notes

The Start selections are:

- Non Flat Start (normally selected)
- Flat Start

Step 2.11 Primary Responsibility: Security Operator

Ensure STCA SPSs are enabled and run STCA.

Instructions

Verify the following from the RAS/ACS Directory display:

- ❑ SPS’s are “ENABLED”;
- ❑ Reclosure: “ENABLED”;
- ❑ ECCS/Voltage: “ENABLED”;
- ❑ CBL: “ENABLED”

Step 2.12 Primary Responsibility: Security Operator

Check for unsolved contingencies, solve in Powerflow and document the reason for the unsolved for turnover.

Instructions

Refer to CROP.34007 Contingency Analysis "Respond to an Unsolved Contingency" as needed.

Step 2.13 Primary Responsibility: Security Operator

Check for thermal and voltage contingency violations.

Step 2.14 Primary Responsibility: Security Operator

Return to Step 2.8 to copy the peak study case in to STCA and run STCA using the second pass in Step 2.8.

Step 2.15 Primary Responsibility: Security Operator

Return to Step 2.8 to copy the peak study case into STCA and run STCA using the third pass in step 2.8.

Step 2.16 Primary Responsibility: Security Operator

Return the STCA "Active Mode:" to the Default mode and re-run STCA.

Step 2.17 Primary Responsibility: Security Operator

Determine the associated adjustment and distribution factors for the contingencies presented.

Notes

- Δ is equal to the Post value - Pre Value
- Adjustment Factor = Δ Generation MW Adjustment / Limiting Element Δ MVA Flow
- Distribution Factor = Limiting Element Δ MVA Flow / Contingent Element MVA Pre Flow
- If required, adjust reactive resources to maintain OP-19 voltage criteria for the post contingent solution.

Step 2.18 Primary Responsibility: Security Operator

Determine and document the pre/post contingent actions required and retain for turnover.

Step 2.19 Primary Responsibility: Security Operator

Evaluate potential DRR restrictions in the same dispatch zone as the generator/DARD pump restrictions.

Instructions

Refer to CROP.45002 Auditing as needed for use of STDR.

Step 2.20 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **Generator/DARD pump restrictions identified.**

Notify the required personnel of resource restrictions.

Instructions

Notify the following:

- ❑ Operations Shift Supervisor
- ❑ Senior System Operator
- ❑ Forecaster

Notes

The Senior System Operator will communicate any necessary restrictions to the Forecaster for capacity analysis assumptions.

Step 2.21 Primary Responsibility: Security Operator

Print the results of Powerflow base case, ILC Powerflow, STCA using Default mode and STCA using Enable Unit MVAr Control mode for turnover.

Notes

Retain the current and previous calendar month study cases.

Condition(s) to perform this section:

- **Performed nightly.**

Section 3 : Double Contingency Evaluation

Step 3.1

Primary Responsibility: Security Operator

Perform Double Contingency studies.

Instructions

Double Contingency studies are performed in accordance with CROP.34001 Double C Confidential.

Step 3.2

Primary Responsibility: Security Operator

Log GRT Limit Changes.

Instructions

Use log entry: > Transmission > GRT LIMIT CHANGES > All Interfaces

Condition(s) to perform this section:

- **Performed for an area when a transmission element goes out of service that would affect the transfer limit.**

Section 4 : North-South Evaluation

Notes

With the addition of the 3124 line the North-South only needs to be performed when any of the following are out of service: 326, 394, 397, or 3124. The intent of this evaluation is to ensure the operating team will be prepared to respond to the contingency with recommended actions in order to maintain system reliability in accordance with OP-19 criteria.

Step 4.1

Primary Responsibility: Security Operator

Retrieve the appropriate Powerflow case.

Step 4.2

Primary Responsibility: Security Operator

Remove the most limiting element from service per the contingency definition.

Instructions

If the 3124 is out of service, remove the 326-1 line from service by opening the terminal breakers at Scobie Pond and the 26-J1 disconnect at Lawrence Road.

Notes

- This will leave the load at Lawrence Road to be fed from the 326-2 line, which has been evaluated to be the worst case scenario.
- Under most system conditions, L/O the 326 line will be limiting. Operators should monitor for other, more limiting contingencies, during line out conditions.

Step 4.3

Primary Responsibility: Security Operator

Access and run ILC Powerflow.

Step 4.4

Primary Responsibility: Security Operator

Determine if the Seabrook-South interface limit has been exceeded.

Step 4.4.1

Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **If the Seabrook-South interface limit has been exceeded.**

Adjust generation, External Transactions, or both north of the Seabrook-South interface.

Standard(s) for completion:

- Generation or tie-line reductions shall continue until the interface limit is **no** longer exceeded.

Instructions

Determine which Newington/Seabrook area generation provides the greatest relief.

Notes

Use the applicable TOGs while performing this step.

Step 4.5 Primary Responsibility: Security Operator

Utilize STCA and ILC Powerflow to determine the most limiting contingency.

Instructions

- ❑ Specifically look for a contingency that causes an element to exceed STE post contingent.
- ❑ Ensure that any unsolved contingencies associated with the study area are addressed. (It is possible that the unsolved contingency could be the most limiting contingency.)

Step 4.6 Primary Responsibility: Security Operator

Remove the most limiting contingency from service in the Powerflow case.

Step 4.7 Primary Responsibility: Security Operator

Adjust generation, external transactions, phase shifters, or all until the element is under the STE limit.

Standard(s) for completion:

- Adjustments shall continue until STE is **no** longer exceeded.

Instructions

- ❑ Determine which Generation provides the greatest relief.
- ❑ Modify tap settings on PV-20 and the Granite, Waltham, or Baker Street phase shifters to help alleviate North-South overloads.

Notes

Use the applicable TOGs while performing this step. Failure to accomplish the required Generation reductions could cause a stability limit violation.

Step 4.8 Primary Responsibility: Security Operator

Restore the most limiting contingency to service.

Step 4.8.1 Primary Responsibility: Security Operator

Check the Powerflow base case for elements over the Normal limit.

Step 4.8.2 Primary Responsibility: Security Operator

Utilize ILC Powerflow to determine if any interface limit is exceeded.

Step 4.8.3 Primary Responsibility: Security Operator

Utilize STCA to determine if any element is over STE post contingent.

Step 4.8.4 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **An element is over the Normal limit in the Powerflow base case; Or**
- **An interface limit is exceeded ILC Powerflow; Or**
- **STCA indicates an element over STE post contingent.**

Return to Step 4.6.

Step 4.9 Primary Responsibility: Security Operator

Record all actions required to mitigate any North-South or STE exceedance for turn over to the oncoming shift.

Step 4.10 Primary Responsibility: Security Operator

Notify the Senior System Operator and Operations Shift Supervisor of the actions required to mitigate any North-South or STE exceedances.

Condition(s) to perform this section:

- **398 or 312/393 345kV tie line is OOS; Or**
- **System conditions require calculation of a nuclear source backdown.**

Section 5 : Nuclear Source backdown Evaluation

Step 5.1

Primary Responsibility: Security Operator

Retrieve the appropriate Powerflow case.

Step 5.2

Primary Responsibility: Security Operator

Adjust the phase shifting transformers in the power flow case.

Instructions

- ❑ Sandbar and Blissville set to regulate at approximately 0 MW;
- ❑ NNC set to SCRA schedule.

To regulate to a MW value perform the following:

- ❑ Click the “LINE” button;
- ❑ Click the “Phase Shifters” tab;
- ❑ Locate the phase shifter;
- ❑ Set the AWR flag;
- ❑ Set the Manual Flag;
- ❑ Enter a Regulation Target MW value in the “MW” well;
- ❑ If desired, enter a Regulation Target Deviation value in the “Deviation” well.

Notes

- When using a MW Regulation Target, the tap position will be modified by Powerflow to attempt to make the Solved MWs as close as possible to the MW Regulation Target value +/- the Deviation value.
- For the STCA Mode Enable Unit MVAr, Phase shifter changing (maintain MW sched) to operate properly, a phase shifter needs to be placed on AWR and a MW Regulation Target used.

Step 5.3

Primary Responsibility: Security Operator

Adjust the New York - New England Schedule to 0 MW.

Step 5.4

Primary Responsibility: Security Operator

Remove the remaining 345kV NY-NE tie line from service per the contingency definition.

Step 5.5

Primary Responsibility: Security Operator

Utilize STCA to determine the most limiting contingency.

Instructions

- ❑ Determine whether nuclear units cause the NNC to exceed STE post contingent.
- ❑ Ensure that any unsolved contingencies associated with the study area are addressed. (It is possible that the unsolved contingency could be the most limiting contingency).

Step 5.6 Primary Responsibility: Security Operator

Condition(s) to perform this step:

- **The NNC exceeds STE post contingent and reliability loop flow is available on the NNC.**

Adjust the NNC to reflect the appropriate amount of agreed upon reliability loop flow.

Notes

- Ensure the TTC is not exceeded.
- The MW value of reliability loop flow used will appear as a Net Import on the New York - New England Interface in ILC.

Step 5.7 Primary Responsibility: Security Operator

Adjust nuclear units, while returning the interchange deviation with NYISO to zero until the element is under the NNC STE limit.

Standard(s) for completion:
Adjustments shall continue until NNC STE is no longer exceeded.

Notes

PV-20 schedule of 0MW is the conservative method. Unless there are outages restricting the utilization of the PV-20 phase shifter it should be considered when alleviating STE exceedances.

Step 5.8 Primary Responsibility: Security Operator

Record all actions required to mitigate NNC STE exceedances for turn over to the oncoming shift.

Step 5.9 Primary Responsibility: Security Operator

Notify the Senior System Operator and Operations Shift Supervisor of the actions required to mitigate NNC STE exceedances.

Condition(s) to perform this section:

- **Performed nightly.**

Section 6 : Administrative

Step 6.1 Primary Responsibility: Security Operator

Review generator startups and shutdowns in the COP for significant changes in generation pattern.

Step 6.1.1 Primary Responsibility: Security Operator

Access the saved peak case.

Step 6.1.2 Primary Responsibility: Security Operator

Update generator/DARD pump output to match the COP output.

Instructions

- ❑ Use the one-line display to close or open the breakers associated with the generator to place it in service or remove it from service.

To modify the MW output of a generator:

- ❑ Click the "UNIT" button; MW Data is the default tab;
- ❑ Locate the generator;
- ❑ Enter the desired MW amount in the generator "MW Output" well.

Notes

For Powerflow to accept the MW value, you must use the enter key.

Step 6.1.3 Primary Responsibility: Security Operator

Run Powerflow.

Step 6.1.4 Primary Responsibility: Security Operator

Balance the case by adjusting internal generation.

Step 6.1.5 Primary Responsibility: Security Operator

Rename and save the second peak case.

Step 6.1.6 Primary Responsibility: Security Operator

Perform Section 2 - Base Case and First Contingency Evaluation.

Step 6.2 Primary Responsibility: Security Operator

Review all outage applications.

Instructions

Review all outage applications by performing the following:

- ❑ Accessing the "Studies" tab;
- ❑ Reviewing the Short Term ISO and LCC study results;
- ❑ Use log entry: > OUTAGES > Transmission and Generation Outage Apps Reviewed.

Step 6.3 Primary Responsibility: Security Operator

Review the previous day outages.

Notes

The previous day outages are reviewed to verify the outages scheduled to start or end have been properly updated with start/stop times or have been checked as overrun.

Step 6.3.1 Primary Responsibility: Security Operator

Update the start or end time.

Step 6.3.2 Primary Responsibility: Security Operator

Overrun the outage.

Notes

Example 1 - **NOT** an Overrun:

Outage has a Planned End Date/Time = 3/4/2019 @ 1600
Security Desk gets call from LCC on 3/4/2019 @ 1500 that the outage will extend until 2300.
This is **NOT** an Overrun. Do **NOT** set the Overrun flag in the ISO Outage Scheduling software.

Example 2 - An Overrun:

Outage has a Planned End Date/Time = 3/4/2019 @ 1600
Security Desk gets call from LCC on 3/4/2019 @ 1500 that the outage will extend until 3/5/2019 @ 1200
This is an Overrun. Set the Overrun flag in the ISO Outage Scheduling software and note in the outage request an expected planned end date and time and then change the Planned End Date Time.

Step 6.4 Primary Responsibility: Security Operator

Perform next day reviews with the applicable entities.

Standard(s) for completion:

- Completed by 0300 unless mitigating circumstances prevent it (e.g. overnight real time reliability related events).

Step 6.4.1 Primary Responsibility: Security Operator

Review and discuss transmission outages to implement and/or return with the LCCs and applicable neighboring RCA/BAAs to verify that all parties are up to date on work times for switching and equipment work as well as any changes to GRT limits.

Step 6.4.2 Primary Responsibility: Security Operator

Discuss next day study results with the applicable LCC Operator and the applicable neighboring RCA/BAAs per MLCC 13.

Instructions

Refer to MLCC 13 ISO and LCC Communications Practices “Next Day Study Results”

Step 6.4.3 Primary Responsibility: Security Operator

Log the completion of the next day study results discussion.

Instructions

- ❑ Use log entry: > Outages > Next Day Review Complete;
- ❑ Identify the entities contacted;
- ❑ Time each review was complete;
- ❑ If unable to complete reviews by 0300, provide reasoning in the comments field.

Notes

When annotating “Time each review complete”, be sure to use the approximate time the phone call was made and not just the log entry time.

Revision History

Rev. No.	Date (MM/DD/YY)	Reason	Contact
--	11/06/19	For previous revision history, refer to Rev 16 available through Ask ISO	Steven Gould
17	11/25/19	Corrected step 1.9; Administrative changes in step 4.2 and 5.2.	Steven Gould
18	01/03/20	Replaced “Catalyst” with “Nine Dragons” in step 1.20.	Steven Gould
19	02/18/20	Replaced “Catalyst” with “Nine Dragons” in Attachment 1.	Steven Gould
20	03/03/20	Added more detail in step 1.20 and Attachment1 for 9DRAGONS and SAPHINCK	Steven Gould
21	10/30/20	Adjusted times in Step 1.4.1, Adjusted outage review process in Attachment 1	Steven Gould
22	06/15/21	Updated References and Background Information, Moved information in 2.8 & 2.9 to the Background Information; Clarified Steps 1.14.5, 1.15 & 1.17, Added notes to 2.4.1; Added instructions in 2.11, Corrected title in Step 3.1 Instructions; Updated Step 6.2; Corrected Step 6.5 from notes to instructions.	Steven Gould
23	07/20/21	Updated Steps 1.15 and 1.17 based on changes toEMS model; added instructions to Step 2.10, Added new Step 2.15;moved some background information to new Attachment 2; reformatted the TOC	Steven Gould
24	02/07/23	Added information to Procedure Background; Updated Step 2.10 with Tillson SPS retirement; Updated Step 2.19; Deleted Step 4.3 as SPS’s have been retired; Added information to Attachment 2	Jonathan Gravelin
25	05/15/23	Modified Step 6.4 and converted to Step 6.4.1, Converted Step 6.5 into Step 6.4.2; Created Step 6.4.3; Deleted Table from Attachment 1 with creation of new log entry that captures all required information.	Jonathan Gravelin
26	06/20/24	Added information to Procedure Background, Added Step 2.7 & 1.24, modified language in Step 6.4.1, Updated Attachemnt 1.	Jonathan Gravelin

Attachment 1 - Nightly Studies Checklist

Peak Case Setup

- ☐ Retrieve "CONTROL_ROOM_GENREF" Powerflow Options [must stop Powerflow before retrieval]
- ☐ Retrieve the next day's OSD1 save case [must stop Powerflow before retrieval]
- ☐ Update the "Time of Study:" with the peak hour (ex: 01/20/14 1700:00), if **not** correct
- ☐ Check details page versus peak/tomorrow outage list
- ☐ Check Out List and one-line for peak/tomorrow work + Category B jobs.
- ☐ Include any outages that occurred after the 1330 turnover that are not in the next day's OSD1 save case.
- ☐ Check ABBR LIMs.
- ☐ Set Baker and Waltham phase shifters to the same position as RTNET.
- ☐ Adjust Blissville phase shifter to (approximately) a 0 MW float.
- ☐ Adjust Sandbar phase shifter to (approximately) a 0 MW float.
- ☐ Adjust Saco Valley phase shifter to (approximately) a 0 MW float.
- ☐ Retrieve generator output data from the SCRA using "hh*mmdd" format
- ☐ Run Topper
- ☐ Run Powerflow
- ☐ Input load into Load/Area (Load=Load Forecast-Losses); Losses obtained from "Network Area and Company Summary"
- ☐ Modify the zonal load percentages; must equal 100.00%
- ☐ Enter peak hour schedules for neighboring areas
- ☐ Check NNC on Network Line/Transformer Summary
- ☐ Check CSC on Load Summary
- ☐ Input transactions for HQ and NB into UNIT
- ☐ Model DPL arming as applicable
- ☐ Ensure the generator/DARD pump output matches the SCRA output
- ☐ Model NBLL
- ☐ Check Must Run units
- ☐ Update generator AVR status for each generator with an AVR OOS on UNIT_MVAR display.
- ☐ Ensure the "Load" transformer and generator output at 9DRAGONS (COGN) and SAPHINCK (SPH1 & SPH2) are matched.
- ☐ Run Powerflow
- ☐ Balance the case by adjusting internal generation
- ☐ Rename and save the peak case
- ☐ Notify the Senior System Operator the peak case is ready and request a peer check

Base Case and First Contingency Evaluation

- ☐ Check Powerflow Base Case violations
- ☐ Copy the NSTAR Cable limits into Powerflow ILC by clicking the "Copy Clone of RTNET ILC" button on the Powerflow Study main page
- ☐ Modify ILC Powerflow to match the expected conditions for the next day
- ☐ Review ILC Powerflow summary for exceedances while noting tight interfaces and arming threshold flows
- ☐ Update the ILC Powerflow Related Devices display
- ☐ Adjust generation, reactive devices, or both to alleviate base case and ILC Powerflow exceedances
- ☐ Re-save the peak study case
- ☐ If not already performed for the shift, retrieve the most recent STCA CTG Database

- ☐ Copy the peak study case to STCA
- ☐ Select the appropriate Active Mode and Start selection
- ☐ Ensure STCA SPSs are enabled and run STCA
- ☐ Check for unsolved contingencies. Solve in Powerflow if unsolved and document reason
- ☐ Check for thermal and voltage contingency violations
- ☐ Determine and document the adjustment and distribution factors for the contingencies presented
- ☐ Determine and document the pre/post contingent actions required
- ☐ Any resource restrictions notify Loader Operator, Senior System Operator, and Operations Shift Supervisor
- ☐ Print the results of Powerflow base case, ILC Powerflow, STCA using "Default" mode and STCA using "Enable Unit MVAr Control" mode for turnover

Double Contingency Evaluation

- ☐ Perform Double Contingency studies in accordance with CROP.34001 Double C
- ☐ Ensure Line/Gen limits are **NOT** exceeded: Boston 4600, SWCT 2700, CT 3400

North-South Evaluation

- ☐ Perform a North-South Evaluation in accordance with Section 4 of this CROP

Nuclear Source Backdown Evaluation

- ☐ Perform a Nuclear Source Backdown Evaluation in accordance with Section 5 of this CROP

Administrative

- ☐ Review generator startups and shutdowns for significant changes in generation pattern, which may have occurred (especially during seasons where significant day and evening peak loads occur). If significant changes in generation patterns have occurred then a 2nd peak case should be prepared, analyzed and saved as necessary
- ☐ Review all Generation and Transmission outage applications for the Operating Day being Studied, log when complete
  - ☐ > OUTAGES > Transmission and Generation Outage Apps Reviewed
- ☐ Review the previous day outages to verify the outages scheduled to start or end have been properly updated with start/stop times or have been checked as overrun
  - ☐ Refer to CROP.32001 Transmission Outages for "Delay in the Completion of an Outage"
- ☐ By 0300 review and discuss the following:
  - ☐ Current and upcoming transmission outages with the LCCs and applicable neighboring RCA/BAAs to verify that all parties are up to date on work times for switching and equipment work as well as any changes to GRT limits
  - ☐ Next day study results per MLCC 13
  - ☐ Log the completion of the next day study results and transmission outage review discussion

    > OUTAGES > Next Day Review Complete

Name of Security Operator: _____

Date: _____

Attachment 2 - Voltage and Reactive Resources

- The word Unit is inclusive to all dynamic reactive equipment found under the "UNIT" display in EMS applications Powerflow, STCA, RTNET, RTCA and CAJR.
- The word Shunt is inclusive to all static reactive equipment **NOT** providing dynamic reactive reserve. E.g.: shunt capacitors, shunt reactors, variable reactors, and LTCs without automatic control
- When examining an area for voltage issues, assess the likely worst reactive contingencies for consideration. They typically will be:
  - Loss of largest shunt reactive devices (capacitors or reactors)
  - Loss of dynamic VAR device, if putting out reactive power near limit (lag or lead, and a significant amount)
  - Loss of very heavily loaded transmission elements (lines or transformers) in an export area or heavily loaded transmission corridor
  - Loss of the largest generator in an importing area near its import limit
  - Loss of a heavily loaded 345 to 115 kV transformer, if it is the only connection from 345 kV to 115 kV at that station
- Dynamic reactive reserve is used to automatically respond when contingencies occur.
- The proper use of Static devices allows dynamic reactive resources to have sufficient reactive reserves to respond during contingencies.
- If you are facing a post-contingent low voltage condition, maximize your pre-contingent lagging reserve in your dynamic devices. If you are facing a post-contingent high voltage condition, maximize your pre-contingent leading reserve in your dynamic devices.
- All situations are different and all available normal actions should be considered for responding to voltage issues. Using shunt devices will **NOT** always be the first action. In some situations, modifying a generator reactive output or voltage schedule is the correct action to take.
  A deviation between the RTCA and CAJR voltage solution results is an indication that pre-contingent actions may be required.
- Capacitors provide lagging VAr support that will raise bus voltage.
- Reactors provide leading VAr support that will lower bus voltage.
- In EMS a lagging VAr value is positive and a leading VAr value is negative.

In the ISO RRM tool:

The ISO RRM tool is accessed via Powerflow by clicking the "ISO RRM" button

- Units
  - Generators are required to be on-line with > 0 MW to have leading or lagging reserve calculated.

- Shunt Capacitors
  - When off-line, it will have a Lagging Capacity value equal to the nominal value.
  - When on-line, it will have a Leading Reserve value equal to the absolute value of the current MVAr output.

- Shunt Reactors
  - When off-line, it will have a Leading Capacity value equal to the nominal value.
  - When on-line, it will have a Lagging Reserve value equal to the absolute value of the current MVAr output.

- Variable Reactor
  - The Leading Reserve value is the difference between the MVAr output and the Leading Nominal MVAr value.
  - The Lagging Reserve value is the absolute value of the MVAr value or the nominal value, whichever is least.

Powerflow modifications available for studying effects of reactive resources:

To place a shunt device in or out of service:
- ❑ Click the “CAP” button
- ❑ Locate the shunt device
- ❑ Modify the “Remove” flag to place the shunt device in-service or OOS.
- ❑ Toggle the breaker to the desired position on the one-line display.

To modify the AVR status of a shunt device:
- ❑ Click the "CAP" button
- ❑ Click the "Voltage Regulation Data" tab
- ❑ Locate the shunt device
- ❑ Modify the AVR flag to the desired status.

NOTE: **NOT** all shunt devices have the ability to be placed on AVR, refer to the NX9B information to verify equipment with “Voltage Sensing” capability.

Verify that the Transformer is an LTC. The top well is for the LTC setting, which is modifiable. The bottom is the fixed position setting in the field, **NOT** to be modified. Refer to the NX9B information to verify the transformer type, LTC transformers identified as “Fixed” cannot be tapped.

To modify the AVR status of an LTC or Variable Reactor:
- ❑ Click the "LINE" button
- ❑ Click the "Transformer Regulation" tab
- ❑ Locate the equipment
- ❑ Modify the AVR flag to the desired status.

To modify the tap position of an LTC or Variable Reactor:
- ❑ Click the "LINE" button
- ❑ Click the "Transformers" tab
- ❑ Locate the equipment
- ❑ If the “Tap” well is **NOT** enterable, remove the AVR flag as described above,
- ❑ Enter the desired tap position in the “Tap” well.

NOTE: For Powerflow to accept the tap position you must use the enter key. In some situations it is preferable to leave the AVR ON for those devices with the AVR flag normally set and modify the voltage schedule in order for STCA to utilize the AVR capability. The study should reflect how the LTC will be utilized in real time.

To modify the voltage schedule of a transformer:
- ❑ Click the “LINE” button
- ❑ Click the “Transformer Regulation” tab
- ❑ Locate the transformer
- ❑ Set the manual flag for “Regulation Target”
- ❑ Enter the target voltage in the “Voltage P.U.” column

To modify the AVR status of a dynamic reactive resource:
- ❑ Click the "UNIT" button
- ❑ Click the "MVAR and Voltage Regulation Data" tab
- ❑ Locate the dynamic reactive resource
- ❑ Modify the AVR flag to the desired status.

To modify the MVAr output of a dynamic reactive resource:

- ❑ Click the "UNIT" button
- ❑ Click the "MVAR and Voltage Regulation Data" tab
- ❑ Locate the dynamic reactive resource
- ❑ If the AVR flag is set, remove the AVR flag
- ❑ Enter the MVAr value in the Output well. Ensure you enter a value that is within the Min and Max range indicated

NOTE: In some situations it is preferable to leave the AVR ON for dynamic reactive devices and modify the voltage schedule in order for STCA to utilize the AVR capability. The study should reflect how the dynamic reactive device will be utilized in real time.

To modify the voltage schedule of a dynamic reactive resource:

- ❑ Click the “UNIT” button
- ❑ Click the “MVAR and Voltage Regulation Data” tab
- ❑ Locate the dynamic reactive resource
- ❑ Set the flag for “Target Voltage Manual”
- ❑ Enter the target bus voltage in the “Target Bus Voltage P.U. V” column

NOTE: OP12B TOG field is meant to identify a unit that has a TOG associated with it, and should **NOT** be dispatched outside their voltage tolerance band if a calculated **STABILITY** limit is present (that is not +/- 99999) unless authorized by the Real Time Studies Group, for example:

- A unit that is associated with a TOG that is an ‘adder’ for the TOG located within an all lines in area, or
- A unit that is an ‘adder’ for a line out condition, or
- A unit that is behind an interface that has an active stability configuration, or
- The unit is currently restricted by an associated TOG.

To modify the voltage schedule at Sandy Pond:

NOTE: In order to accurately model MVar adjustments at Sandy Pond since the removal of the reactive devices in Powerfow, the HQP2 Unit MVar Output must be utilized.

- ❑ Contact NGrid to determine the availability of the Capacitor and Reactor Banks at Sandy Pond
- ❑ Click the “UNIT” button
- ❑ Click the “MVAR and Voltage Regulation Data” Tab
- ❑ Navigate to the “HQ_P1_P2” Station for the “HQP2” Unit
- ❑ Verify the AVR flag is NOT set
- ❑ Utilizing the “Sandy DC Overview” display at Sandy Pond in SCADA as a reference for Capacitor and Reactor capability:
  - ❑ Adjust the MVar output of the HQP2 Unit in step increments based on the reactive device chosen from the Sandy DC Overview.