

Roll Call

Babak Enayati, NGrid

Mike Conway, Borrego

Zach Nicoll, Borrego

Mike Coddington, NREL

Paul Krell, Unitil

John Bonazoli, Unitil

Chris Riffle, Unitil

Cindy Janke, WMECO

Mike Brigandi, NSTAR

Bob Andrew, NSTAR

Jack Habib, NSTAR

John Texeira, NGrid

Brian Ritzinger, DPU Engineering

Ghebre Daniel, DPU Engineering

Sarah Herbert, DPU

Nancy Stevens, DPU

Tim Roughan, NGrid

Laura Bickel, NGrid

Sky Standfield, IREC

The meeting kick off by Babak and introduction

9AM-9:10AM

DPU address, Nancy- circuits close to saturation was due June 30, 2015 - no utility submitted information on circuit hosting and approach of capacity. DPU request was informal at the last meeting, but DPU fully expected delivery.

JH - Eversource, utility information is sensitive and cannot be shared on an informal basis - utility infrastructure information is publically redacted - To share this info, must be done on a adjudicatory basis

NS - concern with precedent set by Unitil. Utilities did not share data privacy concerns. Can be requested on a formal basis, but would like to keep the open flow of information within the TSRG.

BE - utility-only subgroup to present at today's meeting. Group did meet in the interim.

July 8 deliverables:

Eversource interconnection guideline

Reverse Power Flow standard (submitted)

Unitil interconnection guidelines draft (submitted)

1. **IEEE 1547 revision status update**

9:10AM-9:30AM

Babak update - 1547 update slides presented - voltage reg, ride through, Vreg modes

Paul K/Bob A: Voltage ride through limited to voltage sags - should not ride through for anti-islanding. Can V ride through desensitize anti-islanding detection? Frequency ride through is more of a concern because anti-islanding detection schemes are freq-based.

UL1741 has a rep at the meetings that attends meetings so UL testing will be coordinated with 1547 changes. 1741 and 1547 have been "harmonized" - MCoddington

MConway - CA Rule 21 adopting SIWG as minimum technical requirements for interconnection - Do MA utilities have a roadmap for adopting 1547 functionalities? We have a significant runway before IEEE1547, we know what it's going to entail -there's an opportunity for this group to take advantage of this and adopt early

Mike Coddington - **next meeting agenda item**, consider SIWG recommendations for CA - when is it right for MA to think about adopting upcoming IEEE1547 operating

Tim Roughan - tariff mandates that "current standard" is used, so per Tariff utilities will have to comply with new 1547 the day it comes out

2. **Supplemental Review Voltage/PQ and Safety/Reliability Screens 9:30AM-11:30AM**

NREL and EPRI creating fairly complex set of supp review screens - will make public in a few weeks, ready for **next MA meeting - Action item for Mike Coddington**

Sky - Additional screens will sit on top of existing Fast Track/Expedited screens - so if the existing screens fail, it will move to new NREL/EPRI screens before full SIS - consider impedance, distance, etc

- Each utility will present the details of each screening/rule of thumb that is being used for the supplemental review (protection, power quality, etc).

Power Quality Screen

Ngrid John T -

Some projects can fail first 11 Tariff screening questions (*Q2, 15% peak rule is a good example*) and stay in Expedited with no Supp Review

Supp Review is used to answer the three screening questions, if they can't be answered in 30hrs

Or -answer a very specific question - 35kV underground project, odd-ball construction estimates, etc -can't be completed in 30 hrs

100% min load screen (*not a valuable screen in practice*) - Never kicked a project to SIS for that - 150% is more indicative - Unless it creates reverse power flow concerns, for 3V0, etc.

Mini load flow study -

full on/full off at peak load and min load voltage delta, **2% is the limit in most cases**. 3% will likely kick it to full SIS.

flicker module in Cym (long term dynamics)

Full SIS flicker stud process = kW output from NGrid Haverill PV site on a cloudy day. 10sec data. Input load shape for feeder load - run long term dynamics module for voltage deltas. Plot that data and overlay with GE irritation chart

Protection/coordination model - less on protection, less impact on existing fusing. Anti-islanding screening. Anti-islanding studies becoming more common with multiple inverter manufacturers on the same feeder.

1547/UL looking at standardizing anti-islanding detection scheme.

Ngrid looking at an intermediate Anti-Islanding screen between the Sandia screen and full Matlab Simulink Risk of Islanding study.

Babak - seems like there is still a lot of engineering discretion - we're trying to move towards a more quantitative process

Unitil - John B

Full-on / Full-off - using 2% voltage delta as a limit - if it fails, it goes to full SIS

Stiffness Factor from existing protection model. Fault current of aggregate generation vs system fault current at PCC

NSTAR – Bob A

Full on/ Full off flicker at 2% limit

Stiffness factor is primary. Approximation of system fault current vs agg DG

Stiffness can be surrogate for flicker

Quick screen for thermal issues

Expedited with Supplemental has been used as a vehicle for answering tough questions that take more time than the 30hrs - field surveys, common with constructibility questions, etc

Action Item = NSTAR to send around stiffness factor bands

WMECO - Cindy

Supp Reviews have been used to design system modifications and keep the project in the Expedited Track

Aggregate Gen on line segment/circuit, types of generation, load:gen ratio

Load:Gen used for RPF at line regulators and changing regulator controls and DTT for islanding

Online tool to check for voltage rise at POCC and with surrounding customers (6% limit)

Circuit model in Synergy can be used

Min load/Peak full on, full off

GE flicker curve with 2% for multiple customers on xfmr, for sole customer on xfmr 2.5% is acceptable

- Non-utility members will be asked to provide their thoughts
- Q&A

Action item - Mike to move full-on/full-off 2% into TSRG common guideline as a draft change

Safety/Reliability ~ System Protection

Ngrid

Recloser and relaying requirements from TSRG guideline

500kW and above requires effective grounding

High aggregate DG penetration on the same feeder

Major issues with customer one-line - drives rework

Major issues with protection - drives rework

Islanding screen

Unitil

Supervisory reclosing (checks for voltage) at mainline reclosers - Reclosing time and coordination with DG tripping

1MW requires recloser drives coordination study - 1MW is going to go to a full impact study

Protective requirements are handled during the impact study

consider recloser settings/open times as system modification indicator

Eversource

Protection requirements are used to dictate Expedited vs Standard

UL1741 listed inverters

If it stays in Supplemental, a full settings review and coordination study is needed

Eversource releases PCC thevenin equivalence and upstream device settings - requires PE stamped coordination study

- **Utility-only subgroup action items and deliverable on the circuit hosting capacity 11:30AM-12PM**

DPU is trying to get a sense of whether this is a widespread issue or isolated. DPU will have to meet with commission and explain that the utilities did not deliver the requested information.

TR - it's a cost-sharing issue, not a technical issue - Tariff prevents DG<25kW from shouldering utility cost (other than service xfmr upgrades)

MC - This has happened in other service territories, and it will continue to happen. It's a product of natural development habits and market forces. NGrid and NSTAR interconnect large DG at the maximum kW size without upgrades. Then rooftop comes online and crosses that threshold.

DPU to give clear direction on deliverable from utilities

Action Item: Next Agenda - hosting capacity

4. **Lunch 1PM 12PM-**
5. **Significant vs moderate change 2PM 1PM-**

Review of proposed language from NUP and Utilities Party
DG would like to protect the ability to move between contiguous sites with the same landowner
Utility discretion, but here are some examples:

Action item: Babak and Mike to propose new language for 9/23 meeting – circulate the week prior.

Next Agenda: Significant and Moderate

6. **Eversource Reverse Power Flow** **2-2:30**
PM

Consistent policy between MA, CT, NH
RPF is occurring in Eastern MA, Western MA, and CT - Not NH (yet)
Most utility buy variations of IEEE C57.91 transformer spec
RPF is permitted in general - ensuring voltage control on both windings is the primary concern
LTC is the main secondary voltage control - Beckwith M-2001D and M-0239B backup controller will be required. LTC's lock in place when they see RPF.
(what's involved? Any HV equipment? \$20k-50k)
Up to transformer loading criteria (may vary company to company) Eversource - full capacity LTC's - 75% - full nameplate depending on type
Transmission temporary faults - xfmr de-energizing and re-energizing. Voltage fluctuation may introduce other restrictions.
LTC control was locked then the DG trips off, will it be tapped in the right position? Could limit the amount of backfeed that could be carried through the transformer some percentage of nameplate instead of full nameplate
For unknown/unsupported/defunct manufacturers, Eversource is still going back to manufacturers looking for responses, however RPF IS now acceptable on these transformers

Yet to be fully considered by Eversource

- Bidirectional metering

Action item - Mike to update common guideline and matrix with new NSTAR policy

• **Discussion on each utility's interconnection guideline.** **2:30PM-**
3:00PM

Ngrid
ESB 756C update - 59N requirement and VT's are being removed - Target Sept 1
Action item - John to circulate for 9/23

Eversource
Effort underway, standardizing across MA, CT, NH is slowing the process
Action item - Eversource MA to circulate for 9/23 - hoping for full Eversource

Unitil
Draft delivered

5.10 of document indicated Delta high side is preferred, TSRG Matrix indicated effective grounding through Wye-g x delta xfmrs.

Action item - John B to reconcile these two for next meeting

Coddington - Next agenda, discuss flicker standards - review EPRI and other studies for next meeting

8. **Open Discussion**
PM

3-3:30

Group Study - pilot program going off - but on different developers, no group studies are moving forward yet