

Preliminary (A-F) and Supplemental (G-I) Screens from the March 2016 NY SIR



***Includes observations
and review comments***

**Ben York and Tom Key
EPRI**

Using SIR Screens (Mar 2016) to Scope a CESIR

Preliminary Screening (no cost)

- A. Networked Secondary System? – ok
- B. Certified Equipment Used? – ok
- C. EPS Rating Exceeded? – ok
- D. Line Configuration Compatibility? – needs to be simplified, otherwise would require a study with likely data availability issues
- E. Simplified Penetration Test – need to clarify purpose and evolve
- F. Simplified Voltage Change Test – need to provide a number and specify a short hand calculation

Supplemental Screening (there is a cost)

- G. Penetration Test – this is power flow study, need to develop screen
- H. Power Quality and Voltage Tests – don't screen, use PQ in new 1547
- I. Safety and Reliability Tests – too open ended, don't use

Missing Screenings (that could help to define CESIR requirements)

- 3Vo protection and fault current coordination
- transformer compatibility and reverse power at substation

Screen A: Is the PCC on a Networked Secondary System?

- Does the proposed system connect to a secondary network system?
 - If yes (fail),
 - If no (pass), continue to Screen B.

1. Currently a straight-forward pass/fail for LV networks
2. Needs to evolve with a relative size criteria in the future.
 - Methods for hosting on network are being discussed.
 - ConEd demos may inform DG on secondary networks (EAM issue)
 - Expect technology progress as network equipment/protection schemes evolve to better accommodate DER.
3. No short-hand calculation needed at this time.

Screen B: Is Certified Equipment Used?

- Does the Interconnection Request propose to use equipment that has been listed to meet safety standards such as UL1741 (Inverters, Converters and Charge Controllers for Use in Independent Power Systems) and by a nationally recognized testing laboratory?
 - If yes (pass), continue to Screen C.
 - If no (fail)

- Currently using the CA (CEC) list in NY
 - Listings will evolve new IEEE Std 1547 and smart inverters
 - Will get more complicated with new grid support functions

- No short-hand calculation needed at this time

Screen C: Is the Electric Power System (EPS) Rating Exceeded?

- Do the maximum aggregated Gross Ratings for all the Generating Facilities connected to an EPS exceed any EPS rating, modified per established Distribution Provider practice, absent any Generating Facilities?
 - If yes (fail),
 - If no (pass), continue to Screen D.
1. Screen would benefit from some clarifications
 - Define what is meant by “absent any generating faculties”
 - Define how to account for min load, e.g. can a 12MW feeder with 3MW of min load allow 15MW? (especially in urban areas)
 2. Develop simple calculations to be better defined.

Screen D: Is the Line Configuration Compatible with the Interconnection Type?

- Line Configuration Screen: Identify primary distribution line configuration that will serve the Generating Facility. Based on the type of Interconnection to be used for the Generating Facility, determine from the table below if the proposed Generating Facility passes the Screen.
 - If yes (pass), continue to Screen E.
 - If no (fail)

- 1. Screen would benefit from some clarifications
 - Application of table is inconsistent, should be clarified
 - Needs evolve to address as multi-grounded wye systems.
 - ANSI C62.92.6 addresses transformer connections and questions on how to guarantee effective grounding, and may be helpful.
 - Transformer connection compatibility is not well covered
- 2. Need a short hand calculation to be better defined, however, will be difficult to automate and requires good data.

Screen E: Simplified Penetration Test

- Is the aggregate Generating facility capacity on the Line Section less than 15% of the annual peak load for all Line Sections bounded by automatic sectionalizing devices?
 - If yes (pass), continue to Screen F.
 - If no (fail), Supplemental Review is required, continue to Screen F.
1. Important screen, however, 15% is seldom the best answer.
 2. Current ITWG addressing this question of anti islanding
 3. In the future it will be better to apply a calculation with specific feeder data and evolving industry practices
 - Hosting capacity analysis is a future way to address this.
 - ITWG result and update to Sandia method may inform this

Screen F: Simplified Voltage Fluctuation Test

- In aggregate with existing generation on the Line Section - Can the Generating Facility parallel with the Distribution Provider's Distribution System without causing a voltage fluctuation at the PCC greater than 5% of the prevailing voltage level of the Distribution System at the PCC?
 - If yes (pass), Preliminary Screening Analysis is complete.
 - If no (fail), Supplemental Review is required

- 1. 5% may be too high in some cases.
- 2. Needs clarity on how to do this test.
- 3. Recommended short-hand calculations would be beneficial
 - Define criteria for different situations, including needed feeder data
 - Hosting capacity simulation will provide a good answer with higher penetrations by considering distribution of DG to estimate voltage rise.

Screen G: Supplemental Penetration Test

- Where 12 months of line section minimum load data is available, can be calculated, can be estimated from existing data, or determined from a power flow model, is the aggregate Generating Facility capacity on the Line Section less than 100% of the minimum load for all line sections bounded by automatic sectionalizing devices upstream of the Generating Facility?
 - If yes (pass), continue to Screen H.
 - If no (fail), a quick review of the failure may determine the requirements to address the failure; otherwise the Interconnecting Customer may be required go on to the Coordinated Electric System Interconnection Review (CESIR) process. Continue to Screen H.
1. Important ongoing issue, difficult to automate?
 2. Needs to consider more specific conditions such as protection schemes, potential to change the protection or to curtail DG. Likely will not have needed data?
 3. Refine screen to limit the cases that need more detailed study and to consider Load Rejection Overvoltage (LRO).

Screen H: Power Quality and Voltage Tests

- In aggregate with existing generation on the Line Section
 - a. Can it be determined within the Supplemental Review that the voltage regulation on the line section can be maintained in compliance with current voltage regulation requirements under all system conditions?
 - b. Can it be determined within the Supplemental Review that the voltage fluctuation is within acceptable limits as defined by IEEE 1453 or utility practice similar to IEEE1453?
 - c. Can it be determined within the Supplemental Review that the harmonic levels meet IEEE519 limits at the Point of Common Coupling (PCC)?
- 1. This screen will need to be updated with new IEEE Std 1547
- 2. It covers step change, flicker, harmonics, and EMC. Some short had calculations. IEEE 519 and 1453 are superseded.
- 3. Recommended practice is to measure harmonics and flicker in the field if problems are reported and not to depend on screen or study.

Screen I: Safety and Reliability Tests

- Does the location of the proposed Generating Facility or the aggregate generation capacity on the Line Section create specific impacts to safety or reliability that cannot be adequately addressed without a detailed study?
- Not clearly defined, short hand calculations may help
- May not be needed in the future
 - As other screens, methods and tests (including non technical screening) mature, and experience with interconnection increases.
 - New risk of islanding method may supplement this screen.
- Need to cover other issues like fuses, breaker ratings, fault current coordination related to relays and protection? 3Vo protection.

Typical CESIR study objectives mapped to Mar 2016 SIR

1. Determine if reverse power problems; for network, (currently in SIR, [screen A](#)) and for radial ([screen E addresses](#))
2. Test for possibility of islanding ([screens B, E, need updating](#))
3. Check for thermal overloads, local service ([C](#)) and feeder ([G](#))
4. Check for fault-related overvoltage potential
 - Coefficient of Grounding on low-side of xformer, ([screen D](#))
 - GFO, 3Vo on high-side of xformer ([not covered in SIR](#))
 - Transformer connection compatibility ([not covered in SIR](#))
5. Check steady state voltage limit and step changes ([screen F](#))
6. Confirm protection coordination, fault current compatibility, breaker reach, and device ratings ([not covered in SIR](#))

Notes: flicker and harmonics are site depend, usually not be pre-installation study objectives. A short circuit ratio may be considered as criterion.

A look at CA Rule 21 Screens A thru M

Screen	PG&E	NY SIR
A	Is the PCC on a Networked Secondary?	A
B	Certified Equipment?	B
C	Is the starting voltage drop within acceptable limits? (inrush)	NO
D	Is the transformer or secondary rating exceeded?	C?
E	Does a single phase generator cause unacceptable imbalance? (on 240-V service)	NO
F	Is the collective SCCR within limits? (10 or greater)	NO
G	Is the Short Circuit Interrupting Capability exceeded	NO
H	Is the line configuration compatible?	D
I	Is the system considered non-export?	NO
J	Is the system residential (11kVA or less)?	NO
K	Is the generator NEM less than 500kW?	NO
L	Are there known transmission issues?	NO
M	Is the generator less than 15% of line section peak load	E

CA Supplemental Review Screens

Screen	PG&E	NY SIR
N	Does the peak generation exceed the minimum load on the line segment?	G
O	Can the voltage be regulated to ANSI? Is there a flicker or harmonics issue (according to IEEE1453 or 519)	H
P	Safety Risk?	I
Q	Is the installation independent of the transmission system? (Large systems require coordinated study with CAISO)	NO