NERC's New BES Definition: How Many CHP Units Will It Impact?

A presentation by:

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What Is ELCON?

- The national association for large industrial users of electricity in the U.S.
  - Founded in 1976
  - Members from a wide range of industries from traditional manufacturing to high-tech
  - Most members have CHP
- The views today are mine alone

At The Outset, Keep In Mind An Overarching FERC Mindset

In 2007, FERC issued an order with the following statement:

SUMMARY: The Federal Energy Regulatory Commission (Commission) is revising its regulations governing qualifying small power production and cogeneration facilities (QFs), to eliminate the exemption of QFs from the requirements of section 215 of the Federal Power Act. From a reliability perspective, there is not a meaningful distinction between QF and non-QF generators that warrants a generic exemption of QFs from reliability standards.

FERC Order in Docket No. RM07-11-000

Applicability of FPA Section 215 to

Qualifying Small Power Production and Cogeneration Facilities

As Well As An Overarching NERC Mindset

- The broader NERC community (NERC staff and utility volunteers)
  - Assumes that ALL generators basically are stand-alone utility-owned or merchant units built and operated for the sole purpose to deliver to the bulk electric system (BES) power for resale to third-party, wholesale or retail customers.
- However, as we all know, CHP machines most often are built to serve an end-user thermal load with any residual electricity sold as a by-product to the grid under the terms of PURPA.
- The tight integration of CHP to the end user's steam/thermal requirements makes it inseparable from the load.

So What Is NERC?

- The North American Electric Reliability Corporation (NERC):
  - Is the FERC-designated "ERO"
  - Develops mandatory reliability standards with up to $1 million / day penalties
  - Any entity that is on NERC's Compliance Registry must:
    - Comply with all applicable standards
    - Make required compliance filings
    - Be subject to periodic audits
- Increasingly, previously unregistered entities are becoming "Registered Entities"
  - And thus responsible for compliance with various reliability standards

So What Is NERC?

- NERC is comprised of the owners, operators and users of the bulk power system
  - Created in 2007 under authority of the Energy Policy Act of 2005
  - NERC evolved from a voluntary organization created after the NY blackout in the 1960s
- NERC is charged with (among other things) drafting mandatory reliability standards that apply to the interconnected North American electricity grid including most of Canada and parts of Mexico
  - NERC drafts and approves standards
  - The standards must receive regulatory approval before they become mandatory
  - By law, FERC cannot "write" standards – as that would make FERC a standards writer for Canadian and Mexican entities
  - However, FERC can deny approval of proposed standards and remand them to NERC with very specific "guidance"
- And keep in mind – "users" can be anybody

In 2010, FERC Ordered a Redefinition of the BES

- FERC directed (Order 743 and 743-A) NERC to redefine the "Bulk Electric System" (BES) within one year:
  - The bottom line: many more entities may be subject to the "Compliance Registry" based on the revised BES definition
    - Once an entity is placed on Registry, it will REALLY care about NERC
- FERC's directive includes certain "bright lines":
  - Eliminate "generally defined as" to include:
    - All facilities > 100 kV
    - All generators > 20 MW and all generating plants > 75 MW
  - Eliminate "regional discretion"

NERC's Process to Redefine the BES

- NERC established a "Standards Drafting Team" (BES DT) that:
  - Was charged with crafting a new definition of the BES
  - ELCON's VP of Technical Affairs John Hughes is on the SDT – the only voting industrial SDT member
- The BES DT's initial product includes:
  - A core definition – all facilities operated or connected at >100 kV are included (as per the FERC directive)
  - All Regional Entities must use the same definition (again, as per the FERC directive)
  - But the BES DT approved 5 "Inclusions" and 4 "Exclusions"
  - And an "Exception Process" – with the burden of proof on the entity seeking change
  - Radials are excluded
    - Unless "looped" at any voltage
    - And tie lines for BES generation are included
  - "Local networks" are excluded (as per the FPA) – but are undefined

Inclusions and Exclusions in the BES Definition

Core Definition	Inclusions	Exclusions
Unless modified by the lists shown [to the right], all Transmission Elements operated at 100 kV or higher and Real Power and Reactive Power resources connected at 100 kV or higher. This does not include facilities used in the local distribution of electric energy.	I1: Transformers	E1: Radial Systems
	I2: Generators	E2: PURPA Qualifying Cogeneration
	I3: Blackstart Resources	E3: Local Networks
	I4: Dispersed Power Producing Resources	E4: Reactive Power Devices Serving End-Use Customers
	I5: Static or Dynamic Devices	

NERC's Process to Redefine the BES (Cont.)

- Originally the BES drafting team thought that generator inclusion should be much higher – however, NERC's Planning Committee strongly opposed:
  - There was no "technical justification"
  - Would remove 34 GW (3.3%) of generation from the BES
  - Remove about 6,000 generating units (over 50% of what is excluded today)
  - Smaller units may be needed to satisfy local reserve margins
- The "new" definition was originally supposed to be in effect as of July 1, 2013 with a 2-year implementation plan
  - ELCON led an opposition group including several industrial trade groups and the US CHP that resulted in a delay

The Second Effort to Redefine the BES (Cont.)

- After considerable concern was expressed, FERC postponed implementation until July 1, 2014 (still with a 2-year implementation) to allow additional revisions
- Key changes were made by the BES DT in both E1 and E2
  - E1 relates to radial systems
  - E2 relates to PURPA Qualifying Cogeneration
- However, due to the FERC directive, the definition still is based on a "bright line"
  - And, as we all know, nearly all "bright line" requirements bring unintended consequences
  - We expect many in this case

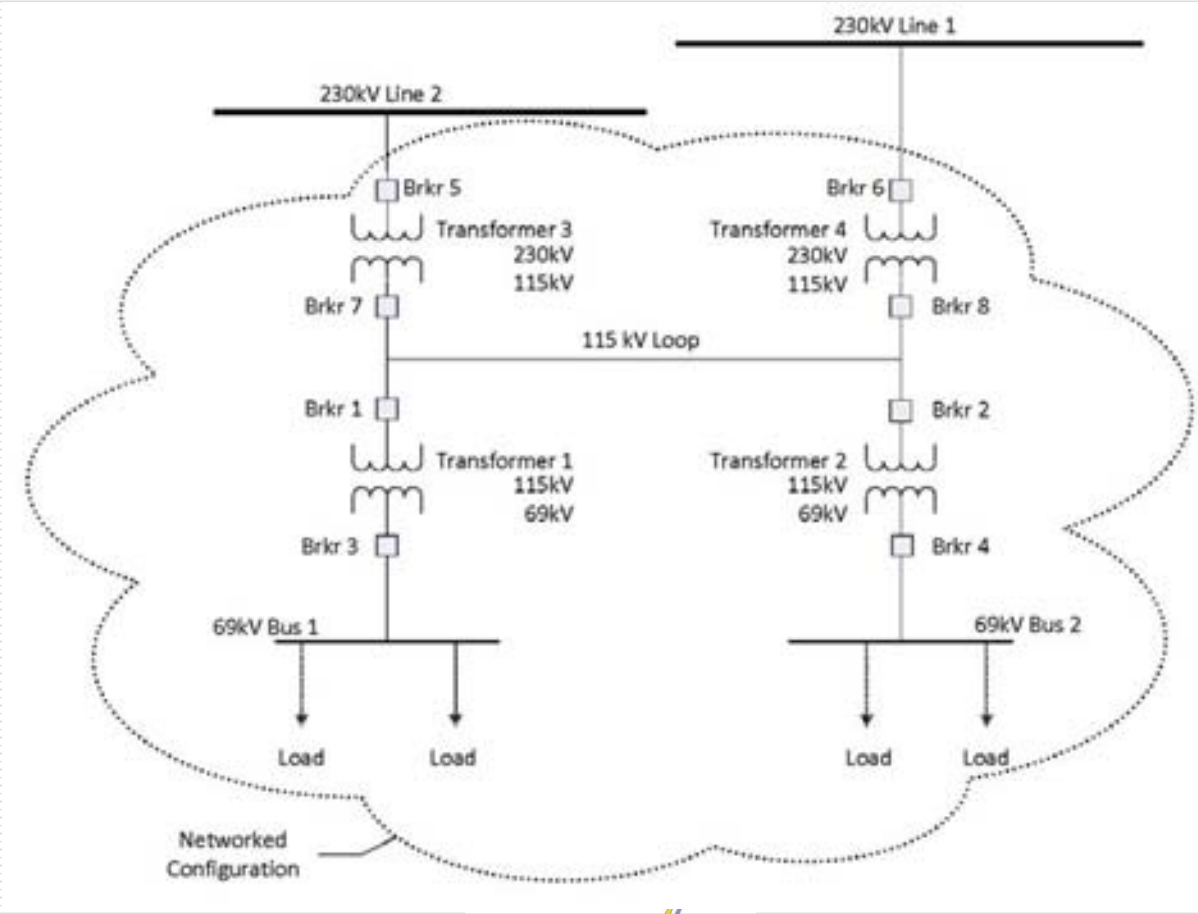
Changes to E1: Exclusion for Radial Systems

- **E1** - Radial systems: A group of contiguous transmission Elements that emanates from a single point of connection of 100 kV or higher and:
  - Only serves Load or,
  - Only includes generation resources, not identified in Inclusions I2, I3, or I4, with an aggregate capacity less than or equal to 75 MVA (gross nameplate rating) or,
  - Where the radial system serves Load and includes generation resources, not identified in Inclusions I2, I3 or I4, with an aggregate capacity of non-retail generation less than or equal to 75 MVA (gross nameplate rating).

Note 1: A normally open switching device between radial systems, as depicted on prints or one-line diagrams for example, does not affect this exclusion.

Note 2: The presence of a contiguous loop, operated at a voltage level of 50 kV or less, between configurations being considered as radial systems, does not affect this exclusion.

Changes to E1:
Exclusion for Radial Systems



Changes to E1: Exclusion for Radial Systems

- The drafting team proposed the threshold of **50 kV** or less for loops between radial systems when considering the application of Exclusion E1.

- The SDT used a two step approach to determine the voltage level. As a first step, regional voltage levels that are monitored on major interfaces, paths, and monitored elements to ensure the reliable operation of the inter-connected transmission system were examined to determine the lowest monitored voltage level.

- Next, power system analyses determined the maximum amount of power that can be transferred through the low voltage systems, when looped, under a worst case scenario at various voltage levels.

- The "technical justification" was a formal white paper. Entities with facilities that loop at 69-kV or higher will have to seek an exception request. Whether the 50-kV threshold is a big or small victory is yet to be determined.

Changes to E2:
QFs with Limited Power Exports

- **E2** - A generating unit or multiple generating units on the customer's side of the retail meter that serve all or part of the retail Load with electric energy if:
  - The net capacity provided to the BES does not exceed 75 MVA, and
  - Standby, back-up, and maintenance power services are provided to the generating unit or multiple generating units or to the retail Load by a Balancing Authority, or provided pursuant to a binding obligation with a Generator Owner or Generator Operator, or under terms approved by the applicable regulatory authority.

Changes to E2:
QFs with Limited Power Exports

- This exclusion was adopted from the *Statement of Compliance Registry Criteria*
  - It eliminates the nameplate rating of a cogeneration unit from being used as the determinative factor for BES classification. The BES Drafting Team also adopted a single generation threshold (75 MVA) for manufacturing facilities with either a single or multiple cogeneration units on site.
- This exclusion continues to confuse the typical utility engineer that participates in standards drafting teams.
  - This confusion is often accompanied by hostility or resentment because the exclusion is deemed "unfair" to the owners/operators of utility generators.

Examples of Other NERC Issues Impacting CHP:

- Generator requirements at the transmission interface (GOTO):
  - Generator tie lines were deemed "transmission assets" by NERC
  - The generator's owner was registered as a Transmission Owner (TO) and Transmission Operator (TOP)
  - After several years of difficult interchange, FERC found that only 4 Standards (e.g., vegetation management) were appropriate
  - While we won this battle, the war is far from over
- Generator verification reliability standards
  - NERC proposed a Standard for verification and data reporting of generator real and reactive power capability and synchronous condenser reactive power capability (MOD-025-2)
  - The Standard requires operating a generating unit in real time in order to determine the theoretical (i.e., nameplate) performance limits that are used to model the BES
  - Loads with CHP cannot be modeled unless the underlying industrial/commercial process application is modeled – and may force protracted shutdown and/or equipment damage

Examples of Other NERC Issues Impacting CHP:

- Long term reliability assessment (LTRA):
  - The LTRA annually assess the adequacy of the BES over a 10 year period
  - The assessment tends to lump all non-intermittent generation together into a single, homogenized "conventional" category even though CHP and conventional generation are quite different
- Generation availability data system (GADS):
  - GADS will collect data from all generators > 20 MW (below is voluntary)
  - If one behind the meter facility becomes a NERC registered entity – ALL generation > 20 MW owned by that company is swept into GADS
  - The GADS Data Reporting Instructions is 607 pages long
- Demand response availability data system (DADS):
  - The goal of DADS is to measure the actual performance of demand response
  - DR often is provided based on some form of backup generation
  - The reporting burden presently is on Balancing Authorities (Bas) and TOPs
  - There is growing pressure to shift the burden to the end-use provider

JA1
JA2

Conclusions

- We all want – and need – a reliable BES
  - But industrials and CHP should only be required to conform to NERC standards if they have a material impact on BES reliability
  - Unfortunately, the NERC requirements appear to go far beyond what is necessary – and bring with them very large additional costs
- I urge each of you to get involved in – or at least be quite aware of – NERC
  - There are many opportunities – but be prepared to spend a lot of time
  - At this time, ELCON is the only industrial group significantly involved in NERC – and is a strong proponent of CHP
  - Participation in ELCON is one way to be represented in NERC
- Thanks for the opportunity to be with you today

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