ISO-NE Planning Technical Guide

Load Interruption Guide

Planning Advisory Committee Meeting

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Presentation Goals

- Solicit discussion and written comments from PAC members on the proposed Load Interruption Guidelines
  - Comments due in 30 days to pacmatters@iso-ne.com
- Process will be to document final load interruption guideline in the Planning Technical Guide
  - Planning Technical Guide - was discussed at the March 20th PAC meeting
  - Load Interruption Guidelines will be Section 21 of the Planning Technical Guide
  - Consequential Load Interruption Guidelines will be discussed today
  - Non-consequential Load Interruption Guidelines will be proposed in the Fall after comments on today's presentation are received and addressed

Load Interruption Definitions

Load Interruption Categories:

- Consequential Load Interruption: All Load that is no longer served by the Transmission system as a result of Transmission Facilities being removed from service by a protection system operation designed to isolate a fault
- Non-Consequential Load Interruption: Non-Interruptible Load loss that does not include: (1) Consequential Load Loss, (2) the response of voltage sensitive Load, or (3) Load that is disconnected from the System by end-user equipment. It includes the manual or automatically controlled interruption of loads that is necessary to maintain the overall reliability of the system [operator directed load shedding?]
- Cascading Load Loss: The uncontrolled interruption of load as a result of cascading equipment failures or voltage collapse

Note: For purposes of this guideline, load that is subject to momentary load interruptions due to automatic switching (e.g., moving load from one distribution substation to another) is excluded from the definition of consequential load interruption

Background

- Draft Load Interruption Guidelines were initially presented to the Reliability Committee on November 17, 2010
- The draft Load Interruption Guidelines were sent to the PAC and the Reliability Committee December 1, 2011 to provide additional opportunity for comments

Purpose of the Guideline

- Guideline will establish the levels of load interruption that will qualify as a system need which requires a Regional Benefit Upgrade
- Guideline will provide a basis for determining when the costs associated with transmission upgrades made to mitigate load interruption are eligible for regionalization
- Guideline will facilitate siting authority review and understanding of transmission projects that address load interruptions
- Guideline should not be considered an Operating Guideline

General Concepts of Load Interruption Guideline

- NERC reliability standards for transmission planning describe when and how load interruption is acceptable but not the amount of load interruption that is tolerable
- Based on comments on the previous load interruption guideline, the current guideline has discrete load interruption levels at which mitigation costs can be regionalized
- Improving customer reliability can be accomplished by expenditures on the transmission system or on the distribution system. The guideline sets load interruption levels to encourage cost effective expenditures on customer reliability, whether at the transmission or distribution level
- Within certain bounds, load interruption itself does not affect the integrity of the transmission system
- The impact of transmission outages on customers is relatively small as shown by data CL&P filed with the CT PURA

Transmission's impact on customers in CT

- CL&P's System Average Interruption Duration Index (SAIDI) in minutes from Docket 86-12-03

Category	2008	2009	2010	2011	2012
Transmission/Power Supply	0.22	0.10	0.00	0.00	0.00
Distribution	116	107	125	133	104
Customer Caused	0.12	0.30	0.53	0.23	0.13
Scheduled	0.96	1.70	1.28	3.03	2.75
Major Storm	159	93	433	8,146	1,954

Consequential Load Interruption Guideline

- Mitigation of consequential load interruptions that exceed levels established for various categories of contingencies will be considered a regional need and will be eligible for regional rate treatment
- Mitigation of consequential load interruptions that do not exceed established levels will be allowed but will not be considered a regional need and will not be eligible for regional rate treatment
- The established limits for consequential load interruption increase as the likelihood of the event causing the load loss decreases
- Three limits for determining regional needs have been established and are described on the following slide
- Limits are designated in megawatts rather than in numbers of customers because the load in megawatts is readily available in models used in transmission planning

Consequential Load Interruption Guideline

1. Any single-element first contingency (line, transformer, or generator) that results in consequential load loss of greater than 100 MW
2. Any multiple-element first contingency (bus section, breaker failure, or double-circuit tower) that results in consequential load loss of greater than 300 MW
3. Any single-element first contingency, followed by system adjustments, followed by a second single-element contingency that result in a total consequential load loss greater than 300 MW
4. Any single-element first contingency, followed by system adjustments, and then followed by a second multiple-element contingency (stuck breaker, double circuit tower or bus fault) which results in consequential load loss greater than 500 MW

Note: For purposes of this guideline, the load interrupted will be based upon the 90/10 load forecast for the appropriate year, typically 10 years into the future

Consequential Load Interruption Solutions

- In the event that item 1 results in the development of a transmission solution, the solution will be designed to reduce the consequential load loss to below 50 MW
- In the event that items 2 or 3 result in the development of a transmission solution, the solution will be designed to reduce the consequential load loss to below 200 MW
- In the event that item 4 results in the development of a transmission solution, the solution will be designed to reduce the consequential load loss to below 400 MW

Questions