

PJM DEDSTF LINES SUB-GROUP update 5/16/16

- Scope and Guiding Principles Document
- Work Plan
 - Spreadsheet review
 - Targeted discussions (ex, live line)
- 3 month look ahead
 - Spreadsheet review
 - Development of preliminary standards format

Scope and Guiding Principle

PJM DEDSTF

Scope & Guiding Principles

April 14, 2016

- Charter
 - “...establish minimum design standards to assure a minimum level of robustness is provided such that the newly competitively-solicited facility ... would not introduce a weak point in the system in terms of performance.”
 - Scope
 - Overhead Transmission
 - 69kV – 765kV
 - Initial primary focus
 - Underground Transmission
 - 69kV – 500kV
 - Start time TBD once substantial progress has been made on the overhead transmission minimum design standards. Additional U/G transmission SMEs may have to be recruited to supplement the current roster.
 - Direct Current Transmission
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Work Plan - spreadsheet

500 KV OH DESIGN STANDARDS

Criteria Items	NESC 2012	PJM 2002 TSDS Guidelines
ENVIRONMENTAL/GENERAL		
Ambient Temperature Range	N/A	-30°C to +40°C (from 40°C N & W of Blue Mountain)
Keraunic Level		40
Minimum Extreme Wind Loading		25 pdf
Heavy Ice Load (No Wind)		1 1/2"
Code Requirements		NESC Grade "B"
Provisions for Live Line Maintenance		As required by the TO
Access Requirements		Construction and maintenance access is required to each structure
Line crossings		
Line cascade mitigation		
ELECTRICAL		
RIV Level @ 350 kV line to ground		300uV @ 1MHz
Switching Impulse Withstand level (3 TM)		990 kV
250 x 2500µs minimum critical flashover		1200 kV
1.2 x 50 µs minimum critical flashover (lightning)		2145 kV
Lightning Trip out Performance (line)		1/100 miles (160km) per year
Line trip out performance from all other causes		1/100 miles (160km) per year
Sag and tension Calculation method		Alcoa Sag & Tension Software or Provide adequate clearance so that 12" of clearance exists

Status Document – lines sub group

PJM DEDSTF Lines Sub-group

Environmental/General

Ambient Temperature Range

No mention in the NESC. The PJM TSDS Guidelines state (-30 C to + 40 C, from -40 CN&W of Blue Mountain)

Status: validate closed

Keraunic Level

PJM TSDS = 40.

Conversation at 4/14/16 meeting centered around viability of this parameter as there is better data available as described below:

The keraunic number is a system to describe lightning activity in an area based upon the audible detection of thunder. It is defined as the average number of days per year when thunder can be heard in a given area, and the likelihood thereby of a thunderstorm. An isokeraunic map plots contours of equal keraunic number. The keraunic number has been used to set standards for safe design of electrical systems in structures connected to the local power grid.

Before technology was developed to accurately detect and record lightning flashes, keraunic measurements were the standard means to assess the probability of lightning at a location. However, a keraunic number does not distinguish between forms of lightning, such as cloud-to-cloud, or cloud-to-ground, and is limited by the requirement for the thunder to be audibly detected. For these reasons, the keraunic number has been replaced by more accurate Flash Density maps, which collect data from both ground-based and satellite lightning detectors.

Status – Use software based programs such as TFlash which utilize flash density data to model performance.

Minimum Extreme Wind Loading

NESC and PJM TSDS recommend NESC 250C WIND MAP

Status: Still in discussion

Lines Sub Group look ahead

Continue spreadsheet review

Develop targeted deeper discussions

Develop preliminary standards document