Revision to Con Edison's Thunderstorm Watch Operating Procedure

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August 6 , 2020

Revisions of Operating Procedures

- Procedures are periodically reviewed for improvements and relevancy
- Today, we are discussing revisions to our Thunderstorm Alert Procedure
- Revisions were presented at the NYISO SOAS and OC
- Revisions were reviewed and supported by the NYISO

What is Thunderstorm Alert?

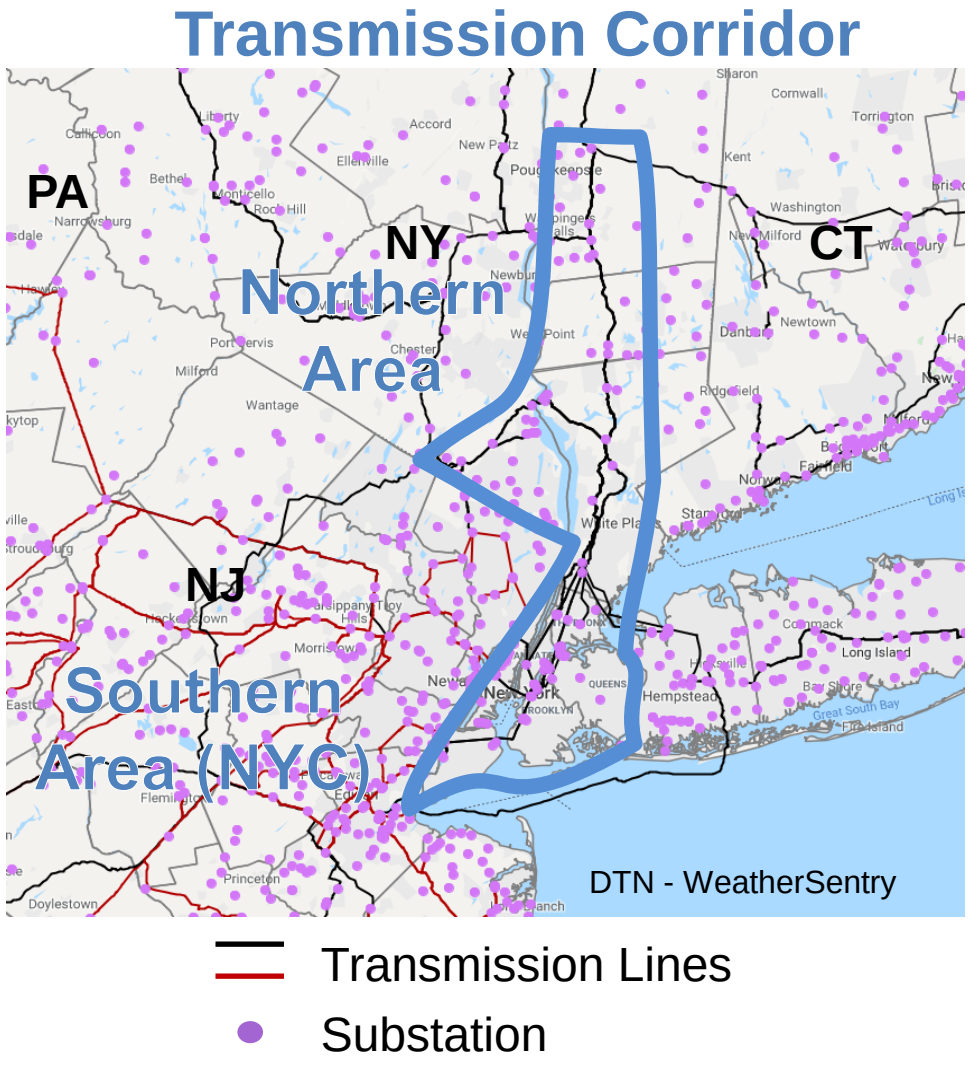
- When high lightning conditions are predicted in the transmission corridor north of the City, the system is operated as if an outage of a single major line in the corridor has already occurred
- In effect, the usual multiple element next contingency operation becomes augmented by the additional single contingency under Thunderstorm Alert operation for the duration of the thunderstorm activity over the area

Thunderstorm Alert: Background

- Resulted from the 1977 Blackout
  - Lightning strikes affected facilities
  - Lack of generation in NYC was unable to account for lost pathways
- Transmission system and protection have evolved
  - New transmission feeders added and technological improvements made
  - Generation fleet has grown and become more diverse
  - Impact of contingencies have decreased
- Thunderstorm Alert is internal to Con Edison/NYISO procedures
- It was time to review the Con Edison procedure to see if the number of Thunderstorm Alert Declarations could be reduced without impacting reliability
  - Thunderstorm Alert events cause operational disruptions
  - We Investigated opportunities for operational efficiencies without lowering reliability bar

Thunderstorm Alert Procedure

- **GOAL: Maintain Reliability**
  - Additional personnel is required to staff substations
  - Impact of outages are simulated
  - NYISO is notified
- **Prior Criteria**
  - Call a Thunderstorm Alert when more than 15 lightning strikes over a 30-minute period are predicted over the Transmission Corridor
  - This level of thunderstorm activity is considered low level
  - No justification found for using this particular threshold



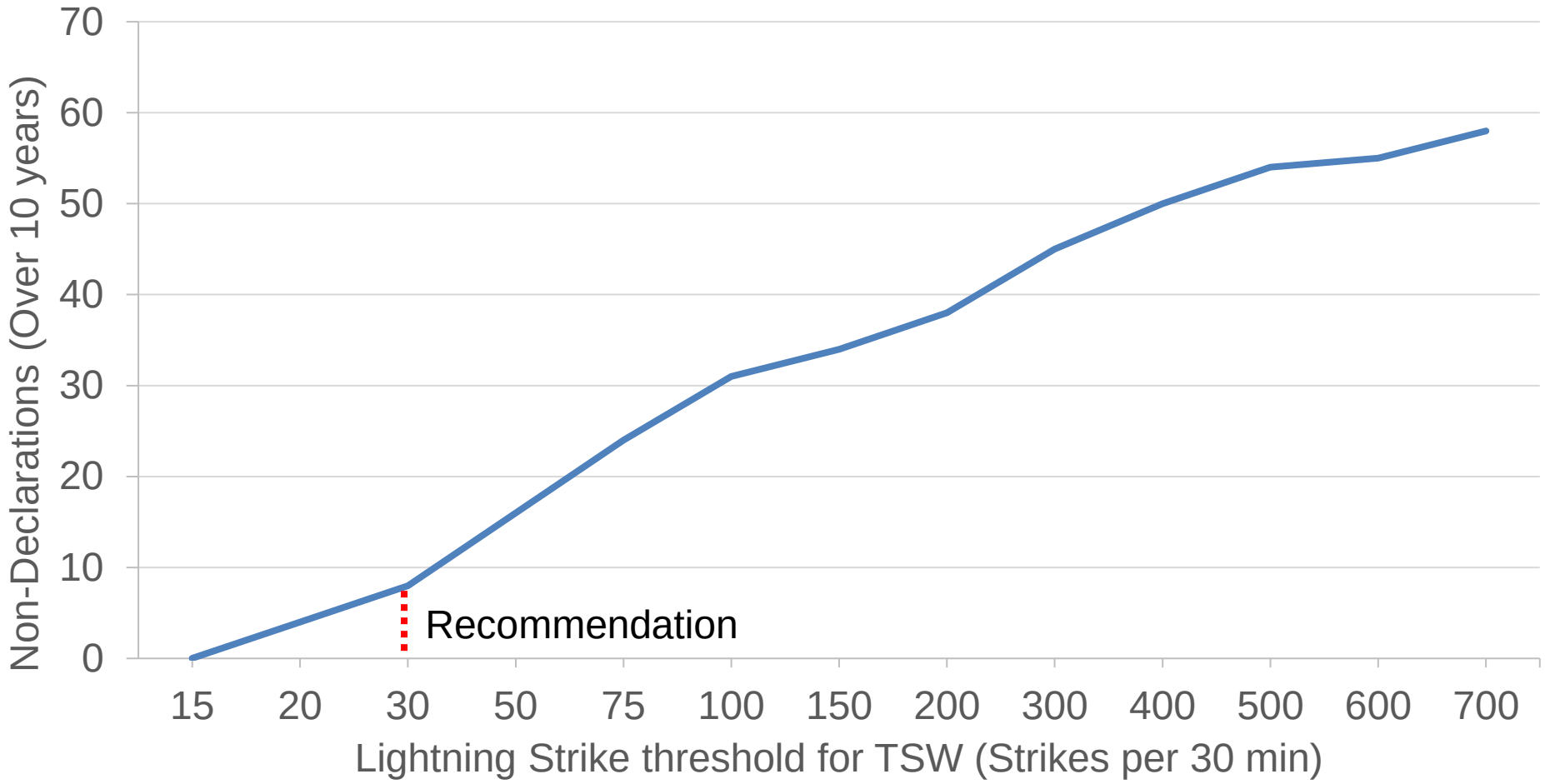
Objectives of Review

- To perform a historical review of prevailing lightning conditions
- Considering that lightning predictions is not an exact science
  - Higher predictions may not materialize
  - Lower predictions may not capture events of higher lightning intensity
- Original Procedure already had been improved by making it a two-step process
  - NYISO alerted two hour prior to first predictions of lightning higher than threshold
  - NYISO is informed one hour prior of a Thunderstorm Alert declaration
- Over the past 10 years we have not seen the significant outages occur that would have necessitated being in Thunderstorm Alert
  - There were zero Common Tower failures over the past 10 year
- We Investigated if threshold for declaration of Thunderstorm Alert could be increased without affecting reliability

Analysis Performed

- Identified instances of Non-Declarations (over past 10 years), where
  1. Transmission outage occurred, and,
  2. Thunderstorm Alert was declared under the current procedure (>15/30), and,
  3. Thunderstorm Alert would not have been declared under a proposed new threshold (<30/30)
- Investigated Non-Declarations events to assess reliability risks

Non-Declarations (Over 10 years) vs Lightning Strikes per 30 Minutes



Threshold Analysis

- Analysis of activity over the past 10 years showed that with the revised procedure
  - There would have been 55 less Declarations over the last 10 years, from 309 to 254
  - Of these 55, there would have been only 8 Non-Declarations events over the past 10 years, that is Declarations not made that had a line out of service
  - Of these 8, some of the transmission outage events had occurred prior to entering the Thunderstorm Alert state for reasons unrelated the lightning
- The threshold can be significantly increased with minimal impact to reliability
- However, we decided to be very conservative and increase threshold only to 30 strikes over 30 minutes

Conclusions

Increase Thunderstorm Alert threshold to 30 strikes over 30 minutes

- Minimum impact to reliability because compared to 1977, we now have a very different transmission and generation system and have deployed enhanced controls
  - For example, reclosure technology greatly reduces the possibility of having multiple contingencies over a short period of time
- The probability of a thunderstorm causing the conditions that Thunderstorm Alert is designed to protect has diminished significantly
- Staffing impacts and uplift will be reduced
- Thunderstorm events will continue to be reviewed to see if further adjustments are justified