

ISO-NE PAC MEETING

04/18/2024

E-205E and E-205W 230kV Line Asset Condition Refurbishment

This document has been reviewed and does not contain Critical Energy/Electric Infrastructure Information (CEII).

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Outline

- Purpose
 - Discuss the asset condition needs driving the refurbishment of the 230kV E-205E and E-205W lines and conceptual alternatives to address the identified asset condition issues
- Background
- Geographic Location
- Project Needs
- Alternatives to be Investigated
- Questions

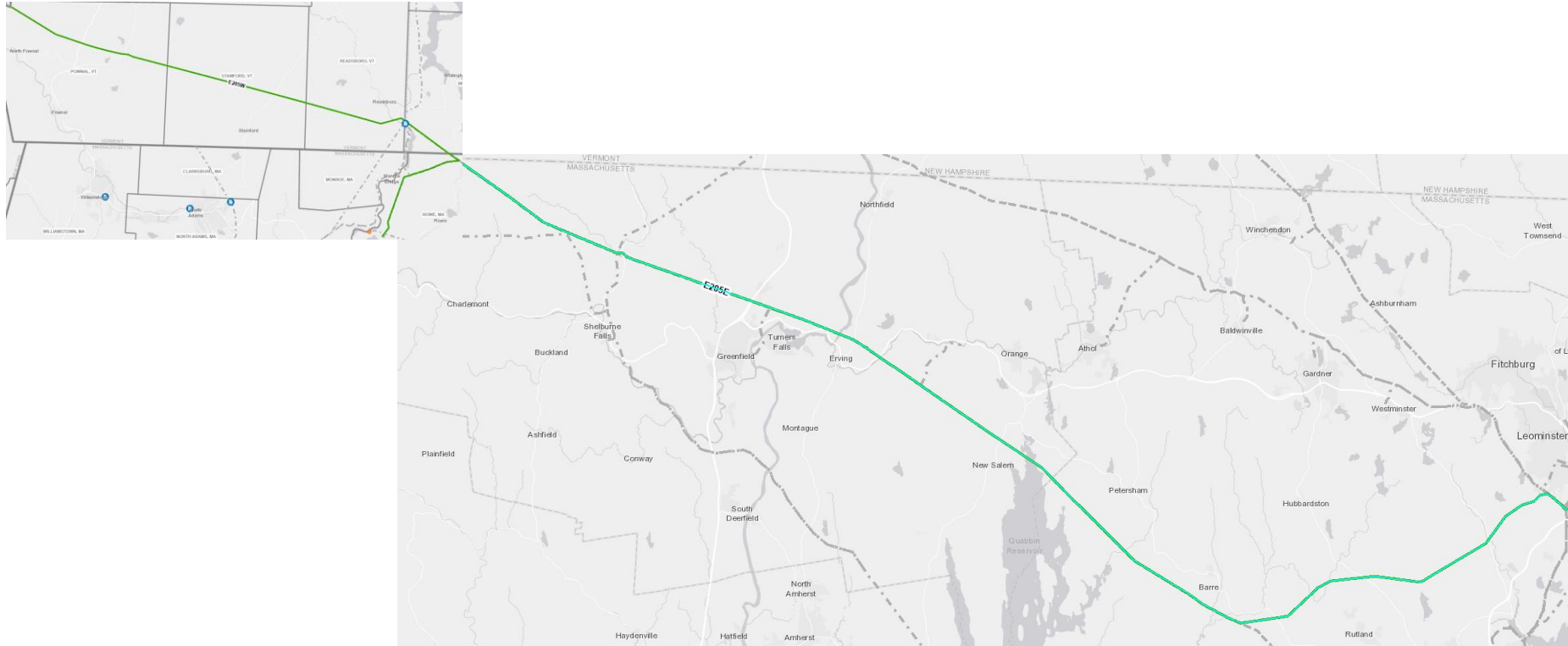
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Background

- E-205 was constructed in 1962 and split into E-205E and E-205W in 1972 with the construction of Bear Swamp substation.
- The E-205 circuits are the only connection between the New York and New England National Grid transmission systems
- E-205E: Bear Swamp Substation – Pratts Junction Substation (74 mi.)
 - 885 total structures – 879 wood structures, 2 steel structures and 4 lattice structures
 - Existing conductor: mix of 795 kcmil 54/7 ACSR “Condor” and 795 kcmil AAC 37 “Arbutus” from 1962.
 - Existing shieldwire: mix of 7 No.9 Alumoweld, 1/8" steel and 3/8" EHS steel installed mostly in 1962
 - In 2002 wood pole crossarms replaced with steel crossarms
 - In 2010 replaced half of structures with new wood structures using temporary access measures. Many of these structures and others are now showing significant woodpecker damage
- E-205W: NY/VT Border – Bear Swamp Substation (27.4 mi.)
 - 319 total structures – all wood structures
 - Existing conductor: 24.3 miles of 795 kcmil 54/7 ACSR “Condor” from 1962. 3.1 miles of 795 kcmil ACSS from 2009.
 - Existing shieldwire: 20 miles of 3/8" steel from 1962 and 7.4 miles of 3/8" EHS steel from 2009.
 - E-205W continues to the National Grid, NY/Niagara Mohawk Eastover Substation as the T6530 circuit (20.4 mi.)
 - In 2000, all wood pole crossarms were replaced with steel crossarms
- Project need: asset condition
- E-205E/E-205W (101.4 miles): 100% PTF

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Geographic Location



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Project Needs

Asset Condition

The asset condition information is derived from the following sources:

- Engineering Ground Line Inspection – 2019, 2022
- Aerial Comprehensive Inspection – 2022 (E-205E) and 2020 (E-205W)
- Internal and External Inspections – Multiple Years

Asset issues found include:

- Original A-frame deadends on E-205E, failure concern
- Approximately 342 structures (261 structures E-205E, 81 structures E-205W) with visible wood pole and pole top deterioration
- Approximately 225 structures (202 structures E-205E, 23 structures E-205W) with visible woodpecker damage
- Damage observed is dispersed throughout the entire circuit
- Heavily spliced conductors (438 splices on the E-205E phase conductors and shield wires, 83 splices on E-205W phase conductors and shield wires)
- Flashed and Damaged Insulators and
- Corrosion on conductors and shield wire

Improved Communication Channels

- The private telecommunications network operated by National Grid requires expansion and modernization to provide a level of service that eliminates single points of failure for communication pathways for a single station and implementation of redundant communication pathways to eliminate cascading data loss from multiple stations
- Expanding OPGW deployment directly augments the scale and reach of the National Grid private telecommunications network and supports our mandate of providing low cost, secure and reliable solution
- National Grid's private telecommunications network strategy is built predominantly on the physical foundation of OPGW reducing the reliance on leased services for protection, critical monitoring, and controls systems
- Being a secure private network, it is isolated from security threats that are possible when connecting to external network elements thus maximizing the reliability and security of the network supporting BES and CEII Cyber Systems

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Project Needs – Points of Concern: Pole Deterioration



E-205E Str 423



E-205W Str 263



E-205E Str 547



E-205W Str 134



E-205E Str 739



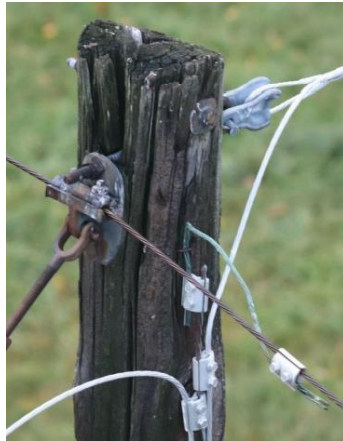
E-205E Str 785

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Project Needs– Points of Concern: Pole Top Deterioration



E-205W Str 225



E-205W Str 68



E-205W Str 223



E-205W Str 215

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Project Needs– Points of Concern: Wood Braces



E-205E Str 499



E-205E Str 440



E-205E Str 479



E-205E Str 471



E-205E Str 513



E-205E Str 508



E-205E Str 301

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Project Needs – Points of Concern: Woodpeckers



**E-205E
Str 511**



E-205W Str 135



**E-205E
Str 676**



**E-205W
Str 262**



**E-205W
Str 197**



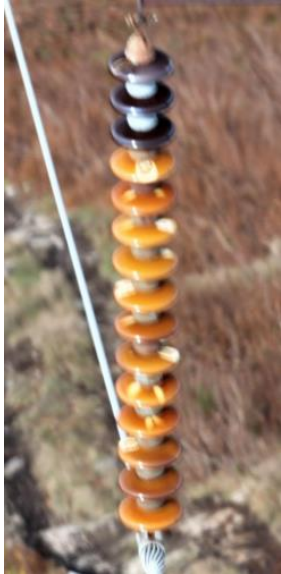
E-205E Str 684



E-205E Str 677

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Project Needs– Points of Concern: Insulators



E-205W Str 183



E-205W Str 81



E-205E Str 450



E-205E Str 528



E-205E Str 604



E-205E Str 440

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Project Needs– Points of Concern: Static Wire



Entire Circuit

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Alternatives to be Investigated

E-205E & E-205W Full Rebuild to 345kV Standards (operated at 230kV)

- Replace all 1,204 E-205E & E-205W structures (885 E-205E & 319 E-205W) with steel 345kV standard structures
- Reconductor all 101.4 circuit miles of E-205E & E-205W with bundled (2) 1590 ACSS “Falcon” conductor
- Replace 101.4 circuit miles of shieldwire with two (2) ½” OPGW on the E-205E & E-205W lines
- Replace all insulators and hardware
- Update grounding at all structure locations
- Construct permanent access improvements

E-205E & E-205W Full Rebuild to 230kV Standards

- Replace all 1,204 E-205E & E-205W structures (885 E-205E & 319 E-205W) with steel 230kV standard structures
- Reconductor all 101.4 circuit miles of E-205E & E-205W with bundled (2) 1113 ACSS “Finch” conductor
- Replace 101.4 circuit miles of shieldwire with two (2) ½” OPGW on the E-205E & E-205W lines
- Replace all insulators and hardware
- Update grounding at all structure locations
- Construct permanent access improvements

Estimated Construction Start Date: Q2 2029

Estimated In-service Date: Q4 2033

National Grid, NY is investigating a similar set of alternatives and milestones for T6530, the NY portion of the E205W circuit

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Questions

E-205E and E-205W 230kV Line Asset Condition Refurbishment

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Please submit any written comments or feedback by May 02, 2024

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Woodpecker Damage Example

- This structure was removed from service from a different circuit within National Grid's New England territory in 2023
- Some woodpecker damage was visible on exterior of pole, just a hole
- Pole collapsed while being lifted out of place, exposing largely hollow interior with extensive damage
- At time of removal, extent of structural damage was not known before the pole collapsed



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