

ISO-NE PAC MEETING

08/21/2024

Brayton Point Substation Asset Replacements

August 20, 2024 Version

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

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Outline

- Purpose
 - Discuss the proposed solution alternatives to address the identified asset condition needs at Brayton Point substation.
- Background
- Transmission One-Line
- Aerial View
- Project Needs
- Solution Alternatives
- Questions

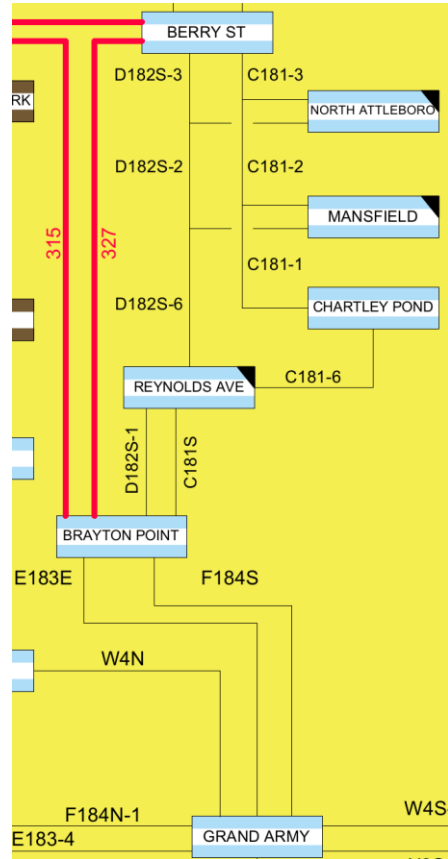
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Background

- Brayton Point is a 345/115 kV substation located in Somerset, MA, with a 345 kV indoor GIS, 115 kV AIS built in 1963, and two 345/115 kV transformers manufactured in 1977 and one 345/115 kV transformer manufactured in 2019.
- The current location of two of the 345/115 kV transformers is within the Base Flood Elevation floodplain.
 - The Base Flood Elevation (BFE) floodplain is the elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year.
- The site is a connection point for two 345 kV transmission lines (315, 327) and four 115 kV transmission lines (E-183E, F-184S, C-181S, and D-182S).
- The driver for this project is asset condition.
- The approved FERC QP837 and QP944 interconnection upgrades have planned work at Brayton Point and are being accounted for to address the remaining asset condition work at the station.
- The Brayton Point Substation is 100% PTF.

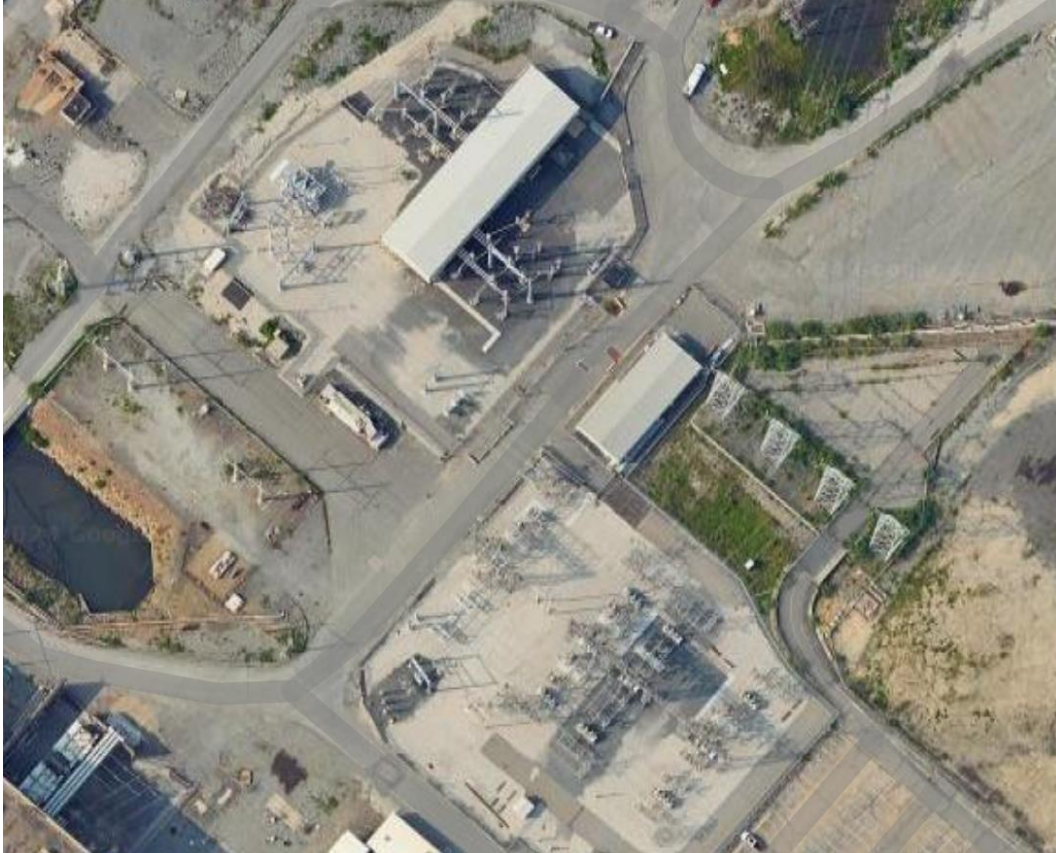
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Transmission One-Line



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Aerial View



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Project Needs

Asset Condition

The asset condition information is derived from the following sources:

- Substation Asset Condition Report and maintenance records – 2021.
- Site visit, discussions with field personnel – 2022.

Asset issues found include:

- Two 345/115 kV transformers manufactured in 1977
 - Documented trouble reports relating to oil leaks, bushing hot spots, component failures, and general deterioration.
 - Repairs have been made over time but the transformers have reached the end of useful life and are considered as a high risk of failure.
 - Currently attached to existing power house building owned by Brayton Point LLC which is currently undergoing demolition.
- Six 115 kV Oil Circuit Breakers (OCBs) manufactured in 1988.
 - BZO type breakers which are prone to systematic problems with the operating mechanism, requiring increased maintenance.
 - Operating mechanisms are showing an increase in accumulator pump and O-ring failures.
 - Replacement parts are no longer available and manufacturer support is limited.
- Eight 115kV group operated disconnects manufactured in 1969
 - Showing corrosion at rotating insulator bearings, jack screws, operating switch arms, linkage gear operator, bearings, and the galvanized end caps.

Flood risk

- Relocation of the transformers out of the BFE will reduce the risk of damage caused by flooding and allow for the installation of adequate oil containment.

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Project Needs – Points of Concern: Transformers



345/115kV transformers

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Project Needs – Points of Concern: Circuit Breakers



115kV BZO Oil Circuit Breakers

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Project Needs – Points of Concern: Disconnects



115kV group operated disconnects

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Project Needs – Points of Concern: Flood Risk – FEMA Flood Map



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Solution Alternatives

Option 1: Base Alternative + Online Monitoring

- Replace the two 345/115 kV transformers with new units according to National Grid standard. Connect each transformer independently.
 - Relocate transformers outside of BFE and away from existing power house owned by Brayton Point LLC.
 - Existing power house to be demolished after the relocation.
 - New location will be outside of base flood elevation and 100 year flood plain.
 - Will allow for adequate oil containment.
 - Updated configuration makes the most use of the standard transformer capability.
 - Add circuit breaker to the 345 kV indoor GIS for to connect one of the new 345/115kV transformers.
- Replace six 115kV OCBs with Gas Circuit Breakers (GCBs).
- Replace eight 115kV group operated disconnects with new units.
- Modernize protection and communications systems.
- Integrate online monitoring for transformers and battery banks according to National Grid standard.

Project cost: \$40.563M (-25/+50%) + \$0.515M (-25/+50%), 100% PTF

Estimated construction start date: Q4 2027

Estimated in-service date: Q2 2030

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Solution Alternatives

Option 2: Base Alternative + Online Monitoring + Additional circuit breakers

- Includes the scope of Option 1.
- Add one 345kV GIS circuit breaker and one 115kV GCB.
 - The addition of two breakers noted above improves the layout of the Brayton point substation by eliminating two critical breaker failure contingencies. In the steady-state analysis that was performed to support the PPA for the Brayton Point transformer replacement/addition, the analysis showed that approximately 400 MW of additional resources could be online at Brayton Point with the addition of the series breakers.
 - ISO-NE is supportive of adding the two breakers to the project scope.
 - From an implementation and constructability perspective, adding the series breakers now will avoid the risk of damaging existing interface equipment, avoid additional outages, and will be less intrusive than adding them in the future.
 - Additionally, we will miss on economies of scale if the breaker addition is not performed as part of the planned upgrade for the Asset Condition project.
- The estimated cost of the additional breakers is \$5.5M (-50/+200%).

Project cost: \$40.563M (-25/+50%) + \$0.515M (-25/+50%) + \$5.5M (-50/+200%), 100% PTF

Estimated construction start date: Q4 2027

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Questions

Brayton Point Substation Asset Replacements

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Please submit any written comments or feedback by September 05, 2024

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