

Deerfield 345/115 kV Relay Upgrades

Planning Advisory Committee Meeting

June 15, 2023

Agenda

- Project Background
- Project Location
- Project Drivers
- Project Scope
- Project Summary

Project Background

- Deerfield 345/115 kV substation located in Deerfield, NH has 7 lines terminating at the station
 - 345 kV lines 307, 373, 385 and 115 kV lines C129, D118, G146, L175
- Deerfield contains relays and communication equipment manufactured by both General Electric (GE) and Schweitzer Engineering Labs (SEL)

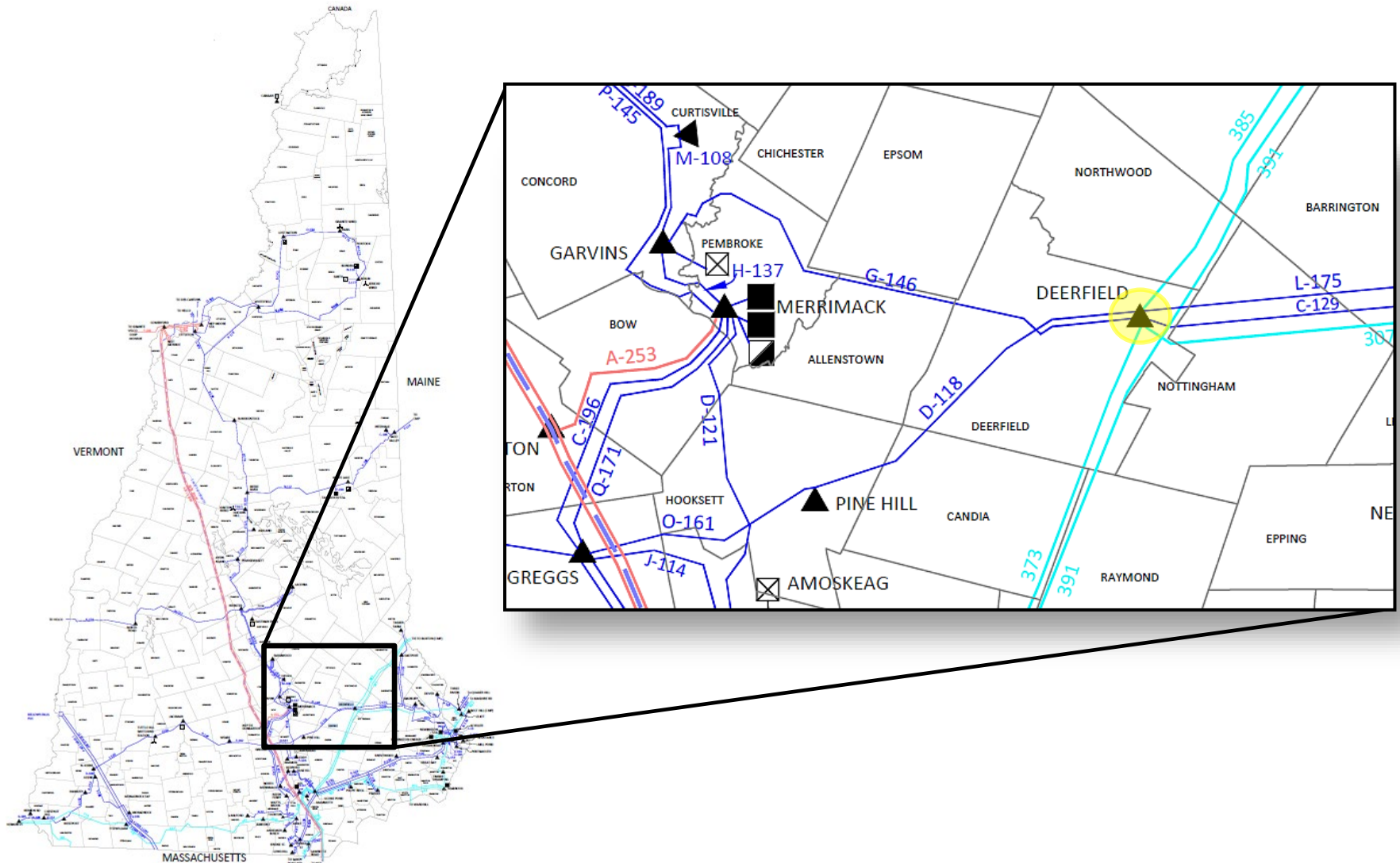


Deerfield– GE 115 kV Line D118
Secondary Protection Relay



Deerfield– SEL TB14 Primary
Transformer Differential Protection Relay

Project Location



Project Drivers

- Current relay/communication equipment no longer supported by manufacturers
 - Suppliers are no longer manufacturing replacements for failed units
- History of failures and mis-operations from certain GE relay types
- Proactively replacing obsolete equipment increases system reliability
- Coordinated replacement of multiple classes of relay/communications devices will minimize costs by improving efficiencies

Project Drivers

Asset Condition – GE Relays

- GE issued an advisory letter in 2013 stating that specific GE Central Processing Units, Power Supply Modules, and Firmware will no longer be manufactured
 - Product support was discontinued in July 2020
 - Lack of support heightens concern with reliable operations going forward
- GE has also issued a product advisory alluding to a large population of their relays being at risk for mis-operating due to a rare phenomenon known as “soft errors”
 - Upgrading to new platform GE relays is the recommended way to resolve the risk. Firmware upgrades alone are insufficient due to the age of the relays
 - Eversource has experienced these type of hardware and firmware related mis-operations from GE relays in the past at other major substations
- Impacted GE relays at Deerfield have an average age of 11 years with a 15-year life expectancy

Project Drivers – Schweitzer (SEL) Relays

- Current SEL relays at Deerfield lack the advanced sequential events recorder (SER) data, event reporting and monitoring capabilities that are heavily relied upon today when analyzing protection system performance
- Newer series SEL relays offer:
 - Faster operating protection, which can reduce equipment damage and improve system stability
 - More advanced communication protocols such as IEC 61850 and IEEE-1588 Precision Time Protocol (PTP), which are utilized by Eversource for protection, control, automation and time synchronization
- Replacement facilitates Power Line Carrier (PLC) elimination and conversion to differential protection over fiber
 - Improves reliability, redundancy, speed, and simplicity of protection
- Addressing relay asset condition issues presents the opportunity to utilize scheduling and mobilization efficiencies to perform a broad scope of relay improvements that would otherwise require additional efforts in the future

Project Scope & Summary

- Replace 15 relays (14 GE, 1 SEL) with new SEL relays
- To accommodate PLC elimination, 2 existing SEL relays will be modified and PLC equipment in yard, including wave traps and line tuning units, will be removed

- Estimated PTF Cost = **\$5.47 Million** (-25% / +50%)
- Projected In-service date: **Q2 2025**

Questions

