

NORTHEAST PUBLIC POWER ASSOCIATION

SUBSTATION II PROGRAM

SEPTEMBER 13 – 16, 2022

SEPTEMBER 27 – 30, 2022

OCTOBER 18 – 21, 2022

NOVEMBER 15 – 18, 2022

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Building on the success of Substation I, NEPPA is pleased to offer a completely redesigned Substation II Program which is held 3.5-days/week for 4 weeks/year.

Substation II expands on Substation I and moves into protection and controls, understanding operations, schematics, and diagrams, testing and test results interpretation of substation equipment. Upon successful completion of the Program, students are awarded a Certificate of Completion.

In addition to in-class lecture, the Substation II Program incorporates hands-on application of concepts and testing, building, and manipulating a relay panel, and weekly testing including a final exam to demonstrate knowledge and comprehension of the course content.

Each Friday of each session will be a half-day conducted virtually for review and testing.

WHO SHOULD ATTEND

This course is designed for:

- Lineworkers or operations employees
- Substation Technicians
- Employees or Supervisors transitioning from other departments
- Engineers
- Construction Supervisors
- Project Managers

LEARNING OBJECTIVES

Upon completion of this four-week program, participants will be able to successfully:

1. Apply concepts to design, build, maintain, troubleshoot, and repair a substation.
2. Demonstrate an advanced understanding and knowledge of applicable standards, specifications, and regulations such as OSHA, the NESC, and NERC/CIP.
3. Practice safely entering, exiting, and performing maintenance in a substation.
4. Apply advanced concepts of the substation's role in a distribution system including testing and programming.
5. Demonstrate ability to test and program equipment found in a substation, including applicable safety precautions and PPE
6. Demonstrate an advanced understanding of SCADA, as well as switching and tagging.
7. Demonstrate an understanding of how to operate and interpret relay functions.

PREREQUISITES

In order to be successful in the Substation II Program, students are expected to participate in the new Basic Electricity and Mathematics for Utility Operations course, as well as successfully complete the Substation I Program.



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INSTRUCTOR

Tim Richardson, P.E., Technical & Safety Trainer



Tim Richardson joined NEPPA in September of 2019 and has been an asset to the training team. Tim has a long history working in the electric utility industry, including as General Manager of Belmont Municipal Light Department from 1995 - 2007.

Most recently, Tim has worked as Principal of Fundy Power Services, LLC and at Consulting Engineers Group prior to that.

Tim brings a wealth of both technical and safety expertise to the organization and applies his expertise of both in an easy-to-understand and easy-to-learn approach.

TESTING

Weekly Tests (20 Questions); Mid-Term Exam (25 Questions); Final Exam (50 Questions)

SUPPLEMENTAL MATERIALS:

In addition to the printed student manual and a program t-shirt, participants are provided the following supplemental material(s)*:

1. Calculator
2. Distribution Transformer Handbook
3. UGLY's Electrical Reference

* Materials are provided in the Apprentice Lineworker, Advanced Lineworker and Substation I Programs and will only be distributed if a student has not already received them.

REGISTRATION FEES

Registration fees include coffee and lunch each day. If you have any dietary restrictions or considerations, please make note on your registration.

Members:	\$2,625
Non-Members	\$3,900

CANCELLATION POLICY

Cancellations are accepted until Tuesday, August 30, 2022. Substitutions may be made at any time prior to the start of the first session.

Cancellation fees will be charged based on the following schedule:

- 2 weeks prior** to the 1st scheduled week of class = 100% refund of registration fees
- Before completion of the 1st scheduled week** of class = 75% refund of registration fees
- Before completion of the 2nd scheduled week** of class = 50% refund of registration fees
- After the 2nd scheduled week** of class = 0% refund of registration fees



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AGENDA

Agenda details are subject to change.

Session I – Overview, Substation Operations, Protection (Part 1): September 13 - 16, 2022

Day 1

8:00 am Welcome & Introductions
 8:30 am Substation Safety, Switching & Tagging, 3-Part Communication
 9:30 Break
 9:45 am Substation Safety, Switching & Tagging, 3-Part Communication (Cont.)
 11:30 am Lunch
 12:00 pm Intro to Substation Design/Bus Types
 2:30 pm Adjourn

Day 2

8:00 am Feeder Protection
 9:15 am Break
 9:30 am Overcurrent Protection
 11:30 am Lunch
 12:00 pm Overcurrent Protection (Cont.)
 2:00 pm Adjourn

Day 3

8:00 am **Guest Speaker & Demonstration**
 11:30 am Lunch
 12:00 pm Transformer & Bus Protection
 1:00 pm Transmission Line Protection
 2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Review the Week;
 9:00 am Break
 9:15 am Week 1 Test
 10:30 am Review Exam Results
 11:00 am Adjourn

Session II – Protection (Part 2) and Substation Drawings: September 27 – 30, 2022

Day 1

8:00 am Welcome, Introductions & Recap
 9:00 am Relays – Operation & Interpretation
 9:45 am Break
 10:00 am Relays – Operation & Interpretation (Cont.)
 11:30 am Lunch
 12:00 pm **Guest Speaker: Relays**
 2:00 pm Adjourn

Day 2

8:00 am Elementary Schematics
 9:45 am Break
 10:00 am Lockout & Auto-Transfer Schemes
 11:30 am Lunch
 12:00 pm Hands-On Relay Panels Project
 2:00 pm Adjourn

Day 3

8:00 am Logic Diagrams
 9:15 am Break
 9:30 am Logic Diagrams
 10:00 am Hands-On Relay Panels Project
 11:30 am Lunch
 12:00 pm Hands-On Relay Panels Project (cont.)
 2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Review the Week;
 9:00 am Break
 9:15 am Week 2 Test
 10:30 am Review Exam Results
 11:00 am Adjourn



Session III – SCADA/Communications:

October 18 - 21, 2022

Day 1

8:00 am Welcome, Introductions & Recap
Weeks 1 & 2
8:30 am IEC 6150: What & Why
9:45 am Break
10:00 am Substation Networks
11:30 am Lunch
12:00 pm **Guest Speaker:**
Advanced SCADA Applications
2:00 pm Adjourn

Day 2

8:00 am SCADA Systems
9:30 am Break
9:45 am IED & Relay Communications
11:30 am Lunch
12:00 pm Hands-On Relay Panels Project
2:00 pm Adjourn

Day 3

8:00 am **Guest Speaker: NERC/CIP**
10:00 am Hands-On Relay Panels Project
11:30 am Lunch
12:00 pm Hands-On Relay Panels Project
2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Review the Week
9:00 am Break
9:15 am Week 3 Test
10:30 am Review Exam Results
11:00 am Adjourn

Session IV – Maintenance / Testing:

November 15 - 18, 2022

Day 1

8:00 am Welcome, Introductions & Recap
9:00 am Transformer Testing & Results
10:00 am Break
10:15 am Transformer Testing & Results (cont.)
11:30 am Lunch
12:00 pm Hands-On Relay Panels Project
2:00 pm Adjourn

Day 2

8:00 am Breaker Testing & Results (HV
Breaker vs. MV Breaker)
9:45 am Break
10:00 am Breaker & MV Switchgear Bus
Testing & Results (cont.)
11:30 am Lunch
12:00 pm Other Common Tests: Recap of
Equipment Testing (CTs/VTs,
Arresters, etc.); Circuit/Lockout
Verification; Ground Grid Testing
2:00 pm Adjourn

Day 3

8:00 am Miscellaneous Systems
10:30 am Hands-On Relay Panels Project
11:30 am Lunch
12:00 pm Presentation of Relay Panels Project
2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Final Recap of Weeks 1 – 3
9:45 am Break
10:00 am Final Exam
11:15 am Certificates of Completion
11:30 am Adjourn





*Northeast
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