

HIGH VOLTAGE ELECTRIC POWER TRAINING
Course Catalogue
INCLUDING AUDIT, PLANNING, AND CONSULTING SERVICES



ELECTRICAL INDUSTRY TRAINING INSTITUTE

Discover the Power of Training

Electric Power Training & Services

"EITI has been a large part of [our] business success. In an industry that is growing well beyond the supply of skilled and qualified tradesmen, we have come to rely heavily upon EITI to provide their expertise in training. Thanks to EITI, our workforce is now able to handle any large and complex project with efficiency and an exceptional, industry-leading safety record."

— CHRIS GRAJEK ALLTECK / QUANTA SERVICES, INC.



1.877.859.8228
www.eiti.us

Training for industry by industry

When safety, efficiency and system reliability are at stake, there is no room for error. You need a training program that not only meets and exceeds local and federal regulations and standards. You need a training program that sets the industry benchmark for best practices in the world. You need a training program that has withstood the test of time and proves a superior success rate, enabling your operation to obtain some of the highest safety and performance records in the industry. You need EITI to provide you with the right training at the right time.

Since 1991, EITI has trained thousands of industry personnel throughout the United States, Canada, Asia and the Middle East. Our diverse group of industry experts lead the industry in training on voltages up to 500 kv or more and in a variety of environments. Learn more about how EITI can help you achieve success – at your facility or ours.

Training for educational institutions

Educational institutions have the academic framework for preparing our next generation of industry workers, but they may not have EITI's wide breadth of expertise, extensive direct industry experience, world-renowned industry curriculum, and proven track record. EITI works with educational institutions to provide the training expertise they need to meet industry's demand for a qualified workforce.



ELECTRICAL INDUSTRY TRAINING INSTITUTE

Discover the Power of Training

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LINEMAN PROGRAMS

An outside electric power Lineman or Power Line Technician is a person who installs, constructs, alters, repairs, maintains, tests, services and operates related overhead, underground and marine electrical transmission and distribution systems.

All EITI programs are developed by world-renowned experts in the electrical power industry. Emphasizing safety and productivity, EITI programs meet and exceed all federal and state regulations and standards.

Today, EITI has gained a world-wide reputation for producing students that beat some of the highest competency rates in the country.



- **LINE WORKER PRE-APPRENTICE CERTIFICATE** (available via partnering educational institutions)
- **POWER LINE TECHNICIAN APPRENTICESHIP** (available where sponsored by an employer)
- **JOURNEYMAN UPGRADING** (customized to client site)

LINE WORKER PRE-APPRENTICE CERTIFICATE

This 8-week, highly intensive program is designed to prepare students for apprenticeship and career opportunities as a lineworker.

COURSE FORMAT

- 8 weeks, full-time (about 300 hours)
- 40% classroom instruction, including manuals, classroom exercises, and tests
- 60% hands-on instruction, including tools, simulations, and practicum in the field.

COURSE CONTENT

- Electrical Theory
- Safety and Safe Work Procedures
- Climbing
- Policies and Regulations
- Tools and Instruments
- Equipment
- Rigging
- Overhead Distribution
- URD Distribution

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with an academic grade of 70% or higher.
- Students must also demonstrate hands-on (practical) proficiency.

PRE-REQUISITES

- Students must be physically fit and able to perform all aspects of the job.

- Level One: There are no academic pre-requisites for this course.
- No previous work-related experience is necessary.
- Additional education may be required: English, Mathematics, Physics, and Computers.

REGISTRATION INFORMATION

- This program is currently only available in the United States of America.
- This program is offered through partnering educational institutions.

POWER LINE TECHNICIAN APPRENTICESHIP

This 15 week (3 level; 3.5 year) power line worker apprentice training program is sponsored by the employer, and includes more than 5,000 hours of work-based apprenticeship training.

COURSE FORMAT

- about 3.5 years to complete
- in-school: 15 weeks total or 5 weeks per level. This includes:
 - 40% classroom instruction, including manuals, classroom exercises, and tests
 - 60% hands-on instruction, including tools, simulations, and practicum in the field.
- work-based apprentice training: about 5,045 hours.

COURSE CONTENT:

PART 1 — PLT 100 AND PLT 101 (5 WEEKS)

- Policies and Regulations
- Tools and Instruments
- Electrical Theory Part 1
- Vehicle Proc. And Aerial Manlifts
- Basic Rigging
- Overhead Distribution
- U/G Residential Distribution

PART 2 — PLT 200 AND PLT 201 (5 WEEKS)

- Safety Regulations/Power System Safety Protection
- Electrical Theory Part 2
- Single Phase Transformation/Metering
- Rigging and Live Line – Distribution
- U/G Residential Distribution
- Grounding – Overhead

PART 3 — PLT 300 AND PLT 301 (5 WEEKS)

- Electrical Theory
- Equipment – Three Phase Transformation
- Rigging & Transformation (Liveline)
- (H) Distribution (Three Phase Metering)
- Distribution: Regulator, Capacitor, Reclose

COMPLETION, ASSESSMENT AND CERTIFICATION

- In-school: practical assessments and written exams for each level
- Work-based: completion of 5,045 workplace hours, a practical assessment, and employer/sponsor attestation.
- Inter-Provincial Red Seal: 7,567 documented hours of directly related work experience and final written exam.



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IP EXAMINATION COMPETENCIES:

1. Occupational Skills 21 %
2. Structures 14 %
3. Conductor Systems 20 %
4. Auxiliary Equipment 21 %
5. Operation, Maintenance and Repair 24 %

PROGRAM CREDIT

- Holders of a Certificate of Qualification as an Electrician may be eligible to receive practical experience credit and technical training credit.

PRE-REQUISITES:

- Students must be physically fit and able to perform all aspects of the job.
- There are no academic pre-requisites for this course.
- No previous work-related experience is necessary.
- Additional education may be required: English, Mathematics, Physics, and Computers.
- This program must be sponsored by an employer.

REGISTRATION INFORMATION

- This program is currently only available in Canada through sponsoring employers.

WORKER SKILLS EVALUATION

To increase the relevancy and effectiveness of your training program, we recommend a Worker Skills Gap Evaluation.

The pre-test ensures that your needs are clearly identified and exactly the right type of training is provided to fill the gap.

SKILL EVALUATIONS ARE AVAILABLE FOR

- Power Line Technicians
- Cable Splicers
- Meter Technicians
- Power Line Journeymen
- Cable Splicer Journeymen

POWER LINE WORKER JOURNEYMAN UPGRADING

Increase worker efficiency, system reliability, and high voltage safety with regular continuing education programs for experienced journeyman line workers. Also meet national and local regulations and standards with regular refresher training.

EITI offers a variety of Journeyman Lineworker programs to power companies throughout the nation. These programs are customized to suit the specific needs of the client and are delivered on-site, at the client's facility.

COURSE FORMAT

- Length as determined by the client. Typically one-week programs.
- 40% classroom instruction, including manuals, classroom exercises, and tests
- 60% hands-on instruction, including tools, simulations, and practicum in the field.

COURSE TOPICS:

As all programs are designed as modules, EITI can quickly customize a training program that suits the client's needs.

- Live Line Certification (500kV)
- Bare Hand Certification (500kV)
- Transformation upgrading for Line Workers
- Rigging, Fall protection, and Rescue procedures
- Reclosures, Capacitors, Voltage Regulators, Fusing, and Transformation
- Underground / Overhead Distribution, systems switching and maintenance
- Helicopter access

ASSESSMENT AND CERTIFICATION

- Students are expected to successfully complete the program with an academic grade of 70% or higher.
- Students are also expected to demonstrate hands-on (practical) proficiency.

PRE-REQUISITES:

- 3+ years of experience and/or training as a power line worker.
- Worker Skills Gap Assessment (and, if necessary, Facility Assessment) is performed by EITI prior to program delivery
- Additional education may be required: English, Mathematics, Physics, and Computers

REGISTRATION INFORMATION

- Contact EITI USA (www.eiti.us), EITI CANADA or EITI INTERNATIONAL (www.eiti.ca) for more information.



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ARBORIST PROGRAMS

Both horticulturists (who need to work around powerlines) and utility workers (who need to clear vegetation from energized power lines) require this important utility arborist training,

UTILITY ARBORIST CERTIFICATE

This program is for persons seeking a career as a Utility Arborist. This course is designed for people with an aptitude for horticulture who need to understand the challenges of working in close proximity to high voltage power lines.

COURSE FORMAT

- 6 week program
- 40% classroom instruction, including manuals, classroom exercises, and tests
- 60% hands-on instruction, including tools, simulations, and practicum in the field.

COURSE TOPICS:

- Safety hazards working near energized electrical equipment, structures and conductors
- OSHA regulations and ANSI standards
- Environmental awareness
- Tree health and evaluation
- Pruning trees, shrubs and vines
- Arboriculture best practices
- Felling trees and removal
- Climbing, rigging, and fall protection
- Aerial lifts and bucket trucks
- Safe chipper operation
- Other equipment operation (eg: chain saws)

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with a grade of 70%. This includes a final written exam and practical assessment

ISA CERTIFIED UTILITY ARBORIST EXAM

- Further practical apprenticeship training is required to acquire ISA Certification. This requirement includes 2400 hours of job related work experience, with not less than 1200 of these hours working in proximity to high voltage conductors.

PRE-REQUISITES:

- Students must be physically fit and able to perform all aspects of the job.
- There are no academic pre-requisites for this course.
- No previous work-related experience



- **UTILITY ARBORIST CERTIFICATE** (available via partnering educational institutions)
- **CERTIFIED UTILITY ARBORIST APPRENTICESHIP** (available where sponsored by an employer)

is necessary.

- Additional education may be required: English, Mathematics, Physics, Science, and Computers

REGISTRATION INFORMATION

- This program is currently only available in the United States of America.
- This program is offered through partnering educational institutions.

CERTIFIED UTILITY ARBORIST APPRENTICESHIP

This employer-sponsored apprenticeship program applies to both horticulturists (who need to work around powerlines) and utility workers (who need to clear vegetation from energized power lines).

COURSE FORMAT

- about 2 years to complete
- in-school: 6 weeks total (Part 1: 4 weeks; Part 2: 2 weeks. This includes:
 - 40% classroom instruction, including manuals, classroom exercises, and tests
 - 60% hands-on instruction, including tools, simulations, and practicum in the field.
- work-based apprentice training: 2,378 hours (of which, 1,200 hours must be in proximity to energized power line)

* NOTE: "proximity" applies to all work performed within 10 feet (3 meters) from a primary conductor with a voltage of 750 volts or greater.

COURSE CONTENT:

- Regulations
- Communications
- Pre-Work Planning & Accident Prevention

- Tools & Equipment (Small)
- Ropes & Knots
- Arboriculture
- Powerline Awareness
- Falling & Bucking
- Climbing
- Heavy Equipment
- Aerial Liftwork

COMPLETION, ASSESSMENT AND CERTIFICATION

- In-school: practical assessments and written exams for each level.
Note: Apprentices must also complete a home study package between levels 1 & 2 technical training. They are to complete "Manual 1 – Basic Arboriculture" and "Manual 2 – Advanced Arboriculture"
- Work-based: completion of 2,378 workplace hours, a practical assessment, and employer/sponsor attestation.
- ITA / BC Certificate of Qualification: 3,567 documented hours of directly related work experience and final written exam.

PRE-REQUISITES:

- Students must be physically fit and able to perform all aspects of the job.
- There are no academic pre-requisites for this course.
- No previous work-related experience is necessary.
- Additional education may be required: English, Mathematics, Physics, Science, and Computers

REGISTRATION INFORMATION

- This program is currently only available in Canada through sponsoring employers.



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POWERPLANT & SUBSTATION PROGRAMS

SUBSTATION OPERATIONS & MAINTENANCE CERTIFICATE

This program is designed for those electrical workers who are new to the substation environment. This 2-week program has been designed into four separate 2-3 day seminar programs to meet the needs of professionals of different backgrounds, from electricians to line workers.

COURSE FORMAT

- 2 weeks, full-time (about 75 hours)
- Also available as individual 2-3 day courses
- classroom instruction, including manuals, classroom exercises, and tests
- hands-on instruction, including tools and simulation.

COURSE CONTENT

- Schematic Reading & Troubleshooting (2 days)
- Protection Skills (3 days)
- High Voltage Safety and Operations (2 days)
- Substation Equipment (3 days)

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with an academic grade of 70% or higher.

PRE-REQUISITES

- There are no academic pre-requisites for this course.
- Some industry-related work experience is beneficial, but not required.
- Additional education may be required: English, Mathematics, Physics, and Computers.

REGISTRATION INFORMATION

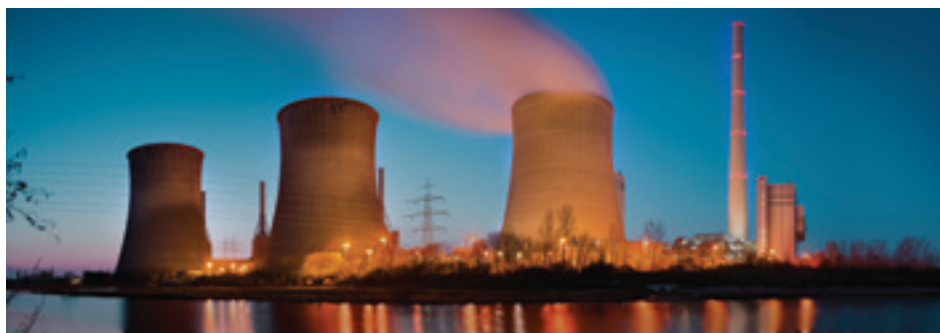
- This program is offered at selected training sites throughout the USA.

POWER PLANT OPERATIONS CERTIFICATE

This program is designed for students who are new to the powerplant environment.

COURSE FORMAT

- 3 weeks, full-time (about 100 hours)
- classroom instruction, including manuals, classroom exercises, and tests
- hands-on instruction, including tools and simulation.



- **SUBSTATION OPERATIONS AND MAINTENANCE CERTIFICATE** (available via partnering educational institutions)
- **POWERPLANT OPERATIONS AND MAINTENANCE CERTIFICATE** (available via partnering educational institutions)
- **JOURNEYMAN UPGRADING** (customized to client site)

COURSE CONTENT

- Metal Clad Switchgear
- Circuit Breaker Control
- Live Line Tools
- Unit Operations
- Governors
- Protection Relaying
- Troubleshooting – Drawings and Control
- Limits of Approach to Energized Conductors and Equipment
- Limits of Approach for Specially Trained Qualified Worker
- Worker Protection Grounding and Bonding
- Arc Flash Hazard
- De-energization and Lockout Awareness
- Power Transformers

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with an academic grade of 70% or higher.

PRE-REQUISITES

- Students must be physically fit and able to perform all aspects of the job.
- There are no academic pre-requisites for this course.
- Some industry-related work experience is beneficial, but not required.
- Additional education may be required: English, Mathematics, Physics, and Computers.

REGISTRATION INFORMATION

- This program is offered at selected training sites throughout the USA.

SUBSTATION/POWERPLANT JOURNEYMAN UPGRADING

Increase worker efficiency, system reliability, and high voltage safety with regular continuing education programs for experienced journeyman substation or powerplant operators. Also meet national and local regulations and standards with regular refresher training.

EITI offers a variety of Journeyman programs to power companies throughout the nation. These programs are customized to suit the specific needs of the client and are delivered on-site, at the client's facility.

COURSE FORMAT

- Length as determined by the client. Typically one-week programs.
- 40% classroom instruction, including manuals, classroom exercises, and tests
- 60% hands-on instruction, including tools, simulations, and practicum in the field.

COURSE TOPICS:

As all programs are designed as modules, EITI can quickly customize a training program that suits the client's needs.

- Switching and Operations Certification
- Electrical Drawings and Control Systems
- Electrical Protection Relaying for Substations
- Gas Technology for Power Stations
- Worker Protection Grounding and Bonding for Stations
- Operating and Maintaining Circuit Breakers
- Metal clad Switchgear
- High Voltage Safety and Operations



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- Distribution Troubleshooting
- Electrical Substation
- Field Switching and Electric Metering

ASSESSMENT AND CERTIFICATION

- Students are expected to successfully complete the program with an academic grade of 70% or higher.
- Students are also expected to demonstrate hands-on (practical) proficiency.

PRE-REQUISITES:

- 3+ years of experience and/or training as a power line worker.
- Worker Skills Gap Assessment (and, if necessary, Facility Assessment) is performed by EITI prior to program delivery
- Additional education may be required: English, Mathematics, Physics, and Computers

REGISTRATION INFORMATION

- Contact EITI USA (www.eiti.us), EITI CANADA or EITI INTERNATIONAL (www.eiti.ca) for more information.

SCHEMATIC READING AND TROUBLESHOOTING

This 2-day course is also part of the complete Substation Operations Certificate. See page 6 for more information.

COURSE CONTENT

- Learn to read and interpret schematics and wiring diagrams for motor control, circuit breaker, motor-operated disconnect switch control.
- Identify major components of the power station control and protection system.
- Learn to read and interpret advanced drawings, schematics, and diagrams for a mimic push button control board, control system interposing, control system interfacing, and complex circuit breaker controls.
- PLCs and batteries.

PROTECTION SKILLS

This 3-day course is also part of the complete Substation Operations Certificate. See page 6 for more information.

COURSE CONTENT

- Worker Protection Grounding and Bonding
- Understand the various types and sizes of safety grounds.
- Factors related to shock and other effects of electric current on the human body.

- Understand Parallel Resistance
- Principles of Induction
- Understanding accidental energization, hazards associated with improper grounding technique and how to minimize risks.
- Step and Touch Potential
- Principles on limits of approach, safety protection, work area, auxiliary isolation, and potential testing.
- Establish Worker Control and applicable installation methods
- Ground Grid areas, Ground Leads, Ground Clamps, and other grounding methods.
- Protection Relaying for Substations: electrical power system, frequency and power control, voltage and var control, basic relay elements, elements of protection, key protection terms, target schemes and limitations, CO-relay based protection, CO-relay based feeder-bus protection, SEL feeder and feeder-bus protection.
- Describe transmission line fault locating: Interpret targets and alarms for transformers, shunt reactors, bus protection.
- Understand generation, high voltage bus, transformer, transmission and distribution line protection.
- Analyze target and alarms for generators, transmission and distribution line faults, and for bus protection.

HIGH VOLTAGE SAFETY AND OPERATIONS

This 2-day course is also part of the complete Substation Operations Certificate. See page 6 for more information.

COURSE CONTENT

- Limits of Approach: Use laser measuring tool to measure LOA distances; How to determine voltages; Identify and measure conducting or energized parts of equipment; and Work area barrier installation requirements and proper set-up.
- Grounding: Live Line Tools, "hot sticks", voltage markers; field care of LL tools; testing.
- Ops and Switching: due diligence; duties and responsibilities of a supervisor; Lockout vs. Tagout; Arc Flash Safety; controlling hazardous energy; and best practices for preventing injury while maintaining or testing electrical or mechanical equipment.
- Arc Flash Hazard; arc flash safety; physiological effects of arc flash exposure and shock; personal protective equipment and clothing; and ways to reduce arc flash hazards and control workplace hazards.

SUBSTATION EQUIPMENT

This 3-day course is also part of the complete Substation Operations Certificate. See page 6 for more information.

COURSE CONTENT

- Power Transformers: electromagnetic induction; primary and secondary voltage, current transformers, and potential transformers; power transformer cooling systems; temperature gauges; level gauges; sealing systems; gas-sealed and conservator-type sealed power transformers
- Circuit Breakers: roles of speed, distance, cooling, dielectric strength, and current zero in extinguishing arcs; air-magnetic circuit breakers; air-blast circuit breaker; oil circuit breaker; vacuum circuit breaker; gas-blast circuit breaker; gas-puffer circuit breaker; solenoid operating mechanism; motor/spring operating mechanism; pneumatic operating mechanism; hydraulic operating mechanism; metal clad switchgear components, accessories, grounding, maintenance and safe operation; circuit breaker control features (semaphores); "Racking" technique
- Voltage Regulators: Step Voltage Regulator; Transformer Principles; Step Voltage Regulator Components, Equipment, Construction and Controls; voltage regulation is needed in a transmission and distribution system; Line Drop Compensation; Switching Arrangements, Sequence, and Procedures; Result of a Break in the "SL" Conductor
- Capacitors and Reactors: substation capacitor banks maintenance, inspection, problems; how to safely remove individual capacitors and capacitor fuses; special precautions when handling capacitors containing PCB's; Testing the integrity of insulators and internal resistor of a substation capacitor; capacitance of substation capacitors; balance of a substation capacitor bank; substation shunt reactors; inspecting a substation oil insulated shunt reactor and an air-core shunt reactor; how to safely de-energize, isolate, test, and ground a shunt reactor.
- Series Reactors: function and how it operates.

WORKER SKILLS EVALUATION

To increase the relevancy and effectiveness of your training program, we recommend a Worker Skills Gap Evaluation. The pre-test ensures that your needs are clearly identified and exactly the right type of training is provided to fill the gap.



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ENGINEERING CONTINUING EDUCATION PROGRAMS

EITI offers specialized courses to upgrade the skills of engineers and senior technical staff in the utility environment.

CIRCUIT BREAKERS FOR ENGINEERS

This 1-week program is designed to give professional engineers a thorough understanding of circuit breakers, from the history of circuit breaker development to application and safety concerns. Ultimately, it will help an engineer to design and specify a safer, more reliable, and cost effective system.

COURSE FORMAT

- 5 days
- classroom instruction, activities and tests.

COURSE CONTENT

- Introduction to Circuit Breakers
- Fundamental Considerations
- Current Interruption
- Load Current Switching - Inductive
- Load current switching - capacitive
- Terminal faults
- Short line faults
- Out of phase switching
- Rated continuous current
- Dielectric
- Other requirements
- Circuit breaker specification, selection and commissioning

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with an academic grade of 70% or higher.

PRE-REQUISITES:

- Designed for Electrical Power Engineers, Technicians or Consultants with bachelor's degree or equivalent education and experience in engineering technology.

REGISTRATION INFORMATION

- This program is offered at selected training sites throughout the USA.



- **CIRCUIT BREAKERS FOR ENGINEERS**
- **SURGE ARRESTER APPLICATION AND INSULATION COORDINATION IN AC POWER SYSTEMS**
- **UNDERSTANDING CURRENT INTERRUPTION TRANSIENTS: TRVS, REIGNITIONS AND RESTRIKES**
- **POWER GENERATION ORIENTATION – DEVELOPMENT, OPERATION AND MAINTENANCE**
(available at selected sites throughout the USA or customized to client site)

SURGE ARRESTER APPLICATION AND INSULATION COORDINATION IN AC POWER SYSTEMS

This 2-day program is designed to give professional engineers a thorough understanding of the characteristics and application of metal oxide surge arrestors. With an emphasis on efficiency and reliability, this program will provide a combination of practical know-how and theoretical understanding to effectively apply surge arresters for the overvoltage protection of substation and transmission equipment. Ultimately, this course will help you reduce the risk of insulation failure of key electrical equipment, minimize outages, improve system reliability and reduce costs.

COURSE FORMAT

- 2 days
- classroom instruction, activities and tests.

COURSE CONTENT

- Introduction and Overview: What Is Insulation Coordination and How Do We Achieve It?
- Statistics for Insulation Coordination: Tools to Characterize Overvoltage Probabilities, Magnitude and Frequency and Their Role in Insulation Coordination
- Power System Overvoltages: Causes and Classification
- Insulation Types and Strengths
- Rated Equipment Withstand Voltages and Testing
- Practical Workshop on Determining Equipment Rated Withstand Voltages

- Surge Arresters
- Practical Workshop on Arrester Selection
- Arrester Application Examples
- Practical Workshop on Arrester Application in Substations

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with an academic grade of 70% or higher.

PRE-REQUISITES:

- Designed for Electrical Power Engineers, Technicians or Consultants with bachelor's degree or equivalent education and experience in engineering technology.
- Ideal for those involved substation design, transmission line design, surge arrester application, or specification, installation, or testing of medium or high voltage substation or transmission equipment.
- Students should be familiar with the basic relationships in electric power systems and the role of transformers, circuit breakers, and other switching devices. The course does not require previous experience with the application of surge protective devices.

REGISTRATION INFORMATION

- This program is currently only available in the United States of America.
- This program is offered at selected training sites throughout the USA.



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UNDERSTANDING CURRENT INTERRUPTION TRANSIENTS: TRVS, REIGNITIONS AND RESTRIKES

This advanced course covers the origin and derivation of the transient recovery voltage (TRV) requirements for circuit breakers applied for fault clearing and the switching of inductive and capacitive loads. The course first develops the fundamental concepts involved following current interruption including oscillatory circuits, symmetrical components and travelling waves. The developed concepts are then applied to the individual current interruption case TRVs and associated reignitions or restrikes. All cases are well illustrated by real examples. At the end of the course, attendees will have an in-depth knowledge and understanding of the TRV requirements in IEC standards and also know how to deal with exceptional cases.

COURSE FORMAT

- 2 days
- classroom instruction, activities and tests.

COURSE CONTENT

- Introduction
- Oscillatory Circuits
- Symmetrical Components
- Travelling Waves
- Terminal Faults
- Short Line Faults
- Out-of-Phase Switching
- Inductive Load Switching
- Capacitive Load Switching
- Fundamental basis for TRVs and reignition and restriking transients
- Derivation of pole factors and amplitude factors associated with TRVs as specified in IEC 62271-100 and IEEE C37.04, C37.06 and C37.09
- Calculation of the effects of adding surge capacitors to control TRVs; effect of shunt capacitor banks, load sharing reactors and opening resistors
- Calculation of TRVs and reignition and restriking transients associated with inductive and capacitive loads, respectively.

ASSESSMENT AND CERTIFICATION

- Students must successfully complete the program with an academic grade of 70% or higher.

PRE-REQUISITES:

To benefit from the course attendees should have a basic prior knowledge of the following:

- Electric circuit theory.
 - Trigonometric and exponential functions.
 - Symmetrical components.
 - IEC Standards 62271-100 and 62271-110 or IEEE Standards C37.04, C37.06 and C37.09.
 - Use of Excel for equation based calculations.
- * *Bring a calculator and a laptop loaded with Excel.*

REGISTRATION INFORMATION

- This program is currently only available in the United States of America.
- This program is offered at selected training sites throughout the USA.

POWER GENERATION ORIENTATION – DEVELOPMENT, OPERATION AND MAINTENANCE

This 2 to 3 day orientation program is designed for operating and maintenance engineers, managers, and senior technicians working in the hydro generation portion of the company. This custom program reviews power system life cycle costs, system design, energy and water supply considerations, operations, maintenance, testing and evaluation. It is designed to help a utility operation become more effective and efficient.

Each course will be specifically customized to take into consideration the client's needs as well as their generation facilities and the local utility business environment.

TARGET AUDIENCE

Operating and maintenance engineers and managers, delivered at the client's hydroelectric generation site.

COURSE FORMAT

- 3 days, on-site
- classroom instruction, activities and tests.

COURSE CONTENT

- Critical first decisions for power system lifecycle costs
- Hydropower plant design using client facilities as examples
- System considerations, speed and voltage regulation
- Water hammer in penstocks, the dangers and solutions & Pumped Storage
- Hydropower operations and its application to the client's facilities
- Maintenance using clients facilities as examples
- Unit commission and testing - looking at the testing done by client
- Requests for Proposals (RFP) compared to client practices
- Critical first decisions for power system lifecycle costs

SHUNT REACTOR SWITCHING

This customized program can be delivered anywhere in the country or around the world.



Course Catalogue

INDUSTRY TRAINING FOR MANAGERS AND NON-ELECTRICAL WORKERS

From general, non-technical industry orientation to help you better understand the challenges your workers face ... to improving the development, operation, maintenance, marketing, and profitability of your electric power company, EITI provides the specific and relevant classroom and field training that will help you generate results. If you want to make a real and positive impact on your bottom line, call EITI.

ELECTRICAL UTILITY INDUSTRY ORIENTATION

This course covers the history of the electrical utility industry and the major events and players which have brought us to today. It includes explanations of the basic concepts of energy and electricity as a foundation for understanding of the way the industry works.

COURSE FORMAT

- 2 Days
- Class Size: Up To 12

COURSE CONTENT

- How electricity is generated and the different forms of generation most commonly used. Describe the region's major generation sources.
- How electricity is transmitted from generation sites to the major areas of consumption, and the types of the region's major transmission network.
- The distribution of electricity to residential, commercial and industrial customers, as well as the metering of electricity.
- How the electricity system in the region is planned, controlled and coordinated to meet various priorities and consumers.
- The pressures and changes facing the electricity system and how the major players in the region's electricity industry are preparing to meet those challenges.



- **ELECTRICAL UTILITY INDUSTRY ORIENTATION**
- **OVERVIEW OF ELECTRICAL UTILITY STRUCTURES EQUIPMENT AND HARDWARE**
- **FIELD ORIENTATION FOR MANAGERS**
- **MANAGERS IN TRAINING (MIT) ORIENTATION**
- **ELECTRIC METERING – OVERVIEW FOR OFFICE PERSONNEL**
(available as customized programs, delivered to client site)

OVERVIEW OF ELECTRICAL UTILITY STRUCTURES EQUIPMENT AND HARDWARE

This course covers electrical safety awareness and provides an introduction to specific electrical utility structures, equipment and hardware.

COURSE FORMAT

- 1 Day
- Class Size: Up To 12

COURSE CONTENT

- Limits of Approach to Energized Electrical Equipment
- Tour training yards/review use of live line tools
- Introduction to Utility Hardware (Transmission, Distribution Overhead & Underground)
- Metering Standard
- Electric Meter Numbering System
- How to Read Meters

FIELD ORIENTATION FOR MANAGERS

This program is designed to provide management personnel with an orientation to transmission and distribution hardware and equipment, including underground distribution and substations. A broad scope of information is covered, but limited in detail to allow many topics to be covered in the three-day schedule. The program will include both classroom and hands-on experiences (e.g. use of live line tools, switching equipment, bucket trucks) and confined space equipment.

The program is intended to provide participants with an enhanced knowledge of the corporation's system, safe work practices, and work methods utilized by their employees/contractors, as well as identification of specific electrical equipment.

TARGET AUDIENCE

Managers new to the role of Field Manager within an electric utility

COURSE FORMAT

- 3 Days
- Class Size: Up To 12

OTHER PROGRAMS

Other courses may also be relevant to managers and supervisors.

Please review other chapters for courses that may interest you.



Course Catalogue

COURSE CONTENT

- Awareness of the different structures and hardware used in the overhead & underground distribution and transmission systems.
- Awareness of the hazards that make grounding necessary and explain grounding theory and application.
- Basic maintenance requirements and work methods
- Familiarization with the various types of electric metering
- Electrical hazards and how to control or mitigate the risks.
- Awareness of the safety training & certification requirements for all individuals working on/ around the electrical system

FIELD VISIT: UNDERGROUND DISTRIBUTION FIELD

- Counterpoise system (public and worker safety)
- Pulling an elbow
- Grounding elbow
- Operate a Mark 11 switch
- Live and Dead Front equipment
- Provide an opportunity to perform hands on use of UD tools

MANAGERS IN TRAINING (MIT) ORIENTATION

Designed for Field Operations managers and supervisors, participants are given elements of the managerial role appropriate to their experience. This commonly includes projects or process improvement work. The scope of the role will broaden as more experience is gained. Ultimately a MiT will be managing teams, ensuring their safety, directing their work, and improving efficiencies (e.g. restoration, maintenance, design, and construction of services to the electrical power distribution and transmission system.)

COURSE FORMAT

- 4 Days (2 days per session)
- Class Size: Up To 12
- hands-on experience in related to field work to gain an understanding of the technical issues encountered when overseeing crews and conducting equipment and work practices inspections

COURSE CONTENT:

PART 1 — 2 DAYS

- Overhead and Underground distribution components, maintenance Requirements and Work Methods
- Common Hot and cold distribution work practices
- Worker Protection Grounding/bonding procedures
- Overview of safety regulations
- Job Planning/Tailboards
- Limits of Approach to energized equipment
- Overview of First Responder procedures and Traffic Control
- Introduction to Rubber Glove equipment
- Live line tools and attachments
- Common knots and hitches
- Underground utility cable related tools and equipment, work methods including entry into confined spaces
- Identification of equipment in the field using one-line diagrams
- Hands on performance of work procedures including changing a fuse in a Mark II and removing an elbow from a Low Profile Transformer (LPT).

- Install grounding on LPT and Dead Front Transformer
- Performing Field Inspection – Safe Work Observation of various tasks performed by PowerLine Technicians
- Tour of energized substation

PART 2 — 2 DAYS

- Metering overview
- general overview of Meter Shop operations
- Principles of Ropes and Knots and Mechanical Advantages Principles
- Bucket Truck Rescue demo/practice
- Familiarization with Pole Climbing and Fall Arrest Equipment
- Pre-Trip Inspections/Bucket Truck/Line Truck Familiarization
- Live Line work performed from a Bucket Truck – Instructor lead demonstration in use of live line tools and Limits of Approach followed by participants performing a live line task i.e. install a line guard or untie a insulator
- Guy Tension Installation - Instructor lead demonstration followed by: Participants performing the task
- Rubber Glove – Install Hood/Line Guard - Instructor lead demonstration followed by participants performing the task
- Voluntary exercise – Pole Climbing
- Electrical Knowledge Quiz
- Review and explain the Field Services Audit & Inspection Report contents and how best apply them when performing simulated site inspections later in the day in 5 different scenarios
- Review and explain in general such items as:
- Confined Space Entry and Rescue procedures
- Underground work related policies, Procedures, Work Methods
- Demonstrate the installation of a UD Elbow and Terminator] on #1 UD concentric cable and have participants under direction complete the process.

ELECTRIC METERING – OVERVIEW FOR OFFICE PERSONNEL

Electrical metering for non-technical personnel.



Course Catalogue

OTHER COURSES

DISTRIBUTION TRANSMISSION LINEWORK INTRODUCTION

This course provides electrical utility employees with a physical demonstration and hands-on experience of the working environment, tools and work methods for Field Operations crews. The goal is to help employees have a practical understanding of the field work that will be required to fulfill their applicable duties.

TARGET AUDIENCE

Individuals who have a career objective to become a Powerline Technician

COURSE FORMAT

- 2 Days
- Class Size: 10 - 12

COURSE CONTENT

- Recognize common distribution structures and potential electrical service reliability problems
- Discover the common distribution line work and switching methods and summarize when and where they are most likely to be used
- Awareness of the structural and safety factors encountered while performing Trouble restoration
- Preparation and set-up required to perform common distribution line work methods
- The working conditions for PLTs in various distribution settings
- Mimic an instructor's actions to use a hot stick in basic live line tasks
- Mimic an instructor's actions to use a line truck to manoeuvre distribution hardware components (transformer)

LIMITS OF APPROACH

This course helps student understand the Limits of Approach (LOA) methodology as per local and national standards and regulations.

COURSE FORMAT

- 0.5 Day
- Class Size: Up To 12

COURSE CONTENT

- Limits of Approach Methodology to Energized Equipment
- Determining Voltages
- Identifying Conducting or Energized Parts of Equipment



- DISTRIBUTION TRANSMISSION LINEWORK INTRODUCTION
- LIMITS OF APPROACH
- OPERATIONS & SWITCHING
- ELECTRICAL DRAWINGS AND CONTROL SYSTEMS
- CIRCUIT BREAKER – GENERAL
- GAS TECHNOLOGY IN POWER SYSTEMS
- REGULATORS, CAPACITORS, REACTORS AND RECLOSERS
- METER DISCONNECT
- PROJECT CONTROLLER & PIC TRAINING
- ENERGIZED LOW VOLTAGE WORK PROTECTION
- UNDERGROUND UTILITIES AWARENESS WORKSHOP
- INTRODUCTION TO UNDERGROUND UTILITY PRINT READING
- CONFINED SPACE SAFETY
- CONFINED SPACE HAZARDS AND AWARENESS
- EARG CONFINED SPACE
- FIELD OPERATIONS CONFINED SPACE
- BREAKING INTO CONCRETE DUCT BANKS AND OTHER FACILITIES WITH ENERGIZED ELECTRICAL CABLES
- HELICOPTER AWARENESS
- HELICOPTER LONG LINE OPERATIONS
- SCAFFOLDING
- INTRODUCTION TO RIGGING
- FALL PROTECTION
- TOWER PAINTING PROCEDURES
- JOB SITE PLANNING AND TAILBOARD
- PERSONAL PROTECTIVE EQUIPMENT
- WORK PROTECTION PRACTICES (WPP) (LOCKOUT EQUIVALENT)
- POWER SYSTEM SAFETY PROTECTION (PSSP)
- HAND AND POWER TOOL SAFETY
- CHAIN SAW SAFETY
- RESPIRATOR FIT TESTING
- OPERATION OF SPECIALIZED EQUIPMENT — BUCKET TRUCK RESCUE
- ENVIRONMENTAL TRAINING
- INTRODUCTION TO INSPECTIONS
- ELECTRICAL INSPECTORS' DISCONNECT COURSE
(available as customized programs, delivered to client site)



Course Catalogue

- Measuring Methods from High Voltage Conductors
- Identifying Work Area Barriers: installation requirements and identify proper set-up.

OPERATIONS & SWITCHING

This is a hands-on course covers theory and practical application of doing actual switching and grounding exercises at a substation.

TARGET AUDIENCE

Apprentice OADs and Apprentice Electricians.

COURSE FORMAT

- 4 days
- Class Size: 6-8
- 60% hands-on at substation
- 40% classroom

COURSE CONTENT

- Distribution switching
- Transmission switching
- Working off the power system (Lockout)

ELECTRICAL DRAWINGS AND CONTROL SYSTEMS

This hands-course is designed for workers who are required to operate, maintain and troubleshoot high voltage equipment on the electric utility systems, e.g. Electricians, OADs, Telecontrol Technicians, and apprentices.

COURSE FORMAT

- 4 days
- Class Size: 8
- hands-on in mock substation

COURSE CONTENT

- Principles of reading and interpreting electrical schematics, motor control schematics, and circuit breakers.
- Control system interfacing and interposing, mimic push-button control breaker controls.
- PLCs and batteries.

FULLY OPERATIONAL EQUIPMENT INSTALLED IN MOCK SUBSTATION

- Circuit breakers BJOB, KSO, and FKP
- Motor operated disconnect
- Remote control (i.e. interposing) and a remote control board
- Modicon PLC control system
- Battery charger

CIRCUIT BREAKER – GENERAL

This generic circuit breaker course is intended to familiarize the participants with the basic principles involved. All types of high voltage breakers will be looked at from an operations and maintenance standpoint.

TARGET AUDIENCE

Electrical workers who must install, maintain, troubleshoot and operate high voltage switch gear.

COURSE FORMAT

- 4 days
- Class Size: 4-8

COURSE CONTENT

- Overview of nameplate data, ratings, and specification
- Methods of electric arc suppression
- Techniques to interrupt operating and fault currents
- Breaker contact construction materials, its maintenance and problems
- Interrupter operations and typical problems for various circuit breaker types
- Purpose and application of circuit breaker accessories
- Components and performance of control circuitry
- Procedures and equipment used in circuit breaker commissioning, troubleshooting, and diagnostics

GAS TECHNOLOGY IN POWER SYSTEMS

This course offers a combination of theory and hands-on practice, providing a thorough understanding of all gasses used in typical power systems operation. This course is designed for the substation crews responsible for operating, testing, troubleshooting and maintaining gas controlled or operated equipment. Safety and environmental concerns are stressed in both the theory and practice sessions. A typical air drier and SF6 gas cart computer simulation is used for instruction.

TARGET AUDIENCE

Electrical crews, managers, contractors, or any employees or managers who are responsible for maintaining gas-operated equipment.

COURSE FORMAT

- 4 days
- Class Size: maximum 8

COURSE CONTENT

- Gas physics and laws
- Units and standards of measurement
- Gas measurements for pressure, weight, moisture, and purity
- Compressed air systems, compressors, dryers, controls, safety, and troubleshooting.
- Dielectric gases, properties, and measurements
- SF-6 environmental and safety concerns
- SF-6 gas cart operations and SF-6 handling procedures
- SF-6 removal and replacement, including drying and purifying
- Mixed gases

REGULATORS, CAPACITORS, REACTORS AND RECLOSERS

This course is for employees who are required to operate, maintain or troubleshoot 1-Phase & 3-Phase Regulators shunt capacitors, series capacitors, shunt reactors, series reactors, reclosers.

TARGET AUDIENCE

Electrician Apprentices and OAD Apprentices who may be required to operate, maintain or troubleshoot this equipment.

COURSE FORMAT

- 1 day
- Class Size: 6-8

COURSE CONTENT

- 1-Phase & 3-phase regulators
- Shunt & series capacitors
- Shunt & series reactors
- Circuit reclosers

METER DISCONNECT

Metering disconnect program for industry personnel.

PROJECT CONTROLLER & PIC TRAINING

COURSE CONTENT

- Key terms relating to Project Controllers
- Forms relating to Project Controllers
- Mimic Displays
- Relevant documents relating to Project Controllership (operating orders, SPR, Multi Employer Workplace (MEW))
- Worker Protection Grounding/Bonding (WPGB)
- Substation New Equipment Testing



Course Catalogue

ENERGIZED LOW VOLTAGE WORK PROTECTION

This course covers work protection methods for energized low voltage work protection.

COURSE CONTENT

- Summarize regulations for Low Voltage Work
- Identify which hazardous low voltage scenarios require low voltage work protection using the appropriate methodology
- List the four things to look for when inspecting your LV rubber gloves
- Describe how to care for your LV rubber gloves
- Use low voltage work protection on the job

UNDERGROUND UTILITIES AWARENESS WORKSHOP

This course is designed to provide students with the necessary knowledge to make safe decisions prior to moving earth in the vicinity of underground utilities, and to learn to follow industry's best practices.

COURSE FORMAT

- 4 hours
- Class Size: maximum 12

COURSE CONTENT

- Applicable regulations and other relevant legislation (i.e. Gas Safety Regulation)
- Implications of due diligence
- Hazards that each of the utilities pose in a dig scenario
- Process of planning a safe dig
- Appropriate color markings for each utility
- Best practices of digging and excavation around utilities
- How to correctly assess the job site
- How to safely expose each utility based on their requirements.
- Contractor responsibility if a utility is contacted
- Procedures to follow if an accident or contact occurs on an underground utility

INTRODUCTION TO UNDERGROUND UTILITY PRINT READING

To provide participants with the information necessary to read and work with common underground utility prints, in order that participants will be able to identify the approximate location of underground equipment before the crew exposes them by hand.

COURSE FORMAT

- 4 hours
- Class Size: maximum 12

COURSE CONTENT

- Applicable regulations, standards, and other relevant legislation (i.e. Gas Safety Regulation)
- Due diligence
- Appropriate color markings for each utility
- Five common reasons why underground equipment is damaged
- Uses of the Plan and Profile found on some utility prints
- Common Utility Print Items on most underground utility prints
- Underground prints to identify the approximate location of all underground equipment before an excavation

CONFINED SPACE SAFETY

COURSE FORMAT

- 1 day
- Class Size: maximum 8

COURSE CONTENT

- Identify a confined space, describe what it is and explain its dangers
- Describe the difference between Low, Moderate and High hazard confined space atmospheres.
- Define key terms used in describing Confined Space Atmospheric conditions.
- Describe the various types of Atmospheric and Physical hazards that might exist in a confined space.
- Demonstrate how to conduct a Bump Test on a Gas detection monitor.
- Conduct air quality sampling of a confined space.
- Properly set up and run a mechanical ventilation system, including knowing the appropriate placement of the outlet/intake hoses.
- Describe the requirements for stand-by and rescue personnel'
- Properly don a rescue harness and set up a rescue tripod.

CONFINED SPACE HAZARDS AND AWARENESS

The course focuses on the hazards and awareness of working in and around confined spaces.

COURSE FORMAT

- 1.5 hours
- Class Size: maximum 8

COURSE CONTENT

- Describe the confined space working regulations and procedures
- Identify hazards involved with working in confined spaces
- Discuss requirements for confined space hazard assessment
- Be familiar with standards and regulations on Confined Spaces

EARG CONFINED SPACE

This session of Confined Space training puts into practice the control and/or monitoring of confined space hazards. The course reviews the essentials of atmospheric testing with gas detectors, ventilation practice, standby person duties / responsibilities, an overview of confined space entry equipment and communication protocols for confined space entry.

COURSE FORMAT

- 1 day
- Class Size: maximum 8

COURSE CONTENT

- Perform atmospheric testing with the pre-scribed equipment and interpret the results
- Describe and perform appropriate ventilation procedures
- Execute the duties of a standby person
- Set up and use prescribed equipment for any confined space
- Outline emergency communication protocols required for confined spaces

FIELD OPERATIONS CONFINED SPACE

The course focuses on the training required before Transmission and Distribution employees work in or around confined spaces.

COURSE FORMAT

- 1 day
- Class Size: maximum 8

COURSE CONTENT

- Define confined space
- Review written work procedures for Confined Spaces
- Apply standards and regulations to confined space work



Course Catalogue

BREAKING INTO CONCRETE DUCT BANKS AND OTHER FACILITIES WITH ENERGIZED ELECTRICAL CABLES

This course is intended to provide contractors with the information they need to safely break into duct banks and related facilities with energized electrical cables. This course is beneficial for Civil Contractors, Civil Inspectors, Safety Watchers, Designers & Engineers at the Specialist level who will design and work on Distribution Feeders.

COURSE FORMAT

- 6 hours
- Class Size: maximum 12

HELICOPTER AWARENESS

Instruction on the special procedures and behaviors required to safely work or travel in these aircraft. Includes discussion about the special hazards of being in close proximity to helicopters.

TARGET AUDIENCE

All personnel who may be required to travel on or work with helicopters.

COURSE FORMAT

- 3 hours
- Class Size: maximum 16

COURSE CONTENT

- Personal protective equipment requirements
- Approaching, entering and exiting the machine
- Communication with the pilot including signaling
- Hazardous zones around the machine
- Emergency procedures
- Loading and unloading procedures
- Load rigging and slinging
- Marshalling yard procedures and safety

HELICOPTER LONG LINE OPERATIONS

This course is required prior to performing any helicopter long line operations. It is applicable to all workers using helicopters to sling loads (incl. CPC Techs, GEN Workers, Trans PLTs and managers approving this work)

COURSE FORMAT

- 1 hour
- Class Size: maximum 16

COURSE CONTENT

- Local and National Standards and Regulations, industry "best practices" work procedures pertaining to helicopter long line operations.
- Discuss the applicable Regulations, Standards, and Procedures
- Helicopter Long Ling Rigging - information on how to rig (the rope, slings, hooks etc) under the aircraft.

SCAFFOLDING

A practical scaffold building course that enables participants to build and use safely a wide variety of scaffold structures using the three component families: end-frame/crossbrace, system scaffold and tube/clamp. All structures will be built in accordance with recommendations from the Scaffold Industry Association, the United Brotherhood of Carpenters, and regulations on Ladders, Scaffold and Temporary Work Platforms from relevant OH&S / OSHA regulations and standards.

TARGET AUDIENCE

All tradespersons and helpers who erect and/or work from scaffolding platforms.

COURSE FORMAT

- 1-3 days
- Class Size: 6-12

COURSE CONTENT

- Tradespersons will be capable of building a:
 - 5'x7' free-standing tube/clamp scaffold tower with an inside ladder, outside ladder and stairway
 - 5'x7' free-standing system scaffold tower to a height of 20' with inside and outside ladders and stairway
 - 5'x7' rolling scaffold tower using endframe/crossbrace to a height of 20' using an inside ladder only for access.
- Tradespersons will be capable of using safety planks on sawhorses, extension ladders with/without ladder jacks, and small scale wooden scaffolds.

INTRODUCTION TO RIGGING

This program provides the skills and knowledge required to safely and effectively complete lifting tasks for heavy loads requiring rigging or barrier installation and removal. Such work is often required in close proximity to energized electrical equipment, so the safe and effective installation and removal of proximity barriers is included in combination with rigging procedures.

TARGET AUDIENCE

Workers required to handle heavy loads in close proximity to energized electrical equipment.

COURSE FORMAT

- 1 day
- Class Size: maximum 8

COURSE CONTENT

- Work plans
- Stress and strains on lines and rigging
- Rules of thumb for calculating safe loads
- Shock loading
- Rope/shackle and fitting inspections
- Hand signals

FALL PROTECTION

Developed in consultation with regulators, this course includes both theory and practical hands-on experiences in Fall Protection using approved equipment, while reviewing the risks associated with work performed above ground level or whenever a fall could cause injury. The application of devices to prevent or "arrest" such falls is discussed in detail. Most commonly-used fall arrest equipment is demonstrated. The program will cover reasons for fall arrest, regulations covering fall arrest and how to implement a fall-arrest program.

TARGET AUDIENCE

Anyone whose work places them more than 3 meters or 10 feet above ground level and at risk of falling.

COURSE FORMAT

- 1 day
- Class Size: maximum 8

COURSE FORMAT

- 1 day, include practical application
- Class Size: maximum 8

COURSE CONTENT

- Definition, limitations and responsibilities of an Authorized User.
- Define and recognize fall hazards.
- Define and describe Fall Restraint, Fall Arrest and the hierarchy of Fall Protection.
- Participants will plan and execute practicable Fall Protection, in accordance with local and national regulations and standards, by assessing work site for fall hazards by:
 - Selecting, inspecting and adjusting appropriate equipment according to industry standards



Course Catalogue

taking into account fall distance, free fall, swing fall and maximum resting force.

- Stating risks associated with choice of equipment.
- Determining a rescue plan

TOWER PAINTING PROCEDURES

The training is designed to prepare Power Line Technicians and Painters to work safely in the area defined as the Energized Zone. It covers hazards involved in energized tower painting. The hazards will be presented through the principles of electrical theory and examples of what could happen if hazards are not managed properly.

COURSE FORMAT

- Class Size: maximum 12

COURSE CONTENT

- Prepare Painters, and Linemen or PLTs to do tower preparation work and painting up to distances outlined in the regulations on Normal Limits of Approach.
- Obtain the knowledge and understanding to identify and manage hazards in a manner consistent with local and national regulations and standards.

COURSE CONTENT

- Electrical Theory
- Limits of Approach
- Insulator & Spill Protection Guards
- Installation of Protective Guards
- Electro Magnetic Induction
- Ropes
- Fall Protection
- First Aid and Rescue Procedures
- Approved local and national safety procedures
- Site Equipment Unsafe
- Field Practice
- Field Practice and Tailboard Forms

JOB SITE PLANNING AND TAILBOARD

Job site planning meetings (frequently referred to as a “tailboard” or “tool box” meeting) are meetings held at the job site with all workers involved. They are held before the work begins and as required during the course of the work to ensure that all workers understand the hazards, risks, and procedures associated with the job.

In this course, we will explore the regulations that demand better on the job planning and communication, and learn how to conduct an effective tailboard.

TARGET AUDIENCE

Individuals who would benefit from this course include: site managers who would supervise any work crews in the field and other foremen or employees who may be required to act as a person in charge on any jobsite. Workers new to industry may also benefit, as participation in and understanding of on-site planning meetings is integral for the safety of any job.

COURSE FORMAT

- 1 day
- Class Size: maximum 12

COURSE CONTENT

- The need for on site planning and documentation (tailboard)
- Legal responsibilities
- How to communicate safety concerns or problems
- How to document a tailboard discussion
- Hazards from the job to reduce risks
- Human factors that create hazards
- Identify if workers are qualified and prepared to do the work
- Identify if the equipment and materials are adequate and safe for the work
- Skills to hold effective tailboards (eg. situation analysis, planning and recording)

WORKER SAFETY

The following courses are ideal for safety committee members, supervisors, workers and health and safety professionals committed to preventing occupational injury and disease, and for members of the general public interested in acquiring a better understanding of risks associated with their work

** EITI is an authorized member of the WorkSafeBC Education Network.*

COURSE FORMAT

- 1 Day each
- Class Size: Up To 12

COURSE SELECTIONS

- Hazard Recognition and Control
- Responsibilities of Joint Health and Safety Committees
- Preventing and Investigating Musculoskeletal Injury (MSI)
- Preventing Workplace Violence
- Supervisor Safety Management

PERSONAL PROTECTIVE EQUIPMENT

This course covers the appropriate use of a variety of common articles of personal protective equipment (PPE) including hard hats, eye protection, hearing protection, hand and foot protection.

TARGET AUDIENCE

Workers involved in construction related activities.

COURSE FORMAT

- 2 hours
- Class Size: maximum 12

COURSE CONTENT

- How to perform a hazard analyses of a known job in order to identify required PPE
- Inspection criteria for PPE

WORK PROTECTION PRACTICES (WPP) (LOCKOUT EQUIVALENT)

This program is designed for employees and contractors, who are expected to utilize Work Protection Practices (WPP).

COURSE FORMAT

- 6 hours
- Class Size: Up To 12

COURSE CONTENT

WPP CATEGORY A:

- Introduction to Safety
- Working Safely Near Live Electrical Equipment
- Accessing Facilities
- Preparing to Work Safely

WPP CATEGORY B PART 1:

- Safety on the Power System
- Elements of Safety Protection
- Safety Protection Roles and Responsibilities

WPP CATEGORY B PART 2:

- Work Protection Practices Category B
- Introduction to Lockouts
- Personal Lockouts
- Group Lockouts

WPP CATEGORY C:

- Preparing Personal Lockout – Equipment not on the One-Line
- Assisting in Personal Lockout – Equipment on One-Line
- Participating in Group Lockout
- Hazardous Testing Under Lockout
- Switching for the Control Centre Operator



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WPP CATEGORY D:

- The WPP PIC
- Core PIC Duties
- Key Rules and Procedures

POWER SYSTEM SAFETY PROTECTION (PSSP)

Power System Safety Protection defines the constraints applied to the power system to provide worker protection from power system hazards during prescribed work.

TARGET AUDIENCE

Contractors working on powerlines within British Columbia.

COURSE FORMAT

- 1 Day
- Class Size: Up To 16

COURSE CONTENT

PSSP CATEGORY 1A:

- What Category 1a is and when it is used
- Procedures for obtaining and returning customer isolation
- Isolation during emergencies and storms

PSSP CATEGORY 1B:

- Category 1b rules and when they are used.
- Customer Infeeds.
- Joint operating orders.
- Isolation and tagging in different circumstances.

PSSP CATEGORY 2:

- Introduction to Safety
- Working Safety Near Live Electrical Equipment
- Accessing Facilities
- Preparing to Work Safely

PSSP CATEGORY 3 PART 1:

- Safety on the Power System
- Elements of Safety Protection
- Safety Protection Roles and Responsibilities

PSSP CATEGORY 3 PART 2:

- PSSP Category 3
- Safety Protection Guarantees
- Protection Extensions

PSSP CATEGORY 4:

- Introduction to PSSP
- Electrical Safety/Limits of Approach
- Assurance of No Re-close Permits
- Safety Protection Guarantees
- Preparing for the Job

PSSP CATEGORY 5:

- Introduction to Category 5
- The Control Hierarchy and Category 5
- Switching
- Grounding and Blocking
- Safety Protection Guarantees
- Live Line Permits and ANRPs

PSSP CATEGORY 6:

- Introduction to Category 6
- PIC Resources
- Using the Mimic Display
- Using Logs
- Using GOIs and GNRs
- Transferring Operating Authority

LOCKOUT:

- What lockout is and who uses it
- When lockout is used and what tags are used with it
- Lockout hardware and supplies
- Personal lockout procedures

HAND AND POWER TOOL SAFETY

This course covers the safe use of a variety of common tools. This course is applicable to workers involved in all types of construction related activities.

COURSE FORMAT

- 2 hours
- Class Size: maximum 12

COURSE CONTENT

- Pre-use inspections
- Selection of PPE appropriate to tool
- Ergonomic considerations when selecting tools

CHAIN SAW SAFETY

This course reviews the basic knowledge required to safely operate and maintain a chainsaw in a utility, industrial, or arboriculture work environment.

This program is recommended for all workers involved in the use of chainsaws and in particular for workers with limited experience.

If the training site and time permits, the instructor will provide practical demonstrations.

COURSE FORMAT

- 0.5 day, 1 day or 2 days
- Class Size: maximum 8

COURSE CONTENT

- Personal protective equipment
- Parts & safety requirements of a chainsaw
- Safe use and basic operations of a chainsaw
- Hazard recognition and overview of environmental concerns
- Pre work planning

RESPIRATOR FIT TESTING

This program is designed for workers who have already received training in the use of respirators and who need to receive an annual fit test of their assigned respirator.

COURSE FORMAT

- 1 hour
- Class Size: maximum 12

OPERATION OF SPECIALIZED EQUIPMENT — BUCKET TRUCK RESCUE

This program is designed for operators of mobile equipment with aerial lifts.

COURSE FORMAT

- 4 hours
- Class Size: maximum 12

COURSE CONTENT

- Explanation of basic hydraulic components
- Basic operating principals for boom equipment
- Operation of client equipment

ENVIRONMENTAL TRAINING

This training is designed to promote environmental awareness, responsible stewardship and safe work methods for workers in the industrial community, including a utilities or high-voltage environment.

This course includes a comprehensive overview of work practices within the electrical industry that have the potential to violate environmental legislation. The legislation and its impact on work procedures are reviewed; management practices to dispel potential harm and mitigation practices to contain problems are described.

TARGET AUDIENCE

Content is mostly specific to the line trade, but scenarios appropriate for various levels of power line development (e.g. designers) can be described.



Course Catalogue

COURSE FORMAT

- 0.5 day

COURSE CONTENT

- Working in and around water
- Oil spill management
- Special waste: transporting out of service oil-filled electrical equipment
- Out-of-service wood pole management and disposal
- Heritage & archaeology awareness

INTRODUCTION TO INSPECTIONS

This program is designed for members of Joint Occupational Safety and Health Committees

COURSE FORMAT

- 3 hours
- Class Size: maximum 12

COURSE CONTENT

This course focuses on conducting workplace inspections. It provides an introduction to:

- The purpose of conducting an inspection
- Who is responsible to conduct inspections
- Determining what needs to be covered in an inspection
- Understanding the major types of inspections and when they must be conducted
- How to determine the hazard rating of conditions observed
- Documenting inspections and monitoring follow-up action

ELECTRICAL INSPECTORS' DISCONNECT COURSE

Metering disconnect program for electrical inspectors.



MUNICIPALITY SAFETY TRAINING PROGRAMS

We deliver customized training for municipal and Regional District employees.

COURSE CONTENT

Topics that can be delivered on request include:

- Electrical Safety for Trades Workers
- Underground Utilities Awareness
- Underground Utility Print Reading

- Confined Space Entry
- Fall Protection
- Job Site Planning
- Chainsaw Safety
- Incident Investigation
- Hand Tool and Electrical Tool Safety
- Aerial Lift Truck Training

FIRST NATIONS UTILITY FOUNDATION PROGRAM

Utility Foundation "Boot Camp" Programs have been developed by groups from the following course listing based on time and budget resources.

The purpose of this program is to enable members of various First Nations groups to position themselves to be awarded local work contracts as well as possible future employment with electric utilities.

COURSE SELECTION

- Introduction to Safety Rights and Responsibilities — 2.0 hr
- Personal Protective Equipment (PPE) — 2.0 hr
- Introduction to Electrical Utility Operations — 3.0 hr
- Introduction to Rigging — 1 day
- Chainsaw Safety — 1 day (Ratio of 1 instructor to 8 students)
- Field Ergonomics — 2.0 hr

- Fall Protection Hands-on — 1 day
- Pesticide Applicator Training - Industrial Vegetation Certificate Category — 2.5 days plus .5 day recommended exam prep session — 3.0 days
- Underground Utility Awareness Workshop — 0.5 day
- Intro to Fire Protection/ Emergency Response & Fire Extinguisher Use — 1.0 day
- Power System Safety Protection (PSSP) Category 2 — 3.0 hr
- Vegetation (Tree Worker) Green Card Certification — 3.0 hr
- De-energization and Lockout — 0.5 day
- Excavation/ Shoring Theory — 1 day
- Traffic Control — 2 days
- Boom/ Bucket Truck Operation — 1 day
- Forklift Operation — 1 day
- Confined Space Entry — 1 day
- Introduction to Climbing — 1 day



Course Catalogue

ELECTRICAL PROGRAMS FOR OTHER INDUSTRIES

ELECTRICAL SAFETY FOR TRADES WORKERS

This 2 hour program provides the basics of how electricity behaves, how to spot overhead and underground hazards, how to plan work and carry it out in a safe manner, what to do if equipment contacts a power line, and how to meet local and national standards and regulations for working near high-voltage lines.

TARGET AUDIENCE

Trade workers who work around high-voltage power lines, either overhead or underground, including:

- boom, concrete or dump truck operators
- carpenters
- crane and excavator operators
- drainage contractors
- electricians
- painters
- roofers
- scaffolders
- utility arborists or arboriculturists
- window washers
- those working in construction, paving, maintenance or
- demolition



- **ELECTRICAL SAFETY FOR TRADES WORKERS**
- **ELECTRICAL SAFETY FOR POLICE AND PARAMEDICS**
- **FIRE FIGHTER TRAIN-THE-TRAINER**
(available as customized programs, delivered to client site)

ELECTRICAL SAFETY FOR POLICE AND PARAMEDICS

This 2 hour program provides the basics of how electricity behaves, how first responders can keep themselves, colleagues and the public safe during an incident that involves electrical hazards, how to evaluate risks associated with working around electrical hazards and identify the decisions that need to be made when working around electrical hazards.

TARGET AUDIENCE

Police and paramedics who respond to emergencies involving high-voltage power lines, either overhead or underground.

FIRE FIGHTER TRAIN-THE-TRAINER

This 5 hour program is designed to assist Fire Service Training Officers in educating their fellow fire fighters on the dangers of common electrical hazards that may be encountered when fighting fires involving electricity and to make fire fighters better equipped to evaluate risks, make decisions and take actions to keep everyone safe.



Service Offering

ASSESSMENTS, PLANNING AND PROCEDURES

With a reputation for helping our clients achieve some of the highest safety and performance records in the industry, EITI has become a valued resource for management training and consulting around the world.

OPERATIONAL ASSESSMENTS AND ASSET MANAGEMENT AUDITS

The success of any electrical utility corporation depends on two things:

- Managing your assets effectively
- Making the right operational decisions that help you reduce costs and improve profits.

With the uncertainty and variability of today's energy markets, it is more important than ever that electrical utility corporations find ways to improve their operational efficiency. As an unbiased third-party, EITI can conduct an audit of your operations and the maintenance of your assets to help you discover ways of reducing operational inefficiencies and improving profits.

With extensive experience in various types of electrical utility operations, our Operational/Asset Audit Team can help you think outside the box and open the door to new possibilities.

OPERATIONS AUDITS

With the uncertainty and variability of energy markets and your hydropower water supply, are you confident in the decisions you are making? For instance, your fuel (in other words, your valuable water supply) is highly variable, both seasonally and daily. What tools do you have that help you decide when to use or save that limited resource? What about managing the selling and buying of electricity for optimal profits? What about the effects your electrical utility operation has on the environment?

An Operations Audit will look into this and how your resources are managed on a larger scale. A typical Operations Audit looks at the following factors:

- The tools and management techniques that are used to optimize the use of the water and other generating sources.



- OPERATIONAL ASSESSMENTS AND ASSET MANAGEMENT AUDITS
- OPERATIONS AUDITS
- ASSET MANAGEMENT AUDITS
- WORKER COMPETENCY ASSESSMENT
- SAFETY AND ENVIRONMENTAL ASSESSMENT AND EVALUATIONS ASSESSMENTS
- WORK SAFETY METHODS
- SYSTEM MAINTENANCE PROCEDURES
- POWER OUTAGE RESPONSE PROCEDURES
- VEGETATION MANAGEMENT
- PROGRAM ASSESSMENT AND DEVELOPMENT

- The tools and management techniques that are used to determine the value of surplus generation capability.
- The tools and decision support that are used to help make decisions on the selling or purchasing of surplus energy and capacity.
- The tools and decision support for scheduling maintenance outages.
- The opportunities for cost savings and the potential to increase revenues.

Upon completion, you will have the information you need to make better business decisions, from avoiding possible penalties for environmental impacts to managing your power capability for optimal reliability and cost savings. Ultimately, it is quite feasible that we can show you how to manage your resources effectively enough to save your operation thousands of dollars every year.

ASSET MANAGEMENT AUDITS

Sustaining or improving the reliability of your aging assets, while minimizing operational, maintenance, and capital costs is vital to every electrical utility company. Also, managing risks (operational, safety, environmental, etc.) and maximizing worker productivity remain key aspects of any business. In order to maintain a solid return on investment from

year to year, utility operations must design and implement a plan for managing their assets.

EITI offers an Asset Management Audit which is essentially a review of the current condition of your equipment and plant at large. A typical audit includes the following:

- Review of existing assets and their status in the equipment life cycle.
- Review of power production, products and services, including benchmarking.
- Review of existing maintenance practices and the identity of future opportunities to improve those practices.
- Review of existing capital plans and the development of a frame-work for future investment, including a time-line for asset repair, replacement, rehabilitation, upgrade, and decommissioning.
- Identification of key issues, including setting targets for reliability and availability.
- Development of an Asset Plan, that aligns with the generation strategy and work plans.

Upon completion of the asset audit, your business will be able to improve on the plant's return on investment and be able to reinvest for the long-term health and growth of the business.



Service Offering

WORKER COMPETENCY ASSESSMENTS

To determine whether your workers meet current safety regulations, and know how to prevent worker error and the resulting damage to equipment and down time, your workers should be assessed by an independent third-party, like EITI.

SAFETY AND ENVIRONMENTAL ASSESSMENT AND EVALUATIONS

Improved safety depends on knowing the right work procedures. We will review your work procedures, assess your workers skills and identify what further action is needed to improve safety in your workplace.

WORK SAFETY METHODS

Your company needs written work methods and procedures to ensure that everyone has the same knowledge and understanding of what needs to be done and how it is to be done. EITI can write them for you to ensure maximum safety and productivity of your workers.

SYSTEM MAINTENANCE PROCEDURES

For reasons of safety and consistency, your utility system must be maintained according to specific regulations and standards. It is imperative that employers establish written work methods and procedures that will meet these requirements. By ensuring that all employees with similar roles and responsibilities have the same level of knowledge and understanding, you can enhance the safety and productivity of your workers.

EITI has the expertise to help you develop specific system maintenance procedures and work methods, with detailed instructions.

POWER OUTAGE RESPONSE PROCEDURES

Find out what you need to do to minimize the disruption — and the lost profits — related to an emergency power outage. EITI will deliver customized procedures to help you deal more effectively with emergencies.

VEGETATION MANAGEMENT PROGRAM ASSESSMENT AND DEVELOPMENT

All utility operations must have a Vegetation Management program to reduce long-term maintenance costs, optimize service reliability, and meet regulatory requirements. EITI can help you identify, plan, and implement your Vegetation Management Plan, including on-going monitoring strategies.

EITI Vegetation Management Services will assist you with the identification, planning, implementation and monitoring of necessary Vegetation Management Program (VMP) components required to:

- Reduce long-term maintenance costs
- Optimize electric service reliability
- Improve customer service
- Achieve regulatory compliance

There is no substitute for experience, our expert Consultants will guide you through the process to ensure you are getting the best value for your limited budget dollars.

COURSE CONTENT

- Vegetation Management - Identification and planning of tree and brush control
- Contract implementation and contractor oversight
- Performance Tracking
- Geographical Information System (GIS) Mapping
- Health and Safety program implementation

RISK REDUCTION STRATEGIES:

- Workload Assessment and Prioritization
- Hazard Tree risk assessment and control
- Wildfire risk assessment and Prevention

SKILLS DEVELOPMENT:

- Basic Vegetation Management
- Vegetation Management for Utility Managers
- Utility Arborist Training and Certification
- Arboriculture and Pruning best practices

TRAINING FOR MANAGERS

EITI also offers some training programs for managers and other non-electrical workers. Programs include:

- Electrical Utility Industry Orientation
- Overview of Electrical Utility Structures Equipment and Hardware
- Field Orientation for Managers
- Managers In Training (MIT) Orientation
- Electric Metering – Overview for Office Personnel

FOR MORE INFORMATION, GO TO PAGE 11

WORKER TRAINING

LINEMAN PROGRAMS

- Pre-Apprenticeship Programs
- Electrical Theory
- Live Line Certification to 500KV
- Bare Hand Certification to 500KV
- Transformation upgrading for Line Workers
- Various apparatus training – Reclosers, Capacitors, Voltage Regulators
- Rigging
- Underground systems switching and maintenance

SUBSTATION TECHNICIAN PROGRAMS

- Switching and Operations Certification
- Electrical Drawings and Control Systems
- Electrical Protection Relaying for Substations
- Gas Technology for Power Stations
- Worker Protection Grounding and Bonding for Stations
- Operating and Maintaining Circuit Breakers
- Metal clad Switchgear
- High Voltage Safety and Operations

WORKER SAFETY PROGRAMS

Combining theory with active application, EITI's safety programs incorporate industry best practices with your own safety program. EITI's programs are designed to meet or exceed all regulatory requirements. These include:

- Jobsite Planning and Tailboard Training
- De-energization and lockout programs
- Underground Electrical Spaces entry and rescue procedures

ENVIRONMENTAL AND SAFETY PROGRAMS FOR UTILITY ENVIRONMENTS

- Switching and Operations Certification
- Electrical Drawings and Control Systems
- Electrical Protection Relaying for Substations
- Gas Technology for Power Stations
- Worker Protection Grounding and Bonding for Stations
- Operating and Maintaining Circuit Breakers
- Metal clad Switchgear
- High Voltage Safety and Operations

SPECIALIZED TRAINING FOR ELECTRICAL UTILITY ENGINEERS

EITI offers specialized courses to upgrade the skills of engineers and senior technical staff in the utility environment. These include:

- Power Generation Orientation – Development, Operation and Maintenance
- Insulation coordination and surge arrester course
- Circuit Breaker theory for engineers
- Shunt reactor switching

TRAINING FOR UTILITY MANAGEMENT: OPERATIONS AND MAINTENANCE

From general, non-technical industry orientation to help you better understand the challenges your workers face ... to improving the development, operation, maintenance, marketing, and profitability of your electric power company, EITI provides the specific and relevant classroom and field training that will help you generate results. If you want to make a real and positive impact on your bottom line, call EITI.

OPERATIONAL SERVICES

OPERATIONS AND MAINTENANCE AUDIT AND ASSESSMENT

This independent, third-party assessment provides an objective point of view. Audits and Assessments cover Capital Projects Development, System Maintenance Standards, Operational Efficiencies, Cash-flow, Work-flow, Worker productivity, and a roadmap for the future.

WORKER SKILLS ASSESSMENTS

Before training, check what knowledge and skills your workers actually need to focus on. An unbiased third-party helps identify unseen gaps.

WORK PROCEDURES

Ensure that all workers follow the same regulatory standards with written Work Methods. This development

process provides guidelines for optimal safety, productivity and proficiency, meeting industry best practices.

TRAINING ADMINISTRATIVE SERVICES

Let EITI keep track of your employee training records and handle training logistics. Ask about our computerized Learning Management System.

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