NFPA® 70E Policies and Best Practices

• Overview
  o Understand Compliance Requirements
  o Provide guidelines for a safe work environment
  o Effectively communicate policies to employees and customers
  o Express company commitment to the rules
  o Establish Written Policies
  o Develop Best Practices for working around electricity
  o Determine what additional policies may be needed by a company
Policies

- Policies are clear, simple statements on how a company conducts:
  - Services
  - Actions
  - Business

- Reflect values, approaches and commitments

- Helps to create the safety culture by which all employees can foster.

Developing Effective Policies

- Include key stakeholders (management, employees and customers)
- Organize by brainstorming or small work group discussions
- Identify policies needed (compare)
  - Templates available
  - Similar organizations
  - Regulations & Consensus Standards
- Develop an overarching policy and specific ones as needed
- Identify and include unique elements of your company
Developing Effective Policies

• Draft, refine and write the policies. Include:
  o Title (name, version number and/or dates, and who authorized it)
  o Purpose statement (why the policy exists and what is to be achieved)
  o Description/Responsibilities (One or two sections outlining the details of the policy and what each needs to do)

• Have policies approved and endorsed by leadership (i.e. Board, President or CEO)

• Promote policies, look for feedback and refine your policies as needed

• Ensure all employees sign off on policies when hired and any changes made to a policy
Developing Effective Best Practices

- Best Practices support and enforce company policies
- Detailed steps to compliance
- Considered technique or method proven to be effective

Develop Effective Best Practices

- Steps
  1. Identify problem areas
  2. Identify other companies or industries that have similar processes
  3. Identify the leaders in these areas
  4. Survey companies for measures and practices and/or review accepted industry standards.
  5. Determine which practices have proven results.
  6. Implement the practices
Questions to Ensure Best Practices are Adopted

• Can the conditions needed for adoption be adequately defined?
• Are the practices feasible to perform?
• Are they currently being done by others?
• Can all comply?
• Can the benefits be clearly and quantitatively defined?

Developing Effective Best Practices

• Outline for a Best Practice
  o Title (name, version number and/or dates, and who authorized it)
  o Statement (Identifies what the practice addresses)
  o Description (Offers detailed procedures of the practice)
  o Benefits (Identifies the positive outcomes of the practice)
  o References (lists any references used in development of the practice or that offer additional information on the practice)
NFPA 70E Company Policy

• **Purpose:**
  • Ensures management and employees perform electrical work in a safe, healthful and productive manner and identify and clarify company requirements and expectations for electrical work to be performed in accordance with the current edition of NFPA 70E.

• **Description:**
  • All electrical work shall be performed by qualified persons in accordance with company policies and procedures.
NFPA 70E Company Policy

• The company intends to follow all:
  o applicable requirements found in OSHA regulations,
  o consensus standards such as NFPA 70E
  o best practices as identified within the electrical industry.

• All persons performing energized electrical work shall be provided:
  o initial training,
  o evaluations,
  o proper Personal Protective Equipment (PPE) and
  o other required to successfully complete task including specialized or refresher

NFPA 70E Company Policy - Responsibilities

• Employer will:
  o provide a practical safe working area for employees relative to the hazards arising from the use of electricity
  o provide all the training required by NFPA 70E and OSHA regulations
  o provide specific Personal Protective Equipment, (PPE) to personnel exposed to electrical hazards and ensure that it is in acceptable condition and being worn by all workers when necessary.
  o create rules and policies with employee involvement that affect workers and ensure compliance. (See SHP Guidelines)
  o determine who is qualified to perform justified energized work
NFPA 70E Company Policy - Responsibilities

• Employees will:
  o abide by all rules and regulations created and provided for their protection.
  o wear all PPE provided by the employer.
  o be familiar with and implement all safe work practices developed and implemented for their own safety.
  o take responsibility for their own actions and strive to keep the workplace free from any additional hazards.
  o communicate any hazards encountered on the job

Customer Communications

• Convey company policies and commitment to all customers:
  o To follow all applicable NFPA 70E and OSHA regulations
  o To support contractors' commitment to providing a safe work environment for employees including establishing an electrically safe working condition
  o To ensure any employer, contractor and worker that performs work on their facility be provided with all known information necessary to stay safe.
  o To make known any specific hazards that may be present in the workplace that could affect a worker.
QUALIFIED PERSON POLICY

• Purpose:
  o A qualified person shall be trained and knowledgeable of the construction and operation of equipment or a specific work method and be trained to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method.

• Description:
  o The qualified person shall be familiar with:
    - the proper use of the special precautionary techniques
    - personal protective equipment, including arc-flash, insulating and shielding materials and insulated tools and test equipment.

• Remember:
  o A person shall be considered qualified only with respect to certain equipment for which they have training and experience and methods and may be unqualified for others

• Employers have the responsibility to assign qualified persons for job tasks including performing justified energized work.
QUALIFIED PERSON POLICY

Qualified person(s) permitted to work within the Limited Approach Boundary (see NFPA 70E) of exposed live parts operating at 50 volts or more shall, at a minimum, be additionally trained in all of the following:

• skills and techniques to distinguish exposed energized parts
• skills and techniques necessary to determine nominal voltage (see definitions section) of exposed live parts.
• approach distances and corresponding voltages
• decision-making process necessary to:
  • perform job safety planning
  • identify electrical hazards
  • assess the associated risk
  • select the appropriate risk control method

Energized Electrical Work Policy

Purpose: Prohibit energized electrical work unless justified, signed off on by an authorized management representative when an energized electrical work permit is required in accordance with this policy and determined to capable of being performed safely.

• Description:
  o All energized electrical work on systems of 50 volts or more must be justified in accordance with NFPA 70E and OSHA as follows:
    • de-energizing will cause additional or increased hazards.
    • de-energizing infeasible due to equipment design/operational limits
Energized Electrical Work Policy

• All energized electrical work on systems of 50 volts or more requires:
  o Energized Electrical Work Permit signed off by all responsible parties prior to work commencing unless work to be performed meets the exemption criteria established in NFPA 70E.
  o completion of a job safety meeting/briefing prior to beginning all projects involving exposure to electrical hazards and document the meeting, with a copy provided to their foreman. A job briefing will also be completed even when working alone.
  o voltages less than 50 volts, decision to deenergize should consider capacity of source and overcurrent protection between source and worker.

Examples of justification to work energized is when de-energizing:
- interrupt life support equipment
- deactivate of emergency alarm systems, and
- cause shutdown of hazardous location ventilation equipment.
- infeasible due to equipment design/operational limits including performing diagnostics and testing that can only be performed energized
- work is needed on circuits that form an integral part of a continuous process that would otherwise need to be completely shut down in to permit work
Energized Electrical Work Policy

NORMAL OPERATING CONDITION

• equipment is properly installed.
• equipment is properly maintained.
• equipment is used in accordance with instructions included in the listing and labeling and in accordance with manufacturer’s instructions.
• equipment doors are closed and secured.
• equipment covers are in place and secured.
• no evidence of impending failure.

Establishing an Electrically Safe Working Condition – LOTO Policy

• Purpose: Lockout/Tagout shall be performed as part of the company’s procedures to ensure that all energized electrical conductors and circuit parts are put into an Electrically Safe Work Condition (ESWC) before an employee performs work, where; an employee is to be within the limited approach boundary or the employee interacts with equipment where conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists.

See NFPA 70E for examples of activities that could pose arc flash hazard.
Establishing an Electrically Safe Working Condition – LOTO Policy

• Description:
  o All employees shall be trained and have a copy of the company Lockout/Tagout Program. All qualified employees shall implement the LOTO program and verify an ESWC

Employees shall ensure the following steps are observed to achieve an Electrically Safe Work Condition
- Determine all possible sources of electrical supply
- Interrupt load current and open disconnecting device
- Verify blades are fully open draw out type circuit breakers fully withdrawn and disconnected
- Release stored electrical energy
- Release or block stored mechanical energy
- Apply lockout/tagout
- Use adequately rated test instrument to verify de-energization
- Apply temporary protective grounding equipment as needed

Note:
Refer to company written program for detailed procedures. (ex. NECA Guide to Lockout/Tagout)
Personal Protective Equipment (PPE) Policy

• **Purpose:** Each qualified employee shall be provided with personal protective equipment, voltage-rated tools and appropriate test instruments to safely complete all tasks. If an employee needs additional tools or personal protective equipment, they shall obtain them according to company procedures.

• **Description:**
  - Employees that regularly perform justified energized work shall wear arc-rated clothing appropriate for the duties performed.
  - Arc-rated clothing compliant with NFPA 70E will be provided by company.
  - ANSI approved safety glasses shall be worn as primary protection for all tasks as needed for hazards present, while inside the arc flash boundary and as required by company policy.
  - Protective equipment is to be maintained in a safe, reliable condition per the manufacturer’s recommendations.
Personal Protective Equipment (PPE) Policy

• Description:
  o Protective equipment and tools shall be visually inspected before use.
  o If there is any doubt concerning the safety of the equipment or tool the employee should contact their supervisor.
  o The supervisor will determine if the item should be taken out of service or subject to examination by a suitably trained third party person and retested if necessary.
  o Annual visual examination by a suitably trained person will be conducted to determine the suitability of the tool for further service.

Personal Protective Equipment (PPE) Policy

• Description:
  o Gloves shall be tested every 6 months. If an electrical retest is required by national regulation or by manufacturer specifications or in case of doubt after visual examination, routine test(s) as prescribed by manufacturer shall apply.
  o Insulating equipment will be cleaned as needed to remove foreign substances. Cleaning of the equipment is to be done according to the manufacturer’s recommendations.
Personal Protective Equipment (PPE) Policy

• Description:
  - Insulating equipment is to be stored in location/manner as to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances/conditions. Not stored in vehicle for extended period or summer.
  - Leather protectors shall be worn over rubber insulating gloves.
  - Care of Insulating blankets, covers, line hose, gloves, and sleeves made of rubber shall meet the following specifications:
    - Insulating equipment shall be inspected for damage before each day’s use and immediately following any incident that can reasonably be suspected of having caused damage.
    - An inflation test for gloves for possible tears or punctures shall be performed.

Personal Protective Equipment (PPE) Policy

• Description:
  - Insulating equipment with any of the following defects shall not be used:
    - A hole, tear, puncture, or cut;
    - Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks);
    - An embedded foreign object
    - Any of the following texture changes: swelling, softening, hardening, or becoming sticky or inelastic
    - Any other defect that damages the insulating properties.
Personal Protective Equipment (PPE) Policy

• Description:
  o Employees may not use insulating equipment failing to pass inspections/tests
  o Failed equipment shall be taken out of service and destroyed by supervisor
  o Insulating equipment found with other defects that might affect its insulating properties shall be removed from service and returned for repair, testing or replacement
  o Only manufacturer qualified repairs will be performed.
  o Rubber gloves shall be tested every six months.
  o Rubber insulating gloves are not permitted to be repaired – they SHALL be replaced.

NFPA 70E Training Policy

• Purpose: Employees shall receive all required training in accordance with NECA 70E to effectively implement all safe work practices necessary to work safely and avoid injury

• Description:
  NFPA 70E training requirements referenced in this policy apply to employees exposed to an electrical hazard when the risk associated with that hazard is not reduced to a safe level by the applicable electrical installation requirements.
NFPA 70E Training Policy

• **Description:**
  - Employees shall be trained:
    - to understand the specific hazards associated with electrical energy.
    - in safety-related work practices and procedural requirements to protect them from electrical hazards associated with their respective job or task assignments.
    - to identify and understand the relationship between electrical hazards and possible injury.
  - Training shall be classroom, on-the-job, or a combination of the two as determined by the risk to the employee.
  - Employees exposed to shock hazards shall be trained in safe release of victims from contact with exposed energized electrical conductors or circuit parts.

• **Refresher training shall occur annually.**
  - Employees responsible for responding to medical emergencies shall be trained in:
    - first aid and emergency procedures.
    - cardiopulmonary resuscitation, (CPR)
    - use of an automated external defibrillator, (AED)
  - Training must occur at a frequency that satisfies requirements of certifying body.
  - Employers shall verify at least annually that employee training required by this section is current.
NFPA 70E Training Policy

- **Description:**
  - Training shall be documented
  - Retraining in safety-related work practice and applicable changes to NFPA 70E shall be performed at least every three years.

Safe Work Practices – Policy

- **Purpose:** All employees will be required to follow the practices below to provide a safe work environment.

- **Description:** In accordance with this COMPANY policy, electrical work and repairs on systems and components 50 volts or more shall ALWAYS be completed with the equipment in an electrically safe work condition.
Safe Work Practices – Policy

• Description:
  o If work has to be done with the equipment energized through justification, the qualified person doing the work shall secure a signed Energized Electrical Work Permit, where required prior to starting job.
  o Electrical testing and troubleshooting will be permitted without an Energized Electrical work Permit In accordance with NFPA 70E.
  o All qualified persons and other affected personnel will be trained on any new equipment on the proper procedure of de-energizing and verifying absence of voltage.

Safe Work Practices – Policy

• Description:
  o Appropriate PPE shall be worn in accordance with the Shock and Arc Flash Risk Assessment for tasks involving exposure to electrical hazards. ANSI-approved safety glasses will be worn while performing work inside the arc flash boundary.
  o All harnesses and lanyards worn inside arc flash boundary must be arc rated.
  o Insulated tools are to be used while working inside the restricted approach boundary.
Safe Work Practices – Policy

• Description:
  o Electrical equipment doors must be kept shut and covers in place unless being serviced.
  o Comply with COMPANY Lockout/Tagout (LOTO) policies and procedures
  o Only qualified personnel will be permitted to perform energized work
  o If an overcurrent protective device opens on other than an overload a qualified person shall troubleshoot the problem.

Safe Work Practices – Policy

• Description:
  o No facial or body jewelry is permitted inside the restricted approach boundary.
  o No metal jewelry is permitted inside the restricted approach boundary.
  o No conductive articles will be in shirt pockets or worn inside the restricted approach boundary.
**Best Practices**

**JOB BRIEFINGS – Justified Energized Electrical Work - Best Practice**

- **STATEMENT:** Provide a systematic approach that outlines key components of job briefings where justified energized electrical work will be performed.

- **DESCRIPTION:** The employee in charge shall conduct a job briefing with all employees involved. This briefing shall address the energized electrical work permit and items below associated with the job.
JOB BRIEFINGS – Justified Energized Electrical Work - Best Practice

• DESCRIPTION:
  A. Define tasks to be performed, routine and critical tasks.
  B. Review risk assessment procedures (including distances of protection for Qualified and Unqualified workers).
   a. Shock Risk Assessment
   b. Arc Flash Risk Assessment
  C. Identify hazards
  D. Identify qualifications
  E. Identify Emergency Response Procedures
  F. Determine Personal Protective Equipment to be used.
  G. Determine tasks to be completed
  H. Determine risk mitigation procedures
  I. Coordinate with Host/Owner on conditions & procedures
    I. Review Lockout/Tagout requirements
      o All affected employees shall participate in job briefing and document participation
JOB BRIEFINGS – Justified Energized Electrical Work - Best Practice

• DESCRIPTION:
  o Job briefings for tasks involving exposure to electrical hazards shall be conducted:
    - at the start of each work shift,
    - when job tasks change and
    - when additional personnel are added to the work crew.
  o The form documenting this job briefing shall have the means for the employee to sign and verify in order for the employer to ensure employee compliance and participation.

Lockout/Tagout - Best Practice

• Statement: Provides safe procedures for de-energizing circuits and equipment and ensuring they are maintained in an electrically safe work condition using an effective lockout/tagout procedure to enable work to be performed without injury.

• Description:
  o Follows OSHA General Industry Standards in 1910.333(b) and supplemented with requirements contained in Article 120 of NFPA 70E.

Note: 1910.333(b)(2)(i) permits 1910.333 as LOTO so long as it complies with paragraphs (c) - (f) of 1910.147.
Lockout/Tagout - Best Practice

• Description:
  o DEENERGIZING
  1. Determine all possible sources of electrical supply to the specific equipment. Check applicable up-to-date drawings, diagrams, and identification tags.
  2. Circuits and equipment to be worked on shall be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as sole means for deenergizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.
  After properly interrupting load current, open disconnecting device(s) for each source. Wherever possible, visually verify that all blades of the disconnecting devices are fully open or that drawout type circuit breakers are withdrawn to the fully disconnected position.

Lockout/Tagout - Best Practice

• Description:
  o DEENERGIZING
  3. Stored electric energy which might endanger personnel shall be released. Capacitors discharged and high capacitance elements short-circuited and grounded.

  Note: If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.

  4. Stored non-electrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.
• Description:
  o DEENERGIZING

5. A lock and tag shall be placed on each disconnecting means used to deenergize circuits and equipment on which work is to be performed. Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag and attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.

Exception:
  - If lock cannot be applied, or employer can demonstrate tagging will provide a level of safety equivalent to a lock, a tag may be used without a lock.
  - Tag used without lock, as permitted by this, shall be supplemented by at least one additional safety measure equivalent to use of a lock (ex. removal of an isolating circuit element).

Lockout/Tagout - Best Practice
• Description:
  o DEENERGIZING

A lock may be placed without a tag only under the following conditions:
  - Only one circuit or piece of equipment is deenergized; and
  - The lockout period does not extend beyond the work shift; and
  - Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.
Lockout/Tagout - Best Practice

• Description:
  o DEENERGIZING

  6. Verification of the deenergized condition must meet the following before any circuits or equipment can be considered and worked as deenergized. A qualified person shall:
    - operate equipment operating controls or otherwise verify the equipment cannot be restarted.
    - use test equipment to test circuit elements and electrical parts of equipment to which employees will be exposed and verify that circuit elements and equipment parts are deenergized.
    - test to determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of circuit have been deenergized and presumed to be safe. If circuit to be tested is over 600 volts nominal, test equipment shall be checked for proper operation immediately after the test.
    - use adequately rated test instrument to test each phase conductor or circuit part to verify deenergized

  Before and after each test, determine that the test instrument is operating satisfactorily.

  ground the phase conductors or circuit parts before touching them, where the possibility of induced voltages or stored electrical energy exists.

  apply temporary protective grounding equipment devices rated for the available fault duty, where it could be reasonably anticipated that the conductors or circuit parts being deenergized could contact other exposed energized conductors or circuit parts.
Lockout/Tagout - Best Practice

- Description:
  
  - REENERGIZING EQUIPMENT
    
    These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily:
    
    1. A qualified person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.
    
    2. Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.
    
    3. Each lock and tag shall be removed by employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task provided that:
       - Employer ensures that employee who applied lock or tag is not available at workplace,
       - Employer ensures that employee is aware lock or tag has been removed before he or she resumes work at that workplace.
    
    4. There shall be a visual determination all employees are clear of circuits and equipment.
Voltage Testing - Best Practice

• **STATEMENT:** Provide a concise approach that outlines the key steps involved with voltage testing.

• **DESCRIPTION:**
Any employee that is to perform voltage testing must be qualified and trained on the test instrument to be used. The qualified employee shall follow the accepted procedure for testing for the presence of voltage and the steps necessary for the verification for the absence of voltage. The employee shall be familiar with the maximum voltage potential and wear all necessary PPE determined in the shock and arc flash risk assessment.

**Voltage Testing - Best Practice**

• **DESCRIPTION:**
1. Identify the circuit(s) to be tested
2. Determine the source of the circuit(s)
3. Determine the maximum nominal voltage that could be present.
4. Perform a shock risk assessment
5. Perform an arc flash risk assessment
6. Select the appropriate Personal Protective Equipment for use
7. Review the procedures for proper test instrument operation.
   a. Verify proper operation of the test instrument.
   b. Test to determine if voltage is present.
8. Verify proper operation of test instrument.
9. Implement Lockout/Tagout requirements.
Voltage Testing - Best Practice

• DESCRIPTION:
Any employee involved with voltage testing must:
• A qualified person, trained in the use of the test instrument to be used
• be able to demonstrate knowledge related to the construction and operation of the test instrument being used
• have received safety training to identify and avoid the hazards associated with the procedure.
• be familiar with the appropriate rating of rubber protective goods, their use and limitations.
• be aware of arc rating of garments and choose appropriate PPE.
• know proper working clearances around electrical equipment
• ensure proper illumination around equipment
• not engage work where there is blind reaching or poor visibility.

Important: A Best Practices should be developed for each test instrument used.

Temporary Power - Best Practice

• STATEMENT: Provides a systematic approach that outlines key components of temporary power, such as installation use and maintenance.

• DESCRIPTION: Temporary wiring for construction activities involve many phases of work. The following must be complied with when providing temporary power:
Temporary Power - Best Practice

• DESCRIPTION:
  o Determine and comply with all applicable codes (OSHA, NEC, NFPA 70E)
  o Determine what power requirements are needed
  o Identify the material needed and the installation environment
  o Provide Temporary service equipment or separately derived system for construction/job site including any power for any construction trailers that may be a part of the project
  o Provide Ground Fault Protection as required and Assured Equipment Grounding Conductor Program, (AEGCP) as required for receptacles and use of portable tools

Temporary Power - Best Practice

• DESCRIPTION:
  o Provide adequate lighting per the location and tasks
  o Provide individual circuits for specialty tools
  o Install equipment in protected locations or enclosures rated for the environment
  o Use listed wiring methods and equipment
  o Maintain enclosure integrity and ensure all openings are covered and/or closed
Temporary Power - Best Practice

• DESCRIPTION:
  o Provide physical protection and/or warning signs for temporary wiring and devices
  o Limit access to equipment and circuits to authorized personnel, keep doors and covers locked
  o Coordinate with Host/Owner on conditions and procedures or special requirements
  o Define routine and critical tasks.
  o Review shock and arc flash risk assessment procedures

Temporary Power - Best Practice

• DESCRIPTION:
  o Identify hazards
  o Identify qualifications (Only qualified and authorized persons should design, install and maintain temporary wiring systems for any job site or location.)
  o Determine and use appropriate Personal Protective Equipment.
  o Comply with all electrical Lockout/Tagout requirements per 29 CFR 1926 and/or 1910 and NFPA 70E
  o Ensure temporary wiring is adequate for the load and environment it will be exposed to.
Temporary Power - Best Practice

- DESCRIPTION:
  - Remove all Temporary wiring as soon as the need for temporary power is over.
  - Follow all applicable manufacturers’ requirements when using portable generators to provide portable/temporary power including maintenance and refueling activities.

Summary

- Policies and Best Practices
  - Help to communicate safety
  - Should include input from stakeholders
  - Require approval at top levels

- Policies
  - Show commitment
  - Create culture

- Best Practices
  - Provide details on procedures to be followed
  - Are proven through measured success
Summary

• NFPA 70E Recommended Policies
  o NFPA 70E Policy
  o Qualified Person Policy
  o Energized Electrical Work Policy
  o Establishing an Electrically Safe Work Condition – Lockout/Tagout
  o Personal Protective Equipment
  o Training
  o Safe Practices

Summary

• NFPA 70E Recommended Best Practices
  o Job Briefing
  o Lockout/Tagout (LOTO)
  o Voltage Testing
  o Temporary Power (installation, use and maintenance)