PURPOSE

The purpose of this program is to ensure that employees are trained in appropriate electrical safety work practices. In addition, employees that work around, but not on electrical systems, must be trained in the hazards associated with electricity.

1.0 GENERAL

A. Only qualified individuals are permitted to perform electrical work for the Company. A qualified person is considered by Peak NDT Solutions as an employee who has the required skills and knowledge to perform electrical work safely. Such persons shall be made familiar with the use of special precautionary techniques, PPE, insulating & shielding materials and insulated tools.

B. Whenever possible, all circuits or equipment shall be de-energized before beginning any work. Authorized workers shall only perform work on energized circuits as described in the "Lockout/Tagout Energy Control Program". In addition, workers shall use:

1. Proper design, fabrication, installation, and documentation techniques.

2. Proper operational and maintenance procedures.

3. Electrical equipment approved by a nationally recognized testing laboratory (National Electrical Code).

4. Proper personal protective equipment (explained later in this policy).

5. Equipment, which meet the requirements of this program.

C. Safe work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. Safe procedures for deenergizing circuits and equipment shall be determined before circuits or equipment are deenergized. A qualified person shall operate the equipment or otherwise verify that the equipment cannot be restarted, verify that the circuit elements and equipment parts are deenergized and determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed even though specific parts of the circuit have been deenergized and presumed to be safe.

D. All equipment grounding conductors and parts of electrical equipment that have been deenergized but have not been "Locked or Tagged" out shall be treated as live parts.

E. Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment and grounding conductors. The equipment-grounding conductor shall be connected to its proper terminal:

1. Before each use;

2. Before equipment is returned to service;

3. Before equipment is used, such as when a cord has been run over;

4. At intervals not to exceed three (3) months, except that cord sets and receptacles, which are fixed and not exposed to damage, shall be tested at intervals not to exceed six (6) months.

F. Tests performed as required by this program shall be recorded as to the identity of each receptacle, cord set and plug connected equipment that passed the test and shall indicate the last date tested or interval for which it was tested. These records shall be kept by log and shall be maintained by the qualified electrician until replaced by a more current record. These records must be available to employees and to regulatory officials on the job site.

2.0 ELECTRICAL EQUIPMENT CONDITIONS OF APPROVAL & USE

A. All electrical equipment, components, and conductors should be listed, labeled and approved by Underwriters Laboratory for their intended purpose. Custom-made and installed equipment can be approved for use, by the Electrical Authority Having Jurisdiction (AHJ), if built according to specific standards (e.g., UL 508 or one of the ANSI C series standards). Appropriate documentation for such equipment shall be maintained on file and easily accessible by those who wish to research it.

B. When building, repairing, or modifying electrical systems, NEC-approved equipment must be used.

C. All live electrical parts shall be positively de-energized when employees work on or near exposed energized parts that could result in direct contact, contact by means of tools or materials or being near enough to be exposed to any hazard they present. While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both.

D. The additional precautions shall be followed to improve safety in the work area:

1. Follow established rules and procedures, including those of the various electrical manufacturers. Supervisory personnel involved in electrical work shall maintain a copy of this policy on the job site for availability to employees as well as regulatory inspectors, including the Assistant Secretary.

2. Identify and report to your supervisor potential electrical hazards or unexpected occurrences or incidents (i.e., discharges or arcs when applying grounds to circuits thought to be de-energized), including near misses.

3. Anticipate potential electrical problems and hazards.

4. Do not rush to finish a job; never bypass approved procedures and work practices.

5. Plan and analyze for safety during each step of any electrical work.

6. Keep accurate records (e.g., as-built designs) of all pertinent work performed on a project.

7. Use properly rated test equipment and verify its condition and operation before and after use.

8. Know applicable emergency procedures.

3.0 MINIMUM CLEARANCE DISTANCES & ILLUMINATION

A. Any vehicle or mechanical equipment working near or capable of having direct contact with an energized overhead line shall be de-energized & grounded or shall be operated within the following clearance distances:

1. For voltages 50kV or below; Minimum of 10 feet

2. For voltages over 50kV; Minimum of 10 feet plus 4 inches

B. When an unqualified person is working near any energized source, the location shall be such that the person, their tools or materials cannot come closer than the following distances:

   1. For voltages 50kV or below; Minimum of 10 feet

   2. For voltages over 50kV; Minimum of 10 feet plus 4 inches

C. When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts as outlined in Section 3.0, G.

D. Protective shields, protective barriers or insulating materials as necessary shall be provided by Peak NDT Solutions and used when working in confined or enclosed work spaces where electrical hazards may exist.

E. Adequate illumination shall be provided for all working spaces around electrical equipment. Employees may not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to work safely.

F. Where live parts present an electrical contact hazard, employees may not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards are provided. Electrically conductive cleaning materials may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

G. If the work is performed by a qualified person, the minimum approach distance may be reduced to the distance given in the table below:

Voltage (phase to phase)	Minimum approach distance
300 V and less	Avoid contact
Over 300V, not over 750V	1 foot 0 inches
Over 750V, not over 2Kv	1 foot 6 inches
Over 2kV, not over 15kV	2 feet 0 inches
Over 15kV, not over 37kV	3 feet 0 inches
Over 37kV, not over 87.5kV	3 feet 6 inches
Over 87.5kV, not over 121kV	4 feet 0 inches

	Over 121kV, not over 140kV	4 feet 6 inches

4.0 NFPA 70E

A. Peak NDT Solutions Onsite Supervisor shall advise all Clients of any unique hazards related to services being provided. The Onsite Supervisor shall communicate any observed hazards found during operations as well as the actions that will be taken to eliminate or control the hazards and prevent reoccurrence.

B. Unqualified Persons: Employees shall **not** be permitted to enter areas that are restricted to qualified employees only, unless all applicable electric conductors and/or equipment are in an electrically safe work condition.

C. To ensure the safety of personnel, Company employees shall be trained in the following skills and techniques:
   - The ability to distinguish exposed energized electrical conductors and circuit parts from other parts of electrical equipment;
   - The ability to determine the nominal voltage of exposed energized electrical conductors and circuit parts;
   - Approach distances as specified in this program, Section 3.0, G; &
   - The jobsite "Walk-Through" process to adequately determine potential hazards, personal protective equipment needed and documentation of the Job Hazard Analysis (JHA) process necessary to perform the task safely.

D. Prior to the start of the operation, a Risk Assessment shall be completed & documented by a Company Supervisor to account for hazards at the limited approach and arc flash boundaries. The Risk Assessment shall identify site-specific hazards, probability of event, severity of event and methods to eliminate or control the hazards. The Risk Assessment hierarchy places elimination of a hazard as the primary method of control and identifies PPE as the last option. Additionally, the Risk Assessment must determine arc flash boundary requirements to minimize the risk of electric shock as well as the safe-work-practices, permits, safety signs, alerting techniques and personal protective equipment that will be needed to safety perform the job task.

Note: An annual audit shall be conducted to ensure the requirements in this written program are being performed by employees. The written program must be updated if another issue is identified with potential hazardous exposure. All PPE & signage used must meet requirements found in applicable laws and regulations.

E. A Job Safety Analysis (JSA) must be held before starting each job and shall include all affected employees & personnel. The briefing shall address step-by-step job procedures, hazards associated with the job task, special precautions, energy controls, PPE requirements, and work permits, if applicable. If any changes occur during the operation that might affect the safety of personnel, Stop-Work-Authority shall be invoked, which will require a revised "JSA".

F. Only qualified persons shall perform tasks such as testing, troubleshooting, and voltage measuring within the "Limited Approach Boundary" of energized electrical conductors or circuit parts operating at 50 volts or more or where an electrical hazard exists.

G. All Company owned test instruments & equipment shall meet the requirements of ANSI/ISA-61010-1. When test instruments are used to test for the absence of voltage on conductors or circuit parts operating at 50 volts or more, the operation of the test instrument shall be verified before and after an absence of voltage test is performed. All insulated tools and PPE must be inspected prior to use and immediately following any incident that can reasonably be suspected of having caused damage. All electrical insulating gloves shall be given an air test, along with the inspection.

H. Peak NDT Solutions has adopted the following maximum test intervals for rubber insulating Personal Protective Equipment:
   - Blankets: before first issue & every 12 months thereafter,
   - Gloves: before first issue and every 6 months thereafter,
   - Sleeves: before first issue and every 12 months thereafter, and
   - Covers & Line Hose: shall be testing if insulating value is suspect

I. Any work-related task on energized electrical conductors or circuit parts that are not placed in an electrically safe work condition, shall be considered energized electrical work and shall require a written work permit.

J. Company employees are prohibited from entering or working in spaces containing electrical hazards including "Limited Approach Boundaries" unless illumination is provided that enables the employees to perform the work safely.

K. Company employees shall be trained in safe-work-practices and procedural requirements specific to electrical hazards associated with their respective jobs. Additionally, employees shall be trained to identify electrical hazards, potential injuries associated with electrical shock, work permits, anticipating unexpected events and electrical flash arc hazard analysis. Training records shall be maintained for the duration of employment including the content of the training,

each employee's name and date of training. An employee shall receive additional training (or retraining) whenever the following conditions occur:

- The Onsite Supervisor indicates that the employee is not complying with Peak NDT Solutions safety-related work practices;
- When new technology, equipment, or changes in procedures affect Peak NDT Solutions established safe-work -practices that the employee was previously trained on; or
- If an employee is asked to perform a safe-work-practice that he or she is not familiar with.

Note: Retraining shall be performed at intervals not to exceed 3 years.

5.0 EXTENSION CORDS & MULTIPLE OUTLET BOXES

A. Use only three-wire extension cords and cables that conform to the rating, grounding, and non-inter-changeability stated in NEC Article 210-7 (Receptacles and Cord Connectors).

B. Check extension cords before use to ensure they are adequate for the intended purpose. Plug high-current equipment (e.g., space heaters, hot plates, and coffee pots) directly into a wall receptacle whenever possible.

C. Use only one extension cord for lamps, appliances, or other equipment in conjunction with the power supply cord. Employees are not permitted to use multiple extension cords (daisy chaining) that will increase resistance in an electrical circuit, which in turn will increase heating of conductors, receptacles, and plugs.

D. Inspect extension cords daily for damage before placing them in service and during use. Only qualified and authorized persons can repair extension cords; this must be done in a manner approved by the manufacturer. Replace damaged cords with ones listed by Underwriters Laboratory, and mark defective cords "DO NOT USE".

E. For receptacles connected to circuits with different voltages, frequencies, or current (AC/DC) on the same premises, use a design such that the attachment plugs on the circuits are not interchangeable.

F. Only highly visible yellow or orange extension cords shall be used outdoors and with portable or integral ground-fault circuit interrupters (GFCIs).

6.0 POWER PLUGS & RECEPTACLES

Peak NDT Solutions as well as those locations on temporary job sites, uses many different voltages, frequencies, and current (ac or dc) in power systems and equipment. Thus, it is essential to ensure that such equipment cannot be inadvertently connected to the wrong power source. For specific purposes, voltage, and current ratings, use a plug receptacle that fully complies with the requirements in ANSI C73 (see the configuration chart form ANSI C73 in the NFPA National Electrical Code Handbook for information about general purpose locking and non-locking plugs and connectors).

7.0 PORTABLE ELECTRICAL TOOLS, EQUIPMENT & INSTRUMENTS

A. Portable electrical equipment or tools shall always be inspected to identify defects; defective equipment shall be removed from service immediately. Portable electric equipment shall be connected to a portable GFCI (or circuit that contains a GFCI) when used outdoors, in damp locations, in any unsafe environment, or for outdoor construction. Ordinarily, the casings for portable electrical equipment are grounded. If it is necessary to operate this type of equipment with other than grounded equipment casing, suitable barriers, guards, or shields shall be installed to protect personnel while working on or near equipment. In addition, a safety procedure shall be written describing the controls for safe operation of the equipment.

B. Receptacles and flexible cords can be used to connect electrical appliances and equipment (e.g., fans, machine tools, and pumps) to power sources. Receptacles used on a two-wire, single-phase portable generator (or vehicle mounted generator), with a rating of not more than 5kW (where circuit conductors are insulated from the frame and all other grounded surfaces) do not need to be GFCI protected.

C. All power tools should be de-energized (i.e., unplugged, breakers turned off, etc.) when not in use.

8.0 EQUIPMENT GROUNDING

A. All electrical apparatuses, equipment, and systems shall be grounded in accordance with NEC Article 250 (Grounding) and ANSI standards. The conductor used for grounding shall meet the following criteria:

1. Be permanent and continuous.

2. Facilitate operation of the circuit's protective devices.

3. Have sufficiently low impedance to limit the voltage to ground to a safe level at all frequencies and fault-current conditions anticipated.

4. Have the capacity (size and rating) to safely conduct any fault that may be imposed on it for the time required for protective device operation.

B. The HSE Manager will be responsible for maintaining training and related records, and provide training under the applicable standard, specific to the duties of company employees.

C. The on-site qualified electrician and/or competent person will be responsible for developing and implementing this procedure on the temporary job site and ensuring compliance thereto by other employees. In addition, he/she shall continually evaluate and assess the integrity of the grounding conductor policy to determine if changes to existing procedures are required.

9.0 STATIC ELECTRICITY

A. A static charge is an imbalance of electrons on an object (matter) that can build up on all matter and transfer from one object to another by conduction or induction. The discharge of static electricity can cause shock or a fire or explosion.

B. Although this type of shock is painful, it is not normally physically hazardous and therefore is not considered reportable as electric shock. It should be noted, however, that injuries might result from reaction to shock (i.e., by a person rapidly pulling his hand away from a metal object and hitting an elbow against a wall or cabinet).

10.0 PERSONNEL GUIDELINES

When working with electrical equipment, employees shall follow the guidelines below for their own protection and that of the equipment:

1. Grounding of the metal parts or enclosures will continuously discharge static. Therefore, wrist straps and other connections used to ground employees shall be solidly grounded where static-safe workstations are used for semi-conductor, electronic, or explosive work. Grounding prevents the wrist strap from becoming a shock hazard in the event of a short circuit from a voltage to the wrist strap conductor.

2. Bonding will equalize the potential between two adjacent non-current-carrying metal parts or enclosures. Thus, only approved or listed grounding clamps are acceptable for static bonding and grounding. Alligator clamps are not acceptable.

3. Upon reenergizing equipment, a qualified person shall conduct tests and visual inspections to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed. Employees exposed to the hazards shall be warned to stay clear of circuits and equipment. Each lock and tag shall be removed by the employee who applied it. There shall be visual determination that all employees are clear of the circuits and equipment.

4. When working with or near electrical energized parts, use the following guidelines:

   - Conductive items of jewelry or clothing shall not be worn unless they are rendered non-conductive by covering, wrapping or other insulating means.
   - Never allow any electrical-powered office equipment to become wet while it is turned on, and never turn on any electronic equipment when it is wet.
   - Never use metal ladders when performing electrical work. Portable ladders shall have non-conductive side rails.
   - When handling long dimensional conductor objects (ducts or pipes), near energized equipment, steps for safe work practices shall be listed in the "Job Safety Analysis".
   - Always note the positioning of power lines which run from a pole to a building when working around buildings.

11.0 PERSONAL PROTECTIVE EQUIPMENT

A. Personal protective equipment is required when installing, examining, adjusting, servicing, fabricating, testing, or maintaining electrical equipment. The work supervisor shall provide employees with the appropriate PPE, and shall ensure that the equipment is used properly. Alternatively, employees may contact the office for assistance in selecting the appropriate PPE for the operation. Protective footwear, hard hats, and insulated nonmetallic-framed safety glasses shall meet the requirements of ASTM-2413, ANSI Z87.1, and ANSI Z89.2. Conductive items of jewelry or clothing shall not be worn unless they are rendered non-conductive by covering, wrapping, or other insulating means.

B. Rubber insulated (nonconductive) protective equipment shall be visually inspected at the beginning of each work day before use and after performing work that can cause damage to PPE. This inspection shall include an air test of

the gloves used. Hot sticks, grounds, aerial-lift equipment and booms, hot rope, and hot ladders shall also be visually inspected.

12.0 EMERGENCY ASSISTANCE & RESCUE

Anyone who witnesses or discovers a serious electric shock should do the following:

1. Call 911;

2. If you are qualified, ensure that all potential sources of energy are safe and in a neutral state;

3. If appropriate, initiate First-Aid / CPR (Only trained personnel should perform this procedure);

4. Notify the victim's supervisor and the appropriate customer representative as soon as possible if not done already;

5. Properly secure the area once the victim is under care, leaving items and equipment in the same position as much as possible;

6. Record:

   - the time, date, and location of the accident;
   - the name of the victim and any witnesses;
   - who was notified;
   - the voltage and current;
   - the contact parts of the body;
   - what equipment or system was being serviced; and
   - the shock reaction and duration of the shock.

13.0 RESPONSIBILITIES UNDER THIS PROGRAM

A. Employees:

- Only perform the tasks for which you are qualified.
- Understand the basic principles of electricity and electrical safety.
- Follow applicable OSHA requirements.
- Use the proper tools and required PPE.
- Request additional training to avoid working beyond your level of qualifications or comfort.

- Comply with the requirements set forth by DOE, OSHA, NEC, and other regulatory agencies.

B. Supervisors:

- Ensure that all employees have the appropriate PPE available and are adequately qualified to perform their jobs.
- Determine the work each employee is qualified to perform and make work assignments accordingly, while making routine inspections of the working equipment and monitoring of employee work practices.

C. HSE Manager:

- Provide support primarily through supervisory and management personnel, which are an initial point of contact for all safety issues raised by individuals.
- Identify electrical safety hazards and make recommendations for resolution.
- Provide support to program line management responsible for analyzing electrical accidents and incidents.
- Evaluate electrical accidents and incidents to determine trends.

- Develop, review and approve electrical safety training programs.
- Interact on a continual basis with groups charged with providing a safe environment for employees.
- Inform management and employees of lessons learned from electrical accidents and incidents.

14.0 EMPLOYEE TRAINING (NON-ELECTRICAL WORKERS)

A. Employees who face a risk of electric shock but who are not qualified persons shall receive formal classroom training to include the following:

- Clearance distances;
- Electrically related safety practices;
- Safety related work practices that pertain to their respective job assignment;
- The proper handling of portable tools and appliance cords;
- Procedures for resetting over-current protective devices;
- Techniques for approaching distances to overhead conductors;
- The meaning of electrical safety warnings and barriers;
- Electrical hazards associated with water;
- The proper response to electric shock.

B. Qualified persons shall, at a minimum, be trained in and familiar with the skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, the nominal voltage of exposed live parts, and the clearance distances and the corresponding voltages to which the qualified person will be exposed. The training shall be of the classroom or on-the-job type. The degree of training provided shall be determined by the risk to the employee

15.0 EMPLOYEE TRAINING (ELECTRICAL WORKERS)

A. Employees who perform electrical work shall be trained to recognize the hazards associated with their work environment and use appropriate procedures and protective equipment to minimize the risk of an accident or injury. Work supervisors shall verify the qualifications and training of all electrical workers before they are permitted to perform electrical work.

B. Employee training shall be documented with respect to the specific equipment and tasks for which the employee is qualified. Much of the experience required for an employee to be considered qualified is specific to the equipment and tasks involved. The depth of the training and how training is provided shall be determined by the hazards associated with the employee's respective tasks.

REVISION INFORMATION

This is applicable to changes made to the current version of the preceding document.

Revision Number	Description