NFPA 70E SAFETY PROGRAM

Doc. Type:	**Program**	Effective Date:	**5/1/2017**
Section:	**62**	Revision Number:	**00**
Status:	**Issued**	Last Revised	**5/1/2017**

1.) POLICY

It is the policy **H2 Enterprises, LLC (H2)** to take every reasonable precaution in the performance of work to protect the health and safety of employees and the public and to minimize the probability of damage to property. The electrical safety requirements contained in this chapter are regulations set forth by **H2**.

2.) PROCEDURES

a. It is the policy of **H2** to follow the fundamental principles of safety, which are described below. A clear understanding of these principles will improve the safety of working with or around electrical equipment.

b. Practice proper housekeeping and cleanliness. Poor housekeeping is major factor in many accidents. A cluttered area is likely to be both unsafe and inefficient. Every employee is responsible for keeping a clean area and every supervisor is responsible for ensuring that his or her areas of responbility remain clean.

c. Plan your work. A job briefing should be held before staring each job and include all employees involved. The briefing should cover hazards associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements.

d. Identify hazards and anticipate problems. Think through what might bo wrong and what the consequences would be. Do not hesitate to discuss any situation or question with your supervisors and coworkers.

e. Resist "hurry-up" pressure. Program pressures should not cause you to bypass thoughtful consideration and planned procedures.

f. Design for safety. Consider safety to be an integral part of design process. Protective devices, warning signs, and administrative procedures are supplements to good design but can never fully compensate for its absence. Completed designs should include provisions for safe maintenance. Maintain for safety. Good maintenance is essential to safe operations. Maintenance procedures and schedules for servicing and maintaining equipment and facilities, including documentation of repairs, removals, replacements, and disposals, should be established.

g. Document your work. An up-to-date set of documentation adequate for operation, maintenance, testing, and safety should be available to anyone working on potentially hazardous equipment. Keep drawings and prints up to date. Dispose of obsolete drawings and be certain that active file drawings have the lates corrections. **H2** shall advise the site owner of:

i. Any unique hazards presented by **H2's** work,

ii. Any unanticipated hazards found during **H2's** work that the site owner did not mention and

iii. The measures **H2** took to correct any hazards reported by the site owner to prevent such hazards from recurring in the future

h. Have designs reviewed. All systems and modifications to systems perfoming a safety function or controlling a potentially hazardous operation must be reviewed and approved at the level of project engineer or above.

i. Have designs and operation verified. All systems performing safety functions or controlling a potentially hazardous operation must be periodically validated by actual test procedures at least once a year, and both the procedures and actual tests must be documented.

j. Test equipment safety. Tests should be made when the electrical equipment is de-energized, or at most, energized with reduced hazard. Test instruments, equipment, and their accessories shall meet the requirements of ANSI/ISA-61010-1-Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1 General Requirements, for rating and design requirements for voltage measurement and test instruments intended for use on electrical systems 1000 Volts and below. When test instruments are used for the testing for the absence of voltage on conductors or circuit parts operating at 50 volts or more, the operation of the test instruments shall be verified before and after an absence of voltage test is performed.

k. 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.

l. Know emergency procedures. All persons working in ares of high hazards (with high-voltage power supplies, capacitor banks, etc.) must be trained in emergency response procedures, including cardiopulmonary resumsctation (CPR) certification.

3.) <u>TRAINING REQUIREMENTS</u>

Employees shall be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective jobs. Employees shall be trained to identify and understand the relationship between electrical hazards and possible injury. Documentation shall be made when the employee demonstrates proficiency, be maintained for the duration of the employee's employment, ad contain each employee's name and date of training.

4.) RE-TRAINING REQUIREMENTS

a. Employees shall be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective jobs.

b. Employees shall be trained to identify and understand the relationship between electrical hazards and possible injury. Documentation shall be made when the employee demonstrates proficiency, be maintained for the duration of the employee's employment, and contain each employee's name and date training.

c. Re-training shall take place an employee is observed not complying with this program, for situations that are new and unfamiliar to the employee, or in intervals of no more than three years.

5.) WORKING WITH ENERGIZED EQUIPMENT

a. This section contains safety requirements that must be met in constructing electrical equipment and in working on energized electrical equipment. Special emphasis is placed on problems associated with personnel working on hazardous electrical equipment in an energized condition. Such work is permissible, but only after extensive effort to perform the necessary tasks with the equipment in a securely de-energized condition has proven unsucessful, or if the equipment is so enclosed and protected that contact with hazardous voltages is essentially impossible. Also special care shall be taken when working with conductive materials and equipment such as long dimensional conductor objects (ducts or pipes). Employees who handle may be working with such objects shall work with the RSO, Replace with Safety Person's Name, to determine if any additional steps for safe work practices need to be taken.

b. Safety related work practices that pertain to qualified and unqualified electrical workers are listed below.

- **i.** Employees who face a risk of electric shock but who are not qualified persons shall be trained & familiar with electrically related safety practices. Only qualified persons may work on electrick circuit parts or equipment that have not been de-energized. Such persons shall be made familiar with the use of special precautionary techniques, PPE, insulting & shielding materials and insulated tools.
- **ii.** Unqualified persons shall not be permitted to enter spaces that are required to be accessible to qualified employees only, unless the electric conductors and equipment involved are in an electrically safe work conditions.
- **iii.** Employees shall be trained in safety related work practices that pertain to their respective job assignments.
- **iv.** Clearance distances shall be obeyered as listed in OSHA Table S-5 (See Electrical Section in General Conditions)

c. Safe work practices shall be employed to prevent electric shoc 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. Conductors and parts of electrical equipment that have been de-energized but not been locked or tagged out shall be treated as live parts.

6.) SAFETY GLASSES

a. Either safety glasses or a face shield must be worn when working on electrical equipment.

7.) PERSONAL PROTECTIVE DEVICES

a. For work on any energized circuitry with a Class B or Class C hazard, the use of personal protective devices (e.g., face shields, blast jackets, gloves, and insulated floor mats) is encouraged, even if not required. In any case, conductive apparel shall not be worn unless they are rendered non-conductive by covering, wrappig or other insulating means. Conductive items of jewelry or clothing shall not be worn unless they are redered non-conductive by covering, wrapping or other insulating means. All insulating PPE must be inspected before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves shall be given an air test, along with the inspection. Such test include:

i. Blanket-before first issue/every 12 months thereafter,

ii. Gloves-before first issue and every 6 months,

iii. Sleeves before first issue and every 12 months. Covers and Line hose shall be testing if insulating value is suspect.

8.) PROTECTIVE SYSTEMS / GFCI'S

a. Equipment must be designed and constructed to provide personnel protection. First-line and backup safeguards should be provided to prevent personnel acccess to energized circuits. Periodic tests must be established to verify that these protective systems are operative.
For all 120 volt, 15 and 20 amp (branch) circuits that are cord/plug connected, Ground Fault Circuit Interrupters (GFCI's) shall be used. GFCI's are specifically designed to protect workers, and work much faster than standard circuit breakers, and at extremely low amperage - far below the threshold at which a hazardous shock can occur. This is the primary protection, and therefore it is required that GFCI's be used as the first component in ay circuit used for tools / extension cords.

9.) ASSURED GROUNDING CONDUCTOR PROGRAM (AEGCP)

a. Secondary protection benefits may be realized from unitlizing an Assured Equipment Grounding Conductor Program (AEGCP). The program provides for initial and periodic verification of ground continuity of all electrical power tool and extension cords. If used, continuity checks are made initially and at three month intervals. Cords that are checked shall have distinguishable taped markings placed within one foot of the male end of the cord. This program is not, however mandatory if GFCI's are faithfully used - which is the company policy.

b. A written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptables that are not a apart of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in good, properly grounded condition.

c. The following tests shall be performed on all cord sets, receptables that are not part of the permanent wiring of the building or structure, and cord-and-plug connected equipment required to be grounded.

i. All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

ii. Each receptable and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

iii. All required tests shall be performed

(a) Before each use on site

(b) When there is evidence of damage,

(c) Before equipment is returned to service following any repairs,

(d) At intervals not exceeding 3 months

d. The tests required shall be recorded and made available to any authority having jurisdiction.

10.) <u>SAFETY PRACTICES</u>

a. Because a wide range of power supplies exist, no one set considerations can be applied to all cases. Employees shall be trained in the skills and techiques to; distinguish exposed energized electrical conductors and circuit parts from other parts of electrical equipment, to determine the nominal voltage of exposed energized electrical conductors and circuit parts, the approach distances specified in Table 130.2 of NFPA 70E, and the decision making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely. Program elements for working in the limited approach boundary might include; evaluations, anticipating unexpected events, all electrical parts are considered live until proven otherwise, work permits, electrical flash arc hazard analysis. The following classification scheme may be helpful in assessing power-supply hazards.

b. Power supplies of 50 volts or less with high current capability too often are not considered a a shock hazard, although these voltages are capable of producing fatal shocks. Since they are not "high voltage", such power sources frequently are not treated with proper respect.

c. In addition to the obvious shock and burn hazards, there is also the likelihood of injuries incurred in trying to get away from the soruce of a shock. Cuts or bruises, and even serious and sometimes fatal falls, have resulted from otherwise insignificant shocks.

d. Power supplies of 300 volts or more, with lethal current capability, have the same hazards to an even greater degree. Because supplies in this category are considered Class C hazards, they must be treated accordingly.

e. High-voltage supplies that do not have dangerous current capabilities are not serious shock or burn hazards in themselves and are therefore often treated in a casual manner. However, they are frequently used adjacent to lower-voltage lethal circuits, and a minor shock could cause a rebound into such a circuit. Also, an involuntary reaction to a minor shock could cause a serious fall (for example, from a laddr or from experimental apparatus).

f. Employees shall not enter spaces containing electrical hazards unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform any task 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. For work considered within the Limited Approach Boundary, a hazard/risk evaluation prior to work being done should be performed. Hazard Analysis should contain event severity, frequency, probability and avoidance to determine the level of safe practices employed.

11.) MORE THAN 300 VOLTS

a. To work on systems with voltages greater than 300 volts (CLASS B OR C HAZARD); Open the feeder breaker, roll out if possible, tag out, and lock if in enclosure. If work is on circuits of 600V or more, positive grounding cables should be attached to all three phases. Tag should contain who, why, and when information and it is of vital importance because a person's life may depend on it. "Vital" in this case means that the presence and status of the tag are inviolate, and the tag must not be altered or removed except by the person who attached it.

12.) LESS THAN 300 VOLTS

a. To work on systems with voltages less than 300 volts (CLASS A HAZARD); Turn-off and tag the feeder breaker. Tag is inviolate except on projects where established circuit checkout procedure allows a qualified person to remove it and energize circuit after checkout is complete.

13.) WORKING ON NEAR LIVE CIRCUITS

a. Working on live circuits means actually touching energized parts. Working near live circuits means working close enough to energized parts to pose a risk even though you might not be working on de-energized parts. Employees may not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to work safely. Protective shields, protective barriers or insulating materials as necessary shall be used when working in confined or enclosed work spaces where electrical hazards may exist. Work 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 be performed by written permit only. Common tasks where you nee to work on or near live circuits include:

- Taking voltage measurements
- Opening and closing disconnects and breakers
- Removing panels and dead fronts
- Opening electric equipment doors for inspection

14.) <u>WORKING ON OR AROUND EXPOSED POWERLINES</u>

a. Proper clearances shall be maintained under and around energized exposed wiring. For wiring 300V and below, the clearance distance for unqualified workers is 3 ft. For overhead lines under 50,000 volts, the minimum clearance is 10ft. Around the conductors, or 4ft. When driving under lines for unqualified workers. The lines shall be de-energized and grounded or other protective measures shall be provided before work is started if the worker has to be closer than the above clearance. Since **H2** does not perform work necessitating qualified electrical workers, it is the policy of **H2** that the clearances noted above applies to all **H2** workers.