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ARC-FLASH HAZARDS AND ELECTRICAL SAFE WORK PRACTICES

This position paper is written to provide guidance to members whose employees are engaged in work in the elevator industry that might expose them to arc-flash hazards, and to assist members in complying with applicable OSHA and NFPA standards. .

As recommended in NFPA 70E, NEII commissioned an Arc-Flash Hazard Analysis (in compliance with Institute of Electrical and Electronic Engineers, Inc.(IEEE) Standard 1584-2002 for procedures for calculating the incident energy of the arc-flash) by an independent consultant to determine at what level an arc flash hazard existed to employees who work on energized elevator equipment.

Based on the Arc-Flash Hazard Analysis the arc-flash boundaries at the elevator / escalator controllers ranged from 3 in. to 16 in. from the exposed components and the incident energy calculated at 18 in. ranged from 0.06 cal/cm^2 to 0.95 cal/cm^2 which indicates that the arc-flash hazard to employees is primarily to the hands and arms.

The surest means of avoiding an arc-flash hazard is to lock-out and tag-out the electrical service to a controller. As stated in Section 7 of the Elevator Industry Field Employees' Safety Handbook, "unless it is not feasible, (i.e.: inspecting; troubleshooting; observing; etc.) employees shall not perform any work on equipment where there is a potential to come in contact with energized mechanical or electrical hazards until all sources of energy have been de-energized, grounded or guarded.". If the equipment must remain energized to perform work, effective insulation and safe electrical working practices should be observed. Described below are several work practices that may be used to reduce arc-flash hazards when working on energized equipment:

- **Guarding:** - Where possible, install temporary guarding to protect from inadvertent contact.

- **Fuses:** - Verify that the correct size, type and capacity are installed.

- **Personal Protective Equipment:** Use appropriate PPE to protect body parts within the range of 3-16 inches from components that are not otherwise guarded. Examples of PPE that may be appropriate are:

- non-conductive eye protection;
- clean leather or fire-resistant gloves;
- natural fiber or fire-resistant rated long-sleeved shirts and pants, or fire-resistant rated long-sleeved coveralls.

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- **Metallic Articles:** - Remove metal articles such as watches, chains, bracelets, earrings, belt buckles and key chains before troubleshooting. See Section 3 of the Elevator Industry Field Employees' Safety Handbook.

- **Instruments:** - Use category III multi-meters and be familiar with use and limitations. Follow manufacturer's instructions and precautions. Use UL or CSA labeled scopes tested for 1000 V.

- **Lockout/Tagout:** - When troubleshooting is complete and further work can be accomplished without the equipment being energized, follow the lockout/tagout procedures in Section 7 of the Elevator Industry Field Employees Safety Handbook before commencing repairs or service work.

- **Special Conditions:** - Troubleshooting in wet, hot, or cold conditions calls for extra caution. Hazards created by water, snow, or condensation in the work area can cause slips, falls, and accidental contact. Don't troubleshoot unless you can keep your shoe/ boot soles dry.

- **Main Line Disconnect:** - DO NOT OPEN THE MAIN-LINE DISCONNECT SWITCH COVER, unless employees are authorized, properly trained and appropriate measures are taken commensurate with the higher risk of arc-flash hazards. If power is not being supplied to the elevator controller (e.g. open main-line fuses, etc.) advise the building owner to correct the condition. This is not the elevator company's responsibility.

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NEII Safety Committee

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