EFCOG Best Practice #234
Qualifications for the Contractor Authority Having Jursdiction (C-AHJ) or Electrical Safety Authority (ESA)

Facility: DOE Complex

Best Practice Title: Qualifications for the Contractor Authority Having Jurisdiction (C-AHJ) or Electrical Safety Authority (ESA) related to Electrical Safety in the Workplace (NFPA 70E)

Point of Contact: Heath Garrison (303)384-7408 Heath.Garrison@nrel.gov
Jeff Williams (505)665-4806 jeff.a.williams@nnsa.doe.gov
William Briscoe (509)376-4232 William_R_Briscoe@rl.gov
David Mertz (630)840-6322 Mertz@fnal.gov

Brief Description of Best Practice: Identifies the elements required to qualify a person or persons to effectively implement the routine activities assigned to the NFPA 70E contractor Authority Having Jurisdiction (C-AHJ) or the contractor Electrical Safety Authority (ESA) by the DOE head of the field element at each DOE complex facilities.

Why the best practice was used: To reduce inconsistency with the qualifications of C-AHJ/ESAs across the DOE complex.

What are the benefits of the best practice: To promote consistency of C-AHJ/ESA qualification and provide guidelines to define a minimum set of qualification criteria.

What problems/issues were associated with the best practice: N/A (New best practice.)

How the success of the Best Practice was measured: N/A (New best practice.)

Description of process experience using the Best Practice: N/A (New best practice.)

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Qualifications for the Electrical Safety Authority (ESA) for Electrical Safety in the Workplace (NFPA 70E)

DOE Field Element Managers should designate responsibility for administering and enforcing the requirements of the Electrical Safety in the Workplace (NFPA 70E) to the contractor. This designation should not be combined with any Fire Protection Program designations/delegations /assignments. Along with this assignment of the C-AHJ, the DOE Field Element Managers should ensure the C-AHJ is appropriately qualified for the tasks. This best practice defines the qualifications expected of the C-AHJ/ESA.

Best Practice Terminology

DOE Authority Having Jurisdiction (DOE-AHJ). The DOE, Head of Field Element is the DOE-AHJ and is ultimately responsible for enforcing requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure, but responsibility can be delegated to another Federal official and routine activities can be assigned to a contractor authority having jurisdiction (C-AHJ).

Contractor Authority Having Jurisdiction (C-AHJ). A Contractor organization, office, or individual assigned routine activities by the DOE Head of Field Element. Routine activities may include but are not limited to assuring compliance with technical requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. The C-AHJ may further assign this designation of authority.

Electrical Safety Authority (ESA). As permitted by NFPA 70E (2018) Article 350; *Each laboratory or R&D system application shall be permitted to assign an ESA to ensure the use of appropriate electrical safety-related work practices and controls. The ESA shall be permitted to be an electrical safety committee, engineer, or equivalent qualified individual. The ESA shall be permitted to designate authority to an individual or organization within their control.*

A. ***Responsibility.*** *The ESA shall act in a manner similar to an authority having jurisdiction for R&D electrical systems and electrical safe work practices.*
B. ***Qualifications.*** *The ESA shall be competent in the following:*
    (1) The requirements of NFPA 70E
    (2) Electrical system requirements applicable to the R&D laboratories

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C-AHJ/ESA Typical Qualifications should include but are not limited to the following:

NFPA 70E defines the Authority Having Jurisdiction (AHJ) as an organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. It also states that in many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction (Article 100). For NFPA 70E the assigned C-AHJ/ESA functions should include interpreting the standard and permitting alternatives where it is assured that these alternatives meet or exceed the standard as it relates to safe work practices.

Your employee(s) assigned as the C-AHJ/ESA must have the requisite education, qualifications, and experience to fulfill this assignment. The documentation and a description as to whom in the organization the assigned authorities will reside, and the qualifications, education, and experience of the individual(s) assigned by (site) to fulfill these functions shall be provided for approval to the Head of Field Element, when requested.

The DOE Head of the Field Element retains the right to over-ride decisions, including the interpretation and application of NFPA 70 and NFPA 70E.

Experience:

A C-AHJ/ESA shall possess specific field experience in electrical maintenance, design, or oversight as it relates to electrical safe work practices. This may be met by having at least 6000 hours (3 years) of verifiable work experience.

Knowledge:

A C-AHJ/ESA shall demonstrate a working level knowledge of the Site applicable electrical safety related requirements addressed in the following regulations, codes, standards, and organizations:

- 29 CFR 1910, OSHA General Industry
- 29 CFR 1926, OSHA Construction
- NFPA 70 National Electric Code (NEC)
- NFPA 70E Standard for Electrical Safety in the Workplace

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- National Electrical Safety Code (NESC), IEEE-C2
- Institute for Electronic and Electrical Engineers (IEEE) 1584
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Nationally Recognized Testing Laboratories (UL, CSA, etc.)
- Department of Energy Standards and Guides per Site Contract

Supporting Knowledge and/or Skills:

- Ability to explain how these Codes and Standards are applied at your site
- Ability to explain how NRTLs are used and determined
- Ability to explain how DOE C-AHJ/ESA assignment process functions at your Site
- Ability to explain the OSHA General Duty Clause
- Ability to explain how electrical hazards are addressed via the Integrated Safety Management System (ISMS) process, including applicable site contractor job planning
- Ability to explain the site contractor's procedure/work control program to include how electrical work performed by the contractor is within planned controls and the specific work control requirements for each job observed
- Ability to explain assessment of how well contractor management systems (lessons learned and other feedback systems) are integrated with the work planning and ISMS process and how lessons learned are addressed by each contractor's ISMS feedback process
- Ability to explain the electrical safety requirements contained in 29 CFR 1910, 29 CFR 1926, 29 CFR 1910.269 and NFPA 70E
- Ability to identify and explain requirements in NFPA 70 (NEC) that effect worker and workplace safety.
- Ability to explain requirements of DOE-HDBK-1092, DOE Electrical Safety Handbook
- Ability to explain safe work practices for laser operations that include electrical hazards
- Ability to demonstrate a working knowledge of IEEE 3007.3, IEEE Recommended Practice for Electrical Safety in Industrial and Commercial Power Systems

A C-AHJ/ESA shall demonstrate a working level knowledge of Hazard Identification, Analysis, and Control procedures:

- Ability to explain the risk assessment process defined in NFPA 70E
- Ability to explain the DOE Electrical Safety Handbook risk assessment for Electrical Hazard Classification System showing eight major groups and 53 classes.

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A C-AHJ/ESA shall demonstrate a working level knowledge of the requirements contained in the following DOE Regulation:

- 10 CFR 851 "Worker Safety and Health Program"
- DOE O420.1C "Facility Safety"

Supporting Knowledge and/or Skills:

- Ability to explain the basic electrical safety requirements established in 10 CFR 851 "Worker Safety and Health Program"
- Ability to explain the basic requirements established in DOE O420.1C

A C-AHJ/ESA shall demonstrate a working level knowledge of the following company initiatives:

- Integrated Safety Management System (ISMS)

Supporting Knowledge and/or Skills:

- Ability to explain the core functions and guiding principles of ISMS.
- Ability to explain the company's Safety & Health Policy, Value Statement, and Safety Goal.

TRAINING AND PROFICIENCY REQUIREMENTS

The C-AHJ/ESA shall participate in an official position-specific training and qualification program that includes the following elements.

Technical education and/or training covering topics directly related to the duties and responsibilities of electrical safety personnel as determined by line management. This includes all "Formal Training Requirements" and may include "Facility Level" training as listed below. It may also, include courses and other training provided by:

- Department of Energy
- Other government agencies (OSHA, DOD)
- Outside vendors (NFPA, National Safety Council, ASSE)
- Educational institutions/universities

Supporting Training and/or Skills:

- Training covering topics that address identified deficiencies in the knowledge and/or skill of electrical safety personnel as determined by line management.

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- Training in areas added to the Electrical Safety Qualification Standard since initial qualification.
- Lessons learned incorporated into the Electrical Safety Qualification Program in accordance with company procedures.
- Specific training requirements (company and professional level) documented in Individual Development/Training Plans.

Electrical Safety Specific Training Requirements

- Attend NFPA Accredited Course on NFPA 70 (certification course preferred)
- Attend NFPA Accredited Course on NFPA 70E
- Attend OSHA Training Course on 29 CFR 1910 Subpart S & 29 CFR 1926 Subpart K
- Attend Site Electrical Safety Program Course

Electrical Theory and Equipment

This section is only required to be completed and validated for those individuals not possessing an Electrical Engineering degree or relevant electrical experience.

- Ability to explain electrical and circuit theory to include theorems, terminology, laws and analysis
- Ability to explain basic AC theory
- Ability to explain AC generators to include construction and operation
- Ability to explain AC motors to include construction and operation
- Ability to explain AC reactive components
- Ability to explain electrical transmission and distribution systems
- Ability to explain transformers
- Ability to explain Uninterruptible Power Supplies
- Ability to explain Variable Frequency Drives
- Ability to explain electrical test instruments and measuring devices
- Ability to explain natural phenomena hazards such as static electricity
- Ability to explain DC generators
- Ability to explain DC motors
- Ability to explain battery construction, voltage production, and hazards
- Ability to explain Electrical System Coordination and its relevance to electrical safety

These training and qualification elements are the minimum.

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