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Electrical Safety Criteria and Review Approach Document		
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1.0 PURPOSE

The mission of the U.S. Department of Energy (DOE) Office of Environment, Safety and Health Assessments (EA-30) is to assess the effectiveness of safety and emergency management systems and practices used by line and contractor organizations and to provide clear, concise, rigorous, and independent evaluation reports of performance in protecting workers, the public, and the environment from the hazards associated with DOE activities.

In addition to the general independent oversight requirements and responsibilities specified in DOE Order (O) 227.1A, *Independent Oversight Program*, this criteria and review approach document (CRAD), in part, fulfills the responsibility assigned to EA in DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*, and DOE O 440.1B, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*, to ensure contractors implement the requirements of 10 CFR 851, *Worker Safety and Health Program*, and DOE Policy (P) 450.4A, *Integrated Safety Management Policy*.

The CRADs are available to DOE line and contractor assessment personnel to aid them in developing effective DOE oversight, contractor self-assessment, and corrective action processes. The current revision of EA's CRADs are available at https://www.energy.gov/ea/criteria-and-review-approach-documents.

2.0 APPLICABILITY

The following CRAD is approved for use by the Office of Worker Safety and Health Assessments.

3.0 FEEDBACK

Comments and suggestions for improvements on this CRAD can be directed to the Director, Office of Environment, Safety and Health Assessments.

4.0 CRITERIA AND REVIEW APPROACH

The review of electrical safety assesses the effectiveness of programs and processes for implementation of a comprehensive electrical safety program. The *Integrated Safety Management Policy* (ISMP), DOE P 450.4A, establishes the Department's policy for work to be conducted safely and efficiently and in a manner that ensures protection of workers, the public, and the environment. To achieve this, the implementation of integrated safety management (ISM) requirements are established through directives, and for contractor organizations through contract clauses. This includes identification of existing and potential workplace hazards and assessment of risk, development and implementation of hazard controls, assurance that work is performed within established hazard controls, and implementation of a formal mechanism and process to gather feedback and implement continual improvement by the site contractor. Additionally, assessments can include an evaluation of the DOE field elements process to assess the adequacy of procedures and implementation of the contractor's electrical safety program. The DOE field office, DOE contractors, and all subcontractors (including construction) are required to implement and manage a program that assures electrical equipment and systems installations, maintenance, and operations are conducted by professionally and technically qualified individuals in a manner consistent with the potential electrical hazards. (See DOE O 440.1B, Chg. 4, sections 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety*; and 10 CFR 851, *Worker Safety and Health Program.*)

The focus of this assessment is electrical safety during the performance of work where personnel may be exposed to electrical hazards. The criteria provided are for assessing strengths and weaknesses identified in the performance of work.

NOTE: Occupational Safety and Health Administration (OSHA) 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout),* applies only where electricity is an energizing source that could restart a machine or equipment and does not apply to work on electrical circuits or parts of equipment (electrical lockout/tagout).

NOTE: OSHA 29 CFR 1910.269 and 1926, subpart V, focus specifically on electric power generation and distribution as utilized at DOE facilities.

The objectives and lines of inquiry are supported by the following regulations and orders:

- 10 CFR 851, *Worker Safety and Health Program*
- 29 CFR 1910.137, *Electrical Protective Equipment (General Industry)*
- 29 CFR 1910.269, *Electric Power Generation, Transmission, and Distribution*
- 29 CFR 1910.268, *Telecommunications*
- 29 CFR 1910.331-.336, *Electrical Safety-Related Work-Practices*
- 29 CFR 1910, subpart I, *Personal Protective Equipment*, 1910.132, *General Requirements*
- 29 CFR 1926.97, *Electrical Protective Equipment (Construction)*
- 29 CFR 1926, subpart K, *Electrical (Construction)*
- 29 CFR 1926, subpart V, *Electric Power Transmission and Distribution*
- 29 CFR 1926, subpart CC, *Cranes and Derricks in Construction*

- 48 CFR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*
- DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*
- IEEE C2-2017, *National Electrical Safety Code (NESC)*
- NFPA 70-2017, *National Electric Code (NEC)*
- NFPA 70E-2015, *Standard for Electrical Safety in the Workplace*

Note:
1. NFPA 70 and NFPA 70E do not cover safety-related work practices for installations under the exclusive control of an electric utility unless they have adopted these standards. (Reference NFPA 70 and 70E article 90.2, *Scope*)
2. IEEE C2 is used as reference to provide additional information.

The following objectives are designed as stand-alone sections to be used in any combination based on the need of the specific assessment.

OBJECTIVES

ES.1: Contracts for electrical work (including maintenance, construction, and demolition) include appropriate DOE safety and health requirements. (10 CFR 851, 48 CFR 970.5223-1, DOE O 440.1B, section 4, and DOE O 226.1B)

Criteria:

Contracts include appropriate safety requirements for DOE sites that fall under DOE or OSHA jurisdiction.

- Do contracts for performance of work for sites under DOE regulatory/enforcement jurisdiction for worker safety and health, clearly convey that DOE is the regulatory and enforcement authority and require compliance with 10 CFR 851, *Worker Safety and Health Program*, and applicable DOE requirements, to include but not limited to:
  - 10 CFR 851, *Worker Safety and Health Program*
  - 48 CFR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*
  - DOE O 440.1B, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*, attachment 1, paragraph 9, *Electrical Safety*
  - DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*
  - DOE O 442.1B, *Department of Energy Employee Concerns Program*
  - DOE P 450.2, *Integrated Safety Management Policy*
- Do contracts for performance of work for sites[1] under the OSHA regulatory jurisdiction, clearly convey that OSHA is the regulatory and enforcement authority and require compliance with OSHA standards?

[1] Per memorandum of understandings between DOE and OSHA, certain DOE sites are under OSHA regulatory/enforcement authority while DOE has the responsibility for managing and overseeing safety at the sites. These sites include: Power Marketing Administrations; National Energy Technology Laboratory; Strategic Petroleum Reserves; National Petroleum Technology Office; Albany Research Center; Naval Petroleum Reserves and Oil Shale Reserves; and certain land parcels transferred from the East Tennessee Technology Park in Oak Ridge, Tennessee, to the Community Reuse Organization of East Tennessee. For detailed information on DOE-OSHA jurisdictional issues, see https://www.osha.gov/dts/doe/index.html .

ES.2: The contractor flow-down of the contract electrical safety requirements to all subcontracts at any tier to the extent necessary to ensure the contractor's compliance with the requirements. (10 CFR 851, 48 CFR 970.5223-1(h), DOE O 231.1B, Contractor Requirements Document (CRD), DOE O 232.2A, CRD, and DOE O 442.1B, attachment 1, CRD)

Criteria:

Each sub-tier contract contains all the prime contract electrical safety requirements and/or clearly describes how each sub-tier contractor will assure regulatory or prime contract requirements are implemented for all work performed by sub-tier contractors where electrical hazards may be present.

- Do work contracts for maintenance, construction and demolition, where electrical hazards may be present, adequately include requirements to implement Integrated Safety Management System (ISMS) descriptions and 10 CFR 851 worker safety and health programs (WSHP), e.g.:
  - Do sub-tier contractors implement prime contractors DOE approved ISMS description and WSHP?
  - Do sub-tier contractors develop their own for DOE approval (or by prime if allowed by DOE field element) ISMS description and WSHP?
  - If the prime M&O contractor issues the contract for electrical work projects or other work where potential electrical hazards may exist, does the work contract specify which M&O contractor ISMS description and WSHP implementing procedures are to be flowed to sub-tier contractors to be implemented for work where electrical hazards may be present?

ES.3: DOE has established sufficient support to ensure that work involving potential electrical hazards is performed safely for all work projects. (DOE O 440.1B, Chg. 4, sections 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety*)

Criteria:

DOE has established support for work involving potential electrical hazards in order to provide safety for all work projects.

- Does work involving potential electrical hazards project acquisition documents include the following:
  - Has a project manager been designated for each maintenance, construction or demolition work project?
  - Do project managers have sufficient training, resources and technical support to perform assigned duties?
  - Do formal written agreements/implementing procedures clearly delineate the respective electrical safety responsibilities/duties of DOE project management and assigned technical support staffs?
  - Is there a system for evaluating the effectiveness of electrical safety programs that is implemented on all work projects where electrical hazards may be present?

- Do electrical supervisors adequately:
  - Determine the necessity for requiring dedicated electrical safety personnel for electrical work?
  - Convey information in the acquisition documentation on all known electrical hazards to which workers may be exposed?
  - Ensure that a pre-job briefing is conducted with all workers involved in the work to be accomplished to review the work procedures and all safety requirements?
  - Ensure that the worker safety plan is approved prior to any on-site electrical work and that required hazard analyses are completed and approved prior to start of work for affected work?

- Ensure that the electrical safety plan and hazard analyses are revised, as necessary, to address identified deficiencies in worker safety performance or changes in work procedures or personnel?
- Perform frequent and regular documented on-site reviews of the worker safety program effectiveness, through personal on-site involvement and/or formal delegation to support staff?
- Ensure documentation exists for all formal procedure actions taken to enforce compliance with worker safety requirements?

ES.4: Contractors have developed and implemented a DOE-approved WSHP and ISMS description appropriate to their project. (10 CFR 851.11; 10 CFR 851.23, appendix A, section 10, *Electrical Safety*; 48 CFR 970.5223-1(e); DOE O 440.1B, Chg. 4, section a 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety*; and NFPA 70E, section 110.1, *Electrical Safety Program*)

Criteria:

DOE-approved WSHP and ISMS descriptions, appropriate for their projects, have been developed by contractors.

- Is the electrical safety program implemented as part of ISMS? (NFPA 70E, section 110.1)
- Has the electrical contractor satisfactorily used the five ISMS core functions for work planning and control?
- Has the electrical contractor prepared a satisfactory written electrical safety plan (see 10 CFR 851, appendix A, paragraph 10) prior to commencement of any work covered by the plan?
- Has the electrical contractor designated a representative on the worksite who is knowledgeable of the work hazards and has full authority to act on behalf of the electrical contractor? Does this person make regular inspections of the potential electrical hazards and all safety requirements?
- Has the electrical contractor prepared and had approved by the electrical manager an activity hazard analysis prior to commencement of affected work?
- Are workers aware of foreseeable hazards and the protective measures described within the activity hazard analysis prior to beginning work on the affected activity? Is this done through pre-job/task briefings or toolbox meetings? Are workers required to be acknowledgeable and informed of the hazards and protective measures associated with assigned work activities?
- Are workers instructed to report to the electrical contractor's designated representative any hazards not previously identified or evaluated? If immediate corrective action is not possible or the hazard falls outside of work scope, does the electrical contractor immediately notify affected workers, post appropriate warning signs, implement needed interim control measures, and notify the electrical manager of the action taken? Does the contractor or the designated representative stop work in the affected area until appropriate protective measures are established?

ES.5: DOE field office and contractors must provide a place of employment free of recognized electrical hazards and ensure that all work performed is compliant with the worker safety and health program. (10 CFR 851.10, DOE O 440.1B, Chg. 4, section a 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety*; and NFPA 70E, section 110.1, *Electrical Safety Program* and 130.7, *Personal and Other Protective Equipment*)

Criteria:

Electrical workers are informed of their safety rights and responsibility by appropriate means, including posting the appropriate poster(s) in the workplace where it is accessible to all workers. (10 CFR 851.20 (a)(10) for sites under DOE jurisdiction and 29 CFR 1910.331-.335, 1910.269, and 1926, subpart V for

sites under OSHA jurisdiction; DOE O 440.1B Chg. 4, sections 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety*; and NFPA 70E, section 11-.1, *Electrical Safety Program*)

- Are electrical workers provided with and use personal protective equipment (PPE)? (10 CFR 851.22 and 23; OSHA 29 CFR 1910.335 and 29 CFR 1910.137; 29 CFR 1926.28; 29 CFR 1926, subpart E and subpart K; and NFPA 70E, section 130.7)
- Have DOE field office and electrical contractors satisfactorily developed and implemented a worker safety training and information programs to ensure that all workers exposed to or potentially exposed to electrical hazards are provided with the training and information on those hazards in order to perform their duties in a safe and healthful manner?

ES.6: DOE field office and contractors adequately implement requirements to control electrical hazards.

Objectives, criteria and lines of inquiry (LOIs) for electrical safety topical areas are provided in the following attachments:

- Attachment A: Electrical Safety Program
- Attachment B: Electrical Lockout/Tagout (LOTO)
- Attachment C: Electric Power Transmission and Distribution

REVIEW APPROACH

Record Review:

- Electrical contracts (DOE prime or M&O electrical contract; contracts for each sub-tiered electrical contractor working under the prime contracts)
- ISMS description
- 10 CFR 851 WSHP
- Electrical safety program
- Work planning and control packages for activities involving electrical work
- Activity hazard analyses for observed electrical work
- Pre-job/task safety briefing records
- Electrical safety assessments (walk throughs; inspections; corrective actions)
- Electrical-related permits
  - Electrical/minimum approach distances/arc flash calculations for PPE
  - Electrical lockout/tagout (LOTO) (NFPA 70E, article 120)
  - Energized electrical work permit
  - Permit-required confined spaces involving potential electrical hazards
- Electrical one-line diagrams, drawings and/or other documentation of protective measures for which applicable OSHA, IEEE and NFPA standards prepared by a professional engineer or other qualified professional
- Listing of qualified persons required for workplace inspections of the electrical work activity, where required by OSHA or NFPA standards
- Applicable DOE training records
- Electrical worker training records:
  - Qualified electrical worker (QEW)
  - Non-electrical workers potentially exposed to electrical hazards
  - Pre-job briefing or toolbox meeting records for electrical work activity hazards
  - Personal protective equipment
  - Permit-required confined spaces
  - Lockout/tagout

- Powered platforms or bucket trucks (aerial lift equipment)
- Electric power generation, transmission and distribution
- Fall protection
- Ladder safety

Interviews:

- Electrical authority having jurisdiction-subject matter expert
- Electrical training manager or trainer
- Electrical supervisor
- Electrical maintenance manager
- Qualified electrical workers
- Electrical utilities manager
- Electrical inspector

Observations:

- Observe any work that includes electrical activities

ATTACHMENT A
Electrical Safety Program

References:
DOE O 440.1B, Chg. 4, sections 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety*
NFPA 70E, section 110.1, *Electrical Safety Program*
10 CFR 851, appendix A, paragraph 10

Applicability:
DOE O 440.1B, Chg. 4, sections 4.m.(1), (5), (13), and (14) and attachment 1, paragraph 9, *Electrical Safety,* requires that "DOE Elements must implement a comprehensive electrical safety program appropriate for the activities at the facility. This program must meet the applicable electrical safety codes and standards referenced in paragraph 4m of this Order." 10 CFR 851, appendix A, paragraph10 requires that "Contractors must implement a comprehensive electrical safety program appropriate for the activities at their site. This program must meet the applicable electrical safety codes and standards referenced in §851.23."

Objective 1:
A comprehensive electrical safety program has been established and implemented that defines the scope of electrical work, including objectives to meet the requirements of DOE O 440.1B, Chg.4, attachment 1, paragraph 9, *Electrical Safety;* 10 CFR 851, appendix A 10, *Electrical Safety*; and NFPA 70E, section 110.1, *Electrical Safety Program*.

Criteria: A documented electrical safety program shall be established and implemented that addresses the risk associated with electrical hazards in the workplace. (DOE O 440.1B, Chg. 4, attachment 1, paragraph 9, *Electrical Safety,* and NFPA 70E, section 110.1)

Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Has a documented electrical inspection program been established to verify that newly installed or modified electrical equipment or systems have been inspected to comply with applicable installation codes and standards prior to being placed into service? (NFPA 70E, section 110.1(B), *Manufacturer's Instructions*, and NFPA 70, *National Electrical Code*)				
Has a documented electrical equipment maintenance program been established to ensure that the condition of maintenance of electrical equipment and systems is being performed according to the manufacturer's instructions? (NFPA 70E, sections 110.1(B), 130.2(A)(4)(2), 130.5(3), 205.3, and 205.4)				

Does the electrical safety program provide an awareness of the potential electrical hazards to employees who work in an environment with the presence of electrical hazards? (NFPA 70E, sections 110.1(C), 110.1(G) and (H), 110.2, and 130.3.)				
Does the electrical safety program identify the principles upon which it is based? (NFPA 70E, section 110.1(D))				
Does the electrical safety program identify the controls by which it is measured and monitored? (NFPA 70E, section 110.1(E))				
Does the electrical safety program identify the procedures to be utilized before work is started by employees exposed to an electrical hazard? (NFPA 70E, section 110.1(F); and OSHA 29 CFR 1926.651(j)(2))				
Does the electrical safety program include a risk assessment procedure? (NFPA 70E, section 110.1(G))				
Does the electrical safety program include requirements for completing a job briefing? (NFPA 70E, section 110.1(H))				
Does the electrical safety program include elements to investigate electrical incidents?				
Does the electrical safety program include auditing requirements for the principles and procedures of the program and field work? (NFPA 70E, section 110.1(I))				
Objective 2: Identification and analysis of the severity and significance of potential electrical hazards have been documented in accordance with established requirements. (10 CFR 851.21 and .25; NFPA 70E, sections 130.4 and 130.5; and OSHA 29 CFR 1910.132(d))				
Criteria: Safety-related work practices shall be used to safeguard employees from injury while they are exposed to electrical hazards from electrical conductors or circuit parts that are or can become energized. (NFPA 70E, sections 130.4 and 130.5, and OSHA 29 CFR 1910.132(d))				
Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Have operations, procedures, maintenance, and facilities been evaluated to identify workplace electrical hazards? (NFPA 70E, sections 130.4 and 130.5, and OSHA 29 CFR 1910.132(d))				
Have all hazards related to electrical work in the workplace been communicated to management and workers? (10 CFR 851.25)				

Have the initial electrical shock and arc flash risk assessments been completed?
• Shock risk assessment completed per NFPA 70E, section 130.4.?
• Arc flash risk assessment completed per NFPA 70E, section 130.5?
• Are shock and arc flash boundaries established as required?
  o Limited approach boundary per NFPA 70E, section 130.4(C)
  o Restricted approach boundary per NFPA 70E, section 130.4(D)
  o Arc flash boundary per NFPA 70E Section, section 130.5(1)
• Electrical hazard warning labels installed per NFPA 70E, section 130.5(D)?
• Are all employees who are exposed or potentially exposed to the electrical hazards, as identified in NFPA 70E, article 130, trained according to the requirements of NFPA 70E, section 110.2?				

Is penetration work, such as cutting or drilling into equipment, floor, wall, ceilings, or other structural elements being analyzed for hazards? (NFPA 70E, section 130.10)				
Is deenergized work for cutting, removing, or rerouting conductors and conductor terminations being analyzed for hazards prior to the work activity?				
Is excavation work, where there is a possibility that underground electrical conductors or equipment may be present, being analyzed for hazards? (NFPA 70E, section 130.9)				
Is work that will be performed in locations near energized overhead power lines analyzed for hazards associated with employees and equipment? (NFPA 70E, section 130.8, and OSHA 29 CFR 1910.333(c)(3), 1910.269(q), 1926.964, and 1926.1408) • What are the hazards associated with work within the minimum approach distance (MAD) for qualified and unqualified workers? • What are the hazards associated with work within the MAD for vehicular and mechanical equipment, including cranes and derricks?				

• How are the hazards associated with the MAD, designated and marked? • What are the hazards that would require personal protective equipment (PPE) to be utilized by ground personnel? • Based on the identified hazards, what specific safe work practices must be used to protect against accidental contact with the overhead power lines?				
Objective 3: Contractors must establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated. (10 CFR 851.22)				
Criteria: Controls are identified and implemented that effectively protect against electrical hazards. (NFPA 70E, articles 120 and 130, and OSHA 1910.332(b))				
Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Does the electrical safety program and procedures include hazard controls that are appropriate for all identified electrical workplace hazards, including the implementation of the hierarchy of controls? (48 CFR 970.5223-1(b)(5) and (6); 10 CFR 851.22; and NFPA 70E, section 110.1(G) • Does the hazardous energy control (lockout/tagout) procedure include all of the requirements of NFPA 70E, article 120 for establishing an electrically safe work condition? (Also see OSHA 29 CFR 1910.147, 1910.333(b), 1910.269(d) and/or (m), and 1926.961 as applicable) • Has a process been established and implemented to authorize energized electrical work? (NFPA 70E, section 130.2)				
Have electrical safety training programs been developed and implemented to ensure that all workers exposed or potentially exposed to electrical hazards are provided required training on the electrical hazards in order to perform their duties in a safe and healthful manner? (10 CFR 851.25; NFPA 70E, section 110.2; 29 CFR 1910.132(f), 1910.332, 1910.269(a)(2), 1926.417, and 1926.950(b))				

Are electrical hazard information, hazard assessments, audits, employee training, and hazard exposure controls established and maintained? (10 CFR 851.26(a)(1); NFPA 70E, sections 110.1(I), 110.2E, and 130.5(A))				
Has a personal protective equipment (PPE) program been developed and implemented? (29 CFR 1910.132, 1910.137, 1910.335 and 1926.97; NFPA 70E, section 130.7)				
Have procedures been developed and implemented to mitigate the risk from identified and potential electrical hazards? (10 CFR 851.22(a); NFPA 70E, section 110.1(G))				
Objective 4: Work is performed in accordance with approved work instructions and within established hazard controls for all electrical work activities and facility operations. (48 CFR 970.5223-1(b)(5) and (6); and 10 CFR 851)				
Criteria: Management ensures that all work activities are conducted in accordance with approved work instruction. (48 CFR 970.5223-1(b)(5) and (6))				
Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Does management ensure workers implement the controls necessary to perform their work activities in a safe and healthful manner? (NFPA 70E, sections 110.1(I)(2), 110.2(C)(3), 110.2(D)(e), and 110.2(D)(3)(1))				
Is the control of electrical hazards communicated and implemented in accordance with accepted electrical safety practices between facilities, operations, workers, and electrical safety professionals? (NFPA 70E, sections 110.2 and 120.2)				
Do approved work instructions include information obtained from the electrical hazards analysis and risk assessment that identifies all potential electrical hazards that may be present during the work activity? (NFPA 70E, sections 130.2, and 130.3)				
Has management verified that all electrical workers are trained and qualified to perform the tasks assigned? (NFPA 70E, section 110.2)				
Do the approved work instructions include the hierarchy of risk control methods needed to eliminate or control electrical hazards wherever possible? (NFPA 70E, sections 110.1(G)(3) and 110.1(H))				

Does management ensure that documented energy control procedures are included in the approved work instructions and are being utilized, to ensure that all hazardous energy sources are effectively controlled? (NFPA 70E, section 120.2)				
Has it been verified that all electrical energy has been controlled? (NFPA 70E, sections 120.1 and 120.2(D) and 29 CFR 1910.333)				
Has it been verified that a properly rated test instrument is used, and that proper operation was verified before and after the zero-energy check before work begins? (NFPA 70E, sections 120.2(F)(2)(e) & (f))				
Where there are exposed energized electrical conductors or circuit parts, are the required safety signs or tags, barricades, and attendants properly posted to warn of the electrical hazards? (NFPA 70E, sections 130.7(E)(1) through (4) and 29 CFR 1910.333)				
Are all required personal protective equipment (PPE) available, inspected for damages and being utilized to protect against electrical shock and arc flash hazards? (NFPA 70E, sections 130.7(A) through (C))				
Where energized conductors or circuit parts might be accidently contacted, are all tools and protective equipment that will be used insulated and rated for the voltage exposure? (NFPA 70E, section 130.7(D)(1), 29 CFR 1910.137 and 1926.97)				
Objective 5: A formal process is established and implemented to gather feedback and implement continuous improvement of the electrical safety program elements, implementation, and the adequacy of hazard identification, prevention, abatement and controls. (DOE O 226.1B, attachment 1)				
Criteria: Management periodically performs and documents self-assessments to ensure the effectiveness of the electrical safety program. (DOE O 226.1B, attachment 1, and NFPA 70E, sections 110.1(K) and 110.2(A)(1)(f)).				
Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Are electrical safety standards adequately utilized?				
Are assessment records, relevant to electrical safety functions documented and readily available? Do the documented results of the audits result in revisions to the electrical safety program and training requirements? (NFPA 70E, sections 110.1(I)(3), and 110.2(E))				

Are safety and health hazard evaluation records used to assess progress in abating electrical hazards? (NFPA 70E, sections 130.3, 130.4(A) and 130.5(A))				
Are required written programs that include electrical safety elements (e.g., electrical shock and arc flash hazards communication and personal protective equipment) evaluated for effectiveness? (NFPA 70E, section 110.1(I))				
Are the electrical safety and qualifications training programs effective? (NFPA 70E, section 110.2)				
Criteria: Management evaluates and resolves any issues revealed by external and internal assessments by ensuring corrective actions are implemented, effective, and have long-term sustainability? (DOE O 226.1B, section 4.b(4) including attachment 1, section 2.b(3))				
Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Does management establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated? (10 CFR 851.22(a)) • Does management communicate the results of these assessments to all affected management and workers? • What are the procedures for the development of corrective actions? • Does management ensure the corrective actions are implemented, effective, and have long-term sustainability? • Does management incorporate lessons learned into future work planning, activities, and training for continuous improvement?				
Objective 6: Electrical circuit protective equipment (e.g., molded-case circuit breakers, low-voltage power circuit breakers, medium-voltage circuit breakers) maintenance activities are properly planned, scheduled, and performed to ensure that the equipment can reliably perform intended functions when required during short-circuit or ground-fault conditions to reduce the incident energy when an arc flash event occurs. (NFPA 70E, sections 110.1(B), 130.2(A)(4)(2), 130.5(3), 205.3, and 205.4)				
Criteria: Electrical circuit protective equipment maintenance processes shall be in place for corrective, preventive, and predictive maintenance. (NFPA 70E, sections 110.1(B), 130.2(A)(4)(2), 130.5(3), 205.3, and 205.4)				

Lines of Inquiry:	YES	NO	N/A	Comments
Is maintenance of circuit protective devices (circuit breakers and protective relays) performed as required by the manufacturers' instruction manuals, national and federal codes, standards, and regulations to ensure proper operation? (NFPA 70E, sections 205.3 and 205.4)				
Are electrical systems and equipment periodically inspected in accordance with preventative maintenance requirements? (NFPA 70E, section 205.3 and 205.4)				
Are maintenance activities associated with electrical systems and equipment (including work control, post-maintenance testing, material procurement and handling, and control and calibration of test equipment) formally controlled to ensure that changes are not inadvertently introduced, the system fulfills its requirements, and that system performance is not compromised? (NFPA 70E, sections 200.1(3), 205.3, and 205.4) • Does maintenance for the system satisfy electrical systems and equipment requirements and performance criteria in safety basis documents or other site maintenance requirements? • Does maintenance address age-related system degradation that could affect system reliability or performance? • Are conditions that require component replacement identified? • Has the system been evaluated for potential inclusion of suspect/counterfeit parts, and manufacturer's recalled items? • Are maintenance source documents such as vendor manuals, industry standards, DOE orders, and other requirements used as technical bases for development of system maintenance work packages? • Are preventive and predictive maintenance activities completed as scheduled? • Is the system inspected periodically according to maintenance requirements and are deficient conditions evaluated and/or corrected? • Are acceptance criteria defined and used for system modification, repair, maintenance, and test activities?				

• Are component failure rates identified? • Are failure rates used in establishing priorities and schedules for maintenance or system improvement proposals? • Has preventive maintenance been performed as prescribed? • Have electrical maintenance employee qualification requirements been established in accordance with applicable industry standards and have these requirements been met, according to the requirements of NFPA 70E, section 205.1?				
Objective 7: The DOE field office has established and implemented a formal mechanism and process to assess the adequacy of procedures and implementation of the contractor's electrical safety program, including the adequacy of hazard identification, prevention, abatement and controls. (DOE O 226.1B, paragraph 4)				
Criteria: DOE field office verifies that the Contractor Assurance System produced periodic scheduled and non-scheduled evaluations (e.g., self-assessment, independent assessment, management walkthroughs, etc.) of electrical work activities which identified issues, concerns and opportunities for improvement in the work planning and control (WP&C) program. (DOE O 226.1B, paragraph 4b) DOE field office ensures that the contractor analyzes, tracks, and trends internally and externally identifies electrical safety issues/concerns; evaluates this information against established performance objectives and expectations (i.e., measures or metrics); develops and implements corrective actions; and conducts effectiveness reviews to ensure continued improvement of the electrical safety program. (DOE O 226.1B, paragraph 4b and 4c)				
Lines of Inquiry:	**YES**	**NO**	**N/A**	**Comments**
Do records or observations demonstrate that identified issues and concerns are analyzed, tracked, trended, and evaluated for collective significance? (DOE O 226,1B, paragraph 4b(4))				
Do records or observations demonstrate that this information is compared to established performance objectives in order to measure the effectiveness of the electrical safety program? (DOE O 226,1B, paragraph 4c)				
Do records or observations demonstrate that corrective actions are developed and implemented for identified issues, concerns, or negative performance trends? (DOE O 226,1B, paragraph 4b(4)(a))				

Do records or observations demonstrate that effectiveness reviews for implemented corrective actions are conducted to ensure corrective actions taken for a given issue, concern or trend result in a reduction or elimination of similar issues? (DOE O 226,1B, paragraph 4b(4)(b))				
Do records or observations demonstrate that corrective action effectiveness reviews include observation of work in the field to validate work execution improvement? (DOE O 226,1B, paragraph 4b(4)(c))				

ATTACHMENT B
Electrical Lockout/Tagout (LOTO)

References:
10 CFR 851.21 and .22
NFPA 70E, article 120
OSHA 29 CFR 1910.333(b)
OSHA 29 CFR 1910.269(d)
OSHA 29 CFR 1926.961

Applicability:
10 CFR 851.21 requires DOE contractors to establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers' injury; to assess worker exposure; document assessments; record observations, analyze new designs; evaluate operations, procedures, and facilities; perform routine job activity hazard analysis; review site safety experience information; and consider interaction between workplace hazards and other hazards. Contractors are then required to establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner. DOE O 440.1B Chg. 4, attachment 1, paragraph 9, *Electrical Safety* requires that "DOE Elements must implement a comprehensive electrical safety program appropriate for the activities at the facility. The program must meet the applicable electrical safety codes and standards referenced in paragraph 4m of this Order."

Objective 1:
A comprehensive electrical lockout/tagout program to establish an electrically safe work condition has been implemented that defines the scope of electrical lockout/tagout objectives to meet the requirements. (10 CFR 851.22, *Hazard Prevention and Abatement*; § 851.25, *Training and Information*; NFPA 70E-2015, article 120, *Establishing an Electrically Safe Work Condition*; 29 CFR 1910.333(b), *Working On or Near Exposed Deenergized Parts*; 1910.269(d), *Hazardous energy control (lockout/tagout) procedures*; IEEE C2-2017, *National Electrical Safety Code*)

Criteria: Documented procedures for electrical lockout/tagout to establish an electrically safe work condition have been developed and implemented that addresses the hazards and risks associated with performing work on electrical circuits or equipment parts. (NFPA 70E-2015, article 120 and sections 130.1(1) and 130.2; and 29 CFR 1910.333(b) and 1910.269(d))

Lines of Inquiry	YES	NO	N/A	Comments
Do the procedures include the requirements for verifying the equipment and circuits are deenergized and in an electrically safe work condition? (NFPA 70E-2015, section 120.1 and 120.2; 29 CFR 1910.333(b)(2)(iv), 1910.269(d)(2)(iv)(D), and 1910.269(d)(6)(vii))				
Do the procedures require that only qualified persons are permitted to verify that a deenergized condition (zero energy check) exists? (29 CFR 1910.333(b)(2)(iv))				

Do the procedures require that only qualified persons are permitted to reenergize the circuits and equipment when work is completed? (29 CFR 1910.333(b)(2)(v))				
Are procedures developed that include job briefings to ensure that all personnel are aware of the operations, hazards, potential hazards, work practices, and personal protective equipment (PPE) required to do the job safely? (NFPA 70E-2015, section 110.1(H); 29 CFR 1910.269(c); and IEEE C2-2017, section 421.A.6.)				
Do the procedures contain the training requirements to ensure that all personnel who could be exposed or affected by the lockout/tagout of electrical circuits and equipment have been trained? (10 CFR 851.25; NFPA 70E-2015, section 120.2(B)(1) thru (4); 29 CFR 1910.333(b)(2)(v), 1910.332, and 1910.269(d)(2)(i); and IEEE C2-2017, section 410.A.2.)				
Does the program require the electrical lockout/tagout procedures to be audited by a qualified person at least annually to ensure there are no deficiencies in the procedures and that all affected employees have an understanding of the requirements? (NFPA 70E-2015, section 120.2(C)(3); and 29 CFR 1910.333(b)(2)(i))				
Objective 2: A comprehensive program has been implemented that defines the scope for deenergizing and grounding overhead power lines to perform work on or near the lines and associated equipment to address the electrical hazards, minimum approach distances to any remaining energized lines and equipment, and risks associated with this type of equipment. (IEEE C2-2017, sections 441(a), 443.E, and 444.C.1; 29 CFR 1910.269(m) and (n) and 1926.961 and .962; and NFPA 70E-2015, sections 130.4, 130.5 and 130.8(C))				
Criteria: Documented procedures for deenergizing overhead power lines to perform work on the lines or associated equipment (switches, transformers, capacitors, reclosures, etc.) have been established and implemented. (IEEE C2-2017, sections 441(a), 443.E, and 444.C.1; 29 CFR 1910.269(m) and (n), 1926.961, 1926.962 and 1926.1407; and NFPA 70E-2015, sections 130.4, 130.5 and 130.8(C))				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Do the procedures require overhead power lines or associated equipment to be deenergized and grounded prior to working on or near them? (29 CFR 1910.333(c)(3); 1910.269(m) and (n); 1926.961(a) and 1926.962; 1926, subpart CC; IEEE C2-2017, section 444; and NFPA 70E-2015, section 130.8)				

Do the procedures require that a minimum approach distance be maintained where workers may be exposed to contact with other energized overhead power lines or associated equipment? (1910.269(l); 1910.333(c)(3); 1926.960; 1926, subpart CC; IEEE C2-2017, section 441(a); and NFPA 70E-2015, section 130.4)				
Do the procedures require that only qualified persons are permitted to work where there is an exposure to energized overhead power lines or equipment? (29 CFR 1910.269(l)(1) and (2); 1926.960(b); and 1926, subpart CC)				
Are procedures developed that include job briefings to ensure that all personnel are aware of the operations, hazards, potential hazards, work practices, and personal protective equipment (PPE) required to do the job safely? (29 CFR 1910.269(c); 1926.952; and 1926, subpart CC)				
Objective 3: Training and retraining are provided to all personnel associated with performing an electrical lockout/tagout to establish an electrically safe work condition and the training has been documented in accordance with established requirements. (29 CFR 1910.332, 1910.269(a)(2), and 1926.950(b); NFPA 70E-2015, sections 110.2 and 120.2(B)(2); and IEEE C2-2017, section 410.A.2.) (NOTE: 29 CFR 1910.269(l)(1) and (2) and 1926.960(b) require qualified persons, therefore training is required to ensure that the workers are qualified.)				
Criteria: Documented procedures for training and retraining all personnel, required to perform an electrical lockout/tagout to establish an electrically safe work condition, have been established and implemented to address the requirements. (NFPA 70E-2015, sections 120.2(B)(1) thru (4); and 29 CFR 1910.333(b)(2)(v) and 1910.332)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Do the procedures contain the training requirements to ensure that all personnel who may be exposed or affected by the lockout/tagout of electrical circuits and equipment have been trained? (NFPA 70E-2015, sections 120.2(B)(1) and (2); 29 CFR 1910.333(b)(2)(v), 1910.332, 1910.269(d)(vi) and (vii) and 1926.950(b); and IEEE C2-2017, section 410.A.2)				
Do the procedures contain the retraining requirements to ensure that all personnel, who may be exposed or affected by the lockout/tagout of electrical circuits and equipment, are current in their training requirements? (NFPA 70E-2015, section 120.2(B)(3); IEEE C2-2017, section 410.A.2.; and 29 CFR 1910.269(d)(viii) and 1926.950(b)(4))				

Objective 4: Controls are identified and implemented that effectively protect against hazards associated with the application of electrical lockout/tagout to establish an electrically safe work condition. (10 CFR 851.22; 48 CFR 970.5223-1(b); NFPA 70E-2015, section 110.1(G) and article 120; and 29 CFR 1910.333(b))				
Criteria: The application of electrical lockout/tagout to establish an electrically safe work condition includes programs and procedures that require hazard assessments and controls that are appropriate for all identified electrical hazards or potential hazards, including the implementation of the hierarchy of risk control methods. (48 CFR 970.5223-1(b); 10 CFR 851.22; 29 CFR 1910.132(d)(1) and 1910.333(b)(2)(ii); NFPA 70E, section 110.1(G); and NESC Rule 444)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Do the procedures include the requirements for conducting and documenting hazard assessments to identify all electrical hazards or potential hazards? (10 CFR 851.22; 29 CFR 1910.132(d)(1) and 1910.333(b)(2)(ii); IEEE C2-2017, section 410.A.3.; and NFPA 70E, section 110.1(G))				
Does management ensure workers implement the controls necessary to perform their work activities in a safe and healthful manner? (10 CFR 851.21 and 48 CFR 970.5223-1(b))				
To eliminate or control hazards, do the approved work instructions include the hierarchy of risk control methods? (10 CFR 851.20(a))				
Do the approved work instructions include the hierarchy of risk control methods needed to eliminate or control hazards wherever possible? (48 CFR 970.5223-1(b)(6); 10 CFR 851.22(b); ANSI Z10; and NFPA 70E, section 110.1(G))				
Where hazards are present, or likely to be present, are all required safety signs or tags and barricades properly posted or positioned to warn of the hazards? (29 CFR 1926.200 and 1910.335(b); and NFPA 70E, section 130.7(E))				
Are all required personal protective equipment (PPE) available, inspected for damage and being utilized to protect against the identified hazards? (29 CFR 1910.269(g); 1910.335; 1910, subpart I; 1926, subpart E; 1926.954; 10 CFR 851.22(b)(4); and NFPA 70E, section 130.6 and 130.7)				

Objective 5: Work is performed in accordance with approved work instructions for electrical lockout/tagout to establish an electrically safe work condition for work activities. (48 CFR 970.5223-1(b) and 10 CFR 851.22(a))				
Criteria: Management ensures that all work activities are conducted in accordance with approved work instruction.				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Does management ensure workers use and implement all work instructions and controls necessary to perform their work activities in a safe and healthful manner? (48 CFR 970.5223-1 and 10 CFR 851.10(a))				
Are the work instructions and controls communicated and implemented, in accordance with accepted programs and procedures, between facilities, operations, workers, and safety professionals? (48 CFR 970.5223-1 and 10 CFR 851.20(a)(8))				
Do approved work instructions include information obtained from the hazards analysis and risk assessment that identifies all potential hazards that may be present during the work activity? (48 CFR 970.5223-1(b) and 10 CFR 851.22(a))				
Has management verified that all workers are trained and qualified to perform the tasks assigned as outlined in EL-3 above?				
To eliminate or control hazards, do the approved work instructions include the hierarchy of risk control methods? (48 CFR 970.5223-1(b); 10 CFR 851.22(b); and NFPA 70E-2015, section 110.1(G))				
Objective 6: A formal process is established and implemented to gather feedback and implement continuous improvement of the electrical lockout/tagout program and procedures used to establish an electrically safe work condition for the prevention, abatement and controls of electrical hazards. (DOE O 226.1B, attachment 1; 48 CFR 970.5223-1(c)(5); and 10 CFR 851.26(b))				
Criteria: Self-assessments of the electrical lockout/tagout programs and procedures for establishing an electrically safe work condition are performed periodically. (DOE O 226.1B, section 4.b.(2), and attachment 1, paragraph 2.b.(2); and 10 CFR 851.21)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Do the programs and procedures include written plans and schedules for planned assessments, focus areas for operational oversight, and reviews of the contractor's self-assessment of processes and systems as required by DOE O 226.1B, paragraph 4.b.(2)?				

Does the contractor assurance system include credible self-assessment, and feedback and improvement activities? (DOE O 226.1B, attachment 1, paragraph 2.b.(2))				
Criteria: Management evaluates and resolves any issues revealed by external and internal assessments by ensuring that corrective actions are implemented, effective, and have long-term sustainability? (DOE O 226.1B, attachment 1; and 10 CFR 851.22(a))				
Does management communicate the results of these assessments to all affected management and workers? How?				
Are there procedures for the development of corrective actions?				
Does management ensure the corrective actions are implemented, effective, and have long-term sustainability? How?				
Does management incorporate lessons learned into future work planning, activities, and training for continuous improvement? How?				
Objective 7: DOE field office has established and implemented a formal mechanism and process to assess the adequacy of procedures and implementation of the contractor's electrical lockout/tagout program and procedures used to establish an electrically safe work condition, including the adequacy of hazard identification, prevention, abatement and controls.				
Criteria: DOE field office verifies that the contractor assurance system performs periodic scheduled and non-scheduled evaluations (e.g., self-assessment, independent assessment, management walkthroughs, etc.) of the electrical lockout/tagout program and procedures to ensure that electrical safety issues, concerns, and opportunity for improvements are identified and controls are implemented. DOE field office ensures that the contractor analyzes, tracks, trends internally and externally identified electrical lockout/tagout issues, concerns and evaluates this information against established performance objectives and expectations (i.e., measures or metrics); develops and implements corrective actions; and conducts effectiveness reviews to ensure continued improvement of the electrical lockout/tagout program and procedures used to establish an electrically safe work condition.				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Do records or observations demonstrate that identified issues and concerns are analyzed, tracked, trended, and evaluated for collective significance?				

Do records or observations demonstrate that this information is compared to established performance objectives in order to measure the effectiveness of the electrical lockout/tagout program and procedures used to establish an electrically safe work condition?				
Do records or observations demonstrate that corrective actions are developed and implemented for identified issues, concerns, or negative performance trends?				
Do records or observations demonstrate that effectiveness reviews for implemented corrective actions are conducted to ensure corrective actions taken for a given issue, concern or trend result in a reduction or elimination of similar issues?				
Do records or observations demonstrate that corrective action effectiveness reviews include observation of work in the field to validate work execution improvement?				

ATTACHMENT C
Electric Power Transmission and Distribution

References:
29 CFR 1910.269, *Electric Power Generation, Transmission and Distribution*
29 CFR 1926, subpart V, *Electric Power Transmission and Distribution*
29 CFR 1926, subpart CC, *Cranes and Derricks in Construction*
10 CFR 851, *Worker Safety and Health Program*
NFPA 70E-2015, *Standard for Electrical Safety in the Workplace*
IEEE C2-2017, *National Electrical Safety Code (NESC)*

Note:
1. 29 CFR 1910.268, *Telecommunications*, addresses electrical hazards associated with, and exclusive to, telecommunications systems and equipment.
2. NFPA 70E does not cover safety-related work practices for installations under the exclusive control of an electric utility unless they have adopted these standards. (Reference NFPA 70E, section 90.2, *Scope*)
3. IEEE C2 is used as reference to provide additional information.

Applicability:
10 CFR 851.21 requires DOE contractors to establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers' injury; to assess worker exposure; document assessments; record observations, analyze new designs; evaluate operations, procedures, and facilities; perform routine job activity hazard analysis; review site safety experience information; and consider interaction between workplace hazards and other hazards. Contractors are then required to establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner. DOE O 440.1B Chg. 4, attachment 1, paragraph 9, *Electrical Safety* requires that "DOE Elements must implement a comprehensive electrical safety program appropriate for the activities at the facility. The program must meet the applicable electrical safety codes and standards referenced in paragraph 4m of this Order."

Objective 1:
A comprehensive electric power transmission and distribution safe work program has been established and implemented that defines the scope of electrical work, including objectives to meet the requirements. (10 CFR 851.10(b), *General Requirements*; 851.11, *Development and Approval of the Worker Safety and Health Program*; 851.20(a), *Management Responsibilities;* NFPA 70E-2015, *Standard for Electrical Safety in the Workplace*; IEEE C2-2017, *National Electrical Safety Code*; 29 CFR 1910.269, *Electric Power Generation, Transmission, and Distribution*; 29 CFR 1926, subpart V, *Electric Power Transmission and Distribution*; 29 CFR 1926, subpart CC, *Cranes and Derricks in Construction*)

Criteria: A documented electric power transmission and distribution safe work program shall be established and implemented that addresses the risk associated with electrical hazards when working on or near overhead power lines. (10 CFR 851.10(b), 851.11, 851.20(a), and 851, appendix A, section 10; NFPA 70E-2015, sections 110.1, 130.4 and 130.8; IEEE C2-2017, part 4; and 29 CFR 1910.269, 1926, subpart V, and 1926, subpart CC)

Lines of Inquiry	YES	NO	N/A	Comments
Has a documented electrical inspection program been established to verify that newly installed or modified electrical lines, equipment or systems have been inspected to comply with applicable installation codes and standards prior to being placed into service? (IEEE C2-2017, sections 013.C., 121., 214., 313., and 420.D.)				
Has a documented electrical equipment maintenance program been established to ensure that the condition of maintenance of electrical lines, equipment and systems is being performed according to the Manufacturer's Instructions? (IEEE C2-2017, section 010.A. and parts 1, 2, and 3; and 29 CFR 1910.269(a)(1))				
Does the electric power transmission and distribution safe work program specify the requirements for the contractor meeting with all subcontractors, including construction? (29 CFR 1910.269(a)(3) and (4); §1926.950(c) and (d); and NFPA 70E-2015, section 110.3)				
Does the electric power transmission and distribution safe work program specify the required training for all employees who may be exposed to the electrical hazards for working on or near overhead electric power lines and equipment? (IEEE C2-2017, sections 410.A.2. and 410.B.; and 29 CFR 1910.269(a)(2), 1926.21, 1926.950(b), and 1926.1430)				
Does the electric power transmission and distribution safe work program include a hazard risk assessment procedure? (29 CFR 1910.269(a)(2)(i)(C); §1926.950(b)(1)(iii); IEEE C2-2017, section 410.A.3.; and NFPA 70E-2015, sections 110.1(G), 130.4 and 130.5)				
Does the electric power transmission and distribution safe work program include hazards energy control requirements? (29 CFR 1910.269(m) and (n); §1926.961 and §1926.962)				

Does the electric power transmission and distribution safe work program include step and touch potential hazards? (29 CFR 1910.269(p)(4)(iii)(C) [Note to paragraph (p)(4)(iii)(C) refers to appendix C for information on hazardous step and touch potentials]; 1926.1408(g)(1)(i)(D); §1926.959(d)(3)(iii) [Note to paragraph (d)(3)(iii) refers to appendix C for information on hazardous step and touch potentials]; and IEEE C2-2017, sections 092.E., 096.B., 442.B. exception 2(b) and 444.D)				
Does the electric power transmission and distribution safe work program include requirements for personal protective equipment (PPE) which includes electrical protective equipment, fall protection, and safety signs and barricades? (29 CFR 1910.269(g); 1910, subpart I; 1910.145; 1910.335; 1926.954; 1926, subpart E; 1926, subpart G; 1926.416; and 1926.28)				
Does the electric power transmission and distribution safe work program include requirements for conducting job briefings? (29 CFR 1910.269(c); 1926.952; IEEE C2-2017, section 421.A.6.; and NFPA 70E-2015, section 110.1(H)) (NOTE: NFPA 70E-2018, section 110.1(I) added a new electrical safety program requirement that includes job safety planning to occur before the required job briefing.)				
Does the electric power transmission and distribution safe work program include elements to investigate electrical incidents? (NFPA 70E-2018, section 110.1(J) is a new requirement for incident investigations)				
Does the electric power transmission and distribution safe work program include auditing requirements for the program and procedures, field work, and lockout/tagout (LOTO)? (NFPA 70E-2015, sections 110.1(K) and 120.1(B)(3) & (4))				

Does the electric power transmission and distribution safe work program address all of the established electrical safety requirements for working on or near energized and deenergized overhead power lines, personnel, and mobile equipment? (NFPA 70E-2015, sections 110.1, 130.4 and 130.8; IEEE C2-2017, part 4; 29 CFR 1910.333(c)(3); 1910.269; 1926, subpart V; 1926.600(a)6); and 1926, subpart CC)				
Does the electric power transmission and distribution safe work program address the requirements for medical services and first aid? (29 CFR 1910.269(b); 1910.151; 1926.951; 1926.23; and 1926.50)				
Does the electric power transmission and distribution safe work program address the requirements for entering enclosed or confined spaces, including underground electrical installations? (29 CFR 1910.269(e) and (t); 1910.146; 1926.953; 1926.965; 1926, subpart AA; NFPA 70E-2015, section 130.6(F))				
Does the electric power transmission and distribution safe work program address the requirements for excavations? (29 CFR 1910.269(f) and (w)(f); 1926, subpart P; IEEE C2-2017, sections 421.B.1.b. and 423.D.; and NFPA 70E-2015, section 130.9)				
Does the electric power transmission and distribution safe work program address the requirements for the selection and safe use of portable ladders and platforms? (29 CFR 1910.269(h); 1926.955; NFPA 70E-2015, section 130.7(D)(1)(e); and IEEE C2-2017, section 420.J.)				
Does the electric power transmission and distribution safe work program address the requirements for the selection and safe use of hand and portable power equipment, including extension cords? (29 CFR 1910.269(i); 1910.334; 1926.956; 1926.302; 1926.416(e); and NFPA 70E-2015, section 110.4(B))				

Does the electric power transmission and distribution safe work program address the requirements for the selection and safe use of live-line tools and insulated hand tools? (29 CFR 1910.269(j); 1910.335(a)(2); 1926.957; IEEE C2-2017, section 441.B.2.; and NFPA 70E-2015, section 130.7(D)(1))				
Does the electric power transmission and distribution safe work program address the requirements and restrictions for materials handling and storage near overhead power lines? (29 CFR 1910.269(k); 1910, subpart N; 1926.958; and 1926, subpart H)				
Does the electric power transmission and distribution safe work program address the requirements for testing and test facilities for the purpose of performing high-voltage and high-power testing on electric transmission and distribution lines and equipment? (29 CFR 1910.269(o); and 1926.963))				
Does the electric power transmission and distribution safe work program address the requirements for operation of mechanical equipment (includes any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines) near overhead power lines and equipment? (29 CFR 1910.269(p); 1910.333(c)(3)(iii)(A); 1926.959; 1926.1408; and NFPA 70E-2015, section 130.8(F))				
Does the electric power transmission and distribution safe work program address the requirements for line-clearance tree trimming operations where trees that are under or near overhead power lines are being trimmed or pruned? (29 CFR 1910.269(r))				
Does the electric power transmission and distribution safe work program address the requirements for working in substations? (1910.269(u); 1926.966; and IEEE C2-2017, sections 110.A. and 421.B.2.b.)				

Does the electric power transmission and distribution safe work program address the requirements for special conditions? (29 CFR 1910.269(w); and 1926.967) • Does the program address the requirements for work on or with capacitors and the lines connected to capacitors? (29 CFR 1910.269(w)(1); and 1926.967(a)) • Does the program address the requirements for work on or with current transformer secondaries? (29 CFR 1910.269(w)(2); and 1926.967(b)) • Does the program address the requirements that involve employee protection in public work areas? (29 CFR 1910.269(w)(6); and 1926.967(g))				
Objective 2: Identification and analysis of the severity and significance of potential electrical hazards have been documented in the electric power transmission and distribution safe work program and in accordance with established requirements. (10 CFR 851.21; NFPA 70E-2015, sections 130.4 and 130.5; OSHA 29 CFR 1910.132(d); 1910.269(a)(4); and 1926.950(d); and IEEE C2-2017, section 410.A.3)				
Criteria: Safety-related work practices shall be used to safeguard employees from injury while they are exposed to electrical hazards from electrical conductors or circuit parts that are or can become energized. (10 CFR 851.22; 29 CFR 1910.269 and 1926, subpart V; IEEE C2-2017, sections 41, 42 and 44; and NFPA 70E-2015, article 105)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Have all hazards related to electrical work in the workplace been communicated to management and workers? (10 CFR 851.20(a)(8))				
Have the initial electrical shock and arc flash risk assessments been completed? • Shock Risk Assessment completed per NFPA 70E-2015, section 130.4(A). • Arc Flash Risk Assessment completed per NFPA 70E-2015, section 130.5 • Protection from flames and electric arcs per 29 CFR 1910.269(l)(8) • Protection from flames and electric arcs per 29 CFR 1926.960(g) • Assessment performed to determine potential exposure to electric arc per IEEE C2-2017, section 410.A.3.				

Are shock and arc flash boundaries established as required? • Limited approach boundary per NFPA 70E-2015, section 130.4(C) • Restricted approach boundary per NFPA 70E-2015, section 130.4(D) • Arc flash approach distance per 1910.269(l)(3) • Minimum approach distance per 1926.960(c)(1) • Minimum approach distance to energized lines or parts per IEEE C2-2017, section 441.A.				
Are electrical hazard warning labels or signs installed? (NFPA 70E-2015, section 130.5(D); and IEEE C2-2017, section 421.B.2.)				
Are all employees who are exposed or potentially exposed to the electrical hazards trained according to the requirements? (10 CFR 851.25; 29 CFR 1910.269(a)(2); 1926.950(b); and 1910.332; IEEE C2-2017, section 410.A.2.; NFPA 70E-2015, section 110.2)				
Is work that will be performed in locations near energized overhead power lines analyzed for hazards associated with employees and equipment? (NFPA 70E-2015, section 130.8; and 29 CFR 1910.333(c)(3); 1910.269(p); 1926.959; and 1926.1408) • Are the hazards associated with work within the minimum approach distance (MAD) for qualified and unqualified workers designated? • Are the hazards associated with work within the MAD for vehicular and mechanical equipment, including cranes and derricks designated? • Are all electrical hazards associated with the MAD, designated, and marked? • Are the hazards that would require PPE to be utilized by ground personnel designated? • Based on the identified hazards, are specific safe work practices used to protect against accidental contact with the overhead power lines? • Are there procedures for protecting ground personnel from step and touch potential hazards?				

Objective 3: Contractors must establish and implement a hazard prevention and abatement process, as part of the electric power transmission and distribution safe work program, that includes hazard controls utilizing the hierarchy of risk control methods to ensure that all identified and potential hazards are prevented, controlled, or abated. (10 CFR 851.22; and DOE O 440.1B 4.j.)				
Criteria: Controls are identified and implemented that effectively protect against electrical hazards. (29 CFR 1910.269(m) including 1910.269(n); 1926.961 including 1910.962; and 1910.333(b); and NFPA 70E-2015, articles 120 and 130)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Does the electric power transmission and distribution safe work program and procedures include hazard controls that are appropriate for all identified electrical workplace hazards, including the implementation of the hierarchy of risk control methods? (48 CFR 970.5223-1(b)(5) and (6); 10 CFR 851.22(b); DOE O 440.1B 4.J.(4); and NFPA 70E-2015, section 110.1(G)(3))				
Do the hazardous energy control, including personal protective grounding, procedures include all of the requirements? (29 CFR, 1910.269(m) and (n); 1926.961 and 1926.962; 1910.333(b); IEEE C2-2017, sections 123., 444.D., and 445.; and NFPA 70E-2015, article 120)				
Have training programs been developed and implemented to ensure that all workers, exposed or potentially exposed to electric power transmission and distribution hazards, have been provided with the required training on the electrical hazards to perform their duties in a safe and healthful manner? (10 CFR 851.25; DOE O 440.1B 4.k.; 29 CFR 1910.269(a)(2); 1910.332; 1910.132(f); 1926.950(b); and 1926.21(b)(2); and NFPA 70E-2015, section 110.2)				
Are complete and accurate records of all electrical hazard information, hazard assessments, audits, employee training, and hazard exposure controls been established and are they being maintained current? (10 CFR 851.26(a)(1); 29 CFR 110.132(d); IEEE C2-2017, section 410.A.2.; and NFPA 70E-2015, sections 110.1(I)(3), 110.2(C)(4) and (E), 110.3(C), 120.2(B)(4), and 130.5(A) and (D))				

Has a personal protective equipment (PPE) program been developed, implemented, and certified? (29 CFR 1910.269(g); 1926.954; 1910.335; and 1910.132(d)(2); IEEE C2-2017, sections 410.A.3 and 420.H. and I., 422A.2., and 441.A.; and NFPA 70E-2015, section 130.7)				
Is electrical protective equipment such as rubber insulating blankets, matting, covers, insulating line hose, insulating gloves and sleeves, designed, maintained, and used appropriately? (29 CFR 1926.97; and 1910.137; IEEE C2-2017, section 126; and NFPA 70E-2015, section 130.7)				
Have procedures been developed and implemented to mitigate the risk from identified and potential electrical hazards? (10 CFR 851.22(a))				
Is the incident energy analysis and risk assessment reviewed for accuracy at intervals not to exceed 5 years or when major modifications or renovations have occurred? (NFPA 70E-2015, section 130.5(2))				
Objective 4: Work is performed in accordance with approved work instructions and within established hazard controls for all electric power transmission and distribution work activities and facility operations. (48 CFR 970.5223-1(b)(5) and (6); and 10 CFR 851.10)				
Criteria: Management ensures that all electric power transmission and distribution work activities are conducted in accordance with approved work instruction. (48 CFR 970.5223-1(b)(5) and (6))				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Does management ensure workers implement the controls necessary to perform their work activities in a safe and healthful manner? (10 CFR 851.20(a); 29 CFR 1910.269(l), (m), and (n); 1910.333(b); 1910.333(c)(3); 1926.960, .961 and .962; and 1926.1407; and NFPA 70E-2015, sections 110.1(G), and 110.2(A) and (D))				
Does management ensure workers are retrained when deficiencies are identified? (29 CFR 1910.269(a)(2)(v); and 1926.950(b)(4); IEEE C2-2017, section 410.A.2.; and NFPA 70E-2015, sections 110.2(A) and (D)(3))				

Is the control of electrical hazards communicated and implemented in accordance with accepted electrical safety practices between facilities, operations, workers, and electrical safety professionals? (10 CFR 851.20(a)(8))				
Do approved work instructions include job briefings as required? (29 CFR 1910.269(c) and 1926.952; IEEE C2-2017, section 421.A.6.; and NFPA 70E-2015, sections 110.1(H) and 130.2(B)(2)(7))				
Do approved work instructions include all requirements for enclosed and confined space entry, including underground electrical installations? (20 CFR 1910.269(e) and (t); 1910.146; 1910.333(c)(5); 1926.953; 1926.965; and 1926, subpart AA; and NFPA 70E-2015, section 130.6(F))				
Do approved work instructions include information obtained from the electrical hazards analysis and risk assessments that identifies all potential electrical hazards that may be present during the work activity? (29 CFR 1910.269(l)(8) and 1926.960(g); IEEE C2-2017, section 410.A.3.; and NFPA 70E-2015, sections 130.4 and 130.5)				
Has management verified that all electrical workers are trained and qualified to perform the tasks assigned? (10 CFR 851.25; 29 CFR 1910.269(a)(2); 1910.332; 1926.950(b); and 1926.1430; IEEE C2-2017, section 410.A.2.; and NFPA 70E-2015, section 110.2)				
Do the approved work instructions include the hierarchy of risk control methods needed to eliminate or control electrical hazards wherever possible? (10 CFR 851.22(b); and NFPA 70E-2015, section 110.1(G))				
Do work instructions include verification that all electrical energy has been controlled? (29 CFR 1910.333(b)(2)(iv); 1910.26(m); and 1926.961; and NFPA 70E-2015, sections 120.1 and 120.2(F)(2)(e))				
Do work instructions include verification that a properly rated test instrument is used, and that proper operation was verified before and after the zero-energy check, before work begins? (29 CFR 1910.333(b)(2)(iv)(B); IEEE C2-2017, sections 420.D., 444.D., and 445.A.3.; and NFPA 70E-2015, section 120.2(F)(2)(f))				

Do work instructions include, where there are exposed energized electrical conductors or circuit parts, the use of all required safety signs or tags, barricades, and attendants properly posted to warn of the electrical hazards? (IEEE C2-2017, sections 411.D., 420.C.1., and 421.B.1.a. and 2.a.; NFPA 70E-2015, sections 130.7(E)(1) through (3) and 130.7(F); and 29 CFR 1910.335(b); 1926.416(b)(1); and 1926.1407(b)(3)(v))				
Do work instructions include verification that all required personal protective equipment (PPE) is provided, available, inspected for damage and being utilized to protect against electrical shock and arc flash hazards, and fall protection? (29 CFR 1910.269(g); 1910, subpart I; 1910.335; 1910.269(l)(8); 1926.954; 1926.960(g); and 1926, subpart E; IEEE C2-2017, sections 410.A.3. and 420.H; and NFPA 70E-2015, section 130.7(A) through (C))				
Do work instructions include the assessment of exposed energized electrical conductors or circuit parts that might be accidently contacted and that all tools and equipment are insulated and rated for the voltage exposure? (29 CFR 1910.269(j) and 1926.957; NFPA 70E-2015, section 130.7(D)(1) and 29 CFR 1910.335(a)(2))				
Objective 5: A formal process is established and implemented to gather feedback and implement continuous improvement of the electric power transmission and distribution safety program elements, implementation, and the adequacy of hazard identification, prevention, abatement, and controls. (DOE O 226.1B, attachment 1)				
Criteria: Management ensures that all electric power transmission and distribution work activities are conducted in accordance with approved work instruction. (48 CFR 970.5223-1(b)(5) and (6))				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Does management periodically perform and document self-assessments (audits) to ensure the effectiveness of the electric power transmission and distribution safety program? (10 CFR 851.21; 29 CFR 1910.132(d)(1), 1910.269(a)(3)(i)(C), 1910.269(g)(1), 1910.269(l)(8)(i), 1926.950(c)(1)(iii), and 1926.260(g)(1); IEEE C2-2017, section 410.A.3.; and NFPA 70E-2015, sections 110.1(G)(1) and 110.1(I))				

Are electric power transmission and distribution safety resources adequate and utilized? (29 CFR 1910.331-.335; 1910, subpart I; 1910.269; and 1926, subpart V; IEEE C2-2017; and NFPA 70E-2015)				
Are assessment (audit) records, relevant to electric power transmission and distribution safety functions documented and readily available? (10 CFR 851.21(a)(2) and 951.40(b) and (c); and NFPA 70E-2015, section 110.1(I)(3))				
Is the Contractor compliant with applicable electric power transmission and distribution safety requirements and established performance measures? (29 CFR 1910.331-.335; 1910, subpart I, 1910.269; and 1926, subpart V; and NFPA 70E-2015, as referenced in 10 CFR 851, Technical Amendment dated 1-17-18)				
Are electric power transmission and distribution safety and health hazard evaluation records used to assess progress in abating electrical hazards? (10 CFR 851.20(a)(9) and (b)(8); and 851.22; and NFPA 70E-2015, sections 130.3, 130.4(A) and 130.5(A))				
Are programs that include electric power transmission and distribution safety elements (including electrical shock, arc flash, and minimum approach distance hazards, including personal protective equipment requirements) communicated to all applicable personnel? (10 CFR 851.20(8); 29 CFR 1910.269(a)(3) and 1926.950(c); and NFPA 70E-2015, section 110.3)				
Are the electrical safety and qualifications training programs related to electric power transmission and distribution effective? (29 CFR 1910.269(a)(2); 1926.950(b); and 1910.332; and NFPA 70E-2015, section 110.2;)				
Criteria: Management evaluates and resolves any issues revealed by external and internal assessments by ensuring corrective actions are implemented, effective, and have long-term sustainability? (DOE O 226.1B, section 4.b.(4) including attachment 1, section 2.b.(3)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Does management establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated? (10 CFR 851.22(a))				
Does management communicate the results of these assessments to all affected management and workers? (10 CFR 851.20(a)(8))				

Are there procedures for the development of corrective actions? (10 CFR 851.40(h) and 851, appendix B, IX, *Enforcement Actions*, and section 7*, Corrective Action To Prevent Recurrence*)				
Does management ensure the corrective actions are implemented, effective, and have long-term sustainability? (10 CFR 851.40(h) and 851 appendix B, IX, *Enforcement Actions*, and section 7, *Corrective Action To Prevent Recurrence*)				
Does management incorporate lessons learned into future work planning, activities, and training for continuous improvement? (48 CFR 970-5223-1(b); DOE Order 440.1B, sections 4.i.(5) and 11.b.(2); 10 CFR 851.26(b)(2); DOE Order 225.1A, sections 4. and 5.; DOE Order 231.1B, attachment 3, section 1.g.; and DOE Order 226.1B, sections 2.b.(5) and 5.d.(2))				
Objective 6: The DOE field office has established and implemented a formal mechanism and process to assess the adequacy of procedures and implementation of the contractor's electric power transmission and distribution safety program, including the adequacy of hazard identification, prevention, abatement and controls. (DOE O 226.1B, paragraph 4)				
Criteria: DOE field office verifies that the Contractor Assurance System produced periodic scheduled and non-scheduled evaluations (e.g., self-assessment, independent assessment, management walkthroughs, etc.) of electric power transmission and distribution work activities which identified issues, concerns, and opportunities for improvement in the work planning and control (WP&C) program. (DOE O 226.1B, paragraph 4b) DOE field office ensures that the contractor analyzes, tracks, and trends internally and externally identifies electric power transmission and distribution safety issues/concerns; evaluates this information against established performance objectives and expectations (i.e., measures or metrics); develops and implements corrective actions; and conducts effectiveness reviews to ensure continued improvement of the electrical safety program. (DOE O 226.1B, paragraph 4b and 4c)				
Lines of Inquiry	**YES**	**NO**	**N/A**	**Comments**
Do records or observations demonstrate that identified issues and concerns are analyzed, tracked, trended, and evaluated for collective significance? (DOE O 226,1B, paragraph 4b(4))				
Do records or observations demonstrate that this information is compared to established performance objectives to measure the effectiveness of the electric power transmission and distribution safety program? (DOE O 226,1B, paragraph 4c)				

Do records or observations demonstrate that corrective actions are developed and implemented for identified issues, concerns, or negative performance trends? (DOE O 226,1B, paragraph 4b(4)(a))				
Do records or observations demonstrate that effectiveness reviews for implemented corrective actions are conducted to ensure corrective actions taken for a given issue, concern or trend result in a reduction or elimination of similar issues? (DOE O 226,1B, paragraph 4b(4)(b))				
Do records or observations demonstrate that corrective action effectiveness reviews include observation of electric power transmission and distribution work in the field to validate work execution improvement? (DOE O 226,1B, paragraph 4b(4)(c))				