UPF JOB HAZARD ANALYSIS

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JHA NO.:	**JHA-00716**	**REV:**	**1**	**ISSUE DATE:**	**08/12/2026**
JHA TITLE:	**Electrical Safety, LOTO, and Equipment and Components Installation**	**WORK PACKAGE NUMBER:**	N/A	**SPECIFIC LOCATION:**	**N/A**

Activity	**Sub-Activity**	**Hazard**	**Control**
Lockout/Tagout (Life Critical Activity)	General Requirements	Release of Hazardous Energy	· Never commence work until all energy sources have been identified and isolated in accordance with procedures
		Defeating a Safety Device	· Never remove and/or tamper with any tag and/or lock installed for the safety of personnel.
			Lock and tag machinery, equipment, components, and/or systems that may contain any type of stored energy before work begins
			· Eliminate all residual or stored energy before starting any work activities
			· The LO/TO program prevents the accidental release of hazardous energy such as electricity, compressed gases, liquids, and steam. The LO/TO program includes requirements for tagging, locking, blanking, capping, or blocking of moving mechanical parts, and for isolating electrical systems to prevent their being energized accidentally or without authorization
			· You must be trained on work-specific LO/TO requirements to be authorized to lock or tag out equipment and machinery
			· Never remove and/or tamper with any tag and/or lock installed for the safety of personnel
			· Prior to work, lock and tag machinery, systems, equipment, components, and/or systems that may contain any type of stored energy
			· Identify and eliminate all residual/stored energy prior to any work activities
			· Sign the authorized lockout/tagout EIP permit, as required in accordance with procedures, prior to work activities
			· Do not perform work on any machinery, system, or equipment covered by LO/TO procedures without authorization or approved training

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· Never manipulate any machinery, equipment, or system devices covered by any type of a LO/TO or restricted-use tagging permit without authorization and/or if not in accordance with procedures
			· All panels and circuit breakers shall be easily identifiable with signage and NFPA 70E warning labels
			· Only qualified electrical workers shall perform zero-energy checks using approved test equipment. Appropriately rated arc flash PPE will be used as required by the warning label or engineering calculation
			· All electrical equipment to be inspected prior to use, any damaged equipment to be removed from service and quarantined. Insulating gloves shall be rated for the hazard, air tested for holes prior to use, and maintained with proper annual testing records
			· Check access and escape routes are clear at all times
Lockout/Tagout (Life Critical Activity)	Prerequisites to Isolation	Release of Hazardous Energy	The following are prerequisites to isolation:
			· Personnel shall not isolate a piece of plant equipment until they possess the appropriate training, competencies, and authorization to isolate a specific item of plant or equipment
			· Personnel shall not work on or within safe approach boundaries of a piece of plant equipment until they possess the appropriate training, competencies, and authorization
			· Any personnel escorting a visitor ensures the visitor does not manipulate or otherwise tamper with any plant component under control of this Procedure
			· An EIP is not always required for certain work scopes that can be executed by isolation under direct control of the individual performing the work
			· Personal locks shall only be attached and removed by their owner utilizing the lock's uniquely matched key

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Lockout/Tagout (Life Critical Activity)	Preparation, Issue, and Implementation	Release of Hazardous Energy	· The intent of CFN-1312A and CFN-1312B is to protect people. If any doubt exists regarding the level of protection that an isolation might provide, any potential hazards and mitigation necessary shall be fully addressed via the Job Hazard Analysis (JHA) process
			· No work shall proceed within the boundary of the EIP until the isolation points are verified, the permit has been signed as issued by the TA, and the WGS and/or AE for the working group have signed on the permit accepting the permit and zero-energy has been verified.
Electrical Safety	Forms, Permits, and Templates	Missing Work Control Document	The following may apply according to the scope of work/task:
			· CFN-1317, *UPF Electrical Hazard Risk Assessment & Testing Form*
			· CFN-1232, *UPF Energized Electrical Work Permit (EEWP) is required for this work/task if energized and 50 volts or greater*
			· Y17-95-64-801, *UPF Energy Isolation Management (EIM) - Lockout/Tagout (LOTO) process*
			· CFN-1325, *UPF, Construction Power Electrical Equipment Maintenance Record*
			· Y17-95-64-842, *UPF Construction Electrical Testing*
Electrical Safety	Receiving Additional Training and Retraining - Additional Training	Arc Flash	· Ensure employee receives additional training if they are introduced to new equipment, technology, or changes in procedures which differ from normal use
		Shock	· Ensure employee receives additional training if job related duties change from normal duties
			· Ensure classroom or on-the-job training, or a combination of the two are performed
			· Ensure Electrical Safety Training Documentation is to be retained for the duration of employment after proficiency is demonstrated
			· Ensure all applicable training and qualifications are completed, current, and up to date prior to performing work/task on conductors, circuit parts, or equipment.

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Activity	**Sub-Activity**	**Hazard**	**Control**
Electrical Safety	Receiving Additional Training and Retraining - Retraining	Arc Flash	· Employee is retrained if they are not complying with safety-related work practices
		Shock	· Employee is retrained if they are expected to perform a task that is performed less than once a year
			· Employee is retrained if they need to review safety-related work practices not normally used during regular job duties
			· Ensure classroom or on-the-job training, or a combination of the two are performed
			· Ensure Electrical Safety Training Documentation is to be retained for the duration of employment after proficiency is demonstrated
			· Ensure all applicable retraining and re-qualifications are completed, current, and up to date prior to performing work/task on conductors, circuit parts, or equipment.
Electrical Safety	Equipment Labeling - labeling	Arc Flash	· Ensure electrical equipment including switch-boards, panelboards, industrial control panels, meter socket enclosures, motor control centers other than those in dwelling units are examined, adjusted, serviced, or have maintenance performed while energized have labels containing the following information:
		Shock	o Nominal System Voltage
			o Arc Flash Boundary
			· The label should also include:
			o Available incident energy and associated work distances or arc flash PPE category for the equipment, but not both
			o Minimum arc rating of clothing
			o Site-specific level of PPE
			· Ensure documentation of the method of calculating data is included on the label

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· It is the responsibility of the owner of the electrical equipment for documentation, installation, and maintenance of label
			· Ensure labeling is reviewed for accuracy not to exceed 5 years and if upon review or if changes render the label inaccurate that the label is updated to include these changes.
Electrical Safety	Utilizing Alerting - Safety Sign and Tags Techniques	Arc Flash	· Ensure safety signs, safety symbols, and tags are used when necessary to warn employees electrical hazards which could put them in danger
		Shock	· Verify signs and tags meet applicable requirements state, federal, local/regional codes and standards
Electrical Safety	Utilizing Alerting - Barricades	Arc Flash	· Verify safety signs are utilized in conjunction with barricades to limit or prevent employee access to work/task area containing energized electrical conductors or circuit parts
		Shock	· Ensure if the barricade would increase likelihood of exposure to electrical hazards that they are not utilized
			· Ensure barricades are no closer than the LAB given for Shock Protection Approach Boundaries to exposed energized electrical conductors or circuit parts for the related voltage
			o Verify that boundaries are not placed closer than the AFB where it is greater than the LAB
Electrical Safety	Utilizing Alerting - Attendants	Arc Flash	· Ensure if safety signs and barricades do not provide sufficient warning/protection from electrical hazards, that an attendant is utilized to warn/protect employees
		Shock	· Ensure manual signaling and alerting are performed by an attendant to keep employees out of work/task areas where they could be exposed to electrical hazards.
Electrical Safety	Working with Batteries & Battery Rooms -	Arc Flash	· Prohibit access to unauthorized personnel
		Chemical Exposure	· Ensure battery room or enclosure is only accessible by Authorized Personnel appointed by Person in Charge of the premises

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Access to Energized Battery Enclosures or Rooms	Shock	· Ensure proper illumination is provided to enable employees to perform work safely
		Eye Damage	· Ensure warning signs or labels are posted for the following: series connections, parallel connections, charging methodology, temperature/thermal, charge status, DC distribution cable size/length, and prospective short circuit current
		Skin Damage	· Ensure intrinsically safe communication devices are utilized around equipment that is sensitive to Electromagnetic Interference (EMI)
		Burns	
		Inhalation of Metals	
		Being Struck by components	
		Arc Blast	
Electrical Safety	Working with Batteries & Battery Rooms - Avoiding Arc Flash Hazards	Eye Damage	· Prohibit access to unauthorized personnel
		Skin Damage, Burns	· Ensure a battery/battery room risk assessment is performed
		Inhalation of Metals	· Ensure proper illumination is provided to enable employees to perform work safely
		Being Struck by components	· Ensure no conductive objects are worn (e.g. jewelry) while working on battery systems
		Arc Blast	· Ensure warning signs or labels are posted for the following: series connections, parallel connections, charging methodology, temperature/thermal, charge status, DC distribution cable size/length, and prospective short circuit current
			· Ensure battery terminals and electrical conductors are kept clear of unintended contact from tools, test equipment, containers, or other foreign objects
			· Verify tools and equipment are insulated for maximum working voltage

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			· Utilize non-sparking tools when Battery Risk Assessment indicates additional hazards associated with the task to be performed
			· Utilize the proper PPE for battery arc flash hazard(s).
Electrical Safety	Working with Batteries & Battery Rooms - Avoiding Chemical Hazards	Eye Damage	· Prohibit access to unauthorized personnel
		Chemical Burn causing skin damage from electrolyte exposure	· Ensure a battery/battery room risk assessment is performed
		Explosive Gas	· Verify an Eye Wash and Body Wash Apparatus is readily available, maintained, inspected, and in operable condition prior to starting job/task
			· Ensure proper illumination is provided to enable employees to perform work safely
			· Ensure the proper PPE is selected and utilized for the battery chemical hazard(s) (e.g., safety glasses, goggles)
			· Prohibit any open flames, sparks, heat producing activities, or smoking.
Electrical Safety	Working with Batteries & Battery Rooms - Avoiding Electrical Shock Hazards	Arc Flash	· Prohibit access to unauthorized personnel
		Shock	· Ensure a battery/battery room risk assessment is performed
			· Ensure proper illumination is provided to enable employees to perform work safely
			· Ensure warning signs or labels are posted for the following: series connections, parallel connections, charging methodology, temperature/thermal, charge status, DC distribution cable size/length, and prospective short circuit current
			· Utilize the proper PPE for the electrical hazard
			· Ensure no conductive objects are worn (e.g., jewelry) while working on battery systems.

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Activity	**Sub-Activity**	**Hazard**	**Control**
Electrical Safety	Entering Shock Protection Boundaries with exposed Energized Electrical Conductors or Circuit Parts - Entering a Limited Approach Boundary (LAB) while Energized	Arc Flash	· Ensure Unqualified Person(s) are not allowed in the LAB without being advised of possible hazards, while also being continuously escorted by Qualified Electrical Persons
		Shock	· Ensure applicable limits of approach are followed in accordance with NFPA 70E standards
			· If any Unqualified Person(s) are working inside the LAB that a combination of Alerting Methods/Techniques will be applied:
			o Safety, Signs, and Tags
			o Barricades
			· Attendants
Electrical Safety	Entering Shock Protection Boundaries with exposed Energized Electrical Conductors or Circuit Parts - Entering a Restricted Approach Boundary (RAB) while Energized	Arc Flash	· Ensure Unqualified Person(s) are not allowed to cross into the RAB
		Shock	· Ensure applicable limits of approach are followed in accordance with NFPA 70E standards
			o If any Qualified Electrical Person(s) permitted to approach or take a conductive object into the RAB they must be insulated or guarded from energized electrical conductors or circuit parts operating at 50 volts or above.
Electrical Safety	Maintenance of Electrical	Arc Flash	· Prior to maintenance and operation of any electrical equipment or system Ensure any training and qualifications required to perform work task have been completed and documented

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Equipment and Systems - Electrical Equipment and System Maintenance	Shock	· Prior to starting work task ensure all associated and applicable risk assessments and permits are completed to ensure UPF processes and procedures are being followed for safe work practices and to establish electrically safe working conditions
			· Ensure all covers or safeguards that are removed from equipment for maintenance are replaced once the activity is completed and prior to returning to service
			· Ensure proper PPE and tools are utilized for maintenance and operation
			· Ensure any required specialized tools, unusual PPE, or other equipment utilized for maintenance or operation are utilized in accordance with UPF processes, procedures, and in accordance with manufacturer's instructions and in accordance with NFPA 70E standards
			· Ensure up-to-date schematics, diagrams, drawings are utilized, using a questioning attitude and stop authority if equipment or system does not align with provided information
			· Ensure all maintenance of electrical equipment and systems is conducted, performed, and completed in accordance with manufacturer's instructions following all applicable NFPA 70E requirements
Electrical Safety	Maintenance of Electrical Equipment and Systems - Substations, Switchgear Assemblies, Switchboards, Panelboards, Motor Control Centers (MCC),	Arc Flash	· Ensure enclosures be kept free of material(s) that could potentially expose personnel to electrical hazards
		Shock	· Ensure area enclosures, including fences, physical protection, enclosures, or other protective means utilized to prevent unauthorized access or unintentional contact with energized conductors or circuit parts are properly maintained in accordance with manufacturer's instructions while utilizing NFPA 70E standards
			· Ensure conductors, including current carrying conductors (buses, switches, disconnects, joints, and terminations), and bracing are properly maintained in accordance with manufacturer's instructions while utilizing NFPA 70E standards

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Activity	**Sub-Activity**	**Hazard**	**Control**
	and Disconnect Switch Maintenance		· Ensure the insulation integrity is maintained to support the associated voltages impressed in accordance with manufacturer's instructions while utilizing NFPA 70E standards
			· Ensure protective devices are maintained to adequately withstand or interrupt the available fault current in accordance with manufacturer's instructions while utilizing NFPA 70E standards
Electrical Safety	Maintenance of Electrical Equipment and Systems - Premises Wiring Maintenance	Arc Flash	· Ensure covers for wiring system components are in place with all associated hardware, and that there are no unprotected openings
		Shock	· Ensure open wiring protection location or barrier is maintained to prevent unintentional contact
			· Ensure raceways and cable trays are maintained to provide physical protection and support conductors.
Electrical Safety	Maintenance of Electrical Equipment and Systems - Controller Equipment Maintenance	Arc Flash	· Ensure controller equipment is maintained, including equipment that governs starting/stopping, direction of motion, acceleration, speed, protection from rotating equipment, and other power utilization apparatus which are in the workplace
		Shock	· Ensure controller equipment maintenance provides protection and control circuitry guarding to prevent unintentional contact and prevent electrical or mechanical hazards
Electrical Safety	Maintenance of Electrical Equipment and Systems - Fuses and Circuit Breaker Maintenance	Arc Flash	· Ensure there are no breaks or cracks in fuse cases, ferrules, and insulators
		Shock	· Ensure fuse clips are maintained to provide adequate contact with fuses
			· Ensure current limiting and non-current limiting fuse holders are not altered or modified to fit fuses from each other for which they are not designed
			· Ensure molded-case circuit breakers are maintained to Ensure they are free from cracks in cases and cracked or broken operating handles
			· Ensure circuit breaker testing after electrical faults are inspected and tested in accordance with manufacturer's instructions

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Activity	**Sub-Activity**	**Hazard**	**Control**
Electrical Safety	Maintenance of Electrical Equipment and Systems - Rotating Equipment Maintenance	Arc Flash	· Ensure terminal chambers, enclosures, and terminal boxes are maintained to safeguard from unintentional contact with any exposed energized conductors, circuit parts, and other electrical hazards
		Shock	· Ensure guards, barriers, and access plates are maintained to prevent personnel from coming into contact with moving or energized parts.
Electrical Safety	Maintenance of Electrical Equipment and Systems - Portable Electric Tools and Equipment Maintenance	Arc Flash	· Ensure attachment plugs, receptacles, cover plates, and cord connectors for portable electric tools and equipment are maintained in accordance with manufacturer's instruction and the following criteria:
		Shock	o There are no breaks, damage, or cracks exposing energized conductors and circuit parts
			o There are no missing cover plates
			o Terminations have no stray strands or loose terminals
			o There is not any missing, loose, altered, or damaged blades, pins, or contacts
			· Polarity is correct
Electrical Safety	Maintenance of Electrical Equipment and Systems - Personal Safety and protective Equipment Maintenance	Arc Flash	· Ensure personal safety and protective equipment are to be maintained in accordance with manufacturer's instruction and in a safe working condition, which includes, but is not limited to the following:
		Shock	o Grounding Equipment
			o Hot Sticks
			o Rubber Gloves, sleeves, and leather protectors
			o Test Instruments
			o Blanket and similar insulating equipment

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Activity	**Sub-Activity**	**Hazard**	**Control**
			o Insulating mats and similar insulating equipment
			o Protective barriers
			o Electrical circuit breaker rack-out devices
			o Portable lighting units
			o Temporary protective grounding equipment
			o Dielectric footwear
			o Protective Clothing
			o Bypass jumpers
			o Insulated and insulated hand tools
			· Ensure personal safety, protective equipment, and protective tools are properly maintained by performing visual inspections prior to use and thereafter not to exceed 1 year. unless specified otherwise by applicable state, federal, or local codes and standards
			· Ensure personal safety, protective equipment, and protective tools are properly maintained to ensure protection of personnel by ensuring the insulating capability has been retained by performing testing prior to initial use and thereafter not to exceed 3 ~ as service conditions, applicable standards and instructions require.
Electrical Safety	Maintenance of Electrical Equipment and Systems - Removing Cable Tray Rungs	Crush/Laceration	· Removal and replacement of cable tray section is the preferred method when electrical cable tray rung damage has been discovered or reported and/or rungs need to be removed for other reasons (spacing, interference, etc.)
			· If removal of the entire section of cable tray is not possible, the following steps detail the preferred method to remove the damaged rungs:

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Activity	**Sub-Activity**	**Hazard**	**Control**
			o If cable tray is installed at elevation, secure the damaged rung to prevent accidental displacement
			o Ensure an approved and authorized UPF Hot Work Permit (CFN-1139) is in place prior to commencing the hot work activity
			o Use an end (pencil) grinder to remove the tack welds securing each end of the rung to the cable tray **(Follow JHA-00721, Hand and Power Tools for Grinding activities)**
			o Remove the damaged rung from the cable tray
			o Use a file to smooth any sharp or jagged edges on the rung and cable tray
Electrical Safety	Utilizing Other Protective Equipment - Insulated Tools and Equipment (Fuse Handling Equipment, Ropes and Handlines, Portable Ladders)	Arc Flash	· Prior to each use inspect insulated tools and equipment for damage to insulation that could limit the tool from performing the desired function or increase the risk for an incident
		Shock	· Verify insulated tools are constructed, designed, and rated for the voltages and environments in which they are utilized
			· Ensure Fuse Handling Equipment is rated for circuit voltage and utilized to remove or install a fuse when terminals are energized
			· Ensure Ropes and Handlines utilized within LAB are non-conductive
			· Verify Fiberglass-Reinforced Plastic Rods utilized for live-line tools meet all applicable codes standards for electrical installation requirements
			· Ensure Portable Ladders have non-conductive side rails when used inside LAB or when there is potential to contact energized equipment, conductors, or circuit parts
			· Ensure all other protective equipment is installed, utilized, and maintained in accordance with applicable NFPA 70E requirements

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Activity	**Sub-Activity**	**Hazard**	**Control**
Electrical Safety	Utilizing Other Protective Equipment - Barriers (Rubber Insulating Equipment, Voltage Rated Plastic Guard Equipment, Physical or Mechanical Barriers)	Arc Flash	· Ensure barriers are in place to prevent unintentional contact with exposed energized electrical conductors or circuit parts operating at greater than 50 volts when work/task is within the RAB
		Shock	· Ensure barriers are supported to remain in place to prevent unintentional contact by a person, tool, or equipment
			· Ensure rubber insulating equipment is properly rated for the voltage and meets all applicable state, federal, or local codes/standards to prevent unintentional contact with energized conductors and circuit parts
			· Ensure voltage rated plastic guard equipment is properly rated for the voltage and meets all applicable state, federal, or local codes/standards to prevent unintentional contact with energized conductors, circuit parts, and equipment to protect employees, or to keep material from contact with ground
			· Ensure physical or mechanical barriers are installed no closer than the RAB and that while the barrier(s) are being installed that the approach boundary distances are maintained in accordance to applicable tables or placed into and electrically safe work condition
			· Ensure all other protective equipment is installed, utilized, and maintained in accordance with applicable NFPA 70E requirements
Electrical Safety	Establishing an Electrically Safe Work Condition - Equipment Operating at or greater than 50 volts	Arc Flash	· Ensure any energized electrical conductors or circuit parts operating at or greater than 50 volts are placed into an electrically safe work condition prior to an employee starting any work/task inside the LAB
		Shock	o The employee is inside the LAB
			o The employee interacts with equipment where conductors or circuit part, while not exposed, increases the potential of injury from an arc flash hazard

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· Ensure an electrically safe working condition is achieved when required and applicable in accordance with NFPA 70E Standards
Lockout/Tagout (Life Critical Activity)	Establishing a Lockout/ Tagout (LOTO) Program - LOTO Procedures	Arc Flash	· Ensure the Electrical Safety Program establishes, documents, and implements a LOTO Program
		Shock	· Ensure the Electrical Safety Program prevents direct or indirect exposure from sources of electrical energy
			· Verify the developed LOTO procedure is based on existing electrical equipment and systems and uses suitable documentation including up-to-date drawings and diagrams
			· Ensure procedure meets or exceeds the requirements of applicable codes, standards, and regulations for LOTO for any electrical sources
			· Ensure the control of energy is done in a manner to minimize any employee exposure to electrical hazards
			· Ensure any electrical circuit interlock operation will not result in energizing the circuit which is being worked on by using applicable up-to-date documentation, drawings, and diagrams
			· Ensure LOTO devices are unique and readily identifiable as LOTO devices
			· Ensure all applicable and related procedures are coordinated related to electrical energy control are fully addressed on a site basis and coordinated with procedures for the control of other hazardous energy
			· Ensure the same or similar LOTO devices used for control of hazardous energy sources such as hydraulic, mechanical, pneumatic, and thermal are utilized for no other purpose
	Establishing a Lockout/ Tagout	Arc Flash	· Verify employer maintains a copy of the LOTO procedure and that the procedure is available to all employees

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JHA TITLE:	**Electrical Safety, LOTO, and Equipment and Components Installation**	**WORK PACKAGE NUMBER:**	N/A	**SPECIFIC LOCATION:**	**N/A**

Activity	**Sub-Activity**	**Hazard**	**Control**
Lockout/Tagout (Life Critical Activity)	(LOTO) Program - LOTO Procedures	Shock	· Ensure the LOTO procedure includes planning, up-to-date single-line drawings or effective means to identify all sources of energy, exposed persons and PPE required for work/task, the person in charge, and their responsibility for LOTO
			· Verify the type of LOTO procedure to be utilized, the elements of control being utilized, who will perform the switching, and where and how to de-energize the load including the release of any stored electrical or mechanical energy
			· Ensure the LOTO procedure identifies how to verify the circuit is de-energized, the person who is responsible for ensuring the work/task is complete, and the person responsible for coordination between affected employees, other craft, or any other performance work/tasks on multiple work/tasks
			· Verify the LOTO procedure identifies that the equipment under a LOTO cannot be restarted utilizing motor controls, push-buttons, selector switches, and electrical interlocks
			· Ensure the LOTO procedure establishes and includes guidelines for testing and use of testing instruments, such as type to be utilized, required PPE, and person verifying on known voltage source before and after use, boundary of electrically safe work conditions, the "test before touch" for every exposed conductor or circuit part(s) in a defined boundary , the requirements for retest for absence of voltage based on condition changes or unattended job location, and any planning to verify when there is no accessible exposed point to take voltage measurements
			· Verify grounding installation requirements, keeping in mind that the grounding needs or requirements may be covered in other work rules as is permitted
			· Ensure the LOTO procedure includes a method to transfer responsibility for LOTO to another person or person in charge when work/task extends beyond one shift

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Activity	Sub-Activity	Hazard	Control
			· Ensure the LOTO procedure establishes coordination between other jobs or tasks including related jobs or tasks, and at remote locations and the person responsible for this coordination
			· Ensure the procedure identifies the process to account for all persons and affected employees who could be potentially exposed to hazardous energy during the LOTO process
			· Ensure the LOTO procedure identifies when and where lockout applies, and when and where tagout applies
			· Ensure the LOTO procedure identifies when a lockout (e.g. physical lock to prohibit operation of disconnecting means) cannot be applied to an existing disconnecting means, that the disconnecting means utilized (e.g. tagout) will not be used as the only means to place the circuit in an electrically safe work condition
			· Ensure the LOTO procedure identifies that when a lock/lockout cannot be applied based on equipment design, that a tagout is permitted when at least one additional safety measure is applied, and the procedure establishes responsibilities and accountability for each person who potentially could be exposed to electrical hazards
			· Ensure the LOTO procedure identifies the details of the process on how to remove locks or tags when the individual installing the LOTO is unavailable, attempts have been made to locate the LOTO installer have been made, and ensuring the LOTO installer is informed prior to returning to work/task
			· Ensure the LOTO procedure identifies the release for return to service detailing the proper steps to take when the work/task requiring the LOTO has been completed
			· Ensure the LOTO procedure identifies clear steps, individual responsibilities, and when the work/task can be interrupted temporarily for testing or positioning equipment then the identical steps for return to service

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Activity	**Sub-Activity**	**Hazard**	**Control**
Electrical Safety	Performing Electrical Energized Work - Equipment Operating at less than 50 volts	Arc Flash	· Any equipment operating at less than 50 volts can be worked on energized after careful consideration and a determination is made that the energy source and the worker are not in an increased likelihood to receive electrical burns or cause an explosion due to electric arcs
		Shock	· Ensure all work on equipment operating at less than 50 volts should be performed in accordance with NFPA 70E standards
Electrical Safety	Performing Electrical Energized Work - Equipment Operating at more than 50 volts	Arc Flash	· Any equipment operating at greater than 50 volts must be de-energized before working within the LAB and where increased likelihood of injury from exposure to arc flash hazards exist
		Shock	· Only exceptions are that de-energizing introduces additional hazards/increased risk or is infeasible due to equipment design/operational limitations
			· Ensure all work on equipment operating at more than 50 volts should be performed in accordance with NFPA 70E standards
Electrical Safety	Exemptions to Energized - Exemptions to Work Permit	Arc Flash	· Ensure the appropriate safe work practices and PPE are utilized by the Qualified Electrical Person (QEP) for the following work/tasks performed without an EEWP:
		Shock	o Testing, troubleshooting, voltage measuring
			o Thermography, ultrasound, visual inspection in which RAB is not crossed
			o Access to and egress from an area with energized electrical equipment if no electrical work is performed and RAB is not crossed
			o General housekeeping and miscellaneous non-electrical tasks if the RAB is not crossed
Electrical Safety	Utilizing Personal Protective	Arc Flash	· Ensure PPE worn for protective clothing from arc and shock hazards is arc-rated, allows for movement and visibility, is loose fitting, covers all parts of the body, including any exposed flammable apparel, while not interfering with work/task

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Equipment (PPE) - PPE	Shock	· Ensure PPE for head, face, neck, and chin protection/protective equipment is nonconductive and worn properly when a danger of head injury from electrical shock or burns from energized electrical conductors, circuit parts, electric arcs/flashes, or any flying objects related to an electrical explosion
		Eye Damage	· Ensure no conductive objects are worn (e.g. jewelry) while working on potentially energized systems
		Hearing Loss	· Ensure PPE for the eyes is worn when a danger for injury from electrical arcs, flashes, or from flying objects as a result of an electrical explosion exists
		Burns	· Ensure hearing protection is worn when inside of the Arc Flash Boundary (AFB)
		Equipment Damage	· Ensure arc-rated clothing is properly rated and worn for body protection when there is the possibility of an arc flash above the threshold incident energy level for a second degree burn (1.2 cal/cm2 (5 J/cm2) ensuring under layers are not meltable fibers, and outer layers worn over arc-rated clothing are made of arc- rated material (e.g. jackets, high visibility apparel)
			· Ensure hand and arm protection is properly rated and worn appropriately when there is a danger of hand injury from electrical shock or arc flash burn due to contact with energized electrical conductors or circuit parts, while ensuring proper maintenance and use, and periodic electrical tests are performed in accordance with state, federal, and local codes/standards
			· Ensure dielectric insulated foot protection is utilized against step and touch potential
			· Ensure arc flash suits can be easily and rapidly removed, suitable for arc flash exposure, and that if exterior air is supplied that the equipment utilized is protected by arc-rated materials or constructed of nonmelting/nonflammable materials
			· Ensure employees adhere to all PPE clothing material characteristic requirements, exclude all apparel not permitted, and follow proper care and maintenance of arc-rated clothing/flash suits in accordance with state, federal, and local codes/standards

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· Ensure all PPE is donned, utilized, doffed, maintained, stored, tested, and replaced in accordance with applicable NFPA 70E requirements
Electrical Safety	Utilizing Personal Protective Equipment (PPE) - Arc Flash PPE Selection Methods	Arc Flash	· Ensure either the incident energy analysis method or the arc flash PPE category method are utilized in accordance with NFPA 70E, but that both are not used on the same piece of equipment
		Shock	· Ensure the results of the incident energy analysis are not used to select an arc flash PPE category
		Eye Damage	· Ensure arc flash selection methods are utilized in accordance with NFPA 70E Standards
		Hearing Loss	· Ensure the Incident Energy Analysis Method is the project preferred method
		Burns	· An Incident Energy Analysis will be used for the following:
		Equipment Damage	o Alternating Current Equipment
			· Power Systems with greater than the estimated maximum fault clearing times
			· Power Systems with longer than the maximum fault clearing times
			· Less than the minimum working distance
			o Direct Current Equipment
			· Power Systems with greater than the estimated maximum fault clearing times
			· Power Systems width longer than the maximum arc duration
			· Less than the minimum working distance

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Activity	**Sub-Activity**	**Hazard**	**Control**
Electrical Safety	Performing a Risk Assessment - Risk Assessment Procedure	Arc Flash	· Ensure the risk assessment procedure included in the electrical safety program addresses exposure to electrical hazards and identifies process to be utilized prior to work/task is started and will identify hazards, assess risks, and will implement risk control in accordance with NFPA 70E
		Burns	· Ensure arc flash hazard and shock hazard risk assessment aspects are included in the risk assessment procedure
		Chemical	· Ensure the risk assessment procedure addresses the potential for human error, the negative consequences on people, processes, the work environment, and equipment which is related to electrical hazards for the work/task
		Fire	· Verify the amount of personnel required to perform work/task safely, any additional training or equipment that those personnel should have (e.g., electrical emergency response, contact release. other protective equipment)
		Shock	· Ensure the preventative and protective risk control methods included in the hierarchy of risk control methods are utilized according to the following hierarchy:
		Thermal	o Elimination
			o Substitution
			o Engineering Controls
			o Awareness
			o Administrative Controls
			o PPE
Electrical Safety	Responding to an Electrical	Arc Flash	· Prior to entry to assess area/situation use Human Performance (HU) Tools (i.e., situational awareness, self-check) to determine if the location is safe to enter

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Emergency Response - Automated External Defibrillator (AED)	Shock	· Prior to entry contact the Operations Center requesting for EMS and a Qualified Electrical Person (QEP) to de-energize prior to entering the area
		Bloodborne Pathogens (BBP)	· Prior to contact Universal Precautions should be utilized to prevent contact with bloodborne pathogens including blood or other potentially infectious material (OPIM)
			· Ensure you do not use an AED on a conductive surface, in moving vehicles, in direct contact with water or fluids, or on someone under 8 years old or under 90 pounds
			· Ensure AED's are not used around flammable materials, do not wipe the victim's chest with alcohol, and do not use on someone with nitroglycerine or other patches without removing
			· Ensure employees responsible for responding to medical emergencies utilize AED's in accordance with training and certification received from certifying body
			· Ensure AED retraining/training occurs annually
Electrical Safety	Responding to an Electrical Emergency Response - Cardiopulmonary Resuscitation (CPR)	Arc Flash	· Prior to entry to assess the area/situation using Human Performance (HU) Tools (i.e., situational awareness, self-check) to determine if the location is safe to enter
		Shock	· Prior to entry contact the Operations Center requesting for EMS and a Qualified Electrical Person (QEP) to de-energize prior to entering the area
		Bloodborne Pathogens (BBP)	· Prior to contact Universal Precautions should be utilized to prevent contact with blood borne pathogens including blood or other potentially infectious material (OPIM)
			· Ensure employees responsible for responding to medical emergencies utilize CPR in accordance with training and certification received from certifying body
			· Ensure CPR retraining/training occurs annually
Electrical Safety	Responding to an Electrical	Arc Flash	· Prior to entry to assess the area/situation using Human Performance (HU) Tools (i.e., situational awareness, self-check) to determine if the location is safe to enter

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Emergency Response - First Aid (FA)	Shock	· Prior to entry contact the Operations Center requesting for EMS and a Qualified Electrical Person (QEP) to de-energize prior to entering the area
		Bloodborne Pathogens (BBP)	· Prior to contact Universal Precautions should be utilized to prevent contact with bloodborne pathogens including blood or other potentially infectious material (OPIM)
			· Ensure employees responsible for responding to medical emergencies utilize FA in accordance with training and certification received from certifying body
			· Ensure FA retraining/training occurs annually
Electrical Safety	Responding to an Electrical Emergency Response - Contact Release	Arc Flash	· Prior to entry assess the area/situation using Human Performance (HU) Tools (i.e. situational awareness, self-check) to determine if it is safe to enter
		Shock	· Prior to entry contact the Operations Center requesting for EMS and a Qualified Electrical Person (QEP) to de-energize prior to entering the area
			· Ensure Contact Release is performed utilizing a rescue hook or non- conductive materials to remove victim from the hazardous area if properly trained to do so safely
			· Ensure the appropriate PPE is worn in accordance with NFPA 70E
			· Ensure Contact Release retraining/training occurs annually
Electrical Safety	Stripping of Electrical Conductors	Laceration	· Use an approved wire stripping tool
			· An approved, fixed blade knife shall be used when a wire stripping tool is infeasible. The use of a fixed blade knife requires the review and approval of the Superintendent and an ES&H Representative
Electrical Safety	Utilizing Test Instruments and Equipment on	Arc Flash	· Ensure equipment and accessories are properly rated for circuits and equipment, approved for the intended purpose, designed for the environment in which they are utilized, and used in accordance with manufacturer's instructions

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Energized Electrical Systems - Performing Testing	Shock	· Ensure equipment and accessories are visually inspected to ensure functional integrity, and if needed properly repaired or replaced prior to each use
			· Verify equipment for proper functionality on a proving unit or known source of voltage before and after performing testing
Electrical Safety	Utilizing Test Instruments and Equipment on Energized Electrical Systems - Performing Troubleshooting	Arc Flash	· Ensure equipment and accessories are properly rated for circuits and equipment, approved for the intended purpose, designed for the environment in which they are utilized, and used in accordance with manufacturer's instructions
		Shock	· Ensure equipment and accessories are visually inspected to ensure functional integrity, and if needed properly repaired or replaced prior to each use
			· Verify equipment for proper functionality on a proving unit or known source of voltage before and after performing troubleshooting
Electrical Safety	Utilizing Test Instruments and Equipment on Energized Electrical Systems - Performing Voltage Measuring	Arc Flash	· Ensure equipment and accessories are properly rated for circuits and equipment, approved for the intended purpose, designed for the environment in which they are utilized, and used in accordance with manufacturer's instructions
		Shock	· Ensure equipment and accessories are visually inspected to ensure functional integrity, and if needed properly repaired or replaced prior to each use
			· Verify equipment for proper functionality on a proving unit or known source of voltage before and after performing voltage measuring
Electrical Safety	Utilizing Safety Grounding Equipment - Inspection	Arc Flash	· Prior to use inspect for cuts in protective sheath and damage to conductors
		Shock	· Prior to use inspect clamp and connector strain relief devices for tightness
			· Prior to use inspect initially and at intervals not to exceed 1 year once installed
Electrical Safety	Utilizing Safety Grounding	Arc Flash	· Ensure if Safety Grounding Equipment is repaired or modified it must be tested properly before being returned to service

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Equipment - Testing Grounding Equipment	Shock	o Ensure testing of the Temporary Protective Grounding Equipment is performed as service conditions require it
Electrical Safety	Utilizing Safety Grounding Equipment - Grounding and testing Devices	Arc Flash Shock	· Ensure grounding and testing devices are stored properly in a clean and dry area and properly inspected and tested before being utilized
Electrical Safety	Working with Capacitors - Stored Energy in Capacitors	Arc Flash	· Ensure the appropriate controls are in place and are applied according to the capacitor(s) stored energy hazard threshold
		Shock	· Ensure the labeling and hazard warning label includes maximum stored voltage and stored energy
		Thermal	· Ensure all manufacturer's instructions and NFPA 70E standards are used in accordance with working with capacitors
		Reoccurrence of Stored Electrical Energy	· Ensure capacitors are installed, maintained, and serviced in accordance with NFPA 70 Article 460 National Electrical Code (NEC)
			· Ensure Appropriate Controls for Capacitor(s) are applied when hazard thresholds are exceeded:
			o Less than 100 volts and greater than 100 joules of stored energy
			o Greater than or equal to 100 volts and greater than 1.0 joule of stored energy
			· Greater than or equal to 400 volts and greater than 0.25 joules of stored energy
Electrical Safety	Working with Capacitors -	Arc Flash	· Ensure employees are familiar, trained to specific hazards and controls to work safely on electrical equipment with capacitor(s) following safety-related work practices

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Appropriate Controls for Capacitors	Shock	· Ensure the risk assessment covers electrical equipment with capacitors and has indicated the appropriate PPE to account for capacitor(s) voltage/stored energy, thermal, shock, arc flash & blast, and take additional protective measures to provide an electrically safe working condition
		Thermal	· Ensure the risk assessment includes a test and grounding method is applied to appropriately ground, bleed, and discharge capacitor(s)in which the appropriate controls are put in place to address the electrical hazard
		Reoccurrence of Stored Electrical Energy	· Ensure the risk assessment is utilized to develop a written discharge procedure which captures the required information necessary to place equipment in an electrically safe working condition including the following:
			o Information about the capacitor voltage, stored energy available, and reoccurrence of stored energy potential
			o Information on the safe work practices and additional protective measures to properly address potential thermal, shock, arc flash, and arc blast electrical hazards per NFPA 70E
			o Information on the proper PPE requirements for hearing protection, lung protection, and alerting techniques per NFPA 70E
			o Duration of wait time after de-energizing before opening enclosure, taking into account the duration of discharge
			o Information on how to properly test for absence of voltage
			o Information on used of grounding sticks or grounding method(s) to safely discharge capacitors as applicable
			o The sequence of operations to properly discharge and place in an electrically safe work condition, using safe work practices and PPE

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· Ensure any work with or on capacitors follows safe work practices, and establishes and verifies electrically safe working conditions in accordance with NFPA 70E, Standard for Electrical Safety in the Workplace
			· Ensure capacitors are installed, maintained, and serviced in accordance with NFPA 70 Article 460 National Electrical Code (NEC)
Electrical Safety	Working with Generators - Generator Inspection	Arc Flash	· Ensure generators are provided with a nameplate including manufacturer's name, rated frequency, number of phases, rating in kilowatts or kilovolt amperes, normal volts and amperes corresponding to the rating, the rated revolutions per minute, and the rated ambient temperature/temperature rise
		Shock	· Ensure generators rated at more than 15 kW provide the power factor, subtransient and transient impedances, insulation system class, and time rating also must be provided on the nameplate
		Thermal	· Ensure generators are equipped with disconnect(s) and are lockable in the open position to Ensure all protective devices and control apparatus can be disconnected entirely from the circuits supplied by the generator, with the exception of the following:
		Fire	o They are portable cord and plug connected generators
			o The driving means for the generator can be readily shut down, rendered incapable of restarting, and is lockable in the off position or the generator is not arranged to operate in parallel with another generator/source of voltage
			· Ensure any work with or on generators follows safe work practices, and establishes and verifies electrically safe working conditions in accordance with NFPA 70E, Standard for
			Electrical Safety in the Workplace

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· Ensure generators are installed, maintained, and serviced in accordance with NFPA 70 Article 445 National Electric Code (NEC)
Electrical Safety	Working with Transformers - Transformers and transformer Vaults	Arc Flash	· Ensure transformers are installed, maintained, and serviced in accordance with NFPA 70 Article 450 National Electric Code (NEC)
		Shock	
Electrical Safety	Working around Look-Alike Systems - Look-Alike Equipment	Arc Flash	· Ensure when working on de-energized equipment that is placed in an electrically safe condition in a work area that includes equipment of a similar size, shape, and construction that alerting techniques (e.g., safety sign and tags, barricades, attendants) are employed to prevent the employee from entering look-alike equipment
		Shock	· Ensure when working on de-energized equipment that is placed in an electrically safe condition in a work area where look-alike equipment is present that all applicable labeling is accurate, up-to-date drawings and diagrams are a match to the work/task location, and the relationship between electrical sources and equipment are established prior to working on look-alike equipment
Electrical Safety	Meeting Auditing Requirements - Electrical Safety Program (ESP) Audit	Arc Flash	· Ensure the ESP is audited to verify the principles and procedures are in compliance with the NFPA 70E standards. not to exceed 3 years
		Shock	· Ensure applicable items of non-compliance from the ESP Audit that indicate either principle or procedure revisions are required that the appropriate revisions are made
			o Ensure items of non-compliance are documented and addressed by way of briefings, training/retraining, and process/procedure revisions, as applicable
Electrical Safety	Meeting Auditing Requirements -	Arc Flash	· Ensure Field Work is audited to determine if the principles and procedures are being followed in accordance with the NFPA 70E standards which is not to exceed 1 year

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Activity	**Sub-Activity**	**Hazard**	**Control**
	Field Work Audit (FWA)	Shock	· Ensure the applicable findings from the FWA that indicate either training or procedure revisions are required that the appropriate revisions are made
			· Ensure indications of principles and procedures not being followed are documented and addressed by way of briefings, training/retraining, and process/procedure revisions
Lockout/Tagout (Life Critical Activity)	Meeting Auditing Requirements - Lockout/Tagout (LOTO) Program and Procedure Audit	Arc Flash	· Ensure the LOTO Program and Procedure is audited by a Qualified Electrical Person (QEP) to verify the program and procedures are in compliance with the NFPA 70E standards, which is not to exceed 1 year
		Shock	· Ensure the LOTO Program and Procedure Audit includes at least one LOTO in progress
			· Ensure the LOTO Program and Procedure Audit is designed to identify the following deficiencies:
			o LOTO program or procedure revisions
			o LOTO training
			o LOTO procedure execution
			o Documentation
			· Ensure items of non-compliance are documented and addressed by way of briefings, training/retraining, and program/procedure revisions
Installation of Electrical Cable and Wire	Power Tugger Assisted Installation of Electrical Cable	Potential Energy Release	· Ensure cable pulling rope, sheaves, rollers and attachments are rated for greater tension (load) than the expected sustained tension (load) generated during the cable pulling process and located properly to facilitate a safe installation. Additionally, all anchor points shall be verified to withstand the expected pulling force generated
			· Ensure properly sized and rated cable reel jack-stands, rollers and spindle are used
			· Ensure rollers, sheaves, etc., are mounted in such a manner that damage to surrounding equipment, cable, etc., is eliminated

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Activity	**Sub-Activity**	**Hazard**	**Control**
			· Place personnel with communications equipment at locations to monitor and assist in cable pulling activities
			· Ensure personnel are positioned in such a manner to eliminate line of fire or pinch point concerns in the event of equipment failure
Installation or Removal of Electrical Equipment, Cables, and Accessories	General Requirements		· Ensure power is isolated, performing a live dead live test to any equipment, devices and cable/conductors
			· Ensure LOTO is applied and verified prior to accessing existing Electrical equipment and accessories
			· Always perform the required independent zero energy verification
			· Arc Flash PPE shall be worn where exposure exists
			· Ensure installations comply with site procedures and regulations
			· Cables and leads are installed with the minimum 7' clearance above floor level
			· Cables are installed on insulated non-conductive supports
			· Ensure testing is maintained in a barricaded area, to ensure work area is safe for work crews and other workers
			· Ensure electrical equipment has the required safe access/egress clearance to disconnecting means:
			o 36" to 120/208-volt
			o 42" to 480-volt
			· Standard 120-volt extension cords and 208-volt (single-phase twist lock) extension cords are a tool of the trade and craft persons can plug or unplug these cords, after shedding the load (e.g., turning off the welder, tool, or heater)

My signature on the corresponding CFN-1251, UPF Construction Attendance Sheet, indicates that I have read the JHA and have received answers to any questions I had relative to the JHA. My signature further indicates my willingness to comply with the provisions and requirements of the JHA.

JHA NO.:	**JHA-00716**	**REV:**	**1**	**ISSUE DATE:**	**08/12/2026**
JHA TITLE:	**Electrical Safety, LOTO, and Equipment and Components Installation**	**WORK PACKAGE NUMBER:**	N/A	**SPECIFIC LOCATION:**	**N/A**

Activity	Sub-Activity	Hazard	Control
			· Only Temporary Power Electricians can plug in, unplug, route, or relocate 480-volt cord sets

UPF JOB HAZARD ANALYSIS

My signature on the corresponding CFN-1251, UPF Construction Attendance Sheet, indicates that I have read the JHA and have received answers to any questions I had relative to the JHA. My signature further indicates my willingness to comply with the provisions and requirements of the JHA.

JHA NO.:	JHA-00716	**REV:**	**1**	**ISSUE DATE:**	**08/12/2026**
JHA TITLE:	Electrical Safety, LOTO, and Equipment and Components Installation	**WORK PACKAGE NUMBER:**	**N/A**	**SPECIFIC LOCATION:**	**N/A**
Ensure a new corresponding CFN-1251, *UPF Construction Attendance Sheet*, is signed and inserted in the CWP to document JHA briefing.					
PREPARER:		**Derek Whitman** Printed Name/Signature		**08/12/2026** Date	
APPROVAL:					
ES&H:		**Jonathan Nichols** Printed Name/Signature		**08/12/2026** Date	
SITE MANAGER: (COI-CM-801768-A087)		Printed Name/Signature		08/14/26 Date	

My signature on the corresponding CFN-1251, UPF Construction Attendance Sheet, indicates that I have read the JHA and have received answers to any questions I had relative to the JHA. My signature further indicates my willingness to comply with the provisions and requirements of the JHA.

Revision #	Revision Change Log
1	**o 8/12/2026** See Highlighted addition on Page 13 Use an end (pencil) grinder to remove the tack welds securing each end of the rung to the cable tray **(Follow JHA-00721, Hand and Power Tools for Grinding activities)**