2025

Accident Prevention Manual and Safe Working Rules

PINNACLE WEST
CAPITAL CORPORATION

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS
LOCAL 387

aps SAFETY

TED GEISLER
CEO

APS colleagues:

Safety is our company's number one core value, and the APS Accident Prevention Manual (APM) is the official guidebook for working safely. The APM is written from the hard-learned experiences of APS workers across generations. It lays out the rules and guidelines for working safely so you can go home to your family in the same condition as you arrived to work.

My expectation is that you reference this manual as you carefully identify work hazards and consider potential risks in all of your daily activities. We all work in complex environments. Whether you are getting ready to crawl into a confined space, climb a power pole, get behind the wheel of a vehicle, handle hazardous chemicals, or you're simply preparing yourself for a day in the office, take a moment to think about what hazards—large and small —you will experience. With those hazards in mind, this manual can help you map out your path, putting the appropriate barriers in place, when necessary, to achieve a safe outcome to your work.

Continually improving our safety performance happens through constant vigilance and attention to detail. Your knowledge of the requirements and guidelines in this APM is part of our learning culture, to develop a growth mindset and apply Human and Organizational Performance (HOP) principles in your work each day. Combined, they can help you avoid an accident or injury to yourself, your co-workers and the public.

Please study the APM thoroughly and make it part of your commitment to safety. If you ever feel unsafe, stop what you're doing. And if you see work being performed in an unsafe manner, I am trusting you to step in and share your and APS's expectations, so everyone's work environment is safe.

Thank you for your ongoing commitment to being the safest version of you.

Ted Geisler
CEO
Arizona Public Service Company

APS Employees

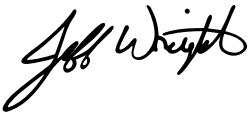
Rules/Revision Committee Accident Prevention Manual

Here is your revised Accident Prevention Manual. It is your responsibility to utilize these rules to aid in successful work completion through employment of proper lifesaving controls to mitigate the hazards we face in our work daily.

APS has always accepted the fundamental responsibility of providing a safe and healthful workplace for all employees. We believe all serious workplace injuries/illnesses are preventable through the identification of hazards and implementation of lifesaving controls and will continue to strive to attain this goal. These rules are only the foundation for attaining this goal, and it is only when individuals implement them that we will reach the highest levels of success.

Thank you for continuing to move safety forward to prevent serious injuries from occurring on behalf of all APM Rules/Revision Committee Members,

Cody Holladay, Co-Chairman



Jeff Wright, Co-Chairman

International Brotherhood of Electrical Workers

JEFFREY WRIGHT
President

JOE GABLE
Business Manager

Dear Brothers and Sisters of the IBEW,

The IBEW was founded to create, promote, and maintain a safe work environment for represented employees. It is the expectation of the Officers and Executive Board Members of IBEW LU 387 that every member abides by all the rules of this Accident Prevention Manual and to ensure all our brothers and sisters do as well.

The Accident Prevention Manual, being a part of the collective bargaining agreement, should be held to the highest priority. From these rules, you will be able to identify potential hazards and mitigate those hazards to ensure you leave work in the same condition you arrived.

If you are ever unsure of a rule or feel something is unsafe, I encourage you to stop and get the correct answers before proceeding with the work.

It is your responsibility and job requirement to follow all the rules in this manual. Please take the time to read these rules and live by these rules, so you and your coworkers can work safely and get back home to your families.

Fraternally,

I.B.E.W. LOCAL UNION NO. 387

Joseph Gable

Business Manager

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For your convenience, the Accident Prevention Manual is also available online at https://apsonline.sharepoint.com/sites/corpsafety/SitePages/Pages/Home.aspx

PLEASE NOTE:

For the most recent changes to the APM,

refer to the electronic version.

Chapter 1: Scope, Applicability and Responsibilities

1-1 PURPOSE

This Accident Prevention Manual (APM) provides employees of Arizona Public Service Company (excluding the Palo Verde Nuclear Generating Station) (the Company) with safety requirements and guidelines when they are performing the tasks discussed in this APM, or when they are exposed to the hazards associated with others performing those tasks. These are the minimum standards for employees and are a condition of employment for work at APS.

This APM has been configured to align the chapters between **Requirements**, which are mandatory rules which shall be followed, and **Guidelines**, which are directions or expectations that should be followed unless a valid reason exists to deviate.

The safety of every employee and member of the public is a vital concern to the Company. Therefore, the Company has established additional policies, processes, and procedures (3Ps) to manage safety, work practices, and conditions to reduce injuries and illnesses. The Company recognizes, however, that it is impossible to provide a rule to cover every precaution that should be taken.

1-2 APPLICABILITY

A. As a condition of employment, every employee is required to observe all rules and practices, and to follow the instruction of their leader or foreman.

B. In the event of a conflict between this APM and a Company 3P, the employee shall follow the guidance of the Company process or procedure for the task they are performing.

C. A variance to a safety Requirement may be authorized (i) only for a specific job or task on a specific day; and (ii) only if a Leader or crew foreman determines that following the safety Requirement will pose a greater hazard or risk to employees than following an alternative course of action (in which case the leader or foreman, after discussion with the crew, will document their decision and rationale on the pre-job brief and APM Variance Form, Appendix F, prior to starting the

work). An individual working alone who needs a variance to a safety Requirement shall obtain this documented variance from a Leader in charge of the work being conducted.

D. Employees are subject at any time to an examination, written or oral, on the rules herein that apply to their duties.

1-3 RESPONSIBILITIES

A. Safety is the responsibility of everyone in the Company, from senior management to front-line employees.

B. Refer to the applicable Company process or procedure for specific safety responsibilities related to the task.

C. **All Employees**

1. Each individual has the duty to work safely.
2. Promote safety throughout their area of responsibility.
3. Intervene when unsafe conditions or behaviors are observed and stop work until the unsafe conditions or behaviors are corrected.
4. Respond positively when unsafe condition or unsafe behavior concerns are raised by others.
5. Report any unsafe condition or seek help to correct the unsafe condition or practice if unable to correct it immediately.
6. Avoid engaging in horseplay, scuffling, and practical jokes.
7. Report work situations to the Leader's attention if it is believed that employees are not sufficiently protected, are called upon to do work they consider hazardous, or are asked to do work which they have not performed in the previous 12 months.
8. Report to your leadership and Health Services with any personal health condition that may prevent or limit you from performing your job tasks safely and effectively.

D. **Additional Responsibilities for Crew Leaders, Including Crew Foremen**

1. Ensure proper equipment and resources are available to safely and effectively complete the job in a timely manner.
   i. Communicate to management immediately when such resources are deficient.

2. Perform job briefings as required by this APM prior to the onset of any work, after any change in the work environment, scope of work or change in personnel, and upon job completion.
3. Provide ongoing oversight to the job environment, working conditions and crew/equipment resources.
    i. Stop work when conditions are determined to be unsafe.
    ii. Accept responsibility and accountability for a safe, productive work environment at all times.

E. **Additional Responsibilities for Leaders**

1. Create an environment that encourages continual safety performance improvements.
2. Demand responsible safety practices are adhered to at all times.
3. Lead by example in safe practices and operations.
4. Regularly train employees in safe operating practices.
5. Incorporate safety in all business planning, programs, and project design.
6. Commit appropriate resources to implement safety programs.
7. Promote open and constructive relationships with employees, regulatory agencies and contractors.
8. Celebrate safety achievements and milestones.

F. **Safety Committee Members**

1. Attend the safety committee meetings.
2. Be active, engaged and vocal in meetings and activities.
3. Complete action items on time and contribute to the committee's overall effectiveness.
4. Help develop safety policies and recommend their adoption by the Safety Department and top management.
5. Support the Safety Department as requested and assist in implementation of new safety initiatives and programs.
6. Keep others in the work area informed about new safety policies, training programs, accident causation, and other safety-related matters.

G. **Safety Professionals**

1. Anticipate, identify and evaluate hazardous conditions and practices.
2. Develop hazard control designs, methods, procedures and programs.
3. Implement, administer and advise others on hazard controls and hazard control programs.
4. Measure, audit and evaluate the effectiveness of hazard controls and hazard control programs

1-4 APM UPDATES

A. All APM revision requests will be made by submitting a Corrective Action Request (CAR).

1. APM revision request CARs will be assigned to the Corporate Safety Manager who will assign the necessary actions to the appropriate individuals.
2. APM revision request CARs must include:
   i. Identification of the APM section(s) being revised
   ii. Specific revision being requested
   iii. Basis for the change

B. All changes to this APM will be made following the steps outlined in the Accident Prevention Manual Update Process (SU-SF-PRC-0113)

C. The APM Rules and Revisions (R&R) Committee will review and recommend changes to the APM.

D. All voting members of the committee must be in agreement before Accident Prevention Manual proposed changes are officially accepted and forwarded to the Executive Sponsor and the IBEW Local 387 Business Manager for approvals.

E. Changes approved by the Executive Sponsor and the IBEW Local 387 Business Manager will be added to the APM upon exchange of letters of mutual agreement between the Union and the Company.

F. Incidental changes may be made to the APM by the R&R Committee. These incidental changes include such things as grammatical or other non-substantive changes and require the consensus of the entire R&R Committee.

Chapter 2: General Safety

INTRODUCTION

This chapter contains specific requirements and guidelines for employees that establish safety expectations to help reduce the kinds of accidents and close call events that may result in injury.

Many of the requirements and guidelines are derived from regulatory agencies such as the Occupational Safety and Health Administration (OSHA) or Environmental Protection Agency (EPA).

2-1 GENERAL SAFETY

A. General Safety Guidelines

Note: Accidents and inefficiencies come from the same source. Some of the leading causes of accidents are the following:

- Improper planning
- Improper tools
- Lack of interest
- Improper training
- Lack of training

The best safety device yet devised is a properly instructed, well trained, careful person. This goal is achieved when employees follow these practices:

1. Know and understand the safety rules that apply to the work being performed.
2. Abide by all safety policies, procedures, practices, and rules.
3. Follow the Leader's instructions.
4. Do everything possible to ensure individual safety, the safety of fellow workers, and the safety of the public; including taking special precautions felt to be necessary under the circumstances.
5. Endeavor to promote harmony and good working relations with fellow workers. (Use good judgment.)
6. Ask for a sufficient number of people to do the work safely.
7. Identify and correct at-risk behaviors observed in the workplace.
8. Identify and correct hazards encountered or created in the workplace.
9. Seek help to correct an unsafe condition or practice if unable to correct it.
10. Report unsafe conditions.
11. Avoid startling others while they are working.
12. Avoid engaging in horseplay, scuffling and practical jokes.

13. Avoid wearing jewelry, rings, bracelets, watch chains, etc., during jobs involving manual labor, climbing or descending ladders, energized electrical equipment, or the operation of moving equipment.
14. Employees should make every effort keep their “Eyes on Path” while walking and using mobile technology during work activities and while on APS property. If you must look at your mobile device, you should move out of the way of other individuals and stop to make sure you are in a safe location. Situational awareness should always be maintained while walking and talking on your cell phone.

2-2 EMERGENCY RESPONSE

A. First Aid Training Requirements

1. Personnel who work in the field in a crew environment, including journeymen and apprentices, are required to successfully complete first aid and cardiopulmonary resuscitation (CPR) training as frequently as specified by the certifying agency.

B. Communication Preparedness Guidelines

1. Use two-way communications for rapid emergency response when working in remote areas.
2. Know the location when working at a fixed location for more than a few minutes.
3. Be able to accurately communicate the location information.
4. A suggested safety practice is to write down the location (e.g., cross streets, GPS coordinates) and leave the information near the two-way communications device so that, should an emergency occur, the resulting excitement does not result in miscommunications and lost time attempting to direct rescuers to the scene.
5. Possess a reference indicating the name, address and phone number of the nearest emergency medical facility when working outside a metropolitan area.

C. Emergency Response Guidelines

1. Request assistance.
2. Provide urgently necessary first aid (to control severe bleeding or no breathing).

Note: The specific Operations Center contacted will coordinate emergency response so that personnel on the scene remain free to provide first aid care for injured personnel.

3. Report emergencies affecting worker safety to an Operations Center or site-specific emergency number immediately.
4. Follow the procedures that have been established for checking in and out with Operations Centers.

2-3 SAFETY MEETINGS

A. Safety Meeting Guidelines

1. Conduct a well-planned and meaningful safety meeting in each area at least once each month to provide opportunities for open and frank discussion.
2. Record the following for the safety meeting records:
3. Date and time of the meeting.
4. Topics covered during the meeting.
5. Attendee names.
6. Keep records of safety meetings for a minimum of 12 months.

2-4 PRE-JOB BRIEFINGS

This section provides guidelines and requirements associated performing a pre-job briefing.

A complete assessment and thorough understanding of any work assignment is vital to its safe and successful completion.

The pre-job briefing has been proven over time to be an effective tool in identifying and communicating critical elements of a job to the workers involved so that safety is provided for employees as well as the public.

Human error-related accidents typically occur when one or more individuals involved in the performance of a work assignment fail to fully understand or recognize certain elements of that work.

A. Pre-Job Briefing Requirements

1. Conduct a pre-job briefing whenever two or more employees perform non-office type work as a group.
   a. Pre-job briefings shall be conducted with the workers involved in the job prior to the start of every job.
   b. Workers working alone need not conduct or document a pre-job briefing. However, the worker shall consider the critical elements of the job as defined in the pre-job briefing checklist.

c. Troublemen troubleshooting or switching on the same circuit AND under the direction of the recognized system operator, are considered to be working alone and therefore do not need to conduct a pre-job briefing.

   i. When two or more troublmen are working together at the same location, not under the direction of the recognized system operator, a pre-job brief shall be conducted.

   ii. This pre-job briefing will be led by the person holding the ticket unless agreed upon otherwise.

2. If conducting work necessary to protect the general public from an imminent threat, the pre-job briefing does not need to be documented until public safety has been ensured, at which time the documentation must be completed.
3. Conduct at least one pre-job briefing before the start of the day or shift if the work activity being performed is repetitive and similar in nature.
4. Additional pre-job briefings shall be held if significant changes that might affect the safety of the employees occur during the course of the work.
5. Discuss each of the following critical elements of the job, at a minimum, in the pre-job briefing:

- Task Identification
- Roles and Responsibilities
- Communications
- Hazard Identification
- PPE Requirements
- Special Precautions
- Work Criteria
- Energy Source Controls
- Work Procedure Involved
- Opportunity for Questions and Worker Input

6. Each employee involved in a work activity shall attend the pre-job briefing associated with that work, participating as necessary to ensure an understanding of the job and its hazards.
7. New personnel arriving on site shall review the pre-job brief form with the person in charge before beginning any work.

B. **Pre-Job Briefing Guidelines**

1. Each worker has the right and responsibility to stop and seek clarification to questions or uncertainties regarding the safe performance of a work assignment at any time.
2. Use the pre-job briefing checklist when conducting a pre-job briefing.
3. Practice prevent event techniques prior to performing critical steps:
   - S.T.A.R. (Stop, Think, Act, Review)
   - Peer Checking
   - The Two-Minute Drill
4. Provide a more extensive review under these circumstances:
   a. The work assignment is complicated or particularly hazardous.
   b. The worker cannot be expected to recognize and avoid the hazards involved in the work.
   c. Any worker feels the need for further information or clarification.
5. A brief review of the critical elements defined in the pre-job briefing checklist is adequate if the work assignment is routine and the workers, by virtue of training and experience, can reasonably be expected to understand the job and recognize the hazards involved.

C. **Pre-job Briefing Checklist Guidelines**

1. Retain pre-job briefing checklists at a dock or office location (not in a vehicle).
2. Make pre-job briefing checklists available for inspection upon request.
3. Provide the following minimum information on the pre-job brief form that is being retained:
   - Date
   - Time
   - Job Number
   - Work location/address
   - Hazards associated with the job
   - Work procedures involved
   - Special precautions
   - Energy source controls

- Personal protective equipment requirements
- Name of the employee leading the Pre-job briefing
- Names of the individual attending the Pre-job briefing

However, the Pre-job briefing forms may be modified for specific jobs.

2-5 BLOODBORNE PATHOGENS

A. Bloodborne Pathogens Requirements

1. Before proceeding with the job, notify the local Operations Center if biological materials (excrement, urine, blood, or drug paraphernalia) that interfere with the planned work are encountered.
2. The Operations Center shall arrange for qualified personnel to remove and sanitize the work area.

2-6 ACCIDENTS, EMERGENCY MEDICAL TREATMENT; ACCIDENT AND CLOSE CALL REPORTING

A. Accident and Close Call Reporting and Follow-Up Requirements

1. Call 911 for serious injuries (at Cholla call x411 and at Four Corners call x3911).
2. Report all of the following to the Leader or designee as soon as possible and, at a minimum, prior to the end of the shift during which it occurs or the end of the shift during which the employee becomes aware of the injury:
   - Accidents that result in personal injury or illness.
   - Accidents that result in property damage.
   - Close calls.
3. Follow all Health Services treatment recommendations and follow-up requests.
4. Consult with Health Services prior to seeking treatment from a medical provider.
5. The responsible Leader shall capture all reported information in the Company's accident database as soon as practical.

B. Prohibition Against Discrimination Requirements

1. Each employee has the right to report work-related injuries and illnesses.

2. No person shall discharge or in any manner discriminate against an employee for reporting work related injuries or illnesses, for filing a safety or health complaint, for requesting access to OSHA part 1904 records, or for otherwise exercising any rights afforded by the OSH Act.

C. **Working Out of Town Guidelines**

1. Notify the area management of presence and ascertain the following:
   a. Local emergency procedures.
   b. Ways to contact the local office.
   c. Any other information deemed advisable by either party for fast, efficient handling of emergency situations.
2. Share this information with those present in case the person in charge receives an injury and is unable to assist with rescue.

D. **Emergency Medical Treatment Guidelines**

1. Initiate prompt, appropriate care of the injured person as the first priority.
2. Send the injured person to a Company first aid clinic if it is also determined by the injured person or the Leader that the injury should receive care beyond first aid.
3. Use a licensed medical doctor when a doctor's care is appropriate.

E. **Accident and Close Call Classifications Guidelines**

1. Close Call

   A close call is any event that has taken place which had a potential for personal injury, but resulted in no injury, and which presents a learning experience to support our ZERO accident culture.

   A good rule of thumb to use is the following:

   IF IT CAUSED THE HEART RATE TO QUICKEN, REPORT IT.

2. Minor Injury

   A minor injury is one treated with band-aids, gauze pads, elastic wraps, or other first aid material. Additionally, an injury requiring the use of nonprescription medication (at nonprescription strength) is considered first aid treatment and would be deemed a minor injury.

While not considered generally to be serious, these small injuries must be reported to the person in charge of the work so that a record can be made of it.

Each employee is personally responsible for reporting injuries.

A record of all such injuries will be forwarded to the appropriate Safety Department for recording.

3. Recordable Injury

   A recordable injury is one that results in a death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness. A case is considered to meet the general recording criteria if it involves a significant injury or illness diagnosed by a physician or other licensed health care professional, even if it does not result in death, days away from work, restricted work or job transfer, medical treatment beyond first aid or loss of consciousness.

   These injuries will be treated in the manner prescribed by the rules of the Industrial Commission of Arizona.

F. **Accident and Close Call Investigations Guidelines**

1. Investigate and communicate events per references; CAR Procedure (SU-CA-PRD-0108), Safety Event Investigations Process (SU-SF-PRC-0001), and Health and Safety Communications Procedure (SU-SF-PRD-0303)

G. **Temperature Extremes Guidelines**

1. Remain vigilant to the hazards posed by temperature extremes when assigned to fieldwork.
2. Discontinue work and arrange for appropriate assistance upon indication that a temperature-related illness is developing. Such illnesses or injuries might include:

   - Heat Cramps - Heat Stroke
   - Heat Exhaustion - Frostbite

3. Always dress appropriately for the environment.

2-7 LIFTING SAFETY

A. Lifting Safety Guidelines

1. Keep the load's center of gravity as close to the body as possible.
2. Lift with the legs.
3. Keep the lower back flexed during the lift.
4. Make turns with the feet, not by twisting at the waist.
5. Do not obstruct forward vision.
6. Do not attempt to lift or push objects that are too heavy.
7. Use mechanical assistance where appropriate.
8. Use gloves or other hand protection, as required, when handling materials.

2-8 ERGONOMICS

A. Ergonomics Requirements

1. Report pain related to repetitive motion (such as shoulder pain associated with MD-6 tool use).
2. Adhere to instructions received as a result of an ergonomic intervention.
3. Inform Leader if pain does not resolve after following the implementation of an ergonomic intervention, so that a reevaluation takes place expeditiously.

B. Ergonomics Guidelines

1. Stretch the areas of the body required to perform an action prior to performing (and during) significant manual or repetitive tasks.

2-9 MANUFACTURER'S SAFETY INSTRUCTIONS

A. Manufacturer's Safety Instructions Requirements

1. Read and follow the manufacturer's safety instructions prior to first use of new equipment.
2. Review the manufacturer's safety instructions as necessary for continued safe operation of the equipment.
3. Know the manufacturer-specified weight capacities of equipment and do not exceed those limits.

2-10 FITNESS FOR DUTY

A. Fitness For Duty Requirements

1. Qualifications for Duty

   Any Leader or Foreman having reasonable grounds to suspect that an employee under their jurisdiction is either emotionally or physically unfit for the work assigned shall prohibit such employee from working until satisfactory medical or other evidence indicating fitness is secured.

2. Intoxicants and/or Drugs

   a. Use of intoxicating liquor or drugs by any employee during working hours is forbidden, and any violation will be sufficient cause for dismissal.

   b. Any Leader or Foreman having reasonable grounds to suspect any employee reporting to work is under the influence of intoxicating liquor or drugs shall prohibit such employee from working until satisfactory medical or other evidence indicating fitness is secured.

   c. Abide by any restrictions placed on work activities.

   d. Report questionable situations to the Leader or Health Services.

2-11 PUBLIC SAFETY

A. Public Safety Requirements

1. Warn and protect the public from workplace dangers presented in the workplace.
2. Take the necessary steps to protect the public from potentially dangerous conditions posed by defective or damaged equipment (e.g., broken manhole covers, fallen wires, sagging lines, broken guys) until such equipment is repaired or you are relieved of the responsibility.
3. Ensure that bystanders and children are warned and protected from injury. (This must be done with as much kindness and consideration as possible.)

B. Public Safety Guidelines

1. Remain courteous to the public at all times.
2. Endeavor to answer public safety questions posed by the public as conscientiously as possible.

3. Refer the questioner to the proper source if an answer is not available.

2-12 CUSTOMER'S PROPERTY

A. Customer Property Guidelines

1. Take the greatest care to prevent damage to the customer's property. (Fences, lawns, walks, shrubbery, etc., must be respected and protected.)
2. Notify the property owner and the Company's Claims Department at once if damage has been done to a customer's property.
3. Restrict smoking to safe areas at the work site.
4. Do not smoke in a customer's house or on a customer's property.
5. Remove all Company property and debris resulting from work.
6. Announce your presence, where appropriate, prior to entering residential customer property if you are the first Company worker on-site during this visit.
7. If customer is not present and you must access the yard, rattle the gate and say 'APS' verbally to announce your presence and to determine if animals are present before entering a fenced yard.
8. Explain to the customer, if present, your purpose and how long you plan to be in the yard.
9. Ask the customer if there are any conditions you should know about that might affect safety.
10. Refrain from profanity and smoking while working within customer premises.
11. Always remain aware that children and others may be within earshot but out of eyesight.
12. Refrain from entering a customer's residence (use a different route of access, if possible).
13. Move cautiously and be alert for dangers such as low overhangs, debris or possible obstructions covered by grass or brush, timid animals that may not immediately show themselves, while moving through a customer's premises.
14. When hazards are identified in the walk path, take precautions to avoid the hazard.

2-13 ANIMALS

A. Animals Guidelines

1. When entering customer's premises, be alert for animals.
2. If customer is present, politely ask the customer to contain the unrestrained animal using a positive means such as locking it within the residence, garage, etc., or chaining the animal to a permanent structure.
3. Do not rely on the customer to simply hold onto the animal or its collar/leash.
4. Notify supervision of the fenced yard containing an unrestrained dog so that other arrangements can be made for one of the following:
   a. Obtain safe access.
   b. Relocate the Company equipment outside the fenced yard.
5. Do not attempt to pet any animal, even if it appears to be friendly.
6. Defend yourself if attacked by a dog:
   a. Do not turn your back on an aggressive animal you may encounter.
   b. Simply face the animal and back away slowly.
7. Carry Dog Sticks or any other forms of protection that will create a barrier between you and the dog (i.e. Hotsticks, etc.).
8. Do not make any quick movements near a dog that it might construe as threatening in nature. (Even a mild-mannered dog may react violently.)
9. Note all of the following in the Customer Care and Billing (CC&B) as a comment on the customer's account. Include date of the note to ensure it's up to date:
   - The presence of a dog or other hazardous animal in a customer's premises.
   - If the animal appears aggressive note it as aggressive. Dogs change, and owners obtain new pets.

   Diligently noting the presence of dogs on the customer's account can help save a co-worker from injury.
10. Always ask the customer if there is a dog located at the account location during each call related to service for that account.

11. Obtain the appropriate medical attention if bitten and the skin is punctured. Contact your Supervisor immediately once you are in a safe location.
12. Supervisor should report all animal bites to Animal Control in your county so that the animal can be placed under observation.

2-14 GENERAL DRESS

A. General Dress Requirements

1. APS employees shall wear clothing that is neat and professional, suited to the work performed, and appropriate to the working environment.
2. Clothing shall be clean and in good condition and not offensive or controversial to fellow workers and customers.
3. Grooming shall be neat, clean, and professional looking as well. Each employee is personally responsible for meeting these grooming and dress standards.
4. APS-issued badges shall be worn in compliance with Company policy.

B. General Dress Guidelines

1. Customer service employees who have jobs that require them to interface with outside customers or their representatives are expected to wear APS-branded clothing when appropriate. Some examples of when APS-branded clothing should be worn are as follows:

   a. When meeting with a new customer, office or field setting.

   b. When attending a meeting with:

   - A customer and its representatives.
   - City or government representatives.
   - Other utility's representatives.

   Please note that not every meeting will require APS-branded clothing.

   The guideline is designed to provide the employee and Leader some flexibility.

2-15 BARRIER TAPE

A. Barrier Tape General Requirements

1. It is the responsibility of the worker installing the barrier tapes and tags to see that they are maintained during the work and are removed immediately upon completion of the work.

2. It is the responsibility of every person entering any taped area to first determine the potential hazard(s) and then take appropriate protective action.
3. Barrier tape must be honored whenever encountered. Danger or Caution tags are required to accompany the barrier tape; however, missing tags do not change the entry and protection requirements.
4. If a red barrier tape is encountered with no danger tags or in a condition where the tape may have become free of its original supports, an attempt must be made to find the individual who hung it in order to obtain permission to cross.
5. If the individual who hung the barrier tape cannot be found, the front-line Leader from the department responsible for the job may determine the hazard(s) contained with the area and have the danger tags bearing the Leader's name placed on the tape, or have the tape removed if no hazard is determined to be present.

B. **Red Barrier Tape Requirements**

Note: Red Barrier Tape is a red or international orange colored tape used to designate "DANGER" and "NO ADMITTANCE."

This tape may also include black stripes or words printed on the tape to indicate a notice of hazard.

1. Use barricading with Red Barrier Tape as needed to define energized devices, equipment, or work areas that are exclusive to those performing the work and restricted to all other parties, such as overhead work at Generation facilities. Work at other APS facilities where the work area cannot be controlled requires red barrier tape. Work on energized equipment, and crane or aerial work, etc.
2. Ensure that Red Barrier Tape has appropriate danger tags bearing the name of the person in charge of the project and the date, along with a brief description of the hazard.
3. Attach the danger tags at reasonable intervals in clear view of workers who may enter the area.
4. Restrict admittance into the barricaded areas to only those individuals having a need to be in the area and authorized by the person whose name appears on the danger tags.
5. Obtain permission from a front-line Leader from the department responsible for the job, if the person whose name appears on the

danger tags is not on site or cannot be found, after the front-line Leader determines the hazards that exist within the area. Permission to enter the taped area may be granted in person, over the radio, or over the phone (preferably in person).

6. Communicate the scope of permission at the time it is requested.
   - Example: the person(s) or crew(s) to be allowed into the area and the length of time the permission is granted.
   - The person granting permission must also apprise the requester of the hazards that exist within the taped perimeter.
7. Remove the Red Barrier Tape only at the direction of the person whose name appears on the danger tags or a front-line Leader from the department responsible for the job if the person is not on site.
8. If the barrier tape is removed at the direction of a front-line Leader, it must be done only after the Leader has personally determined that the area has been returned to a safe condition.
9. Ensure that the area is cleared until the boundaries are established while the barrier tape is being attached.
10. Obtain permission to remain within the perimeter from the person whose name appears (or will appear) on the danger tags if person(s) or crew(s) is (are) required to remain in the area while boundaries are being established.

C. **Yellow Barrier Tape Requirements**

Note: Yellow Barrier Tape is a yellow colored tape, sometimes with a black stripe, used to designate “WARNING” or “CAUTION.”

This tape may also include black stripes or words printed onto the tape to indicate a notice of hazard.

1. Use barricading with Yellow Barrier Tape as needed to define hazardous areas, such as excavations, open manholes, overhead line work, work in substations and switchyards, etc.
2. Ensure that the Yellow Barrier Tape completely blocks off any access to the area.
3. Ensure that Yellow Barrier Tape has appropriate caution tags bearing the name of the person in charge of the project and date, along with a brief description of the hazard.
4. Attach the yellow tags at reasonable intervals in clear view of workers who may enter the area.

5. Enter the taped area only after determining the hazard(s) and taking appropriate protective action.
   Personnel other than those assigned to the work area are not restricted from taped areas.
6. Remove the Yellow Barrier Tape immediately after the hazard(s) is (are) eliminated.

2-16 FENCE CROSSING

A. Fence Crossing Requirements

1. Employees shall not cross over fences unless it is determined to be impractical or impossible to go around. Use gates when possible.
2. The determination to cross the fence shall be documented on the pre-job brief form, along with the procedure that will be used to ensure employee safety.
3. Do not attempt to carry anything when climbing on or over obstacles.
4. Always wear leather gloves when crossing fences.

B. Fence Crossing Guidelines

1. Use a portable fence ladder, trestle ladder, or other approved device when possible.
2. When crossing a barbed wire fence, if an approved device is not available, lay a piece of heavy canvas, such as an empty material bag, over the top strand and cross at the center of the span.

2-17 FIRST AID KITS

A. First Aid Kits Requirements

1. Inspect first aid kits at least monthly to ensure that the contents are adequate and that perishable items have not expired.
2. Replenish first aid kits' contents as necessary.
3. Maintain stationary work location first aid kit contents with at least all of the supplies specified for the type of kit.
4. Maintain assigned CMV first aid kits contents with at least all of the supplies specified for the type of kit.
5. Maintain assigned line truck first aid blue bags contents with at least all of the supplies specified for the type of kit.

B. First Aid Kits Guidelines

1. Know the location(s) of first aid kits in assigned work areas.

2. For T&D, refer to the T&D Safety SharePoint Site under First Aid Supply Orders for information on specific first aid kit contents.

2-18 2-18 LOCKOUT/TAGOUT

Refer to **Fossil Generation Procedure SAF-FG00-3016** "*Lock Out/Tag Out (LOTO) Procedure*," **Supply Chain Procedure SC-FC-PRD-0409** "*Facilities Lock Out Tag Out (LOTO) Procedure*," or **Renewable Generation – SAF-RG00-1000** for further information on hazardous energy control. See **Transmission and Distribution Clearance Procedure and Switching Orders** (Chapter 12) for T&D.

2-19 OUTLETS USED FOR TEMPORARY WIRING INSTALLATIONS

A. **Outlets Used For Temporary Wiring Installations Requirements**

1. All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are part of a temporary wiring installation and are being used by personnel during construction-like activities, including remodeling, or repair, involving buildings, structures or equipment shall have ground-fault circuit-interrupter protection for personnel.
2. Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects. Such as:
   a. Deformed or missing pins
   b. Insulation damage
   c. Indications of possible internal damage.
3. Equipment found damaged or defective shall not be used until repaired.
4. Damaged or defective items shall be tagged "DO NOT USE" and removed from service until repaired and tested.

2-20 STATIONARY ROTATING EQUIPMENT

Rotating parts are common and may include collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears, and horizontal or vertical shafting.

A. **Stationary Rotating Equipment Requirements**

1. All rotating equipment shall have safeguards to prevent employees from becoming entangled when they are working around or in close proximity to rotating equipment.
2. Basic safe work practices when working around or in close proximity to rotating equipment shall include:
   a. Minimize exposure points (tuck in shirt tails, rollup long sleeves, remove jewelry, secure long hair and any other item with the potential for entanglement).
   b. Ensure guards are in place that enclose the rotating equipment if working near equipment that is not under LOTO.
   c. Never bypass or circumvent guarding
   d. Ensure energy sources are locked out prior to any attempted repair.
   e. Ensure that guards are replaced after any repair, servicing, or maintenance activities.
   f. Work from a distance where possible.
   g. Never try to brush debris away from rotating equipment surface while running.

Chapter 3: Office/Facility Safety

INTRODUCTION

This chapter contains specific requirements and guidelines for employees that establish safety expectations to help reduce the kinds of accidents and close call events that may result in injury.

Many of the requirements and guidelines are derived from regulatory agencies such as the Occupational Safety and Health Administration (OSHA) or Environmental Protection Agency (EPA).

3-1 HOUSEKEEPING

A. **Housekeeping Guidelines**

1. Keep offices, yards, vehicles, and job sites neat and orderly at all times.
2. Keep tools, equipment and materials orderly.
3. Do not place tools and materials where they are likely to fall.
4. Remove tools, equipment and materials from the work area if they are not to be used immediately.
5. Promptly dispose of oily waste or rags brought in from the job site or found in the shop area.
6. Do not leave combustible material (e.g., oily waste, rags) on vehicles.

3-2 PACKING AND UNPACKING MATERIALS

A. **Packing and Unpacking Materials Requirements**

1. Dispose of nail points, ends of wires or bands exposed when packing or unpacking boxes, crates, barrels or other containers.
2. Remove nails, bend the points down, or dispose of the lumber immediately to prevent loose lumber from becoming a hazard.
3. Cut the bands on packing crates using shears or a device designed for the purpose.
4. Take precautions to keep everyone clear of flying ends when cutting bands on packing crates.

3-3 STAIRWAY USE

A. **Stairway Use Guidelines**

1. Walk carefully; do not run up or down stairs.
2. Take one step at a time using the handrails provided.

3. Keep hands out of pockets when using stairways.
4. Do not carry items that obscure vision.
5. Do not carry food or liquids in open containers.
6. Immediately report defective stairways, treads, etc. to Facility Services for repair.
7. Install a warning device for other users indicating the presence of defective stairways until hazards can be repaired.

3-4 OFFICE SAFETY

A. Office Safety Requirements

1. Smoking is prohibited in all APS buildings, work vehicles, and within 25 feet in any direction from all doors, windows, and/or ventilation systems of any building.
2. Use proper ladders or portable steps to gain access to elevated materials and equipment.
3. Do not use a chair or desk as a substitute for a ladder or portable step.
4. Equip all office-related power cords and extension cords with a grounded three prong plug (unless it is double insulated in accordance with the manufacturer's design).
5. Ensure that all power cords and extension cords are properly insulated.
6. Replace or repair, using a qualified person, power cords with damaged insulation.
7. Flexible power cords shall not be routed through doorways, windows, or similar openings unless protected from damage and used temporarily.
8. Flexible power cords shall not be used as a substitute for the fixed wiring of a structure; run through holes in walls, ceilings, or floors; attached to building surfaces; or concealed behind building walls, ceilings, or floors.
9. Extension cords, power strips, surge/spike protectors, or portable outlets shall be directly connected to a permanently installed branch circuit receptacle and shall not be series-connected (daisy chained) to each other.
10. Appliance with high power loads such as space heaters, refrigerators and microwave ovens shall not be plugged into power strips.
11. A minimum of 36 inches of clearance shall be maintained in front of breaker panels (overcurrent devices) for access.

B. **Office Safety Guidelines**

1. Learn and follow all safety-related procedures, particularly those for special hazards involving unique equipment used in the area.
2. Keep stairways, hallways, aisles, and walkways between desks clear of spilled liquids, telephone and office machine cords, trash cans, or other objects that could create slipping or tripping hazards.
3. Keep to the right at corners.
4. Go around corners slowly to avoid collisions.
5. Do not run or slide across floors or through doorways.
6. Stand or walk clear of doors that may swing open unexpectedly.
7. Open doors slowly to avoid striking someone on the other side.
8. Do not push on glass panes of doors.
9. Use door handles to open doors.
10. Coil or carry the cord do not dangle it to avoid tripping when carrying corded equipment.
11. Sit squarely and well back on the seat of any chair and keep all chair legs and casters on the floor.
12. Keep desks, file and cabinet drawers, door slides and locker doors closed when not in immediate use.
13. Open one filing cabinet drawer at a time.
14. Do not leave sharp or pointed edges (e.g., paper cutters, paper spindles) exposed when not in immediate use.
15. Know the location of area fire extinguishers and first aid kits.
16. Store the heaviest materials near the bottom of shelving units and lockers to keep the unit's center of gravity low.

3-5 SHOP SAFETY

A. **Shop Safety Requirements**

1. Maintain good housekeeping within all work and storage areas at all times.
2. Keep air hoses, extension and power cords, and welding hoses/ leads off of floors and out of walkways as practical to reduce tripping hazards.
3. Dispose of oily rags in metal containers having metal covers.
4. Do not dispose of oily rags in normal trash containers.

5. Do not use toxic or flammable solvents in parts cleaning basins.
6. Store all flammable liquids except incidental amounts in current use in approved flammable liquid storage cabinets.

Refer to **Chapter 5, Hazardous Materials**.

7. Conspicuously post and enforce “No Smoking” signs in all shops and near flammable liquid storage and use areas.
8. Take special care against the hazards of sparks or fire when spraying flammable liquids (e.g., painting).
9. Take precautions against overspray when spraying flammable liquids (e.g., painting).
10. Use proper eye, skin and respiratory protection when spraying paint. Refer to **Chapter 4, Personal Protective Equipment**.

Refer to **Chapter 5, Hazardous Materials**.

11. Properly ground all portable electrical tools and equipment.
12. Do not splice electrical cords.
13. Replace (or repair to new condition) damaged electrical cords.
14. Equip parts cleaning basins that contain combustible liquids with lids having a fusible-link closing mechanism.
15. Keep closed parts cleaning basins except during actual use.

3-6 FIRE SAFETY

A. Fire Prevention Requirements

Smoking indoors and in outside areas that constitute a fire hazard is prohibited. These areas include, but are not limited to, the following:

- Paint areas.
- Areas containing fuel pumps.
- Chemical storage areas.
- Areas within 50 feet of posted “No Smoking” signs.

B. Fire Prevention Guidelines

1. Take all reasonable precautions to prevent accidental fires.
2. Be familiar with fire prevention and suppression equipment in assigned areas.
3. Be able to locate and to use all firefighting equipment in assigned areas.

4. Maintain all firefighting apparatus in serviceable condition and place in accessible locations.
5. Report uncontrolled fires to the appropriate emergency response agency immediately by calling 9-1-1.
   a. Know the area's emergency dispatch number.
   b. Follow the procedure.
6. Keep work areas, exits, stairways, areas under stairways, or areas used for safe passage free of rubbish and flammable and combustible extraneous materials.
7. Maintain a clear aisle width of at least 30 inches inside all buildings and inside storage areas.

C. **Equipment Refueling Guidelines**

1. Shut off the engine when refueling equipment.
2. Verify that there is at least one fire extinguisher with a rating of not less than 12BC within 50 feet of the fueling area.
3. Exercise caution to avoid static discharge when fueling a vehicle.

D. **Fire Extinguishers Safety Requirements**

1. Post "Fire Extinguisher" signs for fire extinguishers that are not readily noticeable due to their location to highlight their location.
2. Equip the Company's Fleet of Commercial Motor Vehicles (CMV) with fire extinguishers as a part of their emergency equipment.

   The CMV fire extinguishers are type ABC extinguishers and are in good condition.

E. **Fire Extinguisher Inspection Requirements**

1. Perform visual inspections daily (prior to use) on CMV's fire extinguishers.
2. Perform and document an initial visual inspection prior to placing the fire extinguisher in service and additional inspections monthly on other fire extinguishers to verify the following:
   - No visible damage or obstructions.
   - Proper charge/pressure.
   - Securely attached.
   - Properly sealed.
   - Annual, 6 year and 12 year tests/inspections are current

3. Use a qualified vendor or a trained APS employee to perform annual inspections within 12 months from the date of manufacture as stamped on the extinguisher or from the previous inspection.
4. Use a qualified vendor to perform 5 year hydrostatic tests on all carbon dioxide (CO_2) fire extinguishers within 5 years from the date of manufacture as stamped on the extinguisher or from the previous inspection.
5. Use a qualified vendor to perform 6 year maintenance tests within 6 years from the date of manufacture as stamped on the extinguisher or from the previous inspection.
6. Use a qualified vendor to perform 12 year hydrostatic tests on all stored pressure fire extinguishers within 12 years from the date of manufacture as stamped on extinguisher or from the previous inspection.

F. **Fire Extinguisher Documentation Requirements**

1. Document fire extinguisher inspections on a log or checklist maintained in department files, by an electronic method that provides a permanent record, or a tag/label affixed to the fire extinguisher.
2. Use one of the following labeling methods to record monthly inspections:
   - A tag affixed to the neck of the fire extinguisher.
   - A label affixed to the shell of the fire extinguisher.
   - An inspection log or checklist (including vehicle inspection checklists) maintained in department files.
   - An electronic method that provides a permanent record.
3. Do not use a tag affixed to the neck of the fire extinguisher method for fire extinguishers located in harsh environments (e.g., on vehicles).
4. Use labels affixed to the shell of the fire extinguisher for annual, six-year, and 12-year tests/inspections.

G. **Fire Extinguisher Replacement Requirements**

1. Replace fire extinguishers when used during the course of the day.
2. Replace fire extinguishers when found defective.
3. Replace fire extinguishers when found to exceed the annual, six-year or 12-year tests/inspections.

4. Replace used fire extinguishers with similarly rated fire extinguishers from the facility's "Full Bin."
5. Place used fire extinguishers in the facility's "Empty Bin."

3-7 EMERGENCY SHOWERS AND EYEWASH STATIONS

A. Emergency Shower and Eyewash Inspection Requirements

1. All emergency showers and eyewash stations shall be inspected weekly.
2. The inspection shall include the following:
   a. Activate the safety shower/eyewash to clear the supply line of any sediment build-up that could prevent fluid from being delivered to the head of the device and minimize contamination due to sitting water.
      i. Use a collection device to capture water from testing if station does not have adequate drainage.
      ii. Self-contained eyewash equipment must not be flushed. These units shall be visually checked to determine if flushing fluid needs to be changed or supplemented.
   b. Verify that activation handle on valve fully opens and closes.
   c. Ensure protective covers on eyewash stations are present and replace caps after testing.
   d. Clean any residual water that was flushed which may cause an additional hazard.
   e. Identify any abnormal conditions:
      i. Low or high pressure
      ii. Uneven flow on eyewash stations
      iii. Plugged lines
      iv. Leaking during operation or at rest
      v. Excessive fluid temperature that does not change with flow
      vi. Structural damage and/or deterioration to eyewash station or emergency shower
      vii. Faded or missing signs
3. Document the inspection on the weekly inspection tag attached to the shower/eyewash (APN 00134891) or on an approved weekly eyewash inspection form.

Chapter 4: Personal Protective Equipment (PPE)

INTRODUCTION

This chapter contains specific requirements and guidelines for employees to establish safety expectations for protective equipment, devices, and clothing.

The Company has conducted hazard assessments of all job categories to evaluate the potential for injury to various body parts and to determine the necessary protective equipment and clothing to protect against those injuries.

The personal protective equipment (PPE) hazard assessments are available for review through a site safety representative.

4-1 GENERAL PPE SAFETY

A. **General PPE Safety Requirements**

1. Use suitable PPE whenever required by instructions or when it would provide additional protection.

   The only exception shall be when the Leader determines that the PPE could create a greater hazard than that from which it is intended to protect, due to the location or nature of the job.

   For Example:
   Certain functions in compartment work and confined spaces may be hampered by wearing PPE because of the working space available.

2. Inspect the PPE prior to use to ensure that it is safe, properly assembled and not visibly defective.

4-2 HARD HAT SAFETY

A. **Hard Hat Safety Requirements**

1. Wear a hard hat in working areas where there is a potential for injury to the head from any of the following:

   a. Falling objects.

   b. Overhead obstructions.

   c. Electrical hazards.

2. All hard hats used at the Company shall meet American National Standards Institute (ANSI) Standard Z89.1-1997 (or later), Type 1 or 2, Class E, and be approved by the Safety Department.

3. Wear a hard hat in areas which are posted as requiring hard hat use.
4. Wear hard hats during the following operations and/or conditions:
   a. Working from any location where the use of fall protection equipment is required by **Section 15-1(A) Fall Protection Safety Requirements**.
   b. When within power plant perimeters, except while going to or from the gate at shift change or at lunch, or in indoor office environments.
   c. In shops and warehouse areas where exposure to falling objects exists.
   d. On ground level when work is being performed overhead.
   e. In areas near construction sites.
   f. Working in manholes.
   g. Working in trenches.
   h. Working in any area with limited headroom.
   i. Working near electrically energized objects.
   j. Working near any raised boom.
   k. Anytime when exposed to potential head injury.
   l. While operating forklifts.
5. Hard hats are not required when sitting inside the enclosed cab of a car or truck.

B. **Hard Hat Replacement Requirements**

1. Replace the hard hat or suspension immediately if it is damaged by any means, degraded by exposure to temperature extremes, sunlight, chemical exposure, etc., or shows signs of significant wear.
2. If the hat has been struck by a forcible blow of any magnitude, both the hard hat shell and suspension shall be replaced immediately, even if no damage is visible.
3. Regardless of condition, replace the entire hard hat every 5 years as indicated by the date of manufacture marked on the hat.
4. Hard hats provided with a UV exposure replacement indicator will be replaced when identified by the indicator, but not more than 5 years.
5. Transmission & Distribution field workers replace the entire hard hat every 2 years as indicated by the date of manufacture marked on the hat or sooner if indicated by the UV exposure replacement indicator.

6. Replace the suspension component every 12 months.
7. Only the following approved labels or stickers, made of a non-metallic material, may be applied to an APS hard hat.
   a. APS logo decal.
   b. IBEW decal. This sticker shall be no more than 2 1/2 inches in diameter and shall never be placed over the APS logo.
   c. Employee's name.
   d. Medical Alert (in case of emergency) sticker. This optional sticker shall be company provided, secure, tamper-proof and designed to be single use. If used, it shall be placed inside of the hard hat.
   e. Safety training verification sticker(s) provided for identification.
   f. Velcro for headlamp.
   g. Other stickers approved by the Corporate Safety Department.
8. Adhesive stickers must be placed at least 3/4" away from the edge of the hard hat.
9. Do not drill holes in the hard hat.
10. Do not deface the exterior of the hard hat by any of these means:
    - Stamping
    - Scratching
    - Use of a permanent marker
    - Cutting
    - Painting
11. Maintain a clearance between the shell of the hard hat and the head for the protective system to work properly.
    a. The shell and suspension function together as a system and are equally important.

C. **Hard Hat Inspection and Maintenance Requirements**

1. Inspect and perform a field test of the hard hat before use each shift.
   a. Compress the shell inward from the sides about 1-inch with both hands, and then release the pressure without dropping the shell.
   b. The shell should quickly return to its original shape, exhibiting elasticity.
   c. If the shell does not show elasticity similar to that of a new shell (how quickly the hat returned to its original shape), or if the shell shows cracks, replace immediately.

2. Inspect the shell for the following:
   - Dents
   - Nicks
   - Cracks
   - Gouges
3. Inspect the suspension for the following:
   - Cracks
   - Frayed or cut straps
   - Torn headband
   - Other signs of wear
4. Replace the hard hat if a shell or suspension shows any of these signs of being worn or damaged.

D. **Hard Hat Cleaning Guidelines**

1. Use only mild soap and warm water.
2. Do not use solvents, chemicals, adhesives, gasoline, or similar substances since they may damage the plastic components.

4-3 EYE PROTECTION

A. **Eye Protection Requirements**

1. Wear appropriate eye protection in working areas where there is a potential for injury to the eyes as well as in areas where eye protection is posted for use.
2. Use ANSI-approved safety glasses.
3. Do not use regular prescription glasses as a substitute for ANSI-approved safety glasses.
4. Wear appropriate eye protection whenever there is a potential for injury from any of the following:
   - Flying particles
   - Molten metals
   - Liquid chemicals
   - Acids or caustic liquids
   - Potentially harmful light radiation
   - Chemical gases or vapors
5. Obtain industrial safety lenses and glasses through the Company-approved prescription eyewear program (not available for supplemental employees).

B. **Prescription and Nonprescription Safety Glasses Requirements**

1. Safety glasses must have the following:
   - Side shields (or uni-lens design that offers protection from the side).
   - Impact-resistant lenses.
   - Frames that help prevent the lenses from being pushed into the eyes.

2. Safety glasses with replaceable lenses are required to meet ANSI standards shown by having the following:
   - "Z87" marked on the frame (this means that the glasses meet all ANSI safety requirements), and
   - The manufacturer's mark or logo marked on the safety lens.
3. Safety glasses with no replaceable components shall have at least one set of markings. The markings may be on the lens or the frames or both the lens and the frame.

C. **Eye Protection Inspection and Maintenance Requirements**

1. Inspect the equipment before each use.
2. Replace safety glasses immediately if the lenses are scratched or pitted

Note: The following chart will help in selecting the proper eye protection for the hazard present.

D. **Eye and Face Protection Selection Guide**

TASK	HAZARDS	PROTECTION
Acetylene Torch - Burning - Cutting - Welding	• Sparks • Harmful rays • Molten metal may splash • Flying particles • Heat • Glare	• Welding goggles with tinted lenses • Welding helmet with safety glasses or goggles
Chemical Handling	• Splash • Acid burns • Fumes	• Face shield with chemical splash goggles combined • Refer to Safety Data Sheet (SDS) for appropriate protection
Chipping	• Flying particles	• Face shield with safety glasses combined • Face shield with advanced safety eyewear combined • Goggles with face shield combined

TASK	HAZARDS	PROTECTION
Electrical (ARC) Welding	• Sparks • Harmful rays • Molten metal may splash • Flying particles • Heat • Glare	• Welding helmet with safety glasses combined • Welding helmet with advanced safety eyewear combined
Grinding/Cutting	• Flying particles	• Face shield with safety glasses combined • Face shield with advanced safety eyewear combined • Goggles with face shield combined
High Speed Surface Conditioning (over 9,000 RPM)	• Flying particles	• Face shield with safety glasses combined • Face shield with advanced safety eyewear combined • Goggles with face shield combined
Low Speed Surface Conditioning (9,000 RPM or less)	• Flying particles	• Safety glasses • Advanced safety eyewear • Goggles
Using Emery Wheel or Similar Grinding Equipment	• Flying particles	• Face shield with safety glasses combined • Face shield with advanced safety eyewear combined • Goggles with face shield combined

TASK	HAZARDS	PROTECTION
Drill Press Use	• Flying particles	• Face shield with safety glasses combined • Face shield with advanced safety eyewear combined • Goggles with face shield combined
Machining	• Flying particles	• Safety glasses • Advanced safety eyewear • Goggles
Using Power Tools	• Flying particles	• Safety glasses • Advanced safety eyewear • Goggles
Using Hydraulic and Pneumatic Tools	• Flying Particles • Pressurized Fluid	• Safety glasses • Advanced safety eyewear • Goggles
Using Powder-Actuated Tools	• Flying Particles • Explosive Powder	• Safety glasses • Advanced safety eyewear • Goggles
Airborne Flyash Handling	• Flying particles	• Safety glasses • Advanced safety eyewear • Goggles
Coal Plant Work	• Flying particles	• Advanced safety eyewear • Goggles
All Forestry Operations	• Flying particles • Wood chips	• Advanced safety eyewear • Face shield with safety glasses combined
Switching/Racking of Energized 4160 VAC Equipment	• Electric arc • Molten metal	• Arc rated face shield with safety glasses

TASK	HAZARDS	PROTECTION
Performing arc based related tasks on energized metal clad switch gear in substations or network protectors	• Electrical arc • Heat • Molten metal • Flying particles	• Arc rated face shield or goggles (minimum rating of 12 cal/cm^2) and balaclava (minimum rating of 28 cal/cm^2)
Performing arc based related tasks in power plants	• Electrical arc • Heat • Molten metal • Flying particles	• Arc rated eye and face protection rated to the hazard risk category indicated on the equipment label
Working in an energized secondary device (SES, meter cabinet, j-boxes, etc.) while performing any work that could create a short	• Electrical arc • Heat • Molten metal • Flying particles	• Arc rated face shield (minimum rating of 12 cal/cm^2) or equivalent approved eye and face protection
Performing any work supplied by a 12kV 1000 kVa (or greater) underground system "arc-in-a-box," or work on a 21kV 100 kVa (or greater) overhead "arc-in-a-box"	• Electrical arc • Heat • Molten metal • Flying particles	• Arc rated face shield (minimum rating of 12 cal/cm^2) and balaclava (minimum rating of 28 cal/cm^2) or equivalent approved eye and face protection

4-4 HEARING PROTECTION

A. Hearing Protection Safety Requirements

1. Wear approved hearing protection devices when areas or equipment have been posted or labeled indicating hearing protection is required.
2. Wear approved hearing protection when working in areas where the sound level reaches or exceeds 85 decibels, A-scale (dBA).
   a. A good rule of thumb to use in determining this level is, when talking with someone else at a distance of three feet, if either person needs to raise their voice to be heard, then the ambient noise level is likely at or above 85 dBA. Many tools such as pneumatic, powder-actuated, hydraulic, engine-powered and electric (AC & DC) hand tools, impact wrenches, nail guns, chainsaws and circular saws along with other similar tools can produce sound levels above 85 dBA at the employee's hearing zone.
3. Make hearing protection available to employees upon request.
4. Perform annual hearing tests to detect significant changes in hearing on all employees in the Hearing Conservation Program. To be administered by APS Health Services.

(This is in addition to the pre-employment hearing test.)

B. Hearing Protection Guide

TYPE	DESCRIPTION
Earplugs	• Earplugs have been demonstrated to offer the greatest reduction of potentially dangerous noise of the three types of ear protection. • Disadvantage: They are inserted into the ear canal, which may cause discomfort to some individuals. • Use with caution when experiencing an earache or ear infection. Alternative hearing protection, such as earmuffs, should be considered.
Canal Covers	• Canal covers close off the entrance to the ear canal. • Do not offer as much noise reducing protection as earplugs or muffs. • Advantage: Can be worn at times with an earache or ear infection.

TYPE	DESCRIPTION
Earmuffs	• Earmuffs offer more protection than the canal cover but less than earplugs. • Advantage: Can be worn with an earache or infection and are normally very comfortable. • Advantage: Can be worn in conjunction with earplugs to boost the amount of protection available. • Disadvantage: When worn with eyeglasses, the seal cannot be maintained so the user will not benefit from the full Noise Reduction Rating (NRR) as stated on the earmuff packaging.

C. **Hearing Protection Maintenance Guidelines**

1. Wash hearing protectors with warm water and soap between uses.
2. Allow hearing protectors to dry before reuse in order to prevent problems with infections.
3. Replace all cushions and foam components of ear muffs every six months of use.
4. Hearing protection that has been exposed to extreme environments (over 100 degrees or freezing temperatures) should be replaced every three months.

4-5 RESPIRATORY PROTECTION

A. **Respiratory Protection Requirements**

1. Only employees currently enrolled or listed in the Company Respirator Program are allowed to use respirators or perform operations requiring a respirator.
2. New respirator users may be added to the Company Respirator Program based upon the scope of the work they perform on an as-needed basis.
3. Employees enrolled in the Company Respirator Program are required to read and remain familiar with this section and be thoroughly trained.
4. Employees enrolled in the Company Respirator Program are required to comply with the medical clearance exam, respirator training, and pre-use fit testing requirements.

5. Employees with interfering facial hair are not allowed to use respirators other than comfort use paper type respirators.
6. Respiratory protection training and fit testing is to be administered by APS Safety and Health or as outlined as in the site Respiratory Protection Program.
7. Discard disposable or single-use only respirators after use.
8. Do not attempt to clean and reuse a disposable respirator.
9. Inspect reusable respirators prior to each use.
10. Sanitize and store reusable respirators in a sealable plastic bag (out of direct sunlight) between uses.
11. For the operations identified in **Section4-5(B), Identified Required Respiratory Protection Operations or Areas**, the use of a respirator is mandatory at all times regardless of contaminant concentration or length of exposure.

    It is possible that additional operations, other than those identified **Section 4-5(B), Identified Required Respiratory Protection Operations or Areas**, will be determined to require mandatory respirator use. These decisions will be made after an industrial hygiene evaluation and will be reported to appropriate management.

B. **Identified Required Respiratory Protection Operations or Areas**

OPERATION	COMMENTS
Abrasive Blasting/ Cleaning Operations	When involved in "sandblasting" or abrasive blasting operations unless the operation is conducted in a well maintained glove box or equivalent.
Asbestos Removal	• When working directly with asbestos containing materials (ACM). • When entering a contaminated area.
Chemical Exposure	When exposed to any hazardous chemical (e.g., ammonia, hydrazine) in concentrations above the permissible exposure limit.
Chemical Spill Response	As defined in training programs.
Firefighting, Pressurized Gas Leak	As defined in training programs.

OPERATION	COMMENTS
Lead Exposure	When cutting, welding or grinding on surfaces that contain lead.
Maintenance Operations	When exposed to dusty operations or when high levels of dust are likely.
Mercury Cleanup	At all times when conducting mercury cleanup operations.
Painting Operations	As specified on the product SDS.
Pesticide Operations	When general use pesticides are used in confined or enclosed spaces or when required by the SDS.
Solvent Usage Operations	When involved in solvent handling (e.g., degreasing, cleaning) in confined or enclosed spaces except where local exhaust ventilation is in use.
Welding Operations	When involved with galvanized or stainless steel, mig spray, and carbon arc cutting unless local exhaust ventilation is in use. Galvanized materials may be welded or cut without a respirator if done in an open-air (outside) environment.

Note: Disposable or single use only disposable paper type masks may be worn as needed for comfort.

4-6 HAND PROTECTION

A. Hand Protection Requirements

1. Hand protection is required to be worn when the workers' hands are exposed to hazards such as those from cuts, lacerations, abrasions, contusions, punctures, chemical burns, skin absorption of harmful substances, harmful temperature extremes or electrical contact.
2. All employees performing non-office type work shall have leather work gloves or equivalent in their immediate possession (i.e., wearing, pocket, clipped, tool bag, etc.) at all times:
   a. in the field when you are engaging in work activities; or
   b. at a power plant, any time you have entered the plant site and have reported to work.

3. Prior to performing a task, the worker shall assess the hazards of the task to determine the need for and appropriate type of gloves, taking in account manual dexterity and other appropriate considerations.
4. Examples of gloves appropriate for various tasks are set forth in the guide in section 4-6(B) below.
5. Do not wear gloves while operating non-handheld rotating equipment (drill presses, bench grinders, lathes, table saws and other similar equipment).
6. Generation employees shall follow the Generation requirements for hand protection.

B. **Hand Protection Guide**

GLOVE	HAZARD PROTECTION	TASKS
Leather double layer, Level 2 cut rated gloves (e.g. FR Leather Utility Plus with Kevlar®)	• Sparks • Rough objects • Abrasions • Burns • Moderate heat • Arc flash (up to 27 cal/cm^2) • Contusions • Chips • Cuts • Sharp objects • Glass • Punctures • Splinters	• Arc-based related tasks (up to 27 cal/cm^2) • Hand tool use • Handling rough objects or materials • Off-road ATV operation • Chainsaw operation and sharpening • Clearing and chipping brush and tree limbs • Using knives or tools with sharp blades • Handling materials with sharp edges • Hand-held grinding or cutting • General Auto Mechanic Work

GLOVES	HAZARD PROTECTION	TASKS
Leather work gloves	• Sparks • Rough objects • Abrasions • Burns • Moderate heat • Contusions • Chips • Punctures • Splinters	• Hand tool use • Handling rough objects or materials • Off-road ATV operation • Clearing and chipping brush and tree limbs • General Auto Mechanic Work
Cut-resistant gloves with a minimum cut resistance rating of Level 2	• Cuts • Sharp objects • Glass • Rough objects • Abrasion	• Using knives or tools with sharp blades • Handling materials with sharp edges • Hand-held grinding or cutting • General Auto Mechanic work • Hand tool use

GLOVES	HAZARD PROTECTION	TASKS
Chemical-resistant gloves (refer to the chemical Safety Data Sheet for appropriate glove material)	• Chemical burns • Skin absorption • Skin irritation • Skin sensitizers	• Chemical handling • Pouring chemicals • Mixing chemicals • Cleaning with solvents • Dip tank operations • Painting • Siphoning • Battery cleaning, filling, or taking specific gravity readings
Electrical-rated gloves (rubber insulating gloves)	• Electrical shock	• Working on energized or potentially energized equipment • Setting or removing energized meters
Arc rated gloves	• Arc flash (up to the calorie rating of the glove)	• Arc-based related tasks (up to the calorie rating of the glove)
Non-permeable gloves (latex, vinyl, nitrile, etc.)	• Biological hazards (blood, body fluids, etc.), • Oil contamination	• Medical/first aid activities • Cleaning activities • Oil exposure
High temperature insulated gloves	• Hot ash • Hot liquids	• Slurry line maintenance • Pulling bottom ash
Leather welders gloves	• Burns • Welding arcs • Sparks • Abrasions	• Welding • Torch cutting • Hand-held cutting or grinding
Rubber/latex coated knit gloves (Atlas, etc.)	• Slipping	• Tree climbing

4-7 FOOT PROTECTION

A. Foot Protection Requirements

1. Field classification workers subject to construction and operations hazards are required to wear substantial, enclosed above ankle shoes that are in good condition and have nonslip rubber or plastic soles.
2. Power plant workers subject to plant hazards are required to wear safety footwear meeting American Society for Testing and Materials ASTM F2413-2011/2005 or BS EN ISO 20345: 2011/2004 standard requirements.
3. No tennis or athletic type shoes (except those meeting ASTM F2413-2011/2005 or BS EN ISO 20345: 2011/2004) are allowed.
4. No high heel type shoes are to be worn in construction or operational areas.
5. Safety shoes/boots meeting ASTM F2413-2011/2005 requirements (i.e., safety toed footwear or safety toe attachments to existing footwear) are required to be worn whenever there is a danger of foot injuries due to:
   - Falling objects
   - Rolling objects
   - Objects piercing the sole
   - Any other physical hazards
6. When operating jackhammers or tampers (excluding pole tampers), or other operations that create an extreme impact or crushing hazard to the feet, metatarsal guards and safety toe protection shall be worn.

4-8 WORK APPAREL

A. Work Apparel Requirements

1. All employees assigned to perform work on or around energized facilities or equipment are required to wear a minimum of PPE Category 2 (formerly Hazard Risk Category 2 or HRC2) arc rated (AR) clothing. This includes, but is not limited to Servicemen, Troubleman, Meterman, Electrician and Lineman type classifications, plus other workers who work closely with these classifications in the field: e.g. helpers, crew assigned truck drivers, apprentices.

Shirts	• Approved long-sleeved. • Arc Rated (AR) PPE Category 2 (formerly Hazard Risk Category 2 or HRC2) rated outer layer, in good condition at all times. • If shirts are provided with the Company logo, they shall be worn. • If undergarments are worn, they should be substantially AR or natural fiber.
Pants	• Full-length pant leg. • AR PPE Category 2 (formerly Hazard Risk Category 2 or HRC2) rated outer layer, in good condition at all times. • If AR pants are provided for the work situation, they shall be worn.
Over-Garments (e.g., jacket, coveralls, sweatshirts)	• Approved long-sleeved, arc rated outer layer. • Linings shall be AR or natural fibers. • If garments are provided with the Company logo, they shall be worn.
Other Personal Protective Equipment as job requires.	

2. All employees performing arc based related task on energized metal clad switch gear or network protectors, without remote operations, shall wear clothing or clothing systems with a minimum arc rating of PPE Category 3 (formerly Hazard Risk Category 3 or HRC3) (25 cal/cm^2). Employees shall wear arc rated clothing rated to the incident energy indicated on the equipment label where provided.
3. Protective clothing shall not be used as primary means of protection for equipment with an arc potential above 40cal/cm^2. Remote racking and/or administrative controls shall be used for these situations. (Refer to Electrical Arc Flash Protection Policy.)
4. Whenever employees perform any work on equipment supplied by a 12kV 1000 kVa (or greater) underground system “arc-in-a-box”, or any work on a 21kV 100 kVa (or greater) overhead system “arc-in- a-box”, they must ALSO wear a long switching jacket (49 inch length) or other approved clothing system with a minimum arc rating of PPE Category 3 (formerly Hazard Risk Category 3 or HRC3) (25 cal/cm^2).

5. All other field classification workers (e.g., Meter Readers, Facility Locators) shall wear:

Shirts	• Approved, in good condition at all times. • If shirts are provided with the Company logo, they shall be worn.
Pants	• Full-length pant leg in good condition. • Appropriate for the environment anticipated.

6. All Leaders and non-field office workers shall adhere to General Dress Guidelines as well as field clothing requirements, when appropriate.
7. Power plant workers shall dress in a manner appropriate to their classification.
   a. Shirts shall be a minimum of a long-sleeve non-melting material when working within any plant power block area.
   b. Workers assigned to work having a potential exposure to arc from energized parts or switching/racking operations shall wear Arc Rated coveralls or Arc Rated outer clothing.
8. When arc rated clothing is provided, it shall be worn in a manner that will provide the maximum protection.
9. APS relies on home laundering of the AR Clothing. Users must utilize proper laundering procedures and techniques as outlined by the clothing manufacturer, and the user must inspect the clothing on a regular basis to ensure that it is not in need of repair or replacement.
10. Whenever a worker is working on or is in close proximity to rotating equipment or energized equipment (50 VAC or above), shirts shall be tucked in, with the front of the shirt buttoned up and the sleeves rolled down and buttoned at all times.
11. All workers are responsible for wearing clothing that does not contribute to an unsafe, offensive or disruptive work environment.
12. Prohibited Clothing

    Each employee who is exposed to hazards from flames or electric arcs shall not wear clothing that could melt onto his or her skin or that could ignite and continue to burn when exposed to flames or the heat energy.

Prohibits clothing made from acetate, nylon, polyester, rayon and polypropylene, either alone or in blends, unless it is demonstrated that the fabric has been tested to withstand the conditions that may be encountered by the employee or that the employee wears the clothing in such a manner as to eliminate the hazard involved.

B. **Reflective Vests Requirements**

1. Workers working within any right-of-way where traffic hazards exist or within 15 feet of any street, road, highway, etc., shall wear a high visibility reflective traffic garment (shirt or vest), constructed of AR material, supplied by the Company. Class 2/3 high visibility garments shall be worn during daytime hours, and Class 3 high visibility garments shall be worn during nighttime hours.
2. Reflective traffic vests shall be fluorescent lime green or orange in color, with "reflectorized" material for visibility in low light conditions.

4-9 POLYCHLORINATED BIPHENYL (PCB) CONTAMINANT PROTECTION

A. **PCB Contaminant Protection Requirements**

1. When working around, testing, collecting or barricading any of the following: PCB unknown, PCB contaminated or PCB oil or compounds (>500 ppm), employees shall wear:
   a. Normal APS required PPE (FR clothing, safety glasses, hardhat, boots)
   b. Nitrile gloves
2. In addition to the above, if there is a potential of contaminating the employee's shoes during this work, the employee shall wear the appropriate rubber booties over work boots when in the field. Tyvek booties may be worn over shoes when working in the PCB area within the Transformer Shop.
3. In addition to the above, if there is a potential of contaminating the employee's clothing during this work the employee shall also wear a Tyvek suit.
4. Potentially contaminated PPE shall be removed prior to leaving the work site or entering a vehicle.
5. Refer to TD-DO-PRD-1001 (Leaking Electrical Equipment Response Procedure) for disposal of PPE and further instruction.

Chapter 5: Hazardous Materials

INTRODUCTION

This chapter contains specific requirements and guidelines for employees purchasing and using hazardous chemicals.

It's important to know the properties of the products we use and to understand the necessary measures needed to ensure that you are protected from inherent hazards. This information is made available to workers through training, access to Safety Data Sheets (SDS), and container labeling.

5-1 NEW CHEMICALS PURCHASING

Note: A Chemical Review Team (CRT) has been established to evaluate new chemical products for potential risks to workers and the environment.

The team may recommend alternative products to reduce those risks.

A. **New Chemical Purchasing Requirements**

1. Only chemicals that are approved by the CRT shall be purchased or otherwise brought into the Company or used on Company jobs.
2. Chemicals that are not approved by the CRT shall not be purchased or otherwise brought into the Company or used on Company jobs.

B. **New Chemicals Purchasing Guidelines**

1. Refer to Hazardous Chemical Procurement Process (SU-IH-PRC-0301) for material approval request instructions.

5-2 LABELING

A. **Labeling Requirements**

1. The buyer (or the work area representative, if a chemical or material is ordered outside the Purchasing Department) is responsible for notifying the supplier and acquiring containers that have an acceptable label.

   The on-line SDS system can print acceptable container labels if the product is an approved product.

2. Each worker who performs a transfer of hazardous substances from original containers into a secondary container shall completely and accurately label it.

The on-line SDS system can print acceptable container labels if the product is an approved product.

Transfer containers that will be immediately used by the worker who performed the transfer do not need to be labeled provided the contents are used up or returned to the original container before the end of the shift in which it was transferred.

Note: The manufacturer, distributor, or importer is required to label its products prior to shipment to customers.

B. **Original Container Label Guidelines**

1. Do not remove or deface the labels placed on the original containers.
2. Notify the Company buyer who ordered the substance if material is received without a label.
3. Notify the requester if material is received without a label.
4. Do not release material for use at the facility until it is properly labeled.
5. For all containers holding unidentified substances (the contents cannot be identified) contact your business unit Environmental or Safety representative.

C. **Secondary Container Label Guidelines**

1. Use the National Fire Protection Association (NFPA) hazard coding system to label chemicals that are transferred from their original containers.

   Workers receive training on the meaning of the NFPA system during HazCom (GHS) training.
2. Refer to SU-IH-PRC-0102 IH Hazardous Chemical Communication Process for Secondary Container Label requirements.

D. **Stationary Container Label Guidelines**

Refer to SU-IH-PRC-0102 IH Hazardous Chemical Communication Process for Stationary Container Label requirements.

E. **Laboratory Container Label Guidelines**

Refer to SU-IH-PRC-0102 IH Hazardous Chemical Communication Process for Laboratory Container Label requirements.

5-3 SAFETY DATA SHEETS (SDS)

A. Safety Data Sheets Requirements

1. SDS shall be readily available in each work area by using the on-line SDS system.
   a. This system is normally accessible at all times.
   b. In the event of program failure, SDS is accessible by calling the Help Desk at **(602) 371-7300**.
2. For highly mobile workers who travel outside Company facilities to perform their jobs, SDS information shall be readily available via radio or mobile phone, or by calling the Help Desk at **(602) 371-7300** or DOC at **(602) 371-7322**.
3. Each Leader shall be sure that several workers (for redundancy and backup) know how to access and utilize the SDS system so that copies of applicable SDS can be provided to workers upon request.

5-4 HAZARDOUS MATERIALS HANDLING AND STORAGE

A. Hazardous Materials Handling and Storage Requirements

1. All chemicals shall be handled in accordance with the associated SDS. All required PPE, storage practices, incompatibilities, etc. as listed on the product's SDS shall be determined and, if appropriate, used.
2. Hazardous materials shall only be used for their intended purpose(s).
3. All workers working with chemicals, hazardous materials, and combustible or flammable materials shall be familiar with the product and the requirements for safe handling, storage, and disposal.
4. Smoking is prohibited in the immediate vicinity of bulk handling facilities, storage battery areas, or chemical cleaning areas.
5. Electric switches used in areas where explosive gases are potentially present shall be explosion proof.
6. Store, handle, and transport flammable and combustible liquids only in approved containers.
7. Extreme care must be used at all times to prevent ignition.
8. Do not use gasoline for parts cleaning.
9. Do not pour gasoline into a carburetor to prime the motor while the motor is being turned over.

10. Do not use ignition sources in the immediate vicinity of bulk handling facilities, storage battery areas, or chemical cleaning areas until the area is adequately ventilated.

B. **Hazardous Materials Handling and Storage Guidelines**

1. Maintain physical contact between the pouring and receiving containers when pouring or pumping gasoline from one container into another.
2. Wear the appropriate PPE when performing sandblasting operations.
3. Store chemical products in separate storage containers to prevent reactive chemicals and vapors from mixing if spillage or breakage occurs.
4. Periodically inspect chemical storage containers for deterioration of the containers and inappropriate storage of incompatible chemicals.

5-5 ACIDS, CAUSTICS AND OTHER DANGEROUS CHEMICALS CARE AND HANDLING

A. **Acids, Caustics and Other Dangerous Chemicals Care and Handling Requirements**

1. Workers shall be instructed with regard to hazardous properties, proper protective clothing, and safe handling procedures when handling acids, caustics, or harmful chemicals.
2. Face shields or goggles and rubber gloves shall be considered as minimum protective equipment when working with acids, caustics, or harmful chemicals.
3. Workers working with acidic or caustic chemicals that have the potential to splash in the eyes or on the body shall have a fixed or portable eyewash/full body shower available within 50 feet of the chemical exposure.
4. A minimum of two workers shall be required when handling acids, caustics, or other harmful chemicals under pressure.
    a. One worker shall act as the safety person, to remain out of the immediate hazard area.
    b. The safety person is to be instructed and prepared to render assistance if an accident occurs.

B. **Acids, Caustics and Other Dangerous Chemicals Care and Handling Guidelines**

1. Do not add water or caustic solutions to sulfuric acid. If it is necessary to mix acid with water, always add the acid cautiously to the water.
2. Check the following for contents prior to product discharge for bulk unloading operations:
   - Caution markings.
   - Bills of lading on tank cars and tank trucks.
3. Immediately apply large quantities of running water, 15 minutes minimum, on any exposed area.
4. Do not attempt to neutralize or apply oils or ointments to burned areas without specific recommendations from a doctor.
5. Obtain medical attention/treatment as soon as possible.

5-6 COMPRESSED GAS USE

A. **General Requirements**

1. Handle cylinders with caution to avoid injury; the cylinders are extremely heavy.
2. Transport cylinders with safety caps in place.
3. Do not use a direct flame to heat cylinder.
4. Use only approved heating methods.
5. Support and secure cylinders when in use.
6. Store and ship cylinders in approved racks.
7. Use only proper regulators.

B. **Sulfur Hexafluoride SF_6 Use Requirements**

1. Use adequate ventilation when working in an area that contains SF_6.
   a. SF_6 gas is heavier than air and will not support life.
   b. Harmful byproducts are created during arcing.

C. **Oxygen and Acetylene Tank Requirements** Refer to **Chapter 16, Welding Safety**.

D. **Regulator Use Requirements**

1. Keep regulators clean and dry.
2. Remove regulators and install safety caps when compressed gas bottles are in storage or not in use.

E. **Compressed Air Use Requirements**

1. Do not use compressed air to clean clothes or any part of the body.
2. Do not use natural, liquefied petroleum, or other combustible gases for cleaning, painting, or to substitute for compressed air to operate portable equipment.
3. Regulate compressed air used for cleaning equipment to no more than 30 pounds per square inch (psi).
4. Check any hose and all connections attached to compressed air equipment for defects, loose connections and proper installation of safety pins or wires before using.
5. Ensure that the nozzle on the air hose is under control before turning on air pressure.
6. Shut off the air at the compressor and release the pressure at the equipment when any air equipment is not in use or is to be disconnected.

5-7 FLAMMABLE AND COMBUSTIBLE LIQUIDS

A. **Flammable and Combustible Liquid Requirements**

1. Store all flammable and combustible liquid containers in fireproof cabinets or storage rooms designed to safely store such materials.

   This requirement does not apply to:

   a. Combustible liquids with a flashpoint greater than 200°F. (NFPA flammability rating of 1 or less)
   b. Incidental containers (i.e., containers that have been opened for use but are not necessarily being used) not to exceed 25 total gallons in any one fire area of a building
   c. Warehoused storage if insurance carrier safety requirements are met.

2. Storage of flammable liquid containers in a single flammable liquid cabinet shall be limited to the following quantities:
    a. No more than 60 gallons of flammable liquids having flashpoints at or below 140°F.
    b. No more than 120 gallons of flammable liquids having flashpoints above 140°F. and at or below 199.4°F.
    c. No more than 120 gallons combined total quantity of all liquids
3. Do not store the following materials in a flammable liquid cabinet:
    a. Any potential source of ignition such as road flares, etc.
    b. Compressed gas cylinders
    c. Oxidizers
    d. Acids and bases
    e. Paper, cardboard, or other combustible material (except for materials used for packaging of the liquids in the cabinet)
4. Do not store anything on top of a flammable liquid cabinet.
5. Doors shall be well fitted, self-closing, and equipped with a three-point latch.
6. Use only approved containers for handling and dispensing flammable and combustible liquids (i.e., gasoline, oil, and diesel fuel).
7. Label cans of flammable and combustible liquids in accordance with the HazCom (GHS) program.

B. **Flammable and Combustible Liquid Guidelines**

1. Cap incidental containers containing flammable and combustible liquid securely when not in use.

5-8 PESTICIDES

A. **Pesticide Use Requirements**

1. Only Office of Pest Management (OPM) Licensed applicators may apply pesticides on a routine basis.
2. Non-licensed Applicators (employees) may use Non-Restricted (over the counter) pesticides in an emergency only when both of the following conditions apply:

a. Pest control services are immediately needed for an employee's health and safety in order for the employee to continue performing work tasks.

b. A qualifying party has ensured that the employee (non-licensed applicator) using the non-restricted pesticide has been properly trained.

Note: The Forestry and Special Programs Department maintain all required licenses, (i.e. Business, Qualified Party (QP) and Applicator Licenses), as required by OPM and to provide guidance in development, training, and implementation of the program.

3. Follow the application requirements and instructions provided by the product label and Safety Data Sheet (SDS) for each pesticide used.

4. Immediately prior to the application inside buildings, pesticide application notification signs shall be posted so that they are visible from points where employees usually enter the pesticide treated area.

a. Signs shall be removed once the chemicals are dry.

5. Aerosol pesticides shall not be used inside buildings when bystanders or inexperienced people are present. In addition, the space may not be occupied until applied chemicals are dry.

6. Do not spray pesticides in or around standing waters unless they are labeled for such an application.

B. **Pesticide Storage Requirements**

1. Store all pesticides in a locked cabinet, labeled "Pesticide Storage."

2. Avoid storing pesticides in company vehicles; however in the event that a pesticide is in a company truck, all pesticides shall be in a locked bin.

C. **Pesticide Disposal Requirements**

1. Follow the manufacturer's instructions specified on the label or SDS for disposal of containers.

2. If there are any questions, contact Environmental Services.

Chapter 6: Tools and Rigging

INTRODUCTION

This chapter contains specific requirements and guidelines for employees purchasing and using hand and power tools.

6-1 TOOL USE, INSPECTION, AND APPROVAL

A. **General Tool Requirements**

1. Visually inspect all tools before use.
2. Any safety device, tool, or equipment that, upon inspection, is found unsafe shall not be used.
3. The Tool Approval Committee and/or Safety Department shall ensure that ergonomic and safety factors are considered with respect to the purchase or approval of new tools and equipment for use by Company personnel.
4. The Tool Approval Committee shall approve all common tools used by field personnel with the exception of unique tools or equipment utilized by specialty teams or departments.
5. Tools or equipment purchased for specialty teams or departments shall be reviewed and approved by the Safety Department.
6. When working aloft, secure all tools that are not in use.

B. **General Tool Guidelines**

1. Ensure that the air or hydraulic hoses do not become entangled with the boom control levers.
2. Disconnect air or hydraulically operated tools from supply when they are not in use.
3. Stay clear of pressurized oil or air that is escaping from a ruptured line or fitting.
   a. Make no attempt to stop such a leak by using hands, feet, or other parts of the body.
   b. Stop the pump, compressor, or engine as soon as a leak is detected and the basket can be brought to a safe position.

6-2 CHAINSAWS

A. Chainsaw Requirements

1. Chainsaw use shall be limited to those who have completed training in the use of such equipment.
2. Chainsaws shall not be operated unless the manufacturer's safety devices are in proper working order.
3. Chainsaw safety devices shall not be removed or modified.
4. Inspect chainsaws for the following before using:
   a. All controls are operating properly.
   b. All handles and guards are in place and tight.
5. Certain types of chainsaws have the following manufacturer safety features that shall be in place and operational:
   a. Muffler.
   b. Manual and inertial chain brake.
   c. Spark arrestor.
6. Refer to Section 6-7, HYDRAULIC AND PNEUMATIC TOOLS for further information on hydraulic chainsaws.
7. Follow all manufacturer operation and maintenance instructions.
8. Chainsaw resistant leg protection (chaps) shall be worn while operating a chainsaw during ground operations.
9. Hearing protection shall be worn at all times when operating or in close proximity to a chainsaw.
10. Chainsaws shall be properly maintained and cleaned.
11. The chain shall be maintained sharp and properly tensioned to eliminate slack.
12. A chainsaw shall not be used if the chain rotates at idle.
13. Chainsaws shall be fueled only after the engine has stopped and cooled for a few minutes.
14. To prevent fire:
    a. Chainsaws shall not be started or operated within ten feet (10') of a fueling location.
    b. A hot chainsaw shall not be set on combustible material.

c. Smoking shall not be permitted during fueling or chainsaw operation.

d. Spilled fuel shall be mitigated and removed from the equipment before it is started.

e. Clothing contaminated by flammable liquids shall be changed at once.

15. The chainsaw shall be stopped, hydraulics disconnected or battery removed, and the proper gloves worn when performing any maintenance on the chain or cutting bar.
16. Chainsaws shall not be started or operated unless the area within ten feet (10') of the chainsaw and operator is clear of other individuals.
17. Individuals not operating a chainsaw shall use caution when in proximity to a chainsaw in operation.
18. Do not leave a chainsaw running while unattended.
19. When starting a chainsaw on the ground or in an elevated position:
    a. The chain brake shall be engaged.
    b. The chainsaw shall never be drop started.
    c. That is gasoline powered, the operator shall hold the chainsaw firmly in place on the ground or otherwise supported in a manner that minimizes movement of the chainsaw. Pull the starting grip slowly until you feel a definite resistance and then give it a brisk, strong pull.
20. Chainsaws shall not be operated with one hand.
21. Chainsaws shall be operated with:
    a. The left hand on the front handle and the right hand on the rear handle.
    b. The thumbs and fingers of both hands firmly encircling the handles.
    c. The operator positioned to the left side rather than directly behind the rotating chain.
    d. The chainsaw at full throttle.
22. While operating a chainsaw keep the left arm straight when possible.
23. To reduce the possibility of kickback:
    a. Avoid contact of the bar tip with any object.

b. When possible keep the tip of the bar visible.

c. Operate the chainsaw with the wood being cut on the straight portions of the bar closest to the motor.

24. To maintain balance and control, a chainsaw operator shall maintain secure footing and shall not overreach with a chainsaw or cut above shoulder height.

25. When moving less than five feet (5') with a running chainsaw, the chain brake shall be engaged.

26. When moving more than five feet (5') with a chainsaw, the chainsaw shall be shut off, chain brake engaged and carried with the bar to the rear. If the style of chainsaw has a muffler, direct it away from your body.

27. When an individual is working from an elevated position with a chainsaw, the chainsaw shall be made safe against falling utilizing positive securement (i.e. supported by a separate line or tool lanyard).

28. The primary attachment point of the chainsaw lanyard shall be of the self-locking and self-closing variety, requiring at least two consecutive, deliberate motions to prepare the gate for opening.

29. While a worker is in an elevated position, prior to starting a chainsaw or a cut, the operator shall ensure the area beneath them is clear.

30. While a worker in an elevated position has a chainsaw in operation, all personnel shall stay clear of the area directly beneath the worker.

31. A chainsaw shall not be operated from an erected pole or structure with more than one individual on the erected pole or structure.

6-3 LIVE-LINE EQUIPMENT

A. Live-Line Tool Requirements

1. Visually inspect all live-line tools before use each day.
2. Wipe all live-line tools clean, and if any hazardous defects are indicated, tag and remove them from service.
3. Remove all live-line tools from service every 2 years for examination, cleaning, testing, repair, and service.
4. Store all live-line tools not being regularly transported in a dry, warm location.

5. Transport live-line tools away from extra materials that may damage them and in containers that are designed for their safe transportation.
6. Do not use live-line tools that have not been tested by the due date indicated on the attached inspection sticker.
7. Do not place hands closer to the energized line or the energized metal parts of the tool being used than is absolutely necessary when using live-line tools and, in no case, closer than specified in **Minimum Approach Distances for Qualified Electrical Workers Requirements Table** in **Appendix C**, **Minimum Approach Distances**.
8. Refer to **Section 14-4(A).**, **Hot Stick Requirements**, for additional information on hot sticks.
9. Keep live-line tools free from dirt and moisture.
10. Do not lay live-line tools directly on the ground.

B. **Hot Hoist Requirements**

1. Keep hot hoists and their handles clean when not in use.
2. Store hot hoists and their handles in an appropriate bag when not in use.

6-4 HAND TOOLS

A. **Hand Tool Requirements**

1. Do not use any safety device, tool or equipment found unsafe upon inspection.
2. Cover sharp-edged and pointed tools with the scabbards or guards when not in use.

   The guards shall be in place when storing the tools in the truck, tool bag, or other storage space.
3. Remove the jack handle from the socket when a jack is not being operated.
4. Keep tools in good condition.
5. Use tools only for the jobs for which they are designed.
6. Do not use screwdrivers with the metal shanks that extend through the handle near energized equipment.
7. Equip files with tangs with handles.
8. Always direct a knife away from your body when using it.

9. Knives shall not be used to cut tie wraps.
10. Repair or replace impact tools such as chisels and punches as they become mushroomed or cracked.
11. Do not use a pipe or "cheater bar" to extend the handle of a tool for leverage unless the tool was designed for such use.
12. Replace wooden handles that are cracked, splintered, or loose.
13. Do not use cloth or linen tape measures having metallic reinforcement fibers woven into the cloth on any job at the Company.
14. Do not use metallic tape measures in areas where they may contact exposed energized equipment.

B. **Hand Tool Guidelines**

1. Take care in handling and storing tools.
2. Use caution when selecting tools for use near energized equipment.
3. An approved wire stripping tool should be the preferred tool used for stripping wire when available.

6-5 POWER TOOLS

A. **Power Tool Requirements**

1. Power tools shall be used only by Qualified Persons.
2. Observe all warning signs and instructions.
3. Ground non-current carrying metal parts of portable electric tools such as drills, saws, and grinders by use of a three-wire cord when connected to a power source, unless the tool is an approved double-insulated type or is powered by a low voltage isolation transformer.

   This applies to any cord-connected and plug-connected equipment.
4. Visually inspect the tool and cord before use, looking for external and possible internal defects such as damaged insulation, missing or damaged ground pin and/or blade, loose parts, etc.
5. Replace tool if parts are worn or damaged. Remove from service and tag with an approved "Danger" tag.
6. If an extension cord is required, make sure it is for the correct wattage and has the proper plugs. Verify condition of the cord and plugs and check for rated use, indoor or outdoor.
7. Do not carry or lift a tool by its cord.

8. Never disconnect power by pulling on the cord — use the plug.
9. Operate all power tools within their design limitations.
10. Stop and disconnect power driven equipment before adjusting, cleaning, oiling, or repairing.
11. Ensure the power switch is "Off" before plugging or unplugging tools.
12. Do not use electrical tools where there is a hazard of flammable dusts, gases, or vapors.
13. Keep the electrical cord away from heat, oil/chemicals, sharp edges, and ensure it doesn't become a tripping hazard.
14. Shut off gasoline engines or motor driven equipment before refueling.
15. Do not start a gas engine equipped with a rope starter if anyone is within reach of the backlash of the rope.
16. Tools intended to be used with a safety guard shall not be used if the safety guard is not in place.
17. Do not use a stationary drill press unless a point of operation guard is in place.
18. Ensure that the equipment is equipped with approved guards when using emery wheels or similar grinding equipment.
19. Use a vice or some other suitable method to hold material being drilled unless the object is so heavy that it will not move.
20. Be alert to the hazards of the exhaust fumes from gasoline engines. Always place them so that the exhaust fumes are downwind from the work area.
21. Do not use portable power saws, hand axes, or hatchets when standing on an erected pole or structure.

6-6 BENCH AND PEDESTAL GRINDERS

A. Bench and Pedestal Grinder Requirements

1. Provide a tool rest that is adjusted to within 1/8 inch of the grinding wheel prior to use on all bench and pedestal grinders.
2. Adjust the tongue guard to within 1/4 inch prior to use on grinders equipped with tongue guards.
3. Secure pedestal and bench grinders to prevent "walking" or tipping during use.

6-7 HYDRAULIC AND PNEUMATIC TOOLS

A. Hydraulic and Pneumatic Tool Requirements

1. Use only tools that are in good condition.
2. Ensure that hoses are appropriate for the pressure created by the tool.
3. Do not exceed manufacturer safe operating pressure for hoses, pipes, valves, filters, and other fittings.
4. Check hoses for cuts, bulges, and abrasions, and replace any hose found defective.
5. Send all damaged or broken tools to the tool room for repair. Only qualified, trained individuals shall make repairs.
6. Securely install and maintain safety clips or retainers on pneumatic tools and hose connections to prevent accidental disconnection of attachments.
7. Use a nonconductive hose on tools where contact to exposed live electrical parts may occur.
8. Do not use any part of the body to locate or attempt to stop leaks.
9. Ensure that check valves are installed when hydraulic lines longer than 35 feet may contact exposed parts at primary voltages or otherwise provide for loss of insulating value due to partial vacuum.

B. Hydraulic and Pneumatic Tool Guidelines

1. Do not allow hoses to be kinked.
2. Do not carry or lift a tool by its hose.
3. Adjusting or Changing Hydraulic and Pneumatic Tools
   a. Shut off pressure at the supply valve ahead of the hose.
   b. Bleed off the pressure before breaking the connection when making adjustments or changing tools unless the tool is equipped with quick-change connectors.

6-8 POWDER-ACTUATED TOOLS

A. Powder-Actuated Tools Requirements

1. Powder-actuated tools shall be operated only by personnel who have been trained in the operation of the particular tool in use.
2. A powder-actuated tool must not be able to be operated until it is pressed against the work surface with a force of at least 5 pounds

greater than the weight of the tool to prevent the tool from firing accidentally.

3. All powder-actuated tools must be designed with a protective shield or guard on the barrel to confine any fragments when the tool is discharged.
4. Use of powder-actuated tools in a flammable or explosive atmosphere is prohibited.
5. Defective powder-actuated tools shall not be used.
6. Powder-actuated tools shall not be unattended.
7. Inspect all powder-actuated tools prior to use to ensure that the barrel is free from obstructions.
8. Tag defective powder-actuated tools and remove them from service immediately.
9. Never point a powder-actuated tool in the direction of another person.
10. Do not load powder-actuated tools until they are ready to be used.
11. Do not place any part of your body in front of the barrel end of a powder-actuated tool.
12. Carry and transport explosive charges in approved containers.
13. Inspect the material that the powder-actuated tool will be used on for stability prior to use of the tool.
14. Use only the fasteners specified by the manufacturer for the powder-actuated tool being used (and the backing material in that application, if applicable).

B. **Powder-Actuated Tools Misfire Guidelines**

1. Wait at least 30 seconds.
2. Attempt to operate the tool a second time.
3. Wait at least another 30 seconds to ensure that the faulty cartridge is less likely to explode.
4. Carefully remove the load.
5. Place misfired cartridges in a covered metal container.

6-9 SCAFFOLDING

A. Scaffolding Requirements

1. Only trained and qualified persons shall erect scaffolds.
2. The training shall be specific to the type of scaffold being erected.
3. A Qualified Person shall inspect each scaffold at the beginning of each shift or prior to use.
4. All personnel who use the scaffold shall utilize the type(s) of fall protection specified by the Qualified Person.
5. Design and erect scaffolds to be capable of carrying the total load (four times the intended load) without shifting or settling.
6. Wire, synthetic, or fiber rope used for scaffold suspension shall be capable of supporting at least six times the maximum intended load.
7. Erect, move, dismantle, or alter scaffolding using only qualified persons (defined by training or experience).
8. Securely fasten all decking.
9. Install top rails, mid rails and toe boards when scaffolds are four ft. or higher except for “Baker Scaffolds” where overhead obstructions prevent the installation of railing. In all cases railing must be provided when the scaffold exceeds 10 ft. in height.
10. Design swinging scaffolds to prevent excessive tilting.
11. Wear a safety harness attached to a lifeline (each individual must be connected to a separate lifeline, which is separate from the lines supporting the scaffold) when working on a scaffold suspended by rope.
12. Use wood planks in scaffolds that are not less than 10 inches wide and 2 inches thick (commercial size).
    a. The wood planks shall not extend less than 6 inches beyond the outer supports.
    b. Scaffold platforms 10 feet in length or less shall not extend more than 12 inches beyond the outer supports.
    c. Scaffold platforms greater than 10 feet in length shall not extend more than 18 inches beyond the outer supports.
    d. All scaffold planking shall overlap a minimum of 12 inches unless platforms are nailed together or otherwise restrained to prevent movement.

13. Do not cover wood platforms with opaque finishes, except that platform edges may be covered or marked for identification.

    Platforms may be coated periodically with wood preservatives, fire retardant finishes, and slip resistant finishes; however, the coating may not obscure the top or bottom wood surfaces.

14. Fully plank or deck each platform on all working levels of scaffolds between the front uprights and the guardrail supports.
15. Ensure that all scaffold platforms are at least 18 inches wide.
16. Do not inter-mix scaffold components from different manufacturers unless the components fit together without force and the user maintains the scaffold's structural integrity.
17. Install guardrails and toe boards on all scaffolds that are four feet or more in height and on all scaffolds immediately adjacent to excavations, deep water, machinery, or other sources of danger.
18. Where the potential for dropped/falling objects exists on scaffolds, perimeter debris netting (e.g., fine mesh, such as Pearl Weave®) or plywood shall be installed from the toe board to the top rail of the guardrail system to prevent objects from inadvertently falling from the elevated area.
19. Floor openings and holes shall be covered to prevent tools, equipment, and/or materials from falling through holes, gaps, and crevices. Holes two (2) inches or more (based on the smallest dimension) in any scaffold surface through which an object may fall to a lower elevation must be covered for prevention.
20. Appropriately colored barrier tape or hard barricades with appropriate signage shall be utilized to establish Exclusion Zones in areas where objects could fall from overhead.
21. Observe the following precautions when working from scaffolds:
    a. Inspect all ropes, slings, hangers, platforms, and other supporting parts before installation and periodically while in use.
    b. Reinspect scaffolds using a Qualified Person after any incident or occurrence that might affect the structural integrity of the scaffold.
    c. Never overload a scaffold.
    d. Use only bolts and hitches that are in good condition and properly secured.

e. Do not perform welding, burning, or open flame work from scaffolding supported by fiber or synthetic rope.

f. Do not jump onto or off scaffolds, or climb or slide down suspension ropes.

g. Remove all loose objects from the scaffold when stopping work for the day.

22. Design swinging scaffolds to prevent excessive tilting.

23. Eliminate slippery conditions on scaffolds as soon as possible after they occur.

24. Do not work on scaffolds exposed to the elements during storms or high winds.

25. Erect single point suspension scaffolds (SKYCLIMBERS) so that the load cable runs in a straight vertical path.

26. Electrically insulate the SKYCLIMBERS load cable from ground when welding is to be performed from single point suspension scaffolds (SKYCLIMBERS).

27. Equip all scaffolds with a solid means of access. The means of access shall extend a minimum of 36 inches above the working platform unless an appropriate handhold is in position that can be used in lieu of the ladder's side-rails or rungs.

28. Protect each worker on a single point or two point adjustable suspension scaffold using both a personal fall arrest system and guardrail system. Such workers must complete the required fall protection training prior to using the scaffold.

B. **Scaffolding Guidelines**

1. Use scaffolding as a means to reach locations that require inspection or work for an extended period of time.

6-10 LADDERS

A. **General Ladder Requirements**

1. Ladders shall be inspected before initial use in each work shift, and more frequently as necessary, to identify any visible defects that could cause employee injury.

2. Do not load ladders beyond their intended loads. All ladders must have readable manufacturer's load rating charts applied to the ladder.

3. Use only Company-approved ladders that are nonconductive near energized conductors or equipment.
4. Use ladders of the correct length.
5. Do not use defective ladders.
6. Always tag defective ladders with a danger tag until either repaired or destroyed.
7. Do not erect a ladder in front of a closed door that opens toward the ladder's position unless the door is first locked or guarded against movement.
8. Do not use ladders that do not have safety feet as specified by the manufacturer.
9. Place, hold, tie, or otherwise secure a portable ladder to prevent slipping or falling.
10. Face the ladder when ascending or descending a ladder
11. Use both hands when ascending or descending a ladder.
12. Do not hand carry any object or load while climbing up or down the ladder.
    a. Use a tool belt, hand line, or hand line with material bag when raising or lowering tools and materials.
13. The top of a non-self-supporting ladder shall be placed so that both side rails are supported, unless the ladder is equipped with a single support attachment.
14. A ladder shall not be moved, shifted, or extended while an employee is on it.
15. Ladders and ladder sections shall not be tied or fastened together to provide added length unless they are specifically designed for such use.
16. Do not use wire truss portable ladders.
17. Finish wooden ladders with clear shellac, varnish, or other clear finish only.
18. Do not use paint on wooden ladders; paint might obscure a defect in the wood.

B. **General Ladder Guidelines**

1. Store fiberglass ladders out of direct sunlight.

2. Exercise care when placing portable ladders.
3. Blocking or lashing portable ladders or having the portable ladder held by someone may be required, especially upon oily, metal, or concrete surfaces.

C. **Stepladder Requirements**

1. Use stepladders in the fully spread position only.
2. Do not substitute a stepladder for a straight ladder.
3. Stand no higher than the second rung from the top of a stepladder.
4. Do not stand on the top platform of stepladders unless the platform is specially constructed for this purpose.

D. **Straight Ladder Requirements**

1. Portable straight ladders used to access an upper landing surface shall extend a minimum of 3 feet above its upper support.
2. Stand no higher than the third rung from the top of a straight ladder.
3. Place the bottom of the ladder one-fourth of the vertical height of the ladder away from its upper support where possible.

E. **Fixed Ladder Requirements**

Employees shall use the personal fall arrest system or ladder safety system when climbing fixed ladders equipped with those devices.

F. **Fixed Ladder Guidelines**

Check ladders for looseness, rust, and corrosion before each use.

G. **Extension Ladder Requirements**

1. Equip extension ladders with all necessary irons, locks, pole slings, and hooks specified by the design.
2. Always assemble extension ladders so that the sliding section (upper) is placed on top of the base (lower).
3. Do not lean to one side or work from the extension ladder without properly securing the extension ladder and securing yourself to the ladder.
4. Maintain the extension ladder rope and pulley in good condition
5. Use the extension ladder rope and pulley to extend the ladder whenever the ladder is to be extended.

H. **Step Bolts and Manhole Steps Requirements**

1. Each step bolt or manhole step shall be inspected prior to the first use of each work shift.
2. Any step bolt that is bent more than 15 degrees from the perpendicular in any direction shall be removed and replaced before an employee uses it.

6-11 CABLES, ROPES, SLINGS, AND CLEVISES IN RIGGING

A. **Cables, Ropes, Slings, and Clevises in Rigging General Requirements**

1. All field rigging done involving work with or near energized primary shall be done under the supervision of a Qualified Electrical Worker.
2. Ensure that cables, ropes, slings, clevises, etc., are in good condition and are not used beyond their safe limits as outlined by the manufacturer of such items or other approved sources of information.

B. **Wire Rope, Cables, Slings and Attachments Requirements**

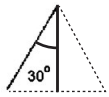
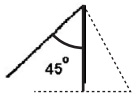
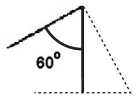
1. It is the responsibility of all personnel involved in the use of wire rope slings to have a working knowledge of them.
2. It is the responsibility of the person in charge of the operating equipment to determine whether the proper sling is being used for the job and whether the sling is attached correctly to prevent the load from slipping, rolling, or tipping.
3. All cable (wire) approved for general use on Company equipment shall be of extra improved plow steel independent wire rope center (IWRC).
4. Special cable may be used on mobile cranes, hydrolifts, gantry cranes, and other lifting equipment not covered in the **Safe Working Load for Wire Rope Slings Chart**.
5. Maximum load limits (load lines and slings) shall not exceed the limitations as indicated on the **Safe Working Load for Wire Rope Slings Chart**, or the manufacturer's safe working load rating, stamping, or tagging of the device.
6. Each sling shall identify the safe working load (SWL) in tons. All multi-part slings are identified at 45° SWL.
7. Do not use hooks, clevises, rings, etc., which are found defective. Tag the defective device and remove to prevent use by others.

8. Replace unsafe wire ropes, slings, and their attachments.
9. Place protective pads between the edges and the cable on slings when objects with sharp edges are to be lifted.
10. Ensure that the proper sling is being used for the job and that the sling is attached correctly to prevent the load from slipping, rolling, or tipping.
11. Do not wrap a winch line around any load in lieu of a sling (except while setting poles). A separate sling shall be used instead.
12. Ensure that proper precautions are taken whenever wire rope is being used in the proximity to energized equipment to prevent wire rope from coming in contact with the energized equipment.
13. Use appropriate protective devices such as rubber protective equipment, barriers, guide ropes, etc., whenever wire rope is being used in proximity to energized equipment to prevent wire rope from coming in contact with the energized equipment.
14. Cover all conductors, spread or both, if it should be deemed necessary to use wire rope on poles carrying energized conductors.

C. **Wire Rope, Cables, Slings, and Attachments Guidelines**

1. Do not use chains for load lifting operations.
2. Regularly inspect wire ropes, slings, and their attachments.
3. Thoroughly inspect wire rope prior to use when it has been idle for a period of time.
4. If portions of wire rope used as winch cables are subject to localized severe service near the eye, it may be possible to reverse the rope on the drum or to cut off a portion and leave the rope in service with adequate safety.

SAFE WORKING LOAD (SWL) FOR WIRE ROPE SLINGS (RATED CAPACITY IN POUNDS) ALL MULTI-PART SLINGS IDENTIFIED AT 45° SWL			
Rope Diameter Inches	Straight Pull	Choker Hitch	Vertical Basket Hitch
1/4	1120	840	2000
3/8	2400	1860	4400
1/2	4400	3200	7800
5/8	6800	5000	12200
7/8	13200	9800	24000

SAFE WORKING LOAD (SWL) FOR WIRE ROPE SLINGS (RATED CAPACITY IN POUNDS) ALL MULTI-PART SLINGS IDENTIFIED AT 45° SWL				
	2 Vertical Leg Bridle Slings			
Rope Diameter (Inches)	Vertical			
1/4	2240	1900	1550	1120
3/8	4500	4080	3360	2400
1/2	8300	7480	6160	4400
5/8	13600	11560	9500	6500
7/8	26400	22440	18460	13200
	· 3 Leg Bridle Slings Multiply by 1.5 · 4 Leg Bridle Slings Multiply by 2			

STRENGTH OF MANUFACTURED EYE HOOKS DROP FORGED STEEL, WELDLESS		
Inside Diameter of Eye (inches)	**Throat Opening (inches)**	**SWL (pounds)**
3/4	1	1000
7/8	1 - 1/16	1200
1	1 - 3/16	1400
1 - 1/8	1 - 1/4	2400
1 - 1/4	1 - 3/8	3400
1 - 3/8	1 - 1/2	4100
1 - 1/2	1 - 3/4	5000
1 - 5/8	2	6000
1 - 3/4	2 - 1/16	8000
2	2 - 1/4	9400
2 - 3/8	2 - 1/2	11000
2 - 3/4	3	13600
3 - 1/8	3 - 3/8	16000
3 - 1/2	4	22000
If the throat opening of any hook exceeds the dimension given for the corresponding diameter of the eye, the HOOK HAS BEEN OVERSTRAINED and SHALL NOT BE USED.		

SHACKLE SAFE LOAD IN POUNDS – DROP FORGED STEEL, WELDLESS		
Screw Pin Type Shackle	Round Pin Type Shackle	Safety Type Shackle
Diameter of Pin (inches)	Max. Width Between Eyes (inches)	SWL (pounds)
1/4	3/8	560
3/8	9/16	1400
1/2	11/16	2700
5/8	13/16	3600
3/4	1 - 1/16	5600
7/8	1 - 1/4	7800
1	1 - 1/2	10400
1 - 1/8	1 - 5/8	13200
1 - 1/4	1 - 7/8	16000
1 - 3/8	2	20000
1 - 1/2	2 - 1/8	24000
1 - 5/8	2 - 1/4	28000
1 - 3/4	2 - 3/4	32000
2	2 - 3/4	36000
2 - 1/4	3 - 1/4	46000
2 - 1/2	4	56000

All shackle pins must be straight and all pins of screw type must be screwed in all the way. If width between the eyes is greater than listed above, the SHACKLE HAS BEEN OVERSTRAINED and SHALL NOT BE USED.

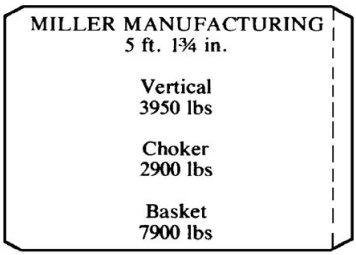
D. **Hooks, Shackles, Clevises, and Other Attachments Requirements**

1. No open hook shall be used to hoist a bucket, cage, spreader, or skip nor in any circumstance where the inadvertent dislodgment from the hook could cause a risk of injury to workers.
   A safety hook, or mousing, shall be installed or the hook shall be replaced by a shackle.
2. All shackle pins must be straight, and all pins of screw pin type must be screwed in all the way.
3. The use of rebar, bolts, etc., bent or straight, in substitute of pins, is unsafe and shall not be allowed.
4. All shackles and eyehooks shall be used in accordance with the ratings on the Shackles and Eyehooks Charts.

E. **Synthetic Rope, Synthetic Rope Slings, and Synthetic Webbing Slings Requirements**

1. All synthetic web slings shall have a manufacturer's tag, permanently attached, that indicates the SWL. (Refer to the example.)

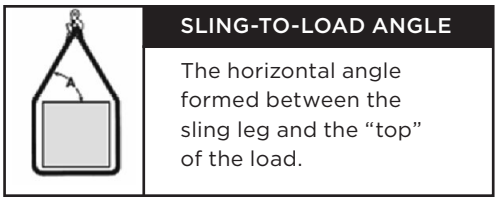
MANUFACTURER'S TAG EXAMPLE



2. Slings must not be subjected to unexpected strains or improperly used where the angle, as well as the load lift, is not considered.

   Such consideration shall be in accordance with the **Sling-To-Load Angle Figure** and the **Reduced Work Load Chart**.

LOAD LIFT ANGLE FIGURE



REDUCED WORK LOAD CHART

Leg Angle	Loss Factor	Leg Angle	Loss Factor
90º	1.000	55º	.8192
85º	.9962	50º	.7660
80º	.9848	45º	.7071
75º	.9659	40º	.6428
70º	.9397	35º	.5736
65º	.9063	30º	.5000
60º	.8660		

3. Do not use hooks, clevises, rings, etc., that are found to be defective.
4. Replace unsafe synthetic ropes, slings, and their attachments.
5. Do not expose ropes to caustic or acids.
6. Do not store ropes in a room containing acids.
7. Place protective pads between the edges and the rope when objects with sharp edges are to be lifted with ropes.
8. Properly ground cable trailers and winch trucks before pulling in cable.
9. Flat strap (Muletape) shall not be used for rigging, lifting, or dragging equipment. Flat strap is designed and rated for cable installation only.

F. **Rope, Rope Slings, and Synthetic Webbing Slings Guidelines**

1. It is the responsibility of all personnel involved in the use of rope and slings to have a working knowledge of them.
2. It is the responsibility of the person in charge of the operating equipment to determine whether the proper sling is being used for the job and whether the sling is attached correctly to prevent the load from slipping, rolling or tipping.
3. Regularly inspect synthetic ropes, slings and their attachments.

G. **Synthetic Security Rope Guidelines**

1. The following information is used to determine rope factors and SWL ratings:
2. Most rope purchases are bid through different vendors and the criterion variables are as follows:
   - SWL (safety factor).
   - Specific rope types.
   - Specific manufacturers.

   a. Tensile strengths are determined at the manufacturer generally by averaging, and always on new and unused rope.
      i. Tensile strength is an average strength or "tension" the rope can handle without breaking; exceeding the manufacturer tensile strength can result in breakage.
      ii. Tensile strengths vary depending on rope composition and from manufacturer to manufacturer.

   b. Breaking strength is the amount of tension required to cause breakage; exceeding the manufacturer listed breaking strength will result in breakage.

   c. The suggested SWL varies by manufacturer and rope composition.
      i. Most manufacturers leave the determination of the SWL to the user and do not assume liability for the application or rope condition.
      ii. Generally, 20 to 25 percent of the tensile strength is used in determining an SWL rating.
      iii. Some manufacturers recommend ratings as low as 5 percent of tensile strength to be used as the SWL where stress, age, binding, property damage, or personal injury is at risk.

   d. To determine an SWL rating for a rope not listed in this APM, a maximum of 20 percent of tensile strength, also known as a 5 to 1 safety factor, is used.

   e. To determine a safety factor for a rope that is listed in this APM, the APM rating is not to be exceeded regardless of the actual strength of the rope.

f. All ropes listed in this APM, regardless of composition, meet or exceed the SWLs listed in the APM and meet National Cordage Institute specifications.

g. All ropes are synthetic, and none contain 100 percent natural fibers.

   i. Unless stated otherwise, any or all ropes can be composed of the following materials: polyester, polypropylene, polyurethane, polyethylene, polyolefin, nylon, or combinations of one or more of these.

   ii. The fibers may be extruded, co-extruded, braided, single braided, double braided, woven, spun, twisted, monofilament, multifilament, parallayed, plaited, or any combination thereof.

h. The process used to manufacture a rope is not of significance unless ordered and/or listed here by their name brand (e.g., Samson, Spectron II).

3. The following information is used to identify rope types and specifications:

   a. Nylon = 100 percent nylon and among the strongest of 100 percent composition materials.

   b. Polyester = 100 percent polyester and the main construction of most of the double braided winch lines in use.

   c. Blend or Synthetic Blend = Rope composed of more than one of the above listed synthetics.

TWISTED 3-STRAND ROPES	
1/4 in. Nylon, Polyester, or Polypropylene (P-Line) • Average Tensile: 1,250 min – 1,650 lb. max • Factor: 11 to 1 = 113 lb. Polypropylene (still available, former most common) • 12 to 1 = 137 lb. Nylon (Nylon, most common currently) • APM: 113 lb. SWL: 330 lb.	**1/2 in. Nylon, Polyester, Polypropylene, or Synthetic Blends** • Average Tensile: 3,960 min – 6,400 max • Factor: 9 to 1 = 440 lb. Blends (*Most used, Continental Western @4,200 lb. Tensile: 5 to 1 = 840 lb.) • 14 to 1 = 457 lb. Nylon • APM: 440 lb. SWL: 840 lb.
3/8 in. Nylon, Polyester, Polypropylene, or Synthetic Blends • Average Tensile: 2,440 min – 3,700 max • Factor: 10 to 1 = 244 lb. Blends (*Most used Continental Western @2,700 lb. Tensile: 5 to 1 = 540 lb.) • 14 to 1 = 264 lb. Nylon • APM: 244 lb. SWL: 540 lb.	**3/4 in. Nylon, Polyester, Polypropylene, or Synthetic Blends** • Average Tensile: 3,960 min – 4,200 max • Factor: 7 to 1= 1,080 lb. Blends (*Most used, Continental Western @8,500 lb. Tensile: 5 to 1 = 1,700 lb.) • 14 to 1 = 1,092 lb. Nylon • APM: 1,080 lb. SWL: 1,700 lb.

WINCH LINES	
1/2 in. Polyester, Nylon, or Blends • Average Tensile: 8,500 lb. min – 10,500 lb. max • Factor: 5 to 1 = 1,700 lb. Nylon (Nylon, polyester or blend – no common) • 5 to 1 = 2,100 lb. Blends (Nylon, polyester or blend – no common) • APM: 1,500 lb. SWL: 1,700 lb. DVTS order	**5/8 in. Polyester, Nylon or Blends** • Average Tensile: 15,200 lb. min – 16,300 lb. max • Factor: 5 to 1 = 3,040 lb. Nylon (Nylon, polyester or blend – no common) • 5 to 1 = 3,260 lb. Blends (Nylon, polyester or blend – no common) • APM: none SWL: 3,040 lb. DVTS order

WINCH LINES	
3/8 in. Amsteel-Blue (Color Varies) • Average Tensile: 19,600 lbs. • Factor: 5 to 1 =3,900 lbs.	**1 in. Polyester, Nylon, or Blends** • Average Tensile: 36,300 lb. min – 37,200 lb. max • Factor: 5 to 1 = 7,260 lb. Nylon (Nylon, polyester or blend – no common) • 5 to 1 = 7,440 lb. Blends (Nylon, polyester or blend – no common) • APM: 5,680 lb. SWL: 7,260 lb. DVTS order
3/4 in. Amsteel-Blue (Color Varies) • Average Tensile: 58,000 lb. min – 64,400 lb. avg. • Factor: 5 to 1 = 11,600 lb.	

SPECIALTY ROPES	
5/16 in. Spider Flex. Blend • Average Tensile: 2,730 lb. • Factor: 5 to 1 = 546 lb. (No substitutions) • SWL: 546 lb. Pulling equipment and spider lines only	**3/4 in. Pulling Line (Flat Strap) Polyester** • Average Tensile: 2,500 lb. • Factor: None used currently @5 to 1 = 500 lb. • SWL: 500 lb. 32904400 • Used for cable pulling only
5/8 in. 12 Strand Polyester • Average Tensile: 17,500 lb. • Factor: 3 to 1 = 5,833 lb. (Mfg. spec new rope only) • Up to 20 to 1 = 875 lb. (Mfg. spec, used rope or snag, shock, injury, damage risk) • SWL: Varies • Pulling equipment only	

UNI-LINE	
3/8 in. Blend • Average Tensile: 6,000 lb. • Factor: 5 to 1 = 1,200 lb. • SWL: 1,200 lb.	**3/4 in. Blend** • Average Tensile: 24,200 lb. • Factor: 5 to 1 = 4,840 lb. • SWL: 4,840 lb.
7/8 in. Blend • Average Tensile: 32,800 lb. • Factor: 5 to 1 = 6,560 lb. • SWL: 6,560 lb.	

H. **Rigging Guidelines**

1. Observe the condition of lift cables, slings, winches and outriggers before making lifts.
2. If unsafe conditions exist, make corrections to lift cables, slings, winches and outriggers before work proceeds.

I. Steel Lattice Structures Rigging Requirements

Perform the following when rigging on steel structures.

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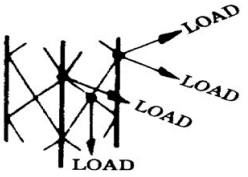
• Rig to use “truss” action



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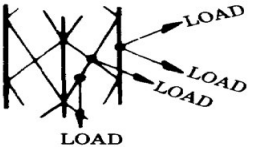
• Do not rig so that a member must act as a flexural member of structure (beam).



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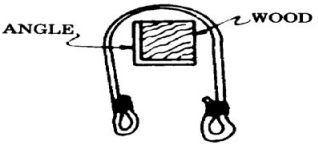
• Use a sling.



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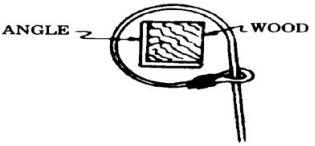
• Do not use a choker



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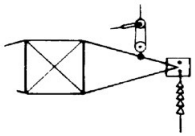
• Use open “work hole” if one is provided or sling to intersection point of members.

• Apply the load in the direction in which the structure is trussed.



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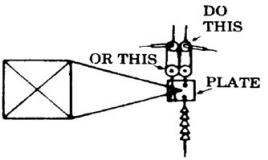
• Use the “work hole” provided. If none is provided, sling around intersection point of lower chords of the cross arm.



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• Do not remove bolts to make “work holes.”

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• Do not pull up a dead-end load by using a sling over the lower chord of the cross arm.

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6-12 HEAT GUNS

A. General Use Requirements

1. Prior to using any heat gun, ensure that you have been trained in the safe operation of the tool.
2. Follow all safety instructions and the Operations Manual when using any heat tool.
3. Heat tools intended to be used with a safety guard shall not be used if the safety guard is not in place.
4. Always wear safety glasses and flame retardant or leather gloves when using a heat gun.
5. Never modify the heat tool in any way.

B. General Use Guidelines

1. Do not use a heat tool to shrink wrap an area that you cannot see.
2. Place the heat gun on a stable, level surface when not hand held.
3. Allow the tool to cool before storing it.
4. When working with any type of heat or open flame, always keep a fire extinguisher close by.

C. Propane Heat Gun Requirements

1. Check all fittings for leaks and inspect the hose for cracks or loose connections.
2. When shrink wrapping indoors, make sure the work area is well ventilated.
3. Never operate the heat tool below 15 PSI.
4. Each time you complete a shrink wrap project, turn off the propane tank and purge all gas from the hose attached to the heat tool.
5. Make sure the regulator gauge reads “0” PSI before storing away the heat tool.

D. Electric Heat Gun Requirements

1. Unplug the heat gun when not in use.

Chapter 7: Generating Plants

7-1 SCOPE

This chapter applies to all electric generating stations. Personnel from other departments engaged in work at such stations shall comply with the rules of this chapter. This chapter provides safe working rules to help prevent accidents. Individual plant operating procedures shall not circumvent these rules. The common guidelines of these rules, coupled with the rules of common sense, should contribute to a safe operation.

7-2 SWITCHING RULES

A. **Switching Requirements**

1. All verbal switch orders shall be written down and repeated back to the ECC. Where preprinted orders are used, such orders shall be reviewed in sequence with the ECC prior to or during switching.
2. Make certain that you understand the orders.
3. Perform all orders in sequence as given by the ECC.
4. Report back to the ECC after an order has been completed and give complete details of the switching performed.
5. Switching at generation plants that are not controlled by APS will be done in accordance to that control area's switching rules.
6. Rubber gloves and leather protectors shall be worn when employees are doing switching of any kind in the switchyards.
7. If, in the employee's opinion, performing a certain switching step may result in trouble, they shall call the Recognized System Operator.
8. Before energizing equipment, give particular attention to ground switches and other grounding devices that they are open or removed.
9. After opening a set of disconnects, always check the blades and see that all three phases have the proper separation.
10. After closing a set of disconnects, always check the blades for proper contact. If the proper contact has not been made, report the improper contact to the ECC and make arrangements for proper adjustments.
11. No switch, circuit breaker, or disconnect shall be operated under any condition when a tag by order of the ECC is placed on it, without specific orders from the ECC.

12. A Contact Tag is an ECC order. It means that the switch on which it is placed must not be re-closed until permission to close it has been granted by the person to whom the Contact Tag was issued.

7-3 SAFE WORK RULES

A. Safe Work Rule Requirements

1. All reasonable efforts will be made to isolate the sources of energy prior to applying a temporary or permanent patch on any line containing steam or compressed gasses, water above 150 pounds per square inch (psi), or any pressure vessel. Before proceeding with repairs on a pressurized line (as defined above) or vessel, the on-duty manager must approve. After approval, a thorough pre-job briefing will take place with the operations and maintenance crew members involved.
2. All temporary power cords shall not be routed in or across walkways in such a way as to create a tripping or falling hazard. All cords placed through doorways shall be protected against damage.
3. Portable electric lighting used in wet and/or other conductive locations, as for example, drums, tanks vessels, shall be operated at 12 volts or less. However, 120 volt lights may be used if protected by a ground-fault circuit interrupter.
4. Scaffolding shall be used as a means to reach locations that require inspection or work for an extended period of time. Only Competent Persons (by training or experience) shall erect, move, dismantle, or alter scaffolding.
5. All air hoses shall have control valves or valve nozzles on the discharge end. Where air lines equipped with “Chicago” fittings are used, safety wire or clips shall be used to secure the fitting.

7-4 CHEMICAL/HAZARDOUS MATERIALS HANDLING, STORAGE, AND DISPOSAL

A. Chemical/Hazardous Materials Handling, Storage, and Disposal Requirements

1. Proper PPE shall be worn when employees are working with hazardous materials or chemicals.
2. In the event of a fire, explosion, release, or spill involving mixed waste, hazardous material, or hazardous waste, immediately leave the area

and call the respective generating plant's emergency number. Ensure that others in the area are instructed to leave, and then isolate the area. The integrated hazardous material contingency plan shall be implemented when an incident occurs that could threaten human health or the environment or other conditions as described in the plan.

3. Compressed gas cylinders, whether full or empty, shall be transported or stored in an upright position. All cylinders shall be secured to prevent falling or rolling. Unless a recessed head protects the cylinder valve, the metal protective cap shall be in place. Compressed gas cylinders, when not in use, must have the gauges removed and the protective caps in place.
4. Where hydrogen, CO_2, chlorine, and nitrogen gases are stored, used, or piped by plant systems, always keep the area well ventilated. Proper signs shall be placed in the area, identifying the potential hazard and all precautionary requirements (i.e., no smoking, open flame, or ignition source where flammable gas is present).
5. After hydrogen has been purged from a generator with CO_2, do not enter the generator casing immediately; purge with air and test the atmosphere prior to entering. Only authorized personnel shall do purging or refilling of machines using hydrogen.
6. Only authorized and properly trained personnel shall attempt to stop or repair a chlorine leak. Proper emergency procedures as required for any chemical/hazardous material spill shall be used by all personnel involved in the incident. A second person shall stand by, in the clear, to assist in case of an emergency.
7. Self-contained breathing apparatus (SCBA) shall be inspected and tested monthly. Only those personnel properly trained and authorized are permitted to use a SCBA.
8. Never apply water to a chlorine leak — nor to a leaky container; use only ammonium hydroxide in testing for leaks.
9. Always stay to the windward side of a chlorine leak.
10. When handling chlorine, keep gas masks or other clean air breathing equipment available for emergency use.
11. Where workers are required to enter any vessel or confined space that is filled with nitrogen the following procedures shall be followed:

a. When a vessel or enclosure is filled with nitrogen, a warning sign shall be posted at the entrance(s). The sign shall read:

DANGER
This enclosure is nitrogen filled. Before entry, Confined Space procedures shall be followed.

B. **Chemical/Hazardous Materials Handling, Storage, and Disposal Guidelines**

1. Always remember that the presence of CO2 gas gives no warning. In using CO2 for fire extinguishers, avoid fumes and ventilate area as soon as possible.
2. Chlorine gas is heavier than air and will tend to accumulate in the lower parts of room or building.

7-5 COAL PLANT RULES

A. **Coal Plant Requirements**

1. Plant operating procedures must be strictly adhered to in regard to safe practices in operating soot blowers or wall de-slaggers.
2. To prevent fire or explosions, plant operating procedures shall be strictly adhered to when securing pulverizers or mills for operation, maintenance, or inspection.
3. Use extreme caution when welding in an enclosed area. Never weld in an enclosed area with coal dust on floors, beams, equipment, etc. Vacuum clean where possible. When vacuum cleaning is not possible, flame retardant cloth shall be used to cover exposed area.
4. Never weld in or around conveyors in operation.
5. Always cover stopped conveyor belts with dampened flame resistant cloth to prevent fires while welding or burning overhead.
6. When welding is being done in an area where coal, coal dust, or other flammable materials are present, a portable fire extinguisher shall be available in the immediate area.
7. Never stop coal conveyor when one or more idlers are overheated from failure to turn.
8. Percussion tools using powder or cartridges for driving pegs or pins into concrete, brick, or steel shall not be used where flammable dust or dust clouds are present.

9. Never direct a jet of compressed air into smoldering or burning fuel. When water is used to extinguish burning fuel, always use a spray effect, not a jet or solid stream.
10. All individual power plant "Safety Rules and Regulations" regarding the operation of mobile equipment specific to that plant only shall be observed by all operators.

7-6 BATTERY ROOMS AND BATTERY BANKS

A. Battery Rooms and Battery Banks Requirements

1. Battery rooms shall be locked or secured. Only authorized personnel shall be permitted to enter or perform work in a battery room.
2. Battery rooms shall be properly vented to remove hydrogen gas. Eye wash facilities shall be located near each battery room.
3. All electric devices shall be explosionproof in areas where there is a potential for the accumulation of hydrogen gas.
4. Care shall be taken with metal tools shorting across posts and drawing an arc.
5. When cleaning, filling, or taking specific gravity readings, wear proper protective clothing, face shield, rubber gloves, and an apron when needed.
6. Do not use a petroleum-based solvent or cleaner on battery cases. It can attack the case and cause it to crack and break.
7. If you should come in contact with electrolyte on your skin, flush the area with fresh water for 15 minutes. Do not use creams or salves.
8. Eye contact. Flush with fresh water for 15 minutes and seek medical attention.
9. Keep batteries and battery room clean.

7-7 POWER PLANT MOTORS

A. Power Plant Motor Requirements

1. When cable or equipment is to be de-energized and cleared for work, the LOTO shall be obtained in the prescribed manner. This is necessary if the circuit is to be disassembled. It shall be tested to ensure that no voltage exists.

2. Every reasonable effort shall be made to ensure proper, proven, and correct identification of the cable and equipment. Identification markings shall be kept in good condition.
3. High voltage cable and equipment shall bear identification tags. The identification tag shall positively identify where both ends of the cable are terminated. Each end of the cable will identify the opposite end.
4. Cable or equipment shall be considered energized until a LOTO has been established. Before a LOTO is established, the switching device shall be opened and shall be racked out when applicable.
5. After the load is disconnected from power source, high voltage cables may retain a capacitive charge. Treat them as capacitors. Discharge by either spiking or grounding before making physical contact. Care shall be taken to prevent damage to stress cones, insulation, etc.

7-8 GROUNDING RULES

A. **Grounding Requirements**

IF GROUNDING IS NECESSARY, THE FOLLOWING SHALL APPLY:

1. The Qualified Electrical Worker (as defined in OSHA 1910.269(a) (2) (ii) (A, B, C, & D)) in charge of the job shall be responsible for placing grounds to adequately protect employees. If proper grounds cannot be placed, the employees shall use protective equipment and perform the work as though it is energized.
2. Grounding shall be done by a minimum of two qualified persons.
3. When grounding lines and equipment 69 kV and above. Grounding shall be done by a minimum of three qualified persons, where one shall act as a safety observer.
4. Lines and apparatus normally carrying 600 VAC or more, when de-energized for repairs, may be grounded at the switchgear by use of a grounding breaker, at the motors using grounding cables, or worked as though the circuit is energized.
5. Spiking or grounding shall be installed with live-line tools and not with rubber gloves on cables and equipment normally operating in excess of 600 VAC. Grounding switches shall be used if they are in the circuit.
6. Proper eye protection (tinted or clear) shall be worn during any operations where there is the possibility of an electrical arc.

7. Flexible 600 volt 1/0 insulated jumper cable with approved grounding clamps of sufficient size to carry fault shall be used for grounding.
8. If grounding breakers are used, they shall be of equal rating and size as the normal breaker in the cubicle to be grounded. The Qualified Electrical Worker (as defined in OSHA 1910.269(a)(2)(ii)(A, B, C, and D)) shall ensure that the grounding breaker stabs are positioned correctly to ground either the bus or the line.

7-9 OVERHEAD/GANTRY CRANES

A. Overhead/Gantry Crane Requirements

1. Only trained and Competent Personnel shall be assigned to operate this equipment. One worker should be assigned the task of directing the crane operator, but the operator shall also obey an emergency stop given by any crewmember.
2. When loads must be maneuvered over personnel, the personnel shall be instructed to vacate the area. It is the duty of the fellow crewmembers to assist the operator in watching load clearances.

OVERHEAD/GANTRY CRANE STANDARD SIGNALS CHART

Hoist	Lower	Use Main Hoist	Use Whipline	Stop
Emergency Stop	**Travel**	**Move Slowly**	**Trolley Travel**	**Dog Everything**

7-10 GENERATOR BRUSH INSPECTION AND REPLACEMENT

A. Generator Brush Inspection and Replacement Requirements

1. Ensure no grounds exist on the generator by checking in with the control room to ensure no ground alarms exist on the excitation control system.

   If a ground alarm is present; STOP! Do not perform removal of brush holders.

2. Do not mix collector brush brands within the same excitation system. (i.e. different generators may have different brands but the brand of brushes used on a given generator must be the same).
3. If severe visible arcing is seen on the collector rings or brush rigging, STOP, do not attempt to replace brushes and notify the control room immediately.
4. Prior to start of PM remove any metallic objects (watches, chains, ear rings, or other items, which could come in contact or fall into the brush rigging.)
5. Wear arc flash Category 2 rated clothing and 00 rubber gloves with leather protectors for excitation voltages less than 375 VDC and 0 gloves for voltages greater than 375 VDC (0 glove application not to exceed 1000VDC). Reference Section 11-7 Hand Protection Care and Maintenance.
6. When working in vicinity of brush rigging on operating machines; tuck in shirt tails and ensure long sleeves are buttoned tight or secured with tape with sleeves inserted into rubber glove cuffs.
7. Do not replace more than 25% of the brush count so new brushes wear into the collector ring profile.

Chapter 8: Confined Spaces

INTRODUCTION

This chapter contains specific requirements and guidelines for employees conducting activities within confined spaces.

Activities within confined spaces account for a significant number of serious injuries and fatalities throughout American industry.

8-1 CONFINED SPACES

A. **Confined Space Requirements**

1. A confined space is a space that:
   a. Is large enough for a person to enter the space and perform work; and
   b. Has a limited or restricted means for entry or exit; and
   c. Is not designed for continuous occupancy.
2. Within the Company, this definition includes the following spaces if they meet all three of the criteria defined in 8-1(A)(1):
   a. Manholes.
   b. Water tanks.
   c. Chemical storage tanks.
   d. Miscellaneous tanks.
   e. Transformers.
   f. Vaults.

3. The entryways into all of these spaces/areas shall be labeled with markings stating: Danger Confined Space or other similar language.
   a. Exception - labels or signs are not required if a space has a locked entry cover or panel, or an access door that can only be opened with special tools.
   b. Spaces meeting this exception include:

   - Manholes.
   - Transformers.
   - Vaults.

4. A rescue effort in a confined space shall not be attempted until personnel are properly prepared to perform a rescue.

5. Evaluate the space to be entered utilizing the Entry Supervisor or a Confined Space Inspector prior to entry into a confined space.
   a. For purposes of this section, the Entry Supervisor is anyone who has completed confined space entry training.
   b. Confined space entry training includes detailed information on:
      - The types and uses of direct-reading instrumentation used to assess atmospheric hazards.
      - The specific parameters that the Entry Supervisor is required to understand.
6. A Confined Space Evaluation Checklist/Entry Permit or Confined Space Classification Form (Gen) shall be completed to determine the type of confined space to be entered.
7. Unlock and open at least two exits throughout the entire time that the vault is occupied when work is being done in a building vault or manhole vault that has two or more exits.

   The exits to be opened shall be those at each end of the vault.
8. Attendants are required for all entries into manholes and vaults regardless of permit type.
9. Ensure that emergency rescue and retrieval equipment are set up and immediately available for use while workers are within manholes and underground vaults or permit required confined spaces.
10. Rescue harnesses shall be used while workers are within manholes and underground vaults, to facilitate quick rescue should the need arise.
11. Workers shall be attached to a lifeline while they are within manholes and underground vaults or permit required confined spaces where feasible, without creating additional hazards. If it is deemed safer to not be tethered, this determination shall be fully documented on the Confined Space Evaluation Checklist/Entry Permit or Confined Space Entry Permit (GEN).
12. Perform all of the following to determine whether a confined space is a PERMIT-REQUIRED confined space or a NON-PERMIT confined space:
13. Isolate the confined space to ensure that energy sources to be worked on are neutralized.

Energy sources may include the following:

- Electrical energy
- Thermal energy
- Gravity
- Mechanical energy
- Pneumatic energy

14. Clean the confined space, as appropriate, by the following:
    a. Flushing or purging the space to get rid of gases, vapors, liquids, etc.
    b. Ventilating the space with forced air ventilation (continuously).
    c. Using steam or a nonreactive gas to displace a flammable or toxic atmosphere to inert the space.
15. Ensure that the public is kept at a safe distance from the confined space even if the area must be roped off in order to do so.
16. Park motorized vehicles upwind from the source of escaping exhaust gas whenever possible.
17. No smoking within confined spaces.

B. **Confined Space Guidelines**

1. Complete the Confined Space Evaluation Checklist/Entry Permit or Confined Space Classification Form (GEN) to determine the type of confined space to be entered.
    a. Some confined spaces will be determined to be PERMIT-REQUIRED confined spaces after the evaluation checklist is completed.
    b. Most will be determined to be NON-PERMIT confined spaces.
    c. The major differences between the two types of confined spaces are:
        i. The requirement to have all entrants wear rescue/retrieval systems that are attached to a lifeline (where possible without creating additional hazards) leading to outside the space at all times when within a PERMIT-REQUIRED confined space.
        ii. To signify an understanding of the Entry Permit's requirements and conditions, all entrants must sign the confined space entry roster prior to entry of a PERMIT-REQUIRED confined space.
        iii. NON-PERMIT confined spaces have no such requirements, although, they too have been evaluated and tested to ensure worker safety.

8-2 CONFINED SPACE TESTING

A. Confined Space Testing Requirements

1. Testing for gases and vapors shall be done at various levels within a large confined space because most gases and vapors are either lighter or heavier than air, which can result in different concentrations depending upon where you are within the space.
2. Atmospheric testing must be accomplished using only direct-reading instrumentation that has been properly calibrated.
3. A functional ("bump") test must be performed on every instrument prior to each days use. A functional test is defined as a brief exposure of the monitor to a concentration of gas(es) in excess of the lowest alarm set-point for each sensor for the purpose of verifying sensor and alarm operation.
4. If an instrument fails to operate properly following any functional "bump" test, a full instrument calibration must be performed prior to use.
5. All electronic direct-reading instrumentation shall be calibrated in accordance with the manufacturer's specifications.
6. Do not permit entry unless adequate ventilation is provided and the atmosphere is found to be safe by testing for oxygen deficiency and the presence of explosive gases or fumes.
7. Use forced air ventilation and otherwise make the confined space safe before entry when conditions are detected that are not within the limits defined on the Confined Space Entry Checklist or Confined Space Classification Form (Gen).
8. Test the atmosphere of the manhole or excavation for combustible gases or liquids before using open flames in a manhole or excavation.
9. Ensure that the atmosphere of the manhole or excavation is found safe or cleared of combustible gases or liquids before using open flames in a manhole or excavation.

B. Confined Space Testing Guidelines

1. Perform required atmospheric testing using the information supplied on the Confined Space Evaluation Checklist or Confined Space Classification Form (Gen) that has been updated with the information that is contained on the space's Master Data Sheet.

2. Perform required atmospheric testing in the following order beginning outside the space and, if the space is large, working inward:
   a. Check the oxygen content first.
   b. Check for combustible gases/vapors second, if applicable.
   c. Check for toxic atmospheres third, if applicable.
   d. Check for safety hazards last, if applicable.

8-3 NON-PERMIT REQUIRED CONFINED SPACES

A. Non-Permit Required Confined Spaces Requirements

1. Certify that the confined space in question was tested and found to be safe.

   This certification must include the Entry Supervisor's name, the date, and the name and location of the space.

2. Post the Confined Space Evaluation Checklist or Confined Space Classification Form (Gen) at the most common entryway to the space for review by the workers entering the NON-PERMIT space.

   The Confined Space Evaluation Checklist or Confined Space Classification Form (Gen) shall specify the protective measures to be taken upon entry to the space as well as the intervals in which the space's atmosphere must be re-tested.

3. Ensure that emergency rescue and retrieval equipment are immediately available at the location.

8-4 PERMIT-REQUIRED CONFINED SPACES

A. Permit-Required Confined Spaces Requirements

1. Perform the following if the Evaluation Checklist or Classification Form (Gen) determines the space to be PERMIT-REQUIRED Confined Space.
   a. Complete the Entry Permit for the confined space to be entered.
   b. List all of the following on the Entry Permit:
      - The name of the space to be entered.
      - The specific work to be performed within the space.
      - The date and duration of entry (i.e., permit expiration).
      - The authorized entrants by roster.
      - The specified attendant(s).
      - The Entry Supervisor.

- The expected hazards of the confined space.
- The measures used to isolate the space (i.e., clearance number), if applicable.
- The acceptable entry conditions.
- The results of pre-entry and periodic testing, accompanied by the names or initials of the testers and by an indication of when the tests were performed.
- The means, and number, used to activate the rescue team.
- The means used to communicate between entrants and the attendant.
- The equipment to be on-site (e.g., PPE, alarms, rescue equipment, communications).
- Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety.
- Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.
- Post the Entry Permit at the main entryway into the confined space.

2. Specify and station a trained attendant outside the entryway to the confined space during entry.
3. All entrants are to wear the specified retrieval/rescue system, usually a full body harness with attached lifeline (where possible without creating additional serious safety hazards) extending to an anchorage point outside the space.
4. The line shall be not less than ½ inch in diameter and shall have a tensile strength of not less than 2,400 pounds.
5. THIS LINE SHALL NEVER BE TIED TO THE TRUCK OR ANY OTHER VEHICLE, except that the hook on a boom may be used as an anchorage for a set of blocks used for emergency extrication.
6. Continuously monitor the space during entry into a confined space.
7. Notify the appropriate emergency services (911 or plant emergency phone number) at once any time a gas mixture is found.

8. Note any problems during the confined space entry on the Entry Permit when it is canceled.
9. Forward the canceled Entry Permit to the appropriate department for review and retention. (Entry Permits are required to be retained for at least 1 year.)

8-5 CONFINED SPACE RESCUE

A. Confined Space Rescue Requirements

1. Ensure that work within the confined space does not take place until adequate precautions are taken to respond to an emergency should one arise.
2. Ensure, at a minimum, that all of the following are accomplished:
   a. A rescue tripod or equivalent shall be immediately available within the work area and shall have all necessary rigging in place.
   b. A review is performed of any device to be used for summoning assistance shall be tested.
   c. All entrants, the Entry Supervisor and the assigned attendant shall discuss the entry plans, means to signal an emergency, and rescue roles should an emergency occur.
   d. The attendant shall establish, in writing, the phone number to be used to summon emergency assistance.
3. Do not enter a confined space to perform a rescue until properly prepared to perform a rescue.
   a. Summon emergency assistance as specified on the Entry Permit.
   b. Attempt to rescue from outside the confined space using rescue equipment specified on the Entry Permit.
   c. Rescue attempts that require entry into a confined space shall be performed only by properly trained and equipped personnel.

8-6 MANHOLE COVERS

A. Manhole Cover Requirements

1. Use a pick or manhole cover tool to remove or replace manhole covers.
2. Do not set a manhole cover in place by jumping on the edge of the cover with both feet.

3. Ensure that adequate public warning devices are in place prior to opening a manhole.
4. Warning devices shall meet all regulatory requirements.
5. Ensure that adequate public warning devices remain in place until the manhole is again covered.
6. Warning devices shall meet all regulatory requirements.

B. **Manhole Cover Guidelines**

1. Do not expose the hands to potential pinch points when removing or replacing manhole covers.

8-7 MANHOLES, VAULTS, AND EXCAVATIONS WORK

A. **Manholes, Vaults, and Excavation Work Requirements**

1. Heat and handle metal and insulating compounds at a safe distance and in such a manner that they do not create a hazard to personnel within this type of space or to members of the public.
2. Remove all torches and other heating devices (whether or not they are lit) from these types of spaces when the work does not require their use.
3. Ensure that when heating a cold compound, first heat one side of the container so that gasses are permitted to escape without splattering.
4. Ensure the compound and all tools permitted to come in contact with a hot pot are dry before being added.
5. Use a solder pothook to handle a hot pot.
6. Perform switching within a manhole or vault with sufficient workers strategically placed to maintain oral and, if possible, visual communication between worker(s) doing the work and the attendant.
7. Perform work within a manhole or vault with all open entrances/exits guarded with manhole barricades or barriers.
   Cones are not considered adequate barriers.
8. Ensure that a Troubleman or other electrical Journeyman accompanies Non–Electrically Qualified Workers when they are entering a network vault.

9. Ensure that someone attends the network dump switch anytime work performed within a vault could reasonably result in a fault condition.

8-8 RAISING/LOWERING TOOLS AND MATERIALS

A. Raising/Lowering Tools and Materials Requirements

1. Do not toss materials and tools.
2. Use a hand-line or an approved container to raise and lower materials and tools.
3. Warn workers within the manhole or vault when performing any raising or lowering operation.
4. Receive acknowledgement before raising or lowering such materials and tools.
5. Ensure that workers within the manhole or vault stand in the clear until any raising or lowering operation is completed.

Chapter 9: Digging Operations

INTRODUCTION

This chapter contains specific requirements and guidelines for employees conducting digging operations.

9-1 GENERAL

A. **General Requirements**

1. Pneumatic tools and other equipment that have conductive handles shall not be used to uncover cables or conduit containing primary voltages.
2. If unable to de-energize concrete encased primary, then get approval from APS management to use the following alternate method.
   a. Only a battery-operated chipping hammer with insulated case and handle may be used to expose concrete encased conduits containing energized cables while wearing properly rated rubber gloves and the qualified electrical worker is standing on an isolation mat as a second layer of protection.
   b. Control of the hammer/chisel shall be in such a manner that all chipping/chiseling shall not exceed the depth of one (1) inch at a time into the concrete/slurry until the conduit is identified and location is known.
3. When any trench, excavation, or manhole is to be left unattended and all personnel removed from the area, it shall be barricaded.
4. Barricades shall be in accordance with the federal, state, and local laws.

B. **General Guidelines**

1. Where possible in areas exposed to vehicular traffic, a truck shall be placed between oncoming traffic and the work zone to protect workers who are within the work zone.
2. If the usual methods of warning do not seem sufficient, flagmen shall be placed at strategic points to direct traffic into safe lanes.

9-2 BLUE STAKE

A. **Blue Stake Requirements**

1. The One Call Notification Center (Arizona 811) shall be called at least 2 days, but not more than 5 days, in advance prior to digging any

hole or excavating the earth unless an accelerated response has been worked out with Arizona 811.

2. Individual utility owners within the service area who do not participate in Arizona 811 shall also be contacted.
3. Before digging begins, all utilities within the area of excavation shall be identified and marked by the owner of the underground facility, or the area shall be marked as "all clear."
4. Perform the following if utility markings become illegible:
   a. Stop work.
   b. Call Arizona 811 for remarking of the lines.
5. Hand dig within 2 feet of any identified utility.

   Qualified electrical workers shall hand dig within 2 feet of any high voltage pad-mounted equipment.
6. Immediately inform the Leader if any line is damaged.

B. **Blue Stake Guidelines**

1. During excavation, maintain awareness for the possibility of unmarked or mismarked utilities.

9-3 BORING MACHINES

A. **Boring Machine Requirements**

1. All personnel shall stay clear of the rotating bar of the boring machine.
2. When a punch is being made, all personnel shall stay out of the bell hole to prevent being struck by the bit or pipe as it enters the bell hole.
3. Only one person shall signal the operator at one time.
   a. If the person setting the bar is visible to the operator, that person shall give the signals.
   b. In other cases, a second person shall relay signals.
4. All air motors shall be equipped with handles of solid steel on the side opposite of the controls.

B. **Boring Machine Guidelines**

1. Even relatively tight clothing may become caught in the bar unless special care is taken to avoid contact.

9-4 VERTICAL BORING

A. Vertical Boring Requirements

1. Locate all underground utilities before any boring operation begins.
2. Neutralize the controls anytime the controls are left unattended.
3. Do not make adjustments to equipment while it is running.
4. Stay “in the clear” of the revolving auger of the pole hole digger.
5. Guard or cover all pole holes, or excavations. Covers for holes in floors, roofs and other walking/working surfaces shall meet the following requirements:
   a. All covers shall be a minimum of 1 inch thick, 4ft by 4ft, and capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
   b. All covers shall be secured when installed to prevent accidental displacement by wind, equipment, employees or the public.
   c. All covers shall be marked with the word “HOLE” or “COVER” to provide warning of the hazard. (ex. Cone topper signage—spray paint on cover)
   d. Perform visual inspection of hole cover prior to installation.

   Note: This provision does not apply to covers used on streets or roadways.

B. Vertical Boring Guidelines

1. Raise and lower boring equipment with care while ensuring that other people remain out of the way.
2. Maintain a clear view of the bore at all times.

9-5 HORIZONTAL (DIRECTIONAL) BORING

A. Horizontal (Directional) Boring Requirements

1. Locate all underground utilities before any boring operation begins.
2. Always wear high voltage gloves and safety glasses when performing the following:
   a. Operating a directional boring machine.
   b. Serving as a rodman.
   c. Installing rack anchors.
   d. Driving a ground rod.

3. Ensure that all underground utilities are located prior to driving ground rods.

   Place a grounding rod at the rear of the unit, at least 6 feet from the unit and drive it until 1 foot or less is exposed.
4. Place grounding "grid mats" as prescribed by the manufacturer. Small mats are placed in parallel under the tracks and large mats to allow the rodman access to drill rods without the need to step off the mat.
5. Place voltage stakes at least 6 feet from the unit, the grid mats, the power source, and the ground rod.
6. Do not operate equipment without first verifying that the strike-alert system's test confirms it is operational.
7. Do not wear loose clothing that can be caught up in the machine and cause serious injury or death.
8. Tie long hair back, and keep it out of the way.
9. Do not use an air motor to break couplings within rods. Always use an appropriate wrench.

9-6 TRENCHING AND EXCAVATIONS

A. Trenching and Excavation Requirements

1. Locate all underground utilities before any trenching or excavation operation begins.
2. Place the spoils pile at least 2 feet from the edge of the trench or excavation that a worker must enter.
3. Shore, sheet, or lay back to a stable slope trenches or excavations that are 5 feet or more in depth.
4. Protect trenches less than 5 feet in depth when ground movement may be expected.
5. Perform all of the following when in trenches, splice pits, or bore pits that are equal to or greater than four feet (48 inches) deep:
   a. Wear a hard hat.
   b. Provide a means of exit for workers in the excavation or trench.
   c. Provide ladders or other safe means of exit so that no worker is working more than 20 feet from a safe exit.

d. Extend the ladder 3 feet above the top of the excavation or trench when a ladder is used.

e. Remove the ladder when safe exit is clarified.

6. To protect the public, guard all excavations, trenches and job sites using signs, barricades, orange mesh fencing, or cones.
7. Perform an inspection of excavations using a trained Competent Person after each rainfall before allowing workers within the excavation.
8. Make any necessary improvements identified for an excavation inspected by a trained Competent Person after each rainfall before allowing workers within the excavation.
9. Backfill the trench and space outside the walls of manholes or vaults as soon as practical.
10. Fill and tamp trench lines, “pot” holes, splice pits, and bore pits in accordance with state and local requirements.
11. Ensure that any material used to cover an excavation is of a length sufficient to allow not less than 6 inches on each end to rest on the edge of the excavation.

    Steel plates may be used to temporarily cover trenches across roadways.
12. Sheet pile, shore, or brace the side of the excavation as necessary to resist the extra pressure if heavy equipment or large trucks are placed or operated on a level above or near the excavation.
13. Install substantial “stop logs” or wheel chocks when mobile equipment is operated next to an excavation where personnel are working.
14. Perform an inspection of all shoring, sheeting, or other protection using a Competent Person before workers are exposed on a daily basis.
15. Do not perform trenching and excavations below the level of the base of footing of any foundation or retaining wall except in hard rock or when the wall is underpinned and other precautions such as shoring and bracing are taken to ensure the stability of adjacent walls and safety of workers.

16. Protect all excavations of less than 5 feet if examination indicates possible hazardous ground movement.
17. Take the following precautions in all excavations when a possibility of hazardous gasses or oxygen deficiency exists:
    a. Use a properly calibrated gas meter to test for hazardous gases.
    b. Operate mechanical ventilation a minimum of 20 minutes prior to allowing workers entering the excavation.
    c. Maintain the mechanical ventilation in place during any work within an excavation.
18. Create and maintain maximum allowable slopes in accordance with OSHA requirements.

9-7 SHORING

A. Shoring Requirements

1. Maintain materials used for sheeting and sheet piling, bracing, shoring and underpinning in good serviceable condition.
2. Use timbers that are sound and free from large or loose knots.
3. Use timbers that are designed and installed to be effective to the bottom of the excavation.
4. Maintain minimum requirements for trench timbering in accordance with OSHA requirements.
5. Place cross braces or trench jacks in a horizontal position, spaced vertically, and secured to prevent sliding, falling, or kickouts.
6. Backfill and remove trench supports from the bottom of the trench.
7. Release jacks or braces slowly.
8. Use ropes to pull the jacks or braces out from above after workers have exited the trench or excavation.
9. Shore, sheet, brace, slope, or otherwise support sides of trenches, in unstable or soft material 5 feet or more in depth, with material of sufficient strength to protect the personnel working within the trench.
10. Use diversion dikes and ditches or other suitable means to prevent surface water from entering a trench or excavation.

11. Do not allow water to accumulate in a trench or excavation.
12. Stop work and remove workers if water accumulates in a trench or excavation.

9-8 TRENCH BOXES

A. Trench Box Requirements

1. Use portable trench boxes or sliding trench shields for the protection of personnel in lieu of a shoring system or sloping if appropriate.
2. Design portable trench boxes or sliding trench shields so that they are constructed and maintained in a manner that provides protection equal to or greater than the sheeting or shoring required for the trench.

9-9 TRENCHER AND BACKHOE OPERATION

A. Trencher and Backhoe Operation Requirements

1. The operator shall be in full attendance and on the equipment at all times when it is in operation.
2. Stepping over the digging boom while the machine is in operation shall be strictly prohibited.
3. When necessary to move an excavation machine where signaling is required, the operator shall receive signals from one designated person only.
4. Prearranged signals shall be mutually agreed to and understood by both parties.

B. Trencher and Backhoe Operation Guidelines

1. Use caution during the operation of small trenchers not equipped with a seat when standing in front or back of the machine. If the machine hangs on a foreign line, it can be jerked violently.
2. Constantly maintain awareness of the presence of contractors and other nonworkers working in the area of a trencher or backhoe.
3. Warn contractors and other nonworkers working in the area of a trencher or backhoe of the dangers involved in approaching or stepping over the boom.

9-10 PLASTIC PIPES

A. Plastic Pipe Guidelines

1. Do not leave open overnight bell holes and ditches containing plastic pipe where the pipe will be exposed to vandalism or accidental damage.
2. Use extra care with plastic pipe containing gas under pressure.
3. Do not allow paper, leaves, etc., to accumulate around plastic pipe in an open ditch.
4. Do not permit oil, grease, soap, or any other substance that would prevent the cement from acting on the plastic pipe to contact the pipe at any time.
5. Exercise care in handling plastic pipe to prevent mashing or distortion.

Chapter 10: Mobile Equipment, Fleet and Shop Safety

INTRODUCTION

This chapter contains specific requirements and guidelines for employees operating the Company's motor vehicle fleet and mobile equipment.

The contents of this section shall apply whenever an employee is using Company-owned vehicles, or when using privately owned vehicles on Company business.

Note: The purpose of the following rules is to assist in avoiding traffic accidents by developing careful and courteous driving practices.

10-1 GENERAL

A. **General Requirements**

1. Drivers shall possess (on their person) a valid driver's license for the specific vehicle(s) driven.
2. Drivers shall observe all federal, state, and local traffic laws and regulations at all times.
3. Electric assisted micromobility vehicles (e.g., e-bikes, electric scooters, hoverboards) shall not be used for company business, including travel on company time.
4. The following minimum personal protective equipment shall be worn when using motorcycles for company business, including travel on company time:
   a. Securely fastened full-face or three-quarter DOT compliant helmet.
   b. Face shield.
   c. Sturdy abrasion resistant jacket.
   d. Long pants (e.g., heavy weight material, denim).
   e. Sturdy over-the-ankle boots.
   f. Full-fingered gloves.
5. The driver shall not place the vehicle in motion until all occupants are seated with seatbelts fastened, if provided.
6. No person shall be allowed to drive Company equipment unless that person is an employee of the Company and is authorized to use the vehicle. Contract employees/vendors may be authorized on a case-by-case basis.

This rule shall apply to family members and friends of employees in charge of Company vehicles.

Contractors may be authorized to operate Company vehicles on a case-by-case basis.

7. Upon meeting or overtaking any school bus that has stopped for the purpose of receiving or discharging children, the driver of the Company equipment:
   a. Shall come to a complete stop if the "STOP" sign on the bus is being displayed or if the bus driver is signaling to stop traffic.
   b. Shall not proceed until the bus resumes motion, the "STOP" sign is retracted, or the driver otherwise signals for traffic to proceed.
   c. Shall proceed with caution in all other cases not covered by the above.
8. Drivers shall drive courteously at all times and shall yield the right-of-way to other vehicles or to pedestrians if there is any question as to which vehicle or pedestrian has the right-of-way.
9. Do not attempt to mount or dismount a moving vehicle.
10. Do not permit individuals to ride on running boards, sides of flatbed trucks, fenders, trailers, rear tailboards, or top of line trucks.
11. Make a complete stop at all exits from Company property and remain stopped until conditions are safe to proceed into the street or roadway.

B. **General Guidelines**

1. Do not allow passengers to ride in a vehicle in such a position as to interfere with the driver's view ahead or to the sides or to interfere with the driver's control over the driving mechanism of the vehicle.
2. Do not allow littering, including throwing lit materials (e.g., cigarettes) from the vehicle.
3. Maintain vehicles in a clean condition. Those subjected to muddy conditions shall have accumulations of mud removed as soon as practical.
4. Maintain the driver's cabin of all vehicles in an orderly, clean manner free from debris at all times.
5. Properly position and secure objects that may injure an occupant during travel or interfere with driving to prevent the object from becoming a lethal projectile should an accident occur.
6. Remove climbers before operating or riding in any vehicle.

7. Do not extend head or arms out of the window while a vehicle is in motion.
8. Do not coast downgrades with gear shifting mechanism in neutral position.
9. Do not equip truck bin doors that are hinged on the bottom edge with a chain or other device that will cause the door to remain in a horizontal position when the door is open.

   Such doors shall hang down when open and shall be kept closed if practical.

   Where this is not practical, the door shall be posted with a sign stating: "KEEP THIS DOOR CLOSED WHEN NOT IN USE."

10-2 FLEET INSPECTIONS

A. Fleet Inspection Requirements

1. Perform an adequate pre-use inspection of the vehicle prior to its first use of the day including all of the following:
   - Tire Condition
   - Windshield and Visibility
   - Operating Lights
   - Directional Lights
   - Brakes
   - Housekeeping
2. Check engine coolant and oil levels at least weekly.
3. Check fire extinguishers and first aid kits at least monthly and correct any deficiencies found.
4. Correct defects that affect the safe operation of the vehicle prior to operating the vehicle on publicly accessible roads.
5. Do not operate any Company vehicle or tow any Company trailer that has a Red Tag attached.

   Mechanics may do so in the course of their work after ensuring it is safe to do so.
6. Conduct a DOT pre-trip inspection on commercial motor vehicles (CMVs) prior to first operation of the vehicle.
7. Conduct periodic inspections of the CMV and trailer, if any, during the day.
8. Conduct a DOT post-trip inspection of the CMV at the end of use or shift, whichever comes first.

9. All defects/deficiencies identified during a pre-trip, periodic, or post-trip inspection shall be documented using the Geotab Driver APP or on the DVIR forms supplied by the Company.
10. Do not operate a CMV with a known defect that affects the safe operation of the vehicle.
11. Ensure that all emergency equipment (such as spare electrical fuses if the vehicle uses them, fire extinguisher, and emergency flares or reflectors) is maintained in a state of readiness during each pre-trip inspection.
12. Process paper DVIR originals as prescribed on the DVIR booklet instructions.
13. Forward all paper DVIR originals with defects/deficiencies to the Department Leader for 90-day retention in department files.

10-3 CELL PHONES, SMART PHONES, AND OTHER MOBILE DEVICES

A. Cell Phones, Smart Phones, and Other Mobile Devices Requirements

1. Electronic devices which can cause a visual, cognitive, or manual distraction, such as cell phones, smart phones, laptops, tablets, smart watches, MP3 devices, etc. shall not be used to read, write or send a message, review documents, engage meeting content, scroll through social media, watch videos, record videos, or any other use of the device that causes a distraction and requires use of your body while operating (i) a Company Vehicle at any time while in motion; or (ii) a personal vehicle for a Company purpose, while the vehicle is in motion.
    a. Hands free vehicle integrated technologies can be used if voice activated or are “one touch” and do not cause a visual or cognitive distraction. The technology must remain hands free and not provide a visual distraction.
    b. Cell phone can be used if initiated before the vehicle is in motion and you do not actively operate, hold or support the device with your body. This includes, but is not limited to, in your hands and perched on your shoulder.
    c. The use of two-way radios in moving vehicles is allowed but should be minimized where practical in non-emergent or outage situations.
2. Any use of cell phones, tablets and other mobile devices is prohibited, including hands free, in class 13 or higher trucks while in motion.

3. This applies to personally-owned vehicles used for transportation between APS facilities, between an APS facility and job site, between an APS facility and another location for a business purpose, or on company property, including parking lots/garages, while the vehicle is in motion. This does not apply during an employee's ordinary commute to and from home or during driving that is not work-related, although APS encourages its employees to use safe driving practices at all times.
4. This section is not intended to supersede federal nuclear regulations governing the need to establish and maintain continuous communication capability, such as those requirements under 10 CFR 73.55, Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage.
5. This section does not apply to security and emergency response teams that must remain in constant communications while responding to a fire alarm, fire, radiological event, security event, medical event, or other emergency.

10-4 DEFENSIVE DRIVING

A. Defensive Driving Requirements

1. Yield the right-of-way to all emergency vehicles when they are approaching with red light and/or siren in operation.
2. Company equipment will proceed immediately to a position parallel to, and as close as possible to, the right hand edge or curb of the roadway and shall stop and remain in such position until the emergency vehicle has passed.

B. Defensive Driving Guidelines

1. **Aim High in Steering**
   a. This principle, when practiced correctly, requires the driver to pay attention to that portion of the roadway approximately 10 to 15 seconds ahead of the current position.
   b. Aiming high in steering enables the driver to predict the actions of other drivers and to anticipate mistakes with enough time to safely react to the conditions as they unfold.
   c. Do not focus your attention solely on the brakes of the vehicle in front.

2. **Get the Big Picture**
   a. This principle teaches good drivers to become great drivers by broadening perspectives to recognize hazards, or potential hazards, from all directions.
   b. Actively look for vehicles approaching your projected path from the sides of the road as well as from behind.
   c. Know where other vehicles are positioned around you at all times.
   d. Do not allow other drivers to travel within your blind spots for long periods of time.
   e. Do not allow others to tailgate; simply allow them to pass where possible.
3. **Keep Your Eyes Moving**
   a. Develop a natural scanning method with your eyes that allows you to both aim high in steering and get the big picture every few seconds.
   b. Keeping your eyes moving helps you to remain aware of all potential traffic hazards around you.
4. **Leave Yourself an Out**
   a. Try to position your vehicle within a "hole" in traffic where possible.
   b. Leaving yourself an out allows you to maintain a buffer to use for reaction time and maneuverability should the unexpected occur.
   c. Maintain sufficient interval between your vehicle and a preceding vehicle at all times to permit a sudden stop to be made safely; normally, this requires a four second following distance.
   d. When pulling to a stop behind another vehicle, leave approximately one car length between your vehicle and the vehicle in front of you. As a rule of thumb, in a passenger car or light duty vehicle you should be able to see the bottom of the tires on the vehicle in front of you.
5. **Make Sure They See You**
   a. Remaining as visible as practical to other drivers helps provide another defense.
   b. When you are not visible to others, you run the risk of an accident.
   c. Avoid traveling within another driver's blind spots.
   d. Make full use of appropriate vehicle operating and/or running lights during low light conditions.

6. Plan routes to avoid “U” turns so far as possible.
   a. When such turns cannot be avoided, appropriate signaling requirements shall be observed.
   b. Drivers shall comply with all state and local requirements governing “U” turns.
   c. Flagger may be used at the discretion of the driver.
7. Drive with extra care in residential subdivisions and when passing school grounds, playgrounds, or in the vicinity of children.

   Children may dart out at any time without regard to traffic.

10-5 SPEED LAWS

A. Speed Limit Requirements

1. Drivers of vehicles shall comply with the specific speeds established by code for certain situations such as school zones, business and residential districts, and other special zones established by the posting of speed limit signs.
2. Drivers of vehicles shall comply with the specific speeds established by code for open highways.
3. Drivers of vehicles shall comply with the factors determining a prudent speed, which is usually lower than that established by code, such as:
   - Road Condition
   - Vehicle Condition
   - Load
   - Weather
   - Visibility
   - Vehicle Trailer and Load
   - Hazards to Passengers
   - Traffic Flow
4. The driver shall consider all of these factors and plan a driving speed for maximum safety.
5. Special speed limits shall apply to the mechanical limitations of the vehicle as stenciled on the dash of the vehicle or may be specified by the driver’s Leader to meet a specific condition not covered elsewhere.
6. Vehicles in Company yards shall not exceed 15 miles per hour (mph).

10-6 VEHICLE ACCIDENTS

A. Vehicle Accident Requirements

1. Report traffic accidents or property damage, regardless of how minor, to the Company as soon as possible so that the Company Claims Department can take the necessary action.

2. Perform the following in the case of a serious accident.
   a. Stop immediately and remain at the scene.
   b. Notify someone in the Company who is in a position to help you (e.g., System Operator) by radio, telephone, or other convenient means.

      The person taking the call will notify the appropriate police and Company departments.
   c. Provide name, address, and registration number of your vehicle upon request of the other driver or persons attending the other vehicle.
   d. Ask any witnesses present to fill out a "Witness Card" (standard equipment in every vehicle is a small envelope).
   e. Collect and return completed "Witness Cards" to the envelope.
   f. Enter all of the information obtained on a folded card in the same envelope.
   g. Return the card to the envelope for delivery to the Company Claims Department.
   h. Request the driver's name, address, and registration number if any other vehicles are involved.
   i. Request an inspection of the driver's operator's or chauffeur's license if any other vehicles are involved.
   j. Provide the drivers of the other vehicles the same data in return for any other vehicles are involved.

B. **Vehicle Accident Guidelines**

1. Do not block traffic more than is absolutely necessary.
2. Render reasonable assistance to any person injured in an accident, including making arrangements for carrying such persons to a hospital or emergency center for medical or surgical treatment if it is apparent that such treatment is necessary or if requested by the injured person.
3. Put out warning devices to warn oncoming traffic.
4. BE CALM. DON'T ARGUE.
5. Do not comment as to perceived guilt, and give information only to the police and Company representatives.

10-7 PARKING AND BACKING

A. Parking and Backing Requirements

1. Determine that no person or objects are in the path of the vehicle before starting to move a vehicle either forward or backward by performing the following:
   a. Perform a personal inspection of the area around the vehicle immediately prior to movement.
2. Use of Spotters
   a. When available, spotters shall be employed as guides in all situations where the driver does not have a clear vision of the path of travel or when overhead obstructions are present.
   b. Standard hand signals found in Appendix “B” shall be used to communicate with the driver during close quarters maneuvering, both forward and backward. Voice signals may also be used when radio communications are available.
   c. Spotters shall be positioned on the ground in the direction of travel and in clear visibility to the vehicle operator.
   d. Spotters shall stand in a safe position to guide vehicle without being in the way. (Estimate 8-10 feet away from vehicle and objects/tripping hazards.)
   e. Spotters shall never walk backwards while performing their duties.
   f. Spotters shall not use cell phones or other electronic devices while performing their duties.
   g. Spotters shall not perform any other duties or actions while spotting.
   h. The driver shall immediately stop the vehicle any time the driver loses sight of the spotter.
3. Perform all of the following for all vehicles that are parked and left unattended:
   a. Passenger cars and light trucks equipped with an automatic type transmission need to be placed in the “park” position. As found in vehicle classes 03 thru class 12.
   b. Commercial motor vehicles (CMV) and or Heavy Duty trucks equipped with automatic transmissions need to be placed in gear or “Neutral” and parking brake applied. As found in vehicle classes 13 through Class 22.

The only exception to this rule shall be when it becomes necessary to leave a vehicle unattended with the motor running or the key in the ignition, all necessary precautions shall be used to ensure the safety of the general public and/or vehicle, and the parking brake shall be applied.

4. Comply with state and local parking regulations except when an exemption is granted for work involving construction, operations, removal, or repair of utility facilities.

   Specified warning devices must protect vehicles parked under the foregoing special conditions.

B. **Parking and Backing Guidelines**

1. Give first preference to parking space locations that do not require backing to exit when parking.

   In situations where backing is a must, back into the space (unless posted otherwise) to position the vehicle so the driver may drive forward to exit.

2. Do not back into streets or roadways unless it is impractical to proceed by other means.

   Use extreme caution and a spotter, if available, under these circumstances.

3. When available, two spotters should be assigned when backing a class 13 or larger vehicle, one covering each side of the vehicle.
4. Spotters should wear approved a high visibility reflective traffic garment (shirt or vest) for clear visibility to the vehicle operator.

10-8 SPECIAL PERMITS

A. **Special Permit Requirements**

1. Special permits from the proper government agency shall be obtained before any load is moved upon the road or highway when said load exceeds the normal legal limits with respect to weight, length, width, or height.
2. The driver of the vehicle shall understand and abide by the conditions of the special permit.
3. Carry a copy of the permit on the vehicle to which it refers and make it available to any authorized agent.

4. Notify and follow the proper law enforcement agencies' instructions in cases of extreme emergencies at hours when written permits cannot be obtained.

10-9 RAILROAD GRADE CROSSINGS

A. Railroad Grade Crossing Requirements

1. All vehicles MUST STOP at railroad grade crossings and remain stopped until safe to proceed under the following conditions:
   a. When any visible mechanical or electrical signal device is operating, indicating the possible presence of a train.
   b. When a signalman is in the roadway for the purpose of warning motor traffic of an approaching train.
   c. When a train's whistle can be heard but the location and speed of the train cannot be readily determined.
   d. When the train is visible and is in a position that would render crossing unsafe.

10-10 TRANSPORTING MATERIALS AND EQUIPMENT

A. Transporting Materials and Equipment Requirements

1. Secure or cover all loads and materials prior to travel.
2. Ensure that the vehicle is loaded properly.
3. Ensure that the operator's view is kept as clear as possible.
4. Ensure that loads are properly fastened with appropriate binders.
   a. Follow the manufacturer's recommendations when using binder straps.
   b. Inspect binders and nylon tie down straps prior to each use for rips, tears, frays, UV damage, visible load rating, cuts, and wear from weather (discoloration) on all straps.
   c. Store nylon tie down straps away from exposure to the elements.
      i. Straps that are actively securing a load do not need to be removed.
      ii. Straps protected from the elements (Garage or Cover overhead) do not need to be removed.
5. Ensure that materials transported on the same truck with workers are secured in such a manner as to prevent shifting.
6. Ensure that all sharp tools and equipment are covered or stored in their proper place.

7. Exercise extreme caution when pipe is lifted.
   a. Ensure that there is a clearance between the pipe and any other object to prevent fingers from being caught.
   b. Ensure that large steel pipes are unloaded by the use of skids in the absence of a mechanical lifting device to unload pipe or poles.
   c. Ensure that pipe is not turned loose to roll down the skids.
   d. Ensure that signals used during unloading are given by only one person in order to avoid confusion.
   e. Ensure that pipe-retaining stakes remain in place on the truck or trailer body until the bottom layer or pipe is to be unloaded.
8. Ensure that the skids are left in place until the piece of equipment is in position for transportation when loading heavy machinery.
9. Ensure that all trenchers, tractors, or other heavy equipment being hauled on a truck or trailer are tied down securely with a wire rope, chain, or other Department of Transportation (DOT) approved tie down rated for that equipment before the truck or trailer is moved.
10. Ensure that no two pieces of heavy equipment such as tractors, are loaded or transported on the same tip trailer at the same time.
11. Ensure that equipment or material that projects more than four feet beyond the end of any vehicle, dolly, or trailer has one or more red flags or red cloths not less than 18 inches square. The red cloth shall be prominently displayed at the end of such load and clearly visible from the rear (day or night).
12. Ensure that equipment or material which projects more than four feet beyond the end of any vehicle, dolly, or trailer has a light bar clearly visible for a distance of 200 feet under normal atmospheric conditions (day or night).

10-11 LIFTING EQUIPMENT

A. Lifting Equipment Requirements

1. Maintain the minimum clearance separation distances as identified in the **Minimum Clearance Between Energized Line and Equipment Requirements Table** in **Appendix C**, **Minimum Approach Distances** between all lift equipment, cranes, derricks, and similar devices being operated in proximity to energized electrical circuits and not under the immediate direction or supervision of qualified personnel.

This rule is to clarify existing Company practices and distinguish between clearances required for work directed by Qualified Personnel and others. Qualified Personnel are those individuals that, as a result of training and experience, can be expected to recognize the safety requirements of the work involved.

2. Discontinue the use of the equipment until adjustments or repairs are satisfactorily made if the operator or Foreman determines that a condition exists that renders a boom, winch, cable, or any other part of a lifting device unsafe.

   Refer to **Appendix B, Hand Signals Charts** for the hand signals used to communicate movement.

10-12 FORKLIFTS OR INDUSTRIAL TRUCKS

A. Forklift or Industrial Truck Requirements

1. Operate powered industrial trucks using only trained and currently certified operators.
2. Do not stand or pass beneath the elevated portion of an industrial truck or suspended load.
3. Do not allow passengers to ride on an industrial truck.
4. Wear seatbelts (where provided) at all times while operating powered industrial trucks.
5. Identify the rated load of the industrial truck and any jib attachment used with the truck.
6. Handle only loads that are within the rated capacity of the truck or jib attachment, whichever is lower.
7. Equip all jib attachments used in conjunction with an industrial truck with a legible manufacturer's nameplate stating the attachment's rated capacity.
8. Perform both of the following prior to and during any loading or unloading operation involving such mobile equipment with an industrial truck:
   a. Set brakes on all mobile equipment (e.g., trucks, railroad cars, trailers).
   b. Place wheel chocks on all mobile equipment (e.g., trucks, railroad cars, trailers).
9. Inspect powered industrial trucks at the beginning of each shift or prior to first use during that shift.

10. Do not use lift trucks that have safety-related defects until properly repaired or certified by an authorized person that the defect does not affect the safe operation of the equipment.
11. Do not "ride the forks" of an industrial truck.
12. Carry the forks of a lift truck as close to the ground as feasible (given the terrain), usually within 6 inches of the surface while traveling.
13. An exception to this is when a retractable boom obstructs the operator's vision; in which case, the forks shall be carried higher so that the boom does not obstruct the operator's vision.
14. Always face the direction of travel while operating an industrial lift truck.
15. Ensure that an overhead cage will shield the operator should a spill occur when lifting small parts.
16. Properly secure all dockboards or bridge plates prior to using them.
17. Ensure that all dockboards or bridge plates are rated to handle the imposed load.
18. Do not drive the forklift at an excessive speed.
19. Use a forklift as a man-lift only when equipped with handrails, mid-rails, toe boards, and operating controls with a "kill switch" within easy reach of the people in the basket.
    a. Secure the basket to the lift truck.
    b. Do not allow individuals to ride in the basket from job to job, except when minor position changes are made in order to reach the work.
20. Perform all of the following when leaving a powered industrial truck unattended:
    a. Fully lower the forks.
    b. Place the controls in neutral position.
    c. Set the brakes.
    d. Shut off the power.
    e. May be omitted if the operator remains in the immediate area (within 10 feet).
    f. Chock the wheels if the truck is parked on an incline.
21. Locate the following facilitates nearby before changing or charging industrial truck batteries for:
    a. Flushing and neutralizing spilled electrolyte.

b. Providing fire protection.

c. Protecting charging apparatus from damage by trucks.

d. Providing ventilation.

e. Providing eye and skin care (safety eyewash/shower) should an electrolyte splash occur.

22. Do not free rig from forklift tines. Always use an approved jib and/or hook attachment.

23. Secure Loads:

a. Handle only stable or safely arranged loads. Prior to picking up any load, the operator shall inspect the load for balance and stability.

b. Forklift loads shall be as symmetrical and secured as feasible and shall be set as far back on the forks as possible.

c. When ascending or descending ramps, a forklift with any load shall be driven with the load upgrade.

d. When handling materials using a forklift within a warehouse setting, loads shall be centered on a pallet prior to lowering, raising or displacing cargo. (e.g. material on shelving or from the ground).

e. When transporting material over the road (across parking lots,dock areas or yard roadways) where uneven terrain may exist,cargo shall be secured by bolting or strapping materials to a pallet whenever possible.

f. In the event that a pallet cannot be safely used to transport cargo over the road, take proper steps to ensure that the load is balanced, stable, and secured where possible.

g. When utilizing an APS approved forklift attachment, secure attachments unique to the forklift equipment to forks or securement points as designed prior to use or transport of cargo.

- Attachments will change the center of gravity as well as the load center, thus changing the maximum load capacity of the forklift. Operators shall calculate the load rating based on the attachment used.

10-13 MOBILE EQUIPMENT

A. Mobile Equipment Requirements

1. Boom Truck Stability
   Refer to "*Boom Truck Stability-Safe Use of Outriggers*" guidelines located in the owner's manual of the vehicle.

- The outriggers are only to be adjusted (e.g., set, retracted) after VISUALLY VERIFYING that the individual outrigger is in the clear.

2. Do not move vehicles with aerial equipment from one working location to another with the equipment in the raised position.
3. Be constantly alert to the fact that the vehicle has exposed equipment above the elevation of the truck cab, and allow the necessary clearance when driving aerial equipment trucks.
4. Only trained and authorized personnel shall be permitted to operate the aerial devices.
5. Where available, hoisting routes that minimize the exposure of employees to hoisted loads must be used.
6. While the operator is not moving a suspended load, no employee must be within the fall zone, except for employees:
   a. Engaged in hooking, unhooking or guiding a load; or
   b. Engaged in the initial attachment of the load to a component or structure.
7. Do not leave cranes, hoists, or derricks unattended while a load is suspended, unless blocked or otherwise supported.
8. Do not move loads over the heads of workers or others until authorized by the Leader/Foreman.
9. Direct all individuals away from under any suspended and hoisted loads.
10. Permit no one to ride on a suspended load.
11. Carry aloft only personnel who have been authorized.
12. Permit only Journeymen to operate the boom carrying an aerial basket in the vicinity of lines or equipment energized over 600 VAC.

    The only exceptions to this rule shall be covered in the joint apprenticeship agreement.
13. Tag Lines
    a. Tag lines shall be used when moving an overhead load horizontally, unless, during a JHA or pre-job brief, using tag lines is determined to pose a greater hazard/risk than not using tag lines (that determination will be documented on the pre-job brief or JHA).
    b. Tag lines shall be used when necessary to keep workers in the clear, out of pinch points, or to prevent rotation of the load.

c. Tag lines used near energized power lines or conductors shall be of a non-conductive material.

d. Use extreme caution and maintain proper clearances when load is being moved under/over or near energized lines or equipment to avoid contact.

14. Maintain familiarity with the applicable mechanical and electrical test due dates for the equipment being operated.
    a. Do not operate any equipment at any time beyond the test due date.
    b. Do not allow any equipment to be modified without the express approval of the owning department's manager and the Manager of Transportation Services.
15. Report dents and scratches to the responsible Leader as soon as identified and capture in the EventWay System.
16. Report all malfunctions and unusual noises to the Leader for investigation and repair, if appropriate.
17. Do not rely upon the insulating value of the vehicle, boom and bucket to provide electrical protection to the individuals using the equipment.
18. Do not allow buckets and platforms to contact energized conductors or equipment except for adequately covered low voltage conductors or high voltage neutrals.
19. Do not exceed the manufacturer's recommended SWL limit.
20. Do not perform jobs that exceed the safe loading of the equipment.
21. Check the movement of all remote controls to ensure that they operate freely prior to engaging the power take-off.
22. Engaging Power Take Off (PTO)
    Follow the operator's manual or the placard on the dash.
    a. Note: Not all PTO placards are the same and not all trucks operate the same. Follow the operation directions for your truck.
    b. When rental trucks use PTO operation, follow the operator direction manual.
23. Equip each piece of aerial equipment with a kill button or hydraulic dump valve that is mounted within reach of all personnel within the bucket(s).

24. Refer to **Appendix B**, **Hand Signals Charts**, for the hand signals used to communicate movement.

10-14 MOBILE CRANE TRAINING AND EXPERIENCE

A. Mobile Crane Training and Experience Requirements

1. All workers operating mobile cranes shall be certified as operators and pass a qualification evaluation prior to operating the equipment unless continuously monitored by an on-site trainer.
   a. Crane operators who operate in the State of New Mexico must also be licensed hoist operators by the State of New Mexico.
   b. Each crane operator must pass an operator qualification evaluation by an on-site APS mobile crane trainer after obtaining certification or licensing to be qualified to operate an APS crane.
2. Operator certification and evaluation requirements do not apply for the following equipment:
   a. Digger derricks, including heavy derricks, hydralifts, and toters when used for construction or maintenance of electric power generation, control, transformation, transmission, and distribution lines and equipment.
   b. Bed mounted truck cranes (such as Auto Cranes) when used for activities related to equipment maintenance and repair.
   c. Machinery that hoists by using a come-a-long or chainfall.
   d. Powered industrial trucks (forklifts) except when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load, independent of the forklift.
   e. Articulating/knuckle-boom truck cranes and pole delivery trucks (grizzlies) that deliver material to a construction site when used to transfer materials from the truck crane to the ground.
   f. Permanently installed overhead and gantry cranes.
   g. Equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less.
3. An operator-in-training shall not operate the crane in any of the following circumstances:
   a. If any part of the crane, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get within 20 feet of a power

line that is up to 350 kV, or within 50 feet of a power line that is over 350 kV.

b. If the crane is used to hoist personnel.

c. In multiple-crane lifts.

d. In multiple-lift rigging operations, except where the operator's trainer determines that the operator-in-training skills are sufficient for this high-skill work.

4. All workers operating mobile cranes used to suspend personnel shall have completed an additional 2,100 hours of supervised experience at the controls of the crane.
5. Non-Company operators shall have a minimum of 3 years experience before being allowed to suspend Company personnel in an approved personnel-working basket.
6. Refresher training in relevant topics and operator re-evaluation shall be completed when:
   a. An operator has been observed to operate the crane in an unsafe manner or an evaluation reveals that the operator is not operating a crane safely.
   b. An operator has been involved in an accident or near-miss incident.
   c. An operator is assigned to drive a different type of crane.
   d. The workplace changes in a manner that could affect safe operation of a crane.

10-15 MOBILE CRANES

A. Mobile Crane Requirements

1. Use the power UP and power DOWN line when suspending personnel.
2. Establish a means of communication between the suspended personnel and the operator:
   a. When possible, the suspended personnel shall signal the operator.
   b. When not possible, the Foreman shall make satisfactory arrangements for safe signaling.
   c. The operator shall remain at the controls at all times while personnel are suspended, and the outriggers shall be extended and set.

3. Ground cranes, booms, etc. (including crawler-type cranes), at the frame prior to working near primary energized lines or equipment. Barricade the vehicle and establish a "safe zone" around the vehicle if grounding is not possible.
4. Adhere to the manufacturer's operating instructions.
5. Do not exceed the rated load for a given boom angle.
6. Inspect the lifting hook at least monthly for cracks, deformation greater than 10 degrees, or a throat opening greater than 15 percent from that of original manufacture.
7. Do not use out-of-specification lifting hooks.
8. Ensure that all jibs on conventional type crane booms have positive stops to prevent their movement of more than 5 degrees above the straight line of the jib and boom.

   The use of cable type belly slings does not constitute compliance with this rule.
9. Equip all cranes with a proper grounding post.
10. Refer to **Appendix B**, **Hand Signals Charts**, for the hand signals used to communicate movement.

10-16 INSULATING AERIAL DEVICE CATEGORIES

A. Category B Aerial Device Requirements

1. A Category B aerial device shall be used when work is performed on energized lines or equipment with a rated line voltage greater than 46 kV.
2. If a Category B aerial device is used for work on distribution lines or equipment it shall be equipped with covers for metal boom tip components of the aerial device that are exposed to conductor contact and are at risk of phase to ground or phase to phase current flow.
   a. These covers shall be made of high electrical resistance material.

B. Category C Aerial Device Requirements

1. Category C aerial devices **SHALL NOT** be used for work on energized lines or equipment with a rated line voltage greater than 46 kV.
2. Category C aerial devices shall have covers for metal boom tip components of the aerial device that are exposed to conductor contact and are at risk of phase to ground or phase to phase current flow.
   a. These covers shall be made of high electrical resistance material.

10-17 AERIAL EQUIPMENT BOOM MANEUVERING

A. Aerial Equipment Boom Maneuvering Requirements

1. Test the controls to ensure proper operation prior to maneuvering a boom or basket into an area containing obstructions.
2. Suspend operations until the discrepancies are corrected if tests indicate a malfunction or air within the hydraulic system.
3. Follow the manufacturer's recommendations regarding the sequencing in raising boom sections.
4. Set the appropriate vehicle and pedestrian warning signs, lights, and barricades in place as soon as possible upon arriving at the work area.
5. Set the vehicle as level as possible before aerial equipment is raised into working position.
6. Assign one worker the responsibility for all operations required to place the basket in operating position, using the basket, and restoring it to the traveling position. When responsibility for operation changes, this shall be communicated and acknowledged.
7. Take the necessary precautions to avoid accidents with traffic or pedestrians when the boom must be maneuvered over a street or highway. Use a spotter if necessary.
8. Always face in the direction of movement.
9. Do not extend the basket beyond the barricaded work area.
10. Raise the lower boom high enough to clear the traffic before turning or positioning for work in traffic areas. Use a spotter or traffic control when this is not possible to avoid accidents with traffic or pedestrians.
11. Exercise caution in the movement of the basket when operating procedures require that the basket be positioned above any energized conductor or equipment.
12. Know the location of all obstructions so that the basket or boom will not contact such obstructions when it is raised, lowered, or rotated.
13. Observe the clearances in the **Minimum Approach Distances for Qualified Electrical Workers Requirements Table** in **Appendix C**, **Minimum Approach Distances**, between the uninsulated boom section and the energized conductor or equipment when operating equipment with the uninsulated portion of the boom in the proximity of energized conductors or equipment.

14. Do not use the boom tip jib or winch line to handle energized conductors unless the jib or jib extension has been rated, tested and maintained for the appropriate line voltage or an appropriate rated, tested and maintained, electrical protection device is used.
15. Ensure that hand signals used to communicate boom movement, are recognized prior to moving the boom or buckets.

    A predesignated person shall give all signals except emergency stop, which may be given by anyone.

    Refer to **Appendix B**, **Hand Signals Charts**, for the hand signals used to communicate movement.
16. Do not shock load the equipment.
    (Exercise smooth boom or bucket control through proper valving techniques.)
17. Do not jam fiberglass boom sections into obstructions or strike equipment.
18. Do not operate the lower controls except as directed by personnel within the buckets, except during an emergency situation.
19. Use careful consideration in determining the exact placement of the equipment to ensure safe completion of the planned work in relation to conductors, equipment, and obstructions.
20. Ground truck frames on aerial equipment prior to un-cradling the boom while in the proximity of voltages in excess of 600 VAC, unless it is to be used to establish a ground:
    a. Barricade the vehicle and establish a “safe zone” around the vehicle if grounding the truck is not possible.
    b. Ground personnel or the public cannot be allowed to approach the truck anytime the boom/bucket is in the elevated position.
    c. If it becomes necessary to approach the truck, the boom and the basket must be moved to a safe distance from the energized equipment.
    d. The boom/bucket must remain there until the ground personnel complete their work and move outside the safe distance from the truck. Only then can the boom be moved and the aerial work allowed to proceed.

10-18 MAINTENANCE AND SERVICING

A. Maintenance and Servicing Requirements

1. Repair or perform maintenance service on hydraulic or aerial equipment using only authorized, qualified persons or personnel.
2. Contact the nearest Company garage for instructions if it becomes necessary to repair hydraulic equipment in the field.
3. Overhaul, repair, maintain, and use equipment in accordance with the manufacturer's specifications.
4. The Leader in charge of any aerial equipment shall be responsible for scheduling tests of said equipment prior to the expiration of the 6-month period for electrical tests and 90-day period for mechanical tests.
5. A qualified mechanic having specific training in the systems being inspected shall perform all mechanical inspections.
6. Perform a mechanical test on the aerial unit at least once every 90 days unless it is out of service.
7. Inspect the aerial unit before it is placed in service if it is placed in service after the 90 day inspection period.
8. **Load Tests**
   a. Load test aerial equipment as required by the service (Preventative Maintenance) or repair work that requires it.
   b. Perform the first test without cargo or a person in the bucket.
   c. Perform the second load test with one of the following: (a) bucket weights, (b) weight block, or (c) dynamometer using the manufacturer's recommended maintenance procedures.
   d. Perform a visual inspection of all mechanical linkages, hydraulic hoses and connections by the mechanic after the final test.
9. **Electrical Tests**
   a. Inspect the insulated portion of aerial units designed for electrical protection in accordance with the manufacturer's recommendations at least every 180 days unless the aerial unit is out of service.
   b. Perform the electrical test prior to the aerial unit being placed in service if it is placed in service after the 180 day inspection period is exceeded.

10. **Rope Winch Line Inspection**
    a. Perform the rope winch line inspection prior to each day's use while the rope winch line is in service.
    b. Perform inspection per manufacturer's guidelines.
    c. Visually inspect the rope winch line for dirt and foreign debris.
    d. Remove and replace dirty rope winch line with clean rope winch line to ensure that the dielectric properties intended for the unit are maintained.
    e. Winch line shall be turned end-to-end or rotated out every six months.
11. **Operating Fluids Inspection**
    Inspect hydraulic and other oils and fluids for correct operating levels as recommended by the manufacturer at least every 30 days.
12. **Test Schedules**
    a. Complete all tests within the timeframes identified.
    b. Do not subject personnel to potential hazards posed by the system related to any lapsed inspection until such time as the inspection/test is completed.

10-19 MOBILE CRANE INSPECTIONS

A. **Mobile Crane Inspection Requirements**

1. **Frequent Inspections**
    a. Perform inspections prior to use.
    b. Test and visually inspect the anti-two-block device.
    c. Visually inspect all running ropes.
    d. Ensure that all operating controls have full range of operation available.
    e. Ensure that boom and drum brake systems, if equipped, work appropriately.
2. **Periodic Inspections**
    a. Perform an inspection of mobile cranes in accordance with OSHA standards at least semiannually using a qualified inspector.
    b. Retain the documentation of the inspection by the responsible garage indicating successful completion.
3. **Inspection Results**
    Correct items affecting the safe operation of the crane found during the inspection before the equipment is placed in service.

10-20 TRAILERED EQUIPMENT

A. Trailered Equipment Requirements

1. Use safety chains on all trailed equipment except semi tractor trailers coupled with a standard fifth wheel.

   When a safety chain is used, it shall be placed so that the tongue of the vehicle being towed will not fall upon the roadway if a failure in the primary towing connections occurs.

2. Lower the stiff leg in the back first to prevent the trailer from tipping before releasing two wheeled trailers equipped with pivot.
3. Free-standing trailers that are equipped with a wheel on the tongue jack shall have both the left and right rear axle wheels chocked.

10-21 OFF-HIGHWAY VEHICLES

A. All-Terrain Vehicle (ATV), Utility Terrain Vehicle (UTV), and Recreational Off-Highway Vehicle (ROV) Requirements

1. Complete a hands-on training course prior to operating an all-terrain vehicle (ATV) or utility terrain vehicle (UTV).
2. The driver shall not place the UTV or ROV in motion until all occupants are seated with seatbelts fastened (where provided).
3. Use the following types of attire and PPE when operating ATVs, UTVs, or ROVs:
   a. A securely fastened full-face or three-quarter DOT compliant helmet.
   b. Safety glasses, goggles or a face shield.
   c. Long-sleeved shirt.
   d. Long pants (e.g., heavy weight material, denim).
   e. Leather above-the-ankle boots.
   f. Leather gloves.
4. (Generation/Transportation ONLY) A company approved hard hat can be used in place of a helmet when UTVs or ROVs are operated inside of an APS facility provided that they are:
   a. used on paved surfaces or established roads within the boundary of an APS facility fence line, (Generation/Transportation ONLY), and
   b. (Generation/Transportation ONLY) used at a maximum speed of 15 MPH.
5. Follow all manufacturer safe-operating recommendations.

10-22 WORKSITE CONDUCT

A. Worksite Conduct Requirements

1. Consider the vehicle energized at line potential when the basket is being used in any manner that might result in contact with energized circuits or equipment.
2. Observe the following safe practices when aerial equipment is being used in any manner which might result in contact with energized circuits or equipment:
   a. Operate remote controls on the vehicle or insulate from ground by using high voltage rubber gloves and other protective equipment as necessary.
   b. Ensure that the equipment is not in contact with, or near energized equipment before approaching the vehicle.
   c. If vehicle is not properly grounded, install a barricading system and establish a “safe zone” around the vehicle to protect workers on the ground and the general public who may enter the work area.
3. Do not use aerial baskets to place personnel on any pole or structure above energized lines or equipment unless such lines or equipment are adequately covered.
4. Use uniform flashing warning lights on the vehicle when in operation at the job site.

10-23 SAFETY EQUIPMENT

A. Safety Equipment Requirements

1. Wear approved insulated safety headgear and suitable clothing at all times when working from aerial equipment.
2. Wear rubber gloves when installing rubber protective equipment on energized high voltage conductors from aerial equipment.
3. Refer to **Section 4-6(A)**, **Hand Protection Requirements**. Refer to **Section 11-6(A)**, **Rubber Glove Requirements**.
4. Perform all of the following when work is completed:
   a. Lower the basket.
   b. Cradle the boom.
   c. Retract outriggers or jacks.
   d. Remove and store flares, flags, and barricades in proper compartments.

Chapter 11: Insulate – Rubber Goods and PPE

INTRODUCTION

This chapter contains specific requirements and guidelines for the use, inspection, and testing of insulating material or rubber protective equipment including rubber gloves.

11-1 PROTECTIVE DEVICES

A. **Protective Device Requirements**

1. Except for the specific part being worked on, energized conductors, secondary conductors, neutral conductors, transformer cases, equipment or equipment hangers, and guy wires within reach of any part of a worker's body are required to be covered with insulating material or rubber protective equipment (RPE) when work is to be done on or near energized lines or when a potential for induction or other sources exists.
   a. RPE is rubber protective equipment
   b. Plastic protective devices are protective devices, other than RPE, made of plastic, fiberglass, and other insulating material.
2. Isolation mats made of insulating material or RPE are required to be used to protect personnel from ground when employees are installing RPE directly over uninsulated conductors or devices energized in excess of 600 volts alternating current (VAC). Isolation mats are available in rolls and may be cut to length to provide a secondary defense when employees are working with energized equipment.
3. Insulating blankets are required to be used to protect personnel from accidental contact with high voltage or ground potential.
4. This means that the worker must not intentionally touch RPE that is being used to isolate the worker from an energized conductor.
5. Secondary blankets (rated 1000 VAC) are available and can be used on secondary and service.
6. Rubber Line Hose, Rubber Hoods, Rubber Blankets, Plastic Cover, or any other protective device shall not be used in a manner where the user is touching, leaning or resting on them while installed on energized lines or equipment. Protective devices are for accidental contact only.

11-2 GENERAL PROTECTIVE DEVICES

A. General Protective Devices Requirements

1. Test all RPE as indicated by the rubber test lab in accordance with the following:
   a. Rubber Insulating Gloves—Before first use and every 6 months thereafter.
   b. Rubber Insulating Sleeves—Before first use and every 12 months thereafter.
   c. Rubber Insulating Blankets—Before first use and every 12 months thereafter.
   d. Rubber Insulating Covers—Upon indication that insulating value is suspect.
   e. Rubber Insulating Line Hose—Upon indication that insulating value is suspect.
   f. If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.
2. Do not use outdated RPE.
3. Protect RPE from mechanical, environmental and chemical damage when not in use.
4. Store line hose, blankets and hoods in the containers provided.
5. Ensure nothing else is placed in the containers.
6. Do not use protective devices that are defective.
7. To avoid corona and ozone damage, do not allow RPE to remain in place on energized lines or apparatus overnight or for more than one 8 hour period unless approved by the Leader in charge.
8. Protect RPE from physical damage from moisture, bull head thorns, etc., by placing them on a canvas or other dry, smooth surface when they are placed on the ground.
9. Do not use any questionable article of rubber goods until it has been tested.
10. Place protective devices from a position below the exposed live parts whenever possible.
11. Work from a position below the exposed live parts whenever possible.

12. Completely cover conductors that are within the minimum approach distance of the worker, including the feet, with protective devices when working above or on a level with energized circuits carrying voltages from 600 VAC to 15,000 VAC. The conductor being worked on may be uncovered where necessary.
13. Cover conductors in situations where a groundman might cause a short circuit while raising or lowering tools or materials on a hand line.

11-3 PLASTIC PROTECTIVE COVERS

A. Plastic Protective Cover Requirements

1. Use only approved protective devices on lines over 15,000 VAC phase-to-phase. Plastic line guards and hoods are available for use on lines carrying higher voltages.
2. Install and remove approved protective devices with hot sticks only. The use of rubber gloves for installing or removing plastic guards or hoods on lines with over 15,000 VAC between any two conductors shall not be permitted.

11-4 ISOLATION MATS

A. Isolation Mat Requirements

1. Use a suitable mat made of insulating material or RPE to ensure that the worker is insulated from ground when installing RPE directly over un-insulated conductors or devices exposed live parts energized in excess of 600 VAC.

11-5 INSULATING BLANKETS

A. Insulating Blankets Requirements

1. Use insulating blankets to protect personnel from accidental contact with high voltage or ground potential.
2. Insulating blankets (Class 4, rated to 36 kilovolt alternating current [kVAC]) are required to be used for protection on lines or equipment energized up to 36,000 VAC between phases.
3. Inspect insulating blankets immediately before use.
    a. Roll the blanket on a flat clean surface while looking for any waning color (red or yellow color depending upon the blanket) and/or cuts, oils, or defects.
    b. Do not use blankets with cracks, holes, snags, blisters or other defects for electrical protection purposes.

c. Destroy blankets with cracks, holes, snags, blisters or other defects by cutting through several of the eyes or cutting the corner off so as to be obvious to the next user.

4. Do not fold insulating blankets.
   a. Roll blankets for storage.
   b. Brush the surface clean to prevent dirt or debris from becoming embedded in the surface while the blanket is being rolled.
5. Protect the nearest and lowest wires first with blankets to provide protection when installing insulating blankets.
6. Remove blankets from the farthest and highest wires first to provide protection when removing insulating blankets.

11-6 RUBBER GLOVES

A. Rubber Glove Requirements

1. Rubber insulating gloves shall only be worn by workers who have been qualified through successful completion of the required step of their apprenticeship or other equivalent training.
   a. Such use shall be limited to the specific tasks that the worker is qualified to perform.
2. All insulating material is required to be handled in such a way that the workers will not touch, hold, or otherwise steady the energized conductors or equipment with their gloved hands.
3. All placement or removal of protective devices is required to be performed in such a way that the workers will not contact the energized conductors or apparatus in any manner with their gloved hand.
4. Rubber insulating gloves are required for the protection of workers against electrical shock and shall be worn whenever there is a possibility of contacting electric power above 50 VAC.
   a. Class 2—Rated to 17,000 VAC – tested at 20,000 VAC (re-test required every 6 months).
   b. Class 0—Rated to 1,000 VAC – tested at 5,000 VAC (re-test required every 6 months).
   c. Class 00—Rated to 500 VAC – tested at 2500 VAC (re-test required every 6 months).

Note: See 11-7(A)(8) for Generation specific requirements for use of 00 gloves without leather protectors.

5. Wear appropriately rated rubber gloves when:
   a. Working voltages from 50 VAC to 5000 VAC.
   b. Working within the minimum approach distance of exposed energized lines or exposed live parts on any voltage greater than 50 VAC.
   c. Working on steel structures (Note: Additional protective devices such as wood platforms, rubber mats, etc. must also be used.)
   d. Operating gang-operated air break switches from the ground even though the switch handles are grounded.
   e. Working on series street light circuits.
   f. Stringing conductors near energized lines or exposed live parts.
   g. Raising or lowering poles between or near energized lines or exposed live parts above 50 VAC.
   h. Removing ground wires or neutrals from their attachment points on a pole, structure or device on any overhead or underground energized equipment or circuits.
   i. Working on a neutral when it is in the primary position.
   j. Any set of circumstances exists that the worker may consider the gloves advisable for safety.
6. Wear High Voltage Rubber Insulating Gloves (Class 2) rated to 17,000 VAC during the following conditions:
   a. Working voltages from 600 VAC to 5,000 VAC. (This applies to wooden poles or wooden structures.)
   b. Installing or removing protective devices on circuits from 5,000 to 15,000 VAC, phase to phase.
      i. This would include installing on SINGLE PHASE ONLY, 21 kilovolt (kV) system.
      ii. This SHALL NOT include installing on a single conductor of a 2 or 3 phase circuit, 21 kV system.
      iii. This SHALL NOT include installing on any conductor of a 34 kV system.

c. Removing a primary neutral from its attachment point on a pole, structure, or device on any overhead or underground energized equipment or circuits.

d. Making the first cut on any underground conductor.

e. Operating oil, vacuum, or oil filled disconnecting devices in vaults, manholes or on poles that are energized over 600 VAC and it is impossible to use live-line tools.

f. Opening and closing primary enclosures.

7. Install or remove protective devices on circuits using rubber gloves.
8. These devices are to protect personnel from accidental contact only.
9. Use a live-line tool when connecting or removing grounds.
10. Rubber gloves are not required when using a live-line tool.
11. Do not contact energized conductors or apparatus in any manner with a gloved hand when placing or removing protective devices.
12. Ensure that a gloved hand does not touch, hold, or otherwise steady the energized conductors or equipment when handling insulating material.

11-7 HAND PROTECTION CARE AND MAINTENANCE

A. Hand Protection Care And Maintenance Requirements

1. Exchange rubber gloves any time they become damaged.
2. Exchange rubber gloves any time the worker to whom they are assigned becomes suspicious of their ability to protect the worker in a manner for which they were intended.
3. Do not wear leather protectors except when in use over rubber gloves.
4. Inspect rubber gloves corona cracks and bruises.
5. Give rubber gloves a “Roll and Air Test” prior to first use each day.
6. Do not use the glove if it does not pass the testing.
7. Refer to **Section 11-8(A) Rubber Glove Roll and Air Test Guidelines**.
8. (Generation only) Class 00 rubber gloves may be worn without leather protectors during jobs when small equipment and/or parts manipulation requires high finger dexterity. This exception only applies if the voltage does not exceed 250 volts AC or 375 volts DC. Once the task is complete, the 00 rubber gloves shall be re-tested.

9. No other class of glove except for Class 00 shall be used without leather protectors.

11-8 RUBBER GLOVE ROLL AND AIR TEST

A. Rubber Glove Roll And Air Test Guidelines

1. Hold the glove at each side to air test the glove.
2. Slightly stretch the gauntlet to provide a slight air seal.
3. Revolve the glove around the edge of the glove as an axis, rolling it toward the palm and trapping the air in the palm.
4. Hold the glove with one hand.
5. Squeeze the glove with the other, while listening for leaks.
6. Visually inspect the glove surface.
7. Turn glove inside out and repeat steps 1 to 6.
8. Never leave a glove or sleeve in an inside-out condition.

Chapter 12: Transmission & Distribution Clearance Procedure and Switching Orders

INTRODUCTION

This chapter contains specific requirements and guidelines for employees for Transmission and Distribution Clearance Procedure and Switching Orders.

This chapter provides safe working rules to help prevent accidents.

Individual plant operating procedures shall not circumvent these rules.

These rules, coupled with the rules of common sense, should contribute to a safe operation.

12-1 GENERAL

A. **General Requirements**

1. Lines or equipment shall be considered energized at all times until all authorizations from the System Operator (ECC or DOC) have been received and grounds are installed.
2. The Recognized System Operator having authority over the circuit or equipment to be worked is responsible for ensuring that the circuit or equipment has been cleared before issuing a Clearance to the crew Leader.
3. If there is any doubt or question whether a Clearance should be issued, contact the Recognized System Operator before proceeding with work.
4. No individual shall begin any maintenance, repair, or construction work on electric circuits or equipment until ensuring that conditions are safe and proper authorization has been obtained.
    a. Electric circuits and equipment shall always be considered energized until an inspection or test is made to verify a de-energized condition.
    b. The Leader shall be responsible for ensuring that proper authorization has been obtained for all work done under their supervision.
    c. No individual shall begin work on any circuits or equipment until instructed by the Leader to do so.

12-2 TRANSMISSION & DISTRIBUTION CLEARANCES

A Clearance is an official permission or approval to take lines or equipment out of service for inspection, maintenance, or repair work and to make all necessary preparations so work can be done to ensure safety to personnel and equipment.

A Clearance guarantees that the lines or equipment will not be put into service while personnel are working on it.

A. Clearance Definition Requirements

1. A Clearance is a statement by one having complete authority over all parts of a circuit or piece of electrical equipment that said circuit or equipment is disconnected from all known sources of power.

   It is assurance that all proper precautionary measures have been taken and workers may proceed with grounding the circuit.

2. A Clearance further guarantees the circuit or equipment will remain in the condition stated until released by the person possessing the Clearance.

   Should the work require that you change or alter a Clearance Point in any way, such as moving a tag, changing a Clearance Point identification, altering a locking mechanism, etc., the appropriate System Operating Center must be contacted.

   Mutual understanding must be established as to the work scope and needs.

   A note shall be attached to the Clearance identifying the changes, or if necessary, your Clearance will be released, and a new Clearance will be issued.

3. Clearing is the process of de-energizing lines or equipment on which work is to be done.

   It includes the process of disconnecting and rendering inoperable all switches, disconnects, jumpers, taps and any other means through which known sources of electrical energy may be supplied to a circuit or piece of equipment on which work is to be performed.

   Clearing also includes the installation of “Danger Tags” on all energy isolation points to ensure that isolation devices are not accidentally manipulated during the performance of work.

a. Lines or equipment shall be considered energized at all times until a Clearance has been issued or a Personal Tagout has been installed and grounds placed as specified in the APS Personal Protective Grounding Manual. The only exception for obtaining a Clearance or Personal Tagout is when the equipment is under the complete control of a crew or individual Journeyman, as outlined in Section 12-2.C, Clearance Exception.

b. All switching devices at sources of power supply shall be checked open, locked when possible, and tagged before a Clearance is issued or a Personal Tagout is installed. Grounding devices may then be placed on lines or other equipment.

B. **Clearance Point Requirements**

1. A Clearance Point is established so a Clearance can be issued.
2. A Clearance is solely for the protection of the crew members and those that need to work on a section of line or equipment.
3. It shall not be compromised at any time in any way. It is the responsibility of the Journeyman involved and System Operator to ensure that the Clearance Points are correct and will cover the scope of the work to be done.

C. **Clearance Exception Requirements**

1. A Clearance may not be necessary when there is only one crew working on a line or equipment and if the means of disconnection is accessible and completely visible to, and under the sole control of, the person in charge.
2. This exception is intended to allow work on a distribution transformer and shall not go beyond one pole or a single piece of equipment.
3. Contact with the operating center and mutual understanding between personnel involved must be established before proceeding with work.

D. **Communications Requirements**

1. Accurate Identification
   Equipment shall be definitely identified by the use of its correct name. In the case of a line, the proper designation must be given and the terminals between which the line has been cleared for work shall be specifically named.

2. Phonetic Alphabet

   The phonetic alphabet is a tool that shall be used during switching orders, clearances, when referencing relay lockouts, and conductor phasing (other than 3 phase).

A	Alpha	**H**	Hotel	**O**	Oscar	**V**	Victor
B	Bravo	**I**	India	**P**	Papa	**W**	Whiskey
C	Charlie	**J**	Juliet	**Q**	Quebec	**X**	X-ray
D	Delta	**K**	Kilo	**R**	Romeo	**Y**	Yankee
E	Echo	**L**	Lima	**S**	Sierra	**Z**	Zulu
F	Foxtrot	**M**	Mike	**T**	Tango		
G	Golf	**N**	November	**U**	Uniform		

3. During switching orders and clearances, the substation name and abbreviation shall be used to establish mutual understanding of the work location. Once the work location is established and work continues in the same location, using the substation abbreviation is acceptable.

   a. If switching steps in a switching order span multiple substations or if a switching step indicates a change in work location, the substation name and abbreviation shall be used.

E. **Clearance Switching Performance and Receiving Requirements**

1. The person performing switching duties and receiving the Clearance shall carefully and accurately repeat the switching or Clearance information to the Recognized System Operator to ensure mutual understanding.

F. **Clearance Acceptance Requirements**

1. The person accepting a Clearance (the Acceptor) shall assume ownership and responsibility for the Clearance and the conditions established by the Clearance.
2. The Acceptor shall ensure that all known means through which sources of electric energy to the circuit or equipment to be worked are disconnected and tagged prior to beginning work. This includes those sources of energy that may not be known by the System Operator, i.e. distributed generation sites, etc. that must be properly isolated in the field and tagged per personal tagout procedures for guaranteed circuit isolation.

3. In some cases, the physical distance between Clearance Points makes verification by the Acceptor difficult or impossible.

   If the Acceptor cannot physically verify Clearance Points, the responsibility falls onto the Recognized System Operator to ensure that the Clearance Point is open and tagged.

G. **Clearance Transfer Requirements**

1. A Transfer of Clearance is a statement by an existing Clearance Holder of a Clearance transferring ownership and responsibility of that Clearance back to the Recognized System Operator with the understanding that work is NOT complete and the circuit or equipment is NOT ready for service AND notifications of any grounds and shorts that may still be installed.
2. When issuing a Transfer of Clearance back to the Recognized System Operator, the existing Clearance Holder shall provide the following information:
   a. The locations of any installed shorts or grounds.
   b. The current condition of the equipment.
   c. Notice that the individual or crew previously working under the Clearance will not return to work on the associated lines or equipment as grounded and de-energized without first communicating with the System Operator to determine the work requirements and the proper authorizations for proceeding with work.
3. Clearances shall not be transferred from worker to worker and can only be transferred between worker or crew and the Recognized System Operator.

H. **Clearance Release Requirements**

A Release of Clearance is a statement by an existing Clearance Holder of a Clearance releasing ownership and responsibility of that Clearance back to the Recognized System Operator, with the understanding that work is complete, all personnel are in the clear, and all grounds and shorts are removed.

I. **Construction Release for Operations Requirements**

1. A Construction Release for Operations is a statement by one having complete authority over a new circuit or piece of equipment to a Recognized System Operator that installation of the circuit or equipment is complete.
2. A Construction Release for Operations guarantees that personnel are in the clear and that the circuit or piece of equipment may safely be placed into service.

J. **Operations Release for Removal Requirements**

1. An Operations Release for Removal is a statement by a Recognized System Operator having complete authority over all parts of an electrical circuit or equipment that said circuit or equipment is disconnected from all known sources of power and will remain de-energized during the course of the removal work.
2. An Operations Release for Removal is a transfer of control and responsibility over a circuit or piece of equipment from the Recognized System Operator to the requesting work group for the purpose of removing the circuit or equipment from the system.

K. **Work Release Requirements**

1. A Work Release is a statement by a Recognized System Operator having complete authority over all parts of an electrical circuit or equipment allowing a piece of equipment to be taken out of service to facilitate non-electrical work, operational testing, or inspection.
2. A Work Release requires the worker or crew to treat the equipment as energized at normal operating voltages and use appropriate work practices for energized primary voltages.

L. **Multiple Clearance and Contact Tags Requirements**

1. Only Leaders who are Qualified Electrical Workers (or those designated with that authority) may take multiple Clearances.

   When taking the Clearance for more than one crew, the Leader shall report to the operator the names of all Foremen who will be working under the Clearance.
2. As many qualified persons as necessary may each obtain their individual Clearance or Contact Tag on a line or piece of equipment, but each person shall exercise the same precaution and follow the

same procedure in obtaining and releasing the Clearance as though they were the only one obtaining such a Clearance.

3. Should it be necessary for the person holding a Clearance or Contact Tag to leave the job, they shall have another qualified person available on the job who will obtain a Clearance from the Operating Center.
   a. The first person will then transfer the Clearance.
   b. Clearances shall not be transferred from worker to worker and can only be transferred between worker or crew and the Recognized System Operator.

M. **Special Work Requests for Third Parties Requirements**

1. When a third party must perform work near overhead lines or equipment and the work cannot be performed outside of the minimum clearance distance (refer to **Appendix C**), one of the following must be done:
   a. De-energize line or equipment, establish a Clearance, issue Clearance on the proper Clearance form, and ground the line (when no system neutral is present, the line shall be removed). The Third Party Authorized Representative signs the proper form.
   b. Permanently relocate the existing line or
   c. Temporarily re-route existing line to provide necessary minimum clearance distances.
2. If a Third Party will be performing work near energized line (but not within the minimum clearance distance), it may be appropriate to install insulating barriers as additional precautionary protection. Use the proper form to describe precautionary methods taken and have the Third Party Authorized Representative sign the form.
3. If method 1 (a) or 1 (c) is used, this condition shall remain in effect until a Third Party Authorized Representative notifies the company that the work is completed and signs the proper release form.

12-3 CLEARANCE TAGS

A. **Danger Tag Requirements**

1. Any switching device or piece of equipment bearing a Danger Tag shall be considered unsafe to operate and shall not be operated under any circumstances without first obtaining an order from the person authorized to place or remove such tag.

2. The Tag shall be attached to all devices through which known sources of electric energy may be supplied to a line or piece of equipment that is to be worked as if de-energized and shall prohibit any operation of that device.
3. Transmission Operations—Identifies Energy Control Center (ECC) as the Controlling System Operator.
4. Distribution Operations—Identifies DOC as the controlling System Operator.
5. Personal—Identifies that device has not been released to the Operating Center and is the isolation for new construction or that an individual worker has control of energy isolation device for work outside the Operating Center's control. (i.e., isolation of secondary voltage or distributed generation).
6. Attach using a Salisbury tagging device or a self-locking, one-piece nylon cable tie having a minimum unlocking strength of 50 pounds.

B. **Contact Tag Requirements**

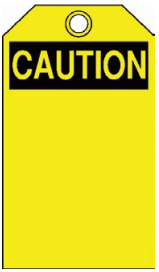
1. A Contact Tag indicates that a device or circuit will NOT automatically re-close or be manually re-closed should a fault occur in an area protected by that device.
2. A Contact Tag shall be attached to devices at the direction of the Recognized System Operator.
3. Should a device operate, the circuit shall be considered energized until proven otherwise and/or grounded.
4. Attach using a Salisbury tagging device or a self-locking, one-piece nylon cable tie having a minimum unlocking strength of 50 pounds.

C. **Fire Mitigation (FM) Tag requirements**

1. A Fire Mitigation (FM) tag indicates that a device or circuit will NOT automatically re-close or be manually re-closed should a fault occur in an area protected by that device.

2. A Fire Mitigation (FM) tag shall be attached to devices at the direction of the Recognized System Operator. (ECC or DOC)

3. Should a device operate, the circuit shall be considered energized until proven otherwise and/or grounded.
4. Attach using a Salisbury tagging device or self-locking, one-piece nylon cable tie having a minimum unlocking strength of 50 pounds. Locking the tag onto the operating handle, or control enclosure locking device is also acceptable, as is utilizing a magnet tag hanging device in indoor substation panels.



D. **Caution Tag Requirements**

1. A Caution Tag is used to provide critical information to field personnel regarding a line or piece of equipment.
2. Any individual may use the Caution Tag to identify abnormal or unusual conditions regarding a line or piece of equipment if that condition could adversely affect workers in or around the area.
3. Include the following information on the Caution Tag:
   a. The date the Caution Tag was hung.
   b. The name and contact details of the individual placing the Caution Tag.
   c. The reason or condition the line or equipment is tagged.
4. Attach using a Salisbury tagging device or a self-locking, one-piece nylon cable tie having a minimum unlocking strength of 50 pounds.

E. **Salisbury Tagging Device Requirements**

1. The Salisbury Tagging Device may be used to attach any of the tags described earlier in this section.
2. The Salisbury Tagging Device does not take the place of a tag.

F. **Metal Tag Holder Device Requirements**

1. A Metal Tag Holder Device may be used to attach any of the tags described earlier in this section.
2. A Metal Tag Holder Device does not take the place of a tag.
3. A Metal Tag Holder Device shall not be used on any conductors and shall be attached using a system lock or nylon cable tie.

G. **Personal Tagout**

1. When a Recognized System Operator (RSO) does not have authority over a circuit or equipment to be worked above 50 volts, the person in charge is responsible for ensuring the circuit or equipment has been cleared and a Personal Tagout has been established.
2. No individual shall begin any maintenance, repair, or construction work on de-energized electric circuits or equipment that are not under the authority of an RSO until ensuring that conditions are safe and a Personal Tagout has been established.
    a. After a Personal Tagout is installed and prior to contacting/working on conductors, approved testing shall be done to ensure that they are de-energized.
    b. A visual inspection of the circuit must be performed to ensure that it is safe to proceed.
    c. If the source device cannot be inspected to ensure that conductors are removed from the source and tagged, a clearance must be requested and issued by the operations center.
    d. If steps a - c cannot be safely accomplished, equipment must be worked as energized.
3. Multiple tags may be applied to an isolation point as needed. Each individual performing work (or crew foreman when a crew is performing work) must place his or her own personal tag to the isolation point or points.
4. Personal Tagout Removal
    a. Personal Tagout may be removed only by the individual whose name appears on the tag. If the owner of the tagout is not available, follow the steps identified in paragraph 5.

   b. Individuals should remove their Personal Tagouts prior to leaving the job site. A Personal Tagout must be reestablished prior to resuming work on the circuit or equipment.
   c. All Personal Tagouts must be removed and all personnel must be in the clear prior to placing the circuit or piece of equipment into service.
5. Removal of a tag by someone other than the owner requires the following:
   a. Make an effort to reach the Personal Tagout Holder.
   b. If the Personal Tagout Holder cannot be contacted, contact the departmental leader or section leader for authorization to remove the tag.
   c. When the Personal Tagout Holder becomes available, the leader must inform the personal tag holder in a timely manner that the Personal Tagout has been removed.

12-4 CLEARANCE TAGGING

A. Clearance Tagging Requirements

1. Do not operate a device having Danger/Do Not Operate Tags, Caution Tags, or Contact Tags attached to it.
2. Operating a tagged device will result in immediate disciplinary action up to and including discharge.
3. Thoroughly research all devices bearing Caution Tags prior to operating.
4. Do not operate switches bearing Contact Tags under any circumstances until permission has been granted by the person to whom the Contact Tag was issued or the following occurs:
   a. Make an effort to reach the Contact Tag Clearance Holder by telephone if the Contact Tag Clearance Holder is not on-site.
   b. Contact the departmental Leader or duty man to verify that said switch may be operated safely prior to operating the switch if the Contact Tag Clearance Holder cannot be contacted.
5. Attach the tag to the point at which a lock would be attached, unless attachment at that point will prevent planned removal or manipulation of the device if an energy isolation device has the capability of being locked out.

6. Consider tagging all of the following device control methods to ensure that the device cannot be inadvertently operated if an electrically powered device is required to be disconnected and tagged:
   a. Main Power Supply.
   b. Control Power Supply.
   c. Remote Controls.
   d. Local Controls.
   e. Manual Operator.
7. Locate the tag as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device, when a tag cannot be attached directly to the energy isolation device.
8. Attach the tag using a method substantial enough to prevent inadvertent or accidental removal.
9. This requires attachment of Danger/Do Not Operate Tags, Caution Tags, or Contact Tags using a Salisbury tagging device or a self-locking, one-piece nylon cable tie having a minimum unlocking strength of 50 pounds.
10. Place tags associated with pulling fuses as close to the fuse holder as practical, at a location obvious to anyone intending to replace the fuses.
11. Do not use a Salisbury Tagging Device in place of a tag.
12. Do not use a Metal Tag Holder Device in place of a tag.
13. Do not use a Metal Tag Holder Device on any conductor.
14. Attach a Metal Tag Holder Device using a system lock or nylon cable tie.

B. **Shared Clearance Tagging Requirements**

1. Transmission Operations—Identifies Energy Control Center (ECC) as the Controlling System Operator.
   a. When establishing a shared clearance point, install a second Danger Tag AND a Caution Tag for a visual indication of this unique condition.
   b. A shared clearance point is required when one job is performed on the one side of the isolation device and simultaneously a different job is performed on the other side of that same device, meaning this clearance point is shared by two different jobs, each one on opposite sides of the isolation device at the same time.

c. Whichever job completes first, follow standard procedure to release its associated clearance and remove one Danger Tag and the Caution Tag. This will leave one Danger Tag installed for the crew still conducting work.

12-5 SWITCH TYPE CLEARING

A. Gang Operated Switch Type Requirements

1. Open, lock, and tag all gang operated switches with the appropriate tag.
2. Attach the tag for gang operated switches to the lock after moving the handle to the open position.

B. Automatic or Power Operated Disconnect Switch Requirements

1. Check open automatic or power operated disconnects switches.
2. Check locked open in the coupled position automatic or power operated disconnect switches.
   a. At the request of an Outside Entity's Recognized System Operator (RSO), switch shall be open and locked; switch shall be left either coupled or uncoupled, at the RSO's request.
3. Check in the "ON" to the "OFF" position automatic or power operated disconnect switch control power safety switches.
4. Check open automatic or power operated disconnect switches in substations (or on lines).
5. Check mechanically blocked open, locked, and tagged with the appropriate tag and tagging device automatic or power operated disconnect switches operating mechanisms.

C. Stored Energy Operated Line Switch Requirements

1. Check Stored Energy Operated (SEO) line switches in accordance with **Section 12-5.B, Automatic or Power Operated Disconnect Switch Requirements**.
2. Mechanically block open SEO line switch operating rods with a specifically designed locking pin, locked and tagged with the appropriate tag and tagging device.

D. Single Throw and Double Throw Disconnect Switch Requirements

1. Check open single throw and double throw disconnect switches.

2. Place the appropriate tag and tagging device in the pull ring with a hot stick.

E. **Fuse Disconnect Requirements**

1. Check open fuse disconnects.
2. Place the appropriate tag and tagging device in the pull ring with a hot stick.
3. Remove the fuse holder and attach the tag and tagging device to the bottom of the disconnect, where possible.

F. **Jumper Requirements**

Remove jumpers and place the appropriate tag and tagging device on the line with a hot stick at the location where the jumpers were removed. The preferable location is on the de-energized side of the clearance point, but may be placed on the energized side where the manipulation of the device will require the removal of the tag if placed on the de-energized side, such as in the case of t-taps, underground cable, etc.

G. **Underground Oil Fuse Drum and Fuse Link Requirements**

1. Remove underground oil fuse drums and fuse links.
2. Replace the drum and leave in the open position.
3. Tag with the appropriate tag and tagging device.

H. **Type R.A. (or similar type) Oil Disconnect Requirements**

1. Open Type R.A. (or similar type) oil disconnects on underground cable.
2. Visually check open Type R.A. (or similar type) oil disconnects through the window.
3. Properly lock open and tag Type R.A. (or similar type) oil disconnects.
4. Place Type R.A. (or similar type) oil disconnects with ground switch combination in the ground closed position and tag as directed by System Operators when all known sources of power supply have been disconnected with approved switching devices.

12-6 SWITCHING

A. **Switching Requirements**

1. The person performing switching duties and receiving the Clearance shall carefully and accurately repeat the switching

or Clearance information to the Recognized System Operator to ensure mutual understanding.

2. All verbal switching orders shall be written down or typed and repeated back to the Recognized System Operator (3-way communications).
3. Where preprinted switching orders are used, such switching orders shall be reviewed in sequence with the Recognized System Operator prior to or during switching.
4. Make certain that the switching orders are understood.
5. Perform all switching orders in sequence as given by the Recognized System Operator.
6. Report back to the Recognized System Operator after the switching order has been completed and give complete details of the switching performed.
7. Rubber gloves and leather protectors shall be worn when doing switching of any kind in switchyards unless hot sticks are used.
8. If, in the worker's opinion, performing a certain switching step may result in trouble, the worker shall call the Recognized System Operator.
9. Give particular attention to ground switches and other grounding devices that are open or removed, before energizing equipment.
10. Report back to the Recognized System Operator after the order has been completed and give complete details of the switching performed.
11. Always, after opening a set of disconnects, check the blades and see that all three phases have the proper separation.
12. Always, after closing a set of disconnects, check the blades for proper contact. If the proper contact has not been made, it shall be reported to the Recognized System Operator and arrangements made for proper adjustments.
13. No switch, circuit breaker, or disconnect shall be operated under any condition without specific orders from that Recognized System Operator unless:
    a. A clearance has been issued, and
    b. The switch, circuit breaker, or disconnect is located within the boundaries of the clearance.

14. The RSO shall be notified if a personal tagout is attached to a primary device within a clearance.

12-7 ENERGIZING LINES AND EQUIPMENT

A. Energizing Lines and Equipment Requirements

1. Prior to releasing a Clearance or a Construction Release for Operation, the Leader shall account for each member of the crew or crews and shall inform each member of the crew or crews that the line or equipment will be released and is to be considered energized.
2. Individuals or crews utilizing a Personal Tagout on lines or equipment that will be turned over to the Recognized System Operator (RSO) shall notify and obtain authorization from the RSO prior to energizing the lines or equipment.
3. Do not open or close a switch until positive that it is the right one.
4. When closing a switch, be sure that all personnel are in the clear and connections to wire are correct.
5. Workers shall utilize 3-way communications when involved in the issuance, transfer, or release of a Clearance or switch order.

Chapter 13: Grounding

INTRODUCTION

This chapter contains specific requirements and guidelines for employees for Grounding.

The purpose of using personal protective grounding on de-energized lines and equipment is to limit current through the worker to an acceptable value, if voltages are introduced into the work area.

To ensure these current levels can be achieved, a personal protective grounding procedure must be implemented in the work area in a way that creates an Equipotential Zone (EPZ) and the personal protective grounding equipment must be bonded to the best available ground source.

13-1 GENERAL GROUNDING

A. **General Grounding Requirements**

1. Specific information about grounding rules and practices for transmission and distribution lines and related equipment are compiled in the APS Personal Protective Grounding Manual. These rules shall be followed when working on all transmission and distribution conductors and equipment.
2. Specific instructions and procedures for the installation/removal of personal protective grounds in electric generating plants are compiled in the Generation Grounding Procedure (MNT-FG00-4004). This procedure shall be followed when working on conductors and equipment in an electric generating plant.
3. The Foreman or other Qualified Electrical Worker responsible for the work shall see that protective grounds are properly placed.
4. Workers shall not install grounds until they are instructed to do so by the worker in charge.
5. Qualified persons shall install grounding devices.
6. Before contacting the line with grounding equipment, the worker installing the device shall determine that all workers are a safe distance from any portion of the device.
7. If work is to be done on a single phase line or on one or more phases of a multiple phase circuit, a clearance or release for removal shall be obtained.

8. Only Journeymen and qualified apprentices shall handle wire on the ground, except that helpers may assist the Journeymen and apprentices if the wires are de-energized and properly grounded at the work location.
9. Extra precautions shall be taken for the initial ground installed and the last ground removed. The grounds shall be removed in the opposite sequence from how they were installed.
10. It shall be a requirement to verbalize and physically point out the installation of the initial grounds and removal of the final grounds using concurrent verification.
11. This portion of grounding the job shall receive immediate and close supervision from the Foreman.
12. An adequate number of Qualified Electrical Workers shall be present to do the job safely, including the following:
    a. A Foreman.
    b. One Journeyman.
    c. A 5th step or above apprentice (except for two person crews as specified in Article 31, Section 6 of the APS/IBEW Labor Agreement).

    These crews were negotiated with distribution voltages in mind and were not intended for use in substation or generation areas.
13. When grounding lines and equipment 69 kVAC and greater, the crew shall consist of the following:
    a. A Foreman.
    b. Lineman or Electrician.
    c. A 7th step or above apprentice.
14. After installation, grounds shall remain in place until the work is completed unless:
    a. the equipment is released for removal; or
    b. physical installation of grounds during the process is not possible (such as in cases of high potting, physical removal of cable, and ringing out cable); or
    c. using the isolation method as allowed in the APS Personal Protective Grounding Manual.

15. In all cases, where applying grounding devices, these devices shall be securely fastened to the source of ground before connections are made to the conductors and, in removing such devices, they shall be detached from the conductors first.
16. Specific information about grounding jumper size and number required are compiled in the APS Personal Protective Grounding Manual.
17. Grounding cables should be no longer than is necessary to keep the resistance as low as possible and to minimize slack in cables to prevent violent movement under fault conditions.
18. Ensure that the lines and equipment are de-energized by testing the lines and equipment with a device designed to detect voltage. This includes but is not limited to "tic tracers," volt meters, phase meters, etc.
19. Equip all grounding sets with approved pressure type grounding clamps.
20. Inspect all grounds prior to installation. Grounds equipped with protective coatings shall be in good condition to prevent moisture from wicking underneath and corroding the conductive material, resulting in a loss of current-carrying capacity.
21. Ground lines and apparatus carrying 600 VAC or greater when de-energized for repairs before work is started.

    Refer to **Section 13-3** for exceptions.
22. Install grounds using live-line tools of adequate length and capacity on all circuits normally operating in excess of 600 VAC.
23. Any grounding plan involving a grounding switch shall be reviewed by Engineering.
24. Ensure that all grounds have been removed before equipment is put back into service.
25. Clean the ground connections by wire brushing before the grounding clamps are installed to ensure the lowest possible voltage drop across the work site.
26. Use self-cleaning clamps if the ground connections cannot be cleaned.

13-2 SUBSTATION GROUNDING

A. **Substation Grounding Requirements**

1. When any work performed on ground switches requires the worker to be in the primary position, the transformer shall be switched out of service, a Clearance obtained, and the ground switch closed.

   The exception to closing the ground switch shall be when the work is to adjust the contact jaws and blade.

2. Lines and apparatus normally carrying 600 VAC or more, when de-energized for repairs, may be grounded at the switchgear by use of a grounding breaker.

3. Circuits left ungrounded shall be treated as energized.
4. Place grounds on all trailers and equipment, including the bushings and casings of all equipment when using vacuum or oil pumping equipment. Ground the tanker if an oil tanker is used.
5. Use grounding breakers of equal rating and size as the normal breaker in the cubicle to be grounded if grounding breakers are used.
6. Ensure that the grounding breaker stabs are positioned correctly to ground either the bus or the line using a Qualified Person.
7. Wear the proper safety equipment, including hard hats, safety glasses and face shields, while performing voltage verification for grounding device installation activities.

13-3 GROUNDING EXCEPTIONS

A. The only exceptions to grounding requirements are as follows:

1. Testing, changing taps on transformers, or similar operations that make grounding impractical.
   a. Other examples would include removing risers from overhead transformers and capacitors after the device has been de-energized.
2. When performing electrical tests on the equipment that requires grounds to be removed. Such tests include, but are not limited to, the following:
   a. Meggar.
   b. TTR.
   c. Double Insulation Measurements.

   d. Current Transformer tests.
   e. Breaker Timing tests.
3. Grounds may be omitted from a clearance to accomplish the following:
   a. Test sudden fault pressure relays that are not in a primary position.
   b. Change taps on a transformer or similar operations that make grounding impractical.
   c. Work on underground facilities when visual openings are totally contained within manholes or vaults.
   d. Work on overhead when all connections to sources of energy are open and are within the control and observation of the workers performing the work.

IF GROUNDS HAVE BEEN OMITTED FROM A CLEARANCE, THESE FACILITIES SHALL THEN BE WORKED WITH RUBBER GLOVES.

Chapter 14: Transmission/Distribution/Substation Work Practices

INTRODUCTION

This chapter contains specific requirements and guidelines for all electrical distribution and transmission personnel.

These requirements and guidelines are also applicable to personnel from other departments or divisions engaged in distribution or transmission work.

These requirements and guidelines have been compiled to help prevent electrical contact or accidents during the construction or maintenance of overhead or underground circuits and substations.

Workers are not relieved of their obligation to use good judgment and common sense in the performance of their duties. All precautions taken in normal work shall apply to restoration and "clean-up" operations.

14-1 EXPOSED ENERGIZED CIRCUITS

A. **Minimum Approach Distances for Non–Electrically Qualified Workers Requirements**

1. All Non–Electrically Qualified Workers shall maintain the Minimum Approach Distance separation between energized primary circuits and all equipment under their control as identified in the **Minimum Approach Distances for Non-Electrically Qualified Workers Requirements Table** in **Appendix C**, **Minimum Approach Distances**.

B. **Minimum Approach Distances for Qualified Electrical Workers Requirements**

1. Qualified electrical workers shall maintain the Minimum Approach Distance separation between energized high voltage and extra-high voltage (EHV) circuits and themselves as identified in the **Minimum Approach Distances for Qualified Electrical Workers Requirements Table** in **Appendix C**, **Minimum Approach Distances**.
2. No employee shall approach or take any conductive object closer to exposed energized parts than the established minimum approach distance, unless:
   a. The employee is insulated with rubber insulating gloves from the energized part upon which the employee is working, provided

that the employee has control of the part in a manner sufficient to prevent exposure to uninsulated portions of the employee's body.

The only allowable activity for work above 5,000 V under this exception is the installation of protective cover-up, or

b. The energized part is insulated from the employee and from any other conductive object at a different potential.

3. When work is performed on 69 kV or above that requires the use of a Category B aerial device, the equipment shall be positioned so that its uninsulated portions cannot approach the energized lines or equipment any closer than the minimum approach distance for the voltage involved.

C. **Two Qualified Worker Requirement**

1. Except as allowed under 14-1(C)(2) below, at least two qualified electrical workers shall be present while employees perform the following types of work:
   a. Installation, removal, or repair of lines or equipment energized at more than 600 volts.
   b. Installation, removal or repair of de-energized lines or equipment if an employee is in a working position from which he or she can reach or take a conductive object within 6 inches of energized 12 kV overhead or 12 inches of energized 21 kV overhead parts or equipment, even if rubber protective equipment has been applied.
   c. Work above any energized primary line or equipment, even if rubber protective equipment has been applied.
   d. Work involving the use of mechanical equipment, other than insulated aerial lifts, near energized primary.
   e. Other work that exposes an employee to electrical hazards greater than, or equal to, the electrical hazards posed by the operations listed above.
2. 14-1(C)(1) requirements for at least two qualified electrical workers to be present do not apply to the following operations:
   a. Routine circuit switching.
   b. Installation of rubber protective equipment when the employee works in a position from which a slip or shock will not bring the

employee's body into contact with exposed, uninsulated parts energized at a potential different from the employee's.

c. Work performed with live-line tools when the employee is positioned so that he or she is neither within reach of, nor otherwise exposed to contact with energized parts.

Note: For purposes of this section, an employee is considered to be exposed to contact even if insulation covers the part or the employee is insulated with rubber insulating gloves or both.

d. Work in an energized, deadfront, padmount transformer without touching the energized loadbreak elbows, if the worker first inspects and finds:
   - The primary cables and concentric neutral, or shield in good condition, and;
   - The primary loadbreak elbows in good condition and properly seated on the transformer bushings or parking stands, and;
   - The bleed wire from the elbows' tie-off tabs to the ground bus connected and in good condition, and;
   - The transformer case, transformer's ground bus and energized primary cables concentric neutral, or shield, all bonded together and grounded to the transformer ground source.

e. Emergency repairs to the extent necessary to safeguard the general public. This emergency repair exception is limited to the following:
   - Downed energized power lines.
   - Service outage to life support equipment.

D. **Minimum Clearance Distance Maintenance Requirements**

1. Install devices to maintain the minimum approach distances when Qualified Electrical Workers work near or above energized circuits that cannot be adequately covered with rubber goods or suitable shields.
2. Refer to **Minimum Approach Distances for Qualified Electrical Workers Requirements Table** in **Appendix C, Minimum Approach Distances** for the Minimum Approach Distances.
3. Use additional clamp sticks or have such devices in place when workers install equipment or materials that might fall into energized apparatus or break insulators located below.

4. Take precautions to prevent ropes, tools, and other materials from contacting energized wires or equipment when passing near them.

E. **General Electrical Requirements**

1. Be familiar with and experienced in accepted Company standards for procedures and work methods when assigned to work on high voltage or EHV circuits.
2. Perform one of the following for workers not having the necessary experience:
   a. Instruct workers not having the necessary experience.
   b. Direct workers not having the necessary experience to work with an experienced person.
3. Consider all electrical circuits energized until approved testing methods verify they are de-energized, all authorizations from the System Operator (ECC or DOC) have been received, and the equipment is grounded.

   Refer to **Section 13-3**, **Grounding Exceptions**, for exceptions.
4. Do not open the secondary side of a current transformer while the primary side is energized.
5. Treat a transformer primary neutral lead between the transformer and the point of connection to a neutral or ground wire as though it is energized at primary voltage when working or handling it.
6. Do not wear conductive jewelry within the Minimum Approach Distance for Qualified Electrical Workers.

   Refer to **Minimum Approach Distances for Qualified Electrical Workers Requirements Table** in **Appendix C**, **Minimum Approach Distances**, for the minimum approach distances.
7. Inspect for and eliminate back-feed conditions.

F. **New Construction Circuits Requirements**

1. Perform all of the following when circuits are completed at the source of energy first:
   a. Ground conductors.
   b. Install a Tag at the source end.
   c. Remove the Tag upon completion of work.

G. **Less Than 600 VAC Energized Circuits Requirements**

1. Make tests by direct metallic contact with an approved voltmeter for conductors normally energized at 600 VAC or less.

H. **5 kVAC and Greater Energized Circuits Requirements**

1. A contact tag shall be obtained before installing or removing conductors which cross over or under conductors energized at more than 600 volts.
2. A contact tag shall be obtained any time that a person performing the task at hand considers it necessary for their personal safety
3. Plan the work.
4. Make the plan known to all members of the crew.
5. If doubts exist concerning the safety of the operation, proceed only when it is determined that the work can be done safely.
6. Inspect tiewires on the pole being worked and on adjacent poles prior to starting work on overhead circuits.
7. Ensure that two Qualified Electrical Workers are either on poles or in buckets when working aloft using hot sticks and doing work on hot lines, except as allowed by the APS/IBEW Labor Agreement.
8. Closely cooperate with every person on the job.
9. Do not tolerate displays of temper, poor cooperation, or other irrational behavior.
10. Ensure that the Leader or Foreman is in a position to closely observe the personnel at all times and advise them as necessary when a crew is engaged in hot stick work.
11. Confine conversation to the job at hand.
12. Use precaution when moving about on a pole.
13. Do not change positions without advising the other workers.
14. Strictly observe safe working distance requirements in congested locations.
15. Request to de-energize circuit or determine alternative method of job completion when it is impossible to observe safe working distance requirements.
16. Perform no other work on a pole or structure upon which live-line work is in progress.
17. Do not use live-line tools on energized lines or equipment until trained by an authorized and experienced instructor.

18. Ensure that live-line tools are of a standard type and length.
19. Ensure that live-line tools have no alterations except those created and approved by the Tool Shop.
20. Never work on more than one conductor at a time when two or more personnel are performing work on the same structure.
21. Make one contact at a time when installing or removing jumpers.
    a. Control the unsecured end when the first connection is made or until the final disconnection is complete.
22. Always keep energized jumpers clear of contact with wood cross arms, poles, or any equipment not intended to withstand the voltage involved.
23. Operate all cut outs and disconnects with a switch stick or other approved hot stick of suitable length.

    Disconnects designed to be operated in another manner are exempt.
24. Do not hang live-line tools on a conductor.
25. Use an approved tool hanger to hang live-line tools.
26. Refer to **6-3(A), Live-Line Tool Requirements**, and **Section 14-4(A), Hot Stick Requirements**, for further information on hot sticks.

I. **600 VAC - 15,000 VAC Energized Circuits Requirements**

1. Use an isolation mat, rubber blanket, isolation platform, aerial bucket, rubber gloves, or other suitable protective device to isolate employees when they are installing protective equipment directly onto noninsulated conductors or devices energized in excess of 600 VAC. These devices are to protect personnel from accidental contact only.
2. Place protective devices from a position that does not expose contact with energized parts.
3. Always protect the nearest and lowest wires first.
4. Remove protective equipment in the reverse order.
5. Do not use defective protective devices.
6. Always protect devices from damage.
7. Avoid damaging or dislodging protective devices after installation.
8. Do not allow rubber protective equipment to remain in place on energized lines or apparatus overnight or for more than one 8

hour period to avoid corona and ozone damage, unless such use is approved by the Foreman or person in charge.

9. Refer to **Chapter 11**, **Personal Protective Equipment**, for further information on isolation mats, rubber blankets, rubber gloves, or other personal protective devices.

J. **15,000 VAC and Greater Energized Circuits Requirements**

1. Use only approved protective equipment on lines over 15,000 VAC between phases.
2. Refer to **Chapter 11**, **Personal Protective Equipment**, for further information on isolation mats, rubber blankets, rubber gloves, or other personal protective devices.
3. Install and remove protective equipment with hot sticks.
4. Use hot sticks to work on circuits energized at 15 kVAC or greater.
5. Refer to **6-3(A), Live-Line Tool Requirements**, and **Section 14-4(A)**, **Hot Stick Requirements**, for further information on hot sticks.

14-2 HIGH VOLTAGE UNDERGROUND RESIDENTIAL DISTRIBUTION

A. **Underground Residential Distribution (URD) General Requirements**

1. Treat all cables that do not have grounded conducting sheaths or shielding as bare conductors.
2. Barricade, or cover with protective devices, all unshielded conductors and equipment that are or will be within reach of a worker's position.
3. Do not work on more than one uncovered conductor at a time when working on or within reach of conductors energized at 120 VAC to ground.
4. Do not attempt to cut or splice any conductor energized in excess of 600 VAC between conductors or between conductor and ground.
5. Discharge all cable disconnected from a power source before making physical contact with conductive parts.
6. Positively identify and mark the cable(s) being worked on.
   a. Upon completion of de-energization, cables to be worked on shall be marked using one of two methods:
      - Clothes pin—applying a Red/Orange blanket clamp/clothes pin or
      - Grease pen—a marking of the cable with contrasting color "ink" (removable upon completion of the work).

   b. After marking the cable that is to be worked on, it shall be tested for dead (e.g., spiking and/or cutting).
   c. The marking shall be removed when work is completed and before energizing the cable.
7. Keep identification markings in good condition at all times.
8. Ensure all high voltage URD cables bear an identification tag positively identifying where the opposite ends of the cable are located.
9. Ensure dedicated network feeder cables also have the feeder code, feeder number, and phase designation.
10. Ensure truck frames and wire pulling equipment are grounded when pulling conductor into energized equipment.

B. **Fishing Conduits or Ducts Requirements**

1. Provide protection against potential contact with energized or rotating equipment before a rod, wire, tape or mandrel is pushed, blown or pulled through a pipe, duct or conduit.
2. Use non-conductive fish tape when exposed to high voltage.
3. Station a worker at each end of the pipe, duct, of conduit when fishing.
4. Fish ducts and conduits by the method representing the least hazard including ergonomic hazards.

C. **Identifying the Contents of an Unknown Conduit Requirements**

1. Only qualified APS workers with a journeyman classification such as a lineman, electrician, troubleman, etc. (or contract personnel working for APS with equivalent qualifications) are authorized to cut into a possible power line conduit or window a possible power line conduit. Cutting into or windowing a conduit shall only occur AFTER a 60 cycle tracking device has been used to verify that the conduit does not contain an energized power line.
2. If a conduit is in such proximity to other conduits that it is not possible to determine conclusively by the use of a 60 cycle tracking device that the conduit does not contain an energized power line, then the qualified journeyman may carefully window the conduit by using a windowing tool.
3. When windowing a conduit, high voltage rubber gloves and all PPE shall be worn.

D. **URD Equipment Requirements**

1. Open switching cabinets, termination cabinets, primary J-boxes, transformers, or other primary enclosures using only Journeyman trained Linemen, Electricians, or Polyphase Metermen.
   a. Entry can be made into secondary j-boxes by a Journeyman, "A" Serviceman, Electric Serviceman or Facilities Locator.
   b. Meter readers can only enter an electrical enclosure which has signage identifying the enclosure as "APS Meter Inside."
   c. All other personnel shall be accompanied by a person with Journeyman training.
2. Install isolation mats prior to performing any work in an energized URD primary enclosure except for work performed with live line tools.
3. Wear high voltage rubber gloves, hard hats and safety glasses when opening the doors or lids on all energized primary enclosures.
4. Wear PPE anytime within reaching/falling distance of any energized object.
5. Wear high voltage rubber gloves until the exposed energized equipment is "dead" or covered with approved insulating equipment (e.g., blankets, fiber).
6. Refer to **Chapter 4**, **Personal Protective Equipment**, for additional information regarding PPE.
7. Ensure that a second Qualified Electrical Worker, with the sole task of observing for safe practices, is present when performing work that would cause an individual to place themselves within the Minimum Approach Distance for Qualified Electrical Workers Requirements (Appendix C, Minimum Approach Distances) or in a location where they could reach or fall into energized, high voltage, live-front equipment.
   a. Protective barriers may be removed or replaced by a Qualified Electrical Worker who is working alone with a live line tool whenever possible.
   b. If they cannot use a live line tool, they must use a method that always keeps the barrier board between their body and any exposed parts while keeping themselves out of MAD for any exposed parts. An isolation mat must be installed if a live line tool is not used.

c. When the barrier is not in place, the rules for MAD shall be followed.

8. Close and lock energized primary enclosures before leaving the immediate area.
9. Ensure that a designated person is left in attendance of energized primary enclosures when they cannot be physically closed and locked.
10. Perform primary switching on energized equipment under the following conditions:
    a. The energized equipment is equipped with a load-break-switching device.
    b. A load break tool is to be used on energized equipment when performing switching in a switching cabinet:
        - Breaking parallel
        - Opening loop
        - Dropping load
    c. The energized equipment without load-break switching capability and with all load removed, verified with amp meter, and one of the following:
        - It de-energizes up to 1,250 feet of paralleled 750 MCM.
        - It de-energizes up to 1,850 feet of 1,100 MCM.
        - It de-energizes up to 2,500 feet of 750 MCM to 1,000 MCM.
        - It de-energizes up to 3,600 feet of 4/0 MCM.
        - It de-energizes up to 5,000 feet of 1/0 cable.

        If not possible, contact Recognized System Operator (RSO) see Chapter 12-6(A)(8).
11. Perform all of the following when using a loadbreak tool:
    a. Use an 8-foot hot stick with the worker placed at the extreme end of the stick during operation.
    b. Wear appropriate apparel and PPE, including safety glasses and arc rated gloves see Chapter 4-6 (B).

        If not possible, contact Recognized System Operator (RSO) see Chapter 12-6(A)(8)

    c. Use the equipment in good weather and lighting conditions.

d. Ensure that the worker performing the switching is not holding a handheld flashlight.

e. When safe operation distance of the tool does not exist, a second journeyman working classification shall be used when the above conditions are not met.

E. **Protective Devices and Cover-up Requirements**

1. Install approved protection devices or cover-ups, using a qualified person or persons, on all high voltage termination points (elbow type terminators) when work is being performed in a transformer enclosure.
2. Install approved protective devices to protect plastic gas lines or other equipment from damage when repairing underground cable (cables) in trenches or ditches.
3. Refer to **Chapter 4**, **Personal Protective Equipment**, for additional information regarding protection devices or cover-ups.

F. **Working with Network Systems Requirements**

1. Test all network protectors from a current limited source.
2. Use only approved links and/or fuses across open points between energized secondary bus and the protector, or between an energized transformer and the protector.

   Approved links and/or fuses are listed in the posted procedure.
3. Before installing transformer links or protector fused links between energized secondary bus and protector or between energized transformer and protector, always test across open points using a fast-acting 5 ampere (amp) maximum current limiting fuse.

   Using the 5 amp in-line fused jumper, test from energized secondary bus across open point to the same phase on the protector, then check the test fuse for continuity. If continuity is good, install link, and torque to 50 foot-pounds. Repeat test for next phase, then install link. Repeat test again for remaining phase, then install link. Test one phase at a time.
4. Allow only the workers required to do the work in the area during the following evolutions:

   a. When transformers or protectors are being switched into service.

   b. When transformers or protectors are being switched out of service.

c. When transformers or protectors are being connected to an energized bus.

5. Follow safe operating procedures for all network transformers and protectors.
6. Post the procedures for network transformers and protectors within the vault.

G. **Energized Cable Moving Requirements**

1. Non-URD Cable Requirements
   a. Use extreme care when moving any energized cable.
   b. Do not move high voltage lead-shielded cable without the cable-splicing Foreman's approval.
   c. Examine the exposed surface of any energized cable for defects prior to disturbing or working on it.
   d. Do not move or work on cable while it is energized if suspicious conditions are found.
   e. Use high voltage rubber gloves in addition to covering the exposure with approved protective devices when working on unshielded cable.
   f. Refer to **Chapter 11**, **Insulate - Rubber Goods and PPE**, for additional information about rubber gloves, protection devices, or cover-ups.
2. URD Cable Requirements
   a. Inspect all terminations and visible points to verify that the metallic shielding is grounded to the system neutral.
   b. Cover exposed low voltage terminals prior to moving shielded cable in URD transformers when contact is possible.
   c. Refer to **Chapter 11**, **Insulate - Rubber Goods and PPE**, for additional information regarding rubber gloves, protection devices, or cover-ups.
   d. Perform installation or removal of load-break terminations with approved hot sticks and attachments.

      Refer to **Section 6-3(A), Live-Line Tool Requirements**, and **Section 14-4(A)**, **Hot Stick Requirements**, for information on hot sticks.

e. When using high voltage rubber gloves after examination reveals no cable defects, move URD cable at points other than the termination.

   Use caution to prevent disturbing the termination.

H. **High Voltage Cable Testing and Spiking Requirements**

1. Test and Spike at the work location, all cables to be worked on normally carrying in excess of 600 VAC after all authorizations from the System Operator (ECC and/or DOC) have been received.
2. Cables must be Tested and Spiked to verify that the cable is de-energized before performing any work that would cut, pierce, or open the cable or splice. (Refer to Section 14-2(G) for information regarding moving energized cable)
3. Perform spiking with an approved hot stick, hot cutter, remote operated spiking tool, or remote operated cutter from outside the manhole, vault, or trench.
4. A remote cable cutter that allows the employee to remain outside the manhole, vault or trench, may be used in lieu of spiking with an approved hot stick.
5. Refer to **Section 6-3(A)**, **Live-Line Tool Requirements**, and **Section 14-4(A)**, **Hot Stick Requirements**, for further information on hot sticks.
6. If a spike is used, pierce the cable with the spike at a location on the cable that is designated by the person in charge.
7. Ensure that all personnel are clear of the work area during the spiking operation.
8. Cut the initial cable using rubber gloves or hot sticks after spiking.

14-3 69 KVAC AND GREATER TRANSMISSION

A. **Transmission General Requirements**

1. Obtain a Contact Tag before performing live-line work on 69 kVAC to 500 kVAC circuits.
2. Do not use flammable or conductive aerosol products on or near energized lines or equipment.
3. Establish communications between the appropriate Operations Center and crew Foreman before performing work on energized circuits 69 kVAC and greater.

4. Communicate the crew location and type of work to be performed.
5. Inspect the tower for missing nuts, loose steel, or any condition that could cause a fall before climbing it.
6. Wear safety belts with the safety belt in a position that will not interfere with movement when climbing.
7. Do not ride in cable carts on overhead ground wires once the line(s) have been released for Operations.
8. Do not remove structural steel braces or supports to facilitate hot stick work.
9. Determine whether the load will be supported without any of the damaged steel before removing damaged steel.
10. Use adequate bracing to support the load until the damaged member is replaced.
11. Do not crawl on strings of insulators.
12. Use a ladder, platform, or other suitable device to access dead-ends or perform work beyond strings of insulators.
13. Keep ladders and other devices clean to prevent electrical tracking.

    Refer to **Section 6-10**, **Ladders**, for further information regarding ladders.

14. Tag repairable devices "out-of-service" until repaired.
15. Destroy devices when they are found to be irreparable.

B. **Erection of Towers and Other Structures Requirements**

1. Ensure that all persons not directly involved in the erection of towers or other structures stay out of the immediate work area when towers or other structures are being erected.
2. Stay in the clear when a crane or boom has to travel with a load.
3. Use tag lines to control the load when a crane or boom has to travel with a load.
4. Perform all rigging under the supervision of the Foreman or a Journeyman.

   Refer to **Section 6-11**, **Cables, Ropes, Slings, and Clevises in Rigging**, for further information.

5. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

C. **Leg Stats and Bell Shunts Requirements**

1. Perform the following when working from metal structures near energized EHV equipment:
   a. Wear leg stats or conductive boots (required at 161 kVAC or greater).
   b. Use properly installed bell shunts.
2. Take every precaution to stay at the same electrical potential as the metal structure when working from metal structures near energized EHV equipment.
3. Shunt no more than two insulators when workers must come in personal contact with insulators at the structure end of lines or equipment energized at 161 kVAC or greater.
4. Do not make contact with the insulator when fiberglass or similar material is used as both a structural member and a means of insulation, and a reduced number of insulators are relied upon.

14-4 230 KVAC AND GREATER TRANSMISSION

A. **Hot Stick Requirements**

1. All hot sticks shall be tested before use each day and prior to a new project using trained personnel.
2. Use a portable wet/dry hot stick tester to test the hot stick.
3. Perform all of the following before a hot stick is used:
   a. Visually inspect the hot stick.
   b. Clean the hot stick with an approved cleaner.
   c. Wipe the hot stick with an approved cloth.
   d. Re-inspect the hot stick before it is sent up the tower or structure.
4. Refer to **Section 6-3(A)**, **Live-Line Tool Requirements**, for further information on hot sticks.

B. **Rope Requirements**

1. Clean and visually inspect any rope used to perform work on energized lines (69 kVAC and greater) prior to using.
2. Keep all ropes and hand lines to be used near energized conductors out of the dirt, mud, or water.

3. Refer to **Section 6-11**, **Cables, Ropes, Slings, and Clevises in Rigging**, for further information.

14-5 SUBSTATION WORK

A. Substation Entry Requirements

1. Do not carry items on or above the shoulders when handling tools, equipment, and materials in substations.
2. Notify Security of arrival and departure from a substation. Contact ECC if performing electrical work in the substation or if the planned work could affect the electrical system.
3. Always lock substation and similar installation gates except when someone is in immediate attendance (within 20 feet) at the gate.
4. Enter a substation or switchyard only after meeting at least one of the following conditions:
   a. Successful completion of a training class covering:
      - The recognition of potentially energized components.
      - The proper use of electrical protective equipment that will be required by the work being performed.
      - The safety work practices to be utilized while performing specific work assignments within the substation or switchyard.
      - What is safe to approach and what is unsafe to approach.
      - The maximum voltages involved within the substation.
      - The Minimum Approach Distances to apply.

        Refer to Appendix C., Minimum Approach Distances.

   b. The worker is accompanied by and under the direct observation of a person who has met the requirements of Step a.

B. Substation General Requirements

1. Ensure that everyone doing work in a station, substation or distribution center is shown the area in which they are to work.
2. Identify which areas are energized and which are out of service.
3. Remain within the assigned work area in the substation unless authorized to do otherwise by the person in charge.

4. Refer to the following section for further information on substation work.

   Section 13-2 Substation Grounding Requirements.

C. **Battery Rooms Requirements**

1. Refrain from introducing any source of ignition in battery rooms because batteries emit flammable hydrogen gas.
2. Ensure that battery rooms are properly vented.
3. Ensure that a working eyewash station is available within 50 feet of any work constructing or maintaining battery banks.
4. Wear appropriate PPE when cleaning, filling, or taking specific gravity readings. PPE shall be dictated by the work being performed.

   Refer to **Chapter 4**, **Personal Protective Equipment**, for additional information regarding PPE.
5. Do not use petroleum-based solvents or cleaners on battery cases.
6. Wash any skin area with fresh water for at least 15 minutes if it comes in contact with electrolyte.
7. Flush your eye(s) with fresh water for at least 15 minutes if electrolyte splashes into it.
   a. Seek medical attention.
8. Maintain good housekeeping within all battery rooms.

D. **Capacitor Banks Requirements**

1. Series Capacitor Banks Requirements
   a. Ground capacitor banks at both ends of the bank using the ground switches and/or 4/0 mechanical grounds.
   b. Use suitable jumpers to bypass all bus connections being opened.
   c. Handle leaking or ruptured cans in accordance with current PCB handling procedures.
   d. Exercise care when operating individual segments.
      ii. Open direct current (dc) control circuits.
      iii. Notify all crew members prior to operating DC control circuits.
   a. Become familiar with the expected action prior to operating control devices (e.g., bypass switches are air-operated and spring-closed).

b. Properly store temporary ladders.

Refer to **Section 6-10**, **Ladders**, for further information regarding ladders.

4. Primary Shunt Capacitors
   a. De-energize the bank prior to working on high voltage capacitors.
   b. Short and ground the terminals using temporary jumpers and a hot stick after a mandatory 5 minute wait.
   c. Alert all workers in the vicinity of equipment being tested prior to the tests.

E. **Ground Grid Requirements**

1. Do not open or cut the substation ground grid until jumpers have been installed using a temporary conductor.
2. Use with high voltage rubber gloves to work open grounds in abnormal conditions.
3. Do not leave open grounds in a hazardous condition.
4. Dry cad weld type molds prior to striking when making ground grid connections using cad weld type molds.
5. Wear eye protection and gloves when making cad weld type connections.

F. **Stored Energy Requirements**

1. Before working on equipment, disable, block, and/or make inoperable by suitable means equipment that may expose personnel to operating forces caused by inadvertent or accidental operation.
   a. This may include the following:
      - Disabling electrical circuits.
      - Discharging springs, air, hydraulic, or other stored energy.
      - Blocking or pinning mechanisms.
      - Combinations of the above methods.

14-6 AERIAL WORK, ELEVATIONS FOUR FEET AND ABOVE

A. **General Requirements**

1. Perform work above energized equipment after at least the following precautions have been taken:

a. The complete covering of all exposed electrical parts.
b. The use of a working platform with guardrail.
c. Any other method that is suitable to both the Foreman and personnel doing the work.

B. **Baskets Requirements**

1. Use safety harnesses and approved lifelines when working in personnel baskets suspended from a crane.
2. Refer to **Section 10-22(A)**, **Safety Equipment Requirements**, for further information on aerial work.
3. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

C. **Bucket Requirements**

1. Use full body harnesses and safety lanyards equipped with double-action snap hooks when working from a bucket.
2. Ensure that the anchorage is capable of withstanding a force of 5,000 pounds per connected worker.
3. Do not permit riding in the bucket except when the vehicle is moved pole to pole, on solid even ground, and the bucket is returned to its rest position for each move.
4. Enter or leave the bucket only with the bucket near the ground or in the rest position unless transferring from a bucket to a pole or structure.
5. Do not stand on top of the bucket, on planks placed across the top of the basket, or on ladders placed in or on the bucket.
6. Do not belt to an adjacent pole, structure, or equipment when performing work from a bucket.
7. Take adequate measures to ensure a safe transfer when transferring from a bucket to any pole/structure.
8. Perform all transfers to poles or structures above energized high voltage circuits only after the lines or equipment are covered.
9. Refer to **Section 10-22(A)**, **Safety Equipment Requirements**, for further information on aerial work.
10. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

D. **Aerial Platform Requirements**

1. Use body belts and lanyards equipped with double-action snap hooks connected to an anchorage capable of withstanding a force of 5000 pounds in addition to the requirements in **Section 14-6(C)**, **Bucket Requirements**.
2. Refer to **Section 10-22(A)**, **Safety Equipment Requirements**, for further information on aerial work.
3. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

E. **Outriggers and Stabilizers Requirements**

1. Lower outriggers to firm footing before elevating personnel.
2. Examine for snow, ice, mud, soft ground, or other unusual conditions.
3. Exercise precautions if there is snow, ice, mud, soft ground, or other unusual conditions.
4. Use chocks or cribbing to ensure the stability of the truck if conditions necessitate.
5. Ensure that that no one will be injured before moving the stabilizers, outriggers, or hydraulic jacks.
6. Ensure that the outriggers or stabilizers are in the down position and the emergency brake is set. Wheels should be chocked if necessary.
7. Check the outriggers or stabilizers for safe operation before a load is lifted if any doubt exists as to the stability of the truck.
8. Use the vehicle's warning lights (flashing or rotating) whenever appropriate.
9. Refer to the following related sections for further information:
   Section 10-12(A) Mobile Equipment Requirements
   Section 10-14(A) Mobile Crane Requirements
   Section 10-15(A) Aerial Equipment Boom Maneuvering Requirements

F. **Tackle, Blocks, Ropes, and Slings Requirements**

1. Keep approved blocks, ropes, slings, and other tackle clean, dry and free from any foreign substance.
2. Do not use metallic winch lines in place of rope blocks to install transformers above an energized secondary.

3. Refer to **Section 6-11**, **Cables, Ropes, Slings, and Clevises in Rigging**, for further information.

G. **Hand-Line Use Requirements**

1. Perform the following when a worker is working near energized conductors:
   a. Take a rope hand line up the pole.
   b. Do not take the rope hand line down until the work is completed.
2. Use hand-lines made of approved material and not less than the equivalent strength of ½ inch manila rope.
3. Attach the hand line to the body belt.

   Do not tie the hand line to the body belt.

H. **Other Equipment Requirements**

1. Keep bolt cutters larger than 24 inches below the level of the low voltage circuit on poles with energized circuits.
2. Do not take metallic hoisting lines above the level of conductors energized in excess of 600 VAC.

   Spread and cover conductors with approved devices when using pole or transformer setting equipment with a boom that extends above that level.

I. **Material Raising and Lowering Requirements**

1. Employees on the ground shall not enter the area below overhead work without first communicating with and obtaining permission from overhead workers.
2. Ensure that ground personnel give a sign of recognition when receiving instructions from overhead workers.
3. Do not raise or lower tools and material when a person is climbing a pole.
4. Use a hand line or hand line with material bag when raising or lowering tools or material.
5. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

14-7 WIRE WORK

A. Stringing and Sagging Wire Requirements

1. De-energize the energized conductors when stringing wire in proximity to energized conductors.
2. Assume the wire being strung is at the same voltage as the wires of the live line if it is not possible or practical to de-energize the energized conductors when stringing wire in proximity to energized conductors.
3. Protect yourself and others from induction contact when stringing wire in proximity to energized conductors.
4. Wear rubber gloves when watching the coil or payout reel.
5. An equipotential zone for all in the area must be established and maintained for the duration of the pull. Specific information about grounding rules and practices for wire stringing and sagging are compiled in the APS Personal Protective Grounding Manual. These rules shall be followed when stringing and sagging electrical wire.
6. Do not stand in loops of rope or wire when using sagging tackle, or on the inside angle of wire that is being pulled into position for tying.
7. Ensure that the Foreman is always with the crew when making any dangerous crossing.

B. Splicing and Repairing Wire Requirements

1. Specific information about grounding rules and practices for electrical lines and related equipment are compiled in the APS Personal Protective Grounding Manual. These rules shall be followed when splicing and repairing wires.
2. Perform the splicing of conductors or handling of wire using Journeymen and qualified apprentices when conductors are adjacent to energized circuits.
3. Use a ground man, helper, or truck driver to assist the Journeyman or apprentice in making splices when the entire conductor is being spliced on the ground.

14-8 POLE WORK

A. Pole Handling and Hauling Requirements

1. Equip pole cribs and storage pits with retaining pins to prevent the pile from collapsing.

2. Position away from “pinch points” when involved in transferring poles from a pole crib to a pole trailer.
3. Remain outside of the pole crib when a pole is being lifted from or lowered into the crib.
4. Wear proper PPE when handling treated wood poles.

   Refer to **Chapter 4**, **Personal Protective Equipment**, for additional information regarding PPE.
5. Load poles on trailers using proper equipment.
6. Secure poles to the trailer by means of winch lines or binders when poles are loaded on a pole trailer.
7. Use an 18 inch by 18 inch (minimum) red flag(s) on the point furthest to the rear of the load at all times (day or night) that poles are being transported on a pole trailer.
8. Use a light bar on the pole trailer at all times (day or night) that poles are being transported on a pole trailer.
9. Equip pole trailers with permanently mounted safety chains.
10. Use caution when unloading poles from a trailer to prevent them from rolling off the trailer.
11. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

B. **Pole Digging and Setting Requirements**

1. Ensure that all persons not engaged in pole setting operations are kept out of the work area.
2. Inspect the site for overhead clearance prior to positioning a vehicle.
3. Establish the balance point to provide minimum effort for guiding the pole to the hole when lifting a pole with a winch line.
4. Guard or cover all pole holes, anchor holes, or excavations when conditions are warranted.
5. Ensure covers overlap excavation edges by a minimum of 6 inches.
6. Perform all of the following when setting or removing poles near energized conductors:

   a. Ensure one of the following:

vii. The conductors are de-energized and covered with protective devices.

viii. The conductors are spread to minimize accidental contact.

ix. Use a pole cradle or blankets on the pole if these are not practical.

a. Wear rubber gloves when handling the pole.

b. Do not step on or off the truck until the pole is secure enough to prevent contact with an energized conductor.

c. Ground the truck frame when setting or removing poles near energized conductors. Barricade the vehicle and establish a "safe zone" around the vehicle if grounding is not possible.

10. Do not allow anyone on a gin pole while it is in use.

11. Do not support pike poles by using a worker's body belt or safety strap.

12. Use cant hooks or other suitable devices to prevent rotation of poles.

C. **Climbing Equipment Requirements**

1. Do not use climbers after the gaffs are worn or filed to less than 1 ¼ inches long, measured on the underside of the gaff.

2. Gaffs shall be properly aligned and sharp.

3. Ensure that the snap hook and D-ring are properly engaged before the weight of the body is placed on the strap.

4. Use only approved safety straps and body belts.

D. **Pole Climbing Requirements**

1. Assure yourself the structure or device will support your weight before climbing poles, ladders, scaffolds, trees, elevated structures, or riding span wires, messengers or cables, or entering cable cars, boatswains' chairs etc.

2. Inspect the pole brand to verify that the pole is set to proper depth.

i. Poles purchased between May 1958 and December 1991 will have a brand stamped 12 feet from the butt of the pole.

ii. Poles, 50 feet and under, purchased after December 1991 will have a brand stamped 10 feet from the butt of the pole.

iii. Poles, 55 feet and over, purchased after December 1991 will have a brand stamped 14 feet from the butt of the pole.

4. Inspect pole steps to verify that they will support the workers' weight.
5. Inspect the pole for the following prior to climbing a pole:
   - Knots
   - Cracks
   - Improper Clearances
   - Loose Ground Wires
   - Excessive Rake
   - Foreign Materials
   - Shallow Depth
   - Collision Damage
   - The Presence of "Unsafe Pole" Markers
6. Perform either a Prod Test or a Sounding Test in accordance with **Section 14-8(E)**, **Wood Pole Testing Requirements**, to determine the pole's internal condition prior to climbing a wood pole.
7. Become familiar with the circuits, voltages, apparatus thereon, and any other conditions that may present themselves as hazards before climbing poles or structures.
8. Inspect gaffs prior to each use.
9. Remove climbers when walking.
10. Do not support yourself by grasping guy wires, braces, racks or other equipment, unless it is absolutely necessary when climbing or working on poles.
11. Refer to **Section 14-8(C)**, **Climbing Equipment Requirements**, for further information.

E. **Wood Pole Testing Requirements**

1. Prior to climbing or changing the strain of a wood pole and adjacent wood pole, a prod test or sound/hammer test shall be performed.
2. If a Prod Test is performed:
   a. Remove eight to ten inches of dirt around the base of the pole.
   b. Repeatedly thrust a screwdriver blade into the pole below grade level.
   c. Continue around the circumference of the pole.
3. Perform a Sounding Test or Hammer Test in accordance with the following:
   a. Strike the pole surface sharply with a hammer.
   b. Hit the pole hard.

c. Continue the test from a point close to the ground to as high as you can reach.
   Test Results Criteria:
   i. A pole free from internal decay sounds clear and the hammer will rebound.
   ii. A hollow or decayed pole is recognized by a dull or hollow sound and the hammer will not rebound as strongly.

F. **Steel Pole Requirements**

1. Inspect each pole, tower and adjacent structure for corrosion, sharp edges, dents, abnormal holes, and foreign attachments prior to climbing or changing the strain on the structure.
2. Wear low voltage rubber gloves anytime voltages ranging from 50 VAC to 600 VAC are worked from a steel structure.
3. Refer to **Chapter 4**, **Personal Protective Equipment**, for further information on PPE.
4. Apply protective devices on a steel pole to energized primary conductors in accordance with one of the following:
   a. Use insulated aerial equipment.
   b. De-energize the line if insulated aerial equipment cannot be utilized.
5. Do not hand set steel poles when in close proximity to energized high voltage conductors or equipment.
6. Setting of steel poles in energized primary shall be done with a fully constituted crew consisting of a crew foreman and two journeyman linemen. (As conditions require, additional qualified personnel may be needed to complete the task).

G. **Dismantling and Removing Overhead Structure Requirements**

1. Support any pole to be dismantled to withstand altered strain placed on it and the weight of the personnel working on it.
2. Do not permit anyone to climb a pole that is under abnormal strain.
3. Stand clear of poles when not actually engaged in the removal of poles.

4. Stop pedestrians and traffic, when necessary, when a pole is being removed.

14-9 EQUIPMENT WORK

A. Transformer Connecting and Disconnecting Requirements

1. Carefully check for back-feed, abnormal voltage and other hazardous conditions before starting work on a transformer installation.
2. Perform both of the following before work on the bank has begun when transformer secondary's are paralleled or banked for the purpose of replacement:
   a. Disconnect the secondary leads.
   b. Remove primary fuses.
3. Do not leave a transformer in a back-feed condition.

B. Sectionalizers Requirements

Do not locate high voltage sectionalizing devices between transformers with banked secondarys.

C. Capacitors Requirements

1. De-energize the capacitor bank prior to working on high voltage capacitors:
   a. Wait five minutes.
   b. Short the capacitor terminals.
   c. Ground with a temporary jumper.
   d. Install the jumper with a hot stick.
      Refer to **6-3(A), Live-Line Tool Requirements**, and **Section 14-4(A)**, **Hot Stick Requirements**, for further information on hot sticks.
2. Wear rubber gloves when connecting and disconnecting low voltage capacitors.

   Refer to **Chapter 11, Insulate – Rubber Goods and PPE**, for further information on rubber gloves or other personal protective devices.
3. Discharge the capacitors by shorting both terminals when disconnected.
4. Prevent damage to the case, terminals, and the capacitors' interior when handling, carrying, or transporting capacitors.

5. Perform all toggle switch operations using one of the following:
   - Rubber Gloves.
   - Insulated Switch Stick.
   - The String Method.

D. **Street Lighting Circuits and Equipment Requirements**

1. Street Lighting Circuits and Equipment General Requirements
   a. Protect against broken glass when changing light bulbs.
   b. Do not remove grounds from a street light bracket unless circuit is de-energized and leads removed.
2. Multiple Circuits Requirements
   Treat multiple circuits as secondary voltage.
3. Series Circuits Requirements
   a. Use the same general precautions as in handling 4 kVAC circuits.
   b. These circuits may be long and may be exposed to contact with several primary circuits of different voltages.
   c. Do not open or cut series circuits without installing a jumper or otherwise shorting the circuit.
   d. This action is not necessary when a Clearance has been issued.
   e. Work a series circuit with rubber gloves unless a Clearance has been obtained and the circuit is grounded on both sides of the work area.
   f. Do not remove a mid-point or end ground connection until a Clearance has been obtained on the circuit.
   g. Do not change series circuit lamps while the circuit is energized.

E. **Equipment Neutral Requirements**

1. Do not open or cut the common neutral conductor of an energized power supply that is supplying load current until it is first bypassed with a temporary conductor.
2. Work open neutrals with rubber gloves.
3. Do not leave open neutrals and/or neutrals in abnormal conditions in such a condition as to be a hazard to the public.
4. Handle neutral conductors with the same caution used for energized circuits.

Chapter 15: Fall Protection

INTRODUCTION

This chapter contains specific requirements for the use of fall protection equipment, including fall arrest and fall prevention equipment.

15-1 FALL PROTECTION SAFETY

A. **Fall Protection Safety Requirements**

1. Except as allowed under 15-1(A)(2) below, a Fall Protection System is required any time the unprotected working height is equal to or greater than four feet above the surrounding areas, including when performing work from bucket trucks, aerial lifts or on top of electrical equipment.
   a. A personal fall arrest system shall be used when working from a scissor lift if it is recommended by the manufacturer and the lift is provided with an approved anchor point. Do not tie off directly to the guardrail system.
2. Exceptions to 15-1(A)(1) include:
   a. Climbing fixed ladders unless a ladder climbing safety device is installed.
   b. Work from a portable stepladder.
   c. Work on vehicles or trailers.
   d. Work from a baker scaffold less than 10 feet in height.
   e. Low slope roof work as allowed under 15-5(A).
3. Wear work positioning devices for any of the following:
   a. When working from an aerial platform or straight ladder.
   b. When a qualified climber ascends or descends a pole.
   c. When working at an elevation from a pole.
4. Wear a Fall Restraint System when working from a properly secured portable straight or extension ladder, or a fixed ladder.
5. Use fall protection at all times when climbing, when performing work from and descending wood poles, towers and when performing work from a bucket truck, aerial lifts or on top of electrical equipment.
6. Inspect fall protection equipment thoroughly for defects prior to each use.

7. Do not use defective fall protection equipment.
8. Destroy or tag for repair defective fall protection equipment to prevent accidental use by someone else.

15-2 FALL ARREST SYSTEMS

A. System Requirements

1. A fall arrest system is a full body harness attached to a shock absorbing lanyard.
2. The shock absorbing lanyard is connected to a static or retractable lifeline or an anchorage capable of withstanding a 5000 pound force.
3. Body belts are not approved for use as a part of a fall arrest system.
4. Fall arrest systems are required to be constructed for each job requiring their use so that any resulting fall is arrested as short as possible.
5. Fall arrest systems are required to be constructed so that the fall arrest system will not allow a free fall of greater than 6 feet.
6. All components of a fall arrest system subjected to a significant fall are required to be immediately removed from service pending any accident and close call investigation instructions and destroyed after any investigation has been closed and action items completed.

B. Lifelines Requirements

1. Lifelines, when used, are required to be attached above the worker where possible.
2. A separate lifeline is required to be used for each worker tying into a vertical lifeline.
3. Lifelines are required to be ½ inch nylon rope, or equivalent.
4. Lifelines are required to be attached to an anchorage capable of withstanding a 5000 pound pull in the direction of any resulting strain should a fall occur.
5. Lifelines are required to be attached to straps (e.g., tower harness, boom strap) that, where appropriate, have been protected against sharp angles or rough edges.

C. Lanyards Requirements

1. All lanyards used as a part of a fall arrest system are required to be of the shock absorbing type.
2. Snap hooks on all lanyards are required to be the double action type.

15-3 CLIMBING BELTS

A. Climbing Belts Requirements

1. Only approved safety straps and body belts shall be used.
2. Climbing belts and straps are classified as work positioning devices designed to prevent falls from occurring.
3. Straps are required to be constructed of leather with a synthetic core, with 5/8 inch nylon rope or other synthetic equivalent.

15-4 AERIAL WORK, ELEVATIONS FOUR FEET AND ABOVE

A. General Requirements

1. Ensure that handrails, work positioning devices, or fall protection equipment protect workers working at elevations of four feet or more.
2. Use approved safety belts or straps, harnesses, lifelines, guardrails, or other protection when working in elevated positions.
3. Inspect each safety device each time it is used whether the safety device is Company or personally provided.
4. Use only safety devices that are in good condition.
5. Secure workers to allow both hands free when working in an elevated position.
6. Do not wear climbers when working from aerial equipment.
7. Do not travel or work directly below an elevated bucket or platform without first receiving acknowledgement from, and having 3-way communication with, the elevated worker.
8. Do not throw tools, materials, or equipment to or from elevated aerial equipment.
9. Refer to **Section 15-1**, **Fall Protection Safety Requirements**, for further information about fall protection equipment.
10. Refer to the following related sections for further information on aerial work requirements:

    Section 10-12(A) Mobile Equipment Requirements

    Section 10-14(A) Mobile Crane Requirements

    Section 10-15(A) Aerial Equipment Boom Maneuvering Requirements

    Section 10-22(A) Safety Equipment Requirements

11. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

B. **Safety Belts and Harnesses Requirements**

1. Visually verify that the snap has engaged the D-ring of the harness or climbing belt before relying upon it to support weight.
2. Use an approved tower harness with the lifeline attached above when working above energized lines or equipment and the safety strap cannot be used to prevent falling.
3. Carry double safety straps with one on each D-ring of the body belt when double safety straps are used.

C. **Lifelines Requirements**

1. Attach the lifelines above the working elevation when possible when using lifelines.
2. Keep lifelines long enough to allow work and still minimize the length of a fall.
3. Use lifelines equivalent to ½ inch nylon rope.
4. Attach the lifeline to an approved tower harness or both D-rings of an approved Lineman's body belt or a tree trimmer's saddle.
5. Use rope safeties only when working on metal structures.
6. Use approved nylon rope or cord safeties provided by the Company.

15-5 ROOF WORK

A. **Low Slope Roof Requirements**

1. Employees working from low-slope roofs (having a slope less than or equal to four inches vertical, 12 inches horizontal) with unprotected sides and edges four feet or more above lower levels will be protected by personal Fall Arrest Systems except where the work is to be performed at a distance of 15 feet or more from the edge.
2. On low slope roofs where work is performed at less than 15ft from the leading edge, a written fall protection plan can be used. This written plan can be recorded in several different ways. Employees working alone can use the "notes" field of the ADMS ticket or written on the service request. Crews performing this work this information can be captured in the Pre-Job Brief. The fall protection plan can consist of several different options to use as "soft controls." The following "soft controls" can be utilized.

- Utilizing a pole climbing skid/safety strap as a positioning belt tethered to the weather head. (This allows you to move freely around the connection point without allowing you to get near the edge).
- Placing a high visibility cone or flag at each of the leading edges to alert you to your position on the roof.
- Call for a second person to be a safety observer to ensure you know your position on the roof.
  a. The safety observer shall be competent to recognize fall hazards;
  b. The safety observer shall warn employees when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
  c. The safety observer shall have visual sighting of the employee being monitored;
  d. The safety observer shall be close enough to communicate orally;
  e. The safety observer shall not have other responsibilities which could take the observer's attention from the monitoring function.

B. **Steep Roof Requirements**

1. Steep roofs (having a slope greater than four inches vertical, 12 inches horizontal) with unprotected sides and edges four feet or more above lower levels will be protected by personal Fall Arrest Systems.
2. Utilize Buck KIT191 - Buckingham Modified Roof Top Kit (APN 00165714) or equivalent kit approved by the PPE Review Team.

Chapter 16: Welding Safety

INTRODUCTION

This chapter contains specific requirements and guidelines for employees involved in welding, grinding, burning, open flame, or a similar operation (Hot Work).

16-1 GENERAL WELDING

A. **General Welding Requirements**

1. Personnel involved in welding may use any welding equipment for which they have been properly trained and qualified.
2. Welder trainees or welder helpers shall work under the direction of the welder and under the supervision of the Foreman or Leader.
3. Only Company personnel or factory-authorized personnel shall do welding on aerial lift equipment, and then, only those who have been authorized to do that particular job shall perform the work.
4. Refer to **IH Hexavalent Chromium Procedure SU-IH-PRC-0304**, for further information on welding operations on or with stainless steel, chrome steel, or hard facing.
5. Place safety signs and shields or barricades around welding jobs where needed to protect co-workers or the public from direct rays of electric arc or welding flame.
6. Securely hang welding cables above or under the walkways when welding cables cross walkways or other open spaces where people work or travel.
7. Open the welding machine main switch when the welding machine is not in use.

B. **General Welding Guidelines**

1. Initiate welding only after the entire procedure has been checked and approved by the Foreman or Leader.
2. Move objects to be welded, cut, or heated to a location designated safe for the operation when practical.
3. Remove all material or potential fire hazards in the vicinity of objects to be welded, cut, or heated.

4. Take precautions to guard against all of the following primary hazards during welding:
   - Electric Shock
   - Radiant Energy
   - Fires
   - Burns
   - Toxic Fumes
   - Explosions

16-2 WELDING FIRE HAZARD CONTROL

A. Welding Fire Hazard Requirements

1. Establish a fire watch and have a fire extinguisher available when welding within 35 feet of flammable or combustible materials unless the area is completely wetted using water in accordance with the following:
   a. During welding or cutting operations.
   b. For 1 hour after welding or cutting operations. (e.g., rubber or scrubber coatings.)
2. Place suitable firefighting equipment conspicuously in the work area.
3. Maintain all firefighting equipment in a state of readiness for instant use.
4. When welding or cutting in elevated positions or ground level take precautions to prevent hot metal from contacting people or combustible materials. **(e.g., remove flammable or combustible materials and/ or protect materials by wetting or covering with fire blankets where applicable)**
5. Take all necessary precautions to prevent ignition of combustible materials (especially during hot work).
6. Take steps to protect against sparks entering ventilation or conveyor systems.
7. Cool or plainly mark hot material before leaving it unguarded.
8. Label in 1 inch letters the substance contained in fuel, gas and oxygen manifolds.
9. Do not attempt to weld or cut in dusty or gaseous areas until the area has been ventilated sufficiently to eliminate the possibility of fire or explosion.
10. Check the opposite side of any wall or partition near a welding or cutting operation.

11. Take appropriate measures, including the following, prior to removing coatings on metals that are to be welded or cut to ensure that they do not contain lead:
    a. Conduct an analysis on suspicious coatings to ensure that workers are not exposed to lead and that lead does not inadvertently enter the environment.
    b. Take precautions to prevent ignition of flammable coatings.
    c. Strip the coating for a sufficient distance from the area to be heated to prevent ignition when the coating is determined to be highly flammable.
    d. Inspect at the beginning of each work shift all torches, fittings and connections in use carrying any substance that may ignite or enter into combustion or be in any way harmful to workers.
    e. Immediately remove from service all defective materials and parts.
12. HOT WORK shall be permitted only in areas that are made fire safe.

    A HOT WORK Designated Area is a pre-determined location designed or approved by the area manager for hot work operations. A designated area shall be a specific area that is of non-combustible or fire resistant construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas.
13. Refer to the Generation Non-Nuclear Hot Work Procedure for safety measures required when performing HOT WORK activities in a generation facility.

16-3 ARC WELDING

A. Arc Welding Requirements

1. Ensure that all members of any crew where arc welding is done are aware of the dangers of watching an electric arc.
2. Ensure that no one is close enough to be injured by the arc before welding is started.
3. Warn individuals standing nearby before striking an arc.
4. Do not look at a welding arc unless your eyes are properly protected and always remain a safe distance from the arc unless your face and hands are properly shielded from arc burn.

5. Use curtains or protective shields made of fireproof material, if possible, when arc welding.
6. Do not use an electric welder until it has been properly grounded.
7. Welding operators shall inspect the electrode holder insulation and welding cable to ensure they are in good condition before use.
8. Repair or replace damaged insulation before use. Only Qualified Electrical Workers (repair technicians) shall service or repair welding equipment.
9. De-energize the main disconnect switch before disconnecting the power receptacle.

16-4 WELDING ROD

A. Welding Rod Guidelines

1. Do not place welding rod ovens on combustible materials.
2. Open metal welding rod containers with an appropriate opener.
3. Place all rods in suitable containers for storage and use.
4. Do not use metal welding rod containers for anything but welding rod storage.
5. Dispose spent rods in approved containers.

16-5 COMPRESSED GAS SAFETY

A. Gas Welding Requirements

1. Ensure that all workers using combustible gas instruments receive training in their use.
2. Do not allow oil or grease of any kind to come in contact with any cylinder, regulator, torch, valve, connection, hose, or other equipment used in gas welding.

   Oil or grease in the presence of oxygen may cause an explosion.

3. Use extreme care to prevent any kind of oil or grease from accidentally contacting oxygen-acetylene welding equipment.
4. Do not smoke, weld, or allow open flames near in-service hydrogen cylinders, as explosive mixtures of hydrogen may be present.
5. Do not smoke, weld, or allow open flames immediately below generators, as explosive mixtures of hydrogen may be present.
6. Do not use matches or hot work to light a torch.

7. Use approved friction type lighters or other approved devices to light a torch.
8. After connecting welding or cutting apparatus to oxygen and fuel-gas cylinders, or when starting to reuse the apparatus after an interval of half hour or more, each gas shall be allowed to flow through its respective hose separately for a few seconds to purge the hose of any mixture of gases.
9. Install appropriately sized reverse flow check valves and flashback arrestors to ensure adequate flow at the regulator and the torch to protect against reverse gas flow and fire entering the gas hoses or cylinder under abnormal conditions.
10. Hoses showing leaks, burns, worn places, or other defects rendering it unfit for service shall be repaired or replaced.

B. **Gas Cylinder Use Requirements**

1. Remove the compressed gas cylinder's gauges when the cylinder is not in use. Cylinders used inside of shops, garages, or similar environments are considered to be in use and may remain connected to the cylinder gauges and ready for use.
2. Be sure all connections are tight. Use soapy water or leak detector to locate leaks.
3. Secure gas cylinders so that they cannot be knocked over.
4. Ensure that gas cylinders have their protective caps (if so designed) in place unless they are actually connected for use.
5. Do not crack valves on hydrogen bottles to blow out valves and connections, as the expanding hydrogen may ignite.
6. Ensure that gas cylinders not having fixed hand wheels have keys, handles, or nonadjustable wrenches on valve stems while these cylinders are in service.
7. Do not face the regulator on a gas cylinder at the time the valve is opened.
8. Do not open an acetylene cylinder valve more than 1 1/4 turns.
9. Avoid direct contact with the gas when releasing compressed CO_2 from cylinders, as its expansion produces a refrigerating effect that may freeze any exposed body portion.

10. Relieve the pressure before dismantling valves, gauges, and similar apparatus associated with compressed gas cylinders.

C. **Gas Cylinder Storage Requirements**

1. Store gas cylinders containing acetylene, oxygen, hydrogen, nitrogen, CO_2, etc., upright with their caps in place in approved safe places away from highly combustible material and well separated from radiators, furnaces, and other sources of heat.
2. Store oxygen cylinders separately from cylinders containing acetylene or other combustible gases in accordance with one of the following:
   a. Separated by a distance of at least 20 feet.
   b. Physically separated using an approved barrier with one–half hour flame resistant rating that reaches a height of 5 feet.
3. Store full gas cylinders separate from empty ones.
4. Do not store gas cylinders on welding carts unless the cart is equipped with an approved noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.
5. Plate steel is not considered an approved barrier.
6. Cylinders used outside of shops, garages, or similar environments which are not reasonably anticipated to be used within 24 hours and all cylinders which are not connected for use shall be stored as outlined in this chapter.

D. **Gas Cylinder Transport Requirements**

1. Ensure that gas cylinder caps are in place and precautions taken to prevent their being knocked over or dropped when moving cylinders, except when the cylinder is properly secured on approved cylinder trucks.
2. Do not lift a compressed gas cylinder by its protective cap.
3. Do not drop or roughly handle gas cylinders.
4. Secure compressed gas cylinders in the appropriate position (e.g., upright for acetylene cylinders) with protective caps in place during transportation.
5. Do not free gas cylinders that are frozen to the ground by prying on them using their protective caps.

6. Use warm water to free gas cylinders that are frozen to the ground.

16-6 PRIMARY CONDUCTORS OR EQUIPMENT WELDING/CUTTING

A. Primary Conductors or Equipment Welding/Cutting Requirements

1. Where it is necessary to weld in proximity to high voltage circuits, provide solid protective barriers or other means to prevent the ionized air or metallic vapor produced by welding from causing a flashover of the circuit.
2. Ensure that welders assigned to work near or above energized primary conductors or equipment are trained in the hazards presented by metallic fumes that might ionize the air near energized primary conductors and result in an electric flash.
3. Ensure that welders are working under the close supervision of a Qualified Electrical Worker anytime they must work closer to exposed primary voltages than the distances specified in the **Minimum Approach Distances for Non-Electrically Qualified Workers Requirements Table** in **Appendix C.**, **Minimum Approach Distances**.
4. Conduct a thorough pre-job briefing between the welder and Qualified Electrical Worker prior to starting any work that requires a worker to work closer to exposed primary voltages than the distances specified in the **Minimum Approach Distances for Non-Electrically Qualified Workers Requirements Table** in **Appendix C.**, **Minimum Approach Distances**.

   Refer to **Section 2-4**, **Pre-Job Briefings**, for further information regarding Pre-Job Briefings.
5. Welders may work closer to energized primary voltages than the Minimum Approach Distance for Qualified Electrical Workers, while under the close supervision of a Qualified Electrical Worker, once protective cover-up has been installed over the energized conductor by a Qualified Electrical Worker.

16-7 CONFINED SPACE WELDING

A. Confined Space Welding Requirements

1. Provide assistance to the welder using a Welder Trainee, helper, or other classification when the welder is working in holes, manholes, or vaults.

2. Allow the Welder Trainee, helper, or other classification to remain on top of the excavation to attend the welder and watch for fire, cave-in, etc., if the Welder Trainee, helper, or other classification is not needed in the bell hole or the ditch.
3. Provide adequate ventilation when welding in confined areas or when brazing, cutting, or welding any zinc, brass, bronze, stainless, galvanized, lead-coated, or other toxic materials.
4. Provide appropriate respirators when welding in confined areas or when brazing, cutting or welding any zinc, brass, bronze, galvanized, lead-coated, or other toxic materials.
5. Refer to **Chapter 8**, **Confined Spaces**, for further information concerning confined spaces.

16-8 CONTAINER WELDING

A. Container Welding Requirements

1. Initiate welding only after the entire procedure has been checked and approved by the Foreman or Leader.
2. Exercise extreme care when cutting or welding on any container.
3. Consider all containers dangerous until proven safe.
4. Make initial penetrations of drums by cold chisel or air chisel before applying heat to the drum to accommodate the release of pressure during the application of heat.
5. Observe the following procedures as a minimum precaution when welding or cutting containers that may have contained flammable liquids:
   a. Steam or wash the inside of the container to remove as much of the flammable liquid as possible.
   b. Fill with water to within 3 inches of the place where the weld or cut is to be made.
   c. Purge the remaining space with an inert gas, preferably CO_2 or nitrogen.
   d. Check for an explosive mixture with an approved instrument before welding or cutting is started.
   e. Perform additional checks at 15 minute intervals if work continues longer than 15 minutes.

6. Perform the following minimum precautions prior to initiating welding on a container:
   a. Wrap the entire tank with flame resistant materials or rubber blankets.
   b. Cover the filler cap with wet rags.
   c. Keep the rags on the filler cap wet and in place while the job progresses.
7. Remove the entire tank from the equipment to a safe distance if the precautions in **Step 6** cannot be accomplished.
8. Ensure that a second person is standing by with an ABC fire extinguisher with a capacity of not less than 10 pounds when welding or cutting on equipment near a fuel tank.
9. Refer to **Section 5-6**, **Compressed Gas Use**, for further requirements.

16-9 APPAREL

A. Apparel Requirements

1. Wear approved welding goggles or helmets with the proper shade lens when chipping slag or removing scale.
2. Wear approved goggles or face shields if approved helmets are not worn.
3. Wear leather gloves while welding or cutting.
4. Ensure that clothes are free of oil or grease.
5. Ensure that clothing around the neck, wrists, and ankles is fastened at all times.
6. Use AR clothing in confined areas.
7. Do not wear contact lenses during any welding operation.
8. Remove all gas lighters and matches from clothing before welding or cutting.
9. Do not wear pants with cuffs or pants tucked inside the boot top when using welding equipment.
10. Select clothing that will not catch fire easily (e.g., clothing that is frayed).
11. Wear long sleeved shirts and trousers made of 100 percent natural fiber or AR material.

12. Wear earplugs in addition to the PPE required in **Chapter 4**, **Personal Protective Equipment**, when performing the following:
    a. Welding or cutting overhead.
    b. Tying in.
    c. Welding exposing an ear to falling sparks or weld metal.

    Note: The person using the welding equipment designates the shade that experience has shown to be the best suited to their eyes.

13. Wear proper eye protection at all times in accordance with the following:
    a. Do not wear contact lenses during any welding operation.
    b. Use oxy-acetylene goggles shade No. 3 or darker.
    c. Use arc-welding lenses shade No. 10 or darker.
    d. Use a shade No. 12 lens especially designed for the TIG process when performing the TIG process.
    e. Refer to **Section 4-3(D)**, **Eye and Face Protection Selection Guide**, for additional eye protection information.
14. Refer to **Chapter 4**, **Personal Protective Equipment**, for additional information regarding PPE.

Chapter 17: Work Involving Helicopters

INTRODUCTION

This chapter contains specific requirements and guidelines for employees involved in helicopter work.

17-1 GENERAL HELICOPTER WORK

A. **General Helicopter Work Requirements**

1. Work to be performed with helicopters shall be on a voluntary basis.
2. Workers shall not be discriminated or retaliated against for not volunteering to work with helicopters.
3. If the workers and/or Leader determine the work is being done in an unsafe or unprofessional manner, the work will be discontinued until the unsafe conditions are corrected.
4. Workers refusing to follow safety procedures shall be immediately removed from the project.
5. The pilot shall have ultimate responsibility for the safety and conduct of all personnel in or around the aircraft.
6. Workers shall not request the pilot to undertake any flight operations that will violate federal and state laws, regulations, and directives, and APS Safety Rules.
7. The pilot and the person in contact and/or Foreman shall have the ultimate decision in determining the safest method to perform the work, given all the circumstances of a particular job situation.
8. Do not approach a helicopter closer than 50 feet while the rotors are in motion unless required by work duties.
9. Do not work in the area to the rear of the cockpit unless authorized by the pilot.
10. Do not board or depart a helicopter while the rotors are in motion without the pilot's specific authorization.

B. **General Helicopter Work Guidelines**

1. Ensure that the pilot is informed of the location of ground personnel on the project and other aircraft in the area.
2. Explain and discuss communications procedures in detail.

3. Request input from all personnel involved to identify and prevent hazards and potential operational problems.
4. Take precautions to eliminate, as far as practical, the dust or other conditions which reduce visibility.
5. Instruct ground personnel to exercise special caution to keep clear of main and stabilizing rotors when visibility is reduced by dust or other conditions.
6. Board and depart from the front of the aircraft whenever possible.
7. Approach and depart the helicopter on sloping or irregular terrain in the area of greatest clearance under the blades.
8. Never walk up-slope from the helicopter.
9. Ensure that the workers are trained and qualified to perform such work when the job includes working from the skid.
10. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

17-2 HELICOPTER WORK PRE-JOB BRIEFINGS

A. Helicopter Work Pre-Job Briefing Requirements

1. Perform the following in a pre-job briefing with each crew member and the pilot in attendance prior to any work being done:
   a. Explain the plan of operation for that job.
   b. Discuss each activity to be performed so that all activities are clearly understood by everyone.
   c. Explain proper procedures for entering and exiting the helicopter to all workers.
   d. Discuss planning to minimize possible hazards of the operation.
   e. Inform and direct all personnel exposed of the safeguards and escape procedures.
   f. Place emphasis on the following:
      - Emergency procedures, including mechanical failures resulting in autorotation.
      - Hazards associated with loose items interfering with main rotor and tail rotor blades.
      - Hazards arising from rigging components in external load operations.

- Hot line crossings and clearances to power lines.
- Head and hand signals as a means of communication between the pilot and the ground crew during external load operations.

A. Refer to **Section 2-4**, **Pre-Job Briefings**, for further information regarding pre-job briefings.

17-3 APPAREL

A. Apparel Requirements

1. Workers shall wear approved flight helmets and flight suits on all helicopter flights while engaged in tasks related to operations and maintenance, line patrols, or other construction activities.
2. On all flights, flight suits and helmets will be optional unless deemed necessary by the pilot in command of that helicopter.
3. Ground crews working in proximity to helicopter loading or unloading operations shall comply with the following:
   a. Wear hard hats equipped with secured chinstraps.
   b. Wear dust goggles.
   c. Refrain from wearing loose clothing likely to flap in the rotor downwash or snag on a hoist line.

17-4 GROUND TO PILOT COMMUNICATIONS

A. Ground to Pilot Communication Requirements

1. Maintain constant two-way audible communications using a radio with a designated person on the ground crew assigned to signal during any loading or unloading operation.
2. Ensure that the designated ground signaler is clearly distinguishable from other ground personnel by the use of a different colored vest, hard hat, or other clothing.
3. Maintain constant operable communications from helicopter to helicopter, helicopter to workers working below, and pilot to passenger.
4. Cease operations until communications are restored if they are interrupted.
5. Ensure that the designated signaler is familiar with, and uses, the hand signals presented in Appendix B. to complement the verbal two-way communications provided via radio.

6. Refer to **Appendix B.**, **Hand Signals Charts**, for the hand signals used to communicate movement.

17-5 EQUIPMENT AND TOOLS

A. Equipment and Tool Requirements

1. All equipment and tools shall be free from defects, and/or excessive wear.
2. The pilot and workers performing the work shall visually inspect rigging before each daily shift.
3. Economy shall not govern safety or quality of tools and equipment.
4. Helicopters shall be Federal Aviation Administration (FAA)-certified for the work to be performed.
5. Pilots shall be qualified in accordance with Federal Aviation Regulations (FAR) Part 133, A., B., C., and Part 135 and demonstrate experience prior to performing such work.
6. Maintain pilot logbooks daily.
7. Perform helicopter maintenance in accordance with manufacturer's recommendations and the FAA.
8. Store fuel in proper fuel tanks.
9. Dispense fuel from fuel tanks using filter systems of the Go-No-Go Type, such as those manufactured by Bendix Corporation and Facet Company.
10. Maintain filtering systems according to manufacturer's recommended specifications.
11. Do not remain in helicopters during fueling operations.
12. Perform fueling with care so as not to allow contaminants to enter the fueling process.
13. Remove drips, spills, and excess fuel from the aircraft immediately.
14. Perform a pre-flight inspection of the helicopter each day before any work is done.
15. Complete a pilot's checklist daily.
16. Keep a copy of the pilot's checklist in the aircraft at all times.
17. Inspect lines used to carry loads daily.
18. Replace damaged lines immediately.

19. Discard rigging items if deficiencies are found, unless repairs can be made to return the condition to like-new quality.
20. Ensure that cargo release hooks operated by the pilot have a manual release device.

17-6 LOADING AND UNLOADING OPERATIONS

A. Loading and Unloading Operations Requirements

1. Secure all external loads except those suspended directly below the aircraft such as hot sticks, ball markers, hand lines, grounding sets, etc., to the helicopter to ensure that they do not interfere with the rotors.
2. Properly sling loads and tag lines with sufficient length to prevent them from being drawn up into the rotors.
3. Use pressed sleeve, swedged eyes, or equivalent means for all freely suspended loads to prevent hand splices from spinning open or cable clamps from loosening.
4. Design and install all electrically-operated cargo hooks so that they cannot open inadvertently.
5. Ensure that all electrically-operated cargo hooks are equipped with a mechanical means for releasing the load.
6. Ensure that a Competent Person tests both means of operation (electrical and mechanical) prior to the first use each day to determine that the release functions properly for all electrically-operated cargo hooks.
7. Check the size and weight of all loads and the manner in which they are attached to the helicopter.
8. Do not attempt a lift if the pilot believes the lift cannot be made safely.
9. Do not work directly under a hovering aircraft except to engage or disengage cargo slings.
10. Provide a safe means of access when engaging or disengaging cargo slings.
11. Safely dissipate any static charge developed by suspended loads using a grounding device.

12. Require all workers who need to touch the load to wear high voltage rubber gloves if the static charge may not be safely dissipated.
13. Do not allow the weight of any load, internal or external, to exceed the manufacturer's rating given the work area's current density altitude.
14. Do not allow open fires in areas where they may be spread by rotor downwash.

B. **Loading and Unloading Operations Guidelines**

1. Carry cargo in covered baskets whenever possible.
2. Take adequate precautions to eliminate the potential for dusty conditions due to rotor downwash where practical.
3. Maintain good housekeeping in all loading and unloading areas.
4. Provide sufficient ground personnel to ensure that helicopter loading and unloading operations can be performed safely.

17-7 WORKING ALOFT - RECEIVING LOADS

A. **Working Aloft – Receiving Loads Requirements**

1. Tie off workers receiving loads to the structure by the use of an approved Lineman's safety strap while aloft.
2. Ensure that the first worker carries a suitable hand line up the structure.
3. Ensure stable footing before receiving any loads from the helicopter.
4. Do not wear loose fitting clothes that could become entangled in sling load operations.
5. Limit loads received to insulators, travelers, transformers, tools, and ladders.
6. Do not hover loads directly above workers at any time.
7. Ensure that at least two workers shall be available to receive loads when working from a structure.

17-8 INSTALLING INSULATORS

Note: The following are examples of some methods for installing insulators. These examples do not preclude the utilization of another suitable method.

A. **"V" Strings Installation Requirements**

1. Install "V" string insulator assemblies by the use of a spreader bar of sufficient length to pin each string to the tower attachment point.

2. Bring the assembly into the tower using the helicopter so that the assembly is horizontally equal to or below the workers in the tower.
3. Do not attempt to pin both sides of the "V" string insulator assembly at the same time.
   a. Pin the outside end of the arm first.
   b. Permanently pin one string before attempting to pin the other string.
4. Signal the pilot to lower the spreader bar to place the weight of the assemblies in their permanent position using one designated Journeyman.
5. Disconnect the slings when the Journeyman has determined the assemblies are secure.
6. Signal the pilot to depart from the tower.

B. **Dead-End Strings Installation Requirements**

1. Signal the pilot to position the ladder to one side of the permanent dead-end attachment point on the tower.
2. Signal the pilot to release the load when the ladder is secure.
3. Attach safety chains.
4. Descend the ladder and safety off.
5. Guide the pilot to attach the insulator string to the permanent attachment point.
6. Release the load once the permanent pin is securely fastened.
7. Signal the pilot to depart from the tower.

17-9 CONDUCTOR TRAVELERS INSTALLATION

Note: The following example is one method of installing travelers. This example does not preclude the utilization of another suitable method.

A. **Conductor Travelers Installation Guidelines**

1. Guide hooks to the bridge rail as directed by the Lineman as the helicopter comes in with landing ladder.
2. Release the load from the helicopter when instructed by the Lineman.
3. Attach safety chains using the Lineman.
4. Descend the ladder when the Lineman's harness and lanyard are secured and safety off.

5. Deliver the traveler to the helicopter.
6. Start to signal the pilot as to the load's relation to position on the ladder at approximately 200 feet away.
7. Attach a ground to the load when it is within reach to drain it of static electricity.
8. Signal the helicopter to position the traveler for attachment to insulators.
9. Signal to the pilot to slack off slowly on the load when the task is successfully completed.
10. Release the rigging when the helicopter has slacked off on the load.
11. Un-belt and climb up the ladder back onto the arm.
12. Belt off to the tower.
13. Hook the ladder to the long line when the helicopter returns.
14. Move the ladder to the next position using the helicopter.
15. Repeat process as necessary.
16. Take special care to prevent loads from causing injury to worker when receiving or hooking up loads from aloft.

17-10 HELICOPTER EGRESS

A. Helicopter Egress Guidelines

1. Belt onto the helicopter via the attach points with the shock lanyard, positioning the belt and the proper tools and hardware for the job loaded onboard.
2. Maneuver the helicopter up next to the structure so that the Lineman can place his tools and hardware on the structure.
3. Bond all structures by cable to the helicopter before the Lineman transfers between the helicopter and the structure.
   a. Bond structures to the helicopter utilizing approved cables with spring loaded quick release clamps.
   b. Bond the helicopter to the same object that the Lineman transfers onto.
4. Use grounds from the structure to the wire in the case of an isolated static system if the Lineman cannot safely transfer without coming into contact with the static.

a. Bond the helicopter to the wire.

b. Ground the wire to the structure.

5. Start transferring equipment and material to the structure once the helicopter is properly bonded and, if necessary, the structure's static grounded.
6. Place every piece of equipment onto the structure in a way so as to prevent any contact with the lower phases.
7. Tie up hand lines, hoists, grounds, splices, and cables in a manner to prevent inadvertent release as items have the potential to come into contact with the phases.
8. Place everything in a manner that does not interfere with the hand and footholds that will be used for the Lineman transfer.

   Note: The pilot always has the option of departing the structure at any time for whatever reason.

   Un-belting the primary safety and removing the shock lanyard from the helicopter and attaching it to the structure will prevent the Lineman from falling in the event of an emergency.

   This also allows the pilot the option of performing an emergency procedure without worrying about the Lineman being attached to the helicopter and the tower at the same time.

9. Transfer the Lineman by removing his regular belt harness from one D-ring.
10. Refasten the snap onto the other D-ring so that other snaps of the belt are into one D-ring.
11. Do not leave the harness hanging without refastening it; this will prevent the harness from catching on the aircraft.
12. Unsnap the large carabiner (attached to the shock lanyard) from the helicopter when the helicopter is in position.
13. Attach the large carabiner to the structure.
14. Proceed onto the structure with both hands and feet free once released from the helicopter.
15. Wait in that position until the helicopter has cleared the structure.
16. Ensure that there is nothing hanging from the Lineman's belt that could possibly get caught or hung up as the helicopter leaves the structure once the Lineman has transferred.

17. Move the helicopter away from the structure in a slow and cautious manner so that in the event of something hanging up, the helicopter can maneuver back to the structure and have the Lineman free whatever is hanging up.

17-11 HELICOPTER ENTRANCE

A. Helicopter Entrance Guidelines

1. Position the helicopter up next to the structure when the Lineman is ready to transfer back to the helicopter.
2. Bond the helicopter to the same source.
3. Begin transferring equipment onto the helicopter.
4. It may be necessary at times for the Lineman to board the helicopter and, once satisfied, help position equipment in the helicopter.
5. Transfer to the helicopter and safety off once all equipment is onboard.
6. Remove the bond cable after all equipment is onboard and the transfer to the helicopter is complete.
7. Move the helicopter away from the structure in a slow and cautious manner so that in the event of something hanging up, the helicopter can maneuver back to the structure and have the Lineman free whatever is hanging up.
8. In the case of a hang-up when the Lineman is departing the structure, the helicopter must be re-bonded to prevent accidental static discharge.
9. Never safety off to the structure and the helicopter at the same time during transfer.

17-12 WORKING FROM A HELICOPTER SKID

A. Working From a Helicopter Skid Guidelines

1. Use a federal OSHA-approved safety harness.
2. Remove the rear left door.
3. Attach a D-ring to the middle seat belt attach point
4. Run the Lineman's belt through the D-ring.
5. Observe aircraft center of gravity limits.
6. Ensure that aircraft performance and controllability are not in question before the task is performed.

7. Position the helicopter in the approximate position desired and check for controllability in the case of adverse wind angles.

17-13 STATIC DISCHARGE

A. Static Discharge Guidelines

1. Dissipate the potential static charge by touching the skid to the tower if the purpose of the lift is to place the Lineman onto the tower.
2. Evaluate the situation and use either hot gloves or jumper cables to bond the helicopter if the purpose of the lift is for the Lineman to work on an ungrounded item, such as conductor wire or static wire.
3. Attach jumper cables that can be removed with minimal force so as to allow the helicopter to maneuver away if needed.

Chapter 18: Vegetation Management

INTRODUCTION

This chapter contains specific requirements and guidelines for employees in vegetation management or doing any other work required to maintain a clear right-of-way for Company electric lines.

This chapter provides safe working rules to help prevent accidents.

It is not possible to list all hazards that might be encountered, but the use of these specific requirements and guidelines, together with good judgment and common sense, will ensure a safe operation.

18-1 ELECTRIC LINE-CLEARANCE OPERATIONS

These rules are compiled as a minimum guide toward preventing accidents to personnel engaged in clearing vegetation located near overhead electric lines.

Because of the hazardous nature of the work it is not possible to address all work-site hazards that may be encountered.

Safe operations can be achieved, however, by applying these safety rules with good judgment and using common sense when responding to unexpected workplace situations.

Unusual circumstances and personal emergencies may require that these rules be modified to effectively respond to specific situations.

18-2 OTHER APPLICABLE SAFETY REQUIREMENTS AND GUIDELINES

These rules are specific to the business of vegetation management.

The information presented in other sections of this APM, operator's manuals, and other industry-related safety and training materials will also pertain.

18-3 QUALIFIED LINE-CLEARANCE ARBORISTS

A. **Qualified Line-Clearance Arborists Requirements**

1. To prevent injuries to persons not knowledgeable in tree pruning and removal hazards and to conform to the requirements, only a qualified Line-Clearance Arborist, Line-Clearance Arborist Trainee, or other Qualified Electrical Worker shall perform tree work in proximity to energized overhead power lines.

18-4 QUALIFIED LINE-CLEARANCE ARBORIST TRAINEES

A. Qualified Line-Clearance Arborist Trainees Requirements

1. Line-Clearance Arborists who have been trained in Line-Clearance operations may prune and remove trees in the vicinity of energized lines if, in the judgment of the crew Foreman, the work can be completed safely.
2. Line-Clearance Arborist Trainees performing work where an electric hazard exists must work under the direct supervision of a qualified Line-Clearance Arborist.

18-5 JOB PLANNING/PRE-JOB BRIEFINGS

A. Job Planning/Pre-Job Briefing Requirements

1. All Forestry Crews regardless of the size shall have a person in charge (PIC) assigned to every job.
2. Before climbing, pruning, or removing any tree, all arborists involved in the operation shall conduct a job briefing.
3. Thoroughly inspect the tree and its surroundings to become acquainted with all possible hazards.
4. Identify all electric hazards in or near the work area.
5. Establish work procedures and PPE required for the job.
6. The person in charge may assign a Designated Safety Observer (DSO) during critical tasks of a job. This shall be determined during the Pre-Job Brief.
7. Refer to **Section 2-4**, **Pre-Job Briefings**, for further information regarding pre-job briefings.

18-6 COMMUNICATION AND SIGNALING

A. Communication and Signaling Requirements

1. The potential hazards involved in Line-Clearance operations (e.g., falling objects, high-speed cutting equipment, electrical facilities) in conjunction with the operation of noisy tools and equipment demands that warning systems, including common hand signals, be used to prevent accidents.
2. A second crewmember must be within visual or voice communication distance when another crewmember is working or maneuvering limbs

within 10 feet of a conductor energized in excess of 750 VAC or when performing work in excess of 12 feet from the ground.

3. The Arborist in charge shall establish a safe work plan to manage the drop zone prior to the start of any forestry-related activity. Three-way communication among arborists aloft and other workers on the ground shall be established before cutting and dropping any debris out of the tree. The command "Underneath" from the ground person and the response of "All Clear" from the arborist aloft, then the repeated command of "All Clear" from the ground person when clear of the drop zone is an example of Three Way Communication (see list of suggested verbal commands and responses). When applicable, non-verbal communication methods shall be established during the pre-job brief.
4. The arborist aloft shall cease all activity while workers on the ground are in the drop zone.

B. **Communication and Signal Requirements**

COMMAND	DESCRIPTION	RESPONSE
Stand Clear	Replaces heads ups or headache, wood or limbs coming down or equipment potentially unsecured	Clear or All Clear
Cutting or Stand Clear Cutting	Cutting going on, either lowering or chunking get into position or out of the way	Clear or All Clear
Working or Stand Clear Working	Work going on overhead always be ready for possible falling objects	All Clear
Set	A final confirmation between climber and ground the man before act is performed	All Set
Lift, Hoist	Must lift up limb, etc. over an obstacle	Set, all set
Underneath	Ground worker going to retrieve something or work under climber, climber should cease all activity	All Set or All Clear
3 Long Whistles	Emergency	Evaluate situation

COMMAND	DESCRIPTION	RESPONSE
One Sharp Whistle	Attention, help may be needed. Cutting may be about to occur	Ok, coming, or All Clear

18-7 ENERGIZED LINES

C. **Energized Lines Requirements**

1. All overhead and underground hardware, including poles, transformers, regulators and insulators, and all wires, including electric, telephone, and cable television shall be considered as being energized at potentially fatal voltages.
2. Minimum Approach Distances to energized hardware shall not be violated.
3. Refer to **Appendix C.**, **Minimum Approach Distances**, for further information.
4. If the work cannot be completed safely, the situation shall be reported before any work is attempted.
5. A Qualified Electrical Worker and/or line crew will assist in the operation.

18-8 TREE CLIMBING

A. **Tree Climbing Requirements**

1. Arborists shall be tied in or secured while ascending a tree and remain tied in or secured until they have returned to the ground.
2. Prior to descending, the climber must first check rope length to ensure a safe descent.
3. If the length is questionable, the climber must secure the end of the climbing line with a figure eight knot.
4. Line-Clearance arborists should climb on the side of the tree that is away from energized conductors and shall tie in using a sturdy, wide-angled crotch located well above the work area in such a position that a slip would swing the arborist away from energized equipment or other hazards.
   a. Where possible, the rope shall be crotched around a main Leader rather than a lateral limb.

b. When practical, a false crotch shall be incorporated into the climbing system.

5. Under no conditions shall an arborist be pulled into a tree by using a truck, car, or other machine attached to the climbing rope.
6. Slack in the climbing rope shall be kept to a minimum to reduce the distance of fall should an arborist slip or lose balance.
7. Never shall an arborist climb above the tie in point.
8. Climbing ropes or hand lines shall be used for raising and lowering ropes and tools.
9. Tools shall not be thrown into a tree, out of a tree, or between arborists while in a tree.
10. Climbing lines used in a split-tail system and split-tails shall be terminated with an eye splice or a knot that interfaces appropriately with the connecting link that it is attached to.
    a. The termination knot selected shall remain secure under normal loading and unloading.
    b. When using a carabiner without a captive eye, the knot or eye splice shall cinch in place to prevent the accidental opening and/or side loading of the carabiner.
11. Rope snaps used in climbing shall be self-closing and self-locking, with a minimum tensile strength of 5,000 pounds (22.24 kilo newton [kN]).
12. Carabiners used in climbing shall be self-closing and self-locking, with a minimum tensile strength of 5,000 pounds (22.24 kN).
13. Carabiners shall be designed to release the load by requiring at least two consecutive, deliberate actions to prepare the gate for opening.
14. The arborist shall not "burn" out of the tree but shall descend using reasonable care to avoid personal injury and damage to climbing equipment.

18-9 USING AN AERIAL LIFT FOR LINE-CLEARANCE OPERATIONS

A. Using an Aerial Lift for Line-Clearance Operations Requirements

1. The operator shall tie in with a safety harness and lanyard before raising the booms.

2. The operator shall neither touch nor bring the booms or bucket closer than the Minimum Approach Distances when working near any energized power line, potentially energized hardware, or any object that is in contact with an energized conductor.
3. When an aerial lift along roadways is operated, the booms shall be elevated high enough, or sufficient traffic control must be provided, to allow adequate clearance for passing vehicles.
4. Weight limitations shall not be exceeded. (The booms shall never be used to lift, push, or pull branches of any size.)
5. No person shall climb onto the truck, cab screen, dump box, chipper, etc., while the booms are elevated in the working position.
6. When an arborist is placed in a tree using an aerial lift, the arborist shall be tied into the tree before removing the safety line attached to the aerial lift.
7. Verbal approval shall be granted by the bucket operator before any ground personal may touch the truck or chipper when the boom is elevated near energized power lines.

18-10 TREE FELLING

A. Tree Felling Requirements

1. Ropes shall be used when felling a tree that is 8 inches in diameter or greater or when a target is present.
2. Wedges, block and tackle, or other appropriate devices may be used to assist in the felling operation.
3. Any limbs that may strike nearby objects as the tree falls shall be pruned to a sufficient height or width to allow the tree to fall without striking such objects.
4. Personnel not involved in the removal operation shall maintain a safe distance of two tree lengths from the tree being felled.
5. The work area around the trunk shall be cleared to provide safe working conditions.
   a. An escape route shall be determined and cleared prior to beginning the felling operation.
   b. Ideally, the escape route should be at a 45° angle to the rear of the intended felling direction.

6. When multiple leader trees must be felled, each Leader shall be felled separately in order to prevent splitting.
7. Notches in the intended direction of fall shall be used to fell trees that are greater than four inches in diameter at breast height.
   a. Notches shall not exceed one-third of the diameter of the tree and shall provide a wedge shape of 45° or greater to guide the fall of the tree and prevent splitting.
   b. The two cuts that form the notch shall not cross at the point where they intersect.
8. With a conventional notch or a Humboldt notch, the back cut shall be 1 to 2 inches above the apex of the notch to provide an adequate platform to prevent kickback of the tree or trunk.

   With an open-face notch (greater than 70°), the back cut should be at the same level as the apex of the notch.
9. Depending on the size of the tree, the minimum remaining hinge wood must be equal to or greater than 10 percent of the trunk diameter at the cutting point.
10. After the back cut is completed, the arborist shall shut off the saw and immediately move a safe distance away from the tree using the planned escape route.
11. After the arborist is a safe distance from the tree, other crewmembers shall pull the guide rope to cause the tree to fall.
    a. Crewmembers should be alert to flying debris from the falling tree as well as from adjacent trees.
    b. Never shall a co-worker stand behind the chainsaw operator in order to push the tree over.
12. Workers shall not re-enter the work area until a thorough inspection is made to identify broken or hanging limbs in adjacent trees or other newly created hazards resulting from the felling operation.

18-11 CLIMBING AND BUCKING

A. Climbing and Bucking Requirements

1. The area in which bucking will be performed shall be maintained clear of cut logs and limbs, brush, vines, and other debris.

2. Chainsaw operators shall stand in such a position that their legs and feet are out of the path of the cutting bar and rolling logs.
3. When possible, workers shall stand on the uphill side of the log and never straddle the trunk.
4. All cuts shall be made in a manner so as to relieve tension on logs, limbs, or pinned saplings under stress.
5. Plastic wedges shall be used to prevent or correct binding of the bar and chain when logs are cut.
6. When necessary, cant hooks shall be used to roll over logs to complete bucking.

18-12 TOOLS AND EQUIPMENT

A. General Requirements

1. In no circumstance shall spliced ropes or homemade safety equipment or tools be used until they have been approved through the Tool Task Force Committee and the Forestry Safety Committee.
2. All tools, ropes, saddles, and other equipment, including trucks, aerial lifts, chippers, and chainsaws, shall be inspected daily before use.
3. Damaged, deteriorated, or defective tools and equipment shall be removed from service.
4. Wheel chocks shall be set in place when any equipment is parked on sloping terrain or before an aerial lift is operated.
5. Refer to **Section 6-2**, **Chainsaws**, for further information.

B. Brush Chippers Requirements

1. A chipper shall not be operated under a tree that is being worked or if the booms of an attached aerial lift are elevated near energized power lines.
2. Loose-fitting clothing, jewelry, climbing equipment, or gauntlet-type gloves shall not be worn while operating a chipper.
3. Brush shall be fed into the chipper butt-end first from the back corner of the feed table on the curbside of the road.
4. Hands or other parts of the body shall not be placed into the in-feed hopper.
5. Leaning into or pushing material into the in-feed hopper with the feet is prohibited.

6. Foreign material such as gravel, wire, nails, etc., shall not be fed into a chipper.
7. The engine and exhaust system area shall be maintained free of sawdust and wood chips to prevent a fire hazard.
8. When not in use, the key shall be removed from the chipper.

C. **Rope Care Requirements**

1. When not in use, ropes shall be properly coiled and stored where they can be kept clean, dry, and away from sharp tool or contaminating products, including oil and grease.
2. Rope shall never be stored close to a storage battery, gasoline, or other chemical products as fumes can weaken the rope.
3. Ropes shall be inspected for cleanliness, cuts and abrasions, damage and excessive wear before each use.
4. Do not burn a rope by running it through a crotch or over any other surface too rapidly.
5. Do not put stress on a rope while it is bent over a sharp corner.
6. Never use ropes dedicated to tree work for anything other than tree work, without retiring the used rope.
7. Ropes shall not be left unattended in trees or lying about the work area when not in use.
8. Ropes shall not be left in trees overnight.
9. Refer to **Section 6-11**, **Cables, Ropes, Slings, and Clevises in Rigging**, for further information.

   Note: The care of a rope will determine its life and may mean the difference between a safe operation and a serious accident.

D. **Rope Use Requirements**

1. An arborist shall know how to use rope to achieve the desired results without risk of injury.
2. All the hazards inherent in the use of rope cannot be listed here, but the following minimum rules shall be observed.
3. All personnel using ropes to rig for tree work shall be familiar with the different rope characteristics and all knots used in tree work and be familiar with their applications.

4. While using saws, arborists shall use care to avoid contacting ropes with the saw blade.
5. Rope shall not be tied or wrapped around the arm or any part of the body to provide a better grip.
6. Personnel shall not stand in a coil where the rope could become entangled in their feet if it is suddenly released.
7. A worker shall control only one rope at a time.
8. Any limb that may be difficult to control by hand while being cut from the tree shall have a rope or ropes attached and be controlled and lowered by personnel on the ground.
9. A rope shall not be tied off to a truck or other mobile equipment unless the motor has been turned off, parking brake applied, and the ignition key removed.
10. The only exception shall be when the vehicle is used for a moving or dragging operation and a rope must be tied to it to complete the job.
11. All ropes used for tree work shall be in the clear before workers grind brush or operate chainsaws or any other equipment in which the ropes may become entangled.
12. No heavy rope work shall be attempted unless adequate personnel are available to complete the job safely.
13. Refer to **Section 6-11**, **Cables, Ropes, Slings, and Clevises in Rigging**, for further information.

E. **Climbing Ropes, Safety Lanyards, and Split-Tails Requirements**

1. All new safety lanyards and climbing ropes shall have a minimum breaking strength of 5,400 pounds and shall be designated as a tree climbing rope by the manufacturer.
2. Climbing ropes, safety lanyards, and split-tails shall be inspected before each use for cuts and abrasions.
3. Particular attention shall be given to the section of rope that is susceptible to excessive wear.
4. Safety snaps and carabiners should be rotated from one end of the rope to the other to prevent excessive wear on one end.
5. Safety lanyards shall be used along with and not instead of a climbing rope.

6. Safety snaps and carabiners shall not be interlocked in order to connect two lengths of rope together.
7. A hand line or pull rope shall never be used as a climbing rope.
8. Conversely, a climbing rope shall never be used for any other purpose than as a climbing rope and to raise and lower tools and ropes.
9. Each arborist is responsible for their own climbing rope, PPE, and safety lanyard and only the arborist to whom they are assigned shall use them.
10. Equipment used to secure an arborist in the tree or from an aerial lift shall not be used for anything other than its intended purpose.
11. EXCEPTION: The arborist climb line may be used to raise and lower tools.
12. Refer to **Section 15-2(A)**, **Fall Arrest Systems Requirements**, for further information.
13. Refer to **Section 15-3(A)**, **Climbing Belts Requirements**, for further information.

F. **Climbing Saddles Requirements**

1. Climbing saddles shall be inspected daily for loose rivets or stitching and excessive wear.
2. D-rings shall be checked for cracks, nicks, burs, and shape prior to, during, and after each use.
3. Weak or questionable equipment shall not be used.
4. Saddles shall not be altered in any manner that would compromise the integrity of the equipment.
5. The snap or carabiner on the climbing rope shall be attached to the saddle through the appropriate attachment points.
6. Arborist saddles and lanyards used for work positioning shall be identified by the manufacturer as suitable for tree climbing.

G. **Climbing Hooks Requirements**

1. Arborists shall use only climbing hooks with gaffs of the type and length compatible for the tree being worked.
2. Prior to each use, climbing hooks, including pads and attachment straps, shall be inspected for damage and excessive wear.

3. Gaffs shall remain sharp by filing with a flat file according to the manufacturer's instructions.
4. Grinding wheels shall never be used to sharpen gaffs, as the heat generated will cause the metal to become brittle.
5. To prevent wounds, gaff guards shall be placed over gaffs when climbing hooks are being stored or transported.

H. **Ladders Requirements**

1. Arborists may ascend a ladder without being tied off; however, the arborist shall not work from or leave the ladder unless they are tied to the tree. If work is performed off of the ladder, it must be tied off by a separate strap or cord.
2. Ladders shall not be used as bridges or to load or handle logs or other materials.
3. Refer to **Section 6-10**, **Ladders**, for further information regarding ladders.

I. **Pruning Tools Requirements**

1. Pole pruners must never be raised or lowered by placing a finger in the hook.
2. A rope shall be tied under the head, never around the hook.
3. Pole pruners and pole saws shall be securely hung vertically so as not to become dislodged unexpectedly. If this cannot be accomplished, pole pruners and pole saws shall be tethered in some form when not in use or safely sent back to the ground.
4. Pole pruners and pole saws shall not be hung on wires. Pole saws should also be covered by a scabbard when not in use aloft.
5. Pole pruners and pole saws shall not be left in a tree unattended.
6. Pole saws shall be stored in scabbards when not in use.
7. When limbs are removed where an electrical hazard exists, an insulated pruning tool shall be in proximity to the arborist.

J. **Axes, Sledge Hammers, and Wedges Requirements**

1. Wedges, sledge hammers, and axes shall be inspected prior to each use.
2. Those found to have loose parts, cracks, splintered handles, or other flaws or indications of wear shall not be used.

3. To prevent injuries, mushroomed areas and burrs on wedges and sledges shall be filed away before use.
4. Only plastic wedges shall be used to prevent pinching while a chainsaw is being used.
5. All persons shall be positioned so that they will not be struck should the axe or sledge deflect from its intended direction of travel.

K**. Rigging Requirements**

1. The number of connecting links used for components of a rigging system shall be minimized when possible.
2. Care shall be taken to ensure that connecting links interface properly and in compliance with the manufacturer's recommendations.
3. The qualified arborist shall ensure that the load ratings shown on the rigging equipment or provided by the manufacturer for all ropes, connecting links, and rigging equipment shall be observed in all rigging operations.
4. Rigging equipment shall be chosen for the specific task based on working load limits and design specifications.
5. All equipment used for rigging operations shall be in good working condition.
6. Equipment that has been damaged or overloaded shall be removed from service.
7. When the potential exists for rigging equipment to be confused with climbing equipment, the equipment shall be clearly marked to indicate its different purposes.
8. Climbers shall chose tie-in points that will provide proper protection while allowing for a separation between the rigging system and the climbing system.
9. Running rigging lines shall not be allowed to come in contact with any part of the climbing system.
10. Arborists performing rigging operations shall be educated to understand and trained to estimate the potential forces at any point in a rigging system being used.
11. The system components shall comply with working load limits relative to the operation and the maximum potential forces.

12. Careful consideration shall be given to the potential forces resulting from the specific influences of rope angles as well as the number of lines and/or line parts that will act on any rigging point.
13. Only qualified arborists or qualified arborist trainees directly involved in the operation shall be permitted in the work zone when a load is being suspended by the rigging system.
14. Arborists working aloft shall position themselves so as to be above or to the side of the piece being rigged and out of the path of movement of the piece when it has been cut.
    a. Climbers and their climbing systems shall be positioned outside of the rigging system itself when a cut is being made or a load is being moved or lowered.
    b. Climbers shall have an escape plan prepared.
15. Steps shall be taken to prevent spars from splitting or tearing during the rigging operation, and climbers shall take steps to prevent the systems from trapping, pinning, or entangling them should the tree split or rigging fail.

    Load binders are one possible means of preventing splitting.

Chapter 19: Mine Property Safety

INTRODUCTION

This chapter contains specific requirements and guidelines for employees who access mine properties to conduct maintenance on APS equipment or facilities located on the property. These requirements and guidelines apply when driving on mine property but not once employees have entered an APS substation located on the property.

These requirements and guidelines are derived from regulatory agencies such as the Mine Safety and Health Administration and from mine operators.

19-1 GENERAL SAFETY

A. **General Requirements**

1. Employees shall adhere to all site safety rules and requirements when accessing and traveling on mine property.
2. Employees shall complete all required mine safety awareness training.

19-2 VEHICLE INSPECTION, MAINTENANCE, AND OPERATION

A. **Vehicle Inspection, Maintenance, and Operation Requirements**

1. Drivers shall observe all site traffic rules and comply with all traffic signs.
2. All APS vehicles to be used during a shift shall be inspected by the vehicle operator before being placed in operation on that shift.
   a. A copy of the documented vehicle inspection for the shift shall be maintained on the vehicle.
3. When defects make continued operation hazardous to persons, the equipment shall be taken out of service and placed in a designated area for that purpose, or a tag or other effective method of marking the defective items shall be used to prohibit further use until the defects are corrected.
4. When the operator has an obstructed view to the rear, the vehicle shall have:
   a. An automatic reverse-activated signal alarm;
   b. A wheel-mounted bell alarm which sounds at least once for each three feet of reverse movement;

c. A discriminating backup alarm that covers the area of obstructed view; or

d. A spotter to signal when it is safe to back up.

5. All vehicles entering mine property shall be supplied with at least two wheel chocks.
6. Vehicles shall not be left unattended unless the controls are placed in the park position and the parking brake, if provided, is set. When parked on a grade, the vehicle's wheels shall be either chocked or turned into a bank.

19-3 MATERIALS HANDLING

A. Materials Handling Requirements

1. Valves on compressed gas cylinders shall be protected by covers when being transported.
2. Waste or rags containing flammable or combustible liquids that could create a fire hazard shall be placed in covered metal containers or other equivalent containers with flame containment characteristics.

Appendix A. Terms and Definitions

TERM	DEFINITION
3-Way Communications	A communication technique used to obtain mutual understanding by which one person (the sender) states the message, the second person (the receiver) acknowledges the sender and repeats the message in a paraphrased form, and the sender acknowledges the accuracy of the receiver's reply.
Acceptor	The person assuming ownership and responsibility for a Clearance and the conditions established by the Clearance.
Alive	Electrically energized as distinguished from Dead or de-energized. (Same as Live or Hot.)
Advanced Safety Eyewear	Safety eyewear that provides a sealing surface, such as foam or rubber, against the face of the user to keep dust or small particles out of the eye.
Amp	Check for current flow through conductor
ANSI	American National Standards Institute
Apparatus	Electrical equipment unless otherwise specifically designated. (Same as equipment.)
Apprentice	A worker who is learning a trade under the apprenticeship-training plan, mutually agreed to between the Company and the Union.
APS	Arizona Public Service
AR (formerly FR)	Arc-Rated
Arc-In-A-Box	An arc-in-a-box condition exists when the exposed energized part being worked is in a 5-sided box or cabinet. The arc flash hazard is increased due to one side open, intensifying the flash. Examples of this type of exposure include: • Service entrance sections • Junction boxes • Meter cabinets
ATV	An ATV is defined as a motorized off-highway vehicle designed to travel on four low-pressure or non-pneumatic tires, intended by the manufacturer for use by an operator or by an operator and a passenger and having the following characteristics: • Handlebars for steering • A seat designed to be straddled by the operator
Authorized	Given or endowed with the right to control, command, or determine.
Bakers Scaffold	A narrow frame multipurpose scaffold with casters/wheels, used as a mobile scaffold, with the end frame measuring 3 feet or less in width.
Boundary Points	The shutoff points that separate equipment to be worked on from electric supplies or process flows. (Also referred to as Clearance Boundary Points or Red Tag Clearance Boundary Points.)

TERM	DEFINITION
Category B Aerial Device	Aerial devices which are equipped with a lower test electrode system but are designed and manufactured for work in which the boom is not considered as primary insulation, but secondary to using insulating tools. These devices are intended primarily for work on transmission lines or equipment.
Category C Aerial Device	Aerial devices which are not typically equipped with a lower test electrode system and are designed and manufactured for work in which the insulating system is not considered as primary insulation, but secondary to, using insulating gloves or tools. These devices are restricted to work on distribution lines or equipment.
Caution Tag	The type of tag used to provide critical information to field personnel regarding a line or piece of equipment. (Similar to Yellow Caution Tag.)
CDL	Commercial Driver's License
Circuit	A combination of lines and exposed live parts; refers to the current carrying parts of conductors, equipment, apparatus, etc.
CIS	Customer Information System
Clearance (Transmission and Distribution)	A statement by one (e.g., Recognized System Operator, Operations Team Leader) having complete authority over all parts of a line or Electrical equipment that said line or equipment is disconnected from all known sources of power. (Refer to **Chapter 12**, **Transmission and Distribution Clearance Procedure and Switching Orders**, for specific details regarding transmission and distribution Clearances.)
Clearance Point (Transmission and Distribution)	A visual open on a circuit with a tag installed at the direction of the RSO that provides de-energization and isolation of equipment to be worked on by personnel.
Cleared	The system condition where all known sources of electrical energy to a circuit or piece of equipment has been disconnected, rendered inoperable, and tagged to protect the worker during the performance of work.
Clearing	The procedure of de-energizing lines or equipment on which work is to be done. It includes suitable tagging or marking of control switches, disconnecting devices, operating handles, or locations where the lines or equipment might be accidentally energized if such warnings were not used.
CMV	Commercial Motor Vehicle
Company	Pinnacle West Capital Corporation, Arizona Public Service Company, APS Energy Services, and Pinnacle West Energy (excluding the Palo Verde Nuclear Generating Station).
Company Business Vehicle Travel	Work-related travel between established work environments. This could be any site and may not be your normally established work environment. This could be an office, substation, power plant, customer location, home office, etc.

TERM	DEFINITION
Competent Person	A person who meets the definition of competent as defined in OSHA 1910.399. (One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.) With respect to trenching and excavation work, any worker who has received training in classifying soils as well as the OSHA Requirements applicable to sloping, shoring and trench boxes used for worker protection. This training shall include an overview of the Competent Person's responsibilities with respect to inspection activities.
Compression Members	Braces or supports of a metal structure that have stress applied to them from their ends toward their middle.
Concurrent Verification	A series of actions by two individuals working together at the same time and place to separately confirm the condition of a component before, during, and after an action. This consists of one person (the Performer) completing the steps while the second person (the Verifier) independently verifies the steps are being completed correctly immediately prior to the Performer executing the step.
Confined Space	A confined space is a space that Is large enough for a person to enter the space and perform work. Has a limited or restricted means for entry or exit; and, Is not designed for continuous occupancy. Within the Company, this definition includes the following spaces: • Manhole vaults (electric) • Transformers • Water tanks • Breakers/OCBs • Chemical storage tanks • Underground vaults • Miscellaneous tanks
Contact Tag	The type of tag used to indicate that a device or circuit will NOT automatically re-close or NOT be manually re-closed should a fault occur in an area protected by that device.
Contract Labor	All labor other than APS employees.
CPR	Cardiopulmonary Resuscitation
CRT	Chemical Review Team
Danger/Do Not Operate Tag	The tag attached to all devices through which known sources of electric energy may be supplied to a line or piece of equipment that is to be worked as if de-energized and prohibits any operation of that device.
Dead	De-energized and grounded.
Decibel (dB)	Unit of measurement of sound level.

TERM	DEFINITION
Decibel, A-scale (dBA)	Unit of measurement of sound level weighted to approximate the frequency response of human hearing.
De-Energized	Disconnected from all sources of electricity.
Dispatcher	A system operator, load dispatcher, substation operator, control room operator, or any person authorized to issue Clearance.
Division Operation Centers	The location designated by the operating director or division manager as a point of operation to order the dispatching of the distribution lines of a particular area.
DNO	Do Not Operate
DOT	Department of Transportation
DVIR	Driver Vehicle Inspection Report
ECC	Energy Control Center
EHV	Extra-High Voltage
Emergency	A condition or set of circumstances which require immediate action; the lack of which action would constitute a prolonged hazard to persons or property.
EMS	An emergency medical services system is a community wide, coordinated means of responding to an accident or a medical emergency.
Energize	To provide an electrical power supply to equipment.
Energy Control Center	The System Load Dispatching Office and such sub-system load dispatching centers as designated by the system operations department to control the system generation and to operate the transmission system.
Ensure	To make sure, certain, that a thing or condition exists and if the thing or condition does not exist, take the necessary actions to establish it.
Entry Supervisor	Anyone who has completed Confined Space Entry training.
EPA	Environmental Protection Agency
Equipment	Electrical equipment unless otherwise specifically designated. Same as apparatus.
Established Road	Any public or private highway or road improved or otherwise dedicated for public ingress or egress. A solid surface, such as: asphalt, concrete or compacted aggregate that has been leveled and graded.
Exposed Live Parts	Any device having voltage potential which is not suitably guarded or isolated.
Extension Ladder	A non self-supporting portable ladder that is adjustable in length.
Fall Arrest System	A Fall Arrest System is used to arrest an employee's fall from an elevated working level. It allows for a free fall distance greater than two (2) feet, but not more than six (6) feet and consists of a full-body harness attached to a lanyard with a deceleration device. (Body belts are not approved for use as a part of a Fall Arrest System.)

TERM	DEFINITION
Fall Restraint System	A Fall Restraint System is used to prevent exposure to a fall hazard by restraining an individual in such a way to prevent them going beyond an unprotected edge. It consists of a full body harness or belt with a static lanyard.
First Aid	The immediate care given to a person who has been injured or has been suddenly taken ill. Includes self-help and home-care if medical assistance is not available or is delayed. Includes well-selected words of encouragement, evidence of willingness to help, and promotion of confidence by demonstration of competence.
Fixed Ladder	A ladder with rails or individual rungs that is permanently attached to a structure, building, or equipment. Fixed ladders do not include step bolts, or manhole steps.
Full Face Helmet	A wrap-around style helmet which encompasses whole head area.
Ground	A conducting connection between an electric conductor or equipment and earth, or to some conducting medium that serves in the place of earth.
Grounded	The condition where a ground has been installed
Ground-Fault Circuit Interrupter (GFCI)	A device intended for the protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when a current to ground exceeds the values established for a Class A device.
Group Work Permit	Prevents trial operation or cancellation of an existing Red Tag Clearance for the protection of one or more persons. A Group Work Permit is not a Clearance.
Guidelines	Directions or expectations that should be followed unless a valid reason exists to deviate.
Hazard	Any unsafe act or unsafe condition that may lead to injury of persons or damage to property.
Hot	Electrically energized as distinguished from Dead or de-energized. (Same as Alive or Live.)
Hot Work	Work involving burning, welding, grinding, open flame, or a similar operation (e.g., a chemical reaction) that is capable of initiating fires or explosions.
Initial Ground	A ground installed to test or dissipate a charging current on a line or equipment.
Isolate	To set apart or separate from a system in use.
Journeyman	A worker who has served their apprenticeship or equivalent training, and is qualified as a Journeyman as determined by the Union and the Company.

TERM	DEFINITION
Land	Attachment of cables or wires to equipment or apparatus
Leader	The person in charge of the work or working crew, regardless of the person's formal title or classification. (e.g., Foreman, Leader, Supervisor, Crew Leader, Team Leader, Manager, Department Leader).
Like for Like	A construction release phrase describing the replacement process whereby system components are replaced while under Clearance (within Clearance boundaries) using similarly rated hardware and/or conductors that are reconnected in the original system configuration. A like for like statement simply eliminates the need for a formal statement of release for removal, followed by a formal statement of release for operation, describing the same list of system components required for system operating information purposes.
Live	Electrically energized as distinguished from Dead or de-energized. (Same as Alive or Hot.)
MAD	Minimum Approach Distance
Manhole Steps	Steps that are individually attached to, or set into, the wall of a manhole structure.
Manual	Accident Prevention Manual
May	Denotes permission (choice), not a requirement or recommendation.
Micromobility	Electric assisted vehicles such as, but not limited to, e-bikes, electric scooters, hoverboards
Must	Same as "shall."
NFPA	National Fire Protection Association
Non– Electrically Qualified Worker	A worker who is not a Qualified Electrical Worker as defined in OSHA 1910.269(a) (2) (ii).
Operating Center	A location designated as a point of control.
Operations Center	A location designated as a point of control.
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment.
Pre-Job Briefings	A job briefing with the workers involved before they start each job. The briefing shall cover at least the following subjects: hazards associated with the job, work procedures involved, special precautions, energy source controls and PPE requirements.
Process Flows	A continuous source of energy other than electrical (i.e., water, steam, air, and oil).
Protective Device	Line hoses, blankets, hoods or other devices used to protect personnel from high voltage or ground potential. (These devices are to protect personnel from accidental contact only.)
Qualified Electrical Worker	A worker who is trained and competent as defined in OSHA 1910.269(a) (2)(ii).

TERM	DEFINITION
Qualified Person(s) **Qualified Personnel**	A worker who is trained and competent as defined in OSHA 1910.399. (One who is familiar with and experienced in procedures and work methods of accepted Company standards.)
Readily Available	Easily reached, seen, or used
Recognized System Operator	Designated Operating Center that maintains complete authority over all parts of line and electrical equipment that make up the working transmission and distribution system. • These Operators include: • Energy Control Center • Division Operation Centers • Metro Dispatch Headquarters • APS and Merchant Power Plants • Recognized Operating Center from an Interconnected Utility
Recreational Off-highway Vehicle (ROV)/ Utility Terrain Vehicle (UTV)	A ROV or UTV is defined as a motorized off-highway vehicle designed to travel on four or more tires, intended by the manufacturer for use by one or more persons and having the following characteristics: • A steering wheel for steering control • Foot controls for throttle and service brake • Non-straddle seating
Red Barrier Tape	A red or international orange colored tape used to designate “Danger” and “No Admittance”.
Redundant Steel	Steel bracing that carries no calculated stress in itself, but helps support compression members and gives them extra strength.
Requestor	An authorized person who has requested a Clearance. (Also referred to as Clearance Requestor or Red Tag Clearance Requestor.)
Requirements	Mandatory rules that shall be followed
RPE	Rubber Protective Equipment
SDS	Safety Data Sheet
SEO	Stored Energy Operated
Shall	Denotes a requirement (mandatory).
Should	Denotes a high recommendation (i.e., valid reasons required to deviate).
Single Point Isolation Tag	A tag that is used on equipment that can be isolated by a single point of isolation and will not impact Operations control of critical plant equipment.
SPI	Single Point Isolation
Spike	To pierce cable with tool to verify de-energization of cable
Splice	Add two or more ends together at one connection point

TERM	DEFINITION
Step Bolt	A bolt or rung attached at intervals along a structural member used for foot placement and as a handhold when climbing or standing.
Stepladder	A self-supporting, portable ladder that has a fixed height, flat steps, and a hinged back.
Straight Ladder	A non self-supporting portable ladder that is not adjustable in length.
Strip	Removal of jacket, insulation, semi con or outer layer from wire, cable
SWL	Safe Working Load
System Operation Centers	The location designated by the system operations department to control the system generation and to operate the transmission system (i.e., system load dispatching office, sub-system load dispatching centers).
Tension Members	T-braces or supports of a metal structure that have stress applied to them in a stretching manner.
Terminate	To make up ends of cable with terminator, elbow, t-body, etc.
Three-Quarter Helmet	A helmet which covers 3/4 of the head area.
URD	Underground Residential Distribution
Verify	Test and/or inspect to assure that isolation of the machine or equipment has been accomplished.
Working Ground	The ground installed to give the worker protection during the progress of the job.
Working Height	The distance from the walking/working surface to a grade or lower level.
Work-Positioning Devices	Work Positioning Devices allow for a maximum free fall distance of less than two feet and consists of a full body harness or climbing belts and straps rigged to allow an employee to be supported on an elevated surface (such as a wall or pole) and work with both hands free while leaning backward.
Yellow Barrier Tape	A yellow colored tape, sometimes with a black stripe, used to designate “WARNING” or “CAUTION”.
Yellow Caution Tag	Used to prevent operation of equipment for purposes other than the protection of employees working on the equipment. (Similar to Caution Tag.)

Appendix B. Hand Signals Charts

Ensure that hand signals used to communicate movement are recognized prior to moving.

Designate a specific person to give all signals (Emergency Stop may be given by anyone).

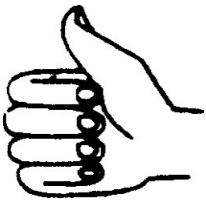
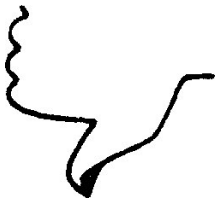
HELICOPTER STANDARD SIGNALS CHART

Move Right • Left arm extended horizontally; right arm sweeps upward to position over head. 	**Hold Over** • The signal "Hold" Is executed by placing arms over head with clenched fists.
Move Left • Right arm extended horizontally; left arm sweeps upward to position over head. 	**Take Off** • Right hand behind back; left hand pointing up.
Move Forward • Combination of arm and hand movement in a collecting motion pulling toward body. 	**Land** • Arms crossed in front of body and pointing downward.
Move Rearward • Hands above arm, palms out using a noticeable shoving motion. 	**Move Upward** • Arms extended; palms up; arms sweeping up.
Release Sling Load • Left arm held down away from body. • Right arm cuts across left arm in a slashing movement from above. 	**Move Downward** • Arms extended palms down; arms sweeping down.

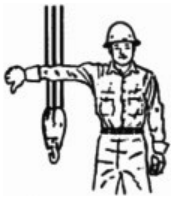
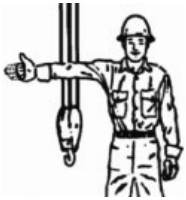
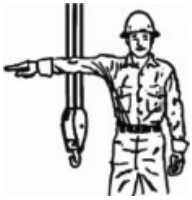
GANTRY CRANE STANDARD SIGNALS CHART

Hoist	Travel	Use Whipline
Lower	**Move Slowly**	**Stop**
Use Main Hoist	**Trolley Travel**	**Dog Everything**
	Emergency Stop	

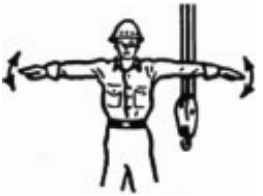
TRUCK HOIST STANDARD SIGNALS CHART

Take Up	Lower	Stop
		

MOBILE CRANE STANDARD SIGNALS CHART

Hoist (Raise)	Lower (Hoist)	Use Main Hoist
• Extend the right arm upward, forefinger pointing upward, then move hand in small horizontal circle.	• Extend the right arm downward, forefinger pointing downward, then move hand in small horizontal circles.	• Tap first on head and then use regular signals to hoist or lower.
Use Whipline	**Raise Boom**	**Lower Boom**
		
• Tap elbow with one hand and then use regular signals to hoist or lower.	• Extend right arm straight out, fingers closed and thumb pointing upward.	• Extend right arm straight out, fingers closed and thumb pointing downward.
Raise Boom and Lower Load	**Lower Boom and Raise Load**	**Swing**
		
• Extend right arm with thumb pointing up; then flex fingers in and out as long as load movement is desired.	• Extend right arm with thumb pointing down, and then flex fingers in and out as long as load movement is desired.	• With arm extended, point with finger the direction of swing of boom.

MOBILE CRANE STANDARD SIGNALS CHART (CON'T)

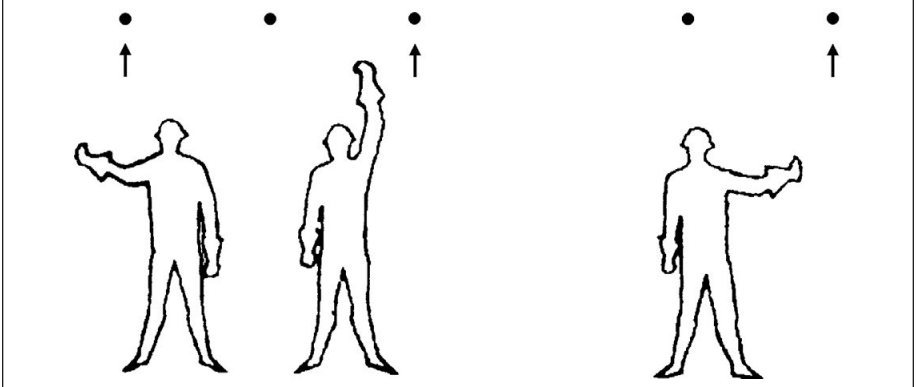
Stop	Emergency Stop	Travel
		
• Arm extended, palm down and open, move arm back and forth horizontally.	• Both arms extended, with palms down, then move arms back and forth horizontally.	• Right arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.
Move Slowly (i.e., Hoist Slowly)	**Dog Everything**	**Extend Boom (Two Hands)**
• Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal.	• Clasp hands in front of the body.	• Both fists in front of body with thumbs pointing outward.
Retract Boom (Two Hands)	**Extend Boom (One Hand)**	**Retract Boom (One Hand)**
• Both fists in front of body with thumbs pointing towards each other.	• One fist in front of chest with thumb tapping chest.	• One fist in front of chest, thumb pointing outward & heel of fist tapping chest.

LINE WORK STANDARD SIGNALS CHART

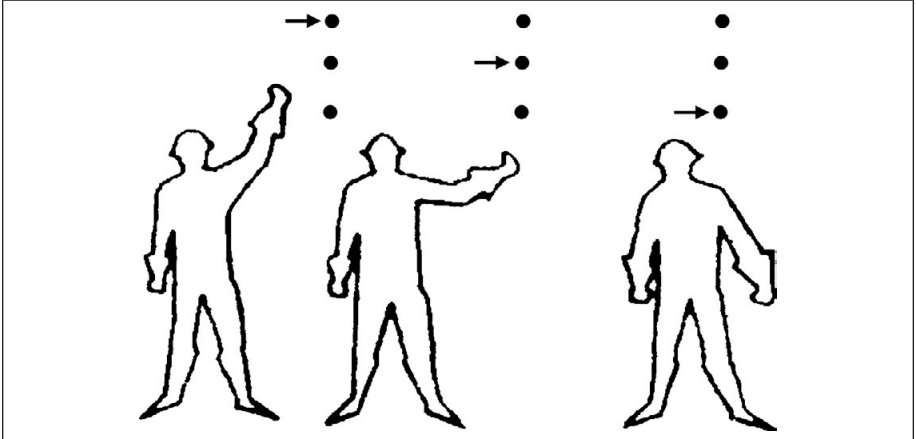
(1) Take Up Go Ahead	(2) Slow Caution	(3) Stop
• This signal is used to indicate the direction of pull. • Faster or slower motions of this signal are used to indicate speeds other than caution or slow speeds. • When there is a choice of conductors to be pulled, this signal is given with one of the indicating signals 7 to 12 inclusive.	• This signal always follows either No. 1 or No. 4 and is an indication of slow speed for caution. • This signal must be given continuously while the pull is being made at slow speed and is to be terminated by either giving the No. 1, No. 4 (depending on direction, or No. 3 signal).	
(4) Slack Off	**(5) That Is All**	**(6) Cut Loose**
• This signal is used to indicate the direction of pull and is used in slacking or lower as No. 1 is used for taking up.		

LINE WORK STANDARD SIGNALS CHART (CON'T)

(7) (8) (9) Horizontal Conductors



(10) (11) (12) Vertical Conductors

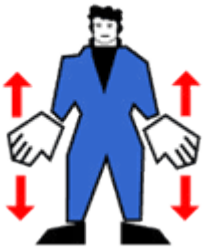


(7) through (12)

- These signals are always used in connection with either No. 1 or No. 4 and are given at the same time as either No. 1 or No. 4 is given.
- In using No. 10, No. 11, and No. 12, the man's arm on the wire side to be pulled is used for the indicating signal.

STANDARD BACKING HAND SIGNALS CHART

Turn Left	Turn Right

Slow Down	Straight Back	Stop
		

Appendix C. Minimum Approach Distances

MINIMUM APPROACH DISTANCES FOR QUALIFIED ELECTRICAL WORKERS REQUIREMENTS

Qualified electrical workers shall maintain the following "Minimum Approach Distance" separation between energized high voltage and extra high voltage circuits and themselves.

No employee shall approach or take any conductive object closer to exposed energized parts than the established minimum approach distance, unless:

- The employee is insulated with rubber insulating gloves from the energized part upon which the employee is working, provided that the employee has control of the part in a manner sufficient to prevent exposure to uninsulated portions of the employee's body. The only allowable activity for work above 5,000 V under this exception is the installation of protective cover-up.

Or

- The energized part is insulated from the employee and from any other conductive object at a different potential.

AC Voltage	Clearance
50 V – 300 V	Avoid Contact
301 V – 750 V	1 ft. 1 in.
2.1 kV – 15 kV	2 ft. 6 in.
15.1 kV – 35 kV	3 ft. 0 in.

Elevation in feet	69 kVAC	115 kVAC	161 kVAC	230 kVAC	345 kVAC	500 kVAC
0 - 3,000	3 ft. 4 in.	3 ft. 6 in.	4 ft. 6 in.	5 ft. 3 in.	7 ft. 1 in.	8 ft. 9 in.
3,001 - 4,000	3 ft. 5 in.	3 ft. 7 in.	4 ft. 8 in.	5 ft. 4 in.	7 ft. 3 in.	8 ft. 11 in.
4,001 - 5,000	3 ft. 6 in.	3 ft. 8 in.	4 ft. 9 in.	5 ft. 6 in.	7 ft. 5 in.	9 ft. 2 in.
5,001 - 6,000	3 ft. 7 in.	3 ft. 9 in.	4 ft. 10 in.	5 ft. 8 in.	7 ft. 8 in.	9 ft. 5 in.
6,001 - 7,000	3 ft. 8 in.	3 ft. 10 in.	4 ft. 11 in.	5 ft. 10 in.	7 ft. 10 in.	9 ft. 9 in.
7,001 - 8,000	3 ft. 9 in.	3 ft. 11 in.	5 ft. 0 in.	6 ft. 0 in.	8 ft. 1 in.	10 ft. 0 in.
8,001 - 9,000	3 ft. 11 in.	4 ft. 0 in.	5 ft. 2 in.	6 ft. 2 in.	8 ft. 4 in.	10 ft. 3 in.
9,001 - 10,000	4 ft. 0 in.	4 ft. 1 in.	5 ft. 4 in.	6 ft. 4 in.	8 ft. 6 in.	10 ft. 6 in.
Transient Overvoltage	N/A	3.5	3.5	3.0	2.6	2.0

Note: The above distances shall not be construed to mean workers can work at those distances without protective guards and devices. Adequate clearance shall be maintained so that protruding tools will not come in contact with conductors, limbs or other obstructions..

MINIMUM APPROACH DISTANCES FOR NON-ELECTRICALLY QUALIFIED WORKERS REQUIREMENTS

All Non–Electrically Qualified Workers shall maintain the following "Minimum Approach Distance" separation between energized primary circuits and all equipment under their control.

MINIMUM CLEARANCE BETWEEN ENERGIZED LINE AND EQUIPMENT REQUIREMENTS*

The minimum clearance separation shall be maintained between all aerial lift equipment being operated in close proximity to energized electrical circuits and not under the immediate direction or supervision of Qualified Personnel.

MINIMUM CLEARANCE BETWEEN ENERGIZED LINE AND NON-ELECTRICALLY QUALIFIED WORKERS AND/OR EQUIPMENT	
Energized Line Voltage	**Minimum Clearance**
2.1 kV to 35 kV	10 ft.
69 kV	11 ft.
115 kV	13 ft.
161 kV	14 ft.
230 kV	16 ft.
345 kV	20 ft.
500 kV	25 ft.

This rule is to clarify existing Company practices and distinguish between clearances required for work directed by qualified personnel and others.

Qualified personnel are those individuals that, as a result of training and experience, can be expected to recognize the safety requirements of the work involved.

*Cranes & Derricks must maintain 20 foot clearance up to 350kV, and 50 feet above 350kV. If this clearance cannot be maintained, contact the APS Public Safety Department for assistance at (602) 250-3418.

Appendix D. Arc Flash PPE Clothing Categories Table

Category	Clothing
2	Minimum Arc Rating of 8 cal/cm^2 PPE Category 2 (formerly Hazard Risk Category 2 or HRC2) arc rated coveralls or combination of PPE Category 2 arc rated outer shirt and PPE Category 2 arc rated pants, and leather work gloves (unless wearing voltage rated gloves).
3	Minimum Arc Rating of 25 cal/cm^2 PPE Category 3 (formerly Hazard Risk Category 3 or HRC3) arc rated jacket, PPE Category 2 over pants over PPE Category 2 pants (two layers), arc rated hood, arc blast goggles or face shield, gloves (minimum arc rating PPE Category 3), and hearing protection. Appropriate voltage rated gloves when required.
4	Minimum Arc Rating of 40 cal/cm^2 PPE Category 4 (formerly Hazard Risk Category 4 or HRC4) arc rated fash suit that consists of jacket, arc rated bib overalls, arc rated hood, gloves (minimum arc rating PPE Category 4), and hearing protection. Appropriate voltage rated gloves when required.

Appendix E. Hazard Communications

HAZARD COMMUNICATIONS STANDARD (HCS) PICTOGRAMS AND HAZARDS

Health Hazard	Flame	Exclamation Mark
• Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	• Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	• Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (non-mandatory)
Gas Cylinder	**Corrosion**	**Exploding Bomb**
• Gases Under Pressure	• Skin Corrosion/Burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle	**Environment (Non-Mandatory)**	**Skull and Crossbones**
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

Appendix F: APM Variance Form

Requesting Department: _____

APM requirement variance requested for: _____

APM section reference: _____

Job the variance is requested for: _____

Date and time the variance applies to: _____

Explanation of why the variance is necessary: _____

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Proposed alternate safe work practice to provide for worker safety:

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Leader or Crew Foreman Signature / Date

APM Chapter 1-2(B) B.A variance to a safety Requirement may be authorized (i) only for a specific job or task on a specific day; and (ii) only if a Leader or crew foreman determines that following the safety Requirement will pose a greater hazard or risk to employees than following an alternative course of action (in which case the leader or foreman, after discussion with the crew, will document their decision and rationale on the pre-job brief and APM Variance Form, Appendix G, prior to starting the work). An individual working alone who needs a variance to a safety Requirement shall obtain this documented variance from a Leader in charge of the work being conducted.

Attach completed form to the pre-job brief

Appendix F: APM Variance Form

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Proposed alternate safe work practice to provide for worker safety:

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Job the variance is requested for: _____

Date and time the variance applies to: _____

Explanation of why the variance is necessary: _____

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Proposed alternate safe work practice to provide for worker safety:

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Leader or Crew Foreman Signature / Date

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Attach completed form to the pre-job brief

Index

The index includes the commonly used terms and phrases; however, it is by no means all inclusive. To perform a complete search by phrase or word in the Accident Prevention Manual, refer to the electronic version at **http://aps/sites/corpsafety/Documents/APM.pdf**.

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