

COLORADO STATEWIDE SAFETY MANUAL

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Section 1.0 - General Rules

1.1 Statement

The personal safety and health of each employee and of the general public is of primary importance and shall receive first consideration in the performance of all work. Incident prevention must be an integral part of everyday operations, just as safety is an integral part of every job. To maintain a high quality, effective program every employee must have the proper attitude toward injury and illness prevention. To achieve success, we must encourage full cooperation of all employers and supervisors as well as fellow employees.

It is imperative that job planning include safety planning, and that all plans consider every aspect of the job, i.e. transportation, storage, public facilities, etc., as well as specific on-site tasks.

This manual shall be used in conjunction with safety policies and procedures being enforced by the contractors, the customers, and federal, state, and local authorities having jurisdiction over the work. In case of conflict, the strictest standards shall take precedence over all others until the conflict is resolved.

"NO JOB IS DONE RIGHT UNLESS IT IS DONE SAFELY."

1.2 Responsibilities

(a) Employer Responsibility

To the greatest extent possible, employers will provide mechanical and physical facilities required for personal safety and health in keeping with the highest standards set within our industry. Employers will also hold employee safety meetings and training sessions as required by this agreement, the employer safety program, or mandated federal and state regulations. Employers shall act upon all reports of hazardous working conditions and defective equipment promptly and without retribution to any employee.

(a) Union Responsibility

The union will promote safety awareness and illness prevention to the fullest extent possible. It will encourage participation by members in all union and employer programs consistent with this agreement, and will assist employers in the development of a cooperative safety awareness effort not only between employers and employees, but also between each employee and his fellow workers.

(b) Employee Responsibility

Employees shall participate in all union and employer safety meetings and training sessions to the fullest extent possible. They shall: set examples for fellow workers; develop and maintain proper attitudes toward injury and illness prevention; prohibit fellow workers from endangering themselves or others; take responsibility to protect themselves, fellow workers, and the general public from injury, as well as protecting property of the employers, customer, and public at all times.

Experienced employees have the responsibility of training others. Foremen and journeymen shall explain in detail the particular hazards and precautions necessary to insure the safety of everyone exposed to the job. Instructions given must be clear, concise and accurate. Attitude and behavior must always display qualities that will impart safe behavior and working habits in less experienced employees.

Employees shall keep all first aid, CPR, and other training certifications current at all times.

Employees must report hazardous working conditions and defective equipment to the employer.

1.3 Mandatory Rules

(a) Statement

The rules in this manual are mandatory and are to be considered minimum standards. They are to be followed on all occasions, with certain exceptions noted in paragraph (b) below. An employee who knowingly violates an established safety rule or practice, may be subject to disciplinary action for infractions, just as he is now subject to such action for violation of other operating rules and procedures. Each person in charge is to employ the same methods of enforcement of these rules as those for any other order or instruction.

(b) Exceptions

All covering codes and rules that are more restrictive than those set forth in this manual, shall apply. No rules can be drawn which will exactly meet all conditions which will be encountered.

IN LIFE ENDANGERING SITUATIONS, THE PERSON IN CHARGE WILL USE HIS BEST JUDGMENT, REGARDLESS OF ANY RULES OR INSTRUCTIONS.

1.4 Accident Reporting

(a) Statement

It is in the best interest of all parties that each accident be reported promptly and accurately to the employee's supervisor and the employer. All serious accidents must be reported by the employer to the union immediately by phone, and a written copy of the accident report provided to the Union.

(b) Workman's Compensation Reporting

For your own protection, in order that you and/or your physician receive prompt payment, the following procedure must be followed:

- (1) Report all accidents as soon as practicable, but in no case later than two (2) days from the date of the accident occurrence to your employer.
- (2) Employers will make available a list of acceptable doctors. Workman's Compensation laws in the state of Colorado give the insurance carrier the right to designate doctors of their choice. Failure to abide by these rules can cause the insurance company not to pay medical bills. In case of an emergency, you can go to the nearest doctor.
- (3) Do not change doctors without permission after a report has been filed showing doctor selected. Permission to change doctors can be obtained by advising the employer that you want to change doctors and the employer will contact the insurance carrier for you, or you can contact them directly. You must have a good reason for wanting to make the change or the carrier will deny your request for a change. Always check with your employer before taking any action of this kind.

1.5 Conduct

(a) Statement

It shall be the duty of each employee to work in a safe manner, to familiarize himself with and use safe practices, and to guard his fellow employees by providing a good example and by warning them of dangerous conditions or practices.

Employees are not expected to be exposed, or to expose themselves, to any hazards in the normal conduct of work.

(b) Conduct at Work

- (1) Horseplay, scuffling, practical joking, or the use of, or being under the influence of, alcohol or controlled substances creates dangerous and hazardous conditions and is strictly forbidden.
- (2) The person in charge shall require safe practices to be followed, and require good, workmanlike behavior on the job.
- (3) Personal cell phones shall not be worn or used during work hours. Unless there is a legitimate reason (agreed to by the employer rep) that deems an employee has one on their person. If so, the use shall be kept to a minimum and not done while performing any work tasks or observing any other employees for any reason.
- (4) An employee entering the customer's premises must always announce his presence and explain the reason for entry, when possible. Employees owe customers special courtesies while on their premises and shall conduct themselves accordingly.
- (5) Employees who are doubtful of their ability to work safely because of illness, drugs, antibiotics, or extreme emotional upset must report this condition to the person in charge.
- (6) Employees shall cultivate courtesy to fellow employees and the general public; this is especially true when driving. Remember that in the eyes of the customer, YOU are the union and the company.

1.6 Housekeeping

A major deterrent of accidents, fires, and claims is the clean, neat, and orderly condition of all buildings, yards, and enclosures; of all trucks and vehicles; and of each job whether on employer premises, public roadways, or private premises. The maintaining of these conditions is called "housekeeping."

- (a) Good housekeeping is the responsibility of each employee and is essential at all times and in all locations and will be strictly enforced.
- (b) Floor surfaces shall be kept in good repair, free from holes and all tripping hazards. All oil, grease, water, or other slipping hazards must be cleaned up immediately.
- (c) Stairways shall have handrails and be well lighted. Nothing shall be left or stored on stairways at any time.
- (d) Unsafe conditions of handrails, stairways, ramps, floors, yards, or any other locations must be noted and reported to the person in charge promptly.
- (e) The orderly storage of material is essential, with proper passageways and access for personnel and vehicles maintained at all times.
- (f) All jobs shall be run in a neat and orderly manner, with tools, scraps, parts, equipment, and materials neatly piled or stored out of the way of work or traffic. Junk and refuse shall be disposed of promptly.

- (g) All trucks and vehicles shall be kept in orderly condition with tools, parts, materials, and equipment properly stored and secured when necessary. Junk, scrap, and refuse shall be disposed or promptly and not allowed to clutter the vehicle.
- (h) Glass objects and sharp edged materials shall be disposed of in a manner which will not result in a hazard to other persons.

1.7 Job Briefing And Teamwork

(a) Statement

Proper planning of work and assignment of tasks can eliminate most accidents and promote better working conditions for all employees. Time spent in job planning and communications is an investment in safety, customer relations, and productivity that is worth making.

- (b) Pre-job briefings conducted in sufficient detail to fully inform employees of the procedures involved in the job, and to ensure that the employee can accomplish the job in a safe manner, will be considered adequate retraining. Tasks performed less often than once per year require retraining before the task is actually performed.
- (c) The employer shall ensure that the employee in charge conducts a job briefing with the employees involved before they start each job. The briefing shall be documented per company policy and cover at least the following subjects: hazards associated with the job, work procedures involved, special precautions, energy source controls, and personal protective equipment requirements.
- (d) If the work to be performed during the work day or shift are repetitive and similar, at least one job briefing shall be conducted before the start of each day or shift. Additional job briefings shall be held if significant changes, which might affect the safety of the employees, occur during the course of the work.
- (e) An employee working alone must complete a documented Job Briefing.
- (f) Much of our work must be done by groups of employees and requires careful teamwork. For the safety of all persons involved, each person must assist in the smooth operation of the team with one person directing the work.
- (g) It is imperative that no member of the team be allowed to compromise the safety of others by their attitudes, actions, demeanor, or refusal to follow safe work practices.

1.8 Traffic Control, Barricading, And Public Protection

(a) General Rules

- (1) All applicable federal, state, county and city traffic control laws will be abided by. Most governing agencies require that all traffic plans be submitted to them for approval before the plan is put into use. Most of these agencies also require that the traffic plans be drawn and or approved by a licensed Traffic Control Specialist.
- (2) Each employee must realize that public safety is a major part of their duties and shall conduct their services accordingly.
- (3) All work on customers' premises, on streets, highways, or other non- company premises shall be carried on with maximum protection of life and property, and with minimum interference with public activities.

- (4) Precautions must be taken to avoid injury to the public and personnel from arc welding, flying chips or sparks, falling objects, or from tripping over or striking piled material or equipment. Work areas frequented by the public, and below or near work in progress must be barricaded, roped off or otherwise safeguarded against entry by the public.
 - (5) Where traffic is congested, qualified flag persons shall be assigned to direct traffic and protect both the public and the workers. Night watch persons shall be employed at the discretion of the supervisor in charge of the work.
 - (6) The primary goal of traffic control is to eliminate or divert pedestrian or vehicular traffic from the work area. This is accomplished through the strategic placement of warning devices such as signs, barricades, cones, flashers and ribbons.
- (b) Flagmen - Flagmen are required to be certified or licensed.
- (c) Pedestrian Safety
- (1) Work shall cease immediately when a pedestrian enters a work zone or barricaded area and shall not start again until the pedestrian has left the area.
 - (2) At no time will pedestrians be allowed to walk under overhead workers or equipment.
 - (3) At all times a clear and safe path must be provided for pedestrians. Tools, materials and debris must be kept out of their path at all times.

1.9 Fire Extinguishers and Fire Protection

(a) Reporting Fires and Hazards

Employees are expected to note and report any fire hazards in places where they work, and shall familiarize themselves with the proper procedure for reporting a fire.

(b) Location and Care of Extinguishers

- (1) All fire extinguishers in plants, shops and vehicles, as required, shall meet underwriters' requirements.
- (2) Fire extinguishing equipment shall be inspected once every year and bear inspection tag.
- (3) All fire extinguishers shall be securely mounted and located as to be easily seen and readily accessible. Employees shall familiarize themselves with the location and operation of all fire extinguishers in their areas, and shall be prepared to point out their location when asked.

(c) Fire Extinguisher Usage

In general: Only fire extinguishers of approved type shall be used. Employees must be trained in the care and proper use of fire extinguishers.

- (1) FOR CLASS A FIRES (wood, paper, etc.) water or soda-acid types are best. Dry powder or carbon dioxide types may also be used.
- (2) FOR CLASS B FIRES (natural gas, oil, gasoline, paint, etc.) foam or dry powder types are best. Carbon dioxide type may also be used.

- (3) FOR CLASS C FIRES (electrical or around electrical equipment) Carbon dioxide or vaporizing liquid types are best. Fog nozzles may be used, but only by crews who are specifically trained in their use. Dry powder type may be used where voltages of less than 250 volts are encountered, but must not be used in substations, on substation equipment, or any other location where control panels, instruments, or relays will be covered or damaged by the powder.

(d) Special Precautions

- (1) Never use water on gasoline or oil fires. Use foam, dry powder, or carbon dioxide on such fires.
- (2) Fire extinguishing units using water (except fog nozzles used by trained crews), other conducting liquid, or dry powder units shall not be installed where they may, through error, be used on Class C Electrical Fires where voltages of 250 volts or over may be encountered.
- (3) Fire fighting in enclosed and/or confined spaces can create a changed atmosphere; proper breathing apparatus must be used.

(e) Automatic Equipment

- (1) Automatic carbon dioxide equipment must be made non-automatic while employees are working in the space protected by such equipment.
- (2) Fire doors must not be blocked open, but shall be free to close in case of fire. Exits must not be blocked.

(f) Flammables

- (1) Storage containers must be labeled, and health hazard warnings attached.
- (2) Special care must be taken in handling flammables. Flammable liquids must be stored in closed and approved non-explosive containers, and such containers kept in approved locations.
- (3) Oil, oily rags, or other flammable materials must be kept off floors. Such materials must be deposited in approved metal containers provided for that purpose.
- (4) Flammable liquids must not be disposed of by pouring them into sewer or other drains.
- (5) In transferring large quantities of gasoline from one container to another, both containers must be grounded to prevent static sparks.
- (6) Open flames and smoking are prohibited around gasoline storage tanks and pumps, when handling oils or other flammable liquids, or when combustible dust or gas is present or suspected.
- (7) Warning signs must be posted at all entrances to rooms where explosives or other flammable substances are stored or being used. Such restrictions must be strictly obeyed and enforced.

1.10 Compressed Air Tools and Equipment

(a) Statement

Portable air power tools include paving breakers, tampers, impact or rotary drills, cutting or riveting tools, boring machines, buffers, and all similar equipment, shall be of a type having sturdy construction, positive tool holders and protected controls.

Portable air power tools must be inspected at regular intervals, maintained in safe working condition, and shall not be used if their condition, including hose and connections is doubtful.

(b) Using Portable Air Power Tools

- (1) Portable air power tools shall be used only by employees trained in proper use of such tools, and shall only be used for the purpose for which they are designed.
- (2) Eye protection, gloves, and metatarsal guards must be worn while using paving breakers or other impact tools.
- (3) Paving breakers and similar tools shall be laid down when not in use to avoid bodily injury and damage to equipment.
- (4) When laying down air tools, be sure the trigger will not operate accidentally.

(c) Compressed Air

- (1) When authorized, compressed air may be used to clean motors, machinery, or other equipment. Employees using compressed air for this purpose must take special precautions to protect themselves and other persons from the air, dust, and particles which will result.
- (2) Compressed air must not be used to remove dust from clothing, body, or hair.
- (3) Horseplay with portable air power tools and air lines is particularly dangerous, and is strictly forbidden.
- (4) Pointing a portable air power tool or air hose at any person is forbidden.

(d) Air Hose

- (1) The pressure shall be released on air hose or lines before uncoupling or disconnecting them.
- (2) Air hose must not be subjected to burning, crushing, or dragging.
- (3) ½" O.D. or greater hoses shall be safety wired at all fittings.

(e) Air Compressors

- (1) Air compressor safety valves shall be tested at least twice a year.
- (2) Air storage tanks must be drained periodically of accumulations of water, oil, and rust, and shall be blown down at intervals as required in winter to prevent freeze-ups.
- (3) The pressure shall be released on air tanks when not in use.

1.11 Scaffolds

(a) Scaffolding is of several types and designs and must be erected and maintained according to manufacturing and OSHA standards. It shall be inspected daily by a competent person before use.

(b) Barricades

Danger signs must be displayed and/or barricades used where overhead work is in progress and where persons or traffic may be endangered by passing through the danger zone below.

(c) Personal Fall Protection

Employees working on overhead position shall wear appropriate fall protection, secured in such a way as to prevent a fall greater than six (6) feet.

(d) Handling Materials and Tools on Scaffolds and Ladders

- (1) Material must be raised and lowered by the use of hand lines. When articles are of such weight and shape that they cannot be securely hitched to a hoisting or hand line, they must be raised and lowered in containers.
- (2) Workmen helping to hoist objects must keep in position where they will not be endangered by accidental dropping of the load.
- (3) Tools and materials must not be left unsecured in overhead positions, large objects must be securely lashed, and tools or small objects must be kept in containers.
- (4) If a tool belt is worn, only those tools for which the belt is designed shall be carried. No tools shall be carried in the pockets.
- (5) Employees shall not carry objects in their hands when climbing or descending scaffold access ladders.

1.12 Ladders

(a) Approved Ladders

- (1) Portable wood ladders - straight ladders, step ladders, and extension ladders - shall meet OSHA standards.
- (2) All portable wood and fiberglass ladders shall be equipped with safety feet, and with pole grips if they are to be used on poles.
- (3) All wooden ladders shall be finished with oil or clear varnish. Painting of ladders which might conceal the grain is forbidden.
- (4) When ladders become split, broken, or otherwise defective, they must be destroyed or defective parts replaced with new.
- (5) An approved class of ladder shall be used to meet weight restrictions:
 - Type IA: 300 lbs.
 - Type I: 250 lbs.
 - Type II: 225 lbs.
 - Type III: 200 lbs.

- (6) The use of portable metallic ladders for work on or near any electrical equipment is prohibited.

(b) Placing and Climbing Ladders

- (1) Company ladders shall be used wherever possible. When it is necessary to use any other ladder, particular care must be taken to be sure the ladder is strong enough for the planned work.
- (2) Before climbing any ladder, the employee shall first assure himself that the ladder is safe.
- (3) Employees must not substitute boxes, benches, tables, or makeshift substitute for ladders.
- (4) Single or extension ladders shall be placed such that the horizontal distance from the top support to the base of the ladder is not less than 1/4 or more than 1/3 the length of the ladder. Where this is not possible, the ladder must be tied at the top. A second person must hold the ladder while it is being tied.
- (5) The employee shall face the ladder when climbing or descending, and both hands shall be used. Materials and tools shall be raised and lowered by hand line.
- (6) When used on slippery floors, such as iron, oily cement, or icy surface, additional precautions must be taken to prevent the ladder feet from slipping, such as tying with ropes, bracing against some fixed object, or being held by a second employee who has taken the precaution to assure sound footing.
- (7) Clipping ladders shall have a metal safety chain attached and in use at all times.

(c) Extension Ladders

- (1) When extending or lowering extension ladders, the hands must be kept on the side rails, never the rungs.
- (2) On a two section ladder, allow a minimum lap of 3 feet for ladders up to 26 feet long. For ladders 26 to 48 feet, allow a minimum lap of 4 feet; and for ladders 48 feet to 60 feet, allow a minimum lap of 5 feet.

(d) Working from Extension or Step Ladders

- (1) When working from ladders which are more than twenty (20) feet long, the ladder shall be either securely tied or held by another employee.
- (2) Only one employee shall work on one ladder at one (1) time, unless the ladder is designed for two-man operation.
- (3) In working from ladders, employees shall avoid leaning over or reaching out farther than arm's length.
- (4) Employees shall not stand on the top two (2) rungs of a ladder or on the top two (2) steps of a stepladder.
- (5) Ladders placed near doors or in passageways shall be protected against being struck by the door or by traffic through the passageway by suitable barriers and warning signs, or by another employee holding the ladder, or by other suitable means.

- (6) A ladder must not be moved while an employee is on the ladder.
- (7) Ladders shall be tied or otherwise secured in heavy wind conditions.

(e) Ladder Storage

- (1) Ladders shall be stored in such a manner as to protect the ladders, provide ease of access or inspection, and to prevent danger of accident when withdrawing the ladder for use. Storage should provide as much protection as possible. They shall not be stored near radiators, stoves, or steam pipes.
- (2) Ladders stored in a horizontal position shall be supported at a sufficient number of points to avoid sagging and permanent set.
- (3) Ladders carried on vehicles shall be adequately supported to avoid sagging and securely fastened in position to minimize chaffing and effects of road shock.

(f) Fixed Ladders

Fixed or permanent ladders shall be maintained in sound, usable condition, kept free from grease or other slipping hazard, and where space is available shall extend at least three (3) feet above the highest landing.

1.13 Night Work

When working at night, spotlights or portable lights shall be provided as needed to perform the work safely. At no time will an overhead crew be permitted to work without adequate lighting.

1.14 Working Near or Over Water

When crews are engaged in work over or near water and when danger of drowning exists, suitable protection shall be provided, such as U.S. Coast Guard - approved life jackets or buoyant work vests.

- (a) When fall protection is provided on walking/working surfaces located above water, and no drowning hazard exists, employees do not need to wear U.S. Coast Guard-approved life jackets or buoyant work vests. Use of nets for fall protection does not eliminate the possibility of drowning hazard. The use of fall protection, including fall protection that eliminates drowning hazards, does not relieve employers from having to provide ring buoys and a lifesaving skiff(s) which will be adequate for the crew size. Any type of suitable drowning protection worn by the employee will meet all PPE requirements such as FR/AR requirements.
- (b) Proper testing and PPE will be provided, and utilized when working in or near water that could have possible contaminants.

1.15 Safety Rules for Fiber Optics,

- (a) Keep all food and beverages out of the work area. If fiber particles are ingested, they can cause internal hemorrhaging.
- (b) Always wear safety glasses with side shields to protect your eyes from fiber shards or splinters. Treat fiber optic splinters the same as you would treat glass splinters.
- (c) Keep track of all fiber and cable scraps and dispose of them properly. If available, work on black work mats and wear disposable lab aprons to minimize fiber particles on your clothing.

Fiber particles on your clothing can later get into food, drinks, and/or be ingested by other means.

- (d) Never look directly into the end of fiber cables – especially with a microscope – until you are positive that there is no light source at the other end – having tested it with a power meter. Use a fiber optic power meter to make certain the fiber is dark. When using an optical tracer or continuity checker, look at the fiber from an angle at least 6 inches away from your eye to determine if the visible light is present.
- (e) Contact lens wearers must not handle their lenses until they have thoroughly washed their hands.
- (f) Do not touch your eyes while working with fiber optic systems until your hands have been thoroughly washed. Only work in well-ventilated areas.
- (g) Keep all combustible materials safely away from the curing ovens and fusion splicers.
- (h) When finished with the lab, dispose of all scraps properly. Put all fiber scraps in a properly marked container for disposal.
- (i) Thoroughly clean your work area when you are done to ensure no contaminants are present.

Section 2.0 - Training / Voltage Recognition

2.1 Training

Employees shall be trained in and familiar with the safety-related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments. Employees shall also be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole top and manhole rescue), that are related to their work and necessary for their safety.

- (a) A qualified employee is one who, by reason of training, experience and work habits, is able to complete a job task safely and efficiently. Qualified employees shall also be trained and competent in:
 - (1) The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment,
 - (2) The skills and techniques necessary to determine the nominal voltage of exposed live parts,
 - (3) The minimum approach distances specified in the OSHA regulations corresponding to the voltages to which the qualified employee will be exposed, and
 - (4) The proper use of the special precautionary techniques, personal protective equipment insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment.
- (b) The employer shall determine, through regular supervision and through inspections conducted on at least an annual basis that each employee is complying with the required safety-related work practices.

An employee shall receive additional training (or retraining) under any of the following conditions:

- (1) If the supervision and annual inspections indicate that the employee is not complying with the required safety related work practices, or
- (2) If new technology, new types of equipment, or changes in procedures necessitate the use of safety related work practices that are different from those which the employee would normally use, or
- (3) If he or she must employ safety related work practices that are not normally used during his or her regular job duties.

NOTE: Tasks performed less often than once per year may necessitate retraining before the performance of the work practices involved.

- (c) The training shall be of the classroom or on-the-job type.

The training shall establish employee proficiency in all work practices and shall introduce the procedures necessary for compliance to applicable regulations.

The employer shall certify that each employee has received the required training. This certification shall be made when the employee demonstrates proficiency in the work practices involved and shall be maintained for the duration of the employee's employment.

2.2 Cardiopulmonary Resuscitation And First Aid Training

- (a) When employees are performing work on or associated with exposed lines or equipment energized at 50 volts or more, persons trained in first aid including cardiopulmonary resuscitation (CPR) shall be available as follows:
 - (1) For field work involving two (2) or more employees at a work location, at least two (2) trained persons shall be available. However, only one trained person need be available if new employees are trained in first aid, including CPR, within three (3) months of their hiring dates.
 - (2) For fixed work locations such as generating stations, the number of trained persons available shall be sufficient to ensure that each employee exposed to electric shock can be reached within four (4) minutes by a trained person. However, where the existing number of employees is insufficient to meet this requirement, all employees at the work location shall be trained.
- (b) Employees must keep a current certification from an approved course in First Aid and CPR.

2.3 Training For Enclosed Spaces

- (a) Employees who enter enclosed spaces or who serve as attendants shall be trained in the hazards of enclosed space entry, in enclosed space entry procedures, and in enclosed space rescue procedures.
- (b) If applicable, employees shall adhere to all requirements contained in Section 9, Confined Spaces.

2.4 Additional Training

- (a) Employees may need additional training when they are engaged in work that would require this type of work including but not limited to:
 - (1) Climbing
 - (2) Excavations, trenching and shoring (competent person) training
 - (3) Safety related work practices
 - (4) Recognition of all hazards on each job and how to plan for each hazard
 - (5) Use of Personal Protection Equipment (P.P.E.)
 - (6) Lock out tag out procedures
 - (7) Grounding Procedures
 - (8) Assured grounding
 - (9) Use of power driven tools
 - (10) Hot stick knowledge & skills
 - (11) Apparel
 - (12) Phase to ground and phase to phase clearances

- (13) Overhead construction principals
- (14) Underground construction principals
- (15) Substation construction principals
- (16) Fall protection
- (17) Bucket Truck
- (18) Heavy Equipment Operation

2.5 Qualified Observer Use and Duties

- (a) A qualified observer shall be present whenever, during the course of the job, proximity to energized parts causes a hazard, or work is to be performed on energized equipment or lines.
- (b) The duties of the qualified observer are:
 - (1) To be thoroughly instructed and familiar with any hazard and the work to be done.
 - (2) Give the employees under his observation his undivided attention and allow no distractions.
 - (3) He shall give warning, any time employees are approaching energized parts or other hazards.
 - (4) While acting as qualified observer, a workman shall not leave his post to perform any other duties. A Qualified Observer is defined as is an electrically qualified worker that can identify all hazards present to the crew working energized conductors. The Qualified Observer shall be capable of:
 - (5) Distinguishing exposed live parts;
 - (6) Identify nominal voltages;
 - (7) Determine minimum approach distances;
 - (8) Knowing safe work practices for working on, or near, energized lines and equipment;
 - (9) Recognize electrical hazards to which workers will be exposed and skills and techniques to control those hazards;
 - (10) Rendering immediate assistance in case of an accident
- (c) Where the nature and extent of the work at any one location is such that one observer cannot adequately see the movements of all workers in hazardous areas, additional observers shall be used as necessary.

Note: Any dispute arising over the qualifications of observers may be addressed through the grievance procedure.

Section 3.0 - Distribution Equipment & Approach Distances

3.1 Overhead Equipment & Working Distances

(a) Minimum Approach Distance

- (1) Minimum approach distance is the closest distance an employee is permitted to approach an energized or ungrounded conductor refer to Appendix A Minimum Approach Distance Chart pg. 104.
- (2) No employee shall approach or take any conductive object closer to exposed energized parts than specified in the current applicable OSHA minimum approach distance table, unless:
- (3) The employee is insulated from the energized part (insulating gloves or insulating gloves and sleeves rated for the voltage involved shall be considered insulation of the employee only with regard to the energized part upon which work is being performed), or
- (4) The energized part is insulated from the employee and from any other conductive object at a different potential, or
- (5) The employee is insulated from any other exposed conductive object, as during live-line bare-hand work.

(b) Climbing Equipment

- (1) Climbers shall not be used after the gaffs are worn or filed to less than 1-1/8 inches long, measured on underside of the gaff.
- (2) They shall be checked before each use and sharpened as necessary. Climbing equipment shall be stored properly to avoid damage to gaffs.
- (3) Climbers shall be worn only when engaged in work requiring their use and shall never be worn when driving a vehicle, setting or handling poles, climbing ladders, working on the ground, while on floors or roofs or in aerial lifts.

(c) Hand lines

- (1) Hand lines shall be kept as dry and pliable as possible. They shall be inspected before use and discarded when defective.
- (2) Hand lines shall be minimum ½ inch in diameter.
- (3) Handline equipment must be manufactured and approved for usage.

3.2 Rubber Gloving

When working on energized apparatus exceeding 600 volts, gloves and sleeves must be utilized.

- (a) Rubber gloves shall be worn for all voltages over fifty (50) volts. When working from the pole, no one shall glove voltages that exceed 5000 volts phase to phase. The following are the basic rules for overhead line work on circuits exceeding 5000 volts but not to exceed 15,000 volts phase to phase, or 9000 volts phase to ground, using rubber gloves and rubber sleeves:

- (1) This work may be performed only from insulated aerial devices or approved

insulated platforms.

- (2) As the mechanical and insulating quality of this equipment is of prime importance, each unit must be inspected visually each day that the unit is in use.
 - (3) The insulating fiberglass boom and basket must be thoroughly cleaned as needed and determined by the crew using the unit; and must be cleaned each time any service work is performed on the boom. Consult manufacturer and owner's guidelines for products and methods of cleaning.
 - (4) The insulating value of each unit will meet the prescribed ASTM standards and will be given a high voltage test every calendar year.
 - (5) A thorough mechanical check of the entire unit is to be performed annually by a qualified technician. A boom inspection sticker will be placed in the rear window of each aerial device.
- (b) Each person will be issued a pair of rubber gloves, a bag, and leather rubber glove protectors, a pair of rubber sleeves with straps and a bag, and approved safety glasses. These items must be put on before entering the minimum approach distance zone and not removed until out of the minimum approach distance zone. This rule shall be followed whether actually handling energized conductors or not.
- (c) When employees are working on energized circuits or equipment using the rubber gloving method, insulating rubber gloves and sleeves rated for the highest nominal voltage shall be worn Cradle to Cradle when working from an aerial platform.
- (d) All rubber protective equipment shall be the proper class for the voltage exposure.
- (e) Testing and checking of protective equipment:
- (1) Electrical protective equipment shall be checked daily by the user for signs of damage or deterioration.
 - (2) Standard shop testing is to be performed on gloves and sleeves every ninety (90) days from date of issue.
 - (3) Testing date (storage time) can be up to ninety (90) days prior to the date of issue if the rubber goods are stored properly.
 - (4) Proper storage shall meet the criteria in Section 7.11 of this manual.
- (f) Crew makeup:
- (1) There shall be two (2) qualified employees in the bucket and one (1) qualified observer on the ground while performing rubber glove work.
 - (2) Two (2) buckets with one (1) man in each may be used as a bucket crew.
 - (3) There may be other employees on the pole to assist a bucket crew. When this is necessary, the employees on the pole must use approved hot stick procedures and will work only on the same phase or equipment as the bucket crew.
 - (4) Any deviation from the above crew make-up shall be mutually agreed upon by the Employer and the Union before such work is started.
- (g) Work shall be performed on one energized conductor at a time and all other energized or grounded facilities within reaching or falling distance shall be thoroughly covered with

approved rubber or insulating guards. (Special attention shall be given to work on concrete, steel and creosote.)

- (h) Rubber gloving shall not be performed whenever it is determined by the majority of the crew that it would be unsafe to do so.
- (i) Whenever available, the nearest appropriate recloser or breaker shall be set for one time operation on all circuits in working zone before proceeding with rubber glove work. Whenever one time operation is not available, changes to the work plan must be taken, such as installation of temporary devices. In addition dispatch/system operators will be notified of crew location.
- (j) Appropriate insulated hot sticks are to be used to energize or de-energize oil filled equipment and are to be used for opening or closing switching and cutouts, installing or removing taps or during any other work function which may produce an arc.
- (k) All crew members expected to perform under these standards shall be properly trained in accepted rubber glove methods. Particular emphasis will be given to the use and care of rubber protective equipment and the use and care of insulated aerial devices.
- (l) For this work the insulated aerial bucket shall be of the type having both an insulated bucket and an insulated upper boom including insulating of all parts within the upperboom such as hydraulic hoses, cables, and operating rods.
- (m) Safety boards can be used in inaccessible areas under these standards with the following conditions:
 - (1) Approved fiberglass boards ONLY.
 - (2) Dialectically tested within twelve (12) months prior to use.
 - (3) A visual inspection and cleaning must be performed prior to any use, during the cleaning and visual inspection any deficiencies will require the safety board to be removed from service for repairs and dialectically tested.
 - (4) Minimum clearance of 2'6" will be maintained from lineman to pole or the pole will be insulated from the lineman. i.e. pole guard to isolate the lineman.
 - (5) Fall Protection will be attached to an approved isolated staging rail or tripod attached to the insulated board. No board will be used in this work unless equipped with approved rails or tripods. At no time shall tools, or positioning devices hang below the Board or maintain attachments to the pole. *(Note)- More stringent host Utility rules may exist regarding the use of Safety Boards.
 - (6) Equipment or material shall not be passed between a pole or structure and a safety board while an employee working from a safety board is within reaching distance of energized conductors or equipment that are not covered within insulating protective equipment.
- (n) No work will be performed under the provisions of this section until all crew members are familiar with and understand the safe working rules in this section.

3.3 Capacitors

- (a) Capacitors may hold a charge for several days after being disconnected from supply source if

there is no discharge path. Discharge resistors must not be relied upon for safety. Capacitors not in use shall have shunts in place at all times.

(b) Discharging Capacitors:

- (1) After disconnecting a capacitor, the employee shall wait at least five (5) minutes to allow time to drain off the major portion of the residual charge.
- (2) Employee shall short-circuit the capacitor terminals several times or until no arc is heard.
- (3) An insulated jumper shall be used for short-circuiting.
- (4) Each terminal shall then be short-circuited to the case several times or until no arc is heard.
- (5) Caution must be used in short-circuiting in case the discharge resistor has failed and a full charge is short-circuited.

(c) Employees who work on capacitors shall wear rubber gloves, and suitable Eye and Face protection until the above outlined procedures (in item B) are completed.

3.4 Overhead Lines

(a) Pole Work

- (1) Before climbing poles, ladders, scaffolds or other elevated structures, the employee must assure themselves that the structure is strong enough to safely sustain their weight.
- (2) A sound test with a hammer will be done to check wood pole(s) before climbing as well as checking 12 inches below the ground line for evidence of pole rot. If it is believed the pole is properly supported by conductors or other apparatus the sound test can be used without checking for rot. It shall be observed that pole(s) are set to a safe depth (especially in excavated areas) and that down guys are in place correctly.
- (3) Before climbing poles or structures, employees shall familiarize themselves with the circuits, voltages, any attached apparatus, and any unusual conditions which might present a hazard. Poles that are supported by stubs will be checked (as well as the stub) for soundness, pole rot and that they are correctly and safely attached to the stub, if the stub is metal it shall be checked for corrosion before climbing a pole it is attached to.
- (4) When a pole is found to be unsafe or is placed in stress by removing supporting wires, guys or the changing of conductor position, the pole MUST be adequately supported before any work is started. Manned pike poles may be used as temporary support while attaching guys or other supports, but MUST NOT be used as supports during the stripping or stress changing work.
- (5) No pole shall be set near an energized line with ground wire stapled on it more than two (2) feet above the ground level unless it has been deemed by a competent person that installing the ground wire after the pole has been set will present a bigger hazard or risk. In the case it is installed before the pole is set an air-gap will be cut or installed into the ground wire before setting the pole.

- (6) Riding or sliding down guy wires is not allowed.
 - (7) Not more than one employee can ascend or descend a pole at the same time.
 - (8) Pole holes in ground shall not be left unattended or unguarded, they must be properly covered or barricaded.
- (b) Energized Lines and Equipment
- (1) Operating voltage of equipment and lines shall be determined before working on or near energized parts using proper test equipment including phasing sticks.
 - (2) Electrical equipment and lines shall be considered energized until determined to be de-energized with proper equipment, locked and tagged, GROUNDED and Equipotential Zone established. Work only on one (1) phase at a time on energized structures.
 - (3) Equipment utilized near energized parts shall be properly bonded to an effective ground. Employees shall avoid coming into contact with the equipment when work is being performed in the energized area from the equipment or the equipment is in the energized area. Barricades will be utilized when necessary to keep people away from this equipment.
 - (4) Work may be done above energized equipment only after precautions have been taken. These precautions include covering of all exposed electrical parts, to the satisfaction of both the Foreman and the employees doing the work.
 - (5) Keep feet and other parts of the body clear of ground wires and other conductors at all times.

3.5 Stringing or Removing De-energized Conductors

When stringing or removing de-energized conductors, the following provisions shall be complied with:

- (a) Prior to stringing operations, a briefing shall be held with all employees involved, setting the plan of operations and specifying the type of equipment to be used, grounding devices and procedures to be followed, crossover methods to be employed, and the clearance authorization required.
- (b) Proper EPZ Zone will be installed at all sites where equipment is staged for pulling, wire is caught off or possibility employees could make contact with conductors while on the ground
- (c) If there is any possibility of the conductor accidentally contacting an energized circuit or receiving a dangerous induced voltage buildup, the conductor being installed or removed shall be grounded or provisions made to insulate or isolate the employee.
- (d) If the existing line is de-energized, proper clearance authorization shall be secured and the line grounded per section 5 of this manual.
- (e) When crossing over energized conductors in excess of fifty (50) volts, rope nets or guard structures shall be installed, or provisions made to isolate or insulate the workman and the energized conductor.
- (f) The automatic reclosing feature of the circuit interrupting device shall be made inoperative. When this is not possible all proper precautions shall be used.
- (g) Conductors being strung or removed shall be kept under positive control by the use of

- adequate tension reels, guard structures, tie lines, insulation or other means to prevent accidental contact with energized circuits.
- (h) Conductor travelers installed at angles shall be installed so that pulling lines and conductors cannot walk out through access doors
 - (i) Guard structure members shall be sound and of adequate dimension and strength, adequately supported and installed at a safe depth.
 - (j) Catch-off anchors, rigging, and hoists shall be of ample capacity to prevent loss of the lines.
 - (k) The manufacturer's load rating shall not be exceeded for stringing lines, pulling lines, sock connections, and all load bearing hardware and accessories.
 - (l) Pulling lines and accessories shall be inspected regularly and replaced or repaired when damaged or when dependability is doubtful.
 - (m) Conductor grips shall not be used on wire rope unless designed for this application.
 - (n) While the conductor or pulling line is being pulled (in motion), employees shall not be permitted directly under overhead operations, nor shall any employee be permitted on the cross arm.
 - (o) Work from structures shall be discontinued when adverse weather (such as high wind or ice on structures) makes the work hazardous.
 - (p) Stringing and clipping operations shall be discontinued during an electrical storm.
 - (q) Wire pulling equipment shall have ample capacity, be in good repair, and operate smoothly, and be leveled and aligned in accordance with the manufacturer's operating instructions.
 - (r) Reliable communications between the reel tender and the pulling rig operator shall be provided and used. Excessive cross talk and radio chatter shall be kept to a minimum!
 - (s) In the event that any adjustment of equipment or related apparatus must be made during the process of either conductor stringing or hard or soft line pulls, a signal of "Hold the pull!" shall be given. THIS SIGNAL SHALL NEVER BE OVERRIDDEN BY ANYONE!

3.6 Stringing Adjacent to Energized Lines

Prior to stringing parallel to an energized line a competent determination shall be made to ascertain whether dangerous induced voltage buildups will occur, particularly during switching and ground fault conditions. When there is a possibility that such dangerous induced voltage may exist, the employee shall comply with the provisions listed below:

When stringing adjacent to energized lines the tension stringing method or other methods shall be used which preclude unintentional contact between the line being pulled and any existing energized conductor.

- (a) All pulling and tensioning equipment shall be isolated, insulated or effectively grounded per section 5 of this manual and barricaded.
- (b) Proper Grounding and Equipotential Zone protections shall be established to protect employees from hazardous differences of potential.
- (c) During stringing operations, each bare conductor, subconductor, and overhead ground conductor shall be grounded at the first tower adjacent to both the tensioning and pulling set

up.

- (d) The grounds and bonds shall be left in place until conductor installation is completed.
- (e) Such grounds shall be removed as the last phase of aerial cleanup.
- (f) Except for moving type grounds, the running grounds shall be placed and removed with a hot stick.
- (g) Conductors, subconductors, and overhead ground conductors shall be grounded by methods of EPZ grounding when dead-ending or catching off.
- (h) When performing work from structures, clipping crews and all others working on conductors, subconductors, or overhead ground conductors shall be protected by a Zone of Equipotential.
- (i) It is recommended that insulated measuring sticks be used to verify clearance distance.
- (j) When the foreman determines that a hold-down or hold-downs must be installed at or on various structures the hold-down team shall be equipped with a radio of the same operating frequency as the wire puller operator and reel tender.
- (k) During the process of conductor pulling, employees shall not be permitted on the cross arm of the tower, or on the upper portion of the pole or on the conductor bridge or bridges.
- (l) If the potential for induced voltage is present, a specific grounding plan is required. See Section 5 of this manual.

3.7 Transmission

(a) Footings

- (1) Excavations require a competent person and all rules of trenching and shoring must be followed.
- (2) Excavations for pad or pile-type footings shall be sloped or shored if entry is required. Ladders shall be used for all footing excavations in excess of four (4) feet.
- (3) Provisions shall be made for cleaning out auger type footing without requiring an employee to enter the footing unless shoring is used to protect the employee. A competent trained person is required when shoring is required.
- (4) A designated employee shall be used in directing mobile equipment adjacent to footing excavations.
- (5) No one shall be permitted to remain in the footing excavation while equipment is being spotted for placement.
- (6) Where necessary to assure the stability of mobile equipment, the location for such equipment shall be graded and leveled.
- (7) Any auger shaft hole in excess of 30" in diameter and 4' in depth shall be effectively barricaded so no employee can come within 6' of the hole without proper fall protection.

(b) Steel Tower Assembly

- (1) Tower assembly shall be carried out with a minimum exposure of employees to falling objects, and minimize suspended loads.

- (2) Guy lines shall be used as necessary to maintain sections or parts of sections in position and to reduce the possibility of tipping.
 - (3) A qualified employee shall be utilized to determine that required clearance is maintained in moving equipment under or near energized lines.
- (c) Transmission Conductor General Rules
- (1) Climbing or walking on suspension insulators or conductors will not be allowed under any circumstance.
 - (2) When in the working position, hooking or snapping into one “D” ring on body belts equipped with two (2) “D” rings, will never be permissible for vertical positions.
 - (3) Sliding down guy wires, rope or any other line hanging from top of pole will never be allowed.
 - (4) No one will ride on material, or headache ball, being moved by crane or any other equipment designed to lift loads unless rated for human cargo.
 - (5) A transmission clipping crew shall have a minimum of two structures clipped in between the crew and the conductor being sagged, or an equivalent means of securing conductors.
 - (6) When working on bare conductors, clipping and tying crews shall work between Master grounds with proper Zone of Equipotential established. Additionally, the structure and conductor being worked on shall be grounded at the work site. The ground shall remain intact until the conductors are clipped in, except on dead-end structures. (Per Section 5 of this Manual)
 - (7) Except during emergency restoration procedures and agreement of the crew, work from structures shall be discontinued when adverse weather (such as high wind or ice on structures) makes the work hazardous.
 - (8) Stringing and clipping operations shall be discontinued during any electrical storm.
 - (9) Reliable communications between the reel tender and pulling rig operators must be maintained at all times. Excessive cross talk and radio chatter will be kept to a minimum.
 - (10) Each pull shall be snubbed or dead-ended at both ends before subsequent pulls.
 - (11) Conductors, subconductors, and overhead ground conductors shall be grounded and EPZ established at all dead-end or catch-off points.

3.8 Underground

(a) Confined Spaces

Confined space: Vaults, Manholes, Tunnels or Trenches. Any space that you can bodily enter, is not intended for continuous human occupancy and limited means of access or egress is considered a confined space refer to Section 9. A trench or excavation 4’ or more in depth can be considered a confined space.

(b) Identification

- (1) All cables and equipment shall be labeled with tags or other suitable means of identification.

- (2) Before any work is started in a manhole, excavation, or primary enclosure, all cables and equipment shall be positively identified by the person in charge and the crew so informed.

(c) Energized Cables

- (1) All cables and equipment shall be considered energized and worked with adequate protective equipment until they have been proven de-energized.
- (2) Cables energized at voltages above 600 volts normal operating range must not be bent or moved, nor shall the sheath be removed unless the cable has been positively identified, proven de-energized and grounded.
- (3) Cables energized at 600 volts normal operating range or less, may be moved under the direction of the supervisor, except if the cable is noticeably warm or the movement will cause a short radius bend. Rubber gloves shall be worn when moving or bending such cables.
- (4) When working on, testing, cutting or splicing a cable or other equipment energized at 600 volts normal operating range or less, rubber gloves shall be worn. All adjacent conductors, equipment and grounds with which contact can be made shall be covered with rubber protective equipment, barriers or barricades.
- (5) An employee who may touch or make electrical contact with another employee working on energized conductors or equipment shall use the same protective equipment required for the work being done.

(d) Primary Enclosures

- (1) Primary enclosures shall not be energized unless the enclosure is properly grounded. The ground shall not be removed except for special test work.
- (2) When primary compartments on energized pad-mounted enclosures are opened, they shall be considered a hazard and all safety rules pertaining to an energized condition, including eye/face protection and rubber gloves, shall apply. If work is to be done on de-energized parts and all energized circuits are completely insulated or isolated FIRST and the area to be worked on is suitably grounded, then work may be done without rubber gloves if the supervisor determines that it is safe.
- (3) When working on energized primary conductors or facilities within enclosures, the proper circuit must be positively identified, and all possible precautions will be used. Where possible, the conductors will be de-energized and grounded at the terminal poles or source.
- (4) Energized primary enclosures shall be attended while open and securely locked when closed.
- (5) Only qualified personnel shall work on or near energized cabinets, transformers or other energized equipment. One (1) qualified employee shall be classified as a Qualified Observer.
- (6) To prevent an injury from faulting or arcing, no switching will be done with an employee inside any enclosure or confined space.
- (7) Proper Arc Rated face protection must be worn along with gloves and sleeves while opening, closing and working in any energized primary enclosure until the electrical hazard has been effectively eliminated.

(e) Excavation Work Near Energized Cables

- (1) Switch out cable whenever possible.
- (2) Set feed on non-reclosing.
- (3) Whenever possible, gloves should be worn and insulated platforms should be stood on.
- (4) When digging near energized cables special precautions must be taken to prevent damage to the lines. If an energized cable becomes exposed a Qualified employee must supervise work done by non-qualified personnel.
- (5) Rubber gloves are required when using jack hammers, bars or other hand tools which may contact electric power cables.
- (6) Check tools and equipment for proper usage. Small chipping hammers are more appropriate than heavy jack hammers when working around ducts containing energized cables.
- (7) Dielectric rated Rubber Boots and or Overshoes or other means of insulating employees should be given proper consideration at all times.

(f) De-energized Cables

- (1) Before any work is started on cable which is energized at voltages above 600 volts normal operating range, a clearance shall be obtained in strict accordance with Section 4.
- (2) When cutting into a de-energized cable, a grounded spiking tool with a sharp point will be applied with a hot-stick into the conductor to verify that the cable is dead.
- (3) When spiking cables from within an enclosure or trench, extra precautions should be taken to protect the workmen from accidental exposure to electrical flash. A remote spiking tool shall be used whenever possible.

(g) Stations and Substations

Where a cable is being installed from a station or substation, all conductors of the circuits must be grounded during the work on joints.

(h) Pulling Cable

Employees shall not remain in a manhole during pulling strains.

(i) Transformers

- (1) Transformers shall not be energized unless properly grounded. The case ground shall not be removed from an energized transformer.
- (2) Whenever the electrical interlock is made inoperable or does not work because of other conditions, the selector switch shall be padlocked and tagged.
- (3) The taking of oil samples from energized transformers shall be done only by employees specially trained and authorized to do this work. The proper facilities for taking these samples shall be used in each instance.

(j) Network Protectors

- (1) Network protectors shall not be closed manually unless specific instructions from qualified employees have been issued to do so, and then only when it is certain that associated transformer is alive, in proper phase relation.
- (2) Network protectors shall be blocked open when any work is to be performed on the fuses.

3.9 Substations

(a) Qualified Personnel

The operations, maintenance or repair of any substation equipment shall be done only by employees properly trained, qualified and specifically authorized to do the work involved.

(b) Safe Working Distance

Refer to Minimum Approach Distance in Appendix A. This rule shall not prevent work on energized parts with proper protective equipment or devices.

(c) Material Handling

- (1) Wherever material must be hoisted or moved through hazardous areas, suitable barriers and/or protective rubber goods shall be used to prevent contact with energized parts.
- (2) No material or tools shall be carried on the shoulders when working around energized parts. Long materials, including lumber, shall be carried in a horizontal position.
- (3) Tools and materials must not be thrown to employees aloft or dropped by them.

(d) Other Protective Equipment

- (1) Rubber protective equipment such as rubber blankets and line hose, or physical barriers shall be installed to prevent contact when working inside the minimum approach distances.
- (2) When work is to be performed near energized high voltage parts, suitable approved barriers shall be placed between the space occupied by workmen and the nearest energized parts.
- (3) It is the responsibility of the supervisor to determine where the barriers are to be placed, and the barriers are to be moved only under his direction.
- (4) Barricade tape shall be used to mark off and bar approach to energized hazardous areas adjacent to the work areas.

(e) Entry to Substations

- (1) Entrances to substation enclosures shall be locked at all times, except when an employee has the entrance in view and can prevent entry by unauthorized persons.
- (2) Employees entering substations or plants shall comply with issued instructions concerning notifying plant, division or system operating personnel, as specified.

(f) Construction in Energized Substations

- (1) When construction work is performed in an energized substation, authorization shall be obtained from the designated, authorized person before work is started.

- (2) If the potential for induced voltage is present, appropriate grounding is required. See Section 5 of this manual.
- (3) Isolation of section being worked on is required. For example, locked and tagged, any switches, removal of buss, etc.
- (4) Barricades or barriers shall be installed to prevent accidental contact with energized lines or equipment.
- (5) Where appropriate, signs indicating the hazard shall be posted near the barricade or barrier. These signs shall comply with local and federal standards.
- (6) Precautions shall be taken to prevent accidental operation of relays or other protective devices due to jarring or vibrations.
- (7) Use of any hoisting equipment or gin poles, in restricted or hazardous areas, must be overseen and supervised by at least one (1) qualified employee. The operator of this equipment must also be made aware of any energized lines or equipment with which his equipment may come in contact.
- (8) When a substation fence must be expanded or removed for construction purposes, a temporary fence affording similar protection when the site is unattended shall be provided. Adequate inter-connection with ground system shall be maintained between temporary fence and permanent fence.
- (9) All gates to all unattended substations shall be locked except when work is in progress. All unauthorized persons must be kept out of work areas.

3.10 Cadwelding

Cadwelding shall be done by a competent employee. The person cadwelding is required to wear a safety face shield (non-flammable), leather gloves, and long sleeves. Caution shall also be taken to remove moisture and other impurities from wire and mold before each shot.

Section 4.0 - Lockout / Tagout

4.1 General

(a) Management Responsibilities

- (1) Each supervisor is responsible to see that employees are trained on appropriate lockout/tagout procedures.
- (2) Each supervisor shall effectively enforce compliance of this lockout procedure.
- (3) Each supervisor shall assure that the locks, devices and tags required for compliance with the lockout procedure are provided to their employees.

(b) Employee's Responsibility

- (1) Employees shall comply with the lockout procedure.
- (2) Employees shall consult with their supervisor or other appropriate knowledgeable management personnel whenever there are any questions regarding their protection.
- (3) Employees shall obtain and care for the locks and other devices required to comply with the lockout procedure.

4.2 High Voltage Lockout/Tagout

(a) Application

This section applies to the de-energizing of transmission and distribution lines and equipment for the purpose of protecting employees. Control of hazardous energy sources used in the generation of electric energy is covered in this section. Conductors and parts of electric equipment that have been de-energized under procedures other than those required by this section, as applicable, shall be treated as energized.

(b) General

- (1) If a system operator is in charge of the lines or equipment and their means of disconnection, all of the requirements of paragraph C of this section shall be observed, in the order given.
- (2) If no system operator is in charge of the lines or equipment and their means of disconnection, one employee in the crew shall be designated as being in charge of the clearance. All of the requirements of paragraph C of this section apply, in the order given, except as provided in the next paragraph, of this section. The employee in charge of the clearance shall take the place of the system operator, as necessary.
- (3) Any disconnecting means that are accessible to persons outside the employer's control (for example, the general public) shall be rendered inoperable while they are open for the purpose of protecting employees.

(c) De-Energizing Lines and Equipment

- (1) A designated employee shall make a request of the system operator to have the particular section of the line or equipment de-energized. The designated employee becomes the employee in charge and is responsible for the clearance.
- (2) All switches, disconnects, jumpers, taps, and other means through which known

sources of electric energy may be supplied to the particular lines and equipment to be de-energized, shall be opened. Such means shall be rendered inoperable, unless its design does not so permit, and tagged to indicate that employees are at work.

- (3) Automatically and remotely controlled switches that could cause the opened disconnecting means to close shall also be tagged at the point of control. The automatic or remote control feature shall be rendered inoperable, unless its design does not so permit.
- (4) Tags and locks shall prohibit operation of the disconnecting means and shall indicate that employees are at work. Tagging disconnecting means is mandatory and locks shall be used when applicable.
- (5) After the applicable requirements in this section have been followed and the employee in charge of the work has been given a clearance by the system operator, the lines and equipment to be worked shall be tested to ensure that they are de-energized by an approved testing device.
- (6) Protective grounds shall be installed as required by Section 5.
- (7) After the applicable requirements of paragraphs (1) through (6) of this section have been followed, the lines and equipment involved may be worked as de-energized.
- (8) If two (2) or more independent crews will be working on the same lines or equipment, each crew shall independently comply with the requirements in all the paragraphs of this section.
- (9) To transfer the clearance, the employee in charge (or, if the employee in charge is forced to leave the work site due to illness or other emergency, the employee's supervisor) shall inform the system operator; employees in the crew shall be informed of the transfer; and the new employee in charge shall be responsible for the clearance.
- (10) To release a clearance, the employee in charge shall:
 - i. Notify employees under his or her direction that the clearance is to be released;
 - ii. Determine that all employees in the crew are clear of the lines and
 - iii. Determine that all protective grounds installed by the crew have been removed; and
 - iv. Report this information to the system operator and release the clearance.
- (11) The person releasing a clearance shall be the same person that requested the clearance, unless responsibility has been transferred under paragraph c. (9) of this section.
- (12) Tags may not be removed unless the associated clearance has been released under paragraph c. (10) of this section.

4.3 Equipment and Machinery Lockout/tagout Procedures

(a) General Practices

The power of any equipment, machine or process to be set-up, adjusted repaired, serviced, installed, or where maintenance work is to be performed and unintended motion or release of energy would cause personal injury, such a power source shall be locked out by each employee doing the work. Prior to starting the work, sources of energy such as springs, air, hydraulic and steam shall be evaluated to ensure that a zero energy state has been achieved.

(b) Procedures for Isolation

- (1) Machinery or equipment capable of movement shall be stopped and the power source de-energized or disengaged. Where necessary, the moveable parts shall be physically blocked to prevent inadvertent movement during servicing or adjusting.
- (2) Any electrical equipment undergoing service, repair, or adjustment shall be DE-ENERGIZED and locked out.

Section 5.0 - Grounding

IF IT ISN'T GROUNDED - IT ISN'T De-Energized.

- Identify
- Isolate
- Test
- Bond
- Ground

5.1 Grounding for The Protection of Employees (Personal Grounds)

(a) Equipotential Zone

Temporary protective connections also known as personal Protective Grounds or Bonds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential, should they occur.

- (1) When establishing an EPZ all three phases must be bonded together, attached to a Cluster bracket and bonded to the system neutral.
- (2) The Cluster bracket must be either bonded to the pole ground or bonded to the pole with a nail, staple or other hardware to at least the depth of the lineman's gaff's.
- (3) The Cluster bracket must be placed as close as possible to the feet of the Qualified employee.
- (4) The bond from the Cluster bracket to the conductor must be attached on the source side creating a connection between the employee and the potential source whenever possible.

(b) Protective Grounding Equipment

- (1) Protective grounding equipment shall be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault. This equipment shall have a capacity greater than or equal to that of No. 2 AWG copper.

NOTE: HOT LINE CLAMPS ARE NOT TO BE USED IN ANY CIRCUMSTANCES.

- (2) Protective grounds shall have a resistance meeting the minimum requirements of host contractor or regulatory agency and low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment.

(c) Testing

Before any ground is installed, lines and equipment shall be tested and found absent of nominal voltage.

(d) Order of Connection

When a ground is to be attached to a line or to equipment, the ground-end connection shall be attached first, and then the other end shall be attached a by means of a live-line tool.

(e) Order of Removal

When a ground is to be removed, the grounding device shall be removed from the line or equipment using a live-line tool before the ground-end connection is removed.

(f) Removal of Grounds for Test

Grounds may be removed temporarily during tests. During the test procedure, the employer shall ensure that each employee uses insulating equipment and is isolated from any hazards involved, and treats the ungrounded equipment as energized and the employer shall institute any additional measures as may be necessary to protect each exposed employee in case the previously grounded lines and equipment become energized.

5.2 System Ground

- (a) Grounds shall be placed so that at least one (1) of them is readily visible to one member of the crew. When working on a line that is isolated, tagged and de-energized the line must be grounded. The use of bracket grounds is to shorten the duration of any accidental energization and is not intended to provide employee protection from hazardous differences in potential. A Zone of Equipotential is the only process that protects the workers.
- (b) Grounds shall be placed between any potential energy source and the worker and should also be as close as practical to the work location
- (c) If work is to be performed at more than one (1) location in the line section, the line section must be grounded at each location in the line section with proper EPZ and crews will communicate when they are installing/removing grounds to other crews.
- (d) Adequate means, such as barricading (which is the most preferred method), shall be taken to prevent workmen from making accidental contact with grounding cables, ground rods, etc.
- (e) If a common neutral is available, it shall be considered the preferred ground rather than a driven ground rod as long as the common neutral is capable of carrying adequate fault current to protect the workers.
- (f) A ground rod shall not be placed where it will interfere with employee's work and must be located in such a manner as to reduce step potential hazards.

5.3 Grounding Vehicle Frames

- (a) The frames of all motor vehicles equipped with booms or aerial baskets shall be either barricaded or grounded with adequate vehicle equipment when working in the vicinity of energized lines or equipment. Barricading is the approved method to be used at all times. If a vehicle is attached to a reel trailer, pulling device or tensioner, it must be kept at the same potential as the vehicle via bonding even when barricaded.
- (b) The frames of all reel trailers or pulling devices shall be grounded and barricaded when wire or cable is being pulled on poles or in underground ducts which contain any energized wire, cable or equipment.
- (c) Frames of transformer trailers and portable substations shall also be grounded with adequate vehicle and/or equipment grounds.

5.4 Communications Conductors

Bare wire and communication conductors on power poles or structures shall be treated as energized lines unless protected by insulating materials.

Section 6.0 - Fall Protection

6.1 Fall Protection Guidelines

Under 1910.269 all employees performing work are required to be certified as “qualified climbers”.

- (a) Definitions For the sake of understanding, it must be understood there are two types of fall protection.
 - (1) The first type is the actual fall and the arrest of that fall. For this system it is required to have a harness and a double locking snap lanyard. The actual fall cannot be greater than six (6) feet and the actual arrest cannot have more than 1800 lbs. inertia stress on the equipment. There must be sufficient distance to catch the employee safely, including the extra distance in the shock absorber.
 - (2) The second type is the restraining or positioning protection. In this type of protection, the employee is restrained from reaching a fall. This type of fall protection requires the employee to have a double locking snap hook(s) on their restraining equipment. The lineman that uses his lineman’s belt and a safety as their fall protection is required to have double locking snap hooks on their safeties. They are also required to be certified to climb or change positions on a structure before they can do so without fall protection. It must be noted that the certification of climbing only allows the lineman to climb or change positions. They are required to safety off before proceeding with any work.
- (b) All employees working above four (4) feet shall be protected from falling.
- (c) Each company performing maintenance job functions will have to determine how they will certify employees as being qualified climbers under the OSHA definition.
- (d) Employees working on poles, towers, elevated substations, bucket trucks, or other work locations must be provided fall protection when working above four (4) feet. This protection can be the use of guard rails, lifelines and harness, warning line, or approved fall protection plans.
- (e) Employees exposed to a fall hazard must be certified to have had training in the proper fall protection procedures and the use of fall protection equipment.
- (f) Employees shall use full body harness with a shock absorbing lanyard for fall protection. When transferring from a vertical surface to a horizontal surface on a structure proper fall protection of a body harness is required.
- (g) All anchorage points for fall arrest equipment must be able to support 5,000 pounds of force. All fall arrest hardware shall have a breaking strength of 5,000 pounds.
- (h) All fall arrest equipment that has any shock loading must be certified as safe to be used by a competent person before it is placed back in service.
- (i) All lineman’s safety straps shall be equipped with double locking snaphooks.
- (j) No alterations to safety straps or lanyards will be permitted under any circumstances. This specifically includes double locking snaphooks.
- (k) Wood Pole Fall Restriction device shall be “engaged” ground- to-ground when ascending, descending, changing position and when in the working position. When in the working position, work positioning equipment may be used when rigged such that an employee cannot fall more than two (2) feet.

Section 7.0 - Personal Protective Equipment

7.1 Clothing

- (a) When special protective clothing and equipment is furnished and required for specific jobs, the wearing of such clothing and equipment is mandatory.
- (b) The use of reasonable clothing can minimize an injury. On the other hand, the combination of an accident and certain types of clothing will increase the same injury into an extremely serious and painful condition.
- (c)
 - (1) Clothing suitable to the job shall be worn at all times.
 - (2) Work clothing of good construction and types recommended costs no more than ordinary clothes, often less.
 - (3) Each employee shall wear a long sleeve shirt, long pants and work boots at all times to minimize danger when exposed to, moving machinery, hot or injurious substances and rough or sharp surfaces.
 - (4) Employees exposed to the hazards of electrical arcs shall wear approved arc resistance/flame resistance (AR/FR) long sleeve shirts or other, AR/FR clothing as required. Synthetic clothing (For example: acetate, nylon, polyester and rayon) other than AR/FR designated clothing, will not be used under any circumstances. All undergarments worn will be made of natural fibers.
 - (5) Dangling watch chains, key chains or other similar metallic accessories shall not be worn when working on or near energized parts, or when working around machinery.
 - (6) Do not wear cuffed trousers. They catch and hold hot or corrosive materials, endangering the wearer. Large cuffs are also a tripping hazard.
 - (7) Thin, sponge type, or worn-through soles invite puncture wounds from nails, rocks and similar items. Poorly fitting shoes or those in bad condition are not only a hazard, but often cause unnecessary fatigue.
 - (8) OSHA requires anyone exposed to a falling or rolling hazard to wear hard toed footwear per the ANSI Standard.
 - (9) Any materials which are oil or paint soaked are highly flammable and shall not be worn.
 - (10) Suitable gloves must be worn when handling hot, rough, or sharp materials, when welding or cutting, when handling chemicals, or when handling or using compounds, hot applied pipe coatings or similar materials.
 - (11) Leather-faced or leather gloves must be worn when handling steel winch cable. Allowing steel rope or winch cable to run through the hands is forbidden.
 - (12) Gloves shall be worn while handling rope and employees shall avoid letting rope slip or run through hands.
 - (13) Long hair/jewelry (necklaces, etc.) shall be worn or kept in a manner so as to not be

an entanglement hazard while working around equipment or processes.

- (14) Jewelry (watches, rings, etc.) shall not be worn when working on or near energized apparatus.
- (15) If the work requires the employee to wear a respirator, the employee will be clean shaven for proper respirator fit.

7.2 Eye Protection

(a) Statement

- (1) Throughout this manual there is reference made to "suitable eye protection." When so used, the term "suitable eye protection" means adequate to provide complete protection against the condition or hazard present.
- (2) In considering the need for eye protection, both the employee and the person in charge must remember that any injury to an eye, however slight, can be serious.
- (3) The forms of eye protection equipment available include goggles, face shields, safety glasses, helmets, and hoods.
- (4) There is no single type or form of eye protection which will fit all persons or offer protection from all hazards. However, from the multitude of products available, adequate eye protection can be obtained for any eye hazard encountered. To obtain the proper type of eye protection equipment, careful consideration must be given to the hazard to be protected against and then to the selection of a type of equipment which will provide adequate protection. In making this selection, reference shall be made to the recommendations contained in the manufacturers' catalogs.
- (5) Proper ARC rated face shields must be worn whenever an employee is exposed to an arc flash greater than 9 Cal/cm² of heat energy for any single-phase open air, application and 5 Cal/cm² for all other exposures.
- (6) Where the eye hazard to be protected against requires the use of goggles, face shields, helmets, or hoods for adequate protection, safety glasses shall not be substituted for the required equipment. The required equipment shall be worn over the safety glasses.

(b) Care of Eye Protection Equipment

- (1) Quantities of eye protection equipment shall be such that employees will not be required to wear equipment previously worn by others until it is properly cleaned.
- (2) In cleaning eye protection equipment, soap and hot water shall be used to give the equipment a good washing. Solvents, gasoline, and similar cleaning agents shall not be used due to the danger of causing skin rashes or eye irritation.
- (3) All forms of eye protection equipment must be kept in good repair and ready for use. When it is not in use, it shall be stored in a manner which will keep it clean and ready for use. Where necessary, special containers shall be provided and used for this purpose.
- (4) The employee shall take care to properly adjust eye protection equipment to be worn to insure a proper fit. Clear vision can be assured by the proper use of anti-fog solution or special cloths to prevent fogging and sweating of the lenses.

(c) Impact Hazards

Suitable eye protection shall be worn to protect the eyes from hazards encountered in chipping, grinding, buffing, boring, breaking, or similar work subjecting the eyes to flying fragments from the tools or machines being worked upon. The degree of the hazard will determine which of the following types shall be used: 1) hoods, 2) goggles, 3) face shields, 4) safety glasses with side shields.

(d) Dust Hazards

Goggles shall be worn when working in heavy dust concentrations; as conditions require in handling quantities of dry lime, cement or similar materials; or as wind conditions require. The degree of hazard will determine the type of goggles to be used.

(e) Hot Materials

Suitable eye protection shall be worn when handling or pouring molten metals, insulating compounds or similar hot materials which may splash. The degree of the hazard will determine which of the following types shall be used: 1) goggles, 2) face shields.

(f) Acids, Caustics, and Irritants

Suitable eye protection shall be worn whenever pouring, handling, or using acids, caustics, or other irritants where the materials or fumes from the material may come into contact with the eyes. The degree of the hazard will determine which of the following types shall be used: 1) hoods, 2) goggles, 3) face shields.

(g) Injurious Light Rays

- (1) Suitable dark colored goggles and/or helmets must be worn by welders and their helpers when welding, cutting, or brazing.
- (2) Dark colored goggles shall be worn by all other employees working in close proximity to unprotected welding operations.
- (3) Suitable dark colored eye protection shall be worn when viewing glare from intense heat as in large boilers, heat treating furnaces, and similar equipment.

7.3 Head Protection

- (a) All Safety Hard Hats shall be of the insulated type established by O.S.H.A. and shall meet the specifications contained in American National Standards Institute, Z89.2-1971.
- (b) Safety Hard Hats shall be adjusted in accordance with manufacturer's instructions, to provide maximum protection.
- (c) No holes, metal attachments or alterations of any kind shall be made on Safety Hard Hats.
- (d) The wearing of Safety Hard Hats is mandatory at all times by all personnel while on duty, except while in the cab of equipment or under rollover cab protection on digging equipment.

7.4 Lineman's Climbing Equipment

- (a) Hardware for lineman's body belts, safety straps, and lanyards shall conform to OSHA standards (see Section 6.1, Fall Protection Guidelines).
- (b) After climbing to the work station, the employee must LOOK to make sure the locking snaphook is properly engaged in the "D" ring before leaning back. Employees must never rely on the "click" as an indication that the fastening is secure.
- (c) No belt attachments such as pliers holsters, pouches, or other equipment shall conflict with the "D" ring or be attached closer than 4" to the "D" ring. No wire shall be attached to body belts to hang nuts and washers.
- (d) Only approved safety straps and body belts shall be used.
- (e) While in a working position, snapping both ends of the safety strap into one "D" ring will not be permitted at any time.
- (f) In addition to being used as an employee safeguarding item, body belts with approved tool loops may be used for the purpose of holding tools. Body belts shall be free from additional metal hooks and tool loops other than permitted in safety rules. Only those tools for which the belt is designed shall be carried in the belt loops. No tools shall be carried in a "nut & bolt bag".
- (g) Body belts and straps shall be inspected before use each day to determine that they are in safe working condition.

7.5 Breathing Protection

- (a) Respirators or fresh air masks shall be worn:
 - (1) Whenever irritant or poisonous gases or fumes are present.
 - (2) Wherever lack of oxygen is encountered.
- (b) Dust Masks shall be worn when air samples indicate dust masks are sufficient protection to handle the exposed hazards, such as:
 - (1) While handling quantities of dry lime, cement or similar materials.
 - (2) When working in heavy dust concentrations.

7.6 Protective Creams

Protective creams shall be used to protect exposed skin when exposed to askarels, joint compounds, pulling compounds, or similar skin irritants.

7.7 Employees Exposed to Vehicular Traffic

Employees exposed to vehicular traffic shall be provided with and shall be instructed to wear warning vests marked with or made of reflectorized or high visibility material.

7.8 Ear Protection

- (a) Ear protection shall be provided and used, whenever it is feasible to reduce the noise levels or duration of exposures to those specified in Table D-2, Permissible Noise Exposures, in 1926.52 of O.S.H.A. for the Construction Industry.
- (b) Ear protection devices inserted in the ear shall be fitted or determined to be adequate individually by competent persons.
- (c) Plain cotton is not an acceptable protective device.

7.9 Personal Contact with PCB

Personal contact with PCB materials is prohibited unless employees are HazMat certified, and proper protection is provided.

7.10 Tree Trimming

- (a) Personal protective equipment while tree trimming shall be the same as for other electrical workers.
- (b) Climbing ropes shall be used when working aloft in trees. These ropes should have a minimum diameter of ½ inch and should be 3- or 4- strand first-grade manila, with a nominal breaking strength of 2,385 pounds or equivalent strength and durability. Synthetic rope shall have a maximum elasticity of not more than 7%.
- (c) Saddle belts or safety belts shall not be spliced or weakened by punching extra holes in them.
- (d) Climbing ropes shall not be used to lower limbs or other parts of trees or to raise or lower equipment.

7.11 Lineman's Rubber Gloves

- (a) Manufacturing Standards

Lineman's rubber gloves have been manufactured to the ANSI/ASTM D120-77 SPECIFICATIONS

Red Label	Class 0	1,000 V Working Voltage	5,000 V Proof Test
White Label	Class 1	7,500 V Working Voltage	10,000 V Proof Test
Yellow Label	Class 2	17,000 V Working Voltage	20,000 V Proof Test
Green Label	Class 3	26,500 V Working Voltage	30,000 V Proof Test
Orange Label	Class 4	36,000 V Working Voltage	40,000 V Proof Test

- (b) Rubber gloves and sleeves must be put on before reaching the minimum approach distance.
- (c) Gloves and sleeves must be inspected visually and the gloves air tested, by the wearer before each use.
- (d) Rubber insulating gloves shall always be used with protective gloves. They shall be inspected at the same time the rubber gloves are inspected. Look for metal particles, imbedded wire, abrasive materials or any substance that could cause puncture, abrasion, contamination or deterioration. Adequate flashover distance between the top of the protective gloves and bead of the rubber gloves should be maintained. The minimal recommended uncovered distance is 1" for each 10,000 volts for which the glove is rated.
- (e) Gloves and sleeves can be damaged by many chemicals, especially petroleum base products, such as oils, gasoline, hydraulic fluid, inhibitors, hand creams, pastes and salves. If contact is made with these or other petroleum base products, the contaminant should be wiped off immediately. Gloves should be cleaned using a mild soap. After washing, rinse thoroughly with clear water and air dry. If any signs of physical damage or chemical deterioration are found, such as swelling, softness, hardening, stickiness, ozone deterioration or sun checking, the subject gloves should not be used.
- (f) Gloves and sleeves shall be stored in a protective bag when not being used.
- (g) Rings, watches, jewelry and sharp objects should not be worn on your hands or arms when

wearing rubber gloves.

- (h) Per OSHA Standard 1910.269, rubber gloves must be worn while working on energized circuits or equipment having a potential above fifty (50) volts.
- (i) Rubber sleeves must be worn while working on energized circuits or equipment having a potential above 600 volts. When working on secondary voltage, sleeves must be worn where there is a possibility of accidental contact of energized circuits or equipment.
- (j) Rubber gloves shall be worn by all employees handling the conductor when stringing or removing wire on poles which support energized lines; or whenever handling any wire or conductor hanging from a pole while standing on the ground.
- (k) Rubber gloves shall be worn by employees:
 - (1) When setting or removing poles close to energized conductors or equipment.
 - (2) While handling tree limbs in contact with or liable to contact wires above fifty (50) volts normal operating range.
 - (3) When any set of circumstances exist that the workman may consider them advisable for his safety.
 - (4) While hanging and pulling guy wire on energized poles.
 - (5) When handling or guiding wire rope or cables where there is a possibility of contact with energized conductors or equipment.
- (l) Rubber gloves, sleeves and blankets must be tested ninety (90) days after date of issue. Testing date can be up to ninety (90) days prior to date of issue, if rubber goods are stored properly. Proper storage shall meet the following criteria:
 - (1) No rubber goods shall be folded or creased and gloves shall be stored in a suitable closed box.
 - (2) Storage area temperature not to exceed 100 degrees F.
 - (3) Storage area to be free of ozone, sulfur dioxide, or any other reactive gas.
 - (4) Rubber goods shall be stored out of proximity of any source of heat such as radiators, steam pipes, etc.
- (m) Under no conditions will patched rubber goods be used on any energized system.

(n) Test Intervals

Rubber Gloves	90 Days
Sleeves	90 Days
Line House	12 Months
Blankets	180 Days
Other protective goods	12 Months
Hot Sticks	24 Months
Safety Boards	12 Months

- (o) Rubber Protective Equipment must be carried in approved containers and handled carefully to avoid damage.

- (p) When not in use, Rubber Protective Equipment shall be protected from mechanical and chemical damage, and must always be stored in the approved containers provided for such use. This equipment shall never be stored when wet, but must be properly dried to prevent deterioration.

Specific care must be taken to see that no tools or materials are piled on rubber equipment.

- (q) Rubber blankets must be rolled or hung vertically in a proper container when stored, and must never be folded. Line hose and rubber gloves shall be stored in full length position, never folded.
- (r) Glove protectors shall be examined regularly for soundness and imbedded foreign materials. They shall not be worn except when in use over rubber gloves.
- (s) Rubber gloves shall never be used without protectors, and must not be worn or stored inside out.
- (t) When gloving off the pole, no one shall glove voltages that exceed 5,000 volts phase to phase. The following are the basic rules for Overhead line work on circuits with voltage not to exceed 15,000 volts, phase-to-phase, using rubber gloves and rubber sleeves. This work may be performed only from insulated aerial baskets or properly tested safety boards.

Section 8.0 - Excavation, Shoring & Trenching

8.1 Scope

(a) General Requirements

- (1) Employees must be protected against cave-ins except when the excavation is in stable rock or less than five (5) feet deep and examination by a competent person provides no evidence that a cave-in should be expected.
- (2) Employees must also be protected against falling rock, soil or material by use of an adequate system. This system includes scaling to remove loose rock or soil, installation of protective barricades and other equivalent protection.

(b) Competent Person

- (1) All excavations must be monitored by a competent person. A competent person is defined as someone who is trained in 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.
- (2) A competent person is required to be present on all sites where employees are exposed to excavation hazards (in the trench).

(c) Daily Inspections

- (1) Excavations, adjacent areas, and protective systems must be inspected daily by a competent person. Exposed employees must be removed if there is evidence of possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions until necessary precautions have been taken.
- (2) Daily inspections of excavations shall be made by the competent person. Inspections shall be made after a rain or other changing conditions as to the stability of the walls or sides of the excavations.

(d) Specific Trenching and Excavation Requirements

- (1) When working in all classes of soil, the competent person on the job shall determine the shoring and trenching requirements up to five (5) feet. If the walls or faces of the excavation of any class soil are (5) feet or deeper feet, the walls must be sloped, shored or shielded with Nationally Recognized Testing Laboratory approved protective equipment to provide for the safety of workers. Tabulated Data Sheets must accompany all shoring boxes.
- (2) A combination of sloping, shielding, and or shoring may be used.
- (3) A slope that measures $\frac{3}{4}$ to 1 is acceptable for Type A soils.
- (4) A slope that measures 1 to 1 is acceptable for soils classified as Type B.
- (5) A slope that measured to $1\frac{1}{2}$ to 1 is acceptable for soils classified as Type C.
- (6) Employees shall be provided with adequate access to egress for trenches or excavations four (4) feet or greater in depth; and they shall be located so that no more than twenty-five (25) feet of lateral travel is required. Ladders shall extend at least

three (3) feet above the trench.

- (7) Excavated materials (spoils) shall be effectively stored and retained at least two (2) feet or more from the edge of the excavation.
- (8) Any excavations greater than twenty (20) feet deep shall have the sloping or trenching approved by a Registered Professional Engineer (RPE).

(e) Barricading Excavations

- (1) Excavations shall be barricaded anytime there is possible danger or hazard to the public or personnel. No excavation shall be left unattended for any length of time without being filled, covered and/or barricaded.
- (2) Excavation barricades will be an approved design, constructed of approved materials and/or roped off and supported in such a manner as to support an adult falling against or upon them.
- (3) Barricades shall be placed at a sufficient distance from the edge of the excavation that there shall be no danger of falling across or under the barricades and into the excavation.
- (4) The barricades shall completely encompass and enclose the excavation and any spoils and/or debris.
- (5) Excavation barricades or ropes shall be flagged to be more noticeable and warning signs or ribbons shall be posted on all sides.
- (6) Equipment and vehicles may be used as barricades and/or covers for excavations so long as the vehicles are secured and immobile and are posted and lighted to the above criteria.
- (7) Where it is necessary to have crossings over excavations, those crossings shall be constructed of approved materials and designed so as to be able to support several adults upon them at one (1) time and shall have guard rails on both sides of sufficient strength and design to support an adult falling upon or against them. These walkways or crossings shall extend at least three (3) feet past the edge of the excavation and shall have warning signs posted at or upon both entrances.

Section 9.0 - Confined Spaces

9.1 How to Identify Confined Spaces

(a) Purpose

To protect workers from the hazards of toxic, explosive, or asphyxiating atmospheres, and from possible engulfment by small particles. A work area classified as a confined space may contain a hazardous atmosphere which could expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from airborne contaminants or oxygen deficiency.

(b) Scope

This section is designed to cover all those involved with confined space work, dealing with the issues of administration, supervision, entry and rescue.

(c) Definitions

- (1) Confined space - A confined space is defined as an area which:
- (2) Confined spaces include, but are not limited to: process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than four (4) feet in depth such as pits, tubs, vaults, and vessels.
- (3) Is large enough and so configured that an employee can bodily enter and perform assigned work;
- (4) Has limited or restricted means for entry or exit; and
- (5) Is not designed for continuous employee occupancy.
- (6) Permit-required confined space - A confined space that has one or more of following characteristics:
 - (7) Contains or has a potential to contain a hazardous atmosphere;
 - (8) Contains a material that has the potential for engulfing an entrant;
 - (9) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly covering walls or by a floor which slopes downward and tapers to a smaller cross-section; or
 - (10) Contains any other recognized serious safety or health hazard.
- (11) Non-Permit confined space - A confined space that does not contain atmospheric hazards or have the potential to contain any hazard capable of causing physical harm. Entry into a confined space without a written permit or attendant will only be permitted if:
 - (12) All hazards are eliminated; or
 - (13) The space can be maintained in a safe condition for entry by mechanical ventilation alone.

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. After classification as a non-permit space, the SUPERVISOR must fill out the Confined Space Pre-Entry Checklist before entry into the confined space. The checklist or a copy shall be kept at the work site for the duration of the job. If circumstances dictate an interruption in the work, the permit space must be re-evaluated and a new check list must be completed.

- (14) Enclosed Space-A space that does not contain an atmospheric hazard. The only hazards are electrical, and the space is entered by a qualified person. Entry requirements are identical to that of a non permit space except retrieval equipment will be available and an observer must be present. *Note- "Entry" for the purposes of this Manual will be defined as any part of the workers body breaking the plane of the space.

9.2 Responsibilities

(a) Employer

The employer shall have a "competent person" evaluate the workplace to determine if any spaces are permit-required confined spaces. The proper course of action will then be taken in accordance with the requirements.

(b) Entry Supervisor:

All entry supervisors must know the hazards of confined spaces. In addition, they must also perform the following duties:

- (1) Verify that all tests have been conducted and all procedures and equipment are in place before endorsing a permit. The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means;
- (2) Terminate entry if necessary;
- (3) Cancel permits;
- (4) Verify that rescue services are available and the means for summoning them are operable;
- (5) Remove unauthorized individuals who enter the confined space; and
- (6) When shifts and entry supervisors change, determine that acceptable conditions, as specified in the permit, continue.

(c) Standby Person (Attendant):

A standby person must know the hazards of confined spaces, including the mode, signs or symptoms, and consequences of the exposure. In addition, they must also know how to perform the following duties:

- (1) Be aware of behavioral effects of potential exposures;
- (2) Maintain continuous count and identification of authorized attendants;
- (3) Remain outside the space until relieved;
- (4) Communicate with entrants as necessary to monitor entrant status;

- (5) Monitor activities inside and outside the permit space and order exit if required;
- (6) Summon rescuers if necessary;
- (7) Prevent unauthorized entry into the confined space;
- (8) Perform non-entry rescues if required; and
- (9) Ensure that no other duties are performed which would interfere with the primary duty to monitor and protect the safety of authorized entrants.

(d) Authorized Entrant:

Anyone who enters a permit-required confined space must know the following:

- (1) The potential hazards;
- (2) The ability to recognize signs or symptoms of exposure;
- (3) An understanding of the consequences of exposure to hazards;
- (4) How to use any needed equipment;
- (5) How to communicate with attendants as necessary;
- (6) How to alert attendants to warning signs or the existence of hazardous condition;
- (7) Exit whenever there is detection of a prohibited condition;
- (8) Exit as quickly as possible whenever ordered or alerted to do so.

(e) Rescue Personnel:

Rescue services may be provided by on-site employees or an off-site service. Besides these services, a retrieval system or method shall be used to facilitate non-entry rescue. The following is mandatory of rescue personnel:

(f) Recommended Procedures:

Employees shall only be permitted to perform work in Confined or Enclosed Spaces when a Competent Person has verified and completed all of the following:

- (1) The Competent Person(s) is present at all times when employees are entering or working in the space;
- (2) The space is classified in one of the following categories: Permit Required Confined Space; Re-Classified Confined Space (Non-Permit Required Confined Space); or Enclosed Space;
- (3) An entry permit has been filled out and all pertinent information is conveyed to the employees;
- (4) Acceptable entry conditions are identified and any necessary purging, inerting and/or ventilation is instituted;
- (5) A rescue plan is developed and implemented prior to entry including employee training in rescue procedures;

- (6) Identification of the Authorized Persons to enter the space (Entrants) and the Authorized Persons who will stay outside the space (Attendants);
- (7) Appropriate and calibrated air monitoring equipment is used to detect the initial air quality and monitor employees in the space. Acceptable entry conditions shall be achieved prior to employees entering the space;
- (8) Air monitoring will be conducted periodically while employees are in the space or at any time re-entry is required after exiting the space;
- (9) Fresh air purging of the space is completed prior to employees entering the space;
- (10) Fresh air ventilation is provided while employees are in the space;
- (11) Appropriate barricades are surrounding the entry location and appropriate fall protection is provided for the Entrants; and
- (12) Entrants and Attendants understand their responsibilities.

ON-SITE TEAMS:

- (1) Must be properly equipped and must receive the same training as authorized entrants;
- (2) Must be trained in the use of personal protective and rescue equipment;
- (3) Must be trained in first aid and CPR, and at least one rescuer, currently certified in both, shall be available; and;
- (4) Must practice simulated rescues at least once every 12 months.

OUTSIDE RESCUE SERVICES:

- (5) Must effectively respond in a timely manner;
- (6) Must be equipped, trained and capable of functioning appropriately to perform permit space rescues;
- (7) Must be made aware of the hazards of the confined spaces;
- (8) Must have access to all permit spaces to develop rescue plans; and
- (9) Must practice rescues.

ATTENTION: A Material Safety Data Sheet (SDS) or similar information shall be submitted to the medical facility treating an exposure victim.

(g) Contractors:

A General Contractor must provide information to their subcontractors on permit spaces. The information shall include:

- (1) The permit space program and procedures;
- (2) The likely hazards that the subcontractor might encounter;
- (3) Coordination between subcontractors when joint entries need to be performed; and
- (4) The General Contractor debriefing at the conclusion of entry operations.

9.3 Requirements

- (a) If a workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence, location of, and danger posed by the permit spaces.
- (b) If it is decided that employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering them.
- (c) If employees will enter permit spaces, refer to Section 9.2 of this section, which is a written program, available for inspection by the employees and their authorized representatives.
- (d) Alternate procedure may be used if the employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere. These procedures are as follows:
 - (1) It shall be demonstrated that continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry;
 - (2) Monitoring and inspection data that supports the demonstrations shall be developed;
 - (3) If initial entry of the permit space is necessary to obtain the data required, all procedures will comply with the permit-required confined space program;
 - (4) This data shall be documented and made available to each employee who enters the permit space; and
 - (5) Entry into the permit space under these terms shall be performed in accordance to the requirements of 29 CFR 1910.146 (c)(5)(ii).
- (e) When there are changes in a non-permit confined space that might increase the hazards to entrants, the employer's competent person shall reevaluate that space and reclassify it if necessary.

NOTE: Proper application of the 29 CFR 1910.146 Appendix A-Permit Required Confined Space Decision Flow Chart would facilitate compliance with the preceding requirements.

9.4 Tools and Materials

- (a) When the manhole is occupied, the handling of all tools and materials into or out of manholes must be controlled by the employees inside the manhole.
- (b) Tools and materials shall not be placed near the edge of manholes or where they may fall or come into contact with energized equipment.

9.5 Hot Materials

- (a) When heating solder or compound, the furnace shall be set at a safe distance from the street opening and preferably on the side away from traffic. At inclined locations, the furnace shall be placed on the low side of the opening or where it will provide the least possible hazard.
- (b) When heating compound or similar solidified substance, heat must be applied to one side first, preferably from the top down, so that any gas formed can escape readily.
- (c) Hot material must not be lowered into a manhole until so instructed from below. Safety pot hooks shall be used. Employees in the hole shall be warned to stand clear.

- (d) Cold ladles shall not be placed in hot compound. Ladles shall be heated and lowered separately.
- (e) Eye protection shall be worn when handling, ladling, pouring or applying hot compound.
- (f) Proper barricades must be in place to keep personnel and material from falling into Confined or Enclosed spaces.

9.6 Atmospheric Testing

NOTE: Atmospheric testing is required for two (2) distinct purposes: evaluation of the hazards and verification that acceptable entry conditions exist.

(a) Evaluation Testing:

The atmosphere shall be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmosphere that may exist or arise. The order of testing is to test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

(b) Verification Testing:

The atmosphere should be tested for residues of all contaminants identified by the evaluation testing, to determine that concentrations, at the time of testing and entry, are within the range of acceptable entry conditions.

(c) Duration of Testing:

Measurements shall be made for at least the minimum response time of the test instrument specified by the manufacturer.

(d) Testing Stratified Atmospheres:

The atmospheric envelope should be tested a distance of approximately four (4) feet in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

9.7 Training

- (a) The employer shall provide training to each affected employee so that they acquire the understanding, knowledge, and skills necessary for safe performance.
- (b) The employer shall also certify that the required training has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training.

Section 10.0 - Hazardous Material

10.1 SDS

(a) Written Hazard Communication Program

- (1) The Company's Hazardous Material Manual is to be maintained at each job site. The manual shall contain written Hazard Communication Program and the S.D.S. (Safety Data Sheets) for material on the job sites. The foreman will maintain a list of hazardous material on each job.
- (2) Before working on any job, EACH employee will be trained to recognize and avoid the hazards, and will be informed of their right to know about hazardous material.

(b) Working with PCB's

- (1) GENERAL
- (2) Askarel is the generic name for non-combustible (fire-resistant) liquid insulation used in capacitors and some transformers. Askarel is composed of a group of synthetic chlorinated organic compounds known as polychlorinated biphenyls (PCB's) and other organic compounds such as chlorobenzene. The various manufacturer's brand names include: Chlorextol (Allis Chalmers), Pyranol (General Electric) and Inerteen (Westinghouse).
- (3) Synonyms for polychlorinated biphenyls (PCBs) include: Askarel, Arochlor, Asbestol, Chlorextol, Diachlor, Dykanol, Elemex, Hyvol, Ierteen, No-Flamol, Pyranol, Saf-t-kuhl, Chlophen, DK, Fenchlor, Kanechlor, and Pyrolene
- (4) Any oil shall be considered contaminated if the PCB content is 50 parts per million or more.
- (5) PRECAUTIONS
- (6) Personal contact with PCB materials is prohibited unless employees are HazMat certified, and proper protection is provided.
- (7) All capacitors contain Askarel unless otherwise indicated.
- (8) All transformers are considered PCB contaminated unless proven by laboratory tests to contain less than 50 ppm of PCB contamination and are tagged accordingly.

Section 11.0 - Motor Vehicle Equipment

11.1 Motor Vehicle Operation

(a) General

- (1) Company vehicles must be operated in strict accordance with State and local laws. No work or errand is of sufficient importance to warrant violations of safe driving practices.
- (2) Any employee driving a Company vehicle must have a valid State Operator's or Commercial Drivers license, appropriate for the assigned vehicle, in his possession.
- (3) An employee shall not drive or operate a Company vehicle unless they are assigned or granted permission to do so. Unauthorized persons must not be allowed to drive Company vehicles.
- (4) All drivers and passengers shall use seat belts.
- (5) Driving any company vehicle while under the influence of alcohol or illegal drugs is expressly forbidden.

(b) Vehicle Condition

- (1) An employee assigned as driver of a Company vehicle is responsible for the safe operation of the vehicle. An unsafe vehicle must not be used. An inspection as per DOT regulations shall be performed as required.
- (2) The driver shall see that emergency equipment required by State Law is on the vehicle, and shall make sufficient inspection and tests to be sure that the brakes, steering gear, horn, lights, and controls are in safe operating condition before the vehicle is used. The driver shall keep the windshield clean.
- (3) All vehicles equipped with air brakes must have a low pressure warning device in operating order.
- (4) Specific instructions as to the care, operation, repair and maintenance of Company automotive equipment shall be closely followed.
- (5) If there are any defects, or repairs needed on the vehicle, the driver must promptly report these conditions to the appropriate supervisor.

(c) Trailers

- (1) A safety chain of sufficient strength is required when towing any trailer or equipment, except semi-trailers, and must be fastened securely to the truck and trailer. The driver shall confirm the break-away system is operable (ie. the battery is OK).
- (2) When the trailer is equipped with lights, they must be connected to the truck system and operating properly.
- (3) When the trailer is equipped with brakes, they must be connected to the truck system, operating properly, and have a break-away feature which will automatically set the trailer brakes in the event of a break-away.

(d) Loads and Passengers

- (1) The driver shall observe laws and regulations regarding legal width, height, length, and axle loads of the vehicle he is operating, and shall properly mark with warning flags or lights any projections of loads over the body lines. Such projections shall be avoided whenever possible.
- (2) Loads must be properly distributed and not piled too high. When necessary, they shall be blocked, tied, or padded to prevent shifting or damage. The loading must be such that the driver has clear vision to the front and both sides with sufficient mirrors in view to properly see to the rear.
- (3) Passengers in Company vehicles must be seated, and in such a manner that no part of their person projects beyond the body lines of the vehicle.
- (4) All loads must be secured pursuant to Department of Transportation guidelines and standards.

(e) Vehicle Operation

- (1) Employees shall not text, read, write, edit emails, or documents on any Company electronic device while operating any motorized vehicle. Such activities may be performed after the vehicle is safely out of active traffic lanes and vehicle is parked. This policy includes construction equipment. To make or receive cellular phone calls while in motion the appropriate Bluetooth or hands-free functions must be utilized.
- (2) No personal electronic devices are to be used during work hours.
- (3) Company vehicles are to be driven in a manner such as to create a favorable impression on the public, with more than ordinary courtesy and consideration for other drivers and pedestrians.
- (4) Always give the pedestrian the right of way, and do not sound the horn to warn pedestrians unless it is absolutely necessary.
- (5) When traveling on down grades, the driver shall not coast with the gears in neutral.
- (6) When radio communication requires the extension of the antenna, care must be used to be sure the antenna will properly clear conductors or other energized equipment.

(f) Unloading and Parking

- (1) When parking a vehicle on a slope or grade, wheels must be cramped to the curb, and wheel chocks or other blocking material used to prevent the vehicle from rolling.
- (2) Care must be taken at night so as not to block headlights, tail lights, or emergency lights with the body or other obstruction.
- (3) Always shut the engine off when refueling, and as soon as possible after entering a garage, loading dock, or other enclosure.

(g) Accident Reports

All motor vehicle accidents, however slight, must be reported to the appropriate company representative.

Section 12.0 - Aerial Equipment

12.1 Aerial Lifts

(a) General Requirements

- (1) Aerial lifts acquired for use shall be designed and constructed in conformance with the applicable requirements of the American National Standard for “Vehicle Mounted Elevating and Rotating Work Platforms,” ANSI A92.2-2015, including appendix. Aerial lifts include the following types of vehicle mounted aerial devices used to elevate personnel to job-sites above ground: (i) extensible boom platforms, (ii) aerial ladders, (iii) articulating boom platforms, (iv) vertical towers, and (v) a combination of any of the above.
- (2) Aerial booms shall be secured in the lower traveling position by the locking device on top of the truck cab, and the manually operated device at the base of the ladder before the truck is moved for highway travel.
- (3) Extendible and articulating boom platforms.
- (4) Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.
- (5) Only qualified and authorized persons shall operate an aerial lift.
- (6) Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.
- (7) Employees shall always stand firmly on the floor of the bucket, and shall not sit or climb on the edge of the bucket or use planks, ladders, or other devices for a work position.
- (8) Fall Protection in compliance with OSHA 1926.502 shall be worn and a lanyard attached to the boom or bucket when working from an aerial lift.
- (9) Boom and bucket load limits specified by the manufacturer shall not be exceeded.
- (10) An aerial lift truck shall not be moved with employees in the bucket, except for equipment which is specifically designed for this type of operation in accordance with the provisions of subparagraphs (1) and (2) of paragraph (a) of this section.
- (11) Articulating boom and extendible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.
- (12) Climbers shall not be worn while performing work from an aerial lift.
- (13) The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
- (14) Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position.
- (15) Employees shall not transfer from the bucket to a pole or fixture, nor from a pole or

fixture to the bucket. On dual bucket trucks, employees shall not transfer between the baskets.

- (16) Only approved attachments shall be allowed on the buckets.
- (17) When two (2) employees are working from a bucket or buckets, the employee operating the unit shall not move the bucket or buckets until the second employee has been told of the move.

Note: In this section, the word bucket(s) shall also mean basket(s).

- (18) Insulated Booms
- (19) Electrical test. All electrical tests shall conform to the requirements of ANSI A92.2-1990 section 5. However equivalent d.c. voltage tests may be used in lieu of the a.c. voltage tests which are approved by the equipment manufacturer or equivalent entity shall be considered an equivalent test for the purpose of this subparagraph (3).
- (20) Such test shall be performed every calendar year. The insulating fiberglass boom and basket must be thoroughly cleaned as needed and determined by the crew using the unit, and must be properly cleaned each time any service work has been performed.
- (21) After such test a sticker shall be attached to the vehicle in a visible location showing test results.
- (22) Structural Tests
- (23) A stress test and structured boom test shall be conducted as per ANSI standards A92.2- 2015, or if the boom has been modified or a structural member has been replaced. An annual boom inspection shall be conducted. Such inspection shall be in compliance with ANSI standard A92.2- 2015.
- (24) A sticker showing the results of such tests shall be attached to the vehicle in a visible location.
- (25) A visual inspection of all mounting and securement pins must be conducted prior to use.

12.2 General Use of Aerial Lifts

(a) Outriggers

- (1) Available footing for the truck wheels and outriggers shall be examined carefully and extra caution, including the use of pads, shall be exercised if there is snow, ice, mud, soft ground or other unusual conditions.
- (2) Blind ditches, manholes, culverts, underground cesspools, tanks, wells, etc., shall be considered as additional possible hazards.
- (3) The operator shall assure all personnel and obstacles are clear prior to moving outriggers either down or up.

(b) Maneuvering Booms and Buckets

- (1) Only employees who have been certified shall be permitted to operate the booms carrying an aerial bucket.
- (2) The operator shall note all obstructions so that the bucket or booms will not contact

obstructions when raised, lowered or rotated.

- (3) When the booms are to be maneuvered over a street or highway, necessary precautions, including flagmen, shall be taken to provide adequate safe clearance for traffic and pedestrians.

(c) Inclines and Hills

The truck shall sit approximately level as viewed from the rear. On hills, the truck must either be headed uphill and all work done with the boom pointed uphill beyond the center of the truck, or the truck headed downhill, but all work must be done with the boom pointed uphill. Wheel chocks shall be installed prior to use of the aerial lift.

(d) Ground Controls

- (1) When the bucket is in operation, a qualified employee shall be present to operate the ground controls if the need arises.
- (2) Except in emergency situations, the lower controls shall not be operated when employees are working aloft, unless so requested by the employees in the bucket.
- (3) All crew members shall be familiar with emergency lowering procedures.

(e) Use of Insulated Aerial Buckets

- (1) BEFORE entry into the minimum approach distance, the appropriate rubber gloves and rubber sleeves shall be put on. The appropriate rubber gloves and rubber sleeves shall not be removed until outside the minimum approach distance.
- (2) Energized conductors and equipment shall be covered with protective devices.
- (3) Adequate clearance shall be maintained so that protruding tools will not come into contact with conductors, limbs or other obstructions.
- (4) All hydraulic fluids used for the insulated sections of derrick trucks, aerial lifts, and hydraulic tools which are used on or around energized lines and equipment shall be of the insulating type.
- (5) The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
- (6) Equipment or material shall not be passed between a pole or structure and an aerial lift while an employee, working from the bucket, is within reaching distance of energized conductors or equipment that are not covered with insulating protective equipment.

(f) Working from Non-Insulated Aerial Platform Trucks and Cranes

- (1) Work shall not be performed on or over any energized circuits or equipment.
- (2) When working from a Non-Insulated aerial platform the basket must be bonded to any conductive object the employee may come in contact with to create an EPZ.
- (3) Rubber goods or protective equipment shall not be installed or removed from any energized line or piece of equipment by employees working from aerial platform trucks.
- (4) The floor of the aerial platform shall be kept clear of all tripping hazards and loose

material such as wire, tools, etc.

- (5) When working near energized conductors, no part of the aerial platform boom (or crane) shall violate the minimum clearance rules.

(g) Aerial Lifts

When working near energized lines or equipment, aerial lift trucks shall be grounded, and or barricaded.

- (1) Grounding Vehicle Frames

The frames of all motor vehicles equipped with booms or aerial buckets shall be barricaded or grounded with approved clamp capable of conducting the anticipated fault current.

- (2) Grounding Lead

A ground lead, to be attached to either a tower ground or driven ground, shall be capable of conducting the anticipated fault current and shall have a minimum conductance of No.2AWG copper.

Section 13.0 - Procedures for Helicopter Work

13.1 Safety

While the Employer and Union recognize that the Employer has sole responsibility for the health and safety of all the workmen on the job, and that helicopter work can be more hazardous than the conventional methods, the following rules and guidelines shall be followed:

(a) Operating Certification

The helicopter service provider must hold appropriate certification and have a current "FAA Operating Certificate" for the category of operation being performed. (Reference 14 C.F.R. Parts 133, 135, and 137 – Contact the local Flight Standard District Office (FSDO) for assistance.)

(b) Personnel

- (1) All personnel must be physically and mentally able and qualified to perform the work to which they are assigned, including being knowledgeable in these rules.
- (2) There must be a sufficient number of qualified ground personnel to safely guide, secure, hook and unhook the load.
- (3) No employee shall perform or be ordered or assigned to perform any activity for which they are not trained, qualified, and competent or which they may compromise their safety or the safety of others.

(c) Job Briefing and Hazard Analysis

- (1) Before the commencement of any construction, maintenance, or lifting activity using a helicopter, a job hazard analysis (JHA) must be developed, which, at a minimum, must:
 - (2) Define the core tasks;
 - (3) Identify specific hazards;
 - (4) Identify mission specific tasks;
 - (5) Describe procedures or controls used to safely manage or mitigate the hazards;
 - (6) Describe the communication procedure to be used with the crew;
 - (7) Discuss fatigue, and methods to eliminate or mitigate it;
 - (8) Specify minimum approach distances (MAD);
 - (9) Describe a site-specific emergency action plan.
- (10) A site-specific job briefing must be held each day construction, maintenance, or lifting activities using a helicopter are performed. The daily job briefing at a minimum must:
 - (11) Summarize or recap the content of the JHA as applicable to the day's duties;
 - (12) Communicate any site-specific hazards not identified in the JHA and provide mitigation for those hazards;

- (13) Identify or establish roles for each person who will be interfacing with the aircraft or its load;
 - (14) Describe the communication procedure to be used with the crew;
 - (15) Specify minimum approach distances (MAD) from energized electrical lines in the work area;
 - (16) Describe the applicable sections of the site-specific emergency action plan, such as the location of first aid equipment and rescue gear.
 - (17) An additional job briefing must be held immediately if working conditions change during the course of the job. Working conditions would include weather, wind, and visibility. During the job briefing all affected employees and others, including signalpersons, ground workers, pilot(s), must be advised of the hazards including a change of operation, if needed.
 - (18) The pilot and the lineman have the ultimate decision latitude in determining the safest method to use, within company, state, federal, and FAA regulations given all the circumstances of a particular job situation.
 - (19) Employees refusing to follow safety procedures shall be immediately removed from the project. Work to be performed with helicopters shall be on a voluntary basis. Employees shall not be discriminated against by the Employer for not volunteering to work with helicopters. If the employees and/or Employer determine the work is being done in an unsafe or unprofessional manner, the work will be discontinued until the unsafe conditions are corrected.
- (d) Pilot's Responsibility
- (1) The pilot and person in charge must ensure the pilot is properly rested and fit for duty.
 - (2) The helicopter pilot shall be responsible for the size, weight and way loads are connected to the helicopter.
 - (3) No load shall be made if the helicopter pilot believes the lift cannot safely be performed. The person in charge shall make certain the pilot is able to freely exercise their prerogative and judgment as to safe operation of the helicopter itself concerning size, weight and manner by which loads are connected.
 - (4) No employee shall work on, under, near or in conjunction with a helicopter whose operation does not correspond with the foregoing provisions.
 - (5) The pilot shall possess the appropriate ratings for the aircraft and shall be competent to safely conduct the assigned tasks. The pilot shall have the final authority and is solely responsible for the safe operation of the helicopter load at all times.

13.2 Equipment and Tools

- (a) All equipment and tooling shall be free from defects, and in accordance with manufacturers specification for continued serviceability. Each day, rigging shall be visually inspected by the pilot and men performing the work. If deficiencies are found, the item shall be discarded unless repairs can be made to return its condition to like new quality.

- (b) Helicopters shall be FAA certified for work to be performed. Pilots shall be qualified under FAR Part 133, Class A, B, & C as applicable and must be proficient and current in task to be completed.
- (c) Helicopter maintenance shall be done in accordance with manufacturer's recommendations and the FAA.
- (d) A pre-flight inspection of the helicopter shall take place each day prior to any work being done. A pilot's checklist shall be completed daily. A copy of the checklist shall be kept in the aircraft at all times. Long lines used to carry loads shall be inspected daily and replaced immediately should any damage occur beyond manufacturer's allowable limits. Communication shall be operable at all times from helicopter to helicopter, helicopter to workmen working below and pilot to passenger. If communications are interrupted, operations shall cease until they are restored.

13.3 Receiving Loads While Working Aloft

(a) Cargo Hooks

- (1) All cargo hooks shall have a primary and secondary release mechanism designed and installed as to prevent inadvertent operation. The hooks primary and secondary release shall be tested prior to each day's operation to determine that the release functions properly.
- (2) No employee shall be permitted to work under a hovering helicopter(s) unless the cargo hooks used comply with Federal Aviation Administration regulations governing such hooks.

(b) Hooking and unhooking

- (1) Work performed at an elevated position and directly under hovering helicopters shall be performed only by qualified and capable employees.
- (2) Work shall be limited to minimum time necessary to guide, secure, hook or unhook the loads
- (3) When an employee is working from the ground under hovering helicopters, the employee shall have a safe means of ingress and egress at all times, including a readily available escape route or routes in the event of an emergency.
- (4) Positive guide systems shall be used for the placement of large segments of primary tower structure and shall enable the heavy lift helicopter to temporarily secure and release the load. Bolting of or otherwise permanently securing the structures is prohibited under hovering helicopters except that in the event of an unforeseen contingency of an emergency nature which represents a substantial hazard to life or property, an employee may do such work as is necessary to preserve life or protect substantial property.

(c) Sling and rigging

- (1) The pilot is responsible for the integrity of the rigging for any external load and must ensure safe delivery of the cargo by inspecting and monitoring the security of the rigging throughout the operation. Prior to operations, the pilot must check the condition and application of all rigging gear to ensure serviceability. Prior to

commencing operations, determine the complete rigging requirements, including slings and taglines.

- (2) All personnel involved with rigging activities must receive appropriate rigging training and show proficiency specific to helicopter operations and the work tasks being performed.
- (3) The slings used for the external load must be inspected each day before use. Slings must be inspected by an employee designated, trained and qualified as a rigger.
- (4) No sling shall be used unless it has a properly marked minimum tensile strength of five times the load which will be carried or is being carried.
- (5) No sling shall be used unless upon inspection it is determined to be in good condition and capable of the work which is to be performed and properly marked.
- (6) Loads must be properly slung so that there will be no slippage or shifting of the load and so that the load will not accidentally be dislodged from the helicopter.
- (7) In an energized environment helicopter load lines must be comprised of nonconductive materials which are the appropriate weight, strength, and length to prevent the line from being lifted and entangled into the aircraft rotor system.
- (8) Pressed sleeves, wedged eyes, or equivalent means shall be used for all suspended loads utilizing wire rope. All eyes on synthetic line shall be produced by the line manufacturer or a certified splicer for the specific type of line.

13.4 Cargo Loading and Handling

- (a) All cargo shall be loaded and secured under the direction of the pilot or pilot's designee.
- (b) No passenger shall be transported in the helicopter with a sling load and no person shall be transported as an external or sling load, except in accordance with 14 CFR 133.35, and FAA authorization of HEC.
- (c) Explosives and other "dangerous materials" shall not be transported except by FAA under "will carry" authorized, and special permit issued PHMSA and F.A.A.
- (d) All sling loads, including line-stringing devices, shall be attached only to quick-release devices. Steel or metallic sling ends shall be of the pressed sleeve or swaged eye-type, or equivalent. Tag lines shall be of a length or secured in such a manner that will not allow their being drawn up into the rotors.
- (e) External sling load operations shall not be performed if electrical storms in the immediate vicinity make the work unsafe.
- (f) Load landing operations shall not be performed when the pilot or ground crew deems the wind conditions are unacceptable.

Helicopter Line Stringing

- (g) Weight of the external load shall not exceed the manufacturer's load limit.
- (h) Each helicopter operator utilized in line stringing shall be authorized by the Federal Aviation Administration, Part 133, Class C Operations.

- (i) All line stringing operations shall be conducted in accordance with the following requirements:
 - (1) Stringing tension method shall enable a consistent positive control of the cable, rope, or similar lines at all times during pulling operations; During all pulling operations, the helicopter pilot shall maintain an aircraft orientation that allows the pilot to maintain constant visibility in both directions online;
 - (2) When pulling from the aircraft belly hook attachment point, a ballast weight of a minimum three hundred pounds shall be utilized;
 - (3) At no time during the pulling operation shall the load line that is attached to helicopter's belly hook attachment point exceed a thirty-degree angle from vertical.
 - (4) A helicopter shall not pull any cable, rope, or similar line which is at any point attached to a fixed object other than the helicopter itself. Helicopters may pull a "free-wheeling" or "pay-out" of the cable, rope, or similar line so long as the end is not tied to a truck or fixed object other than the reel itself.
- (j) When stringing lines or conductors, there shall be radio communication between the helicopter and the ground crew.
- (k) When stringing lines or conductors close to or parallel to energized lines, conductive lines or reels, payout machines, and conductors shall be grounded as required by the High Voltage Electrical Safety Orders. Hoist wires or other gear shall not be attached to any fixed ground structure. EXCEPTION: When pulling lines or conductors that are allowed to "pay-out" from a container or roll off a reel.

13.5 Helicopter Skid and Tower Aerial Hover Transfer

- (a) Full body harnesses, lanyards, hardware, and attachment points must meet the requirements in ANSI Z359.1-2007
- (b) All employees transferring from a helicopter to a structure/conductor must wear a full body harness and lanyard fixed to an approved attachment point on the helicopter, structure/conductor. An ANSI approved device that allows the worker to be attached simultaneously to the helicopter and the structure/conductor shall be used until the transfer is complete.
- (c) Fall protection must be established and maintained one hundred percent during the entire time the employee is transferring from the helicopter to or off the structure/conductor.
- (d) After the linemen are belted on to the helicopter via the attach points with the shock lanyard, positioning belt and the proper tools and hardware for the job loaded onboard, the pilot will maneuver the helicopter next to the structure so that the linemen can place his tools and hardware on the structure and then transfer himself to the structure.
- (e) The rear door shall be removed, and the linemen must attach to a Class A external load attachment point approved by the FAA for external cargo operations.
- (f) On steel structures up to 2 workers may be transferred at the same time provided the pilot and lineworkers all agree that it is safe to do so. If anyone feels it is not safe to perform this method on any particular job or location, then the method shall be modified to limit the transfer to 1 worker at a time.
- (g) On wood poles this method will always be limited to 1 worker at a time.

- (h) All structures shall be bonded by cable to the helicopter prior to the lineman transferring between the helicopter and the structure. Such bonding will be done utilizing approved cables with spring loaded quick release clamps.
- (i) It is extremely important, that whatever the helicopter is bonded to must be the same object that the lineman transfers on to. In the case of an isolated static system, grounds from the structure to the wire shall be used if the Lineman cannot safely transfer without contacting the static. If this is the case then the helicopter should be bonded to the wire and then the wire grounded to the structure, in that order.
- (j) Once the helicopter is properly bonded and if necessary, the structure's static grounded, the lineman is ready to start transferring equipment and material to the structure. Every piece of equipment shall be placed onto the structure in a way so as to prevent any contact with the lower phases. Handlines, hoists, grounds, splices, cables all have the potential to come into contact with the phases and must be secured in a manner to prevent inadvertent release. Everything should be placed in a manner that does not interfere with the hand and footholds that will be used for the lineman transfer.
- (k) If followed, these guidelines will minimize the risks involved in these procedures. Again, before the flight begins is the time to analyze a particular situation. If a special condition exists, you may have to deviate slightly to gain more safety, but it should be an exception.

13.6 Working from the Helicopter Skid

- (a) Linemen must use an ANSI approved safety harness.
- (b) The rear door shall be removed, and the lineman must attach to a Class A external load attachment point approved by the FAA for external cargo operations.
- (c) Aircraft CG limits must be observed.
- (d) Aircraft performance and controllability must not be in question prior to the task to be performed. In the case of adverse wind angles, the helicopter will be positioned in the approximate position desired and checked for controllability.
- (e) STATIC DISCHARGE: If the purpose of the lift is to place the lineman onto the tower, then the potential static charge will be dissipated by touching the skid to the tower. If the purpose of the lift is to work on an ungrounded item, such as conductor wire or static wire, then the lineman will evaluate the situation and use either hot gloves or jumper cables to bond the helicopter. Jumper cables, once attached, shall be able to be removed with minimal force so as to allow the helicopter to maneuver away if needed.

13.7 Helicopter Rules for Human External Cargo (HEC)

- (a) Incorporated hereto by reference is the Helicopter Rules for Human External Cargo (HEC) that was approved on December 1, 2010
- (b) Human External Cargo (HEC).
 - (1) The sling/vertical suspension system (human external cargo or HEC) is a vertical system suspended from the helicopter cargo hook. The aircraft attaching means shall comply with all governmental requirements (e.g., 14 C.F.R. Part 133, Class B or D –

External Load). For Class B & D operations the aircraft attaching means shall also comply with 14 C.F.R. 27.865 or 29.865. Helicopter operators involved in HEC must have an FAA approved Rotorcraft Load Combination Flight Manual (RLCFM) that includes specific approval for HEC.

- (2) Helicopter operations involving HEC shall incorporate the use of a secondary safety device, in addition to the helicopter's primary attachment means, to prevent the inadvertent release of the load. This device shall remain jettison-able in accordance with Class B load requirements.
- (3) All lines utilized for HEC operations shall be dedicated for HEC and shall not be used for transporting cargo.
- (4) HEC lines shall not be less than 10:1 safety ratio between the rated breaking strength and the working load.
- (5) All harnesses utilized for helicopter HEC operations must meet the ANSI Z359.1-2007 standards for class III (full body) harnesses and must be equipped with both dorsal and sternal D rings.
- (6) All suspension harnesses used for HEC must be adjusted to the user. The harness must be designed to prevent suspension trauma or equipped with an orthostatic shock relief device. Such devices must be deployed and used if an employee has been in suspension longer than five minutes.
- (7) External platform skid operations. If a platform system is used to transport crews or where a crew member performs work from the platform system and all aircraft attachments shall comply with applicable FAA regulations and requirements. All platform operations shall be conducted in accordance with the 14 C.F.R. Part 133, Class A – External Load. Flight and hovering capabilities of the helicopter must not be adversely affected by the design of the platform. The platform must not affect the auto rotation and emergency capabilities of the helicopter. The platform and loads may affect the lateral and longitudinal CG weight and balance of the helicopter in flight. An engineered counter-balance must be used if the platform exceeds the lateral CG limits of the manufacturer's specifications for the helicopter which will ensure stability.

(c) External cargo sling loads

- (1) Helicopter longline support operations (cargo operations) shall only be performed by qualified, competent and trained personnel. All operations shall be conducted in accordance with applicable Federal Aviation Administration regulations.
- (2) All external load operations, in addition to the above-mentioned regulations shall also comply with the Helicopters Association International, Utilities, Patrol and Construction Committee guidelines (latest version).

(d) General

- (1) No Employee will be required to perform or undertake helicopter line worker activities. Helicopter line work shall be performed by volunteer line workers only. No employee shall be discriminated against who refuses to volunteer for this work.
- (2) Before each flight, the supervisor in charge, the pilot, and the helicopter line workers(s) must analyze and address any conditions specific to the work situations and agree on the safety measures required to address those conditions. When

determining and selecting the best method to use, the supervisor in charge, the pilot, and the helicopter line workers(s) must ensure that safe distances can be maintained between all parts of the helicopter and any energized conductors, de-energized conductors, coworkers and/or the structure.

- (3) If, at any time either before performing the work or while performing the work, the helicopter line workers(s), the supervisor in charge, or the pilot, in his or her opinion, believes that dangerous or unsafe conditions exist that could jeopardize the safety of the operations, the helicopter line workers supervisor in charge, or pilot has the right to postpone or stop the operation until those safety concerns have disappeared or have been corrected. These conditions include, but are not limited, to the following.
 - (4) Inclement weather conditions
 - (5) Insufficient Clearances
 - (6) Exceeding Helicopter load limits
 - (7) Structure or Conductor damage that causes a safety concern
 - (8) Any other condition that may adversely affect the safety of the operation.
 - (9) “Pilot in Command” means the person who –
 - (10) Has final authority and responsibility for the operation and safety of the flight;
 - (11) Has been designated as pilot in command before or during the flight; and
 - (12) Holds the appropriate category, class, and type rating, if appropriate, for the conduct of the flight
- (e) Equipment/PPE

Personal protective equipment when working on, under or in the near vicinity of helicopters:

- (1) All employees shall wear eye protection of such design as to prevent the likelihood of dust or other substances from contacting the eye(s) of employees.
- (2) The person in charge must perform and document a hazard assessment to identify and determine the appropriate PPE for the work being performed, the location and site and/or equipment.

(f) Wearing apparel

No employee shall wear clothing or apparel which is either designed to or in fact can reasonably be expected to flap or otherwise react in a similar fashion in the downwash or air disturbance of a helicopter(s). No employee shall work on, under or in the near vicinity of a helicopter while wearing such apparel or clothing which flaps or moves to the extent that it presents a hazard in that it could be caught in the moving equipment, the hoist line, or otherwise interfere with the safe performance of the work.

(g) Loose gear and objects

All loose gear, including lunch boxes, rope, cardboard, wire covers, and similar items shall be removed or secured or otherwise made fast before the helicopter is started or allowed to approach such area. In the event the gear is not secured or fastened, it shall be removed and located outside the downwash at least 100 feet from the helicopter.

(h) Head Protection

All helicopter line works must use an ANSI Z89.1, Type 1, Class E, approved helicopter helmet or Hard Hat equipped with a 3-point chin strap securely fastened. Every precaution must be taken to prevent the possibility of a hard hat or helmet from being blown off and contacting the helicopter rotor blades.

(i) Fall Protection:

The helicopter line workers shall be attached 100% of the time to an approved anchorage point while working as an external load. Workers shall either wear a rope access type harness or a combination lineman's body belt and full body harness both equipped with a work positioning strap and shock absorbing lanyard. All lanyards and positioning straps used by helicopter line workers must be positioned to prevent possible hang-ups while transferring to and from a structure and while egressing the tower or landing zone.

When work is to be performed while hanging from a long-line and not just for the purpose of transporting the worker to the structure and/or conductor, the use of a boatswains chair shall be required.

(j) Hearing Protection:

Helicopter line workers must use either approved hearing protection or an approved flight helmet or gear while working from a helicopter. All ground-support personnel must wear adequately rated hearing protection while working near helicopters.

(k) Visual Inspections:

Visual inspection of supporting the structures and conductors shall be performed by the lineworkers prior to transferring any worker from the helicopter to the structure or conductor to identify any condition that might jeopardize a line worker's personal safety or raise concern for the helicopter line worker, the supervisor in charge, or the pilot. Any unsafe conditions that are discovered during the inspection process must be corrected before performing the helicopter line-work procedures. If these conditions cannot be corrected, use an alternate work method.

(l) Helicopter operation

- (1) Whenever approaching or leaving a helicopter with blades rotating, all employees must remain in full view of the pilot and remain in a crouched position while within 50 feet of the helicopter. No employee may approach the rear of the helicopter unless directly authorized and directed by the pilot of such craft. All employees when operating or working within 50 feet of the helicopter with blades turning are subject to the direction of the helicopter pilot.
- (2) All materials and equipment loaded in the aircraft shall be properly secured for flight.
- (3) Long objects, such as shovels and hot sticks, shall be carried horizontally and below the waist to avoid contact with the aircraft rotor blades.
- (4) The pilot shall ensure that all loads are safely secured to the helicopter or in cargo baskets and properly loaded with regard to weight and balance.

No tools shall be carried in on the lineworkers body belt that could fall out during transport. Any tools that could fall off the belt must be secured by a lanyard. Tools that could impede the lineworkers movements or that could hang up on the helicopter or the structure should also not be carried by the lineworker.

- (5) Never throw anything while loading and unloading the helicopter. Thrown items may come in contact with the aircraft rotor blade, causing damage to the aircraft and possible injury to ground personnel.
- (6) While in the helicopter, safety belts must remain fastened at all times except when the pilot instructs otherwise or while entering or leaving the helicopter.
- (7) Smoking in the helicopter is prohibited at all times.
- (8) No employee shall ride in or work under or near a helicopter with less than twenty minutes reserve fuel.
- (9) No employee shall attempt to slow or stop the rotorcraft blades.

(m) Helicopter work tasks

- (1) Aerial hover transfer
- (2) Full body harnesses, lanyards, hardware, and attachment points must meet the requirements in ANSI Z359.1-2007.
- (3) All employees transferring from a helicopter to a structure/conductor must wear a full body harness and lanyard fixed to an approved attachment point on the helicopter, structure/conductor. An ANSI approved device that allows the worker to be attached simultaneously to the helicopter and the structure/conductor shall be used until the transfer is complete.
- (4) Fall protection must be established and maintained one hundred percent during the entire time the employee is transferring from the helicopter to the structure/conductor.

(n) Fly Yards or other Landing Zone Locations

Fly yards or other landing zone locations used for helicopter line-work must be located as close as practical to the area work is to be performed. All efforts shall be made to limit any worker from being transported via HEC or skid for more than 10 minutes fly time.

- (1) When establishing the landing zone, the following items shall be considered:
- (2) Size and type of helicopter;
- (3) Suitability of the planned activity;
- (4) Physical barriers or obstructions;
- (5) Helicopter touch down area and congestion in the area.
- (6) All helicopter landing, loading and unloading areas shall be maintained in a neat and orderly fashion so as to reduce the likelihood of flying materials, tripping, or other hazards attendant to the work being performed.

Before each flight begins, the pilot, the supervisor -in-charge and the helicopter line worker must analyze and address specific work conditions and agree on the safety measures to take when addressing those conditions.

If a special condition exists, it may be necessary to adjust these procedures slightly to provide a greater margin of safety. Adjustments to these procedures should be

considered only as a temporary exception for the duration of the special condition. If changes occur an additional tailboard is required to address all such changes to the operation.

(o) Grounding

When the requirements to perform this work dictate that the line be grounded, refer to the grounding section of the IBEW/NECA Colorado Statewide Safety Manual – Section 5. Employees must follow all applicable protective grounding rules before performing any work.

(p) Static charge

All loads shall be grounded or bonded with a device capable of discharging either the actual or potential static charge before ground personnel either touch or come close enough to touch the suspended load.

(q) Visibility

Employees shall keep clear of and outside the downwash of the helicopters except as necessary to perform a permitted activity. Where reasonably practical, reduced vision of the operator and ground crew shall be eliminated.

(r) Communications

Communications between the lineworker and pilot may be in the form of hand signals, head signals, direct verbal communication, or when practical the use of radio communications. If radio communications are used each employee must also be proficient in the other forms of communications in case of equipment malfunction.

- (1) Communication must be maintained between the air crew and ground personnel at all times by a designated and qualified signalperson. There must be a constant, open line of communication using radios or head and hand signals.
- (2) Signal systems must be understood by the air crew and the ground crew, including signalpersons, prior to the hoisting of any load.
- (3) Signaling and maintaining communications with the pilot will be exclusive to the designated signalperson during periods of loading and unloading. The signalperson must be distinguishable from other members of the ground crew by the pilot of the aircraft. This may be by way of orange-colored gloves, vest, or other apparel.
- (4) The lead worker and one crew personnel must also have an operating transmitter and receiver.
- (5) Authorized and qualified employees may come within 50 feet of the helicopter when the rotor blades are turning, but no closer, other than to enter the aircraft or to hook or unhook the load or do other essential functions. Other employee(s) shall not come closer than 100 feet of the aircraft when it is operating.
- (6) The signal between the signalperson and the operator of the helicopter shall be those submitted to the FAA for the particular job. When head signals are to be used, the qualified worker must utilize a visually enhanced hard hat or helmet with clear markings to indicate the desired movement. Any signals other than up/down in/out will require the use of hand signals.

- (7) Should there occur a change in the hazards, methods of performing the job, signals to be used, or other operating conditions during the course of any particular job, a conference shall immediately be held at which time all affected employees and others (including signalpersons, ground workers, and pilots) will be advised of such hazards or change of operation. No employee shall be permitted to work unless such employee and others fully understand and changes that have taken place.

When using head signals the lineman must have a visually enhanced hard hat or helmet with clear markings to indicate the desired movement. Any signals other than up or down will require the use of hand signals.

HELICOPTER HAND SIGNALS

MOVE RIGHT



Left arm extended horizontally; right arm sweeps upward to position over head.

HOLD-HOVER



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.

TAKEOFF



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



Hand 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.

(s) Fires

Open fires shall not be permitted in any area in which said fires will be affected by the downwash of the rotors, nor shall any employee smoke in an area subject to the downdraft of the rotor.

(t) Refueling operations

- (1) Refueling of any helicopter with either aviation gasoline or Jet B (Turbine) type fuel shall be prohibited while the engines are running.
- (2) Fueling of helicopters using Jet A (Turbine-Kerosene) type fuel is allowed with engines running.
- (3) All helicopter fueling must comply with the following:
- (4) No unauthorized persons shall be allowed within fifty feet of the refueling operation or fueling equipment.
- (5) A minimum of one thirty-pound fire extinguisher good for class A, B and C fires, shall be provided within one hundred feet on the upwind side of the refueling operation.
- (6) All fueling personnel shall be thoroughly trained in the refueling operation and in the use of the available fire extinguishing equipment they may be expected to utilize.
- (7) There must be no smoking, open flames, exposed flame heaters, flare pots, or open flame lights within fifty feet of the refueling area or fueling equipment. The refueling area or the fuel truck must be posted with "NO SMOKING" signs.
- (8) Prior to making any fueling connection to the aircraft, the fueling equipment shall be bonded to the aircraft by use of a cable, thus providing a conductive path to equalize the potential between the fueling equipment and the aircraft. The bond shall be maintained until fueling connections have been removed, thus allowing separated charges that could be generated during the fueling operation to reunite. Grounding during aircraft fueling shall not be permitted.
- (9) To control spills, fuel shall be pumped either by hand or power. Pouring or gravity flow shall not be permitted. Self-closing nozzles or deadman controls shall be used and shall not be blocked open. Nozzles shall not be dragged along the ground.
- (10) In case of a spill, the fueling operation shall be immediately stopped until such time as the person-in-charge determines that it is safe to resume the refueling operation.
- (11) Helicopters with their engines stopped being refueled with aviation gasoline or Jet B (Turbine) type fuel, shall also comply with subsection (3)(a) through (g) of this section.

(u) Training Requirements

Training for line-workers who voluntarily choose to use this work method will consist of both General training established or approved jointly by NECA and the IBEW as well as site specific training that will be performed by the contractor and Helicopter Company

performing the work.

Section 14.0 - First Aid and Emergency Procedures

14.1 First Aid and Emergency Procedures

(a) Statement

All employees shall be trained in Emergency Procedures and shall carry current First Aid and CPR cards issued by qualified training agencies.

(b) Emergency Planning

Every crew shall have a plan ready for execution in case of an emergency. This plan may vary with the location of the work being done and other circumstances that surround the work procedures. When an AED is available, procedures must be in place to ensure it is in working order and ready for use.

(c) Artificial Resuscitation - Pole Top

- (1) When a victim receives an electrical shock, his breathing often stops. The goal of a successful rescue should be rescue first. If for any reason the victim cannot be rescued immediately, resuscitation should begin while still on the pole.
- (2) It must be noted that brain damage can occur four (4) minutes after breathing stops. Therefore, pole top rescue should include the ability to perform pole top resuscitation when necessary.
- (3) The rescuer should be very careful that they do not endanger their own life as they get the patient in position to work on him. If the victim is still in contact with the source of current, the rescuer should not make contact with the victim without using rubber gloves or taking other precautions to insure, their own safety.

(d) Lowering a Person from a Pole or Structure

An injured person should be lowered by the use of Pole Top rescue methods as quickly as possible. If the injured workman has stopped breathing for four (4) minutes, pole resuscitation, as noted above, shall be performed when possible.

Section 15.0 - Tools

15.1 General

(a) Hand or Power Tools

- (1) All hand, power tools, and similar equipment shall be maintained in a safe condition.
- (2) When power operated tools are designed to accommodate guards, they shall be equipped with such guards when in use.
- (3) Guards must be provided on power operated tools and equipment when moving parts (belts, gears, pulleys, shafts, etc.) are exposed to employees or otherwise create a hazard. The guarding must meet the requirements set forth in ANSI B15.1 (latest revision).
- (4) Employees using hand or power tools, and exposed to injury hazards, shall wear personal protective equipment necessary to protect the employee from the hazard.

(b) Inspection

- (1) All tools must be inspected at regular intervals and not used unless in safe working order.
- (2) The person in charge shall insure that all tools are in proper and safe condition and are available and used in the execution of the work for which they are intended.
- (3) Each employee shall inspect the tools being used and shall remove from use, and report in writing, any defective tools.

(c) Hand Tools

- (1) Tools shall be used only for the purpose for which they are designed.
- (2) When using tools, the employee shall handle the tool and place himself in such a way that no injury will result if the tool or material should slip. Care must be taken to avoid injury from tools used by other employees.

(d) Insulation and Electrical Work

- (1) Screwdrivers having metal shanks extending through the handles must not be used for electrical work.
- (2) Metallic tapes or metallic rules must not be used near energized electrical equipment. Cloth tapes with metal re-enforcing shall be considered metallic tapes.

(e) Tool Storage

- (1) Tools temporarily stored or laid aside on the job must be placed so as not to create a stumbling, falling, or similar hazard. They must not be left on ladders or stairways. Tools with sharp edges shall be covered or stored in such a way as to protect against a cutting hazard.
- (2) Particular care must be used when working in elevated positions. Tools must not be left unsecured and they must be kept in containers.
- (3) Tools must be handed, not thrown, to another workman. When working aloft, tools

must not be thrown up to employees, or dropped or thrown by them. Tools must be sent up and down by hand lines, canvas buckets, or other safe containers.

(f) Jacks

Jacks must not be overloaded or extended beyond their designed limit. Loads which must be maintained for any considerable length of time must be supported to relieve the strain on the jacks. Employees must never go under a load supported only by a jack or jacks. The load must be adequately blocked or otherwise supported before any person goes under the load.

(g) Extension Cords and Trouble Lights

- (1) Three (3) wire extension cords used for lighting supply must be of a type having conductors enclosed in a common rubber sheath and shall be waterproof their entire length including terminals.
- (2) Lamps for trouble lights must be enclosed in a guard.
- (3) Lamp guards must be gas proof on trouble lights used in possible explosive atmospheres.
- (4) Lamp guards must be of non-conducting material on trouble lights used in locations with exposed electrical contact points.
- (5) The use of electrical cords to hoist or lower tools shall not be permitted.

(h) Portable Electric Tools

- (1) Three (3) wire electrical cords supplying portable electric power tools shall be rubber sheathed, with adequate terminal connections, and shall include a ground wire attached to the tool casing and to an outlet ground or other low resistance ground.
- (2) The user must thoroughly inspect portable electric power tools and cords before use. Defective equipment must not be used.
- (3) The use of electrically operated tools that have a cord is prohibited while working on poles, in insulated aerial buckets and on structures that have energized circuits.
- (4) Electric power tools shall be of the double insulated type or appropriately grounded per OSHA 1926.302 subpart K.

(i) Pneumatic Tools

- (1) Pneumatic power tools shall be positively secured to a non-conductive hose.
- (2) Safety clips or retainers shall be installed or maintained on pneumatic impact tools to prevent attachments from being expelled.
- (3) Pneumatic fastening tools, with automatic feed and which operate at more than 100 PSI shall have a muzzle safety device to prevent the tool from ejecting the fastener.
- (4) Compressed air shall not be used for cleaning purposes unless the pressure has been reduced to less than 30 PSI. Protective personal equipment shall be worn during these operations.

(j) Hydraulic Power Tools

Hydraulic power tools shall only be filled with fire resistant fluids approved by the Department of Mines and the Department of the Interior Schedule 30, and shall have non-conducting hoses.

(k) Powder Actuated Tools

Powder actuated tools shall:

- (1) be operated only by trained employees wearing the appropriate personal protective equipment.
- (2) be tested each day prior to loading or operation.
- (3) be removed from service or repaired when defects are discovered.
- (4) be “loaded” only prior to use and be constantly attended when in “loaded” condition.
- (5) be “unloaded” when operations are completed.
- (6) be used with all guards, shielding, and safety devices in working order and meet all other applicable requirements of ANSI A10.3 (latest revision).

(l) Ropes

- (1) A load shall not be placed on any rope that approaches the breaking point of the rope. A rope being used to support a load MUST have a breaking point of at least five (5) times the load being supported, taking into account such things as knots, splices, sheaves, etc.
- (2) Ropes shall be selected by size, strength, material, and condition that will meet the requirements of each job.
- (3) A rope shall not be placed or dragged over rough or sharp objects.
- (4) When rope is used to raise, lower, or support a load, sharp corners and edges shall be padded or protected.
- (5) Rope shall be kept free of acid, oil, solder, grease, or other contaminating material.
- (6) Rope used directly on energized lines shall be clean and dry.
- (7) Hand lines shall not be less than ½ " in diameter, manila or equivalent, and shall be maintained in good condition at all times.
- (8) Safety lines are not intended for shock loading and are used for emergency rescue, such as lowering an injured worker to the ground. Such safety lines shall be a minimum of ½ " in diameter and 3 or 4 strand first grade manila, or its equivalent in strength (2,650 lb.) and durability.
- (9) Safety lanyard shall be a minimum of ½ " nylon, or equivalent, with a maximum length for a fall of no greater than six (6) feet. The rope shall have a nominal breaking strength of 5,400 lbs.

15.2 Live Line Tools

(a) General Work Provisions

- (1) Live line tools shall be used only by employees specifically trained in their use. These tools shall be used in strict accordance with the instructions and ratings of the manufacturer.
- (2) No other work shall be done on a pole or structure while live line tools are in use.

(b) Care and Selection

- (1) Live line tools (hot sticks) require very special care. They shall be transported only in approved containers and kept in good, dry condition at all times. They shall only be finished with an approved clear finish.
- (2) After use, live line tools must be properly cleaned and dried before storage. Never lay live line tools on the ground.
- (3) Only approved live line tools which are clean and dry shall be used. Care must be taken to select tools of the proper voltage rating, mechanical strength, and length for the job. Do not over-stress a live line tool. If there is doubt about the strength of a piece of equipment, a stronger tool or tools shall be used. Never use a live line tool whose condition is doubtful.

15.3 Using Live Line Tools

- (a) Maintain safe working distance AT ALL TIMES. Choose a safe position from which to work and do not change position without looking first. Pole partners must watch each other and warn as necessary. Avoid contact with cross arm braces or other metal attachments at all times.
- (b) When a conductor is being untied from the insulator, the conductor and the wires must be kept under control at all times. Ties must be kept cut short so they cannot contact insulator pins, cross arms, the pole, or other conductors. Only one conductor shall be worked at a time.
- (c) UNDER NO CIRCUMSTANCES shall any part of the lineman's body approach closer than the MINIMUM WORKING DISTANCES shown in Appendix "A" to the energized end of the live line tool.
- (d) Live line tool work must be done cautiously and systematically. Conversation shall be limited to the work at hand and distractions kept to a minimum. NEVER attempt to hurry live line tool work.
- (e) "Grip All" or "Shot Gun" sticks shall not be used in place of wire tongs or hold sticks.
- (f) The insulation on temporary jumpers must not be relied on for physical protection such as standing, sitting, or leaning on them. The temporary jumpers shall be tied or held away from the work area. Temporary jumpers shall be treated as energized line conductors.

15.4 Inspections and Tests for Live Line Tools

- (a) Only live-line tools having a manufacturer's certification to withstand the minimum tests as per ASTM shall be used.
- (b) All live-line tools shall be visually inspected before use each day. Tools to be used shall be wiped clean and if any hazardous defects are indicated such tools shall be removed from service. A Qualified employee may require a Live Line Tool be tested at any time.
- (c) All live line tools shall be inspected, cleaned waxed Annually and tested every (24) months. Any refinishing and/or repair work will require the minimum ASTM test before the stick may be returned for service. The employer will maintain records for each stick.

15.5 Hand Lines

- (a) Hand lines shall be kept as dry and pliable as possible. They shall be inspected before use and discarded when of doubtful strength.

- (b) A hand lines must always be available and kept cleared while employees are aloft, ready for use in emergency.
- (c) Reference shall be made to the Data Sheets in the Appendix for the size line needed to safely carry the load.

Section 16.0 - Welding, Burning and Cutting Operations

16.1 General

- (a) Nobody will be permitted to operate a welder without being properly instructed on the use of the equipment.
- (b) The primary hazards during welding are: electric shock, burns, radiant energy, toxic fumes, fire, and explosions. Adequate ventilation shall be provided while welding, brazing, or cutting any zinc, brass, bronze, galvanized, or lead-coated material.
- (c) Avoid burns from electric arc's gas welding flames, hot slag, or by touching welded parts before they are cool by taking the following precautions:
 - (1) Wear clothing suitable for the work to be done.
 - (2) Gauntlet gloves shall be worn while welding or cutting.
 - (3) Outer clothing shall be free from oil and grease.
- (d) Do not use any combustible material to support the work that is being welded or cut.
- (e) Do not use any cutting or welding torch or electrode where there is danger of starting a fire.
- (f) When flammable material cannot be removed from exposure to sparks, it shall be protected by a barrier of sheet metal or other fire-resistant material and a fire extinguisher kept handy.
- (g) When welding or cutting in elevated positions precautions shall be taken to prevent sparks or hot metal falling on people or flammable material underneath. If needed, a spotter shall be used.
- (h) Regulators and connections shall be cared for to ensure not to be damaged or contaminated by foreign material.
- (i) Do not use leaky gas cutting or welding equipment.
- (j) Do not use matches to light a torch, or re-light a torch, on hot work. Use a friction lighter.
- (k) The torch head shall never be used as a hammer to remove loose material.
- (l) After hooking up valves they shall be initially opened a quarter turn then opened fully.

16.2 Compressed Gas Cylinders

- (a) Proper handling and storage of gas cylinders will assure the safety of workmen and provide for safe work areas. This section applies to shop, substation, and other work areas where cylinders of compressed gases are present and/or must be handled.
- (b) The tops of the cylinders shall be kept free of tools, dirt, and greases.
- (c) Except when in use, the valve protectors shall be maintained in place at all times.
- (d) Cylinders shall be clearly marked as to the contents, and appropriate precautions shall be enforced as necessary.
- (e) Cylinder relief plugs shall not be tampered with in any way.
- (f) Cylinder storage locations shall be in areas out of the main flow of normal traffic, and appropriate place carding shall be provided.

- (g) Oxygen and fuel cylinders shall be separated by 20' when stored.
- (h) Acetylene cylinders shall not be used for twenty-four (24) hours after being laid on their side.
- (i) As an alternative, fuel and non-fuel gas cylinders shall be separated from storage areas by a one-half hour rated five (5) foot fire wall.
- (j) All cylinders shall be secured in the upright position. In shop or other storage areas, racks shall be fabricated for full and empty cylinder storage. The racks shall be of noncombustible construction; provided protection on three (3) sides for each row of cylinders; and have chains to maintain the cylinders in the upright position.
- (k) When cylinders are utilized in a work area, the cylinder shall be mounted on a cart for transport.
- (l) Cylinders on carts shall have the valves fully closed when not in use.
- (m) When hose connections are made, the cylinder valve shall be closed and care should be taken to assure that the connections are proper, tight, and without leaks. DO NOT FORCE CONNECTIONS. Valves should be fully opened when in use.
- (n) At all times, cylinders shall be maintained away from ignition sources and energized equipment.
- (o) Leaking cylinders shall be moved outside to allow the gas to dissipate.

16.3 Electric Arc Welding

- (a) When changing electrodes, keep them clear from grounded or other nearby metal objects.
- (b) Extreme caution shall be used to prevent accidental grounding of electrodes.
- (c) To protect the eyes, face, and body during electric welding and cutting, the operator shall wear an approved helmet with the proper shade glass and proper protective clothing. While cleaning welds, proper eye protection shall be worn to guard against flying particles of scale when the shield is raised.
- (d) Never strike an arc with an electrode unless proper protective equipment is worn, and nearby persons have been given warning.
- (e) No repairs to the whip (welding lead) shall be done within ten (10) feet of the stinger.

16.4 Burning and Cutting Operations

- (a) Approved welding goggles shall be worn by operators of acetylene welding or cutting apparatus. Goggles should fit snug and be adjusted so that they will not slip out of place.
- (b) While building up pressure on the regulator of a cutting or welding torch, always stand to one side of the regulator or gauge.
- (c) Do not use acetylene at a pressure exceeding fifteen (15) pounds per square inch. The regulator valve should be opened slowly to not more than one full turn for general use.
- (d) Do not expose compressed gas cylinders or containers to excessive heat or rough handling. Keep sparks and flames away from such cylinders or containers.
- (e) All connections to piping, regulators and other appliances shall be kept tight to prevent leakage. Do not test for leaks with an open flame; use suds made from soap and water.

- (f) When cylinders or containers are not in use, keep valves tightly closed.
- (g) Do not use needlessly high oxygen pressure while flame cutting since sparks may fly over large areas and increase fire hazards.
- (h) If a flashback occurs in a torch, first shut off the oxygen and then close the acetylene valve at the torch. Before re-lighting the torch, check the tip, the hose, and the gas pressure to the torch.

Section 17.0 - Rigging

17.1 Rigging Equipment

- (a) The supervisor shall refer to the Tables and Data shown in the Appendix of this manual for material strengths of cables, hooks, ropes, slings, and chains, and the proper methods of tying knots, slinging loads and connecting clips. All factory- made slings must have a capacity chart permanently attached. The chart must be made of wear resistance material.
- (b) All materials used in slinging or connecting loads must be carefully inspected by a competent person before use, and must not be used when in doubtful condition.
- (c) Hooks that have been damaged must never be used.
- (d) All employees who may have occasion to use ropes, slings and cables must be instructed in how to tie standard knots and hitches, and in safe methods of hooking and slinging loads.
- (e) Flexible steel cable slings are preferred in lifting heavy loads.
- (f) Where chain slings are used, extra care and inspection must be used--a chain is no stronger than its weakest link. Chains must not be knotted, twisted or kinked, and the load must be applied slowly and evenly, never suddenly.
- (g) Before taking a strain on rigging or hoisting equipment, it should be inspected for flaws, improper hitches, etc.
- (h) In using cable clips, they must be used in accordance with printed instructions and the clips must be set up after strain is taken on the cable.
- (i) Particular care must be taken to see that the cable, hooks, and chains are not unduly stressed through improper slinging of the load.
- (j) When more than one steel choker or sling is used, the eyes will be shackled together.
- (k) No employee shall be allowed under a suspended load.
- (l) Where hazards to employees exist, line or other suitable devices shall be used to control loads being handled by hoisting equipment.

17.2 Signals

The best available means of transmitting information and orders to crew members shall be used. Whatever method is used, there must be a general understanding of the signals to be used and who is to give them, adopted at the pre-job conference and rigidly followed.

All crews working in remote locations not having radio communication shall be checked by the employer four (4) times a day.

17.3 Handling Poles

- (a) In the unloading of poles from railway cars or from trucks and trailers:
 - (1) The task shall be accomplished by an adequate crew under the orders of one person, and using the best equipment available.
 - (2) The supervisor shall inspect equipment and the placing of skids and hoisting or

restraining lines before the load is released.

- (3) The supervisor shall give all orders and is responsible for crew members staying in the clear.
 - (4) In unloading poles from railway cars, employees are not permitted on the load unless a minimum of three (3) stakes on each side of the car and their binding wires are in place and in good condition.
 - (5) Before the last bindings are cut, the load must be bound with ropes or cable at each end, with provision for slacking off by use of winches or proper snubbing.
 - (6) Where the car is to be unloaded from one side (the usual way) the opposite side must be braced before binding wires are cut.
 - (7) As poles roll from the car down skids, employees guiding them must work from the ends of poles and keep clear.
- (b) In loading or unloading poles on trucks and trailers:
- (1) Strong skids placed to avoid slipping shall be used.
 - (2) Where possible, power from a winch shall be used to roll poles up skids onto the truck and trailer and to guide and restrain poles rolling down skids.
 - (3) Vertical lifting of poles by employees shall be avoided whenever possible, and used only where ample manpower is available.
 - (4) Poles delivered in field must be placed out of the way of traffic, securely blocked in place, and barricaded if exposed to vehicular or pedestrian traffic.
- (c) Whenever possible, the erection and placing of new poles and the removal of old poles shall be done with power equipment. Special care must be taken to find and mark the balance point.
- (d) The man in charge shall personally inspect equipment, attachment and control lines and shall give all signals to the hoist operator.
- (e) Where poles must be set or removed without using power equipment, the supervisor shall direct crew members in placing and using control lines, pikes, etc.
- (f) During pole hauling operations, all loads shall be secured to prevent displacement. Hoists shall never be used to secure loads.
- (g) DAYLIGHT TRAVEL – Red flags are required at the end of the load projections greater than 4 feet (1.22 meters), CRS 42-4-209.
- (h) Precautions shall be exercised to prevent blocking of roadways or endangering traffic.
- (i) No one will be allowed on a pole trailer unless the load is properly secured.
- (j) NIGHT TRAVEL – A red light or lantern is required at the end of the load projections greater than 4 feet (1.22 meters), CRS 42-4-209.

17.4 Transformers

- (a) Where transformers must be moved or hoisted, the supervisor is expected to make the best use of available blocks, ropes, and hand operated hoists. The supervisor shall inspect all hoisting, handling equipment, and rigging before strain is taken.

- (b) The supervisor is responsible for keeping all crew members in the clear in case of rigging failure or electrical contact.
- (c) In hoisting or lowering transformers, steel winch lines or other conducting cable shall not be used on poles or other structures supporting energized circuits.

17.5 Cross Arms

- (a) The principal hazards in handling cross arms are splinters, and those due to the length and weight of the cross arms.
- (b) Appropriate mechanical devices shall be set up for hoisting heavy arms or alley cross-beams. These shall be inspected by the man in charge and used under his direction.

17.6 Insulators

- (a) The principal hazards in handling insulators are those due to breakage or sharp edges. Specific care must be taken that the sharp edges do not cut the employee or his belt or safety strap.
- (b) Insulators shall be hoisted and lowered in canvas bags or by using suitable equipment designed specifically for that purpose.
- (c) In no case shall insulators be thrown by one person to another.

17.7 Wire

- (a) The principal hazards while handling wire are weight, backlash of cut ends, and possible contact with energized circuits.
- (b) Power equipment shall be used to move coils of wire or they shall be moved on hand trucks and all precautions shall be taken when lifting and handling these coils.
- (c) Heavy reels shall be moved, placed on reel-wagon, and generally maneuvered with power equipment or by an adequate crew.
- (d) Cable reels shall not be left unattended unless they are fully secured.
- (e) Employees must use specific care to keep clear of the back-lash of cut wire ends, particularly to the eyes, face and head. Other employees who may be endangered by such back-lash must be warned before the wire is cut.
- (f) Gloves shall be worn when guiding wire on a reel with particular care taken to watch for obstructions on the wire such as old splices and taps.

17.8 Unloading

Prior to unloading steel, poles, cross arms and similar materials, the load shall be thoroughly examined to ascertain if the load has shifted, binders or stakes have broken or the load is otherwise hazardous to employees.

17.9 Attaching the Load

The winch line shall not be wrapped around the load.

Section 18.0 - Material, Handling, Storage and Equipment

18.1 Material Handling

(a) Supervisor's Duty

Since the handling of materials is one of the most common sources of accidents, the teaching of safe and methods for lifting and handling materials is one of the supervisors' most essential functions.

NOTE: Back Injuries are a significant portion of all work related injuries.

(b) Proper Lifting

- (1) Employees shall be trained in the safe lifting and carrying methods, either as individuals or as members of a team, and when trained , shall follow these methods in all cases.
- (2) Be sure that the object is not too heavy or bulky to lift or handle unassisted. Secure help when needed, and use mechanical aids for heavy loads.
- (3) When Lifting
- (4) Get set securely with the feet at shoulder width.
- (5) Squat over the object being lifted, bending the knees and keeping the back as nearly upright as possible.
- (6) Lift with the leg and arm muscles, keeping the load close to the body.
- (7) Face the load while carrying.
- (8) When it is necessary to turn, do so by shifting the feet. Twisting of the body while lifting or carrying is to be specifically avoided.
- (9) It is just as important to lower the object using the same principles.
- (10) When carrying or handling materials, watch out for pinch points, uneven surfaces, and material defects.
- (11) Never carry a load so large that it obstructs the vision.
- (12) In team lifting, work in unison with one person giving all the orders.

(c) Hand Trucks

- (1) In loading or unloading two (2) wheel or four (4) wheel hand trucks, care must be used in lifting and setting down.
- (2) Two (2) wheel trucks shall be loaded with the bulk of the weight over the wheels, the least on the handles.
- (3) Hand trucks shall be pushed, not pulled, especially on down grades. The operator must always be able to see where he is going.

(d) Lifting Equipment

- (1) All hoisting and lifting equipment shall:
- (2) Be labeled as to capacity.

- (3) Be carefully inspected before using.
- (4) Not be used unless in safe condition and adequate for the load.
- (5) This equipment shall be operated only by employees trained in its use. (Refer to Manufacturer recommendation for more information.)

18.2 Storage

- (a) Material shall be piled so as to prevent toppling, sliding, or rolling. In general, heavy material shall be piled at lower levels with light materials above, and so as to be easily accessible when needed.
- (b) Bags of material shall be cross tied with the mouths on the inside of the pile. Bricks must be cross tied. Piles of cement shall not be more than ten (10) sacks high. The first four (4) end bags shall be cross piled in two (2) separate tiers up to the fifth bag, where a step-back of one bag shall be made. When removing sacks, the pile shall be kept as even as possible.
- (c) Barrels and kegs shall be piled on end where possible. If stored on their sides, racks must be provided for them, and planks laid on top of a row before others are placed above. Wherever possible, boxes shall be laid on the side having the greatest area.
- (d) Nails must never be left projecting from boards, packing cases, concrete forms, etc. All projecting nails must be removed entirely, bent flat, or boards containing them placed in a container immediately. Nails driven into the sides of kegs and barrels to secure the heads must always be removed as soon as the keg or barrel heads are taken out.
- (e) No materials or equipment shall be stored under energized bus, energized lines, or near energized equipment.

Section 19.0 - Live Line - Bare-Hand Work

(This section is applicable to live line, bare-hand work ONLY)

19.1 Prior to Performing Work

- (a) Before using or supervising the use of the Live-Line Bare-Hand technique on energized circuits, employees shall be trained and certified in the technique and in the safety requirements. Employees shall receive a refresher training as required. Employees shall be requalified if they have not performed LLBH work in the past twelve (12) months.
- (b) The nominal voltage rating of the circuit on which the work is to be performed, the minimum approach distances to ground of lines and other energized parts on which work is to be performed, and the voltage limitations of equipment to be used.
- (c) The insulated equipment, insulated tools, and aerial devices and platforms used shall be designed, tested, and intended for live-line bare-hand work. Tools and equipment shall be kept clean and dry while they are in use.
- (d) The automatic-re-closing feature of a circuit-interrupting devices protecting the lines shall be made inoperative, if the design of the devices permits.
- (e) Work may not be performed when adverse weather conditions would make the work hazardous even after the work practices required by this section are employed. Additionally, work may not be performed when winds reduce the phase-to-phase or phase-to-ground minimum approach distances at the work location below that specified. Note: thunderstorms in the immediate vicinity, high winds, snow-storms, and ice storms are examples of adverse weather conditions that are presumed to make live- line bare-hand work too hazardous to perform safely.
- (f) A conductive bucket liner shall be provided for bonding the insulated aerial device to the energized line or equipment.
- (g) The employee shall be connected to the bucket liner by the use of conductive shoes, leg clips, or other means.
- (h) Where differences in potentials at the work site pose a hazard to employees, electrostatic shielding designed for the voltage being worked shall be provided.
- (i) Before the employee contacts the energized part, the conductive bucket liner shall be bonded to the energized conductor by means of a positive connection. This connection shall remain attached to the energized conductor until the work on the energized circuit is completed.
- (j) Aerial lifts to be used for live-line bare-hand work shall have dual controls (lower and upper) and follows: the upper controls shall be within easy reach of the employees in the bucket. On a two-bucket-type lift, access to the controls shall be within easy reach from either bucket. The lower set of controls shall be located near the base of the boom, and they shall be so designed that they can override operation of the equipment at any time. Lower (ground level) lift controls may not be operated with employees in the lift, except in case of emergency.
- (k) Before employees are elevated into the work position, all controls (ground level and bucket) shall be checked to determine that they are in proper working condition.
- (l) Before the boom of an aerial lift is elevated, the body of the truck shall be grounded. Vehicles shall be barricaded or appropriate controls in place to ensure ground personnel are prevented from accidental contact with the vehicle.

- (m) Prior to employees entering the bucket, a boom-current test shall be made before work is started each day, each time during the day when higher voltage is encountered, and when changed conditions indicate a need for an additional test. This test shall consist of placing the bucket in contact with an energized source equal to the voltage to be encountered for a minimum of 3 minutes. The leakage current may not exceed 1 micro ampere per kilovolt of nominal phase-to-ground voltage. Work from the aerial lift shall be immediately suspended upon indication of a malfunction in the equipment.

19.2 Minimum Approach Distances

- (a) The minimum approach distances specified in Appendix A shall be maintained from all grounded objects and from lines and equipment at a potential different from that to which the live-line bare-hand equipment is bonded, unless such grounded objects and other lines and equipment are covered by insulating guards.
- (b) While an employee is approaching, leaving, or bonding to an energized circuit, the minimum approach distances in Appendix A shall be maintained between the employee and any grounded parts, including the lower boom and portions of the truck.
- (c) While the bucket is positioned alongside an energized bushing or insulator string, the phase-to-ground minimum approach distances of Appendix A shall be maintained between all parts of the bucket and the grounded end of the bushing or insulator string or any other grounded surface.
- (d) A non-conductive measuring device shall be readily accessible to assist employees in maintaining the required minimum approach distance.

19.3 Material and Equipment

- (a) Hand lines may not be used between the bucket and the boom or between the bucket and the ground. However, non-conductive- type hand lines may be used from conductor to ground if not supported from the bucket. Ropes used for live-line bare-hand work may not be used for other purposes.
- (b) Uninsulated equipment or material may not be passed between a pole or structure and an aerial lift while an employee working from the bucket is bonded to an energized part.
- (c) A minimum approach distance table reflecting the minimum approach distances listed in Appendix A shall be printed on a plate of durable non- conductive material. This table shall be mounted so as to be visible to the operator of the boom.

19.4 Work Rules

- (a) Work shall be discontinued when adverse weather conditions would make the work hazardous in spite of the work practices required.
- (b) Only volunteer Journeyman Lineman will be live-line bare-hand certified. Note – An approved apprentice with LLBH Training can be a qualified observer.
- (c) Except for training, when live-line bare-hand work is being performed, there shall be three certified live-line bare-hand employees present, one of which shall be in charge. Two certified employees at point of contact and third employee monitor micro-ammeter, if the aerial device is not equipped with an alarm.
- (d) Acceptance tests for aerial devices shall conform to ANSI standards. All units are subjected to these acceptance tests and certified before they are placed in service.

- (e) Written procedures must be provided to the crew prior to the initiation of the work for each different type of bare hand procedure or situation.
- (f) Written procedures should not be changed while the work is in progress. If due to unforeseen circumstances a minor change is required in procedures, the job shall be halted, and only through consultation of the whole crew, insuring that everyone understands the required change, work may proceed. If a substantial change is contemplated the supervisor of line work methods must be consulted, and approve of such change.

19.5 Working Clearances:

- (a) Figures 1 to 4 show an aerial device as the insulated component to put the men at the conductor. The same clearances are required when using other means such as ladders, helicopters and rope to gain access to the conductor.
- (b) No portion of the insulated section of the aerial-lift equipment is permitted to be less than the phase-to-ground clearance from an external grounded part or from any grounded parts such as the lower arm sections or portions of the vehicle.(Working Clearance Table, Column 2)
- (c) No portion of the grounded section of the aerial-lift equipment is permitted to be less than phase-to-ground clearance to an energized conductor. (Working Clearance Table, Column 2)
- (d) When positioning the bucket along-side an energized insulator string, a minimum line to-ground clearance requirement shall be maintained between all parts of the bucket, the insulator string and ground. When working the energized end of the insulator string, the bucket must be positioned so that no portion of the insulator string is shunted by the bucket or worker.
- (e) When positioning buckets over and energized circuit clearances must take into account the length of the bonding, and wanding, clamps should they inadvertently hang free.
- (f) When the nature of the work requires that minimum clearances be approached, calibrated measuring sticks should be used to verify clearances.

19.6 Wood Poles

- (a) For circuits mounted on wood poles or attached to wooden structures, all wood members shall be considered to be at ground potential.

19.7 Safe Working Load of Buckets

- (a) The buckets and upper insulated boom shall not be used to lift or support weights in excess of its rated capacity. To protect the fiberglass parts, none of the buckets parts or upper arm shall be used as fulcrum for prying or lifting.

19.8 Hand Lines

- (a) The use of a hand line attached to the bucket is strictly prohibited.

19.9 Securing the Ladder

- (a) One end of the insulated ladder shall be positively secured to the structure, either by clamps or safety chains.
- (b) Neither the energized end of the insulated ladder nor the workmen shall be solidly clamped or tied to the conductor, insulator string or other suspended components.

19.10 Conductive Clothing

- (a) When working from an insulated aerial device, on a maximum circuit voltage of 230KV, the lineman shall wear a conductive jacket and gloves as a minimum requirement.
- (b) When working from an insulated ladder, helicopter or rope support system the lineman shall wear the complete conductive clothing kit.
- (c) Lineman involved in bare hand procedures, though not bonded to the line but performing work on the structure, may wear conductive clothing to eliminate discomforting current discharges.
- (d) Leather protective gloves, as a part of the kit shall be worn over conductive gloves.
- (e) Conductive clothing shall be worn on the outside of personal clothing, except for in the use of gloves.

19.11 Safety Belts and Lanyards:

- (a) Safety belts and lanyards shall be worn at all times.
- (b) Approved safety belts and/or lanyards shall be securely fastened to the ladder, not to the conductor to which the lineman is bonded.

19.12 Supporting Conductor with Aerial Device (Tangent structures only)

- (a) Ensure that the boom capacity is not exceeded when handling a conductor with the jib. When moving a conductor to a different location, prior to attaching jib to the conductor, move boom to the extreme location you wish to move the conductor to, and check the load chart at that location. Make sure the capacity of the boom will not be exceeded at any point.

19.13 Insulator Testing

- (a) Prior to commencing work in the vicinity of an insulator string it is required that an insulator integrity test be performed using an approved insulator testing method and apparatus.
- (b) A minimum of 50% of the insulator string should be in good electrical and mechanical condition to allow the placement of live line tools along the die lie of the string.
- (c) When working on circuits where clearances cannot be maintained, the work to be performed shall be done with the use of the live line tools. The lineman may be bonded to the conductor but his body shall maintain proper clearances.

19.14 Bonding

- (a) Install Bonding to the Circuit: When making the initial bond with a wand, such bond will be made by the lineman not operating the aerial device.
- (b) Approach the conductor to within a safe limit. The distance must be far enough away so that inadvertent contact will not be made, yet close enough that the lineman “bonding on” can easily reach out with the bonding wand, with a positive movement, and install it onto the conductor.

Caution: Think out loud. Tell your fellow workman what you are doing and wait for his acknowledgment before you act!

19.15 Insulated Ladders

- (a) Tests: Ladders should be retested every ninety (90) days.

- (b) Ladders shall be stored in hot line trailers on storage racks or in bags on the roof racks.

19.16 Nonconductive Rope:

- (a) Only nonconductive rope which has been tested electrically to ensure its integrity shall be used for bare hand work.
- (b) Nonconductive rope used in bare hand work shall be stored in approved, appropriately marked containers.
- (c) Nonconductive rope used in bare hand work shall be tested annually, or whenever there is a question as to its dielectric quality.
- (d) Nonconductive rope used in bare hand work shall not be permitted to contact the ground in order to prevent the accumulation of dirt and moisture between the fibers. Approved storage containers and tarpaulins are utilized in the prevention of this occurrence.
- (e) Nonconductive rope when not in use shall be stored in dry-heated storage or stored with silica.
- (f) Nonconductive rope, when in use, shall be transported and stored in enclosed area of vehicle or trailer to or between jobs.

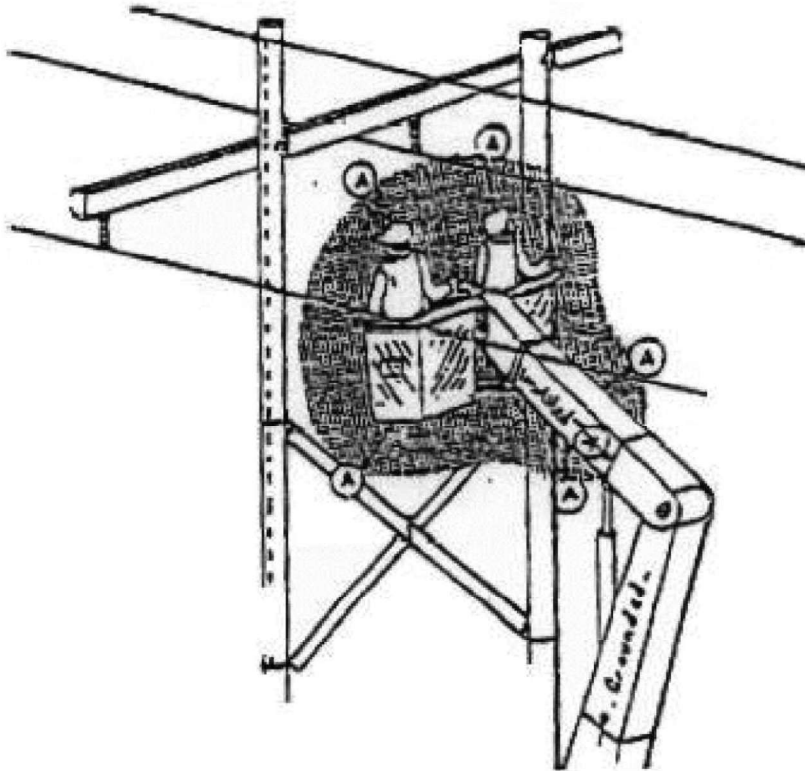


Fig.1 A- is the minimum Phase to ground clearance

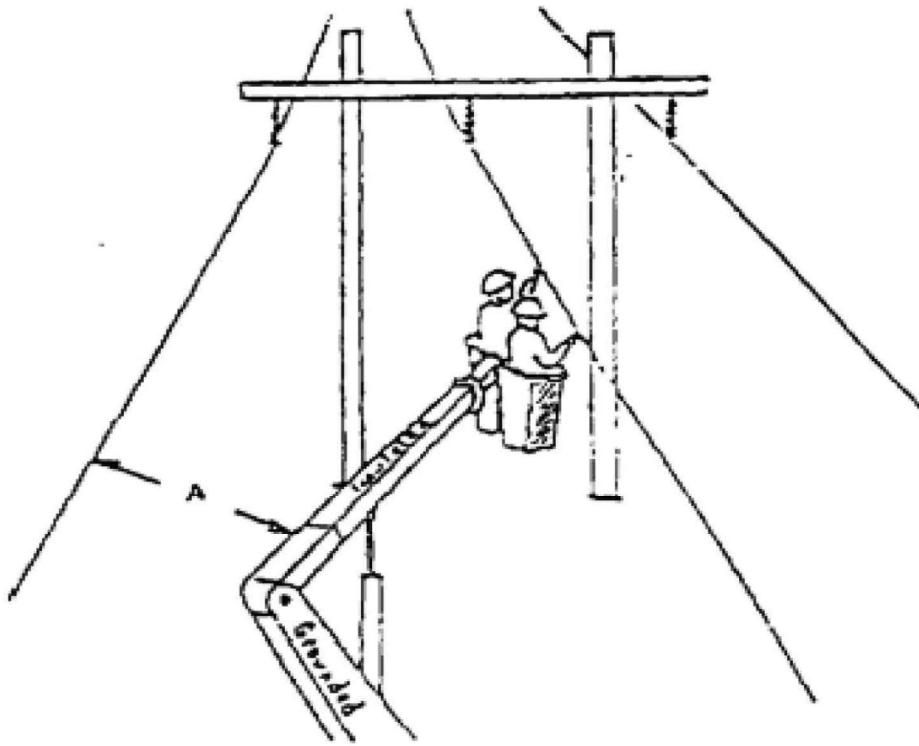


Fig. 2 A- is the minimum phase to ground clearance

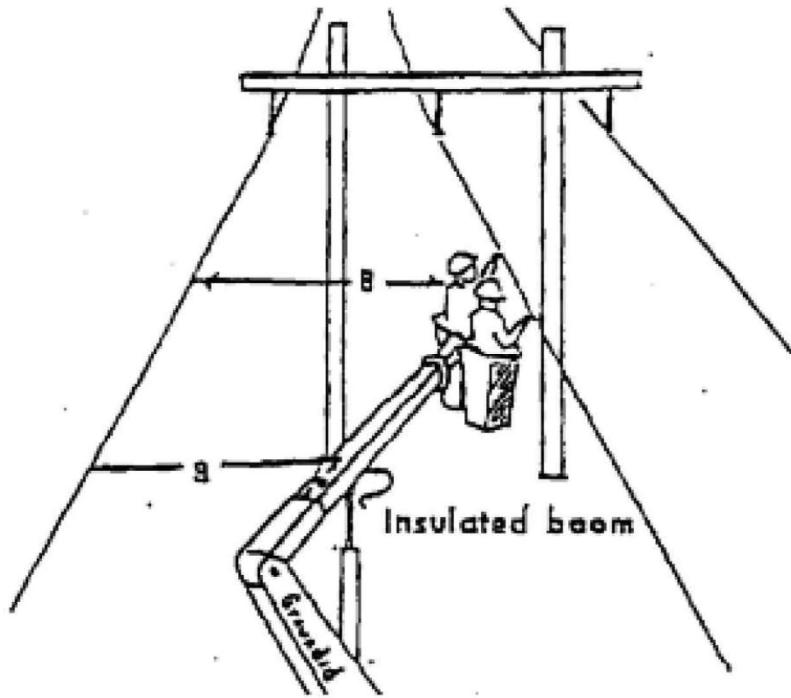


Fig.3 B- is the minimum phase to phase clearance

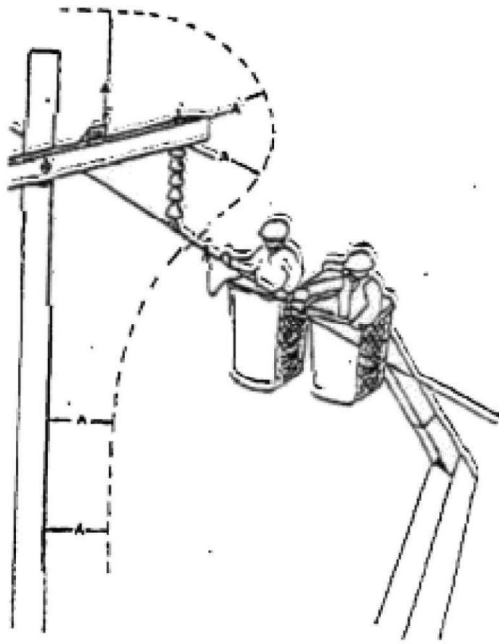


Fig. 4 A- is the minimum phase to ground clearance

WORKING CLEARANCE TABLE

During bare hand contact with live electrical lines and/or apparatus, the limits of approach of persons, tools, equipment and material they may be handling with respect to objects at ground potential, including poles, towers, and cross arms and to conductors other than the one on which they are working, shall be as specified in the following table.

WORKING CLEARANCE TABLE

Voltage range phase to phase (kV)	Phase-to-ground exposure		Phase-to-phase exposure	
	m	ft	m	ft
72.6 to 121.0	1.13	3.71	1.42	4.66
121.1 to 145.0	1.30	4.27	1.64	5.38
145.1 to 169.0	1.46	4.79	1.94	6.36
169.1 to 242.0	2.01	6.59	3.08	10.10
242.1 to 362.0	3.41	11.19	5.52	18.11
362.1 to 420.0	4.25	13.94	6.81	22.34
420.1 to 550.0	5.07	16.63	8.24	27.03
550.1 to 800.0	6.88	22.57	11.38	37.34

¹ Employers may use the minimum approach distances in this table provided the worksite is at an elevation of 900 meters (3,000 feet) or less. If employees will be working at elevations greater than 900 meters (3,000 feet) above mean sea level, the employer shall determine minimum approach distances by multiplying the distances in this table by the correction factor in Table R-5 corresponding to the altitude of the work.

² Employers may use the phase-to-phase minimum approach distances in this table provided that no insulated tool spans the gap, and no large conductive object is in the gap.

³ The clear live-line tool distance shall equal or exceed the values for the indicated voltage ranges.

Table R-5—Altitude Correction

Altitude above sea level (ft)	A
0 to 3,000	1.00
3,001 to 4,000	1.02
4,001 to 5,000	1.05
5,001 to 6,000	1.08
6,001 to 7,000	1.11
7,001 to 8,000	1.14
8,001 to 9,000	1.17
9,001 to 10,000	1.20
10,001 to 12,000	1.25
12,001 to 14,000	1.30
14,001 to 16,000	1.35
16,001 to 18,000	1.39
18,001 to 20,000	1.44

Section 20.0 - Directional Boring

20.1 Pre-job

- (a) A Tail board meeting must be held between crew members, prior to starting work, to discuss the job to be done and any unusual circumstances that may be encountered.
- (b) All utilities such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered in areas of excavations for bore pits, receiving pits and within close proximity to the line of the bore shall be determined prior to excavating or boring. When excavation and boring operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.
- (c) Adequate communication shall be present on all job-sites where work is being performed.
- (d) Approved PPE, including safety glasses, shall be worn by all employees at all times, whenever work is being performed.

20.2 Excavations

- (a) A competent person shall be present on all work-sites where men are working in trenches or pits.
- (b) All bore and receiving pits shall conform to OSHA excavating regulations.

20.3 Obstructions

- (a) All obstructions between the point of entry and the point of egress shall be located and/or pot-holed prior to beginning a bore.
- (b) Whenever boring across or in close proximity to energized electric lines, a qualified observer shall be present to observe the work.

20.4 Grounding

- (a) Boring machines must be solidly grounded and properly barricaded whenever a bore is in progress.
- (b) Rubber gloves shall be worn whenever there is reason to believe that there may be energized electric lines to cross or the route of the bore may come into close proximity with them.
- (c) When a Directional Boring machine is equipped with a Strike sensing device, it shall be properly grounded and tested prior to each job.

Section 21.0 - Fusion Fitting

21.1 General Rules and Definitions

(a) Scope

The safety rules and definitions in this section are those which apply specifically to gas operation. The safety rules in the General Section of this manual are of equal importance and effect.

(b) Natural Gas

Natural Gas is largely a mixture of gaseous hydrocarbons occurring naturally in the earth in certain places. Wells are drilled, and the gas is piped from the wells to be used as fuel. Natural Gas consists of approximately 75% methane, 5% ethane, 5% miscellaneous hydrocarbons and 15% nitrogen. The gas is lighter than air and can easily drift or be carried on a breeze of wind.

(c) Combustion Limits

Natural Gas in its raw state is not explosive, but when mixed in air it becomes explosive. Gas is combustible and explosive in mixtures of approximately 5% to 15% gas in air.

(d) Combustion Products

When properly mixed with air, Natural Gas burns clean and forms products which are mostly carbon dioxide and water vapor. However, when there is an insufficient supply of air for combustion, when there is smothering of the flames (as in improper venting), or flame impingement on cold surfaces, there is incomplete combustion and carbon monoxide is formed. Carbon monoxide itself is odorless and very poisonous. Employees must be constantly alert to conditions which indicate the possibility of incomplete combustion. Typical warnings are the

smell (a sweetish odor peculiar to incomplete combustion); smarting or burning of eyes, nose or throat, and headache or dizziness. Incomplete combustion resulting in dangerous carbon monoxide production can occur without any odor. Customer calls or complains of unusual amounts of condensation appearing on walls, woodwork or windows require special attention and care as they may indicate a possibility of escaping products of combustion.

(e) Natural Gas Hazards

There are four hazards in working with Natural Gas. Employees must be alert to these hazards at all times:

- (1) Fire- Due to burning gas.
- (2) Explosion- Due to igniting gas which is mixed with air.
- (3) Asphyxiation or Suffocation- Due to an excess of gas or lack of oxygen.
- (4) Poisoning- Due to fumes containing carbon monoxide.

(f) Toxicity

Natural Gas, Even odorized gas, is not poisonous. However, it contains no oxygen and if present in sufficient quantities to displace the air, can cause suffocation due to lack of oxygen.

(g) Odorant

Natural Gas is colorless and odorless. Odorant is vaporized into the gas at various locations so that a person with normal sense of smell can detect a natural gas leak before the gas concentration exceeds one percent (1%) gas in air by volume. Odorant is flammable and in heavy concentrations is toxic. However, in the small amounts used to odorize natural gas, it is generally not toxic.

- (1) Odorant leaks must be reported and repaired promptly. Should odorant be spilled, immediately steps shall be taken to clean it up or neutralize the odor using only approved neutralizers. Each case shall be reported to the supervisor to insure, that others are notified and the situation is properly corrected.
- (2) Special care shall be taken before fusion or drilling on odorizers. See “Explosive Hazards” rules in General Section.

(h) Pressure

Pressure shall be defined, measured and normally referred to in terms of the pressure used in the appropriate field manuals.

(i) Matches

Matches, other than the safety type, shall not be carried on the person.

(j) Tools, General

Gas work requires the use of many and assorted tools. Specific attention is drawn to the various tools and equipment rules in the General Section.

(k) Tie-Ins

- (1) Whenever a new or rebuilt main is to be tied into a live main and such tie-in involves cutting, uncoupling, unplugging or otherwise opening a live main, the procedure outlined in the appropriate field manual shall be followed.

- (2) The person in charge shall thoroughly investigate the distribution area affected, direction of feed, pressure to be encountered, by-pass requirements, etc., before proceeding with the work. The person in charge shall consult with the supervisor as to the method to be used.

21.2 Personal Protective Equipment

(a) Eye Protection

Eye protection is required at all times work is proceeding. Face protection is required anytime there could be energized gas lines or other hazardous conditions.

(b) Clothing

Clothing shall be of the non synthetic type to eliminate the possibility of ignition in case of an accidental flash caused by ignition of unburned gas.

(c) Gloves

Gloves shall be worn whenever possible. It must be noted that certain work will require the removal of gloves such as aligning the pipe for butt fusion (high low). Gloves should be worn when exposed to heated irons or exposure to sharp instruments to avoid serious burns.

(d) Head Protection

Head Protection shall be worn at all times.

(e) Hearing Protection

Hearing Protection shall be worn anytime there is exposure to escaping gas or any other time there is noise exceeding 85 decibels.

21.3 Fusion Process

(a) Tools

Before you start, make sure all tools are clean and fit for the job.

(b) Inspection

Inspect polyethylene pipe for cuts, gouges, and deep scratches, and remove these pipe sections before fusing the pipe.

(c) Procedure

- (1) Remove tension in the line before making any connections.
- (2) Make sure the correct time and temperature are used.
- (3) Square pipe ends to remove any damage or “necked down” surface.
- (4) Wipe pipe ends with CLEAN dry cotton rag to remove any foreign substance and cuttings from I.D. (Avoid rags of synthetic fiber that may melt and char against heated surface).
- (5) Check Heating iron fusion surface temperature with indicating crayons or pyrometer.
- (6) Clean heater faces after every joint with wooden implement (NEVER use metal tools).

- (7) Do a trial fusion at the start of each day.
- (8) To remove static electricity prior to cutting or tapping a pressurized gas line, spray polyethylene pipe with water/soap solution or water/glycol solution and ground either at the close off clamps or with a solution wetted cloth.
- (9) Fusion equipment may not be explosion-proof, take safety precautions if fusing in a combustible atmosphere.
- (10) Shield fusing equipment from inclement weather and winds.
- (11) If direct burial, polyethylene pipe should be snaked in the ditch and the temperature of the pipe should be approximately the same as the soil at the installed depth before completing the tie-in. Fusion of coils should be done so that the joined coils form an "S" to reduce the stress at the joint. If the polyethylene pipe has been inserted in an existing line, it should be allowed to cool to the casing pipe temperature prior to the final tie-in. For each 10 degree F temperature drop, 100 feet of polyethylene pipe shrinks approximately one (1) inch.

21.4 Purging and Cleaning

(a) General

- (1) After connection to live lines, but before new lines connected there are put in service, the new line shall be completely purged of air or inert gases.
- (2) Gas mains or services shall not be purged inside a building or other enclosure.

(b) Blowing

- (1) When cleaning intermediate pressure mains by blowing with natural gas, a cushion of inert gases shall be used when specified. Such blowing shall only be done under close supervision with adequate protection to employees and the public. When directed by supervisor, the police and fire department authorities shall be notified in advance and their assistance obtained, where needed, to control traffic or pedestrians during the blow.
- (2) Where blow risers are installed with compression couplings, such couplings shall be bonded in accordance with the appropriate field manual and the riser adequately braced to prevent whipping or slippage during the blow.

21.5 Electrical Work

(a) Authorization

Electrical work shall only be done by those employees who have been specifically trained and authorized to do this work.

(b) Wiring

All electrical wiring and installations shall be made in accordance with the National Electrical Code and NFPA Code.

(c) Energized Equipment

- (1) The electric supply shall be turned off before any repair work is done on electrical circuits, pumps, fans or fan motors. All electric equipment, appliances, wires or

cables shall be considered energized until proven otherwise.

- (2) In testing for energized electrical circuits or in checking voltage, a tester shall be used. The use of finger or tool contacts for this purpose is forbidden.
- (3) The use of the Lock out Tag Out (Section 4) shall be used.

(d) Cartridge Fuses

Cartridge type fuses must not be replaced by hand. An approved fuse puller shall be used.

(e) Explosion Proof Equipment

- (1) All lights and switches in regulator stations or meter houses must be of the explosion proof type.
- (2) Switches must be open when installing new lamps.

(f) Electric Meters

When “Turning-On” and “Shutting-Off” electric meters, employees shall follow the safety precautions and procedures in the appropriate field manual. If it is felt the work cannot be completed in a safe manner, the supervisor or person in charge shall be notified immediately.

21.6 Operator Qualification

All employees who perform work on Pipeline Facilities must be qualified to meet or exceed the customers training while performing work under identified Covered Tasks.

Persons not qualified in accordance with the customer’s program may perform Covered Tasks only if they are observed by an Individual that is qualified to perform the Covered Task. The qualified Individual must be able to identify and take immediate corrective action when necessary.

This requirement does not apply to personnel performing work not identified as a Covered Tasks

A list of Covered Tasks are included as **Appendix F**.

Appendix A

Minimum Approach Tables

Table V-4 — Altitude Correction Factor	
Altitude above sea level (m)	<i>A</i>
0 to 900	1.00
901 to 1,200	1.02
1,201 to 1,500	1.05
1,501 to 1,800	1.08
1,801 to 2,100	1.11
2,101 to 2,400	1.14
2,401 to 2,700	1.17
2,701 to 3,000	1.20
3,001 to 3,600	1.25
3,601 to 4,200	1.30
4,201 to 4,800	1.35
4,801 to 5,400	1.39
5,401 to 6,000	1.44

Table V-5 — Alternative Minimum Approach Distances for Voltages of 72.5 kV and Less¹				
Nominal voltage (kV) phase-to-phase	Phase-to-ground exposure		Phase-to-phase exposure	
	m	ft	m	ft
0.050 0.300 ²	Avoid contact		Avoid contact	
0.301 to 0.750 ²	0.33	1.09	0.33	1.09
0.751 to 5.0	0.63	2.07	0.63	2.07
5.1 to 15.0	0.65	2.14	0.68	2.24
15.1 to 36.0	0.77	2.53	0.89	2.92
36.1 to 46.0	0.84	2.76	0.98	3.22
46.1 to 72.5	1.00	3.29	1.20	3.94

¹Employers may use the minimum approach distances in this table provided the worksite is at an elevation of 900 meters (3,000 feet) or less. If employees will be working at elevations greater than 900 meters (3,000 feet) above mean sea level, the employer shall determine minimum approach distances by multiplying the distances in this table by the correction factor in Table V-4 corresponding to the altitude of the work.

²For single-phase systems, use voltage-to-ground.

Appendix B

Knots Are Weak

If a knot or hitch of any kind is tied in a rope, its failure under stress is sure to occur at that place. Each fibre in the straight part of the rope takes proper share of the load, but in all knots the rope is cramped or has a short bend, which throws an overload on those fibers that are on the outside of the bend and one fibre after another breaks until the rope is torn apart. The shorter the bend in the standing rope, the weaker is the knot. The results given in the following table are approximate, but are sufficient to cause engineers to be cautious in all rope fastenings employed in important work.

Appendix C
Data 2
Safe Loading in Pounds

**SAFE WORKING LOADS OF ROPE
POLYPROPYLENE**

DIAMOND BRAID		SOLID BRAID		HOLLOW BRAID		TWISTED	
Diameter	Working Load	Diameter	Working Load	Diameter	Working Load	Diameter	Working Load
3/8"	244 lbs.	3/8"	139 lbs.	5/32"	26 lbs.	1/4"	113 lbs.
		1/2"	213 lbs.	1/4"	110 lbs.	3/8"	244 lbs.
		5/8"	294 lbs.	5/16"	154 lbs.	1/2"	420 lbs.
				3/8"	215 lbs.	5/8"	700 lbs.
				1/2"	350 lbs.	3/4"	1090 lbs.

NYLON

DIAMOND BRAID		SOLID BRAID		TWISTED	
Diameter	Working Load	Diameter	Working Load	Diameter	Working Load
1/8"	40 lbs.	1/8"	26 lbs.	1/4"	124 lbs.
3/16"	90 lbs.	3/16"	52 lbs.	3/8"	278 lbs.
1/4"	124 lbs.	1/4"	90 lbs.	1/2"	525 lbs.
5/16"	192 lbs.	5/16"	135 lbs.	5/8"	935 lbs.
3/8"	244 lbs.	3/8"	192 lbs.	3/4"	1420 lbs.
1/2"	525 lbs.	1/2"	323 lbs.		

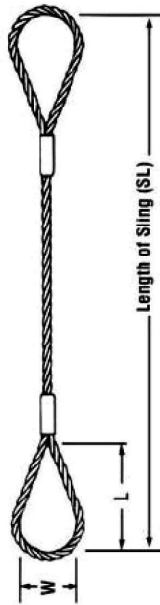
MANILA		SISAL		POLYESTER	
Diameter	Working Load	Diameter	Working Load	Diameter	Working Load
1/4"	54 lbs.	1/4"	44 lbs.	3/16"	70 lbs.
3/8"	122 lbs.	3/8"	98 lbs.	1/4"	149 lbs.
1/2"	264 lbs.	1/2"	236 lbs.	5/16"	230 lbs.
5/8"	496 lbs.				
3/4"	695 lbs.				

WARNING: Do not use for overhead lifting, support of human weight or athletic or playground equipment, or other situations where personal safety or valuable property could be endangered. The working loads should never be exceeded. Additional care must be exercised when using rope under shock (stress, jerk) conditions. These conditions can reduce working loads by as much as 1/3. Never stand in line with rope under tension; such a rope, particularly nylon rope, may recoil (snap back). Never use rope to secure large flat surfaces or object which could "airplane" or dislodge through buildup of air pressure. All ropes should be replaced if signs of wear, such as broken fibers, are apparent. Misuse can result in serious injury or death.

Wire Rope Slings

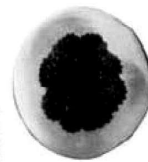
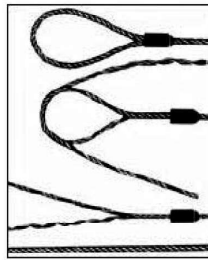
Sling with Single-Rope Legs & Torpedo Loop-Lock Splices Hanes Supply Sling No. 105B

Eyes are formed using the flemish eye splice. Ends are secured by pressing a metal sleeve over the ends of the strands of the splice. Pull is directly along the centerline of rope and eye. Gives most efficient use of rope capacity and is economical.



Flemish Eye Splice

In the standard flemish eye mechanical splice, rope is separated into two parts—3 adjacent strands, and 3 adjacent strands and core. These two parts are then re-laid back in opposite directions to form an eye, and ends are secured with a pressed metal sleeve.



Swaging Provides Positive Grip

This cutaway of a metal sleeve swaged onto a splice shows how metal "flows" into valleys between strands to positively prevent ends from unlaying when sling is used within its rated capacity.

Appendix D Data 3

Wire Rope Safe Loading in Pounds Improved Plow Steel Wire Rope with Independent Wire Rope Core

Dia. of Rope (in)	Min. Length (SL) of Sling (ft - in)	Loop Dim.		Rated Capacities (Tons)*												
		W (in)	L (in)	IPS Rope - IWRC				EIPS Rope - IWRC				Basket Hitch				
				Choker Hitch	Single Leg Vertical	60°	45°	30°	Choker Hitch	Single Leg Vertical	60°	45°	30°			
1/4	1-6	2	4	.41	.56	.97	.79	.56	.48	.65	1.1	.92	.65			
3/8	2	3	6	.93	1.2	2.1	1.7	1.2	1.1	1.4	2.4	2.0	1.4			
1/2	2-6	4	8	1.5	2.2	3.8	3.1	2.2	1.9	2.5	4.3	3.5	2.5			
5/8	3	5	10	2.5	3.4	5.9	4.8	3.4	2.9	3.9	6.8	5.5	3.9			
3/4	3-6	6	12	3.5	4.9	8.5	6.9	4.9	4.1	5.6	9.7	7.9	5.6			
7/8	4	7	14	4.8	6.6	11	9.3	6.6	5.6	7.6	13	11	7.6			
1	4-6	8	16	6.3	8.5	15	12	8.5	7.2	9.8	17	14	9.8			
1-1/8	5	9	18	7.9	10	17	14	10	9.1	12	21	17	12			
1-1/4	5-6	10	20	9.7	13	23	18	13	11	15	26	21	15			
1-3/8	6	11	22	12	15	26	21	15	13	18	31	25	18			
1-1/2	7	12	24	14	18	31	25	18	16	21	36	30	21			
1-3/4	8	14	28	19	25	43	35	25	21	28	48	40	28			
2	9	16	32	24	32	55	45	32	28	37	64	52	37			
2-1/4	10	18	36	30	39	68	55	39	35	44	76	62	44			
2-1/2	11	20	40	37	47	81	66	47	42	54	94	76	54			
2-3/4	12	22	44	44	57	99	81	57	51	65	113	92	65			
3	13	24	48	52	67	116	95	67	60	77	133	109	77			
3-1/2	16-6	32	64	69	88	152	124	88	79	102	177	144	102			
3-3/4	18	36	72	78	100	173	141	100	90	115	199	163	115			
4	20	40	80	88	113	196	160	113	101	130	225	184	130			
4-1/2	24	50	100	108	139	241	197	139	124	160	277	226	160			

* Rated capacities of basket hitches are based on a minimum diameter of curvature at the point of load contact of 40 times the rope diameter for slings 1/4" thru 1" diameter and 25 times the rope diameter for slings 1-1/4" diameter and larger.

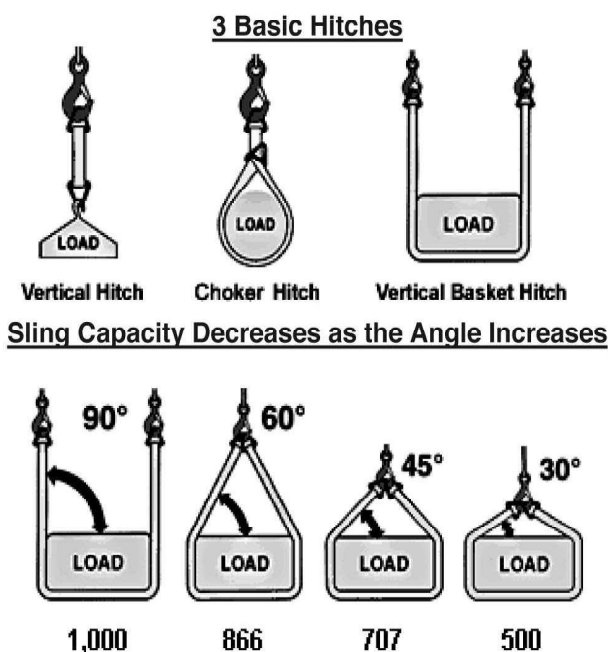
Appendix E

DATA 4
 CHAIN SLINGS — SAFE LOADS
 (ASTM Specifications A 56-30)
 (Factor of Safety 3)

Sling Angle and Rated Capacity

When selecting a sling to carry a given load, it is important to consider the angle at which the sling is to be used. As an example, one sling in a basket hitch or two slings attached to one crane hook are different applications involving different sling angles. The degree of the angle will determine how much the capacity will be reduced. To determine if a particular sling will have the capacity required, take the angle between the sling leg and the horizontal, then multiply the sling's rating by the factor provided in the accompanying table.

The capacity of a sling will be reduced as the angle from the horizontal is reduced. In the example below, you will see how the 1,000 pound capacity of a sling used in a vertical basket hitch is reduced:



Angles in Degree	Factor
90	1.000
85	0.996
80	0.985
75	0.966
70	0.940
65	0.906
60	0.866
55	0.819
50	0.766
45	0.707
40	0.643
35	0.574
30	0.500

Chemical Environment Data

	Acids	Alcohols	Aldehydes	Strong Alkalis	Bleaching Agents	Dry Cleaning Solvents	Ethers	Halo-genated Hydro-Carbons	Hydro-Carbons	Ketones	Oils Crude	Oils Lubri-cating	Soap & Deter-gents	Water & Sea-water	Weak Alka-lis
nylon	NO	OK	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
polyester	*	OK	NO	**	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK

* Disintegrated by concentrated sulfuric acid ** Degraded by strong alkalis at elevated temperatures

CAUTION DO NOT EXCEED RATED CAPACITIES

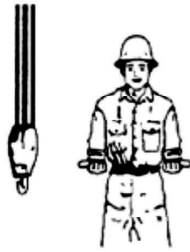
Appendix F

DATA 5
COVERED TASK LIST

Covered Task Summary (CTS) Name	Performance Evaluation Form (PEF) Title	CFR
Locating Pipelines		192.614(b)(5)
Protection During Disturbance of Segment Support		192.614(b)(6)(l), 192.755(a)
Inspection for Damage		192.614(b)(6)(i)(u), 195.442.b.6
Plastic Pipe - Electrofusion		192.273(c), 192.281(c)
Plastic Pipe - Butt Heat Fusion		192.273(c), 192.281(c)
Plastic Pipe - Sidewall Heat Fusion		192.273(c), 192.271(c)
Plastic Pipe - Mechanical Joints		192.273(c), 192.281(c)
Plastic Pipe – Socket Heat Fusion		192.273(c), 192.281(c)
Abandonment or Inactivation of Facilities		192.727(b), 192.727(c)
Backfilling		192.319(b), 192.361(b)
Underground Clearances		192.325
Installation of plastic pipe:	Installation of plastic pipe: Direct Burial Installation of plastic pipe: Boring Installation of plastic pipe: Plowing/Planting Installation of plastic pipe: Plowing/Pull-in Installation of plastic pipe: Insertion Installation of plastic pipe: Above Ground	192.321(a), 192.321(b), 192.321(c), 192.321(e), 192.321(f), 192.321(g)(2), 192.311, 192.361(c), 192.261(d)
Cover – Service Lines, Mains and Transmission Lines		192.177(a)(3), 192.327(b), 192.327(d), 192.327(e), 192.361(a), 195.248.a
Inspection		192.305, 192.307, 195.206
Line Markers		192.707, 195.410
Protection when Minimum Cover not Met	Protection when Minimum Cover not Met	192.327(c), 195.250, 195.248(b)
Purging	Purging: Large Volume, i.e. Segment of Main or Transmission Line, Etc. Purging: Small volume, i.e. Service Line, Short Pipeline Segments, Compressor, Component, Etc.	19.629, 192.727(e), 195.403.a.6
Tapping Steel and Plastic Pipe		192.627
Connections to Pipelines (Mains, Transmission, and Service)		
Service Line Replacement		19.361(c), 192.361(d), 192.361(e), 192.361(e), 192.361(f), 192.365, 192.375(a), 192.375(b), 192.377, 192.379, 192.379, 192.381(c)(d)
Prevention of Accidental Ignition		192.751(a)(c), 195.402.c.11
Service Lines Not In Use and Service Discontinuance		192.727(d)

Appendix G

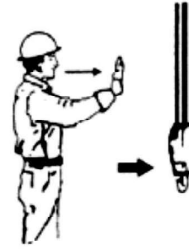
DATA 6
Universal Crane Hand Signals



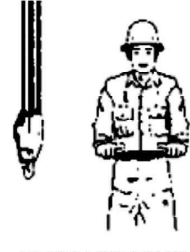
EXTEND BOOM



DOG EVERYTHING



TRAVEL



RETRACT BOOM



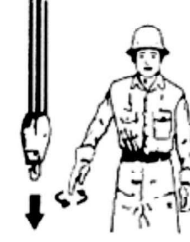
**EXTEND BOOM
(ONE HAND)**



**RETRACT BOOM
(ONE HAND)**



HOIST



LOWER



USE MAIN HOIST



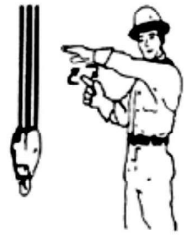
USE WHIP LINE



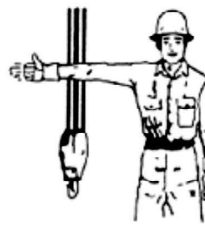
RAISE BOOM



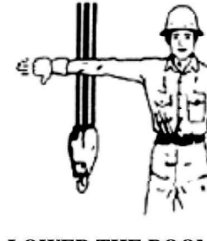
LOWER BOOM



MOVE SLOWLY



**RAISE THE BOOM &
LOWER THE LOAD**



**LOWER THE BOOM &
RAISE THE LOAD**



SWING



STOP



EMERGENCY STOP

Phone: (480) 860-4329

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