Lansing Board of Water & Light

Safety Manual

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INTRODUCTION

ACCIDENT PREVENTION

No aspect of the BWL operations is of greater importance than accident prevention. The degree of safety and the results accomplished are directly proportional to the effort expended to control the conditions, practices, and human actions that are responsible for accidents.

PURPOSE

The purpose of this manual is to assist in the prevention and elimination of accidents.

EFFECTIVENESS

A. This manual shall be effective as of the date of issuance. Compliance by every employee is mandatory and is considered a requirement for employment.
B. Existing governmental codes, statutes, rules, and orders shall be considered a part of this manual and where any conflict exists between the two, those of governmental status shall prevail.

EMERGENCY CONDITIONS

In case of an emergency involving hazard to life, any Employee-in-Charge may modify or suspend any portion of this manual deemed necessary to permit proper handling of the specific emergency. Any person so acting shall be fully accountable for the reasonableness of their actions.

OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS

The BWL is responsible for employee compliance with all aspects of Occupational Safety and Health Act rules (or as modified by the state) and may be subject to severe penalties for violation of these requirements by any employee. As stated in the Occupational Safety and Health Act, “Each employee shall comply with the occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to their own actions and conduct.”
Those employees who do not abide by the safety rules of this manual or other BWL safety requirements shall be subject to disciplinary action up to and including discharge.

EMPLOYEE-IN-CHARGE RESPONSIBILITIES

The Employee-in-Charge shall be responsible not only for their own safety but also for the safe work environment of other employees under their supervision. Before assigning work to an employee, the Employee-in-Charge shall ensure the employee knows and understands the hazards associated with the work and the proper procedures to perform the work safely.
The Employee-in-Charge at all levels shall accept, in a cooperative manner, all reports of hazards, and an employee shall not be reprimanded or penalized for reporting hazards.

RESPONSIBILITY OF EMPLOYEES

Employees share with the employer the responsibility for safety. Each employee is responsible for their own safety, the safety of their co-workers, and the general public. Employees shall become familiar with and use all the protective devices, which are provided for their protection.
Employees shall report all unsafe equipment, unsafe tools, and hazardous conditions that come to their attention to the Employee-in-Charge.

KNOWLEDGE OF SAFETY RULES

Every employee shall become thoroughly familiar with the contents of this manual as they apply to their work activities.

CONDITIONS NOT COVERED

Although each employee is primarily responsible for their own safety, in all instances where conditions are not covered by this manual or the job is not completely understood, the employee shall obtain specific instructions from an Employee-in-Charge before proceeding with the work.

QUALIFICATIONS FOR DUTY

Any Employee-in-Charge who has reasonable grounds (just cause) to suspect that an employee under their jurisdiction is either mentally or physically unfit for the work assigned shall prohibit such employee from working until satisfactory medical or other evidence indication employee fitness is secured.

CARE IN PERFORMANCE OF DUTIES

Each employee shall use reasonable care in the performance of their duties and act in such a manner as to assure at all times maximum safety to themselves, their co-workers, and the public.

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101 EMPLOYEE RESPONSIBILITY

101.1 Every employee has a personal responsibility for safety.

A. Employees have the right and obligation to stop a job when there is a known or perceived hazard to employees, physical assets, or the public.
B. No employee shall sacrifice safety for time or speed on a work project.
C. Questions about the interpretation or application of a safety rule or procedure shall be resolved before continuing the job.
    1. The final interpretation of Safety Manual rules rests with the Safety Department or the BWL Safety Committee.
D. Employees shall learn and follow:
    1. BWL Safety Manual rules.
    2. BWL Safety Programs and initiatives.
    3. Departmental procedures.
E. When a hazardous condition is identified, it shall be reported it to the Employee-in-Charge using the BWL Incident Report Form. See 107 INCIDENT REPORTING AND INVESTIGATION.

101.2 Employees shall not use or be under the influence of intoxicating beverages or drugs on BWL premises or on the job during working hours.

101.3 Any personal condition that may impair work performance or anyone's safety shall be reported promptly to Employee-in-Charge, including the consumption of over the counter or prescription medications.

101.4 Every employee shall be aware of the site-specific Visitor Management Procedures prior to gaining access to any BWL site they are visiting.

101.5 An employee working alone shall identify the hazards of their job and contact their Employee-in-Charge if any hazard cannot be mitigated by the employee.

102 EMPLOYEE-IN-CHARGE RESPONSIBILITY

102.1 All safety rules and safe work practices shall be upheld consistently by the Employee-in-Charge.

102.2 The Employee-in-Charge shall take immediate action to mitigate a hazardous condition.

102.3 Before starting work, the Employee-in-Charge shall inspect the area to be sure that the protection is adequate.

102.4 Prior to the start of each job, the Employee-in-Charge shall facilitate a job briefing with the employees involved.

A. The briefing shall cover at least the following:
    1. Hazards associated with the job
    2. Work procedures involved
    3. Special precautions
    4. Energy source controls
    5. Personal protective equipment requirements
B. When applicable, also:
    1. Fall Protection Plan
    2. Traffic control
    3. SDS review of any chemicals to be used
    4. Emergency procedures
    5. Confined Space permit
    6. Hot Work permit
    7. Weather
C. Additional job briefings shall be held:

1. If significant changes occur during work which may affect safety of the employees.
2. To transfer knowledge when there is a change of crew members on a job.

D. When a job requires the assistance of other crews or departments, the Employee-in-Charge shall be responsible for communicating and coordinating between them, including the participation of all parties in the job briefing.

102.5 The Employee-in-Charge shall ensure only qualified trained employees operate the tools and equipment needed to perform a job.

103 CONTRACTORS AND VISITORS

103.1 Visitors shall be escorted by a BWL representative aware of identified hazards of the equipment or work location.

103.2 Contract employees working for the BWL shall be oriented in the BWL Contractor Safety Program prior to the start of work.

A. No representation shall be made that all hazards have been identified or that the workplace is guaranteed in a safe condition.
B. Contractors shall comply with all applicable federal and state regulations and BWL safety rules and programs relevant to the work performed.
C. The contractor shall be responsible for establishing control measures to protect their employees, and/or employees under their control, from exposure to hazards present at the work location.
D. Any contractor safety violation, personnel injury, near miss or hazard shall be reported to the BWL Employee-in-Charge or the Contract Coordinator immediately.
E. The Employee-in-Charge or Contract Coordinator shall report to the Safety Department any contractor safety violation, injury, near miss or hazard by completing an incident report form.

104 FIRE PROTECTION AND PREVENTION

104.1 Stairways and doors that are used for fire egress shall be free of all obstructions or impediments.

A. Doors shall open outward with the exit travel, and
B. Fire exit doors shall never be locked or chained closed.

104.2 Signs shall be posted forbidding open flames in all areas containing fast burning combustible material, flammable liquids, and flammable vapors and gases.

A. Examples of such areas include, but are not limited to, various areas in garages, coal handling areas, oil storage rooms, fuel tanks and dispenser areas, and hydrogen storage areas.
B. Open flames or spark-generating devices (matches, torches, welding equipment, grinders, etc.) shall not be used in any posted location.

104.3 When a fire is detected, it shall be immediately reported to the Employee-in-Charge and employees shall evacuate the facility if deemed necessary.

104.4 All interior structural fires or uncontrollable fires require an immediate call to 911.

104.5 A fire in the beginning stage (incipient) may be combated with available and appropriate fire extinguishers if deemed safe to do so and if the following criteria are met:

A. Fire is small and confined.

B. Fire can be fought with the employee's back toward a non-threatened escape.
C. The extinguisher's class matches the type of fire

104.6 Fire extinguisher training shall be provided for any employees expected to operate portable fire extinguishers.

104.7 Portable fire extinguishers shall:
A. Be located where they will be readily seen and accessible.
B. Be clearly visible and free from obstructions such as material or tools.
C. Be inspected and so documented on the extinguisher's affixed tag with inspector initials and date, to verify:
1. Monthly by BWL employees:
a. Its location in designated place.
b. No signs of actuation or tampering.
c. No obvious damage.
d. Appropriate pressure (in green area).
2. Annually by a licensed fire protection contractor: a thorough annual mechanical inspection to ensure operability.

104.8 An assigned location shall be determined for any used, partially used, or defective extinguishers and any such extinguishers shall be reported to the Employee-in-Charge.

104.9 Dry pipe fixed fire protection systems shall have weekly visual inspections to make sure they have adequate water/air pressure.

104.10 Fixed fire protection system sprinkler heads shall not be painted over; and painted sprinkler heads shall be replaced.

105 HOT WORK

105.1 Lansing Board of Water and Light shall maintain a written Hot Work Program for any work process involving open flame or producing heat and/or sparks.
A. Only qualified trained employees shall perform hot work in accordance with the Program.
B. Work in areas such as welding booths, specifically designed to control any heat or sparks, does not require a hot work permit.
C. Hot work activities performed in the field or outside BWL buildings may not require a permit as determined by the Employee-in-Charge.
1. However, the work area shall be inspected for fire hazards.
2. A fire extinguisher shall be readily available.

105.2 The completed Hot Work Permit shall be displayed in the work area for the duration of the hot work, and during each shift the hot work continues.

105.3 An area of at least 35 feet around a hot work operation shall be prepared prior to starting the job to mitigate any potential fire hazards.
A. Combustible and flammable substances shall be removed, relocated, guarded, shielded, or covered with fire-resistant material.
B. Cracks or openings through which sparks could pass in the floor or walls to adjacent areas shall be covered with a fire-resistant material.
C. Ductwork and duct openings shall be sealed, guarded, or covered with fire-resistant material.
D. Conveyor systems that might carry sparks to distant combustibles shall be protected or shut down.

105.4 Fire Watch shall:
A. Be assigned for the duration of the hot work.
B. Be assigned for one hour after the hot work has been completed.

C. Have a fire extinguisher readily available at the hot work site.

105.5 Intermittent area observation for up to an additional three hours after the one-hour fire watch may be required depending on job characteristics.

106 EMERGENCIES

106.1 It is the responsibility of all BWL employees to report any type of emergency to the Employee-in-Charge for the safety and protection of BWL employees, customers and facilities. Examples of emergencies include, but are not limited to, natural disaster, fire, chemical spill or release, catastrophic event, bomb threat, etc.

106.2 Emergency Action Plans shall be periodically reviewed with employees for appropriate responses in case of emergency.

A. The occurrence of any emergency not covered in emergency plan requires employee to obtain specific instructions from the Employee-in-Charge or supervisor before proceeding with the work.

106.3 Occupants of BWL buildings shall be given instructions on building evacuation procedures.

A. The Employee-in-Charge shall instruct BWL employees, visitors and contractors on area evacuation procedures.
B. Building or area evacuation procedures shall be reviewed with all employees at their initial departmental orientation and periodically thereafter.
C. Meeting host shall ensure attendees are knowledgeable of shelter-in-place and evacuation procedures for the meeting venue.
D. Building or area evacuation procedures shall be posted.

106.4 Periodic drills shall be held in each BWL department or area for fire, adverse weather conditions and/or other emergency response actions.

107 INCIDENT REPORTING AND INVESTIGATION

107.1 All safety incidents – injuries, hazards and near misses – shall be reported:

A. Immediately to the Employee-in-Charge.
B. Via Safety Department's written incident report form to Employee-in-Charge by the end of the employee's shift.
    1. When employee injury prevents the employee from completing the incident report, Employee-in-Charge shall complete as much of the form as possible.

107.2 Incident Response Actions.

A. Seek immediate medical treatment of injured persons; including calling 911 if required.
B. Secure and stabilize the incident site:
    1. Shut down equipment or power sources if necessary.
    2. Cordon off the area.
C. Notify Environmental Services if a release of hazardous materials is suspected. See Section 1004 SPILL RESPONSE.
D. Identify possible witnesses.

107.3 All incident reports – injuries, hazards and near misses – shall be investigated.

A. The investigation shall begin immediately after any incident response actions have been completed.
B. When an incident results in property damage Risk Management shall be notified.

107.4 The Employee-in-Charge shall:

A. Ensure immediate communication (verbal/voice mail) of all serious injuries involving medical treatment, emergency response or medical transport to the Area Manager, Safety Department, Human Resources, and Union Safety Director.
B. Immediately investigate the incident using the Employee-in-Charge Investigation Form.
C. Ensure a trained Bargaining Unit co-investigator is involved when the report is submitted by a Bargaining Unit employee.
D. Ensure that the following forms have been completed and sent to Safety Department within 24 hours:
    1. The Incident Report Form.
    2. Witness Statement Form(s).
    3. Employee-in-Charge Investigation Form.

107.5 The Safety Department shall:

A. Review the completeness of the Employee-in-Charge Investigation Form.
B. Determine whether a more comprehensive investigation is needed.
    1. Notify the appropriate Manager of the above decision.
    2. In collaboration with the Manager, assign an investigation team if necessary. The investigation team:
        a. Shall be made up of not less than two trained persons.
        b. Consists of Bargaining and non-bargaining where applicable.
        c. Members may be internal or external to the RA.
        d. May be assisted by the Technical and Safety Trainer, Union Safety Director and Safety Department.

107.6 The Comprehensive Investigation Report shall be completed and sent to Safety Department within 15 calendar days.

A. Safety Department shall review the report for completeness and forward the report to the respective Managers and Directors for final review and signature.
B. Safety Department shall distribute final report copies to the employee, Union Safety Director, and Human Resources.
C. An extension of the investigation period may be granted by the Manager of Safety or their designee after a written request by the Manager.

107.7 An employee may appeal an Investigation Report of their reported incident.

A. Employee shall contact the Director of Safety or Union Safety Director.
B. The Director of Safety and Union Safety Director shall review the original Investigation Report and contact the employee and investigators for additional information.
C. The Director of Safety and Union Safety Director shall work with the employee and investigators to resolve any differences. An amended report shall be issued to document the appeal.

107.8 Each Responsibility Area (RA) shall have trained incident investigators. Safety Department shall be responsible for maintaining a current list of all trained investigators, training content, information and procedures.

109 PUBLIC INJURY

109.1 In the event of a public injury on a BWL property or job site, the Employee-in-Charge and BWL Security shall be immediately notified.

109.2 BWL Security or Employee-in-Charge shall gather the names, addresses, and telephone numbers of the injured and witnesses.

109.3 The BWL General Public Incident Report form shall be completed and forwarded to the Risk Management and Safety Departments.

109.4 Refer to Section 302 VEHICLE ACCIDENTS for additional guidance.

110 CUSTOMER PREMISES

110.1 When approaching or working on customer property, employees shall assess the work area for:

A. Trip or fall hazards such as missing or defective stairs.
B. Slip hazards such as ice, snow-covered items, etc.
C. Dogs, cats, or other potentially dangerous animals.
D. Suspicious or assaultive people.
E. Biological hazards such as mold, excrement, garbage, drug paraphernalia or asbestos.
F. Inadequate light.

110.2 Animal bites or any other injury on customer premises shall be documented per 107 INCIDENT REPORTING AND INVESTIGATION. Additionally, the Employee-in-Charge shall ensure a report is filed with Animal Control for all animal bites.

110.3 Employees shall not jump or climb fences or hedges.

110.4 Only qualified electrical employees shall work within 10 feet of switchboards, uncovered bus bars, cables, etc.

110.5 If an employee must work or inspect any premises alone, the employee shall be trained on the process area's specific safety procedures:

A. Including situational awareness.
B. Including a detailed system of checking in/out during the course of work.
C. Minimally:
    1. Upon hire or transfer.
    2. Annually.
    3. After any change to the procedure.
    4. After deficiency in knowledge of trained procedures is shown.

111 HOUSEKEEPING

111.1 Work locations and both the inside and outside of vehicles and buildings shall always be kept clean and orderly.

111.2 Weeds and other range vegetation shall not be allowed to grow in or around substations, pole yards, buildings, oil tanks, or other structures.

111.3 Combustible materials, scrap and debris such as oil-soaked rags, paper, coal dust, etc. shall not be permitted to accumulate and shall be regularly removed and stored in appropriate (metal) containers.

111.4 Coal dust residues shall be cleaned at regular intervals.

A. Cleaning methods shall not generate dust clouds.
B. Only vacuum cleaner approved for combustible dust collection shall be used.
C. Open and hidden areas shall be inspected for dust residues at regular intervals.

111.5 During the course of construction, alteration or repairs, scrap lumber with protruding nails and all other debris shall be kept cleared from work areas, passageways, and stairs.

A. Broken glass and sharp metal objects (such as banding materials) shall be promptly wrapped and appropriately discarded.

111.6 At the completion of work, all associated tools and materials (scrap or otherwise) shall be moved to storage or disposal areas.

111.7 Floors, platforms, stairways, aisles, roadways, walkways and material storage areas shall be kept clear from trip and slip hazards.

A. Eyewash/shower stations, compressed gas cylinders and fire extinguisher areas shall be kept clear from obstructions.
B. Snow and ice shall be removed from walkways.
C. Where the type of operation produces slippery conditions, mats, grates, cleats or other methods shall be used to eliminate slipping hazards.
D. Drip pans or absorbent mats shall be installed where oil, water or other liquid drips cannot be corrected.
E. Spilled grease and oil shall be immediately wiped up or absorbed using absorbent material to minimize a slipping hazard.

111.8 Objects shall be secured if there is any possibility of them falling on people below.

111.9 Parts and Materials shall be stored:

A. In an orderly manner to prevent their falling or spreading.
B. So at least a three feet radius is maintained from any:
    1. Energized panels or equipment such as control panels, fuse boxes, switchgear and energized wire.
    2. Fire suppression equipment.

111.10 Barrels or drums shall be stored in racks designed for storage.

111.11 Parts and materials shall be stored:

A. Within, not on top of, bins and cabinets.
B. On shelves that do not create a hazard when removing the material.
C. On shelving designed for the weight or size of the material, with the material not allowed to protrude from the shelf.
D. In a manner that will not allow the contents of open boxes or cartons to drop or spill when removing from storage.
E. So that loose material on shelves or pallets cannot slide or fall.

112 WORK AREA PROTECTION

112.1 Work area protection shall include approved, informative, protective devices such as tape, fencing, signs, flags, traffic devices, and barricades.

112.2 Adequate lighting shall be used at all work locations.

A. Flashlights shall be used until lighting is provided.
B. Open flames or matches are not suitable light sources.

112.3 Warning devices shall:

A. Be used to notify the public and employees of worksite hazards.
B. Be removed as soon as the hazard is eliminated.
C. Be stored in a proper manner and removed from the work area when not in use.

112.4 In work areas with heavy concentrations of dust or foreign material:

A. The work area shall be cleared of the material and adequately ventilated, and
B. Appropriate breathing apparatus or respirator shall be used if ventilation efforts do not improve the air quality to an acceptable level. See Section 201 RESPIRATORY PROTECTION.

112.5 Only authorized persons shall be permitted in a work area.

112.6 Protective barriers shall only be removed for work in progress.

112.7 For protection of work areas involving traffic, see 351 BARRICADING AND TRAFFIC CONTROL.

112.8 Despite suitable covering, walking or working in areas below work in progress shall be avoided.

112.9 When sidewalk or street is used for storage of materials (even temporarily), the area shall be protected from entry.

113 OFFICE SAFETY

113.1 Doors shall be opened slowly to avoid striking anyone on the other side.

113.2 Doorways shall remain clear of any objects, except in cases of work in progress.

113.3 In hallways, stairwells and other pedestrian walkways, employees shall:

A. Keep to the right when walking, particularly at blind corners.
B. Walk cautiously up and down stairs, using the handrail whenever possible.
C. Carry pointed objects such as pencils, knives or scissors with the point protected.
D. Not run.

113.4 Hand-operated paper cutters shall:

A. Be equipped with a guard to keep fingers away from the cutting surface.
B. Always be closed and hooked when not in use.

113.5 Broken glass and other sharp objects shall:

A. Not be placed in wastepaper containers, and
B. Be discarded directly into an external dumpster to prevent handling by unsuspecting people.

114 WORKSTATION ERGONOMICS FOR VIDEO DISPLAY USE

114.1 Employees using stationary video display terminals for extended periods of time shall consider the following:

A. Keeping back straight with feet resting firmly on the floor for support.
B. Using a chair that provides support to the lower back.
C. Positioning video display terminal so the operator's eyes are level with the top of the screen.
D. Positioning the video display terminal directly in front of the user and adjusting to avoid glare.
E. Adjusting the height of the chair or keyboard so that shoulder-elbow-arm angle is at 90 degrees.
F. Using a cushioned wrist rest to keep user's hand and fingers in the same plane as the forearm.
G. Adjusting body position frequently to avoid muscle stiffness.

115 ELEVATORS

115.1 Posted operating instructions shall be followed including:

A. Abiding by posted weight restrictions.

115.2 If transporting long material, it shall not protrude through any roof openings of the elevator car.

115.3 When being serviced, appropriate clearance and tagging procedures shall be followed.

115.4 Defective and/or improperly operating elevators shall be promptly reported to Employee-in-Charge and removed from service.

116 EXCAVATION, BORING AND TUNNELLING

116.1 Employees shall:
- A. Follow “MISS DIG” staking request procedures prior to excavating.
- B. Refer to Section 351 of this Safety Manual if excavation activities expose employees to vehicle traffic.
- C. Refer to Rules 311 and 351 for equipment parking and on-site storage.

116.2 The Employee-in-Charge shall provide to all the crew in the job briefing discussion, available information that relates to the location of underground utilities.

116.3 Soil not placed in a transport vehicle shall be piled at least two feet away from the edge of the trench.

116.4 Material, equipment or tools shall be prevented from falling or rolling into excavations by:
- A. Keeping such items at least two feet from the edge of excavations, or
- B. Using retaining devices.

116.5 Augering motors such as post hole diggers and hammer drills shall not be operated while employees are near the auger flights.

116.6 Air supply shall be detached before boring equipment is placed in or removed from the trench.

116.7 Before operating, verify that air supply lines are secured to the equipment and that all safety pins are in place.

116.8 While excavation is open, all underground installations shall be protected, supported, or removed to safeguard employees.

116.9 When trench excavations are 4’ or more in depth:
- A. Safe means of egress such as stairway, ladder or ramp shall be inside the trench.
- B. Any ladders in use shall extend above the trench a minimum of 3’.
- C. Means of egress shall be placed so that employees are not required to laterally travel more than 25’.

116.10 When loads are being handled by lifting or digging equipment, employees shall:
- A. Not be permitted underneath loads.
- B. Stand away from vehicle to avoid being struck by any spillage or falling materials.

116.11 When mobile equipment is operated adjacent to an excavation and the operator does not have a clear and direct view of the edge of the excavation, a warning system such as barricades, a spotter, or stop logs shall be utilized.

116.12 Employees shall not work in excavations when water has accumulated or is accumulating unless adequate precautions have been taken, such as:
- A. Special support or shield systems to protect from cave-ins.
- B. Water removal to control the level of accumulating water.
- C. Use of a body harness and lifeline.

116.13 If excavation work interrupts the natural drainage of surface water, a suitable engineer shall design appropriate means to prevent surface water from entering the excavation.

116.14 Where the stability of adjoining building, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided.

116.15 Inspections of excavations, the adjacent areas, and protective systems shall:
- A. Be conducted daily before starting work and as needed throughout the shift.

B. Be conducted by a competent person, capable of identifying possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions.
C. Be immediately addressed to ensure identified hazards are mitigated prior to employee entry into the work area.

116.16 When excavations are left open, warning devices, barricades, fencing, or guardrails shall be placed to adequately protect the public and employees.

116.17 No more trench shall be open at one time than is necessary. At the end of each workday, as much of the excavation as practical shall be closed.

116.18 Cave-ins shall be prevented in excavations of five feet or greater by an adequate protective system:
A. Either sloping or benching, or
B. By a shoring or
C. Shield system.
D. Unless inspection by a competent person deems the excavation safe without protective system.

116.19 When choosing a protective system, a competent person shall take into consideration:
A. Soil type
B. Vibration sources
C. Previously disturbed soil
D. Layered soil
E. Presence of water
F. Heavy equipment work adjacent to the excavation
G. Limited work area
H. Other hazard-increasing conditions.

116.20 Shoring and shield systems shall be:
A. Installed, removed, or moved vertically only if employees are safely outside the shields, protected from cave-in, collapse or being struck by members.
B. Installed in a manner to restrict lateral or other hazardous movement of the shield.
C. Removed:
1. Beginning at and progressing from the bottom of the excavation.
2. By releasing members slowly, watching for any indication of possible cave-ins or failure of the remaining members.

116.21 Sloping, benching, shoring or shielding for excavations greater than 20 feet deep shall be designed by a registered professional engineer. Refer to Table 8.1 for soil type maximum slope requirements for excavation less than 20 feet.

Table 8.1 Maximum Allowable Slopes for Excavations Less Than 20 Feet Deep*	
Soil or Rock Type	Maximum Allowable Slopes (H1V)'em**
Stable Rock	Vertical (90 deg)
Type A ***	¾:1 (53 deg)
Type B	1:1 (45 deg)
Type C	1:1/2:1 (34 deg)

Notes:
*Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.
**Numbers in parentheses are angles expressed in degrees from the horizontal. Angles have been rounded off.
***A short-term maximum allowable slope of 1/2H:1V (63 deg) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.56 m) in depth shall be 3/4H:1V (53 deg).

118 BOAT AND WATER SAFETY

118.1 Boats, barges, and dredges shall be operated by qualified employee(s), trained to:

A. Report to the Employee-in-Charge any damaged or unsafe flotation devices.
B. Appropriately select watercraft if wading is undesirable, impractical or impossible. In other words, only substantial boats, not canoes or rafts, shall be used.
C. Not exceed the rated capacity of the craft with the combined weight of tools, equipment and personnel.
D. Not transport large tools (ladders, etc.) in the same boat with groups of workers. Use a separate boat or make additional trips.
E. Extinguish all fires, smoking, etc. in the immediate area during refueling and ensure the availability of a fire extinguisher.

118.2 Life rings shall be available anywhere drowning hazards exist.

118.3 The weight of anyone boarding the boat shall be placed as near the center line of the boat as possible.

118.4 Watercraft and its usage shall comply with Michigan boating laws and regulations.

A. The use of U.S. Coast Guard approved life jacket when working in, over, or adjacent to a river, pond or similar water body is required.

119 ADVERSE WEATHER CONDITIONS

119.1 BWL employees should review and be familiar with the BWL Emergency Action Guide and area-specific action plans regarding the appropriate response to inclement or adverse weather conditions.

119.2 The Employee-in-Charge shall be notified if inclement or adverse weather conditions are observed.

119.3 Outdoor or field work shall be discontinued or altered in the presence of adverse weather conditions.

A. When lightning is in the immediate vicinity, outdoor work shall not be permitted.

B. During heavy precipitation, work involving the possibility of electrical shock shall not be permitted.
C. During high wind conditions, outdoor work on equipment such as bucket trucks, aerial lifts, etc., shall be performed in accordance with manufacturer's guidelines; and in the absence of guideline, outdoor elevated work shall not be permitted:
    1. In the presence of winds at or exceeding 40 miles per hour, and
    2. In winds at or exceeding 30 miles per hour if work involves material handling.

119.4 Emergency restoration during adverse weather shall only be performed when authorized by management.

119.5 Employees working outdoors shall identify take shelter areas.
A. Shelter areas include sturdy buildings, basements, etc.
B. Employees should go to identified shelter area as soon as possible.
C. Employees exposed to adverse weather conditions in a shelter area should try and maintain communications with the Employee-in-Charge and/or with BESOC to update their situation periodically.
D. The BWL Emergency Action Guide (EAG) may be consulted for a list of shelter locations.

120 MAIL AND PACKAGE ORDERING AND RECEIVING

120.1 Only the BWL's official U.S. Postal Service mailing address shall be used for mail and small package delivery and in electronic exchanges such as email signature blocks:

Lansing Board of Water & Light
P.O. Box 13007
Lansing, MI 48901

120.2 Private courier (UPS, DHL, FedEx, etc.) deliveries shall be routed to BWL Purchasing and Warehousing:

Lansing Board of Water & Light
Purchasing and Warehousing
1110 S. Pennsylvania Ave.
Lansing, MI 48912

120.3 Mail and packages coming into the BWL shall be for BWL business only and shall be processed in accordance with 1112 MAIL AND PACKAGE RECEIVING.

123 CONTACT WITH MIOSHA

Communication and collaboration within the BWL and with MIOSHA are necessary to ensure proper application of MIOSHA standards and thorough, satisfactory resolution of all safety concerns. However, safety concerns involving MIOSHA representatives require timely, specific, appropriate and consistent action which the following rules shall guide.

An employee's ability to contact MIOSHA with a safety concern shall not be restricted by the BWL or these rules.

123.1 When MIOSHA contacts BWL.
A. Any employee receiving BWL-related notification from MIOSHA shall relay the notification to Safety Department directly or via their manager.
    1. Notification may be written, verbal or in-person.
    2. Subscription emails sent by MIOSHA do not qualify as "notification".
    3. Safety Department shall inform the appropriate personnel.

a. Management of affected area(s).
b. IBEW Safety Director and/or steward(s) of affected area.
c. Executive Staff.

B. In the event of unannounced visit, Safety Department shall be contacted immediately to coordinate attendees of the opening and closing conferences, walkaround inspection and records review. Invited participants shall include:
1. Safety Department staff.
2. IBEW Safety Director and/or any Bargaining employees they recommend.
3. Personnel from the affected department(s).

123.2 Safety Department shall be responsible for:

A. Any exchange of information from BWL **to** and **from** MIOSHA regarding inspection, previously submitted complaint, potential citation, violation and/or fine, interpretation of standards, consultation/training (CET), employee hospitalization or death resulting from workplace injury, etc.
1. Documentation related to the possible events listed shall be catalogued and retained.
2. Written responses such as abatement plans, appeals, etc. shall be:
a. A collaborative effort with affected department(s).
b. Submitted via trackable certified mail.
3. Any requirement from MIOSHA to post/display documentation shall be honored for the duration of time specified.

B. Making notifications regarding MIOSHA activity to the appropriate BWL personnel.

C. Coordination of personnel to be present during MIOSHA visit, whether planned or unannounced.

D. Collection and assembly of requested documentation, including but not limited to:
1. 300 Log of Injuries.
2. Training records.
3. Safety programs.

151 CONFINED SPACES

151.1 Lansing Board of Water and Light shall maintain a written Confined Space Entry Program. The written program shall provide guidelines for hazard assessment, confined space classification, employee training, and entry procedures.

151.2 Each department shall classify and maintain a list of all confined spaces, including field and fixed facilities, which employees could be expected to enter.

151.3 When possible, all Permit Required confined spaces shall be labeled by a sign that reads “Permit Required Confined Space – Do Not Enter”.

151.4 Training.

A. Employees shall be trained on the hazards and procedures – including rescue – associated with confined spaces prior to any entry or work assignment in a confined space.

B. Refresher training shall occur whenever there is a change in assigned duties, a change in the confined space that presents a new hazard, or a change in the initial entry conditions.

C. Entry into a Permit Required Confined Space requires that employees be trained as Entry Attendants, Authorized Entrants, and/or Entry Supervisors.
D. First-Aid and CPR certification is required for Entry Attendants and Rescue Personnel.

151.5 Rescue Plan.

A. A rescue plan shall be established prior to entering a Permit Required Confined Space.
B. All non-entry rescue equipment shall be on site during entry.
C. All entrants shall have on harness compatible with non-entry rescue equipment.
    1. When non-entry rescue is possible.

151.6 Prior to Entering a Confined Space.

A. Confined Space Entry Permit.
    1. A written Confined Space Entry shall be completed by the Employee-in-Charge prior to entry into any Confined Space.
    2. An Entry Supervisor shall be identified prior to entry into a Permit Required Confined Space.
    3. The Confined Space Entry Permit shall be posted at the confined space entrance.
B. If the space cannot be entered safely, the space shall not be entered. Employee-in-Charge shall be contacted immediately.
C. When possible, all electrical and mechanical energy sources shall be physically rendered inoperative, locked, and/or tagged out.
D. Emergency procedures shall be reviewed with all members of Entry Team.
E. Communication procedures and method of communication shall be verified, and instructions maintained at each entry location.
F. Before any entrance cover or hatch is removed, it shall be determined that there is no temperature, pressure, or hazardous condition that may injure the employee(s) opening the space.
G. All levels of the space shall be tested for oxygen, carbon monoxide, flammable, and toxic gases.
H. A Safety Watcher/Entry Attendant shall be assigned when entering a confined space. See Section 152.

151.7 Air Monitoring.

A. Continuous monitoring shall be conducted at the breathing level of the entrants while in the confined space.
B. If at any time during the entry the monitor indicates an unsafe environment, all entrants shall leave the space immediately.
C. All air monitoring equipment shall have a visible and audible alarm with instantaneous readout.
D. Each department shall maintain its own air monitoring equipment. Regular calibration and testing of the air monitoring equipment shall be in accordance with the manufacturer's instructions and the department's written procedures.

151.8 When covers are removed from confined or enclosed spaces, a railing, temporary cover, or other approved temporary barrier shall guard the opening.

151.9 Safe and clear access to the confined space entrance shall be maintained at all times. If possible, all electrical cords, hoses, leads, ropes, etc., shall be

routed through an entrance other than the employee's access into the confined space.

151.11 Retrieval Devices.

A. When entering a Permit Required Confined Space, unless their use may endanger the worker, the Authorized Entrant shall be equipped with an approved full body harness and lanyard/safety line or other approved retrieval apparatus.
B. The retrieval device shall be secured at the entrance and be accessible to the Entry Attendant without entering the space.

152 SAFETY WATCHER/ENTRY ATTENDANT

152.1 The Employee-in-Charge shall assign a Safety Watcher whenever there are unusual work conditions, environmental hazards, limited visibility or communication, or any other situation that may create a serious safety hazard.

152.2 The Employee-in-Charge shall instruct the Safety Watcher about the hazards associated with the work site.

152.3 The Safety Watcher shall monitor the work site and maintain communication with assigned employees regarding changing hazards of the work site.

152.4 A Safety Watcher may perform other duties as long as the duties do not distract or interfere with monitoring the assigned employees.

152.5 Where the work is covered under MIOSHA Part 86, the Safety Watcher shall have First Aid and CPR training.

154 WORKING IN VAULT OR MANHOLE

154.1 Only approved manhole and vault cover devices shall be used to remove or replace manhole, vault, or handhole covers.

154.2 The manhole or vault cover shall be placed away from vehicular traffic lanes and in a location so as not to present a hazard to workers and the public.

154.3 Before an employee enters any manhole or vault the employee will refer to the Board of Water and Light Confined Space Location Inventory and comply with the Confined Space Program.

154.4 Prior to entry, the space shall be inspected:

A. To determine the presence of potential hazards such as compromised structure, overheated or faulted cable, gas fumes, foul air, smoke, etc.
B. If any hazard is found, the Employee-in-Charge shall be promptly informed and only with the Employee-in-Charge's approval may an employee enter the underground area.
C. If the presence of vapors or gas is detected, the area shall be purged and ventilated until further tests are conducted to determine that the manhole or vault is safe to enter.

154.5 Upon discovery of damaged cable:

A. Manhole, vault, etc., they shall be cleared of personnel.
B. Reentry allowed only after all switching is completed and damaged cables are de-energized.

154.7 Workers entering or leaving underground structures shall always use ladders.

155 WORKING AROUND AND DAMAGE TO UNDERGROUND UTILITIES

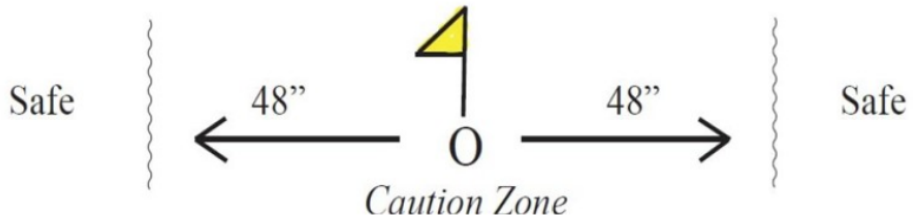
Warning: Additional rules may apply to working around energized lines, including approach distances, employee training and qualifications. Refer to Safety Manual Section 500 and/or MIOSHA Part 86.

155.1 Prior to any underground excavation or construction, contact shall be made with MISS DIG to locate and mark underground public utility services.

A. The request shall define a specific construction location.
B. There shall be no expectation that MISS DIG will locate customer-owned utilities.

155.2 Prior to excavation, employees shall:

A. Survey the area to look for the presence of unmarked underground utilities.
B. Contact MISS DIG for restaking if the locate marker(s) have been knocked down, removed or altered.
C. Verify Utility Location.
    1. Excavator shall verify they are about to work at the correct site.
    2. For proposed excavations within 48 inches parallel to any utilities, employees shall use soft excavation (pothole) at intervals as often as reasonably necessary to establish the precise location of the utility markings.



155.6 Hand Dig (Caution) Zone.

A. The Hand Dig Zone shall be established as 48 inches on either side of the utility marking.
B. Prior to power excavation, the exact location of all utilities within the Hand Dig Zone shall be located using hand digging, vacuum excavation, non-mechanized excavation tools, or any other nondestructive excavation practices.
C. If unable to locate the utility within the Hand Dig Zone, MISS DIG shall be contacted for assistance.

155.7 All underground utilities shall be exposed across the entire width and depth of the proposed excavation.

155.8 All exposed utilities shall be supported to prevent falling or breaking. Contact the utility owner for specific requirements.

155.9 Buried Electrical Cable.

A. All underground electric cable shall be considered energized.
B. No pneumatic tools or metallic probes shall be used within three feet of underground facilities energized over 600 volts.

155.10 If damage to underground utilities occurs, including nicks, dents, or scrapes to the utility coating:

A. The Employee-in-Charge shall be notified immediately, to in turn contact the owner of the damaged utility.
B. The area shall be barricaded, and the public kept out until hazardous conditions can be eliminated.
C. If electrical cables are damaged, the following steps shall be taken:
    1. If the damaged property belongs to a utility other than the BWL, the utility property owner shall be notified at once.
D. If gas lines are damaged, the following steps shall be taken as soon as possible:

1. Attempts to repair or stop the leak are not permitted.
2. The hole shall be left open to allow the gas to dissipate into the atmosphere.
3. All possible source of igniting the gas shall be removed or eliminated.
4. Residents of the area shall be warned when necessary.
5. The local fire department shall be notified immediately, if needed.
6. The gas company shall be notified at once.

E. If communications cables are damaged, the communications company shall be notified at once.

F. If sewer lines are damaged, Employee-in-Charge shall be contacted to make arrangements with utility owner or licensed plumber for repair.

155.12 When mismarked utility is discovered, even if there is no damage to the utility, MISS DIG shall be contacted for a restake, and the affected utility company notified.

SECTION 200
PERSONAL PROTECTIVE EQUIPMENT

200 Personal Protective Equipment General
201 Head Protection
202 Hair Protection
203 Eye Protection
204 Face Protection
205 Hearing Protection
206 Hand Protection
207 Foot Protection
208 Protective Clothing
209 Electric Arc Flash Protection
210 Respiratory Protection
211 Life Jackets
220 Fall Protection and Prevention

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200 GENERAL PERSONAL PROTECTIVE EQUIPMENT

200.1 Lansing Board of Water and Light shall maintain a written Personal Protective Equipment (PPE) Program. The written program shall provide guidelines for hazard assessment, equipment selection, and employee training.

200.2 PPE shall only be used after engineering controls or administrative controls are deemed not feasible or sufficient.

200.3 PPE Hazard Assessment.

A. Each BWL process shall perform a hazard assessment to determine appropriate and necessary PPE for each job assignment or work site.
B. The hazard assessment shall be verified with a written certification which identifies the worksite, person who certifies the assessment, and completion date.
C. PPE must conform to currently accepted ANSI/ASTM standards.

200.4 PPE deemed necessary by the hazard assessment shall be provided to BWL employees.

200.5 Employees shall be trained in proper use and care of assigned PPE.

A. Training shall be documented and certified by the employer.
B. Employees shall demonstrate understanding of the training and ability to use assigned equipment.
C. Employees shall be retrained if workplace changes or new PPE equipment renders previous training obsolete, or when there are inadequacies in employee usage of PPE.

200.6 PPE shall be selected to properly fit and not excessively interfere with the movements of the employee.

200.7 Shared PPE shall be adjustable, properly maintained and cleaned or sanitized between users.

200.8 Employees shall be responsible for proper use, care and maintenance of assigned PPE.

200.9 Damaged PPE shall be immediately repaired or replaced.

200.10 Safety Department shall approve all PPE prior to purchase or use in the workplace.

200.11 The daily Tailgate job briefing shall include a review of PPE appropriate to the job assignment.

201 HEAD PROTECTION

201.1 Hard hats shall be worn in all production, maintenance, construction, and equipment areas by all employees at all times.

201.2 Employees shall inspect hard hats prior to each use.

A. Hard hats shall not be physically altered.
B. Only manufacturer approved chin straps, face shields, earmuffs, emergency lights, or other accessories may be used.
C. Hard hats shall remain free of all foreign material other than required stickers.
D. Personal identification name tags made of non-conductive pressure sensitive tape may be attached on the shell of the hard hat (on the front above the bill).
E. Hard hats shall never be worn with the suspension removed.

201.3 Hard hats shall be stored in a clean, dry place where they will not be exposed to physical damage, abuse, or excessive heat.

201.4 Hard hats may be removed when they constitute a hazard in a particular part of a work site only if there is no bump or overhead hazard or when operating equipment that is protected by a substantial roof or enclosed cab.
A. Specific locations where a hard hat is NOT required shall be specified in the PPE Hazard Assessment.
B. Hard hats shall be visible, within arm's reach, and readily accessible to the employee at all times in these situations.

202 HAIR PROTECTION

202.1 Hair covering shall be used whenever the employees' hair presents a danger of entanglement in moving or rotating machinery, tools, equipment, or potential for ignition.

203 EYE PROTECTION

203.1 A PPE hazard assessment shall be performed to determine the appropriate level of eye protection for the job assignment or work area.

203.2 The minimum level of eye protection is ANSI Z87.1-2003 compliant with non-conductive frames and permanently attached side shields.

203.3 Eye protection shall be worn in all production, maintenance, construction, and equipment areas by all employees at all times.

203.4 Prescription eyewear not qualified as safety glasses shall be covered by safety glasses or appropriate goggles for the job assignment.

203.5 Tinted or transitional lenses may be worn for outdoor work only. Only clear prescription or non-prescription safety glasses shall be worn for inside work assignments.

203.6 Contact lenses.
A. Protective eyewear shall be worn over contact lenses.
B. Contact lenses shall not be worn where there is an exposure hazard from chemical vapors, splashing liquids, dusting or any other condition where their use would increase eye damage.

203.7 Chemical, non-vented goggles shall be worn where there is a potential hazard from chemical vapors or splashing liquids such as when pressure washing, heating materials, inspecting batteries, transferring liquids, etc.

203.8 Impact (vented) goggles shall be worn when safety glasses with side shields may not provide adequate protection such as when chipping, drilling, grinding, power tools, compressed air, powder-actuated tools, etc.

203.9 Filter lenses, tinted shields or welding helmets with shade numbers appropriate for the work being performed shall be worn where there is an optical radiation hazard such as when gas-torch cutting, welding, using lasers, etc.

204 FACE PROTECTION

204.1 A PPE hazard assessment shall be performed to determine the appropriate level of face protection for the job assignment or work area.

204.2 Face shields shall be used as additional protection where work activities involve chipping, grinding, wire brushing, splashing liquids, or electric arc potential.

204.3 Safety glasses or goggles shall be worn under face shields.

205 HEARING PROTECTION

205.1 Lansing Board of Water and Light shall maintain a written Hearing Conservation Program.

A. The written program shall provide guidelines for noise surveys and hazard assessments, audiometric testing, hearing protection devices, employee training, and documentation.

B. Employees who are exposed to noise at or above 85dB shall participate in the hearing conservation program.

205.2 Employees included in the hearing conservation program shall:

A. Participate in the annual audiometric testing.

B. Wear appropriate hearing protection at work.

C. Receive annual training.

205.3 Employees experiencing a recordable Standard Threshold Shift as determined by certified audiometric testing shall have a follow up session with the Safety Department consisting of a brief investigation, refresher training, and refit of the use of hearing protection devices.

205.4 A hazard assessment shall be performed to determine the appropriate level of hearing protection for the job assignment or work area.

205.5 Areas where the sound level exceeds 85 dB TWA, shall be identified with a warning sign “Hearing Protection Required”.

206 HAND PROTECTION

206.1 A PPE hazard assessment shall be performed to determine the appropriate level of hand protection for the job assignment or work area.

206.2 All gloves shall be inspected for holes, tears, ozone deterioration, texture changes, or any condition which would compromise the integrity of the glove.

A. Any glove which fails to pass a visual inspection shall be returned to the Employee-in-Charge and discarded.

B. Leather gloves which are contaminated with oils or other chemical materials shall be returned to the Employee-in-Charge for disposal.

206.3 Insulating Rubber Gloves.

A. Insulating rubber gloves shall be used when working on or around electrical equipment that is energized or has the potential to become energized.

Activity or Maximum Line Voltage	Required Insulating Rubber Glove Protection
Removing or installing water and electric meters	Class 0
Removing or installing water meter ground connectors	Class 0
Installing or removing equipment ground connectors	Class 0
50 – 1,000 volts	Class 0
1,001 - 17,000 volts	Class 2

B. Air check test.

1. Employees shall perform a daily, or if damage is suspected, 20 second air check on insulating rubber gloves before use.
2. Any insulating rubber glove which does not pass the air check test shall immediately be taken out of service and replaced.

C. Electrical testing.

1. All insulating rubber gloves shall be electrically tested before first issue.

2. All insulating rubber gloves in use shall be electrically tested every 30 days.

D. Protective covers.
   1. Leather protective covers shall be worn over all Class 2 insulating rubber gloves.
   2. Leather protective covers no longer suitable for protection of rubber insulating gloves shall be discarded.

E. Storage.
   1. Insulating rubber gloves shall be kept as free as possible from ozone, chemicals, heat, oils, and sunlight.
   2. Insulating rubber gloves shall not be folded, creased or compressed.
   3. Insulating rubber gloves shall be stored in a container or compartment that is designed and used exclusively for their storage.

206.4 Chemical Protective Gloves.

A. Chemical protective gloves shall be worn whenever there is a potential for chemical exposure.

B. Refer to the Safety Data Sheet for appropriate glove type.

206.5 Puncture-resistant gloves shall be worn when handling rough and sharp materials.

207 FOOT PROTECTION

207.1 A PPE hazard assessment shall be performed to determine the appropriate level of foot protection for the job assignment or work area.

207.2 Minimum foot protection is a 6” high, sturdy work boot.

207.3 Leather athletic shoes are not considered appropriate foot protection.

207.4 Chemical protective boot covers shall be worn where there is a risk of chemical exposure.

208 CLOTHING

208.1 A PPE hazard assessment shall be performed to determine the appropriate protective clothing for the job assignment or work area.

208.2 Dangling sleeves or loose clothing shall not be worn when working on or near moving or rotating equipment.

208.3 Long sleeved shirts and long pants shall be worn when working on or near equipment that may be hot (boilers, steam lines, pumps, etc.).

208.4 High Visibility Clothing.

A. High visibility vests (ANSI 107-2004, Class 2), shirts or jackets shall be worn when the work zone is within 15 feet of any public or private roadway.

B. High visibility apparel shall be inspected prior to each use for wear, damage, fading, or other deterioration which effects visibility and reflectivity. Defective garments shall be immediately repaired or replaced.

C. High visibility clothing shall be worn according to the manufacturer’s instructions to ensure the required level of visibility and reflectivity.

208.5 During welding and cutting work, fire retardant (FR) or leather clothing shall be worn. The specific protection depends upon the job hazard, but clothing shall be free of excessive oil or grease.

209 ELECTRIC ARC FLASH PROTECTION

209.1 Lansing Board of Water and Light shall maintain a written Arc Flash and Shock Hazard Safety Program. The written program shall provide guidelines for hazard assessment, PPE selection, and employee training.

209.2 A PPE hazard assessment shall be performed to determine work assignments that require Arc-Rated (AR) clothing and other appropriate arc-rated PPE.

209.3 In situations of potential exposure to electric arc or flames, only natural fiber, nonflammable clothing that does not melt, ignite or burn continuously shall be worn.

209.4 Synthetic fabrics shall not be worn, either alone or in blends, unless the manufacturer has certified the clothing's protective value against arc flash hazards.

209.5 Where required, the minimum AR clothing requirement shall have an arc rating greater than or equal to the heat energy of source of electrical arc, and include:

A. Coverall or pants/shirt, arc-rated gloves.
B. Hard hat, safety glasses, face shield, ear canal inserts, balaclava.
C. Safety boots.

209.6 Additional clothing worn over or under the AR clothing shall be made of all-natural fibers.

209.7 When work is performed on energized parts or equipment, employees shall remove all conductive articles such as keys, watch or wallet chains, rings, earrings, necklaces, wrist watches, wrist bands, and eyeglasses with metal frames or clothing with metallic attachments.

210 RESPIRATORY PROTECTION

210.1 Lansing Board of Water and Light shall maintain a written Respiratory Protection Program. The written program shall provide guidelines for hazard assessment, respirator selection, fit testing, and employee training.

210.2 A hazard assessment shall be performed to determine the appropriate level of respiratory protection for the job assignment.

210.3 Employees shall be medically qualified prior to respiratory protection fit testing and use.

210.4 Employees shall be fit tested on all assigned respiratory protection prior to initial use, with annual retesting.

210.5 Employees shall be trained in the use of each type of assigned respiratory protection on initial assignment with annual refresher.

210.6 Employees are responsible for respirator maintenance. Defective equipment shall be immediately returned to the Employee-in-Charge for replacement.

211 LIFE JACKETS

211.1 A U.S. Coast Guard approved life jacket shall be worn when working in, over, or adjacent to a river, pond or similar water body.

220 FALL PROTECTION AND PREVENTION

220.1 Administrative.

A. BWL shall maintain a written fall protection and prevention program intended for the protection of BWL employees, contractors, vendors, visitors, and the public in BWL facilities and at BWL job sites.

B. The BWL Fall Protection and Prevention Program shall be maintained in full compliance with MIOSHA Construction Safety Standard Part 45: Fall Protection, General Industry Standard Part 2: Walking-Working Surfaces, and other applicable safety standards.
C. The BWL Fall Protection and Prevention Program shall be periodically reviewed for compliance and best practice.
D. Employees exposed to fall hazards shall be trained in the provisions of the BWL Fall Protection and Prevention Program.
E. BWL departments shall perform a fall hazard assessment of their work to determine if fall hazards exist, then consult with BWL Safety on equipment selection.

220.2 General.

A. BWL employees, contractors, vendors, visitors, or members of the public shall not be exposed to a fall of four feet or greater.
B. Barricades or guard railing systems shall be erected and maintained for as long as fall hazards exist.
C. When guard railing systems are removed for work:
    1. Temporary barriers or guardrails and warning signs shall be erected around the work area to prevent access by unauthorized persons.
    2. A fall protection system shall be used to protect employees.
D. Every fall by a person using fall protection equipment (FPE) shall be reported and investigated.
E. Any person subjected to a fall shall be examined and cleared by a physician prior to returning to work.
F. All components of a fall protection system subjected to a fall shall be removed from service and rendered inoperable.

220.3 Equipment Selection and Inspection.

A. BWL shall purchase and provide the required fall protection equipment (FPE) to employees and replace worn or damaged equipment.
B. All FPE shall be inspected annually or more frequently if required by manufacturer:
    1. Inspections shall be documented and retained until FPE is removed from service.
    2. Any FPE which fails inspection shall be rendered inoperable and discarded to prevent its reuse.

220.4 Equipment Use and Care.

A. A fall arrest system shall consist of rated anchor point(s), full body harness, connecting device and trauma straps.
B. Body belts shall not be used as a component of a fall arrest system.
C. Rip-stitch and similar style tear-apart shock-absorbing lanyards shall not be used when the possible fall distance is less than 18 feet (from anchor point to the next lower level).
D. Only BWL-approved and supplied FPE shall be used by BWL employees.
E. Employees shall:
    1. Properly adjust, wear, use, and store their assigned FPE.
    2. Inspect their equipment immediately prior to each use and return any damaged or suspect equipment to the Employee-in-Charge for replacement.
    3. Protect FPE:

a. From exposure to and damage from excessive dirt, oils, paints, solvents and other chemicals, and open flames, sparks, weld or cutting debris, and weld flash radiation during use.
b. By properly storing when not in use.
c. By ensuring shared or common FPE devices are stored in identified cabinets, either in BWL trucks or in BWL facilities.

F. No component or part of a personal fall arrest system shall ever be used to rig, hoist, or lower any materials.
G. Whenever working in an elevated position in a facility, employees shall attach their fall protection lanyard, self-retracting device (SRL), portable and reusable attachment device, or lifeline to an approved anchor point.
H. FPE shall not be permitted to contact equipment capable of energization.
I. Employees working in an aerial lift device, or a mobile elevated work platform shall wear a full body harness with SRL properly attached to the designated anchor of the aerial lift or work platform.
J. Employees constructing or dismantling scaffolding shall be protected from falls of 10 feet or greater by a fall arrest system:
1. Using an overhead approved anchor point OR
2. Attaching to an upright using an SRL.
K. Any employee working from a scaffold at a height of six feet or more from the supporting surface of the scaffold shall be protected from a fall by a proper guard railing system or other fall protection system.
L. Employees working on or from suspended scaffolds shall be protected from falls by a fall protection system using an independently secured lifeline.

220.5 Fall Protection Training.

A. The BWL shall provide fall protection and prevention training to all BWL employees that may be susceptible to fall hazards.
B. Training shall be provided by designated employees who have been deemed competent to:
1. Recognize fall hazards.
2. Identify when FPE is necessary and what FPE is required.
3. Inspect the equipment prior to use.
4. Properly don and doff, adjust, and wear the FPE.
5. Understand the limitations of the FPE.
6. Know or determine the proper care, maintenance, and useful life of the FPE.
7. Erect, maintain, disassemble, and inspect temporary fall protection systems.
8. Develop a fall protection plan and rescue plan.
C. New employees, including transfers, shall be trained before they are required to don FPE.
D. Refresher training shall be provided when the following situations are encountered:
1. Employee is not demonstrating the proper understanding and skill level.
2. The issuance of new or changes in the type of fall protection systems or equipment to be used that may render prior training obsolete.
3. Any changes in the regulations affecting fall protection.
4. Any changes within the BWL's Fall Protection and Prevention Program.
E. Fall protection and prevention training shall be documented.

220.6 Fall Protection Plan.

A. Any time work requires the use of FPE, a fall protection plan shall be developed prior to the start of the work, then discussed during tailgate with all affected employees.
B. A fall protection plan shall provide a review of:
    1. The work requiring the use of FPE.
    2. The known fall hazards.
    3. Any barriers that can be used.
    4. The FPE to be used.
C. All employees involved in the work shall be tailgated on the fall protection plan. If an employee joins the work late:
    1. The work shall stop, and
    2. An additional review of the fall protection plan shall be conducted.
D. Fall protection plans shall be recorded and maintained by each department.

220.7 Fall Protection Rescue Plan.

A. A fall protection rescue plan shall be developed for any work that requires the use of FPE. The purpose of the fall protection rescue plan is to provide prompt rescue of anyone subjected to a fall.
B. The fall protection rescue plan shall include a review of the equipment and personnel to be used to rescue a person subjected to a fall.
C. Fall protection rescue plans shall consider and address:
    1. The elevation of the work.
    2. The estimated distance of a fall.
    3. The location of rescue equipment.
    4. The role and responsibility of each employee of the work crew in the event of an employee fall.
    5. Any restrictions or hazards which may impede emergency response to the work area.

220.8 Special activities such as utility pole climbing and tree trimming are addressed in BWL Safety Manual Sections 500 and 1200 respectively.

SECTION 300
VEHICLE OPERATIONS

300 General
301 Seat Belts and Shoulder Harnesses
302 Vehicle Accidents
303 Inspections of Vehicle and Equipment
304 Transporting Employees
305 Trailers and Transporting Materials
306 Parking
307 Backing
309 Equipment Fueling
310 Powered Industrial Trucks (Forklifts)
311 Heavy and Specialized Equipment
312 Power-Driven Winch
313 Crane, Hoist, Derrick
314 Rigging Equipment
315 Aerial Devices
316 Aerial Work Platforms
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300 GENERAL VEHICLE OPERATIONS

300.1 Only full-time BWL employees or persons specifically authorized by the General Manager or the General Manager's designee who possess a valid license or permit for the equipment being used shall operate BWL motor vehicles on BWL business.

A. Drivers shall know and obey all state and local motor vehicle laws applicable to the operation of their vehicle.

300.2 The Employee-in-Charge shall prohibit unauthorized persons to drive or operate vehicles.

300.3 All vehicle loading and operation shall be done according to applicable state and federal Department of Transportation rules and regulations.

A. All load and lifting limits shall be posted on equipment.

300.4 The driver shall drive at safe speeds no greater than that permitted by law. Traffic, road, and weather conditions shall be given consideration in determining the safe speed within the legal limit at which the vehicle shall be operated.

300.5 The operator of a motor vehicle shall clearly signal intention of turning, passing, and stopping.

300.6 Drivers shall be prepared to stop and yield the right-of-way in all instances when necessary to avoid an accident.

300.7 The driver of a vehicle shall be courteous toward other operators and pedestrians. The vehicles shall be operated in a safe manner, and the driver shall yield the right-of-way to pedestrians and other vehicles when failure to do so might endanger any person or another vehicle.

300.8 The driver shall maintain sufficient distance behind another vehicle to safely stop the vehicle.

300.9 Drivers shall exercise added caution when driving through residential and school zones.

300.10 When entering or leaving any building, enclosure, alley, or street where vision is obstructed, a complete stop shall be made, and the driver shall proceed with caution.

300.11 Trucks on which derricks or booms are raised above traveling height shall not be moved except under the immediate direction of the Employee-in-Charge who shall give his undivided attention to the movement.

300.12 Before a vehicle is driven under and adjacent to energized equipment, especially in substation areas, the clearance shall be checked, especially that of the radio antenna, to ensure that proper clearances will be maintained between the vehicle and energized equipment.

300.13 When proceeding down a grade, the clutch shall not be disengaged. Trucks, particularly if heavily loaded, shall be in a lower gear on steep grades.

300.14 If a vehicle or piece of equipment does not start for any reason, contact Fleet Services for assistance. Only qualified, trained employees shall jump start BWL vehicles or equipment.

300.15 All items in the truck cab or on the bed shall be secured for unanticipated shifting or movement due to turns, fast stops, acceleration, etc.

300.16 Keep truck bins free of dirt and unnecessary objects.

300.17 Keep truck cabs clean and free of unnecessary items.

301 SEAT BELTS AND SHOULDER HARNESSES

301.1 Safety seat belts and shoulder harnesses shall be worn by both drivers and passengers.

301.2 Personal Vehicles - Employees who drive their personal vehicles for BWL business shall also wear safety seat belts and shoulder harnesses.

302 VEHICLE ACCIDENTS

302.1 If any person is injured as the result of a vehicle accident, employees shall see that necessary emergency aid is provided. Ambulance transportation and emergency treatment shall be arranged by contacting the Employee-in-Charge, BWL Security at 7077, BESOC at 6433, or calling 911 (4911 from BWL phone lines).

302.2 Human Resources shall be notified immediately of any vehicle accidents that result in any injury.

A. Even in the presumed absence of injury, medical consultation for both vehicle operator and passengers will be mandatory if airbags deployed.

302.3 All motor vehicle accidents shall be reported to the appropriate police agency and the Employee-in-Charge as soon as possible after the accident.

A. The vehicle operator must:
   1. Secure the names and addresses of witnesses and others involved in accident.
   2. Note the position of the vehicle after the collision.
   3. Complete the BWL Vehicle and Equipment Accident Report form, and
   4. Submit the original completed report to the Employee-in-Charge.

B. The Employee-in-Charge shall:
   1. Ensure employee's fitness for returning to the job, and
   2. Send copies of the completed BWL Vehicle and Equipment Accident Report form to:
      a. Fleet Services
      b. Safety
      c. Risk Management

302.4 Employees shall neither sign statement nor discuss nor argue the causes or results of an accident with anyone but law enforcement or proper representative of the BWL.

302.5 Should another involved party demand immediate action, referral shall be made to the Employee-in-Charge.

303 INSPECTIONS OF VEHICLE AND EQUIPMENT

303.1 Before operating a BWL vehicle or equipment, each driver or operator shall make sure that the vehicle or equipment is in proper operating condition.

A. Refer to the BWL's Driver's Responsibility decal posted in the vehicle.

B. Any unsafe condition should be reported to the Employee-in-Charge and Fleet Services for correction.

C. Vehicles with steering and brake defects shall not be driven.

D. The driver shall inspect windshield wipers frequently and see that they are in good operating condition and that the windows and windshield give sufficient visibility for safe operation of the vehicle.

E. Snow and ice shall be removed from vehicle prior to operation.

F. All vehicle lights and reflectors shall be inspected daily by the employee; and if found defective, they shall be repaired immediately.

303.2 An inspection, check list, instruction, and any form provided for a vehicle shall not be removed or defaced unless directed by the Employee-in-Charge.

303.3 Only qualified employees may adjust safety devices (i.e., sensing or limiting devices, etc.).

303.4 The driver shall report any defects that may have developed during the day. Items that affect safety shall be repaired prior to continued vehicle operation.

304 TRANSPORTING EMPLOYEES

304.1 Employees being transported for BWL purposes shall ride only in truck cab or crew compartment.

304.2 Only authorized personnel shall be passengers in BWL vehicles.

304.3 Employees shall refrain from standing in front of or in back of the vehicle when it is being started.

304.4 Employees shall refrain from getting on or off the truck, vehicle, or equipment while it is in motion.

305 TRAILERS AND TRANSPORTING MATERIALS

305.1 Pre-trip inspection shall be conducted before employing a trailer.

305.2 Employees shall not ride on or in trailers.

305.3 Hitch shall not be used as a step for gaining access to trailer or vehicle.

305.4 Employees shall keep hands and body parts away from pinch points when hitching or unhitching a trailer.

305.5 Employees shall stand clear of all moving equipment or backing trucks and trailers.

305.6 When attaching to a trailer, a spotter shall be used when sight is obstructed.

305.7 Clearance shall be ensured both for height and for loads with overhanging ends, etc. that may swing in a wide arc if the truck is turned.

305.8 Material that extends more than four feet beyond the front or back of the truck or trailer shall have warning devices attached.

A. During the day, red flags shall be used.
B. At night or during periods of poor visibility, safety lights shall be used.

305.9 A trailer shall not be loaded in excess of:

A. Trailer manufacturer's weight rating.
B. Vehicle manufacturer's towing capacity.

305.10 All trailer loads shall be secured properly.

A. Loads under 10 feet in length, regardless of weight, require 2 tie-downs.
B. Loads longer than 10 feet require 2 tie-downs plus 1 additional tie-down for every additional 10 feet in length.
C. Only properly rated tie-downs shall be used.
D. Loose material (e.g., sand and gravel) shall be tarped.

305.11 When loading or unloading a trailer:

A. Trailer must be hitched to towing vehicle when driving equipment onto it.
B. Material that may shift or roll requires:
    1. Use of a spotter.
    2. All employees to maintain minimum 10 feet of distance.

305.12 When not attached to a towing vehicle, wheel chocks or blocking shall be used on all trailers and other towed equipment not equipped with parking brakes.

305.13 All tools and materials shall:

A. Be safely stored in the proper compartment while driving to and from the job site.
B. Be secured to prevent shifting or falling.

305.14 Refer to Section 521 for pole-handling requirements.

306 PARKING

306.1 Vehicles and equipment shall never be left unattended with the motor running.

A. Ignition system shall be turned off.
B. The ignition system shall not be left running while vehicle is parked in a garage.
C. A vehicle shall not be warmed up inside a garage nor shall the driver test the engine operation in a garage unless the exhaust gas is carried directly to outside atmosphere by a local exhaust ventilation system or doors and windows are open so adequate natural ventilation exists.
D. An exception shall be permitted for a vehicle engine left temporarily running when the vehicle is:
    1. Operating in extreme cold.
    2. Parked with the parking brake engaged and taillights/emergency flashers on.
    3. Under the continuous monitoring of the driver.
    4. Parked outside a garage or other similarly walled space.
    5. Needed to operate emergency equipment, warning lights, or radios.

306.2 When vehicles or equipment must be parked on the roadway or within ten feet of a traveled road, they shall:

A. Be parked on the right-hand side facing in the direction of traffic flow, whenever possible.
B. Be parked off the traveled road surface, whenever possible.
C. Be protected with proper warning lights, reflectors, or red flags in accordance with state or local requirements.

306.3 Vehicles shall not be parked on bridges or over culverts except when necessary for work.

306.4 Vehicles and equipment needing to be parked on an incline shall be left in a safe position, with:

A. Ignition system turned off.
B. Parking brake engaged and taillights/emergency flashers on.
C. The continuous monitoring of the driver.
D. Rear wheels chocked.

306.5 Use wheel chocks or blocking on all trailers and other towed equipment not equipped with parking brakes when not attached to a towing vehicle.

306.6 Stopping and/or parking on the highway shall be avoided.

A. Warning signals and lights shall be used.
B. Rotating beacon shall be used.
C. Taillights/emergency flashers shall be used.
D. Flares or reflectors shall be placed to give adequate advance warning.
E. If work is in progress, traffic control devices shall be used in accordance with the Michigan Manual on Uniform Traffic Control Devices.

307 BACKING

307.1 Whenever possible, the vehicle shall be positioned to avoid the necessity of backing.

307.2 Another employee, if present, shall be stationed at the rear of the vehicle to assist the driver in backing the vehicle safely.

307.3 When backing a vehicle, take the following precautions:

A. A reverse signal (back-up alarm) and back-up cameras shall be used if vehicle is so equipped.
B. Back slowly.
C. Watch both sides but do not depend entirely on mirrors.

309 EQUIPMENT FUELING

309.1 When refueling vehicles, employees shall follow all posted rules and regulations indicated on the pump.

309.2 No form of ignition shall be allowed in the immediate area while handling any type of combustible fuel. The operator must remain in the immediate (within 10 feet) area while dispensing fuel.

309.3 Firefighting equipment shall be present during fueling.

309.4 Engine and lights shall be turned off prior to fueling.

309.5 To prevent a static spark:
A. Contact the nozzle, spout or metal part of the can with the equipment before removing cap from the fuel tank.
B. Keep the pouring spout in contact with the tank while pouring.
C. Fuel storage containers shall be on the ground when filling.

309.6 Store flammable liquid fuels, such as gasoline and cleaning solvent, only in approved safety containers.

309.7 Move mobile equipment outdoors before fueling.

309.8 If fuel is spilled on equipment, be sure that spilled fuel is completely cleaned up, evaporated or free from ignition before starting equipment.

310 POWERED INDUSTRIAL TRUCKS

310.1 Only employees who are trained, possess a valid Operator's Permit/Certification, and are authorized shall operate a powered industrial truck. Refer to BWL Powered Industrial Truck Training Program.
A. The Operator's Permit/Certification shall be readily available upon request.
B. Retraining is required every three years to renew the Permit/Certification.
C. Refresher training is required when there is an accident, near-miss, or unsafe operation, new or different equipment is introduced, or the workplace conditions change.

310.2 Before using the equipment the operator shall inspect the condition of the equipment. This shall be done at least once per shift.
A. All equipment defects shall be immediately reported to the Employee-in-Charge, and the truck shall be taken out of service.
B. Equipment tagged out of service shall only be operated once Fleet Services has deemed it safe to operate.

310.3 All powered industrial trucks shall have a clearly visible, legible name plate with maximum load capacity and lift height.

310.4 Before operating the equipment, the operator shall make sure that no person or objects are in the path of the vehicle.
A. Clearance distance in all directions, including overhead, shall be checked to ensure sufficient safe operating distances.
B. Safe working distances for electrical equipment shall be complied with. See Section 501 SAFE WORKING DISTANCES.

310.5 Battery Charging. See also Section 309 EQUIPMENT FUELING.
A. Vehicles shall not be charged with the engine running.
B. No ignition sources shall be allowed in the immediate area of vehicle charging.

310.6 Only attachments provided by or approved by the manufacturer or qualified engineer shall be used.

310.7 Modifications and Maintenance.

A. Modification to powered industrial trucks shall only be made with the authorization and certification of the manufacturer or qualified engineer.
B. Only trained and authorized employees shall perform maintenance and servicing of powered industrial trucks.

310.8 Overhead protective guards shall not be removed.

310.9 Passengers are not allowed.

310.10 Only powered industrial trucks specifically designed to elevate personnel shall be used to do so.

310.11 Seatbelts, when provided by the manufacturer, shall be used when operating a powered industrial truck.

310.12 Stunt driving and horseplay are prohibited.

310.13 Loading.

A. The rated load of the machine or the forks shall not be exceeded.
B. Loads shall be positioned as far back as possible and secured.
C. When picking up a load, forks shall be set squarely and as far as possible under the load.
D. Loads shall not be raised or lowered while traveling.
E. Loaded or empty, forks shall be carried as low as possible, but high enough to clear uneven surfaces.
F. Loads shall be securely fastened or safely positioned to prevent tipping or falling.

310.14 Driving.

A. Vehicles shall always be operated at a safe speed for existing conditions.
B. The operator shall face or look in the direction the forklift is traveling.
C. Always sound horn when approaching doors, blind corners, and intersections and proceed with caution.
D. A safety watcher is recommended any time operator's view is obstructed.
E. Inclines.
    1. If empty – drive in reverse up the incline, drive forward down the incline.
    2. If loaded – drive forward up the incline; drive in reverse down the incline.

310.15 Vehicles shall be parked where they do not block exits or emergency response equipment.

310.16 Loading Docks and Trailers.

A. Dock boards shall be used when loading or unloading trucks.
B. The wheel of the truck shall be blocked/chocked and a visual safety inspection of the dock plate and flooring of the vehicle shall be made.
C. Maintain a safe distance when operating fork truck near the edge of a loading dock.

311 HEAVY AND SPECIALIZED EQUIPMENT

311.1 Only qualified employees shall operate motorized equipment.

311.2 The manufacturer's procedures regarding operation, maintenance, adjustments, and repairs shall be followed by qualified employees.

311.3 Before starting any equipment, the operator is responsible for the inspection and testing of controls, brakes, hydraulic lines, connections, cables, etc.

311.4 Before operating, be sure everyone is clear of the machine, paying special attention to swing radius.

311.5 When working around load-alls, backhoes, excavators, leaders, etc., stand clear of pinch points.

311.6 Only authorized employees (no riders) shall be permitted on equipment.

311.7 Outriggers shall be operated, placed and inspected according to manufacturer procedure.

311.8 Equipment shall never be left unattended with the motor running.

A. Ignition system shall be turned off.
B. The ignition system shall not be left running while vehicle is parked in a garage.
C. A vehicle shall not be warmed up inside a garage nor shall the driver test the engine operation in a garage unless the exhaust gas is carried directly to outside atmosphere by a local exhaust ventilation system or doors and windows are open so adequate natural ventilation exists.
D. An exception shall be permitted for a vehicle engine left temporarily running when the vehicle is:
    1. Operating in extreme cold.
    2. Parked with the parking brake engaged and taillights/emergency flashers on.
    3. Under the continuous monitoring of the driver.
    4. Parked outside a garage or other similarly walled space.

311.9 After parking equipment:

A. The blade, scoop, etc. shall be secured by resting at ground level.
B. Parking brake shall be engaged.
C. Vehicle wheels shall be chocked if parked on an incline.

311.10 Before any maintenance or repair work begins, approved safeguard procedure shall be taken for any power-driven equipment.

312 POWER-DRIVEN WINCH

312.1 The employee directing the overall operation shall be in a position where this employee can be clearly seen and understood while giving instructions.

312.2 Always check position of winch line in block, and security of chains and other slings before applying load or moving truck. Do not overload at any time.

312.3 Leather gloves shall always be worn when handling winch lines.

312.4 Before placing any winch line under strain:

A. Winch operator shall give verbal warning.
B. All workers shall stand clear.

312.5 Winch equipment shall be inspected before each use; if repairs are needed, they shall be done promptly and before additional use.

312.6 Only approved chains, slings and winch lines shall be used.

312.7 Energized wires or equipment shall always be avoided.

312.8 No employee shall be under a suspended load or inside the angle of a winch line. No employee shall stand or work near a cable, chain, or rope under tension unless the nature of the work requires it.

312.9 Winch lines, ropes or wire cables shall not be guided by hand when standing within reach of drum or sheave.

313 CRANE, HOIST, DERRICK

313.1 Two qualified employees shall be required during boom operations.

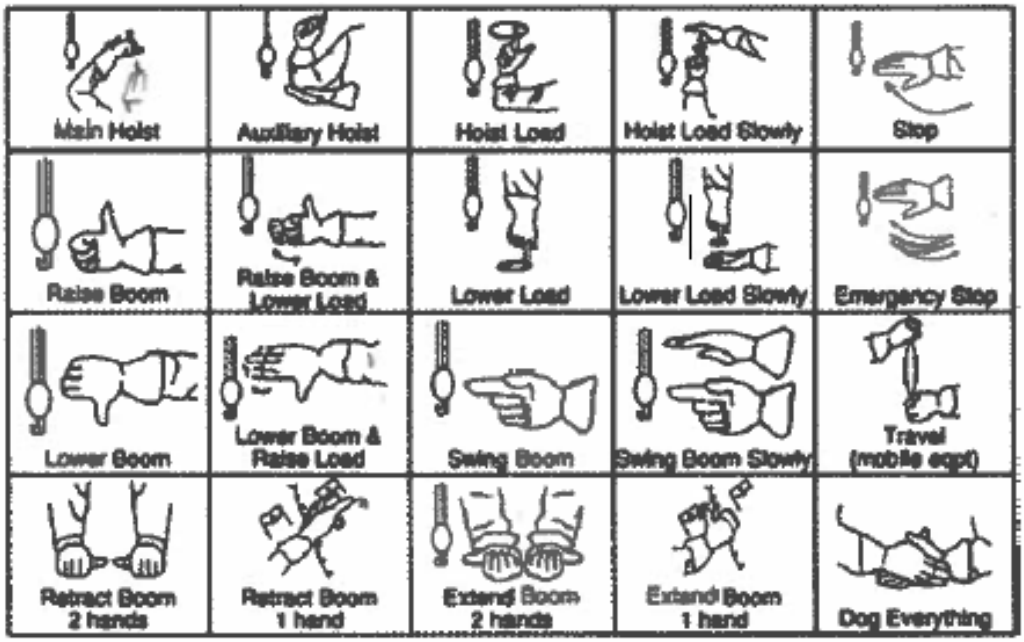
313.2 Only authorized persons shall be permitted in the cab or on the equipment. Only trained and qualified employees shall operate the hoisting equipment.

313.3 Before using the equipment the operator shall inspect the condition of the equipment. This shall be done at least once per shift.

A. All equipment defects shall be immediately reported to the Employee-in-Charge, and the truck shall be taken out of service.
B. Equipment tagged out of service shall only be operated once Fleet Services has deemed it safe to operate.

313.4 Signals to the equipment operator shall be given by one person designated to perform this task and must be maintained throughout the operation. Refer to table below for standard signals.

A. If communication becomes interrupted, operations must stop until communication is reestablished.
B. Signal person shall be properly qualified.
C. A “stop” signal given by anyone must be obeyed by operator.



313.5 Employees shall:

A. Always stand clear of moving loads.
B. Never ride on load or hooks.
C. Never stand or walk under suspended or moving loads, nor cable and hook.

313.6 Load limits, as specified by the manufacturer:

A. Shall not be exceeded under any circumstance.
B. Shall be posted and never removed from the equipment.

313.7 Before a lift is attempted, the:

A. Lifting mechanism shall be level and firmly supported, with hoist line centered over the center of gravity of the load to be lifted.
B. Weight of the load shall be determined.
C. Load shall be test-lifted and the brakes checked.
D. Slings and bindings shall be checked and readjusted as necessary for stability.

313.8 When mobile hoists, cranes or similar lifting devices must be used near energized lines or equipment, the lifting device shall be:
- A. Properly grounded, or
- B. Insulated, or
- C. Isolated.
- D. With clearance:
  1. In accordance with electrical section for transmission and distribution construction, or
  2. When work does not involve power transmission or distribution and maintenance, minimum clearance distances shall be the following (numbers are expressed as phase to ground):
     a. Up to 50kV – 10 feet, phase to ground.
     b. Over 50kV to 200kV – 15 feet, phase to ground.

313.9 Operators shall not leave their position at the controls of the cranes, hoists, derricks or other lifting devices while the load is suspended.

314 RIGGING EQUIPMENT

314.1 All rigging equipment shall be of sufficient strength, proper type, and safe for its intended use.

314.2 Rigging equipment shall not be loaded beyond its rated capacity.
- A. Load weights shall be determined before attempting to lift them.
- B. Loads shall not exceed manufacturer specifications.

314.3 Operating and maintenance procedures as specified by the manufacturer shall be followed.

314.4 Only trained qualified employees shall operate hoisting equipment.

314.5 Keep suspended loads clear of all obstruction.

314.6 When working with hoisting equipment under tension, employees shall position themselves to minimize the potential of being struck by a cable or other rigging equipment, in case of failure.

314.7 Do not place hands or fingers between the sling and its load while the sling is being tightened around the load.

314.8 Shock loading such as pinching off of dropping load on a slack sling is prohibited.

314.9 Allowances shall be made for unknown factors when determining the adequacy of the equipment being used.

314.10 Before use:
- A. Slings, fastenings and attachments shall be inspected by a qualified person and removed from service if damaged or defective.
- B. Ensure slings have proper rating tags attached.

314.11 Makeshift lifting devices formed from bolts, rods or reinforcing steel shall not be used.

314.12 Slings shall not be shortened with knots, bolts, or other makeshift devices.

314.13 Slings shall be padded or protected from the sharp edges of their loads.

314.14 When eyebolts are used, care shall be taken to ensure the bolt is not side loaded.

314.15 A sling shall not be pulled from under a load when the load is resting on the sling.

314.16 Slings shall be long enough to provide the maximum particle angle between the sling leg and the horizontal plane of the load.

314.17 Slings shall be securely attached to the load using hooks with retaining devices or the use of shackles or other positive latching device.

A. Shackle pins shall never be replaced with bolts or other non-approved devices.
B. Only hooks with approved retaining devices shall be used.
C. Hooks shall never be rigged so that they are point loaded at the tip of the hook.
D. The load shall be securely seated in the shackle of the hook.

315 AERIAL DEVICES

315.1 Only authorized persons who are properly trained and qualified shall use or operate aerial devices.
A. Only qualified employees shall approach or work at energized conductors.
B. All other employees and equipment operators shall maintain a safe clearance from electrical installations.

315.2 When positioning an aerial lift device, ensure:
A. Appropriate traffic control.
B. Public safety.

315.3 Tools shall be inspected before taking aloft.

315.4 The operating and maintenance instruction manuals issued by the manufacturer shall be on the vehicle and followed.
A. Aerial devices shall not be “field modified”.
B. The insulated portion shall not be altered in any manner.

315.5 Prior to use, the aerial device:
A. Shall be given a warm-up period.
B. The hydraulic system and the lift controls shall be checked and tested.
C. Malfunctions or unsafe operational conditions shall be reported and device removed from service.

315.6 Aerial devices shall have both upper and lower controls. Lower-level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

315.7 When moving a vehicle supporting an aerial device:
A. The boom shall be lowered, the basket cradled and secured.
B. The outriggers shall be fully retracted.
C. Employees may remain in the bucket for short moves and must be facing the direction of travel.

315.8 When employees are in the bucket of an aerial lift, the emergency brake of the vehicle shall be used to provide added protection. When the vehicle is on an incline, wheel chocks shall be used regardless of whether outriggers are used. The truck should sit approximately level when viewed from the rear.

315.9 When outriggers are used, they shall be set on approved pads. Outriggers shall not be extended or retracted outside of clear view of the operator unless all employees are outside the range of possible equipment motion.

315.10 Safety rules governing the use of hot-line tools, rubber goods, personal protective equipment, and general safe practices shall also apply to work done from aerial baskets.

315.11 The operator shall always face the direction in which the basket is moving and shall see that the path of the boom or basket is clear when it is being moved.

315.12 Employees’ feet shall be on the floor of the basket the entire time they are in it. Employees shall not work from the top or edge of the basket or on ladders placed in the basket.

315.13 Employees shall not wear climbers while in the basket.

315.14 When two employees are in the basket or baskets:
- A. One of them shall be designated to operate the controls.
- B. One employee shall give all signs, which shall be thoroughly understood by all persons concerned.
- C. When two employees are working from the basket, employees shall not contact poles, crossarms, or other grounded or live equipment while the second employee is working on equipment at a different potential.

315.15 The aerial lift, together with the employee in the basket and all tools and equipment, shall maintain proper safe working distance (Refer to Safety Manual rule 501).
- A. When necessary, a safety watcher shall be used to ensure safe working distance is maintained.
- B. When required, appropriate protection shall be requested and provided by the Electric Transmission and Distribution Department.

315.16 When using tools in a basket, the operator shall ensure that hoses, handlines, droplines, etc. do not become entangled in the operational controls.
- A. Electric drills with cords are restricted to areas at 600 volts or less.

315.17 Aerial basket vehicles working adjacent to energized primary shall be properly grounded or barricaded and treated as energized.
- A. An exception shall be permitted for a vehicle equipped with lower boom and pedestal insulation rated for the working voltage.

315.18 Aerial Lift Operators shall wear a full body harness with approved connecting device attached to the designated attachment point on the aerial lift.
- A. Employees shall not attach belt to an adjacent pole or structure.

315.19 Approved escape devices, rescue blocks and boom straps shall be in their designated places before going aloft.

315.20 Work shall not be performed from the cab guard of aerial lift device.

315.21 The insulated boom shall be kept clean and inspected daily, and dielectrically tested annually.

316 AERIAL WORK PLATFORMS

316.1 A full body harness with attached approved connecting device shall be used by each employee at all times when working in aerial work platforms, with attachments to the designated attachment point on the aerial work platforms.

351 BARRICADING AND TRAFFIC CONTROL

351.1 GENERAL
- A. Work area protection is the adequate safeguarding or protecting of pedestrians, motorists, utility workers and equipment using:
  1. Barriers
  2. Warning signs
  3. Lights
  4. Flags
  5. Traffic cones
  6. High level standards
  7. Barricade rope
  8. Traffic regulators (flaggers), etc.
- B. The public must be warned in advance, then regulated and guided safely through or around the work area; and planned to ensure protection of the public, the workers and the equipment.

C. Refer to Part VI of the current Michigan Manual of Uniform Traffic Control Devices (MMUTCD) for specific direction on the use of safeguards listed in 351.1A.

351.2 Whenever possible, trucks or equipment shall be placed between the working area and oncoming traffic.

351.3 If the work area in the street is expected to take less than 15 minutes, cones may be omitted when using high intensity rotating, flashing, oscillating or strobe lights.

351.4 To protect pedestrians from unattended excavation, warning signs and/or tape and barricades shall be placed around the work area.

351.5 See rule 208.4A regarding high-visibility clothing.

351.6 Near schools and heavy pedestrian areas, a person shall be posted to direct pedestrian traffic around the work zone.

351.7 The appropriate street and law enforcement agencies shall be contacted for permission and assistance if it is necessary to provide protection to the public beyond normal signing or barricades.

351.8 All traffic control devices shall be removed immediately when no longer needed.

353 TRAFFIC REGULATORS (FLAGGERS)

353.1 Traffic regulators and appropriate traffic controls shall be used whenever there is any doubt that effective protection cannot be provided by signs, signals, and barricades.

353.2 Traffic regulators shall:

A. Read, understand, and follow the D.O.T. Traffic Regulators Instruction Manual to ensure signals provide sufficient warning to protect themselves and the work site.
B. Don the appropriate personal protective equipment.
C. Employ adequate equipment and signage in good working condition.
D. Conduct themselves in a manner consistent with the Manual.

355 ATTENTIVE DRIVING

355.1 Employees driving for BWL business – cars, trucks, powered industrial trucks, aerial lifts, boom trucks, lawn equipment, backhoes, etc. – shall maintain continuous attention to vehicle operation.

355.2 Cell phones and other electronic devices shall not be used by the vehicle operator/driver while the motor vehicle is in motion.

A. Ensure mobile devices are secured.

355.3 Use of cell phones or other electronic devices may be conducted while the motor vehicle is parked in a safe location.

355.4 Cell phones and other electronic devices shall not be used by any BWL employee while driving a personal vehicle for company business.

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TOOLS AND EQUIPMENT

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403 Rope
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400 GENERAL TOOLS AND EQUIPMENT

400.1 All tools, regardless of ownership shall be of an approved type, maintained in good condition, and inspected prior to each use.

A. Tools are subject to inspection at any time and the Employee-in-Charge has the authority and responsibility to condemn unserviceable tools regardless of ownership.

B. Defective tools shall be tagged to prevent their use, or they shall be removed from the job site.

1. Wooden handles shall not be taped or lashed with wire.

C. Makeshift and substitute tools shall only be used with proper authorization and under supervision.

1. Wrenches with sprung or damaged jaws shall not be used.
2. Pipe shall not be used to extend a wrench handle for added leverage unless the wrench was designed for such use.

400.2 Tools shall be used only for the purpose for which they have been approved and the proper tools for the job performed shall always be used.

400.3 As impact tools such as chisels, punches, drift pins, etc. become mushroomed or cracked, they shall be dressed, repaired or replaced before further use.

400.4 Chisels, drills, punches, ground rods and pipes shall be held with tongs or other suitable holders (not hands) while being struck by another employee.

400.5 Only approved insulated electrical tools shall be used within the safe working distance (see 501.1) of energized electrical circuits or equipment.

A. Insulation shall not be depended upon to protect users from shock.

400.6 Tools with sharp edges such as saws, wood chisels, drawknives, or axes shall be stored in suitable guards or in special compartments.

400.7 Use suitable handles on all files or tools with pointed tangs.

400.8 Tools shall be handled responsibly, meaning they shall:

A. Be placed in tool buckets or firmly attached to hand lines if they must be raised or lowered one elevation to another.

B. Never be placed unsecured on elevated places.

C. Not be left lying around where they may cause a person to trip or stumble.

D. Not be thrown from place to place or from person to person.

400.9 When working on or above open grating:

A. A canvas or other suitable covering shall be used to cover the grating to prevent tools or parts from dropping to a lower level.

B. The danger area shall be barricaded or guarded.

401 HAND SAWS

401.1 Saws shall always be kept sharpened and properly set.

401.2 When using a hand saw, free hand shall remain above and at a safe distance from saw blade.

402 AXES/SLEDGES AND WEDGES

402.1 Axes shall be sharp, with the head firmly secured and the handle in good condition.

402.2 A clear working distance shall be maintained by:

A. Ensuring other workers are in the clear before swinging an ax.

B. Checking for any small brush or branches that might interfere with swinging an axe.

C. Clearing overhead obstructions.

402.3 Axes shall be used only on the ground, while maintaining firm footing.

403 ROPE

403.1 New rope shall be inspected throughout its length before being placed in service and shall be inspected on a periodic schedule.

403.2 Defective rope shall never be used.

A. Rope shall be examined regularly for cuts, worn spots, burns and rot.
B. Rope shall be untwisted at various places and inspected for poor fiber and dry rot.
C. Rope's outward appearance shall not be accepted as proof of quality or strength.

403.3 Rope reinforced with metal strands shall not be used.

403.4 Ropes shall be kept away from fire, acids, oil, chemicals, and all sources of excessive heat.

403.5 A rope shall not be overloaded or dragged over rough or sharp objects.

403.6 When not in use, rope shall be dried, stored properly, and kept free from mechanical damage and excessive heat.

403.7 The safe load of rope shall not be exceeded.

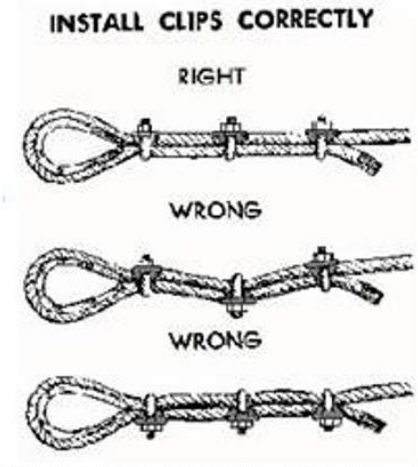
403.8 Handlines shall have a safe working load strength of at least 199 pounds, equivalent to one-half inch manila rope.

404 CABLES, WIRE ROPE AND WIRE ROPE SLINGS

404.1 All wire rope slings shall:

A. Display a visible, legible tag.
B. Not exceed the specified working load limit.
C. Be inspected annually by a certified professional.
D. Be inspected before each use and replaced if there is evidence of:
   1. Strands worn down one-third of their original diameter.
   2. Kink(s).
   3. Corrosion.
   4. Birdcaging and/or fatigue that would adversely affect performance under normal working tension.
   5. Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay.

404.2 Wire rope clips shall be inspected for proper installation and tightness.



Correct way to apply U-bolts to form an eye in wire rope.

404.3 The U-bolt must be applied so the “U” is section is in contact with dead end of rope.

404.4 All powered lifting devices shall be equipped with winch load limiting device (WLLD).

406 CHAINS

406.1 Use of chains shall be limited to use around sharp edges and used where rope would cause undue kinking or cutting; and shall not be used in place of wire rope or to extend a wire rope in a winch application.

406.2 “Shock” tension shall be avoided.

406.3 The user shall inspect chain before each use for:

A. Excessive corrosion.
B. Wear that has caused reduction in links’ diameters.
C. Defective weld joints on links.
D. Elongation of links.
E. Load limit tag if chain is to be used for overhead lifting.

406.4 All lifting chains shall be of alloy welded construction, proof tested, and certified with a load limit tag.

407 RIGGING AND HOISTING EQUIPMENT

407.1 Only trained qualified employees shall perform rigging operations.

407.2 Prior to use, the user shall inspect ropes, slings, hooks and other fittings for kinks, cuts or wear, weak points and load limit tag; and defective equipment shall be discarded.

407.3 Inspection of supporting members for chain falls, etc. shall be done before using to assure adequate strength for the load.

407.4 Pads should be suitably placed for heavy objects with sharp corners to prevent damage to cable rigging equipment.

407.5 A tag line shall be used to maintain constant control.

407.6 Employees shall stay out from under any load and clear of the angle formed by cables under tension.

408 POWER TOOLS AND EQUIPMENT

408.1 Only trained and qualified employees shall operate power tools.

408.2 Portable electric tools such as drills, saws, and grinders shall be effectively grounded when connected to a power source unless the tool is:

A. Approved double-insulated type, or
B. Connected to the power supply by means of an isolating transformer or other isolated power supply, such as a 24v DC system.

408.3 All powered tools shall be examined before use to ensure:

A. Proper functionality
B. Presence of all applicable safety devices
C. Integrity of the electric cord and electric components.

408.4 Powered tools shall only be operated in accordance with the instructions of the manufacturer.

408.5 All tools shall be properly maintained and shall be disconnected from the power source during repair, maintenance and adjustments, or when left unattended.

408.6 Electrical tools shall not be used in the presence of flammable vapors, gases, or dusts.

408.7 Tools connected to a central power supply, including portable and vehicle-mounted generators (not isolated or double insulated) shall be protected by a Ground Fault Circuit Interrupter (GFCI).

408.8 Extension cords shall be of Underwriter's Laboratories approved type and maintained in good condition. Broken plugs shall be repaired by a qualified electrician or discarded.

409 MACHINE TOOLS

409.1 Only approved tools shall be used.

409.2 Tools shall be shut off when not in use.

409.3 Adjusting and gauging (callipering) of work being done shall not be permitted while the machine is running.

409.4 Guards may be removed only after the machinery is locked out.

409.5 Operator shall:

A. Ensure the rated speed of the wheel is not exceeded.
B. Equip grinding wheels with safety washers.

409.6 During operation, operator shall:

A. Keep hands from the space between the tool and material.
B. Stand to one side, out of the line of flying particles, until wheel reaches top speed.

410 FUEL-POWERED TOOLS

410.1 GENERAL

A. Only a qualified person shall operate fuel-powered tools.
B. Tools shall only be operated when the operator is accompanied by an employee certified in first aid.
C. Safety devices shall not be disabled or modified.
D. Tools shall not be running when:
   1. Refueling.
   2. Left energized.
   3. Work is being done on them.
E. Tools shall be at least 10 feet away from fuel supply at start-up.
F. There shall be no smoking or open flames while refueling.
G. If fuel is spilled on equipment, employee shall ensure that spilled fuel is completely cleaned up, evaporated or free from ignition before starting equipment.
H. All fuels shall be stored in approved, labeled containers.
I. Fuel containers shall be inspected prior to use and replaced if needed.

410.2 SAWS

A. During start and operation, tool operator shall ensure all other persons are in the clear.
B. When in use, the operator is to maintain two-hand control of gas saw.
C. Cracked, dull or damaged blades shall not be used.
D. Power saws shall not be drop started.
E. Idle adjustments shall be made so that the chain or blade comes to a complete stop when the trigger or throttle is released.
F. When cutting concrete, operator shall:
   1. Use wet methods to control dust, and/or
   2. Use BWL-approved respiratory protection.

410.3 CHAINSAWS

A. During chainsaw operation, operator shall wear the PPE specified by a PPE Hazard Assessment.
B. Employees shall not approach chain-saw operator within the reach of the saw while the saw is in operation.
C. All chainsaws shall be equipped with “deadman” controls (controls cannot lock in the “on” position).
D. If the hand-held chainsaw operator is aloft, a second employee shall:
   1. Be able to rescue the chainsaw operator.
   2. Remain at least eight feet away from the operation.
E. When starting a chainsaw on the ground:
   1. It shall be placed on or against a solid support.
   2. Chain brake shall be engaged.
   3. Area shall be cleared of all co-workers.
F. Chainsaw engine shall be stopped while the unit is being moved from one location to another, including being carried up into a tree.
G. Chainsaw shall be held with both hands encircling the handles during operation unless the employee demonstrates that a greater hazard is posed by keeping both hands on the chainsaw in that situation.
H. Chainsaw operators shall ensure the area around their work is clear of brush or materials that may interfere.
I. Chainsaws designed and manufactured on the end of extended poles may be operated alone.

411 POWDER-ACTUATED TOOLS

411.1 Only a qualified trained employee shall operate a powder-actuated tool.

411.2 Appropriate personal protective equipment shall be donned by anyone around powder-actuated tool use.

411.3 Before attempting use of a powder-actuated tool the operator shall:
A. Inspect it to determine if it is in proper working order.
B. Test before loading to ensure safety devices are engaged.
C. Tag defective equipment out of service.

411.4 Powder-actuated tools shall not be loaded until just prior to the intended firing and shall be unloaded when left unattended.

411.5 Explosive charges shall be carried and transported in approved containers.

411.6 Powder-actuated tools shall not be used in an explosive or flammable atmosphere.

411.7 Neither a loaded nor empty powder-actuated tool shall be pointed at any employee. Hands shall be kept clear of the open end.

411.8 Studs or other fasteners used in a powder-actuated tool shall be only those specifically manufactured for use in such tools. Cartridges of different manufacturers shall not be interchanged.

411.9 In case of misfire, the operator shall:
A. Follow tool manufacturer recommendations.
B. Place misfired cartridges in metal container filled with water and return to Employee-in-Charge for proper disposal.

411.10 Operator shall only place his/her finger on the trigger once the muzzle of the tool is against the work surface.

411.11 Operators shall not:
A. Leave unfired powder loads on floor or work surface
B. Pry a powder load out of the chamber.

412 AIR NAILER

412.1 Only qualified trained employees familiar with its use shall operate the air nailer. The tool:
A. Must be used only for the purpose for which it was designed.
B. Shall only be operated when it is in contact with the work piece.
C. Shall be carried by the handle only.
D. Shall never be presumed empty.

412.2 Before attempting use of an air nailer the operator shall:
A. Inspect it to determine if it is in proper working order.
B. Test before loading to ensure safety devices are engaged
C. Keep the tool clean and lubricated.
D. Tag defective equipment out of service.
E. Ensure air supply does not exceed recommendation of tool.

412.3 Operator shall wear eye and hearing protection during operation of air nailer.

412.4 The tool shall be disconnected from air source when:
A. Loading fasteners.
B. Making repairs or clearing jams.
C. Not in use.

412.5 Safety devices shall not be disabled or modified.

412.6 Air nailers shall be fitted with only male pneumatic typic air connectors.

412.7 Only manufacturer-recommended parts and fasteners shall be used.

413 PRESSURE WASHER

413.1 Before each use, operator shall:
A. Check for weak, worn or damaged equipment.
B. Replace any damaged hose.
C. Tighten all fluid connections.

413.2 Equipment shall be maintained in accordance with manufacturer specifications.
A. Pressure ratings of any component in the system shall not be exceeded.
B. Gas engine shall not be run with the governor disconnected.
C. Operating speed shall not exceed manufacturer recommendations.

413.3 High pressure and high velocity fluids can penetrate the skin.
A. Gun shall be pointed away from people.
B. Hands, fingers, or body shall not be placed in front of spray tip.

413.4 The equipment shall be off, and all stored pressure released before:
A. Removing spray tip.
B. Servicing.
C. Leaving unattended.

413.5 Only water or approved detergents shall be used in the equipment.

413.6 Fuel tank shall not be refilled while the engine is running or hot.

413.7 When operating in a closed building, adequate ventilation shall be arranged.

414 SAND BLASTER

414.1 Only qualified trained employees shall use the sand blaster.

414.2 Manufacturer’s guidelines for air hose, blast hose, coupling, and nozzle size, selection, and use shall be followed.

414.3 Employees shall always wear NIOSH-approved respirators as required by MIOSHA.

413.4 All appropriate PPE, as specified by equipment manufacturer, shall be worn.
- A. Supplied-air respirator compressors shall be positioned so as to prevent contaminated air from entering the air intake system.
- B. NIOSH-approved breathing air hose shall always be used to connect an appropriate air filter to the respirator.
- C. Unless proper filtration is used, connection shall not be made to in-plant lines.

414.5 Air supply system shall be inspected for cleanliness before each use.

414.6 Maximum working pressure of blast machines and related components shall not be exceeded.

414.7 Blast machines shall not be modified.

414.8 High pressure and high velocity fluids can penetrate the skin.
- A. Gun shall be pointed away from people.
- B. Hands, fingers, or body shall not be placed in front of spray tip.

414.9 Before each use, air and blast hoses shall be inspected, and damaged hoses replaced.

414.10 Air hose lengths shall be kept as short and straight as possible.

414.11 Compressor shall be shut off and depressurized when not in use.

415 HYDRAULIC TOOLS

415.1 Only qualified trained employees donning appropriate PPE shall use hydraulic tools.

415.2 Manufacturer's safe operating pressure for hydraulic tools, hoses, valves, filters, and fittings shall be followed.

415.3 Employees shall never attempt to repair a hydraulic leak unless trained and qualified to do so.

415.4 Pressure shall be released before connections are broken unless quick-acting, self-closing connectors are used.

415.5 The fluid used in hydraulic-powdered tools shall meet manufacturer specifications or equivalent.

415.6 The hydraulic lines supporting a hydraulic tool shall:
- A. Provide protection against loss of insulating value.
- B. Be equipped with check valves where there is 35+ feet of separation between the oil reservoir and the upper end of the hydraulic system.

416 PNEUMATIC TOOLS

416.1 Pneumatic equipment shall only be used by qualified persons wearing the appropriate personal protective equipment.

416.2 To prevent accidental disconnection or disengagement, all safety devices shall be secured and enabled prior to use, including but not limited to:
- A. Whip to hose and tool
- B. Clips and retainers

416.3 Compressed air and compressed air tools shall only be used for their intended purpose, not including:
- A. Pointing at another person,
- B. Blowing dust or dirt from clothing,
- C. Cleaning, except when reduced to less than 30 psi and with effective chip guarding,
- D. Using hoses for hoisting or lowering tools.

416.4 All hoses exceeding one-half inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure or disengagement of a connection.

416.5 The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.

416.6 Before adjusting or changing air tools, unless equipped with quick-change connectors:

A. Air shall be shut off at the air supply valve ahead of the hose, and
B. Hose shall be bled at the tool before breaking the connection.

416.7 When necessary to use a pneumatic tool near exposed live electrical parts, the tool shall have a non-conductive hose and an accumulator to collect moisture.

416.8 Air leaks shall only be stopped by isolating pressure and replacing defective equipment.

417 POWER LAWN MOWERS, EDGERS, ETC.

417.1 Prior to use:

A. Manufacturer-specified guards shall be in place.
B. Assess the area to be mowed for hazards such as rocks, pieces of wire, or other foreign objects.
C. Ensure appropriate PPE is available and worn:
   1. Safety glasses or goggles
   2. Hearing protection
   3. Safety footwear

417.2 Prior to making adjustments, inspections, or repairs, the employee shall turn off the mower equipment and permit it to come to a complete stop.

417.3 When operating a power mower on a slope, the employee shall:

A. Move a walk-behind mower across the face of a slope of no more than 17 degrees.
B. Not operate riding grounds-keeping equipment up or down a slope of more than 26 degrees nor move across the face of a slope of more than 17 degrees.

417.4 During operations, operator shall ensure no person is put in the line of fire of the discharge opening.

418 WELDING, CUTTING AND BRAZING

418.1 Arc or flame welding and cutting equipment shall only be used by qualified persons wearing the appropriate personal protective equipment:

A. Hard hat.
B. Eyewear which offers protection from airborne particles when helmet or goggles are removed.
C. Long-cuffed gloves.
D. Clothing:
   1. Fire-retardant or leather.
   2. Free of excessive oil or grease.
   3. Fastened at neck.
   4. Free of fraying and excessive damage.

418.2 Welding, cutting and brazing operations shall comply with Section 105 – Fire Protection and Prevention.

418.3 The welder shall:

A. Shield or barricade the welding operations to:

1. Protect others from splatter and harmful rays.
2. Prevent ignition of flammable material.
3. Protect from falling objects.

B. Periodically inspect:
1. Gas hoses and connections.
a. Tape shall not be used on hoses.
2. Welding cables, insulation and connections.

418.4 Scrap rod shall be immediately and properly disposed of.

418.5 All hot material shall not be left unguarded unless plainly marked “Hot”.

418.6 Cables or hoses used in welding operations that cross walkways shall be suspended or protected from traffic.

418.7 Adequate ventilation or approved breathing apparatus shall be provided while welding in confined spaces or while brazing, cutting or welding any zinc, brass, bronze, galvanized or lead-coated material.

A. Oxygen or fuel gas cylinders shall not be taken into confined spaces.

418.8 All containers to be welded upon shall be vented.

418.9 Only qualified welders shall weld or cut a tank that has contained flammables, and tank shall be:

A. Cleaned

B. Purged

C. Adequately vented

418.10 The torch shall be:

A. Ignited by approved friction lighter.

B. Held away from the body and other persons when ignited.

418.11 Gas welding and cutting: Only approved gas welding or cutting equipment shall be used.

418.12 All oxy fuel torches shall be equipped with flashback arrestors.

418.13 Should a torch flashback occur, cylinder valves shall be closed quickly.

A. Hoses, regulators and torch shall be checked for damage.

B. Tip shall be checked for plugging before attempting to relight.

418.14 Regulators, valves, cylinders, or hose connections of gas welding equipment shall not contact oil or grease.

A. Contamination within the equipment when under pressure may become explosive.

B. All contaminants shall be removed before further use of equipment.

C. No sealants or lubricants shall be used on any connections.

418.15 Where arc welding or cutting will be performed in a wet environment, action shall be taken to minimize any shock hazard.

418.16 The explosion hazard present in dusty or gaseous spaces shall be adequately ventilated to remove the hazard before welding or cutting equipment is used.

418.17 Electric Welding: Only approved electric welding equipment shall be used:

A. Equipment shall always be maintained in proper operating condition.

B. The electric welding machine shall be properly grounded before use.

C. Owner’s manual provided by the manufacturer shall be readily available.

D. When electrode holders will be left unattended, the electrodes shall:
1. Be removed
2. Be placed or protected so that they cannot make electrical contacts with employees or conducting objects.

E. When not in use, the power supply switch to the equipment shall be opened.

418.18 Welding outlets that do not have a quick disconnect device for the individual outlet shall not be used.

418.19 Matches and butane lighters shall not be carried in the area of welding or cutting operations.

419 COMPRESSED GASES

419.1 Compressed gas cylinders shall be visually inspected to determine if they are in a safe condition.

A. A leaking cylinder shall not be used.
   1. Cylinder shall be taken outdoors away from sources of ignition, secured and identified.
   2. Employee-in-Charge shall be notified.

419.2 Cylinders shall be labeled by the manufacturer with their contents.

A. Cylinder gas shall only be used for its intended purpose.
B. No attempt shall be made to mix gases in a cylinder or to transfer gas from one cylinder to another.

419.3 Before leaving a work site, employee shall ensure:

A. Cylinder valves are turned off.
B. Valves on empty cylinders are closed and capped.

419.4 Compressed gas cylinders not having fixed hand wheels shall have keys, handles, or non-adjustable wrenches on the valve stems while the cylinders are in service.

419.5 Compressed gas cylinders, whether full or empty, shall be:

A. Stored in an upright position and chained or otherwise secured so they cannot fall or be upset.
B. Grouped and stored based on their hazard class.
C. Stored away from highly combustible material and separated from sources of heat such as direct sunlight, radiators and furnaces.
D. Stored or used at temperatures less than 125 degrees Fahrenheit.
E. Placed where they will not become part of an electrical circuit and at least five feet away from an electrical outlet.

419.6 Empty cylinders shall be marked or tagged as empty and secured.

419.7 Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials (e.g., oil or grease) by a five feet high non-combustible barrier and/or a minimum distance of 20 feet.

A. Hydrogen and fuel gas cylinders shall not be stored inside any operating building. Separate storage buildings or sheltered storage areas shall be used.
B. Oxidizing and fuel gas cylinders used as a unit shall not be considered in storage.

419.8 When compressed gas cylinders are handled, cylinders shall:

A. Be secured for transport in a vertical upright position.
B. Always have the valve cap or valve protection device in place, except when in use or connected to a welding set.
C. Be protected from dropping, jarring and exposure to temperature extremes.
   1. A suitable cradle or other device shall be used for transport.
   2. Lifting shall not be accomplished using the valve or valve cap.

419.9 When connecting to a compressed gas cylinder, the user shall:

A. Inspect all hoses and fittings for holes and thread conditions before connecting.

B. Never force connections that do not fit nor tamper with the safety relief devices of cylinders.
C. Use a suitable liquid leak detector and never a flame.
D. Never stand, nor allow another person to stand, in front of regulator when compressed gas cylinders are being opened.

419.10 Before the regulator is removed from a cylinder, the valve shall be closed, and all pressure released from the regulator.

419.11 The recessed top of cylinders shall not be used as a place for tools.

419.12 Hydrogen: Cylinders shall be properly secured.
A. "Danger – No Smoking" signs shall be posted where hydrogen is used or stored.
B. Only employee trained on hydrogen hazards, operating procedures and emergency response actions shall be allowed to operate and maintain the hydrogen feed system.

419.13 Oxygen: Oil, grease or similar materials shall not be allowed to contact any valve, fitting, regulator, or gauge of oxygen cylinders.
A. Oxygen shall never be used as a substitute for compressed air.
B. When an oxygen cylinder is in use, the valve should be opened fully to prevent leakage around the valve stem.

419.14 Acetylene: Cylinders shall be properly secured and always used, transported or stored in a vertical position.
A. "Danger – No Smoking" signs shall be posted where acetylene is used or stored.
B. An acetylene cylinder shall not be opened more than one and one-half turns of the spindle and preferable no more than three-fourths of a turn.
C. Employees shall not use acetylene in a free state at pressures higher than 15 psi.

419.15 Anhydrous Ammonia: The feed system shall be visually inspected periodically to ensure it is in safe working condition.
A. Only employees trained on its hazards, operating procedures and emergency response actions shall be allowed to operate and maintain the anhydrous ammonia feed system.
B. When working on the anhydrous ammonia feed system:
1. Respiratory protection (SCBA) is required in addition to other appropriate PPE.
2. The buddy system must be employed when entering, leak testing, operating and otherwise maintaining the feed system room.

420 COMPRESSED AIR

420.1 Before each use, hoses and hose couplings shall be inspected for loose connections, defects (cracks, bulges, splits, etc.); and removed from service if damaged or defective.

420.2 When using compressed air for cleaning equipment or work areas:
A. Proper protective equipment (safety goggles, face shield, gloves, etc.) shall be worn.
B. The maximum of 30 psi shall not be exceeded.
C. Air relief nozzle shall be used.

420.3 Compressed air shall not be used to clean off one's clothing or body.

420.4 Compressed air shall not be used on any containers not designed to be pressurized.

420.5 Only air hose and coupling with safety clip or retainer designed for compressed air shall be used in connection with all compressed air lines.

420.6 All compressors shall be equipped with safety valves.

A. Hoses shall be connected and secured prior to pressurizing.

B. Hose connectors shall be of the approved self-locking type.

421 SAFE SUPPORT AND SCAFFOLDS

421.1 Only qualified employees shall design, erect, alter, or move scaffolding.

421.2 Prior to ascending a scaffold, employees shall receive hazard recognition training for scaffolding.

A. Scaffolding is designed to support employees working with tools.

B. If additional support is needed, the qualified employee shall be consulted.

421.3 Employees shall:

A. Confirm a dated tag, signed by the qualified employee is affixed.

1. Multiple days of use require daily inspection and signature.

B. Check all scaffolding before use to ensure it is of sufficient strength and rigidity to safely support the weight of persons and materials to which it will be subjected.

C. Ensure scaffolding is equipped with a standard guardrail with midrail and toe boards.

D. Ensure scaffold planks are cleated and extend over their supports by not less than six inches and not more than 12 inches.

421.4 It is permissible to move scaffolds designed with casters or wheels, which shall be locked to prevent movement.

421.5 Employees working on suspended scaffolds shall be protected by an independent lifeline, body harness, and a lanyard.

421.6 Safe access shall be provided for all scaffolds. Structural members should not be used as a means of access to work platform.

423 LADDERS – GENERAL

423.1 Portable ladders shall be approved non-conductive ladders.

A. Makeshift ladders, stock, machinery, etc. shall not be used for climbing.

423.2 All ladders shall be inspected before each use. Ladders with weakened loose, broken or missing steps, broken side rails, or other defects shall be tagged and removed from service.

423.3 Rungs and steps shall be kept clean and free of grease and oil.

423.4 A portable ladder shall not be loaded in excess of the duty rating. Ladders without a legible tag stating the duty rating shall not be used.

423.5 When moving ladders, employees shall ensure they do not contact machinery, benches, energized equipment, etc.

423.6 When placing a portable ladder near a door or aisle through which there is any type of traffic, the following precautions shall be employed:

A. Warning signs,

B. Blocking the door open, or

C. Having an employee guard the doorway.

423.7 Ladders shall not be used in a horizontal position as a platform or scaffold.

423.8 A ladder shall not be placed on a box, barrel, or other unstable base.

423.9 A ladder-leveling device shall be used if an uneven surface cannot be avoided.

423.10 When using a ladder, employees shall:

A. Face the ladder and maintain three points of contact when climbing up or down.
B. Maintain three points of contact and shall not work or reach any farther than arm's length from the ladder to avoid losing balance.
C. Not stand astride a ladder and another object.
D. Ensure tools and materials carried in pockets, pouches or belts do not protrude to catch on ladder rungs.

423.11 Ladders used to gain access to a roof or other elevated position shall extend at least 3 feet above the point of support.
A. Ladders shall not be spliced together to form a longer ladder.

423.12 A ladder shall not be placed against an unsafe support (e.g., a cable tray).

424 STEPLADDERS

424.1 Stepladder legs shall be fully spread and the spreading bars locked in place.

424.2 Stepladders shall not be used as a straight ladder.

424.3 When an employee is working more than 10 feet high on a stepladder (except a platform ladder) the stepladder shall be held by another person.

424.4 Stepladders longer than 20 feet shall not be used.

424.5 The top of a step ladder shall not be used as a step.

425 STRAIGHT OR EXTENSION LADDERS

425.1 Keep the distance from the ladder's base to the wall one-fourth the distance from the base to its point of top support.

425.2 All straight or extension ladders shall be equipped with securing devices and approved safety feet. Where safety feet do not overcome the hazard of slipping, the ladder shall be secured by tying or other adequate means.

425.3 Extension ladders should be overlapped at least:
A. Four feet for lengths up to 36 feet.
B. Five feet for lengths from 36 to 48 feet.
C. Six feet for lengths from 48 to 60 feet.

425.4 Only one employee shall work from a ladder at one time, except for properly rated hook ladders or those designed to support two people.

425.5 When working from straight ladders the ladder must be securely placed, held, tied or otherwise secured.

425.6 Straight ladders shall not be climbed beyond the third step from the top.

426 LASERS

426.1 The BWL shall maintain a written Laser Safety Program with procedures for equipment purchase, use, training, record keeping and employee safety.

426.2 The BWL Laser Safety Officer shall approve the purchase and implementation of:
A. All new laser equipment.
B. Related warning signs.
C. Required shielding/curtains.
D. Appropriate protective laser eyewear.

426.3 It is the responsibility of the employee/contractor operating the laser equipment to protect the employees in the area from exposure to the laser beam and to ensure the proper warning signs are posted.

426.4 All repairs to laser equipment shall be performed by manufacturer-authorized representative.

426.5 Only an authorized and qualified BWL employee may perform routine site maintenance of specific lasers according to the manufacturer's operating instructions.

426.6 BWL employees shall only operate lasers and associated equipment for which they have been formally trained.

426.7 Permanently installed lasers shall be locked out and tagged out whenever any repairs are performed in the laser's immediate vicinity or when employees must work in the path of the laser beam.

SECTION 500
ELECTRIC RULES

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500 DEFINITIONS

500.1 Voltage is used as follows: All references to specific voltages (primary or secondary) are to nominal supply line voltages and exclude communication circuits. These voltages may vary within the accepted practices established by the Board of Water and Light.

500.2 Rubber Gloves as referred to in this section of the manual are limited to the gloves that are approved for use on energized conductors and equipment and are regularly worn by lineworkers and qualified electrical workers.

500.3 The term “energized lines” as used herein is defined as any conductor, including neutral conductors, apparatus or part thereof, capable of being energized at or above 50 volts. This also includes street light conductors, communications lines, and lines of a similar nature.

500.4 The term “primary lines” as used herein is defined as any conductor, including neutral conductors and apparatus or part thereof, capable of being energized at or above 600 volts.

500.5 Equipotential Zone: A safe work zone created by placing a grounding cluster on the pole below and as close as possible to where the lineman will be standing and installing grounds from the line to the grounding cluster. This grounding scheme is specifically designed to prevent employees from being exposed to differences in potential. This scheme requires the following:

A. One set of personal protective grounds.
B. One grounding cluster used on the work pole.
C. Connection from grounding cluster to system neutral (if applicable).
D. Ground connection from grounding cluster to center phase.
E. Short circuit remaining phases and remove excess slack from grounding cable.
F. Work to be performed about grounding cluster.

500.6 Bracket Grounding: A grounding scheme in which personal protective grounds are installed on both sides, and within one span of the work areas:

A. Two sets of personal protective grounds.
B. Two grounding clusters.
C. Connection from grounding cluster to system neutral (if applicable).
D. Ground connection from grounding cluster to center phase.
E. Short circuit remaining phases and remove excess slack from grounding cables.

500.7 Qualified Employee (qualified person): One knowledgeable in the construction and operation of the electric power generation transmission and distribution equipment involved, along with the associated hazards.

500.8 Voltage: The effective (RMS) potential difference between any two conductors or between a conductor and ground. The voltage specified in this manual shall mean the maximum effective voltage to which the personnel or protective equipment may be subjected. Low voltage includes voltages up to 600 volts. High voltage or Primary Lines shall mean voltages in excess of 600 volts.

501 SAFE WORKING DISTANCES

501.1 Without a protective barrier and protective equipment, qualified workers shall not approach closer to any exposed energized equipment or conductors than a distance specified below. The distance specified must be increased by the appropriate amount whenever conducting tools or materials are used to

extend the reach of a qualified worker. Non-qualified employees must maintain a minimum clearance of 10 feet up to 50 kV.

Nominal System Phase to Phase Voltage	Phase to Ground Exposure *	Phase to Phase Exposure*	Phase to Phase and Phase to Ground Safe Working Distances **
	(Feet-Inches)	(Feet-Inches)	(Feet-Inches)
50 to 300	Avoid contact	Avoid contact	Avoid contact
301 to 750	1'1"	1'1"	2 feet
751 to 5,000	2'1"	2'1"	3 feet
5,100 to 15,000	2'2"	2'3"	3 feet
15.1 kV to 36 kV	2'7"	3'	4 feet
36.1 kV to 46 kV	2'10"	3'3"	4 feet
46.1 kV to 72.5 kV	3'4"	4'	
72.6 kV to 121 kV	3'9"	4'8"	
121.1 kV to 145 kV	4'4"	5'5"	7 feet

*Minimum Working Distances required by MIOSHA, Part 86. For reference only.
**The safe working distances are more restrictive than MIOSHA, Part 86.

502 PROTECTIVE EQUIPMENT

502.1 In applying rubber protective equipment, employees should always protect the nearest and lowest wires first, protecting the worker as the worker progresses. In removing rubber protective equipment, the reverse order shall be maintained. Protective equipment shall be applied from a position underneath the conductor when possible.

502.2 Rubber gloves shall never be worn inside out or without leather protectors. They shall be exchanged at any time they become damaged or the employee to whom they are assigned becomes suspicious of them. Leather protectors shall not be worn except when in use over rubber gloves, although old leather protectors properly identified, maybe used as a work glove.

502.3 Class "0" or greater rubber gloves with leather protectors shall be worn when working with voltages up to 600 volts.

502.4 In service care and use of electric protective equipment, the employee shall inspect items for damage before each day's use and any time damage is suspected during use.

A. Protective rubber gloves must be given a minimum 20-second air test before each day's use and when damage is suspected.
B. Any insulating equipment with any of the following defects shall not be used:
    1. Hole, tear, puncture or cut.
    2. Ozone cutting or ozone checking.
    3. An embedded foreign object.
    4. Any texture changes such as swelling, softening, hardening, or becoming sticky or inelastic.
C. Insulating equipment shall be cleaned as needed to remove foreign substances.
D. Employees are responsible for tagging any defective protective equipment and turning it in for testing and repair.

E. Insulating equipment shall be stored in such a manner and location to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions.

502.5 Rubber protective equipment, including mechanical jumpers, allowed to remain in place on energized lines, or apparatus overnight, or longer, shall be cleaned and tested before re-use.

502.6 Rubber goods shall be tested upon being received from the manufacturer and shall be submitted for re-testing as follows:

Rubber Insulating Equipment Test Intervals:	
Type of equipment	When to test
Rubber insulating line hose	Upon indication that insulating value is suspect.
Rubber insulating covers	Upon indication that insulating value is suspect.
Rubber insulating blankets	Before first issue and every 30 days thereafter. (1)(2)
Rubber insulating gloves	Before first issue and every 30 days thereafter. (1)(2)
Rubber insulating sleeves	Before first issue and every 30 days thereafter. (1)(2)
Mechanical jumpers	Before first use and every 6 months thereafter.

(1) Electrically tested insulating equipment maintained as stock (not made available for use) shall be re-tested within a 12-month period and before it is made available for use.

(2) Electrically tested insulating equipment that is available for use but not issued shall be re-tested within a six-month period and 30 days from first day of use.

502.7 Each employee who is exposed to the hazards of flames or electric arcs will not wear clothing that, when exposed to these flames or electric arcs, could increase the extent of injury that would be sustained by the employee. Clothing made from the following types of fabrics either alone or in blends is prohibited: Acetate, Nylon, Polyester, or Rayon.

When work is performed on energized parts or equipment, employees shall cover (with proper protective devices) or remove all exposed conductive articles, (such as key or watch chains, rings, earrings, etc., wrist watches, wrist bands, and eyeglasses with metal frames).

502.8 Workers shall wear 20 kV Class 2 rubber gloves with leather protectors when working on lines or equipment energized at voltages from 600 to 8500 phase to ground. Additional protection shall be required as follows:

A. 20 kV rubber sleeves shall be worn whenever work is performed within minimum approach distance.
B. 20kv Class 2 rubber gloves and 20kV Class 2 rubber sleeves shall be put on before entering the primary zone and shall not be removed until the employee is completely out of the primary zone.
C. Rubber blankets, line hose and other protective devices shall be used to avoid accidental contact with nearby grounds or energized circuits. This shall apply on wood poles or wood structures. When working on metal structures, added protective equipment such as wood platforms, rubber mats, etc. shall be used.

502.9 20 kV Class 2 rubber gloves with leather protectors shall be worn when operating gang operated air break switches from the ground even though the switch handles are grounded.

502.10 20 kV Class 2 rubber gloves with leather protectors shall be worn when stringing conductors near primary lines or exposed live parts.

502.11 20 kV Class 2 rubber gloves with leather protectors shall be worn when raising or lowering poles between or near primary lines or exposed live parts.

502.12 20 kV Class 2 rubber gloves with leather protectors shall be worn when moving or changing ground wires or neutrals on energized equipment.

502.13 Class “0” or greater rubber gloves shall be worn when working aloft with 120 to 600 volts on any metal structure.

502.14 20 kV Class 2 rubber gloves with leather protectors and Class 2 rubber sleeves shall be worn when working on neutral when it is in the primary position.

502.15 20 kV Class 2 rubber gloves or Class 2 rubber gloves with leather protectors and Class 2 rubber sleeves shall be worn when any set of circumstances exists that the worker may consider it advisable for their safety.

502.16 20 kV Class 2 rubber gloves with leather protectors shall be worn while checking for potential with an approved voltage testing device on systems over 600 volts, except when using an approved fiberglass stick tester.

502.17 20 kV Class 2 rubber gloves with leather protectors shall be worn while operating or inspecting underground equipment such as subway transformers, oil switches, oil filled cutouts, RCOC switches, cable, terminals, disconnects, or any other equipment whose operating voltage is over 600 volts.

502.18 20 kV Class 2 rubber gloves with leather protectors shall be worn while rodding in ducts containing energized cables and wires, and while pulling out any abandoned lead cables from ducts carrying energized cables.

502.19 20 kV Class 2 rubber gloves with leather protectors shall be worn while standing on the ground and operating non-wireless controls of boom-type equipment where contact with primary conductors is possible.

502.20 20 kV Class 2 rubber gloves with leather protectors and Class 2 rubber sleeves shall be worn while placing and removing line hose, hoods, blankets and other protective equipment used with lines and equipment energized more than 600 volts.

502.21 20 kV Class 2 rubber gloves with leather protectors shall be worn when the primary side of an energized live front pad mount transformer is open.

503 HOT LINE TOOLS

503.1 When hot line stick work is being performed, only fiberglass hot line tools that are approved shall be used.

503.2 Do not place hot line tools on the ground or permit them to touch the ground when lowering from poles or structures.

503.3 Hot line tools must be kept dry, clean, and free of moisture. Do not store in damp areas. These tools shall be thoroughly dried out at intervals when necessary.

503.4 When transporting hot line tools, keep them rolled in a canvas tarpaulin with one layer of canvas between each tool to prevent scars or abrasions. Use separate and larger canvas to place on the ground. When racks are provided on trucks or trailers for transporting tools, they should be well padded. Employee-in-Charge shall see that hot line tools that are constantly transported on trucks or trailers shall be regularly checked and refinished as often as necessary to keep them in first-class condition. The worker shall

also check the tools before using. Employee-in-Charge shall be responsible to see that the sticks are returned to the trailer, cleaned, and stored properly.

503.5 When inspecting hot line tools, look for signs that indicate the tool has been over-stressed. Indications may include bent or cracked parts, bent rivets or bolts and cracked glue joints that indicate that ferrules have slipped, and damage to the fiberglass has occurred. Check detachable or bolted fittings to be sure fastenings have not loosened and look for excessive wear. Broken or damaged hot line tools shall not be used. They shall be destroyed or returned to the manufacturer to be properly repaired.

503.6 Live line tools and equipment shall be wiped clean and carefully inspected before use. At least once a year, or more frequent if necessary, live line tools and equipment shall be taken out of service, inspected and dielectric tested. Tests shall be completed and documented by a qualified person(s). Live line tools that are new, rarely used, and stored in a safe place may be excluded from annual testing and be tested every two years. All live line tools shall be tagged, indicating testing date.

504 RECLOSURES

504.1 Reclosures may not be used as Clearance points. Only devices providing a visual air opening shall be used for employee protection such as an open switch or open jumper. This visual open may be at a reclosure location but the open will be the Clearance point. When Clearance is given, a Clearance tag will be place on or as near as practical to the open.

504.2 Automatic reclosing devices shall be deactivated whenever there is a possibility that reclosing shall endanger personnel. Reclosures placed on non-auto reclosing shall be caution tagged.

505 RADIOS

505.1 At any time a crew is working on a primary circuit, the circuit numbers and location shall be displayed near the truck radio.

506 TESTING FOR POTENTIAL

506.1 Electrical equipment and lines shall always be considered as “live” unless they are positively known to be dead and are grounded. Before starting to work, preliminary inspection or test shall be made to determine what conditions exist.

507 GROUNDING

507.1 For employees to work lines or equipment as de-energized, the lines shall be de-energized, tested, and shall be grounded.

507.2 Equipotential Zone – Temporary protective grounds shall be placed in such a manner as to prevent employees from being exposed to differences in electrical potential.

507.3 Protective grounding equipment shall consist of cables and conductors designed specifically for use as personal protective grounds and capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault. The grounding conductors shall be a minimum of 1/0 copper. For complete grounding requirements on the BWL system refer to Electric T & D Policy and Procedure Manual, Section 12 – Personal Protective Grounding.

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

507.5 Order of Connection – When attaching grounds, the ground end shall be attached first and then the other end shall be attached by means of insulated tools. Exception – When conditions exist that do not allow the use of insulated tools, other suitable devices may be utilized.

507.6 Order of Removal – When a ground is to be removed the grounding device shall be removed first from the line or equipment by means of insulated tools. Exception – When conditions exist that do not allow the use of insulated tools, other suitable devices may be utilized.

507.7 Grounds may be removed temporarily during tests. During the test procedure the employer shall ensure that each employee:

A. Uses insulating equipment and is isolated from any hazards involved.

B. The employer shall also institute any additional measures to protect each employee in case of previously grounded lines and equipment was to become energized.

508 INCLEMENT WEATHER

508.1 Before any work on the primary system is started, anticipated weather conditions for the day shall be given consideration. If a hazardous condition (i.e., rain, fog, high humidity, high winds, snow or ice storms) develops while work is in progress and the job must be completed or made safe, the circuit shall be de-energized and grounded before the work is completed.

508.2 Except during emergency restoration, field work shall be discontinued when adverse weather conditions would make the work hazardous. Adverse weather conditions are defined as:

A. Lightning in the immediate vicinity.
B. High winds (40 mph or greater).
C. Snowstorms.
D. Ice storms.
E. Heavy rain.

509 STORM RESTORATION

509.1 Whenever it is necessary to patrol lines during the day or night and conditions make it potentially unsafe to patrol with one person, additional help shall be provided.

509.2 Whenever there is a system disturbance due to downed wires, poles, or trees, each employee must recognize the potential dangers and proceed with caution.

509.3 Only qualified journey workers or qualified apprentices shall handle damaged wires directly. Other personnel shall not enter the immediate trouble area to work unless under direct supervision of a journey worker qualified in electrical work.

509.4 In the event of a major system disturbance so extensive that restoration of service, done with the use of journey worker or journey worker supervision, within a reasonable length of time is impossible, these work areas shall be made safe or the power source de-energized.

510 WORKING ALOFT

510.1 Only BWL-approved belts, harnesses and lanyards shall be used.

510.2 No material shall be dropped from a pole unless absolutely necessary, then this shall be done under the direction of the Employee-in-Charge. The drop zone shall always be guarded and cleared.

510.3 Any pole found to be unsafe shall be adequately guyed or otherwise supported before pole is climbed.

510.4 When there is an injury on a pole that requires the lineworker to be removed, there shall be an ambulance and a ladder truck requested immediately; there shall be no exceptions. Any additional equipment needed shall be dispatched by the BWL. This procedure shall be posted at BESOC.

510.5 All overhead crews shall practice pole top rescue and bucket rescue annually.

510.6 When it is necessary for a lineworker to transfer from the pole to the bucket or from the bucket to the pole this shall be considered a special cause and shall be approved by the Employee-in-Charge. The lineworker's safety strap shall always be fastened to either the pole or the approved ring of the insulated bucket or boom.

510.7 Climbers shall not be worn in the bucket except as necessary and as explained by the previous rule.

510.8 20 kV rubber gloves and sleeves shall be put on before entering the work area within which energized lines or apparatus may be reached and shall not be removed until the employee is completely out of reach of this area.

510.9 The minimum required protection for qualified employees when working energized primary lines or equipment shall be 20 kV rubber gloves and sleeves.

510.10 When the basket is in the primary zone, care shall be used so as not to introduce any conducting media between basket and ground or between two phases.

511 AERIAL LIFTS

511.1 See Rule 508.2 in this manual.

511.2 Workers must wear a full body harness with a shock-absorbing lanyard attached to the designated attachment point on the aerial lift.

512 CLIMBING AND WORKING ON POLES

512.1 Before climbing through, passing between, or positioning oneself in a primary area, all conductors of 600 volts and above shall be covered with necessary protective devices. The uncovered portion shall be only that which is to be worked on and shall be one phase or neutral at a time.

512.2 Lineworkers shall not wear their climbers while driving vehicles, when doing work on the ground, on ladders, in buckets or platforms in which the wearing of the climbers causes a hazard unless co-workers are working on primary conductors.

512.3 When not climbing or when the climbers are stored, gaff guards shall be in place.

512.4 Employees shall not work on an elevated pole or structure without securing themselves with an approved fall restraint device.

512.5 Protective body belts, safety straps, lanyards, lifelines and body harness shall be inspected before use each day and any time damage is suspected.

513 OVERHEAD ENERGIZED LINES AND EQUIPMENT

513.1 Only as a reflection of a custom in the electric utility industry to express, specifically, in a collective bargaining agreement, as well as in the "Safety

Rules," the understanding of the parties to the particular agreement on this aspect of electric utility work - the parties hereto agree that two or more employees, qualified in the judgment of the immediate Employee-in-Charge of the job, shall work together whenever wires or equipment are energized at more than 600 volts to ground, or in the judgment of the Employee-in-Charge of the job, wiring is congested or unusual exposure is involved. Work on conductors energized in excess of 8,500 volts, phase to phase, must be performed with hot stick tools or with 20 kV gloves and 20 kV sleeves from an approved aerial lift.

513.2 Normal practice shall be to work two lineworkers in the primary zone. During the time an employee is doing work on any energized part of the line over 600 volts, the other employee shall act as an observer, for the purpose for preventing an accident but may assist when working on the same phase. When both lineworkers are working aloft in the primary zone, a safety watcher shall be present. This person must have working knowledge of overhead line work and the BWL Safety Manual. They shall also have a BWL radio unit immediately available and be trained in proper radio procedures including pole top rescue.

514 CLEARING OF DOWNED PRIMARY BY ONE QUALIFIED LINEWORKER

514.1 In case of an emergency were danger of life or property imminent, one journey line worker may clear the hazard without assistance, if in the line worker's judgment, it can be done safely.

514.2 In an emergency situation, clearing of down primary lines by one qualified line worker is permitted providing one of the following methods is used:

A. 20 kV gloves and sleeves from an approved aerial lift device, or

B. Approved hot line cutters and/or hot line tools.

515 FUSES, CUTOUTS, AND DISCONNECTS

515.1 The operating of switches and cutouts energized at 600 volts or above does not constitute the "working directly on" of energized equipment and as such may be completed in an approved manner by a single qualified employee.

515.2 Blown fuses located at risers supplying underground distribution shall not be refused until the cable is tested with an approved testing device. Testing shall be done by a qualified employee trained in the use of the test device.

A. In the case of a fuse blown due to obvious physical evidence (i.e., animal, bird, tree limb, kite string, etc.) a qualified lineworker may replace the fuse without testing, if in the employee's judgment it can be done safely.

515.3 Two qualified employees in the primary zone are required to change out current-limiting fuses (K-Mates).

515.4 When opening or closing fused cutouts, using load pickup jumpers, or picking up load, the workers shall wear the necessary personal protective equipment including eye protection to avoid injury from electric contacts, arc, or flash.

516 TRANSFORMERS

516.1 The primary lead(s) of a distribution transformer shall be considered energized at primary full voltage until both the primary and secondary leads have been disconnected or it has been disconnected or it has been definitely determined that the secondary circuit to which the transformer is attached has been de-energized and grounded.

516.2 The cases of all transformers connected to a source of supply shall be considered as being energized at the full primary voltage unless they are adequately grounded.

516.3 When performing work on the primary leads or cutouts connected to a distribution transformer, without 20 kV rubber gloves and sleeves, the secondary leads shall be disconnected.

517 CAPACITORS, REGULATORS, RECLOSERS

517.1 Before qualified employees work on capacitors, the capacitor shall be disconnected from energized sources. After five minutes from the time of disconnection the capacitor shall be short-circuited and a shorting wire installed.

517.2 Only a qualified employee wearing proper personal protective equipment may open or close a capacitor bank using the designated control device or an approved live line tool.

517.3 When de-energizing capacitors installed on an ungrounded substation rack the rack shall be bonded to ground before the capacitors are short circuited and grounded.

517.4 Any line to which a capacitor is connected shall be short circuited before being considered de-energized.

517.5 Before high voltage capacitors are handled and stored they must be short-circuited and grounded. When in storage they will have a shorting wire in place.

517.6 When a fuse is open at a capacitor location and there is no visible sign of external damage, all capacitor tanks shall be tested before they are reenergized.

517.7 All capacitors, regulators, or reclosers, shall be opened or closed by a qualified employee using the proper control device and/or from an approved insulated aerial device, wearing personal protective equipment.

517.8 All capacitors' cutouts shall be opened with an approved load break device.

517.9 When a fuse is open at a capacitor location and no visible signs of an external damage, all capacitor tanks shall be tested before they are re-energized.

518 STRINGING AND REMOVING WIRES

518.1 Whenever wires are strung or removed over roadways, there shall be traffic control.

518.2 "Catch Poles" shall be used when stringing or removing wire over express ways with moving traffic - one on each side and one in the middle median with protective barriers. If traffic is stopped during stringing and removing wire, catch poles are not needed.

518.3 When stringing or removing conductor(s) from the primary zone, precautions shall be taken to adequately insulate the worker by means of 20 kV rubber gloves and an insulated platform. The journey worker attending the reel shall be required to wear 20 kV rubber gloves and to keep all parts of the body free from contact with the conductor(s).

518.4 Non-insulated wire shall be pulled over a grounded roller and the truck shall be isolated or grounded to protect employees at ground level.

518.5 When stringing or removing wires crossing over lines energized at 600 volts or more, suitable guard structure or insulating equipment shall be installed at the point of crossing in order to eliminate possibility of accidental contact.

518.6 The automatic reclosing feature of the circuit-interrupting device shall be made inoperative when stringing or removing wire.

518.7 When required to string wire across any main road (four lanes or more) there will be a police officer or flagman posted at each direction of the work.

519 HYDROLIFT

519.1 With the exception of equipment certified for work on the proper voltage, mechanical equipment shall not be operated within 10 feet of any energized line or equipment unless one of the following conditions is met:

A. An insulated barrier is installed between the energized part and the mechanical equipment, or

B. The mechanical equipment is grounded, or

C. The mechanical equipment is insulated, or

D. The mechanical equipment is considered as energized.

520 HOISTING CABLES – CONDUCTIVE MATERIAL

520.1 Steel cables shall not be used to raise transformers, poles or any other material near energized lines, except when the cable and any other conductive materials being raised are adequately protected by insulating covering placed on such energized lines.

521 POLE HAULING AND SETTING

521.1 When setting or removing poles all employees must ensure that the pole does not contact the energized conductor(s). In addition, everyone shall be wearing approved electrical protective equipment and utilize approved insulated devices. When in the primary zone, no employee shall contact the pole or pole setting unit with any uninsulated part of his or her body while standing on the ground.

521.2 Poles, ladders, pipe, etc. shall be loaded parallel with the truck length. Such material shall not extend beyond the normal sides of the vehicle.

521.3 All poles shall be securely fastened to prevent a hazard due to shifting.

521.4 When poles are being transported, amber lights with orange or red flags shall be attached to the front and back of the truck or back of the trailer.

521.5 When a vehicle is hauling long poles, escort vehicles displaying suitable warning signs shall be used.

521.6 If it becomes necessary to store poles at the locations where they will be set, they shall be so placed that they will not interfere with traffic. If poles are left on or near a street, highway, or walkway overnight, and have the potential to create a hazard, they shall be safe guarded by well-lighted warning signs.

521.7 Poles shall be so placed or blocked that they will not roll.

521.8 Poles loaded on a truck or trailer shall be securely fastened in at least two places.

521.9 The wheels of the transporting vehicle shall be blocked or securely braked prior to loading or unloading.

521.10 If any pole holes are left unfilled at the end of the work period, they shall be protected with substantial coverings.

521.11 Pole holes must be attended or physically guarded to prevent employees or the public from falling into the hole.

521.12 Only employees who are trained and qualified shall operate the pole setting equipment.

522 STREET LIGHTING CIRCUITS

522.1 Circuit shall be disconnected from source of supply by opening and physically rendering inoperative disconnecting switches, or cutouts. Proper Clearance tags shall be attached. Dependence shall not be placed on time switches or other automatic devices.

551 WORKING ON ENERGIZED CABLE AND EQUIPMENT

551.1 Only qualified employees shall be assigned to work on underground conductors or equipment energized in excess of 50 volts. Apprentices in training who are qualified by experience and training shall be permitted to work on underground conductors or electrical equipment energized in excess of 50 volts while under the continuous supervision of a qualified employee. During the time the work is being done on any exposed parts or equipment energized in excess of 50 volts, two qualified employees shall be present at each work location.

551.2 Cable and equipment to be worked upon shall be positively identified, tested in an approved manner, and where required, a Clearance shall be obtained from BESOC in the prescribed manner.

552 WORKING ON DE-ENERGIZED CABLE AND EQUIPMENT

552.1 Before proceeding with the work, all primary conductors shall be tested for potential, short circuited and grounded at all ends whenever possible and at all locations, whether in a vault, substation, adjacent transformers or where the underground cable connects with the overhead system.

552.2 All switches or jumpers, through which it is possible to energize the cable to be worked upon, shall be opened and tagged. Where locking facilities and air Clearances are available, they shall be used.

553 WORKING AROUND CABLE IN VAULTS AND MANHOLES

553.1 Cables energized at more than 600 volts shall not be moved in such a manner as to form a bend or materially change the radius of any bend. Slight changes in position of the cable may be made that shall not endanger the sheath or insulation.

553.2 Employees shall never step on energized cables.

553.3 After completing cable work, the cable shall be properly tagged.

554 CHIPPING DUCT

554.1 When chipping concrete around duct containing cables, there shall be at least two journey workers or one journey worker and a qualified apprentice at the work location.

554.2 Before powered chipping tools are used to remove the concrete casing from around a duct containing energized cables, the cable shall be de-energized. This shall include all ducts containing energized cables adjacent to the duct to be exposed.

555 JUNCTION BOXES

555.1 Junction boxes with exposed air brake blades shall not be operated to drop load.

556 CABLE AND REEL HANDLING

556.1 If necessary to leave a cable reel or a trailer unattended the reel or trailer wheels shall be chocked on both sides.

556.2 Employees shall not remain in vaults or manholes during heavy pulling strains on cables.

557 DIRECT BURIED CABLE: Electric Cable specially designed to be buried under the ground without any kind of extra covering, sheathing or piping to protect it.

557.1 When digging in the vicinity of electric underground facilities a qualified employee shall be contacted to locate and mark facilities. If available maps do not give precise locations, suitable instruments shall be used to determine their location.

557.2 All underground electric cable shall be considered energized and shall be respected as such.

557.3 Neither pneumatic tools nor metallic probes shall be used when within three feet of underground facilities energized at over 600 volts. Further excavation shall be performed with proper hand tools.

557.4 Before beginning work, carefully observe for the presence of underground facilities such as gas meters, regulator vent guards, cables running down a pole or building into the ground, underground electric service, lack of overhead wires, electric service pedestals, telephone pedestals, yard lights, street lighting, line or cable markers, transformer pads, old or new ditch lines, valve boxes, etc.

558 CABLE OR EQUIPMENT FAILURE

558.1 When a fault condition exists, all buried cables operating at 600 volts and above located within three feet of the faulted cable shall be de-energized before digging. The cables not being worked on may be re-energized if not exposed in the excavation or after exposed cables are in satisfactory operating condition and properly protected to provide safe working conditions for personnel.

558.2 De-energized direct buried cable normally operating at 600 volts and above, shall be protected with proper hold-offs and grounded before cutting into them.

558.3 Splices performed on a URD cable requiring the use of a torch may not be used within a three feet vicinity of a natural gas line. Exposed natural gas lines between three feet and six feet from the proposed splice shall first be covered with:

A. A minimum of six inches of dirt, or

B. A rated flame-proof blanket.

558.4 Non-heat shrink splices shall be utilized when cables cannot be rerouted to obtain the minimum three feet clearance.

559 UNDERGROUND EQUIPMENT AND URD CABLE

559.1 Non-load break terminations (bayonets, etc.) shall never be used to make or break load. Conductors or transformers shall be energized, de-energized or sectionalized by opening or closing the closest rated load break device.

559.2 Energized load break elbows or other cable disconnecting type termination shall be handled only with approved insulating hot line tools. Energized load

break elbows or other types of disconnecting terminations shall never be removed or installed with the gloved hand only.

559.3 Only approved accessories and devices shall be used to test and ground cables, transformers, or other underground equipment. All equipment and transformers shall be considered energized until grounded.

559.4 All underground equipment shall be tested and proven to be de-energized before grounds are installed.

559.5 Proper procedure for URD fault locating shall be followed.

559.6 All test equipment shall be removed from all equipment and/or cables under test before any switching can be done.

560 PAD-MOUNT TRANSFORMERS

560.1 Rubber glove work on pad-mount transformers shall be limited to secondary voltages up to and including 600 volts.

560.2 When switching or phasing leads energized at 600 volts and above in pad-mount electrical equipment, there shall be two journey workers or one journey worker and a qualified apprentice at the location of the electrical equipment.

560.3 It is required to physically check out the loop or it is required to phase primary before tying together in loop feed transformers.

560.4 Because of the inherent capacitance of underground cable after being energized at high voltage, an electrical charge may be stored in the cable until it is grounded. Note: If a de-energized cable is lying next to an energized cable, the de-energized cable will pick up an induced voltage charge. All cable terminations and transformer shall be grounded before touching them.

575 ELECTRIC METERING AND EQUIPMENT

575.1 Because of the high fault currents available in this equipment, only qualified and properly trained employees shall work on meters and meter equipment.

A. Rubber gloves with leather protectors, arc-rated face shield with balaclava/Class E Type I or II hard hat with eye protection, and arc-rated clothing shall be worn when installing or removing meters from energized meter sockets. Leather gloves may be worn if socket is de-energized.
B. Meter sockets shall be inspected before the meter is installed and/or the service is energized. Checks shall be made to ensure there is not socket damage, loose connections, or foreign objects present that could cause a short circuit or flashover.
C. Voltage readings between the source, load, and ground shall be made to identify cross-phasing, back feed, or phase-to-ground fault present in the meter socket.
D. Single-phase and three-phase meters installed into meter bases with bypass handles:
    1. Shall be disconnected or connected using one of the following methods:
        a. Using an approved disconnect device at the meter socket.
        b. Using the facility main switch or disconnect.
        c. Disconnecting the service or deenergizing the transformer location.
        NOTE: Disconnecting sleeves MAY NOT be plugged directly into the meter socket.
    2. May be operated by Electric Metering Specialists to perform meter changes.
    3. Shall only be operated by CARS when using an approved disconnect device for a turn-on or turn-off.

E. Before removing a meter, a visual inspection shall be made to determine if the meter or meter socket is damaged. If damage is indicated, the meter shall be de-energized before removal.
F. When setting socket-type meters, the load side terminal shall be entered first, followed by the source side. The removal of the meter shall take place in the reverse order. Care shall be taken to prevent the meter ring from coming into contact with the socket terminals.
G. Meters shall not be disconnected by rotating the meter in the meter socket.
H. During testing, the energized socket or test equipment shall not be left unguarded. If a socket is to be left energized, a meter or approved socket cover shall be in place before leaving the work area.
I. Only qualified, trained employees shall perform installation, removal, and maintenance of transformer-rated meters.
J. Under no circumstances shall the secondary terminals of a current transformer be opened. The transformer shall be shunted before the secondary metering circuit is opened.
K. A check shall be made to ensure that all instrument transformer cases and associated enclosures are properly grounded.
L. When approaching or working on customer property, employees shall watch for tripping hazards, defective stairs, and the presence of dogs, cats, or other potentially dangerous animals.
M. Before entering customer property, employees shall announce their presence and state their business if practical. Employees shall also notify the customer when leaving the property if practical.
N. If possible, employees shall turn off customer main switch prior to installing and removing socket-type meters.
O. Employees shall push socket-type meters into their socket. Employees shall never hit the meter with their hand or any other device.
P. When metering equipment shows evidence of lightning, fire, vandalism, or other significant damage the service shall be de-energized before any work is performed.
Q. Non-conductive tools shall be used to avoid contact between live parts and the ground.

575.2 Required personal protective equipment for electric meter work.
A. ANSI Z87.1 safety glasses or goggles.
B. ANSI Z89.1 Class E Type I or II hard hat with arc-rated face shield with chin cup.
C. Class “0” rubber gloves with leather protectors when working on equipment up to 600 volts.
D. Class “2” gloves with leather protectors and sleeves when working on equipment above 600 volts.
E. Arc-rated clothing.

575.3 Prior to performing any work on the secondary side of an energized current transformer, inspect all test equipment leads to ensure all connections are secure.

575.4 Never open the secondary circuit of a CURRENT transformer while the primary winding is energized. If it is necessary to disconnect instruments on wiring, first short circuit the secondary winding at the current transformer or at a terminal block provided for the purpose.

575.5 Never short-circuit the secondary circuit of energized instrument VOLTAGE transformers.

575.6 Always wear eye protection and appropriate gloves when stripping broken glass from meters.

575.7 Due to the hazard of flying glass, never intentionally break or attempt to chip away broken glass covers. Carefully disassemble the glass using proper personal protective equipment.

575.8 Pick-up and properly dispose of all broken glass. Never leave broken glass at a customer's premises, or in an inappropriate area.

590 ENGINEERING GENERAL RESPONSIBILITY

590.1 All engineering process areas shall follow required BWL safety rules when in the office and in the field.

A. When approaching or working on customers' property, employees shall watch for tripping hazards, defective stairs, and the presence of potentially dangerous animals or any other hazards.
B. Before entering customer property, employees shall notify the customer of their presence and state their business. They shall notify the customer when leaving.
C. Employee shall wear an approved bright colored safety vest and required personal protective equipment when working within 15 feet of the edge on any roadway or driveway.
D. Use one or more assistants when measuring across roadways with traffic that will interfere with measuring by one person alone. This includes measuring the height of facilities overhanging the roadway. Assistants may watch for developing hazards or help measure, whichever is safer.
E. Use a measuring wheel, non-metallic folding rule or cloth tape for general measuring. Do not measure with a hand-held measuring wheel from a moving vehicle.
F. Steel measuring tapes shall be used for line surveying only when there is no risk of contact with energized conductors.
G. Employees shall not probe in areas where direct buried cables are located.
H. Only trained qualified employees shall use a fiberglass measuring stick to measure the height of any overhead equipment. The fiberglass measuring stick shall:
    1. Be inspected before each usage.
    2. Be cleaned as needed but not less than once a year.
    3. Last inspect date shall be attached to stick.
I. Employees working alone in isolated area shall notify the Employee-in-Charge of their intended location and scheduled route or location and/or maintain radio contact with another approved employee.

590.2 Underground distribution work area.

A. Employee shall request from the electric emergency worker or distribution process area assistance to open enclosure, transformer or any other energized equipment.
B. Employee shall be properly trained and qualified before entering any excavation more than four feet deep.
C. Only qualified trained employee shall enter manholes, vaults, or enclosed spaces and they must follow BWL confined space rules in Section 150 and request assistance from the distribution process area.

D. Employees shall wear approved required personal protective equipment.
E. Employees shall not make contact with any exposed energized equipment.

590.3 Electric Substations.

A. Unaccompanied entry into a substation or switchyard is only authorized for the following Qualified Electrical Journey Workers with NERC responsibilities and training to respond to substation emergencies:
   1. EC&M Electricians
   2. ECS Technicians
   3. ETG System Protection Technicians
   4. ESI Electric System Inspectors
B. Non-Qualified employees may enter both substations and switchyard only when accompanied by a Qualified Electrical Journey Worker.
C. Journey Operations Technicians are deemed authorized Qualified Electrical Journey Workers for unescorted entry into substation switchyards only.

SECTION 600
WATER TRANSMISSION AND DISTRIBUTION SYSTEM

600 Personal Safety
601 Distribution Installation and Repairs
602 Services
603 Equipment/Cranes/Vehicles
604 Disinfecting Water Mains

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105 Fire Protection and Prevention
111 Housekeeping
116 Excavation, Boring and Tunneling
119 Adverse Weather Conditions
151 Confined Space
154 Opening of Vault or Manhole
155 Working around Utilities
303 Inspections of Vehicles and Equipment
304 Transporting Employees
305 Transporting Materials
306 Parking
307 Backing
309 Equipment Fueling
311 Heavy and Specialized Equipment
313 Crane, Hoist, Derrick
314 Rigging Equipment
351 Barricading and Flagging
353 Traffic Regulators (Flaggers)
355 Attentive Driving
400 Tools – General
408 Power Tools and Equipment
416 Pneumatic Tools
418 Welding, Cutting, and Brazing
419 Compressed Gases
420 Compressed Air

600 PERSONAL SAFETY

600.1 Whenever confronted with a threat of bodily harm, the threatened employee shall withdraw from the situation as quickly as possible without rebuttal or remarks and immediately notify the Employee-in-Charge.

600.2 Employees shall know the locations of the First Aid and CPR kits.

600.3 Employees shall obtain assistance when lifting heavy or awkward objects and always use proper lifting techniques.

600.4 Loose fitting clothing, dangling jewelry and rings shall not be worn while operating and working around power driven equipment.

600.5 Employees shall know where to locate SDS files.

600.6 Employees shall wear the personal protective equipment required for the task being performed.

600.7 Lockout/Tagout programs are department-specific and shall be referenced for proper procedure.

600.8 Employees shall consult Safety Manual Section 200 and/or department PPE Hazard Assessment for additional guidance on personal safety and protection.

601 DISTRIBUTION INSTALLATION AND REPAIRS

601.1 Mains.

A. Traffic control shall be the first consideration.
   See Section 351 – Barricading and Traffic Control
   See Section 353 – Traffic Regulators
B. With the exception of soft excavation, confirm the “all-clear” via MISS DIG’s Positive Response prior to any and all excavations.
C. Excavation shall comply with rules 116 and 155 of this Manual.

601.2 Hydrants.

A. When lifting or lowering a hydrant:
   1. Proper rigging techniques shall be employed, and
   2. Employees shall keep a safe distance from the hydrant.
B. Safe lifting practices shall be utilized when using a Seat Wrench.
C. No person shall stand in front of any nozzle when pressurizing a hydrant.

601.3 Lead Pots/Steam Pots.

A. When handling molten lead or lead substitute, a full-face shield, leather gloves, leather apron or fire-resistant coveralls shall be used in addition to standard PPE.
B. Steam pots, hoses, and spouts shall be inspected before using.
C. When preparing lead for melting, employee shall ensure no water is mixed with the lead.
D. Propane Tanks.
   1. In transport, tanks shall be disassembled and secured.
   2. In use, tanks shall be checked for leaks.

602 SERVICES

602.1 When using the Bore Machine, the operator shall stand behind or to the right of the machine.

602.2 Hoses shall not be used for lowering or lifting the Bore Machine in or out of the hole.

602.3 Excavation shall comply with rules 116 and 155 of this Manual.

602.4 When flaring copper, a brass hammer shall be used.

602.5 When hoses cross a street they must be secured.
602.6 When handling dry ice, appropriate PPE shall be donned to protect the skin.
602.7 Any time a water meter is removed, a jumper cable shall be attached prior to removing the meter to ensure that a continuous ground is maintained.
602.8 When it is necessary to drill through a customer's wall to install radio wire, employee shall confirm the area to be drilled is free of electrical or other utility lines.
602.9 The Hydraulic Valve Turner shall be operated by a minimum of 2 qualified trained employees.

603 EQUIPMENT/CRANES/VEHICLES

603.1 Section 300 – Vehicle Operations shall be consulted for:
A. Operator requirements.
B. Vehicle/equipment requirements.
603.2 When equipment is in use, operator shall ensure all safety devices (including doors and guards) are engaged and functioning.
603.3 No person (employees, pedestrians, etc.) shall be permitted to traverse the hazardous area between fixed objects and moving equipment.
603.4 Trailer lights and braking systems shall be tested prior to transporting to ensure they are in working condition.
603.5 Employees shall keep hands and body parts away from pinch points when hitching or unhitching a trailer.

604 DISINFECTING WATER MAINS

604.1 Water Transmission and Distribution employees shall maintain procedures and conduct employee training consistent with the most current version of AWWA Standard C652-99 for employees responsible for water main, wells, valves, and equipment disinfection.
604.2 Only trained and qualified personnel shall disinfect mains or other related equipment.
604.3 Employees shall refer to the appropriate Safety Data Sheet (SDS) for direction on the approved protective equipment and clothing to be worn whenever disinfectants are handled.
604.4 Chemicals and solutions shall be stored in containers clearly labeled to identify their contents and hazards.
604.5 When transporting, chemicals shall be in approved containers and secured to prevent spillage.

SECTION 700
WATER PRODUCTION

700 General
701 Water Well and Water Main Disinfection
702 Basin Area
703 Filter Press Operation
704 Valve Turning
705 Telemetry and Remote Operating Equipment
706 Laboratory
707 Acids – Muriatic and Citric
708 Dry Chemical and Unloading Bins
709 Bulk Chemicals

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Other Appropriate Rules in this Manual:

103 Employee-in-Charge Responsibilities
151 Confined Space
200 Personal Protective Equipment
314 Rigging Equipment
351 Barricading and Flagging
419 Compressed Gases
420 Compressed Air

700 GENERAL

700.1 Any employee or visitor to Water Production facilities shall receive site safety orientation prior to being allowed access unaccompanied by Water Production personnel.

700.2 Anyone performing work at Water Production facilities shall:

A. Sign in at the appropriate area(s).
B. Follow all NSF and 10 State Standards for materials.
C. Be familiar with Water Production's Confined Space Program if work will be performed in confined space.
D. Refer to Water Production's LOTO Program.
    1. Personal locks are required for lock-out purposes.
    2. Tags are to be used for employee identification and contact information only.
    3. No lock (LOTO-related or chemical) shall be cut without management approval.
E. Employ appropriate respiratory protection.
    1. Employees working in Water Production shall follow the requirements of the BWL Respiratory Protection Program.
    2. Anhydrous Ammonia Feed System (419.15):
        a. SCBA shall be donned every time ammonia is opened to atmosphere.
        b. SCBA is not required for work on a locked-out system.
F. Ground fault protections devices (GFCI) shall be used to power any electric devices operated outside of the office area.

700.3 Handrails shall remain in place when not removed for work in progress, including but not limited to:

A. Filter press
B. Loading docks
C. Hoist areas

700.4 Equipment Identification.

A. Each facility shall establish a uniform and consistent equipment identification system.
B. Employees shall use the facility identification system to identify equipment for operation or maintenance activities.

700.5 Housekeeping.

A. Soda ash and lime dust shall be removed from pipes, beams, equipment, etc. at regular intervals and in such a way not to cause a hazardous condition.
B. Compressed air is not to be used for cleaning soda ash and lime dust.
C. Walkways shall be kept clear of foreign objects and materials.

700.6 The Employee-in-Charge shall be responsible for both their own safety and for the safe work environment of employees under their supervision.

701 WATER WELL AND WATER MAIN DISINFECTION

701.1 Water Production employees shall maintain procedures and conduct employee training consistent with the most current version of AWWA Standard C652-99 for employees responsible for water main, wells, valves, and equipment disinfection.

701.2 Only approved sodium hypochlorite (bleach) and calcium hypochlorite (labeled HTH) solutions and tablets shall be used for water main disinfection.

701.3 Only vessels designated for the transport of sodium hypochlorite shall be used to do so.

702 BASIN AREA

702.1 Only approved oils, paints, solvents, or chemical materials are allowed in the basin area.

702.2 Employees working in the basement or basins at Wise shall vacate those areas during liquid chemical unloading.

702.3 Hazard Assessment of basin shall precede entry to identify:

A. Fall protection.
B. Ergonomic challenges.
C. Confined space requirements, including Safety Watch.
D. Ladders.
E. Additional PPE.
F. Hot work.

702.4 Radios are required for work in basins.

703 FILTER PRESS OPERATION

703.1 The flashing red lights indicate dumping is commencing; therefore, employees shall vacate the Filter Press truck bay loading area, and no one shall enter.

703.2 Prior to dumping, employee shall confirm:

A. Truck is positioned to receive material, and
B. Truck has the available capacity to receive material.

703.3 Employees shall not stand, walk, etc. beneath the bombay doors.

704 VALVE TURNING

704.1 Only trained and qualified employees shall operate valve turning equipment.

704.2 Only approved valve-turning equipment shall be used.

705 TELEMETRY AND REMOTE OPERATING EQUIPMENT

705.1 Equipment that can be remotely started shall be identified and signs posted.

705.2 Any employee entering area(s) containing this equipment shall communicate with control room prior to entry.

706 LABORATORY

706.1 Refer to Department PPE Hazard Assessment for PPE requirements related to lab work.

A. Contact lenses shall not be worn in the lab.
B. Gloves shall be worn when appropriate.
C. Hands shall be washed following lab work, prior to exiting the lab.
D. Food and drinks shall not be brought into nor consumed inside the lab.

706.2 Employees shall have access to and familiarity with the SDS for the chemicals with which they are working.

707 ACIDS – MURIATIC AND CITRIC

707.1 Consult SDS for:

A. Appropriate PPE.
B. Incompatible materials.

707.2 Secondary containers shall be designated and labeled specifically and only for the acid being contained therein.

707.3 Refer to appropriate SOP for safe usage.
707.4 Acids shall be stored in acid cabinets when not in use.

708 DRY CHEMICAL UNLOADING BINS

708.1 When in the bins and unloading areas:
- A. Long sleeves and pants are required.
- B. Respiratory protection is required when dust is visibly airborne.
  1. Half-mask with goggles, or
  2. Full-face mask.

708.2 Bin Whips
- A. Two people required for movement.
- B. Area and task to be assessed for consideration of ergonomic challenges.

708.3 Bin Lids
- A. Lids shall be opened far enough that they stay open on their own.
- B. When work is complete, lids shall be returned to closed position.

708.4 Emptying dust-return barrels requires training on this task, including but not limited to:
- A. Knowledge of safe lifting practices.
- B. Use of respiratory protection.
  1. Half-mask with goggles, or
  2. Full-face mask.
- C. Chemical hazards.
  1. Exposure.
  2. Proper placement.
- D. Utilization of pallet jack.

709 BULK CHEMICALS

709.1 PPE requirements determined by Safety Data Sheet (SDS), PPE Hazard Assessment, Job Safety Analysis, BWL Safety Manual or Department Procedure shall be followed, especially when work requires interaction with:
- A. Lime (Calcium Oxide)
- B. Bleach (Sodium Hypochlorite) – see 1010 (hyperlink)
  1. Only vessels designated for the proper secondary containment of sodium hypochlorite shall be used.
- C. Fluoride (Hydrofluorosilicic Acid)
- D. Soda Ash (Sodium Carbonate)
- E. Anhydrous Ammonia

709.2 Entry into rooms designated for the holding of bulk chemicals require permission of Water Production Management.

709.3 Unloading (dry or liquid).
- A. Prior to unloading:
  1. Truck driver shall be tailgated.
  2. Second verification by management shall be obtained.
- B. Water Production employee and truck driver shall each have a working radio on their person.
- C. Areas restricted by barricade for liquid chemical unloading shall not be entered.

SECTION 800
LOCKOUT/TAGOUT AND CLEARANCES

800 General
801 New or Replacement Equipment
854 Dispatching and Switching
855 Operating Switches and Devices
857 Testing
859 Grounding

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800 GENERAL

800.1 Lansing Board of Water and Light (BWL) shall maintain a Lockout/Tagout Program.

800.2 BWL Lockout/Tagout and Clearance procedures apply to all BWL employees and contractors.

A. Under no circumstances shall an unauthorized person attempt to start, energize or use a machine, equipment or circuit that has been locked or tagged out.
B. Employees shall consult with supervision/management whenever there are any questions regarding energy control procedures or methods.
C. Outside contractors shall submit Lockout/Tagout requests through the BWL Employee-in-Charge coordinating the contractor work. In an emergency:
    1. Contractors may contact the Electric System Operator (ESO) at BESOC.
    2. The contractor to whom the ESO gave clearance shall be considered the Employee-in-Charge.

800.4 Before employees perform any servicing or maintenance on a machine, equipment, or circuit where the unexpected energizing, startup or release of stored energy could occur, the machine, equipment or circuit shall be isolated from the energy source and rendered inoperative.

800.5 Each department or facility shall identify a single person or designee per shift that is responsible for the Lockout/Tagout program for the purpose of reviewing and processing all Clearance requests.

800.6 Each piece or combination of equipment, machines or circuits shall have specific Lockout/Tagout procedures which include:

A. Steps for shutting down, isolating, blocking and securing the equipment.
B. Steps for placement, removal and transfer of locks or tags.
C. Requirements for testing to determine and verify the effectiveness of the locks or tags.
D. Steps for permissive bypass.
E. Steps for returning the equipment, machine or circuit back into service.

800.7 All switches, disconnectors, jumpers, taps, and other sources of electric energy shall be opened and rendered inoperable unless its design does not so permit; and tagged to indicate that it is locked/tagged out.

800.8 Automatically and remotely controlled switches that could cause the opened circuit to become energized shall be rendered inoperable and shall be tagged at the point of control.

800.9 Employee Training.

A. Employee training shall be provided prior to any exposure to potential hazardous energy sources, as identified in the BWL LOTO program.
    1. Authorized employees shall receive training in the recognition and control of hazardous energy sources and the methods and procedures for hazardous energy control.
    2. Affected employees shall receive training in the purpose and use of energy control procedures.
B. Employees shall be retrained whenever there is a change in assignment, equipment or procedures, or whenever periodic inspections identify deviations or inadequacies in the use of energy control procedures.

800.10 Lockout/Tagout devices:

A. Shall be singularly identified and be the only devices used for controlling hazardous energy sources.
    1. Protective locks and tags shall not be used for any other purpose.
    2. Devices shall be clearly identifiable from other locks and/or tags.
B. Shall be standardized within the facility or department.
C. Shall clearly identify the authorized employee requesting the Clearance.
D. Shall be selected to withstand the environment which they will be exposed for the expected work duration.

800.11 When a Lockout device cannot be used a Tagout device shall be used.
A. Tagout procedures shall provide the equivalent level of safety as a Lockout device.
B. Tagout devices shall be attached at the same location that a Lockout device would have been attached.

800.12 Prior to starting work on equipment or an electrical system that has been locked or tagged out the authorized employee shall verify (i.e., test start) that the isolation and deenergization has been accomplished.

800.13 Release from Lockout or Tagout.
A. Each department or facility shall identify a single authorized person or designee per shift that is responsible for the Lockout/Tagout program for the purpose of releasing a Clearance and returning equipment to service.
B. Only an authorized employee shall remove locks or tags.
C. If the authorized employee who requested the Lockout/Tagout devices is not available, procedures shall be followed for the device to be removed under direction of the department management.
D. The work area shall be inspected to ensure that the equipment components are operationally intact, and all employees and material have been removed from the area.
E. If applicable, all personal protective grounds shall be removed, at which time the system shall be considered energized.
F. All affected employees shall be notified that the Lockout/Tagout devices have been removed or are about to be removed.

800.14 Temporary Removal of Lockout/Tagout devices – Permissive Bypass.
A. Lockout/Tagout devices may be removed for energizing for temporary testing or positioning of equipment following all criteria in Rule 800.11.
B. Immediately after testing, all Lockout/Tagout devices shall be reapplied.

800.15 Group Lockout/Tagout.
A. When multiple work groups are working on the same equipment an authorized employee shall be designated to coordinate affected work groups.
B. The authorized employee shall follow the facility-specific procedure which provides an equivalent level of safety as a personal Lockout/Tagout device.

800.16 Shift or Personnel Changes.
A. The authorized employee shall ensure that procedures are in place to provide an orderly transfer of Lockout/Tagout protection between off going and oncoming shift employees.

801 NEW OR REPLACEMENT EQUIPMENT

801.1 Whenever replacement, major repair, renovation, or modification of a machine or equipment is performed the equipment shall be designed to accept a Lockout device.

801.2 Before any new, replacement or modified equipment is put into service the Project Coordinator or System Operations shall verify that a Clearance procedure is in place and/or initiate the necessary changes to the Clearance procedure.

854 ELECTRIC TRANSMISSION AND DISTRIBUTION CLEARANCES

854.1 Jurisdiction.

A. All electric lines and equipment in the BWL transmission and distribution system shall be under the jurisdiction of the Electric System Operator.
B. Generators and house service electrical systems in the power plants are under the jurisdictions of the Power Plant Employee-in-Charge.

854.2 All requests for Clearances within the BWL transmission and distribution system shall be made to the Electric System Operator.

A. All procedures necessary to provide safe Clearances shall be ordered in accordance with the BWL LOTO Program.
B. The Electric System Operator shall issue orders for switching, placing or removing protective tags and locks, and for the removal or replacement of high voltage lines or equipment in service.

854.3 Notification.

A. Employees entering any substation, vault, or manhole shall make their presence known to the Electric System Operator.
B. The Electric System Operator shall notify all personnel in the area before switching begins.

854.4 The Electric System Operator shall keep clear and complete records of all transmission and distribution switching and Clearances. This includes, but is not limited to:

A. Equipment name.
B. Switch and circuit designations.
C. All locations of grounds and tags.

854.5 Clearances shall not include grounding unless the person requesting Clearance specifically asks for it.

A. Clearance or switching procedures shall not relieve the necessity for installing personal protective grounds.
B. Personal Protective Grounds shall be reported to the Electric System Operator ONLY if left unattended.

854.6 Employee-in-Charge shall be responsible for ensuring:

A. All employees are made aware of and have acknowledged the instructions or orders relative to the condition of Clearance of lines or equipment before work is started.
B. All employees involved are advised of any changes in the condition or status of the lines or equipment.

854.7 Each crew working on the same lines or equipment shall comply with clearance procedures – not working under another crew's clearance but being added to the clearance.

854.8 Switching Orders.

A. All communications concerning operation of switches or devices within the BWL transmission and distribution system shall be scheduled in advance and in writing whenever possible.
B. Verbal orders shall be repeated back by the receiver to avoid misunderstanding. The names of the sender and receiver of such orders shall be documented.

854.9 Discussion shall be held with all authorized and affected employees any time modifications need to be made to switching order.

A. All authorized and affected employees shall understand and agree to the switching order changes.
B. The authorized employee shall document changes on the original written switching order and include date, time, and initials of the authorized employee.

855 OPERATING SWITCHES AND DEVICES

855.1 No switches shall be operated without first securing approval and/or field control from the Electric System Operator.

855.2 In case of emergency, switches or devices may be operated without authorization from the Electric System Operator; however, the operator shall be notified as soon as possible.

857 TESTING

857.1 Before starting work, deenergized lines shall be checked for potential in accordance with BWL procedures.

859 GROUNDING

859.1 Protective grounds shall be applied before working on deenergized lines and equipment.

859.2 If protective grounds cannot be applied, then lines and equipment shall be treated as energized.

859.3 Recording grounds.

A. Requested Grounds.
When protective grounds are requested as part of the Clearance, a record of each ground applied shall be kept by the Electric System Operator so that all grounds can be removed prior to returning equipment to service.
B. Personal Protective Grounds.
Grounds installed by workers for personal protection shall be reported to and recorded by the Electric System Operator when left unattended.

859.4 Protective grounds shall not be applied until the line or equipment has been tested and determined to be deenergized.

859.5 Grounds.

A. Grounds shall be first connected to a ground source before being brought in contact with any deenergized conductor of the circuit to be grounded.
B. All ground cables shall be removed from all circuits' conductors before being disconnected from the ground source.
C. Grounds shall be so placed that one of them is readily visible to at least one member of the crew where possible.
D. The station’s source shall be grounded first for initial Clearance and station grounds removed last before restoration.
E. Changing of grounding points during the Clearance shall be by field direction with ESO’s approval.
F. Grounds may be installed back to source first to allow removal of protective covers from grounding points.

859.7 Proper personal protective equipment deemed necessary by system requirements shall be used when applying and removing protective grounds.

859.8 Only cables and conductors designed for the purpose shall be used for protective grounding.

859.9 Minimum copper conductor size for ground cables:
138 kV - 2/0
Distribution Primary - 2/0
Distribution URD Elbow Grounds – 1/0
Lead Underground (U.G.) - 2/0
Overhead - 2/0

SECTION 900
ELECTRIC, STEAM AND CHILLED WATER PRODUCTION

900 General
901 Dams, Cooling Towers and Ponds
902 Natural Gas Sites
904 Chilled Water Plant
905 General Coal Handling and Railcar Operation
907 Locomotive Operation
912 Coal Bunkers

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This section of the Safety Manual pertains to safety requirements applicable to electric, steam and chilled water production facilities. However, other sections of this manual are common to all employees and production employees are expected to be familiar with the requirements and follow all rules applicable to their work assignment. At individual facilities where specific safety instructions are required, these instructions shall be provided to all employees and visitors.

900 GENERAL

900.1 All new and existing employees shall be required to complete Natural Gas Awareness Training.

A. Additional training shall be provided to employees with a reasonable expectation of performing work inside a natural gas facility.

900.2 Equipment shall be considered in service unless properly cleared and locked or tagged out.

900.3 Equipment Identification.

A. Each facility shall establish a uniform and consistent equipment identification system.

B. Employees shall use the facility identification system to identify equipment for operation or maintenance activities.

900.4 Housekeeping.

A. Coal dust and fly ash shall be removed from pipes, beams, equipment, etc. at regular intervals and in such a way not to cause a hazardous condition.

B. Compressed air is not allowed for cleaning coal dust or fly ash.

900.5 Where explosion proof lighting is required it shall not be replaced with conventional fixtures.

901 DAMS, COOLING TOWERS AND PONDS

901.1 All work on dams, cooling towers and ponds shall involve two qualified employees.

901.2 Employees shall be secured with a safety harness and Self-Retracting Lifeline (SRL) when working on, inspecting, or cleaning dam trash racks.

901.3 Lifelines shall be placed and maintained on or near cooling towers, discharge platforms, outfalls, and river or pond docks, platforms, and intake to the hydro turbines.

901.4 Life jackets shall be worn when walking or working on the Eckert cooling tower platforms and boom floats.

901.5 The Moores Park Dam pond level shall be dropped below the crest of the dam when working on the upstream face of the dam.

902 NATURAL GAS SITES

902.1 Visitors (including BWL crews and contractors) to gas facilities shall:

A. Complete Natural Gas Awareness Training prior to visit.

B. Sign in, providing all requested information.

C. Neither smoke nor use matches or lighters anywhere in the facility.

D. Restrict movement only to plant areas designated by escort, marked pathways, and aisles unless reason for visit has authorized permission to be outside of those areas unescorted.

E. Don all required personal protective equipment.

902.2 Entry into compressor building is restricted to authorized employees only.

902.3 In the event the smell of natural gas becomes strong, employees shall:

A. Stay low.

B. Exit the facility using stairways – not elevators – and proceed to designated muster points.

C. Refrain from using cell phones, light switches or motors capable of producing an arc or spark.

D. Notify the control room as soon as possible.

902.4 Should anyone inhale enough natural gas to cause breathing to become labored or cease, employees shall:
- A. If safe to do so, move victim to fresh air immediately.
- B. Call 911.
- C. Notify control room.

902.5 Hot work.
- A. Inside the plant requires testing and continuous monitoring of the working area's (10-foot radius) natural gas ppm.
- B. Inside the compressor building shall only be performed during outage.

902.6 Any time a gas pipe is to be opened beyond the use of valves, the BWL Electric Production Line-Break Procedure shall be followed.

902.7 No attempt to extinguish a gas fire shall be made until the flow of gas has been stopped.

902.8 Gas line valves shall only be operated by Gas Plant Chiller Operators (GPCOs).

902.9 Access to all parts of gas piping systems during cleaning and purging shall:
- A. Be restricted to only those involved in the procedure.
- B. Require any uninvolved personnel to be evacuated from the affected area(s).

902.10 Purging.
- A. Personnel in the affected area(s) shall be informed of the hazards associated with the activity prior to the initiation of any purging activity.
- B. Purging in and out of service shall comply with the BWL Electric Production Purging Procedure, including the use of nitrogen gas.
- C. Detection equipment shall be employed throughout the purging.
- D. Only authorized trained employees shall operate gas detection equipment.

904 CHILLED WATER PLANT

904.1 Prior to entry, visitors (including BWL crews and contractors) shall call into Reo Operations from the parking lot to report they are on-site.
- A. The front door is the only approved method of entry.

904.2 Upon entry to the facility, any active (refrigerant) alarms/strobes shall be immediately reported to the Operations Supervisor.
- A. Further entry is prohibited.
- B. Employees shall evacuate immediately to the designated muster point.

904.3 Only SCBA-trained employees may enter the building to investigate a refrigerant alarm or repair an active leak.

905 GENERAL RAILCAR OPERATION

905.1 Employees Shall Not:
- A. Ride in cars, on couplings, on the ladder between, or on the footboard of the locomotive.
- B. Cross in front or back of the cars or locomotive unless it is safe to do so.
- C. Climb over the top of cars.
- D. Work or crawl under a car or locomotive unless the wheels are blocked in both directions and blue flags placed.
- E. Jump from one car to another while either is in motion.
- F. Go between car and locomotive while they are in motion.

905.2 All below-grade coal handling equipment shall be treated as confined space.

905.4 Blue Flags.

A. The Employee-in-Charge or authorized contractor shall place blue flags at both ends of the track whenever there are track repairs, derailment, locomotive or car repairs, railroad request, derailer installation or any other situation where moving the rail cars creates a dangerous situation.
B. When a blue flag is in place, locomotives or rail cars shall not be moved into or inside the blue flag area.
C. The Employee-in-Charge shall immediately notify Canadian National Railway of a blue flag track.
D. Equipment or materials shall not be placed where they obstruct the visibility of the blue flags.
E. Only the Employee-in-Charge or person setting the flag shall remove blue flags.

907 LOCOMOTIVE OPERATION

907.1 Only authorized, trained employees shall operate locomotives or the locomotive remote control.

907.2 Locomotive warning bells and horn.

A. Before moving a locomotive, the operator shall sound the warning bell or horn.
B. The warning bell or horn shall be sounded when approaching a walk, a driveway, or entering or exiting thawing pit or thawing shed area.

907.3 Flying switches shall not be made.

907.4 Drawheads or knuckles shall not be shifted while locomotive or car is in motion.

907.5 When operating manually, the locomotive shall not be moved unless the operator has received radio communications Clearance by the switcher.

A. Hand signals are not permitted.
B. Repeat transmission before acting. If you are unsure, stop the train at once.

912 COAL BUNKERS

912.1 All coal bunkers are classified as Permit Required Confined Spaces.

912.2 Before entering a coal bunker, a Clearance shall be installed on the tripper and all coal feeder equipment.

SECTION 1000
CHEMICAL AND BIOLOGICAL MATERIALS

1000 Hazard Communication (Right to Know)
1001 General
1002 Bloodborne Pathogens
1003 Chemical Material Storage
1004 Spill Response
1005 Chemical and Biological Waste Disposal
1006 Flammable and Combustible Materials
1007 Bulk Chemical Tanks, Piping and Storage
1008 Acids and Bases (caustic)
1009 Cleaning Materials
1010 Sodium Hypochlorite
1011 Pesticides
1012 Asbestos
1013 Fly Ash - Inorganic Arsenic
1014 Lead
1015 Silica

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1000 HAZARD COMMUNICATION (RIGHT TO KNOW)

1000.1 BWL shall maintain a written Hazard Communication Program. The written program shall provide implementation procedures, workplace hazard identification, labeling requirements, Material Safety Data Sheet (SDS) availability, and employee training.

1000.2 Employees shall receive Hazard Communication training during initial orientation or prior to work assignment.

1000.3 All employees shall be trained on the BWL written Hazard Communication Program.

1000.4 Material Safety Data Sheets (SDS).

A. SDS location and new materials signs shall be posted in each facility.
B. A SDS shall be received before any chemical material can be used. This includes materials used on a “trial” basis or samples.
C. All responsibility areas shall ensure that SDS are available to employees during their work shift.

1001 GENERAL

1001.1 Refer to the Material Safety Data Sheet (SDS) for chemical hazard information prior to using any chemical material.

1001.2 All chemical material spills or releases to the environment shall be immediately reported to the Employee-in-Charge.

1001.3 Personal Protective Equipment.

A. See Safety Manual Section 200 – Personal Protective Equipment.
B. Personal protective equipment shall be used according to the SDS recommendations.
C. Safety glasses alone are not approved for chemical use.
D. Use chemical safety goggles or a full-face shield when handling chemical materials.
E. Most leather materials cannot be decontaminated and shall be disposed of. Contact the manufacturer for cleaning procedures for any contaminated leather gloves, tools, or equipment.

1001.4 First Aid and Medical Treatment.

A. Immediately report all chemical or biological exposure or injury to the Employee-in-Charge.
B. Refer to the SDS for first aid recommendations.
C. Respiratory or eye exposure may require immediate medical attention.

1001.5 Eyewash Stations.

A. Where the eyes or body of any employee may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.
    1. Corrosivity shall be determined by consulting manufacturer’s label or Section 2 of the appropriate SDS.
        a. Corrosive substances include:
            1. Acids with a pH equal to or less than 2.0.
            2. Bases with a pH equal to or greater than 11.5.
        b. Phrases such as “severe skin burns and eye damage”, “serious eye damage” or “serious eye irritation” require eyewash equipment.
    2. Unit shall be capable of delivering flushing fluid to the eyes and face not less than 1.5 liters per minute (0.4 gpm) for 15 minutes.

3. Personal wash units (e.g., 12- to 16-ounce bottles) do not meet the criteria of suitable eyewash equipment.

B. Stations shall be:
   1. Positioned within 55 feet (approximately 10 seconds) of travel distance from the hazard.
   2. Positioned on the same level as the hazard.
   3. Easily accessible (i.e., no obstacles, closeable doorways, or turns).
   4. Clearly marked and well lit.
   5. Free of any protective covering that requires manual removal prior to use, but nozzle covers removed by water pressure upon activation are permitted.
   6. Inspected monthly per manufacturer's guidelines to ensure proper operation and so documented on the equipment.
      a. Plumbed eyewashes shall be also activated weekly for a period long enough to verify operation and ensure that clean flushing fluid is available.
      b. Self-contained eyewashes shall be visually checked weekly to determine if flushing fluid needs to be changed or supplemented.
   7. Serviced per manufacturer's guidelines.
   8. In compliance with currently accepted ANSI standard.

1001.6 Work Practices.

A. Prior to handling or transferring any chemical, and prior to starting work on any chemical piping or storage system, the employee shall locate and be familiar with the operation of eyewash stations and showers.
B. All chemical materials shall be used according to the manufacturer's intended purpose.
C. All chemical hazards shall be identified and controlled prior to chemical use. (Corrosivity, flammability, reactivity, etc.).
D. Siphons shall not be used to transfer liquid materials unless there is a mechanical way to start the siphon, and there is a way to control the shut-off of the siphon flow.

1002 BLOODBORNE PATHOGENS

1002.1 BWL shall maintain a written Bloodborne Pathogen Exposure Control Program. The program contains requirements for exposure control, employee training, and response procedures to prevent employee exposure to bloodborne pathogens.

1002.2 All injuries with blood or body fluids present shall be immediately reported to the Employee-in-Charge.

1002.3 Universal precautions shall be used when handling any material that has been contaminated with blood or other potentially infectious material.

1002.4 Contaminated waste shall be disposed of in red biohazard bags.

1003 CHEMICAL MATERIAL STORAGE

1003.1 Chemical materials shall be stored according to the manufacturer's recommendations for ventilation, temperature, humidity, reactivity, etc.

1003.2 Chemical materials shall be stored in capped or sealed containers.

1003.3 Chemical materials shall be stored in a secured location appropriate for the type of material and container size.

1003.4 Whenever possible, chemical materials should be kept in their original container with clearly identified labels.

1003.5 If a portable container is necessary, the container shall be clearly labeled and under direct control of the employee.

1003.6 Chemical storage areas shall be labeled with appropriate warning signs.

1004 SPILL RESPONSE

1004.1 Only employees trained on specific chemical hazards shall respond to chemical material spills and clean-up.

1004.2 In case of a chemical spill or release, employees shall:

A. Immediately notify the Employee-in-Charge.
B. Evacuate the affected area immediately if the spill or releases is hazardous.
C. Relay as much of the following information as possible:
    1. Exact location of spill.
    2. Type and source of spilled material based on information from labels, placards, etc.
    3. Approximate amount or area affected.
    4. Exposed personnel.

1004.3 Employees in each work area shall have spill response training appropriate to the quantity and type of materials used.

1004.4 Each work area shall have readily available spill response materials and supplies appropriate for the quantity and type of materials used.

1004.5 All chemical spills shall be immediately controlled or contained according to the SDS recommendations and regulatory requirements.

1004.6 Environmental Services shall be contacted for large quantity spills and hazardous material spill response requiring outside assistance.

1005 CHEMICAL AND BIOLOGICAL MATERIAL WASTE DISPOSAL

1005.1 All chemical materials shall be disposed of according to the Material Safety Data Sheet.

A. Non-hazardous material, empty and dry containers can usually be disposed of into the regular trash dumpsters.
B. All non-hazardous material liquids shall be dried or solidified before disposal.
C. Contact Environmental Services for disposal assistance.

1005.2 Large quantities of spilled chemical materials, absorbents, and contaminated soils, including transformer oil and fuel, may require alternate disposal procedures.

1006 FLAMMABLE AND COMBUSTIBLE MATERIALS

1006.1 The SDS shall be consulted for specific information on flash point and flammability.

1006.2 No open flames shall be allowed where flammable materials are used or stored.

1006.3 All flammable material storage locations shall have the appropriate regulatory warning signs.

1006.4 Flammable and combustible materials shall not be transported in the same part of a vehicle in which people ride.

1006.5 Flammable and combustible materials shall be stored in the original container or fire-resistant safety cans with flash screens and self-closing lids.

1006.6 Flammable and combustible materials shall be stored in approved inside rooms or storage cabinets.

1006.7 In any building:

A. No more than 25 gallons of flammable or combustible liquid shall be stored in a room outside of an approved storage cabinet.
B. No more than 60 gallons of Class I or Class II liquids may be stored in a storage cabinet.
C. No more than 120 gallons of Class III liquids may be stored in a storage cabinet.
D. No more than three such cabinets may be located in a single storage area.
E. Quantities in excess of these amounts shall only be stored in an inside storage room designed for storage of flammable and combustible liquids.

1006.8 Connections on all flammable and combustible material drums and piping systems shall be vapor and liquid tight.

1006.9 When flammable liquids are transferred from one storage container to another container, the containers shall be effectively bonded and grounded to prevent sparking from the buildup of static charge.

1006.10 Gasoline or naphtha shall never be used as a cleaning or degreasing agent.

1006.11 Nylon cloths shall not be used as wiping rags around flammable liquids due to sparks caused by static electricity.

1006.12 Fire extinguishing equipment shall be readily available when using flammable materials.

1007 BULK CHEMICAL TANKS AND STORAGE

1007.1 All chemical tanks, valves and transfer lines shall be labeled according to the BWL Hazard Communication Written Program.

1007.2 All bulk tank deliveries shall be verified for correct chemical material and delivery address prior to material offloading.

1007.3 Available tank volume shall be verified prior to material offloading.

1007.4 Bulk tanks shall have secondary containment specific to the chemical material and tank size.

1008 ACIDS AND BASES (CAUSTIC)

1008.1 Refer to the Material Safety Data Sheet for hazard identification, personal protective equipment and emergency response information.

1008.2 Do not store acids and caustic materials in the same location or storage cabinet.

1008.3 Do not mix acids and caustic materials unless in a controlled environment. Large amounts of heat and carbon dioxide may be generated.

1008.4 Do not add water to acids or caustic materials.

1009 CLEANING MATERIALS

1009.1 All cleaning materials, including general consumer products purchased in a retail store, shall have a SDS on site when used for BWL work purposes.

1009.2 Refer to the SDS sheet for hazard identification prior to using any cleaning material.

1009.3 All cleaning materials shall be used according to the manufacturer’s intended purpose.

1009.4 Do not mix cleaning materials. When mixed many commercial and general consumer products produce a violent reaction with toxic reaction products. Example: Never mix bleach and ammonia. Toxic reaction products are produced.

1009.5 Use only manufacturer approved cleaning materials in power washers or parts washing equipment.

1010 SODIUM HYPOCHLORITE

1010.1 Only employees trained on the hazards, operating procedures and emergency response shall be allowed to operate and maintain the sodium hypochlorite feed system.

1010.2 Employees shall be trained on the hazards, incompatibilities, PPE, storage, handling and emergency procedures for both household and industrial grade sodium hypochlorite solutions.

1010.3 Respiratory protection shall be in accordance with the BWL Respiratory Protection Program and the Chlorine System Job Safety Analysis.

1011 PESTICIDES

1011.1 The term pesticide refers to all materials regulated by the Environmental Protection Agency or Michigan Department of Agriculture used to control insects, weeds or vegetation, algae, fungus, or rodents. (Michigan Act 451, Part 83, Pesticide Control, Regulation 636, Pesticide Applicators).

1011.2 A SDS shall be available on-site for all pesticide products used by BWL employees.

1011.3 Certified Applicator or Registered Technician.

A. Any BWL employee or contract employee using or applying a pesticide material on BWL property or during the course of work must be a Certified Applicator or a Registered Technician.
B. The only exception to Certified Applicator or Registered Technician qualification status is if the product is in a pre-mixed “ready-to-use” container where there is no transfer or mixing of the product.
C. Many of the over-the-counter products available to homeowners, that require dilution and mixing, require Registered Technician status when used in the course of employment.

1011.4 Pesticide Application Notification and Recordkeeping. (Required for BWL or contract service application).

A. Application records must be kept for one year.
B. Regulatory required notifications and postings must be made and remain in place for 24 hours.

1011.5 Storage and Disposal of Pesticide Containers and Products.

A. All materials shall be stored in a secured, dry location.
B. All containers and products shall be disposed of according to label instructions.

1011.6 Employee Work Practices.

A. All pesticides shall be applied according to label instructions.
B. Pesticides shall be applied from the original container. Mixing or product transfer is not allowed.
C. Refer to the SDS for specific personal protective equipment (PPE).
D. Refer to SDS for specific hazards and medical treatment.

1012 ASBESTOS

1012.1 Immediately contact Safety or Environmental Services Department if you suspect asbestos containing material damage or release.

1012.2 Assume unknown insulating material contains asbestos.

1012.3 Only employees who have received asbestos training can respond to an asbestos material release and clean-up.

1012.4 Do not drill, saw, grind, sand, or subject to any dust producing process asbestos containing material without adequate dust collection or dampening with a wetting agent (requires Asbestos Worker Certification).

1012.5 Avoid all contact with damaged, friable asbestos containing materials without proper training and personal protective equipment.

1012.6 If a suspect asbestos release occurs, where feasible, cover the material with plastic to isolate the material and immediately report the release to the Employee-in-Charge.

1013 FLY ASH – INORGANIC ARSENIC

1013.1 BWL shall maintain a written Fly Ash - Inorganic Arsenic Control Program with requirements for hazard identification, work practices and employee training for working with arsenic containing materials.

1013.2 Each department shall establish specific work practices for working with arsenic containing materials.

1013.3 Hygiene.

A. No food, beverages, or smoking allowed in the work area.
B. Employees shall thoroughly wash their hands and face prior to eating, smoking, or any other activity that may cause ingestion of arsenic containing material.
C. Protective clothing shall be removed before leaving the immediate work areas and shall never be worn into the lunchroom or removed from the work site.

1013.4 Work Practices and Special Precautions.

A. As much as feasibly possible, fly ash should be removed from the work area prior to beginning the work assignment.
B. Areas with fly ash accumulation shall not be cleaned with compressed air or air blowing equipment.
C. All areas subject to high heat source (i.e., welding) should be mechanically cleaned prior to work.
D. If possible, wet the material to minimize dusting.
E. Shoveling and brushing may be used only if vacuuming or other relevant methods have been tried and found to be ineffective.
F. If vacuuming methods are used the vacuums shall be used and emptied in a manner to minimize the reentry of fly ash into the workplace.

1014 LEAD

1014.1 BWL shall maintain a written Lead Control Program with requirements for hazard identification, work practices and employee training for working with lead containing materials.

1014.2 Each department will establish specific work practices for working with lead containing material.

1014.3 Hygiene.

A. No food, beverages, or smoking allowed in the work area.

B. Employees shall thoroughly wash their hands and face prior to eating, smoking, or any other activity that may cause ingestion of lead containing material.
C. Protective clothing shall be removed before leaving the immediate work areas and shall never be worn into the lunchroom or removed from the work site.

1014.4 Work Practices and Special Precautions.

A. Do not clean area with compressed air or air blowing equipment.
B. Temperatures over 700ºF (371ºC) will generate lead vapor. Example, welding or heat gun use on lead containing materials.
C. Glove bagging or "tenting" may be necessary to contain debris.
D. Ventilation systems may be required to provide clean air and dust control.

1014.5 Lead Waste Disposal.

A. All protective clothing shall be placed in a designated container for disposal. The container shall be identified as LEAD CONTAMINATED WASTE.
B. All debris shall be contained and be disposed of according to regulatory requirements.
C. Analytical lab testing may be required to determine waste characterization. Contact Environmental Services for assistance.

1015 SILICA

1015.1 BWL shall maintain a written Inorganic Silica Control Program with requirements for hazard identification, work practices and employee training for working with silica containing materials. Silica is found in coal dust, sand, cement, grout, and similar materials.

1015.2 Each department will establish specific work practices for working with silica containing material.

1015.3 Hygiene.

A. No food, beverages, or smoking allowed in the work area.
B. Employees shall thoroughly wash their hands and face prior to eating, smoking, or any other activity that may cause ingestion of silica containing materials
C. Protective clothing shall be removed before leaving the immediate work areas and should never be worn into the lunchroom or removed from the work site.

1015.4 Work Practices and Special Precautions.

A. As much as feasibly possible, coal dust should be removed from the work area prior to beginning the work assignment.
B. Do not clean the area with compressed air or air blowing equipment.
C. Where cutting and grinding is required wet methods should be used to minimize dust.

SECTION 1100
MATERIAL HANDLING AND STORAGE

1100 General
1101 Coiling Machines
1102 Material Uncrating and Unpacking
1103 Truck Loading and Unloading
1104 Material Storage
1105 Storage Bins, Racks, and Shelves
1106 Reels of Cable
1107 Pallets
1108 Truck Delivery
1109 Flammable Materials
1110 Heating Equipment
1111 Ash Handling
1112 Mail and Package Receiving

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1100 GENERAL MATERIAL HANDLING AND STORAGE

1100.1 Aisles, walkways, doors and emergency exits shall be kept clear.

1100.2 Stand clear of all moving equipment or backing trucks and trailers. Be aware that loads with overhanging ends, etc. may swing in a wide arc if the truck is turned.

1100.3 Do not stand under suspended loads.

1100.4 Employees shall obtain assistance in lifting heavy objects or use power equipment.

1100.5 When two or more persons carry a heavy object that is to be lowered or dropped, there shall be a prearranged signal for releasing the load.

1100.6 All material handling equipment shall have an adequate capacity for the load to be lifted. Charts shall be posted on the machine and the operator shall assure that the load is within the chart limits.

1100.7 Hand trucks shall be kept in good repair, inspected regularly and be parked where they shall not create a hazard.

1101 COILING MACHINES

1101.1 Only trained, qualified employees shall operate coiling machines.

1101.2 A face shield and eye protection shall be worn when using coiling machines.

1101.3 All loose clothing and hair shall be secured prior to using the coiling machines.

1101.4 To prevent kick-back the completed coil shall be properly secured before cutting and releasing it from the reel.

1102 MATERIAL UNCRATING AND UNPACKING

1102.1 Follow all manufacturers' instructions printed on the cartons or crates.

1102.2 Proper tools (safety band cutters, box cutters, scissors, tin snips) shall be used when opening or uncrating materials.

1102.3 Band Cutting.

A. Clear the area of all employees not directly involved in the cutting operations.
B. Safety band cutters shall be used.
C. Be aware of stored energy in the band that may cause unpredictable movement.
D. Secure any materials which may shift when the band is released.
E. All bands shall be secured and disposed of properly.

1102.4 Remove all nails, staples and other sharp objects and properly or dispose of all packaging material.

1103 TRUCK LOADING AND UNLOADING

1103.1 The CDL driver is responsible for inspecting and approving loading and material positioning.

1103.2 All loads shall be secured to prevent shifting.

1103.3 Material that extends more than four feet beyond the front or back of the truck or trailer shall have warning devices attached.

A. During the day, red flags shall be used.
B. At night or during periods of poor visibility, safety lights shall be used.

1104 MATERIAL STORAGE

1104.1 All material shall be stored in such a manner that it does not constitute a hazard to anyone working in the area.

1104.2 Plates and flat materials shall be safely secured when placed on edge and leaned against walls or railings.

1104.3 Pole Storage.

A. All utility poles shall be stored in bunkers or an area specifically designated for pole storage.
B. All poles shall be blocked and secured to prevent movement.

1105 STORAGE BINS, RACKS AND SHELVES

1105.1 Material shall be stored in bins, racks or shelves in such a manner that it does not constitute a hazard to anyone working in the area.

1105.2 All material shall be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse during storage or transit.

1105.3 Storage structures such as bins, racks and shelves shall be assembled and installed according to the manufacturer's instructions and used for their intended purpose.

A. Structures shall be secured to prevent from tipping.
B. Structures designed for storage shall not be used as ladders.

1105.4 Material stored in bins, racks or shelves shall be within weight limits for the structure.

1105.5 Bins, racks, and shelves shall never be used as ladders.

1105.6 Material in bins, racks or shelves shall be kept at least 18 inches from any sprinkler heads.

1105.7 Bins, racks or shelves shall not be located where they block doorways or emergency exits.

1105.8 Barrels or drums shall be stored in racks designed for storage.

1106 REELS OF CABLE

1106.1 Upright reels shall be blocked when stored.

1106.2 Cable ends shall be secured with a heavy staple or other means to prevent the wire or cable from springing free.

1107 PALLETS

1107.1 Pallets shall be inspected for broken boards or supports before moving.

1107.2 Broken pallets shall not be moved. The material shall be transferred to a new pallet.

1107.3 Material shall be secured or loaded to prevent load shifting or displacement from the pallet.

1108 TRUCK DELIVERY

1108.1 Truck engines shall be turned off when in the loading dock area whenever possible.

1108.2 Field Job Site Delivery.

A. When arriving at the job site, a Tailgate Meeting shall be conducted to identify hazards of the job site.
B. The driver shall inspect the delivery site for suitability or terrain problems.
C. When a delivery vehicle is located in traffic, appropriate traffic cones, barricades or warning devices shall be used.

1108.3 Dock Locks.

A. Dock locks shall be used on all vehicles with an ICC- bar restraint.
B. Rear tires shall have wheel chocks or blocks if there is no ICC-bar restraint.
C. Dock locks, wheel chocks or blocks shall not be removed until the truck is unloaded and paperwork completed.

1109 FLAMMABLE MATERIALS

1109.1 All flammable liquids shall be stored in approved, properly labeled safety containers. Gasoline, naphtha, lacquer thinner, and other solvents of this class shall be handled and dispensed only in UL approved, properly labeled (yellow letters) red metal safety cans.

1109.2 Flammable liquids shall be used only for their designed purposes. Gasoline, benzene, naphtha, lacquer thinner, etc. shall not be used for cleaning purposes, or for starting or kindling fires.

1109.3 Storage of open containers of flammable liquids and materials (grease, oil, paint, soiled rags, etc.) is prohibited.

1109.4 If flash point is 100 degrees or more, employees don't have to store the contents in safety cans. However, ensure the container:

A. Is of good quality.
B. Has no leakage of liquid or vapor.
C. Is properly labeled.

1110 HEATING EQUIPMENT

1110.1 Heating equipment and/or torches used for soldering, welding, etc. shall not be lighted when being transported.

1110.2 Furnaces and torches shall be kept within the barricaded work area to guard against spills and shall be attended at all times. When necessary to leave molten materials unattended, adequate safety precautions shall be taken.

1110.3 Suitable guards shall be placed around lighted or hot furnaces to prevent accidental contact with the flame or furnace.

1110.4 A blowtorch or other open flame shall never be used to melt ice around a manhole or vault cover.

1110.5 Metals and insulating compounds shall be heated and handled in such a manner as to prevent hazards to the employee working in manholes or vaults, and to vehicular or pedestrian traffic.

1110.6 Gauntlet gloves shall be worn while heating or handling hot insulating compound.

1110.7 Compound shall never be removed from a container by heating the bottom until a vent has been provided alongside of the can to relieve pressure.

1110.8 Workers should avoid standing over a solder pot as there is danger of an explosion if perspiration or moisture drops into hot solder. Cold solder and ladles should be heated before immersing in hot solder.

1110.9 Pot guards should be used on solder pot when being heated.

1110.10 Safety pothooks shall be used when lowering solder pots and compounds kettles. Solder ladles shall be lowered separately. In lowering bulky material, the hand line should be properly secured to prevent slipping.

1110.11 Before lowering hot solder or hot compound into a manhole or vault, those working in the hole shall be warned to stand clear. The worker on the

surface shall not proceed to lower material until they have been instructed from below.

1110.12 Furnace and tanks containing liquefied petroleum gas such as butane or propane shall not be placed in a manhole or vault.

1111 ASH HANDLING

1111.1 Suitable clothing and protective equipment shall be worn when rodding, lancing or otherwise working on slag or ash through boiler access doors.

1111.2 Close fitting and buttoned clothing at the neck, wrist, and ankles is suitable clothing protection.

1111.3 Clear goggles are adequate while working through boiler ash pit openings or precipitators.

1111.4 Welding type helmets with colored lenses are suitable protection while working through boiler furnace openings.

1111.5 The operator shall keep the rod or lance away from his body to guard against falling slag or ash and to prevent the rod or lance from kicking upward when inserting or using a rod in an ash pit or furnace.

1111.6 All rods or lances in the work area shall be considered hot.

1111.7 Return to the provided rack all unused lances, rods or other tools.

1111.8 Air or water hose connection couplings shall be wired or otherwise locked together.

1111.9 Adequate railings shall be provided around elevated poke hole platforms.

1111.10 Should an employee become dizzy or drowsy when working around ash handling equipment, the employee shall notify someone and immediately go to where there is fresh air.

1112 MAIL AND PACKAGE RECEIVING

1112.1 The BWL Print Shop courier shall be the contact with the U.S. Post Office and shall be responsible for the consolidation of mail and receipt thereof.

1112.2 The Print Shop courier shall inspect all mail items at the Post Office and/or prior to entry into any BWL facility.

A. Suspicious items identified at the Post Office or prior to entry into a BWL building shall be left where discovered and BWL Security shall be notified.
B. Suspicious mail may exhibit excessive markings, excessive postage, no return address, sealing with tape, misspelled or poorly written words, incorrect titles, etc.
C. Deliveries attempted by a U.S. Postal Worker to a BWL facility shall be refused and the Postal Worker advised of the P.O. Box.

1112.3 The BWL Purchasing and Warehousing Department (PWD) shall be the contact with all private couriers and responsible for the consolidation and coordination of deliveries.

A. To reach their intended destination, all items:
    1. Shall be accounted for, inspected and inventoried by PWD, then:
        a. Delivered to the facility by PWD personnel, or
        b. Arranged to be picked up.
    2. Shall be coordinated with PWD when delivery of chemicals and extraordinarily large items require direct delivery to the facility.
B. Suspicious items identified in any BWL facility shall be left where discovered and BWL Security shall be notified.

C. Suspicious items may exhibit protruding wires, aluminum foil or visible oil stains, the words “personal” or “private”, irregular shape, soft spots or bulges, buzzing or ticking sounds, etc.
D. Any delivery attempt made by private courier to a location besides PWD shall be refused and referred to PWD for appropriate receiving, unless alternative arrangement was previously made.

1112.4 After-hours, weekend or emergency deliveries shall be coordinated between BWL contact (delivery requestor), Security and PWD.

1112.5 Employees shall notify immediately both Safety and Security if an item is delivered and opened that appears to contain an unknown or suspicious substance.

SECTION 1200
VEGETATION MANAGEMENT

1201 General
1202 Working Near Energized Conductors
1203 Care and Use of Tools and Rope
1204 Portable Power Hand Tools
1205 Chippers
1206 Right-of-Way Clearing and Maintenance
1207 Herbicide Application

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1201 GENERAL

1201.1 All applicable sections of the BWL Safety Manual shall be followed. Please refer to the applicable sections as needed.

1201.2 A visual hazard assessment, including a root collar inspection, shall be performed on the tree prior to entering any tree or performing any work on a tree.

1201.3 Prior to any work being performed, the crew leader shall establish appropriate work zones.

A. Those who have not taken part in the job briefing shall not enter those work zones.

B. If someone who has not taken part in the job briefing does enter the work zones, all work shall be terminated until that person either leaves the work zone or is included in the job briefing.

1201.4 Climbing spurs shall have gaffs of a type and length compatible for the tree being climbed.

1201.5 Employees shall not use dead or rotted limbs for support, regardless of size.

1201.6 No work shall be done in a tree until the employee is securely tied in or belted to the tree.

1201.7 The climbing rope shall be crotched in such a manner as to prevent its "working out" on a lateral limb.

1201.8 When working in a multiple trunk tree, the climbing rope shall preferably be crotched around a main trunk other than the one on which the employee is working.

1201.9 Employee shall crotch their climbing rope in two places if a single crotch does not adequately protect them from falling into energized lines or falling back into the trunk of the tree.

1201.10 The climbing rope shall not be used as a pull rope or as a hand line to lower limbs or branches.

1201.11 The ground end of a climbing rope shall not be allowed to dangle over roadways and shall be kept free from obstructions, passing vehicles, etc.

1201.12 The friction hitch shall not be released until the climber is on the ground.

1201.13 Branches or other material shall not be dropped unless the immediate area has been cleared so that there is no possibility of injury to persons or damage to property. If such a possibility exists, a rope shall be used to lower branches or other materials.

1201.14 When lowering heavy tree members, employees shall not tie fall lines around hands or bodies.

1201.15 Employees shall not attempt to clear limbs or brush from under that side of tree where the Line Clearance Arborist is working.

1201.16 Employees shall obtain assistance or use power equipment, if available, when lifting logs or other heavy loads.

1201.17 When it is necessary to work in the vicinity of poison ivy, poison oak, or poison sumac, employees shall keep sleeves rolled down and wear gloves.

1202 WORKING NEAR ENERGIZED CONDUCTORS

1202.1 Wires in proximity to tree work shall be considered as energized, unless proven to be dead and grounded.

1202.2 A second Line Clearance Arborist shall be within normal voice communication and have climbing gear readily available to the work area if any of the following conditions exist:

A. If a Line Clearance Arborists is to approach closer than 10 feet to any conductor or electrical apparatus energized or capable of being energized at more than 600 volts.
B. If branches or limbs being removed are closer to lines energized or capable of being energized at more than 600 volts or are within the distances listed in the table in Section 501 of the BWL Safety Manual.
C. If roping is necessary to remove branches or limbs from conductors or apparatus energized or capable of being energized at more than 600 volts.

1202.3 Line Clearance Arborists shall maintain clearances from energized conductors as shown in the table from the BWL Safety Manual Section 501.

1202.4 Line Clearance Arborists shall use insulating tools when removing branches that are contacting exposed energized conductors or equipment 600 volts or higher or that are within the distances (or have the potential to become within the distances) specified in the table in Section 501 of the BWL Safety Manual.

1202.5 Care shall be taken to prevent limbs being removed from coming in contact with Line Clearance Arborists' body.

1202.6 Ladders, platforms, and non-insulated tools shall not be brought closer to an energized conductor or apparatus than the distances listed in the table in Section 501 of the BWL Safety Manual.

1202.7 All insulated tools shall be tested and maintained annually, at a minimum.

1202.8 Tree work shall terminate and employees shall move to a place of safety during electrical storms and periods of high winds or other unusual weather conditions that are dangerous to employees.

1202.9 Employees shall not remove tree limbs or branches from above energized conductors while other employees are working in trees below the conductors in the same span.

1202.10 Broken or fallen wires shall not be handled except by persons qualified in such work.

1202.11 When working near wires, employees shall have their climbing rope secured so that, in the event they slip or a limb breaks, they will swing free and clear of the wires.

1202.12 Tree limbs shall not be dropped on conductors.

1202.13 Ropes shall not be thrown over conductors or crossarms for the purpose of using the conductor or crossarm as a support or hitch.

1202.14 Dry ropes shall be used in trees through which energized conductors pass.

1202.15 For additional information concerning working near energized conductors, refer to MIOSHA Part 53.

1203 CARE AND USE OF TOOLS AND ROPE

1203.1 Line Clearance Arborists shall inspect all climbing lines, work lines, lanyards, and other climbing equipment for damage, cuts, abrasions, and/or deterioration before each use and shall remove them from service if signs of excessive wear or damage are found.

1203.2 Ropes shall be kept away from fire, acids, oil, chemicals, and all sources of excessive heat.

1203.3 Ropes shall be stored separately from sharp-edged cutting tools.

1203.4 Dragging ropes over rough surfaces and sharp objects, such as rocks, shall be avoided.

1203.5 The cutting edge of tools shall be suitably sheathed or guarded except while in actual use. Cutting tools shall be kept sharp and properly shaped.

1203.6 When not in actual use, the Line Clearance Arborist's saw shall be returned to the scabbard.

1203.7 Tools shall not be thrown into or dropped from a tree; they shall be raised or lowered by a suitable rope line.

1203.8 A pruner shall not be laid on a limb or in a crotch or hooked on a wire rope. It shall be hooked over a limb strong enough to hold its weight.

1203.9 Ladders shall be removed from the base of the tree when not in use.

1203.10 Climbing ropes shall have a minimum diameter of one-half inch (12.7mm) with a minimum breaking strength of 5,400 pounds (24.2 kN). Synthetic rope shall have an elasticity of not more than seven percent.

1203.11 Ropes shall be coiled and piled or suspended so that air can circulate through the coils.

1203.12 Rope ends shall be finished in a manner to prevent raveling.

1203.13 A rope that has compromised insulation (for instance, wet or contaminated) may not be used near exposed energized lines.

1204 PORTABLE POWER HAND TOOLS

1204.1 When climbing in a tree, no work with a chainsaw shall be performed until the Line Clearance Arborist uses a second point of attachment to the tree.

1204.2 Power saws weighing more than 15 pounds that are used in trees shall be supported by a separate line or tool lanyard, unless the work is performed from an aerial lift.

1205 CHIPPERS

1205.1 Prior to any chippers being used, the manufacturer's operations and safety manual shall be read, understood, and followed. This manual shall be reviewed annually.

1205.2 No chipper shall be operated unless the manufacturer's safety devices are in proper working order. Safety devices shall not be removed or modified.

1205.3 Access panels for maintenance and adjustment of the chipper blades and associated drive train shall be in place and secure during operation.

1205.4 Tear away traffic vests shall be used while operating any chipper near a roadway.

1205.5 An employee shall never place hands or another part of their body into the brush hopper while chipper is in operation.

1205.6 Tools or other metallic objects shall not be used to push brush into the chipper. Sweepings, which may contain foreign objects such as stones and nails, shall be loaded on the truck and not fed into the chipper.

1205.7 The ignition key shall be removed when the chipper is left unattended.

1205.8 Employees shall only use wrist-length (non-gauntlet) gloves while feeding a chipper.

1205.9 The chipper shall not be operated when only one person is on the crew.

1205.10 Brush chippers shall be equipped with a locking device in the ignition system.

1205.11 For additional information on chippers, refer to MIOSHA part 53 and OSHA Standard 29 CFR 1910.269.

1206 RIGHT-OF-WAY CLEARING AND MAINTENANCE

1206.1 When two or more employees are cutting brush, they shall be separated by at least 10 feet.

1206.2 Employees shall not anchor equipment to railroad tracks, fences, or other non-BWL structures.

1206.3 When emerging from right-of-way, prior to road travel, employees shall test brakes.

1207 HERBICIDE APPLICATION

1207.1 Before any herbicide application is made, the applicator must obtain their certification with the Michigan Department of Agriculture.

1207.2 Before using any herbicide employees shall read, understand, and follow the label. Spraying shall not be done when wind exceeds 15 mph unless specifically authorized by the supervisor.

1207.3 Brush shall not be sprayed at a distance greater than 15 feet from a power spray nozzle.

1207.4 Foliage and basal sprays shall not be used on wild cherry trees in areas where livestock may graze because of poisonous acid that is generated.

1207.5 Herbicides and other chemicals shall never be left where they would create a hazard to persons or property.

1207.6 Empty containers shall be disposed of in an approved manner.

DEFINITIONS

A

AC: Alternating current.

Abrasions: The wearing, grinding, or rubbing away by friction, such as on the skin.

Accident Prevention Program: The program by which an employer provides instruction and safety training to an employee in the recognition and avoidance of hazards.

Acute Exposure: Exposure to a toxic substance that results in severe biological harm or death. Acute exposure is usually characterized as lasting no longer than a day.

Aerial Device: Any piece of equipment utilizing a bucket or platform to place the worker(s) at an elevated worksite.

Affected Employee: An employee whose job requires him to operate, use, or work in the area where servicing or maintenance is being performed on a machine or equipment under Lockout/Tagout.

Alive or Live: Electrically connected to a source of potential difference or electrically charged so as to have a potential significantly different from that of the earth in the vicinity. The term “live” is sometimes used in place of the term “current-carrying” where the intent is clear, to avoid repetition of the longer term.

Anchorage: A secure means of attachment for lifelines, lanyards, and straps.

ANSI: American National Standards Institute.

Approved: The term “approved”, when used in connection with methods, tools, or equipment, refers to the methods, tools, or equipment approved by the BWL through committee, departmental action, or safety rule.

Asbestos: A naturally occurring mineral fiber that is used for thermal insulation. Chronic inhalation exposure can lead to a lung disease called asbestosis, lung cancer, or mesothelioma.

Authorized Employee: A person who applies the locks or tags on machines or equipment to be serviced.

Automatic Circuit Recloser: A self-controlled device for interrupting and re-closing an alternating current circuit with a predetermined sequence of opening and re-closing followed by resetting, hold-closed, or Lockout operation.

B

Backreamer: A downhole tool that increases the diameter of a pilot bore hole to accommodate the size of the product being pulled.

Barricade: A physical obstruction such as tapes, cones, or A-frame type wood, plastic or metal structures intended to provide a warning about and to limit access to a hazardous area.

Barrier: A physical obstruction which is intended to prevent contact with energized lines or equipment or to prevent unauthorized access to a work area.

Benching (Benching System): A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels.

Body Belt (Safety Belt): A strap that both secures around the waist and attaches to a lanyard, lifeline, or strap.

Body Harness: Straps that are secured on an employee in a manner that distributes the arresting forces over at least the thighs, shoulders, and pelvis with provisions for attaching a lanyard, lifeline, or deceleration device.

Bond: The electrical interconnection of conductive parts designed to maintain a common electrical potential.

Bus: A conductor or a group of conductors that serve as a common connection for two or more circuits.

Bushing: An insulating structure, including a through conductor or providing a passageway for such a conductor, with provision for mounting on a barrier, conducting or otherwise, for the purpose of insulating the conductor from the barrier and conducting current from one side of the barrier to the other.

C

Cable: A conductor with insulation, or a stranded conductor with or without insulation and other coverings (single-conductor cable), or a combination of conductors insulated from one another (multiple-conductor cable).

Cable Sheath: A conductive protective covering applied to cables. A cable sheath may consist of multiple layers of which one or more is conductive.

Capable of Being Locked Out: An energy isolating device that has either a built-in locking mechanism; a hasp or other means of attachment to or through which a lock can be affixed; or that can be locked out without being dismantled, rebuilt, or replaced, or having its energy control capabilities permanently altered.

Carcinogen: A substance that causes cancer. A cancer is characterized by the growth of abnormal cells, sometimes in the form of a tumor. Examples of carcinogens include asbestos, vinyl chloride, and benzene. Substances regulated by OSHA as carcinogens would be found in 29 CFR Subpart Z.

Carcinogenic: Cancer-producing.

Catastrophic Release: A major uncontrolled emission, fire, or explosion involving one or more hazardous chemicals that presents serious danger to employees or the public.

Caustic: Capable of destroying or eating away by chemical action, corrosive. A material with a pH less than 7.0.

Chemical: According to OSHA, “any element, chemical compound, or mixture of elements and/or compounds.”

Chemical-Protective Clothing: Clothing that may be resistant to chemical permeation, penetration, or degradation.

Chronic: A human health problem whose symptoms develop slowly over a long period of time. Chronic effects are the result of long-term exposure and are long-lasting.

Circuit: A conductor or system of conductors through which an electric current is intended to flow.

Circuit Breaker: A device designed to open and close a circuit of up to 600 volts and to open the circuit automatically on a predetermined over-current without injury to itself when properly applied within its ratings. Over 600 volts, it’s capable of making, carrying, and breaking currents under normal circuit conditions. Under specified abnormal conditions, such as a short circuit, it is able to make and break currents and carry them for a specified time.

Clear Hot Stick Distance: The minimum distance for the use of live-line tools held by line workers when performing live-line work.

Clearance (LOTO): This is a commonly used term to refer to Lockout/Tagout. A process or procedure of controlling hazardous energy sources (electrical, mechanical, chemical, pressure, thermal, pneumatic, gravity, hydraulic) on equipment, electrical circuits, or systems using a system of locks, tags and communication for the purpose of employee safety and protection.

Clearance (between objects): The clear distance between two objects measured surface to surface.

Clearance (for work): Authorization to perform specified work or permission to enter a restricted area.

Code of Federal Regulations (CFR): The collection of rules and regulations originally published in the Federal Register by various governmental departments and agencies. OSHA regulations are found in 29 CFR.

Combustible Liquids: Any liquid having a flash point greater than 100^{o} F. (NFPA 30)

Communication Lines: See Lines, Communication.

Competent Person: (MIOSHA definition) A person who is experienced and capable of identifying an existing or potential hazard in surroundings or under working conditions which are hazardous or dangerous to an employee and who has the authority and knowledge to take prompt corrective measures to eliminate the hazards.

Compliance: Meeting all the requirements of the law.

Conductive: Having the quality or power to conduct or transmit electricity, heat, sound, or light.

Conductor: A material, usually in the form of a wire, cable, or bus bar, or other things (including the human body), used for carrying an electric current.

Confined space: A space that: (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and (3) Is not designed for continuous employee occupancy. (MIOSHA Part 90 and 490).

Container (OSHA): "Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes and piping systems are not considered to be containers." Note that some state right-to-know laws consider pipes to be containers.

Contaminate: To soil, stain, corrupt, or infect by contact or association.

Contractor: Organization retained by BWL to perform work on BWL property or right-of-way.

Corrosive: A chemical that causes the destruction of living tissue by chemical action at the site of contact.

Covered Conductor: A conductor covered with a dielectric having no rated insulating strength or having a rated insulating strength less than the voltage of the circuit in which the conductor is used.

Crew: Any number of employees working on the same job or task under the direction of an Employee-in-Charge. All employees working alone shall comply with all Safety Manual rules that apply to a crew.

Current-Carrying Part: A conducting part intended to be connected in an electric circuit to a source of voltage. Non-current-carrying parts are those not intended to be so connected.

D

Decontaminate: The freeing of a person or object of some contaminating substance (such as radioactive material, organisms, chemicals, soil, etc.).

De-energized: Free from any electrical connection to a source of potential difference and from electric charge; not having a potential different from that of the earth.

Designated Employee (MIOSHA): A qualified person designated to perform specific duties under the existing conditions.

Device: A unit of an electrical system that is intended to carry, but not use, electric energy.

Directional Boring Machine: A steerable, horizontal boring machine that allows trenchless installation of underground utilities.

Direct Buried Cable (DBC): Electrical cable which is specially designed to be buried under the ground without any kind of extra covering, sheathing or piping to protect it.

Disinfectant: An agent or chemical that destroys harmful microorganisms and eliminates infection.

Disciplinary Action: Administrative action taken by the employer against the employee; may vary from verbal reprimand to dismissal.

Disconnected: Detached from any energy source.

Disconnecting Means: A device, devices, or other means used to disconnect a circuit's conductors from their source of electric supply.

Documentation: The record of compliance with OSHA regulations that a company should maintain records, in paper or electronic form, required to verify operating procedures, programs, training, attendance, or inspections and maintenance.

Durable: A quality of Lockout and Tagout devices. It means they're capable of standing up to the environment to which they are exposed for the maximum period of time that exposure is expected.

E

Earmuffs: Padded cushions on a headband that cover the ears, used to protect ears from excessive noise.

Earplugs: Foam or other molded plugs that fit into the ear canal used to protect your ears from excessive noise.

Effectively Grounded: Intentionally connected to earth though a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the buildup of voltages that may result in undue hazard to connected equipment or to persons.

Electric Line Truck: A truck used to transport personnel, tools, and material for electric supply line work.

Electric Supply Equipment: Equipment that produces, modifies, regulates, controls, or safeguards a supply of electric energy.

Electric Supply Lines: See Lines, Electric Supply.

Electric Utility: An organization responsible for the installation, operation, or maintenance of an electric supply system.

Electrical Energy: Power that comes from electrical currents that flow through conductors such as wires and cables.

Electrical Shock: Electrical current that enters the human body, which can cause bodily harm/damage (i.e., pain, internal bleeding, damage to muscles, nerves, or tissues, cardiac arrest, or death).

Emergency: An unusual condition which endangers life and/or property.

Employee: Any person who receives a paycheck from the BWL to perform work.

Employee-in-Charge or Supervisor: Any person, regardless of classification, who is directly in charge of a specific job or specific jobs. (Depending upon local classification, this person may be a leader, working supervisor, crew leader, acting crew leader, general supervisor, supervisor, or superintendent, manager, engineer, etc.)

Energy-Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Enclosed: Surrounded by a case, cage, or fence, which will protect the contained equipment and prevent accidental contact of a person with live parts.

Enclosed Space: A working space, such as a manhole, vault, tunnel, or shaft, that has a limited means of egress or entry, that is designed for periodic employee entry under normal operating conditions, and that under normal conditions does not contain a hazardous atmosphere, but that may contain a hazardous atmosphere under abnormal conditions.

Energized: Connected to an energy source or containing residual or stored energy.

Energy: Movement or the possibility of movement. Forms of energy include electrical, hydraulic, pneumatic, and mechanical.

Energy Control Program: An OSHA-required employer program to prevent unexpected machine or equipment energizing or start-up, or release of stored energy that could cause movement during service or maintenance. The program consists of employee training, energy control procedures including Lockout/Tagout, and periodic inspections to ensure that machines or equipment are isolated from their energy source and rendered inoperative before any employee performs service or maintenance.

Energy Isolating Device: A physical device that prevents the transmission or release of energy, including, but not limited to, the following: a manually operated electric circuit breaker, a disconnect switch, a manually operated switch, a slide gate, a slip blind, a line valve, blocks, and any similar device with a visible indication of the position of the device. (Push buttons, selector switches, and other control-circuit-type devices are not energy isolating devices.)

Energy Source: Any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, or other energy source that could cause injury to personnel.

Entry Attendant: An employee assigned to remain immediately outside the entrance to an enclosed or other space to render assistance as needed to employees inside the space.

Equipment (electric): A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like used as part of or in connection with an electrical installation.

Excavations: Any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Exposed: Not isolated or guarded.

Exposure: The condition of being subject to some effect of influence.

Eye Hazards: Hazards that pose a risk to the eye or ability to see.

Eye Loupe: A small, high-powered magnifying lens held close to the eye.

F

Face Shield: Clear or tinted window attached to a frame that fits over the face for protection.

Fall Arrest System: A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, or lifeline. Use of a body belt in a fall arrest system is prohibited.

Fall Protection Program: A program intended to protect workers from injury due to falls when working at elevation.

Fell: The process of severing a tree from the stump so that it drops to the ground. “Feller” is the person who fells the tree.

Field Control: Authority granted to the Person-in-Charge by an Electric System Operator to oversee and coordinate the operation of high voltage switches within a specific area.

Flameproof: Resistant to damage or burning on contact with flame.

Flame-Resistant Clothing (FR or FRC): Clothing made from material having a property whereby combustion is prevented, terminated or inhibited following the application of a flame or non-flame source of ignition.

Flammable: Capable of being easily ignited and of burning quickly.

Flammable Liquid: Any liquid having a flash point less than 100^{o} F (NFPA 30).

Flares: Flares, torches, fuses, red lanterns, reflectors, or any other equipment that is adaptable for the purpose intended.

Free Fall: The act of falling before the personal fall protection system begins to arrest the fall.

G

Goggles: Eye coverings that seal around the eyes and are held securely to the head with a strap or headband.

Ground: (noun) The connection, established either intentionally or accidentally, of an electric circuit or equipment with reference ground through a conductor, or other conducting object or substance.

Ground: (reference) That conductive body, usually earth, to which an electric potential is referenced.

Ground: (verb) Connecting or establishing a connection, either intentionally or accidentally, of an electric circuit or equipment to reference ground. Connected to earth or to some conducting body that serves in place of earth.

Grounded: Connected to earth or to some conducting body that serves in place of the earth.

Grounding Electrode (Ground Electrode): A conductor embedded in the earth, used for maintaining ground potential on conductors connected to it and for dissipating into the earth current conducted to it.

Grounded System: A system of conductors in which at least one conductor or point (usually the middle wire or neutral point of transformer or generator winding) is intentionally grounded, either solidly or through a current-limiting device (not a current-interrupting device).

Guarded: Covered, fenced, enclosed, or otherwise protected, by means of suitable covers or casings, barrier rails or screens, mats, or platforms, designed to minimize the possibility, under normal conditions, of dangerous approach or accidental contact by persons or objects.
Note: Wires which are insulated, but not otherwise protected, are not considered as guarded.

H

Hard hat: A protective hat made of rigid material, such as metal or fiberglass, which protects the head from injury.

Hazard Communication Program (Right-to-Know): A program to ensure protection of employees from potential chemical hazards. Includes training, SDS, safe work practices.

Hazard Identification Analysis Form: A checklist style form used at the job site, which will aid the employee in identification and control of hazards associated with the site and the work to be performed.

Hazard Warning (OSHA): "Means any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the hazards of the chemical(s) in the container(s)." A hazard warning is one of the types of information required on a container. See also Label.

Hazardous Atmosphere: (MIOSHA Part 90 and 490) An atmosphere that may expose employees to the risk of death, incapacitation or impairment of ability to self-rescue (that is, escape unaided from an enclosed space), injury, or acute illness from one or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10 percent of its Lower Flammable Limit (LFL) or Lower Explosive Limit (LEL).
2. Airborne combustible dust at a concentration that meets or exceeds its LFL. (This concentration may be approximated as a condition in which the dust obscures vision at a distance of five feet (1.52 m) or less).
3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in MIOSHA, Occupational Health Standards, Chapter III, Health Hazard Control Measures, or in MIOSHA, Occupational Health Standards, Chapter II, Air Contaminants and Physical Agents, and which could result in employee exposure in excess of its dose or permissible exposure limit.
5. Any other atmospheric condition that is immediately dangerous to life or health.

Hazardous Chemical (OSHA): "Means any chemical which is a physical hazard or a health hazard." See also Health Hazard; Physical Hazard.

Hazardous Substance: Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive.

HazCom: See Hazardous Communication Program. Chemical hazards.

Health Hazard (OSHA): "Means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees."

High-Powered Tests: Tests in which fault currents, load currents, magnetizing currents, and line-dropping currents are used to test equipment, either at the equipment's rated voltage or at lower voltages.

High-Voltage Tests: Tests in which voltages of approximately 1000 volts are used as a practical minimum and in which the voltage source has sufficient energy to cause injury.

High Wind: A wind of such velocity that the following hazards would be present:

1. An employee would be exposed to being blown from elevated locations, or
2. An employee or material handling equipment could lose control of material being handled, or
3. An employee would be exposed to other hazards not controlled by the standard involved. Note: Winds exceeding 40 miles per hour (64.4 kilometers per hour), or 30 miles per hour (48.3 kilometers per hour) if material handling is involved, are normally considered as meeting this criteria unless precautions are taken to protect employees from the hazardous effects of the wind.

Hot Line Tools and Ropes: Those tools and ropes that are especially designed for work on energized high voltage lines and equipment. Insulated aerial equipment especially designed for work on energized high voltage lines and equipment shall be considered "hot-line".

Hot Tap: A procedure used to install connections or parts during repair, maintenance, and service activities that involve welding on pipelines, vessels, or tanks under pressure. It is used to replace or add pipeline sections without interrupting service for air, gas, water, steam, and petrochemical distribution systems.

Hot Work Permit: An employer's written authorization to perform operations capable of producing a source of ignition.

Hydraulic Energy: Power that is created by water or other pressurized fluid that moves through pipes or hoses.

I

Imminent Danger: A condition or practice which could reasonably be expected to cause death, disease, or serious physical harm immediately or before the imminence of the danger can be eliminated through enforcement procedures otherwise provided.

Immediately Dangerous to Life or Health (IDLH): Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space. (MIOSHA Part 90 and 490)

Impervious: Unable to be penetrated (e.g., by a chemical).

Ingest: To take in, as if for digestion.

Inhalation: Chemicals that enter the body by breathing in and that may have local effects and/or may be absorbed into the bloodstream through the lungs.

Insulated: A conductor wrapped in rubber or other materials that keep the electric current on its path and help prevent shock and fires.

Insulation (cable): That which is relied upon to insulate the conductor from other conductors or conducting parts or from ground.

J

Job Briefing: (Tailgate) A meeting held at the start of the shift or job assignment where workers and supervisors/leaders/Employee-in-Charge get together to discuss the work assignment, including hazards associated with the work.

Job Safety Analysis: A formal evaluation of the hazards associated with a particular task and a determination of the adequate hazard controls that must be in place to safeguard employees including an assessment of required PPE.

Jobsite: The point where the employees are assembled to perform the work.

L

Label (OSHA): "Any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals."

Lanyard (Strap): A flexible line used to secure a body belt or body harness to a lifeline or directly to a point of anchorage.

Leggings: Protective coverings worn over the leg from the knee to ankle.

Lifeline: A line provided for direct or indirect attachment to a worker's body belt, body harness, lanyard, or deceleration device. Such lifelines may be horizontal or vertical in application.

Line-Clearance Tree Trimming: The pruning, trimming, repairing, maintaining, removing, or clearing of trees or the cutting of brush that is within 10 feet (305 cm) of electric supply lines and equipment.

Lines, Communication Lines: The conductors and their supporting or containing structures which are used for public or private signal or communication service, and which operate at potentials not exceeding 400 volts to ground or 750 volts between any two points of the circuit, and the transmitted power of which does not exceed 150 watts. If the lines are operating at less than 150 volts, no limit is placed on the transmitted power of the system. Under certain conditions, communication cables may include communication circuits exceeding these limitations where such circuits are also used to supply power solely to communication equipment.
Note: Telephone, telegraph, railroad signal, data, clock, fire, police alarm, cable television, and other systems conforming to this definition are included. Lines used for signaling purposes, but not included under this definition, are considered as electric supply lines of the same voltage.

Lines, Electric Supply Lines: Conductors used to transmit electric energy and their necessary supporting or containing structures.

Lockout Device: A key or combination lock, blank flange, bolted slip blind, or other positive means used to hold an energy isolating device in a safe position and prevent the machine or equipment from energizing.

Lockout - The placement of a Lockout device on any energy isolating device such that the equipment cannot be operated until the Lockout device is removed.

LOTO – Lockout/Tagout.

M

Machine Guards: Safety devices used on or around machinery to help prevent injury to employees.

Manhole: A subsurface enclosure which personnel may enter, and which is used for the purpose of installing, operating, and maintaining submersible equipment or cable.

Manhole Opening: An opening through which persons may enter into a confined or enclosed space.

Manhole Steps: A series of steps individually attached to or set into the walls of a manhole structure.

Material Safety Data Sheet (SDS): A document provided by chemical manufacturers to convey information to the users of their products. The information includes data on physical characteristics, fire and explosion hazards, reactivity, exposure limits, storage and handling, health hazards; special precautions; and fire and spill response procedures.

Mechanical Energy: Power that is created by built-up energy, such as in springs.

Minimum Approach Distance: The closest distance an employee is permitted to approach an energized or a grounded object.

MSD: Musculoskeletal disorder. Painful occupational illnesses that develop over time. Caused by constant repetitive motion causing damage to the muscles, tendons, and/or nerves in the hands, wrists, elbows, back, neck, and/or shoulders. Most-common SDS include tendonitis, carpal tunnel syndrome, Reynaud's syndrome, and tenosynovitis.

SDS: Material Safety Data Sheet. See Material Safety Data Sheet.

N

Near Miss: An unintended, unplanned, or unexpected event that could have, but did not, result in personnel injury or property damage.

Neoprene: A synthetic rubber characterized by superior resistance.

NIOSH: National Institute for Occupational Safety and Health.

Nonconductive: The inability to conduct or transmit electricity, heat, sound, or light.

O

OSHA: Occupational Safety and Health Act (OSHA) of 1970: Requires employers to provide to employees a workplace free from recognized hazards and to comply with safety and health standards established by the Act. The Act also charges each employee with a legal duty to comply with the Act's safety and health standards. The federal Act pertains to most employers but specifically excludes federal, state, and local government employees. However, numerous states have developed safety and health standards that require compliance by all government entities.

P

Pad Mount: Transformer or equipment in a surface-mounted enclosure normally worked from ground level.

Penetration: A chemical's passage through an opening in a protective material.

Periodic Inspection: An OSHA-required inspection of energy control procedures conducted by employers at least annually. The inspection of particular employees and procedures must be conducted by an authorized employee who is not involved with the inspected procedures.

Permeation: The passage of a chemical through a piece of clothing on a molecular level, even if the material has no visible holes.

Permit-Required Confined Space (permit space): A confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard. (MIOSHA Part 90 and 490)

Personal Fall Arrest System: A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, or lifeline. Use of a body belt in a fall arrest system is prohibited.

Personal Monitoring Device: A battery operated Radio Frequency Exposure (RFE) monitoring device that is designed to be worn on a person and which will alarm when the RFE exposure exceeds 50 percent of the Maximum Permissible Exposure Limit (MPE) for occupational environments.

Personal Protective Equipment (PPE): Devices or clothing designed to protect against workplace hazards.

Physical Hazard (OSHA): "Means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive." Any chemical that can be classified as a physical hazard is considered to be a hazardous chemical under the law. See also Hazardous Chemical.

Physically Render Inoperative: The use of locks, blind flanges, or other similar devices or procedures to prevent the operation of switches, breakers, valves, and operating controls.

Polychlorinated Biphenyls (PCBs): A chlorinated, hazardous, nonconductive and noncombustible liquid used in some transformers and capacitors. It has several trade names — Pyranol, Askeral, Inerteen, etc.

Positioning Device: A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface such as a wall or pole and to work with both hands free. Positioning devices may also be used for leading edge work or in aerial lift and work platforms in a manner that will prevent employee movement beyond the edge or equipment barrier.

Puncture: To pierce with a sharp point.

Primary Compartment: A compartment containing voltages greater than 600 volts.

Primary Voltage: Any electrical circuit that normally operates at more than 600 volts.

Protective System: A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Public: Any individual not an employee or representative of the BWL. Public Injury describes an instance when any such individual allegedly sustains injury on BWL property or jobsite.

Q

Qualified Person (MIOSHA): A trained person possessing a recognized degree or certificate of professional standing or who, by extensive knowledge, training, and experience, has demonstrated the ability to solve or resolve problems relating to the subject matter and work.

Qualified Person (Part 86, Electric Power Generation, Transmission and Distribution): One knowledgeable in the construction and operation of the electric power generation, transmission, and distribution equipment involved, along with the associated hazards. Qualified employees shall be trained and competent in the:

1. Skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.
2. Skills and techniques necessary to determine the nominal voltage of exposed live parts.

3. Minimum approach distances corresponding to the voltages to which the qualified employee will be exposed.
4. Proper use of precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment.

An employee who is undergoing on-the-job training and who, in the course of that training, has demonstrated an ability to perform duties safely at their level of training and who is under the direct supervision of a qualified employee is considered to be a qualified employee for the performance of those duties. An employee undergoing on-the-job training must meet the full requirements for fall protection.

R

Radiation: Energy radiated in the form of rays, waves, or streams of energetic particles.

Radio Frequency (RF): For the purposes of the Federal Communications Commission (FCC) standard, the frequency range is from 3 kHz to 300 GHz.

Reactivity: A measure of the tendency of a substance to undergo chemical reaction with the release of energy.

Red Box: A red painted box used to cover a switch on a control panel, signifying “DO NOT OPERATE”. It is used for informative purposes and must be tagged with the reason it is being used. The Red Box cannot be used in place of a required Clearance.

Reduced Visibility: Times when normal visibility is reduced because of insufficient daylight (dawn or dusk) or adverse weather conditions such as fog, heavy rainfall, or snow.

Registered Professional Engineer: A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer registered in any state is deemed to be a “registered professional engineer” when approving designs for “manufactured protective systems” or “tabulated data” to be used in interstate commerce.

Respirator: Device designed to protect the wearer from inhaling harmful contaminants.

Respiratory System: The system necessary for breathing and the channels by which they connect with the outer air.

Right-to-Know: A term applied to a variety of laws and regulations enacted by municipal, county, and state governments that provide for the availability of information on chemical hazards; also includes the OSHA Hazard Communication Standard. See also HazCom.

Roadway: The road and the areas immediately adjacent thereto, such as the shoulder of the road, parking strip, etc. This area normally extends approximately 15 feet from the road edge.

Rope Grab: A device that attaches to a lifeline as an anchoring point to provide a means for arresting a fall.

S

Safety Can: An approved metal or nonmetallic container which has a capacity of not more than five gallons, which has a flash-arresting screen, spring closing lid and spout cover, and which is designed so that it will safely relieve internal pressure when exposed to fire.

Safety Glasses: Eye protectors with sidepieces that fit over the ear.

Safety Rule: A positive rule requiring compliance by all employees concerned. Deviation from safety rules is not permitted and is subject to disciplinary action.

SCBA: Self-contained breathing apparatus respirator.

Secondary Compartment: A compartment containing voltages less than 600 volts.

Secondary Voltage: Any electrical circuit that normally operates at less than 600 volts.

SEI: Safety Equipment Institute.

Servicing and/or Maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines and/or equipment that could expose the employee to the unexpected energization or start-up of equipment or release of hazardous energy. Examples are lubrication, cleaning, or un-jamming machines or equipment, and making adjustments or tool changes.

Shall: When the word “shall” appears in the wording of a rule, the rule is to be obeyed as written. (A mandatory requirement).

Shatterproof: The inability of an object to break apart or disintegrate.

Shield (Shield System): A structure that is able to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shield structures can be permanent or portable and moved along as work progresses.

Shoring (Shoring System): A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the side of an excavation and which is designed to prevent cave-ins.

Should: When the word “should” appears in the wording of a rule, the rule is to be obeyed as written when reasonable or practical to do so. (An advisory requirement).

Side Shields: Sidepieces that are worn with safety glasses or goggles that prevent hazards from entering the eyes from the side.

Sloping (Sloping System): A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as soil type, environmental conditions of exposure, and application of surcharge loads.

Snap-Hook: A self-closing device with a keeper, latch, or other similar arrangement that will remain closed until manually opened. Such devices include self-closing, single-action, double-action, or double-locking snap-hooks.

SOP: Standard (or Standing) Operating Procedure.

Stability: The likelihood a material is to remain unchanged. Material is considered stable if it remains unchanged under normal conditions.

Stable Rock: Natural solid mineral material that can be excavated with vertical sides and which will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or side of the excavation is secured against caving in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Step Bolt: A bolt or rung attached at intervals along a structural member and used for foot placement during climbing or standing.

Stored Energy: Potential or residual energy that exists in an object that isn't moving.

Strike Sensing System: A system with dual circuits to measure elevated electrical potential on the directional boring machine and current flow along the drilling string.

Substantial: A quality of Lockout and Tagout devices that means they can't be removed without excessive force or unusual techniques such as bolt cutters or other metal cutting tools. Tagout devices and their means of attachment must be substantial enough to prevent inadvertent or accidental removal, with a minimum unlocking strength of at least 50 pounds and designed to be at least equivalent to a one-piece nylon cable tie tolerant of all environments.

Supervisor Or Employee-in-Charge: Any person, regardless of classification, who is directly in charge of a specific job or specific jobs. (Depending upon local classification, this person may be a leader, working supervisor, crew leader, acting crew leader, general supervisor, supervisor, or superintendent.) See Employee-in-Charge.

Suspension: The inner structure of a hard hat, consisting of the headband and straps, capable of absorbing and distributing impact experienced by a hit or blow.

Switch: A device for opening and closing or changing the connection of a circuit. In these rules, a switch is understood to be manually operable, unless otherwise stated.

Swivel: Joins a backreamer assembly to a conduit adapter, and permits the backreamer to rotate without turning the conduit that is being pulled in. It is also a device that can be placed between a pull line and a conductor being strung to allow the pull line and conductor to rotate.

System Operator: A qualified person designated to operate the system or its parts.

T

Tagout Device: A prominent warning device such as a tag and a means of attachment, which can be securely fastened to an energy isolating device according to established procedures. It informs employees not to use the energy isolating device and the equipment it controls until the Tagout device is removed.

Tagout: If a device is not capable of being locked out, a Tagout system can be used. The Tagout system must provide full employee protection as if a lock had been used. The Tagout device shall be attached at the same location, or as close as possible, that a Lockout device would have been attached.

Tailgate Meeting: See Job Briefing.

Toe Cap: Metal reinforcement added to the toes of safety shoes to prevent injuries.

Toxic Substance: A chemical or substance that may present an unreasonable risk of injury to health or the environment.

Transferring: The act of moving from one distinct object or location to another.

Transitioning: The act of moving from one location to another on equipment or a structure while going around or over an object.

Transformer: A device used to increase or decrease electric energy from one circuit to another.

U

Underground Residential Distribution (URD): A general term that covers the necessary facilities to furnish underground service, generally to residential and commercial customers and usually through directly buried cable.

Universal Precautions: A method of work practices for infection control that treats all human blood and other potentially infectious material as capable of transmitting HIV, (HBV) Hepatitis and other bloodborne pathogens. Refer to the BWL Bloodborne Pathogen Exposure Control Program for specific procedures.

Unsafe Conditions: Any dangerous conditions, hazardous conditions, defective conditions, or unusual conditions that could be conducive to accidents.

V

Vapor: The gaseous phase of a substance.

Vault: An enclosure, above or below ground, which personnel may enter, and which is used for the purpose of installing, operating, or maintaining equipment or cable.

Vented Vault: A vault that has provision for air changes using exhaust flue stacks and low-level air intakes operating on differentials of pressure and temperature providing for airflow, which precludes a hazardous atmosphere from developing.

Vinyl Chloride: A chemical compound, used in producing some plastics, that is believed to be carcinogenic.

Voltage: The effective (RMS) potential difference between any two conductors or between a conductor and ground. The voltage specified in this manual shall mean the maximum effective voltage to which the personnel or protective equipment may be subjected. Low voltage includes voltages up to 600 volts. High voltage shall mean voltages in excess of 600 volts.

Voltage of an Effectively Grounded Circuit: The voltage between any conductor and ground, unless otherwise indicated.

Voltage Limiter: A device used to detect potential differences between the directional boring unit and ground.

W

Warning Signs: Any sign or similar means of employee or public notification alerting to an actual or possible hazard. Included are “Danger” signs, “Caution” signs, traffic protection signs, instructional signs, and informational signs.

Worksite: The location on the structure or equipment where, after the worker has completed climbing (horizontally and vertically), the worker is in position to perform the assigned work or task.

Z

Zero Mechanical State (ZMS): When no energy is coming into or is inside the equipment.

APPENDIX A
MIOSHA STANDARDS

Standards, fact sheets and other resources can be found on the Michigan Department of Labor and Economic Opportunity website or contact Safety Department for assistance.

Ref / Link	MIOSHA Construction Safety and Health Standards
Part 1	General Rules
Part 2	Masonry Wall Bracing
Part 6	Personal Protective Equipment
Part 7	Welding and Cutting
Part 8	Handling and Storage of Materials
Part 9	Excavation, Trenching and Shoring
Part 10	Cranes and Derricks
Part 11	Fixed and Portable Ladders
Part 12	Scaffolds and Scaffold Platforms
Part 13	Mobile Equipment
Part 15	Excavators, Hoists, Elevators, Helicopters, and Conveyors
Part 16	Power Transmission and Distribution
Part 17	Electrical Installations
Part 18	Fire Protection and Prevention
Part 19	Tools
Part 20	Demolition
Part 21	Guarding of Walking and Working areas
Part 22	Signals, Signs, Tags and Barricades
Part 24	Tar Kettles
Part 25	Concrete Construction
Part 26	Steel Erection
Part 27	Blasting and Use of Explosives
Part 32	Aerial Work Platforms
Part 35	Confined Space in Construction
Part 42	Hazard Communication
Part 45	Fall Protection
Part 91	Process Safety Management of Highly Hazardous Chemicals
Part 308	Inorganic Arsenic
Part 430	Hazard Communication
Part 431	Hazardous Work in Laboratories
Part 432	Hazardous Waste Operations and Emergency Response
Part 451	Respiratory Protection
Part 470	Employee Medical Records and Trade Secrets
Part 504	Diving Operations
Part 523	Abrasive Blasting
Part 602	Asbestos for Construction
Part 603	Lead Exposure in Construction

Ref / Link	MIOSHA Construction Safety and Health Standards
Part 621	Health Hazard Control for Specific Equipment and Operations in Construction
Part 680	Occupational Noise Exposure
Part 681	Radiation in Construction: Ionizing and Nonionizing
Part 690	Silica in Construction

Ref / Link	MIOSHA General Industry Safety and Health Standards
Part 1	General Provisions
Part 1A	Abrasive Wheels
Part 2	Walking-Working Surfaces
Part 5	Powered Platforms for Building Maintenance
Part 6	Fire Exits
Part 7	Guards for Power Transmission
Part 8	Portable Fire Extinguishers
Part 9	Fixed Fire Equipment
Part 11	Polishing, Buffing and Abrading
Part 12	Welding and Cutting
Part 13	Derricks
Part 14	Conveyers
Part 18	Overhead and Gantry Cranes
Part 19	Crawler, Locomotive and Truck Cranes
Part 20	Underhung Cranes and Monorail Systems
Part 21	Powered Industrial Trucks
Part 22	Tractors
Part 23	Hydraulic Power Presses
Part 24	Mechanical Power Presses
Part 25	Manlifts
Part 26	Metalworking Machinery
Part 27	Woodworking Machinery
Part 33	Personal Protective Equipment
Part 37	Accident Prevention Signs and Tags
Part 38	Hand and Portable Power Tools
Part 39	Design Safety Standards for Electrical Systems
Part 40	Safety-Related Work Practices
Part 49	Slings
Part 50	Telecommunications
Part 53	Tree Trimming and Removal
Part 54	Powered Groundskeeping Equipment
Part 55	Explosives and Blasting Agents
Part 56	Storage and Handling of Liquefied Petroleum Gases
Part 58	Aerial Work Platforms
Part 69	Compressed Gases: Acetylene, Hydrogen, Oxygen, and Nitrous Oxide

Ref / Link	MIOSHA General Industry Safety and Health Standards
Part 72	Automotive Service Operations
Part 73	Fire Brigades
Part 75	Flammable Liquids
Part 78	Storage and Handling of Anhydrous Ammonia
Part 85	Control of Hazardous Energy Sources (LOTO)
Part 86	Electric Power Generation, Transmission and Distribution
Part 90	Permit-Required Confined Spaces
Part 91	Process Safety Management of Highly Hazardous Chemicals
Part 92	Hazard Communication
Part 301	Air Contaminants for General Industry
Part 305	Asbestos for General Industry
Part 308	Inorganic Arsenic
Part 310	Lead in General Industry
Part 380	Occupational Noise Exposure in General Industry
Part 430	Hazard Communication
Part 431	Hazardous Work in Laboratories
Part 432	Hazardous Waste Operations and Emergency Response
Part 433	Personal Protective Equipment
Part 451	Respiratory Protection
Part 470	Employee Medical Records and Trade Secrets
Part 472	Medical Services and First Aid
Part 474	Sanitation
Part 490	Permit-Required Confined Spaces
Part 504	Diving Operations
Part 523	Abrasive Blasting
Part 525	Grinding, Polishing and Buffing Operations
Part 529	Welding, Cutting and Brazing
Part 554	Bloodborne Infectious Diseases
Part 590	Silica in General Industry
Part 591	Process Safety Management of Highly Hazardous Chemicals

APPENDIX B
SAFETY AND HEALTH MANAGEMENT SYSTEM

- The Lansing Board of Water and Light's Safety and Health Management System is composed of the following elements:
  - Management Commitment.
  - Employee Involvement.
  - Workplace Analysis.
  - Hazard Prevention and Control.
  - Safety and Health Training.

- **MANAGEMENT COMMITMENT**
  - Management at all levels shall demonstrate a strong, genuine, continuous, and personal commitment to safety.
  - Management's leadership and commitment shall be evident in:
    - Personal commitment to safety as a value built into each business priority.
    - Acceptance of the merits of safety management such as, reduced amount and severity of injuries, reduced costs associated with injuries, increased employee morale, improved BWL public image, increased productivity, quality, and ultimately profitability.
    - A clearly stated Safety and Health Policy that is communicated and understood by all employees.
    - Defined safety program goals and corresponding objectives designed to meet those goals.
    - Sufficient resources allocated to support the achievement of safety program goals and objectives.
    - A system of accountability to ensure managers, supervisors, and employees accomplish their assigned safety responsibilities.
    - Key indicators of safety performance are included in the corporate and departmental balanced scorecard.
    - Periodic reviews of programs, projects, and activities to determine their effectiveness in achieving safety program goals and objectives.

- **EMPLOYEE INVOLVEMENT**
    - Employee involvement shall provide the means through which workers develop and express their own commitment to safety and health.
    - Employee involvement shall be evident in:
        - Responsibility for safety and health is defined, shared and accepted at all levels in the organization.
        - Employees are encouraged to report safety and health hazards.
        - Active participation in daily tailgate (job briefing) meetings.
        - Attendance and participation in departmental safety meetings.
        - Attendance to safety and health training events.
        - Participation in incident investigations.
        - Participation in job safety analysis.
        - Membership in department safety advisory committees.
        - Membership in the BWL Safety Committee.

- **WORKPLACE ANALYSIS**
    - The BWL shall establish a hazard analysis program to identify existing and potential hazards, as well as conditions and operations in which changes might create hazards, using tools such as:
        - Job safety analysis.
        - Periodic area inspections.
        - Risk assessments.
        - Industrial hygiene exposure assessments.
        - Incident investigations.
        - Process hazard analysis.
        - System safety reviews.
    - The BWL shall develop a hazard inventory which includes the following:
        - Work environment: Chemical, physical, biological, and ergonomic hazards.
        - Equipment and processes: Construction plans, fire prevention, emergency response, tool/equipment conditions, housekeeping, and machine and electrical safeguards.

        - Employee work practices: Appropriate use of equipment, tools, machines, safety devices, lifting techniques, lock out/ tag out and personal protective equipment.
    - The BWL shall establish a reliable system of employee hazard reporting which includes:
        - A policy that encourages employees to report safety and health concerns.
        - Protection of reporting employees from any type of reprisal or harassment.
        - Timely investigation of the hazard and its corrective action.
        - Timely and appropriate responses to the reporting employee.
        - Tracking of required hazard correction.
        - Documentation in a record keeping system.
    - The BWL shall create a hazard ranking system based on hazard evaluation and risk assessment so the best method of control can be selected and implemented.
        - Hazards shall be categorized according to the risks they posed according to the probability of occurrence, severity of outcomes, and employee exposure.
        - Qualitative hazard probability estimations can be made through research, analysis and evaluation of historical safety data and expert opinion. Any rationale for assigning a hazard probability should be documented.
        - Appropriate definitions of hazard severity categories shall be established to set understandable qualitative measures for incidents that might occur if a hazard potential is identified.

- **HAZARD PREVENTION AND CONTROL**
    - Hazard control measures shall be applied to bring risk to an acceptable level when worker exposures are found to pose an unacceptable risk.
    - Hazard control should begin by eliminating hazards at the design or redesign stage. If this is not feasible then the following hierarchy of control measures shall be applied:

        - Engineering controls should be used as the first and most reliable strategy to control a hazard. Examples of engineering controls are ventilation systems, machine guarding, sound enclosures, circuit breakers, platforms with guard railing, interlocks, etc.
        - Administrative controls can be used to minimize worker exposure through policies, procedures, and rules when engineering controls are not feasible. Examples of administrative controls include standard operating procedures, preventive maintenance, housekeeping programs, equipment inspection programs, worker rotation, employee training, confined space program, Lockout/Tagout program, etc.
        - Personal protective equipment (PPE) can be used as a supplementary control method when hazards cannot be engineered out and when administrative controls cannot provide sufficient protection. PPE should not be used as a substitute for engineering and/or administrative controls.
    - The BWL shall ensure that workplace modifications through design take the following issues into account:
        - The relationship between the worker and the job through ergonomic design considerations.
        - Relevant safety and health regulations and standards.
        - Facility, workstation and machine design.
        - Material selection.
        - Proper material handling.
        - Life safety and fire protection.
        - Safety and health aspects of automated process.
        - Preventative maintenance of equipment.
        - Safe operating procedures.
    - The BWL shall develop operational safety and health programs that:
        - Identify, evaluate, and control employee exposures to work-related hazards.
        - Assure proper treatment, follow up, and return-to-work from work-related ailments and injuries.
        - Manage and control external exposures that can put the organization at risk for potential liability such as:

        - On-site contractors.
        - Vendors.
        - Public liability.
        - Natural disasters.
    - The BWL shall have an emergency action plan that focuses on:
        - All potential emergencies, including but not limited to:
            - Fire.
            - Natural disasters.
            - Industrial explosions.
            - Chemical releases or spills.
            - Medical emergencies.
            - Workplace aggression and violence.
            - Terrorism.
        - Evacuation procedures.
        - Appropriate alarms.
        - Emergency response equipment.
        - Coordination with local responders and emergency operations center.
        - Disaster recovery.
        - Media communication.
        - Employee training.
    - An audit program shall be developed with the participation and input from those at all levels of the organization, and should include the following:
        - Standards and procedures for conducting the audits.
        - Program review of one or all of the safety management system elements including: Management commitment; hazard recognition, evaluation and control; operational safety programs, employee involvement, and health and safety training.
        - A proposed audit schedule.
    - A continuous improvement plan shall be created and executed by BWL management, safety department, safety committee, and department safety advisory committees, using the results from the periodic audits and assessments, to include:
        - Measurable improvement goals, strategies and tactics.
        - Goal implementation timetable.

        - Review of the measurements effectiveness and process adjustment to facilitate constant improvement.

- **SAFETY AND HEALTH TRAINING**
    - Safety and health training shall provide the mechanism for employees to understand safety and health hazards, and how to protect themselves and others.
    - Safety and health training shall be conducted for new and current employees:
        - When employee's responsibilities or job duties change.
        - When employees show a deficiency in knowledge of a safety rule or procedure.
        - When new hazards are identified and new controls are implemented.
        - When required by a specific standard, equipment or procedure.
    - Safety and health training can be performed in classroom, online, on-the-job-training, one-on-one training with co-workers and supervisors, or using a Learning Management System.
    - Safety and health training programs shall be developed using the guidelines established by the BWL Organizational Development and Training department.
    - New employee basic safety orientation shall be conducted as soon as possible and prior to employee assignment of work duties.
    - New employee basic safety orientation shall cover a discussion of topics, including, but not limited to, the following:
        - BWL corporate values - Reliability, environmental stewardship, affordability, customer service, and health and safety.
        - BWL Safety and Health Policy.
        - BWL safety organizational structure.
        - BWL Safety Manual.
        - BWL Emergency Action Guidelines
        - Classes of fires and fire extinguisher use.
        - Injury, near miss and hazard reporting and investigation process.
        - Hazard identification and control.
        - Personal protective equipment.
        - Principles for the reduction of human error.

        - Hazard communication.
        - Electrical safety and control of energy sources.
        - General ergonomic principles.
        - Specific safety training related to the employee duties or department.
    - Departmental safety and health training shall include topics including but not limited to the following:
        - Fitness for duty.
        - Warning signs and labels.
        - Emergency evacuations.
        - Fire safety.
        - Location of fire extinguishers, first-aid kits, and automated external defibrillators.
        - Blood-borne pathogens exposure control program.
        - Workplace ergonomics.
        - Back safety.
        - Office safety.
        - Hazard communication.
        - Personal protective equipment.
        - Respiratory protection.
        - Hearing conservation.
        - Fall protection.
        - Hazardous waste operation.
        - Electrical Safety.
        - Control of hazardous energy (LOTO).
        - Permit required confined spaces.
        - Excavation safety.
        - Tool safety.
        - Welding safety.
        - Forklifts.
        - Aerial lifts.
        - Cranes.
        - Other specialized safety training as mandated by OSHA/MIOSHA regulations or equipment manufacturer.

APPENDIX C
SAFETY AND HEALTH POLICY

The Lansing Board of Water & Light recognizes its responsibility for providing a safe working environment for its employees, contractors, customers and the general public. To that end, the safety and health program shall create an understanding that safety is not a priority that can be changed, but a value associated with every priority. This responsibility can only be met by providing a comprehensive safety program that will:

- Comply with all governmental rules and regulations.
- Promote safety awareness among all employees through training.
- Provide safety equipment necessary for the safe completion of a task.
- Develop and implement a continual improvement process to identify and eliminate unsafe conditions or acts.

We further recognize that safety is beneficial to the employee, the employee's family, the customer and the community. Therefore, it is our commitment to provide a safe and healthy workplace and to ensure that safety is never secondary to any other business priority. It is also understood that anyone providing services to the Board of Water & Light will be held to the same high standards regarding the safety and health of their employees.

It is the responsibility of each employee to work safely for their benefit and their co-workers. This responsibility includes following the safety rules and planning each work activity utilizing risk assessment, good judgment, skills and a sincere dedication to safe work practices.

It is the responsibility of each employee in a leadership position to actively support the Board of Water & Light's overall safety and health program. Included with this responsibility is proper planning, monitoring and enforcing the use of safe working practices and safety rules.

To be successful all employees must develop proper attitudes toward injury and illness prevention. This requires cooperation in all safety and health matters, not only between supervisor and employee, but also between each employee and their co-workers. Only through such a cooperative effort can this safety and health program be established and preserved.

APPENDIX D
SAFETY MANUAL ACTIVITY LOG

Rule or Section	Action	Section Title	Added
Appendix A	Revision	Link Updates to (most) Construction and (most) General Industry Standards	11/15/2023
123	New	Contact with MIOSHA	11/15/2023
1001.5	New	Eyewash Stations (old 1001.5 Work Practices moved to 1001.6)	10/18/2023
Appendix A	Revision	General Industry Part 380 link update	10/5/2023
900	Revision	Electric, Steam and Chilled Water Production	8/16/2023
800	Revision	Lockout/Tagout and Clearances	2/15/2023
209.3-209.5	Revision	Electric Arc Flash Protection	2/15/2023
Definitions	New	Crew	2/15/2023
Manual (all)	Revision	19 appearances of “MSDS” replaced with “SDS”	8/21/2022
Definitions	Revision	Public	8/21/2022
Definitions	New	Imminent Danger	8/21/2022
1105.3	Revision	Storage Bins, Racks and Shelves (enhanced with rules moved from previous 111.21)	8/21/2022
1006	Revision	Flammable and Combustible Materials (enhanced with rules moved from previous 111.18)	8/21/2022
1004	Revision	Spill Response (enhanced with rules moved from previous 106.5)	8/21/2022
508.2	Revision	Inclement Weather	8/21/2022
211.1	Revision	Life Jackets	8/21/2022
206.5	Revision	Hand Protection (relocated from previous 111.13A)	8/21/2022
100	Revision	General Requirements (all)	8/21/2022
313.1	New	Crane, Hoist, Derrick	7/20/2022
Appendix A	New	Hyperlinks to Safety Standards	1/21/2022
Appendix A	Revision	Link to Michigan.gov, Safety Standards List	1/21/2022
Appendix E	Revision	Updated Intranet Link to Safety Programs	1/19/2022
220	Revision	Fall Protection and Prevention	1/19/2022
700	Revision	Water Production	8/18/2021
604	Revision	Disinfecting Water Mains	8/18/2021
502.6	Revision	Protective Equipment	5/19/2021
575.1D	Revision	Electric Metering and Equipment	4/21/2021
305	New/Rev	Trailers and Transporting Materials (trailer rules added and section title expanded)	3/17/2021
1103.3	Revision	Truck Loading and Unloading	3/17/2021
110.11	New	Customer Premises	2/16/2021
600	Revision	Water Transmission and Distribution System	2/16/2021
114.1	Revision	Stationary Video Display Terminals	11/18/2020
155.5	Revision	Verification of Utility Location	9/16/2020
155.6	Revision	Hand Dig Zone	9/16/2020
400	Revision	Tools and Equipment	9/16/2020
500	Revision	Definitions	9/16/2020
502	Revision	Protective Equipment	9/16/2020

Rule or Section	Action	Section Title	Added
503	Revision	Hot Line Tools	9/16/2020
521	Revision	Pole Hauling and Setting	9/16/2020
575	Revision	Electric Metering and Equipment	9/16/2020
1010	New	Sodium Hypochlorite (replacing Bleach)	9/16/2020
1204	Revision	Portable Power Hand Tools	9/16/2020
590.3	Revision	Electric Substations	7/16/2020
102.2	Revision	Employee Responsibility	6/17/2020
120	New	Mail and Package Ordering and Receiving	1/15/2020
1112	New	Mail and Package Receiving	1/15/2020
300.1	Revision	General Vehicle Operations	7/11/2019
300	Revision	Vehicle Operations	6/19/2019
Definitions	Revision	Definition of “employee”	6/13/2019
554.2	New	Chipping Duct	10/18/2017
554.1	Revision	Chipping Duct	10/18/2017
507.3	Revision	Grounding	5/17/2017
518.2	Revision	Catch Poles	5/17/2017
859.8	Revision	Grounding – Cable Size	5/17/2017
859.9	Revision	Grounding – Conductor Size	5/17/2017
Appendix C	New	Safety and Health Policy (existing policy, NEW to Safety Manual)	4/19/2017
Appendix B	New	Safety and Health Management System	4/19/2017
Appendix B-C	Revision	Relabeled as D and E to keep Updates and Navigation last in the Manual	4/19/2017
503.6	Revision	Hot Line Tools	4/19/2017
200-211	Revision	Personal Protective Equipment (not including Fall Protection and Prevention)	4/19/2017
Appendix A	Revision	Construction Safety & Health Standards	12/4/2016
Appendix A	Revision	General Industry Safety & Health Standards	12/4/2016
501.1	Revision	Safe Working Distances	11/16/2016
559.6	New	URD Testing	6/15/2016
108	Revision	Near Miss/Hazard Reporting and Investigation	11/17/2015
107	Revision	Injury Reporting and Investigation	8/19/2015
575.1	Revision	Electric Metering and Equipment	10/9/2014
575.1A	Revision	Electric Metering and Equipment	10/9/2014
575.1D	Revision	Electric Metering and Equipment	10/9/2014
575.2	Revision	Electric Metering and Equipment	10/9/2014
422	Revision	Working Aloft	5/22/2014
423	Revision	Ladders – General	5/22/2014
424	Revision	Stepladders	5/22/2014
425	Revision	Straight or Extension Ladders	5/22/2014
111	Revision	Housekeeping	10/16/2013
109	Revision	Public Injury	9/18/2013
Definitions	New	Definition of “direct buried cable”	6/19/2013
105	Revision	Fire Protection and Prevention	6/19/2013
558.1	Revision	Cable or Equipment Failure	6/19/2013

Rule or Section	Action	Section Title	Added
557	Revision	Direct Buried Cable	6/19/2013
Appendix C	New	Navigation Help (for using electronic Manual)	3/29/2013
116.9 & 155.11	Revision	Excavation, Boring and Tunneling / Working Around Underground Utilities	3/20/2013
220	New	Fall Protection and Prevention	3/20/2013
518.4	Revision	Stringing and Removing Wires	3/20/2013
104	Revision	Contractors and Visitors	11/7/2012
355	New	Attentive Driving	9/19/2012
515.3	Revision	Fuses, Cutouts and Disconnects	9/19/2012
859.6	Revision	Grounding	6/20/2012
Appendix B	New	Safety Manual Activity Log	4/10/2012
106	Revision	Emergencies (replacing Evacuation Plans)	3/21/2012
119	New	Adverse Weather Conditions	3/21/2012
300.20	New	Jump Starts - Vehicles & Equipment	3/21/2012
107.8B	Revision	Injury Reporting & Investigation	10/19/2011
108.5B	Revision	Near Miss/Hazard Reporting & Investigation	10/19/2011
855.1	Revision	Authority	7/20/2011
315.27	Revision	Full body harness	5/18/2011
410.1	Revision	Chain Saws	5/18/2011
1200	New	Vegetation Management	5/18/2011
854-858	Revision	Lockout/Tagout & Clearances	9/15/2010
310	Revision	Powered Industrial Trucks (Forklifts)	3/17/2010
500	Revision	Electric Rules	6/17/2009
354	New	Mobile Computers in Vehicles	4/15/2009
800	Revision	Lockout/Tagout & Clearances	9/19/2007
1000	Unknown	Chemical and Biological Materials	4/16/2007
200	Unknown	Personal Protective Equipment	2/21/2007
700	Unknown	Water Production	1/17/2007
900	Unknown	Electric, Steam & Chilled Water Production	1/17/2007
151	Unknown	Confined Spaces	9/27/2006
152	Unknown	Safety Watcher	9/27/2006
1100	Unknown	Material Handling & Storage	9/27/2006
Appendix A	Unknown	MIOSHA Standards (moved 5/18/11 to Appendix, formerly Section 1200)	6/30/2006
117	Unknown	Explosives	6/28/2006
155	Unknown	Working Around Underground Utilities	6/28/2006
107	Unknown	Injury Reporting & Investigation	3/15/2006
108	Unknown	Near Miss/Hazard Reporting & Investigation	3/15/2006
426	New	Lasers	10/19/2005
Definitions	Unknown	Definitions	5/26/2005

Documentation for any of the above changes may be requested from Safety Department

APPENDIX E
ELECTRONIC NAVIGATION HELP

Instructions for use with Adobe Reader X

Viewing this manual online provides the advantage of jumping around via bookmarks and hyperlinks. These are tips for improving your navigation experience with the Safety Manual:

To enable the find (search) function for a word or phrase:

- *The keyboard shortcut to bring up a search window is Ctrl + f*
  OR
- Click **view** at the top of the document viewer window
- Select **show/hide**
- Select **toolbar items**
- Select **edit** and (if not already checked) click on **find**
- **Find** will now appear as a magnifying glass toward the top of the viewer window. Click it to enter your word or phrase. Continue to hit enter until the desired selection has been found.

To enable the **previous/next** buttons for returning to pages already visited:

- *The keyboard shortcuts for previous and next are:*
  - *Previous: Alt + left arrow*
  - *Next: Alt + right arrow*

  OR
- Click **view** at the top of the document viewer window
- Select **show/hide**
- Select **toolbar items**
- Select **page navigation** and (if not already checked) click on **previous** and **next**
- **Previous** and **next** will appear as blue left-pointing and right-pointing arrows and function like the back and forward arrows in a web browser.

Other points of reference:

- Use the + and – buttons to zoom in and out to your preferred view
- Underlined items are hyperlinks and will take you to a section where those items are further described
- There is a RETURN TO TABLE OF CONTENTS option on the first page of every section (100, 200, DEFINITIONS, etc.)
- This document has selectable text, meaning partial or complete rules and sections can be copied and pasted into other documents
- With your browser window already open, click here to visit Safety Department on the intranet for more information on any of the programs referred to in this Manual
- Suggestions for revisions to any portion of this Manual should be routed through your department's Safety Advisory Committee for submission to the BWL Safety Committee
- Please call 702-6576 with questions or for additional assistance