



Power Operations

Safe Work Rules Handbook



Safety is at our core.

*Mission: To meet our customers' energy needs in a **safe**, reliable, efficient and environmentally-responsible manner.*

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That is why leadership is continually focused on:

- Making your workplace free of occupational injuries and illnesses through prevention, preparedness and response to potential hazards.
- Training you to perform your job in a safe and environmentally-responsible manner.
- Evaluating our work activities, facilities and programs by auditing behaviors, work processes, management systems and equipment.
- Encouraging everyone to be actively involved in the prevention of incidents.
- Integrating safety and occupational health into our strategies, business decisions, plans and operations.
- Complying with applicable safety and health procedures, laws and regulations.
- Assigning responsibility to all co-workers and holding everyone accountable for health and safety performance.
- Providing the necessary resources to support our safety and health processes.
- Recognizing and eliminating Potential Serious Injury and Fatality exposures (PSIF).

Revision Number	Revision Date	Revisions (reference page/section numbers)
0-3	Various	Revisions to Document not tracked in log
4-Baselined	10/2/20	Safe Work Rule Handbook was baselined Changes going forward will be documented in this log.
5	8/20/21	Fire watch requirement changed from 30 minutes to 60 minutes after job is completed or interrupted. Per NFPA 51B; Matches requirements in AUE-ADM-2413 – Hot Works.
6	12/4/2024	Changes to RTLB, Portable Grinder Specifics, and Plant Vehicles

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Power Operations - Rules to Live By

Power Operations - Rules to Live By

Power Operations Rules to Live By focus on activities that have the potential to produce a fatality or serious injury. While there are many hazards that can produce serious results, the items listed below are so significant that a single violation warrants immediate interaction and discipline. A fact-finding meeting will be conducted to consider circumstances involved. Employees determined to be in violation of these rules will receive a minimum of a five (5)-day suspension and a final warning.

- **Fall Protection** — Failure to use proper fall protection when there is a risk of a fall that is greater than 4 feet.
- **WPA (Lock Out / Tag Out)** — Violation of a tag, lock or tag-out device that is used for employee protection. This only pertains to an actual violation of a tag. Examples would be - Operating something with a tag, removing a device that is tagged out, or working on a device without WPA.
- **Electrical Safety** — Failure to follow the proper procedures and wear proper personal protective equipment when working on energized equipment. Co-workers are required to evaluate operating voltages, testing for voltage/current and wearing appropriate PPE to match level.
- **Confined Space Entry** — Failure to evaluate a confined space and perform air monitoring checks prior to entry.
- **Rigging / Hoisting** — Walking or working under a suspended load. Failure to properly barricade off lifting zones or not following proper rigging expectations.
- **Trenching and Shoring** — Do not enter excavations 5' or deeper unless evaluated by a Competent Person to be protected from cave-in by sloping, benching or shoring.

Violations of other safe work practices are also subject to disciplinary action up to and including discharge. The Ameren Missouri Power Operations Safe Work Rules Handbook provides specific guidance on the most common hazards in the workplace and specific rules to follow.



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Introduction

Purpose

The purpose of this manual is to provide consistent general safe work practices for Ameren Missouri Power Operations personnel in an abbreviated, readily accessible handbook.

Scope

Due to the nature of our work and its related hazards, rules and guidelines have been developed that are specifically applicable to Energy Centers. These are set forth in this handbook in condensed form. However, this handbook is not to be taken as a complete guide to Ameren Missouri's safety requirements. It is intended only as one reference source for safety rules and guidelines to help employees achieve safe performance. It must also be recognized that abnormal or unusual circumstances may require modifications of, or additions to, the safety practices contained in this handbook.

Employer & Employee Responsibilities

The supervisor / coordinator and the employee are all responsible for the performance of the work. They are also responsible for application of safe work practices, the proper care and use of protective devices, tools and equipment and the protection of life and property.

All employees are responsible for:

1. Knowing and practicing safety as it pertains to the job,
2. Observing safety instructions,
3. Alerting other employees in the use of safe work practices,
4. Eliminating unsafe conditions (if able to do so), and
5. Informing supervision of unsafe conditions or situations which are beyond the employee's ability to immediately address.

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Individual Accountability

Successful operation of our energy centers is founded on our belief that the safety and health of employees, contractors and visitors shall not be compromised for the sake of cost and production. The benefits of a safe work place and safe work practices extend far beyond monetary savings. We recognize that injuries impact our quality of life, as well as that of our families and associates, and we accept that avoidance of injury is each employee's responsibility.

Management, as well as the bargaining unit co-workers, must take personal responsibility for compliance with applicable safety and health regulations, standards, rules, policies and practices. It is the responsibility of each employee to look out for their safety, as well as the safety of others.

Important points to remember:

1. Conduct and behavior shall be in accordance with safety rules and procedures in order to eliminate unsafe acts.
2. Horseplay in any form will not be tolerated.
3. Personnel shall not alter or make inoperative any safety device such as relief valves, sprinkler valves, gauge valves, electrical and mechanical interlocks, guards, electrical switches, etc., unless they are instructed or authorized to do so in the course of their assigned work.
4. Safety equipment designed for specific functions shall only be used for its intended purposes.
5. Emergency equipment shall be ready for immediate use.

All Ameren co-workers need to understand that in order to accomplish work in a safe manner that we must hold ourselves and other accountable by using the Focused on Safety principle that unsafe acts are neither committed nor accepted. Every co-worker is expected to challenge any unsafe act and complete each workday safely.

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Emergency Reporting & Your Duties

It is your responsibility to be alert for abnormal situations. These situations can include fires, personal injury, explosions, chemical spills, tornadoes, floods, earthquakes and emergency evacuations. If you believe a situation to be of an emergency nature, call the Shift Supervisor or the Control Room. The Shift Supervisor or designee will evaluate the situation and initiate appropriate action. Report all emergencies as quickly as possible. Moments saved in the beginning of an emergency can save time, lives and equipment. For more detailed information on reporting, refer to your energy center-specific "Emergency Action Sheet."

When reporting, provide:

1. Your name
2. Location of emergency
3. Nature of emergency
4. Injuries involved (if any)
5. Hazards in the area (electrical, chemical, potential for injury, etc.)

NOTE: Follow directions given and, if conditions permit, don't hang up until told to do so.

General Safe Work Practices:

1. In the event that the emergency alarm is sounded, follow the instructions given by the supervisor or the Unit Operator, via radio or over the PA system.
2. Respond to the emergency only to the extent that you are trained and have the proper personal protective equipment. Do not put your personal safety in jeopardy! If the energy center is evacuated, report to the assigned assembly area for an accountability check.
3. In the event of extreme weather conditions, report to the designated shelter areas. If you are unable to get to a shelter area, take shelter at the best possible location and report your location as soon as possible

Duties relating to emergencies such as firefighting, hazardous material spills, first aid and rescue depend upon your level of training. Only employees who have had appropriate training for these situations may respond to the level of their training. If you are not trained to assist in the abatement of the emergency, evacuate the area and report to your assembly area as soon as you are sure the emergency has been reported.

REFERENCES:

- OSHA-29 CFR1910.38, *Emergency Action Plans*
- AUE-ADM-2414, *Reporting & Processing Accidents and Injuries*
- *Emergency Action Sheet-02 , Actions of Personnel Upon Discovering Emergency Situation*
- *Emergency Action Sheet-05 , Emergency Communications*

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Injuries & Illness / Emergency Incidents

Emergencies can happen anywhere, anytime to anyone. For this reason, it is imperative to expect the unexpected and understand what to do. It is just as important to know what to do, as it is to know what not to do. For example, do not move an injured person, unless conditions warrant such action. Likewise, if you are not properly trained to help someone, make sure you get someone who is.

1. Minor Injuries / Illnesses Requiring First Aid
 - a. Report all injuries immediately to your supervisor or plant safety personnel, regardless of how small they may appear
2. Serious Injuries / Illnesses and Emergencies Requiring Assistance.
 - a. Survey the area for immediate life threatening conditions to be able to report hazards and immediately contact the Shift Supervisor and provide the following information:
 - Your name
 - Location of the emergency
 - Nature of the emergency
 - Injuries involved
 - Hazards in the area (electrical, potential for additional injury, etc.)

NOTE: Follow directions given and, if conditions permit, don't hang up until told to do so.

- b. The Shift Supervisor will initiate emergency response efforts and call 911, if applicable.
 - c. Return to the scene and provide first aid if necessary, and only to the extent you are trained.
 - d. If safe to do so, remain at the scene to provide information and assistance to emergency responders / ambulance service. Never put yourself at risk!
3. The following form is to be kept in the Energy Center Control Room and used as reference when an injury (including minor injuries) occurs.

Revised: 05/27/19

ATTENTION RUSH ISLAND EMPLOYEES

**IF A TRUE LIFE-THREATENING MEDICAL EMERGENCY,
CALL SHIFT SUPERVISOR at ext. 29233 OR 29234**

WORK INJURY (including minor injuries) - WHEN NURSE / EMT IS ON SITE

DIRECT THE EMPLOYEE TO THE ON-SITE MEDICAL FACILITY x69966

NOTE: If there is any question about the safety of moving the injured, DO NOT MOVE, contact the Nurse/EMT and direct him to the injured employee.

Supervisors will direct all employees who sustain a work related injury to see the Nurse/EMT immediately, if available.

- The Nurse/Paramedic will evaluate the injury:
 - If they are able to treat the injury/injuries within their standing orders they will do so.
 - If not, before sending anyone off site they will contact Midwest Occupational Medicine to discuss with a physician to determine that off-site medical care is necessary.
- If instructed to send employee for off-site medical care, they will be sent, only after Jill Hoffman or Anne Donze have been notified, to the following depending on the need for treatment:**

Eye Doctor**Mulqueeny Eye Centers**

Dr. Mulqueeny, Annette Stiebel

or Erica Lashbrook

612 North New Ballas

Creve Coeur, MO 63141

Phone: 314-542-3600 or 636-219-9722

After hours: 314-341-3600 (Dr. Mulqueeny)

or 636-219-9722 (Annette Stiebel)

(Need to call ahead)

Motion Orthopedics**Dr. Byler**

633 Emerson Rd.

Creve Coeur, MO 63141

Phone: 314-991-2013

(Monday – Friday 8:00am to 5:00pm)

(Need to call ahead)

Medical Treatment**Mercy Urgent Care Facility**

(next to the AT&T store)

Dr. Don Richard

660A South Truman Blvd.

Festus, MO 63028

Phone: 636-933-1669

Fax: 636-933-1203

(Monday – Friday, 8 a.m. to 4:30 p.m.)

- The Nurse/EMT will contact the medical facility to discuss with the physician their assessment and re-iterate Midwest Occupational Medicine's protocols for Ameren.
- The Nurse/EMT will then contact Brentwood Services to report the initial injury, and e-mail an event notification to:
 - Safety Supervisor
 - Admin Supervisor
 - Employee's Supervisor
 - Brentwood Services
- The Nurse/EMT will continue to follow up with the medical facility for discharge instructions. Once received he/she will inform the plant and Brentwood Services about future handling.

WORK INJURY (including minor injuries) – WHEN NURSE / PARAMEDIC IS NOT ON SITE

- If an injury occurs, contact the Shift Supervisor. Shift Supervisor will evaluate and administer first aid, if appropriate.
- If immediate medical care is needed, Shift Supervisor will send the employee to:

Mercy Hospital Jefferson (Emergency Room)

1400 US Highway 61

Festus, MO 63028

Phone: 636-933-1111

Fax: 636-933-1030

- The Ameren Supervisor will call Brentwood Services @ 800-781-2075 or 636-486-5079 or 314-520-4910 (Chris Fry) at 636-812-9916 (24-Hr #), Ameren Safety Supervisor, **Jill Hoffman** Ext. 29356 or 314-208-5155, **Mark Watler** Ext. 69966 or 573-366-1269, or Admin Supervisor, **Anne Donze** Ext. 29203 or 314-540-5268. If unable to speak to one of these contacts personally, an e-mail should be sent to all three.
- Brentwood Services will page the on-call physician at Midwest Occupational Medicine to give them the off-site medical facilities information so they can call to discuss plan of care.

If a work injury occurs, a supervisor or safety coordinator must complete the screens in Safety1 Source to create a Form 70 report. (Contact the Corporate Health and Safety Department if you have questions about the entry of injury information into Safety1 Source.)

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SAMPLE FROM Rush Island

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REFERENCES:

- OSHA-29 CFR1910.151, Medical Services & First Aid
- OSHA-29 CFR1926.50, Medical Services & First Aid
- ES-REG-204, Medical Services & First Aid
- AUE-ADM-2414, Reporting & Processing Accidents and Injuries
- Emergency Action Sheet-02, Actions of Personnel Upon Discovering Emergency Situation
- Emergency Action Sheet-03, Handling Injured Personnel
- Emergency Action Sheet-04, Emergency Personal Protective Equipment

Focus 5

Focus 5 is a list of the top five causes of injury to Ameren Missouri co-workers. The list is based on the analysis of three years of recordable injury reports in Missouri Customer and Power Ops.

The top five areas for Ameren Missouri are:

1. **Body Mechanics:** This involves awareness and practicing proper positioning, working within easy reach, effective stretching and avoiding exertion.
2. **Eyes on Path/Work:** This involves identifying and correcting slip, trip and fall hazards and ensuring walking/working surfaces are free from hazards.
3. **Line of Fire:** Line of fire injuries occur when the path of a moving object intersects with an individual's body. The three major categories are caught in or between object, struck by object and released energy.
4. **Pre-Job Inspection:** The area involves improving communication and techniques for identifying and mitigating hazards.
5. **Proper Tool/Equipment:** Proper tool/equipment involves using the right tool, in the right way, for the job at hand. Also, proper maintenance and pre-use inspections are important aspects of this focus area.

Hierarchy of Controls

Controlling exposures to occupational hazards is a fundamental method for protecting our co-workers. The Hierarchy of Controls (HOC) is a tool which strengthens processes already in place by identifying effective hazard control solutions. The HOC outlines the controls used to mitigate a hazard from most effective - elimination, to least effective or last line of defense - PPE. Knowing, understanding, and properly applying the Hierarchy of Controls will result in a safer workplace.



Job Hazard Assessment (JHA)

Hazard assessments are required under OSHA regulations for deciding what personal protective equipment controls may be needed for hazards on the job. They are essential in all work environments to ensure that every task is evaluated and performed as safely as possible. To accomplish this, there are many tools that will effectively allow co-workers to identify the hazards associated with each task from both an environment and personnel perspective.

Job Hazard Analysis (JHA) Process

The basic principle of a JHA is to break down the work to be performed into distinct tasks, and then analyze each distinct work task for potential safety risks or hazards. This process should also include information on the performance requirements of PPE. Only consider what could happen to the worker and what performance requirements are needed to safely complete each task. The JHA should also include "what if" analysis for non-routine and upset conditions. It is important to include a "what if" or fault tree approach to the job analysis, because accidents commonly result from deviations from work practices and normal operations.

Basic JHA Steps

1. Break down the work into specific task
2. Identify / Evaluate hazards associated with each task
3. Implement control measures by following the Hierarchy of Controls
4. Review the JHA for effectiveness

Safe Start

Similar to hazards associated with the work environment and job task, co-workers should perform a self-evaluation of themselves using the Safe Start principles to identify their state of mind prior to starting any task.

Simply stated, when we are in one of the four states identified in Safe Start that can cause or contribute to the identified critical errors. These critical errors will increase an individual's risk for experiencing an injury.

Once you have identified the state you are in, you can utilize one of the four Critical Error Reduction Techniques (CERT) to reduce the chances of having yourself commit an error that would lead you to injury yourself or someone else around you.



These four states...

- ☐ Rushing
- ☐ Frustration
- ☐ Fatigue
- ☐ Complacency

can cause or contribute to these critical errors...

- ☐ Eyes not on Task
- ☐ Mind not on Task
- ☐ Line-of-Fire
- ☐ Balance/Traction/Grip

...which increase the risk of injury.

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Job Safety Briefings

Job Briefings Policy

All job briefings shall comply with the OSHA standard 1910.269(c):

The employer shall ensure that the employee in charge conducts a job briefing with the employees involved before they start each job. The briefing shall cover at least the following subjects:

- **hazards associated with the job**
- **work procedures involved**
- **special precautions**
- **energy source controls**
- **personal protective equipment requirements**

Job briefings are **required** before work on any job and shall include **everyone** on the jobsite.

All work shall utilize an **ongoing planning process** according to the following structure:

- **Level 1:** The briefing is led by supervisor/crew leader or designee before leaving for job site.
- **Level 2:** The briefing is led by supervisor/crew leader or designee upon arrival at job site (or during Level 1, if necessary). This briefing addresses jobsite set-up and housekeeping.
- **Level 3:** The briefing is led by crew leader or designee before starting the job. It is specific to the job, documented (job briefing form) and signed by everyone present.
- **Re-Brief:** The briefing is led by any crew member, when any of the following occurs:
 - at the beginning of each new segment of the job
 - following job breaks, interruptions or delays
 - when something unexpected occurs
 - when significant changes are made
 - upon arrival/departure of team member(s)
 - any other time deemed appropriate by any crew member
- **Level 4:** The briefing is led by supervisor/crew leader or designee, documented (job briefing form), upon completion of the job.

REFERENCES:

- OSHA-29 CFR1910.269(c), *Job Briefings*
- *Job Briefing Policy dated 7-1-2013, (see Corporate Safety website)*

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Co-Worker to Co-Worker (C2C) Interaction and Feedback

Since hazards don't discriminate between work groups, everyone at the Energy Center is considered a Co-worker.

C2C feedback is ongoing, informal and whether giving or receiving feedback it is done in a respectful manner.

C2C Interaction is the formal process we know as a job observation.

C2C feedback occurs when co-workers interact with each other and provide feedback on safety related issues. For example, *a Supervisor observes a Laborer hosing around electrical buses not allowing the water to come in contact with the bus enclosure. The Supervisor would provide positive feedback to the Laborer concerning the proper technique in protecting electrical equipment. This is Co-worker to Co-worker interaction and feedback.*

C2C Interaction will be performed per the Ameren C2C Interaction Policy. The purpose of the policy is:

- Improve the quality of interactions between co-workers
- Increase and reinforce safe behaviors across Ameren
- Provide a consistent framework for Ameren's approach to C2C interaction (formerly Job Observation).

Observer General Guidelines

Refer to the Ameren Missouri C2C Interaction Guidelines for assistance on performing co-worker to co-worker observations. When providing and receiving feedback, it is ongoing and respectful between co-workers. C2C feedback can increase shared intelligence, can keep an incident from occurring, reinforces safe behaviors, builds an environment of trust and caring and leads to better results.

REFERENCE:

- Ameren C2C Interaction Policy (Link on Power Operations Safety Website)
- Ameren C2C Interaction Guidelines (Link on Power Operations Safety Website)
- Ameren Power Operations Interaction Guidelines

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Abrasive-Blasting

Abrasive-blasting is a process in which a blasting medium is used to remove materials. The process generates fugitive dust, which creates a potential risk to both health and the environment. Airborne contaminants such as lead, cadmium and silica must be considered when performing abrasive-blasting operations. Controls such as a complete enclosure or wet abrasive-blasting can be employed to reduce these emissions. Additionally, proper personal protection for those engaged in abrasive-blasting must also be provided.

General Safe Work Practices

1. Abrasive blasting shall only be conducted within regulated areas and with approved equipment. Always follow established procedures.
2. Perform a visual check of the surrounding area before beginning abrasive-blasting to ensure other personnel are in the clear.
3. When abrasive-blasting in areas other than enclosed cabinets, abrasive blast hood with continuous airline respirator and abrasive blasting suit consisting of pants or bibs and a jacket along with leather gloves. Class D grade air shall be used in all supplied air applications.
4. When performing abrasive-blasting inside a blast cleaning enclosure, dust collecting equipment shall be in continuous operation.
5. Abrasive-blasting respirators shall be worn by all abrasive-blasting operators when working inside of enclosures.
6. Dust shall not be permitted to accumulate on the floor or on the ledges outside of an abrasive-blasting enclosure. Dust spills shall be cleaned up promptly.
7. Aisles and walkways shall be kept clear of abrasive material which may create a slipping hazard.

Environmental Precautions

Abrasive wastes (blasting medium) may contain hazardous characteristics such as lead and cadmium. Follow guidelines on Environmental Services Share Point site for hazardous waste disposal of paint abrasive wastes if it contains a contaminant.

REFERENCE:

- OSHA-29 CFR1910.94(a), *Abrasive Blasting*
- *Environmental Services Share point site (For link see Power Operations Safety Website)*

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Abrasive Wheels & Tools

There are many general requirements for electric / pneumatic portable grinders, fixed grinders and other tools with abrasive wheels. The hazards associated with these types of equipment include, but are not limited to cuts, pinch points, eye and face hazards and structural failure.

General Safe Work Practices (Prior to Operation)

1. Properly install any new abrasive wheel. This is essential for safe operation.
2. Conduct a “ring test.” (Abrasive wheels have been known to disintegrate when failure occurs.) To perform a “ring test:”
 - a. Suspend the wheel by the spindle hole with a screwdriver or similar tool.
 - b. Lightly tap with a wooden handle.
 - i. A dull (thud) sound indicates, in all probability, the wheel is cracked.
 - ii. A sharp ring indicates the wheel is free from cracks.
3. Thoroughly inspect all wheels for defects.
4. Make sure the wheel-rated speed and the grinder speed are compatible.
5. Do not use an abrasive wheel when the diameter is less than the factory label.
6. Ensure that all guards, rests and shields are intact and adjusted properly.
7. Always utilize an impact resistant, full-face shield and safety glasses when using abrasive wheels or grinders.
8. Ensure the trajectory pathway is clear of all personnel when starting the equipment.
9. Never force work against grinding wheels, especially a cold wheel. Instead, apply gradually, allowing the wheel an opportunity to warm.
10. Whenever a wheel breaks, carefully inspect the grinder to make certain the parts have not been damaged.

Fixed Machine Specifics

1. If the grinder is equipped with a tool rest, the tool rest shall be adjusted a maximum distance of 1/8 inches from the surface of the wheel.
2. The tongue guard shall be positioned a maximum distance of 1/4 inch from the wheel.
3. Allow the wheel to be brought up to speed for approximately 30 seconds prior to applying work.
4. Use the tool rest, when practical.

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5. Never grind on the sides of grinding wheels unless specifically designed for that purpose.

Portable Grinder Specifics

1. If the wheel gets bound in the course of work, re-inspect the wheel for damage prior to continuing.
2. Portable grinder wheels (greater than 2 inches), shall be enclosed with a substantial guard to protect the operator and others in the event the wheel breaks.
3. Co-workers must be trained and follow the manufacturers safe operations and maintenance guidance. Ensure the use of the right size grinder for the application. Coworkers shall inspect the grinder prior to each use.
4. Approved grinders must be inspected by the tool room to ensure proper guards and handles are correctly installed.
5. When using wire wheels or grinding discs, the tool room will ensure the proper design rated speed and application is correct for the grinder. Do not use wheels that are cracked, missing wires, or those that vibrate excessively.
6. All wire wheel and discs should be returned to the tool room for inspection and proper disposal if worn.
7. The grinder shield and handle must be always used. If the shield or handle must be removed, Supervisor approval is required and documented. Once the task is complete, the shield or handle must be replaced and returned to the toolroom for inspection.
8. Based on the task the grinder will be used for, proper PPE will be required. This shall be discussed during the JSB process. PPE shall include but not limited to proper eye protection, hearing protection, hand protection, face shield, long sleeves, and hardhat. Additionally, leather welding aprons, chaps shall be used unless the use of these provide additional safety risks or concerns.
9. Co-workers shall be aware of their surroundings and proper precautions shall be used if grinding material can cause sparks or flying debris. (Utilize hot work permit)

REFERENCES:

- OSHA-29 CFR1910.215, *Abrasive Wheel Machinery*
- OSHA-29 CFR1926.303, *Abrasive Wheels & Tools*

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Aerial Work Devices

Aerial work devices (AWDs) are any vehicle-mounted devices, telescoping, articulating or both, which are used to access and perform work in elevated areas. Examples include powered scissor lifts and powered work platforms, such as a JLG, Genie or Handy Herman. Since each piece of equipment requires special training, only trained and qualified personnel shall operate them.

Special Precautions

1. AWD's shall only be used for their designed purpose.
2. Never operate an AWD in an adverse weather environment, such as lightning or high winds.
3. Never exceed the manufacturer's rated load capacity as stated on the equipment nameplate or in the manufacturer's manual.
4. Workers shall not modify AWD's without written permission of the manufacturer.

General Safe Work Practices (Prior to Operation)

1. An operator's manual shall accompany the machine.
2. Visually inspect the equipment and test the lift controls per manufacturer recommendations.
3. Inspect the area of travel for obstructions.
4. Ensure the work platform surface is clean and unobstructed.
5. Ensure brakes are set prior to operating and outriggers, when used, are positioned on pads or a solid surface.
6. When possible, place barrier tape around the area where an AWD is in use.
7. All standard PPE shall be worn when operating an AWD.
8. Fall protection shall be worn at all times while in the AWD basket, except as specified by OSHA and manufacturer guidelines.
9. Fall protection shall consist of a body harness and either fall restraint or fall arrest such as an SRL (Self Retrieving Lanyard) and shall prevent the employees from contacting any lower level or be ejected from the basket.

NOTE: Fall Restraint is defined as equipment or a system that prevents the worker from reaching a fall hazard

10. The lanyard or SRL shall only be attached to approved points on the AWD.

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11. A fall protection lanyard shall not be attached to an adjacent structure when working in an AWD.

Operational Safety

1. Do not operate aerial lifts with combustion engines inside buildings or enclosed areas unless they are adequately ventilated.
2. Do not alter safety devices.
3. Position the equipment on a firm, level surface or within slope limitations specified by the manufacturer. Do not position the AWD against another object to steady it.
4. When positioning an AWD near fixed objects, use caution to avoid pinch points.
5. AWD entry gates or chains shall be secured before operating the lift.
6. Employees shall always stand firmly on the floor of the basket.
 - a. They shall not sit or climb on the edge of the basket.
 - b. The use of planks, ladders or other devices for a work position is prohibited.
7. The boom shall be lowered when driving an aerial lift from one location to another.
8. Specify one operator to manipulate controls when more than one worker is on the lift.
9. Do not exit an elevated AWD unless the platform has been positioned within close proximity of a safe and secure structure. Maintain fall protection at all times.
10. Operators shall maintain safe working distances from all exposed energy sources in accordance with the “Electrical Safety” section of this handbook.
11. Refueling and battery charging shall be performed in well ventilated areas.
12. Maintenance activities shall be performed by qualified maintenance personnel, as outlined by the manufacturer and in accordance with the manufacturer’s specifications.

REFERENCES:

- OSHA-29 CFR1910.67, *Vehicle-Mounted Elevating & Rotating Work Platforms*
- OSHA-29 CFR1926.453, *Aerial Lifts*
- “Electrical Safety” section of this handbook

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Asbestos

Asbestos is a naturally occurring mineral known for its insulating properties. The fibers are hollow, microscopic in size and can be densely packed. When asbestos fibers are bonded together (intact), it is these properties that make it such a good insulator. For this reason, it can be found in many energy centers. Although the following list is not inclusive, asbestos may be found in such items as thermal system insulation, gaskets, packing, valve insulation, transite, roofing materials, exterior siding panels, floor tiles and mastic.

When asbestos fibers become friable and airborne, they pose a greater health hazard. Inhalation and digestion of asbestos fibers have been linked to chronic health conditions, including asbestosis, cancer and mesothelioma. Therefore, it is imperative that any work involving potential asbestos exposure follows safe work practices.

General Safe Work Practices

1. Do not perform asbestos related tasks unless adequately trained.
2. When in doubt if a material is asbestos or contains asbestos, presume the material is asbestos and treat it according to approved work procedures.
3. Promptly erect "Danger – Asbestos" barrier tape around any suspect material, inform your supervisor / safety coordinator of the issue and originate a Job Requisition (JR) to correct deficiencies.
4. Do not dry sweep or use compressed air to clean up asbestos or presumed asbestos material.
 - a. Wetting asbestos material is the most effective control against employee exposure to asbestos.
 - b. Only vacuums equipped with high efficiency particulate air filters (HEPA) may be used to clean up asbestos.
5. Close doors and windows to minimize draft sources around suspect materials. This will help reduce airborne exposures.
6. Never cut, grind, sand, hammer or scrape on any asbestos-containing material.
7. Do not drill holes in or hang rigging from asbestos insulated pipes.
8. Do not enter regulated (posted and barrier taped) areas unless you are authorized, properly trained and are wearing the proper protective equipment. This includes a respirator with appropriate cartridges filters.

NOTE: Employees must be trained in the use of personnel protective equipment and negative pressure respirators before entering asbestos regulated areas. Inform your supervisor if you have not been trained in asbestos, or have not been respirator fit-tested, before beginning your assignment.

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9. Wear air monitoring equipment as instructed by supervision.
10. Do not tamper with any air monitoring equipment worn or located on the job site.
11. Never unplug a negative air machine in use on an asbestos containment. Ensure a "Caution" tag is placed on the negative air machine plug to prevent accidental removal of the power source.
12. Promptly notify management of any issues or concerns, such as separation of negative air machine hose hook-ups, tears in the containment area, etc.
13. Do not eat, drink, smoke, chew gum or tobacco, apply cosmetics or remove personal protective equipment in a regulated area.
14. Follow established procedures for decontamination and disposal of asbestos waste.
15. Removal or clean up where waste exceeds 1 (60" x 60") disposal bag requires certified asbestos abatement workers.

REFERENCES:

- OSHA-29 CFR1910.1001, Asbestos
- OSHA-29 CFR1926.1101, Asbestos
- ES-REG-203, Asbestos Exposure Controls & Work Practices
- AUE-ADM-2421, Asbestos Program
- AUE-ADM-2418, Industrial Safety Program
- Emergency Action Sheet-11, Asbestos Release
- "Barrier Tape" section of this handbook

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Ash & Slag

Ash and slag are substances that are by-products of the combustion process found in coal-fired energy centers. These end products of coal combustion can be divided into several major categories: bottom ash, economizer ash, slag and fly ash.

Bottom ash is the part of coal that doesn't burn and falls to the bottom of the boiler. It generally consists of large, hard chunks. These chunks are often quite heavy and may cause minor cuts and abrasions due to their excessive abrasiveness.

Economizer ash tends to be either little hard pellets or small chunks of ash. This type of ash is collected in a hopper before exiting the gas path.

Slag is a heat-fused material that can accumulate on the sides and bottom of the boiler, particularly on boiler tubes. Large chunks of slag falling from overhead inside the boiler can cause serious injury. They can also lead to strains, sprains and crushing injuries when being removed from boilers, ash pits or other ash handling systems.

Fly ash consists of tiny solid particles of ash that are collected in precipitators. It can be present in ductwork or any area where boiler exhaust gases flow to / from the precipitators and where leaks develop. Wet fly ash poses a slipping hazard while hot fly ash can flow rapidly and quickly present an engulfment hazard. Caution should be exercised whenever opening or entering areas with fly ash accumulations since fly ash retains heat and can cause severe burns upon contact.

As outlined above, ash or slag accumulations can result in struck by injuries, pose slip / trip hazards or lead to cuts and burns. All of these types of ash are irritating to the eyes, skin or lungs due to their abrasiveness or pH (corrosiveness) level.

Since breathing ash may be irritating to the lungs and nasal passages, it is best to avoid breathing these dusts. Respiratory protection may be required, particularly since these types of ash contain silica and trace amounts of heavy metals, such as arsenic, cadmium, selenium, chromium and lead. For further information, consult the SDS available for both bottom ash and fly ash.

Special Precautions

1. Don't walk on ash unless an assessment has been conducted to determine it is safe to do so. Even if the crusted surface of ash accumulation appears solid, it may not be. The potential to fall through the ash surface, resulting in severe burns, may occur.
2. In the event ash gets in your eye, resist the temptation to rub it. Instead, flush the eye with eye wash until the irritation subsides.
3. Since ash contains trace amounts of heavy metals, always wash hands and face before eating, drinking or smoking.
4. Follow the guidance for Nuisance Dust in section of this handbook.

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General Safe Work Practices

1. Inspect the work area before entering to ensure it is safe to do so.
2. Avoid or remove ash and slag accumulations in boilers, ductwork, etc. Overhead accumulations are particularly hazardous due to the potential of falling ash or slag on an unsuspecting worker.
3. Clean accumulated ash and slag from the work area, taking care to minimize dust generation when doing so. Vacuum and or wash the ash from the work area.
 - a. Hang barrier tape and a notification tag around the area during cleaning to alert others of the hazard. Refer to the “Barrier Tape” section of this handbook for additional information.
 - b. If water is used for cleaning, make sure to use enough water to remove the ash. Since ash tends to harden like concrete as it dries, be sure to flush the drain after cleaning the area to prevent permanent blockage.
4. Avoid dumping or spilling large quantities of fly ash.
5. Use ventilation or wet methods to eliminate or reduce air borne dust from ash. Wear a dust mask as needed, or a tight fitting (half or full-face negative pressure) respirator with HEPA/P-100 filters when a known hazard exists.
6. Wear appropriate PPE, including disposable white suit, gloves, goggles, face shield, respirator, leather boots and thick or insulated clothing.
 - a. When welding, cutting or grinding on boiler tubes that have slag on them, appropriate respiratory protection may be needed.
7. Have an escape plan / exit route ready in case of a major release.
8. Use approved lighting, as determined by plant-specific guidelines. Ensure the lighting is adequate when conducting inspections and work activities.

REFERENCES:

- OSHA-29 CFR1910.22, *General Requirements for Walking & Working Surfaces*
- OSHA-29 CFR1910.133, *Eye & Face Protection*
- OSHA-29 CFR1910.134, *Respiratory Protection*
- OSHA-29 CFR1910.252, *General Requirements for Welding, Cutting & Brazing*
- AUE-ADM-2415, *Confined Spaces Program*
- “Barrier Tape” section of this handbook
- “Nuisance Dust” section of this handbook

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Barrier Tape

This guideline applies to the use of barrier tape that is often used to warn personnel of hazards, such as falling objects from overhead work; slip / trip hazards; welding slag, sparks or other hot materials; and chemical, radiological, asbestos, lead or other specific hazards. There are several different methods utilized to identify these hazards.

Yellow barrier tape is used to denote a hazard in the marked area that requires additional care or precaution when entering the area. Unlike red barrier tape, personnel can cross under yellow barrier tape with caution. Prior to doing so, though, the employee wishing to cross through the yellow barrier tape area shall evaluate the condition and determine if he / she can safely pass through or safely complete his / her task within the boundaries of the yellow barrier tape area. Examples of some hazards that may be marked with yellow barrier tape include a slippery floor, uneven walkway, etc.

Red barrier tape is used to denote a hazard in the marked area that may result in death, serious injury or significant property damage. Due to this fact, personnel are not allowed to cross through a red tape area, unless specifically authorized by the supervisor listed on the barrier tag.

1. Red "**DANGER - DO NOT ENTER**" barrier tape shall be used when entry into an area is to be restricted. Examples include crane lift areas, possible falling debris, chemical spills, critical steam leaks or laser use.
2. Red "**DANGER - ASBESTOS**" barrier tape shall be used when entry into an area is restricted due to the possibility of asbestos exposure above the PELs. After demarcating the area, the asbestos hazard shall be reported immediately to the Shift Supervisor or the appropriate contact person so the hazard can be evaluated and contained.

Green barrier tape shall be used to warn personnel of possible exposure to hexavalent chromium. Respiratory protection is required in these areas.

Yellow and Magenta barrier tape shall be used to warn personnel DO NOT ENTER an area because radiography is creating a radiation hazard.

White barrier tape FME (foreign material exclusion) shall be used to warn personnel of FME areas.

Portable flashing lights are another tool that may be used with barrier tape to alert personnel of hazards present in the area. These devices are particularly helpful in non-daylight hours or during inclement weather.

Special Precaution

1. Barrier tape and flags shall not be used as a method to prevent a fall that is 4 feet or more when the hole is unattended, or wall opening presenting a fall hazard. In these situations, a physical barricade that meets appropriate regulatory requirements shall be used. Examples of physical barricade include guardrails, fencing or other suitable means.

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General Safe Work Practices

1. Any employee may erect barrier tape; however, only employees authorized to do so may remove the barrier tape when the hazard no longer exists.
2. The barrier tape area should be no larger than necessary, but large enough to encompass the hazard.
3. All barrier tape shall have an information tag attached, listing the:
 - a. Reason for barrier tape placement,
 - b. Supervisor responsible for the barrier tape,
 - c. Date and time of the barrier tape placement and
 - d. The anticipated work completion / tape removal date.
4. The barrier tape and placement tag shall be completely removed as soon as the situation requiring the barrier tape has been corrected and the area is determined to be clear of the hazard.

REFERENCES:

- *OSHA-29 CFR1910.144, Safety Color Code for Marking Physical Hazards*
- *OSHA-29 CFR1910.145, Specifications for Accident Prevention Signs & Tags*
- *AUE-ADM-2418, Industrial Safety Program*
- *“Fall Protection / Fall Prevention” section of this handbook*

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Batteries

These requirements apply to the use, servicing and management of batteries used at the facility. Improper use, servicing or disposal of batteries can result in employee exposure to toxic metals such as lead, arsenic, cadmium, mercury, nickel or reactive chemicals, caustics, acids, solvents and electrolytes. Batteries contain acid, which if spilled, should be treated as hazardous waste.

General Safe Work Practices

1. Before performing battery related tasks, check availability and location of eyewash stations / emergency showers.
2. Do not create sparks, arc or flames in battery areas or rooms.
3. Take extreme precautions when carrying or using conductive materials around batteries. Tools and metallic objects shall not be placed on uncovered batteries.
4. To prevent shocks, avoid physical contact with exposed conductors on batteries.
5. Care shall be exercised to prevent short-circuiting, or generating a spark and creating an ignition source, when charging, cleaning or performing maintenance on the battery.
6. Use insulated tools when working on batteries.
7. When using a hydrometer to check batteries, care shall be taken to prevent splashing battery acid.
8. Check hydrogen sensor reading indication mounted the outside wall of the battery room before entering the area (if applicable).
9. Employees shall wear the appropriate PPE for the job at hand.
 - a. Eye protection shall be worn at all times
 - b. When working with vehicle batteries and the potential exists for chemical exposure, acid resistant gloves, aprons, chemical goggles and full face shield shall be worn. Applications include:
 - i. Adding or removing electrolytes,
 - ii. Moving battery cells,
 - iii. Checking specific gravity, or
 - iv. Washing / cleaning batteries.

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Battery Rooms

1. Only qualified persons may enter battery rooms.
2. Batteries of the unsealed type shall be located in enclosures with outside vents or in well-ventilated rooms.
3. Racks and trays shall be substantial and shall be treated to make them resistant to electrolyte.
4. Floors shall be of acid resistant construction unless protected from acid accumulation.
5. A face shield, apron and rubber gloves shall be worn when handling acids or batteries.
6. Emergency drenching / flushing of the eyes and body shall be within 25 feet of battery handling areas.
7. Facilities shall be provided for flushing / neutralizing spilled electrolyte and for fire protection.

Battery Management

1. Batteries shall be managed in an environmentally safe manner outside the shop area.
2. Batteries shall be placed only in approved storage areas or containers.
3. Please refer to Used Battery Management guidance on the Environmental Share Point Site for additional information.

Charging Batteries

1. Battery charging shall only be performed in designated areas.
2. Smoking is prohibited in battery charging areas.
3. Approved signs shall be posted and observed in all battery charging areas. Signs shall read "Danger—No Smoking, Open Flames or Ignition Sources."
4. Charging apparatus shall be protected from damage by trucks.
5. Adequate ventilation shall be provided in all battery charging areas. Where natural ventilation does not constantly change the air, intrinsically safe, forced ventilation shall be used.
6. Facilities for quick drenching of the eyes and body shall be provided within 25 feet of battery handling areas.
7. Facilities shall be provided for flushing / neutralizing spilled electrolyte and for fire protection

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8. Battery-powered vehicles shall be properly positioned and brakes set before charging operations commence.
9. The manufacturers' recommendations shall be followed when charging batteries.
10. Battery compartment covers shall be open to dissipate heat and vapors.
11. Chargers shall be turned off when leads are being connected or disconnected.
12. Vent caps shall be kept in place, unless specific maintenance work is being performed. Care shall be exercised to ensure that vent caps are functioning properly and are re-installed immediately after work is completed.
13. Batteries shall be free of corrosion build-up when charging.
14. If jumpers are used to start vehicles with dead batteries, the jumper shall be:
 - a. Connected first to the positive terminal of the dead battery, then to the positive terminal of the live battery.
 - b. The other jumper shall be connected first to the negative terminal of the live battery and then to a suitable ground away from the battery (**not** the negative terminal of the dead battery).
15. Ignition, lights and accessories on the vehicle shall be turned off before connections are made.

Changing Vehicle Batteries

1. Vehicles shall be properly positioned and brake applied before attempting to change the battery.
2. Care shall be exercised to prevent grounding the case of a Ni-Cad cell, since the case is part of an electrical circuit.
3. Filler caps shall be in place when batteries are being moved.
4. When removing a battery, the ground connection shall be the **first** connection removed.
5. When making electrolyte for batteries, employees shall always slowly pour the acid in the water, **not** water in the acid. Pouring water into acid can cause an explosion!
6. A bulb device shall be used to handle electrolyte.
7. If electrolyte is spilled on clothing, the contaminated clothing should be removed and the skin washed with water as soon as possible.
8. When installing a battery, the ground connection should be the **last** connection made.
9. Installed batteries shall be secured to avoid physical or electrical contact with compartment walls or components.

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REFERENCES:

- OSHA-29 CFR1910.178, *Powered Industrial Trucks*
- OSHA-29 CFR1926.441, *Batteries & Battery Charging*
- NFPA 70E – Article 240, *Batteries & Battery Rooms*
- NFPA 70E - Article 320, *Safety Requirements Related to Batteries & Battery Rooms*
- *Waste Handling and Disposal Handbook*
- *Used Battery Disposal Guidance on Environmental Services Share point site (For Link see Power Operations Safety Website)*

Beryllium

Some Ameren operations have been identified as having potential employee exposures to beryllium. Exposure can occur during excessive disturbance of coal ash.

In rare cases inhaling or contacting beryllium can cause an immune response that results in an individual becoming sensitized to beryllium. Individuals with beryllium sensitization are at risk for developing a debilitating disease of the lungs called chronic beryllium disease (CBD) if they inhale airborne beryllium after becoming sensitized. Beryllium-exposed workers may also develop other adverse health effects such as acute beryllium disease, and lung cancer.

Ameren will employ proper industrial hygiene practices to ensure compliance with the OSHA standard. These may include engineering controls, work practices, and personal protective equipment.

Ameren Co-workers shall comply with the provisions of the Ameren Beryllium Management Instruction and site management policies and procedures related to beryllium especially in regard to the wearing of personal protective equipment, training attendance, appropriate work practices and cooperation for medical exams.

REFERENCES:

- *ES-REG-218 Beryllium*

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Biological Hazards

Most people don't think about biological hazards when working in a power plant. Although the list below is not all-inclusive, it covers some well-known biological hazards that may be encountered, either in an industrial setting or when working / enjoying the outdoors at home.

Bird Droppings – Clean-up

Personnel who are required to perform clean up or work in areas with large quantities of bird droppings should observe the precautions outlined below.

General Safe Work Practices

1. Large accumulations of bird droppings should be thoroughly wetted with water before removal. Solids may be bagged and disposed of with trash. Surfaces should be thoroughly washed after solid material is removed.
2. Employees should wear an elastomeric ½ mask respirator with HEPA/P-100 filters, disposable Tyvek suit, rubber boots and gloves when removing the bird droppings. The respirator cartridges should be discarded after use. The boots and gloves should be washed with the sanitizing solution before removal.
3. If the bird droppings are in an area with poor ventilation, employees should consider adding carbon-activated cartridges that will reduce the ammonia odor caused by the droppings.
4. Personal clothing soiled with bird droppings should be wiped with a sanitizing solution and washed separately from other laundry.
5. Employees should wash their hands and any exposed skin as soon as possible after the cleanup is completed.
6. Do not eat, drink or smoke in areas with quantities of bird droppings.

NOTE: Contact the Environmental, Safety & Health Department or your Safety Coordinator if you need additional information.

REFERENCES:

- AUE-ADM-2418, *Industrial Safety Program*
- *Corporate Safety Guidelines for dealing with Bird Droppings*

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Legionella Bacteria

The potential for Legionella bacteria exists when inhaling mists or aerosols of raw or stagnant water or in systems contaminated with raw or stagnant water.

General Safe Work Practices

1. Minimize the time spent in areas where raw or stagnant water are present..
2. A half-mask respirator with a HEPA/ (P-100) filter should be used when respiratory protection is utilized.
3. Disinfection of stagnant water may be advised prior to any activities that would result in air borne mists or aerosols.
4. Always follow good hygiene practices:
 - a. Do not eat, drink or smoke in potential Legionella exposure areas.
 - b. Thoroughly wash hands before eating, drinking, smoking, or after working in raw or stagnant water areas.

REFERENCE:

- *AUE-ADM-2418, Industrial Safety Program*
- *Corporate Safety Guideline for Legionella*

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Lyme Disease

Anyone spending time outdoors is susceptible to being bitten by a tick. Ticks potentially carry a variety of diseases, but Lyme disease is of particular concern in the Midwest. Lyme disease is normally associated with a bite from a deer tick. The adult deer tick is about the size of a sesame seed (2.5 mm). Unfed females are brick red with a small black shield on the back, and males are smaller and uniformly dark. They are normally picked up due to contact with vegetation. Once picked up, ticks will crawl to a favorable site to attach, such as the back of the knee, near the hairline or behind the ears.

Since a tick bite is painless, most people don't realize when they have been bitten. In some cases, the first indication of Lyme disease exposure will be a red rash in the area of the bite that occurs within a few days to a few weeks. Flu-like symptoms may also develop. It is critical to seek treatment promptly, since severe and long lasting health problems can develop.

General Safe Work Practices

1. Wear long pants and a long sleeved shirt if you will be outdoors. Tuck your shirt into your pants and your pant legs into boots.
2. Wear a hat and tie back long hair.
3. Use an EPA-approved insect repellent rated for ticks.
 - a. Follow all label precautions carefully.
 - b. Application to clothing appears to be most effective.
4. Inspect clothing often for ticks. Wear lighter colors to increase tick visibility.
5. If possible, change clothes when returning from areas where ticks may be present.

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Tick Removal

Prompt, proper removal of ticks can greatly reduce the potential of getting Lyme disease. Improper removal of a tick can cause infected secretions to enter the wound. In the event that the barbed mouthparts of the deer tick remain within the victim's skin, Lyme disease bacteria are still capable of infecting the host's blood stream. Contrary to popular myth, never burn the tick or use petroleum jelly or nail polish remover as a method of removal. The best way to remove a tick is to:

1. Grasp the tick as close to the skin as possible with a pair of tweezers.
2. Apply a firm, steady, upward pressure until the tick releases. Do not jerk, squeeze or squash the tick.
3. If possible, place the tick in a tightly sealed container with rubbing alcohol. Your local / state health officials or a treating physician can assist with the tick identification process.

REFERENCES:

- *Corporate Safety Guideline for Lyme Disease*
- *OSHA Tick Borne Disease*

Sewage Treatment Plant – Health Hazards

The following recommendations apply to handling samples from any stage of the sewage treatment process and working in or around treatment plant structures.

General Safe Work Practices

1. Use of personal protective equipment is dependent on the expected degree of contamination.
 - a. Fall Protection and life jacket requirements must be adhered to when working around open sewage treatment plant.
 - b. Face shield and safety glasses (or goggles) shall be worn to keep the material out of the mouth and nose if excessive splashing occurs.
 - c. Fluid impervious gloves, such as disposable latex or vinyl, shall be worn whenever there are open cuts on the hands.
 - d. Rubber rain suits or an equivalent, boots and utility gloves shall be worn for dirty jobs, such as cleaning pits or tanks. These items should be hosed clean before removal.

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- e. Visible sewage clinging to clothing shall be removed and the clothing should be washed before wearing again.
- f. Dust / mist respirators have limited usefulness in protecting against biological hazards.
 - i. In heavy misting conditions, they shall only be considered for use when worn in conjunction with a face shield.
 - ii. The dust respirator or cartridges must be changed as soon as they are wet. They should never be allowed to dry for the purpose of re-use.
2. Thorough washing of the hands with soap and water is the primary method of infection prevention that could result from contact with biological hazards.
3. Hands and face should always be washed prior to eating or smoking to prevent organisms from entering the mouth.
4. Contamination on the outside of sample containers shall be removed to minimize the risk of infection to the person conducting the analysis.
5. Gross contamination on equipment shall be removed before beginning repairs.
6. Contact with sewage residue during maintenance / repair of pumps and other equipment can be minimized by using water to hose down the wall of tanks or pools as they are being emptied.

Employees need to be aware that cuts and abrasions have the potential for infection. Therefore, appropriate actions need to be taken to prevent this from occurring. Always report a minor injury to your supervisor. Special immunizations for biological hazards are generally not required, except in flood or disaster conditions when sewage releases are uncontrolled. In general, good personal hygiene is the best line of defense against the diseases that may result from sewage exposure. Few vaccines are available for the pathogens found in sewage.

REFERENCES:

- AUE-ADM-2418, *Industrial Safety Program*
- *Corporate Safety Guidelines for Exposure Sewage – Waste Water*

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West Nile Virus

Anyone spending time outdoors runs the risk of mosquito bites. While the majority of bites do not result in health problems, the possibility for contracting West Nile Virus (WNV) exists. Reducing or eliminating mosquito breeding locations minimizes the possibility for exposure. In general, personnel should take precautions when working near stagnant water.

Many people never develop symptoms that would indicate exposure. In a few cases, flu-like symptoms develop in 3 to 15 days after being bitten by an infected mosquito. Personnel should seek medical assistance if symptoms persist.

General Safe Work Practices

1. Eliminate favorable breeding conditions.
2. If possible, avoid working outdoors during dusk and dawn periods. That is the time of day when mosquitoes tend to swarm.
3. Cover as much of your skin as possible by wearing long sleeve shirts, long pants and socks.
4. Avoid the use of perfumes and colognes when working outside during peak activity hours.
5. Use an EPA-approved insect repellent rated for mosquitoes. Follow all label precautions carefully.

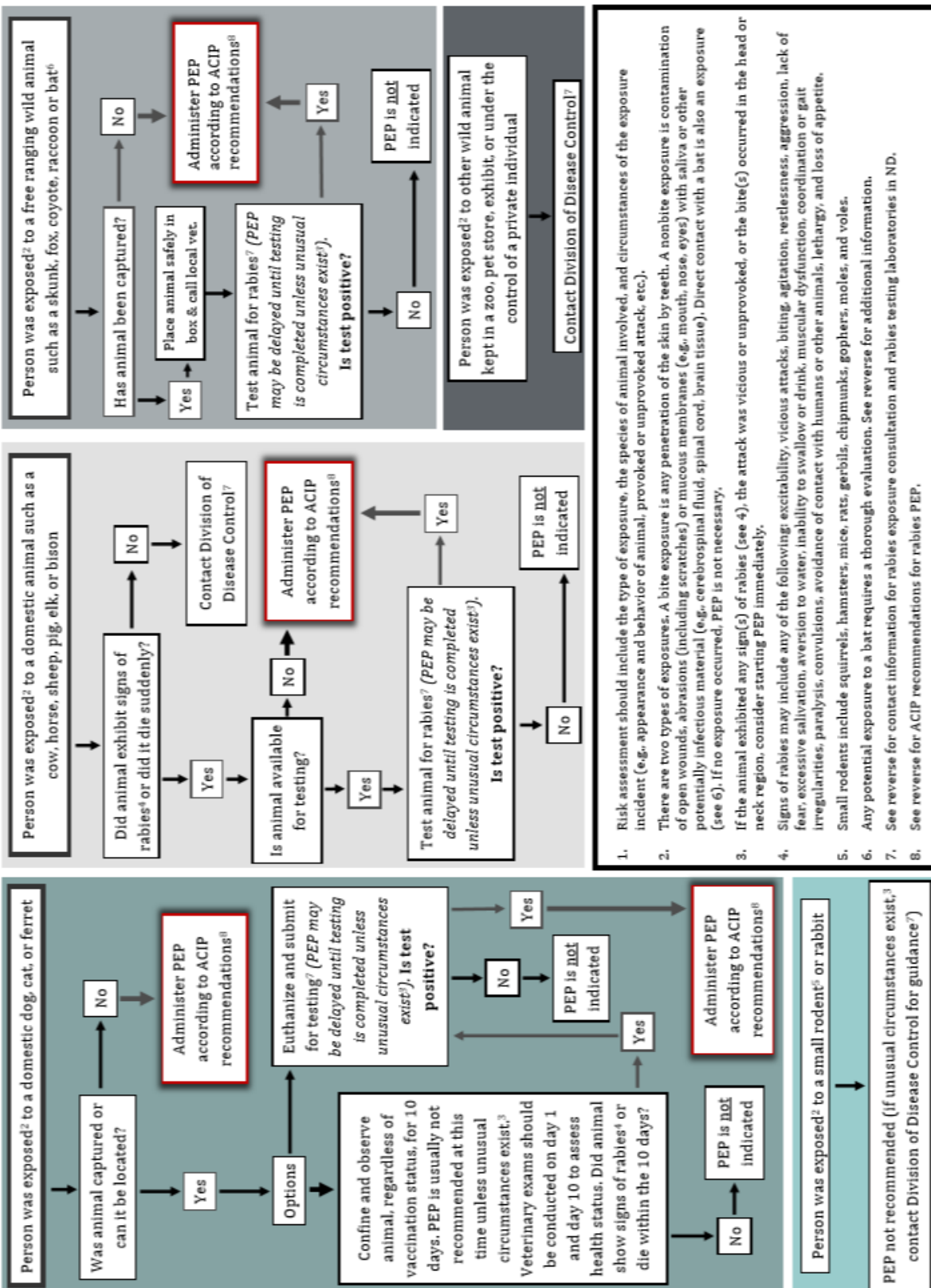
REFERENCES:

- *Corporate Safety Guideline for West Nile Virus*
- *OSHA Workplace Precautions Against West Nile Virus*

Rabies Exposure

In the work place, co-workers have a potential to be exposed to a carrier of rabies. These animals could include a dog, cat, raccoon or bat. There are two types of exposures. A bite exposure is any penetration of the skin by teeth. A non-bite exposure is contamination of an open wound, abrasion (including scratches) or mucous membranes (mouth, nose, eyes) with saliva or other potentially infectious material. Direct contact with a bat is also an exposure. The following Rabies Exposure Assessment Algorithm is provided to help guide a co-worker for those encounters.

Rabies Exposure Assessment¹ Algorithm



Bat Exposures

Any direct contact between a human and a bat should be evaluated for an exposure. If the person is reasonably certain a bite, scratch, or mucous membrane exposure did not occur, PEP is not necessary. If the bat is available for testing and the test is negative, PEP is not necessary. The following situations may qualify as exposures requiring consideration of PEP:

- Finding a bat with a person who may be unaware that direct contact had occurred (ex. An adult witnesses a bat in the room with a previously unattended child, mentally disabled person, or intoxicated person)
- A deeply sleeping person awakens to find a bat in the room

Please contact the Center for Disease Control for consultation regarding potential exposure to bats.

Post-exposure Prophylaxis (PEP) for Rabies

The Advisory Committee on Immunization Practices (ACIP) recommends that unless a person has previously completed the rabies vaccination regimen (either pre- or post-exposure) or is immunosuppressed, PEP should always consist of human rabies immune globulin (HRIG or RIG) and four vaccine doses. RIG and the first dose of the 4-dose vaccine should be administered as soon as possible after exposure (day 0). Additional doses of vaccine should be administered on days 3, 7, and 14. Previously vaccinated persons should receive 2 vaccine doses, the first dose as soon as possible after the exposure (day 0) and the second dose 3 days later (day 3). Persons with immunosuppression should receive RIG and five vaccine doses. RIG and the first dose of the 5-dose vaccine should be administered as soon as possible after exposure (day 0). Additional doses of vaccine should be administered on days 3, 7, 14, and 28.

Every attempt should be made to adhere to the ACIP's recommended vaccination schedules. For most minor deviations from the schedule (i.e., delays of a few days for individual doses), vaccination can be resumed as though the patient was on schedule. If substantial deviations from the schedule occur, re-initiation of the entire series may be required. Contact the Center for Disease Control for guidance on deviations from the vaccine schedule.



References

1. Human Rabies Prevention – United States, 2008; Recommendations of the Advisory Committee on Immunization Practices (ACIP). CDC MMWR 2008; 57 (No. RR-3).
2. Use of a Reduced (4-Dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies: Recommendations of the Advisory Committee on Immunization Practices (ACIP). CDC MMWR 2010; 59 (No. RR-2).
3. Compendium of Animal Rabies Prevention and Control, 2016; National Association of State Public Health Veterinarians, Inc. Journal of the American Veterinary Association. Vol.248, No.5, March 1, 2016.

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Cadmium

Cadmium is a chemical that is found in metals, paint and fly ash. Employees may be exposed to cadmium when welding, cutting, soldering and grinding or brazing on materials that contain or are coated with fly ash. Exposure to cadmium can cause local skin or eye irritation, flu-like symptoms or can affect your health if you inhale it or ingest it.

General Safe Work Practices

1. Do not eat, drink, smoke or chew tobacco or gum in work areas where exposure may occur.
2. Wear appropriate respiratory protection, as needed.

NOTE: Employees required to wear respirators shall be trained in their use, medically approved to wear them and fit tested annually on each type of respirator they wear. Facial hair shall not interfere with the face-to-respirator seal.

3. Perform air monitoring for cadmium exposure when the potential to exceed the action level exists.
4. To further limit exposure to cadmium, wash hands and face after performing work where cadmium or cadmium-containing materials are present.

REFERENCES:

- OSHA-29 CFR1910.1027, Cadmium
- AUE-ADM-2418, Industrial Safety Program

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Chemical Cleaning

Chemical cleaning of boilers and pressure vessels is a necessary part of maintaining an efficient boiler. The removal of iron, copper and other metal deposits is accomplished during a multi-stage process using water, chemicals, heat, cooling, draining and rinsing of boiler tubes. Precautions must be taken throughout the entire process.

General Safe Work Practices

1. Areas where chemical cleaning is in progress shall be barricaded off and signs hung to restrict access during cleaning.
2. If flammable liquids, gases, vapors or combustible materials will be used, the following restrictions apply:
 - a. The area shall be posted with signs restricting entry and warning of the fire and explosion hazards.
 - b. Smoking, welding, and other possible ignition sources are prohibited in these restricted areas.
3. The number of personnel shall be limited to those necessary to safely accomplish the task.
4. Prior to initiating this type of work, consideration should be given to staging clean-up material, personnel evacuation and hazards to personnel not immediately associated with the job.
5. There shall be ready access to water or showers for emergency use.
6. Personnel required to work inside the restricted area must utilize PPE. This includes, but is not limited to, protective clothing, boots, goggles and gloves.

REFERENCES:

- OSHA-29 CFR1910.269(v)(7), *Chemical Cleaning of Boilers & Pressure Vessels*

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Chemical Hazards

Various types of chemicals are used on a daily basis throughout the energy center. These can include, but are not limited to: anhydrous ammonia, corrosives (acids or caustics), mercury, oxidizers (i.e. hydrazine and oxygen), sulfur and toxic gases (i.e. nitrogen and hydrogen). Proper handling and use of these substances is important to prevent injury.

In case of chemical incident, prior to administering first aid, always survey the scene to ensure your safety. Never respond beyond your training. As a general rule, immediately flush any chemically exposed skin area with clean water for at least 15 minutes. If chemical gets in the eyes, hold the eyelids open during irrigation to ensure water contact with all parts of the eye. This is an important step to minimize damage, which may result in partial or total loss of vision.

If clothing is contaminated with a chemical, remove the contaminated area of clothing as soon as possible. In the event clothing is stuck to the skin because of molten sulfur, do not pull it off the area where it is attached. Instead, cut the clothing around the area and obtain medical attention immediately. Do not apply salves, creams or ointments, since these may seal residual chemical and contribute to further skin damage. Contact a doctor immediately after administering emergency first aid treatment.

Anhydrous Ammonia

Anhydrous ammonia is a colorless gas that has a distinct pungent odor and can be detected in low concentrations. Anhydrous ammonia can cause either chemical burns or freeze burns to the eyes, lungs and skin because of their high moisture content. Exposure to anhydrous ammonia vapors or liquid can cause blindness. Inhalation of this chemical can be fatal because the throat swells shut, causing victims to suffocate.

Anhydrous ammonia is used and transported under pressure as a liquid. All equipment used for applying or transferring liquid anhydrous ammonia must be designed for high pressure use.

General Safe Work Practices

1. Read the Safety Data Sheet before working with the chemical. Familiarize yourself with the associated hazards.
2. Always wear personal protective equipment. This includes safety goggles or face shield, rubber gloves, appropriate respiratory protection and chemical protective clothing.
3. Always have an ample water supply nearby.
4. Inspect and replace valves and hoses as needed.
5. Bleed off hose pressure before disconnecting.
6. Stay clear of valve and hose openings.

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Corrosives (Acids & Caustics)

Acids are very corrosive and are incompatible or reactive with organic materials, chlorates, water and powdered metals. Concentrated acid reacts violently when mixed with water. The solution gets very hot and may actually splatter and explode, causing severe burns. When concentrated acid contacts certain chemicals, such as acetone, alcohols, caustics or certain metals, a fire may erupt. Heated acids can emit highly toxic fumes. Exposure to acid can occur through inhalation, ingestion or skin contact. Exposure to the eyes can cause blindness.

Caustics are also highly corrosive substances. Contact with solutions, dusts or mists can lead to severe damage or burns to the skin, eyes and mucous membranes. In contrast to acids, some caustic burns may not be immediately painful. Caustic burns can be severe and slow to heal. Eye exposure to caustic solutions can cause severe eye damage and possibly blindness. Ingestion of a caustic can cause severe abdominal pain, as well as serious damage to the mouth, throat, esophagus and digestive tract. Inhalation of this type of chemical can be fatal because the throat swells shut, causing victims to suffocate. Caustics react vigorously with acids or water and produce heat. They may also react with aluminum and other metals and may lead to the production of hydrogen gas.

General Safe Work Practices

1. Read the Safety Data Sheet before working with either an acid or caustic. Familiarize yourself with the associated hazards.
2. Always wear personal protective equipment. This includes safety goggles or face shield, chemical resistant gloves, appropriate respiratory protection, chemical protective clothing and chemical resistant boots.
3. During delivery of acids or caustics from tank trucks, barrier tape and warning signs shall be used to warn employees of hazardous conditions.
4. Before entering an area where acids or caustics are present
 - a. Know where the emergency eye wash station and safety shower are located.
 - b. Test operate these facilities prior to use. If the shower is wired to alarm the Control Room, be sure to contact them before the test activation.
5. If entry into a chemical storage tank is required, the provisions of the Confined Space Program shall be used. Hydrogen gas may be present.
6. Properly drain, flush and tag acid / caustic lines and pumps prior to maintenance. Flanges and lines should be separated with extreme caution.
7. Never add water to acids or caustics! Doing so can lead to a violent chemical reaction.
8. Do not force acids or caustics from containers using compressed air.

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Mercury

Mercury is a silver colored metal found in various forms. The most common use of mercury in an energy center is in level detectors. Mercury can enter the body through direct skin contact and can irritate the skin and eyes.

General Safe Work Practices

1. Do not eat, drink or smoke where mercury is handled or stored.
2. Wash hands carefully before eating or smoking.
3. In the event of a spill, erect barrier tape around the spill and report it to the appropriate plant contact. Prevent the spill from entering the sewer.
4. Follow all appropriate clean-up guidelines.

REFERENCES:

- *Corporate Safety Guideline for Mercury*

Oxidizers

Oxidizers increase or promote oxidation or burning of combustible materials. Oxygen and chlorine are examples of a gas oxidizer.

Oxidizers are irritating to the skin and mucus membranes. Although oxygen is essential to life, high levels of oxygen (above 23.5%) can cause permanent damage to tissue and spontaneous ignition of combustibles. Oxygen bottles must be kept separated from fuel cylinders by a minimum of 20 feet or by a firewall. Oils or greases should never be used on oxygen valves, regulators or connections which come in contact with pure oxygen.

Chlorine used in water treatment is a toxic gas that can cause serious injury without even breathing the fumes. Very small concentrations of chlorine are capable of incapacitating an individual and causing death. Chlorine vapors are heavier than air and create a visible yellow green cloud. When chlorine reacts with ammonia, it creates a white vapor.

Hydrazine is a strong reducing agent that reduces another chemical and is itself oxidized in the process. It can be highly toxic and dangerously unstable in an anhydrous form. Hydrazine is stocked at some power plants in a 35% concentration. Unlike pure hydrazine, the 35% concentration is not flammable. However, the lower concentration is still toxic and causes combustible material to smolder and catch on fire. Hydrazine can cause permanent damage to the nose, eyes and lungs, as well as burn the skin.

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1. Never smoke, create sparks or strike an arc around oxidizers.
2. Avoid contact with hydrazine.
3. Always wear proper PPE when handling or working around oxidizers, particularly hydrazine.
4. For spill clean-up, use chemical absorbents or sand. Never use combustible materials like rags or sweeping compound since these items may ignite.

Propane

Propane has many uses within power plants, such as fuel for equipment and localized heating of machine parts (i.e. bearings and shafts). Propane gas vapors are dense and can collect and remain in low spots even after the source of gas has been eliminated. Excess propane should never be stored indoors. It is extremely flammable and may be ignited by heat, sparks or flame. In the event of a fire, propane containers may explode and irritating or poisonous gases may be produced. Overexposure to propane may cause dizziness or suffocation. When liquid propane contacts skin, frostbite may occur.

General Safe Work Practices

1. Never smoke, create sparks or strike an arc around propane.
2. Always wear gloves when handling propane cylinders.

Sulfur

Molten sulfur is used to treat flue gas discharged from the boiler. To maintain sulfur's liquid state, it is jacketed with steam. Keeping sulfur in one state greatly reduces the likelihood of creating toxic hydrogen sulfide (H₂S) gas.

In its liquid or molten state, sulfur is combustible, extremely hot and will burn skin. In its solid state, sulfur is combustible and burns with a blue flame that may be difficult to see in daylight. When sulfur burns, it produces toxic sulfur dioxide gas (SO₂). When the SO₂ passes over a catalyst inside the burner box, it creates sulfur trioxide (SO₃). Both gases can be toxic.

Hydrogen sulfide, a rotten egg smelling gas, is another possible hazard of molten sulfur. Under normal operation, hydrogen sulfide gas is not a threat because the conversion of sulfur to hydrogen sulfide only occurs when water vapor is present. Since steam leaks can provide water to increase this gas conversion, it is imperative that steam leaks be repaired.

When performing maintenance on steam lines or steam coils in the sulfur tank, the presence of hydrogen sulfide becomes a primary concern. Before engaging in any maintenance activities, follow the guidelines listed below.

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1. Only trained personnel shall perform tasks such as filling the molten sulfur storage tank or unloading molten sulfur.
2. Remove any solid sulfur in the area.
3. Have a fire extinguisher immediately available in case any sulfur ignites in the course of the job.
4. Take additional special precautions when performing maintenance tasks on sulfur equipment.
5. Wear the following PPE when working around molten sulfur:
 - a. Safety goggles
 - b. Face shield
 - c. Leather gloves with high cuffs
 - d. A long sleeve shirt
 - e. Leathers, a welder's jacket or other equivalent protection
 - f. Respiratory protection with combo P100 and acid / gas cartridges should be worn if exposure to sulfur dust, hydrogen sulfide, sulfur dioxide or sulfur trioxide is suspected.

Toxic Gases

There are many toxic gases that can be found or created in the workplace. They can often not be seen or smelled until it is too late. To protect yourself from toxic gases, it is necessary to conduct air monitoring of the area you may be working when you are around them. Some gases and vapors are heavier than air and sink. Others are lighter than air and rise. Still others are the same weight as air. When working where toxic gases may be present, follow the guidelines listed below.

General Safe Work Practices

1. Monitor all levels of the atmosphere you will be working in with a properly calibrated instrument to determine what gases are present. The most critical area to monitor is the breathing level during the job. Different atmosphere levels need to be checked using a monitor with a sampling pump and tubing, or an external wand. DO NOT lower monitors using a rope device.
2. If oxygen deficiency, toxic gases, or vapors are found, ventilate the area and re-test the atmosphere before starting work in the area.

Although not all-inclusive, below is a list of common toxic gases that may be found in an energy center environment.

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Carbon Monoxide (CO) which is odorless and colorless, is the most abundant toxic gas. It is created during combustion activities (i.e., running gas / diesel engines, burning coal, performing welding or smoking a cigarette).

Carbon monoxide has a similar density to air so it can be found at many levels in an atmosphere. Carbon monoxide is one of the gases monitored on a confined space air monitor. Initial exposure to it causes drowsiness. It then begins to interfere with oxygen exchange in the body. Effects are cumulative with daily exposure. Overexposure can be fatal.

Carbon Dioxide (CO₂) and Nitrogen are sometimes used in an energy center to purge equipment. After the purge, the equipment should be flushed with air prior to worker entry. Carbon dioxide and nitrogen gases cause rapid breathing, lack of muscular coordination, fatigue, nausea, vomiting and suffocation. Always use an air monitor to ensure adequate oxygen levels.

Hydrogen Sulfide (H₂S) can be identified by its rotten egg odor. It is produced either as a byproduct of molten sulfur operations or during the decay of organic material. Hydrogen sulfide can be found underground in sewers. Since hydrogen sulfide has almost the same density as air, it can be found at many levels in an atmosphere. Although it can be readily detected at low levels, high levels can quickly overcome the sense of smell and may go undetected. For this reason, hydrogen sulfide is one of the gases monitored on a confined space air monitor.

Sulfur Dioxide (SO₂) is a colorless gas and has a choking smell. It is formed when burning sulfur or materials containing sulfur, such as oil and coal. Sulfur dioxide can form sulfurous acid when dissolved in water, thus affecting the respiratory system and causing uncontrollable coughing.

Sulfur dioxide is present in flue gas and in the SO₂ house in an energy center. It is twice as heavy as air and tends to settle in low areas.

Sulfur Trioxide (SO₃) is an unstable gas (gaseous sulfuric acid), is white in color and is very hazardous to breathe. It can be encountered in the flue gas injection system that is utilized at some energy centers. Leaks can occur at the burner box and in the ductwork, both at and downstream of the injection point. The tell-tale sign of exposure is a burning sensation in the lungs.

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Spills & Releases

If during a work activity any chemical is spilled, work should halt while the spill is evaluated and cleaned up. Contact the appropriate plant personnel immediately since some spills / releases require prompt regulatory reporting or an emergency response.

General Safe Work Practices

1. Stay out of the spill area and ensure other personnel do not enter it.
2. Be sure to position yourself so the spill or release does not affect you.
3. Prior to performing any spill cleanup, the personal protective equipment specified for the cleanup operation shall be worn.
 - a. The type and level of PPE will depend on the material and the particular hazards associated with the spill.
4. Always refer to spill response guides and / or SDS for proper handling.

REFERENCES:

- *OSHA-29 CFR1910.119, Process Safety Management of Highly Hazardous Chemicals*
- *OSHA-29 CFR1910.1000, Air Contaminants*
- *OSHA-29 CFR1910.1200, Hazard Communication*
- *OSHA-29 CFR1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories*
- *AUE-ADM-2416, Hazard Communication*
- *AUE-ADM-2418, Industrial Safety Program*
- *AUE-ADM-2420, Spill Prevention*
- *AUE-ADM-2419, Personal Protective Equipment*
- *Emergency Action Sheet-08, Chemical Response*
- *Plant Specific spill guides*
- *Environmental Services Share point site (For link see the Power Operations Safety Website)*

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Chemical Laboratory Safety

Many of Ameren's facilities contain laboratories to support maintaining plant chemistry. Each laboratory facility shall have a Chemical Laboratory Hygiene Plan. Personnel who regularly work in these laboratory facilities shall receive training on and be familiar with the detailed requirements in the Chemical Laboratory Hygiene Plan. Personnel who occasionally enter these laboratory areas shall, at a minimum, abide by the requirements outlined below.

General Safe Work Practices

1. Consult the SDS for the chemical being used.
2. Do not eat, drink, smoke, chew gum or apply cosmetics in chemical laboratories.
3. Do not store food, beverages or eating utensils in laboratories.
4. Wash hands thoroughly and often if exposed to chemicals.
5. Use water to promptly flush any skin that comes in contact with hazardous chemicals.
6. Promptly flush eyes with water for at least 15 minutes when hazardous chemical contact has occurred.
7. Promptly remove any clothing contaminated with chemicals.
8. Do not smell or taste chemicals as part of chemical identification.
9. When the potential for contact with hazardous chemicals or splash exists, the following PPE shall be worn (at a minimum):
 - a. Safety glasses or goggles,
 - b. Face shield,
 - c. A chemical resistant apron,
 - d. Chemical resistant gloves and
 - e. Additional PPE may be required, depending on the task at hand or the chemical involved.

REFERENCES:

- OSHA-29 CFR1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*
- AUE-ADM-2418, *Industrial Safety Program*
- *Energy Center-specific Chemical Laboratory Hygiene Plan*

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Clothing & Apparel

The type of clothing you wear may make the difference between working safely or unsafely. Properly fitting clothes with appropriate body coverage can prevent accidents. Wear clothing suitable for the work being performed and follow the guidelines outlined below. Clothing shall be made of natural fibers such as 100% cotton, no synthetics or blends.

General Safe Work Practices

1. Prohibited work clothes include, but are not limited to shorts, cut-offs, tank tops and sleeveless shirts.
2. Employees working in areas where there is danger of injury to the arms shall wear a long sleeve shirt, buttoned or pulled down to the wrist.
3. Clothing made of polyester, nylon and other synthetic fibers greatly increase the risk of serious and fatal injuries when exposed to electrical flash. Clothing made of these materials shall not be worn if working on or near exposed electrical circuits over 50 volts.
4. Dangling jewelry or loose-fitting clothing shall not be worn when working around moving machinery or rotating parts. Shirt tails should be kept tucked in.
5. Metal accessories shall not be worn when working with or near energized conductors, reciprocating equipment or rotating machinery.
 - When working within reaching distance of exposed energized parts or equipment, the employee shall remove or render non-conductive all exposed conductive articles. Examples of metal (conductive) accessories include, but are not limited to key chains, watches, rings, necklaces, and earrings.
6. Special personal protective equipment such as rubber and / or leather gloves, aprons, protective sleeves, leg guards, face shield, respirators, chemical suits, FR / disposable coveralls, etc., must be worn as directed or as needed for the work being performed.
7. Only company approved personal headsets or earphones shall be allowed.

REFERENCES:

- *OSHA-29 CFR1910, Subpart S – Electrical*
- *OSHA-29 CFR1910.269(I), Working On or Near Energized Electrical Parts*
- *OSHA-29 CFR1910.333, Selection & Use of Electrical Work Practices*
- *Ameren Power Operations FR Personal Protective Apparel Policy*
- *“Flame Retardant / Flame Resistant (FR) Apparel” section of this handbook*

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FR / ARC Rated PPE Apparel

Flame retardant / flame resistant (FR) apparel is clothing constructed of a material that prevents, terminates or inhibits combustion when a flaming or non-flaming source of ignition is applied, with or without subsequent removal of that ignition source. Flame resistance can either be an inherent property of the material or it can be imparted via specific treatment applied to the material.

Extensive testing conducted in textile labs by entities in the electrical industry has shown that clothing made of untreated synthetic blends such as acetate, nylon, polyester, or rayon are extremely flammable when exposed to electrical flashes. Due to the fact these materials are known to melt when subjected to extreme heat, these materials could lead to more severe burns than from an electrical flash itself.

With this in mind, and to limit injury potential, Class E electrically trained employees who work on exposed energized lines, parts or equipment shall not wear clothing of a fabric type (or in a manner) that, when exposed to electric flash or electric arc, might increase the extent of injury that would be sustained by that employee.

Where the potential for exposure to electric arc or electric flash hazard exists, all affected employees shall wear the appropriate level of Ameren approved flame retardant / flame resistant arc rated (FR) apparel for these specific hazards. While some employees may be required to wear FR apparel for the majority of their tasks in addition to an arc flash suit, other employees may only be required to wear an FR coverall over natural fiber clothing (such as cotton) for incidental work. Refer to AUE-ADM 5002 Energized Electrical Equipment Procedure and AUE-ADM-2419 Personal Protective Equipment Procedure for guidance on required apparel relative to certain voltages.

General Safe Work Practices

1. FR arc rated apparel (Minimum 8 Cal Rated) shall cover the entire body. Pants and long sleeve shirts are mandatory FR PPE. Use of welding jackets or other non-rated clothing is prohibited for any work involving electrical arc exposure.
2. Clothing shall cover the entire arm length and other potentially exposed areas, as completely as possible when working on energized lines, parts or equipment. Long tail shirts shall be tucked in as well.
3. When working on energized electrical equipment, the outer-most layer shall be of flame retardant / flame resistant ATPV rated material. Other FR PPE such as tested and approved gloves, arc rated face shields and other shall be worn for any work involving electrical arc or contact exposure.
4. Any clothing worn under the outermost FR layer shall be made of 100% natural fiber where possible.
5. FR apparel shall fit properly to minimize interference with the task at hand, but still provide the necessary protection from the hazard.
6. FR apparel shall be inspected before each use.

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- a. Any FR clothing or flash suit with compromised integrity (garment tear, excessive wear, previous flash exposure, etc.) shall not be used.
 - b. Likewise, protective items that become contaminated with grease, oil, flammable liquids or combustible materials shall not be used.
7. FR apparel shall be laundered and maintained according to manufacturer's instructions.

REFERENCES:

- OSHA-29 CFR1910, Subpart S - Electrical
- OSHA-29 CFR1910.269 (l)(6)(iii), Apparel When Working On or Near Energized Electrical Parts
- OSHA-29 CFR1910.333, Selection & Use of Electrical Work Practices
- Electrical Work Safe Practices Manual
- AUE-ADM 5002 Energized Electrical Equipment Procedure
- AUE-ADM 2419 Personal Protective Equipment Procedure
- Ameren Power Operations FR Personal Protective Apparel Policy
- FR Apparel Information on Ameren Power Operations Safety Webpage

Coal Handling (Fuels Processing)

Coal handling equipment is a vital part of our operation. Whether using powered coal equipment, switching or unloading train cars, working on crushers or conveyors, the potential for serious injury is present if proper precautions are followed. In order to avoid serious injury or even death when working around coal handling operations, appropriate safety precautions are required.

General Safe Work Practices

1. Employees should wear appropriate respiratory protection for airborne coal dust. The plant safety supervisor will specify the specific type when required.
2. Employees shall not smoke in coal storage areas or buildings, or areas housing coal crushing or coal handling equipment.
3. When any Hot Work activity is performed in a coal handling area, a Hot Work Permit shall be issued for the area where the welding, grinding or other spark, flame or heat activity is to be conducted.
4. Uses of intrinsically safe heaters, drills, etc. are required in coal handling areas.
5. Only explosion proof lighting shall be used in coal storage buildings and / or buildings housing coal crushing and coal handling equipment. During shutdown and after cleaning standard lighting may be used.

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6. Any employee entering a coal hopper, storage bin, silo, etc. shall follow the confined space requirements.

Switching Cars

1. Only trained and authorized employees shall operate locomotives or locomotive cranes.
2. Employees engaged in switching cars shall not line up draw heads with their feet or hands.
3. Draw heads or knuckles shall not be shifted on locomotives or cars that are in motion.
4. Employees shall not cross or walk on tracks immediately in front of approaching cars or locomotives.
5. Walking between rail cars is prohibited.
6. Employees shall not board or ride the footboard on the leading end of a locomotive.
7. Employees shall not ride on coal cars.
8. Flying switches shall not be made on the move or when traveling on the fly.
9. Before moving a locomotive, the operator shall give a signal via bell or whistle.
10. Rail cars or locomotives parked for an extended period of time shall have the hand brake set.

Powered Equipment

1. Only trained and qualified operators shall use powered equipment.
2. Ensure all equipment guards and shields are in place.
3. Verify all safety interlocks are functional.
4. Inspect equipment each day prior to use. If defective equipment is identified:
 - a. Remove it from service,
 - b. Tag it "Danger – Do Not Use" and
 - c. Initiate action to have repairs made.
5. Wear seat belts when operating equipment fitted with seat belts.
6. Operate all equipment within manufacturer's recommended operating parameters.
7. Buckets or blades shall be lowered to the ground, the transmission placed in neutral and the parking brake applied before exiting the operator's seat.

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Conveyors & Crushers

1. When working around moving conveyors, all loose clothing, shirt tails, etc. should be tucked in or secured to eliminate the potential for being pulled into the equipment.
2. Employees shall not stand on or work from a conveyor belt or conveyor belt table without the protection of Lock Out/Tag Out. Employees shall not ride conveyor belts, buckets, trippers or tripper cars.
3. Employees shall not attempt to perform internal maintenance, wash a conveyor pan, clear a choked conveyor, coal chute or crusher or loosen material therein without first implementing the “Lock Out / Tag Out / WPA” program or an equivalent authorized procedure or directive.
4. When performing work inside a receiving hopper, the track above the coal hoppers shall be barricaded and signs posted, such that an incoming train will not be able to use the track above the hoppers.
5. Before starting a conveyor or crusher, a suitable audible warning shall be given to other employees to stay clear.

REFERENCES:

- OSHA-29 CFR1910.269(v)(11), *Coal & Ash Handling*
- OSHA-29 CFR1926 - *Subpart W, Rollover Protective Structures; Overhead Protection*

Combustible Dust

Combustible dust in the workplace means more than inhaling unhealthy particulates, although that is enough reason to take precautions. As seen in recent years, the accumulation of combustible dust can lead to damage, injuries, and loss of life. The hazards of combustible dust encompass a wide array of materials. Materials that may form combustible dust include, but not limited to, wood, coal, plastics, grain, fertilizer, paper, etc.

Five elements are needed for a combustible dust explosion to occur. The first three elements are those necessary for a fire: Fuel, heat and an oxidizer. These three elements form the “fire triangle,” in which combustible dust is the fuel, heat is provided by any source of ignition, and oxygen is present in the air and in oxidizers.

The fourth element is dispersal of dust into a cloud of the proper concentration. These four conditions are necessary for a deflagration, which is a violent combustion accompanied by a pressure wave. The combustion is rapid, but propagates at a speed less than the speed of sound.

The fifth element, confinement, is necessary for an explosion. Confinement can be any enclosure—including, but not limited to, a building, room, duct, or processing and storage equipment. An explosion occurs when the pressure developed by a deflagration bursts or ruptures the enclosure.

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Secondary explosions or deflagrations occur when pressure waves from the initial (or primary) deflagration or explosion cause dispersal and ignition of combustible dust that has accumulated on surfaces. Secondary explosions are often more devastating than primary explosions due to the increased amounts of fuel.

Combustible Dust Hazard Assessment

Combustible dust hazard assessments should be done in energy centers to identify the following:

1. Material that can become combustible due to consistency (finely ground or milled).
2. Processes that use or produce combustible dusts.
3. Open areas where combustible dusts may accumulate.
4. Hidden areas where combustible dusts may accumulate.
5. Means by which dust can be dispersed in the air.
6. Potential ignition sources.

Dust Control

Recommendations for controlling potential dust fires and/or explosions include:

1. Minimize the escape of dust from process equipment and vent systems.
2. Use dust collection systems and filters.
3. Use surfaces that reduce dust accumulation and help in cleaning.
4. Provide access to all hidden areas to permit inspection.
5. Conduct regular inspections for dust in open and hidden areas.
6. Clean dust residues at regular intervals.
7. Use cleaning methods that do not generate dust clouds where ignition sources are present (no compressed air).
8. Use approved cleaning equipment only (vacuums, etc.).
9. Locate relief valves away from dust hazard areas.
10. Develop and implement a written program for hazardous dust inspection, housekeeping and control.

Ignition Control

Recommendations for ignition control include:

1. Use appropriate electrical equipment and wiring methods in Class II, Division 2 designated areas.
2. Control static electricity, including bonding of equipment to ground.

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3. Control smoking, open flames and sparks.
4. Separate heated surfaces from dusts.
5. Separate heating systems from dusts.
6. Use industrial forklift trucks of the proper type.
7. Implement “Hot Works” permit policy.
8. Adequately maintain all of the above equipment.

General Safe Work Practices

1. Inspect work areas for dust hazards before commencing activities.
2. Do not conduct activities in areas containing coal dust that cause dust to become airborne.
3. Use PPE and/or necessary respiratory protection when working in potential dust exposure areas.
4. Get ‘Hot works permit’ and prepare area before starting any heating, cutting, or welding in potential dust hazard areas.

REFERENCES:

- *OSHA-29 CFR1910.22(a)(1)Housekeeping Standard*
- *OSHA-29 CFR1910.269(v)(11)(xii) Combustible Dust*
- *OSHA-29 CFR1910.307Class II Hazards*
- *OSHA-29 U.S.C.654 General Duty Clause*

Compressed Air

Although compressed air is used throughout Ameren facilities on a regular basis, it shall not be used for cleaning purposes, unless the pressure is regulated to less than 30 psi. In addition, precautions shall be taken to protect the operator and any other personnel from the hazards associated with chips and flying debris. To address these hazards, the compressed air supply can be regulated to 30 psi. Another alternative is the use of an approved safety tip nozzle that prevents backpressure when the tip is dead ended.

Special Precaution

1. Never use oxygen as a substitute for compressed air

General Safe Work Practices

1. Vacuuming is the preferred method of cleaning.

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2. Inspect hoses for cuts or abrasions prior to use. Defective hoses should be removed from service and repaired or destroyed.
3. Before operating an air hose, examine the connections to ensure they are tight.
4. When hoses fitted with Chicago Fittings are connected together, safety clips or wire shall be used to secure the connection. Whip restraints are recommended for additional protection.
5. Unauthorized connections between any of the air or gas distribution systems are not permitted.
6. Pipe and hose fittings shall not be disconnected until the pressure in the hose has been reduced to zero (0) psi. Always use the control valve; do not kink air hoses to stop air flow.
7. Always hold the nozzle when turning on the air.
8. When using air hoses on a job, route them in a manner that will minimize tripping hazards or the potential for the hose to be damaged. Air hoses should be routed overhead or under grating or along the edges of walls to mitigate trip hazards.
9. Do not use compressed air to eject combustible liquids from containers, other than approved spraying containers.
10. Do not exceed the safe working pressure of the container or vessel.
11. Airlines must not be connected to pressurized process systems or vessels which may permit back-up of process materials into the air system.
12. Compressed air used for breathing shall be appropriately filtered, monitored and have alarms.
 - a. To prevent cross-contamination, compressed air should not be used for any other purposes when used for breathing.
 - b. Compressed air used for breathing must meet grade D breathing air requirements, as required by the Compressed Gas Association (CGA).
13. Do not stand directly in front of an airline connection when attaching or removing an airline coupling.
14. Compressed air shall not be used for any cleaning that may disturb asbestos and/or lead based paint.
15. Employees shall not point a blasting nozzle toward another person. Compressed air shall not be used to blow dust off people.

REFERENCES:

- OSHA-29 CFR1910.134, *Respiratory Protection*

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- OSHA-29 CFR1910.242(b), Compressed Air Used for Cleaning
- AUE-ADM-2418, Industrial Safety Program

Compressed Gas Cylinders

The hazards of compressed gases generally pertain to fire, explosion and release of toxic gases. In addition, extra precaution should be taken when handling compressed gas cylinders. They have the potential to become projectiles when the high pressure cylinder ruptures. For safety reasons, all cylinders must be properly marked. An empty cylinder shall be identified as such, have its valve closed and be stored separately from any full cylinders.

Special Precautions

1. Never smoke near flammable, compressed gas cylinders.
2. Never use oxygen as a substitute for compressed air. Do not use oxygen to clean people or equipment.
3. Never use oil or grease on oxygen systems, hoses or fittings. Likewise, do not handle these items with oily hands or gloves. Doing so could produce a fire or explosion.
4. Compressed gas cylinders, other than those for respiratory protection, shall not be taken into confined spaces.
5. Any welding and cutting activities conducted in a confined space shall be carefully planned, ventilated and air monitored.

General Safe Work Practices

1. Never tamper with a safety relief device or valve on a cylinder.
2. Never use cylinders as rollers or supports.
3. Never mix gases in a cylinder.
4. Ensure cylinders are kept in areas not prone to temperature extremes.
5. Secure all cylinders when in use, during transport and while in storage.
6. Keep cylinder valves closed and capped at all times, except when the cylinder is in use.
7. Cylinder valves shall be closed:
 - a. Before moving a cylinder,
 - b. When work is finished or
 - c. When the cylinder is empty.

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8. If cylinders do not have fixed hand wheels, they shall have keys, handles or non-adjustable wrenches on the valve stems while they are in use. In multiple cylinder installations, one key or handle is required for each manifold.
9. Leverage devices shall not be used to open valves or hand wheels. If hand wheels are difficult to open or close or are frozen in position, contact the supplier.
10. Crack open, then close, the valve quickly. Re-open the valve slowly, standing to the side. Do not stand in front of the outlet.
11. If a cylinder leaks and the leak cannot be stopped by simply tightening the valve or packing nut:
 - a. Move the cylinder outdoors to a well-ventilated area, away from any ignition sources.
 - b. Identify the area with barrier tape and completed barrier tags.
 - c. Empty the cylinder and mark it appropriately.
 - d. If the gas is flammable or toxic, place a sign on the cylinder warning of the leak hazard and notify the supplier.
12. Keep cylinders away from the following:
 - a. Electrical circuits,
 - b. Operations that create sparks, heat and fire,
 - c. Piping systems and other equipment that may be used for grounding electrical circuits.
13. Gas cylinders shall be placed with the valve end up, except those cylinders designed for such use.
14. When working with air and gas regulators, the following shall be performed:
 - a. Ensure the regulator is rated for the pressure to be used.
 - b. Ensure fittings are rated for the pressure to be used.
 - c. Ensure the gauges are appropriate for the pressure to be used.
 - d. Ensure the pressure relief on the regulator seats when not in use.
 - e. When placing compressed gases in service, if the regulator pressure setting is unknown, adjust the regulator to minimum pressure and open the valve slowly.

Storage

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1. Valves shall be closed, protection caps in place and cylinders removed from carts when placed in storage.
2. Cylinders should not be stored with the regulators on for more than 24 consecutive hours of non-use unless separated from other full gas cylinders and other combustible materials by a minimum of 20 feet, or by an approved 5 foot wall with a 1 hour fire rating.
3. Cylinders should not be permanently stored in basement or below grade levels.
4. Cylinders shall be stored in designated areas and adequately secured in an upright position on a level surface. Storage areas shall be dry, ventilated areas, a minimum of 20' from combustible materials and away from heat sources.
5. A sign stating, "Danger-No Smoking, Open Flames or Ignition Sources" shall be posted in rooms or at entrances to areas where fuel gas is stored.
6. Cylinders shall not be charged, except by the supplier or if your location has an approved system and you are properly trained in its operation.
7. Cylinders shall be stored by a secured means to prevent falling, striking each other or being knocked over or damaged by passing or falling objects. Cylinders should be secured midway on the cylinder body to an adequate support structure.
8. Cylinders shall not be stored near exits, stairways, elevators or in areas normally used or intended for safe exit of plant personnel.
9. Oxygen cylinders shall be separated from full gas cylinders or other combustible materials by a minimum of 20 feet, or by an approved 5 foot wall with a 1 hour fire rating.

Transporting Cylinders

1. Check identification on cylinders before handling. Specifics will vary from gas to gas.
2. Handle all cylinders with caution. Do not drop or bump them.
3. Only hoist cylinders with devices designed for such use.
4. Do not use valve protection caps to lift cylinders. When moving cylinders short distances, rolling them on their bottom edges is acceptable.
5. A hand truck, fork truck or similar device should be used when moving cylinders long distances or on ramps. Cylinders shall be adequately secured during transport.
6. When transporting cylinders via powered vehicle, cylinders must be adequately secured, capped and in an upright position.
7. Regulators shall be removed and caps replaced when moving cylinders, unless the cylinder is firmly secured on a special carrier intended for that purpose.

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Disposal

Refer to the Waste Handling & Disposal Handbook for guidance on compressed gas cylinders found on the Environmental services Share point Site under Compliance Guidance Documents – Waste Management.

REFERENCES:

- *OSHA-29 CFR1910.101, Compressed Gases*
- *OSHA-29 CFR1910.252, General Requirements for Welding, Cutting & Brazing*
- *OSHA-29 CFR1910.253, Oxygen-Fuel Gas Welding & Cutting*
- *AUE-ADM-2412, Storage & Handling of Flammable Gases*
- *AUE-ADM-2413, Control of Ignition Sources (Hot Works)*
- *Environmental Services Share point Site (For Link see Power Operations Safety Website)*

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Confined Spaces & Permit-Required Confined Spaces

All work activities that involve entry into confined spaces can present serious safety and health hazards. Before pointing out some of these potential hazards, let's begin with two important definitions.

A **Confined Space** is defined as a space that has all of the following:

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.

A **Permit-Required** Confined Space meets all of the requirements above, plus one or more of the following characteristics that cannot be abated.

The space:

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.

Some of the serious safety and health hazards referred to include physical hazards, such as falls from an unguarded level; excessive heat; the presence of moving machinery; or being struck by a falling object, such as slag. In addition, high noise levels may be present for certain activities. Other serious safety hazards can be due to entrapment in the space or engulfment by a liquid (such as water) or solid (such as coal).

Electrical contact, energy sources or the presence of rotating / moving mechanical parts can also pose potential hazards for employees working in a confined space. Furthermore, the atmosphere in the space can be either oxygen deficient or enriched. Likewise, the confined space atmosphere may contain hazardous gases, vapors or other toxic atmospheres which may either be already present in the space or may be generated by work being performed within the space.

Hazardous Atmospheres

A **hazardous atmosphere** is an atmosphere that may expose employees to the risk of death, injury, incapacitation, acute illness or impairment of ability to self-rescue (escape unaided from a permit space) 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);

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2. Airborne combustible dust at a concentration that meets or exceeds its LFL.
3. Atmospheric oxygen concentration below 19.5% or above 23.5%.
4. Atmospheric concentration of any substance for which a dose or permissible exposure limit (PEL) is published in the OSHA Standard.
5. Any other atmospheric condition that is immediately dangerous to life and health.

Oxygen levels may be reduced as the result of oxygen displacement by other gases, such as Argon or Nitrogen. Oxygen is also consumed during combustion of flammable materials, as in welding, cutting, or brazing. A more subtle consumption of oxygen occurs during bacterial activity.

NOTE: Air monitoring may be required in excavations where hazardous atmospheres can be reasonably anticipated.

Flammable atmospheres are generally the result of either an oxygen-enriched atmosphere or certain concentrations of flammable gases, vapors or dust mixed with air.

Combustible gases or vapors can accumulate within a confined space when there is inadequate ventilation. Gases that are heavier than air will accumulate in the lower levels of a confined space. Gases that are lighter than air will accumulate in the upper levels of a confined space. To ensure adequate monitoring of the space, all levels of the confined space shall be monitored. Give particular consideration to locations where gases can accumulate, as well as worker location.

Work conducted in a confined space can generate a flammable atmosphere. Activities such as spray painting, coating or the use of flammable solvents for cleaning can result in the formation of an explosive atmosphere. Welding or cutting with oxyacetylene equipment can also cause an explosion in a confined space. Therefore, welding and cutting in a confined space shall not be allowed without a hot work permit.

If oxygen and acetylene hoses have small leaks in them, an explosive atmosphere could be generated in a confined space. Because of this, these hoses shall either be removed from the space when not in use or the bottles shall be valved out when exiting the area for breaks and lunches. For obvious reasons, oxy-acetylene cylinders are prohibited in confined spaces. While any hot work is being conducted within a confined space, the atmosphere should be tested continuously.

Toxic atmospheres may be present within a confined space due to the product stored in it or the work being conducted in or adjacent to the confined space.

Special Precautions

1. Mechanical and physical hazards can be equally as dangerous as a hazardous or flammable atmosphere.
2. Always stay alert during any confined space entry or activity.

General Safe Work Practices

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1. A Confined Space Evaluation Checklist shall be completed and signed by the entry supervisor prior to any confined space entry.
2. Employees entering a confined space shall read and understand the posted Confined Space Evaluation Checklist prior to entry.
3. Never enter a confined space that has not been evaluated, air monitored and determined safe for entry.

NOTE: All confined spaces are considered Permit-Required Confined Spaces until an evaluation of the space is performed.

4. Know the various types of hazards that may be present in the confined space prior to entering, including the signs and symptoms of exposure.
5. Air monitoring shall be conducted prior to confined space entry and periodically thereafter.
6. Complete additional permits, such as Hot Work, as required.
7. If conditions change, all personnel shall leave the space for re-evaluation of the space to ensure it is not a Permit-Required Confined Space.

Special Precaution for Permit-Required Confined Spaces

1. **Never** enter a Permit-Required confined space to rescue personnel, unless you are serving as part of the rescue team.

General Safe Work Practices for Permit-Required Confined Spaces

1. An attendant shall be assigned to all Permit-Required confined spaces.
2. A Permit-Required confined space permit shall be completed, signed and posted by the entry supervisor prior to entry.
3. Employees entering the Permit-Required confined space shall read and understand the posted permit prior to entry.
4. All entrants shall sign in and out of a Permit-Required confined space.
5. Employees that enter a Permit-Required confined space shall wear a full body harness with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head, for emergency retrieval, unless this would increase the overall risk or would not contribute to the rescue of the entrant.
6. A means of communication with, or direct observation of, the entrants shall be utilized while the space is occupied. In addition, the attendant shall have communication means available to summon rescue services.

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7. Rescue / retrieval equipment shall be available for Permit-Required confined space entry.

Closing of Man Doors

Man doors on equipment that has been tagged out of service are NOT to be closed until all WPA on that equipment has been placed in RELEASED status. POEs will be responsible for closing man doors on equipment only after the WPA has been placed in RELEASED status and the functional authority has given their permission to restore the equipment to normal. The functional authority may request assistance from maintenance to help close man doors after all WPA has been released.

However, doors that are normally closed by maintenance while still signed on WPA should only be closed after the supervisor, who is at the man door, first checks with the functional authority to see that all personnel who are associated with the WPA are accounted for.

REFERENCES:

- OSHA-29 CFR1910.146, *Permit-Required Confined Spaces*
- OSHA-29 CFR1910.269, *Electric Power Generation, Transmission & Distribution*
- ES-REG-209, *Permit-Required Confined Space Program*
- AUE-ADM-2415, *Confined Space Program*

Crystalline Silica

Many Ameren operations have been identified as having potential co-worker exposures to respirable crystalline silica. Exposure can occur in any grinding, drilling, cutting, etc. of materials containing crystalline silica such as concrete and ash.

Workers exposed to respirable crystalline silica are at increased risk of developing silicosis and other non-malignant respiratory diseases, lung cancer, and kidney disease. To the extent possible, Ameren will employ proper industrial hygiene practices to ensure compliance with the OSHA standard. These may include engineering controls, work practices, and personal protective equipment.

Ameren co-workers shall comply with the provisions of the Ameren Respirable Crystalline Silica Management Instruction and site management policies and procedures related to respirable crystalline silica especially in regard to the wearing of personal protective equipment, training attendance, appropriate work practices and cooperation for medical exams.

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- *ES-REG-215 Crystalline Silica*

Electrical Safety

All employees need some knowledge of electrical safety in order to recognize and avoid electrical hazards. Before we even begin to review safe work practices, it is important to understand a few key terms.

Qualified persons: Persons who are familiar with the construction and operation of the equipment and hazards involved as they pertain to their job. A person can be considered qualified with respect to certain equipment and methods, but still be unqualified for others. For example, just because a Repairman receives training how to safely verify WPA inside a breaker cubicle does not mean he or she is qualified to work on that breaker as an Electrician. Qualified persons can be subdivided into two distinct categories:

Class B qualified persons: Those persons who have received some basic electrical safety training (Electrical safety awareness received in the new employee training as well as the yearly OSHA CBT regulatory training would elevate a person to Class B status). They are familiar with the electrical safety-related practices that are necessary to work safely **around** energized equipment or overhead lines. Examples of Class B qualified persons include Coal Gang (except Meramec), Laborers, Machinists and Repairmen.

Class E qualified persons: Those persons who are trained to be exposed to unguarded, un-insulated, energized lines or equipment parts operating at greater than 50v. Class E qualified persons are trained to a greater proficiency level as part of their job classification because they work **on or near** energized equipment or overhead lines on such a regular basis that additional personal protective measures beyond simple awareness are required. Examples of Class E qualified persons include Electrical Engineers (with appropriate experience and training), Electricians, POE-Es, Operations, Technicians, and their Supervisors. (Electrical training received in an apprenticeship program, or other technical schooling which would elevate one to a journeyman status would render a person Class E qualified). Not all Class E employees can perform the same tasks. As an example (Due to their extensive training) Electricians can perform a wider array of Class E work than the other Class E designations (Operations, Supervisors, etc.) previously mentioned.

Because Class E qualified persons work **on or near** energized parts, they are required to know how to determine nominal voltage, use special precautionary techniques and are required to wear additional personal protective equipment in order to perform their work safely. Class E qualified persons also use insulating and shielding materials, as well as insulated tools and equipment, to help protect them from the hazards they could potentially encounter on job assignments.

Minimum approach Distance (per OSHA 1910.269 Rule Changes in 2015)

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Minimum Approach Distance is the minimum distance that a worker must maintain between any part of his/her body or any conductive extension of his/her body and an energized conductor or piece of equipment. For example, if one's arm raised above his/her head could break the Minimum Approach Distance plane even if the worker doesn't intend on raising his/her arm during the work being performed. The appropriate PPE is required. PPE includes but not exclusive to switching gloves, insulated tools and FR rated fall protection. The term "conductive extension" applies to any hand-held tool or piece of equipment that also contact or can contact the worker.

To determine Minimum approach Distance, see table included in AUE-MAN-000003 Electrical Safe Work Practices Manual

Restricted approach distance (See AUE-ADM-5002 Restricted Approach Boundary): A shock protection boundary some distance away from the energy source. It is based on the voltage level to allow for inadvertent movement. Due to an employee's potential contact with an energized conductor, the use of shock protection techniques, additional PPE and insulated tools are required when this boundary is crossed. For this reason, Class B qualified persons are not allowed to work within restricted approach boundaries. Work inside this boundary is considered working on live parts. Therefore, only Class E qualified persons are allowed within this boundary, since they have received additional extensive training.

The following table denotes the minimum and restricted approach distances for Class E qualified persons only. For those of you who work in one of these job classifications, keep in mind the table is a general rule of thumb. It does not cover every situation or account for environmental factors, such as humidity.

Special Precautions

1. Approach distances apply to conductive tools, equipment, ladders, cranes, man lifts, etc., that personnel may be using in the course of their work.
2. Shock is the greatest concern for electrical exposure to lower voltages (51-300 Volts).
3. The potential for thermal burns becomes of greater concern as the voltage increases (480 Volts and above). Therefore, it is imperative that additional PPE requirements are followed in order to protect employees from injury potential.

General Safe Work Practices

1. Only qualified and authorized persons may work on energized electrical equipment.
2. Approach distances will be different for a Class B qualified person and a Class E qualified person. The minimum approach distance (boundary) for a Class B qualified person must be calculated by using the following formula: 10 feet plus 4 inches for every 10kV over 50kV. On the other hand, Class E qualified persons have slightly different approach distances due to their extensive training and use of special tools and PPE.

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3. Class B qualified persons are not allowed to work within restricted approach boundaries. Work inside this boundary is considered working on live parts. Therefore, only Class E qualified persons are allowed within restricted approach boundary, since they have received additional extensive training.
4. Only a Class E qualified person may defeat an electrical safety interlock. This may be done only temporarily, while working on the equipment. When the work is completed, the interlock shall be re-instated.
5. Equipment and electrical circuits shall be de-energized prior to performing work, unless de-energizing is infeasible (i.e. testing).
6. All WPA procedures shall be followed. This includes signing on the protection and verifying tagging to ensure the work can be performed safely and in accordance with the WPA procedure.

NOTE: Employees shall not reach blindly into areas which may contain an energized part. TEST BEFORE YOU TOUCH any conductors even when they have initially confirmed as de-energized.

7. Employees shall be protected from arc flash hazards, as specified under the PPE guidelines listed in this section, the “Flame Retardant Apparel” topic in this handbook or your plant-specific guidelines. Protective clothing shall match the specific hazard and be inspected and properly maintained.
8. Ensure all conductive objects (watches, rings, change, keys, etc.) are removed. If the ring cannot be removed it may be covered.
9. Conductive ladders shall not be used where the employee or ladder could contact exposed energized parts. Use of conductive ladders shall comply with Ameren Safety Rules.
10. Conductive slings or rigging shall not be used near energized lines.
11. Employees may not enter any confined spaces containing exposed electrical conductors, unless illumination is adequate to perform the job safely.
12. Ground Fault Circuit Interrupters shall be used with electric tools in wet locations.
13. Low voltage lighting or a Ground Fault Circuit Interrupter shall be used in confined spaces, such as condenser water boxes.
14. When working in confined areas where electrical hazards may be present, use protective equipment such as protective blankets or insulating materials.
15. Never store or leave items inside a switchgear cubicle.
16. Always use appropriate personal protective equipment when checking WPA, based upon arc flash assessment and your site-specific procedures.

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17. Ensure potentially moving equipment (doors, covers, etc.) is secured to prevent them from swinging into you and causing you to contact exposed parts.
18. Do not perform housekeeping duties near exposed energized parts unless barrier or insulating device is used.
19. Only Class E qualified and authorized personnel shall perform switchgear work.
20. Only Class E qualified persons shall be permitted inside a barricaded electrical area.

Batteries

Please refer to the “Batteries” section of this handbook.

Electrical Extension Cords

1. Extension cords shall be inspected prior to use. Common hazards to check for include loose connections, damaged insulation, etc.
2. If visible damage is present, remove the extension cord from service and tag the cord “Danger - Do Not Use.” Tape repairs on extension cords are not allowed. Any other repairs to damaged cords shall be performed by an Electrician.
3. Extension cords shall not be used in work areas where permanent wiring is required.
4. Plugs or receptacles shall not be altered.
5. Light stringers shall be strung overhead, preferably seven feet above the walking / working surface.
6. Cords shall be routed in a manner that minimizes tripping hazards and the potential for the cord to be damaged. Routing examples include seven feet overhead, under grating, along the edges of the walls or by placing ramps to protect the cords.
7. Cords shall be placed so they are not damaged by doors, sharp corners, pinch points, etc.
8. If the cord has to be routed through a door and cannot be adequately protected, the door should be blocked open. Hang a sign on the door noting why it is left open.
9. Heavy duty extension cords should only be used in the power plant or areas other than offices.
10. Ensure cords used around flammable or combustible materials are designed for that purpose.
11. Employees shall not plug in cords with wet hands or when standing in water.
12. Ground Fault Circuit Interrupters shall be used when extension cords are used to provide power to equipment operated by personnel.

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Fuses

1. Only Class E qualified and authorized persons shall remove fuses.
2. WPA tags shall be placed by Class E qualified persons on pulled fuses and fuse blocks (with lugs) to notify employees of energy isolation.
3. Class E qualified persons shall use approved hot sticks, fuse pulling tools and / or gloves rated for the voltage of the fused system. Equipment shall be inspected before each use and tested per the associated OSHA requirements.

Temporary Wiring

1. Temporary wiring of 600 volts or less may be used in circumstances that include remodeling, maintenance, repair or demolition. Temporary wiring may also be used in emergency situations. All temporary wiring for construction-like activities is required to use GFCI protection.
2. Temporary wiring over 600 volts may be used during tests, experiments, emergencies, or construction-like activities. Such activities require the use of GFCI protection.
3. An assured equipment grounding program is approved if appropriate GFCI of correct rating is not available.

Transformers

1. Exposed transformer neutrals not solidly grounded shall be considered energized.
2. Minimum approach distances include any un-insulated part of an employee or any conductive tool.
3. Qualified employees approaching energized electrical conductors near transformers shall adhere to approach distances listed in the table at the beginning of this section.

Additional Safe Work Practices (Class E Qualified Persons)

1. Personnel shall check for voltage before contacting any un-insulated conductors. **WARNING:** Do not rely solely on a glow stick to identify AC voltage! The device can register a false positive from nearby energized cable, static, etc.
2. Check expiration dates on gloves, mats, etc. Do **not** use the equipment if the expiration date has passed.

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3. Switching glove rubbers shall be air tested prior to use.
4. Class “0” rubber gloves with leather protectors can be used when working with voltages of 750 volts or less. Class “1” rubber gloves with leather protectors shall be worn when working with voltages up to 7,500 volts.
5. Wipe clean and visually inspect each live-line tool every shift it is used.
6. Remove live-line tools from service if any defect or contamination is noted after wiping clean.
7. When working on energized circuits, approved insulated tools shall be used. If a flashlight is used, the exposed parts shall be non-conductive (i.e. plastic).
8. When guarding is removed from energized electrical conductors, or when exposed conductors are left unattended, physical barriers shall be installed.

Required Personal Protective Equipment & Tools for Racking Operations or When Working on Non-Guarded, Energized Equipment (Class E Qualified Persons)

1. Class E hard hat (rated for 20,000 volts)
2. Safety glasses
3. An arc-resistant face shield, when working on energized or exposed conductors 480 volts or above
4. Hearing protection (may be required for some operations)
5. Flame Resistant clothing, as required under the FR policy.
6. An FR limited use coverall, switching jacket or properly rated arc flash suit and hood, as needed for the potential arc exposure to be encountered. (Refer to your plant-specific requirements.)
7. Use the appropriate voltage rated tools and PPE for the voltage exposure at hand.
 - a. For electrical exposures of 51 Volts to 276 Volts:
 - i. Avoid contact and use voltage rated tools or
 - ii. If non-voltage rated tools are used, properly rated voltage gloves and leather protectors shall be worn.
8. Performing work with exposed conductors or when there is potential for accidental contact with conductors.
 - a. For 277 volts or greater Voltage rated tools shall be used and Voltage rated gloves with leather protectors shall be worn.

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NOTE: The section of rubber glove not covered with a leather protector should have a layer of FR clothing beneath to provide arc flash protection. This additional layer of clothing will help minimize burns should a flash occur.

9. Insulating blankets or shielding material, as needed, on exposed energized circuits.

Switchgear (Class E Qualified Persons)

1. Before working in a breaker cubicle, remove the control power source when possible.
2. Before returning a breaker to service, verify that all door fasteners and hardware are in place and securely fastened.
3. Prior to racking a breaker in, ensure that it is in the "Open" position and closing springs are discharged.
4. Upon completion of breaker racking operations, ensure all dawgs on the cubicle door are securely fastened.

Temporary Grounding of Electrical Equipment (Class E Qualified Persons)

1. Always check and verify that the equipment you will be working on is properly isolated from energy sources. Sign on the WPA for this equipment before starting any work.
2. Before any ground is installed, the lines and equipment shall be tested and found to be absent of normal voltage (unless a previously installed ground is present).
3. Temporary protective grounds must be placed and arranged so as to prevent employees from being exposed to hazardous differences in electrical potential.
4. Transformer and overhead electrical transmission lines shall be de-energized and temporarily grounded when employees are working on or within the minimum approach distance.
5. Protective grounds for transformer and overhead electrical transmission lines must have impedance low enough to cause proper operation of protective devices in case of accidental energizing of the lines or equipment.
6. When a ground is to be attached to a switchyard line or to equipment, the ground-end connection must be attached first. Then attach the other end, using proper protective equipment and / or a live-line tool.
7. When a ground is to be removed from switchyard equipment, remove the grounding device from the line or equipment before removing the ground-end connection. Use proper protective equipment and / or a live-line tool as necessary.

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8. When a ground is to be attached to a transmission line or to equipment, the ground-end connection must be attached first. Then, attach the other end by means of a live-line tool and protective equipment.
9. When a ground is to be removed from transmission lines, remove the grounding device from the line or equipment before removing the ground-end connection. A live-line tool and proper protective equipment shall be used.
10. When working on a line that is remote from its terminal connection, hang the grounds at the work area, not at the terminal. This will protect you in case a fault occurs between you and the terminal.
11. Grounds may be removed during testing. However, the following precautions shall be taken:
 - a. Each employee shall use insulating equipment and be isolated from any hazards.
 - b. Additional measures shall be taken as necessary to protect each exposed employee, just in case the previously grounded lines and equipment become energized.

REFERENCES:

- OSHA-29 CFR1910 - Subpart S, Electrical
- OSHA-29 CFR1910.137, Electrical Protective Equipment
- OSHA-29 CFR1910.269, Electric Power Generation, Transmission & Distribution
- OSHA-29 CFR1910.333, Selection & Use of Electrical Work Practices
- OSHA-29 CFR1910.335, Safeguards for Personnel Protection
- OSHA-29 CFR1926.416, General Requirements for Electrical Safe Work Practices
- ASTM D 120, Standard Specification for Rubber Insulating Gloves
- ASTM D 1048, Standard Specification for Rubber Insulating Blankets
- ASTM D 1049, Standard Specification for Rubber Covers
- ASTM F 479, Standard Specification for In-Service Care of Insulating Blankets
- ASTM F 496, Standard Specification for In-Service Care of Rubber Insulating Gloves & Sleeves
- ASTM F 696, Standard Specification for Leather Protectors for Rubber Insulating Gloves & Mittens
- ASTM F 711, Standard Specification for Fiberglass-Reinforced Plastic Rod & Tube Used in Line Tools
- ASTM F 855, Standard Specification for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines & Equipment
- ASTM F 1236, Standard Guide for Visual Inspection of Electrical Protective Rubber Products

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- *ASTM F 1505, Standard Specification for Insulated & Insulating Hand Tools*
- *ASTM F 1506, Standard Specification for Protective Wearing Apparel for Use by Electrical Workers When Exposed to Momentary Electric Arc & Related Thermal Hazards*
- *NFPA 70E - Article 130, Working on or Near Live Parts*
- *NFPA 70E – Article 210, Substations, Switchgear Assemblies, Switchboards, Panel Boards, Motor Control Centers & Disconnect Switches*
- *NFPA 70E - Article 225, Fuses & Circuit Breakers*
- *NFPA 70E – Article 250, Personal Safety & Protective Equipment*
- *AUE-ADM-2418, Industrial Safety Program*
- *“Batteries” section of this handbook*
- *“Flame Resistant / Flame Retardant (FR) Apparel” section of this handbook*
- *Electrical Work Safe Practice Manual*
- *AUE-ADM-5002, Energized Equipment Electrical Safety Program*
- *AUE-MAN-000003 Electrical Safe Work Practices Manual*

Elevated Platforms

The following guidance is provided to assure employee safety while working on elevated platforms and scaffolding.

Energy centers will place special emphasis on two areas to address guardrail safety.

1. Conduct periodic walk-downs and inspections of elevated platforms to ensure proper guardrails are in place.
2. Apply additional measures to designated areas within 6’ of guardrails with a potential fall distance of greater than 4’ to a lower level where or when work is taking place that could result in being struck or otherwise result in falling over or between rails of guardrail.

Energy centers working in conjunction with Power Operations Services engineering will identify areas where additional measures on a permanent basis are to be implemented. Target areas include:

1. Stair landings,
2. Crosswalks between units,
3. Areas as identified by engineering/plant safety personnel where work activities are performed that could result in being knocked through or falling over a guardrail,
4. Ladders where the base is within 6’ of a guardrail and a potential fall to a lower level exists, (install railing/cage to prevent fall to lower level),

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5. Areas where ladders lead to a platform and a swing gate does not currently exist (ensure swing gates are installed in these areas),
6. Other specified areas within 6' of a guardrail as approved by engineering/energy center safety personnel where work is performed that involves probability of sudden movement impact, or where forces are exerted that could result in falling through a guardrail (e.g. some long lance platforms and some large valve locations).

Various permanent solutions are acceptable, based on the best application as determined by engineering/energy center safety personnel. Examples of permanent solutions are:

1. Chain link fencing,
2. Flat or smooth expanded metal,
3. Welding flat/tube stock,
4. Clamping flat/tube stock,
5. Other designs as approved by engineering.

In cases where permanent solutions are not installed, workers are to apply engineer-reviewed temporary solutions to address identified hazards while conducting work.

Examples of temporary solutions include:

1. "J" Clamp-on flat stock design, providing an additional lower-middle and upper-middle rail,
2. Cargo or "snow" fence,
3. Netting consisting of the 3/8" approximate mesh,
4. Clamp-on type solutions, such as flat stock clamped on with U-type clamps,
5. Utilizing fall protection opposed to barriers, as determined by local safety personnel.

REFERENCE:

- *See Fall Protection / Fall Prevention Section of this handbook*

Emergency Showers & Eye Wash Stations

Emergency showers and eyewash stations, or other suitable means for adequate drenching, must be present prior to performing work that exposes employees to hazardous materials. When working in or around these areas, first identify where the nearest emergency shower / eye wash station is located and ensure the path to it is clear. Before beginning assigned work in or near a

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hazardous material, operate the emergency station and flush the line for several minutes. Before testing and flushing the line, be sure to notify the Control Room just in case the emergency shower / eye wash station is alarm monitored.

General Safe Work Practices

1. Emergency showers and eyewash stations shall:
 - a. Be free from obstruction and be accessible from at least two directions.
 - b. Not require more than 10 seconds to reach and must be located no more than 100 feet from the hazard.
 - c. Be located where water spray will not contact electrical apparatus or outlets.
 - d. Be marked with identification.
 - e. Utilize tepid potable water. ("Potable water" as water that meets the quality standards prescribed in the U.S. Public Health Service Drinking Water Standards, published in 42 CFR Part 72, or water which is approved for drinking purposes by the State or local authority having jurisdiction. "Tepid" temperature range is 60 – 100 degrees Fahrenheit.)
 - f. Be installed in a manner that ensures the water will not freeze.
 - g. Be tested periodically to ensure proper operation.
2. Self-contained portable eye wash station units may be used in areas remote from potable water supplies or where small quantities of hazardous materials are handled infrequently. The minimum size of a portable station is a 15-minute unit.
3. Areas / jobs requiring temporary eye or body wash protection must be identified, indicating a portable unit must be present prior to beginning work involving potential contact with the chemical. Portable eye wash stations shall be inspected and the fluid changed according to manufacturer's recommendations.

REFERENCES:

- OSHA-29 CFR1910.151(c), *Medical Services & First Aid*
- AUE-ADM-2418, *Industrial Safety Program*
- *Corporate Safety Guideline for Eyewash and Safety Shower*

Ergonomics

Ergonomics is defined as the science of fitting workplace conditions and job demands to the capabilities of the workers. The goals of an ergonomic program are to decrease the risk of injuries and worker discomfort, as well as to improve worker performance and quality of work life. Cumulative trauma disorders, commonly called repetitive motion syndrome, develop over long periods of time and are caused by forceful exertion, vibration, awkward positions and movements.

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A structured employee flexibility program, combined with a comprehensive ergonomics process, can have a positive impact in reducing musculoskeletal disorders (MSDs). It is believed that a few minutes of flexibility based exercises before work and throughout the day will make you feel better and may help avoid injuries. Day to day life can lead to a significant reduction in the elasticity of our muscles, which can alter the way our body functions. For example tight hamstrings can force your lower back to work harder thus resulting in back pain, but a regular stretching routine helps improve range of motion and physical function. Stretching throughout the day, especially using opposing muscle groups after long periods in the same position can be beneficial.

Risk factors for cumulative trauma disorders include working in the same position for an extended time; using poorly designed hand tools; excessive use of vibrating power tools; repetitive, forceful pushing or pulling; and awkward body postures, such as reaching above the shoulders or bending / twisting the wrists outside of their “neutral” position.

General Safe Work Practices

1. Be alert to identify the task, tool or body position that will minimize pain and injury.
2. Use methods to reduce risk of injury. These include:
 - a. Improving work station ergonomics.
 - i. Move materials that are frequently used close to you to prevent constant reaching.
 - ii. Adjust chair height to allow working with straight wrists.
 - iii. When possible, use both hands while performing a task.
 - b. Being alert to the physical effects of vibration.
 - i. Avoid performing tasks that require operating a vibrating tool for an extended period of time.
 - ii. Wear anti-vibration gloves.
 - iii. Rotate various types of work and take frequent breaks.
 - c. Choosing the tool that is best designed for the job.
 - d. Using material handling devices when possible, rather than lifting.
 - i. When loads are awkward, use extra precaution.
3. Use proper lifting techniques:
 - a. Lift with the legs, not the back.
 - b. When possible, limit lifting to below the shoulders and above the waist.

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- c. Keep the load close to the body when lifting. This technique keeps your back in alignment and allows the stronger muscles in the legs to do the lifting.
- d. Never twist while performing a lift.
- e. Make sure to have a clear path of travel before making a lift.

Improper lifting techniques account for the majority of back-related injuries. Since back injuries account for the majority of strains, eliminate the risk factors for back-related cumulative trauma. Below are some examples of “at risk” behavior:

- 1. Pulling on objects, rather than pushing
 - a. Pushing provides twice the power.
- 2. Bending at the waist
- 3. Twisting and lifting in the same motion
- 4. Reaching and lifting objects with arms extended
- 5. Lifting from below the knees or above the shoulders
- 6. Lifting large, awkward, heavy objects unassisted
- 7. Sitting for extended periods without support for the lower back,
- 8. Standing in the same position for extended periods without placing a foot on a rest
- 9. Performing the same task frequently.

If there is a task that poses ergonomic issues, be sure to contact your supervisor.

REFERENCES:

- *Corporate Safety Guideline on Musculoskeletal Injury*

Excavation Safety

Most people are probably not aware of how hazardous excavations can be. Every year, there are excavation fatalities due to the compressive forces of soil and failure to follow safe excavation work practices. Before reviewing safe work practices, it is important to understand a few key terms, as defined by OSHA.

An **excavation** is any man-made cut, cavity, trench or depression in the earth’s surface that is formed by earth removal.

A **trench** is defined as a narrow underground excavation that is deeper than it is wide, and is no wider than 15 feet at the bottom.

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A **Competent Person** is one who is capable of identifying existing and predictable hazards, and who has the authority to take prompt corrective measure to eliminate them.

Special Precaution

1. Air monitoring may be required in excavations where hazardous atmospheres can be reasonably anticipated.

General Safe Work Practices

1. Do not enter an excavation that:
 - a. Is greater than five (5) feet in depth and has not been examined by a competent person and determined to be safe.
 - b. Is five (5) feet or greater in depth and has not been properly sloped or shored.
2. A Competent Person in excavation shall pre-plan the excavation work prior to the start of the excavation. The pre-plan includes the following actions:
 - a. Locate any underground and overhead utilities.
 - b. Support or remove any surface encumbrances.
 - c. Support adjacent structures.
 - d. Evaluate soil type and conditions.
 - e. Select appropriate protective systems, such as shoring, sloping, or benching.
 - f. Inspect the excavation daily, as well as after a rainfall.
 - g. Complete and sign an Excavation Permit.
 - i. The permit must be signed or initialed and dated before work begins every day.
3. Conduct a pre-job briefing to discuss:
 - a. PPE required
 - i. This may include wearing reflective vests in traffic areas.
 - b. Precursors for cave-ins
 - i. These include fissures, belling on the trench wall or vibrating equipment in the area.
 - c. Atmospheric conditions in the excavation.

- i. Utilize a Confined Space Evaluation Checklist for excavations greater than four (4) feet, if there is potential for oxygen deficiency or other hazardous atmosphere to exist.
 - ii. Conduct air monitoring as required for Confined Space Entry.
- d. Water
 - i. Do not work in excavations where there is accumulated water, unless it has been evaluated by the competent person and determined to be safe.
- e. Operating machinery
 - i. Only trained and qualified employees shall operate equipment.
- f. Vehicle traffic
- 4. If heavy equipment is operating near a trench, extra precautions shall be taken due to the extra load or vibration imposed on the ground.
- 5. Always maintain the proper slope for any excavation. Consult the following table:

MAXIMUM ALLOWABLE SLOPES

[For Excavations Less Than Twenty (20) feet]

<u>Soil Type</u>	<u>Horizontal to Vertical Ratio (H:V)</u>
TYPE "A" SOIL	¾:1 (53 Degrees)
TYPE "B" SOIL	1:1 (45 Degrees)
TYPE "C" SOIL	1 ½:1 (34 Degrees)

- 6. Equipment and work material shall be 2 feet from the edge.
- 7. All excavated material shall be placed and retained a minimum of 2 feet from the edge of the excavation. If sufficient space is not available to store the material, it shall be moved to another location.
- 8. A stairway, ladder, ramp or other safe means of egress shall be located in excavations four (4) feet or more in depth, and must be accessible within twenty five (25) feet of the location where personnel are working.
- 9. A trench box, if used, shall extend a minimum of 18 inches above the trench wall.
- 10. A registered professional engineer shall design the sloping or benching for all excavations greater than twenty (20) feet.
- 11. Barricades or other means (such as fencing) shall be used to protect employees and the public from falling or driving into the open excavation.

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12. Limit work crews in the excavation to the minimum number needed to perform the work.
13. Do not let water accumulate in a trench.
 - a. Water removal equipment must be monitored by a competent person.
 - b. Following rain fall, a competent person in excavation shall re-inspect the excavation.

REFERENCES:

- OSHA-29 CFR1910.269(f), *Excavations*
- OSHA-29 CFR1926 - *Subpart P, Excavations*
- OSHA-29 CFR1926.501, *Fall Protection*
- OSHA-29 CFR1926.651, *Specific Excavation Requirements*
- AUE-ADM-2424, *Trenching and Shoring*

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Fall Protection / Fall Prevention

Fall protection is defined as any means used to protect workers from falls in areas where a fall hazard exists. It involves the elimination of fall hazards, the prevention of falls and the control of a fall should one occur. When a fall hazard exists, there is potential for a worker to lose balance, fall and become seriously injured. As a result, fall protection or fall prevention methods are required in all areas where employees are exposed to falls.

Due to the potential for serious injury or fatality, Power Operations has chosen to abide by the general industry standard four-foot rule. The four-foot rule requires that all floors, platforms, runways and wall and window openings have some type of guarding when they are four feet or greater in height. In these cases, a guardrail system will suffice.

In addition, employees working where a fall hazard of four feet or greater is present shall be protected by a fall protection system. A fall protection system could include safety nets, a guardrail system or fall protection PPE, such as a full body harness. Examples of when personal fall protection would be required include, but are not limited to, working on unprotected sides and edges, in hoist areas, around holes, over an excavation or on formwork, when reinforcing steel, or on overhead ash lines. Harnesses, lanyards and lifelines shall only be used for employee safeguarding and should **never** be altered.

Jobs that involve working at heights need to be evaluated on a case-by-case basis to determine if safety equipment should be used.

General Safe Work Practices

1. Prior to each use, perform a visual inspection of the safety harness and lanyard.
 - a. Do not use if deterioration or defects are noted.
 - b. If a defect is identified, tag the equipment “Danger – Do Not Use” and return it to your supervisor.
2. Fall protection equipment that has gotten wet or damp should be hung in a dry, clean atmosphere at ambient temperature. Do not hang the device in a hot area.
3. If fall protection equipment is subjected to impact loading:
 - a. It shall be tagged “Danger – Do Not Use” and reported to your supervisor.
 - b. The anchor point that arrested the fall shall be reported to your supervisor to be evaluated.
4. Arc rated harnesses and lanyards (arresting devices) must be used by Class 2 electrically trained employees (in addition to their required FR apparel and PPE) when working in an electrical arc hazard boundary also requiring fall protection.
5. Use the following guidelines for attaching fall protection equipment:

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- a. When using a full body harness for fall protection, tie off to the D-ring attachment point in the center of the back near shoulder level.
- b. Attachment points shall be capable of supporting a minimum of 5,000 pounds per employee attached.
 - i. Adequate examples include, but are not limited to tube steel or piping 3 inches or greater in diameter, flange beams 4 inches or greater in width, or other engineered or engineer approved anchor points.
 - ii. Inadequate tie-off points shall not be used. These include, but are not limited to handrails, structural tubing less than 3 inches, conduit 2 inches or less in diameter, tubing and tube support, expansion anchors, pipe strut, valve actuators, cable trays or HVAC ducts less than 18 inches high.
- c. Fall protection equipment shall be secured above the point of operation.
- d. When the anchor point is below the D-ring, the anchor point must be in a location that will prevent you from striking a lower level. It is recommended that personnel utilize a retractable lanyard between the harness D-ring and the anchor point in this type of situation.
- e. The fall protection equipment should not be secured to hot, corrosive, sharp or abrasive contacts.
- f. Fall protection equipment shall not be attached to a guardrail or handrail, unless they have been evaluated and determined to be acceptable for that use.
6. Horizontal lifelines must be designed and installed under the direction of Engineering.
7. All openings in walking and working surfaces which present a life-threatening hazard shall be protected as follows:
 - a. When unattended, the floor opening shall have a:
 - i. Guardrail system installed or
 - ii. Temporary floor cover in place that is sufficient to handle the weight applied to it. The cover shall be marked and secured in place.
 - b. When attended, barrier tape shall be installed 15 feet from the edge of the floor opening.
 - c. If personnel are within 6 feet from the edge of a floor opening that presents a fall hazard of 6 feet or greater:
 - i. The use of a fall arrest or restraint system is required, or
 - ii. A temporary handrail system shall be installed that meets requirements, or

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- iii. An appropriately rated cover shall be marked, put in place over the floor opening and secured in position.

NOTE: Openings in guardrails or handrails are permitted during material delivery, but must be replaced immediately. Fall arrest systems shall be used in lieu of the railing system during delivery.

8. Temporary covers for holes in floors, roofs and other walking / working surfaces shall meet the following requirements:
 - a. Temporary covers located in vehicle aisles shall be capable of supporting at least twice the maximum axle load of the largest vehicle expected to cross over the cover. All other covers shall be capable of supporting at least twice the weight of employees, equipment and materials that may be imposed on the cover at any one time.
9. All covers shall be secured when installed so as to prevent accidental displacement by equipment, employees or the wind.
10. Guardrail systems for holes in floors, roofs and other walking / working surfaces shall consist of a top rail, mid-rail and toe board and shall meet the following requirements:
 - a. The top rail height shall be between 39 and 45 inches and capable of withstanding a force of at least 200 lbs. applied in any direction.
 - b. The mid-rail shall be able to withstand a force of at least 150 lbs. applied in any direction.
 - c. The toe board shall be a minimum of 3.5 inches in height. Toe boards are required on all platforms or scaffolds where there is a potential for material to fall on employees below.

REFERENCES:

- OSHA-29 CFR1910.23, Guarding Floor & Wall Opening & Holes
- OSHA-29 CFR1910.66, Powered Platforms for Building Maintenance
- OSHA-29 CFR1910.28 Walking-Working Surfaces
- AUE-ADM-2418, Industrial Safety Program
- See Elevated Platforms Section in this handbook

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Fire Prevention / Fire Protection

Fire prevention and fire protection are essential for the protection of personnel and facility assets. Some common causes of fire include smoking, open flames, sparks, electricity, heating appliances, friction heat and static electricity. Housekeeping, hot work permits and proper handling of flammable liquids and gases all play a significant role in preventing fires. Steps should be taken to eliminate potential ignition sources, control combustible materials and ensure fire protection systems remain available for use.

Reporting a Fire

In case of a fire, move to a safe location and contact the Shift Supervisor. When reporting, provide:

1. Your name
2. Location of emergency
3. Nature of emergency
4. Injuries involved (if any)
5. Hazards in the area (electrical, chemical, potential for injury, etc.)

NOTE: Follow directions given and, if conditions permit, don't hang up until told to do so.

If your plant has an Emergency Response Team, the Shift Supervisor will dispatch the team members or call outside assistance to fight fires beyond the incipient level. Only employees who have had incipient fire training may fight fires in the early stages of development.

General Safe Work Practices

1. Only fight fires to your level of training.
2. Always have an escape route if you attempt to extinguish a fire.
3. Smoking is prohibited in:
 - a. Flammable liquid storage areas,
 - b. Coal handling / fuel processing areas,
 - c. Hydrogen storage and equipment areas and
 - d. Any other identified no smoking areas.

NOTE: Where smoking is permitted, all cigarette butts and trash should be placed in appropriate waste receptacles.

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4. The Shift Supervisor, upon receiving notification of a fire system impairment, should ensure the appropriate measures are taken:
 - a. Verify the impairment exists and the systems / equipment it will affect.
 - b. Ensure compensatory measures are taken for all fire impairments generated.
 - c. Post a fire watch to cover the impaired equipment, if necessary.
5. Explosion proof lighting should be used in active coal handling / fuel processing areas or if these areas have not been cleaned prior to maintenance activities. Use of intrinsically safe heaters, drills, etc. is required.

Housekeeping

1. Coal dust and spills should be cleaned as soon as possible from the work area.
2. Oil on floors should be cleaned up promptly. Ensure oily rags, scrap material, etc., are properly discarded.
3. The use of compressed air (no more than 30 psi) to blow coal dust from motors, filters, breaker cubicles and other limited areas shall be permitted only when all machinery that presents an ignition source in the area is shut down. All other known potential ignition sources in the area must be removed or controlled. This includes hot surfaces with temperatures over 300 degrees Fahrenheit.
4. Always properly store material. Improper storage can affect the initiation, spread and extinguishment of fire.
5. Do not block fire lanes, fire extinguishers or fire stations that aid in firefighting response. Ensure exits are not obstructed.
6. Please refer to the "Housekeeping" section of this handbook for more detail.

Hot Works

1. A Hot Work permit must be issued for any welding, cutting, brazing or soldering outside the safe welding / cutting areas.
2. The supervisor shall check the area and either issue a permit or have the area cleaned before a permit will be issued.
3. A fire watch shall be present whenever welding or cutting is performed in locations where a minor fire might develop, or when any of the following conditions exist:
 - a. Appreciable combustible material, in building construction or contents, is closer than 35 feet of the operation,
 - b. Appreciable combustibles are more than 35 feet away but are easily ignited by sparks,

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- c. Wall or floor openings within a 35 foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors,
- d. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings or roofs and are likely to be ignited by conduction or radiation.
4. A fire watch shall be present while the work is in progress and for 60 minutes after the job is completed or interrupted (breaks, lunch, etc.)
5. The fire watch shall have fire equipment readily available and be properly trained in its use.
6. Please refer to the “Hot Works” section of this handbook for more details.

Flammable Liquids & Gases

Flammable liquids include, but are not limited to, materials such as gasoline, oils, some paints, lacquers, thinners, cleaners and solvents. To determine if a material or product is flammable review the Safety Data Sheet (SDS) or read the manufacturer’s label on the product.

1. Compressed gas cylinders shall be stored in an upright and secured position, properly labeled and have caps in place.
2. Fuel cylinders (propane, acetylene, hydrogen, etc.) shall be at least 20 feet from aisle ways, elevators, stairs, combustible materials and oxygen cylinders or be separated by a 5 foot wall with a 1 hour fire rating.
3. Oxygen cylinders shall be stored separately and at least 20 feet from combustible material.
4. Please refer to the “Flammable Liquids & Gases” section of this handbook for more detail.

Fire Protection – Extinguishers

Fire extinguishers can save lives and property by extinguishing an incipient fire or controlling it until the Emergency Response Team or outside assistance arrives. Some of the most common fire extinguishers contain water, carbon dioxide or dry chemical.

1. Use the correct extinguisher for the class of fire.
 - Class A - ordinary combustibles (wood, paper, cardboard)
 - Class B - flammable or combustible liquids (gasoline, kerosene, oil)
 - Class C - electrical equipment (outlets, circuit breakers, wires)
 - Class D - combustible metals (magnesium, titanium, potassium)

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2. Know the time and reach limitations of the fire extinguisher, as well as how to operate it. Use the PASS method:

Pull, Aim, Squeeze, Sweep.

3. Inspect fire extinguishers on a monthly basis.

Fire Protection – Sprinkler Systems

Properly installed and maintained sprinkler systems can also save lives and minimize property damage. Sprinkler systems dramatically reduce the heat, flames and smoke produced in a fire, without subjecting personnel to the hazardous environment.

1. Ensure that the sprinkler systems are ready and in service.
2. Inspect sprinkler systems regularly.
3. Check sprinkler heads and piping for leaks.
4. Ensure there are no obstructions blocking access or effectiveness of the sprinkler head. A minimum of 18" clearance is required.

Fire Protection – Fire Water Systems

Fire water systems include hydrants, stand pipes, fire pumps, fire hoses, post indicator valves and other firefighting equipment.

1. These items should be inspected and checked regularly.
2. Firefighting equipment shall only be used to the level of your training.

REFERENCES:

- OSHA-29 CFR1910.36, *Design & Construction Requirements for Exit Routes*
- OSHA-29 CFR1910.37, *Maintenance, Safeguards & Operational Features for Exit Routes*
- OSHA-29 CFR1910.38, *Emergency Action Plans*
- OSHA-29 CFR1910.252(a), *Fire Prevention & Protection*
- *Emergency Action Sheet-09, Fire Response*
- AUE-ADM-2410, *Fire Protection Systems*
- AUE-ADM 2411, *Control of Flammable Materials*
- AUE-ADM-2412, *Storage & Handling of Flammable Gases*
- AUE-ADM-2413, *Control of Ignition Sources (Hot Works)*
- AUE-ADM-2418, *Industrial Safety Program*
- AUE-ADM-2417, *Housekeeping*

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- *“Flammable Liquids & Gases” section of this handbook*
- *“Hot Works” section of this handbook*
- *“Housekeeping” section of this handbook*

First Aid & Bloodborne Pathogens

Bloodborne pathogens are micro-organisms that are present in human blood that can cause disease in humans. Exposure to Bloodborne pathogens can occur from administering first aid or cleaning up blood / body fluids that contain blood after an incident. In the event you encounter potentially infectious material, contact the Shift Supervisor or appropriate contact person immediately.

To limit the potential for exposure to such viruses as Hepatitis B, HIV or other Bloodborne pathogens, be sure to follow the Universal Precautions outlined below.

General Safe Work Practices

1. Avoid contact with human blood / body fluids that may contain blood, IV needles or other sharp objects. Do not compact trash with hands.
2. Only trained personnel shall administer first aid or clean up blood / body fluids containing blood.
3. If there is a possibility of contact with blood / body fluids containing blood, wear fluid impervious disposable gloves.
 - a. If administering first aid and gloves are not immediately available, use several layers of gauze or other clean material, plastic wrap or bags to stop the bleeding until gloves can be obtained.
4. If administering CPR, use a protective mask with a one-way valve. These are available in first aid kits or in other designated areas throughout the plant.
5. Only trained personnel shall remove blood / body fluids containing blood from hard surfaces or equipment.
 - a. At a minimum, disposable gloves shall be worn. Additional PPE may be required, depending on the situation.
 - b. During clean up after an incident, an approved disinfectant shall be used to clean the area where Blood borne pathogens may be present.
 - c. Proper disposal of all materials used during the incident and subsequent clean up should follow the appropriate disposal procedures outlined at each plant.

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6. Carefully remove the gloves and properly dispose of them. Wash hands and any skin that came into contact with blood or body fluids containing blood. Use soap and warm water.
7. Properly launder any clothing that has blood or body fluids containing blood on it.

Immediately inform your supervisor or appropriate contact person of any blood borne pathogen exposure, a puncture wound from a needle / syringe or cuts from an object covered with blood. You will be offered a medical evaluation and Hepatitis B immunization.

REFERENCES:

- OSHA-29 CFR1910.151, *Medical Services & First Aid*
- OSHA-29 CFR1910.269(b), *Medical Services & First Aid in Electric Power Generation, Transmission & Distribution*
- OSHA-29 CFR1910.1030, *Blood borne Pathogens*
- ES-REG-204, *Medical Services & First Aid*
- ES-REG-212, *Blood borne Pathogens*
- Ameren Missouri Power Operations *Blood borne Pathogen Exposure Control Plan for Fossil Energy Centers, Renewables & CTG Operations and Hydro Energy Centers*

Flammable Liquids & Gases

These requirements apply to the storage of flammable liquids in drums or other containers (including flammable aerosols) not exceeding 60 gallons in a room. Flammable liquids include, but are not limited to, materials such as gasoline, oil, some paints, lacquers, thinners, cleaners and solvents. To determine if a material or product is flammable or combustible, review the Safety Data Sheet (SDS) or read the manufacturer's label on the product.

A **flammable liquid** is any liquid having a flash point at or below 199.4 degrees Fahrenheit. Because of this characteristic, flammable liquids tend to evaporate readily under normal atmospheric conditions. Evaporation rate increases if the liquid's temperature is elevated. As flammable liquids evaporate and mix with surrounding air, a condition may arise where the vapors generated can be ignited. If vapor ignition occurs, the heat of the flame results in increased generation of flammable vapors, which further fuels the fire.

In order for a flammable liquid fire to occur, four key elements must be present: fuel, oxygen, heat and a chemical reaction. These four elements are often graphically represented as the "fire tetrahedron." (**Fuel** - provided by the flammable liquid vapors; **Oxygen** - provided by the surrounding air; **Heat** - provided by an external ignition source; and **Chemical Reaction** – provided by the right combination of the other three elements.) If any one of these four components is not present, or is not present in the proper proportion, the fire will not burn.

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Flammable liquids can be subdivided into four categories:

1. Category 1 Liquids

- A liquid having a flash point below 73.4 degrees Fahrenheit and having a boiling point at or below 95 degrees Fahrenheit.
- Examples - Pentane, Ether, Vinylidene chloride

2. Category 2 Liquids

- A liquid having a flash point below 73.4 degrees Fahrenheit and having a boiling point at or above 95 degrees Fahrenheit.
- Examples - Gasoline, Benzene, Acetone, Toluene, Isopropyl Alcohol

3. Category 3 Liquids

- A liquid having a flash point at or above 73.4 degrees Fahrenheit and having a boiling point at or below 140 degrees Fahrenheit
- Examples - Mineral Spirits, Turpentine, Propyl Alcohol, Butanol

4. Category 4 Liquids

- A liquid having a flash point above 140 degrees Fahrenheit and having a boiling point at or below 199.4 degrees Fahrenheit

NOTE: Category 3 liquids with a flashpoint at or above 100° F heated for use to within 30° F of its flashpoint shall be handled in accordance with the requirements of Category 3 liquid with a flashpoint below 100° F.

Category 4 liquid heated for use within 30° F of its flashpoint shall be handled in accordance with the requirements for Category 3 liquid with a flashpoint at or above 100° F.

According to their classification, flammable liquids are required to be stored in the following maximum-allowable container size:

Table for Maximum Allowable Size of Containers and Portable Tanks

CONTAINER TYPE	Category 1 FP <73.4°F BP ≤95°F	Category 2 FP <73.4°F BP >95°F	Category 3 FP ≥73.4°F and ≤140°F	Category 4 FP >140°F and ≤ 199.4°F
Glass/Approved Plastic	1 pt	1 qt	1 gal	1 gal
Metal (Non-DOT)	1 gal	5 gal	5 gal	5 gal
Safety Cans	2 gal	5 gal	5 gal	5 gal
Metal Drums (DOT)	60 gal	60 gal	60 gal	60 gal
Approved Portable Tanks	660 gal	660 gal	660 gal	660 gal

Before outlining general safe work practices, we need to define a few definitions of the approved containers, as noted in the chart above.

Approved plastic containers are plastic containers that have been approved by a nationally recognized testing laboratory such as NRTL (Nationally Recognized Testing Laboratory), DOT (Department of Transportation) or EPA (Environmental Protection Agency).

A **metal safety can** is defined as an approved container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover and designed so it will safely relieve internal pressure when subjected to fire exposure.

General Safe Work Practices

1. Storage in glass containers is not recommended and is prohibited beyond quantities specified in the chart above.
2. Gasoline shall only be stored in metal safety cans.
3. Metal safety cans containing flammable liquids shall be marked with the contents clearly identified.
4. Flammable liquids shall not be stored in locations that limit use of exits, stairways or areas normally used for safe egress.
5. All “No Smoking” signs shall be strictly observed. No open flames shall be allowed or spark-producing tools used, in the area where flammable liquids and gases are stored.
6. Flammable liquids and gases shall be transported and kept only in approved containers. Containers being transported shall be properly secured.

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7. Flammable hazard waste liquid shall only be disposed of in approved waste containers. Flammable waste shall never be emptied into any drain.
8. Flammable waste material, such as oil or paint-soaked rags, shall be stored in covered metal containers and disposed of daily.
9. When pouring flammable liquid from one metal container to another, or when filling gasoline tanks, metal-to-metal contact shall be maintained between the two containers, or between the hose nozzle and the tank, to prevent static build-up.
10. Bulk containers used to dispense flammable liquids into another container shall be bonded to the receiving vessel and grounded to prevent static spark.
11. Dispensing drums shall be equipped with self-closing spigots. Pipe connections on all drums and piped flammable liquids shall be vapor-tight and liquid-tight.
12. All spills of gasoline, oil or other flammable liquids shall be cleaned up immediately and in accordance with environmental procedures.
13. To prevent static build-up when filling containers with flammable liquid, place them on the ground, not in the back of a truck with a bed liner.
14. Storage of flammable liquids in offices shall be prohibited, except that which is required for maintenance and operation of the building and equipment. Such storage shall be:
 - a. Kept in closed metal containers,
 - b. Stored in a flammable storage cabinet in safety cans or
 - c. Stored in an inside storage room not having a door that opens into the portion of the building used by the public.
15. The storage area shall be protected against tampering where necessary and shall be kept free of debris and other Flammable material.
16. Suitable fire control devices, such as a portable Class B fire extinguisher, shall be available at locations where flammable liquids are stored.
17. Materials which will react with water shall not be stored in the same room with flammable liquids.
18. The maximum capacity of flammable liquid storage cabinets shall be no more than 60 gallons of Category 1, 2, or 3 flammable liquids, or more than 120 gallons of Category 4 flammable liquids.
19. Where flammable liquids are used or handled, except in closed containers, a means of disposal shall be provided to promptly and safely address leaks or spills.

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20. Keep flammable liquids and their empty containers away from all sources of heat. Empty flammable containers can hold enough liquid or vapors to support explosion.
21. Store any flammable saturated cloth, paper rags or material in an approved metal can with a tight-fitting lid.
 - a. These materials should be removed on a daily basis and placed in a 55-gallon metal drum with a tight fitting lid.
 - b. The drum should be located in an approved storage location.

REFERENCES:

- OSHA-29 CFR1910.106, *Flammable Liquids*
- AUE-ADM-2411 *Control of Flammable Materials*

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Foreign Material Exclusion

Foreign material exclusion (FME) is an important consideration when working on or near open vessels, piping, etc. Foreign materials entering critical areas in pumps, valves, piping, tubing and other equipment can have devastating results to personnel and equipment. Documentation supports the fact that foreign materials have been lodged in critical locations of systems and catastrophic explosions have resulted in loss of life and major equipment damage.

Good work and housekeeping practices and habits should be followed when dismantling, overhauling and opening equipment and systems. Always be conscious of the potential for foreign material entry and take precautions to avoid the occurrence.

General Safe Work Practices

1. Know the FME procedure for storage and shipment of equipment and materials.
2. Ensure that work areas are cleaned of foreign materials prior to and during work activities.
3. Debris, tools no longer being used and demolished materials shall be removed from the work site at least daily.
4. Ensure that FME is applied to equipment not specifically addressed in AUE-ADM-4217 where practical.
5. Ensure that inspections are performed on equipment before re-assembly.
6. Ensure that parts and components are inspected and cleaned before installation.
7. Follow specific instructions (per AUE-ADM-4217) on boiler/piping systems, Turbine/generator and electrical equipment.

REFERENCE:

- *AUE-ADM-4217, FME Administration Procedure*

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Forklift Industrial Trucks

Forklifts are utilized daily at all Ameren facilities. To ensure the safety of personnel and the safe operation of the forklift, only trained and authorized personnel shall operate the equipment. Re-training shall occur at the intervals outlined in the OSHA standard.

General Safe Work Practices

1. A forklift truck shall not be used for any purpose other than that for which it was intended.
2. Attachments shall be approved and consistent with the manufacturer's guidelines. Any attachment shall meet all safety requirements, including the following:
 - a. Use attachments only for their designated purpose.
 - b. When lifting personnel on a forklift, make sure that any work platform or work basket is:
 - i. Intended for use on the forklift and
 - ii. Firmly secured.
3. Clean up any oil spills from forklifts immediately.
4. Keep all parts of the body inside the forklift cage at all times when traveling. Always face the direction of travel.
5. No passengers shall be allowed on forklifts nor shall a forklift be used to lift personnel other than with specifically designed and approved attachments for intended purpose and prior management supervisory approval.
6. Forklifts shall not be driven up to anyone standing in front of a bench or fixed object.
7. No person shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty.
8. Stunt driving and horseplay are prohibited.
9. Seatbelt shall be worn.
10. In the event a forklift overturns, the safest procedure is to ride the forklift down, keeping all parts of the body within the forklift cage.
11. Forklifts shall not be operated on metal gratings, unless such grating is specifically identified as capable of supporting the weight.
12. Forks shall be kept at a low level when traveling, with or without a load. Likewise, forks shall be fully lowered to the ground when leaving the fork truck.

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13. Prior to use, forklift inspections shall be conducted and the appropriate checklist completed.
 - a. If conditions are identified that adversely affect the safe operation of the forklift, the operator shall tag the forklift, "DANGER - Do Not Use."
 - i. Safety deficiencies such as a seatbelt, brakes or hydraulic cylinder problems warrant immediate removal from service.
 - ii. Do not inspect hydraulic lines by touching. This can result in injection of hydraulic fluids into your body.
 - b. The employee who finds any deficiency shall initiate actions to correct the deficiency (write a JR) and notify the immediate supervisor.
 - c. The defective forklift shall not be used until it has been repaired.
14. The rated capacity of the forklift shall not be exceeded.
15. Forks shall be placed and centered under the load as far as possible, with the load tilted back carefully.
16. Lift only stable or safely arranged loads. Use extreme caution when handling off-center loads that cannot be centered.
17. When driving a forklift to a truck or trailer:
 - a. Block the wheels of the truck or trailer.
 - b. Check the floor of the truck or trailer for breaks or weaknesses, prior to entry with the forklift.
18. Slow down and sound the horn at cross aisles or corners when view is obstructed.
19. Ascend and descend grades slowly.
 - a. If the grade is in excess of 10 percent, drive the loaded forklift with the load upgrade.
20. Only operate a forklift at a speed that will ensure safe turns and stops.
21. Do not defeat or bypass any factory-installed safety device.
22. When unattended, the following actions shall be taken. The forklift:
 - a. Load-engaging means shall be fully lowered,
 - b. Controls shall be neutralized,
 - c. Power shall be shut off,

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d. Brakes shall be set and the

e. Wheels shall be blocked (if the forklift is parked on a grade).

REFERENCES:

- OSHA-29 CFR1910.178, *Powered Industrial Trucks*
- AUE-ADM-2418, *Industrial Safety Program*

Hair Length Containment

There is a recognized potential for serious personal injury if a person's hair should contact moving machinery or open flames. Therefore, it is necessary that the proper precautions regarding long hair be utilized whenever employees in an energy center environment are in the area of heating, cutting, welding operations or moving machinery. In order to accomplish this objective:

Hair will be contained at a length at or above the shoulders with a hair net or other suitable device and styled in such a manner that head protective equipment can be properly worn. It is mandatory that long hair be worn in accordance with this policy.

Hazard Communication / SDS

The purpose of the Hazard Communication Program (HAZCOM) is to ensure that information concerning potential hazards of materials in the work place is transmitted to all affected employees. This is done through the use of the "Safety Data Sheet" (SDS). The Federal Hazard Communication Standard applies to all materials, products and chemicals in the workplace which are known to be present, such that employees may be exposed to under normal use or in a foreseeable emergency. Safety Data Sheets are accessible on-site and are available to employees online through Safety1Source in Scholar, or by asking the Safety Supervisor. Another source for SDS Sheets is as follows:

• SPILLS • EXPOSURES • POISONINGS • SPILLS • EXPOSURES •

SDS
SAFETY DATA SHEETS
24 HOURS A DAY 7 DAYS A WEEK 365 DAYS A YEAR

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To denote the severity and type of hazard a material may present, a system of colors and numbers are used for labeling. These are typically displayed in an NFPA Hazmat diamond. The blue quadrant represents any health hazards the material may pose; red denotes the flammability rating; yellow represents any reactivity hazards and white denotes special information, such as whether the material is an oxidizer, corrosive or reacts with water.



Numerical ratings denote the relative degree of risk for each hazard and range from 0, 1, 2, 3 and 4. While a zero represents no risk, a four represents the greatest risk. These numbers are then used in each of the four colored quadrants of a Hazmat diamond to represent the severity of each type of hazard for that particular material.

Labels may also contain additional information in the form of pictograms, hazard statements, signal words and precaution statements for each hazard class and category of the products used. The pictograms are in a standard format.

Attachment D

PICTOGRAMS

Pictograms shall be in the shape of a square set at a point and shall include a black hazard symbol on a white background with a red frame sufficiently wide to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label.

One of eight standard hazard symbols shall be used in each pictogram. The eight hazard symbols are depicted in Figure D.1. A pictogram using the exclamation mark symbol is presented in Figure D.2, for the purpose of illustration.

Figure D.1 – Hazard Symbols and Classes

Flame  Flammables Self Reactives Pyrophorics Self-heating Emits Flammable Gas Organic Peroxides	Flame Over Circle  Oxidizers	Exclamation Mark  Irritant Dermal Sensitizer Acute Toxicity (harmful) Narcotic Effects Respiratory Tract Irritation	Exploding Bomb  Explosives Self Reactives Organic Peroxides
Corrosion  Corrosives	Gas Cylinder  Gases Under Pressure	Health Hazard  Carcinogen Respiratory Sensitizer Reproductive Toxicity Target Organ Toxicity Mutagenicity Aspiration Toxicity	Skull and Crossbones  Acute Toxicity (severe)

Figure D.2 – Exclamation Mark Pictogram



Where a pictogram required by the Department of Transportation under Title 49 of the Code of Federal Regulations appears on a shipped container, the pictogram specified in C.4 for the same hazard shall not appear.

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General Safe Work Practices

1. All employees, contractors and others on site should read and follow applicable labels and SDSs and be familiar with the labeling systems used by the energy center.
2. Employees shall be informed when a new hazardous material is introduced.
3. Refer to the Safety tab on Scholar home page for HAZCOM COMPLIANCE MANUAL.
4. If you find an SDS in the package for a new product, give it to your supervisor or site administrator.
5. Replace any missing, defaced or covered label.
6. When transferring chemicals to another container, affix a completed 2" (stock #16-04-470) or 4" (stock #16-04-417) NFPA label. If chemicals are to be used within the shift, labeling is not required.
7. Employees concerned about a material for which an SDS is not available should contact their supervisor.

REFERENCES:

- OSHA-29 CFR1910.1200, Hazard Communication
- ES-REG-208, Hazard Communication Program
- AUE-ADM-2416, Hazard Communication
- Emergency Action Sheet-08, Chemical Response Procedure
- Safety 1 Source SDS Catalog

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Hazardous Atmospheres

Hazardous atmospheres are defined as any atmosphere which can result in temporary or long term health problems, injury, death or explosion. This may include flammable gases or vapors, combustible dusts (coal), nuisance dusts (coal, ash), inert or oxygen displacing gases (nitrogen, CO₂), low (<19.5 %) or high (>23.5%) oxygen or toxic gases such as hydrogen sulfide, CO, SO₂ or SO₃.

Any material which has a permissible exposure limit (PEL) listed in the SDS would be considered a hazardous atmosphere at or above that PEL. Oxygen depleted conditions, or high CO, CO₂ or hydrogen sulfide levels, can be the result of combustion, engine exhaust, welding or biological activity. All oxygen deficient atmospheres are IDLH and will require SCBAs or an airline respirator with an escape bottle.

Hazardous atmospheres are of particular concern with regard to confined spaces or any areas with poor ventilation. Because toxic gases and other hazardous atmospheres are often more or less dense than air, these gases can accumulate in low or high areas in concentration and can be harmful or deadly.

Hazardous atmospheres should be eliminated through ventilation and engineering methods whenever possible. Appropriate PPE should be utilized if engineering controls have proved inadequate. Air purifying respirators with P-100 filters (for particulates) or chemical cartridges (for some acids and gases) may be required in areas that have sufficient oxygen. If a higher level of respiratory protection is needed due to toxic exposures or insufficient oxygen, SCBAs shall be used, but only by those trained and qualified in their use.

General Safe Work Practices

1. All confined spaces shall be monitored for oxygen, explosive concentrations and toxic gases.
2. Air monitoring may be required in excavations where hazardous atmospheres can be reasonably anticipated.
3. Always sample and ventilate all levels of a work area. Assure air at the breathing level is checked, as well as that near ignition sources which might cause an explosion.

REFERENCES:

- OSHA-29 CFR1910.94, *Ventilation*
- 29 CFR1910, *Subpart H – Hazardous Materials*
- 29 CFR1910, *Subpart I – Personal Protective Equipment*
- 29 CFR1910, *Subpart Z – Toxic & Hazardous Substances*

Hazardous Waste

Hazardous waste is any waste that is ignitable, corrosive, reactive, toxic or is listed as a hazardous waste in state or federal regulations. If hazardous wastes are not handled and disposed of properly, they may pose an immediate safety hazard and a longer term threat to human health and the environment. Designated accumulation areas at the plant may have drums or other containers for collecting and storing waste with hazardous properties. Containers for collecting hazardous waste must be made of material that is compatible with the chemical waste. Collection containers must be labeled and kept closed when not adding waste so that the risk of an employee being exposed to the hazard is minimized.

Ignitable hazardous wastes have a flash point less than 140 degrees Fahrenheit. Examples of potentially ignitable hazardous wastes at Ameren energy centers include waste gasoline, diesel fuel, fuel oil, oil-based paints, solvents, propellants, and the contents of some aerosol cans. Sources of ignition in the designated accumulation and storage areas must be prevented or controlled. Drums for collecting waste solvent must be equipped with static grounding wires, a funnel and ball valve assembly, and the valve handle must be in the fully closed position except when waste is being added to the drum. Labeling on the waste drum, such as the words "Waste Solvent", the Hazardous Waste label, and the DOT hazard class label are reminders of the hazards.



Corrosive hazardous wastes are wastes with a pH less than 2.0 or greater than 12.5. Examples of potentially corrosive hazardous wastes at Ameren energy centers include waste products of sulfuric acid, hydrochloric acid, sodium hydroxide, ammonium hydroxide and damaged lead acid batteries. Drums of waste corrosive material must be labeled as a hazardous waste and have the DOT "Corrosive" class 8 label.



Reactive hazardous wastes are wastes that are unstable and readily undergo violent changes or react violently when mixed with water or other chemicals. An example of reactive hazardous waste is concentrated sulfuric acid. Drums of reactive waste must be labeled as a hazardous waste and have a DOT label indicating the appropriate hazard class for the respective waste material.



Toxic hazardous wastes are wastes that can potentially leach toxic constituents and are harmful or fatal to humans when ingested or absorbed by tissue. Examples of toxic wastes include toxic metals such as arsenic, cadmium, chromium, iron, lead, mercury, nickel or silver. Other toxic materials may include herbicides, pesticides, volatile organic compounds like benzene, and semi-volatile organic compounds like some cleaning agents. Lead based paint chips, abrasive-blasting waste, waste mercury, and boiler chemical cleaning wastes are potentially toxic hazardous wastes generated at Ameren energy centers. Drums of waste toxic material must be labeled as a hazardous waste and have the DOT "Toxic" or "Poison" class 6 label.



Listed hazardous wastes are wastes from manufacturing, industrial, and commercial processes with constituents that the EPA has determined to be hazardous based on testing. Listed hazardous wastes are not typical at Ameren energy centers but may be generated during special projects. Containers of listed hazardous wastes must display the yellow-red hazardous waste label. Employees can find additional information on the Environmental Services SharePoint site located on Scholar. This website includes waste management instructions to ensure employee safety, and contact information for solid waste management at Ameren energy centers.

Universal wastes are specific objects with low levels of hazardous components that can be easily managed as in a recycling process. Universal wastes found in the Ameren energy centers include lamps, nickel-cadmium and lithium batteries, sealed and properly packaged lead acid batteries, and sealed mercury-containing articles (thermometers, switches and manometers). To minimize the risk of an employee being exposed to the hazardous components in universal wastes collected for recycling, the collection containers must be

1. Suitable for collecting the waste
2. Clearly labeled to identify contents and avoid mixing wastes
3. Kept closed except when adding waste

Fluorescent Lamps without green labeling or end caps may contain Mercury. The unbroken lamps should be accumulated in a fiber drum that is labeled "Universal Waste – Mercury Containing Lamps" to minimize the risk to employees. Waste fluorescent lamps must be carefully handled and packaged to avoid breakage. The container must be handled with care. Broken lamps must be treated as a toxic hazardous waste. Employees can be exposed to harmful Mercury vapor from a broken lamp. If exposed to Mercury, an employee should seek immediate medical attention from the facility nurse or Safety Supervisor. Additional information on managing waste lamps can be found in the *Waste Handling and Disposal Handbook* accessible through a link in the Safety section of your facility's SharePoint site.

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Street and Incandescent Lamps, including sodium vapor, mercury vapor and metal halide lamps, may contain toxic substances. The unbroken lamps should be accumulated and shipped in a plastic or plastic-lined container and labeled “Universal Waste – Mercury Containing Lamps” to minimize the risk to employees. Broken lamps must be treated as a toxic hazardous waste. Employees exposed to toxic substances from a broken lamp should notify the facility nurse or Safety Supervisor immediately for evaluation.

Nickel-Cadmium and Lithium Batteries contain corrosive and toxic chemicals and may have a residual electric charge. These properties may present a safety hazard if the waste battery isn't managed properly. Lithium batteries in particular have been known to spontaneously catch fire under certain conditions.

Undamaged Ni-Cad batteries are typically accumulated and shipped for recycling in DOT approved shipping containers and labeled “Universal Waste – Batteries.”

Undamaged Lithium Batteries may be managed in the same way as Ni-Cad batteries, with one exception. The electrical contacts of lithium batteries must be covered with electrical tape in order to prevent **fire hazards** from occurring during accumulation and shipping.

Damaged or leaking batteries should be containerized and labeled as "damaged batteries" preferably in a double plastic bag appropriate for their size and weight. The containerized damaged battery should be treated as a corrosive hazardous waste. Do not mix the damaged battery with the container of intact batteries since the entire container will be contaminated with corrosive waste.

Lead-Acid Batteries contain corrosive and toxic chemicals and may have a residual electric charge. L-A Batteries may be managed as universal wastes if they are not damaged and are shipped properly. If the battery isn't completely drained of its charge, the battery terminals should be covered to minimize the electrical hazard. Sealed, undamaged, lead-acid batteries must be secured in a manner that prevents short circuits and spills in order to be managed / shipped as universal waste.

Mercury Contained in Manufactured Articles includes sealed mercury ampules, switches, thermometers and manometers. Unbroken articles present minimal risk to employee safety as long as they are handled carefully, accumulated in a DOT-approved shipping container, and labeled as “Universal Waste – Mercury Switches,” or “Universal Waste – Mercury Manometers.” Broken articles must be treated as a toxic hazardous waste. Employees can be exposed to elemental Mercury and Mercury vapor from a broken article. If exposed to Mercury, an employee should seek immediate medical attention from the facility nurse or Safety Supervisor. Additional information on managing waste articles containing Mercury can be found in the *Waste Handling and Disposal*.

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- OSHA-29 CFR1910.119, *Process Safety Management of Highly Hazardous Chemicals*
- AUE-ADM-2418, *Industrial Safety Program*
- *Emergency Action Sheet-08, Chemical Emergency Response*
- *Energy Center Spill Guides*
- Guidance for disposal of hazardous and other regulated wastes can be found on the Environmental Services SharePoint Site (*See the Power Operations Safety Website for link*)
- *Refer to the Waste Handling and Disposal Handbook*

Hexavalent Chromium

Chromium is used in such widely diversified products as corrosion-resistant materials, pigments, coatings, metal plating, and chemicals. Hexavalent chromium (CrVI) is generally created by heating chromium containing products. CrVI also occurs as a by-product of welding or cutting operations on stainless steel, high strength steel, aluminum alloys or chromated components. In addition, a portion of trivalent chromium (CrIII) used in refractory bricks can convert to CrVI during normal furnace operations. Occupational exposure to CrVI has been associated with skin and respiratory problems.

General Safe Work Practices

1. Utilize ventilation methods to reduce airborne chromium levels as low as practicable.
2. Green barricade tape shall be used to warn personnel of possible exposure to hexavalent chromium. Respiratory protection is required in these areas. Contractors are responsible for compliance with the OSHA Regulation on Hexavalent Chromium. "Regulated Areas" should be clearly demarcated with Green barricade tape with a caution tag that clearly states the hazard in the work area, (e.g., "Hex Chrome Exposure – Respiratory Protection Required"). In general, regulated areas should be established a minimum distance from the activity as described below;
 - a. 5 Feet – Welding on boiler tubes, steam piping and other materials that contain 2.5% chromium or less.
 - b. 10 Feet – Welding on Stainless steel and other materials that contain more than 2.5% chromium.
 - c. 20 Feet and/or Visible plume – Plasma arc cutting, air arc cutting, chamfer-trodes, cut-trodes and other processes lacking sufficient air monitoring data by Ameren for the protection of our employees.
3. Wear the appropriate PPE when cutting, welding or grinding.
 - a. Most jobs fall within the range of respiratory protection afforded by the half-face air purifying respirator (APR) with P-100 (HEPA) filters. Exposures anticipated or proven to be above ten times the PEL will require respirator equipment with a higher protection factor.

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- b. Respiratory protection may range from air purifying respirators to powered air purifier (PAPR), airline or self-contained breathing apparatus (SCBA).

NOTE: Employees required to wear respirators shall be trained in their use, medically approved and fit tested both initially and annually on each type and brand of respirator they wear. Facial hair shall not interfere with the face-to-respirator seal.

4. Use proper hygiene practices and wash hands after exiting work areas requiring respiratory protection.
5. For additional information, refer to “Respiratory Protection” in the “Personal Protective Equipment” section of this handbook.

REFERENCES:

- OSHA-29 CFR1910.1000, Air Contaminates
- OSHA-29 CFR1926.55, Gases, Vapors, Fumes, Dusts & Mists
- ES-REG-216 Hexavalent Chromium
- Corporate Safety Guideline Hexavalent Chromium Information
- “Personal Protective Equipment – Respiratory Protection ” Section in this handbook

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High Pressure Water Jetting

When using high pressure water for maintenance and cleaning activities, there are hazards that should be recognized before you start.

Operating Precautions

- Always wear a *full face shield* when using a high-pressure washer.
- Never point the high-pressure spray wand at another person.
- High-pressure washers develop pressures from 1,000 to 4,000 psi at the spray-wand nozzle. At these pressures, washer fluids could be inadvertently injected into the skin.
- Keep hands and feet away from the spray-wand nozzle.
- Be aware of the work environment and keep high-pressure spray away from electric wiring, receptacles, or junction boxes.
- High-pressure washer detergents can be caustic. Avoid contact with the eyes or skin.
- Never repair a damaged high-pressure hose. Always replace it.
- Do not try to wash your face shield or any part of your body with the high pressure wand. Many of these wands to DO NOT FEATHER when you squeeze the trigger gently, many will yield full pressure immediately and lacerate your body parts.
- You may be working with a contractor to excavate. If there is any question as to the **safe operation** of the equipment, contact **your supervisor**.

Hot Work

If an employee is going to be welding, flame cutting, brazing or soldering outside a designated safe welding and cutting area, a Hot Work Permit must be issued. The designated authority will check the area and either issue a permit or have the area cleaned before a permit will be issued. With the exception of designated Hot Work areas, a fire watch shall be present while the work is in progress and for 60 minutes after the job is completed or interrupted (breaks, lunch, etc.).

General Safe Work Practices

1. Always obtain approval of the supervisor before starting Hot Work.
2. Wear a hard hat, safety glasses, a welding hood and other appropriate PPE when welding. Any variance to wearing a hard hat must be approved by the supervisor, per Notes section under Personal Protective Equipment - Head Protection of this Handbook.
3. Only perform Hot Work activity after a Hot Work checklist has been completed.
4. Relocate all combustibles at least 35 feet from the work area. Where relocation is impractical, combustibles shall be protected with flame-proof guards or curtains. Edges of curtains at the floor should be sufficient to prevent sparks from going under them.
5. Do not take combustible materials into an area designated as a safe Hot Work location, unless the combustible is shielded from the activity.

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6. Ducts that might carry sparks to combustibles shall be protected or shut down.
7. Precautions shall be taken to prevent materials separated by a wall, ceiling, partition or roof from igniting due to conduction or radiation.
8. On-going Hot Work activities may continue under the original checklist, only if conditions have not changed. If conditions have changed, a new Hot Work checklist shall be completed.
9. When practical, move the Hot Work activity to a safe Hot Work area, and complete the authorized Hot Work. If the Hot Work cannot be readily moved, a Hot Work Checklist will be required.
10. Where it is not practical to move the Hot Work activity or combustible material, a suitable barrier should be provided around the work area. A fire watch shall be posted to ensure that sparks or hot slag do not come in contact with combustible material.
11. An appropriate portable fire extinguisher shall be available at the Hot Work site and the fire watch shall be trained in its use.
12. Fire extinguishers used for Hot Work areas should be returned to their storage location unless discharged. Discharged fire extinguishers shall be removed from service and recharged.
13. If sparks or hot slag falls on combustible material or personnel, stop the work and modify barriers to retain the sparks and hot slag.
14. When a fire watch is necessary during Hot Work activities, it should continue for 60 minutes following the operation.
15. Check with Supervision if you have any doubts regarding the status of safe Hot Work areas.

REFERENCES:

- OSHA-29 CFR1910, Subpart Q - Welding, Cutting & Brazing
- AUE-ADM-2413, Control of Ignition Sources (Hot Works)

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Housekeeping

Good housekeeping is a necessary requirement for maintaining a safe work environment. Benefits of good housekeeping include the prevention of injuries and fires, and an overall improved safety culture. Because housekeeping is essential to maintain a clean and orderly work place, it is everyone's responsibility.

General Safe Work Practices

1. Routine inspection for elimination of walking and working surfaces hazards.
2. Store materials properly during and after the job.
3. Remove unnecessary equipment when finished and clean up all spills resulting from the job.
4. Place tools and materials in a manner to avoid tripping hazards. Ensure walking and working surfaces such as aisles and stairs are clear of tripping and slipping hazards.
5. Ensure stacked objects are not protruding or overhanging in aisle ways.
6. Hang hoses up or place them where they will not be walked into or tripped over. String hose lines so as not to obstruct paths, stairways, roads or railroad tracks. If this cannot be done, use the appropriate barrier tape and tags to prevent injury or accident.
7. Dispose of chemicals properly to reduce the possibility of other employees being exposed to the chemical hazard. Refer to site-specific waste management guidelines and spill guides.
8. Dispose of cigarette butts, welding rods, waste paper, cups, metal chips and similar trash in approved containers.
9. Remove all ladders, scaffolding and related equipment when finished. Place these items in proper storage areas.
10. Remove protruding nails from boards or flatten the nails.
11. Housekeeping practices should minimize or prevent airborne dust such as asbestos, bird droppings, coal dust and Legionella.
12. Do not block emergency equipment such as exits, eye wash stations, firefighting equipment, etc.

Fire Prevention

1. Clean coal dust and spills as soon as possible from the work area.

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2. Clean oil from floors promptly. Ensure oily rags, scrap material, etc. are properly discarded.
3. The use of compressed air of no more than 30 psi to blow coal dust from motors, filters, breaker cubicles and other limited areas shall only be permitted when all machinery that presents an ignition source in the area is shut down. All other known potential ignition sources in the area must be removed or controlled. This includes hot surfaces with temperatures over 300 degrees Fahrenheit.
4. Do not crowd material storage arrangements. This can affect the spread of fires and can prevent firefighting spray from reaching the fire.
5. Do not block fire lanes, fire extinguishers or fire stations that aid in firefighting response. Ensure exits are not obstructed.

REFERENCES:

- OSHA-29 CFR1910, Subpart D – Walking & Working Surfaces
- OSHA-29 CFR1910.22, General Requirements of Walking & Working Surfaces
- OSHA-29 CFR1926.302, Electric Utilization Systems
- OSHA-29 CFR1910.333, Selection & Use of Electrical Work Practices
- OSHA-29 CFR1910.269, Electric Power Generation, Transmission & Distribution
- AUE-ADM-2417, Housekeeping
- “Fire Prevention / Fire Protection” section of this handbook

Industrial Vacuuming

General Safe Work Practices

1. A Job Safety Briefing must be performed prior to performing the job including the potential for severe injury. Job site must be analyzed for hazards. See checklist located within references below.
2. Any individual participating in the job of utilizing high suction vacuums must receive equipment operational training prior to performing work.
3. Inspect equipment prior to operation to assure safe operation.
4. Monitor tank level indicators to avoid overfilling and over pressurizing receiving tanks or creating excessive vacuum in supply tanks.
5. Run vacuum hoses out of walking and working areas if possible to avoid tripping on hoses and to avoid injuries due to movement of the hoses (can jump if there is a blockage).

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6. Wear hearing protection. Noise levels can be very high around this equipment.

Potential Hazards

Personnel operating high suction vacuums must be aware of the numerous potential hazards associated with vacuuming operations in a power plant setting, including but not limited to:

1. Sources of ignition
2. Flammable atmospheres
3. Potential hazards associated with the surrounding area
4. Slips, trips, and falls
5. Spills and releases
6. Fires and explosions
7. Suction at the end of the hose
8. Inadvertent movement of hoses walking or working areas
9. Noise
10. Body position and ergonomics when handling the hoses
11. Working in confined spaces

Grounding

Grounding is important for any high suction vacuum equipment when in use. Always ground high suction vacuums. Prior to starting high suction vacuums need to be grounded directly to the earth or bonded to another object that is inherently grounded (due to proper contact with the earth). A safe and proper ground to earth may be achieved by connecting to any properly grounded object including but not limited to any one or more of the following examples: a metal frame of a building, tank, or equipment that is grounded.

Manual Handling of Hoses Vacuum Breaks (Safety Tee)

1. Vacuum breaks are mandatory when using any type of high suction vacuuming equipment.
2. A vacuum break "Safety Tee" is the mechanical device placed in the hose near the suction end that breaks the suction of the hose.
3. The larger the diameter of the hose, the bigger the force you have. If a larger diameter hose should get stuck to your body it could be fatal.
4. Placement of in line vacuum breaks should be located as close as possible to the working end of the vacuum hose whenever the hose is manipulated by hand.

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5. Prior to job being performed vacuum break must be installed and tested for proper operation.
6. While work is being performed the person manning the vacuum break must have the rope in hand at all times.
7. Emergency Shutoff - Prior to starting job, locate where the emergency shutoff is on the vacuum.
8. Test and verify proper operation.

Vacuum Relief Valve

1. Prior to starting job locate where the vacuum relief valve is on the equipment.
2. Test for proper operation by pressing end of hose against flat surface and verify valve is opening.

Communications

1. If for any reason direct line of sight cannot be maintained radios must be used to increase the ability for communications.

Ergonomics and body position

1. Get help to move hoses and equipment.
2. Use a mechanical means, for example a broom stick, to handle hose. Allow for a 4 inch gap between the ground and the hose when attaching the mechanical means to the hose.
3. Individuals cannot have body parts in direct contact with either a hose or a nozzle if used.
4. When operating the hose stand to one side of the hose.
5. Rotate workers between jobs that have different muscle group requirements.
 - * Optional- The use of a nozzle can be used where applicable.
 - * Optional-The use of a screen on the end of the hose can be used where applicable.

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Ladder Safety

There are many different ladders used in the power plant setting. Some of the most common types are step ladders, fixed ladders and straight or extension ladders. The hazards associated with using ladders include falls, slips / trips, falling objects, pinch points, electrical shock and back injuries while moving and placing the ladder. To complete work tasks safely, both proper ladder use and selection are required.

General Safe Work Practices

1. Choose the Proper Ladder.
 - a. Use the correct ladder type, length and capacity for the job.
 - b. Only use step ladders when the spreaders are fully locked. Never use step ladders as straight ladders unless it is designed to do so.
 - c. When working on, with or around an electrical power source, proper precaution must be taken to avoid electrical shock.
 - d. Never use metal ladders around electrical energy sources.
2. Check the Condition of the Ladder.
 - a. Prior to use, inspect the ladder for split or cracked side rails; missing, broken or loose rungs; structural defects; splinters or sharp edges.
 - b. All rungs and steps should be free of oil, grease, etc.
 - c. Defective ladders shall be removed from service and tagged, "Danger – Do Not Use."
3. Carefully Place the Ladder.
 - a. Ladders shall have safety feet and be placed on firm footing capable of supporting the load. Never place ladders on boxes or similar items to obtain additional height.
 - b. Straight / extension ladders shall be set out one foot at the base of the ladder for every four feet of ladder height.
 - c. Secure a straight / extension ladder prior to use. The ladder should be secured at the bottom and at the top, when possible.
 - d. The top of a straight / extension ladder shall extend at least 3 feet above the uppermost support when dismounting. In addition, no more than $\frac{1}{4}$ of the ladder shall extend above the point of dismounting.
 - e. Ladders shall not be placed in front of doors opening toward the ladder, unless the doors are blocked open, locked or guarded.

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4. Climb the Ladder Carefully.

- a. Always face the ladder and maintain three points of contact when going up or down.
- b. Don't carry tools or materials while ascending or descending a ladder. Instead, raise them with a hand line.
- c. Never stand on the top two steps or rungs of a ladder, unless specifically designed for that use.
- d. Don't allow more than one person on a ladder at a time, unless the ladder is designed for more than one person (i.e. trestle ladder).
- e. When climbing fixed ladders equipped with a safety climbing device, employees shall wear a safety harness attached to the safety rail. Examples include the ladders on water tanks, water towers, etc.

5. Use the Belt Buckle Rule.

- a. Keep your belt buckle within the ladder rails. Never overreach! Instead, take an extra few minutes to move the ladder and properly reposition it.
- b. Don't lean to the side when you're on a ladder. The ladder's center of gravity will shift, making it likely to tip over.
- c. All ladder adjustments shall be made from the ground.

REFERENCES:

- OSHA-29 CFR1910.25, *Portable Wood Ladders*
- OSHA-29 CFR1910.26, *Portable Metal Ladders*
- OSHA-29 CFR1910.27, *Fixed Ladders*
- OSHA-29 CFR1910.269(h)(3), *Ladders, Platforms, Step Bolts & Manhole Steps*
- OSHA-29 CFR1910.333, *Selection & Use of Electrical Work Practices*
- AUE-ADM-2418, *Industrial Safety Program*

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Lasers

Lasers are capable of causing significant eye damage and body burns. Therefore, do not view the direct beam of lasers or laser light reflected from mirrors, etc. Permanent eye damage may result if the proper eye protection is not worn.

Lasers have found many applications in the engineering and industrial fields. In the energy center, lasers have been associated with alignment, heat sensors and field measurements. The laser beams currently used in power plants are either Class I or Class II:

Class I

Under normal operating conditions, this type of laser cannot emit a hazardous level of optical radiation

Class II

This is a low power laser device that does not have enough output power to injure a person accidentally, but may produce retinal injury when stared at for a long period. "Caution" labels must be affixed to this kind of laser.

General Safe Work Practices

1. Never point lasers at people.
2. Never look into a laser beam.
3. Know the class of laser you are working with and follow instructions for proper use.

REFERENCE:

- *OSHA-29 CFR1926.102, Eye & Face Protection*
- *NFPA 70E, Article 330, Safety-Related Work Practices for Use of Lasers*

Lead

It is necessary that everyone working in energy centers be aware of the hazards of working with or around lead-containing materials, as well as the effects of lead exposure. Employees must also be aware of the personal protective equipment necessary to limit exposure, so it is less than the Permissible Exposure Limit. (PEL= meter of air (50 ug/m(3)) averaged over an 8-hour period).

At Ameren, potential worker exposure to lead may occur during repair and maintenance activities involving welding, soldering, grinding, brazing, lead packing, cutting lead-bearing or lead-coated materials and working with lead-containing paints. All painted surfaces, including primer, should be treated as lead-based paint unless verified to be lead free. Appropriate training and authorization are required when grinding, welding, etc. on painted surfaces.

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1. Minimize the production of airborne lead particulates by using HEPA ventilation methods, containment or equipment with HEPA exhaust systems.
2. Contain all waste. This can be done by vacuuming lead with a HEPA vacuum.
3. Do not sweep or shovel lead. This promotes airborne particulates.
4. Do not use compressed air to clean clothing or equipment.
5. All painted surfaces, including primer, should be treated as lead-based paint unless verified to be lead free.
6. Do not use a grinder to remove paint. Instead, use a “peel away” paint remover (stock # 30-55-092) or formal lead abatement procedures.
7. Wear proper PPE when cutting, welding or performing other work with lead. Clothing and equipment may consist of:
 - a. Coveralls (or similar full-body work clothing)
 - b. Gloves
 - c. Head covering
 - d. Foot covering (disposable) boots.
8. Most jobs, excluding abrasive-blasting of lead containing materials, fall within the range of respiratory protection afforded by a half-face negative pressure respirator with HEPA type filters.
9. Exposures anticipated or proven to be above ten times the PEL will require respirator equipment with a higher protection factor. In these instances, respiratory protection may range from a negative pressure air purifying respirator to a powered air purifier, airline or self-contained breathing apparatus (SCBA).
10. NOTE: Employees required to wear respirators shall be trained in their use, medically approved to wear them and fit tested annually on each type of respirator they wear. Facial hair shall not interfere with the face-to-respirator seal.
11. To avoid ingestion of lead, always wash hands before eating, chewing gum, smoking cigarettes or using smokeless tobacco.

REFERENCES:

- OSHA-29 CFR1910.1025, Lead
- ES-REG-211, Lead
- AUE-ADM-2418, Industrial Safety Program

Lock Out / Tag Out / WPA

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Whether it is called Lock Out / Tag Out (LO / TO), Hold Card, Clearance & Tagging or Worker's Protection Assurance (WPA), all of these are methods used in industry to provide for the safety of personnel while working on equipment. Personnel safety is accomplished through equipment isolation and tagging procedures. WPA, is a contract between the Functional Authority and the holder. It is only in effect when it is "signed on" by all of the appropriate parties.

Any time new equipment is connected to the system, WPA is required. Likewise, WPA is required to isolate a piece of equipment or system from energy sources so work on or inside the existing equipment can be safely performed. To ensure the requested equipment cannot be energized, it is placed in a safe condition (unless specifically requested otherwise). This means that energy isolation devices that present a hazard to the employee are tagged. Depending on the type of WPA requested, all energy sources may or may not be isolated. Refer to your plant-specific guidelines.

Special Precaution

1. WPA does NOT replace safe work practices, nor does it relieve the employee of the responsibility for determining that safe work conditions exist.

General Safe Work Practices

1. All new employees shall be trained in their location's WPA program.
2. WPA is a shared responsibility.
 - a. Because tags can evoke a false sense of security, employees must check and understand their WPA and realize the importance of adhering to the program.
 - b. If you have any questions about your WPA, contact the appropriate plant authority.
Never assume you know the answer!
3. Each employee performing work on the equipment shall sign on the protection.
4. Prior to working on the equipment or system, employees shall verify the tags and the boundary record match. This includes checking the required position of each tagged isolation device listed on the boundary record.

NOTE: The term Tags Plus is an additional safety measure to protect all workers when tagging out isolation devices. This means the tag is installed plus physical restraints are placed on energy isolation devices to prevent accidental or inadvertent energization of the device.

5. Only operate equipment, breakers and valves you are authorized to operate.
6. Be aware of limitations and ramifications when performing work under WPA.
7. All sources of energy (electrical, pneumatic, chemical, thermal and residual) shall be controlled prior to working on the equipment or system, unless requested otherwise.

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8. Violation of the tagging procedure could result in the injury / death of an employee and destruction of equipment.
9. Control shall be maintained until all affected employees are clear of the machine or equipment being worked on.
10. Promptly report any loose or illegible tags.

REFERENCES:

- OSHA-29 CFR1910.147, *Control of Hazardous Energy (Lock Out / Tag Out)*
- OSHA-29 CFR1910.269(d), *Hazardous Energy Control (Lock Out / Tag Out) Procedures*
- *WPA Implementation Manual*

Material Handling & Storage

Handling and storage of materials involves diverse operations, such as hoisting with a crane, driving a fork truck or other motor-operated vehicle and manually carrying and stacking of materials or equipment. Improper handling or storage of materials can cause serious injuries. In addition, co-workers can be injured by falling objects or improperly stacked materials.

General Safe Work Practices

1. Proper hand protection shall be worn when handling chemicals or special materials.
2. Approved work gloves shall be used when handling wire, wire rope, glass, porcelain and other materials with sharp or rough edges.
3. Use approved ladders, stairs, personnel lifts or fork trucks to retrieve materials from overhead storage.
4. When packing or unpacking materials, remove any protruding nails and staples. Likewise, take adequate precautions when handling wire and banding material.
5. Chemical spills shall be cleaned immediately and in accordance with company procedures.
6. Do not store incompatible materials together (i.e., acids and caustics).

Lifting

1. Use mechanical means, if possible.
2. Keep the load as small as practical.
3. Get help for larger loads when needed.

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4. Keep the load close to your body.
5. Always lift with your legs.
6. Avoid twisting as you lift.
7. Bend at the knees, not with your back.
8. Maintain optimal work position (below the shoulders and above the waist) whenever possible.

Repetitive motions

1. Whenever possible, maintain optimal work position (below the shoulders and above the waist).
2. Turn your whole body instead of twisting.
3. Change positions frequently.
4. Incorporate frequent breaks as needed.
5. Rotate personnel who perform repetitive tasks, when possible.

REFERENCES:

- *OSHA-29 CFR1910, Subpart I – Personal Protective Equipment*
- *OSHA-29 CFR1910.176, Handling Materials*
- *OSHA-29 CFR1910.1200, Hazard Communication*
- *“Chemical Hazards – Spills & Releases” section of this handbook*
- *“Ergonomics” section of this handbook*
- *“Fork Trucks” section of this handbook*
- *“Ladder Safety” section of this handbook*
- *“Rigging & Hoisting” section of this handbook*

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Ameren Commercial Motor Vehicle Driver Policy

Motor vehicle accidents are the number one contributor of fatalities in the workplace. To prevent motor vehicle accidents, injuries and fatalities, strict adherence to the following requirements is required.

General Safe Work Practices

1. When riding in or operating a vehicle:
 - a. Perform a pre use inspection of the vehicle being used.
 - b. Wear the seat belt.
 - c. Sit in seats designed and approved for passenger use, unless the vehicle is designed to be driven standing up.
2. No passengers are permitted to ride on running boards, fenders or any part of any motorized vehicle, except on seats or inside the vehicle. Passengers may not stand in moving vehicles.
3. When refueling, turn the vehicle ignition off. Do not smoke in the immediate area of the vehicle.
4. When possible, position the vehicle to eliminate the need to back up.
5. Check brakes prior to using the vehicle. Report any problems to your supervisor.
6. Do not use any vehicle that presents an injury hazard or is unsafe to operate.
7. Do not operate a motor vehicle inside buildings, unless adequate ventilation is provided. If ventilation is in question, contact the Safety Supervisor / Coordinator for assistance.
8. Make sure all loads are contained within the sides of the truck bed, are strapped down or are otherwise secured. This prevents the load from slipping off the truck.
9. Do not operate the motor vehicle when the rear view is obstructed or when any employee is exposed to hazards created by the moving vehicle. Operating in this fashion is only allowed if:
 - a. The vehicle has a reverse signal alarm that is audible above the surrounding noise level, or
 - b. The vehicle is backed up when a designated employee signals that it is safe to do so.
10. No employee shall service any rim wheel (split / multi-piece or large single piece) unless the employee has been trained and instructed in the correct and safe operating procedures of servicing that type of wheel.(See Safety Guideline "MM-Multi-Piece/Large Single Piece Rim Wheel Safety"

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11. A red flag shall be placed on material that extends more than 4 feet past the vehicle rear or more than 12 inches over the sides of a vehicle.
12. Vehicles operating in areas or under conditions that cause fogging or frosting shall be equipped with defrosting or defogging devices.
13. Unauthorized persons shall not be permitted to ride in Company vehicles.
14. No passengers are allowed in the beds of trucks, carts or trailers.
15. Trucks shall not be operated with tailgates hanging loose or with tool compartment doors open.
16. Vehicles shall not be parked closer than 8 feet to any railroad track.
17. When loading or unloading, wheels shall be chocked or the vehicle shall be placed in PARK and / or the brakes shall be set.
18. Employees shall not board or get off of a moving vehicle.
19. Do not operate vehicles immediately next to manholes/vaults, open digs or trenches.
20. Limit use of hand held electronic devices, avoid distractions and stay focused to address potential hazards.

Licensed Vehicles

1. Ameren commercial motor vehicles (with a gross vehicle weight of 10,000 lbs.) shall be driven in compliance with the Ameren Commercial Motor Vehicle Driver Policy.
2. Do not operate a motor vehicle on public roadways without authorization and a valid driver's license for the vehicle.
3. The lights and horn must be operational for use on public roadways.
4. Obey all traffic laws and speed limits when operating a company vehicle on public roadways.
5. Whenever visibility conditions warrant, both headlights and tail lights must be turned on when vehicles are used on public roadways.
6. Before using a vehicle on a public roadway, check that all lights are working. Do not use vehicle on a public road if headlights, tail lights, brake lights, turn signals, etc. are not working.
7. Slow moving vehicles must be equipped with a slow moving sign.

Accidents

1. When involved in an accident, drivers of a company vehicle shall always stop and give their name, address, the company's name and the location's address.

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2. Company vehicle drivers shall secure the names, addresses and license numbers of others involved in the accident, as well as the names of all available witnesses or others who may have knowledge of the accident.
3. Drivers or other employees shall not determine or admit liability of the company when an accident occurs.
4. All vehicle accidents shall be reported immediately to your supervisor so the Human Resources Department can be contacted.

Plant Vehicles

When riding in or operating a vehicle:

1. These rules apply to the operation of any motorized vehicle including ATV's Gators, electric carts, tractors and mini trucks.
 - a. All occupants shall wear seat belts (if so equipped) whenever vehicle is in motion.
 - b. DOT approved helmets are to be worn while driving or riding on an ATV.
 - c. Sit only in seats designed and approved for passenger use, unless the vehicle is designed to be driven standing up.
 - d. Arms and legs should be kept inside the cab or within the vehicle when vehicle is in motion.
 - e. Roll bars or cages are not to be removed or altered and collapsible roll bars are to be extended and locked when vehicle is being operated.
 - f. Maximum speed limit for all plant vehicles is 15 mph.
2. No passengers are permitted to ride on running boards, fenders or any part of any motorized vehicle, except on seats or inside the vehicle. Passengers may not stand in moving vehicles.
3. When refueling, turn the vehicle ignition off. Do not smoke in the immediate area of the vehicle.
4. When possible, position the vehicle to eliminate the need to back up.
5. Check brakes prior to using the vehicle. Report any problems to your supervisor.
6. Do not use any vehicle that presents an injury hazard or is unsafe to operate.
7. Do not operate a motor vehicle inside buildings, unless adequate ventilation is provided. If ventilation is in question, contact the Safety Supervisor / Coordinator for assistance.
8. Make sure all loads are contained within the sides of the truck bed, are strapped down or are otherwise secured. This prevents the load from slipping off the truck.

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9. Co-workers must follow the manufacturers safe operations and maintenance guidance. Ensure Cushman vehicles are operated within the design capacity of the vehicle and co-workers are trained on the safe operation.
10. Proper speed limits while operating a Cushman electric cart must be followed. While operating a cart within the energy centers provides several hazards that require reduced speed. Some of these hazards include sharp turns, narrow pathways, noisy areas, reduced lighting, and co-worker foot traffic.
11. Cushman vehicles that provide passenger seating must follow the following:
 - a. Passengers must always keep their hands and feet within the handrails and guards while the vehicle is moving. Passengers in a rear facing seat must use particular care since they cannot see the upcoming path of the vehicle approaching hazards. Rear facing passengers must always hold on to the safety handles and keep their feet firmly placed upon the vehicle's floorboard.
 - b. At no time, is the passenger allowed to pull any cart or equipment while riding on the back of a cart. Additionally, no co-worker will be allowed to ride on the back of a cart while towing a piece of equipment or cart.
 - c. The driver must be aware that a passenger is being transported and ensure they are following safe operating practices while driving.
12. Cushman carts shall only be used to tow plant approved carts or trailers. Hitches and pins shall be inspected prior to each use. Do not exceed the towing capacity of the vehicle.
13. Do not operate the motor vehicle when the rear view is obstructed or when any employee is exposed to hazards created by the moving vehicle. Operating in this fashion is only allowed if:
 - a. The vehicle has a reverse signal alarm that is audible above the surrounding noise level, or
 - b. The vehicle is backed up when a designated employee signals that it is safe to do so.
14. No employee shall service any rim wheel (split / multi-piece or large single piece) unless the employee has been trained and instructed in the correct and safe operating procedures of servicing that type of wheel. (See Safety Guideline "MM-Multi-Piece/Large Single Piece Rim Wheel Safety")
15. A red flag shall be placed on material that extends more than 4 feet past the vehicle rear or more than 12 inches over the sides of a vehicle.
16. Vehicles operating in areas or under conditions that cause fogging or frosting shall be equipped with defrosting or defogging devices.
17. Unauthorized persons shall not be permitted to ride in Company vehicles.
18. No passengers are allowed in the beds of trucks, carts or trailers.
19. Trucks shall not be operated with tailgates hanging loose or with tool compartment doors open.

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20. Vehicles shall not be parked closer than 8 feet to any railroad track.

21. When loading or unloading, wheels shall be chocked or the vehicle shall be placed in PARK and / or the brakes shall be set.

22. Employees shall not board or get off of a moving vehicle.

23. Do not operate vehicles immediately next to manholes/vaults, open digs or trenches

REFERENCES:

- OSHA-29 CFR1910.177, *Servicing Multi-Piece & Single Piece Rim Wheels*
- OSHA-29 CFR1910.269(p)(1)(ii), *Mechanical Equipment*
- OSHA-29 CFR1926.601, *Motor Vehicles*
- AUE-ADM-2418, *Industrial Safety Program*
- Ameren Commercial Motor Vehicle Driver Policy

Motor Vehicle Driver Safety Policy (Ameren Safe Driver Policy)

Driving safely is a key component of our safety efforts at Ameren. The purpose of the Safe Driver Policy is to establish the responsibilities and activities to improve safety while driving Ameren company vehicles or personal vehicles on behalf of Ameren. See the Ameren Motor Vehicle Driver Safety policy for requirements.

The Ameren Safe Driver Policy applies to all Ameren employees who operate a company vehicle (automobile, van, or truck) or drive a personal vehicle on behalf of the company.

Violation of this policy will subject employees to potential disciplinary action, up to and including discharge.

REFERENCES:

- See link to Ameren Motor Vehicle Driver Safety Policy on Power Operations Safety webpage

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Motor-Operated Valves

The term **motor-operated valve** applies to all motor-operated valves with a manual override hand wheel. Common examples of this type of valve include, but are not limited to, Limitorque, Rotork, and Teledyne. Many of these types of valve operators have gear reduction built-in for both motor and hand wheel mode operation. They are designed with hand wheel dimensions intended for hand operation only. The use of a valve wrench on a motor-operated valve hand wheel can exert dangerous levels of force sufficient to fracture the operator housing and/or valve body. This fracturing can result in sudden high pressure release failure or failure when the equipment is returned to service. Either failure could result in serious injury or fatality to persons in close proximity.

General Safe Work Practices

1. Never use a valve wrench on a motor-operated valve.
2. Always follow manufacturer's recommendations for proper limit and torque settings. Never force or adjust the motor-operated valve beyond the manufacturer's settings.
3. Be aware of high pressure hazards typically associated with this type of equipment.
4. Stand clear of motor-operated valve hand wheel when in service, in case of remote start.
5. If available, use bypass valves to equalize pressure and temperature.
6. Inspect valve stem prior to manual operation. A clean and lubricated valve stem will make for easier/safer operation.

REFERENCES:

- *Manufacturer's Guidelines for MOV*

Multi-piece or Large Single Piece Rim Wheel Safety Precautions

Multi-piece rim (i.e. split-rim) and large single rim tires can be very dangerous if not handled properly. These wheels are sometimes used on large vehicles such as trucks, tractors, rubber-tired cranes, trailers, buses and off-road machines. This does not include automobiles, pick-up trucks or vans utilizing automobile tires or truck tires designated "LT". This precaution also does not apply to mules, gators, bicycles, etc. where split-rims are not used. Information below must be followed to ensure safety to personnel and property.

Special Precautions

1. Be aware of extreme pressure potential. A 20-inch tire inflated to 100 psi can contain up to 40,000 lbs. of explosive force. Properly maintained tires can handle this amount of pressure, but tires that have been used while flat or underinflated can present considerable risk.

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2. Use caution when inflating and/or inspecting tires/rims to assure the trajectory area does not pose a threat to personnel or property.
3. Split locking rings on multi-piece rims may blow-off the rim scattering rim components causing serious injury and/or property damage.
4. Large single rim tires may rupture, separate, and/or de-laminate throwing tire fragments and wheel well debris.
5. Multi-piece rim tires and large single-piece tires must be serviced using specific procedures to avoid potential hazards.
6. Multi-piece rim tires and large single-piece tires should only be inflated by those who are trained in proper techniques and when using appropriate equipment.
7. All operators of equipment with multi-piece rim tires and large single piece rim tires should be trained and skilled to identify hazards and to follow proper direction.
8. Large single-piece rim tires may be inflated only when contained within a restraining device, positioned behind a barrier or bolted on the vehicle with the lug nuts fully tightened.
9. Large single-piece rim tires shall not be inflated when any flat, solid surface is in the trajectory and within one foot of the sidewall.

General Safe Work Practices

1. Tires shall not be inflated above normal operating pressure as written on the side of the tire unless higher pressure is recommended by the manufacturer.
2. Only air compressors and accessories with the ability to inflate tires remotely may be used. Examples include clip-on air chucks that can be mechanically fastened to the valve stem, (thus it does not have to be held by hand). The clip-on air chuck is used with an in-line valve and gauge that can be operated away from the trajectory angle of the tire/rim should the rim or tire fragments become dislodged and blowout.
3. Always wear appropriate PPE such as safety glasses when working on and/or servicing tires and rims.

Inflation of tires above 80% of recommended normal operating pressure

1. Multi-piece rim tires with tire pressure currently at 80% of normal operating pressure or above as marked on the tire may be inflated by trained plant personnel using appropriate remote methods while the tire is on the vehicle.

Servicing tires below 80% of recommended normal operating pressure:

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1. Multi-piece rim tires below 80% of recommended normal operating pressure shall be serviced only by those who are specifically trained and instructed in split-rim or large tire servicing and with proper equipment.
2. Multi-piece rim tires under 80% of recommended normal operating pressure are not to be serviced by plant workers.
3. Multi-piece rim tires must be completely deflated by removing the valve core before removing the wheel from the vehicle if the tire has been driven underinflated at 80% or less of the recommended normal operating pressure or it has obvious or suspected damage to tire or wheel components.

References:

- OSHA 29 CFR 1910.177 *Servicing Multi-piece and Single piece Rim Wheels*

Nuisance Dust

Nuisance dust contains airborne particles that pose a potential respiratory hazard. High levels of nuisance dust may reduce visibility and can get into the eyes, ears and nose. This may create potential safety and health issues.

Certain dusts in the energy center environment may contain potentially harmful substances such as asbestos, silica, arsenic, cadmium, chromium, lead, etc. These are NOT considered nuisance dusts and should be addressed under the applicable sections of this handbook.

Environmental Precautions

Visible dust originating from the energy center and going beyond the property line may be reportable. Notify Environmental Services if this occurs.

General Safe Work Practices

1. Clean work areas regularly. Do not allow dust to accumulate.
2. Anticipate potential nuisance dust problems when planning a job. Address these prior to beginning work.
3. Use floor sweep compound when sweeping in shops, warehouses, etc.
4. If possible, use enclosures and exhaust ventilation systems for processes that create dust.
5. Do not use compressed air to clean off surfaces.
6. Wet roadways when dry, dusty conditions are present.
7. Certain dusty conditions may require additional PPE, such as goggles.

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8. Employees should wear appropriate respiratory protection, as conditions warrant.

REFERENCES:

- *Environmental Services Share point Site See Power Operations Safety Website for link*

Parts Cleaners

Parts cleaners are an important part of plant maintenance. Since parts cleaners can pose a potential fire hazard, it is important to use them safely and spot possible hazardous conditions. Safety instructions, health information and NFPA ratings are posted on the inside cover of a parts cleaner. Always read and understand labels, SDS and instruction manuals before use.

General Safe Work Practices

1. Do not eat, smoke, drink, etc., while using the parts cleaner.
2. Do not add unapproved solvents to the parts cleaner, such as gasoline, kerosene or halogenated solvents.
3. Wear chemical splash goggles or a splash shield with eye protection when using the parts cleaner.
4. Wear neoprene gloves to avoid excess skin exposure. A splash apron should also be worn.
5. Do not use compressed air to dry parts. This can cause vapors and mist, which should not be inhaled. In addition, the vapors and mist can become a fire / explosion hazard.
6. Maintain proper housekeeping in the area around the parts cleaner.
7. Ensure the lid is kept closed at all times when the parts cleaner is not in use.
8. Ensure the parts cleaner is properly labeled for HAZCOM.

Fire Prevention

1. Do not spray aerosols in or around the parts cleaner.
2. Ensure no ignition sources are near the parts cleaner.
3. Never put hot parts in the parts cleaner.
4. Do not prevent the lid from closing or leave a large object in the parts cleaner that could prevent the lid from closing completely. This prevents the fusible link on the parts cleaner lid from automatically closing in the event of a fire.
5. Do not leave solvent-soaked rags in the parts cleaner.

Environmental Precautions

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1. Avoid spilling solvent. If it is spilled, clean it immediately. Follow the SDS sheet for instructions.
2. Contain leaks promptly and make repairs immediately.
3. Do not dump used oil from equipment or solvents in the parts cleaner.
4. Any waste material or used solvents from the parts cleaner must be disposed of in accordance with plant procedures.

REFERENCES:

- *Manufacturer's guidelines*
- *Energy Center-specific waste disposal procedure*

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Personal Protective Equipment

There are many different types of personal protective equipment (PPE) used in an energy center. Although some PPE is considered “standard” for any job, other jobs may require additional PPE. The following is a list of the most common types of PPE used in our energy centers

- Safety glasses-wrap around or foam lined
- Steel or composite safety toed shoes
- Hard hats
- FR clothing
- Hearing protection
- Respiratory protection

Chemical Protection

There are hazardous chemicals used in our energy centers which require protection of eyes, skin and respiratory system. Some of these chemicals are used in original manufacturer’s containers, while others may be in bulk containers or tanks. Safety Data Sheet (SDS) information, spill guides and container labels should be consulted in order to avoid overexposure and injury.

If you are not familiar with the risks, precautions or proper PPE to use when working with or around these chemicals, consult the SDS or ask your Supervisor or Safety Supervisor / Coordinator before proceeding.

PPE may include a minimum of appropriate gloves and splash face shield to coated splash suits with appropriate chemical cartridge respirators (Level B protection) or a totally encapsulated suit with SCBA (Level A protection). The chemical, concentration, quantity and hazards will determine what level of protection is appropriate. No one should work with chemicals which they are not trained on the risks of, or not familiar with, the proper protection.

REFERENCES:

- *ES-REG-201, Personal Protective Equipment*
- *AUE-ADM-2419, Personal Protective Equipment*
- *Energy Center Spill Guides*

Eye & Face Protection

Eye injuries account for the majority of incidents at energy centers. Foam-lined and/or close-fitting, contoured safety glasses shall be worn when on premises. Safety glasses with foam gaskets or contoured should fit closely to the face with minimal gaps around the sides top and bottom to help prevent air borne materials from getting behind the glasses and into the eyes.

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Safety glasses with removable side shields should not be worn except without specific authorization from plant management.

Additional eye / face protection may be required where machines or operations present additional hazards. Examples include, but are not limited to, activities such as:

1. Welding,
2. Burning,
3. Grinding,
4. Chipping,
5. Machining operations,
6. Overhead work,
7. Handling chemicals, corrosive liquids or molten materials,
8. Steam cleaning or pressure washing,
9. Abrasive-blasting,
10. Electrical switching operations,
11. Working in high draft areas,
12. Working in dusty environments and
13. Handling chemicals, corrosive liquids or molten materials.

The type of eye/face protection chosen should be appropriate for the job to be done. Available eye / face protection includes:

1. Goggles
2. Safety glasses (plain or prescription) as allowed in the safety eyewear program. .
3. Frames and lenses must meet ANSI Z87.1 requirements.
4. Face shields (chemical, grinding with impact rating, arc blast or shaded for welding helpers)
5. Welding helmets
6. Full face respirators (fit testing required).

REFERENCES:

- *OSHA-29 CFR1910.133, Eye & Face Protection*
- *ANSI Z87.1, Practice for Occupational & Educational Eye & Face Protection*
- *ES-REG-201, Personal Protective Equipment*

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- *AUE-ADM-2418, Industrial Safety Program*
- *AUE-ADM-2419, Personal Protective Equipment*
- *Safety Eyewear Program on Corporate Safety Website*

Foot Protection

Foot protection shall be worn in all areas of the energy center where foot injuries could occur. Each Director will determine safety shoe requirements specific to the station, based on a hazard assessment.

For specifications on Safety Shoe construction and types, see AUE-ADM-2419 and AUE-ADM-5002.

REFERENCES:

- *OSHA-29 CFR1910.136, Foot Protection*
- *ANSI Z41, Standard for Personnel Protection, Protective Footwear*
- *ES-REG-201, Personal Protective Equipment*
- *AUE-ADM-2418, Industrial Safety Program*
- *AUE-ADM-2419, Personal Protective Equipment*
- *AUE-ADM-5002 Energized Electrical Safety Program*
- *Electrical Work Safe Practices Manual*

Hand Protection

Wear hand protection to protect against cuts, punctures, temperature extremes, hazardous materials or chemicals, impact and vibration or electrical contact. Examples of work practices requiring hand protection include, but are not limited to:

1. Working where the slip of a tool could result in hand injury
2. Using a brush to clean metal shavings / cuttings from machining processes
3. Operating valves where there is possible danger to the hands
4. Sandblasting
5. Handling ropes, slings, chokers or cables
6. Handling lumber used for scaffolding

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7. Unpacking or un-baling packing crates or opening boxes where injury from nail, wire, metal bands or splinters is possible
8. Handling solvents, corrosives and oils
9. Working in electrical trays
10. Working with electrical cable shielding material
11. Working with sheet metal
12. Handling glass
13. Handling tooling bits
14. Operating a jack hammer, impact wrench or other high vibration tools.\
15. Welding, grinding, hand grinding and cutting

REFERENCES:

- OSHA-29 CFR1910.138, *Hand Protection*
- ES-REG-201, *Personal Protective Equipment*
- AUE-ADM-2418, *Industrial Safety Program*
- AUE-ADM-2419, *Personal Protective Equipment*

Head Protection

In general, hard hats will be worn at all times where an impact, bumping, falling / flying objects or electrical contact hazard exists. Each Director will determine hard hat requirements specific to the Energy Center, based on a hazard assessment. Hard hats have an expiration date. See manufacturer guideline for details (inside hard hat).

Some areas in which hard hats are usually not required are:

1. Office areas,
2. Lunch rooms,
3. Restrooms,
4. Unit control rooms,
5. Enclosed cabs of vehicles and
6. Shop areas when no head hazard exists.

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NOTE: These areas may be exempt during normal activities. However, any unusual activity or operation that would logically require the use of hard hats voids this exemption for the duration of that activity or operation.

NOTE: Other locations where an exemption may apply shall be approved by supervision. Precautions shall be taken to ensure hazards (such as those listed above) are addressed.

Generally, the only acceptable hard hat for use in the energy center is an ANSI-approved, Type I, Class E or Class G hard hat. These hard hats protect from falling objects and electric shock. The employee's first and last name shall be displayed in ½ inch legible letters on the hard hat. Only approved manufacturer attachments shall be used on either the outside or inside of the hard hat.

General Safe Work Practices

1. Wearing of hard hats with the bill in front is preferred.
2. Do not alter the hard hat's suspension and shell.
3. Do not use paints, solvents, chemicals, adhesives or petroleum products on hard hats, unless approved. Small stickers are acceptable.
4. Frequently clean, inspect, maintain and replace hard hats, as specified by the manufacturer's instructions.

REFERENCES:

- OSHA-29 CFR1910.132, *General Requirements for Personal Protective Equipment*
- OSHA-29 CFR1910.135, *Head Protection*
- ANSI 89.1, *Requirements for Protective Headwear for Industrial Workers*
- ES-REG-201, *Personal Protective Equipment*
- AUE-ADM-2418, *Industrial Safety Program*
- AUE-ADM-2419, *Personal Protective Equipment*

Hearing Protection and Noise

Exposure to loud noise can cause short and long term issues with hearing. Noise exposure measurements have been taken to determine noise levels.

- Hearing protection shall be on person whenever in the powerhouse.
- Wear hearing protection in all posted / designated areas and where work operations cause noise levels above 85 dBA.
- At a minimum, hearing protection should be worn in and around Energy Centers when units are operational.

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NOTE: As a general rule, wear hearing protection when background noise makes normal conversation difficult. Use hearing protection when in doubt of exposure.

Hearing protection is available throughout the plant and is stocked in company storerooms. Follow the instructions on how to properly insert the protectors to ensure the best fit possible. Some activities may require the use of double hearing protection (i.e., ear muffs and ear plugs). Talk with your supervisor or safety representative if you have any questions.

REFERENCES:

- OSHA-29 CFR1910.95, *Occupational Noise Exposure*
- ES-REG-201, *Personal Protective Equipment*
- ES-REG-214, *Hearing Conservation Program (includes Sound Maps for Energy Centers)*
- AUE-ADM-2418, *Industrial Safety Program*
- AUE-ADM-2419, *Personal Protective Equipment*
- AUE-ADM –2428, *Hearing Conservation*

Respiratory Protection

Approved, fit-tested respiratory protection must be worn by qualified employees when exposed to atmospheres that may contain harmful dusts, fogs, fumes, mists, gases, particulates, smokes, sprays or vapors. Appropriate respiratory protection is also required in atmospheres that may be oxygen deficient.

Each type of respirator has a limited range of protection, so wear the proper respirator for the task at hand and the environment involved. When in doubt about which type of respirator or cartridges to use, contact your supervisor or safety personnel.

General Safe Work Practices

1. Employees required to wear respirators shall be trained on their use, medically approved to wear them and fit tested annually for each type of respirator they wear. Facial hair shall not interfere with the face-to-respirator seal. See respirator fit guide in AUE-ADM-2429 Respirator Protection Program
2. Prior to use, clean and inspect the respirator for the following:
 - a. Face piece distortion,
 - b. Worn or missing straps,
 - c. Diaphragm valves are intact and free of debris,
 - d. Exhalation valve diaphragm is present.
3. After wearing a respirator, be sure to properly clean and store it.

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- a. Do not use alcohol when cleaning respirators.
 - b. Store the face piece in a loose plastic bag, in a temperature-regulated environment.
4. Check respirator fit and seal before entering a hazardous atmosphere.
- a. Perform a positive check:
 - i. Cover the filters and inhale.
 - ii. If you have a proper seal, the respirator will collapse against your nose.
 - b. Perform a negative check:
 - i. Cover the exhalation valve and exhale gently.
 - ii. If you have a proper seal, air will not blow out around the face piece near the eyes.

REFERENCES:

- OSHA-29 CFR1910.134, *Respiratory Protection*
- OSHA-29 CFR1910.146, *Permit-Required Confined Spaces*
- ES-REG-201, *Personal Protective Equipment*
- ES-REG-209, *Permit-Required Confined Space Program*
- ES-REG-213, *Respiratory Program*
- AUE-ADM-2418, *Industrial Safety Program*
- AUE-ADM-2419, *Personal Protective Equipment*
- AUE-ADM-2415, *Confined Space Program*
- AUE-ADM-2429, *Respirator Protection Program*

Radiography

Periodically, the need for non-destructive examination of station equipment may be necessary. Non-destructive examination requires the use of X-rays or gamma rays in order to produce a record on a sensitized film. This type of testing is called radiography and requires specific controls and training to perform. The primary hazard of radiography is the exposure of personnel to high level energy from the radioactive source material used in this type of examination.

Work involving radiography should be considered as a non-routine activity. It requires careful planning, controls and monitoring to ensure personnel are not exposed to high levels of radiation. Personnel not involved with the radiography activity must pay strict attention to all signs, postings, boundaries and communications that will be present. Generally, areas of concern will display a magenta (purple) tri-foil sign with a yellow background which identifies the presence of radioactive material.



General Safe Work Practices

1. If you encounter unattended material marked as radioactive, immediately leave the area and contact the Control Room.
2. At a minimum, personnel should be aware of their surroundings and attempt to minimize their exposure. This can be accomplished by following three basic principles:
 - a. Limit time in the work area, especially near the radiographer's source material.
 - b. Maintain distance from the source, which will significantly reduce exposure.
 - c. Utilize shielding, whenever practical, to avoid possible exposure.
3. Personnel authorized to assist in this type of testing shall adhere to the radiographer's instructions.
4. Yellow and magenta tape is used to warn you of *radiography* activities.

REFERENCES:

- OSHA-29 CFR1910.1096, *Ionizing Radiation*
- *Emergency Action Sheet-12, Radioactive Incident*

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Reporting Hazards

Timely reporting of hazards is essential in helping to prevent personnel injury. Always promptly inform your supervisor of any condition that may cause injury, property damage or interferes with equipment service, regardless of the department in which such conditions exist. If necessary, erect barrier tape or guard the hazard you observed until someone else secures the condition.

General Safe Work Practices

1. If the unsafe condition involves an immediate threat to your safety or to that of other employees:
 - a. Stop the job and inform other workers involved of the danger.
 - b. Promptly notify your supervisor of the condition
2. If you observe an unsafe condition that you are unable to correct and which poses no immediate threat to the safety of others, the following actions should be taken:
 - a. Place the appropriate barrier tape or a barricade around the hazard to prevent someone from falling, slipping, tripping, etc.
 - b. Report the problem to your supervisor and initiate a JR as needed.
3. If the unsafe condition involves a work practice and there is no immediate danger to personnel, the following actions can be initiated, depending on the nature of the concern:
 - a. Report the concern to your supervisor.

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Rigging & Hoisting

OSHA safety requirements for these activities are designed to protect people engaged in work that requires the use of slings, ropes and chains used in conjunction with other material handling equipment for the movement of material by hoisting. Hazards associated with rigging and hoisting includes electric shock, falling objects, pinch points, caught between objects and equipment failure.

General Safe Work Practices

1. A Qualified Rigger (qualified to the job necessary level) is required on any rigging activity. Non-qualified or under-qualified persons may only assist in installing rigging.
2. Only Qualified Operators and Riggers may inspect and accept lift set-up prior to lift.
3. Determine the load weight, center of gravity and that attachment points are adequate for the load.
4. Inspect rigging equipment prior to use. Remove any defective part from service.
5. Rigging devices shall be rated, tested and labeled with the load capacity. If the labeled rated capacity information is missing, the equipment shall be tagged "Danger – Do Not Use" and taken out of service.
6. Never exceed any rigging / hoisting component's rated capacity.
7. Use tag lines, unless the line could be tangled in other equipment.
8. Prior to the start of a hoisting operation, verify that the load travel path is clear of obstructions and personnel.
9. Maintain visual contact with the load while the load is moving.
10. Employees shall not stand under or pass beneath suspended loads.
11. Do not side load fixtures that are not designed for such purpose.
12. Do not weld or alter any rigging devices.
13. Do not shock-load any rigging or lifting devices. In the event a shock load occurs, take the equipment out of service and have it inspected.
14. Never ride a load or the load block.
15. When lowering a load from one level to another, an employee in the lift area must either control the area below the load, or erect barrier tape around the area to ensure personnel do not inadvertently walk under the load.
16. Refer to the Rigger's Handbook for proper sling angles.

17. The crane operator should designate only one signal person.
18. Rigging from guardrails is prohibited. If damaged guardrails are discovered they should be reported, barricaded and JR'd.
19. Persons designated as signal person must be trained and qualified as signal person. Review hand signals prior to the lift.

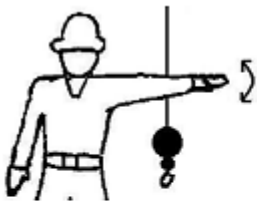
Critical Lifts

Lifts that meets any of the following:

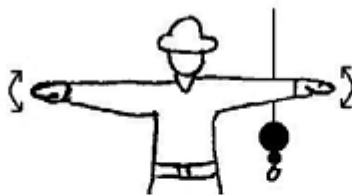
1. Lift where the total weight of the lift exceeds 75% of any mobile crane's load chart capacity.
2. Lift where the total weight of the lift exceeds 80% of a non-mobile crane's or portable hoist's capacity.
3. Lifts involving multiple cranes.
4. Lift when the loss of the load poses the risk of releasing hazardous material to the environment.
5. Lift performed in proximity of live electrical connections.
6. Lifting of an item that requires special care in handling due to size, weight, close tolerances, high susceptibility to damage or other unusual factor.
7. Lifting an item above critical equipment or buildings.
8. Lifts performed by a helicopter.
9. Lifting of personnel.

Hand Signals

- *Appendix A to Subpart CC of Part 1926-Standard Hand Signals*



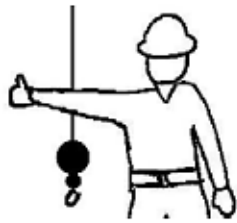
STOP – With arm extended horizontally to the side, palm down, arm is swung back and forth.



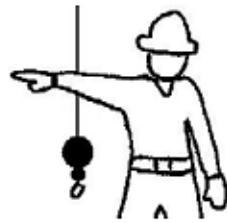
EMERGENCY STOP – With both arms extended horizontally to the side, palms down, arms are swung back and forth.



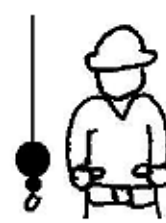
HOIST – With upper arm extended to the side, forearm and index finger pointing straight up, hand and finger make small circles.



RAISE BOOM – With arm extended horizontally to the side, thumb points up with other fingers closed.



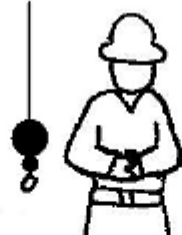
SWING – With arm extended horizontally, index finger points in direction that boom is to swing.



RETRACT TELE SCOPING BOOM – With hands to the front at waist level, thumbs point at each other with other fingers closed.



RAISE THE BOOM AND LOWER THE LOAD – With arm extended horizontally to the side and thumb pointing up, fingers open and close while load movement is desired.



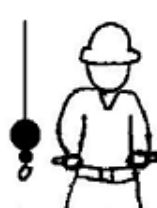
DOG EVERYTHING – Hands held together at waist level.



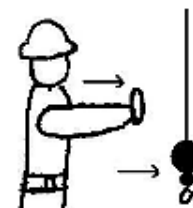
LOWER – With arm and index finger pointing down, hand and finger make small circles.



LOWER BOOM – With arm extended horizontally to the side, thumb points down with other fingers closed.



EXTEND TELE SCOPING BOOM – With hands to the front at waist level, thumbs point outward with other fingers closed.



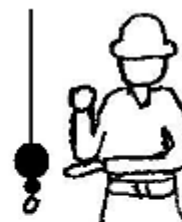
TRAVEL/TOWER TRAVEL – With all fingers pointing up, arm is extended horizontally out and back to make a pushing motion in the direction of travel.



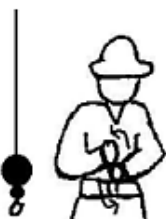
LOWER THE BOOM AND RAISE THE LOAD – With arm extended horizontally to the side and thumb pointing down, fingers open and close while load movement is desired.



MOVE SLOWLY – A hand is placed in front of the hand that is giving the action signal.



USE AUXILIARY HOIST (whipline) – With arm bent at elbow and forearm vertical, elbow is tapped with other hand. Then regular signal is used to indicate desired action.



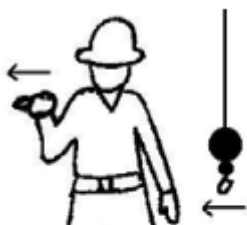
CRAWLER CRANE TRAVEL, BOTH TRACKS – Rotate fists around each other in front of body; direction of rotation away from body indicates travel forward; rotation towards body indicates travel backward.



USE MAIN HOIST – A hand taps on top of the head. Then regular signal is given to indicate desired action.



CRAWLER CRANE TRAVEL, ONE TRACK – Indicate track to be locked by raising fist on that side. Rotate other fist in front of body in direction that other track is to travel.



TROLLEY TRAVEL – With palm up, fingers closed and thumb pointing in direction of motion, hand is jerked horizontally in direction trolley is to travel.

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Mobile / Overhead Cranes

1. Crane operators must be trained and qualified to operate the type/size of crane being operated.
2. Crane operators are ultimately responsible for all lift activities under their watch.
3. Before operating a crane or hoist, perform the required inspection.
4. Never exceed the load capacity of the crane or hoist, as determined from appropriate load charts.
5. Never alter or override any safety devices.
6. If so equipped, employees shall wear the seat belt provided in the cab.
7. Take necessary precautions to avoid two-blocking a crane.
8. All guards shall be in place or the crane shall not be used.
9. Do not operate crane without a qualified signal person if the operator does not have clear vision of hook, load and travel path.
10. Do not operate cranes when weather conditions exist that may cause unsafe operation (i.e. severe lightning storms or high winds).

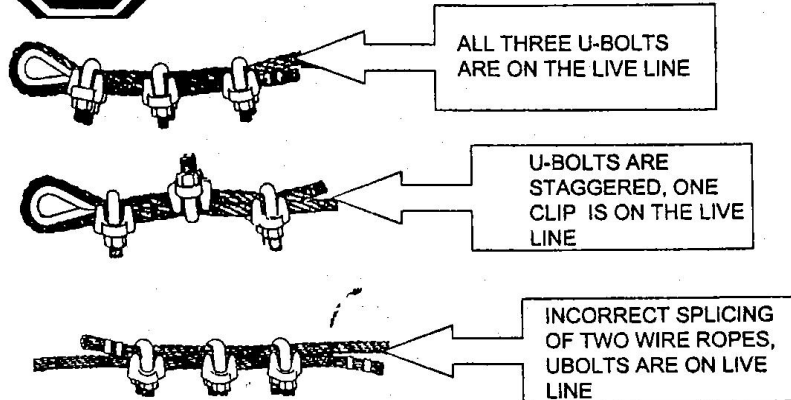
Slings (Wire Rope / Chain / Synthetic)

1. Check the tag for size and capacity. If tag is not present, remove the sling from service.
2. Care must be taken to prevent hand injury when handling wire rope and chain slings. The use of gloves is required.
3. Personnel should be alert for broken wires in wire rope slings.
4. Softeners (edge guards) shall be used to prevent rigging damage on sharp edges.
5. Do not place hands or fingers between the sling and the load when the sling is being tightened around the load.
6. Slings shall not be shortened with knots, bolts or other makeshift devices.
7. Always follow:



NEVER SADDLE A “ DEAD HORSE”

NEVER PLACE “U-BOLT” OVER THE LIVE LINE



Shackles

1. Shackle pins and bodies shall be stored as a set.
2. Install shackles so the running line does not loosen the pin.

Eye Bolts

1. Thread engagement is dependent on the base material that the eyebolt is made of.
2. When installing eyebolts into hard materials such as iron or steel, the minimum required thread engagement is one and one half times the diameter of the eyebolt's threaded shank.
3. When installing eyebolts into soft materials such as aluminum or zinc, the minimum required thread engagement is two times the diameter of the eyebolt's threaded shank.
4. When lifting, always pull with the plane of the eye.
5. Use shouldered eyebolts with shoulder in firm contact for angle pulls. Do not angle pull at less than a 45-degree angle.

Hooks

1. Safety latches shall be present, operable and inspected for defects prior to use.
2. Employees shall not paint hooks. This obscures defects, cracks, etc.
3. Do not point-load the hook.
4. Do not place hands or fingers between the hook and its load.

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5. Equally load each side of a double hook.

Chain Hoists / Come-A-Longs

1. Inspect chain hoists daily prior to use. Inspect handles for visible cracks.
2. Immediately remove any defective chain hoist from service, tag it “Danger – Do Not Use” and inform your supervisor.
3. Select chain hoists based upon anticipated weight and rigging configuration.
4. Position chain hoists so the chain feeds through the chain hoist without binding. Do not side load hooks.
5. Chains on come-a-longs shall not be chained back on themselves.

Jacking

1. Inspect jacks before use.
2. If the foundation is not firm, block the base of the jack.
3. After the load has been raised, crib, block or otherwise secure the load.

REFERENCES:

- *OSHA-29 CFR1910.179, Overhead & Gantry Cranes*
- *OSHA-29 CFR1910.180, Crawler, Locomotive & Truck Cranes*
- *OSHA-29 CFR1910.184, Slings*
- *OSHA-29 CFR1926.251, Rigging Equipment for Material Handling*
- *OSHA-29 CFR1926.305, Jacks – Lever & Ratchet, Screw & Hydraulic*
- *OSHA-29 CFR1926.550, Cranes & Derricks*
- *ANSI / ASME B30.1, Jacks*
- *ANSI / ASME B30.2, Overhead and Gantry Cranes*
- *ANSI / ASME B30.3, Hammerhead Tower Cranes*
- *ANSI / ASME B30.5, Mobile and Locomotive Cranes*
- *ANSI / ASME B30.11, Monorails and Under Hung Cranes*
- *ANSI / ASME B30.16, Overhead Hoists*
- *ANSI / ASME B30.21, Manually Lever Operated Hoists*
- *Rigger’s Handbook*
- *AUE-ADM-2408 Hoisting and Rigging Safety*

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Scaffolding

Scaffolds are temporary work platforms that are utilized as an access to perform inspection or maintenance activities. Scaffolds reduce fall potential and decrease the risk of injury and worker discomfort. Scaffolds also improve work performance by providing safe accessibility to the work site.

General Safe Work Practices

1. Ladders shall not be placed in the horizontal position for use as scaffolding.
2. Scaffolding shall be inspected before the start of each shift when in use. (Before ascending scaffolding check tags and signage for the requirement of fall protective equipment).
3. Materials, tools or debris shall not be allowed to accumulate on scaffolds and create a hazard.
4. Slippery conditions on scaffolds shall be eliminated as soon as possible.
5. Do not carry heavy or awkward items while climbing on scaffolding. Use hand lines to lift or lower equipment or materials.
6. Employees on scaffolds shall work on the platform and shall not use makeshift devices to gain added height from the platform.
7. Fall protection shall be utilized where incomplete handrail or other fall hazards exist.
8. Post "large letter" signage indicating the requirement of fall protective equipment whenever applicable.
9. No scaffold shall be moved while occupied by employees.
10. When employees must work or pass under scaffolds, steps shall be taken to protect those below from the hazard of falling tools or materials. This can include barricading the area below, installing toe boards or attaching mesh material from the guardrail to toe board area.

Construction & Dismantling Safety

1. Scaffolding shall be erected, moved, dismantled or altered only by trained personnel under the direction of a competent person in scaffolding.
2. Employees erecting or dismantling supported scaffolding shall utilize fall protection as specified by the competent person.
3. All scaffolds and support members shall be capable of supporting personnel and the equipment they are intended to carry, with a safety factor of four.

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4. A ladder or equivalent means of safe access shall be provided to the platform. Cross braces, end bucks and step ladders should not be used as a means of access, unless designed for that purpose.
5. The footing or anchorage for scaffolds shall be sound, rigid and capable of carrying the maximum intended load without settling or displacement.
 - a. Adjusting screws shall be used to compensate for uneven ground. Pads shall be placed below each adjusting screw.
 - b. Never use barrels, boxes, loose brick, concrete blocks, etc., to support scaffolds or planks.
6. Scaffolding shall be secured to a building or other solid structure, as recommended by the manufacturer, or when the height to width ratio is 4 to 1.
7. Scaffold sections shall be locked together by pins or equivalent suitable means to prevent possible displacement.
8. Scaffold planks shall extend over their end supports, not less than 6 inches, or more than 18 inches unless cleated or otherwise secured.
9. Platform planks shall be laid with their edges close together, so the platform will be tight with no spaces through which tools or fragments of material can fall.
10. Only lumber designated as scaffold grade material shall be used as planks.
11. Scaffold platforms shall be a minimum of 18" wide.
12. Scaffold bracing shall be in place at all times when work is to be performed.
13. Swing gates should be used on each scaffold for access and egress, if possible.
14. Guardrails, mid-rails and toe boards shall be installed on scaffolding with open-sided platforms more than four feet above the ground or floor.
15. When scaffold ladders are used on a scaffold platform more than 35 foot high, they shall have rest platforms at maximum vertical intervals of 35 foot.
16. Scaffolds shall not be erected, used, dismantled, altered or moved such that they or any conductive material handled on them might come close to exposed and energized power lines. Refer to the "Electrical Safety" section of this handbook for approach distances.

Suspended Scaffolds

1. Scaffold components shall meet the weight requirement for the intended load.
2. Inspect the cables before and after use.

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3. Never exceed the scaffold weight capacity listed by the manufacturer.
4. Personnel being lifted must wear a harness with a lanyard attached to an emergency retrieval device or other suitable means. 5/8 inch safety ropes and rope grabs may be used in some situations. If used then the rope grab must be compatible with the rope being used.
5. Follow manufacturer's guidelines as outlined in the operating manual.

Boatswain Chairs

1. Seat slings must be at least 5/8" fiber rope, or when welding or burning, at least 3/8" wire rope.
2. Inspect all equipment, including cables, before use.
3. Personnel being lifted must wear a harness with a lanyard attached to an emergency retrieval device or other suitable means. 5/8 inch safety ropes and rope grabs may be used in some situations. If used then the rope grab must be compatible with the rope being used.

REFERENCES:

- OSHA-29 CFR1910.28, *Safety Requirements for Scaffolding*
- OSHA-29 CFR1926, *Subpart L – Scaffolds*
- OSHA-29 CFR1926.451, *General Requirements for Scaffolds*
- "Electrical Safety" section of this handbook

Security – Badging and Access

The purpose of the Ameren Badging and Access Policy is to promote a safe and secure environment at Ameren Facilities for Ameren Employees, Contingent Worker Personnel and Visitors. This policy addresses all types badging and access, process for obtaining new badges, escorting responsibilities and enforcement. See this policy for the latest requirements.

REFERENCES:

- Ameren Badging and Access Policy

Shop Safety

There are many hazards located in the shop area. Some of the hazards include, but are not limited to: slips, trips and falls; eye injuries; pinch points; lacerations; burns; flying objects;

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chemical exposures and electrical contact. Always be alert for potential hazards while working in shop areas.

General Safe Work Practices

1. Employees shall be trained and qualified before operating shop tools and equipment.
2. Equipment shall be operated within manufacturer's specifications.
3. Always inspect equipment before operating it. Machine guards shall be in place and properly adjusted to protect the operator and other personnel.
4. Follow the PPE requirements for the machine to be used.
5. Verify that personnel in the area are clear of the machine and are protected from potential hazards.
6. Use a chip removal tool when removing chips and shavings from machinery.
7. Do not use hands to secure material when clamps or vices are needed. Always keep hands free until the machine comes to a complete stop and your hands are safe.
8. Unattended machines shall not be left running.
9. When operating machines or working around running equipment, ensure hair, gloves, loose clothing and jewelry do not become entangled.
10. Clean machines and the area around them after use.
11. Use proper ventilation, screens and protective clothing when cutting or welding. Prior to beginning work, inspect the area. Follow the Hot Works procedure, if needed.
12. Materials and chemicals shall be properly placed or stored so as not to create a hazard to employees working in or passing through the shop area.
13. Always wear the proper personal protective equipment for any hazard in the shop.
14. Repair or replace any broken tools or equipment.
 - a. Immediately remove defective equipment, machines or tools from service and tag them "DANGER- Do Not Use."
 - b. Complete a job requisition (JR) to have them repaired.
 - c. Do not use the defective item until it has been repaired.

Smoking (Ameren Corporate Smoking Policy)

In keeping with Ameren's corporate values, Ameren strives to provide a work environment

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that promotes and ensures the health and safety of all employees. Smoking presents known health risks to smokers and non-smokers alike. The Corporate policy applies to cigarette, pipe and cigar smoke, as well as e-cigarettes.

The Corporate applies to all Ameren employees, vendors, contractors and visitors at any Ameren facility. State and local laws or ordinances regarding smoking must be followed and more stringent variations may apply to certain Ameren employees and at particular locations.

Smoking is prohibited in all Ameren buildings and any posted areas where hazards may exist. Smoking is prohibited within 25 feet* from all entrances, exits, windows that open and ventilation intakes that serve an enclosed area for all Ameren locations. Smoking is not permitted in a multi-occupant Company vehicle or while operating motorized equipment.

References:

- Ameren Corporate Smoking Policy – Effective 1/1/2014

*Note: the State of Illinois requires a minimum of 15 feet.

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Temperature Extremes

Cold Exposure Guidelines

In winter, many energy center workers spend all or part of their day working in cold environments. Excessive cold can pose special hazards to safety and health. Prolonged exposure to freezing temperatures can result in health problems, such as frostbite and hypothermia.

Frostbite occurs when the skin tissue freezes. Although frostbite typically occurs at temperatures below 30 degrees Fahrenheit, it can occur at temperatures above freezing when wind chills are present. Symptoms of frostbite include a tingling, stinging or aching feeling in the area exposed to the cold, followed by a sensation of numbness.

The body parts primarily affected are the ears, cheeks, nose, hands, fingers, feet and toes. Deeper frostbite involves freezing muscles and tendons, causing exposed areas to become numb, painless and hard to the touch.

Whether the frostbite is mild or severe, it is important to seek immediate medical attention; do not leave the victim alone. Be sure to cover any frostbitten area with dry, sterile gauze or a soft, clean cloth. Contrary to popular belief, do NOT massage frostbitten tissue.

Hypothermia occurs when the body temperature falls to a level where normal muscular and brain functions are impaired. The early symptoms of hypothermia occur at or below a body temperature of 95 degrees Fahrenheit. Symptoms include uncontrolled shivering, cool bluish skin, drowsiness, lethargy, mild confusion and an inability to do complex motor functions. As the body temperature falls, symptoms include slurred speech, a state of dazed consciousness and failure to complete simple motor functions.

Treatment of hypothermia involves conserving any remaining body heat and providing additional heat through other sources. Give the victim a warm, sweet beverage (avoid those containing caffeine or alcohol). Have (or help) them remove wet clothing. Add layers of dry clothing or use blankets to re-warm the body. Chemical heat packs or hot water bottles can also be applied in an effort to raise body temperature. If these items are used, have the patient lie down and place them under the armpits, on the neck and chest.

General Safe Work Practices

1. Layer clothing.
2. Wear a hat. Forty percent of all body heat is lost through the head.
3. Protect the feet, hands and face.
4. Keep an extra set of dry clothes available in a locker and / or vehicle.

Heat Exposure Guidelines

This Guidance was established to promote the health and safety of occupational activities in locations where elevated temperatures and humidity exist. The intent of the guide is to ensure co-worker wellbeing when performing work in an environment with extreme heat (heat indices above 90 degrees). For additional information on heat exposure and Heat Exposure Plan, go to Scholar/Safety/Safety Resources/Heat Stress for the *Ameren Missouri Heat Exposure Guideline*. OSHA does not have a specific standard that covers working in hot environments. Nonetheless, under the OSH Act, employers have a duty to protect workers from recognized serious hazards in the workplace, including heat-related hazards. This guide helps prepare and implement heat exposure plans.

Entering & working in hot areas

When heat is combined with humidity the result is a heat index which is a single value that indicates the apparent temperature in degrees Fahrenheit, or how the area will feel. When there is more moisture in the air, perspiration does not evaporate as quickly as in dry air. Relative humidity above about 40% will begin to raise the heat index above the ambient temperature.

Additional risk factors to the heat index can be:

- Work in direct sunlight (which adds 15 degrees to the heat index)
- Prolonged or strenuous work
- Wearing heavy protective clothing or impermeable suits

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91° to 103°F	Moderate	Implement precautions and heighten awareness
103° to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

Heat Related Illness

When the body is unable to maintain its core temperature, heat disorders may occur. These include heat fatigue, heat cramps, heat exhaustion and heat stroke. If you recognize the signs and symptoms of any of these heat illnesses, taking the appropriate actions greatly reduces chances of a more serious heat related illness.

Heat fatigue, the mildest heat illness, involves feeling uncomfortable, irritable, confused, having a headache and feeling extremely tired. Activities should be slowed down until the body can adjust to the ambient temperature. Treatment of heat fatigue includes leaving the heated area, relaxing and drinking plenty of fluids.

Heat cramps, another common heat illness, are sudden, painful muscle spasms affecting the arms, legs or abdominal muscles. Treatment involves moving to a cool place, stretching the affected muscles and (slowly) drinking cool, lightly salted water or an electrolyte replacement drink such as Gatorade. Keep in mind that drinking too much electrolyte replacement drink is also a problem.

Heat exhaustion occurs when the body is unable to cool itself through sweating. Symptoms include clammy skin, a pale or flushed complexion, heavy sweating, intense thirst, headache, dizziness or feeling lightheaded, weakness, irritability, confusion, nausea and / or vomiting.

Treatment involves moving to a cool place, loosening or removing excess clothing and boots, sponging the neck and under the armpits, fanning the body, resting with feet slightly raised and drinking cool, lightly salted water or an electrolyte replacement drink. Heat exhaustion, if left unchecked, can lead to heat stroke, which is the most serious heat-related disorder.

Heat stroke occurs when the body fails to regulate its internal temperature. Because the body stops sweating, it can no longer rid itself of excess heat. Since heat stroke can be life-threatening, it is critical that emergency medical treatment be provided. The main symptoms of heat stroke are:

1. Mental confusion, delirium, loss of consciousness, convulsions or coma;
2. Dry, pale skin with no sweating or hot, red skin that looks sunburned; and
3. A high body temperature of 103 degrees Fahrenheit or more.
4. Other symptoms may include quick or difficult breathing, constricted pupils and rapid pulse.

Treatment for heat stroke requires an immediate call to 911. Prompt first aid can prevent permanent injury to the brain or other vital organs. While waiting for emergency personnel, do not leave the victim alone. Move the patient to a cool, shaded area and have them lie on their back or side. Loosen and remove heavy clothing and have the patient drink cool water (unless sick to the stomach or not fully conscious). Fan the body while spraying it with a cool water mist or wipe the body with a wet cloth. Place ice packs under the armpits, on wrists or behind the knees.

General Safe Work Practices

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1. Rotate the workload among co-workers.
2. Shorten the duration of exposure in accordance with the Heat Exposure Plan.
3. Increase rest time or frequency of rest periods per Heat Exposure Plan guidelines (rest/recovery areas should have a heat index below 90 degrees to provide an adequate cooling effect).
4. Utilize air conditioned rest areas where available.
5. Minimize direct heat sources by insulation or installing reflective screening/shading.
6. Use fans or mechanical ventilation in the work area.
7. Take cool drinking water to jobsites.
8. Utilize protective equipment such as cooling vests.
9. Know the signs and symptoms of heat related illness and look out for co-workers.

Mitigation Measures for Working in Heat

Before starting work:

1. Hydrate the body with water and non-caffeinated beverages.
2. Eat well-balanced meals.
3. Get adequate rest.
4. Avoid caffeine, alcohol, and large amounts of sugar.
5. Use urine color to determine if you are properly hydrated.
6. Talk to your doctor about medications you are taking if heat/sunlight may cause side effects.
7. If muscle cramps or other symptoms are present prior to work, inform your supervisor.

During Work:

1. Follow Heat Exposure Plan work/stay/rest time guidelines.
2. Drink small amounts of water and electrolytes frequently to replenish lost fluids.
3. Watch yourself and co-workers for signs and symptoms of heat-related illness.
4. Wear light-colored, loose fitting, breathable clothing.
5. Stop and report to your supervisor if you or a co-worker exhibit signs/symptoms of heat-related illness.

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- 6. Report any issues that you may have encountered from the previous day or overnight to your supervisor.

Heat Exposure Plan

- 1. Use the following table to calculate recovery time needed for the specified heat exposure stay times.

Stay Times (Minutes)

Heat Index (°F)	Light Activity	Moderate Activity	Heavy Activity
90	480	480	190
91	480	480	158
92	480	460	134
93	480	430	117
94	480	395	103
95	480	373	92
96	480	373	83
97	480	373	76
98	385	274	70
99	294	211	64
100	237	171	60
101	199	143	54
102	170	123	49
103	149	99	44
104	132	82	40
105	119	69	36
106	108	60	34
107	99	53	31
108	91	47	28
109	79	43	25
110	See Below	See Below	See Below

Work in temperatures with a heat index above 110 require leadership approval and written heat mitigation plans.

NOTE: Routine Walk Downs and Operator Rounds do not require leadership approval. Stay times must still be determined and followed.

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Stay times use the following variables: moderate radiant heat, non-ventilated, work clothes, partially acclimated.

Recovery Time Calculation: $60(\text{Actual Time}/\text{Stay Time}) = \text{Recovery Time}$

Recovery Time = minimal physical activity (sitting or standing) in shade, if possible

Heavy Activity: welding, climbing, grinding, continuous bending, shoveling, wearing protective clothing (Tyvek, 40 cal suit)

Moderate Activity: steady walking, sorting materials, pump/valve rebuilding, other work that requires hand/arm usage

Light Activity: sedentary, sitting, standing to observe, walking at a normal pace on a level surface, operating equipment from a cab, calibrating instruments

Stay Time and Recovery Time Examples

Recovery Time = $60(\text{Actual Time}/\text{Stay Time})$ minimal physical activity (sitting or standing) in shade, if possible

Example #1

Co-Worker is in an area that has a heat index of 95 degrees F doing light activity.

Stay Time = 480 minutes

Actual Time Worked = 75 minutes

$60(75 \text{ minutes worked} / 480 \text{ minutes stay time}) = \text{Minimum 10 minute recovery time}$

Example #2

Co-Worker is in an area that has a heat index of 102 degrees F doing heavy activity.

Stay time = 49 minutes

Actual Time Worked = 40 minutes

$60(40 \text{ minutes worked} / 49 \text{ minute stay time}) = \text{Minimum 49 minute recovery time}$

Example #3

Co-Worker is in an area that has a heat index of 108 degrees F doing moderate activity

Stay Time = 47 minutes

Actual Time Worked = 30 minutes

$60(30 \text{ minutes worked} / 47 \text{ minute stay time}) = \text{Minimum 38 minute recovery time}$

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REFERENCES:

- OSHA Fact Sheet #3154, *Heat Stress Card*
- OSHA Fact Sheet #3156, *Cold Stress Card*
- OSHA Fact Sheet #3166, *Protecting Yourself in the Sun*
- OSHA Fact Sheet #9516, *Protecting Workers in Hot Environments*
- OSHA Fact Sheet, *Working Outdoors*
- OSHA Technical Manual – Section 3, Chapter 4
- Corporate Safety Guideline *Heat Stress: Identification & Prevention Guideline*

Tools

Hand tools are used routinely by employees in the performance of their duties. Hand tools include such items as hammers, screwdrivers, wrenches and all power tools. Power tools include electrical, pneumatic, hydraulic, powder actuated and internal combustion engine-driven tools.

When using tools, employees shall be familiar with and comply with the requirements of the operator's manual provided by the manufacturer. Be aware of potential hazards. Additional hazards may be introduced through the use of excessive force and / or improper body position.

General Safe Work Practices

1. Don't use defective tools.
 - a. Tools must be visually inspected for defects before use.
 - b. Immediately tag and return tools found to be defective.
2. Use the right tool for the job.
 - a. The wrong size or type of tool can cause personal injury and / or damage to equipment.
 - b. Only use tools for the purpose they were designed.
 - c. Keep clear of "line of fire" when exerting force on hand tools and particularly with power or pneumatic tools. Expect sudden movement and don't be where you can be struck by the tool or caught between the tool and solid object.
3. Use the right tool and the right method.
 - a. Adjustable wrenches should be used so the force is applied to the fixed jaw and towards the user.

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- b. Wrenches can slip off the nut / bolt. In order to prevent a potential injury, be aware of what your hand could strike if the tool slips.
 - c. Be aware that valve wrenches add additional torque. They can cause a quick change of body position when the valve breaks off the seat.
 - d. Cheaters and hammers should not be substituted for the proper wrench, nor should they be used.
 - e. Valve wrenches should not be used on motor-operated valves (Limitorque or Rototork valves).
 - f. Never use the electric cord to lift or lower tools or equipment.
 - g. Incorporate proper body position or controls to prevent injuries should the tool or bit catch. This creates excessive twisting or torque.
 - h. Magnetic based drills should be properly secured before attaching to surface in case of loss of power. Rope, tool lanyards or other reliable tethers shall be used.
4. Job made tools shall have appropriate Engineering review before fabrication.

Tool Maintenance

- 1. Cutting tools must be kept sharp in order to perform their proper function without applying excessive force.
- 2. Guards and protective covers should always be in place and in proper working order.
- 3. Avoid using striking tools with mushroomed heads. Instead, remove them from service and tag them "Danger – Do Not Use."

Electric Tools

- 1. Do not raise or lower tools by the cords.
- 2. Any cord and plug connected equipment shall:
 - a. Be equipped with a plug having a ground prong or
 - b. Be double-insulated. (Normally the tool has a plastic insulated handle and case and does not have a ground prong).
- 3. A Ground Fault Circuit Interrupter (GFCI) shall be used for any portable electric tool, especially when working in wet locations.

Fuel Powered Tools

- 1. Turn off fuel powered tools when refueling and servicing.

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2. When fuel powered tools are used in confined spaces, evaluate the space for atmospheric hazards.
3. Fuel powered tools must be stored in well-ventilated areas.

Hand Tools

1. Inspect hand tools prior to use.
2. Keep wooden tool handles free of splinters or cracks. Keep the handles tight in the tools.
3. Cheaters and hammers should not be substituted for the proper tool, nor should they be used.
4. Always use appropriate PPE when working with or around hand tools.
5. When using saw blades, knives or other tools, direct the tools away from you, any aisle areas and away from other employees working in close proximity.
6. Knives and scissors must be sharp. Dull tools can cause more hazards than sharp ones.
7. Cracked saw blades must be removed from service.
8. Wrenches must not be used when jaws are sprung to the point that slippage occurs.
9. Where ignition hazards exist, spark-resistant tools made of non-ferrous materials should be used.

Powder Actuated Tools

1. Employees shall be trained in the operation of the tool prior to using it.
2. Prior to use, test powder actuated tools in accordance with the manufacturer's recommendations to ensure safety devices are in proper working condition.
3. Do not load tools until just prior to the intended firing time.
4. Do not point tools toward personnel.
5. Do not place hands near the barrel.
6. Do not leave powder actuated tools unattended.
7. Do not attempt to drive fasteners into very hard or brittle materials, including cast iron, glazed tile, surface hardened steel, etc.
8. Do not drive fasteners into easily penetrated materials unless such materials are backed by a substance that prevents the pin or fastener from passing through. Avoid creating a projectile hazard on the other side of the material.

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9. Do not use powder actuated tools in explosive or hazardous atmospheres.
10. Always use the correct shield, guard, or attachments recommended by the manufacturer.
11. Always wear appropriate PPE when operating powder actuated tools.

Pneumatic & Hydraulic Tools

1. Do not lock supply control valves open at any time. They must be accessible for immediate hand control.
2. Never exceed safe operating pressures for hydraulic and pneumatic tools, hoses, valves, pipes, filters or fittings.
3. Do not use hydraulic or pneumatic tools where they may contact exposed electrical conductors, unless they have been designed and maintained for such use.
4. Air-powered tools should be used for wet or damp work areas to prevent electrical shock.
5. If pneumatic tools are used on energized electrical lines or equipment, provide protection against moisture accumulation in the air supply.
6. Secure pneumatic power tools to the hose by some positive means to prevent the tool from becoming accidentally disconnected.
7. Use safety clips or retainers on pneumatic impact tools to prevent attachments from being accidentally expelled.
8. Release pressure before connections are broken.
9. Do not kink hoses.
10. Do not use any part of your body to attempt to locate or stop a hydraulic or pneumatic leak.
11. Do not hoist or lower tools by the hose.
12. Always use appropriate PPE when operating pneumatic and/or hydraulic tools.

Angle Grinders

1. Only Ameren approved electric or battery powered right angle grinders shall be used at Ameren facilities. The approved grinders must meet the following requirements:

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- a. Grinder must have a brake system capable of stopping the wheel in 2 seconds or less.
 - b. Grinder must have handle attachment that has 180° of position mounting.
 - c. Grinder must have safety clutch that provides anti-kickback protection.
 - d. Grinder must be a rat-tail design (no paddle switch).
 - e. All grinders shall be operated with their OEM supplied safety equipment.
2. If work requirements dictate the removal of grinder OEM supplied safety equipment, AUE-FRM-2425-01 Grinder Safety Deviation Form shall be filled out and the necessary Management approvals obtained prior to work beginning.
 3. Proper PPE shall be worn while using angle grinders. This includes, but is not limited to, impact resistant face shield, safety glasses, hearing protection, arm protection and leather or cut resistant gloves.
 4. Grinder wheel must be dimensionally correct for the angle grinder and meet or exceed the posted RPM's of the angle grinder. Grinder wheel must be contained both axially and radially by the grinder's guard.

REFERENCES:

- OSHA-29 CFR1910.242, *Hand & Portable Powered Tools & Equipment*
- OSHA-29 CFR1910.269(i)(2), *Cord & Plug-Connected Equipment*
- OSHA-29 CFR1910.269(i)(4), *Hydraulic & Pneumatic Tools*
- OSHA-29 CFR1910.302, *Electric Utilization Systems*
- OSHA-29 CFR1910.333, *Selection & Use of Electrical Work Practices*
- NFPA 70E – *Article 245, Portable Electric Tools & Equipment*
- ADM-AUE-2425 - *Tools and Equipment Safety*

Walking & Working Surfaces

Walking and working surfaces encompass all of the areas in which we work. Many aspects of walking and working surfaces are discussed in other topics such as housekeeping, scaffolds and coal handling. The following requirements apply to any walking and working surface.

General Safe Work Practices

1. Perform routine inspections of walking and working surfaces hazards.
2. Unauthorized personnel must not remove, reach through, climb or walk through areas marked with barrier ropes, barrier tape or barricades. See Barrier Tape Section of this handbook for further information on barricades.

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3. Barricades, barrier ropes or barrier tapes must be posted with the hazard involved, as well as an indication of which side of the barrier is the "safe" side.
 - a. Posted signs shall face outward, away from the hazard area.
4. Personnel shall use proper walkways.
 - a. Do not attempt shortcuts through electrical switching areas.
 - b. Do not walk on pipelines, cable trays or electrical busses.
 - c. Do not slide down pipes, stanchions or handrails.
 - d. Do not jump from one level to another.
 - e. Do not cross between or under coupled train cars.
 - f. Do not walk from one roof to another, unless proper access is provided.
 - g. Do not walk or climb on building steel without proper fall arrest
5. Walkways shall be kept clear of all slip, trip or fall hazards.
6. Tools, material or equipment must not be dropped or thrown from one level to another.
7. Employees shall not ride in or work from the bucket of a bobcat, backhoe or any other equipment not specifically designed for this purpose.
8. Personnel shall not use conduits or cable trays as a working surface. The use of other plant equipment for a working surface requires engineering approval prior to use of that equipment for that purpose.
9. When ascending or descending stairwells, employees should keep at least one hand on the handrail.(Maintain three points of contact.)
10. When working on elevated platforms refer to Elevated Platforms section in this book.

REFERENCES:

- OSHA-29 CFR1910, Subpart D – Walking & Working Surfaces
- OSHA-29 CFR1910.22, General Requirements
- OSHA-29 CFR1910.23, Guarding Floor & Wall Openings & Holes
- OSHA-29 CFR1910.24, Fixed Industrial Stairs
- OSHA-29 CFR1910.25, Portable Wood Ladders
- OSHA-29 CFR1910.26, Portable Metal Ladders
- OSHA-29 CFR1910.27, Fixed Ladders
- OSHA-29 CFR1910.28, Safety Requirements for Scaffolding

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- OSHA-29 CFR1910.29, *Manually Propelled Mobile Ladder Stands & Scaffolds*
- OSHA-29 CFR1910.30, *Other Working Surfaces*
- “Barrier Tape” section of this handbook
- “Housekeeping” section of this handbook
- “Ladder Safety” section of this handbook
- “Scaffolding” section of this handbook

Weather

Adverse weather such as temperature extremes, high winds, tornados, lightning, rain, snow, ice and hail can have an impact on your job. It is important for you to know what condition you will be dealing with and work accordingly. Know your physical condition and ability to cope with extreme weather conditions.

General Safe Work Practices

1. Know how to deal with temperature extremes.
2. Special precautions should be taken when working in high wind environments.
 - a. Wear appropriate PPE to protect from potential hazards from airborne dust.
 - b. Know limitations of the equipment you are using, such as cranes and lifts.
3. Follow energy center guidelines for dealing with severe weather.
 - a. Know the location of your center’s tornado shelters.
 - b. Know your center’s emergency procedures.
 - c. Be aware of lightning hazards. Avoid working around water when lightning exists.
 - d. Heavy rain storms can cause flooding in storm sewers and underpasses.
 - e. Rain can affect working on or around electrical equipment.
 - f. Use caution when driving or walking in snowy or icy areas.
 - g. Know where first aid and other emergency equipment are located at your facility.

It is sometimes necessary to work under adverse weather conditions. Be aware of potential severe weather conditions, follow any instructions given and know what you need to do to stay safe.

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- *Emergency Action Sheet-10, High Winds / Tornado Response*
- *“Temperature Extremes” section of this handbook*

Work Area & Office Safety

There are many potential dangers in an office area or assembly areas. The following includes potential safety items that can be found in these types of environment.

General Safe Work Practices

1. Keep work area clean and neat, with everything in its proper place.
2. Keep floors and aisles clear.
3. Do not leave sharp objects lying out or protruding.
4. Clean up spills immediately. Identify wet floors with proper signs or warning tape until the area is dry.
5. Never use electrical equipment when hands are wet.
6. Route cords, hoses, welding leads, etc., in such a fashion to avoid tripping hazards.
7. Keep all desk, file or cabinet drawers closed when not in use.
 - a. To prevent tipping file cabinets, do not open more than one drawer at a time.
8. Do not use tables, chairs, desks, boxes or inverted buckets or trashcans as an alternative to a ladder.
9. Do not run in hallways or up and down stairs. When ascending or descending stairs, use handrails.
10. Do not text or use a mobile phone while walking.
11. Since improper lifting techniques account for the majority of back-related injuries, use proper lifting techniques when moving items around the work area.
 - a. Lift with the legs, not the back.
 - b. When possible, limit lifting to below the shoulders and above the waist.
 - c. Keep the load close to the body when lifting. This technique keeps your back in alignment and allows the stronger muscles in the legs to do the lifting.
 - d. Never twist while performing a lift.

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- e. Make sure to have a clear path of travel before making a lift.
12. When moving large or heavy items, use a dolly or similar equipment.
13. Where possible, store large, heavy objects at waist level.
14. Keep all chair legs on the floor while seated.
15. Damaged office chairs or other equipment shall not be used.
16. All electrical office equipment should be turned off and unplugged when being adjusted, maintained or repaired.
17. Small appliances such as space heaters, coffee makers, etc., must be shut off and / or unplugged at the end of the shift.
18. Disconnect, remove from service / have repaired all malfunctioning or faulty electrical equipment. Repairs of electrical equipment shall only be performed by qualified and authorized personnel.
19. Do not use more plugs than an outlet is designed for. If additional outlets are needed, use a power strip equipped with fuse or circuit breaker protection.
20. Workstations should be designed with the surface at a comfortable height and comfortable positioning of thighs and feet.
 - a. Attempt to maintain knees at the same level as the hips.
 - b. Chairs should be maintained so feet are flat on the floor or are supported by a footrest.
21. When working with a keyboard or mouse, maintain it in a flat position.
 - a. Utilize a wrist-rest, if necessary.
 - b. Maintain elbows and arms close to the body.
 - c. Maintain the mouse, pointing device or calculator at the same level as the keyboard.
22. Do not block emergency exits or fire escapes.
23. Know where fire extinguishers and first aid kits are located.

REFERENCE:

- *AUE-ADM-2418, Industrial Safety Program*
- *Corporate Safety Guidelines Office Ergonomics Presentation and Office Ergonomics Stretching Exercise*

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Working On or Near Water

When working on or near water, it is imperative that additional safety precautions be taken. Employees shall follow the safety rules outlined below, or their energy center-specific requirements.

General Safe Work Practices

1. Only authorized personnel should work near bodies of water, i.e. rivers, lakes, ash ponds canals, reservoirs.
2. Use the buddy system for any physical work around the water.
3. Carry a portable radio for communication.
4. Inspect and wear a U.S. Coast Guard-approved life jacket or buoyant work vest when working within 20 feet of any body of water where no handrail is present. Personal floatation devices (life Jackets) should be kept in vehicles at all times
5. Defective units shall be taken out of service, tagged “Danger – Do Not Use” and given to your supervisor.
6. Properly adjust, fasten and cinch the life jacket or buoyant work vest to prevent accidental removal in the event of a fall into the water.
7. Know the location of ring buoys; ensure they are securely tied, readily available and accessible. Ring buoys shall be inspected for defects and replaced if defective.
8. Properly secure any portable ladder used while working on or near the water.
9. Work performed near water should be done during daylight hours when possible.
10. When driving near bodies of water wear seat belts and observe a 10 mph speed limit.
11. Pay attention to current weather conditions and respond appropriately during any severe weather advisory.

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Emergency Safety

In the event someone falls in the water, the witness shall:

1. NOT jump into the river to attempt rescue! Never put yourself at risk.
2. Immediately notify the Shift Supervisor or other appropriate personnel of the incident.
3. Keep the individual in sight.
4. If possible, throw a life ring or any available flotation device downstream of the person in the water and in his / her general vicinity.
5. Encourage the individual to relax, tilt the head back and let the life vest “buoy” him/her.
6. Instruct the individual to remove the tool belt or begin unloading tools.
7. Ensure the individual receives appropriate first aid measures after being rescued.

REFERENCES:

- *OSHA 29 CFR 1926.106 Working Over or Near Water*