J J WHITE INCORPORATED

JOB HAZARD ANALYISIS MANUAL

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J. J. WHITE, INC.

JOB HAZARD ANALYSIS MANUAL

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J. J. WHITE, INC.

JOB HAZARD ANALYSIS MANUAL

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JOB HAZARD ANALYSIS – 001

PILING AND STORING MATERIALS

KEY POINTS

- Store materials so they will not obstruct stairs, ladders, exits, or safety and fire protection equipment. Whenever possible, do not put material in aisles or walkways. Do not pile combustible material in contact with hot surfaces such as light bulbs and steam lines.

- In a mix of light and heavy materials; the heavy items should be placed on the bottom of a pile.

- Pipe is to be piled in special pipe racks when available, otherwise to be stored in separated layers, chocked with wooden wedges.

- If materials are to be stacked, no containers or materials are to be hidden from view, so that, if one piece were moved, some other item would also move or fall.

- Stacked material should be stable to prevent load shifting.

- If materials are placed in a storage rack, make sure that the rack is strong enough to hold the containers or materials so that containers are not protruding from the rack and those materials are secured so they will not move.

- Pallets of bags should normally not be stacked more than two high.

- All floors should be posted with the maximum design load rating in pounds per square foot. Materials should not be placed or stacked such that the floor load rating is exceeded.

- Gas cylinders are to be stored in an upright position, secured with a guard chain to a solid support, and with the protective cap over the valve. No cylinders are to be left free standing - they must be chained at all times, except during the actual moving process.

- Do not store drummed or bagged materials if the containers are punctured. Consult your supervisor as to the disposition of such items.

JOB HAZARD ANALYSIS – 001 PILING AND STORING MATERIALS	
PURPOSE :	Proper Procedure for Piling and Storage of Materials.
JOB HAZARD :	Injuries to employees and pedestrians from improperly stored material.
PROTECTIVE EQUIPMENT :	Basic P.P.E.; Based on Location
SCOPE :	This procedure covers practical suggestions as to the safe placement of materials normally received and stored at the job site or lay-down area.
REFERENCES :	N/A

PROCEDURE:

A. Preparation and Use

1. Store materials so they will not obstruct stairs, ladders, exits, or safety and fire protection equipment. Whenever possible, do not put material in aisles or walkways. Do not pile combustible material in contact with hot surfaces such as light bulbs and steam lines, or where hot work activities are taking place.

   When a difference in road or working levels exist, means such as ramps, blocking, or grading shall be used to ensure the safe movement of vehicles between the two levels.

   Dockboards (bridge plates)

   - Portable and powered dockboards shall be strong enough to carry the load imposed on them.
   - Portable dockboards shall be secured in position, either by being anchored or equipped with devices which will prevent their slipping.
   - Handholds, or other effective means, shall be provided on portable dockboards to permit safe handling

   Employees working on stored material in silos, hoppers, tanks, and similar storage areas shall be equipped with personal fall arrest equipment.

Material stored inside buildings under construction shall not be placed within 6 feet of any hoistway or inside floor openings, or within 10 feet of an exterior wall which does not extend above the top of the material stored.

The minimum vertical distance between sprinklers and stored material below shall be 18 inches.

2. In a mix of light and heavy materials; the heavy items should be placed on the bottom of a pile.

3. Pipe is to be piled in special pipe racks when available, otherwise to be stored in separated layers, chocked with wooden wedges.

4. All materials stored in tiers shall be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling or collapse.

5. If materials are to be stacked, no containers or materials are to be hidden from view, so that, if one piece were moved, some other item would also move or fall.

6. If materials are placed in a storage rack, make sure that the rack is strong enough to hold the containers or material that containers are not protruding from the rack, and that materials are secured so they will not move.

7. Pallets of materials should normally not be stacked more than two high.

8. Brick stacks shall not be more than 7 feet in height. When a loose brick stack reaches a height of 4 feet, it shall be tapered back 2 inches in every foot of height above the 4-foot level.
When masonry blocks are stacked higher than 6 feet, the stack shall be tapered back one-half block per tier above the 6-foot level.

9. All floors should be posted with the maximum design load rating in pounds per square foot. Materials should not be placed or stacked such that the floor load rating is exceeded.

10. Lumber:
    - Used lumber shall have all nails withdrawn before stacking.
    - Lumber shall be stacked on level and solidly supported sills.
    - Lumber shall be so stacked as to be stable and self-supporting.

- Lumber piles shall not exceed 20 feet in height provided that lumber to be handled manually shall not be stacked more than 16 feet high.

11. Gas cylinder storage

    - All compressed gas cylinders must be handled with care. They should not be dropped, rolled on side, abused or used for any other purpose than that for which they were intended.
    - Cylinders must be stored in an upright position, secured with a guard chain or wire to a solid support.
    - Cylinders not connected for use, empty or full, must have their protective caps in place.
    - Never store oxidizers and flammables in the same rack; separate them by 20 feet or with a ½ hour rated fire barrier.
    - No cylinders are to be left free standing - they must be chained at all times, except during the actual moving process.

12. Do not store drummed or bagged materials if the containers are punctured. Consult your supervisor as to the disposition of such items.

13. Identify contents on outside of all containers. All containers must be labeled.

14. If fork lift truck is used in storing process, make sure adequate room to maneuver, and that load is balanced. No one is permitted to operate a fork lift truck until they are properly trained.

15. If a hand cart or hand truck is used, be sure that the load is balanced, kept as low as possible, and the cart or truck capacity is not exceeded.

16. Avoid congestion of storage areas. Leave sufficient room for fire fighting or other emergencies.

17. When material must be stored on or near vehicular roadways, use of barricades and warning lights to warn others is required.

18. Do not overload floors, scaffolds, trucks, etc.

19. Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations.

20. Dispose of combustible trash and debris in containers provided for this purpose.

21. Containers of volatile materials, acids, caustics or empty containers with residues of any chemical or hydrocarbon should be disposed of properly. For proper disposal, consult your supervisor.

22. When lifting any material, lift with your legs, **NOT** your back.

JOB HAZARD ANALYSIS – 002

UNPACKING STOREHOUSE ITEMS

KEY POINTS

- If the packing slip is on the outside of the container, read it first so as to obtain any information as to what to expect when opening the container. Note the warning labels and symbols printed on the outside of the shipping container.
- Examine the container; use the appropriate method, tools, and protective clothing to safely open it.
- Generally, in the use of all hand tools, a slow, steady speed is safer than a fast, jerky motion.
- When using a retractable utility knife, be sure its size is adequate, blade is sharp, and cutting motion is away from the user. Utility knives must be retractable.
- When using a nail remover gloves are required and the hand that holds the tool must be placed below the hammering or movable part.
- When using a staple remover, remove all staples completely, and dispose of them in a trash container. The next person touching the container may be cut if staples are left in the package.
- When cutting metal bands with sheet metal sheers, gloves are to be worn. The bands are to be cut with the individual at right angles to the direction of the band (since the bands are under pressure when cut, they tend to spring toward the direction in which they are wound).
- When using a pinch bar to pry open containers, gloves are to be worn, and the motion is to be steady. Be alert for any sudden release of the lid or parts of the lid.
- After containers are opened, remove the packaging material carefully. Be alert for broken glass or sharp metals, hidden in or beneath the packing material. Be alert for containers, such as orange crates, which are constructed with thin wire bands with sharp ends.
- Dispose of all packing material in trash containers, including any material that has fallen on the floor.

JOB HAZARD ANALYSIS – 002 UNPACKING STOREHOUSE ITEMS	
PURPOSE :	Proper procedure for unpacking items received.
JOB HAZARD :	Injuries to employees from improper unpacking techniques.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Kevlar Gloves, Kevlar Forearm Protection
SCOPE :	This procedure covers the handling of materials received in assorted shipping containers from the opening thereof to the point of storage or disbursement.
REFERENCES :	N/A

PROCEDURE:

A. Preparation and Use

1. If the packing slip is on the outside of the container, read it first to obtain any information as to what to expect when opening the container. Note the warning labels and symbols printed on the outside of the shipping container.

2. Examine the container; use the appropriate method, tools, and protective clothing to safely open it.

3. Tools :

   a. Generally, in the use of all hand tools, a slow, steady speed is safer than a fast, jerky motion.

   b. When using a retractable utility knife, be sure its size is adequate, blade is sharp, and cutting motion is away from the user. Note : only retractable utility knives are acceptable.

   c. When using a nail remover, gloves are required and the hand that holds the tool must be placed below the hammering or movable part.

   d. When using a staple remover, remove all staples completely, and dispose of them in the trash container. The next person touching the container may be cut if staples are left in the package.

e. When cutting metal bands with sheet metal shears, gloves are to be worn. The bands are to be cut with the individual at right angles to the direction of the band (since the bands are under pressure when cut, they tend to spring toward the direction in which they are wound).

f. When using a pinch bar to pry open containers, gloves are to be worn, and the motion is to be steady. Be alert for any sudden release of the lid or parts of the lid. Brace your body accordingly.

4. After containers are opened, remove the packing material carefully. Be alert for broken glass or sharp metals, hiding in or beneath the packing material. Be alert for containers, such as orange crates, which are constructed with thin wire bands with sharp ends.

5. Dispose of all packing materials in trash containers, including any material that has fallen on the floor.

6. Nails or staples are to be removed or flattened – from packing crates or parts of packing crates.

7. When using retractable utility knives or when handling sheared metal parts (i.e. Tower Trays) Kevlar gloves and Kevlar forearm sleeves must be used to prevent lacerations from metal burrs.

JOB HAZARD ANALYSIS – 003

GRINDERS AND ABRASIVE WHEELS

KEY POINTS

- Gloves must be worn when using all grinders.
- You must wear a face shield and safety glasses/monogoggles to operate any grinder.
- Out of round wheels or grinding wheels with a groove worn in them shall be dressed with a dressing tool to return it to its original condition. Wheels out of balance, which cannot be balanced by dressing shall be removed from the machine and destroyed. Always use full surface of wheel evenly.
- Adjust the work rest on a pedestal grinder to a maximum of 1/8" opening.
- When mounting a grinding wheel on any type grinder, check that the operating speed of the wheel being mounted equals or exceeds the operating speed of the grinder it is being mounted on.
- Never grind on the side of a wheel designed for peripheral grinding.
- Never grind soft materials on grinder wheels (i.e. aluminum, brass, wood).
- Replacement wheels must be stored and handled properly.
- If there are any doubts about the integrity of a grinding wheel, replace it and destroy the wheel in question.
- Never operate an electric powered grinder without Ground Fault Circuit Interrupters (G.F.C.I.'s).

JOB HAZARD ANALYSIS – 003 GRINDERS AND ABRASIVE WHEELS	
PURPOSE :	This procedure outlines the precautions to be observed when using a portable grinder, changing a wheel on a portable grinder, and the rules governing grinder issuance and control.
JOB HAZARD :	Flying objects, rotating parts, abrasive surfaces.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Face Shield, Sealed Eyewear, Monogoggles.
SCOPE :	Grinders are high speed tools which use an abrasive wheel at high speed for cutting. They must be clearly marked to show maximum allowable wheel size and operating speed. They can be portable hand tools or stationary pedestal tools. They can be air or electric driven.
REFERENCES :	JHA-052 (Safe Use of Angle Grinders with Wafer Cutting Wheels).

PROCEDURE:

A. Preparation & Use

1. General Operating Rules.

a. Grinders shall not be used without proper eye protection (face shield & goggles or safety glasses). Gloves must be worn when using all grinders.

b. All abrasive wheels shall be provided with safety guards.

Exceptions: Wheels used for internal work.
Mounted wheels, 2” or smaller in diameter.
Cone plug type wheels.

c. All new grinding wheels shall be run at least one minute before applying to work, during which time no one shall stand in front of or in line with the wheel. Never grind on the side of a wheel made for peripheral grinding.

d. Out-of-round wheels or grinding wheels with a groove worn in them shall be dressed with a dressing tool to return it to its original condition. Wheels out of balance, which cannot be balanced by dressing shall be removed from the machine and destroyed. Always use full surface of wheel evenly.

e. Work rests on pedestal grinders shall be kept close to the wheel with a maximum opening of 1/8” on wheel centerline to prevent the work from being caught between the work and the rest. The adjustment shall not be made while the wheel is in motion.

f. Grinder must be clearly marked to show the maximum allowable wheel size and operating speed. If data is not clearly legible, attach a stamped metal tag showing wheel size and R.P.M.

2. Air Type Grinders.

a. Use the size grinding wheel shown on the tool -- never use a larger wheel. To do so can result in a surface speed high enough to destroy the wheel. Check the maximum shown on the wheel. This speed should be equal to or more than the tool’s spindle speed. Never use a wheel having a marked speed less than the tool spindle speed.

b. Wheel type tools are designed to operate within definite air pressure ranges. Too high a pressure may be dangerous. Too low a pressure may create flat spots on grinding wheels which can lead to breakage.

c. Grinding produces highly heated particles (sparks) which might cause ignition of flammable gases. Therefore, a hot work permit maybe required to grind. Always check with owner’s representative before grinding.

3. Mounting.

a. Use only proper flanges and blotters to mount wheels. Check flanges for flatness.

b. Always use new blotters when replacing wheels. Follow manufacturer’s recommendations.

c. When mounting the wheel, make certain that the machine speed (RPM) does not exceed the wheel speed (RPM). Grinder RPM speed is shown on the name plate. Wheel RPM speed is shown on the wheel blotter.

d. The correct size and type of flange is important since it reinforces the center of the grinding wheel. Information concerning the wheel is printed on the wheel blotter.

e. Never use a wheel whose blotter is missing, on wheels that are stamped, blotters must be used.

B. Precautions

1. Common Causes of Wheel Breakage on Portable Grinders.

a. Improper Mounting of Straight Wheels:

i) Both fixed and loose flanges should be of the same diameter, evenly matched and free of distortion to avoid setting-up bending stresses in the grinding wheels.

b. Improper Mounting of Depressed Center Wheels:

i) Clamping nut must fit correctly (i.e., be the same size as the arbor hole) to properly center the wheel.

c. Improper Speeds:

i) Wheel manufacturers plainly mark the safe operating speed in RPM's on each wheel. This speed must not be exceeded.

d. Abusive Operation:

i) Grinding with the flat side of a straight wheel is hazardous and should be avoided.

ii) Excessive pressures between the work and the wheel can set up excessive stresses in the wheel body and cause breakage.

e. Abusive Handling:

i) Careless handling, dropping, bumping, etc. can damage the wheel and cause breakage when brought up to speed.

ii) Any grinder that has been dropped shall have a new wheel installed before use.

2. Check Points on Using Portable Grinders.

a. Check condition of grinding wheel before using (no cracks, chip outs, etc.).

b. Check machine for factory supplied guards and handles.

c. Be sure wheel is right composition for the job.

d. Loose flange securing nut must be fully threaded on shaft.

3. Safety Steps for Using Grinders.

a. Operator must wear a wrap-around full face shield with chin guard or weld hood and safety glasses. If a non-wrap-around face shield is used, mono goggles must be worn under the face shield.

b. Operator should not wear any loose or oil soaked clothing that would possibly catch in grinder or subject to ignition by sparks.

c. Be sure air hoses, electrical cords, or other obstructions are removed from the immediate work area. Air hoses (Chicago Fittings) shall be pinned. Electric plugged into G.F.C.I. Cords, hoses and grinders must have current inspection color code where applicable.

d. Run grinder freely for a few seconds before using to check for trueness and allow time for warm-up. Do not apply cold wheel too quickly to the work -- ease into it until the wheel warms up.

e. Handle wheels carefully at all times -- do not drop, or strike hard objects or leave exposed to the weather. Wheels are fragile.

f. Do not overload machine. At slower speeds caused by heavy pressure on the work, heat develops. Let the machine do the work.

4. Causes of Injury from Abrasive Wheels.

The National Safety Council "Accident Prevention Manual for Industrial Operation" lists the following causes.

a. Failure to wear eye protective equipment.

b. No wheel guards.

c. Excessive wheel speeds.

d. Wrong type wheel for work.

e. Side grinding (wheels are not designed for this).

f. Lack of equipment maintenance.

g. Grinding soft materials (i.e. wood, aluminum, brass, etc.)

h. Taking too heavy a cut.

i. Applying work too quickly to a cold wheel.

j. Bursting of a wheel.

k. Vibration.

l. Wrong size flanges or flanges of unequal diameters.

m. Failure to use wheel washers (under flange).

n. Wheel out of balance.

5. Portable Grinder Control.

a. All employees must sign out for a portable grinder, regardless of the type of wheel used, including wire wheels.

b. Employees who use grinders are responsible for their correct use and return to the tool trailer when that particular job is finished. Grinders should be returned promptly to the tool trailer and not stored in tool boxes.

c. When the grinder is issued at the tool trailer, it will be equipped with all manufacturer supplied safety guards and handles. The only time the grinder may be used without a guard or handle is when grinding internally, such as, inside small diameter piping. Only Tool Room personnel or a Foreman can remove or replace a guard if the Foreman or Safety Coordinator authorizes a "guard removal". A safety guard is an enclosure designed to retain the pieces of the grinding wheel should it be broken in operation. Do not defeat their purpose by arbitrarily removing them. Side guards may be omitted where the work entirely covers the side of wheel or provides a suitable measure of protection.

d. Grinders must be brought in to the Tool Room every day for a Safety Inspection. The grinder will be:

i) Checked for damage.

ii) Checked for proper guard and handle.

e. Employees will return to the tool trailer all grinders not being used. A periodic check should be made of all tool boxes for grinders, grinder components, and wheels not in use.

f. Regarding Shops: All portable grinders being used by shop employees will be locked up at the end of the day. Because of their constant use in the shop they do not have to be turned in after each job. They must be brought to the Tool Room every month for inspection.

6. Handling of Abrasive Wheels.

All grinding wheels are breakable and therefore care shall be exercised in handling to prevent damage. The following rules shall be observed:

a. Handle wheels carefully to prevent dropping or bumping.

b. Do not roll wheels (hoop fashion).

7. Inspection of Abrasive Wheels.

Wheels must be dry and free from obvious defects. While freely suspending the wheel by the hole in the center, gently "tap" wheel with a light non-metallic implement (screw driver handle) about 45^{o} each side of the vertical center line and about 1 or 2 inches from the periphery. A sound and undamaged wheel will give a clear metallic tone; if cracked, there will be a muffled or dead sound. Then rotate the wheel 45^{o} and repeat the test. Destroy any wheel which has a doubtful sound.

8. Storage of Abrasive Wheels.

Suitable racks, bins or drawers shall be provided in the tool room for proper storage of the various types of wheels used. Stored wheels shall not be exposed nor subjected to extremes of temperature and humidity. Wheels can be damaged by high humidity and/or freezing temperatures.

JOB HAZARD ANALYSIS – 004

OPERATION OF FIXED SHOP EQUIPMENT

KEY POINTS

- No employee shall operate any shop equipment unless trained and qualified in its operation.
- Before operating, note location of surrounding personnel and ensure they are clear and aware of your actions. Take note of any special safety precautions posted on or near the equipment.
- Prior to starting any machine, locate the “stop” or “off” switch as well as the breaker for the specific piece of equipment.
- Lock out or otherwise secure equipment “off shift” to ensure only qualified personnel have access to it.

JOB HAZARD ANALYSIS – 004 OPERATION OF FIXED SHOP EQUIPMENT	
PURPOSE :	This procedure defines the safe use of shop equipment. This document is intended to highlight hazards common to the operation of this equipment and is not intended to replace proper training in its use. Examples of equipment include but are not limited to pipe welding positioners, ridged 535 pipe machines, and fixed bench grinders.
JOB HAZARD :	Rotating equipment, various flying particles, loose clothing and jewelry, pinch points, sharp edges, dust.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Face Sheild, Sealed Eyewear, Monogoggles.
SCOPE :	The **unauthorized** operation of any and all shop equipment by any and all personnel in the shop is **expressly forbidden**. Regardless of previous training or skill level, prior authorization from the responsible party supervising the care, operation, and maintenance of the equipment must be obtained before any use of said equipment.
REFERENCES :	Equipment Manuals & Training Manuals. Available from the Shop Supervisor.

PROCEDURE:

A. No employee shall operate any shop equipment unless they have been trained and are qualified in its operation.

B. Before beginning any operations, conduct a visual check on the condition of the equipment. Also note the location of surrounding personnel and ensure they are clear and aware of your actions. Take note of any special safety precautions posted by equipment and follow them accordingly.

C. Prior to starting any machine, locate the “stop” or “off switch as well as the breaker for the specific piece of equipment. All equipment breakers should be clearly labeled. If they are not, report this matter to the shop supervisor.

D. If any problem with the equipment is observed, shut it down, lock it out, and report it to the shop supervisor immediately.

E. Gloves are to be worn while operating shop equipment when practical and when performing certain activities such as using portable tools, and moving or positioning material). Personnel should have their gloves with them at all times to facilitate their use. It may be necessary to take gloves on and off several times during the course of an activity to safely perform tasks.

F. It is essential that good housekeeping is practiced at work areas throughout the job.

G. Lock out or otherwise secure equipment “off shift” to insure only qualified personnel have access to it.

H. Always use double eye protection / face shields.

JOB HAZARD ANALYSIS – 005

FALL PROTECTION

KEY POINTS

- When exposure to fall hazards of 6’ or more cannot be prevented through such measures as permanent or semi-permanent guarded scaffolds or platforms, personal fall protection equipment must be used.

- The fall protection policy applies to working at elevated work locations that are 6’ or more above a lower level or grade level.

- A fall protection system consists of guardrails, full- body harness with a shock absorbing lanyard and anchorage, lifelines, safety nets, warning lines, safety monitoring systems.

- Fall protection systems are required at all times for personnel on unprotected walking/working surfaces above dangerous equipment.

- Personal fall arrest is required when working on scaffolding if the scaffolding is used in a manner that reduced the protection provided; when working from an articulating boom or suspended platform, and when riding or working from a man basket.

- Personal fall arrest devices consist of full-body harnesses with a lanyard. Harnesses must have upper middle back “D” rings for proper body suspension during a fall. Lanyards must be fitted with a double locking snap hook to prevent “roll-out”.

- Anchoring of fall protection – personnel using articulating boom platforms must anchor to the manufacturers designated anchorage point and in man baskets must be anchored to the ball or block.

- Personal fall arrest devices must be anchored waist high or higher to minimize free fall.

- Personal fall arrest devices subjected to a free fall and full body load must be removed from service and discarded.

- Training – No person shall wear or use fall arrest devices without completing training prior to use of fall protection equipment.

JOB HAZARD ANALYSIS – 005 FALL PROTECTION	
PURPOSE :	Establish protective measures for personnel working or preparing to work at elevated heights six (6) or more feet above a lower level or grade level.
JOB HAZARD :	Fall Hazards.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Full Body Harness, Proper Lanyard System, Anchor Strap.
SCOPE :	When exposure to fall hazards cannot be prevented through such measures as permanent or semi-permanent guarded scaffolds or platforms, personal fall protection equipment must be used. This policy applies to working at elevated work locations that are six (6) feet or more above a lower level or grade level. It covers activities such as, but not limited to : work in pipe racks, on sloped roofs, on unguarded scaffolding, on tank tops, and when working inside or outside of any process structure not equipped with appropriate guarded work platforms.
REFERENCES :	J. J. White, Inc. Safety Awareness Manual, Appendix 15.

PROCEDURE:

A. Preparation and Use.

1. General.

a. All walking / working surfaces shall be kept free of unnecessary debris, moisture, and oil to prevent slips, trips, and falls.

b. Personnel using ramps, runways, and walkways greater than 6’ from a lower level or grade level must be protected by guardrail systems.

c. Where personnel can fall through holes in a walking / working surface greater than 6’ above a lower level or grade level, personal fall arrest, covers, or guardrail systems shall be provided.

d. Covers shall be provided where personnel can trip or step through holes in a walking / working surface.

e. Excavations shall be protected by guardrails, fences, barricades, or covers.

f. Where rigging or hoist areas extend through walking/working surfaces, personnel must be protected by guardrails or personal fall arrest systems. (i.e., Exchanger Bundle pulling).

g. If guardrails are removed to facilitate hoisting or rigging, personnel reaching through or over the hoist area must wear personal fall arrest systems.

2. Proper Working Platforms.

a. Permanent platforms with appropriate guardrails and toe boards are required where work is performed on unprotected walking/working surfaces greater than 4' from a lower level on a routine basis.

b. A proper working platform must be provided when possible for personnel working at heights greater than 6' from a lower level.

c. Proper working platforms consist of any of the following and <u>do not normally require fall protection systems</u> :

i) Permanent walkways and platforms with guard rails.

ii) Temporary scaffolding with top & mid-rails set at 42" & 21".

iii) Mobile ladder stands.

iv) Ladders (properly tied off) – Climbing Only. <u>Work from ladders >6' require a fall protection system</u>.

d. Scaffolding must be erected per OSHA 1910.28.

e. Personnel using powered manlifts and self-propelled platforms must be trained in the proper operation, safe use, and inspection of the equipment.

f. Ladders must be approved and be tied off or attended while work is being performed.

<u>WARNING</u> : LADDERS CAN BE DANGEROUS AND MUST BE USED PROPERLY AND BE IN GOOD WORKING CONDITION!

g. When proper working platforms are not possible or feasible, other working platforms may be used and <u>will require fall protection systems</u>. These include but are not limited to :

i) Extensible and/or articulating boom platforms (such as JLG's and electrical bucket trucks).

ii) Suspended platforms (painters' scaffold, etc.).

h. Powered, suspended, and specialty platforms must comply with OSHA 1910.66 and OSHA 1910.28.

3. Personal Fall Protection Guidelines.

a. Work performed on unprotected walking/working surfaces greater than 6' from a lower level requires use of fall protection systems.

b. Fall protection systems consist of :

i) Guardrails.

ii) Full-body harness with a shock absorbing lanyard (personal fall arrest).

iii) Anchor Points.

iv) Lifelines (vertical & horizontal).

v) Safety Nets.

vi) Warning Lines.

vii) Safety Monitoring Systems.

c. Where personal fall arrest is required, it must be fully utilized to ensure no exposure to a fall hazard is permitted (100% Fall Protection).

d. When employees are expected to move continuously on unprotected walking/working surfaces, the work shall be evaluated by those doing the work and the supervisor to determine the type of a fall arrest system (such as a horizontal lifeline for anchorage to allow movement).

e. Personal fall arrest is required when working from scaffolding that is 'Yellow Tagged'. This is when the scaffolding is used in a manner that reduced the protection provided (such as reaching under or over or standing above guardrails) or the scaffold is altered an poses a falling hazard.

f. Personal fall arrest is required when working from an articulating/extensible boom or suspended platform.

g. Personal fall arrest is required when riding or working from a manbasket.

h. Fall protection systems are required at all times for personnel on unprotected walking/working surfaces above dangerous equipment.

i. Persons using fall arrest devices in isolated areas must inform their supervisor of the location and task to be completed.

4. Fall Protection for Working on Roofs.

a. For work on low pitched roofs, personnel shall be protected from falls by use of personal fall arrest, guardrails, safety nets, or a combination of warning lines and a safety monitoring system.

b. Warning lines must be 6' from the edge of the roof.

c. A safety monitoring system alone may be used on roofs that are less than 50' wide.

d. Work on steep roofs requires personal fall arrest, guardrails with toeboards, or safety nets.

5. Proper Use of Personal Fall Arrest Devices.

a. Only approved full-body harnesses with a shock absorbing lanyard are acceptable personal fall arrest devices. Harnesses must have upper middle back "D" rings for proper body suspension during a fall. Lanyards must be fitted with a double locking snap hook attachment. Webbing, straps, and ropes must be of synthetic fiber or wire rope.

b. Prior to use, check harnesses and lanyards for signs fo wear, cuts, burns, abrasion, loose threads, and evidence of chemical exposure. Inspect hardware for proper operation, breakage, corrosion, and distortion.

NOTE : DAMAGED OR DEFECTIVE EQUIPMENT MUST BE DISCARDED – DO NOT ATTEMPT TO REPAIR!

c. Body belts are not to be used as part of a personal fall arrest system.

d. Harnesses must be worn snugly but not too tight. It is important to don the proper size harness.

e. All buckles must be securely fastened.

f. Never alter the body harness or lanyard.

g. Use of a double lanyard to increase length is not permitted.

h. Do not tie knots in the lanyard to reduce the length. This can reduce the strength by 50% or more. Do not attempt to tie lanyards back to themselves. This is not an acceptable OSHA or company practice and will also reduce the strength by a minimum of 50%.

i. Lanyards must support only one person. When vertical life lines are used, each employee shall have separate lines.

j. Fall protection devices are not to be used to suspend personnel to a work location.

k. While moving or climbing, the lanyard must be carried in a manner that prevents snagging.

6. Anchoring of Fall Protection.

a. Personal fall arrest systems must be anchored such that the strength of the fall arrest system is not reduced.

b. Personnel using articulating or extensible boom platforms must anchor to the manufacturers designed anchorage point.

c. Personnel in manbaskets must be anchored to the safety choker provided. The basket must be anchored to a separate choker above the ball.

d. Personal fall arrest devices must be anchored waist high or higher whenever possible, and in such a way as to minimize a free fall.

e. Visually check the engagement of the lanyard snap hook. Do not rely on the feel or sound only.

f. Tug on the lanyard to test the stability of the snap hook.

WARNING : SELECT ANCHOR POINTS CAREFULLY SINCE THEY MUST WITHSTAND THE FORCE OF A FREE FALL. SEE THE J. J. WHITE, INC. SAFETY AWARENESS MANUAL, APPENDIX 15, FOR MORE DETAILS!

g. Where proper anchor points are necessary and are not available in the work location, they must be provided, such as by running a horizontal lifeline or installing a stable anchor site.

h. Personal fall arrest devices subjected to a free fall and a full body load must be removed from services and discarded after use.

B. Care of Personal Fall Arrest Devices.

1. Wet harnesses, lanyards, and lifelines must be allowed to dry thoroughly before storing to prevent growth of mold or mildew.

2. Equipment exposed to oils, chemicals, or other contaminants must be decontaminated to prevent degradation.

3. Use mild soap and warm water to clean. Do not use solvents or harsh chemicals.

4. Fall arrest equipment should be hung or stored flat to maintain proper shape.

C. Inspection.

1. The employee will inspect the entire personal fall arrest system prior to every use. The competent person will inspect the entire system in use at the initial installation and weekly thereafter. The visual inspection of a personal fall arrest system periodically will follow the manufacturer's recommendations. An example of a complete inspection is in Appendix A.

D. Training.

1. No person shall wear or use fall arrest devices without completing training prior to the use of this equipment.

2. All persons who may at some point be required to wear personal fall protection must be trained on the following :

a. Fall hazards in the workplace and how to recognize them.

b. The purpose of fall protection systems and their limitations.

c. Review of the requirements of the Fall Protection Program.

d. Use, care, operation, and inspection of all applicable fall protection systems.

e. The role of personnel.

3. Training shall be completed by a competent person qualified in the following areas :

   a. Proper donning & doffing procedures.

   b. Types of fall hazards in the work area.

   c. Correct procedures for erecting, using, maintaining, and inspecting fall protection systems.

   d. Limitations of the use of mechanical equipment.

   e. Correct procedures for handling and storage of equipment and materials.

   f. Roles of employees in fall protection plans.

   g. Requirements contained in the standards.

4. A written certification record shall be maintained verifying training for each employee.

5. All applicable personnel will be retrained if there is a change in the procedure or fall protection equipment or if the employee demonstrates a lack of understanding.

E. Definitions.

1. Anchor – a secure point of attachment for lifelines and lanyards.

2. Approved – manufactured according to specifications provided by the American National Standards Institute (ANSI) and/or Occupational Safety and Health Administration (OSHA).

3. Articulating Boom Platform – a vehicle mounted platform with hinged boom sections.

4. Body Belt – a strap secured around an employee's waist and attached to a lifeline or lanyard.

5. Body Harness – a design of straps which may be secured about an employee in a manner to distribute the fall arrest forces over the pelvis, thighs, waist, chest, and shoulders with means to attach to an anchor.

6. Competent Person – capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous to personnel and who has authorization to quickly correct or eliminate them.

7. Controlled Access Zone – an area in which certain work may take place without the use of guardrails, personal fall arrest systems, or safety nets and access to the zone is controlled.

8. Dangerous Equipment – equipment which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment (such as electrical equipment, open chemical tanks, sharp objects, etc.).

9. Extensible Boom Platform – a vehicle mounted platform with a telescopic boom.

10. Fall Protection System – personal or general equipment designed to prevent, minimize, or safely break a fall from an elevated work area. For example, a full body harness and lanyard.

11. Guardrail – a barrier erected to prevent employees from falling to a lower level.

12. Lanyard – a flexible line, rope, or strap which is used to secure a body harness to an anchor point.

13. Lifeline – a flexible line for connecting employees wearing personal fall arrest devices at one end to a fall arrest system on the other such as a fall arresting extraction device (vertical); or connected to an anchorage at each end used to act as a means of attachment for other fall arrest systems such as a body harness and lanyard (horizontal).

14. Low Pitch Roof – a roof having a slope less than or equal to four in twelve.

15. Mobile Ladder Stand – a portable platform that has stairs and a deck that can be cranked up and down and can be rolled from site to site.

16. Personal Fall Arrest – a system used to stop an employee in a fall from a working level. It consists of anchorage, connectors, a body harness, and a lanyard or lifeline (full body harness and lanyard) approved for a static load of 5000 lbs. or engineered to meet a two to one safety factor.

17. Proper Working Platforms – a powered device or working surface constructed according to the best available practice that does not require the use of fall protection systems when used properly.

18. Safety Monitoring System – a system in which a competent person monitors the safety of all employees on a roof and warns them when they are at risk of falling

19. Steep Roof – a roof having a slope of greater than four in twelve.

20. Unprotected Walking/Working Surface – a walking or working location where no fall protection systems are in place.

21. Warning Line – a rope, wire, or chain with stanchions and flags at intervals to keep employees from an edge where a fall may occur. A warning line must be developed in accordance with OSHA regulation 1926.502 and must be approved before employees are exposed to fall hazards.

22. Working Platform – a suspended, supported, powered scaffolding, or ladder that is acceptable to provide access to an elevated work location.

NOTE : SOME WORKING PLATFORMS MAY STILL REQUIRE FALL PROTECTION DEVICES.

JOB HAZARD ANALYSIS – 006

SCAFFOLDING

KEY POINTS

- Inspect any scaffolding before working on or climbing it. Determine if the scaffold is of sufficient height and strength for the work to be performed and that the components are in good condition. All scaffolds are subject to daily inspection and are to be tagged by a competent person.

- Footings shall be sound, rigid, and capable of carrying the full load without settlement or deformation and shall be secured against movement in any direction. All scaffolds must have flat plates and if erected on soil must have mud sills as well.

- Planks will be laid close enough together to prohibit materials and/or tools from falling through the scaffold.

- An access ladder or equivalent safe access shall be provided for scaffolds 6’ or higher and must be properly placed and secured in position. If an access ladder is not applicable, equivalent safe access shall be provided.

- Scaffold planks shall extend over their end supports not less than 6” or more than 18”.

- Screening shall be installed if persons are required to work under or pass under the scaffold.

- The **GREEN** scaffold tag shall only be used if all requirements of OSHA Standard 1910.28, and 1926. subpart (L) are completed.

- The **RED** scaffold tag shall be used while scaffolding is being erected, taken down, or has been found defective

- The **YELLOW** scaffold tag allows for work to continue on scaffold platforms as long as each worker wears approved fall protection and is attached to a fixed point with a shock absorbing lanyard.

- A scaffolding Release and Indemnity Agreement must be signed by an officer of the Company, prior to allowing any “Non-J. J. White, Inc. employee” access to a J. J. White, Inc. scaffold.

JOB HAZARD ANALYSIS – 006 SCAFFOLDING	
PURPOSE & SCOPE:	To provide a platform for work that cannot be done safely from the ground or from solid construction.
JOB HAZARD :	Splinters and pinch points during handling, falling material, falls.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Full body Harness, Lanyard System, Additional PPE per Scaffold Tag.
REFERENCES :	J. J. White, Inc. Safety Awareness Manual, Appendix 10.

PROCEDURE:

A. Preparation and Use.

1. All scaffolding erected shall be in compliance with dimensions listed in OSHA standards 1910.28 and 1926. subpart (L). All persons who use, build, modify or dismantle scaffold require specific training.

2. Inspect any scaffolding before working on or climbing it. Determine if the scaffold is of sufficient height and strength for the work to be performed and that the components are in good condition.

3. When erecting or modifying a scaffold, proper consideration must be given to load requirements, location and the protection of other employees or equipment below such scaffolding.

   a. Scaffolding shall be constructed so as to support four times the maximum weight anticipated.

   b. Footings shall be sound, rigid and capable of carrying the full load without settlement or deformation and shall be secured against movement in any direction. All scaffolds not setting on a hard surface such as concrete must have flat plates and mud sills.

4. All planking shall be scaffold grade.

5. All planking or platforms shall be overlapped (minimum 23 inches) or secured from movement. Planks will be laid close enough together to prohibit materials and/or tools from falling through the scaffold.

6. An access ladder or equivalent safe access shall be provided for scaffolds 6' or higher and must be properly placed and secured in position. Ladders shall extend a minimum of three feet past the work platform for access onto the platform. These ladders shall be 90 degrees to the platform where practical and free of obstructions. If an access ladder is not applicable, equivalent safe access shall be provided.

7. Scaffold planks shall extend over their end supports not less than 6" or more than 18".

8. The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

9. On suspended scaffolds (swing stage) a guardrail system must be used whenever feasible. For example, handrails cannot be installed on boatswain's chairs or needle beam scaffolds. Handrails can be installed, and are supplied with "Spyder" style staging, including what is commonly referred it as a window washing rig or a two point adjustable suspension scaffold that has a "Spyder" on each end and an aluminum platform between.

10. Scaffolds higher than 6' must be provided with handrails, midrails and toeboards unless location makes this physically impossible. In this instance an alternate means of fall protection such as lanyard, harness, safety nets, lifeline, etc. is required.

11. Handrails/Guardrails shall be installed no less than 38" or not more than 45" high on all open sides or ends of platforms more than 6' above the ground or floor. Top rails and mid-rails must be at least ¼" (0.6 centimeters) nominal diameter or thickness to prevent cuts and lacerations.

12. Midrails shall be installed half the distance from the working platform to the guardrail.

13. Toeboards shall be installed on any platform over 6' above grade or floor. Toeboards are also required on any intermediate platform with people working below, regardless of height above grade or floor. Material shall be nominally 1" thick and extend at least 4" up from the working platform.

14. Drawings and specifications for all frame scaffolds over 125' in height above the baseplate must be designed by a registered professional engineer.

15. Fall protection is generally required when building or dismantling scaffolding where the scaffold builder is close to an adjacent structure. Where no such structure exists, effective tie-off may not be feasible.

16. Screening shall be installed if persons are required to work under or pass under the scaffold, the working platform shall be provided with a screen between the toe-board and the handrail/guardrail, extending along the entire opening. It shall consist of No. 18 gauge U.S. wire ½" mesh or the equivalent.

17. Upon completion of work, scaffolds should be dismantled and returned to their storage site.

18. Painter's scaffolds, boatswain's chairs, spider staging and accessory equipment must be inspected and tested by the user prior to the commencement of the job.

    a. All persons shall be protected by a safety harness and lanyard attached to an independent lifeline. The life line shall be securely attached to substantial members of the structure (not scaffold) or to securely rigged lines, which will safely suspend the individual in case of a fall.

    b. Entrance and exit from this equipment must always be from ground level unless specifically authorized to do otherwise by your supervisor.

    c. Precautions must be taken to insure that ground traffic cannot disturb supporting tackle and endanger the safety of the people working on this equipment. Sign stating "Danger men working above" is required under these circumstances.

    d. Rope, cable or any type of sling must be protected with pads or wooden blocks where it comes in contact with sharp edges.

    e. Precautions must be taken to prevent burning the supporting cables before performing burning and welding operations from this equipment.

    f. Scaffold must be lowered to the ground or lashed to equipment when workers leave.

B. Tagging Procedure.

1. The GREEN scaffold tag shall only be used if all requirements of OSHA Standard 1910.28, and 1926. subpart (L) are completed. It meets OSHA's criteria for strength and fall protection. It as proper bracing, ribbons, ledgers, top rail and toe plate. No fall protection harness is required unless

the person working leaves the scaffold decking or hangs outside the railing system and is no longer protected by the handrails.

2. The RED scaffold tag shall be used while scaffolding is being erected, taken down, or has been found defective. No one is to climb on or work from a red-tagged scaffold. A scaffold with NO tag is treated as a red tag scaffold.

3. The YELLOW scaffold tag allows for work to continue on scaffold platform as long as each worker is 100% tied off. It may be the handrails were removed or a section of planking is missing from the deck. This requires the worker to wear an approved fall protection harness and is attached to a fixed point separate from the scaffold with a shock absorbing lanyard when the scaffold is over 6'.

4. A competent person must inspect and appropriately tag the scaffold daily before use. Scaffold tags must be placed where access will take place.

JOB HAZARD ANALYSIS – 007

RIGGING

KEY POINTS

- Make sure material is balanced and sling properly adjusted to make a balanced lift.
- Make sure cables, slings, and chokers used are in good condition.
- Never pull over rough or sharp corners with any sling. Use suitable blocking or sling protection on corners.
- **NEVER WORK OR MOVE UNDER A SUSPENDED LOAD!**
- Blocking should be used to protect the sling if therope comes in contact with a sharp object being handled.
- Where head room is small and a sling must be spread at an excessive angle, special care must be used in selecting slings. Excessive sling angle greatly reduced a sling's capacity.
- Contact the Safety Department for additional information.
- When uncoiling wire rope, always roll the coil like a hoop.
- When transferring rope from a storage reel to a drum, the rope should travel from the **TOP** of the reel to the **TOP** of the drum; or from the **BOTTOM** of the reel to the **BOTTOM** of the drum.
- Rigging stretched across walkways must be flagged for visibility.
- **NEVER RIDE ON A LOAD!**

JOB HAZARD ANALYSIS – 007 RIGGING	
PURPOSE & SCOPE:	This safety procedure contains guidelines for safe rigging. It is intended as a statement of good practice and should be used as a source of information.
JOB HAZARD :	Personal injury resulting from improper rigging practices. Damage to equipment from improper rigging practices.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
REFERENCES :	J. J. White, Inc. Basic Safety Rules for Construction and Maintenance Handbook, pages 19-26.

PROCEDURE:

A. Responsibilities of individuals doing the rigging :

1. Verify Rigger is qualified and meets OSHA std. for qualification
2. Verify Signal Person is qualified and meets OSHA STD. for qualification
3. Verify Certification of all rigging is up to date.
4. Know the weight of the material to be lifted.
5. Make sure material is balanced to make a straight lift.
6. Make sure cables used are in good condition.
7. Make sure sling size will lift the material.
8. Never pull over rough or sharp corners with cable sling. Use suitable blocking or sling protection on corners.
9. **Never work or move under a load. Never ride on a load.**
10. Sling angles and capacities – **KNOW THEM!**

Measure the length from bearing to bearing of loops with rope. Figure 1 displays a Standard basket hitch, choker hitch, or as a simple straight sling for handling many objects. Blocking should be used to protect the sling if the rope comes in contact with the object being handled.

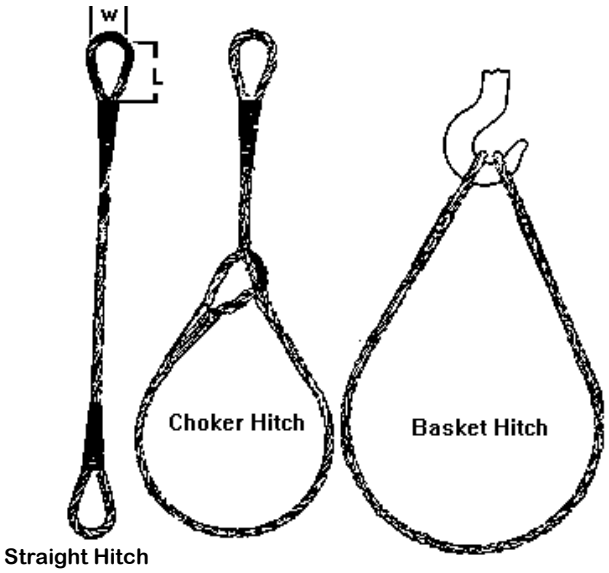
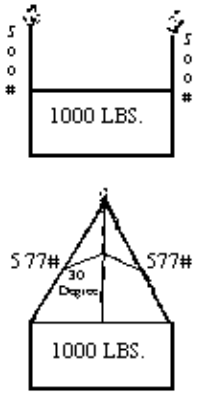


Fig. 1

11. Sling angles and capacities.

While rated capacities are shown in the J. J. White, Inc. Basic Safety Rules for Construction and Maintenance handbook – pages 19-26, as contained in your New-Hire Package – for many slings at an angle of 60^{o} with the vertical, the table below was inserted primarily to show the severe reduction in capacity when a sling is operated at a wide angle. Wherever head room permits, it is recommended that the angle with the vertical not exceed 45^{o}, except in the case of crate slings and slings for handling steel plates where gripping power of sling is based upon a wide angle. Where head room is small and sling must be spread at an excessive angle, special care must be used in selecting slings.



Sling Angle with Vertical	Stress Per. Sling Leg Per 1000# Total Load
0	500
5	502
10	508
15	518
20	532
25	552
30	577
35	610
40	653
45	707
50	778
55	872
60	1000
80	2880

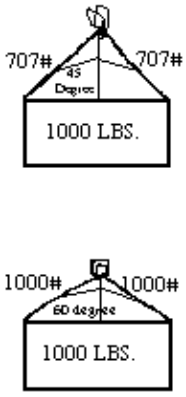


Fig. 2

12. Correct way to use cable clamps and capacities.

    a. Wire rope should be attached properly to ensure maximum holding power. The base of the clip should be applied to the live or long end, and the U-bolt against the dead or short end of the wire rope. Wire rope thimbles are required to ensure the best loop protection.

    b. One additional clip should be attached when using a rope having an IWRC or standard core.

       * The number of clips shown above is the minimum recommended for ordinary usage. For heavy-duty ropes or where there is a possibility of property damage or personal injury, the number of clips used should be increased by one or preferably two for each rope end.

    c. This table does not apply in determining the number for clips for use on strands and 18 x 7 construction ropes.

13. Efficiency of wire rope connections as compared to safe loads on wire rope.

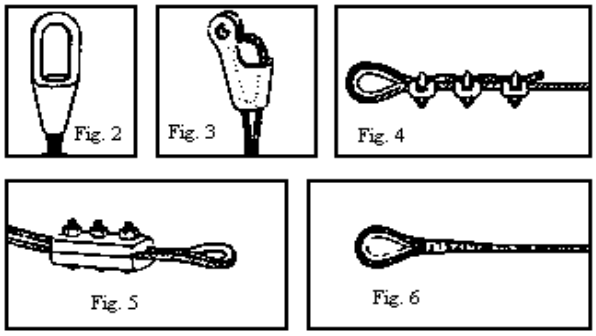


Figure	Type of Connection	Efficiency
	Wire Rope	100%
2	Sockets -- Zinc Type -- properly attached	100%
3	Wedge Sockets	70%
4	Clips -- properly attached	80%
5	Plate Clamp -- Three Bolt Type	80%
6	Spliced Eye and Thimble:	
	1/4" and smaller	90%
	5/16" -- 7/16"	88%
	1/2"	86%
	5/8"	84%
	3/4"	82%
	7/8" and larger	80%

Fig. 3

14. Right and wrong way of uncoiling and unreeling wire rope.

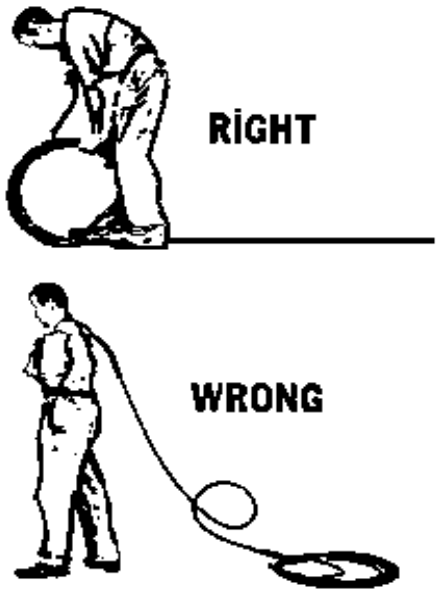


Fig. 4

When uncoiling rope, always roll the coil like a hoop. Never lay the coil down and throw the rope out in loops. When this is done, kinks are liable to form and the rope becomes "twisty" and hard to handle.

15. When unreeling rope from a reel, any of (3) methods may be used :

    a. The reel may be mounted on a shaft and supported by (2) jacks. This leave the reel free to rotate as the rope is unwound.

    b. The reel may be mounted on its side on a turntable or unreeling stand. The rope is then unwound in the same manner as described above.

    c. The reel may be rolled along the ground, paying the rope out behind.

16. Right and wrong way of transferring wire rope from reel to drum :

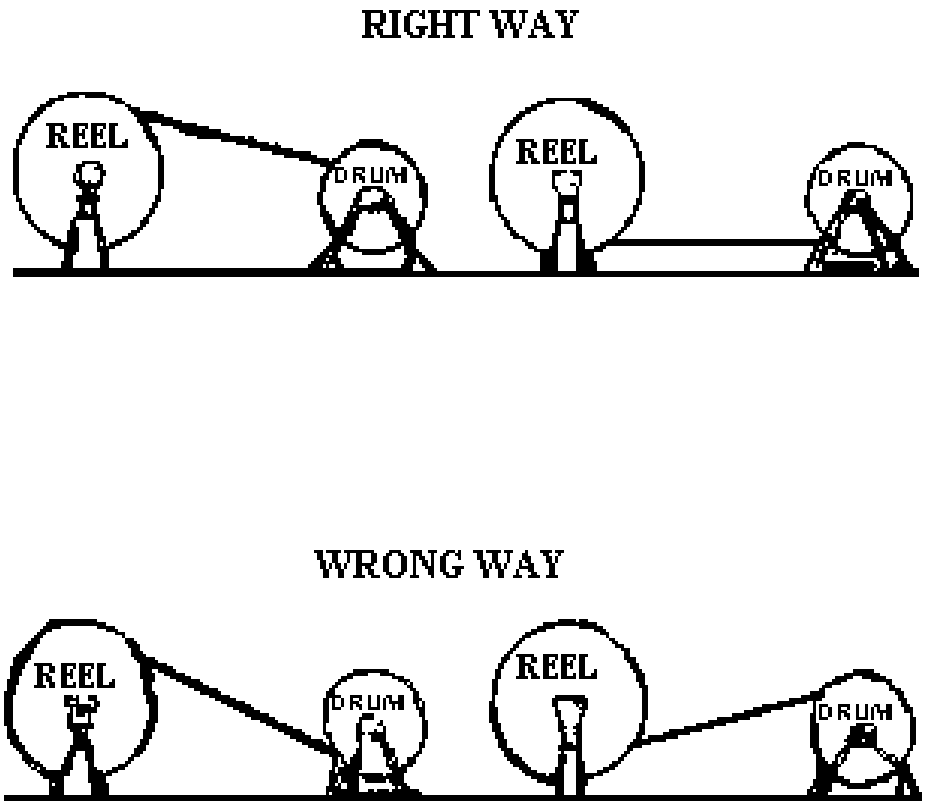
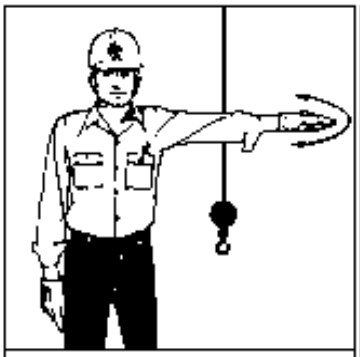


Fig. 5

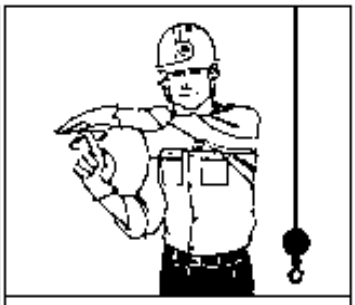
When transferring rope from a storage reel to a drum, the rope should travel from the **TOP** of the reel to the **TOP** of the drum; or from the **BOTTOM** of the reel to the **BOTTOM** of the drum. This will avoid a reverse bend in the rope as it is being installed. Installing a rope so that a reverse bend is put into it cause the rope to become "twisty", difficult to handle and spool smoothly from the drum. This is especially true of larger diameter wire ropes. A braking action should be applied to the reel at all times – use a block or timber against the reel flange – in order to get a good smooth wrap on the drum.

HAND SIGNALS FOR CRANE OPERATORS

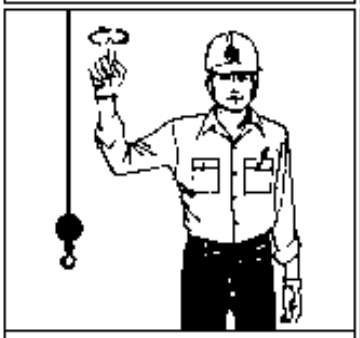


"STOP" Arm extended, palm down, move hand right & left

"Dog Everything", Clasp hands in front of body.

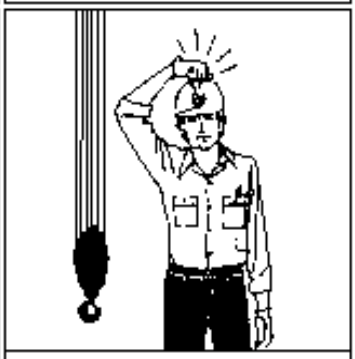


"Move Slowly", Use one hand to give any motion signal and place other hand motionless in front of hand giving signal. (Hoist slowly shown as example



"Hoist", With forarm vertical, forefinger pointing upward, move hand in small horizontal circles

"Lower", with arm extended downward, forefinger pointing down, move hand in small horizontal circles.



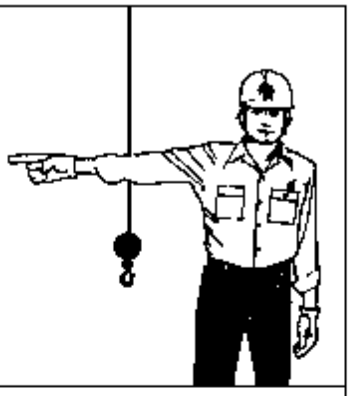
"Use Main Hoist", Tap fist on head; then use regular signals.

"Use Wipline", (Auxiliary hoist). Tap elbow with one hand; then use regular signals.

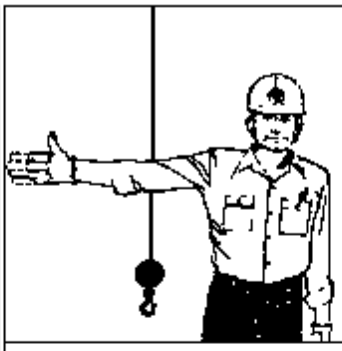
"Raise Boom", Arm extended, fingers closed, thumb pointing upward.

"Lower Boom", Arm extended, fingers closed, thumb pointing downward.

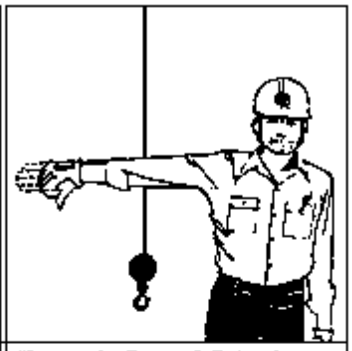
HAND SIGNALS FOR CRANE OPERATORS



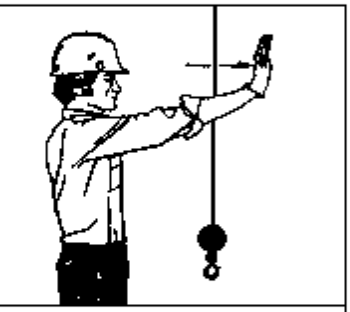
"Swing", Arm extended, point with finger in the direction of the swing of the boom.



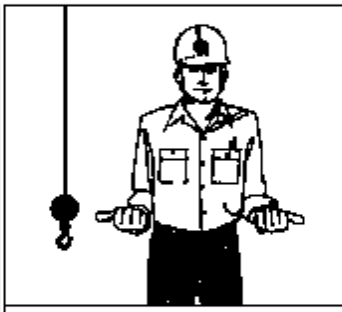
"Raise the Boom & Lower the Load", With arm extended, thumb pointing upward, flex fingers in & out as load movement is desired.



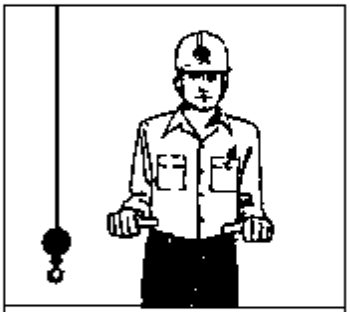
"Lower the Boom & Raise the Load", With arm extended, thumb pointing downward, flex fingers in & out as load movement is desired.



"Travel", (Rail Mounted or Trolley Cranes) With arm extended forward, hand open and slightly raised, making pushing motion in direction of travel.



"Extend Boom", (Telescoping Booms Cranes), Both fists in front of body with the thumbs pointing outward.



"Retract Boom", (Telescoping Boom Cranes), Both fists in front of body with thumbs pointing toward each other.

"Travel",(Both Tracks) Use both fists in front of body, making a circular motion about each other, indicating direction of travel: forward or backward. (Crawler Cranes Only).

"Travel",(One Track) Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (Crawler Cranes only).

JOB HAZARD ANALYSIS – 008

BLANKING

KEY POINTS

- All equipment requiring mechanical work (hot work on lines, drums, towers, etc.; entry for the same, shall be isolated per the blank list developed by the Owner's Operations Department.

- Operations will make a final determination as to when work is done without blanking. The following precautions **must** be taken :

  - Block valves must be closed, chained, and locked in accordance with the Owner's Lock Out / Tag Out procedure.

  - Whenever possible, two blocks must be closed, chained, and locked, and pressure released between them by opening the bleeder, and locking it open.

  - Liquid or gas pressure must be released from the equipment by opening the inlet and outlet bleeders or parting the flanges.

  - Drivers or pumps must be de-energized, locked out and tagged.

- Blanking is required for entry. Equipment may be opened without blanking for **non-entry** purposes such as a cursory inspection.

- Supplied Air Respirators (SAR) shall be worn for all blanking of lines that during operation contain sour water, sour gas, or hydrocarbon gas streams. For lines that contain other toxic streams, the respiratory requirements should be applied from the relevant Industrial Hygiene procedures.

- When blanking equipment which has not been washed and purged and which contained toxic vapors such as hydrogen sulfide, carbon monoxide, or any sour gas stream, the vessel must be steamed and tested by Operations before opening.

- The Owner's Operator and / or Safety Department shall determine the protective clothing and equipment requirements for exposure to the material and denote this information on the work permit under which the blanking procedure is to be performed.

- The person installing the blank or supervisor shall ensure adequate fire protection is provided as required by the permit. The person(s) who write the permit shall plan escape routes.

- The owner / operator in charge of the unit shall lock out and tag out each blank. J. J. White, Inc. personnel will then apply their own lock and / or tag.

- All blanks requiring SAR for installation require the same for removal.

- Under no condition shall any vessel blanks be pulled before a vessel is closed to entry.

JOB HAZARD ANALYSIS – 008 BLANKING	
PURPOSE :	This procedure covers blanking of equipment and lines for mechanical work and it is to be used as a source of information and guide where applicable. The purpose of blanking is to aid job safety by isolating the work area from potentially harmful materials such as chemicals or hydrocarbons. For the purposes of this JHA, where referenced, a blind is also a blank.
JOB HAZARD :	Normal hazards plus potential for pressure in line or equipment resulting in a release of product causing fire and/or injury to personnel.
PROTECTIVE EQUIPMENT :	Basic, Respiratory and other PPE per Owner's Work Permit and JHA - 30.
SCOPE :	Blinding or Blanking is a method of hazardous energy control.
REFERENCES :	JHA-26.

PROCEDURE:

****All initial line breaks require face shields, sealed eyewear, monogoggles, and protective clothing****

A. Types of Blanks / Blinds.

1. Blank Flange -- Used with appropriate gasket to close off the end of a line or opening on equipment by bolting to a matching flange.

2. Slip Blank -- Used to prevent flow by installing with one gasket on each side of blank between a pair of flanges.

3. Split Blank -- Used in a manner similar to a slip blank. In addition, flat spacer bars are installed on one side to allow ventilation and/or drainage. An appropriate gasket is placed between the spacers and the flange. The opposite side of the blank is closed off to the flange and an appropriate gasket installed.

   NOTE: Use caution when installing split blanks. Cover sewers and check for leaks at blanked flange. Have Owner's Operator take flammable gas tests in surrounding area. Also check surrounding area for potential ignition sources to ensure materials vented/drained through split will not create hazardous condition.

4. Metal Plugs/Caps -- Used to plug small threaded connections.

B. Definitions.

1. Battery Limit Blanks, usually related to a unit shut down for mechanical work, are installed on the unit side of a valve, located at the unit's boundary, in lines entering or leaving the unit.

2. Isolation Blanks, usually related to individual or groups of equipment within the unit to be shut down for mechanical work or entry. These blanks are installed to separate the equipment to be worked on from the operating equipment.

3. Test Blanks are used by various crafts when testing pressure equipment, e.g., pressure testing of exchangers after cleaning during a turnaround.

4. Supplied Air Respirators (SAR) is a supplied air respirator with a 5 minute escape pack.

C. Responsibility.

1. The Owner's Operations Department is responsible for determining the number, location, size, and control of blinds to be installed for a given job.

D. Standard Blanking Procedure.

1. Prior to working on a line or piece of equipment, the Owner's Operations Department responsible shall identify all locations that require isolation, and how and where each will be isolated. An isolating device list/blank list shall be developed for any major piece of equipment with lines requiring isolation by blanking.

2. Close all isolation valves for the line or equipment.

3. Isolate any locations provided with double block and bleed valves, and lock out the double block and bleeds.

4. Vent, drain and purge the line or equipment to remove process pressure, liquids and vapors.

5. Install the blank(s) at the locations noted on the blank list as follows:

a. Obtain information on the material in the line and its temperature and pressure from the operator. If there is a delay in opening the line, verify

the information again with the operator immediately prior to the opening of the line.

b. The mechanic(s) who install the blank shall comply with personal protective equipment requirements listed on permit.

   i) They shall obtain and put on all protective equipment prior to opening the line. All Line Breaks, other than water service lines, require employees to don monogoggles and face shield in addition to permit required PPE.

   ii) Supplied Air Respirators may be required for battery limit and isolation blanking of lines that, during operation contain sour water, sour gas or hydrocarbon gas streams and have not been tested by Operations.

   iii) For lines that contain toxic streams (e.g. Benzene >0.1%), the respiratory requirements should be applied from the relevant Industrial Hygiene procedures.

   iv) When blanking equipment, which has not been washed and purged, and which contained toxic vapors such as hydrogen sulfide, carbon monoxide, benzene, etc., it may be necessary to wear a Supplied Air Respirator.

c. Operations shall test the first joint opened to make the determination whether blanking locations require the use of SAR's.

d. If the vessel has not been washed or purged, Operation

e. Supervisor will determine if Supplied Air Respirators are to be worn for installation of all blanks.

f. The person installing the blanks or supervisor shall ensure adequate fire protection (i.e. fire extinguishers, steam lance) is provided. The person(s) who will install the blank(s) shall plan escape routes.

g. A final physical inspection of the condition of the line shall be done jointly by the person(s) installing the blank(s) and the operator.

h. The person(s) performing the work will approach the joint from upwind. All joints shall be considered under pressure until proven otherwise. They shall keep out of the direct line of the opening by loosening the bolts on the opposite side of the flange first. Just enough bolts shall be loosened to determine whether the joint can be safely opened. If there is

pressure on the line the worker(s) shall close the joint and inform the Unit Operator.

i. If the joint is threaded, they shall loosen it just enough to observe any leakage. If there is pressure on the line the worker(s) shall close the joint and inform the Unit Operator.

j. If bolts are corroded or need to be cut off to open the joint, the old bolts shall be removed and replaced one at a time, and each new bolt tightened to maintain the integrity of the joint seal. Then the joint can be opened in accordance with item (g) above. A Hot Work Permit is required if a torch is used to heat and loosen or to cut off the old bolts.

6. After each blank has been installed, the operator and the person(s) installing the blank shall each affix a tag on the blind according to the Owner's Blanking/Blinding Procedure.

7. After the blanks have been installed, the Unit Operator will verify that all lines have been isolated in accordance with the blank list and all double block and bleed valves are locked out in the appropriate position.

CAUTION: A line or joint shall never be left open. If the worker(s) are unable to complete installation of the blank for any reason, they shall close the joint and advise the operator in charge and Operations and/or the J. J. White, Incorporated Maintenance Supervisor.

Never remove all bolts to install a blank. Remove only as many as required in order to perform the blank installation.

When installing a blank, always install two gaskets, and remember to tighten all bolts.

8. After all equipment isolation blanks have been installed, then the man ways can be opened. Before the first man way is opened, the equipment will be properly cleaned and purged.

E. Blanking Required.

1. All equipment requiring mechanical work (hot work on lines, drums, towers, etc.; entry for same) shall be isolated from process streams and hazardous energy. Isolation blanks must be installed based on a blank list developed by the Owner's Operations Department.

2. Hydrocarbon, Chemical and designated utility lines entering and leaving any unit that is shut down for internal inspection or mechanical work must be blanked at battery limits in accordance with unit blanking procedures.

   a. Battery Limit blanks must be installed prior to installing internal unit blanks or opening process equipment.

   b. If no battery limit valves exist, then the isolation blanks are installed at the valves closest to the unit battery limit.

3. Operations shall determine that, if an entire unit is shut down, but no major turnaround work is planned, limited inspection or mechanical work can be performed without installing battery limit blanks provided isolation blank points are slip blanked per blank list.

4. If a portion of a unit is shut down for mechanical work, isolation blanks will be required.

5. When a vessel is prepared for entry, it must be isolated from other equipment by inserting slip blanks or split blanks and gaskets in connecting lines at flanges closest to the vessel, or disconnecting piping and installing solid blanks on the open ends of the piping.

6. When a process heater or boiler is prepared for entry, the fuel supply and snuffing steam lines must be blanked. Isolation blanking may not be required for the water or process fluid side UNLESS performing maintenance on heater/ boiler tubes.

7. **When preparing a pipeline or vessel for Hot Work, all connections must be split blanked or blanked and vented.**

8. When a piece of equipment or line is to remain open and unattended, it must be blanked.

F. Blanking Not Required.

1. The Owner's Operator shall determine when the following conditions can be met :

   a. Gauge glass and instrument connections do not require blinding where isolated, vented, and drained.

   b. Clean Water and Steam Lines :

i) When cold work is required, Operations will determine when clean water and steam lines must be isolated by closing and locking the valves shut.

ii) When hot work is required and blanking is not possible due to physical or operational limitations, prior approval by Operations must be obtained. Whenever possible, two blocks must be closed, chained and locked with the bleeder between the valves opened, free of restrictions, and tagged and locked open.

G. Blank Removal.

1. Before pulling blanks that were installed to prevent flow into vessels, all vessel man ways must be closed.

2. After completion of vessel cleanliness inspection, de-blanking priorities are as follows:

   a. First, close all equipment man ways;

   b. Second, pull isolation blanks; and

   c. Third, pull battery limit blanks; or in the case of a partial shutdown, pull isolation blanks.

3. Under no condition shall any vessel blanks be pulled before a vessel is closed to entry. A vessel is considered closed to entry when all openings have a solid blank or man way cover and gasket.

4. Unit boundary, battery limit and pressure blanks must not be pulled until all openings have a solid blank or man way cover, gasket with **all flange bolts installed and tightened**, and isolation blanks have been pulled.

JOB HAZARD ANALYSIS – 009

MANLIFTS

KEY POINTS

- Only trained and qualified personnel are permitted to operate manlift equipment.
- Before operation, operator must make an inspection and pre-operation check for safety defects.
- The prospective operator should review the specific operator manual and run through the operating characteristics of the piece of equipment before it is operated.
- Follow all prescribed safety precautions and practices outlined in the manual. The safety bar or pin must be secured before operating any manlift.
- A harness and lifeline must be worn while operating a manlift with the lanyard or lifeline tied of to the manufacturer's designated anchorage point.
- Retract boom and lower to approximately 15^{o} to 20^{o} above horizontal before traveling.
- The platform does not provide protection from contact with or proximity to an electrically charged conductor. Do not use manlifts for electrical work. Do not operate within 15' of high voltage power lines.
- When platform is occupied, use of ground controls is restricted to emergency situations only.
- Before initiating any basket swing operations, ensure the area in the swing path of the platform, as well as the tail (counterweight) swing area are clear of all obstructions and personnel.
- Never push or pull the swing control lever through neutral to opposite direction to stop swing motion.
- A Hot Work Permit is required for the operation of any manlift type equipment in process areas.

JOB HAZARD ANALYSIS – 009 MANLIFTS	
PURPOSE :	This procedure defines the safe use of manlifts. This document is intended to highlight hazards common to the operation of this equipment and is not intended to replace proper training in its use.
JOB HAZARD :	Collision with moving or stationary objects, equipment, or personnel. Contact with electrical lines. Upset or overturning.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Full body harness & Lanyard.
SCOPE :	All persons involved with operation of manlift equipment within a plant must use extreme care to prevent any serious accidents that result from improper practices. It is the intent of this analysis to outline the responsibilities and practices to be used by employees operating and working with high reaches, condors, and various manlift equipment.
REFERENCES :	J. J. White, Inc. Safety Awareness Manual, Appendix 11.

PROCEDURE:

A. General.

1. **Only trained and qualified personnel are permitted to operate manlift equipment.**

   a. Before operation, the operator must make an inspection and pre-operation check for safety defects to ensure the equipment is mechanically ready and operationally safe. Check control settings before operating the equipment.

      NOTE : An inspection checklist is included in the Operating Manual which is located in the storage compartment of the manlift.

   b. All prescribed safety precautions and practices outlined in the operation and maintenance manual must be adhered to. The safety bar or pin must be secured before operating any manlift.

   c. Never exceed maximum weight limit as found on the vehicle / basket placard.

   d. The machines are designed to operate on reasonably level ground and should not be operated on a severe incline.

e. When the machine is stationary and in use on roadways, warning cones must be placed to warn other traffic.

f. A harness and life line must be worn while operating a manlift with the lanyard or life line tied off to the manufacturers designated anchorage point.

NOTE : If equipment does not operate as expected, take it out of service until it has been inspected and necessary repairs have been made.

2. Traveling.

a. Walk the path of travel as to avoid holes, rocks, extreme soft surfaces, and other obstacles which might subject the platform to undue stress or possible overturn.

b. Retract boom and lower to approximately 15^{o} to 20^{o} above horizontal before traveling.

c. The platform does not provide protection from contact with or proximity to an electrically charged conductor. Do not use manlifts for electrical work do not operate within 15' of high voltage power lines.

d. All manlifts should be equipped with a tilt type switch that enables operation in the "creep" mode while the boom is above horizontal.

e. Requires an escort when moving about the plant or job.

3. Platform Operation.

a. When platform is occupied, use of ground controls is restricted to emergency situations only.

b. The ground controls include a selector switch which must be positioned in order to over-ride the work platform controls. Follow instructions on the instruction placard to over-ride work platform controls.

c. If equipped with an auxiliary power unit, it will provide the power necessary to operate the platform in case of primary power source failure. This should only be used in cases of emergency.

4. Swinging the Boom.

   a. Before initiating any basket swing operations, ensure the area in the swing path of the platforms, as well as the tail (counterweight) swing area are clear of all obstructions and personnel.

   b. Never push or pull the swing control level through neutral to opposite direction to stop swing motion.

   c. All controls should be operated with a gentle easing motion. When the boom is extended, abrupt stopping and starting of the boom swing may be minimized by moving the control lever slowly.

B. Precautions.

1. The **unauthorized** operation of any manlift is **expressly forbidden**, regardless of previous training or skill level. Prior authorization from the responsible party supervising the care, operation, and maintenance of the equipment must be obtained before any use of said equipment.

2. Since there are several different types of manlift vehicles on the market, a serious job hazard consideration is the prospective operator's unfamiliarity with the specific piece of equipment. It is highly recommended that a trained and qualified operator read over the specific operator manual and run through the operating characteristics of the piece of equipment before it is moved into a confined type position.

3. A Hot Work Permit is required for the operation of any manlift equipment in any and all process areas.

4. Area at manlift should be flagged off with yellow caution tape to avoid people from walking underneath.

JOB HAZARD ANALYSIS – 010

CONFINED SPACE ENTRY

KEY POINTS

- The intent of this procedure is to ensure communication among all parties involved in the work in a designated confined space – the Permit Issuing Authority, Entry Supervisor, Attendant and Entrant(s).

- The Permit Issuing Authority will determine if a confined space permit is to be issued – upon the decision, the issuing authority will make sure that a sign reading "**Danger – Permit Required Confined Space, Do Not Enter**" is displayed at the entrance or entrances to the space.

- Always review isolation list prior to issuing Confined Space Permits to ensure proper isolation.

- When all lock-out, tag-out, blinding procedures, and all purging is completed the entrance covers can be removed.

- The Issuing Authority will complete all gas testing of the space. It is the responsibility of the Issuing Authority to determine from the confined space vessel's service if tests in addition to oxygen content and flammability are required and ensure sufficient ventilation is provided and maintained (Type of Ventilation : Natural, Induced, Other).

- Each entrant shall use a full body harness with a retrieval line. A retrieval line may only be omitted if the retrieval line would not contribute to the rescue effort, or hamper rescue due to entanglement. Approval for omission of a retrieval line in a confined space may only be obtained through the combined and documented approval of the J. J. White, Incorporated Management and the Permit Issuing Authority.

- The confined space permit will remain valid until the work is completed but no longer than 12 hours.

JOB HAZARD ANALYSIS – 010 CONFINED SPACE ENTRY	
PURPOSE :	This procedure covers the preparation, authorization, issuance, and termination of confined space entry permits.
JOB HAZARD :	Oxygen-deficiency, toxic or flammable vapors, difficult access and egress.
PROTECTIVE EQUIPMENT :	Basic P.P.E., full body harness, life line and additional P.P.E. as will be required by the permit.
SCOPE :	The intent of this procedure is to ensure safe working conditions and communication among all parties involved in work in a designated confined space – issuing authority, entry supervisor, attendant, and entrant(s).
REFERENCES :	J. J. White, Inc. Safety Awareness Manual, Appendix 9.

CAUTION : NO J. J. WHITE, INC. EMPLOYEE SHALL ENTER AN INERT ATMOSPHERE.

ALL EMPLOYEES MUST GO THROUGH CONFINED SPACE TRAINING

A. Definitions.

1. Permit Required Confined Space – Any enclosed or partially enclosed space such as a tank, process vessels, furnace box, flue, boilers, floating roof tank, sewer, or an open-top space more than four feet in depth such as a pit or excavation or where there is reason to anticipate a potential or known hazard.

2. Confined Space Entry Permit Form – A specific type of work permit to ensure that entry is authorized and executed subject to specified safety precautions.

3. Issuing Authority – An issuing authority will be a Unit Operator.

4. Entry Supervisor – The unit operator who is the entry Supervisor will review hazards with entrant(s) and attendants, authorize, and terminate the entry.

5. Authorized Entrant – Authorized employees, workers, technicians, mechanical crew members entering the confined space.

6. Attendant / Standby Person – A person stationed outside the permit-required space who monitors a confined space operation and has duties specified on the Confined Space Entry Permit form.

7. Authorized Gas Tester / Test Person – The Permit Issuer will perform all routine gas tests. Special tests may be performed by the plant Industrial Hygienist or IH representative.

8. Radio Dispatcher – A person who continually monitors the owner's communications systems and who is responsible for notifying fire / rescue when any emergency is reported.

9. LFL / LEL – Lower flammable limit / lower explosive limits. The lowest concentration of a gas in air at atmospheric pressure, capable of being ignited when a source of energy such as a flame or spark is applied.

10. PEL / TLV – Permissible exposure limit / threshold limit value. Both values are the time weighted average concentrations for an eight hour workday, to which an average worker may be exposed without adverse side effects.

11. IDLH – Immediate danger to life and health is any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a confined space.

    NOTE : IF THE EMPLOYEE EXPOSURE CANNOT BE IDENTIFIED OR REASONABLY ESTIMATED, THE ATMOSPHERE IS TO BE CONSIDERED IDLH.

12. Isolation – The process by which a confined space is removed from service and completely protected against the release of energy and material into the space by such means as : blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages (Isolation List).

13. Ventilation - Sufficient ventilation must be provided and maintained to ensure that a hazardous atmosphere does not develop during entry operations. Sufficient ventilation can be achieved by the use of mechanical ventilation such as air movers, (Copus blowers) or natural ventilation.

B: Duties of :

1. Permit Requestor :

   a. Evaluates the job site to determine if it meets the OSHA criteria for confined space.

   b. Ensures completion of Confined Space Entry Permit.

2. Entry Supervisor :

   a. Knows the hazards that may be faced during entry including information on mode, signs or symptoms of consequence of exposure, has reviewed the confined space permit and has ensured sufficient ventilation is provided and maintained;

   b. Verifies entries on permit that all test specified have been completed and that all procedures and equipment specified are in place before endorsing and allowing entry to begin;

   c. Terminates the entry and cancels the permit when operations under the permit are completed or a condition not allowed by the permit arises;

   d. Verifies rescue services are available and a means of summoning are operable; (i.e., Radio Contact)

   e. Removes unauthorized individuals who attempt to enter the permit space during operation;

   f. Determines when responsibility for the permit space is transferred, entry operations remain consistent with terms of the permit and that acceptable entry conditions are maintained;

   g. Complete permit termination procedure and debriefing, as required.

3. Authorized Entrant :

   a. Knows the hazards that may be faced during entry including information on mode, signs or symptoms and consequences of exposure and has reviewed the confined space permit;

   b. Proper use of equipment; proper use of PPE as required by the Permit;

   c. Knows the communication procedure and communicates with attendant/standby person as necessary;

d. Alerts the attendant/standby person whenever:

i) Entrant recognizes any warning signs or symptoms of exposure to a dangerous situation; or

ii) Entrant detects a prohibited condition;

e. Exit from the space whenever:

i) An order to evacuate is given;

ii) Entrant recognizes any warning signs or symptoms of exposure to a dangerous situation;

iii) Entrant detects a prohibited condition;

iv) An evacuation alarm is given;

v) Complete permit termination procedures and debriefing.

4. Attendant :

a. Knows the hazards that may be faced during entry including information on mode, signs or symptoms and consequences of exposure and has reviewed the confined space database;

b. Is aware of possible behavioral effects of hazardous exposure to entrants;

c. Maintains an accurate count of entrants in space and maintains log of names and times in and out of the space;

d. Remains outside of space until relieved;

e. Communicates with entrants as necessary;

f. Monitors the activities inside and outside the space to determine if it is safe for entrants to remain in space and orders entrants to evacuate the space immediately under the following conditions:

i) Detects a prohibited condition;

ii) Detects behavioral effects of hazardous exposure to entrants;

iii) Detects a condition outside of the space that endangers the entrants; or

iv) If attendant cannot safely perform all assigned duties.

g. Summons rescue and other emergency services by radio as soon as attendant determines that entrants may need assistance to escape;

h. Takes the following action when unauthorized persons approach or enter the permit space :

i) Warns the unauthorized person to stay away from the permit space;

ii) Warns the unauthorized person to exit immediately; and

iii) Informs Entry Supervisor if unauthorized persons have entered permit space;

i. Performs no other duties that might interfere with primary duties to monitor and protect the entrants and ;

j. Verifies rescue services are available and a means of summoning are operable – radio communication, etc.

5. Rescue & Emergency Services :

a. Under no circumstance should an Attendant or Supervisor enter the confined space for rescue purposes.

b. If non-employees perform rescue services, the employer shall:

i) Evaluate the prospective rescue service(s) abilities to respond in a timely manner based on the hazards associated with each entry.

ii) Evaluate the prospective rescue service(s) abilities to function appropriately while rescuing entrants.

iii) Choose a rescue service that is capable of responding in a timely manner and is equipped in skills and equipment to perform the rescue service.

iv) Inform the rescue services of hazards they may encounter at the site

v) Inform the rescue services of all access points to the confined spaces.

vi) Provide rescue services with access to all spaces from which rescue may be necessary

c. Non-entry rescue retrieval systems or methods shall be used whenever an entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant;

i) Each entrant shall use a full body harness with a retrieval line attached to the entrant's back unless it can be demonstrated that this is not feasible, and/or would not contribute to rescue efforts;

ii) The retrieval line shall be attached to a mechanical device or fixed point outside of space. A mechanical device shall be available to retrieve personnel from a vertical type space more than five feet deep. This mechanical device will be attached to a tripod with equipment lowering device also attached; and

iii) If entrant is exposed to a substance, the MSDS shall be made available to the medical facility.

d. The Radio Dispatcher is the person who continually monitors the Owner's in-house communication system and who is responsible for notifying Fire/Rescue when an emergency is reported; must be able to provide Fire/Rescue with confined space information.

i) When the issuing authority of a Confined Space Permit calls with information about the Confined Space, the Radio Dispatcher enters the information into the log sheet in the Confined Space Log Book which will include : the area, specific location, unit, issuer, telephone number, start time, end time.

B. Procedure.

1. The Permit Issuer (Owner's Representative) will determine if a confined space permit is to be issued. Upon the decision, the permit issuer will make sure that a sign reading "Danger - Permit Required Confined Space, Do Not Enter" is displayed at the entrance or entrances to the space.

2. When all lock-out, tag-out and blinding procedures are completed and all purging is completed, (Note: Always review isolation list to ensure proper isolation has been accomplished), the entrance covers can be removed. The opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent premature entry as well as accidental fall

through the opening, and that will protect each employee working in the space from foreign objects entering the space.

3. The Permit Issuer will complete all routine gas testing of the space. Special tests will be conducted by an Industrial Hygienist. It is the responsibility of the Permit Issuer to determine from the confined space service, if tests in addition to oxygen content and flammability are required and ensure sufficient ventilation is provided and maintained (Type of Ventilation: Natural, Induced, Other) prior to issuing the permit. Further non-routine gas tests will be performed by the Owner's Representative.

4. A confined space atmosphere shall be retested if left unattended/ unoccupied for more than four hours, if entry has not been made within four hours after testing, or if there is reason to believe the conditions could have changed.

5. The confined space permit will remain valid until the work is completed but no longer than 12 hours.

6. The Permit Issuer, Entry Supervisor, Attendant and Entrant(s) shall review the information from the confined space permit and gas test results to determine the appropriate PPE required.

7. All rescue procedures and alarm procedures as described on the confined space permit will be reviewed with each entrant and attendant before entry.

8. All rescue equipment and communications equipment will be in plant and tested before entry. A means of communication between the attendant and the in-plant rescue team must be made available via radio.

9. An attendant/standby person will be stationed at each confined space.

10. A record of all entrants by name, time in and time out will be kept by the attendant.

11. Any time the rescue team is not available, the confined space permit must be suspended.

12. Proper ventilation is required for any entry. If an air mover is used, special precautions must be taken to ensure that the air mover is only connected to an air system and that the air mover is properly grounded and blowing out of confined spaces.

13. Conditions for Entry **without** respiratory protection :

i) The confined space is clear of all deposits, scale, and sludges likely to give off vapors when disturbed.

ii) The work to be done inside the confined space will not release or generate flammable or toxic vapors.

iii) The confined space is adequately ventilated and tested to ensure a safe atmosphere, defined as :

Oxygen	=	19.5%-23.5%
LEL (max)	=	10%***
Toxic Contaminants	=	"Non-detectable" within the limits of the gas test method (PEL or TLV).
Hydrogen Sulfide (max.)	=	10 PPM
Carbon Monoxide (max.)	=	35 PPM
Sulfur Dioxide (max.)	=	2 PPM
Hydrogen Fluoride (max.)	=	3 PPM
Benzene (max.)	=	1 PPM
Ammonia (max.)	=	35 PPM
Hydrocarbon	=	300 PPM

*** **If HOT WORK is to be performed, LEL reading must be 0% ***

14. Conditions for Entry **with** respiratory protection :

i) If confined space testing indicates that the conditions in the space do not meet the requirements for ensuring a safe atmosphere as defined above, **respiratory protection is required**. Contact the Owner's or J. J. White Safety Department for a proper recommendation.

15. Conditions for Entry into an IDLH Atmosphere:

i) If a confined space must be entered where the concentration of harmful contaminents exceeds the IDLH limit, personnel trained and equipped to provide effective emergency rescue are to be located immediately outside the IDLH atmosphere.

NOTE : IF THE EMPLOYEE EXPOSURE CANNOT BE IDENTIFIED OR REASONABLY ESTIMATED, OR IF THERE IS REASON TO BELIEVE THAT CONDITIONS IN THE ATMOSPHERE MAY CHANGE AND BECOME HAZARDOUS, THE ATMOSPHERE IS TO BE CONSIDERED IDLH. PPE WHICH PROVIDES ADEQUATE PROTECTION AGAINST THE POTENTIAL EXPOSURE IS REQUIRED.

ii) Visual, voice, or signal line communication is to be maintained between the person(s) in the IDLH atmosphere and the person(s) located outside the IDLH atmosphere.

iii) Rescue Personnel located outside the IDLH atmospheres are to be equipped with positive pressure supplied air respirators and appropriate retrieval equipment for rescue of the personnel who enter the hazardous atmosphere.

iv) Rescue Personnel located outside the IDLH atmospheres are to be equipped with positive pressure supplied-air respirators and appropriate retrieval equipment for rescue of the personnel who enter the hazardous atmosphere.

16. The potential for heat stress in an enclosure and the requirement for additional protective equipment (e.g. cooling vests) will be evaluated by the Owner's Safety Department or J. J. White, Inc. Safety Coordinator.

17. When an attendant observes an unsafe condition or when an attendant is notified about a plant upset that may pose a hazard to the entrants, the attendant will alert those inside and have them come out. The attendant will alert those inside by the emergency communications system set up before entry (i.e., whistle, Freon horn, hammer beats, shutting off equipment air lines, etc.). Reentry can be made only after a recheck shows it is safe to do so.

18. At the completion of the job, the attendant will remove the permit from the entrance with the attendant's sheet and will return the permit to the Permit Issuer.

C. Issuing the Permit.

1. Permit Issuer, Entry Supervisor (Unit Operator) must print name, sign and record date/time in space provided for Permit Signatures.

2. The J. J. White, Inc. Employee performing the work must print name and sign permit in space provided for Permit Signatures.

3. The Permit Issuer will issue the work copy. The work copy must be posted at the job site until the completion of the job, end of the workday or when the Permit expires.

4. The attendant's sheet must remain at the job site until Permit Termination.

5. The Permit Issuer’s copy must be posted in the Issuer's trailer or shelter until the work copy is returned and the Permit is terminated

JOB HAZARD ANALYSIS – 011

PORTABLE AND PERMANENT LADDERS

KEY POINTS

- Select the right ladder for the job.
- All J. J. White, Inc. ladders are to be of fiberglass construction with aluminum rungs (except scaffold ladders).
- Step ladders should only be used with the legs fully extended. Never stand on the top two steps. Never use a step ladder as a straight ladder.
- Inspect the condition of the ladder before use, i.e. rungs, side rails, extension guides and locks, foot pads. Report all defects to your supervisor. Never use a broken ladder.
- Secure the base of the ladder. Raise the ladder to the vertical height required. The feet of the ladder must be placed 1’ out horizontally for every 4’ of vertical height.
- Face the ladder using both hands on rungs when ascending or descending. Always maintain at least three points of contact with the ladder.
- Tie off the ladder at the top. To do this someone must hold the ladder for the initial climb.
- Never use on half of an extension ladder
- At no time should more than one person use a ladder.
- Never work from a ladder at elevations greater than 6’ unless you are utilizing fall protection.
- Keep both hands free for climbing.
- Close the safety bar at the top of the ladder after each use.
- If the safety bar is missing or inoperable, report the condition.

JOB HAZARD ANALYSIS – 011 PORTABLE AND PERMANENT LADDERS	
PURPOSE :	Safe method for use of portable and permanent ladders.
JOB HAZARD :	Falls, possibility of electrical hazards.
PROTECTIVE EQUIPMENT :	Basic P.P.E., fall protection may be required if working at heights above 6' from a ladder.
SCOPE :	Proper selection of available ladders, on-the-job inspection of all ladders to be used, safe handling of the ladder, and proper body position are all necessary considerations when the use of a ladder is needed.
REFERENCES :	N/A.

PROCEDURE FOR PORTABLE LADDERS:

A. Preparation and Use.

1. Select the right ladder for the job.

   a. Step ladder – should be used only with the legs extended. Never stand on the top two steps.

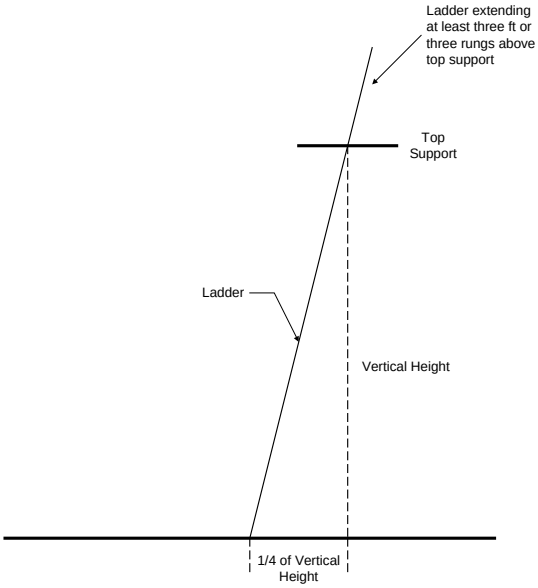
   b. All standard portable ladders used by J. J. White, Inc. will be fiber-glass ladders with the exception of scaffold ladders.

   c. Special application ladders – non-rigid, flexible ladders such as rope or chain ladders.

2. First check the condition of the ladder rungs, side rails, extension guides and locks, foot pads, and spreader hinges on a step ladder. Check the ladder for defects and report them to your supervisor. **DO NOT USE DEFECTIVE LADDERS!** Ladders are to be inspected daily prior to use.

3. Supports for the ladder at grade and top must be sound and free from a traffic area.

4. Secure the base of the ladder. Raise the ladder to the vertical height required. The feet of the ladder must be placed at a horizontal distance equal to ¼ of the vertical height to the top support. Ladder must be sufficiently long enough to extend at least 3'or (3) runs above the top support.



5. Face the ladder using both hands on the rungs when ascending or descending. Always maintain three points of contact with the ladder.

6. Tie off the ladder at the top. To do this, someone must hold the ladder for the initial climb.

7. At no time should more than one person use the same ladder.

8. When an object is out of reach, move the ladder.

9. Tools are to be hoisted in a bucket or by hand-line, not carried.

10. When removing the ladder tie-off, have an individual support at grade level to steady the ladder.

11. Return the ladder to its designated storage place.

B. Precautions.

1. Never use only one half of an extension ladder.

2. At no time should more than one person use the same ladder.

3. Precautions specific to the use of non-rigid ladders :

   a. Ladder must be properly secured.

b. Use only double-rung type ladders.

c. When descending ladders, be aware of the tendency of a ladder to swing out.

d. Climbing on non-rigid ladders is more physically demanding than climbing on rigid ladders.

e. Use of safety harnesses with 100% fall protection while climbing non-rigid ladders is mandatory.

f. Non-rigid or flexible ladders should only be used when other types of ladders are not suitable.

PROCEDURE FOR <u>PERMANENT</u> LADDERS:

1. Before using a permanent access ladder, visually check its condition – rungs, loose metal straps on the cage, objects protruding through the cage, etc.

2. Only one person is to be on the ladder at one time. A collision could cause a fall.

3. Keep both hands free for climbing. Never carry anything in your hands while climbing. Tools should be hoisted by and line and / or bucket.

   NOTE : BE AWARE OF YOUR RADIO AND MICROPHONE CORD TO AVOID GETTING LOOSE ITEMS CAUGHT IN THE LADDER CAGE.

4. Face the ladder and use both hands while climbing. Place each foot and hand securely on the ladder rungs as you climb.

5. Close the safety bar or chain at the top of the ladder after each use.

6. Never run air hoses, light cords, extension cords, or welding leads within the confines of a permanent ladder cage. The only exception to this rule would be to allow a supplied air breathing hose to be run inside for ease of egress in the event of an emergency.

7. Extreme caution must be exercised when using ladders in corrosive atmospheres or areas that are infrequently used such as flare stacks.

   NOTE : IF THE SAFETY BAR OR CHAIN IS MISSING OR INOPERABLE, REPORT CONDITION TO THE MAINTENANCE DEPARTMENT FOR REPAIRS.

JOB HAZARD ANALYSIS – 012

ENTERING PROCESS AREAS

KEY POINTS

- All J. J. White, Inc. personnel entering process areas for any purpose must check in with the operator at the area. All persons shall sign-in in the log book set up in the operator shelter for that purpose.

- Instead of individual members of contractor crews signing in the log book, some owners may allow a contractor supervisor to enter his own name an contractor company name in the log book on behalf of the workers under his supervision. Check with your contract administrator to verify if this practice is allowed.

- All persons, if alerted to do so, should leave the area immediately upon request.

- J. J. White, Inc. supervision shall check in with the operator of the area, define job, scope of work, obtain the proper permits, and report to the operator when the job has been completed.

- No work is to be started until every provision has been made to do the job safely. Always read and follow work permits.

- The proper cold work, confined space, or hot work permit should be issued when required. Vehicles entering an operating area require hot work permits.

- All persons shall inform the operator when their visit or work is completed and sign-out in the log book in the operator shelter.

- Current Hydro Fluoric Acid Safety Training is required for entry onto any Hydro Fluoric Alkylation Unit. This training must be performed by the owner.

- To facilitate good hazard recognition, J. J. White, Inc. personnel must have a basic understanding of the hazards associated with any process area they will be required to enter (i.e. Hydrogen Sulfide, Benzene, H.F., etc.).

JOB HAZARD ANALYSIS – 012 ENTERING PROCESS AREAS	
PURPOSE :	Proper procedure for entrance into process areas.
JOB HAZARD :	Process Hazards.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Unit specific training will be required.
SCOPE :	No work shall be performed in the process areas until it has been approved by the operator in charge. This requirement ensures that provisions are made to do the work safely, and that the proper permits have been issued.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. All persons entering process areas for any purpose must check in with the operator in the area.

2. All persons must provide pertinent information in the Entry Log Books located in the operating shelters.

   a. Information to be entered into the Entry Log Books consist of :

      Your Name
      Company Name
      Destination
      Time-In
      Time-Out

   b. Instead of individual members of contractor crews entering information into the Entry Log Book, some owners may allow a contractor supervisor to enter his own name, and remaining information in the book on behalf of the workers under his supervision.

   c. Employees must sign in/out of unit every time they leave. For example : break, lunch, end of work. Some owners may modify this policy during turnarounds.

3. All persons, if alerted to do so, should leave the process area immediately upon request.

4. No work is to be started until every provision has been made to do the job safely.

5. The proper Cold Work, Entry, or Hot Work Permit must be issued when required. Vehicles entering an operating area require a Hot Work Permit.

6. All persons shall inform the appropriate operating personnel when their visit or work is completed and enter the time-out in the log book.

7. Entry into any Hydrofluoric Unit requires **HF Safety Training** in order to enter the unit.

8. To facilitate good hazard recognition, J. J. White, Inc. personnel must have a basic understanding of the hazards associated with any process area they are required to enter (i.e. Hydrogen Sulfide, Bezene, H.F., etc.).

9. **NO CELL PHONES SHALL BE BROUGHT ONTO ANY UNIT WITH APPROVAL OF OPERATIONS.**

JOB HAZARD ANALYSIS – 013

RADIOGRAPHIC INSPECTION

KEY POINTS

- Radiographic Inspection is the non-destructive method of inspecting internal structure of a part based on differential absorption of penetrating radiation. The unabsorbed radiation can be recorded on film or photo sensitive paper viewed on a fluorescent screen or monitored with electronic radiation detectors to obtain a two-dimensional shadow image.

- Distance is the best protection because radiation intensity varies inversely as the square of the distance from the source. For example, radiation received at a point 10’ from a source is one-hundredth of radiation received at 1’ from the source. Conversely, radiation received at 1’ from the source is one-hundred times greater than radiation received at 10’ from the source.

- Time is a second way to control radiation exposure since exposure is directly proportional to the time spent in the radiation area. For example, the radiation received in a ten-minute exposure is ten times greater than a one minute exposure.

- Shielding is a third way to control radiation exposure since dense a material such as lead, steel, and concrete can absorb radiation before it can reach your body. The amount of radiation absorbed is proportional to the density and thickness of the shielding material.

- All personnel must observe all radiation signs.

- The radiation area is to be roped off or barricaded and the standard radiation warning signs shall be posted at a maximum of 50’ intervals.

- All radiation source containers must be labeled with the radiation insignia.

- No one shall enter a radiation area unless as an operating emergency make entry a necessity. In any emergency involving radiation, priority must be given to human safety since injuries caused by radiation exposure may not be discovered immediately and may be irreversible.

- As a matter of policy, J. J. White, Inc. will always subcontract all radiographic inspection work. J. J. White, Inc. personnel are never to engage in radiographic testing in any manner

JOB HAZARD ANALYSIS – 013 **RADIOGRAPHIC INSPECTION**	
PURPOSE :	General and specific information and emergency response steps for radiographic inspection.
JOB HAZARD :	Radiation Hazard.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Radiographic inspection is the non-destructive method of inspecting internal structure of a part based on differential absorption of penetrating radiation either electromagnetic radiation (x-ray or gamma ray) or particulate radiation (neutrons). The unabsorbed radiation can be recorded on film or photosensitive paper, viewed on a fluorescent screen, or monitored with electronic radiation detectors to obtain a two-dimensional "shadow" image. Strict adherence to the regulations developed by the U.S. Nuclear Regulatory Commission (NRC) will eliminate any dangers in the use of radiographic inspection.
NOTE :	**As a matter of policy, J. J. White, Inc. will always subcontract all radiographic inspection work. J. J. White, Inc. personnel are never to engage in radiographic testing in any manner. This JHA is generated only to raise basic radiation hazard recognition. Be familiar with client specific procedures.**
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. General.

a. There are three ways to minimize exposure to radiation : Distance, Time, and Shielding.

i) Distance is the best protection because radiation intensity varies inversely as the square of the distance from the source. For example, radiation received at a point 10' from a source is one-hundredth of radiation received at 1' from the source. Conversely, radiation received at 1' from the source is one-hundred times greater than radiation received at 10' from the source.

ii) Time is a second way to control radiation exposure since exposure is directly proportional to the time spent in the radiation area. For example, the radiation received in a ten-minute exposure is ten times greater than a one minute exposure.

iii) Shielding is a third way to control radiation exposure since dense a material such as lead, steel, and concrete can absorb radiation before it can reach your body. The amount of radiation absorbed is proportional to the density and thickness of the shielding material.

b. Allowable industrial radiation absorption according to NRC for personnel is 5 roentgen (r) or 5000mr per year for each year of age over 18. The yearly dose is safe over and beyond all other uncontrolled exposures such as cosmic rays.

c. Film badges and dosimeters are used to measure the radiation dosages received by personnel working in a radiation area. The dosimeter measures the total radiation exposure at any given time, the film badge measures the total accumulated radiation exposure over a period of time.

2. Specific information.

a. All personnel must observe all radiation signs 3-bladed purple propeller on a yellow background, barriers, and rules for their safety.

b. The NDE subcontractor will coordinate any radiographic inspection work performed in the plant with appropriate J. J. White, Inc. supervision, and the owner's representative. They will coordinate scope of work, timing, and work location.

c. A film badge (and dosimeter) will be worn by appropriate personnel when they are in the vicinity of the radiographic contractor's work area.

d. Any radiographic inspection subcontractor employed by J. J. White, Inc. must be licensed by the NRC. The subcontractor must follow the rules and regulations required by the NRC, the State in which the work is being performed, and all rules and regulations of the company and facility where the testing is to be performed.

e. The radiation area is to be roped off or barricaded and the standard radiation warning signs shall be posted at a maximum of 50' intervals.

f. The NDE subcontractor's supervisor will be responsible to see that the area is clear of all personnel prior to each exposure of the radiation

source. Also, the NDE subcontractor will be responsible to see that the perimeter is patrolled by an employee of the NDE subcontractor during each exposure.

g. Survey meters must be used to measure the radiation levels and to be sure the source has been properly shielded. Lookouts should be posted wherever the radiation levels are above 2mr accumulation in any one hour interval.

h. Whenever possible, the position of the source should be such that the primary beam will be away from areas occupied by people. Beam spread should be kept as small as possible by the use of shields.

i. All radiation source containers must be labeled with the radiation insignia – three-bladed purple propeller on a yellow background. Sources must be locked in a secure location when not under the direct control of the radiographic technician.

j. The radiographic inspection subcontractor is responsible for all material brought on-site, and must see to it that all material has been properly disposed before leaving the job site.

k. No one shall be allowed to enter a radiation area unless an operating emergency makes entry a necessity. An exception would be a Nuclear Regulatory Commission Inspector who may enter for inspection purposes after positive identification has been established, he has been issued a film badge and dosimeter, and he has been made aware of the radiation field.

3. Emergency Procedure.

a. In the event of an emergency, the radiographic contractor shall notify immediately the J. J. White, Inc. supervisor and the Area Operator. The subcontractor shall ensure that contamination is minimized and establish a safe perimeter around the accident – posting signs and roping off the area. The subcontractor supervisor shall see that all personnel are evacuated from the hazard area.

b. Identify and immediately isolate all personas who might have received high exposures or who could have been contaminated.

c. If the emergency involves a fire or requires personnel to enter the room, alert them to the situation and regulate entry to minimize exposure time and number of incidents.

d. Maintain complete records of the incident including all follow-up done on-site and in the hospital to personnel involved.

JOB HAZARD ANALYSIS – 014

WELDING AND BURNING

KEY POINTS

- The most common way in which harmful materials may enter the body as a result of welding, burning, etc., is through breathing finely divided metal powders, dust, or metal fumes.

- The heating, soldering, brazing, or grinding of cadmium, including alloys or plating containing cadmium, is prohibited.

- Cadmium metals are often mistaken for galvanized metal or zinc plating; if there is cadmium suspected, notify the J. J. White, Inc. Safety Coordinator to arrange for cadmium testing before burning.

- Burning or welding or surfaces containing lead paint can produce hazardous fumes. The coated surface should be cleaned prior to welding or burning. Always question whether a painted surface contains lead before burning o welding on it.

- Fluxes and rosins may contain material such as fluorides which when heated give off vapors that are irritating to the eyes, nose, throat, and respiratory system. Do not breathe fumes. Use only with adequate ventilation.

- In planning or carrying out work involving burning or welding, consider :

  - The base metal and its health effects.

  - Coatings on base metals and their health effects.

  - Ventilation required.

  - Presence of other employees near the job.

  - Respiratory protection.

  - Fire watch must monitor area for a minimum of ½ hour after hot work activities cease. Follow client specific criteria.

NOTE : DO NOT USE ORDINARY DUST RESPIRATORS. AIR PURIFYING RESIPRATORS WHICH ARE DESIGNED TO PROTECT AGAINST PARTICLES AND / OR LOW LEVEL CHEMICAL VAPORS ARE REQUIRED.

- Welding
  - Wear protective clothing that shields eyes, hands, and the entire body from hot metal splatter and ultraviolet rays.
  - If a permit is required in the work area, you must have it and have it posted.
  - Never strike an arc in the presence of other persons whose eyes are not shielded.
  - Provide adequate ventilation in confined areas.
  - Assure equipment is maintained in good condition. Secure welding machine ground connections before power is applied to welding machines.
  - Place fire extinguisher and / or charged fire hose at weld site.
  - When operations are discontinued during working hours, the power switch must be placed in the "off" position. At the end of the work day, the machine must be turned off at the main power source if it is located at an operating unit.
- Burning
  - Oxygen must never be used as a substitute for compressed air and must never be released in a confined space.
  - When working inside confined spaces, oxygen / propane / acetylene or other fuel gas hose and torches must be removed before leaving the job. If this is impossible or impracticable, the hose must be disconnected from the cylinder after the cylinder valve is closed.
  - Never leave pressure on hoses. Never place cylinders inside enclosures nor leave torch in enclosures where leaks could accumulate explosive mixtures.
  - Wear protective clothing that shields the eyes, hands, and entire body from hot metal slag and sparks. Secure sleeves and pant-legs. Use of leather sleeves and bibs may be required.
  - Inspect equipment for defects, which may render it unfit for service. If you find a defect do not attempt repairs, tag it accordingly and send it back to the tool room.
  - A fire extinguisher and / or other firefighting equipment in the appropriate state of readiness shall be immediately available in the work area.

- Air Arc Gouging

  - Arc gouging produced much higher levels of toxic metal fumes and gases than welding. Ventilation should be provided with the exhaust away from occupied area.

  - Arc gouging also produces high noise levels. Hearing protection is always required.

JOB HAZARD ANALYSIS – 014 WELDING AND BURNING	
PURPOSE :	Proper precautions and procedures for welding and burning.
JOB HAZARD :	Eye injuries, toxic breathing hazards, burns, fires.
PROTECTIVE EQUIPMENT : goggles / flash goggles ,	Nomex coveralls, welding jacket / leathers, welding shields, burning and eye glasses are required at all times. Respiratory protection when exposure levels exceed the permissible limits. Fire extinguishers and/or a charged fire hose must be at the worksite.
SCOPE :	Welding and Burning in shop locations or in the field require strict adherence to proper procedure to prevent eye injuries, toxic breathing hazards, burns, and fires. This procedure is intended as a guide to safe practices in welding, burning, brazing, and related operations. It is presented as minimum requirements. Special consideration should be given to such matters as ventilation and length of work periods in unusual locations. Additional health protective measures may be required. Assistance may be obtained by consulting the J. J. White, Inc. Safety Coordinator.
NOTE :	Fire Watch must monitor the work area for a minimum of ½ hour after hot work activities cease. Follow client specific criteria.
REFERENCES :	N/A.

HEALTH AND SAFETY CONSIDERATIONS:

A. The principle that is common to all welding and burning and similar operations is the heating of metal to cause its separation or joining. In these operations, whether by gas, flame, or electric arc, physical changes occur in the state of the metal, chemical changes occur in the air, and both physical and chemical changes take place in fluxes and coatings.

1. The most common way in which harmful materials may enter the body as a result of welding, burning, etc. is through breathing finely divided metal powders or metal fumes. In general, metal fumes are much smaller particles than metal dust and are therefore more easily inhaled and deposited into the lungs.

2. The electric arc passing through the air breaks down or changes certain components to form several harmful gases. Ozone is produced from oxygen. Nitrogen is combined with oxygen to form oxides of nitrogen. Electric arcs also produce radiant energy in the form of ultraviolet light which forms ozone and can cause harmful burns of the skin and eyes.

Fluxes and rosins may contain material such as fluorides, which when heated give off vapors that are irritating to the eyes, nose, throat, and respiratory system. Do not breathe fumes. Use only with adequate ventilation.

3. Most illnesses produced by inhalation of metal fumes or gases or by exposure to the arc emission of ultraviolet radiation are mild and have no permanent effects. These include :

   a. Flash burns of the eyes caused by exposure of unprotected eyes to the ultraviolet light.

   b. Metal fume fever caused by the inhalation of metal fumes resulting in chills, fever, nausea, headache, and dry cough.

   c. Eye, nose, and throat irritations caused by the inhalation of ozone, oxides of nitrogen, and other irritants.

   d. More serious illness in the form of metal poisoning is produced by the inhalation or ingestion of dust, fumes, and vapors of lead, mercury, zinc, beryllium, or cadmium.

   e. Burning or welding on surfaces containing lead paint, zinc, cadmium, beryllium, or mercury can produce hazardous fumes which can exceed established exposure limits if adequate ventilation or respiratory protection is not used. Coated surfaces should be cleaned prior to welding or burning to minimize the possibility of exposure.

   f. The heating, soldering, brazing, or grinding of cadmium, including alloys or plating containing cadmium is hazardous. Since cadmium metals are often mistaken for galvanized metal or zinc plating, it is important to test for cadmium before burning. To test – with adequate ventilation available, heat the metal gently in a small spot. Cadmium will form a gold-yellow film. In contrast, zinc will form a smoky gray color. If cadmium is encountered, the J. J. White, Inc. Safety Coordinator must be notified.

HEALTH AND SAFETY CONSIDERATIONS:

A. In planning or carrying out hot work, certain factors should be considered besides the obviously important hot work permit and gas test :

   1. The base metal and its health effects.

   2. The welding or burning process to be used and its special health problems, if any.

3. The location of the work. Is the work to be done in the open or in an enclosed space?

4. Ventilation required. Is special ventilation equipment needed?

5. Position of the work. Is the work overhead or below? Can it be positioned to allow fumes to be carried away without entering the welder's breathing zone?

6. Presence of other employees near the job. Is eye protection needed against ultraviolet radiation and / or flash burns? Are other workers in the path of the welding fumes and are welding screens in place?

7. Cleanliness of the metal surface and / or any coatings on the metal surface. Are harmful or flammable materials present beneath patches or in seams?

8. Respiratory protection. Are fume respirators adequate, or are air supplied respirators needed?

NOTE : SINCE METAL FUMES CONTAIN PARTICLES THAT ARE MUCH SMALLER THAN DUST PARTICLES, DO NOT USE ORDINARY DUST RESPIRATORS. AIR PURIFYING RESPIRATORS WHICH ARE DESIGNED TO PROTECT AGAINST PARTICLES AND / OR LOW LEVEL CHEMICAL VAPORS SHOULD BE USED. CONSULT THE J. J. WHITE, INC. SAFETY COORDINATOR.

HEALTH AND SAFETY CONSIDERATIONS:

A. Welding.

1. General Arc Welding Precautions.

a. Welding shield must have ANSI Z87.1-85 certification, must be leak proof with no cracks or holes.

b. Use proper welding lens shade.

c. Safety glasses must be worn at all times, even when the hood is in place.

d. Leather welding gloves must be worn. Leather sleeves / bibs are available as needed.

e. Wear protective clothing that shields the entire body from hot metal spatter and ultraviolet rays.

f. Never strike an arc in the presence of other persons whose eyes are not shielded.

g. Provide adequate ventilation in confined areas where appropriate. Use source capture fume exhausters.

h. Assure electrode holder fully insulated, no worn / frayed insulation, and all connections tight. Welding cables must be maintained in good condition and repairs made by a qualified electrician as soon as insulation shows signs of damage such as cracking, melting, or bare wire. Welding machine ground connections must be secured on or as close as possible to the object being worked upon so that good ground is insured. This ground connection is to be made before power is applied to welding machines.

i. Do not make or break any connections or perform any maintenance while welding machine is on. When removing arc welding machine connections, the power supply line must be de-energized to prevent a flash and a visual check must be made of the receptacle for a ground. Care must be taken to see that plugs and cable connections are kept dry. When operations are discontinued during working hours, the power switch must be placed in the "off" position. At the end of the work day, the machine must be turned off at the main power source if it is located at an operating unit.

j. Temporary power lines to portable arc welding machines must be carried overhead whenever practicable, or otherwise laid on the floor or ground suitably protected so that they cannot be damaged or interfere with safe passage. When cables must be laid on the ground, care should be taken to avoid lying in water. Operating an arc welder in damp or wet environments create the possibility of electric shock.

2. Practice.

a. Obtain Cold Work, Hot Work, and / or Entry Permits. All permits must be posted on the job site.

b. According to the Permit, place fire extinguishers and / or charged fire hoses at weld sites.

c. Set up equipment exercising care in the running of leads.

d. Establisgh ground connection as close as possible to welding locations, making sure no other electrical or rotating equipment is in the path of the welding current.

e. If welding is in such a position that ears will be subject to sparks, a leather hood, Nomex hood, or welding cap must be worn to protect the ears.

f. When welding is complete, shut off machine and re-wrap welding cables.

g. Dispose of electrode stubs in proper container, they are a slipping hazard.

h. Use proper grounding clams (not electrode handles), multiple grounds should be of sufficient capacity to prevent sparking and smoking.

B. Burning.

1. General Burning Precautions.

a. Handle all compressed gas cylinders with extreme care. Keep cylinder caps on when not in use. Oxygen must never be used as a substitute for compressed air and must never be released in a confined space.

b. Ensure gas cylinders are secured in a cart with divider or other structural supports. Keep acetylene cylidners in vertical position. Cylinders **must never** be placed inside of a confined space or on tank roofs.

c. Wear proper goggles for tasks over safety glasses.

d. If burning in a position that ears will be subject to sparks, a leather hood, Nomex hood, or welding cap must be worn. Leather welding gloves must be worn. Wear protective clothing that shields the entire body from hot metal slag and sparks.

e. To prevent spontaneous combustion, oil or grease must not be permitted to come in contact with oxygen cylinders, regulators, connectors, or hoses. Oxygen cylinders or apparatus **must** not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike any oily surface or greasy clothes.

f. When working in side confined spaces, oxygen / propane / acetylene or other fuel gas hose and torch must be removed before leaving the job. If this is impossible or impracticable, the hose must be disconnected from the cylinder after the cylinder valve is closed.

g. Fuel gas and oxygen hoses must be inspected for leaks, burns, worn places, loose connections, or other defects which may render the hose unfit for services. Hose burned by a flashback must be discarded.

Flashback arresters must be installed between the burning / welding torch and the fuel / gas / oxygen hose.

2. Practice.

   a. Obtain Cold Work, Hot Work, and / or Entry permits and post at job site.

   b. According to the permit, locate fire extinguisher and / o r charged fire hose at burning site firefighting equipment which usually consists of a fire extinguisher and water hose in the appropriate state of some readiness shall be immediately available in the work area and shall be maintained in open readiness for instant use.

   c. Set up bottles securely and run hoses to work site. Exercise care in the running of hoses.

   d. Make sure to check valves and flashback arresters are attached to the burning / welding torch between the torch and the fuel / gas / oxygen hose.

   e. Turn torch away from your body and hand and light torch with striker, never a lighter or matches.

   f. Never leave pressure on hoses when leaving job site, even for short breaks, turn all cylinders off. Never place cylinders inside enclosures nor leave torch in enclosures where leaks could accumulate.

   g. Approved cylinder carts with dividers and cages should be used for transporting and lifting gas cylinders wherever practical.

C. Air Arc Gouging.

1. Arc gouging produced much higher levels of metal fumes and gases than welding. Carbon monoxide gas is always formed during gouging. Other gases such as sulfur dioxide can be created if a vessel was in any services that utilized H_2S.

2. Ventilation should be provided with the exhaust away from the occupied area.

3. Arc gouging also produces high noise levels. Hearing protection is always required.

4. Particular care should be taken when others are working on levels directly above and below the arc gougers.

JOB HAZARD ANALYSIS – 015

PORTABLE PIPE MACHINE

KEY POINTS

- Do not operate a portable pipe machine unless you have been trained to do so.
- Follow the manufacturer's safety precautions and operating / maintenance instructions.
- Ream the inside burr when necessary. **NEVER** feel for the burr with a gloved or ungloved finger, just look. Burred edges can be razor sharp and very hazardous to the touch.
- When a job is complete, disconnect and clean the machine. This machine is capable of producing very sharp edges and chips. Extreme caution must be maintained when removing or handling "chips" and other sharp pieces of pipe.
- Cutting oil from pipe threading activities must never be allowed to simply run onto the ground. It creates a slipping hazard as well as an environmental hazard.
- Remove any loose clothing that has the potential for entanglement with moving or rotating parts on the machine.

JOB HAZARD ANALYSIS – 015 PORTABLE PIPE MACHINE	
PURPOSE :	To prescribe a safe method of operating a mechanical piece of machinery used to cut and thread pipe.
JOB HAZARD :	Hazards of rotating equipment. Sharp edges, bending and lifting in positioning the machine, and in moving, loading, and stacking pipe lengths. The potential for loose clothing to become entangled.
PROTECTIVE EQUIPMENT :	Basic P.P.E., In handling pipe prior to and after cutting, gloves must be worn.
SCOPE :	Secure Hot Work Permit where required. Connect machine to the proper power source using a ground fault circuit interrupter.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use to Thread Pipe.

1. Check to see that the chuck is opened wide enough to accept the size pipe to be inserted.

2. Insert the pipe end into the chuck leaving enough hanging out to facilitate threading. Piece must be long enough to allow chuck jaws to properly support the pipe for tightness. Tighten the chuck.

3. When necessary, support the free end of the pipe with a pipe stand.

4. Remove or secure all loose clothing that has the potential for entanglement in the machine.

5. Start the machine in the proper direction. Apply cutting oil to end of pipe, making sure drip pan or absorbent material/mats are in place under machine.

6. Ream the inside burr when necessary. NEVER feel for the burr with a gloved or ungloved finger, just look. Burred edge can be razor sharp and very hazardous to the touch.

7. Move the reamer out of the way and set the die to the proper size.

8. Verify oil flow for proper cutting of threads.

9. Make sure oil is free of water and grit.

10. Close the die and move it to the pipe with a firm motion to start the thread. The machine will now thread the pipe automatically.

11. When the proper length of thread has been cut, open the die and stop the machine.

12. Move the die out of the way and open the chuck.

13. Disconnect and clean the machine. One hazardous part of this machine is its ability to produce very sharp edges and chips. Extreme caution must be maintained when removing or handling “chips” and other sharp pieces of pipe.

B. Preparation and Use to Cut Pipe.

1. Remove or secure all loose clothing that has the potential for entanglement in the machine.

2. Push the pipe through the machine to the proper length and close the chuck tightly.

3. Support the pipe if necessary and start the machine.

4. Align the cutter. Apply cutting oil to cut area of pipe, making sure drip pan or absorbent material/mats are in place under machine.

5. Tighten the cutter into position with a firm motion, but do not force.

6. When the cut has been made, stop the machine. Ream the inside burr when necessary. NEVER feel for the burr with a gloved or ungloved finger, just look. Burred edge can be razor sharp and very hazardous to the touch.

7. Move the cutter out of the way.

8. Open the chuck and remove the pipe.

9. Disconnect and clean the machine. One hazardous aspect of this machine is its ability to produce very sharp edges and chips. Extreme caution must be maintained when removing or handling “chips” and other sharp pieces of pipe.

10. Dispose of used oil or absorbent material/mats according to the specified procedure.

JOB HAZARD ANALYSIS – 016

TRANSPORTING CYLINDERS

KEY POINTS

- Cylinders must have valve protective cap in place when storing or transporting.
- Cylinders must not be stored or used near sources of high temperature.
- Persons moving cylinders must make sure they are placed in an upright position, fastened, anchored, or chained so that the cylinder will not fall over.
- Under no circumstances should cylinders be lifted by a crane using slings, chains, or its valve protection cap. When a lift is absolutely necessary, lift in a bottle rack specifically designed for hoisting bottles.
- Do not allow oxygen to contact oil or grease. To prevent spontaneous combustion, oil or grease must not be permitted to come in contact with oxygen cylinders, regulators, connectors, or hoses.
- Do not deface or remove any markings which are used for identification of the cylinder contents.
- Empty cylinders are a hazard and an expense. Return empties to the supplier or the proper cylinder pickup location.
- **TRANSPORTATION OF CYLINDERS MUST BE IN AN UPRIGHT POSITION ON WELD TRUCKS OR FORK LIFTS EQUIPPED WITH A CYLINDER RACK AND WITH A SAFETY CHAIN.**

JOB HAZARD ANALYSIS – 016 TRANSPORTING CYLINDERS	
PURPOSE :	Safe handling procedure for transportation of compressed gas cylinders.
JOB HAZARD :	Handling pressure cylinders. Potential for tripping hazards and rupture of valves & subsequent explosion or projectile action.
PROTECTIVE EQUIPMENT :	Basic P.P.E., hand truck where practical. Cylinder cap for valve protection.
SCOPE :	Compressed gas cylinders must be moved, stored, and secured in a safe manner. This document is intended to highlight hazards inherent in this activity. No attempt is made to provide a detailed step-by-step approach to the job completion. Any additional information required should be secured from your immediate supervisor.
REFERENCES :	N/A.

PROCEDURE:

A. General.

1. Gas cylinders must always have valve protective cap in place when storing or transporting. Most cylinders are equipped with a safety device to protect against over pressure. These devices release the cylinder contents when the temperature is raised to 125-170°F. For this reason cylinders should not be stored near sources of high temperature. Damage to the cylinder or its valve could result in disastrous cylinder propulsion.

2. Cylinders shall not be dropped or permitted to strike each other violently.

3. Transportation of cylinders must be in an upright position on welding trucks or fork lifts equipped with cylinder rack and with a safety chain or safety bracket device to keep cylinders from falling. Cylinders must never be transported without first removing the regulator and installing the protective cap, unless mounted on a hand truck or bottle cart designed for that purpose.

4. Never drag or slide cylinders, use suitable hand truck, fork lift, roll platform or similar device with cylinders firmly secured for unloading and transferring.

5. When a delivery to the work site has been made, the person taking delivery will make sure the cylinders are placed in an upright position, fastened, anchored or chained so that the cylinder will not fall over.

6. Under no circumstances should cylinders be lifted by a crane using slings, chains or the valve protection cap. When a lift is absolutely necessary, lift in a bottle rack or sling specifically designed to lift cylinders.

7. Oxygen cylinders shall be stored in a separate location, at least 20' from cylinders of combustible gases. An alternative is to separate the cylinders by using a non-combustible barrier at least 5' high having a fire resistance rating of at least one-half hour. Combustible material of any other nature should not be stored adjacent to oxygen.

8. Bottle carts designed specifically to hold (1) oxygen and (1) combustible gas (i.e., Acetylene or APP gas) cylinder must have a minimum 5' high, 1/8" thick, 18" wide mild steel division plate between the oxygen cylinder and the combustible gas cylinder. A chain shall be used to secure the cylinders to the cart.

9. When towing compressed gas cylinders on approved portable welding and burning carts with rubber tires, make sure cylinders are secure with hose and regulator unlocked. Protective cap must be in place, trailer hitch must be secure and truck used to tow cart should not exceed 10 mph.

10. When handling, check for defects and abuse.

11. Do not allow oxygen to contact oil or grease. To prevent spontaneous combustion, oil or grease must not be permitted to come in contact with oxygen cylinders, regulators, connectors, or hoses. Oxygen cylinders or apparatus must not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike any oily surface or greasy clothes.

12. All gas cylinders must always be stored in an upright position, never laid on their side.

13. Cylinder valves shall not be tampered with nor should any attempt be made to repair them. Compressed gases are received and stored in standard gas cylinders. Do not deface or remove any markings which are used for identification of the cylinder contents.

JOB HAZARD ANALYSIS – 017

IGNITION SOURCE CONTROL

KEY POINTS

- To keep combustible products from forming flammable gas and oxygen mixtures that are ignitable by the presence of heat. This procedure covers three potential ignition sources : flames, heated surfaces, and sparks.

- Combustion : the chemical action (burning) occurring when a “fuel” reacts with oxygen rapidly releasing energy (heat). Also produced are flames, smoke, and hot combustion gases.

- Ignition : The temperature, volume of heat, heat energy, and the duration of heating required to start the chemical action or “combustion”.

- Temperature : the intensity of heat needed to ignite a fuel and oxygen mixture. This amount of heat varies according to the fuel involved; i.e. H_2S requires a minimum spark but at a temperature of 752^o Fahrenheit, when gasoline needs a larger spark at 536^oF.

- Explosive ranges and auto-ignition temperature of combustible and flammable substances determine the heat energy required to ignite them.

- Furnace burners, flares, pilot lights, space heaters, welding , and burning torches can ignite flammable vapors and gases.

- Matches and cigarette lighters are a potential source of flame which makes smoking a distinct hazard.

- Other sources are sparks from welding, burning, and grinding, as well as static sparks from improper bonding. Heated surfaces can also be a good ignition source such as hot plate, heater coils in tank, etc.

- Vehicles are a potential source of ignition of flammable vapors and gases. As such, in process plants they should be restricted to approved roadways unless access is granted by the Owners Operations Department and **proper permits are issued**.

- Adherence to Hot Work procedures and the Owners Plant Safety Rules plus the restricted use of flame-producing devices are effective control measures.

JOB HAZARD ANALYSIS – 017 IGNITION SOURCE CONTROL	
PURPOSE :	Control of potential ignition sources.
JOB HAZARD :	Fire potential inherent to refinery and process plant operations.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	To keep combustible products from forming flammable gas and oxygen mixtures that are ignitable by the presence of heat. This procedure covers three potential ignition sources : flames, heated sources, and sparks.
REFERENCES :	N/A.

PROCEDURE:

A. Ignition of Combustibles.

1. Combustion: The chemical action (burning) occurring when a "fuel" reacts with oxygen rapidly releasing energy (heat). Also produced arc flames, smoke, and hot combustion gases.

2. Combustible: A substance capable of fueling a fire.

3. Ignition: The temperature, volume of heat, heat energy, and the duration of heating required to start the chemical action of “combustion”.

4. Auto ignition Temperature: The lowest temperature at which a fuel and oxygen mixture will ignite without spark or flame. This amount of heat varies according to the fuel involved, i.e. H2S requires a temperature of 500ºF, while gasoline needs a temperature of about 536ºF.

5. Explosive Limits: The range of concentration of a flammable gas or vapor (percent by volume in air) in which explosion can occur if an ignition source is present.

6. Ignition Source: Anything that provides heat, spark, or flame sufficient to cause combustion or explosion.

7. Explosive ranges and Auto ignition temperature of combustible and flammable substances determine the heat energy required to ignite them.

B. Ignition Sources.

1. Furnace burners, flares, pilot lights, space heaters, welding and burning torches can ignite flammable vapors and gases.

2. Matches and cigarette lighters are a potential source of flame which makes smoking a distinct hazard. In refineries and process plants, smoking is restricted to approved “smoking pens” or “smoking shelters”.

3. Other sources are sparks from welding, burning and grinding, as well as static sparks from improper grounding. Heated surfaces can also be an ignition source such as hot plate, heater coils in tank, etc.

4. Vehicles are a potential source of ignition of flammable vapors and gases. As such, they should be restricted to approved roadways unless access is granted by the Owners Operations Department and proper permits are issued.

5. The presence of oxygen or iron sulfide fines (finely divided particles) in tanks and vessels increases potential for ignition.

   CAUTION : IF THE PRESENCE OF IRON SULFIDE IS SUSPECTED, CONTACT THE OWNERS FIRE DEPARTMENT REGARDING ESTABLISHING APPROPRIATE FIRE PROTECTION.

6. Adherence to Hot Work procedures and the Owners Plant Safety Rules plus the restricted use of flame producing devices are effective ignition control measures.

7. Combustible materials shall be kept at a minimum of 35’ away from Hot Work activity or ignition sources. Where this is not possible, combustible materials shall be protected by fire proof blankets.

8. Fire Watchers shall be used when there is a potential for more than a minor fire. The Fire Watch shall be equipped with and trained to use appropriate firefighting equipment. The Fire Watch shall be maintained for a minimum of a ½ hour after completion of welding and cutting activities or per client specific criteria.

JOB HAZARD ANALYSIS – 018

PORTABLE EXTINGUISHERS

KEY POINTS

- Most fires start small and if the correct hand extinguisher is used quickly, a major fire may be averted.
- Evaluate the fire situation first, sound alarm, then attempt to fight only small fires. Let professionals fight the larger fires; they are trained for the task.
- Whenever possible, approach a fire from upwind, do not enter a spilled fuel area, never turn your back, and do not get so close that a flashback can reach you.
- **Always report fire equipment that has been used as soon as possible to your immediate supervisor so that it can be removed from service and recharged or replaced.**
- Fires are classified according to types of fuels.
    - Class A: Fueled by solid combustible (wood, cloth, paper, etc.) Requires water to cool and quench.
    - Class B: Fueled by hydrocarbon liquids, gases, vapors, or mists. Requires C02 or other inert gases that dilute or exclude oxygen, dry chemical that inhibits, or interrupts the chemical reaction.
    - Class C: Involves energized electrical equipment and requires non-conducting C02, dry chemical, or Halon fire extinguishers.
    - Class D: Fueled by metals such as magnesium, sodium, or potassium. Requires special sodium chloride extinguishers.
- Dry Chemical Extinguishers are to be used on “B” and “C” Class fires.
- **DO NOT USE STORED PRESSURE WATER EXTINGUISHERS OR A CHARGED FIRE HOSE ON ELECTRICAL FIRES!!**

JOB HAZARD ANALYSIS – 018 PORTABLE EXTINGUISHERS	
PURPOSE :	Proper operation of portable fire extinguishers.
JOB HAZARD :	Fire, explosion, hot and toxic air, gases, or vapors.
PROTECTIVE EQUIPMENT :	Basic P.P.E., unless otherwise requested and indicated by the permit.
SCOPE :	Most fires start small and if correct hand extinguishers are used quickly, a major fire may be averted. This procedure covers characteristics and proper use of handheld extinguishers.
REFERENCES :	N/A.

PROCEDURE:

A. General Considerations.

1. A quick evaluation of the fire situation should always be made. This should include familiarization with the different types of extinguishers and usage.

   a. First and foremost, **sound the fire alarm!**

   b. Fight only those fires that are in their incipient or beginning stages.

   c. Let the professionally trained firefighters handle the larger fires.

2. Whenever possible, approach fire from upwind.

3. Do not enter spilled fuel area. Use caution during extinguishment not to stand in product involved in fire – or become contaminated by the exposure of a product

4. Never turn your back, even after the fire is out!

5. Never get so close that a flashback can reach you.

6. If indoors, attempt to fight only the smallest fires don't become trapped.

7. Always report fire equipment you've used as soon as possible to your immediate supervisor. In addition, a fire investigation may be required.

8. Never remove a fire extinguisher from any unit, we must use our own extinguishers for hot work, fire watch, etc.

9. **PASS**
P – Pull Pin.
A – Aim at the base of the fire.
S – Squeeze handle.
S – Sweep side to side with hose or nozzle.

B. Fire Extinguisher Considerations.

1. A fire occurs when a source of heat causes a fuel to react with oxygen. This is the basis of the familiar fire triangle (heat, fuel, oxygen). Extinguishment is usually accomplished when one element is removed.

2. Extinguishers are made in various types to:

a. Remove heat required to maintain combustion.

b. Reduce oxygen below amount needed for combustion.

c. Inhibit or interrupt the chemical chain reaction of combustion.

3. Fires are classified according to types of fuels :

a. Class A: Fueled by solid combustible (wood, cloth, paper, etc.) Requires water to cool and quench.

b. Class B: Fueled by hydrocarbon liquids, gases, vapors, or mists. Requires C02 or other inert gases that dilute or exclude oxygen, dry chemical that inhibits, or interrupts the chemical reaction.

c. Class C: Involves energized electrical equipment and requires non-conducting C02, dry chemical, or Halon fire extinguishers.

d. Class D: Fueled by metals such as magnesium, sodium, or potassium. Requires special sodium chloride extinguishers.

C. Dry Chemical Extinguishers.

1. To be used on “B” and “C” Class fires.

2. How to use :

a. 5-lb dry chemical extinguishers have an internally located CO_2 cartridge.

i) To activate, removed locking pin at top and pull down lever to puncture cartridge seal.

ii) Remove nozzle from holder and approach to within 15 feet of fire (approach should be from upwind whenever possible). Be careful not to enter a fuel spill area.

iii) Squeeze nozzle handle and, using a sweeping side to side motion, direct stream at base of fire or source.

iv) When extinguishment is complete, step back carefully, being alert for possible re-ignition.

DO NOT TURN YOUR BACK EVEN IF THE FIRE IS OUT!!

v) Invert the extinguisher, open the nozzle to clear the hose and bleed off all pressure.

vi) **ALWAYS NOTIFY YOUR IMMEDIATE SUPERVISOR WHEN USED!!**

b. 10-, 20-, or 30-lb extinguishers have an externally located CO_2 cartridge.

i) Break seal (some have pins and some lift hose).

ii) Puncture cartridge to pressure extinguisher.

NOTE: Make sure the extinguisher is pointing away from personnel.

iii) Direct powder at the base of the fire or fire source.

iv) Use maximum stream by staying back at least 13 to 15 feet, and sweep leading edge.

v) When done using, invert extinguisher and open nozzle to clear hose, and bleed off all pressure.

vi) **ALWAYS NOTIFY YOUR IMMEDIATE SUPERVISOR WHEN USED!!**

D. Dry Chemical Extinguishers.

1. To be used on Class “B” and “C” fires.

2. How to use :

   a. All sizes :

      i) Pull pin, breaking seal.

      ii) Direct CO_2 gas to flow across and blanket burning surface.

      iii) If fire is indoors, ventilate room to remove toxic combustion products and CO_2 gases. Stay out until ventilation is complete.

      iv) If area must be entered, only trained firefighting personnel should do so!

      v) **ALWAYS NOTIFY YOUR IMMEDIATE SUPERVISOR WHEN USED!!**

E. Stored Pressure Water Extinguishers.

1. To be used on Class “A” fires only.

2. How to use :

   i) Pull pin and squeeze trigger.

   ii) Direct stream directly to burning material.

   iii) Distance of solid stream is about 30’. If spray is desired place thumb in water stream at nozzle to break up solid stream.

   iv) **ALWAYS NOTIFY YOUR IMMEDIATE SUPERVISOR WHEN USED!!**

   v) **DO NOT USE ON ELECTRICAL FIRES!!**

JOB HAZARD ANALYSIS – 019

HOUSEKEEPING AND ILLUMINATION

KEY POINTS

- The establishment of a housekeeping program reduced accident potential, and increases efficiency and effectiveness.
- No hazard control program can succeed if housekeeping is not seen as an integral part of the overall health and safety program.
- Make housekeeping a standard part of our operations.
- Maintain a clean and orderly work place.
- Reduce the time and effort spent to clean up and area by :
    - Not allowing clutter to build.
    - Not leaving a mess for others to clean up.
- When everything has an assigned place, there is less chance that materials will be taken from the area or misplaced.
- Money is saved and efficiency is increased when employees treat materials with the care they deserve by minimizing spillage and scrap.
- An orderly facility permits easy egress by keeping exits and aisles clear of obstructions.
- All work areas shall be properly illuminated. Special attention shall be paid to confined spaces and work areas not having the benefit of good natural lighting conditions.
- When night shift work is scheduled, a survey of work areas, parking lots, and access routes shall be done to assure sufficient illumination for the safety of our workforce.

JOB HAZARD ANALYSIS – 019 HOUSKEEPING AND ILLUMINATION	
PURPOSE :	The establishment of a housekeeping program reduces accident potential & increases efficiency and effectiveness.
JOB HAZARD :	Slips, Trips, & Falls.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	No hazard control program can succeed if housekeeping is not seen as an integral, ongoing part of the overall health and safety program.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Make housekeeping a standard part of our operations.

    a. Maintain a clean and orderly work place.

    b. Reduce the time and effort spent to clean up an area by:

        i) Not allowing clutter to build.

        ii) Not leaving a mess for others to clean up.

2. When everything has an assigned place, there is less chance that materials will be taken from the area or misplaced.

3. Money is saved and efficiency is increased when employees treat materials with the care they deserve by minimizing spillage and scrap.

4. An orderly facility permits easy access by keeping exits and aisles leading to exits free from obstructions.

5. The signs of disorder are:

    a. Clutter and poorly arranged areas.

    b. Untidy piling of material.

c. Piled-on material damaging other material.

d. Items no longer needed.

e. Blocked stairways, extinguishers.

f. Material stuffed in corners and out of the way places.

g. Materials/equipment gathering dust and dirt from disuse.

h. Excessive quantities of items.

i. Overcrowded storage areas and shelves.

j. Overflowing bins and containers.

k. Broken containers and damaged materials.

6. The benefits of order are:

a. Easier access/egress for emergency response.

b. Eliminates accidents and fires.

c. Prevents wasted energy.

d. Maintains greatest use of available space.

e. Keeps supply inventory at a minimum.

f. Helps control property damage.

g. Guarantees good workplace appearance.

h. Encourages better work habits.

i. Impresses our clients.

j. Reflects a well-run organization.

k. Minimizes the need for separate clean-up crews.

l. Makes the job easier and more pleasant.

B. Illumination.

1. All work performed by J. J. White, Incorporated personnel shall be done under optimized lighting conditions.

2. In the absence of good natural (sun) light, steps must be taken to ensure that adequate lighting is provided to all work areas. Adequate lighting means, not only lighting the area to safely and accurately perform your task, but to also access and exit work areas safely.

3. Special attention must be paid to confined spaces, pump-houses and areas not receiving the benefit of good natural lighting.

4. When night shift work is scheduled, a survey must be completed of all working areas, parking lots, and access/walk routs to assure sufficient lighting for safety.

JOB HAZARD ANALYSIS – 020

EXCAVATION

KEY POINTS

- The "Competent Person" is the superintendent, general foreman, or foreman who is responsible for the excavation.
- Excavations deeper than 4' are permit required confined spaces. Stairways, ramps, or ladders are required as a means of access and egress. Employees must not require more than 25' of lateral travel to reach the stairway, ramp, or ladder.
- Excavations greater than 5' of depth require adequate protective systems such as sloping, shoring, or shielding, to protect employees.
- If work is in or around traffic, the excavation must be protected with signs and barricades.
- Persons performing excavations must always se on the alert for buried red concrete, electrical power lines, piping, sewers, etc. work should be stopped immediately if these or any obstructions are encountered during work in progress. The obstruction or hazard must be reported to the Competent Person and treated as "live" and in-service until proven otherwise.
- All excavations require the use of the **National One Call System**. Please see the J. J. White, Inc. Safety Awareness program manual – appendix 13 for full details.
- Excavations in existing process plants or refineries shall be considered to be in Class "C" soils and shored or sloped accordingly.
- Persons exposed to vehicular traffic must be supplied and protected by barricades and vests.
- Fall protection measures must be taken where appropriate.

JOB HAZARD ANALYSIS – 020 EXCAVATION	
PURPOSE :	Provides guidance for the protection of employees working in and around excavations & trenches.
JOB HAZARD :	Personal injury / health effects due to trench cave-ins, hazardous atmospheres, lack of oxygen, releases due to ruptures of underground utility lines and process piping; electrocution due to contact with electrical lines
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	This JHA is applicable to all J. J. White, Inc. excavation performed by employees. It provides guidance for shoring & sloping, barricades, ladders, and confined space hazards.
REFERENCES :	J. J. White, Inc. Safety Awareness Manual, Appendix 13.

PROCEDURE:

A. Preparation.

1. J. J. White, Incorporated mandates to use of the One Call System for all excavations regardless of location. The only exception to this rule is the hand digging of shallow - less than 18" - excavations. Please refer to the J. J. White, Inc. Safety Awareness Manual Appendix 13. **The National One Call Phone Number is 811.**

2. Location of various facilities and approximate depth below ground will be determined by the Competent Person and **marked by stakes driven into the ground** if necessary.

3. The Competent Person reviews the instructions and precautions on the permit, if a permit is required by the owner and communicates the information to the Job Foreman.

4. The Job Foreman reviews the permit, if any and communicates the information to the person(s) performing the job.

B. General Requirements.

5. Before any work is performed and before any employees enter the excavation, a number of items must be checked and ensured:

a. The excavation permit, if required by the owner must be completed before beginning any excavation work.

b. Determination of underground installations owned by utility companies can be accomplished by contacting the local utility companies through the local "one-call' center for the area.

c. All overhead hazards (surface encumbrances) that create a hazard to employees must be removed or supported to eliminate the hazard.

d. Excavations five' or greater in depth require adequate protective systems utilized to protect employees. This can be accomplished by sloping, shoring, or shielding.

e. If the excavation is to be over 20' deep, it must be designed by a registered professional engineer.

f. Adequate protective systems will be utilized to protect employees. This can be accomplished through sloping, shoring, or shielding.

NOTE: ALL PREVIOUSLY DISTURBED SOILS, SUCH AS THOSE FOUND IN REFINERIES OR PROCESS PLANTS SHALL BE ASSUMED <u>TYPE C</u> SOIL.

g. The worksite must be analyzed in order to design adequate protection systems and prevent cave-ins.

h. Workers must be supplied with and wear any personal protective equipment deemed necessary to assure their protection.

i. All spoil piles will be stored a minimum of 2' from the sides of the excavation and meet the surcharge requirements of OSHA 1926 Subpart P. The spoil pile must not block the safe means of egress.

j. If a trench or excavation is 4’ or deeper, stairways, ramps, or ladders will be used as a safe means of access and egress. For trenches, the employee must not have to travel any more than 25’ of lateral travel to reach the stairway, ramp, or ladder.

k. Excavations and trenches 4’ or deeper are considered to be confined spaces and require a Confined Space Entry Pre-Plan, Confined Space Entry Permit, Ventilation, Standby and Retrieval Equipment on hand.

l. No employee will work in an excavation where water is accumulating unless adequate measures are used to protect the employees.

m. A competent person will inspect all excavations and trenches deeper than 4’ each day prior to employee exposure or entry after it rains, or at any time needed during the shift. The competent person must take prompt measures to eliminate any and all hazards.

n. If work is in or around traffic, signs and barricades must be used to ensure the safety of employees and contractors.

o. Those persons not protected by barriers shall be supplied with, and wear fluorescent orange vests.

p. Persons installing and pulling shoring shall use methods that preclude exposure to cave-ins and engulfment.

JOB HAZARD ANALYSIS – 021

GUARDING OPENINGS

KEY POINTS

- Stairway floor opening shall be guarded by a standard handrail.
- Ladder way floor openings or platforms shall be guarded by a standard handrail with standard toeboard on all exposed sides – except at entrance to opening. Entrances shall be offset where possible to prevent accidental entry into ladders or stairways.
- Hatchway and chute floor opening shall be guarded by a standard handrail.
- Manhole floor openings shall be guarded by a standard manhole cover which must be in place. If not, a standard handrail / toeboard system will be installed.
- Temporary floor opening shall have standard handrail and toeboards.
- Wall openings from which there is a drop of more than 4’ shall be guarded.
- Every open-sided floor or platform 4’ or more above adjacent floor or ground level shall be guarded.
- Every runway shall be guarded by a standard railing on all open sides 4’ or more above floor or ground level.
- Openings in roofs, such as skylights, hatchways, or equipment openings must be guarded by a standard handrail.
- Temporary covers, such as plywood, placed over openings must be marked “hold cover” and must be secured against accidental displacement.
- Temporary handrails may be constructed of “Tube and Knuckle”, “System”, or similar scaffold materials.

JOB HAZARD ANALYSIS – 021 GUARDING OPENINGS	
PURPOSE :	Protection for floor openings, pits, manholes, roofs, hatchways, equipment openings, and wall openings.
JOB HAZARD :	Hazards of open pits, trenches, tanks, ditches, wall openings, walkways, platforms, manholes, and floor openings.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Provide protection from potential hazards associated with openings and holes.
REFERENCES :	N/A.

PROCEDURE:

A. Protection for Floor Openings.

1. Stairway floor opening shall be guarded by a standard handrail and toeboard system. The railing shall be provided on all exposed sides (except at entrance to stairway).

2. Ladder way floor opening or platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.

3. Hatchway and chute floor opening shall be guarded by a standard handrail and toeboard.

4. Manhole floor opening shall be guarded by a standard manhole cover which need not be hinged in place. While the cover is not in place, the manhole opening shall be constantly attended by someone or shall be protected by removable standard railings.

5. Temporary floor opening shall have standard handrails, No Exceptions !

B. Protection for Wall Openings and Holes.

1. Wall opening from which there is a drop of more than 4 feet shall be guarded.

2. Chute wall opening from which there is a drop of more than 4 feet shall be guarded.

3. Window wall opening at a stairway landing, floor, platform, or balcony, from which there is a drop of more than 4 feet, and where the bottom of the opening is less than 3 feet above the platform or landing, shall be guarded.

C. Protection of Open-sided Floors, Platforms, and Runways.

1. Every open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toeboard.

2. Every runway shall be guarded by a standard railing on all open sides 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard shall also be provided on each exposed side.

3. Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, shall be guarded with a standard railing and toeboard.

D. Railing, Toeboards, and Cover Specifications.

1. A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

2. A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

   a. For wood railings, the posts shall be of at least 2-inch by 4-inch stock spaced not to exceed 4 feet; the top and intermediate rails shall be of at least 2-inch by 4-inch stock. If top rail is made of two right-angle pieces of 1-inch by 4-inch stock, posts may be spaced on 8-foot centers, with 2-inch by 4-inch intermediate rail.

b. For pipe railings, posts and top and intermediate railings shall be at least 1-1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.

c. For structural steel railings, posts and top and intermediate rails shall be of 2-inch by 2-inch by 3/8-inch angles or other metal shapes of equivalent bending strength with posts spaced not more than 8 feet on centers.

d. The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail.

3. A standard toeboard shall be 4 inches nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4 inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in greatest dimension.

4. A handrail shall consist of a lengthwise member mounted directly on a wall or partition by means of brackets attached to the lower side of the handrail so as to offer no obstruction to a smooth surface along the top and both sides of the handrail. The handrail shall be of rounded or other section that will furnish an adequate handhold for anyone grasping it to avoid falling. The ends of the handrail should be turned in to the supporting wall or otherwise arranged so as not to constitute a projection hazard.

5. The height of handrails shall not be more than 34 inches nor less than 30 inches from upper surface of handrail to surface of tread in line with face of riser or to surface of ramp.

6. The size of handrails shall be: When of metal pipe, at least 1-1/2 inches in diameter. The length of brackets shall be such as will give a clearance between handrail and wall or any projection thereon of at least 3 inches. The spacing of brackets shall not exceed 8 feet.

7. The mounting of handrails shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point on the rail.

8. Trench or conduit covers and their supports, when located in plant roadways, shall be designed to carry a truck rear-axle load of at least 20,000 pounds. Only standard road plates so designed shall be utilized.

9. Manhole covers and their supports shall comply with local standard highway requirements if any; otherwise, they shall be designed to carry a truck rear-axle load of at least 20,000 pounds.

10. Wall opening barriers (rails, fences, and half doors) shall be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward) at any point on the top rail or corresponding member.

11. Wall opening screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen.

12. Temporary covers over floor or roof openings shall be marked “Hole Covered” in large, easy to read lettering, and shall be secured against accidental displacement.

13. Openings in roofs, such as skylights, hatchways or equipment openings must be guarded by a standard handrail.

JOB HAZARD ANALYSIS – 022

AUTOMOTIVE AND HEAVY EQUIPMENT

KEY POINTS

- Always observe all public and plant traffic rules.
- Only qualified personnel are permitted to operate equipment.
- All equipment must be inspected annually per Local, State, and Federal laws as well as any manufacturer's recommendations, and inspection certifications must be maintained.
- All equipment must be secured so that it cannot be started or moved by unauthorized personnel. Keys must be left in the ignition in operational process areas.
- The brake must be set and the engine must be shut off if the operator leave his / her seat for any reason.
- The vehicle operator must test the brakes, horn, windshield wipers, and lights before starting the intended operation of the equipment.
- Never proceed in fog unless there is adequate vision to in order to stop safely.
- No crane should be operated near electrical wires within a distance of 10' unless proper insulating sleeves are on the wires and insulating grounds have been installed on the boom of the crane.
- There should be no additional counterweight added which would overload the machine beyond its rated capacity. The operator shall not exceed the rated capacity of the manufacturer's load specifications as contained within the load charts.

ALWAYS WATCH ELECTRICAL WIRES – THEY CAN KILL!

- Heavy equipment being moved over public roads must have a license plate and current inspection. If not, utilize a flatbed trailer and tractor.

JOB HAZARD ANALYSIS – 022 AUTOMOTIVE AND HEAVY EQUIPMENT	
PURPOSE :	It is the intent of this procedure to outline the responsibilities and practices to be used by employees operating and working with cars, trucks, and heavy equipment.
JOB HAZARD :	Collision with moving or stationary objects, equipment, or people. Contact with electrical lines.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	All people involved with automotive equipment within an operational process plant must use extreme care to prevent any type of accident that is a result of improper practices. It is the intent of this procedure to outline the responsibilities and practices to be used by employees operating and working with cars, trucks, and heavy equipment.
REFERENCES :	J.J. White, Inc. Commercial Fleet Policy.

PROCEDURE:

A. General Safety and Operating Practices for All Equipment.

1. All equipment must be inspected annually per Local, State and Federal Laws, including adherence to the manufacturer's requirements, and the maintaining of inspection certifications. Note, all cranes shall maintain a copy of the current annual inspection in the cab at all times.

2. All equipment shall be secured so that it cannot be started or moved by unauthorized persons. Equipment and vehicles in operational process areas must have keys in ignition and engine off when left unattended.

   NOTE : ONLY QUALIFIED PERSONNEL ARE PERMITTED TO OPERATE EQUIPMENT.

3. All mobile equipment shall be secured in some way where it cannot move freely after it is parked. The engine must be shut off if the operator leaves his/her seat for any reason.

4. Vehicle operators are to test brakes, horn, windshield wipers, and lights after engine is running before going into service.

5. All types of equipment having a elevated seat or place to stand shall have adequate hand-hold and steps to mount and dismount safely. Step - never jump - onto or from vehicle when mounting or dismounting.

6. Stop the vehicle engine when fueling and avoid spilling fuel.

7. Keep your vehicle free of grease and oil on floors, also clean the windows.

8. Never engage in horseplay of any kind. Never “cowboy” any equipment.

B. Responsibilities of Car and Truck Drivers.

1. Vehicle operators are to obey all speed limit signs, stop signs, railroad crossing signs, and other posted signs in process plants and on all public roads.

2. Vehicle operators are to stay on main roadways unless they have special permission or the appropriate permits to enter an operating area or tank dike.

3. Vehicle operators are to use a spotter when backing up. Never back up if you can go forward and still reach your destination. Use horn when backing to alert potential traffic in an area where obstructions or “blind spots” limit vision. Back-up alarms are required for all vehicles having a restricted view to the rear.

4. Vehicle operators are to avoid any fog area if at all possible, but if they enter a fog area they are to stop, turn on their light, sound horn intermittently, and never proceed in fog unless there is adequate vision to stop safely.

5. Vehicle operators are not to move their vehicle until everyone is seated. Riders in the bed of a pickup truck must be seated on the floor of the bed. Riding in the bed of a pickup truck on public roads is prohibited.

6. Vehicle operators are responsible for all passengers in their vehicle.

7. Vehicle operators are to see that flags are put on all material that is extending beyond the end or sides of the vehicle.

8. No personnel are to mount or dismount a moving vehicle nor ride with their arms, feet, or legs extending over the side or ends of the vehicle. Step - no not jump - onto or from a vehicle when mounting or dismounting.

9. Vehicle operators are to report any repairs needed on vehicles to their Supervisors immediately.

10. Vehicle operators are to set emergency brake while parked or stopped, and engine is to be shut off if leaving the operator's seat for any reason.

11. Be certain foot pedals have proper pads and that soles of shoes and surface of pads are kept free of slippery material such as snow, ice, oil or mud.

C. Front-end Loaders and Backhoes.

1. When traveling with a bucket, adjust the height of the bucket so that it does not obstruct the operator's view.

2. Use a spotter when backing vehicles.

3. All loaders are to have operable brakes.

4. The loader bucket shall be lowered to the ground when not in use.

5. Make sure personnel are clear of bucket or backhoe while operating.

6. Vehicle operators are to set break while parked or stopped, and engine is to be shut off if leaving the operator's seat for any reason.

D. Cranes with Fixed Booms and Hydraulic Cranes.

1. All crane movements within a unit or high hazard area must have a spotter or spotters. No exceptions.

2. There should be no additional counterweight added which would overload the machine beyond its rated capacity. The operator shall not exceed the rated capacity of the manufacturer's load specifications as contained within the load charts.

3. No crane should be operated near electrical wires within a distance of 10' unless proper insulating sleeves are on the wire and insulating grounds have been installed on the boom of cranes.

ALWAYS WATCH ELECTRICAL WIRES: THEY CAN KILL.

4. When equipment is operated, personnel shall stay away from bucket or cab and load should not be allowed to swing over personnel.

5. Load and designated radius charts and plates are in the cranes at all times and must be observed.

6. No additional boom is to be added beyond the crane's rated capacity. Operators shall be responsible for the safety of all cranes when moving on job, particularly concerning road stabilization and boom length.

7. Hoisting cables are to be inspected daily to ensure there are no frayed or damaged cables.

8. Ensure rope is tracking properly on hoist drums.

9. Personnel will be prohibited from riding headache balls, buckets and hooks.

10. Personnel Baskets are only to be used under certain conditions.

11. Comply with manufacturer's specifications regarding counterweights, booms, cables, etc.

12. For heavy loads use the safe number of lines needed for a lift as indicated on the chart in the cab.

13. Outriggers are to be on solid footing at all times. If in doubt, use mats to set outriggers on. Contact the Owner's Engineers regarding any underground utilities.

14. Hand signals will be posted in each piece of equipment.

15. The operator will take signals from a designated person only.

16. Crane should be stored with the end of the boom resting at grade level. It is always desirable for all hydraulic equipment to be lowered to the stops to take pressure off the system and seals. Exceptions must be made in the interest of safety. Crane booms with hanging blocks are a hazard at night if a person could inadvertently walk or drive into them. In these instances, booms should be left raised.

JOB HAZARD ANALYSIS – 023

PERSONNEL LIFTING BASKETS

KEY POINTS

- Before lifting any personnel, a pre-lift meeting must be held with all people involved to review this procedure. Also, a safety check of the crane and hook-up must be made by the rigger and the crane operator. A pre-lift plan must be established by the job supervisor.
- Only a qualified employee shall be used to give hand and arm signals.
- The “Suspended Work Platform” worksheet must be completed prior to the lift.
- When the operator of the hoisting equipment cannot see the person giving hand and arm signals, or the difference in elevation between the signal man and the operator is more than 50’, other positive means of communication must be established.
- Keep the weight on the hook less than 25% of the capacity of the crane regardless of the position of the crane.
- All personnel shall keep all parts of their bod inside the lift device during raising, lowering, and positioning.
- Lifting devices shall be used only for personnel, their tools, and the materials necessary to do the work. They shall not be used to lift only materials or tools.
- A back up safety line of no less than 3-ton capacity must be attached to the collector ring and secured to the lifting blocks above the hook. Personnel harnesses should be tethered to the safety cable.

JOB HAZARD ANALYSIS – 023 **PERSONNEL LIFTING BASKETS**	
PURPOSE :	To outline the responsibilities and practices to be used by employees operating and working with cranes utilized for hoisting people. This safety procedure contains guidelines for cranes and hoist operator signals for working from platforms, cages, or baskets suspended from crane load lines. **The use of a crane to lift personnel should be considered when no safer alternative is available**. This procedure is intended to be a statement of good practice that applies under normal circumstances. Use it as a source of information and as a guide wherever it is applicable.
JOB HAZARD :	Collision with moving or stationary objects, equipment, or personnel and contact with electrical lines. Personal injury or damage to equipment resulting from improper operation or lifting practices. Injury or death resulting from a lack of safety devices required on cranes used for hoisting personnel baskets.
PROTECTIVE EQUIPMENT :	Basic P.P.E. and work gloves, fall protection harness with lanyard(s) and any additional P.P.E. as required for the task being performed.
SCOPE :	All personnel involved with the use and set-up of personnel lifting equipment must use extreme care to prevent any accidents that result from improper practices. It is the intent of this JHA to outline the responsibilities and practices to be used by employees operating and working with all types of cranes and associated platforms.
REFERENCES :	OSHA 29 CFR 1926.550(g), J. J. White, Inc. Safety Awareness Manual, Appendix 11.

PROCEDURE:

A. Preparation and Use.

1. Personnel shall be permitted to work from suspended platforms on crane load lines when the following procedure is used and when other, safer, more conventional means of access are not possible, or would create a greater hazard than that posed by the use of the personnel basket.

2. Crane Operator Hand Signals.

   a. Only a qualified employee shall be used to give signals. These qualifications must include a degree of rigging experience or aptitude, the dynamics of stress and inertia, as well as an understanding of the power of the forces being set in motion. When manual signals are used, only one personal shall be designated to give signals to the operator.

b. A copy of the hand signals must be posted in the cab of the crane. These hand signals are the primary source of communication and should be used whenever applicable.

c. When the operator of the hoisting equipment cannot see the person giving the signals, or the difference in elevation is greater than 50', other means of communication must be used. Such means would include the use of a signal relay man or a two-way radio set on a designated rigging channel reserved strictly for the crane operation.

3. Procedure for Safety Check.

a. Before lifting any personnel, a pre-lift meeting must be held with all individuals involved in the lift to review this procedure. Also, the rigger and the crane operator must make a safety check of the crane and associated rigging hardware. The job supervisor must complete the "Suspended Work Platform Sheet" prior to the lift.

b. The rated capacity of the crane, at the radius at which the lift will be made, must be divided by two. This limit must not be exceeded.

c. A full cycle operational test must be made prior to lifting employees. The platform shall be equipped with the factory supplied test weight during the test lift. Stability of the footing should be verified during the full cycle operational test.

d. A firm footing, uniformly level within one percent, (expressed as on foot in 100 feet), shall be provided for the crane. Outriggers for the crane must be appropriately used during the hoisting.

e. All lifts must be made in accordance with the manufacturer's lifting recommendations.

f. A Suspended Work Platform Sheet must be completed each time the crane is moved from its stationary position.

4. Procedure for Personnel Basket Hook-Up.

a. The main hoist block or whip line must have a positive locking safety clip on the hook. Spring-loaded safeties are not sufficient.

b. Positive locking safety clip shall be set in place after the master link of the 4-leg bridal is put into the hook.

c. A back up safety chocker, no less than 5/8" diameter must be attached to the master link and secured to the lifting blocks above the hook. In the case of a whip line, the safety cable is shackled directly to the whip line above the ball. For the main hoist block, the safety cable can e passed above and through the hook mounting plate or shacked directly to the dead end ear or hole, or to the standing beckett line on blocks with an odd number of running parts.

d. The safety cable in the secured position must have slack to verify that it is taking none of the weight of the master link.

e. Use ½" diameter rope for a tag line attached to the bottom of the personnel basket. Tag lines should be of a reasonable length to reduce the possibility of the line getting caught while the basket is being elevated.

5. Directions for the Rigger and the Operator.

a. Keep the weight of the hook less than 50% of the capacity of the crane regardless of the position of the crane.

b. Insure that there is as little boom movement as possible when personnel lift devices are in use.

c. Crane hooks must have a positive locking device for the throat opening. Spring-loaded safeties alone are not sufficient.

d. All cranes must have an anti-two blocking device, which will automatically deactivate the hoisting action.

e. The use of cranes having live booms (booms in which lowering is controlled by a brake without aid from other devices which slow the lowering speeds) is prohibited.

f. The load line hoist drum shall have a system or device on the power train, other than the load hoist brake, which regulates the lowering rate of speed of the hoist mechanism (controlled load lowering). Free fall is prohibited.

g. Cranes with variable angle booms shall be equipped with a boom angle indicator, readily visible to the operator.

h. Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the boom's extended length.

i. Equipment Needed:

i) Full Body Harness for each person.

ii) A 6’ shock-absorbing lanyard for each person.

iii) Three shackles with a minimum diameter of $^{5}/_{8}$”.

iv) ½” or $^{5}/_{8}$” rope for use as a tag line.

v) One thimbled eye slings. It shall be a minimum of $^{5}/_{8}$” in diameter x 4’-6’ in length.

B. Precautions.

1. All materials and tools for use during the lift shall be secured to prevent accidental dropping.

2. All personnel shall keep all parts of their body inside the lifting device during raising, lowering and positioning.

3. While personnel are in the lift device, all crane operations must be done in a safe and slow manner.

4. No traveling / moving of the crane is allowed while personnel are in the lifting device. If the crane is to be moved, a full cycle operational test must be done with a new pre-lift plan and test weights attached to the personnel basket.

5. The suspended lifting device must be secured to the structure before any personnel enter or exit the basket.

6. No lifts shall be made on another of the cranes load lines while personnel are suspended in a lifting device.

7. The number of personnel occupying the lift device shall not exceed the number required for the work being performed or the limitation of the lifting device.

8. Lifting devices shall be used for personnel, their tools, and the materials necessary to do the work. They shall not be used to lift only materials or tools. This section prohibits the use of personnel baskets for the transfer of tools or materials.

9. When welding from a personnel-lifting device, you must use a protective covering on the load slings.

10. The manbasket must not be used as a convenience elevator. The basket shall only be used when performing work that is inaccessible via normal means or other access poses a greater safety risk.

J.J. White, Incorporated

SUSPENDED WORK PLATFORM WORKSHEET

Project / Site: Date:

Superintendent's Name: Job Number:

Type of Lifting Equipment: _____
(Derrick, Crawler Crane, Truck Crane, etc.)

A. Radius: _____ ft

B. Boom Length: _____ ft

C. Rated Capacity: _____ lbs

D. Rated Capacity / 2: _____ lbs

LOAD CALCULATION TO DETERMINE WEIGHT WITHIN

1. Intended Load:

   a. Weight of Personnel:

      Number of Persons _____ X 250 lbs each = _____
      (Maximum 4 persons)

   b. Tools & Equipment = _____ lbs

   c. Intended Load = a + b = _____ lbs

2. Work Platform Weight = _____ lbs

3. Rigging (slings, blocks, etc) = _____ lbs

4. TOTAL LOAD TO BE LIFTED = 1 + 2 + 3 = _____ lbs

Superintendent's Signature: _____

J.J. White, Incorporated

Pre-Lift Meeting for the Use of a Personnel Lifting Basket

All personnel performing work utilizing a personnel lifting basket or manbasket, must first attend this pre-lift meeting that will address all general safety rules governing the use of the manbasket. In addition, this pre-lift meeting will address all site-specific elements that will contribute to the safe use of the manbasket.

GENERAL SAFETY RULES:

1. All persons using the manbasket must wear a full body harness and lanyard(s) at all times while in the basket. When all work will be performed from within the confines of the manbasket, a single lanyard will suffice. When it becomes necessary to exit the basket at an elevation, a second lanyard is required to effect 100% fall protection. Lanyard attachment will be discussed later.

2. Basic PPE, including work gloves, is required at all times.

3. A complete manbasket inspection, using the form mentioned below, must be performed daily.

4. At no time may the manbasket, rigging, cables or crane come closer than 10 feet to any live electrical line up to 50,000 volts. Safe distances increase as voltages increase above 50,000 volts.

5. A test lift must be performed each time the crane is moved from its set position. The test lift shall simulate the entire range of the intended lift.

6. A qualified crane inspector, prior to use of the manbasket, must inspect the crane. Additionally, the yearly certification of the crane must be found within the cab of the crane.

7. Unauthorized personnel (those who have not attended the Pre-Lift Meeting) are not permitted to use the manbasket.

8. No personnel may be hoisted with the test weight attached. The test weight is considerable, and with personnel in the basket, would result in an overload condition.

9. Uniform code of hand signals or radio communication must be maintained at all times.

10. A tag line must be attached to the manbasket any time it is in use.

11. If exiting or enter the manbasket at an elevation, the manbasket must be tied off to a handrail or structure before exiting or entering the basket.

12. When exiting the manbasket at an elevation, you must remain tied off to an anchorage point with your second lanyard.

13. The crane must be equipped with an anti-two block device that deactivates the hoisting action when contact is made. The anti-two block device cannot be just an audible alarm; it also must deactivate the crane.

14. The crane must be equipped with a locking safety on the hook. It must be a positive acting device, which cannot be inadvertently opened. The use of mousing wire to secure the hook is also acceptable.

15. A safety chokers (5/8 inch minimum) shall be shackled onto the load line above the Beckett and overhaul ball. This choker shall be shackled to the master link of the manbasket bridle.

16. The manbasket must not be used as a convenience elevator. The basket shall only be used when performing work that is inaccessible via normal means or other access posses a greater safety risk.

J.J. White, Incorporated

Pre-Lift Meeting for the Use of a Personnel Lifting Basket

Attendance Signature Sheet

Employee Name (Print)	Employee Signature

_____ _____

Pre-Lift Meeting Administrator Signature Date

J.J. White, Incorporated

Manbasket Daily Inspection Checklist

Project / Site: Date:

Superintendent's Name: Job Number:

A daily inspection for damage and defects must be performed before each of the manbasket to hoist personnel. A qualified person must perform the inspection. The inspection must consist of, but not be limited to, the following items:

1. Master link
2. Slings (4)
3. Swaged lower end fittings (4)
4. Sling eyes (4)
5. Cotter pins (4)
6. Manbasket skid frame
7. Manbasket skid base
8. Sling eyes swaged fittings (upper) (4)
9. Sling attachment pins (4)
10. Test weight
11. Eye bolts
12. Floor grating
13. Top guard rails (4)
14. Corner posts (4)
15. Mid guard rails (4)
16. Sling fairleads (4)
17. Kick plate base angle
18. Mesh panel
19. Handrail – inner
20. Test weight attachment pins (2)
21. Test weight base

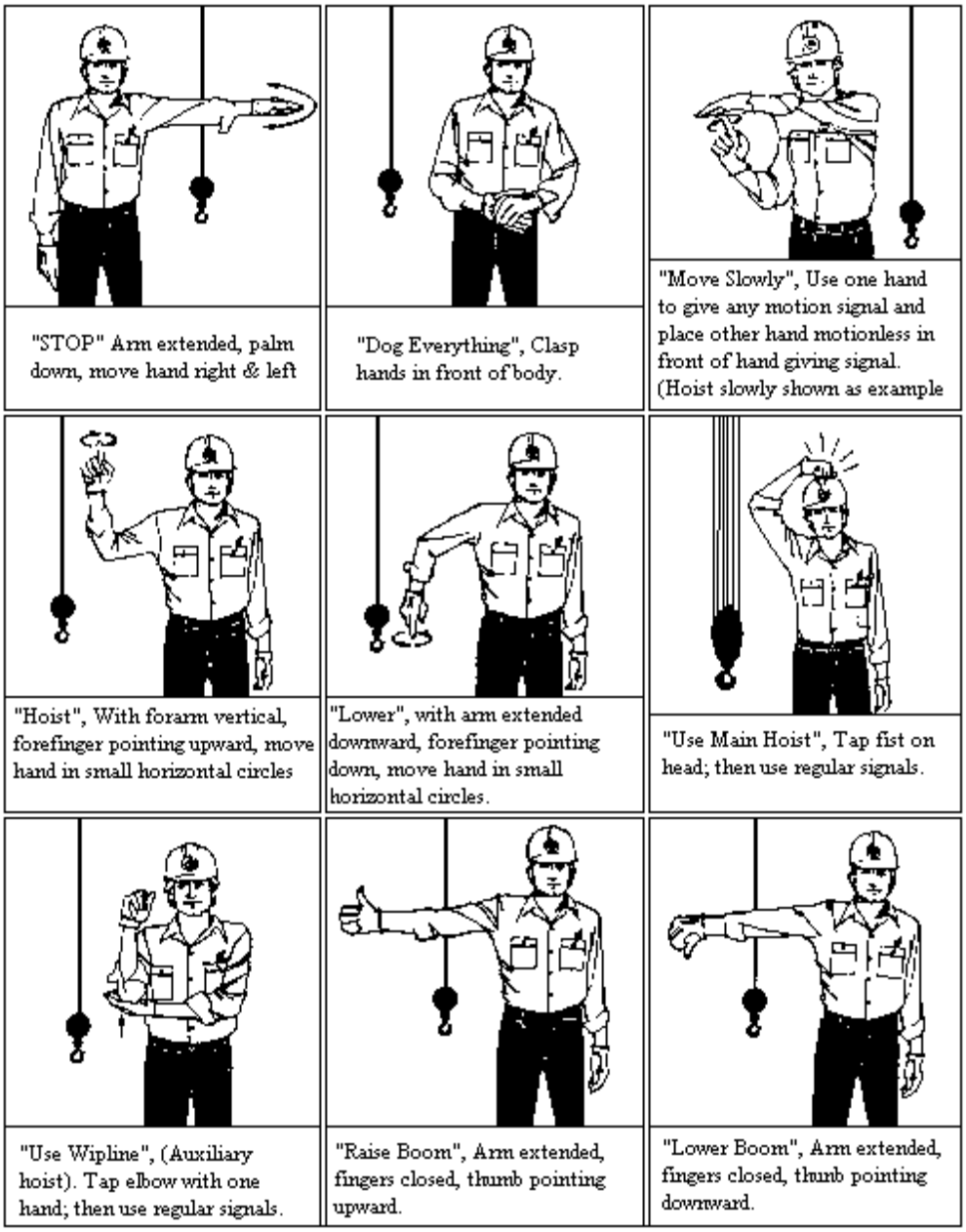
For additional information, contact:

Lifting Technologies, Incorporated
P.O. Box 4672
Missoula, Montana 59086
Phone: (800) 234-5507
Fax: (406) 728-7735

Signature of Qualified Person: _____

Date: _____

HAND SIGNALS FOR CRANE OPERATORS



"STOP" Arm extended, palm down, move hand right & left

"Dog Everything", Clasp hands in front of body.

"Move Slowly", Use one hand to give any motion signal and place other hand motionless in front of hand giving signal. (Hoist slowly shown as example

"Hoist", With forarm vertical, forefinger pointing upward, move hand in small horizontal circles

"Lower", with arm extended downward, forefinger pointing down, move hand in small horizontal circles.

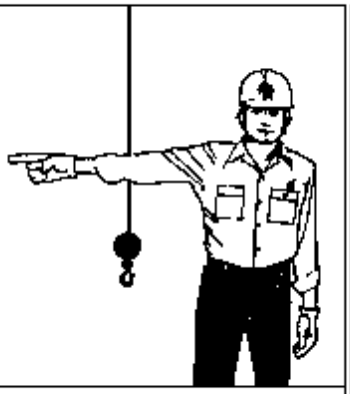
"Use Main Hoist", Tap fist on head; then use regular signals.

"Use Wipline", (Auxiliary hoist). Tap elbow with one hand; then use regular signals.

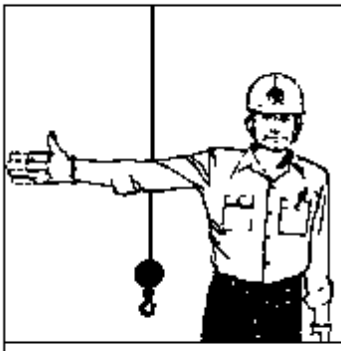
"Raise Boom", Arm extended, fingers closed, thumb pointing upward.

"Lower Boom", Arm extended, fingers closed, thumb pointing downward.

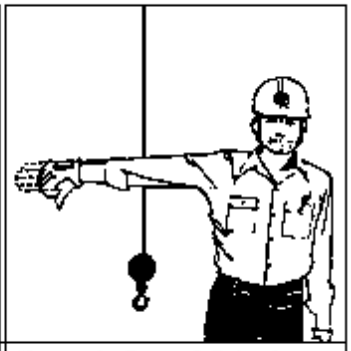
HAND SIGNALS FOR CRANE OPERATORS



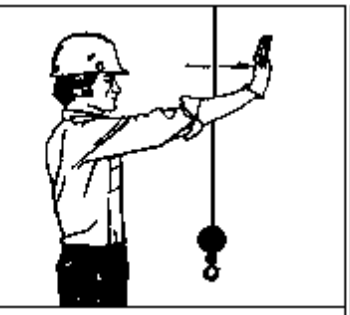
"Swing", Arm extended, point with finger in the direction of the swing of the boom.



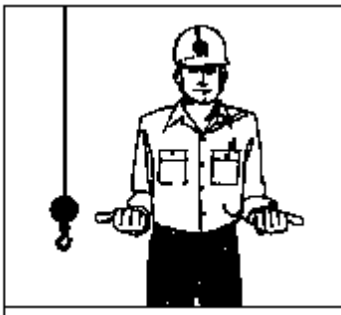
"Raise the Boom & Lower the Load", With arm extended, thumb pointing upward, flex fingers in & out as load movement is desired.



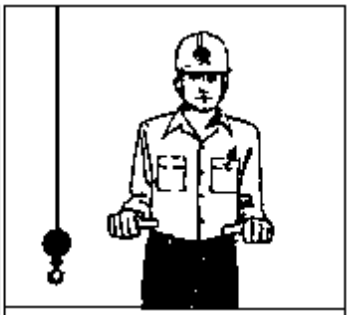
"Lower the Boom & Raise the Load", With arm extended, thumb pointing downward, flex fingers in & out as load movement is desired.



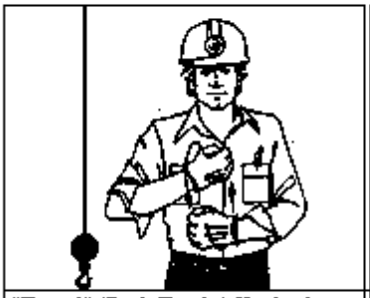
"Travel", (Rail Mounted or Trolley Cranes) With arm extended forward, hand open and slightly raised, making pushing motion in direction of travel.



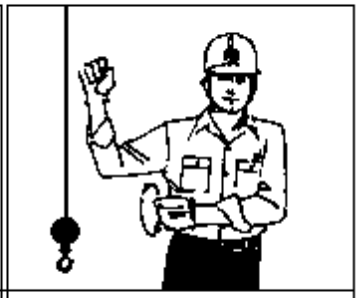
"Extend Boom", (Telescoping Booms Cranes), Both fists in front of body with the thumbs pointing outward.



"Retract Boom", (Telescoping Boom Cranes), Both fists in front of body with thumbs pointing toward each other.



"Travel",(Both Tracks) Use both fists in front of body, making a circular motion about each other, indicating direction of travel: forward or backward. (Crawler Cranes Only).



"Travel",(One Track) Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (Crawler Cranes only).

JOB HAZARD ANALYSIS – 024

MANUAL LIFTING

KEY POINTS

- Many types of injuries can result from improper lifting techniques. Thought, preparation, and care must be incorporated into the act of lifting.
- Use mechanical material handling equipment whenever practical, however, it should only be used by qualified personnel.
- When lifting objects, have secure footing, lifting with your back straight feet apart, and keep the load close to your body. Individuals should limit themselves to lifts that can be made comfortably alone, otherwise get help or use a mechanical device. Avoid twisting while lifting or setting down items.
- Don't carry objects in a manner that obstructs your vision.
- Avoid lifting from the floor if possible, and when necessary, squat, don't bend over to pick up materials.
- Avoid throwing or dropping objects. If throwing or dropping is necessary, establish a safety zone. In some cases, secure the area with a barricade. A safety watch may also be required.
- Avoid lifting above shoulder height and excessively bending, stooping, or reaching.
- Use smooth, steady motions to lift, lower, push, or pull materials.
- Storage of materials shall not create a hazard. Bags, containers, bundles, etc. that are stored in tiers shall be interlocked and limited in height to form stable piles.
- When material must be stored on or near vehicular roadways, use barricades and warning lights to warn others.
- All compressed gas cylinders must be handled with care. They should not be dropped, rolled on their side, abused, or used for any other purpose that that which they were intended.

JOB HAZARD ANALYSIS – 024 MANUAL LIFTING	
PURPOSE :	Prevent injuries as a result of improper lifting and lifting techniques.
JOB HAZARD :	Injury to back, neck, arms, or other parts of the body.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Many types of injuries can result from improper lifting techniques. Through, preparation, and care must be incorporated into the act of lifting.
REFERENCES :	N/A.

PROCEDURE:

A. Before You Start**.** Before manual lifting is performed, a hazard assessment must be completed for loads exceeding 50 lbs (see attachment).

1. Think about the job. Does it need carrying, or can material handling equipment be used instead? Use mechanical material handling equipment whenever practical; however, some of this equipment, such as a forklift, should be used only by trained and qualified personnel.

2. Think about what you are doing before you do it. Where is the load going? Does it require more than one person to lift safely? How can you avoid twisting when picking up, maneuvering, and putting down the load? Do you have a health problem that might make you vulnerable to injury? Individuals should limit themselves to lifts that can be made comfortably alone, otherwise get help or use a mechanical device. Be aware that even a small box or barrel can require significant effort to lift. Test the load first. Gently rock the load to test the weight and its distribution. If you're not sure you can handle it safely, get help.

B. Lifting Technique.

1. When lifting objects, have a secure footing. Place your feet apart to make a stable base for lifting.

2. Placing one leg forward in front of the other will help improve balance and control.

3. Keep the load close to your body.

4. If lifting from a low height, flex the knees and lower the hips when lifting, not your back. Keep your shoulders level and facing in the same direction as your hips.

5. Stand correctly, keeping your back straight.

6. Always grip the load firmly. If you must turn, move your feet, not your hips. Don't "jerk"' the load; your movements should be smooth and deliberate.

7. Do not lean forward or twist as you lift. Leaning forward and lifting increases the load on your disks by nearly 100 percent. Rotating your spine at the same time increases the pressure by over 400 percent.

8. Avoid lifting above shoulder height.

C. Moving the Load.

1. Don't carry objects in a manner that obstructs your vision.

2. Avoid throwing or dropping objects. If throwing or dropping is necessary, establish a safety zone. In some cases, secure the area with a barricade. A safety watch may be required.

3. When pulling or pushing, use your body weight to move the load – if possible, let the momentum of the load do some of the work e.g. when pushing trolleys.

4. When pulling, keep your back straight and your arms as close to your body center line as possible.

5. Avoid twisting your body when turning.

Risk Assessment for Manual Lifting

Assessor			
Date			
Description of the task: Who is to do it?			
To move		**Approximate weight**	
From		**To**	
How many loads?			

The Task

Check if any of the following apply

The load must be held away from the body		Strenuous pushing or pulling	
Twisting		Unpredictable movement of the load	
Stooping		Repetitive handling	
Reaching up above chest height		Insufficient rest or recovery time	
Travelling a long distance (>10 yds)		Handling while seated	
Vision obscured by load while carrying			

The Individual

Check if any of the following apply

Does the person have impaired lifting capability (e.g. through illness or injury)?		Does the task call for special capabilities or two-man lift?	

The Load

Tick if any of the following apply

Is it bulky or unwieldy		Is it unstable or unpredictable?	
Is it difficult to grasp?		Is it harmful (e.g. hot, sharp)?	

Working environment

Check if any of the following apply

Lack of space, interfering with posture or making it difficult to maneuver		Hot/cold/rain/ice/humid conditions	
Poor floors, uneven, slippery		Strong air movement	
Variations in level/grade		Poor lighting	

Recommendations for the lift

No of people to share the task		**Lifting aids (if any)**	
Method of working to minimize the risks identified above to the lowest level reasonably practicable.			

JOB HAZARD ANALYSIS – 025

WINTER WEATHER HAZARDS

KEY POINTS

- Caution must be used to avoid slipping and falling when walking in areas with snow and ice. Securely grasp handrails and go slowly up and down stairways and ladders.
- Keep work areas and walkways free of ice and snow.
- An adequate supply of salt must be available at all work areas.
- Icicles should be removed before they fall onto people or equipment. Use caution when removing icicles to be sure damage is not caused by your actions.
- Water should be kept from freezing in confined spaces because it can create unseen slipping hazards for those persons working in the area.
- Steam clouds in process plants are frequently seen at grade level in cold weather. These obscure vision and can cause general icing as the steam condenses and freezes. Extra caution is needed working in and around steam clouds. Barricades may be used to keep vehicle and foot traffic out of an area covered with steam clouds.
- When low temperatures and high winds are present, adequate clothing must be worn to keep your body from receiving frostbite. Hands, feet, and facial areas are especially vulnerable.
- To conserve body heat when working outdoors during winter conditions, dress in layers, wear appropriate gloves, utilize hardhat liners, and make sure boots are waterproof.
- When temperatures are below freezing, fire hoses used for fire watch duty during hot work should be :
    - Left with the nozzle slightly opened to prevent the hose line from freezing;
    - Left in an uncharged state from the hydrant to the hot work area.

NOTE : CHARGED FIRE HOSES LEFT RUNNING TO PREVENT THE HOSE LINE FROM FREEZING MUST HAVE A SEWER INLET NEARBY TO PREVENT WATER FROM POOLING AND FREEZING

- When driving a vehicle, the following should be observed :
    - Slippery road surfaces greatly increase safe stopping distances.
    - Slow down to a 'crawl' to corner on ice or packed snow.
    - The hazard of carbon monoxide increases in cold weather. Windows should be opened enough to permit air circulation if there is a need to remain in an idling vehicle for extended periods of time. An idling vehicle should never be left unattended.
    - If it is necessary to drive through steam clouds, slow down, turn on your headlights.

JOB HAZARD ANALYSIS – 025 WINTER WEATHER HAZARDS	
PURPOSE :	Avoidance of slips, falls, frostbite, and driving accidents.
JOB HAZARD :	Slips, falls, frostbite, and vehicular accidents.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Reduce risks of winter weather accidents through increased vigilance and preventative accidents.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Caution must be used to avoid slipping and falling when walking in areas with snow and ice. Securely grasp handrails and go slowly up and down stairways and ladders.

2. Keep work areas and walkways free of ice and snow. An adequate supply of salt must be available at all work areas.

3. Icicles should be removed before they fall onto people or equipment. Use caution when removing icicles to be sure damage is not caused by your actions.

4. Water should be kept from freezing in confined spaces, because it can create unseen slipping hazards for those persons working in confined spaces.

5. Steam clouds in process plants are frequently seen at grade level in cold weather. These obscure vision and can cause general icing as the steam condenses and freezes. Extra caution is needed working in and around steam clouds. Barricades may be used to keep vehicle and foot traffic out of an area covered with steam clouds.

6. When low temperatures and high winds are present, adequate clothing must be worn to keep your body from receiving frostbite. Hands, feet and facial areas are especially vulnerable.

7. Slip resistant over boots or ‘grippies’ shall be used when walking on an icy surface.

8. To conserve body heat when working outdoors in winter conditions, dress in layers, wear appropriate gloves, utilize hardhat liners, and make sure boots are waterproof.

9. When driving a vehicle, the following should be observed :

   a. Slippery road surfaces greatly increase safe stopping distances.

   b. Slow down to a "crawl" to turn corners on ice or packed snow.

   c. The hazard of carbon monoxide increases in cold weather. Windows should be opened enough to permit air circulation, if there is a need to remain in an idling vehicle for extended periods of time. An idling vehicle should never be left unattended.

   d. If it is necessary to drive through steam clouds, slow down and turn headlights on.

10. When temperatures are below freezing, fire hoses used for fire watch duty during hot work should be:

   a. Left with the nozzle slightly opened to prevent the fire hose line from freezing. (Note: Charged fire hoses left running to prevent freezing must have a sewer inlet nearby to prevent water from pooling and freezing

   b. Left in an uncharged state from the hydrant to the hot work area.

JOB HAZARD ANALYSIS – 026

OPENING LINES

KEY POINTS

- The Owner's Operations personnel will identify, block off, drain, and depressurize line and / or equipment and advise J. J. White, Inc. personnel of material type in line, temperature and pressure. **Follow all lockout / tag out procedures.**

- Atmospheric vents or drains must remain open while the line is being opened.

- A physical check of line condition should be done jointly by J. J. White, Inc. personnel and the Owner's Operator.

  NOTE : IF THERE IS A DELAY IN OPENING THE LINE, IT MUST BE CHECKED AGAIN IMMEDIATELY PRIOR TO LINE OPENING.

- Refer to SDS for precautions and PPE required. Obtain proper protective equipment to suit the conditions and be aware of designated escape routes. In addition to PPE listed above, rain jackets are required for all initial line breaks.

- All joints will be assumed to be under pressure. Approach joint from upwind and remain out of direct line of opening when possible.

- When opening a joint, loose the bolts on the opposite side of the flange from which you are positioned just enough to determine whether the joint can be opened safely. If there is pressure on the line, close it and get direction from your supervisor.

- **Never leave an open line or joint.** Always notify the operator in charge when joint is closed.

- If the joint is threaded, loosen just enough to determine whether the joint can be opened safely.

- **Never open a joint or work on lines under pressure.**

- J. J. White, Inc. personnel are only permitted to operate utility line (air, water, or steam) valves that are directly associated with their work. All other valves are strictly off limits and are to be operated by the Owner's operations personnel only.

JOB HAZARD ANALYSIS – 026 OPENING LINES	
PURPOSE:	Proper practices and precautions for opening lines.
JOB HAZARD:	Potential for pressure in line or equipment resulting in a release of product causing fire and / or injury to personnel and equipment.
PROTECTIVE EQUIPMENT:	Basic P.P.E., face shield and gloves under normal conditions.
SCOPE:	Actions taken in opening flanges under routine conditions.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. The Owner's Operations personnel will identify, block off, drain, and depressurize line and/or equipment as far as possible and notify Maintenance when line or equipment is ready. Atmospheric vents or drains must remain open while the line is being opened. Check the bleeders for obstructions and clear, if necessary, before opening line.

   NOTE: FOLLOW OWNER'S LOCKOUT / TAGOUT PROCEDURES.

2. The Owner's Operations personnel must advise the J. J. White, Inc. personnel of material type in line, temperature and pressure, when determined. When delay in opening line, it will be checked again immediately prior to line opening. Refer to SDS for precautions and PPE requirements. In addition to PPE above, rain jackets are required for all initial line breaks.

3. J. J. White, Inc. personnel will ensure that all precautions and conditions that are listed on the permit are reviewed and adhered to prior to start of work.

4. J. J. White, Inc. personnel will not proceed until the proper protective equipment is obtained, as outlined on the permit, to suit the conditions, and escape routes have been designated.

5. The J. J. White, Inc. Supervisor or Foreman has the responsibility to make a final inquiry concerning condition of the joint to be opened. A physical

check of the line condition should be done jointly with J. J. White, Inc. Supervisor or Foreman, and the Owner's Operator.

6. In any case, all joints will be assumed to be under pressure and the mechanic is responsible for taking the proper precautions and using good work practices.

B. Precautions.

1. Approach joint from upwind and remain out of direct line of the opening.

2. To open a joint, loosen just enough bolts on the opposite side of the flange from which you are positioned and insert a tethered wedge to determine whether the joint can be opened safely.

   NOTE: WHEN INSERTING A TETHERED WEDGE, INSERT IT ON THE JOINT ON THE SIDE OPPOSITE OF YOU AND DO NOT DRIVE WEDGE ACROSS THE FACE OF THE FLANGE, POSSIBLY DAMAGING THE GASKET SURFACE.

3. If the joint is threaded, loosen just enough to determine whether the joint can be opened safely.

   NOTE : IF THERE IS PRESSURE ON THE LINE, CLOSE IT AND GET DIRECTION FROM YOUR SUPERVISOR.

4. **Never leave an open line or joint.** Always notify the Owner's Operator in charge when the joint is closed.

5. **Never open a joint or work on lines under pressure.**

6. Do not open or close <u>any</u> valves. That serve as isolation points. When unsure of valve / line, secure information from the Owner's Operator before beginning any work.

7. When changing bolts prior to opening a flange, replace one at a time, tightening alternate bolts until the flange is complete, then proceed to open as described in #2 above.

8. Proper precautions should be taken to minimize any spillage. If there is a reason to believe a large quantity of liquid is to be released, arrangements must be made prior to line opening for collection purposes (i.e. vacuum truck or container).

JOB HAZARD ANALYSIS – 027

NON-POWERED HAND TOOLS

KEY POINTS

- All tools must be inspected prior to use to ensure they are in good condition and safe to use.
- Whenever possible, pull – do not push – on the handle of any wrench. If space makes it necessary to do so, push with your open hand, keeping fingers in the clear. In pulling or pushing, have a solid footing and balance your body in case the wrench slips, the nut loosens suddenly, or the stud breaks.
- In using any open-end wrench with offset jaws, place it so the jaw opening faces the same direction as the pull force.
- With adjustable wrenches, place the adjustable jaw to face the direction of the pull force.
- Do not strike a hammer blow on the end of a conventional box, open-end, or crescent adjustable wrench handle to loosen a “frozen” nut or stud, or use a wrench as a hammer. “Beater” wrenches are the only safe wrenches to use with a hammer or sledge.
- Wherever possible, use box or socket wrenches instead of open-end wrenches and fixed open-end wrenches instead of adjustable wrenches.
- Use pliers, slip joint pliers (channel locks), and pipe wrenches for their designed purpose – not to turn nuts or studs.
- Inspect wrenches before using to detect flaws that could cause slipping or breaking.
- Make sure wrenches are the size required for the bolt or stud, and that the jaws, faces, or points, snugly contact the nut or stud head.
- Keep ‘persuaders’ or ‘cheaters’ away from the wrenches. If extra leverage is needed, use a heavier wrench with a longer handle. Homemade extensions and double wrenching is strictly forbidden.
- Check for hand and finger pinch points in any situation where a wrench is to be used, and position the hands to avoid injury – just in case.

- Impact tools (wedges, chisels) shall be kept free of mushroomed heads.
- Never use screwdrivers for punches, wedges, or pinch bars.
- Always use the proper type of hammer.

JOB HAZARD ANALYSIS – 027 NON-POWERED HAND TOOLS	
PURPOSE :	Non-powered hand tools are still the most frequently used tools by employees of J. J. White, Inc.
JOB HAZARD :	Potential strains, falls on same level, hand injuries, striking against objects.
PROTECTIVE EQUIPMENT :	Basic P.P.E. including gloves.
SCOPE :	No specific safety codes cover the selection, care, and use of hand wrenches and they have no built-in safety guards. Each user of hand wrenches must devise their own safeguards by knowing the right wrench to use, whether it is safe to use, and how to use it safety.
REFERENCES :	J. J. White, Inc. Safety Awareness Manual, page 20.

PROCEDURE:

A. Characteristics of Hand Wrenches.

1. Pipe Wrenches : have two toothed jaws, one fixed and one moveable, for gripping and turning round surfaces only - not for square or hex nuts and studs. A pipe wrench will only work when the pull and jaw opening are both toward the user. It is unsafe to use a “cheater” on a pipe wrench - the moveable jaw is likely to break.

2. Pliers : primarily designed for gripping or turning small round or irregular surfaces such as wires, rods, cables, bars, etc. - not for nuts and studs. Electrician’s pliers are designed to grip, form and cut wire - no other purpose. Specialty pliers are designed for light electronic or automotive work.

3. Adjustable Wrenches : two smooth flat jaws, one fixed and one moveable, with the jaws at an angle to the handle. Adjustable wrenches, more commonly called “knuckle busters”, are designed for light casual use on a wide size range of nuts and bolts to avoid carrying several sizes of fixed jaw wrenches. Adjustable wrenches are also useful to turn odd-sized or damaged nuts. but they are not intended to replace fixed open-end, box or socket wrenches for standard, medium, and heavy duty work. Due to the large ratio of handle to jaw opening, an adjustable can “snap” a small bolt or stud. In using an adjustable, place it so the moveable jaw faces the direction of “pull” on the handle, and adjust the moveable jaw to snugly fit the flat of the nut or bolt head.

4. Open End Wrenches : two smooth, fixed size jaws on both ends of a handle. One jaw opening is usually 1/16" to 1/8" larger than the other, with jaws set at 150 or 220 angle to the handle. Angled jaw permits "flopping" the wrench over to turn nuts or studs in close-quarters where other wrenches are difficult to use. Open-end wrenches, which are designed for medium duty work, have handle length properly sized for maximum jaw openings. But, since these wrenches can easily slip off a nut or stud, and their jaws can be "sprung" by excessive force, they are not as safe as box or socket wrenches. In using open-end wrenches, make sure each jaw face snugly contacts the flat of hex or square nuts and studs. Never use a "shim" to make an oversize wrench fit a smaller nut or stud head - it is liable to slip or strip threads.

   DO NOT USE 'PERSUADERS' OR 'CHEATERS'. 'DOUBLE WRENCHING' AND 'CHEATERS' ARE STRICTLY FORBIDDEN.

5. Box Wrenches : heavy duty wrenches which have jaws that completely encircle the nut or stud head. Box wrench "jaws" or rings usually have 12 notches or points which provide 6 evenly spaced "grip" points to distribute turning force. A 12 point box wrench permits continuous turning of a nut or stud with a maximum handle swing of 150, making it ideal for close-quarters work. Since it encircles the nut or stud it will not slip or spread. There are some situations where a 12 point requires extra effort to remove nuts or studs after they are loosened. In these cases, a combination wrench having a 12 point on one end of the handle and an open-end on the other speeds up the work. In using a box-wrench, make sure it is the exact size to snugly contact each hex point of the nut or stud head, and the ring is **not** "cocked".

   DO NOT USE 'PERSUADERS' OR 'CHEATERS'. 'DOUBLE WRENCHING' AND 'CHEATERS' ARE STRICTLY FORBIDDEN.

6. Socket Wrenches : heavy duty 6 or 12 point cylindrical rings with either fixed T or interchangeable ratcheted handles of varying lengths. Various handle fittings are made to permit access and pull to handle the heaviest hand bolting work. In using socket wrenches, the sides or points must snugly contact the flats or points of the nut or stud head, and the sockets must not be "cocked". Inspect sockets for cracks and dirt before using, and check ratchet handles to be sure ratchets do not slip under load.

   NEVER USE A 'CHEATER' ON A RATCHET HANDLE. USE OF A BREAKER BAR IS RECOMMENDED.

7. Special Purpose Wrenches : include "Allen Head" L handle hex bars; spanner wrenches for notched round nuts; torque socket wrenches and torque socket drives; and striking or impact box wrenches. Striking

wrenches are extreme duty box wrenches designed to be struck with a hand hammer or sledge to loosen “frozen” nuts or studs.

B. Precautions – Using Hand Tools Safely.

NOTE : ALL TOOLS MUST BE INSPECTED PRIOR TO USE TO ENSURE THEY ARE IN WORKING CONDITION AND SAFE TO USE.

1. Inspect wrenches before using to detect flaws that could cause slipping or breaking. Check for cracked or bent handles, “sprung” jaws, distorted points or teeth, cracked rings or sockets, loose ratchets, loose or damaged adjusting nuts, grinding or heat temper marks.

NOTE : RETURN ALL DEFECTIVE TOOLS TO THE TOOL ROOM.

2. Whenever possible, pull - do not push - on handle of any wrench. If space makes it necessary to do so, push with your open hand, keeping fingers in the clear. In pulling or pushing, have a solid footing and balance your body in case the wrench slips, the nut loosens suddenly or the stud breaks.

3. In using any open-end wrench with offset jaws, place it so the jaw opening faces the same direction as the pull force. With adjustable wrenches, place the adjustable jaw to face the direction of the pull force.

4. Do not strike a hammer blow on the end of a wrench handle to loosen a “frozen” nut or stud, or use a wrench as a hammer. Striker wrenches are the only safe wrenches to use with a hammer, sledge or “beater”.

5. Whenever possible, use box or socket wrenches instead of open-end wrenches, and fixed open-end wrenches instead of adjustable wrenches.

6. Use pliers, slip joint pliers (channel locks) and pipe wrenches for their designed purpose - **NOT** to turn nuts or studs. In cutting wire with pliers, rotate the cutting edges on the wire and securely hold one of its ends to retard recoil as the wire is severed.

7. Make sure wrenches are the size required for the bolt or stud, and that jaws, faces or points snugly contact the nut or stud head. Do not use shimmed oversized wrenches or wrenches with handles longer than necessary to do the job.

8. Keep “persuaders” away from the wrenches. If extra leverage is needed, use a heavier wrench with a longer handle.

9. Check for hand and finger pinch point in any situation where a wrench is to be used, and position the hands to avoid injury - just in case.

10. Impact tools (wedges, chisels) shall be kept free of mushroomed heads.

11. The handles on tools shall be kept free of splinters or cracks, and shall be kept tight in tools. No wooden handled tools are to be used in a refinery.

12. Never use screwdrivers for punches, wedges, or as pinch bars.

13. Always use the proper type of hammer.

14. When using self-retracting knives, always direct the cutting stroke **AWAY** from the body.

JOB HAZARD ANALYSIS – 028

POWDER ACTUATED TOOLS

KEY POINTS

- You must be trained and have a current license to operate this equipment.
- Only indirect acting powder-actuated tools may be used.
- Always check with the facility owner, as a hot work permit may be requir3ed in normal permit required areas.
- Signs must be posted warning area personnel of powder actuated tools in use.
- Powder actuated tools must not be loaded until just prior to firing.
- Loaded and unloaded tools shall not be left unattended on the job site.
- In the event of a misfire, the operator shall hold the tool firmly against the work surface for a period of 30 seconds and then follow the explicit instructions set forth in the manufacturer's instructions.
- Use only approved fasteners for the tool you are using.

JOB HAZARD ANALYSIS – 028 POWDER ACTUATED TOOLS	
PURPOSE :	To outline the minimum safety precautions to be observed when using powder actuated tools. It is intended to be a statement of good practice applied under normal circumstances and should be used as a source of information or guide where applicable.
JOB HAZARD :	Flying particles, moving parts, noise, dust, possible cuts & abrasions, and eye injuries.
PROTECTIVE EQUIPMENT :	Basic P.P.E., safety glasses or monogoggles, face shield, gloves, and hearing protection.
SCOPE :	Only persons who have been trained and licensed for the particular tool to be used shall be allowed to operate a powder actuated tool.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Only indirect acting powder-actuated tools may be used.

2. A hot work permit may be required in certain facilities. Always check with the Owner's representative before beginning work.

3. The tool operator must test to see that all safety devices are in proper working condition in accordance with manufacturer's instructions before initially loading the tool.

4. Defective tools shall be immediately removed from service and reported to the tool room attendant, or tagged and returned directly to the Tool and Material Manager for repair or replacement.

5. Either safety glasses or impact type safety goggles and a face shield must be worn by the J. J. White, Incorporated employee operating the power tool, and any other personnel working within 10 feet of the powder actuated tool.

6. "CAUTION -- POWDER ACTUATED TOOL IN USE" signs shall be posted in the most strategic and obvious locations encircling the work area.

7. Powder actuated tools must not be loaded until just prior to firing time.

8. Hands shall be kept clear of the open barrel and at no time shall the tool be pointed at any person.

9. Loaded or unloaded tools shall not be left unattended on the job site.

10. Fasteners shall not be driven into the shell of any operating equipment.

11. Fasteners shall not be driven into very hard or brittle material including but not limited to cast iron, glazed tile, surface hardened steel, glass block, rock, face brick, or hollow tile.

12. Driving into materials easily penetrated shall be avoided unless such materials are, backed by a substance that will prevent the pin or fastener from passing completely through.

13. No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.

14. Tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.

15. In the event of a misfire, the operator shall hold the tool firmly against the work surface for a period of 30 seconds and then follow the explicit instructions set forth in the manufacturer's instructions.

16. All power actuated tools must be accounted for after each job and promptly secured in its normal storage area.

17. Use only fasteners approved by the tool manufacturer for the proper charge. These items are color coded.

JOB HAZARD ANALYSIS – 029

AIR POWERED HAND TOOLS

KEY POINTS

- General Air Tool Precautions:
  - Use only hoses for air tool service. Before using check hoses for defects that might cause hose rupture, and replace damaged hoses.
  - Air hoses in traffic areas are prone to damage and create tripping hazards. Where possible, “bridge” hoses with boards or suspend them overhead.
  - Air supply line outlets should be positioned away from users to protect them in case hoses blow off during coupling or uncoupling. Outlets fitted with valved tee vents are desirable to provide pressure relief before uncoupling hoses.
  - Before opening air supply line valve, make sure the tool’s operating trigger or valve is closed. When finished using tool, before uncoupling hoses, first close the air supply line valve then open the tool’s operating trigger or valve to release residual pressure.
  - “Playful” use of air will not be tolerated. Do not use an air hose to blow dust from clothing or any part of the body - to do so, can cause serious injuries.
  - Since drilling may produce chips hot enough to ignite flammable gases, a Hot Work Permit may be required to drill where flammable atmospheres could exist. Safety glasses are required.
- Impact Type Air Tools :
  - Users of impact tools should avoid prolonged, continuous operation. Rubber hand grips and other cushioning devices should be used to help reduce hand and arm fatigue.
  - In using jackhammers or tampers, feet must be placed as far as possible from the bit. Large tampers require two-person operation for maximum safety. Use of a face shield and safety glasses is mandatory.
  - Chipping hammers and shearing or cutting chisels create flying metal hazards to both user and passers-by. Clear people from the area directly ahead of the work. Use of a face shield and safety glasses is mandatory.

- Cutting bits must be sharp to avoid undue stress and untimely breakage. Tool retainers that hold bits securely in place must be used. In changing bits, remove the air supply to prevent accidental ejection.

- In some case, jackhammering or chipping might produce particles hot enough to ignite flammable gases. Therefore, a Hot Work Permit may be required where flammable atmospheres could exist. Ignition by jackhammering cannot occur if water is kept flowing at the bit contact point.

- Air Tool Care:

  - Follow manufacturer's recommendations for proper tool maintenance.

    1) Check tool for loose parts and repair or replace.

    2) Check air pressure strainers regularly and keep them clean.

    3) Check control valves for proper operation.

    4) Keep lubricated with recommended oils.

    5) Repair or replace bit guards.

    6) Safety glasses are the minimum required PPE for use of air tools.

  - All tools requiring repair should be tagged; kept separate from sound tools and sent to the J. J. White, Incorporated Yard for repair or replacement.

JOB HAZARD ANALYSIS – 029 AIR POWERED HAND TOOLS	
PURPOSE :	Hazards can be created by mishandling, improper usage, tool breakage, and inadequate maintenance. This procedure is intended to be a statement of good practice that applies under normal circumstances. It is to be used as a source of information and a guide wherever practical.
JOB HAZARD :	Flying particles, moving parts, noise, dust, air pressure.
PROTECTIVE EQUIPMENT :	Basic P.P.E., face shield and hearing protection as needed. If a non-M.S.A. face shield is utilized, then monogoggles are required.
SCOPE :	Three general types of air powered hand tools commonly used are : the wheel type – grinders, brushes, and buffers; torsion tools – drills, reamers, and impact guns; impact tools – jackhammers, chisels, and tampers. Since air powered hand tools are mobile and difficult to guard, their use often involves hazards to tool users and other personnel in the work area.
REFERENCES :	N/A.

PROCEDURE:

A. General Air Tool Precautions.

1. Use only hoses approved for air tool service. Before using, check hoses for cracks, cuts, blisters or other defects that might cause hose rupture, and replace damage hoses. Safety glasses are to be worn at all times when connecting and disconnecting air supply hoses.

2. Air hoses in traffic areas are prone to damage and create tripping hazards. Where possible, “bridge” hose with boards or suspend them overhead.

3. Within the J. J. White, Inc. system, virtually all air hoses are equipped with “Chicago” style fittings or couplings. As such, the following precautions are mandatory :

   a. All Chicago fittings are to be pinned using spring clips made expressly for Chicago fittings. These can be ordered through the Tool and Equipment Manager.

   b. At no time are Chicago fittings to be disconnected when there is pressure on the hose. Turn off the air supply, bleed the pressure down either at the tool or at the bleeder valve, and then disconnect the fitting.

4. Before connecting hoses to air supply outlets, open line valves sufficiently to bleed water from the line. Use a steam hose to thaw a frozen airline - never use direct flame.

5. Air supply line outlets should be positioned away from users to protect them in case hoses blow off during coupling or uncoupling. Outlets fitted with valved tee vents (bleeders) are desirable to provide pressure relief before uncoupling hoses.

6. Before opening air supply line valve, make sure the tool's operating trigger or valve is closed, and all couplings are pinned. When finished using the tool, before uncoupling hoses, first close the air supply line valve then open the tool's operating trigger or valve to release residual pressure.

7. To protect against accidental starting, air tools with operating triggers located inside the handles should be used. If such tools are not available, controls located outside of handles should be guarded by suitable devices that still permit quick release. Tools with unguarded triggers must be handled carefully to avoid accidental starting.

8. Compressed air is a deadly weapon in the hands of a jokester. "Playful" use of air will not be tolerated. Do not use an air hose to blow dust from clothing or any part of the body - to do so, can cause serious injuries.

B. Torsion Type Air Tools.

1. Torsion tools such as air drills, impact guns and grinders develop high speed power that can cause injuries through contacts, tool breakage or flying chips. Tool guards are usually are impractical so alert handling is required to avoid injury.

2. Drills should have chuck guards to help keep clothing from being caught. Drills should be no longer than needed to do the job. Sleeves that fit over drills serve as limit stops and protect against injury due to breakage.

3. When drilling holes deeper than the drill flutes, keep chips cleaned out to prevent breaking or jamming. Small or dull drills are the ones most likely to break while large drills tend to heat up, causing them to jam or break. To avoid jamming, drills must have both cutting lips of equal length and angle. Feed drills slowly and keep them perpendicular to the drilling surface.

4. If a drill jams in a hole, the tool user can be thrown off balance and injured. It is therefore essential to have solid footing and command of the tool control trigger to avoid such a situation.

5. Reamers and impact guns sockets must be securely attached to the tool spindle. Solid footing and positive command of the control trigger is also required for reaming and bolting.

6. Since drilling may produce chips hot enough to ignite flammable gases, a Hot Work Permit, as well as a Cold Work Permit, may be required by the Owner to drill where flammable atmospheres could exist.

C. Impact Type Air Tools.

1. Users of impact tools such as chisels, jackhammers or tampers should avoid prolonged, continuous operation. Many of these tools operate at 1500 strokes per minute to produce heavy vibration that causes discomfort, and may injure the hands and arms. Rubber hand grips and other cushioning devices should be used to help reduce hand and arm fatigue.

2. Many accidents have been caused by misuse of an air impact tool when it is at rest. A tool connected to an air supply is like a loaded gun - accidental triggering can cause serious injury. Two important devices are essential to aid air tool safety. The first is the control trigger located inside the handle for instant release. The second device is a tool retainer that holds the bit securely to prevent accidental ejection. Follow the tool manufacturer's recommendations in using retainers.

3. In using jackhammers, be sure the proper bits are securely locked in place before using. Bit must be sharp to avoid user strain and help prevent breakage. Drill holes in concrete at low speed to avoid bit jumping. Never guide a bit with your feet; stand with the feet well braced, in back of the bit in case it breaks or strikes steel. It is unsafe to balance a jackhammer on its bit while the user holds it lightly to rest or make an adjustment. In moving the bit to another drilling spot, stop the tool before moving it. Since accidental triggering is a serious hazard while changing bits, disconnect the air hose or shut off the air supply to avoid this hazard. Since tool steel bits lose much of their shock resistance at 00 F, they should be warmed before using in extreme cold weather.

4. In using tampers, follow the same general precautions required for jackhammers. Feet must be placed as far as possible from the bit, with the head held to one side. Large tampers require two-person operation for maximum safety.

5. Chipping hammers and shearing or cutting chisels create flying metal hazards to both user and passers-by. Care must be taken to clear people from the area directly ahead of the work. Cutting bits must be sharp to avoid undue stress and untimely breakage. Tool retainers that hold bits securely in

place must be used. In changing bits, remove the air supply to prevent accidental ejection.

6. In some case, jackhammering or chipping might produce particles hot enough to ignite flammable gases. Therefore, a Hot Work Permit, as well as a Cold Work Permit, may be required where flammable atmospheres could exist. Ignition by jackhammering cannot occur if water is kept flowing at the bit contact point.

7. Mandatory personal protective equipment for use on all impact type equipment includes all of the following:

   a. M.S.A. wraparound face shield.

   b. Safety glasses.

   c. Hearing protection.

   NOTE : IF NON-M.S.A. FACE SHIELD IS USED, THEN MONOGOGGLES MUST BE WORN UNDERNEATH.

D. Air Tool Care.

1. Air tools must be stored on shelves or in tool boxes - not on floors or benches. Hoses should be identified for use with specific tools and kept coiled and neatly stored.

2. Follow manufacturer's recommendations for proper tool maintenance. Check tool for loose parts and repair or replace. Check air pressure strainers regularly and keep them cleaned. Check control valves for proper operation. Keep lubricated with recommended oils. Repair or replace bit guards.

3. Check wheel type tool speeds with the speed (in rpm's) listed on the grinding wheel. Replace wheels that show excessive wear.

4. All tools requiring repair should be tagged; kept isolated from sound tools and returned to the J. J. White, Incorporated Tool and Equipment Manager for repair or replacement.

5. Keep drills and bits sharpened and grinding wheels dressed. Inspect for defects before storing or issuing.

JOB HAZARD ANALYSIS – 030

AIR OPERATED IMPACT GUNS

KEY POINTS

- Before using an impact gun, check the socket for condition (i.e. cracks, wear drive hole, etc.). Check to see that the one piece socket retaining ring is a snug fit and is of proper size, and in good condition.
- Never wire or use a make shift retainer in place of the right size retainer for the job. Never use a split pin with an “O” ring as a retainer.
- Use care in bleeding so no one is exposed to the air stream.
- Extra attention should be given to the fit of the socket on the bolt head or nut prior to applying air to the gun. Check direction of rotation.
- Be careful of the position of the hands when holding the gun. Do not hold near the socket, or put hand on socket for any reason wen it is rotating. If it is necessary to rotate the socket by hand, remove finger from the trigger.
- The holding handle should be issued with the gun and used to lift and help position the impact gun.
- The exhaust from an impact gun can blow dust or foreign bodies into the eyes. Always wear proper eye and face protection.

JOB HAZARD ANALYSIS – 030 **AIR OPERATED IMPACT GUNS**	
PURPOSE :	To define the use of portable impact guns for tightening or loosening bolts, studs, screws on flanges, covers, manways, electrical equipment, automotive equipment, etc.
JOB HAZARD :	Hand-held rotating power tools. Possible cuts, abrasions from loose pins, eye injuries from exhaust, hands and fingers being pinched.
PROTECTIVE EQUIPMENT :	Basic P.P.E. and a wraparound face shield.
SCOPE :	This document is intended to highlight hazards inherent in this activity. No attempt is made to provide a detailed step-by-step approach to job completion. Any additional information required is to be secured from your immediate supervisor.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Upon removing an impact gun from the tool trailer or tool room, check socket for condition, (i.e., cracks, wear drive hole, etc.). Check to see that the one piece socket retaining ring is a snug fit and is of proper size, and in good condition. The tool room personnel should inspect these items prior to issue and discard any damaged retaining rings.

2. Never wire or use a make shift retainer in place of the right size retainer for the job. Never use a split pin with an "O" ring as a retainer.

3. Be sure to secure the hose supplying air to the impact gun and not to create a tripping hazard. Hook up hose to air supply and bleed until you get dry air. Use care in bleeding so no one is exposed to the air stream.

4. Extra attention should be given to the fit of the socket on the bolt head or nut prior to applying air to the gun. Check direction of rotation.

5. Be careful of the position of the hands when holding the gun. Do not hold near the socket, or put hand on socket for any reason when it is rotating. If it is necessary to rotate the socket by hand, remove finger from the trigger.

6. Position the back-up wrench on the opposite nut, keeping your hands clear so as not to get them caught or pinched by movement of the back-up wrench.

7. Care should be exercised to prevent the nut from flying or dropping from the socket after it has been removed from the stud or bolt.

8. Be aware of the weight of guns used in some applications and use chain falls or other support with heavy guns or in awkward positions. The weight of some guns may require two-person operation. The holding handle should be issued with the gun and used to lift and help position the impact gun.

9. The exhaust from an impact gun can blow dust or foreign bodies into the eyes.

B. Changing Chucks or Sockets

1. Shut off air supply and bleed the air hose.

2. Remove the spring pin and take the socket off the drive shaft.

3. Replace the desired socket on the drive shaft. Inspect the spring pin and replace if it shows any sign of wear or fatigue.

4. Reconnect the equipment to the air supply and turn the air on gradually.

JOB HAZARD ANALYSIS – 031

COMPRESSED AIR

KEY POINTS

- Emphasize PPE requirements – basic P.P.E. and an M.S.A. face shield where required.
- A Hot Work Permit may be required for air powered too operation.
- When operating air tools in a confined space, air supply must be provided via a portable compressor because in many plants where J. J. White, Inc. works, the plant air system is backed up by the plant nitrogen system for emergency failures. In a confined space, this could result in serious injury or death.
- Air receivers and knock-out pots must be drained. The introduction of high velocity liquids into air operated tooling may result in damage to the equipment and / or the user.
- When activating portable airlines and equipment, keep your safety glasses on and personnel clear. Never leave pressured airlines and equipment unattended. Depressurize!!
- Do not use air to blow dust or dirt off your clothes. Compressed air could enter the blood stream through an open wound and cause serious injury or death.

JOB HAZARD ANALYSIS – 031 COMPRESSED AIR	
PURPOSE :	To outline the safe use of compressed air.
JOB HAZARD :	Personal injury and damage of equipment due to misuse of compressed air. If the air compressor system fails, nitrogen can possibly be introduced to the system as back up for operating pneumatic instruments and equipment.
PROTECTIVE EQUIPMENT :	Basic P.P.E. and an M.S.A. wraparound face shield where required.
SCOPE :	Proper procedures for compressor operation, air powered equipment, pressurizing vessels and personal precautions.
REFERENCES :	N/A.

PROCEDURE:

A. Compressor Procedures.

1. The safety valves and pressure gauges on compressor equipment must be kept in proper working order to prevent over-pressuring of the equipment.

2. Air receivers and knock out pots must be drained of condensate and lube oil carry over, to avert carry over into the lines and/or damage to the compressor or air-powered equipment. In line driers and oilers may be required when working with a plant air system.

3. Proper lube oil levels of high flash point oil must be maintained. Low levels would cause compressor damage. High levels would cause lube oil carry over into the air system. This can cause explosions in the air system or can burn slowly creating carbon monoxide in the air system.

4. The intake screens should be kept free from accumulations of dirt, grease and oil to assure proper compressor operation and to exclude the contamination of the air being compressed. If portable engine driven compressors are being used, these should be positioned so that engine exhaust is not drawn into the intake. All portable compressors should be set level and a Hot Work Permit may be required in order to operate them.

B. Air-Powered Equipment

1. Only hoses approved for compressed air service should be used. Before using a hose, check it and do not use it if it has cracks, blisters, cuts, fraying, bulges or loose fittings. A ruptured air hose is a serious hazard.

2. Inspect couplings for wear and/or defects. Do not use a hose with bad fittings. Make sure the fittings are secured in the hoses with proper clamps. The parting of a coupling is a serious hazard.

3. When activating an airline, the person activating the line should make sure both he and anyone else in the area are not in front of the hose coupling, in the event it should separate when pressurizing a hose.

4. When opening a supply line valve, make sure the trigger on the tool is closed, and that no one is in front of the hose tool coupling in the event of its failure. When changing pneumatic tools, close the supply line valve, then open the tools operating trigger or valve to release the pressure in the line and tool before disconnecting.

5. When operating air tools in a confined space, Refinery air must not be used since many Process Plant air systems are interconnected to the nitrogen system for emergency backup use and therefore, is a safety hazard. Instead, a compressor with proper filtration equipment must be used and adequate ventilation must be maintained by using exhaust fans, air movers, etc. to insure a proper breathing atmosphere. If this is not possible, supplied-air breathing apparatus must be used.

6. When compressed air is used for cleaning equipment, the pressure must be no more than 30 psi, and protection from flying chips must be provided for personnel. This includes the wearing of safety glasses and M.S.A. wraparound face shields.

7. When using plant air to power a portable reciprocating pump, provide a means to provide continuous bleeding of water from the supply line.

8. Provide a means to prevent damage to air hoses in vehicular traffic lanes and to reduce tripping hazards. Keep hoses straight and free of kinks

C. Pressurizing Vessels with Air.

1. Certain unfired pressure vessels may be pressure tested with air if they are designed or supported in such a way that they cannot be safely filled with water. If this is done, specific provisions must be followed.

2. Never use compressed air to transfer the contents of common 55 gallon drums. These drums are not designed to hold any pressure, and as little as 1 or 2 psi could cause them to rupture.

D. Personal Precautions in Using Compressed Air.

1. Do not use an air hose to blow dust or dirt off your clothes or person. Small particles could be blown into the skin causing infections. A stream of compressed air that strikes an open wound in the skin could cause air bubbles in the bloodstream. This is very painful, and if 10 cc or more is involved, it is fatal.

2. The outlets for the plant air system and the couplings for general use air hoses are intentionally incompatible with breathing airline couplings.

   DO NOT ATTEMPT TO USE THE PLANT AIR SYSTEM OR GENERAL USE AIR HOSES FOR BREATHING AIR.

3. Parts that need cleaning should be brushed whenever possible. Use air only as a last resort, then use a low pressure (Maximum 30 psi) shielded jet or similar safety nozzle. When using air for cleaning, be sure to be wearing proper protective equipment and be careful to direct the air stream away from other people.

4. The proper eye safety equipment when working around compressed air is safety glasses and the M.S.A. wraparound face shield.

5. Do not use compressed air for housekeeping (sweeping) purposes.

6. Do not crimp air hoses to change tools shutdown the supply.

JOB HAZARD ANALYSIS – 032

PORTABLE HOSES

KEY POINTS

- Use only hoses designed for the service intended. Do not use air hoses for steam or hot water, etc.
- Do not re-use a steam hose that has been used as a hydrocarbon drain hose. Destroy and dispose of them properly.
- The hose user should inspect the hose, unions, couplings, and Chicago fittings before using and replace or repair when fittings leak or have a loose fit.
- If hoses are left unattended, the area must be visibly marked. Avoid running a hose in any manner that might cause a tripping hazard. Whenever possible, hoses as well as welding leads and light cords should be run overhead.
- Do not use air hoses to remove dust or dirt from any part of the body.
- Do not crimp air hoses to change tools – shutdown the air supply.
- Make sure fittings are secured together and properly pinned or tightened. Chicago fittings must be pinned.
- It is important to check the service to ensure the proper hose is connected to the proper supply. This is the responsibility of the user.

JOB HAZARD ANALYSIS – 032 PORTABLE HOSES	
PURPOSE :	Proper use and care for hoses.
JOB HAZARD :	Handling high pressure and high temperature hoses. Fires or explosions caused by failed hoses.
PROTECTIVE EQUIPMENT :	Basic P.P.E. – additional equipment may be required depending on the nature of the work. Safety glasses must be worn with connecting, pressuring up, and disconnecting hoses.
SCOPE :	Describes the procedure for proper use and care of air and steam hoses. Defines the proper use, installation, and care of utility hoses. This JHA is not intended to provide detailed step by step approach; additional information can be provided by your supervisor.
REFERENCES :	N/A.

PROCEDURE:

A. Hoses and Connections.

1. Use only hoses designed for the service intended. Do not use air hoses for steam or hot water, etc. Air and steam hoses are fitted with special fittings, and are not interchangeable. Follow client hose coloring system for proper hose use.

2. Inspect hoses for blisters, bulges, cracks, cuts, kinks and frays before using. Check that fittings are secure.

   DO NOT USE HOSES THAT ARE DAMAGED. REPLACE WITH NEW HOSES.

3. If hoses are left unattended, the area must be visibly marked. Avoid running a hose in any manner that may cause a tripping hazard. Whenever possible, hoses as well as welding leads and light cords, are to be run overhead so as to avoid tripping and other entanglement hazards.

4. Housekeeping is imperative. Store hoses in coils to prevent damage and tripping hazards.

B. Safe Use of Hoses.

1. Steam/hot water hose should never be used in 550 psi steam or high pressure (>250 psi) condensate service; these must be hard piped for temporary tie-in's.

2. The breathing airline couplings are incompatible with the outlets for the plant air system and the couplings for general use air hoses. DO NOT attempt to use any plant air system or general use air hoses for breathing air.

3. Do not use air hoses to remove dust or dirt from any part of the body. This type of use has resulted in embedded foreign bodies and embolisms resulting in death.

4. Do not crimp air hoses to change tools shutdown the supply.

5. Do not reuse a steam hose that has been used as a hydrocarbon drain hose. Such a steam hose must be destroyed and disposed of properly.

6. Use only low air pressure (Maximum 30 psi) jet nozzles to clean machinery or equipment.

7. Do not direct water or steam hose outlets into walking or working areas if it can be avoided. Check areas for presence of people and provide for barricade of immediate area.

8. Clear hose outlets of mud, ice, or similar plugs by mechanical means before using. Do not use pressure to clear outlets.

9. Position body solidly to retain control of hand held hose lines. Grasp outlet securely with hands protected by gloves. Do not direct streams against nearby objects; a rebound hazard may be created by doing so.

10. Store hoses properly when they are not in use.

11. Make sure fittings are secured together. Loosening nuts on steam hose clamps to obtain a "swivel joint" effect is forbidden. All Chicago fittings are to be pinned using manufacturers recommended spring clips. Call the Toll and Equipment Manager for a supply of spring clips.

C. High-Pressure Water Washing Hoses

1. All hoses must have proof of certification with them.

2. Any damaged hoses can only be repaired by an approved source.

JOB HAZARD ANALYSIS – 033

SAFETY SHOWERS AND EYE WASH STATIONS

KEY POINTS

- Place a call to the Owner's emergency number when an employee is splashed with a chemical and / or hydrocarbon.
- Activate shower / eyewash station before placing exposed personnel in water streams. This will allow water temperatures to stabilize and clear any possible debris. Leave personnel in the shower / at the eyewash station until the arrival of fire or rescue personnel for medical attention.
- Caution should be exercised when first making contact with the water because temperature regulators can fail, resulting in extremely hot or cold water contacting the body and causing more injury.
- Safety showers / eyewash stations must never be used for other than their intended purpose.
- Always know where safety shower and eyewash stations are **BEFORE** the start of work.
- It is the responsibility of anyone entering an operating unit to wear the proper personal protective equipment for the task to be performed and to know the location of safety showers and eyewash stations in the area.
- Safety showers / eyewash stations are usually identified by a green light or by other highly visible means. Know their locations before you begin working.
- J. J. White, Inc. employees working on acid, caustic, and corrosive lines should always have operations check the safety shower / eyewash stations at their location before starting the job.

JOB HAZARD ANALYSIS – 033 SAFETY SHOWERS AND EYE WASH STATIONS	
PURPOSE :	Prevent / minimize chemical or hydrocarbon burns to the body and / or eyes.
JOB HAZARD :	Working around chemical or hydrocarbon hazards.
PROTECTIVE EQUIPMENT :	Basic P.P.E., and flame resistant clothing and / or chemical suits.
SCOPE :	To provide immediate first aid care for J. J. White, Inc. personnel that are splashed with hydrocarbons and / or chemicals.
REFERENCES :	N/A.

PROCEDURE:

A. General.

1. Move personnel to the closest Safety shower / eyewash. Activate shower / eyewash before placing personnel in water streams. This will allow water temperatures to stabilize. Leave personnel in shower / eyewash until the arrival of Fire / Rescue personnel for medical attention.

CAUTION: MOST EYEWASH STATIONS / SHOWERS ARE DESIGNED TO PROVIDE TEPID WATER TO THE BODY PART BEING RINSED. CAUTION SHOULD BE EXERCISED WHEN FIRST MAKING CONTACT WITH THE WATER BECAUSE TEMPERATURE REGULATORS CAN FAIL RESULTING IN EXTREMELY HOT OR COLD WATER CONTACTING THE BODY. THIS WOULD AGGRAVATE THE EXISTING CONDITION OR CREATE A NEW HAZARD.

2. Safety shower / eyewash stations should be located near all areas where the potential exists for employees to be exposed to harmful materials if an incident occurs. Check your work area before you begin work.

3. Safety Showers / eyewashes must never be used for other than their intended purpose.

4. Safety showers / eyewashes should be checked for proper operation on a regular basis. This is the owner's responsibility. The safety shower / eyewash should be checked before work and any deficiencies which render them inoperable should be reported to the owners Fire / Rescue Department immediately.

5. It is the responsibility of anyone entering an operating unit to know the locations of all safety showers / eyewash in the area. J. J. White, Incorporated employees working on acid, caustic and corrosive lines should always check the safety shower / eyewash at their location before starting the job.

6. Safety showers / eyewashes are usually identified by a green light or other highly visible means. Consult the facility owner for location.

7. Safety showers / eyewashes must be kept clear of materials and debris to allow unrestricted access at all times.

8. Portable eye wash bottles are available in the Superintendent's trailer or change trailers. These should only be utilized for irrigation of dust / dirt from your eye. They are never to be utilized for chemical exposures – Always take personnel to the nearest safety shower. Observe the recommended minimum wash/irrigation time of 15 minutes for all chemical exposures before any observation of the affected areas.

9. If the facility does not have a safety shower / eye wash station, the option is to procure a portable shower / eyewash station through J. J. White, Inc. procurement personnel.

JOB HAZARD ANALYSIS – 034

SUMMER WEATHER AND ELECTRICAL STORM HAZARDS

KEY POINTS

- Summer conditions normally necessary to create a risk of heat related illnesses are as follows : temperatures above 85^{o}F, high relative humidity, and direct Sunlight Solar Load.
- Acclimatization to summer conditions require a minimum of 2-3 work days.
- Dehydration will occur often times prior to the feeling of thirst.
- Drink ample amounts of liquids periodically throughout the entire workday.
- Electrolyte and mineral replacement drinks are readily available and should be distributed prior to the commencement of work activities.
- Be alert for warning signs displayed by fellow employees as well as yourself.
- Electrical storm hazards often have associated high, gusty winds and all materials must be secured when conditions become evident.
- Keep track of local weather forecasts to aid in early detection of an electrical storm or other hazardous conditions.
- During electrical storms, all personnel are to be evacuated to grade levels when the storm is at distance. If a storm becomes imminent, all personnel are to be directed to their respective change trailers.

WORK MAY NOT RESUME UNTIL A MINIMUM TIME OF 20 MINUTES HAS ELAPSED SINCE THE LAST TIME VISIBLE LIGHTNING FLASHES WERE OBSERVED OR AN ALL CLEAR IS GIVEN BY THE FACILITY.

JOB HAZARD ANALYSIS – 034 SUMMER WEATHER AND ELECTRICAL STORM HAZARDS	
PURPOSE :	This procedure outlines the increased risks associated with working outdoors in hotter temperatures and around electrical storm warnings.
JOB HAZARD :	Dehydration, heat exhaustion, heat stroke, and electrocution.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Working outdoors in summer temperatures or immediately prior to / following electrical storms has certain risks associated with it. The intent of this JHA is to reduce risks due in part to summer weather through increased vigilance and preventative actions.
REFERENCES :	N/A.

PROCEDURE:

A. Hot Weather Injury Prevention.

1. Identification and avoidance of dehydration and heat related illness.

   a. Summers (mid-May through mid-September) in the tri-state area are generally characterized by the following conditions :

      i) Temperatures in excess of 85^{o}F.

      ii) High Relative Humidity.

      iii) Direct Sunlight Solar Load.

2. Acclimatization.

   a. Sudden onset of summer conditions from cooler temperatures can cause heat related illnesses for persons who are not acclimatized. Two to three working days are needed for persons to become accustomed to the sudden upward shifts in temperature and humidity.

3. Dehydration.

   a. It is essential during summer conditions to keep the body hydrated. Do not rely on thirst as an indicator of when to take in liquids. Start drinking water or one of the commercially available electrolyte and mineral replacement “sport” drinks first thing in the morning – or at the

beginning of the shift – and continue to drink small amounts periodically throughout the entire day.

4. Heat Cramps.

   a. Heat cramps are warning signs that your body has begun to lose too many electrolytes and or minerals necessary for muscles to function correctly through perspiration from physical activity, and that the body has begun to dehydrate. Heat cramps are usually a precursor to heat exhaustion. Individuals exerting these symptoms should immediately begin liquid intake to avoid increase of symptoms or worsening conditions.

5. Heat Exhaustion.

   a. Heat exhaustion includes symptoms such as headaches, dizziness, weakness, nausea, pale / clammy skin, and fainting. It is important to note that the individual exhibiting these symptoms will still b maintaining perspiration flow.

   b. Individuals exhibiting signs of heat exhaustion require immediate first aid. First aid for heat exhaustion involves relocating the employee to a shaded and adequately ventilated area. The individual should have clothing loosened and minimized. Water and or an electrolyte replacement drink should be consumed. Additionally, cool water compresses should be applied to the forehead and facial areas (neck, the pits of the elbow, arms, and behind the knees) as necessary. If the symptoms do not resolve within a short period of time, immediate medical attention should be sought.

6. Heat Stroke.

   a. Heat stroke is a true medical emergency. Heat stroke is characterized by dry, red hot skin. Note that all perspiration has ceased, and the individuals body no longer has the ability to cool itself. They should be immediately moved to a shaded, adequately ventilated area. Emergency medical assistance should be immediately summoned. While awaiting the emergency medical response personnel, the individual should have clothing and loosened material minimized. Water or electrolyte drinks should be consumed. Additionally, cool compresses should be applied.

7. Personal Protective Equipment.

   a. Personal protective equipment in many cases can aid in the prevention of heat related illnesses. PPE such as a hard hat actually protect your

head against the effects of direct sunlight and provide the user with some additional cooling.

b. Some PPE on the other hand, can increase or accelerate the onset of heat related illness. In these cases, work with your foreman to establish predetermined brief rest periods in locations out of the sun and utilize the time to take on additional fluids.

B. Electrical Storm Hazards.

1. Storm Watch.

a. Weather forecasts should be routinely monitored on all job sites so that work may be planned and executed in an efficient manner.

2. High Winds.

a. High, gusty winds are normally accompanied by summer storms and are often a prelude to an electrical storm. Make sure all scaffold and planking is secured. Sheet plywood and other similar type materials should be secured from any movement.

3. Lightning.

a. As a rule of thumb, electrical storms approach and become visible on the horizon at the 9 o'clock position. In this case, an alert should be immediately communicated to each of the field foremen. Then, if any lightning is noted – this will typically occur at the 10 o'clock position from the quadrant from which the storm is approaching – all work in elevated positions, including work in scaffolds, towers, vessels, and piperacks must be discontinued immediately. All personnel are then to be directed to grade level. If the storm is imminent – dark gray clouds, gusty high winds, and lightning at the 11 o'clock position or higher – all personnel are to be moved to their respective change showers.

Work can only be allowed to resume after a period of 20 minutes has elapsed since the last visible lightning flash or an all clear is given by the facility.

JOB HAZARD ANALYSIS – 039

PRESSURE TESTING PIPING AND EQUIPMENT

KEY POINTS

- A detailed review of the testing pressure is required for each vessel, and all testing must be done in accordance with the Owner's Inspection Procedures for hydrotesting and in accordance with the applicable NBIC or ASME Codes.

- J. J. White, Inc. Quality Assurance / Quality Control Department Responsibilities include:

  - Ensure equipment is properly prepared.

  - Consult with inspection to obtain the correct test conditions of pressure and temperature.

  - Ensure that the necessary test pressure and temperature is obtained and properly verified.

  - Provide calibrated pressure gauges, which have a range of at least 2 times the test pressure and not greater than 4 times the test pressure.

  - Ensure that workmanship is of good quality.

- J. J. White, Inc. Craft Supervisor responsibilities include:

  - Ensure that blanks and test equipment are of proper rating and calibrated.

  - Ensure proper minimum safety test temperatures area attained prior to pressurization.

  - Arrange to have an Inspector available to witness strength tests. Make sure that test pressures are not exceeded during inspection.

  - Ensure after testing and depressuring of equipment, that all blanks are removed, the line has been completely drained and blown out and all test connections and vents are removed and / or plugged properly.

- The Owner's Inspection Group responsibilities include:

  - Review and approve all major piping repairs, additions, or modifications.

  - Provide strength tests pressure and temperature of test media.

- Ensure that proper strength tests are applied and witness all strength tests.

- Should a strength test be waived, determine the need for an apply special inspection techniques to ensure good quality and safety.

- Pneumatic testing is only to be used when hydrostatic testing is not practical. Air test pressure over 100 psi require certain precautions – contact the J. J. White, Inc. Safety Coordinator to generate a pre-plan.

- Special precautions are required when hydrostatic testing pressure vessels and boilers that could collapse under vacuum. Upon draining on such equipment, a vacuum breaker shall be installed to ensure proper venting.

- After hydrostatic test, it is essential that all water be drained from the equipment. Special precautions are required after testing fractionating equipment containing trays or internals which can trap moisture.

- Air, Nitrogen, and other inert gases are considered hazardous when used as a testing medium. Caution must be taken during pressurization and inspection. Pneumatic testing should not be used on equipment which is fabricated of cast iron pressure materials.

JOB HAZARD ANALYSIS – 035

PRESSURE TESTING PIPING AND EQUIPMENT

PURPOSE :	This procedure is concerned with the general procedures for strength and tightness testing of process plant or utility equipment. Specific requirements involving such variables as test pressure, testing media, type of equipment, etc. will be covered in the procedures involving the specific equipment or will be supplied by the J. J. White, Inc. Quality Control Department. Danger of overpressures must be emphasized and it should be recognized that while hydrostatic and pneumatic testing is mentioned in the article, pneumatic testing should only be used when hydrostatic testing is not practical.
JOB HAZARD :	Possible violent ruptures of equipment being tested. The hazard is essentially limited to injuries in case of rupture. The hazard involved with a particular type of test is covered in the applicable procedure.
PROTECTIVE EQUIPMENT :	Basic P.P.E. and any other necessary protective equipment will be indicated in the procedures for test of the specific equipment.
SCOPE :	This section outlines responsibilities and generalized procedures to be followed or when testing piping and equipment that is added, modified, or repaired. All procedures shall conform to practices found in the latest editions of the ASME Boiler and Pressure Vessel Code, NBIC, ASMEB31.3 Petroleum Piping code, and applicable jurisdictional requirements.
REFERENCES :	N/A.

A. Definitions.

1. A Strength Test is normally a pressure applied hydrostatically at 1 ½ times the design pressure for piping. For pressure vessels and boilers, pressure testing is used to verify the structural integrity of these vessels upon completion of initial fabrication, vessel alterations, or other significant repairs. Typically, hydrostatic testing is the method used to perform these integrity tests. The pressure used may not always be 1 ½ times greater the design pressure. A detailed review of testing pressure is required for each vessel and all testing must be competed in accordance to the owner's inspection.

2. The Maximum Allowable Working Pressure for pressure vessels is the highest pressure at which they can be operated. This information is normally on the vessel nameplate, and may be designated on the nameplate as either the maximum allowable working pressure (MAWP) or as the design pressure (DP).

3. The Design Pressure for piping is normally the highest pressure the piping can be operated and is temperature dependent. This information may be found on the piping line identification sheets.

4. The minimum safe test temperature is the external skin temperature (i.e. metal surface temperature that must be attained prior to applying pressure above 25% of the equipment design pressure. This information may be obtained from the Operations Procedure Manual. If not available in the Operations Manual, the minimum safe test temperature shall be obtained from the Inspection Group.

5. The designation New & Cold (N&C) as found on manufacturers and owners data reports indicates the non-corroded and cold ambient (70^{o}F) strength test conditions. These test conditions are normally only used to test a new vessel immediately after fabrication is completed. Once a pressure vessel or boiler is placed in service, test conditions shall be outlined as in NBC.

B. Duties and Responsibilities.

1. The Owner's Inspection Group.

   a. Review and approve all major piping repairs, additions, or modifications.

   b. Provide strength test pressure and temperature of test media. In the case where an ASME Code or NBIC hydrotest is required for altered or repaired pressure vessels or boilers, the owner's inspector must notify the Authorized Inspector prior to initiating mechanical work on the vessel.

   c. Ensure the proper strength tests are applied and witness all strength tests.

   d. Should a strength test be waived, determine the need for and apply special inspection techniques, such as radiology, ultrasonics, dye penetrant, magnetic particles, etc. to ensure good quality and safety.

2. J. J. White, Inc. Craft and Craft Supervision.

   a. Ensure that workmanship is of good quality.

   b. Ensure that blanks and test equipment are of proper rating and calibrated for the test required.

c. Arrange to have an owner's inspector and the authorized inspector, when required, available to witness strength tests. Make sure that test pressures are not exceeded during inspection.

d. Ensure proper minimum safe test temperature is attained prior to pressurization above 25% of the equipment design pressure. For ASME constructed pressure vessels and boilers, the minimum temperature of the test medium shall be reached prior to filling the item.

3. J. J. White, Inc. Quality Control Department

a. Properly prepare equipment for work per the owners written practices.

b. Ensure that proper blanking is done.

c. Consult with the Owner's Inspection Group whenever a strength test is to be performed, to obtain the correct test conditions of pressure and temperature.

d. Ensure that the necessary test pressure and temperature is obtained and properly witnessed. Record all test results on the proper test forms.

e. Pressure gauges used shall be a minimum of twice the test pressure and a maximum of four times the test pressure. Only recently calibrated gauges shall be used. When required, test gauges shall be calibrated immediately prior to the test.

f. Ensure that after testing and depressurizing equipment that all blanks are removed, the line has been completely drained and blown out and all test connections and vents are removed and / or plugged properly. All vents that do not have welded isolation valves must be plugged and seal welded (i.e., thread-o-lets and couplings).

g. A pressure relief valve should be utilized to avoid over pressuring of piping and/or equipment.

C. Pneumatic Testing.

1. **PNEUMATIC TESTING IS ONLY TO BE USED WHEN HYDROSTATIC TESTING IS NOT PRACTICAL.**

2. Refer to the specific J. J. White, Inc. Quality Control guidelines that may be obtained by contacting the Quality Control Manager.

3. Maximum test pressure is 100 psi. Air testing above 100 psi will require special regulations at the work site. Contact the J. J. White, Inc. Safety Department for details.

4. All nitrogen testing or "sweeping" shall be done per the owner's written practice.

5. When working with nitrogen, proper venting or proper respiratory protection must be used.

D. Procedure.

1. Preparation and Use.

   a. The equipment involved may consist of unfired pressure vessels, furnaces, boilers, piping, tanks, or any other pressure containing items.

   b. Specific testing details must be secured from the owner's inspection and liability department.

2. Precautions.

   a. Some unfired pressure vessels and pipe systems may not have been designed for hydrostatic testing. The supporting structure may not support the equipment when full of water and it should be investigated to determine if the additional weight can be supported.

   b. J. J. White, Inc. field erected, owner fabricated equipment will be pressure tested per applicable rules. Strength tests may be required to follow major repairs or alterations.

   c. Special precautions must be taken during cold weather testing ($< 50^{o}F$). The J. J. White, Inc. Quality Control Department should be consulted before any cold weather testing is attempted.

   d. Reinforcing pads : test with air at 25 psi. Check for leaks with sound detector, leak detector, "snoop", or soap pads.

   e. Before applying pressure, the test equipment shall be inspected to see that it is tight and that all low pressure filling lines and other appurtenances that should not be subjected to the test pressure have been disconnected.

f. Use a recently certified gauge for reliable pressure testing. The gauge range should be a minimum of twice the pressure and a maximum of four times the test pressure.

NOTE : LOW-PRESSURE STORAGE TANKS ARE TESTED BY FILLING THE TANK WITH MEDIUM AND CHECKING FOR LEAKS WHILE UNDER "HEAD PRESSURE".

g. Special precautions are required when hydrostatic testing pressure vessels that could collapse under vacuum. Upon draining such equipment, a vacuum breaker shall be installed allowing for proper venting.

h. Air, Nitrogen, and other inert gases are considered hazardous when used as a testing medium. This fact results from the additional energy required over that required for hydrostatic testing. If failure occurs during testing, more energy is released, it is therefore recommended that special precautions be taken when this medium is used for test purposes. All personnel should clear the area during the time when the equipment is pressurized. Inspection should be done with a minimum number of people. All others are to remain clear of the area. Pneumatic testing should not be used in equipment which is fabricated of cast iron materials.

i. The J. J. White, Inc. Quality Control Department and the facility Owner will provide specific testing details for testing with Air, Nitrogen, and other inert gasses.

j. After a hydrostatic test, it is essential that all water be drained from the equipment. Special precautions are required after testing fractionating equipment containing trays or internal which a cup can trap a fountain.

k. After a hydrostatic test, it is essential that all water be drained from the equipment. Special precautions are required after testing fractionating equipment containing trays or internals which can trap moisture.

l. Hydrotesting austenitic stainless items should be treated individually, and in and in accordance to the procedures outlined in the owners Inspection and Reliability Department. Generally, 50 ppm is considered the maximum level for chlorides in the testing medium.

JOB HAZARD ANALYSIS – 036

EMERGENCY EVACUATIONS AND MUSTER POINTS

KEY POINTS

- Before you start work, know the alarm sounds or signals for the facility where you work, and what type of hazards you are being made aware of for each signal.

- Understand the exact evacuation route, and know an alternate route you need to take from your work location to the assigned muster area – Don't just look at an evacuation map, understand it. When in the field, orient yourself to specific points so you'll have them as a frame of reference should you require one during an emergency evacuation.

- Never leave a muster area during an emergency alarm situation unless you have reported your presence to the person in charge. These areas are designed to not only provide a safe area to occupy during an emergency, but also to allow supervision to take a head count and ensure no one is missing.

- Be aware of locations of wind socks in the event of an emergency. Always check the wind direction and make sure you're not headed in the direction of trouble.

JOB HAZARD ANALYSIS – 036

EMERGENCY EVACUATIONS AND MUSTER POINTS

PURPOSE :	Avoidance of confusion during evacuation of personnel in emergency situations. Provide employees with a clear understanding of location and purpose of muster points.
JOB HAZARD :	Becoming lost or heading in the wrong direction during an emergency evacuation of a job site can be a mistake with fatal consequences. Leaving a muster point can cause inappropriate assignment of rescue personnel to a rescue when none is required.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Increase general understanding of escape routes and muster points through greater awareness of alarm systems and evacuation procedures, as well as through an employee's own actions during emergency evacuation situations.
REFERENCES :	N/A.

PROCEDURE:

A. Alarm Systems.

1. All process plant and refinery owners have alarm systems that are specific to their facility.

2. Employees are made aware of these alarm systems during initial orientation into the plant, during weekly scheduled tests, and during annual refreshers.

3. All employees should be familiar with the particular alarm for the area of the plant they are working in.

Note : Plant owners are responsible for establishing evacuation routes and mustering points during routine operations and therefore, J. J. White, Inc. personnel will have no input; however during turnaround projects and some general construction projects, new routes and points may need to be established and the following criteria should be taken into consideration : Evacuation routes and muster points should be selected in advance with the assistance of the Owner's Safety Department or Representative.

4. If alarm sounds – look for the wind sock or a flag to determine wind direction before proceeding to muster area.

B. Evacuation Routes (Primary and Secondary).

1. Should provide free, unobstructed movement to the muster area(s).

2. Should not contain a 'bottle-neck' that increases crowding and the potential for panic.

3. Should not be adjacent to operations that could be affected by the emergency event.

C. Evacuees Have Certain Responsibilities As Follows :

1. Seek out the person responsible for accounting for all persons who have been evacuated. This person could be a J. J. White, Inc. Foreman or an Owner's Representative.

2. Report your name, your foreman's name, and the name and number of the area or unit you were working in.

3. Report the name of any person you may suspect be unaccounted for.

4. Do not leave the muster area until you've reported to a responsible person that you are 'present and accounted for'. Leaving the muster area before reporting that you're 'Okay' may be cause for emergency personnel to be dispatched to the danger area and search for someone who is not in danger, or in need of rescue.

5. Job Foremen should make every effort to account for each persons that were assigned to his or her work gang, and then report each individuals presence to the incident commander.

JOB HAZARD ANALYSIS – 037

CONCRETE FORMING OPERATIONS

KEY POINTS

- All materials are to be stored in designated areas, NOT in walkways.

CAUTION : BANDING AROUND SHIPPED MATERIALS MAY BE UNDER TENSION AND RELEASE SUDDENLY WHEN CUT DURING REMOVAL.

- All shipping bands shall be disposed of properly.
- Any 4'x8' sheet of plywood shall **NEVER** be moved by one person individually.
- All scrap plywood and lumber shall be disposed of immediately. Scraps are not to be allowed to communicate.
- All fabricated forms are to be stored in a designated area when not in use.
- All individuals working at 6' or higher above the next work surface, whom are not protected by a handrail, **are required** to don the appropriate personal fall arrest system.
- Individuals should increase their attention to work areas to identify any tripping hazards associated with forms, braces, and other uneven surfaces.

JOB HAZARD ANALYSIS – 037 CONCRETE FORMING OPERATIONS	
PURPOSE :	Proper procedure for fabricating, handling, and installation of job-made and manufactured concrete forms.
JOB HAZARD :	Handling large sections of raw plywood, operation of a circular saw, form fabrication(nailing & fitting), form installation, handling a maul for driving stakes, falls, and form dismantlement.
PROTECTIVE EQUIPMENT :	Basic P.P.E., MSA full face shield, leather gloves, personal fall arrest system as required.
SCOPE :	This procedure covers the hazards associated with the construction of concrete forms.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. All materials received on site shall be stored in a designated area away from established walkways. Any steel banding used in shipping shall be removed from the site as soon as it is released from the load or bundle.

   CAUTION : BANDING MAY BE UNDER TENSION AND RELEASE SUDDENLY WHEN CUT!

2. Full 4'x8' sheets of plywood shall not be handled by any one individual. A team approach shall be used to eliminate the potential for strains and sprains due to overexertion. Leather gloves shall be used at all times when handling all plywood, lumber pieces, and manufactured forms.

3. Scrap plywood and lumber pieces shall not be left to accumulate under saw horses. All scrap shall be removed daily to a designated area and disposed of promptly.

4. Job fabricated forms as well as manufactured forms shall be neatly stacked and kept in a designated, roped off area.

5. Form release oil shall be kept in a properly labeled container and stored properly when not in use.

6. Persons installing forms higher than 6’ above the next lower walking / working area shall be protected from falls by either a Personal Fall Arrest System or a scaffold handrail system.

7. Persons stripping concrete forms shall exercise increased caution when using hammers or other devices to increase their leveraged power to free forms up and pull nails. Attention should be paid to immediate work surroundings and footing to prevent slips and falls.

JOB HAZARD ANALYSIS – 038

POURING AND PLACEMENT OF CONCRETE

KEY POINTS

- Clear access to the job site where concrete is to be placed must be maintained.
- An equipment spotter **must be** assigned to the concrete truck at all times while the truck is moving on or through the job site to serve as a ground guide.
- A designated signal person **must be** utilized to direct the placement of an concrete.
- When working in an area of, or directly with wet concrete, all persons shall don a face shield. **Contact with wet concrete can cause caustic burns.**
- When working directly with the wet concrete and contact is likely, latex rubber gloves shall be worn. **Contact with wet concrete can cause caustic burns.**

JOB HAZARD ANALYSIS – 038

POURING AND PLACEMENT OF CONCRETE

PURPOSE :	Proper procedure for working with and around wet concrete.
JOB HAZARD :	Directing the movement of heavy equipment, caustic burns, and splash hazard to eyes and face.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Face Shields, sealed eye wear, rubber over boots
SCOPE :	All jobs requiring the use and placement of poured concrete.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Job site preparation includes maintaining clear access to the site where concrete is to be placed.

2. An equipment spotter is to be utilized as soon as a concrete truck moves onto the worksite to serve as a ground guide. At no time is a concrete truck driver to be left on his or her own to maneuver on a worksite.

3. A designated signal person shall be sued to direct the placement of concrete.

4. Those persons working directly with the concrete pouring operations shall utilize face shields to protect against splash hazards and when in contact with wet concrete is likely, heavy latex rubber gloves.

   NOTE : WET CONCRETE CAN CAUSE CAUSTIC BURNS TO THE SKIN IF LEFT IN CONTACT FOR EXTENDED PERIODS OF TIME. ALL WET CONCRETE SHOULD BE WASHED FROM EXPOSED SKIN IMMEDIATELY!

5. An emergency eye wash station shall be immediately available to all persons doing concrete work. It may be a permanent installation or a portable eye wash station.

6. Concrete placement over rebar involves a significant trip hazard. As concrete covers the rebar, a trip hazard emerges. Personnel shall not walk directly on the rebar (concrete covered or not). Plywood or another bridging system shall be utilized to eliminate the hazard. Proper planning is the key to safe work.

7. Special consideration must be taken when a pump truck is used to place concrete for inaccessible or elevated locations. Due to the weight and pressure generated to pump the concrete, a considerable amount of movement may occur and personnel guiding the hose must be aware of this. To avoid injury, one must:

   a. Ensure workers have taken a solid stance prior to the operator energizing the hose. Always anticipate that the hose may move erratically. This may entail the use of bridging materials as mentioned in Section 6 if rebar is present.

   b. Utilize both hands to hold and direct the hose during placement activities.

   c. Establish a clear means of communication to direct the movement of the hose and starting / stopping of the concrete pump.

8. When concrete buckets are used for placement, all personnel shall :

   a. Remove adjacent workers from the swing path of the bucket.

   b. Barricade or post a watch during swing operations.

   c. Utilize tag line(s) for handling the concrete bucket.

   d. Ensure no one is under the bucket (empty or full) for any reasons.

JOB HAZARD ANALYSIS – 039

REBAR HANDLING AND SAFETY

KEY POINTS

- All rebar, whether newly received to the job site or awaiting installation must be stored in a designated location and properly barricaded with yellow caution tape or by some other suitable means.
- All rebar while bundled in packing bands shall be moved by means of rigging which requires inspection by a foreman prior to performing the lift / move.
- All rigged materials (rebar included) require the use of tag lines.
- Shipping bands, when removed, must be immediately and properly discarded.
- Additional caution must be taken when removing shipping bands from rebar bundles as bands are under tension and will spring upward / outward when cut.
- **All rebar must be guarded with flat plastic rebar guards immediately upon installation.**

JOB HAZARD ANALYSIS – 039 REBAR HANDLING AND SAFETY	
PURPOSE :	Proper handling, placement, and installation of rebar and rebar bundles.
JOB HAZARD :	Strains due to heavy lifting, proper material handling, impalement, cuts, and lacerations.
PROTECTIVE EQUIPMENT :	Basic P.P.E., leather work gloves, and other P.P.E. as per the work permit. Plastic rebar protective caps.
SCOPE :	This procedure covers the handling, storage, placement, and impalement precautions for rebar safety.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Rebar received on site for installation and use and otherwise uninstalled rebar should be stored in a designated area away from walkways so as not to create a tripping hazard. The area should be taped off with yellow caution tape or otherwise barricaded.

2. Ascertain weight information from bill of lading or packing slip to ensure proper selection of rigging, slings, crane, forklift or other material handling equipment. All rigging shall be inspected prior to use by a competent person.

3. All suspended loads are to be controlled by the use of tag lines. No exceptions!

4. If it becomes necessary to move bundles of rebar for the placement of slings, utilize team lifts or a mechanical advantage when necessary. Do not attempt to move bundles alone. Always inspect rigging prior to each use.

5. Steel shipping bands shall be removed and discarded properly from rebar bundles immediately after they've been cut away so as not to allow for the creation of a tripping hazard.

   CAUTION: BANDING IS TYPICALLY UNDER EXTREME TENSION AND WILL RELEASE SUDDENLY WHEN CUT!

Sheet metal cutters or a similar tool shall be used when cutting the bands (the claw side of a hammer is not the correct tool for the task).

6. Reinforcing steel for walls, piers, columns, and similar vertical structures shall be adequately supported to prevent overturning and to prevent collapse.

7. All personnel shall take measures to prevent unrolled wire mesh from recoiling. Such measures may include, but are not limited to, securing each end of the roll or turning over the roll.

8. Once installed, all exposed rebar ends that present an impalement or laceration hazard shall be promptly guarded with flat plastic rebar guards. Conventional mushroom caps shall not be used.

JOB HAZARD ANALYSIS – 040

CONVENTIONAL METHODS FOR ORIENTATING IN-SHELL TUBE BUNDLES (ROLLING)

KEY POINTS

- Regardless of the installation method – conventional or hydraulic – the tube bundle should be nested into the slings / sled as close as possible to the final orientation setting.
- Monitor continually for bundle roll during the push sequence.
- Do not attempt reorientation (roll) until the bundle is at least 75% installed.
- With each type of installation method, ensure that all equipment ,components, and lifting mechanisms are appropriately sized and rated for the weight of the exchanger.
- Visually check sling from front and side of tube sheet to confirm a straight pull.
- Gradually hoist bundle to generate rolling motion. Continue hoisting until desired orientation is achieved.

JOB HAZARD ANALYSIS – 040 CONVENTIONAL METHODS FOR ORIENTATING IN-SHELL TUBE BUNDLES (ROLLING)	
PURPOSE :	To establish a safe procedure for rolling a tube bundle in a heat exchanger shell when the utilization of hydraulically operated equipment (bundle extractor) is not feasible.
JOB HAZARD :	Improper rigging procedures / attachments, pinch points, equipment failure.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Orientating a tube bundle, installed in a shell, for the purpose of attaching component parts (channel box / floating head).
REFERENCES :	JHA – 007 Rigging

PROCEDURE:

A. General.

1. Regardless of the installation method – conventional or hydraulic, the tube bundle should be nested into the slings / sled as close as possible to the final orientation setting.

2. Monitor continually for bundle roll during the push sequence.

3. Do not attempt reorientation (roll) until the bundle is at least 75% installed, 2-3 feet, or last baffle enters the shell – **where applicable**.

B. Rolling Methods – Tube Sheet **with** Threaded Bolts.

1. Equipment.

a. Properly sized (diameter) hoist ring(s), a.k.a. Swivel-type eye bolts **only**. One should be sufficient, two at most.

NOTE : BUNDLE DESIGNS MAY VARY.

b. One steel wire sling – $^{5}/_{8}$" minimum diameter.

c. One properly sized shackle for each hoist right utilized.

d. Hoisting mechanism – crane / chain fall.

NOTE : UNDER NO CIRCUMSTANCE SHOULD THIS PROCEDURE EXCEED THE USE OF (2) HOIST RINGS!

2. Attachment.

   a. Attach an adequately rated chain fall to a fixed point – crane hook, davit, or structure – that will permit vertical lift.

      NOTE : CAUTION MUST BE USED WHEN SELECTING AN ANCHORAGE POINT.

   b. Pull chain must be long enough to operate at a safe distance from the load during the hoisting sequence.

3. Hoisting Mechanism.

   a. Visually check sling from front and side of tube sheet to confirm a straight pull. This will optimize the roll and reduce tension on the rigging.

   b. Gradually hoist bundle to generate rolling motion. Continue hoisting until desired orientation is achieved.

C. Rolling Methods – Tube Sheet **without** Threaded Bolt Holes.

1. Equipment.

   a. One properly sized nylon sling.

   b. Several pieces of cut-to-length wood softeners.

   c. Hoisting mechanism – crane / chain fall.

2. Attachment.

   a. Position the tube bundle so that the first baffle beyond the front tube sheet is at least 12” away from the shell.

      NOTE : MINOR EXTRACTION MAY BE REQUIRED TO OBTAIN A PROPER BITE WITH THE CHOKER.

   b. Wrap the nylon sling around the bundle at the baffle location; choke it at approximately the 2 o’clock position – use wood softeners to prevent tube damage.

c. **NOTE : THIS IS A CRITICAL STEP, MANY EXCHANGERS HAVE BEEN DAMAGED DURING THIS STEP. PROPER PRECAUTIONS MUST BE USED TO PROTECT THE EXCHANGER TUBES.**

d. Attach the free eye of the nylon sling to the hoisting mechanism.

3. Hoisting Mechanism.

a. Attach an adequately rated chain fall to a fixed point – crane hook, davit, or structure – that will permit vertical lift.

b. Pull chain must be long enough to operate at a safe distance from the load during the hoisting sequence.

4. Hoisting.

a. Visually check sling from the front and side of the tube sheet to confirm a straight pull.

b. Gradually hoist bundle to generate rolling motion. Continue hoisting until desired orientation is achieved.

JOB HAZARD ANALYSIS – 041

EXTRACTING / INSTALLING TUBE BUNDLES

KEY POINTS

- Know the weight, length, and diameter of the bundle.
- **Never** use a cable less than $^{5}/_{8}$".
- Always be mindful of the work environment and be aware of body positioning. **NEVER WALK UNDER A SUSPENDED LOAD!**
- Boilermaker Supervision will be the designated Competent Person for Conventional Bundle Extraction / Insertion operations where applicable.
- The Operating Engineer will be the designated Competent Person for Truck Mounted and Aerial Bundle Operations.
- When present and a part of the process, the Operating Engineer(s) must be included in JSA process for all Bundle extractions and re-installations.
- The selection of rigging equipment is very important. Choose wisely and oversize! Don't take any unnecessary risks.
- Make sure the load is balanced prior to full separation from shell.
- Utilize spotters for ALL equipment when entering and exiting the work area / unit.
- Be aware of the residual product on bundle prior to transport. Residual product may be hazardous to your health and the environment. Drop cloths or wrapping may be necessary to contain material.
- Preparation and Use :
    - Procure the correct bundle data for determining the proper rigging.
    - Determine if and where anchor points will be located.
    - Selection of rigging appurtenances and devices.
    - **Conventional Specific** – Routing of cable.

- **Aerial Specific** – Secure the work area.

- Removal and transport of bundle to / from the work area.

- Keep hands free from the load and avoid potential pinch points and getting caught between hazards.

- Utilize a clear method of communication with the crane or truck operator – radio, qualified signal person, etc.

- All suspended loads require tag lines.

- The checklist (conventional, truck, aerial) is a very valuable tool – USE IT!

JOB HAZARD ANALYSIS – 041 EXTRACTING / INSTALLING TUBE BUNDLES	
PURPOSE :	To establish a safe work procedure for extracting and installing tube bundles at locations where the use of a hydraulic bundle extractor is not possible, utilizing a truck mounted hydraulic bundle extractor, and utilizing an aerial bundle extractor.
JOB HAZARD :	Improper rigging procedures / rigging attachments, indeterminable structural integrity of anchor points, damage to equipment or personnel injury, movement of equipment in & out of process areas, utilization of powerful hydraulic equipment, personnel under overhead work, and personnel under a suspended load.
PROTECTIVE EQUIPMENT :	Basic P.P.E., fall protection may be required when working from a 'yellow'-tagged scaffold or unprotected work platform.
SCOPE :	An overview of the rigging aspects required to successfully and safely complete the task.
REFERENCES :	J. J. White, Inc. High-Pressure Water Wash Program./ JHA – 007 Rigging

PROCEDURE:

A. General.

1. Know the weight, length, and diameter of the bundle.

2. The anchorage points selected are critical. Ensure that they are capable of supporting the rigging and the load, and that the equipment that is used for anchorage has been inspected and installed correctly before use.

3. The selection of the rigging equipment is very important. Avoid unnecessary risks and oversize if needed.

4. Barricade the area around bundle pulling operations.

5. Never use cable less than $^{5}/_{8}$".

6. Always include the crane operator in the preplan and all JSAs so that all parties involved have a clear understanding of the task at hand.

7. Keep personnel clear of the area during the initial pull.

8. Always be mindful of the work environment and be aware of body positioning. **NEVER WALK UNDER A SUSPENDED LOAD!**

9. Keep hands free from the load and avoid potential pinch points and getting caught between hazards.

10. Utilize spotters for **ALL** equipment when entering and exiting the work area / unit.

11. Secure bundle to equipment prior to transport to / from the wash pad.

12. Be aware of the residual product on bundles prior to transport. Residual product may be hazardous to your health and the environment. Drop clothes or wrapping may be needed in order to contain material.

13. The checklist (conventional, truck, aerial) is a valuable tool – **USE IT!**

B. Preparation and Use.

1. Procure the correct bundle data for determining the proper rigging.

   a. Weight.

   b. Length.

   c. Diameter.

2. Determine if and where anchor points will be located.

   a. Exchanger pedestal (installation).

   b. Crane with cable winch (straight pull).

   c. Structural steel member(s).

3. Selection of rigging appurtenances and devices.

   a. Size, length, and type of cable.

   b. Shackles and blocks.

   c. **Conventional** – Pulling mechanism (crane, hoist, tugger).

   d. **Truck Mounted Extractor.**

   e. **Aerial Extractor suspended from a crane.**

4. **Conventional Specific** – Routing of cable.

    a. Number of parts.

    b. Quantity of turning sheaves (snatch blocks).

    c. Direction of pull (as straight as possible).

5. **Aerial Specific –** Secure the work area.

    a. Install barricades and signage around the work area.

    b. Keep unauthorized personnel from entering the work area.

    c. Keep **ALL** personnel out from under the overhead work.

6. Removal and transport of bundle to / from work area.

    a. Equipment selection to lift and transport bundle to wash pad.

    b. Securing the load prior to transport.

    c. Spotters when moving in / out of the work area / unit.

    d. Residual material hazards to personnel and environment.

    e. **Aerial Specific** – Ensure bundle is balanced on Aerial sled prior to full separation from shell.

C. Process Specific Key Points.

1. Conventional Bundle Extraction / Installation.

    a. Boilermaker Supervision is the designated competent person where applicable.

    b. Ensure crane / equipment inspections are complete prior to the start of work.

    c. Utilize a clear method of communication with the crane operator – radio, qualified signal person, etc.

2. Truck Mounted Bundle Extraction / Installation.

a. The Operating Engineer is the designated competent person for truck mounted bundle operations.

b. Ensure the truck is level and on stable ground. It must be capable of supporting the weight of both the truck and the bundle.

c. Utilize spotters for all equipment when entering and exiting the work area / unit.

d. Ensure crane / truck inspections are complete prior to the start of work.

e. Utilize a clear method of communication with the truck operator – radio, qualified signal person, etc.

3. Aerial Bundle Extraction / Installation.

a. The Operating Engineer is the designated competent person for aerial bundle operations.

b. Ensure crane is level and on stable ground. It must be capable of supporting the weight of both the crane and the bundle.

c. Utilize spotters for all equipment when entering & exiting the work area / unit.

d. Ensure crane / equipment inspections are complete prior to the start of work.

e. Utilize a clear method of communication with the crane operator – radio, qualified signal person, etc.

f. Make sure the load is balanced prior to full separation from the shell.

g. Land aerial puller on ground for bundle transfer to truck.

JOB HAZARD ANALYSIS – 042

WORKING AT RCRA SITES

KEY POINTS

- Past and present activities at Resource Conservation and Recovery Act (RCRA) facilities have sometimes resulted in releases of hazardous waste and hazardous constituents into soil, ground water, surface water, sediments, and air; requiring the investigation and cleanup, or remediation, of these hazardous release. RCRA'S goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner.

- All employees working on an RCRA site shall review the following before any work is to begin :

  - An organizational structure.
  - A comprehensive work plan.
  - A site-specific safety and health plan.
  - The medical surveillance plan.
  - The J. J. White, Inc. standard operating procedures for health and safety.

- Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926. At some locations, the site guidelines will be followed if the guidelines are more stringent than that of the OSHA standard.

- A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.

- Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.

- Once work has been completed, the excavation will be backfilled and returned to its original condition or will be changed in accordance to the site and environmental requirements that have been established.

JOB HAZARD ANALYSIS – 042 WORKING AT RCRA SITES	
PURPOSE :	A written safety and health program for J. J. White, Inc. employees involved in hazardous waste operations (RCRA Sites).
JOB HAZARD :	Varies from site to site.
PROTECTIVE EQUIPMENT :	To be determined based on RCRA conditions.
SCOPE :	This procedure covers work at RCRA sites based on OSHA 1910.120.
REFERENCES :	N/A.

PROCEDURE:

A. Preparation and Use.

1. Resource Conservation and Recovery (RCRA) Sites.

   a. Past and present activities at Resource Conservation and Recovery Act (RCRA) facilities have sometimes resulted in releases of hazardous waste and hazardous constituents into soil, ground water, surface water, sediments, and air; requiring the investigation and cleanup, or remediation, of these hazardous release. RCRA'S goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner.

2. General.

   a. This safety and health program covers the procedures for the J.J. White, Inc. employees involved in hazardous waste operations. The program shall identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations. J.J. White, Inc. will hire an Industrial Hygienist to write an additional in-depth plan before the work begins. The plan that Industrial Hygienist writes will include a safety and health program and a medical surveillance program based on the specific hazardous waste that the employees will be exposed to.

   b. All employees working on a RCRA site (such as but not limited to equipment operators, general laborers and others) that may be exposed

to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

c. All employees working on a RCRA site shall review the following before any work is to begin:

   i) An organizational structure.

   ii) A comprehensive work plan.

   iii) A site-specific safety and health plan.

   iv) The medical surveillance program.

   v) The J. J. White, Inc. standard operating procedures for health & safety.

   In addition to the programs for safety, health, training, medical surveillance, decontamination, new technology, and emergency response, employers at RCRA sites also need the following :

   i) A written hazard communication program meeting the requirements of 29 CFR 1910.120.

   ii) Procedures to effectively control and handle drums and containers.

d. Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926. At some locations, the site guidelines will be followed if the guidelines are more stringent than that of the OSHA standard.

e. If J.J. White, Inc. retains a sub-contractor services for work in hazardous waste operations shall inform those sub-contractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified by the J.J. White, Inc. information program.

f. The written safety and health program shall be made available to any subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.

g. The medical surveillance program shall be instituted by J.J. White, Inc. for all employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year. All employees who are injured become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

h. Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits for substances regulated by 29 CFR Part 1910, to the extent required by Subpart Z, except to the extent that such controls and practices are not feasible. Engineering controls which may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices which may be feasible are removing all non-essential employees from potential exposure during opening of drums, wetting down dusty operations and locating employees upwind of possible hazards. Whenever engineering controls and work practices are not feasible, or not required, any reasonable combination of engineering controls, work practices and PPE shall be used to reduce and maintain to or below the permissible exposure limits or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

i. J.J. White, Inc. shall hire a third party Industrial Hygienist to perform monitoring where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances. Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.

j. A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists. Standard operating procedures shall be developed to minimize

employee contact with hazardous substances or with equipment that has contacted hazardous substances. All employees leaving a contaminated area shall be appropriately decontaminated; all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated. Decontamination procedures shall be monitored by the site safety and health supervisor and the Industrial Hygienist to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies. Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

k. Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness. Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone. Unauthorized employees shall not remove protective clothing or equipment from change rooms. Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

l. Once work has been completed, the excavation will be backfilled and returned to its original condition or will be changed in accordance to the site and environmental requirements that have been established.

JOB HAZARD ANALYSIS – 043

HEARING CONSERVATION

KEY POINTS

- A-Weighting – A method of adjusting noise level measurements to simulate the response of the human ear.

- Affected Employee – Correctly wear company provided hearing protection devices in posted noise hazard areas. Attending annual training and medical surveillance requirements.

- In all cases where employee noise exposure exceeds an 8-hour time-weighted average (TWA) of 85 decibels measured on the A-weighted scale, a continuing effective hearing conservation program shall be administered.

- Protection against the effects of occupational noise exposure shall be required when the sound levels exceed those shown below. Hearing protection will be required when noise exceeds 85 dBs.

Permissible Noise Exposure	
Duration per day, hours	Sound level dB slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

- When engineering or administrative controls fail to reduce the noise level to within the levels required, personal protective equipment shall be provided and used to reduce the noise to an acceptable level.

- Signs shall warn of high noise areas (90 dBs) where personal protective equipment must be worn (i.e. "Hearing Protection required in this Area"). Signs should not indicate a time limit except for rarely entered areas such as pump rooms, etc. For process units with high noise areas it is recommended that signs be placed at battery limits. This recommendation facilitates enforcement of PPE usage.

- Expandable Foam Ear Plugs - Ear plugs typically provide better protection than ear muffs because of better fit and less interference from items such as safety glasses. These plugs are disposable and should be discarded after daily or single use depending on cleanliness. To use, roll into cylinder, insert into the ear canal and hold until the foam expands to fill the diameter of the canal. See the instructions on the plug container.

- Sized Earplugs - If an employee has difficulty with fit for both foam plugs and ear muffs he/she may contact medical for consideration for fitted ear plugs. If used, these plugs are reusable but must be kept very clean as instructed by Medical.

- Ear Muffs – Can be worn attached to the hard hat for primary protection or can be worn attached to the hard hat over ear plugs as secondary protection. Ear muffs must be kept very clean.

JOB HAZARD ANALYSIS – 043 HEARING CONSERVATION	
PURPOSE :	The purpose of this program is to establish procedures to identify and attenuate excessive employee noise exposures and associated hearing loss. A noise level of 90 decibels or greater is known to be a long-term hazard to anyone who is not wearing hearing protection.
JOB HAZARD :	Working with and around equipment with elevated noise levels.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Disposable Foam Ear Plugs, Over the Head Ear Muffs.
SCOPE :	To ensure all employees are protected against noise levels that meets or exceeds permissible limits.
REFERENCES :	OSHA 1910.95.

A. Definitions.

1. Audiogram - A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

2. Audiometric Test – Pure tine, air conduction, hearing threshold examinations with test frequencies including 500, 1000, 2000, 3000, 4000 and 6000 Hz, using audiometers and test conditions meeting the requirements of OSHA 1910.95.

3. A-Weighting – A method of adjusting noise level measurements to simulate the response of the human ear.

4. C-Weighting – Gives essentially equal weight to the noise levels that can be heard by the human ear.

5. Baseline Audiogram – An initial, valid audiogram obtained under defined conditions against which subsequent audiograms are compared.

6. Decibel – Unit of measurement of sound level, abbreviated dB, based on a ratio expressing how much greater a sound level is above a specified reference level.

7. Hearing Protection Device (HPD) – Personal protective equipment used to attenuate the noise level the ear is exposed to. These are typically ear plugs and ear muffs.

8. Hearing Shift – A change in measured threshold of hearing at a specified frequency expressed in decibels relative to an earlier measured threshold. The change in hearing threshold is measured by comparing a current audiogram to an earlier, baseline audiogram.

9. Sound Level Meter – An instrument for the measurement of sound level.

10. Standard Threshold Shift – A change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000,3000 and 4000 Hz in either ear with correction for age.

11. Time Weighted Average - That sound level which is averaged over an employee's work shift.

B. General Requirements.

1. This hearing conservation program shall be established and implemented where personal noise exposures exceed 85 dB(A) full shift TWA, as measured by a Type II sound level meter operated in the slow response mode or a TWA of 85 dB(A)measured on a Type II audio dosimeter which integrates all workplace noise between 80 and 130 dB(A). The program shall include:

a. Noise Monitoring.

b. Engineering / Administrative Controls.

c. Audiometric Testing & Evaluation.

d. Hearing Protection Devices.

e. Training & Education.

f. Recordkeeping.

C. Responsibilities.

1. Health & Safety – Performing noise surveys and exposure monitoring. Recommending appropriate engineering controls, administrative controls and/or hearing protection. Maintaining all records of sound level measurements in MEDGATE. Ensuring that effective hearing conservation training is available for the location. Conducting periodic hearing conservation program effectiveness evaluations.

2. Medical Provider – Providing required medical services testing, including audiometric exams and advising employees of the results of their hearing

tests. Maintaining all records of: audiometric testing, employee notification of hearing test results, and any additional records which relate to hearing evaluation. Obtaining and maintaining documentation of audiometer calibrations and sound pressure levels in the audiometric booth.

3. Affected Employee – Correctly wear company provided hearing protection devices in posted noise hazard areas. Attending annual training and medical surveillance requirements.

D. Procedure.

1. Hearing Conservation Program.

a. In all cases where employee noise exposure exceeds an 8-hour time-weighted average (TWA) of 85 decibels measured on the A-weighted scale, a continuing effective hearing conservation program shall be administered.

b. The hearing conservation program shall be a "living document(s)" including monitoring conducted and planned, engineering and administrative control recommendations and status, audiometric testing, hearing protective devices, information and training, record keeping, and program evaluation. The program shall identify the facility job positions responsible to maintain specific elements of the program. The program may be supplemented with separate safety procedures readily available to employees summarizing current requirements.

2. Monitoring.

a. A program of sampling to monitor noise exposure has been implemented to identify those employees who should be included in the hearing conservation program, and to enable the proper selection of hearing protective devices.

b. Area sampling using a sound level meter will be the initial method of monitoring. Representative personal sampling using a dosimeter will also be conducted, unless area sampling will produce equivalent results.

c. The instrument used to monitor noise levels will be calibrated to ensure accuracy.

d. Noise levels to be measured include all continuous, intermittent, and impulsive sound levels from 80-130 decibels.

e. Whenever there is a change in production process, equipment, or controls that increase noise levels, monitoring shall be repeated. Since

changes in noise levels are not always apparent, annual sound level re-surveys of high noise areas or older equipment areas must be performed periodically.

f. Any employee determined to be exposed to an 8-hour TWA of at least 85 decibels will be notified of the result of the monitoring within 15 days, per SH-110 "Employee Exposure Monitoring Notification". Any follow-up actions that are necessary as a result of monitoring must be performed as needed.

3. Permissible Exposure Limits.

a. Protection against the effects of occupational noise exposure shall be required when the sound levels exceed those shown below. Hearing protection will be required when noise exceeds 85 dBs

Permissible Noise Exposure	
Duration per day, hours	Sound level dB slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

b. At no time should effective noise levels for any employee exceed 115 decibels measured on the A scale, slow response. Exposure to impulsive or impact noise should not exceed 140 decibels sound pressure level.

4. Engineering and Administrative Controls.

a. Feasible engineering and/or administrative controls shall be utilized to keep exposure below the allowable limit regardless of hearing protection worn. Such controls may include minimizing noise-producing equipment, quiet lunch and break areas, and scheduling to minimize noise exposure. Additional applicable requirements are specified in Sun Engineering Standards STD 1630, "Noise Level Standard for Plant Equipment" and STD 1631 "Noise Level Standard in Plant Areas".

b. When engineering or administrative controls fail to reduce the noise level to within the levels required, personal protective equipment shall be provided and used to reduce the noise to an acceptable level.

5. Signs

   a. Signs shall warn of high noise areas (90 dBs) where personal protective equipment must be worn (i.e. "Hearing Protection required in this Area"). Signs should not indicate a time limit except for rarely entered areas such as pump rooms, etc. For process units with high noise areas it is recommended that signs be placed at battery limits. This recommendation facilitates enforcement of PPE usage.

6. Audiometric Testing.

   a. Employees will receive audiometric testing to establish a baseline audiogram within six months of the first exposure at or above an 8-hour TWA of 85 decibels (pre-employment physical / audiogram may be used as baseline). The testing deadline is extended to one year if a mobile test van is used. However, employees must wear hearing protectors for a period of six months until testing is conducted.

   b. For at least 14 hours prior to the baseline audiogram testing, employees shall not be exposed to workplace noise or shall wear hearing protectors. The employees will also be instructed to avoid high levels of non-occupational noise during this 14-hour period.

   c. At least every 12 months following the baseline audiogram testing, all employees whose exposures equal or exceed an 8-hour TWA of 85 decibels will receive new audiometric testing.

   d. The results of each new audiometric test will be compared with the baseline audiogram to determine if there has been a standard threshold shift, subject to age correction guidelines established in OSHA 1910.95.

   e. If a standard threshold shift has been indicated in an annual audiometric test a retest may be conducted within 30 days.

   f. When it has been determined that a standard threshold shift has occurred, the employee must be notified in writing within 21 days of this determination.

   g. If the annual audiogram shows that the standard threshold shift is persistent or that the hearing threshold indicated significant improvement over the baseline audiogram, the annual audiogram may replace the baseline audiogram.

h. The instruments and personnel involved in audiometric testing shall meet the requirements of OSHA 1910.95,Occupational Noise Exposure.

7. OSHA Recordability.

a. Medical will notify the Health and Safety Department when a standard threshold shift has occurred in order for Health and Safety to evaluate if the shift is related to occupation and the OSHA illness recordability, if any and ensure required retraining occurs and additional actions are taken, if necessary.

b. Shifts in hearing at an average of 25dB or more from the original baseline at 2000, 3000, and 4000 Hz in either ear shall be considered for evaluation of injury recording in the OSHA illness / injury log. Once an employee experiences a recordable shift (25dB or greater), the audiogram showing the recordable shift would become the employee's new reference audiogram for future comparisons. An additional case need not be recorded until the employee experiences a further cumulative 25dB shift from the new reference audiogram.

c. A review of current and past occupational exposure conditions and the individual's work history shall be included in the recordability evaluation. Occupational noise exposure is noise exposure at an average of 85dBA for a 40 hour work week or equivalent.

d. Documentation of the recordability evaluation shall be maintained with that year's injury and illness records.

8. Protective Devices (Ear Plugs / Ear Muffs).

a. Hearing protectors are available free to all employees with potential exposures equal to or greater than an 8-hour TWA of 85 decibels. Employees may obtain them at the Safety Store via procurement procedures. Protective Devices are also typically found in control rooms and maintenance group staging areas. They are required to be used within sign marked areas, when using power tools, or in any area that has greater than 90 dBs of noise.

b. Types are as follows:

i) Expandable Foam Ear Plugs - Ear plugs typically provide better protection than ear muffs because of better fit and less interference from items such as safety glasses. These plugs are disposable and should be discarded after daily or single use depending on cleanliness. To use, roll into cylinder, insert into

the ear canal and hold until the foam expands to fill the diameter of the canal. See the instructions on the plug container.

ii) Sized Earplugs - If an employee has difficulty with fit for both foam plugs and ear muffs he/she may contact medical for consideration for fitted ear plugs. If used, these plugs are reusable but must be kept very clean as instructed by Medical.

iii) Ear Muffs – Can be worn attached to the hard hat for primary protection or can be worn attached to the hard hat over ear plugs as secondary protection. Ear muffs must be kept very clean.

c. Hearing protectors shall be required at 85 dBs for individuals who have a standard threshold shift.

d. If the company physician determines that the protective devices cause or aggravate an ear disease or disorder, the employee shall be referred for a clinical audiological evaluation or an ontological examination, as appropriate. If the company physician determines that an ear disease or disorder exists unrelated to protective hearing devices, the employee shall be informed of the need for an ontological examination.

e. If a standard threshold shift is not persistent for employees with less than an 8-hour TWA of 90 decibels as determined by subsequent audiometric testing (retest may be conducted within 30 days), the employee shall be informed and the additional hearing protector requirement may be discontinued.

f. Supervision shall ensure that all employees wear hearing protectors, as required by this procedure.

g. Health & Safety shall evaluate the attenuation of hearing protective devices for the specific noise environments in which they will be used.

h. To obtain the estimated A-weighted TWA under a hearing protector, using an audio dosimeter set to the A-weighting network:

i) Obtain the employee's A-weighted TWA in dBs.

ii) Subtract 7 decibels from the Noise Reduction Rating (NRR) indicated on the hearing protector package.

iii) Then subtract the remainder from the A-weighted TWA.

i. To obtain the estimated A-weighted TWA under a hearing protector, using area monitoring procedures and a sound level meter set to the A-weighting network:

i) Obtain a representative sound level for the area.

ii) Subtract 7 decibels from the NRR.

iii) Subtract the remainder from the A-weighted sound level for the area.

j. Hearing protectors must attenuate employee exposure at least to an 8-hour TWA of 90 decibels (85 decibels for employees who have experienced a standard threshold shift). A choice of ear plugs and/or ear muffs will be offered to ensure proper fit and effective use of protectors.

9. Information & Training.

a. The company shall provide training in the use and care of hearing protective devices provided to employees that are exposed to noise at or above an 8-hour TWA of 85 decibels. Supervision is responsible for ensuring participation by affected employees.

b. The training program shall be repeated annually for each employee in the hearing conservation program.

c. Retraining will be provided as soon as feasible for employees who experience a standard threshold shift.

d. Training will include:

i) The effects of noise on hearing.

ii) The purpose of hearing protectors.

iii) Advantages, disadvantages, and attenuation of various types.

iv) Instructions on selection, fitting, use, and care of hearing protectors.

v) Audiometric testing purpose and procedures.

e. The company shall post a copy of OSHA 1910.95 in the workplace in designated posting board locations and make available copies to affected employees or their representatives.

10. Record Keeping.

a. Each facility Health & Safety or Medical Departments shall maintain an accurate record of all employee noise exposure measurements and audiometric test records. The audiometric test records shall include:

b. Noise exposure measurement records and audiometric test records will be retained for the duration of the employee's employment plus 30 years as part of medical records.

i) The employee's name and job classification.

ii) Date of audiogram.

iii) Examiner's name.

iv) Date of most recent acoustic or exhaustive calibration of the audiometer.

v) Employee's most recent noise exposure assessment.

vi) Measurement of background sound pressure levels in audiometric test rooms.

c. All records generated by this Standard must be accessible to employees, former employees, and representatives designated by an individual employee, while protecting the confidentiality of medical records.

11. Self-Assessment.

a. Program evaluation shall include periodic assessment by each facility of completeness and quality of the program components and an evaluation of the audiometric data. This review will be performed with guidance from Corporate Industrial Hygiene. The Safety Department should document program evaluation.

JOB HAZARD ANALYSIS – 044

MOBILE CRANES

KEY POINTS

- Only designated personnel shall be permitted to operate a mobile crane. Any personnel assigned to operate a mobile crane must be properly trained and approved by J.J. White, Inc.

- If repairs or alterations occur to the crane, the crane may need to be re-rated.

- A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available. All inspections shall be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard.

- If work is to be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided before work is started. If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

REFER TO THE COMPLETE JHA-049 (MOBILE CRANES) FOR DAILY EQUIPMENT INSPECTION FORM, PREVENTATIVE MAINTENANCE CHECKLIST, CRANE SET-UP JOB SAFETY ANALYSIS FORM (JSA), AND J. J. WHITE, INC. OPERATING ENGINEER REQUIREMENTS AND EXPECTATIONS POLICY ACKNOWLEDGEMENT FORM.

JOB HAZARD ANALYSIS – 044 MOBILE CRANES	
PURPOSE :	To set guidelines for operation and inspection of mobile cranes.
JOB HAZARD :	Varies from site to site.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	This is a general guideline for mobile cranes, additional manufacturer requirements will be reviewed prior to any work occurring. Based on the OSHA 1910 standards.
REFERENCES :	See attachments for Preventative Maintenance Checklist, Crane Set-Up Job Safety Analysis Form (JSA), and J. J. White, Inc. Policy for Operating Engineers.

PROCEDURE:

A. Preparation and Use.

1. Only designated personnel shall be permitted to operate a mobile crane. Any personnel assigned to operate a mobile crane must be properly trained and approved by J.J. White, Inc.

2. All cranes will be verified upon issue that an annual inspection has been conducted and a copy requested to be onsite.

3. A preventive maintenance program based on the manufacturer's recommendations shall be established.

4. Inspection of the following equipment will occur on a daily basis. The daily inspection will look for the following:

   a. Load rating chart.

      i) A substantial and durable rating chart with clearly legible letters and figures shall be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at his control station.

   b. All control mechanisms for maladjustment interfering with proper operation

c. All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter.

d. All safety devices for malfunction.

e. Deterioration or leakage in air hydraulic systems.

f. Crane hooks with deformations or cracks. For hooks with cracks or having more than 15 percent in excess of normal throat opening or more than 10 deg. twist from the plane of the unbent hook.

g. Electrical equipment for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation.

5. Additional inspections may be required based on the manufacturer's recommendations.

6. Inspection records shall contain the following:

   a. Date of inspection.

   b. Signature of the person who performed the inspection.

   c. The serial number of the mobile crane which was inspected.

7. A copy of the inspection record shall be kept with the mobile crane for a minimum of 30 days after which the records are turned over to the J.J. White Inc. Fleet Manager.

8. A copy of the Rated Load Test will be kept with the mobile crane.

9. If repairs or alterations occur to the crane, the crane may need to be re-rated. If re-rating is required:

   a. Written reports shall be available showing test procedures and confirming the adequacy of repairs or alterations.

   b. Test loads shall not exceed 110 percent of the rated load at any selected working radius.

   c. No crane shall be re-rated in excess of the original load rating unless such rating changes are approved by the crane manufacturer.

   d. The crane shall be tested in accordance with SAE Recommended Practice, Crane Load Stability Test Code J765.

10. Before adjustments and repairs are started on a crane the following precautions shall be taken:

    a. The crane to be repaired shall be run to a location where it will cause the least interference with other cranes and operations in the area.

    b. All controllers shall be at the off position.

    c. The main or emergency switch shall be open and locked in the open position.

    d. Warning or "out of order" signs shall be placed on the crane, also on the floor beneath or on the hook where visible from the floor.

B. Wire Rope Inspection.

1. A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available. All inspections shall be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard.

2. Some of the conditions that could result in an appreciable loss of strength are the following:

    a. Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

    b. A number of broken outside wires and the degree of distribution of concentration of such broken wires.

    c. Worn outside wires.

    d. Corroded or broken wires at end connections.

    e. Corroded, cracked, bent, worn, or improperly applied end connections.

    f. Severe kinking, crushing, cutting, or unstranding.

3. Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles. Particular care shall be taken to inspect ropes at these locations.

4. All rope which has been idle for a period of a month or more due to shut down or storage of a crane on which it is installed shall be given a thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the rope. A certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the rope which was inspected shall be prepared and kept readily available.

5. Particular care shall be taken in the inspection of non-rotating rope.

C. Hoist Chains.

1. Hoist chains, including end connections, for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations. Visual inspection daily; monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier of the chain which was inspected.

2. All hoist chains which have been idle for a period of a month or more due to shut down or storage of a crane on which it is installed shall be given a thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the hoist chains. A certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the hoist chain which was inspected shall be prepared and kept readily available.

D. Fire Extinguishers.

1. A carbon dioxide, dry chemical or equivalent fire extinguisher shall be kept in the cab or vicinity of the crane.

2. All personnel that operate mobile cranes for J.J. White, Inc. shall receive training on the proper use of fire extinguishers.

E. Overhead Electrical Lines.

1. If work is to be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided before work is started. If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions shall prevent employees from contacting such lines directly

with any part of their body or indirectly through conductive materials, tools, or equipment.

2. Frequent inspection. The following items shall be inspected for defects at intervals as defined in this section or as specifically indicated, including observation during operation for any defects which might appear between regular inspections. All deficiencies such as listed shall be carefully examined and determination made as to whether they constitute a safety hazard.

DAILY EQUIPMENT INSPECTION FORM

DATE :								
EQUIPMENT # :								
MAKE :								
MODEL :								
CAPACITY :								
CHECK LIST :		MON	TUES	WED	THUR	FRI	SAT	SUN
ALL FLUIDS :								
BATTERY :								
LEAKS :								
LIGHTS :								
HORN :								
WIPERS :								
BRAKES :								
BACKUP ALARM :								
ALL FUNCTIONS :								
TIRES / TRACKS :								
EXHAUST :								
LADDERS :								
MIRRORS / GLASS :								
SEATBELT :								
EXTINGUISHER :								
This is to certify that I have inspected this piece of equipment and it is in good condition.								
Operator's Name :								
Operator's Signature :								
Comments :								

PRE-CHECK & GENERAL OPEERATION OF MOBILE CRANES

PREVENTATIVE MAINTENANCE CHECKLIST **EQUIPMENT # _____**

IF EQUIPMENT IS "OK" – PUT CHECK MARK IN DATE COLUMN
LIST PROBLEMS UNDER COMMENTS

CHECK LIST	DATE	COMMENTS
BATTERY		
BACK-UP HORN		
BLOCKS		
BOOM INDICATOR		
BRAKES		
CABLE		
COMPUTER SYSTEM		
CONTROLS		
COOLANT		
ENGINE OIL		
FIRE EXTINGUISHER		
FUEL		
GAUGES		
GLASS		
HORN		
HYDRAULIC OIL		
LOAD CHART		
LIGHTS		
PARKING BRAKE		
STEERING		
TIRES		
OUTRIGGERS		
OUTRIGGER MATS		
1. CHECK ITEMS THAT ARE NECESSARY FOR EACH DIFFERENT TYPE OF EQUIPMENT USED.		
2. MUST BE FILLED OUT ON ALL EQUIPMENT THAT YOU ARE RESPONSIBLE FOR ON A DAILY BASIS AND GIVEN TO YOUR SUPERVISOR OR TRANSPORTATION SUPERVISOR AT THE END OF THE WORK DAY.		

USED FOR ALL EQUIPMENT **EMPLOYEE NAME _____**

EMPLOYEE SIGNATURE _____

CRANE SET-UP JOB SAFETY ANALYSIS FORM (JSA)

Job Description :		Date :
Area :	Unit :	Work Permit # :
Critical Lift – If YES, Mech. 2nd Line Supv. Signature Required ☐-YES ☐-NO		Lift Over In-Service – If YES, Maint/Ops Mgr. Signature Required If ≥ 85% load charge or ≥ 25 ton ☐-YES ☐-NO

CRANE OPERATOR SECTION

Crane Operator (Print) :		Name of Assistant (Print) :
Daily Preventative Maintenance Checklist was completed : ☐-YES ☐-NO		Load chart is posted or available in crane cab : ☐-YES ☐-NO
Heaviest lift is within rated capacity per load chart : ☐-YES ☐-NO		Weight of heaviest lift planned for crane set-up : _____ LBS
The estimated load weight is <75% of the crane capacity : ☐-YES ☐-NO		If NO, obtain weight & determine capacity for lift : _____ %
Crane on level & stable ground; Outriggers fully deployed : ☐-YES ☐-NO		Operator has necessary information to safely perform lift : ☐-YES ☐-NO
Barricade Needed : ☐-YES ☐-NO	Mats Used : ☐-YES ☐-NO	If NO mats, explain :
Swing Clearance OK for Set-Up : ☐-YES ☐-NO	Swing Clearance Restrictions :	
Other safety concerns related to this lift or job : ☐ – Fresh Air ☐ – Wind Speed ☐ – Power Lines ☐ – Ground Stability ☐ – Visibility		
Explain concerns :		

RIGGER SECTION

Rigger #1 (Print) :	Rigger #2 (Print) :
All slings, chokers, shackles, and other load-bearing components were inspected : ☐-YES ☐-NO	
The estimated load weight is <75% of the rigging capacity : ☐-YES ☐-NO	If NO, Obtain the weight & determine % capacity : _____ %
Condition of "lift lugs" & other connection points verified : ☐-YES ☐-NO	Rigger has necessary information to safely perform lift : ☐-YES ☐-NO
Rigging length OK : ☐-YES ☐-NO	If NO, explain :
Sharp edges, chemicals, etc. that may damage slings / rigging addressed : ☐-YES ☐-NO	If NO, explain :

SIGNAL PERSON SECTION

Designated Signal Person (Print):	Radio Used : ☐-YES ☐-NO
Signal Person has necessary information to safely perform this lift : ☐-YES ☐-NO	

SIGNATURE SECTION

All Shaded ☐-NO Answers requires Signature by Mech. 1st Line Supervisor and explanation below :

Crane Operator :	Signal Person :	Rigger #1 :	Rigger #2 :
Mech. 1st Line Supv. :	Mech. 1st Line Supv. Explanation :		
☐ – Critical Lift	Mech. 2nd Line Supv :		
☐ – Lift Over In-Service Equip. Req. if ≥ 85% load chart or ≥ 25 tons	Maintenance Manager :	Operations Manager :	

J.J. WHITE, INC. OPERATING ENGINEER
REQUIREMENTS AND EXPECTATIONS POLICY

I _____, as an employee of J. J. White, Inc. and an Operating Engineer, acknowledge that it is required of me to follow all proper crane procedures for each specific crane that I will be operating. It is also required that I am to inspect each piece of equipment that I will be operating daily and fill out completely a Pre-Use Inspection Checklist prior to the use of that piece of equipment. It is also required that a Crane Set-Up JSA and Pre-Check, General Operation Check List be completed for every job requiring a Crane prior to the start of that job.

My signature below is acknowledgment that I have read and understand these requirements :

SIGNED _____

SOCIAL SECURITY NUMBER (LAST 4) _____

DATE_____

JOB HAZARD ANALYSIS – 045

HEXAVALENT CHROMIUM (HEX CHROME)

KEY POINTS

- Hexavalent Chromium [Hex Chrome, Chromium VI, or Cr(VI)]- means chromium with a valence of positive six, in any form in any compound.

- No employee shall be exposed in excess of the permissible exposure level. This must be done by representing the employee's exposure without regard to the use of respiratory protection.

- Regulated areas should be clearly established where employees will be subject to exposures in excess of the PEL. This area shall be clearly marked and alert employees of the boundaries of the regulated area. Access shall be limited to only authorized personnel. Authorized personnel are anyone of the following : personnel required to work in this area, designated representative of employees for the purpose of exercising their right to observe monitoring procedures and anyone as seen fit by OSHA.

- When feasible, engineering controls will be utilized to reduce or maintain exposures to Cr(VI) to at or below the PEL. The engineering controls will be used to achieve the lowest levels as possible. If the lowest level possible are not at or below the PEL then Respiratory Protection must be used.

  ROTATING EMPLOYEES TO DIFFERENT JOBS/DUTIES TO ACHIEVE AN ACCEPTABLE PEL IS NOT PERMITTED.

- Each employee must be trained in the program and be able to display knowledge of the following but not limited to : general contents of this JHA, description of the medical surveillance requirements, and a copy of this section shall also be provided to each of the affected employees.

JOB HAZARD ANALYSIS – 045

HEXAVALENT CHROMIUM (HEX CHROME)

PURPOSE :	This safety procedure contains guidelines for Hexavalent Chromium [Cr(VI)]. It is intended as a statement of good practice and should be used as a source of information to establish a procedure to eliminate the potential for occupational exposure to Cr(VI) while performing work activities.
JOB HAZARD :	Personal exposure resulting from improper use or control of Cr(VI). Cr(VI) has significant health risks both acute and chronic such as lung cancer, kidney damage, rhinitis, nosebleeds, pulmonary edema, and asthma.
PROTECTIVE EQUIPMENT :	As specified.
SCOPE :	Extreme care must be used when working with or around Cr(VI). Sampling, monitoring, controls, and overall awareness must be addressed with employees working with and employees potentially exposed to Cr(VI). This procedure applies to all employees who are working with, or have the potential to be exposed to Cr(VI) in a particular area at a level of 2.5 µg/m^3 for an 8 hour time weighted average (TWA).
REFERENCES :	OSHA Standard 29 CFR 1910.1026; 29 CFR 1910.141; 29 CFR 1910.1200; 29 CFR 1910.1020; JHA-016.

A. Definitions.

1. Action Level- means a concentration of airborne chromium (VI) of 2.5 micrograms per cubic meter of air (2.5 µg/m^3) calculated as an 8- hour time weighted average (TWA).

2. Hexavalent Chromium [Hex Chrome, Chromium VI, or Cr(VI)]- means chromium with a valence of positive six, in any form in any compound.

3. Emergency- means any occurrence that results, or is likely to result, in an uncontrolled release of chromium (VI). If an incidental release of chromium (VI) can be controlled at the time of release by employees in the immediate release area, or by maintenance personnel, it is not an emergency.

4. Employee exposure - means the exposure to airborne chromium (VI) that would occur if the employee were not using a respirator.

5. Historical monitoring data - means data from chromium (VI) monitoring conducted prior to May 30, 2006, obtained during work operations conducted under workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

6. Objective data- means information such as air monitoring data from industry-wide surveys or calculations based on the composition or chemical and physical properties of a substance demonstrating the employee exposure to chromium (VI) associated with a particular product or material or a specific process, operation, or activity. The data must reflect workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

7. Regulated area- means an area, demarcated by the employer, where an employee's exposure to airborne concentrations of chromium (VI) exceeds, or can reasonably be expected to exceed, the PEL.

8. Permissible exposure limit (PEL)- The employer shall ensure that no employee is exposed to an airborne concentration of chromium (VI) in excess of 5 micrograms per cubic meter of air (5 $\mu g/m^3$), calculated as an 8-hour time-weighted average (TWA).

B. Exposure Determination & Monitoring.

1. In accordance with 1910.1026 (d)(3); the 8- hour TWA exposure for each employee will be determined by the Performance-oriented option. We must determine the exposure on the basis of any combination of the following air monitoring data, historical monitoring data, or objective data sufficient to accurately characterize employee exposure.

   NO EMPLOYEE SHALL BE EXPOSED IN EXCESS OF THE PERMISSIBLE EXPOSURE LEVEL. THIS MUST BE DONE BY REPRESENTING THE EMPLOYEE'S EXPOSURE WITHOUT REGARD TO THE USE OF RESPIRATORY PROTECTION.

2. The company shall provide for monitoring or measuring of employee exposure. Periodic monitoring shall be conducted at least every 6 months if initial monitoring shows employee exposure. Air monitoring will be performed at the beginning of each job task. If exposure monitoring results indicate exposure is above the PEL, the company must include in written notification the corrective action being taken to reduce exposure to or below the PEL.

C. Employee Notification of Determination Results.

1. Where the employee exposure determination exceeds the PEL, within 15 working days the employer shall either post the results in an appropriate location or notify each of the affected employees in writing. Also, the corrective actions being taken to reduce the exposure to employees should be clearly displayed in writing.

D. Accuracy of Measurement.

1. Where air monitoring is performed we shall use a method of monitoring and analysis that can measure chromium (VI) to within an accuracy of plus or minus 25 percent ($^{+}/_{-}$ 25%) and can produce accurate measurements that are within a statistical confidence level of 95 percent of airborne concentrations at or above the action level.

E. Observation of Monitoring.

1. When air monitoring is being performed employees that are affected are permitted to observe the monitoring. Also, if any employee wishes to observe monitoring in an area that requires protective clothing, or other controls, that clothing or those controls must be made available to the requesting employee.

F. Regulated Areas.

1. Regulated areas should be clearly established where employees will be subject to exposures in excess of the PEL. This area shall be clearly marked and alert employees of the boundaries of the regulated area. Access shall be limited to only authorized personnel. Authorized personnel are anyone of the following : personnel required to work in this area, designated representative of employees for the purpose of exercising their right to observe monitoring procedures and anyone as seen fit by OSHA.

G. Methods of Compliance.

1. Engineering and Workplace Practice Controls.

a. When feasible, engineering controls will be utilized to reduce or maintain exposures to Cr(VI) to at or below the PEL. The engineering controls will be used to achieve the lowest levels as possible. If the lowest level possible are not at or below the PEL then Respiratory Protection must be used.

ROTATING EMPLOYEES TO DIFFERENT JOBS/DUTIES TO ACHIEVE AN ACCEPTABLE PEL IS NOT PERMITTED.

2. Respiratory Problems.

   a. Respiratory Protection will be provided to our employees as needed per this procedure and our Respiratory Protection Program. Respiratory protection will be required under the following conditions when monitoring results are at or above the PEL, engineering controls are not feasible, where engineering controls are feasible but not sufficient and emergencies.

3. Protective Work Clothing & Equipment.

   a. Protective work clothing and equipment shall be worn in accordance with JHA-016 on Welding and Burning, which addresses proper P.P.E. to eliminate burns from hot metal splatter, covering hands and protection from ultraviolet rays. P.P.E. will be supplied at no cost!

4. Cleaning & Replacement.

   a. When contamination of protective work clothing has occurred the clothing will be replaced and new clothing will be issued to the employees. The safety department along with an industrial hygienist will notify supervision if this will be necessary.

5. Hygiene Areas & Practice.

   a. Facilities will be made available to employees in accordance with 29 CFR 1910.141, if necessary. Change rooms will be made available to prevent cross-contamination and washing facilities will be made available for the employees to utilize when necessary. If Cr(VI) comes in contact with an employee's skin they will be required to wash up thoroughly. Employees will not be permitted to eat and drink, after working with or on Cr(VI) without first washing up.

6. Housekeeping & Cleaning Methods.

   a. When working with or cleaning up after working with Cr(VI) facilities must be kept free of unnecessary accumulations, spills and releases should be contained and those materials discarded appropriately, HEPA filters shall be utilized when possible and when practical, compressed air isn't allowed to clean surfaces and cleaning equipment must eliminate reentrance of Cr(VI).

7. Disposal.

   a. All waste, scrap, debris and other contaminated materials shall be disposed of in impermeable bags or other impermeable containers in

accordance with the hazard communication standard 29 CFR 1910.1200.

8. Medical Surveillance.

   a. Medical Surveillance will be made available, at no cost to the employee, for any employee who is or may be exposed to Cr(VI), any employee experiencing signs and symptoms associated with Cr(VI) and any employee exposed in the course of an emergency.

   b. The surveillance will take place within 30 days of the initial assignment, unless they have had a similar examination that meets these requirements within the last twelve months. After the initial, annual testing must be performed. If any employee has a medical evaluation and a PLHCP recommends additional testing, this testing must be completed within 30 days of the recommendation. If any employee, at any time, feels any signs or symptoms post the initial test, the employee should be tested. If an employee is involved in an emergency and exposed to Cr(VI) they must be tested within 30 days.

   c. The Medical Examination shall consist of the contents listed in 29 CFR 1910.1026 (k)(3)(4)(5). All relevant information will be forwarded onto the PLHCP for review and consideration as part of the medical exam.

Stainless Steel & Chrome Alloy

	Respiratory Protection	**Engineering Controls/ Ventilation**	**Protective Work Clothing**	**Type of Area**
Welding/Grinding/ Gauging (outdoors/tents)	Half Mask-P-100 Cartridge	TBD	Basic	Non-regulated
Welding/ Grinding/Gauging (Confined Spaces 1)	Half Mask-P-100 Cartridge	Forced air ventilation	Basic	Regulated
Welding/Grinding/ Gauging (Confined Spaces 2)	Full face-Fresh Air Supplied	No Ventilation	Basic	Regulated

Preserved Wood, Pressure Treated Lumber

	Respiratory Protection	Engineering Controls/ Ventilation	Protective Work Clothing	Type of Area
"Extensive" Cutting and Grinding	Half Mask- P-100 Cartridge	TBD	Basic	TBD
"Extensive" Sanding	Half Mask- P-100 Cartridge	TBD	Basic	TBD

Paints and Coatings

These activities will be evaluated by an Industrial Hygienist. Please consult the J. J. White, Inc. Safety Department.

H. Employee Information & Training.

1. Training must take place at the initial time of hire. Each employee must be trained in the program and be able to display knowledge of the following but not limited to; general contents of this section, description of the medical surveillance requirements and a copy of this section shall also be provided to each of the affected employees. Training must be understandable and ensure each employee can demonstrate knowledge of the health hazards associated with Hexavalent chromium exposure; location, manner of use, and release of chromium in the workplace; engineering controls and work practice controls; purpose, proper selection, fitting, proper use and limitations of respirators and protective clothing; Emergency procedures; measures employees can take to protect themselves from exposure; purpose and description of medical surveillance program; contents of the standard. Copies will be readily available without cost to all affected employees. Training shall be documented.

I. Record Keeping.

1. Air Monitoring Data.

a. Air monitoring data must be maintained accurately to demonstrate compliance with the requirement set forth in this section. The air monitoring record shall at a minimum include date of measurement, operation involved in exposure and monitoring, sampling and analytical methods used and evidence of their accuracy, numbers demonstrating duration and results taken, type of PPE worn at the time, employee names, SSN's, job classifications of those involved. These exposure records will be maintained and made available in accordance with 29 CFR 1910.1200.

2. Historical Monitoring Data.

   a. When historical data is relied on to determine exposure this information shall be maintained accurately. The data collected shall include the following, data collection methods that meet accuracy requirements, documented processes being performed at the time of sampling, characteristics of the Cr(VI) containing material, environmental conditions, other relevant information. Also, historical exposure records shall be kept in accordance with 29 CFR 1910.1020.

3. Objective Data

   a. When objective data is relied on to determine exposure this information shall be maintained accurately. The data collected shall include the following, description of the Cr(VI) containing material, source of objective data, testing protocol including the results and analysis method, description of the process, other relevant data. Also, objective exposure records shall be kept in accordance with 29 CFR 1910.1020.

4. Medical Surveillance.

   a. Medical surveillance records will contain the following, Name and SSN, PLHCP's written medical opinion and any other personal information they can provide. Also, medical surveillance records shall be kept in accordance with 29 CFR 1910.1020.

JOB HAZARD ANALYSIS – 046

BICYCLE USAGE

KEY POINTS

- Bicyclists must comply with all vehicle signs and traffic rules.
- Bicycles must be ridden on approved roadways and parking lots. These are locations where vehicles are allowed to be ridden without a work permit.
- Bicycles should be ridden on the right side of the road – with the flow of traffic – unless it is unsafe to do so or the facility has a different requirement (designated bike lane, etc.)
- Items carried on a bicycle must be placed in a basket or attached container / carrier. The load must always be balanced.
- Always assume that others don't see you.
- Avoid vehicles that are slowing or turning, entering the road or your lane ahead of you, or coming up behind you.
- Watch for doors opening from parked vehicles.
- Watch for pedestrians stepping out into your path of travel.
- Allow room for safe maneuvering and braking when road conditions are wet. Since wet weather impairs traction, braking, and visibility for the bicyclist and other vehicles sharing the road. Use of a bicycle while it is raining is prohibited.
- Be prepared to yield, even if you have the right of way.
- Never assume that operators of other vehicles understand your intention. Use the appropriate hand signals to turn and stop.
- The bicyclist must make certain that he / she is familiar with the pedal brakes on the bicycle.

JOB HAZARD ANALYSIS – 046 BICYCLE USAGE	
PURPOSE :	This JHA specifies provisions for safe operation, inspection, and maintenance of bicycles used for refinery related travel.
JOB HAZARD :	Injuries from falls, collisions with objects, and rotating parts.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Bicycle Helmet
SCOPE :	Applies to all employees who ride bicycles on J. J. White, Inc. project sites. Only bicycles that meet the requirements of Section 1 are permitted to be used in the facilities. Where this JHA uses the term "bicycle", it encompasses "tricycles" as well.
REFERENCES :	N/A.

PROCEDURE:

A. Definitions.

1. Bicycle – A vehicle consisting of a light frame, mounted on (2) wire-spoke wheels, (1) behind the other, and having a seat, handlebars for steering, brakes, and (2) pedals by which it is driven.

2. Tricycle – A vehicle consisting of a light frame, mounted on (3) wire-spoke wheels, (1) in front and (2) behind, and having a seat, handlebars for steering, brakes, and (2) pedals by which it is driven.

3. Chain – A connected, flexible series of links, typically of metal, used especially for holding objects together, or restraining, or for transmitting mechanical power.

4. Cranks- A device for transmitting rotary motion, consisting of a handle or arm attached at right angles to a shaft.

5. Chain Guard – A device or an attachment that prevents injury, damage, or loss, especially an attachment or a covering put on a machine to protect the operator or a part of the machine.

6. Fender – A barrier that surrounds part of the wheels of a bicycle to block splashing water or mud and flying debris.

B. General Requirements.

1. Operators of bicycles must operate their bicycle in a safe manner at all times.

2. Defective bicycles must be taken out of service or locked until repairs are made.

C. Responsibilities.

1. Bicycle Owner – The person who is named in the J. J. White, Inc. Safety database of bicycles as the contact or owner of the bicycle. There may be multiple users of the bicycle but there should only be on owner of the bicycle. Responsible to ensure inspections are done for the bicycle.

2. Bicycle Operators / Users – Responsible for the safe, legal, non-abusive operation of the bicycle. Operators must ride defensively at all times.

3. Safety Department / Tool Room – Responsible for purchasing approved bicycles, putting bicycles into a database with an owner's name for each bicycle, tracking compliance of bicycle inspections, performing annual inspections, performing or coordinating repairs, supplying inspection stickers, and generating reports of bicycle inspections.

D. Procedure.

1. Purchase of bicycles.

a. When an employee has a need for a new bicycle, it must be purchased through the Safety Department or designated Tool Room. A bicycle purchase requires written approval by the supervisor of the individual requesting the bicycle. All bicycles within any facility must include the following :

i) Single-speed utility bicycle or a single-speed industrial grade (heavy duty) bicycle.

ii) Chain guard.

iii) Front & Rear fenders.

iv) Pedal brakes.

v) Secure seat.

vi) Reflectors on front, back, and each side. Attachments must be standard attachments and there are no homemade attachments which could negatively affect the safety or operation of the bicycle.

2. Maintenance and Inspection.

a. Bicycles must be properly maintained.

b. The Safety Department will maintain a log of all bicycles in each facility and the owner of the bicycles. The Safety Department will label each bicycle with an identification number

c. Each bicycle must pass an inspection by the user of the bicycle prior to every use. This pre-use inspection does not need to be documented. The following items must be checked.

i) Tires are in good condition and adequately inflated. Wheels must be securely attached to the frame and forks.

ii) Seat is securely attached. Movement up and down, side-to-side, within the attachment, must not be possible. The seat post must be inserted far enough into the frame to be firmly anchored by the set bolt or seat locking device.

iii) Handlebars are securely attached. Check in all directions (side to side, up, and down). The handlebar should not move within the neck clamp and the neck should be secured so that it moves in line with the front forks. Handlebars are in proper alignment.

iv) Pedals are in good condition.

v) Brakes are operational. Check the pedal brake by spinning the wheel and applying the brake, or riding slowly and testing the brake.

vi) Chain is operating properly. The chain should be lightly lubricated and riding tightly on the front and rear sprockets. Do not over-lubricate the chain since this will increase the likelihood of debris sticking to the chain.

vii) Chain guard is in place.

viii) There are no loose or damaged parts on the bicycle. To do this, lift the front wheel off the ground a few inches, and then let the

bicycle bounce on the ground. Note any sound, feel, or part that appears loose. Tighten loose parts before riding.

ix) Assure that the frame is not cracked or broken.

x) Assure hand grips are securely connected to the handlebars and / or frame.

xi) Assure the seat and handlebars are adjusted to the rider. The rider should be able to reach the handle bars while sitting and placing one foot on the ground.

xii) Fenders are in place and in good condition.

xiii) Reflectors are in place on the front, back, and each side, and are in good condition.

xiv) There are no homemade attachments which could affect the safety or operation of the bicycle (i.e. a coffee mug holder inside an approved basket is acceptable as long as it does not affect the safety or operation of the bicycle.

d. If a problem is noted, the bicycle must be tagged out of service. It should be taken to the Tool Room or locked p until the issue is resolved or the bicycle is disposed of.

e. On a quarterly basis, each bicycle must be inspected by the owner or user of the bicycle using the Bicycle Inspection Checklist.

f. This completed quarterly inspection checklist must be taken to the Safety Department by the owner or user of the bicycle and turned in to the Safety Department within 15 days of the end of the quarter.

g. The Safety Department personnel will document the quarterly inspection in their database.

h. The Safety Department personnel will forward the completed quarterly inspection forms to the Corporate Safety Director for records retention.

i. Once a year, each bicycle must be taken to the Safety Department for an annual inspection. The Safety Department personnel will perform an inspection of the bicycle and place an annual inspection sticker on the bicycle.

j. The Safety Department personnel will forward the completed annual inspection forms to the Corporate Safety Director for records retention.

k. Repairs to the bicycle must be done by someone who is capable and qualified of making the repair. Some repairs will be able to be made by the user, but others will require a trained bicycle repair person. The Safety Department will coordinate any of these repairs with their personnel or an outside vendor

3. Safe Use of Bicycles – The following requirements must be followed when riding bicycles within facilities.

a. Pre-Use – Each bicycle must be inspected before each use by the user to ensure it is safe to be ridden by following the requirements in Section 2 of this standard.

b. During Use – The following Requirements must be followed during use of bicycles within facilities :

i) Bicyclists must wear a J. J. White, Inc. issued hard hat.

ii) Bicyclists must comply with all vehicle signs and traffic rules.

iii) Bicycles must be ridden on approved roadways and parking lots. These are locations where vehicles are allowed to be ridden without a work permit.

iv) Bicycles should be ridden on the right side of the road – with the flow of traffic – unless it is unsafe to do so or the facility has a different requirement (designated bike lane, etc.)

v) Bicycles are permitted to be in either direction on one-way streets.

vi) Items carried on a bicycle must be placed in a basket or attached container / carrier. The load must always be balanced.

vii) Always assume that others don't see you.

viii) Avoid vehicles that are slowing or turning, entering the road or your lane ahead of you, or coming up behind you.

ix) Watch for doors opening from parked vehicles.

x) Watch for pedestrians stepping out into your path of travel.

xi) Allow room for safe maneuvering and braking when road conditions are wet. Since wet weather impairs traction, braking,

and visibility for the bicyclist and other vehicles sharing the road. Use of a bicycle while it is raining is prohibited.

xii) Be prepared to yield, even if you have the right of way.

xiii) Never assume that operators of other vehicles understand your intention. Use the appropriate hand signals to turn and stop.

To make a turn, extend the arm in that direction horizontally or extend the opposite arm upward (i.e. turn left, extend the left arm horizontally to the left or extend the right arm upward.

xiv) The bicyclist must make certain that he / she is familiar with the pedal brakes on the bicycle.

c. Bicycle incidents or near-misses must be immediately reported to a supervisor.

d. In order to ride bicycles over sewer gratings, railroad tracks, expansion joints, or other obstructions, you must be able to pass over the object in a perpendicular motion; when in doubt, dismount and walk it out.

e. Prohibited Actions – The following actions must never occur when riding bicycles within the facilities :

i) Don't ride bicycles in dark locations without the proper lighting.

ii) Don't ride a bicycle inside a building.

iii) Don't ride bicycles when snow and / o rice are present on traveling surfaces.

iv) Don't ride bicycles between sunset and sunrise.

v) Don't ride bicycles over rough or soft surfaces (i.e. large rocks, pot holes, soft gravel, soft sand, mud, grassy areas).

vi) Don't ride bicycles in areas where there are obstructions that can hit he rider or the bicycle.

vii) Don't ride bicycles up, down, or alongside steep embankments, such as firebanks.

viii) Don't ride bicycles on sidewalks.

ix) Don't ride bicycles through operating units (valve chain hazard).

x) Don’t ride personal bicycles within the facility.

xi) Don’t use headphones while riding.

xii) Don’t wear clothing or transport objects which could be caught in moving parts.

xiii) Don’t transport articles which obstruct vision or which interfere with the balance or operation of the bicycle.

xiv) Don’t carry objects in your hand(s) while operating a bicycle.

xv) Don’t operate or talk on cell phones while using a bicycle.

xvi) Don’t carry passengers on bicycles that were not designed for carrying passengers.

xvii) Employees who are not familiar with bicycle operations, or suffer from physical impairments or conditions which could affect balance shall not operated bicycles.

f. Post-Use - After riding a bicycle, you must do the following items :

i) Properly park or store the bicycle in bicycle racks or out of common walkways.

ii) Do not lay bicycles flat on the ground sine they can become trip hazards.

iii) If a bicycle is found to have a deficiency, lock it up and tag it out-of-service so no one else rides it, have it repaired or replaced.

JOB HAZARD ANALYSIS – 047

PAINTERS

KEY POINTS

- Select proper P.P.E including respiratory protection if applicable.
- Ensure ventilation is adequate before application of paint/coatings.
- Store paint properly so not to obstruct stair, exits, or safety and fire protection.
- **NEVER** paint or use solvents, solvent-based paints, strippers, stains, caulking or clean-up supplies near an ignition source, open flame or pilot light including furnace, and water heater.
- When working with flammable paints, keep all ignition sources at least 35’ away from work-site.
- Install “Wet Paint” signs in freshly painted areas.
- When working on aerial work platforms, all persons must be trained & demonstrate proficiency in operation of equipment. (JHA-006, JHA-010).
- Consult with your supervisor and or safety coordinator when you are uncertain regarding Environmental, Health and or Safety issues/procedures.

JOB HAZARD ANALYSIS – 047

PAINTERS

PURPOSE :	Proper procedure for painters.
JOB HAZARD :	Constant paint and chemical contact, lead exposure, potential vapor inhalation, constant heavy lifting / climbing. Potential electrical shock, improper use of ladders and scaffolding, poor weather conditions, trips, slips, and falls.
PROTECTIVE EQUIPMENT :	Basic P.P.E., additional as required.
SCOPE :	All persons involved with the use of paint / coatings must review all pertinent Safety Data Sheets and obtain appropriate P.P.E. prior to requesting work permits.
REFERENCES :	JHA-005 (Fall Protection), JHA-009 (Manlifts)

PROCEDURE:

A. Preparation and Use.

1. Review Safety Data Sheets prior to starting work.
2. Select proper P.P.E including respiratory protection if applicable.
3. Ensure ventilation is adequate before application of paint/coatings.
4. Test the substance to determine that it does not contain lead.
5. Lay out sheeting under work area to contain paint and or scrapings.
6. Store paint properly so not to obstruct stair, exits, or safety and fire protection.
7. **NEVER** paint or use solvents, solvent-based paints, strippers, stains, caulking or clean-up supplies near an ignition source, open flame or pilot light including furnace, and water heater.
8. When working with flammable paints, keep all ignition sources at least 35’ away from work-site.
9. Dispose of all solvent soiled rags in proper waste containers, in a well-ventilated area and away from other flammable products.

10. Dispose of all paint and related debris in containers provided for this purpose. For proper disposal, consult your supervisor.

11. Install “Wet Paint” signs in freshly painted areas.

12. Clean up paint spills immediately and render affected area off limits to others until clean-up is complete.

13. When working on aerial work platforms, all persons must be trained & demonstrate proficiency in operation of equipment. (JHA-006, JHA-010).

14. Use ladders & scaffold properly.

15. Use fall protection systems and or fall arrest PPE when working at elevated heights that are 6’ or more above a lower level or grade level.

16. Consult with your supervisor and or safety coordinator when you are uncertain regarding Environmental, Health and or Safety issues/procedures.

JOB HAZARD ANALYSIS – 048

ELECTRICAL CABLE PULLING

KEY POINTS

- Competent Person – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them. The following J. J. White, Inc. electrical personnel are considered "Competent Persons" for cable pulling activities.
  - General Foreman.
  - Assistant General Foreman.
  - Electrical Planner / Scheduler.
  - Job Foreman.
  - Other Electrically Qualified Personnel Deemed Competent by the Electrical General Foreman.
- The J. J. White, Inc. Site Superintendent is responsible for ensuring that a defined, safe, and effective process is in place and that the process is effectively executed every time. The J. J. White, Inc. General Foreman is responsible for ensuring that the J. J. White, Inc. Job Planning Process is followed and the work is effectively executed.
- The J. J. White, Inc. Site Safety Representative is responsible for being available as a resource to ensure the safety of the work.
- The applicable J. J. White, Inc. Foreman is responsible for effectively and safely executing the work per defined Job Hazard Analysis outlined in this document.

JOB HAZARD ANALYSIS – 048 **ELECTRICAL CABLE PULLING**	
PURPOSE :	To define a safe, efficient, and effective electrical cable pulling process to meet the needs of our clients.
JOB HAZARD :	Material handling, defective anchorage points, elevated surfaces, confined spaces, hazardous energy, moving / rotating equipment, and process chemicals.
PROTECTIVE EQUIPMENT :	Basic P.P.E. and gloves.
SCOPE :	This process applies to all refinery electrical cable pulling activities.
REFERENCES :	N/A.

PROCEDURE:

A. Definitions.

1. Competent Person – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them. The following J. J. White, Inc. electrical personnel are considered "Competent Persons" for cable pulling activities.

   a. General Foreman.

   b. Assistant General Foreman.

   c. Electrical Planner / Scheduler.

   d. Job Foreman.

   e. Other Electrically Qualified Personnel Deemed Competent by the Electrical General Foreman.

2. Conductor Grips – A device that affixes the cable to the pulling rope.

3. Management of Change – Written procedure to manage changes (except for "replacements in kind") in order to process chemicals, technology, equipment, procedures, and changes to facilities that affect a covered process.

4. Materials of Contruction – Materials of construction include complying with the clients' designs to ensure that the equipment complies with recognized and generally accepted good engineer practices. Tools that must be referenced to ensure compliance include : piping and instrument diagrams, electrical classification and rating for locations, relief system design and design basis, ventilation system design, and design codes and standards employed.

5. Qualified Person – One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved.

6. Tension – the force that is exerted on the cable as it is pulled through the system. Tension on the tugger shall be carefully monitored to prevent an unplanned event from occurring that could damage the cable or injure an employee.

B. Responsibilities.

1. The J. J. White, Inc. Site Superintendent is responsible for ensuring that a defined, safe, and effective process is in place and that the process is effectively executed every time. The J. J. White, Inc. General Foreman is responsible for ensuring that the J. J. White, Inc. Job Planning Process is followed and the work is effectively executed.

2. The J. J. White, Inc. Site Safety Representative is responsible for being available as a resource to ensure the safety of the work.

3. The applicable J. J. White, Inc. Foreman is responsible for effectively and safely executing the work per defined Job Hazard Analysis outlined in this document.

☑	Job Steps	Responsible Person(s)	Recognized Hazards	Layers of Protection & Instructions
	Job Prep			
	1. Review Scope of Work	General Foreman Job Foreman		
	2. Verify Materials of Construction Comply with PSM Requirements	General Foreman Job Foreman	a. Explosive Vapors & Gasses b. Flammable & Combustible Liquids c. Explosive Dust	a. Materials of Construction Requirements b. Electrical Classifications c. Management of Change d. Process Hazard Analysis e. Pre-startup Safety Review
	3. Verify Trained/Qualified Workers	General Foreman		
	4. Conduct Pre-Job Meeting to review scope of work	General Foreman, Job Foreman, & Crew		
	5. Determine Pulling Method (includes, but not limited to: a) Manual/Hand Pulling; b) Electric Tugger; c) Line Truck)	Job Foreman & Crew		
	6. Determine Crewing Needs - Determine sufficient manpower needs for the type of installation; consider: a) wire type; b) environment; length of run; c) pulling method	General Foreman Job Foreman		
	7. Determine Tool Needs (includes, but is not limited to: a) Ropes; b) Blocks; c) Sheaves	Job Foreman & Crew	Dropped Load Line of Fire	Follow Cable Manufacturer's guidelines for rigging and pulling

	8. Determine rigging needs	Job Foreman & Crew	Falling Objects & Damaged Infrastructure	Ensure appropriate anchorage points for installing rigging. Appropriate anchorage points include but are not limited to Structural Steel and Utility Poles. **Anchorage to process piping is permitted when cable pulling calculations are approved by a Qualified and Competent Person.**
	9. Determine an unobstructed route for installation	Job Foreman & Crew		Consider: a) Clear Conduit; b) Cable Tray; c) Free Air
	10. Review Scope of Work	General Foreman Job Foreman		
	11. Verify Materials of Construction Comply with PSM Requirements	General Foreman Job Foreman	d. Explosive Vapors & Gasses e. Flammable & Combustible Liquids f. Explosive Dust	f. Materials of Construction Requirements g. Electrical Classifications h. Management of Change i. Process Hazard Analysis j. Pre-startup Safety Review
	12. Verify Trained/Qualified Workers	General Foreman		
	13. Conduct Pre-Job Meeting to review scope of work	General Foreman, Job Foreman, & Crew		

	14. Determine Pulling Method (includes, but not limited to: a) Manual/Hand Pulling; b) Electric Tugger; c) Line Truck)	Job Foreman & Crew		
	15. Determine Crewing Needs - Determine sufficient manpower needs for the type of installation; consider: a) wire type; b) environment; length of run; c) pulling method	General Foreman Job Foreman		
	16. Determine Tool Needs (includes, but is not limited to: a) Ropes; b) Blocks; c) Sheaves	Job Foreman & Crew	Dropped Load Line of Fire	Follow Cable Manufacturer's guidelines for rigging and pulling
	17. Determine rigging needs	Job Foreman & Crew	Falling Objects & Damaged Infrastructure	Ensure appropriate anchorage points for installing rigging. Appropriate anchorage points include but are not limited to Structural Steel and Utility Poles. **Anchorage to process piping is permitted when cable pulling calculations are approved by a Qualified and Competent Person.**
	18. Determine an unobstructed route for installation	Job Foreman & Crew		Consider: a) Clear Conduit; b) Cable Tray; c) Free Air

JOB HAZARD ANALYSIS – 049

ERGONOMICS PROCESS

KEY POINTS

- Ergonomics is the study of workplace design and the physical and psychological impact it has on workers. Ergonomics is about the fit between people, their work activities, equipment, work systems, and environment to ensure that workplaces are safe, comfortable, efficient, and that productivity is not compromised. Employees will be trained to manage ergonomic risk through a defined process of recognition, evaluation, and prescriptive control and training.

- Mechanical lifting devices / tools shall be used when lifting more than 50lbs at any one time.

- Planned Work – The Superintendent shall work with the Craft General Foreman during the mobilization period to determine the needs and plan for safe and effective performance. If equipment is needed to perform the work, a safe method must be planned to transport it to the work site. If manual lifting is required to handle materials, planning shall include a review of and compliance with the ergonomic standards. If vibrating tools are being used, such as pneumatic tools, jackhammers, concrete vibrators, etc., planning should include a review and compliance with the ergonomic standards.

- Emergency Work – In the planning stage for emergency work, the Craft General Foreman shall determine the needs and plan for safe and effective performance. If equipment is needed to perform the work, a safe method must be planned to transport it to the work site. If manual lifting is required to handle materials, planning shall include review of and compliance with the ergonomic standards. If vibrating tools are being used, such as pneumatic tools, jackhammers, concrete vibrators, etc., planning shall include a review of and compliance with the ergonomic standards.

JOB HAZARD ANALYSIS – 049 ERGONOMICS PROCESS	
PURPOSE :	To define J. J. White, Inc.'s policy and expectations for eliminating the risk associated with ergonomic hazards.
JOB HAZARD :	Improper manual lifting, awkward postures, repetition, contact stress and vibration can be root causes for many types of injuries and occupational illness.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Ergonomics is the study of workplace design and the physical and psychological impact it has on workers. Ergonomics is about the fit between people, their work activities, equipment, work systems, and environment to ensure that workplaces are safe, comfortable, efficient, and that productivity is not compromised. Employees will be trained to manage ergonomic risk through a defined process of recognition, evaluation, and prescriptive control and training.
REFERENCES :	N/A.

PROCEDURE:

A. Responsibilities.

1. Site Superintendent – Responsible for ensuring that proper ergonomic methods are considered, planned, and incorporated on every applicable task.

2. Planning Resource – responsible for planning the work and identifying the necessary tools to eliminate ergonomic risks for each planned job.

3. General Foreman – responsible for recognizing, evaluating, and controlling ergonomic risks by prescribing he proper safe procedures through the JSA and ensuring the procedures are followed.

4. Site Safety Representative – responsible for being the site resource to ensure that this process meets J. J. White, Inc.'s corporate objective.

B. Objective.

1. Process.

a. Planned Work – The Superintendent shall work with the Craft General Foreman during the mobilization period to determine the needs and plan

for safe and effective performance. If equipment is needed to perform the work, a safe method must be planned to transport it to the work site. If manual lifting is required to handle materials, planning shall include a review of and compliance with the ergonomic standards. If vibrating tools are being used, such as pneumatic tools, jackhammers, concrete vibrators, etc., planning should include a review and compliance with the ergonomic standards.

b. Emergency Work – In the planning stage for emergency work, the Craft General Foreman shall determine the needs and plan for safe and effective performance. If equipment is needed to perform the work, a safe method must be planned to transport it to the work site. If manual lifting is required to handle materials, planning shall include review of and compliance with the ergonomic standards. If vibrating tools are being used, such as pneumatic tools, jackhammers, concrete vibrators, etc., planning shall include a review of and compliance with the ergonomic standards.

C. J. J. White, Inc. Ergonomic Standards.

1. Managing Force – Mechanical lifting devices / tools shall be used when any of the following conditions exist :

   a. Lifting more than 50 lbs. at any one time.

2. Manual Material Handling General Safety Practices.

   a. Employees shall always use a mechanical lifting device for lifting purposes when loads and / or conditions outlined in the Manual Lifting Standards are exceeded. If the object is inaccessible to a lifting device or it is large, awkward, or too heavy, employees shall contact their Foreman and request help. When manually lifting any item, regardless of its weight, employees shall always use proper lifting techniques which include :

      i) Wear Gloves and other Personal Protective Equipment that is required for the area.

      ii) Know the destination of the lift.

      iii) Ensure that you have firm footing. Ensure that you have a clear path to your destination.

      iv) Face the intended load.

      v) Place feet shoulder width apart.

vi) Keep back straight.

vii) Bend knees.

viii) Squat down.

ix) Firmly grasp the object.

x) Pull object as close to your body as possible. Always keep the object as close to your body as possible to minimize hazardous forces on your body.

xi) Lift with legs. When lifting with more than one person, use a three count.

xii) When turning, step in the direction of the turn and never twist.

xiii) When setting the object down, place feet shoulder width apart.

xiv) Keep back straight.

xv) Bend knees.

xvi) Squat down.

xvii) Set down object.

b. If at any time you lose control of the object, step back, and let it fall to the floor.

JOB HAZARD ANALYSIS – 050

WORKING AROUND HEAVY EQUIPMENT

KEY POINTS

- Never take for granted that equipment operators see you.
- Swinging counterweights often create dangerous pinch-points. Avoid areas where one could be caught between counterweights and a fixed object.
- Never walk alongside moving equipment. Keep clear in case the unit suddenly turns your way, or slides, or the load shifts.
- Stay out from under loads on cranes or hoists. Use established walkways and beware of shortcuts.
- Red danger tape shall be used to barricade when a skid steer will be operated in order to keep unauthorized, untrained personnel out of the area.
- Always assume the operator cannot see you. Make visual eye contact and wait for a signal to confirm you are seen.
- It is your responsibility to work safely around heavy operating equipment. Be observant and aware of adjoining work to avoid conflict or problems.

JOB HAZARD ANALYSIS – 050

WORKING AROUND HEAVY EQUIPMENT

PURPOSE :	Proper procedure for working in the vicinity of heavy equipment.
JOB HAZARD :	Injuries to employees from being struck by equipment or caught between equipment and a stationary object.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	This procedure covers the behavior and work practices in order to avoid being struck by or caught between heavy equipment.
REFERENCES :	JHA-009 (Manlifts), JHA-022 (Automotive & Heavy Equipment), JHA-044 (Mobile Cranes),

PROCEDURE:

A. When construction equipment is operating on a project, you must be aware of the environment around it and yourself. If both construction workers and equipment operators are aware of their surroundings, individuals will not get injured. The following are general rules for working safely around heavy equipment :

1. Never take for granted that equipment operators see you.

2. Never rely on hearing a horn or other warning signals – it might sometimes be lost in the general noise around a project.

3. Equipment shouldn't be backed without a ground guide / spotter to check the blind spots and give signals. Always stay clear and be visible to the operator whenever equipment is traveling backwards. This is when most equipment accidents occur.

4. Swinging counterweights often create dangerous pinch-points. Avoid areas where one could be caught between counterweights and a fixed object.

5. Never hitch a ride on the running board. Personnel may only utilize manufacturer's fixed seating.

6. No riding on top of loaded vehicles – the load may shift, or there may not be adequate over-head clearance in a tight spot.

7. When riding in a personnel transport vehicle, keep your arms, legs, and all parts of your body inside the unit and make sure your seat belt is fastened and secure.

8. Never walk alongside moving equipment. Keep clear in case the unit suddenly turns your way, or slides, or the load shifts.

9. Stay out from under loads on cranes or hoists. Use established walkways and beware of shortcuts.

10. If the boom of a unit ever contacts a power line, stay away from the frame of the unit and the load cables. The ground also has the potential to be energized close to the equipment.

11. Never lubricate, clean, or work on a machine that is in operation. Stop the machine. If you have to remove a guard, replace it as soon as work is completed.

12. Red danger tape shall be used to barricade when a skid steer will be operated in order to keep unauthorized, untrained personnel out of the area.

13. Always assume the operator cannot see you. Make visual eye contact and wait for a signal to confirm you are seen.

14. It is your responsibility to work safely around heavy operating equipment. Be observant and aware of adjoining work to avoid conflict or problems.

JOB HAZARD ANALYSIS – 051

ENTRY ONTO EXTERNAL STEEL FLOATING ROOFS

KEY POINTS

- J. J. White, Inc. will provide a properly calibrated continuous type atmospheric monitor and will be required to perform continuous monitoring. His or her monitor will be required to be on the roof and in use at all times when personnel are working on the roof.

- A minimum of (3) 33 lbs. type ABC and / or BC fire extinguishers will be required on site. One fire extinguisher will remain on the platform. One fire extinguisher will be located at the base of the primary entry and egress point. One fire extinguisher will be located near the workers on the roof.

- A high reach will be required as a secondary means of emergency escape. All personnel need to be qualified high reach operators. These means of egress will not be placed into position until after all atmospheric testing has been completed. All personnel will be instructed that the high reach is to be used in case of emergency only.

- All employees will have received the J. J. White, Inc. required confined space training as applicable to their specific assigned duties.

- When working on in-service projects, personnel must have a minimum of both Benzene and H2S hazard exposure training. Additional training may be required and must be addressed in the site specific work plan.

- Prior to the initial entry, all provisions outlined in the Emergency Rescue Plan must be in place.

- Established limits for oxygen content will be 19.5% - 23.5%. less than 19.5% of oxygen content will require supplied air respirators. Greater than 23.5% of oxygen content will require that the J. J. White, Inc. Superintendent and Facilities Safety Coordinator must be contacted before proceeding.

JOB HAZARD ANALYSIS – 051

ENTRY ONTO EXTERNAL STEEL FLOATING ROOFS

PURPOSE :	Entry onto steel floating roofs for the purpose of performing in-service type work. This JHA is not applicable for inspection type activities.
JOB HAZARD :	Chemical exposure due to pulling of vapor seal on in-service equipment. Elevated LEL levels due to product storage.
PROTECTIVE EQUIPMENT :	Basic P.P.E., leather work gloves, and other P.P.E. as per the work permit. Respiratory protection equipment, as specified by permit and atmospheric testing.
SCOPE :	This JHA addresses the entry onto external steel floating roofs for the purpose of performing in-service type Cold Work. This JHA is relevant to external steel floating roofs – internal aluminum and steel floating roofs are not addressed.
REFERENCES :	N/A.

A. Equipment.

1. Atmosphere Testing Equipment.

   a. J. J. White, Inc. will provide a properly calibrated continuous type atmospheric monitor and will be required to perform continuous monitoring. His or her monitor will be required to be on the roof and in use at all times when personnel are working on the roof.

   b. Depending on the type of product (toxics and flammability) being stored in the tank, other instrumentation may be required to read applicable toxics. This requirement will be addressed in the site specific safe work plan.

   c. Personal air sampling equipment such as personal monitors or organic vapor badges may be required or requested by the facility Safety Department to assist in the development of and / or to update medical exposure records.

2. Fire Extinguishers.

   a. A minimum of (3) 33 lbs. type ABC and / or BC fire extinguishers will be required on site. One fire extinguisher will remain on the platform. One fire extinguisher will be located at the base of the primary entry and

egress point. One fire extinguisher will be located near the workers on the roof.

3. Respiratory Protection.

   a. A minimum of (1) 5-minute SCBA escape pack / mask per person will be located at the primary entry point.

   b. Depending on the type of product stored in the tank, and the measured concentrations, air purification respirators may be required. This determination must be addressed on the site specific work plan.

   c. Supplied air may be required. This must be addressed on the site specific safe work plan. If supplied air is required it must be a Grade D or equivalent.

   d. The supplier of the breathing air must supply documentation that a qualification test has been performed and that the breathing air meets the standard for this grade.

   e. Prior to the start of the project, an Emergency Rescue Plan will be developed. This plan will address the requirement for the rescue equipment.

4. Secondary Egress.

   a. A high reach will be required as a secondary means of emergency escape. All personnel need to be qualified high reach operators. These means of egress will not be placed into position until after all atmospheric testing has been completed. All personnel will be instructed that the high reach is to be used in case of emergency only.

      CAUTION : ENSURE GROUND STABILITY PRIOR TO SETTING UP THE HIGH REACH IN ALL TANK DIKE AREAS.

5. Air Compressor.

   a. A diesel powered air compressor will be required if it will be operated within the firewall. The air compressor shall have a ground rod to the ground and a lead wire attached to the tank.

6. Pneumatic Tools.

   a. Pneumatic air or hand tools will be required for all work performed on the roof.

7. AFFF Foam.

   a. AFFF foam will be on site and used as a vapor barrier to control exposure to hazardous vapors and high LEL levels. See procedures for the Use of AFFF foam.

   b. Task Force Tips Foam-pack model #UM12 may be used. It is a portable multipurpose foam system with a built in inductor that can be set to desired mix ratio. It can also be used for straight water application without making changes to the pack. It comes with (3) quick-connect nozzles – low, medium, and high expansion. It is connected to a 1.5" fire hose.

B. Training.

   1. Confined Space Training.

      a. All employees will have received the J. J. White, Inc. required confined space training as applicable to their specific assigned duties.

   2. Chemical Exposure Training.

      a. When working on in-service projects, personnel must have a minimum of both Benzene and H2S hazard exposure training. Additional training may be required and must be addressed in the site specific work plan.

      b. All personnel performing in-service type work will be trained at a minimum for First Responders at the Awareness level in accordance with 1910.120.

   3. Emergency Rescue Training.

      a. Emergency rescue training will be determined by the Emergency Rescue Plan and will be addressed in a safe work plan.

C. Procedure.

   1. Pre-Job Instruction.

      a. Prior to the start of the project, a copy of the job scope, written construction plan, and the MSDS for the specific product stored in the tank will be reviewed by the On-Site Safety Coordinator or Superintendent, and a site specific safe work plan developed.

      b. A pre-job JSA meeting will be held with the Foreman, Work Crew, On-Site Safety Coordinator, and any related facility personnel. At a

minimum, the following items will be discussed in this meeting. Site specific information including emergency numbers, evacuation routes, emergency warning alarms, assembly areas, and any other pertinent customer facility policies. In addition, all personnel will review safe work plans, MSDA, and P.P.E. requirements for the project. This meeting will be documented on a JSA Card.

2. Pre-Job Inspection.

   a. Prior to the start, the Foreman will obtain the required permits from the Customer. The Foreman will complete the required permits per the Policies.

   b. A Confined Space Permit will be required. Due to the inability to isolate the product from the tank roof, limited means of entry and egress, and the potential for exposure to a hazardous atmosphere, and explosive vapors, the tank will remain as a Permit Required Confined Space.

   c. The Foreman and Customer Facility's Safety Representative will check the tank and verify that the following requirements are being met.

      i) Supplied air may be required as determined in the site specific safe work plan. It is common to enter onto external floating roofs that are within 4' of the top of the tank without the use of fresh are as this is a freely vented area exposed to atmospheric wind currents similar to a fixed roof. If allowed by the safe work plan, tank external floating roofs that are within 4' of the top of the tank may be entered upon without the use of respiratory equipment.

      ii) External pontoon floating roofs that are below 4' shall be evaluated on a case by case basis with regards to the use of respiratory equipment. Respiratory Equipment shall be used when the floating roof is lower than 4' from the top of the tank unless a site specific safe work plan signed b J. J. White, Inc. Safety Coordinator identifies that it is not required. For example, floating roofs on water that does not contain any products that could be dangerous, may not require the use of respiratory equipment.

      iii) Regardless of the contents of the tank, floating roof position, or the use of respiratory equipment, the work crew must utilize continuous atmospheric sampling while personnel are on the floating roof.

iv) The tank must be in a static condition, no movement of product will be allowed while any personnel are on the roof. If product movement has recently occurred, it is preferred that there be at least a 3-hour interval between the time product movement has stopped and the time personnel enter onto the roof. This recommended practice is to allow time for potential hazardous vapors to disburse.

v) All valves and electrical equipment must be locked out / tagged out. J. J. White, Inc. personnel may apply their company-furnished lock in addition to the locks installed by the facilities personnel.

vi) If the roof drain is piped into a drainage system, the drain valve must be locked while Company personnel are on the roof. This will prevent the possibility of any product from backing up onto the roof. It is imperative that the foreman re-opens the valve at the end of each shift.

3. Atmospheric Testing.

a. A qualified person who is trained in the use and calibration of the type of monitor they will be using must perform all atmospheric testing for oxygen, flammability (combustible gases or vapors) and toxic air contaminants.

b. The continuous monitor must be equipped to test the atmosphere for oxygen content, explosive vapors (lower explosive limits (LELs)), and applicable toxics. The initial testing will be completed by the Facility Representative and all readings will be documented on the entry permit.

c. Prior to the initial entry, all provisions outlined in the Emergency Rescue Plan must be in place.

d. Employee reading the instrumentation may be equipped with a 30-minute SCBA for emergency egress should the need arise.

e. Actual air sampling of the vapor space between the primary and secondary seal must be performed. This can be accomplished by pulling the secondary seal back and placing the sample draw tube between two seals. All pontoons will also need to be checked for leakage. If leakage is found, elimination of this hazard will be required.

f. After initial testing has been performed, additional results will be recorded on the permit.

g. Established limits for oxygen content will be 19.5% - 23.5%. less than 19.5% of oxygen content will require supplied air respirators. Greater than 23.5% of oxygen content will require that the J. J. White, Inc. Superintendent and Facilities Safety Coordinator must be contacted before proceeding.

h. If testing indicates LEL of 10% or greater than AFFF Foam will need to be applied to ensure <10% LEL's to prevent the possibility of explosive vapors being released into the work area atmosphere.

NOTE : NO WORK CAN TAKE PLACE UNTIL THE LEL READINGS ARE <10%. ALL UNNECESSARY PERSONNEL SHOULD EXIT THE ROOF UNTIL SAFE READINGS HAVE BEEN ESTABLISHED.

i. If testing indicates a presence of 5 parts per million (ppm) of H2S or more, supplied air respiratory protection will be required.

JOB HAZARD ANALYSIS – 052

SAFE USE OF ANGLE GRINDERS WITH WAFER CUTTING WHEELS

KEY POINTS

- In general, where a safer alternative cutting tool is available, or can be obtained, an angle grinder should not be used as a cutting tool. Alternative cutting methods may include, but are not limited to, the use of power band saws, drop type abrasive power saws, fret saws, hand-held reciprocating hacksaws, clamshell cutters, mechanical shears, specialist circular saws and blades designed for cutting sheet metal, oxyacetylene equipment, plasma cutters, etc.

- Double eye protection is mandatory when using a grinder with a wafer wheel – ensure face shields with an appropriate impact rating for the proposed hazard is worn with a minimum of Z87 rated safety glasses.

- If a grinder must be used, choose the right grinder for the job. Do not use a larger, heavier, or more powerful grinder than is necessary for the job as it is much easier to lose control of and get fatigued during use.

- Do not use a damaged accessory. Before each use inspect the accessories such as the wafer wheels for chips and cracks, backing pad for cracks, tears, or excess wear. If the power tool or accessory is dropped, inspect for damage or install an undamaged accessory. After inspecting and installing an accessory, position yourself and bystanders away from the plane of the rotating accessory and run the power tool at maximum non-load speed for one minute. Damaged accessories will normally break apart during this test time.

- Do not operate the power tool near flammable materials.

- Use special care when working corners, sharp edges, etc. Avoid bouncing and snagging the accessory. Corners, sharp edges, or bouncing have a tendency to snag the rotating accessory and cause loss of control or kickback.

- All reasonable efforts must be taken by both workers and supervisors to avoid the use of angle grinders with wafer wheels for cutting applications. To control the use of angle grinders with wafer wheels, the Site Superintendent of the work must grant approval after determining that there is not a practical alternative work method available. **Refer to Angle Grinder Cutting Wheel Pre-Plan** for approval.

JOB HAZARD ANALYSIS – 052

SAFE USE OF ANGLE GRINDERS WITH WAFER CUTTNG WHEELS

PURPOSE :	To define the requirements for the safe use of angle grinders with wafer cuttings wheels.
JOB HAZARD :	Flying objects, rotating parts, abrasive surfaces.
PROTECTIVE EQUIPMENT :	Basic P.P.E, leather work gloves, safety glasses, full face shield, Sealed eye wear and mono goggles
SCOPE :	This applies to all personnel who use angle grinders with wafer cutting wheels at all J. J. White, Inc. work sites.
REFERENCES :	JHA-003 (Grinders and Abrasive Wheels).

PROCEDURE:

A. Preparation and Use.

1. Control and Substitution.

   a. In general, where a safer alternative cutting tool is available, or can be obtained, an angle grinder should not be used as a cutting tool. Alternative cutting methods may include, but are not limited to, the use of power band saws, drop type abrasive power saws, fret saws, hand-held reciprocating hacksaws, clamshell cutters, mechanical shears, specialist circular saws and blades designed for cutting sheet metal, oxyacetylene equipment, plasma cutters, etc.

   b. All reasonable efforts must be taken by both workers and supervisors to avoid the use of angle grinders with wafer wheels for cutting applications. To control the use of angle grinders with wafer wheels, the Site Superintendent of the work must grant approval after determining that there is not a practical alternative work method available. Refer to **Angle Grinder Cutting Wheel Pre-Plan** for approval.

2. Instruction, Training, and Supervision.

   a. All operators of angle grinders are to be given appropriate instruction and training in this JHA.

   b. All operators are to be trained in safe work procedures specific to the tasks being done in the workplace.

c. One-on-one supervision shall be provided for people receiving training, or who are unfamiliar with the use of angle grinders with wafer wheels.

3. Personal Protective Equipment.

a. Double eye protection is mandatory when using a grinder with a wafer wheel – ensure face shields with an appropriate impact rating for the proposed hazard is worn with a minimum of Z87 rated safety glasses.

b. Hearing protection.

c. Long sleeved shirt and pants, or approved coveralls.

d. Leather work gloves.

e. As appropriate, a dust mask or respirator capable of filtering particles generated by the cutting process.

f. Do not wear loose clothing, loose jewelry, exposed long hair, or loose gloves when performing grinding operations.

B. Safe Work Procedures.

1. If a grinder must be used, choose the right grinder for the job. Do not use a larger, heavier, or more powerful grinder than is necessary for the job as it is much easier to lose control of and get fatigued during use.

2. The posture and positioning of the operator must be considered while determining the appropriate tool for the job.

3. The rated speed of the disc must be at least equal to the maximum speed marked on the power tool. Wheels running faster than their rated speed can break and fly apart.

4. The size of the discs, flanges, backing pads, or any other accessory must properly fit the spindle of the power tool. Accessories with arbour holes that do not match the mounting hardware of the power tool will run out of balance, vibrate excessively, and may cause loss of control.

5. Do not use a damaged accessory. Before each use inspect the accessories such as the wafer wheels for chips and cracks, backing pad for cracks, tears, or excess wear. If the power tool or accessory is dropped, inspect for damage or install an undamaged accessory. After inspecting and installing an accessory, position yourself and bystanders away from the plane of the rotating accessory and run the power tool at maximum non-load speed for

one minute. Damaged accessories will normally break apart during this test time.

6. Use only disc types that are recommended for the power tool to be used and the specific guard designed for the selected wheel. Discs for which the power tool was not designed cannot be adequately guarded and are unsafe.

7. Cutting wheels should not be used for grinding jobs. Abrasive cut-off discs are intended for cutting, side forces applied to these discs may cause them to shatter.

8. The guard must be securely attached to the power tool and positioned for maximum safety, so that the least amount of wheel is exposed towards the operator.

9. Allow the grinder to “run-up” to operating speed before applying it to the objet to be cut.

10. Make sure the work piece is secured to prevent binding of the cutting wheel and material.

11. Wherever possible, adopt a comfortable stance with feet apart and a well-balanced and clear view of the job.

12. Stop the grinder at regular intervals for a short break to rest your hand and harms.

13. Disconnect the power and place the grinder on a flat surface with the cutting wheel facing upwards when not in use.

14. Remove the plug from the power point before changing the cutting wheel.

15. Never lay the power tool down until the cutting wheel has come to a complete stop. The wheel may grab the surface and pull the power tool out of your control.

16. Do not operate the power tool near flammable materials. Sparks could ignite these materials.

17. Do not “jam” the cut-off wheel or apply excessive pressure. Do not attempt to make an excessive depth of cut. Overstressing the wheel increases thee loading and susceptibility to twisting or binding of the wheel in the cut and the possibility of kickback or breakage.

18. Do not position your body in line with and behind the rotating disc. When the disc, at the point of operation is moving away from your body, the

possible kickback may propel the spinning disc and the power tool directly at you.

19. When wheel is binding or when interrupting a cut for any reason, witch off the power tool and hold the power tool motionless until the wheel comes to a complete stop. Never attempt to remove the cut-off wheel from the cut while the wheel is in motion, otherwise kickback might occur. Investigate and take corrective action to eliminate the cause of wheel binding.

20. Do not restart the cutting operation in the work piece. Let the wheel reach full speed and carefully re-enter the cut. The wheel may bind, walk up, or kickback if the power tool is restarted in the work piece.

C. Kickback Prevention.

1. Kickback is a sudden reaction to a pinched or snagged rotating wheel, backing pad, brush, or any other accessory. Pinching or snagging causes rapid stalling of the wheel which in turn causes the uncontrolled power tool to be forced in the direction opposite of the wheel's rotation at the point of the binding.

2. The wheel may either jump toward or away from the operator, depending on the direction of the wheel's movement at the point of pinching. The wheels may also break under these conditions.

3. Kickback is the result of power tool misuse and / or incorrect operating procedures or conditions and can be avoided by taking proper precautions as given below :

   a. Maintain a firm grip on the power tool and position your body and arms to allow you to resist kickback forces. Always use the manufacturer's handles for maximum control over kickback or torque reaction during start-up. The operator can control torque reactions or kickback forces if proper precautions are taken.

   b. Never place your hand near the rotating wheel. The rotating wheel may kickback over your hand.

   c. Do not position your body in the area where the power tool will move if kickback occurs. Kickback will propel the tool in the direction opposite to the wheels movement at the point of snagging.

   d. Use special care when working corners, sharp edges, etc. Avoid bouncing and snagging the accessory. Corners, sharp edges, or bouncing have a tendency to snag the rotating accessory and cause loss of control or kickback.

D. Safety of Bystanders.

1. Fragments of work piece or of a broken wheel may fly away and cause injury beyond the immediate area of operation if appropriate controls are not taken. The operator of any angle grinding activity shall ensure the safety of all bystanders or passersby. Controls may include :

   a. Keep bystanders a safe distance away from work area by erecting barricades to prevent access to the area.

   b. Erecting screens to encapsulate projectiles, where appropriate.

   c. Anyone entering the work area must wear the same P.P.E. as the operator.

E. Pre-Use Checks.

1. The operator of an angle grinder shall check the condition of the machine prior to each use. The following pre-use checks are to be undertaken with the power lead disconnected from any power source.

   a. The quarterly inspection is current and the power lead is in good condition?

   b. The cutting disc is in good condition?

   c. The correct flange and locking nut is in place for the type of disc being used? If not, the disc can shatter at high speed.

   d. Is the guard in place?

   e. The manufacturer’s handles are in place?

   f. Any cutting wheel that has been dropped or has become wet is thrown away?

   g. Are welding screens / fire blankets positioned to prevent flying / falling particles hitting other workers?

   h. Is the work piece secured appropriately?

   i. No flammable materials are close by?

J. J. WHITE, INC. ANGLE GRINDER CUTTING WHEEL PRE-PLAN

Job Description : _____

Work Location : _____ Date : _____

REASON FOR PRE-PLAN
J. J. White, Inc. Safety Procedures require a pre-plan whenever a specific task warrants it necessary to use a cutting wheel (wafer wheel) on a grinder.

SCOPE OF WORK AND SCHEDULE : (This pre-plan expires after a single work tasks, no greater than one shift)

_____

_____

_____

SAFETY PRECAUTIONS

- Where a safe alternative cutting tool is available or can be obtained, an angle grinder should not be used as a cutting tool.
- The use of large grinders for cutting purposes should be avoided wherever possible.
- All guards must be properly installed on the grinder.
- Inspect wheel for defects.
- Check wheel RPM specification and verify they are compatible with the grinder being used.
- The Operator must wear a face shield with safety glasses beneath.
- Support material being cut so that binding of the wheel is minimized.
- Maintain control of grinder at all times. Use (2) hands when operating the grinder.
- Be aware of body positioning.
- The cutting wheel must come to a complete stop before control of the grinder is relinquished.
- Excess cutting wheels – used or new – must be returned to the Site Superintendent or Safety Department.
- The operator must be properly trained in the use of, and hazards associated with, using a grinder with a cutting wheel.

ALL PERSONNEL INVOLVED IN THE WORK ASSIGNEMENT MUST READ AND SIGN THIS PRE-PLAN

ANGLE GRINDER AND CUTTING WHEEL INFORMATION
Angle Grinder Size : _____

Angle Grinder Max RPM : _____

Cutting Wheel Size : _____

Cutting Wheel Max RPM : _____

PRE-PLAN REVIEW ATTENDEE'S

Name	Position
	Site Safety Professional
	Craft Foreman
	Grinder Operator
	Employee (1)
	Employee (2)
	Employee (3)
	Employee (4)
	Employee (5)

Site Superintendent (required)

_____

JOB HAZARD ANALYSIS – 053

MOLD REMEDIATION

KEY POINTS

- The primary function of personal protective equipment is to prevent the inhalation and ingestion of mold and mold spores and to avoid mold contact with the skin or eyes.
    - To protect your eyes, use properly fitted goggles or a full face piece respirator. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not appropriate in mold remediation.
    - Gloves protect the skin from contact with mold, as well as from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material should be selected based on the type of substance/ chemical being handled.
    - Either a half mask or full face piece air-purifying respirator can be used. A full face piece respirator provides both respiratory and eye protection. Please refer to the discussion of the different levels of remediation to ascertain the type of respiratory protection recommended.
- Level I: Small Isolated Areas and Level II: Mid-Sized Isolated Areas remediation can be conducted by the regular building maintenance staff as long as they are trained on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation should be consulted prior to remediation activities to provide oversight for the project involving Level III: Large Isolated Areas and Level IV: Extensive Contamination.

JOB HAZARD ANALYSIS – 053 MOLD REMEDIATION	
PURPOSE :	To provide a baseline for the construction of a mold remediation plan.
JOB HAZARD :	Respiratory exposure to mold (inhalation / ingestion), skin contact with harsh cleaning chemicals, eye exposure to irritants / dust / small particles.
PROTECTIVE EQUIPMENT :	Basic P.P.E., respiratory protection, additional P.P.E. as needed.
SCOPE :	The guidelines have been designed to help construct a remediation plan. The remediation manager should rely on professional judgment and experience to adapt the guidelines to particular situations. When in doubt, caution is advised. Consult an experienced mold remediation specialist or JJW Corporate Safety Director for more information.
REFERENCES :	OSHA Hazard Communication Standard (29 CFR 1910.1200), OSHA Respiratory Protection Standard (29 CFR 1910.134).

A. Personal Protective Equipment.

1. Any remediation work that disturbs mold and causes mold spores to become airborne increases the degree of respiratory exposure. Actions that tend to disperse mold include :

   a. Breaking apart moldy porous materials such as wallboard;

   b. Destructive invasive procedures to examine or remediate mold growth in a wall cavity;

   c. Removal of contaminated wallpaper by stripping or peeling;

   d. Using fans to dry items or ventilate areas.

2. The primary function of personal protective equipment is to prevent the inhalation and ingestion of mold and mold spores and to avoid mold contact with the skin or eyes. The following sections discuss the various types of PPE that may be used during remediation activities :

   a. Skin and Eye Protection.

      i) Gloves protect the skin from contact with mold, as well as from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove

material should be selected based on the type of substance/ chemical being handled. If you are using a biocide such as chlorine bleach, or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If you are using a mild detergent or plain water, ordinary household rubber gloves may be used.

ii) To protect your eyes, use properly fitted goggles or a full face piece respirator. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not appropriate in mold remediation.

b. Respiratory Protection.

i) Respirators protect cleanup workers from inhaling airborne mold, contaminated dust, and other particulates that are released during the remediation process. Either a half mask or full face piece air-purifying respirator can be used. A full face piece respirator provides both respiratory and eye protection. Please refer to the discussion of the different levels of remediation to ascertain the type of respiratory protection recommended. Respirators used to provide protection from mold and mold spores must be certified by the National Institute for Occupational Safety and Health (NIOSH). More protective respirators may have to be selected and used if toxic contaminants such as asbestos or lead are encountered during remediation.

ii) As specified by OSHA in 29 CFR 1910.134, individuals who use respirators must be properly trained, have medical clearance, and be properly fit tested before they begin using a respirator. In addition, use of respirators requires the employer to develop and implement a written respiratory protection program, with worksite-specific procedures and elements.

c. Protective Clothing.

i) While conducting building inspections and remediation work, individuals may encounter hazardous biological agents as well as chemical and physical hazards. Consequently, appropriate personal protective clothing (i.e., reusable or disposable) is recommended to minimize cross-contamination between work areas and clean areas, to prevent the transfer and spread of mold and other contaminants to street clothing, and to eliminate skin contact with mold and potential chemical exposures.

ii) Disposable PPE should be discarded after it is used. They should be placed into impermeable bags, and usually can be discarded as ordinary construction waste. Appropriate precautions and protective equipment for biocide applicators should be selected based on the product manufacturer's warnings and recommendations (e.g., goggles or face shield, aprons or other protective clothing, gloves, and respiratory protection).

B. Levels of Remediation.

1. **Level I: Small Isolated Areas** (10 sq. ft. or less) - e.g., ceiling tiles, small areas on walls.

a. Remediation can be conducted by the regular building maintenance staff as long as they are trained on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

b. Respiratory protection (e.g., N-95 disposable respirator) is recommended. Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should be worn.

c. The work area should be unoccupied. Removing people from spaces adjacent to the work area is not necessary, but is recommended for infants (less than 12 months old), persons recovering from recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

d. Containment of the work area is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

e. Contaminated materials that cannot be cleaned should be removed from the building in a sealed impermeable plastic bag. These materials may be disposed of as ordinary waste.

f. The work area and areas used by remediation workers for egress should be cleaned with a damp cloth or mop and a detergent solution.

g. All areas should be left dry and visibly free from contamination and debris.

2. (10 - 30 sq. ft.) - e.g., individual wallboard panels.

a. Remediation can be conducted by the regular building maintenance staff. Such persons should receive training on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

b. Respiratory protection (e.g., N-95 disposable respirator) is recommended. Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should be worn.

c. The work area should be unoccupied. Removing people from spaces adjacent to the work area is not necessary, but is recommended for infants (less than 12 months old), persons recovering from recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

d. Surfaces in the work area that could become contaminated should be covered with a secured plastic sheet(s) before remediation to contain dust/debris and prevent further contamination.

e. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

f. Contaminated materials that cannot be cleaned should be removed from the building in a sealed impermeable plastic bag. These materials may be disposed of as ordinary waste.

g. The work area and areas used by remediation workers for egress should be HEPA vacuumed and cleaned with a damp cloth or mop and a detergent solution.

h. All areas should be left dry and visibly free from contamination and debris.

3. **Level III: Large Isolated Areas** (30 - 100 square feet) - e.g., several wallboard panels.

Industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation should be consulted prior to remediation activities to provide oversight for the project.

The following procedures may be implemented depending upon the severity of the contamination:

a. It is recommended that personnel be trained in the handling of hazardous materials and equipped with respiratory protection (e.g., N-95 disposable respirator). Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should be worn.

b. Surfaces in the work area and areas directly adjacent that could become contaminated should be covered with a secured plastic sheet(s) before remediation to contain dust/ debris and prevent further contamination.

c. Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.

d. The work area and areas directly adjacent should be unoccupied. Removing people from spaces near the work area is recommended for infants, persons having undergone recent surgery, immunosuppressed people, or people with chronic inflammatory lung diseases. (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

e. Dust suppression methods, such as misting (not soaking) surfaces prior to mediation, are recommended.

f. Contaminated materials that cannot be cleaned should be removed from the building in sealed impermeable plastic bags. These materials may be disposed of as ordinary waste.

g. The work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth or mop and a detergent solution.

h. All areas should be left dry and visibly free from contamination and debris.

Note: If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the mold is heavy (blanket coverage as opposed to patchy), it is recommended that the remediation procedures for Level IV be followed.

4. **Level IV: Extensive Contamination** (greater than 100 contiguous square feet in an area).

Industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold

remediation should be consulted prior to remediation activities to provide oversight for the project.

The following procedures may be implemented depending upon the severity of the contamination :

a. Personnel trained in the handling of hazardous materials and equipped with:

   i) Full face piece respirators with HEPA cartridges;

   ii) Disposable protective clothing covering entire body including both head and shoes;

   iii) Gloves.

b. Containment of the affected area:

   i) Complete isolation of work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and other openings);

   ii) The use of an exhaust fan with a HEPA filter to generate negative pressurization;

   iii) Airlocks and decontamination room.

c. If contaminant practices effectively prevent mold from migrating from affected areas, it may not be necessary to remove people from surrounding work areas. However, removal is still recommended for infants, persons having undergone recent surgery, immune- suppressed people, or people with chronic inflammatory lung diseases. (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

d. Contaminated materials that cannot be cleaned should be removed from the building in sealed impermeable plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. These materials may be disposed of as ordinary waste.

e. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth or mopped with a detergent solution and be visibly clean prior to the removal of isolation barriers.

JOB HAZARD ANALYSIS – 054

FATIGUE MANAGEMENT

KEY POINTS

- Work Schedule limitations will be managed as follows :

Work Schedule / Situation	12-hour Shift	10-hour Shift	8-hour Shift
Max. consecutive shifts in a work set	14 shifts	14 shifts	19 shifts
Min. time off after a work set	36 hours	36 hours	36 hours
Holdovers shall not exceed	2 hours	2 hours	2 hours
Extended shift: Max. for an unscheduled shift	16 hours	16 hours	16 hours
Extended shift: Time off after shift			
10-16 hour shift	N/A	N/A	8 hours
12-16 hour shift	N/A	8 hours	N/A
14-16 hour shift	8 hours	8 hours	N/A
Max. number of extended shifts/work set	1 (>14 hours)	14 hour shift : 1 12 hour shift : 2	>12 hour shift : 2
* Note : for 3 or more 12-hour shifts, follow the 12-hour shift schedule. Extended shifts must be non-consecutive.			

- The table above is based on ANSI/API 755 fatigue management for outages.
- A holdover extends past the normal shift and involves employees participate in training, safety meetings or administrative activities. Holdover periods should not exceed 2 hours and, where possible, they should occur at the end of the day shift. Holdovers are not “Extended shifts” as used in the table above.
- Extended shifts (>14 hours) shall occur only when necessary to fill an unscheduled safety critical position.
- Exceptions are only allowed when approved by the TA Manager or designee, a management representative from the employee’s company, and the employee’s immediate supervisor. The current edition of ANSI/API 755 shall be followed when considering an exception to the work schedule limits.
- Ergonomic equipment may be used such as anti-fatigue mats for standing, lift assist devices for repetitive lifting and other ergonomic devices as deemed appropriate. Consideration will be given by the Safety Department and Field Supervision.
- Employees must report fatigue / tiredness, and lack of mental acuity to supervision. Supervision must take appropriate action to prevent loss.

JOB HAZARD ANALYSIS – 054 **FATIGUE MANAGEMENT**	
PURPOSE :	Identification and managing worker fatigue.
JOB HAZARD :	Employees becoming fatigued from working too long without enough rest or becoming complacent from repetitive activity.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Employee must be trained and aware of the hazards of the fatigued worker. They must be able to identify the signs for themselves and well as others. Work / rest regimens are established to ensure workers are getting adequate rest.
REFERENCES :	N/A.

PROCEDURE:

1. Work Schedule limitations will be managed as follows :

Work Schedule / Situation	12-hour Shift	10-hour Shift	8-hour Shift
Max. consecutive shifts in a work set	14 shifts	14 shifts	19 shifts
Min. time off after a work set	36 hours	36 hours	36 hours
Holdovers shall not exceed	2 hours	2 hours	2 hours
Extended shift: Max. for an unscheduled shift	16 hours	16 hours	16 hours
Extended shift: Time off after shift			
10-16 hour shift	N/A	N/A	8 hours
12-16 hour shift	N/A	8 hours	N/A
14-16 hour shift	8 hours	8 hours	N/A
Max. number of extended shifts/work set	1 (>14 hours)	14 hour shift : 1 12 hour shift : 2	>12 hour shift : 2
* Note : for 3 or more 12-hour shifts, follow the 12-hour shift schedule. Extended shifts must be non-consecutive.			

The table above is based on ANSI/API 755 fatigue management for outages.

A holdover extends past the normal shift and involves employees participate in training, safety meetings or administrative activities. Holdover periods should not exceed 2 hours and, where possible, they should occur at the end of the day shift. Holdovers are not "Extended shifts" as used in the table above.

Extended shifts (>14 hours) shall occur only when necessary to fill an unscheduled safety critical position.

Exceptions are only allowed when approved by the TA Manager or designee, a management representative from the employee's company, and the employee's immediate supervisor. The current edition of ANSI/API 755 shall be followed when considering an exception to the work schedule limits.

Scenario 1: A crew working 10-hour shifts is allowed to work a maximum of 14 consecutive shifts (a work set). After the 14th shift, the crew must take off 36 hour before beginning its next 14-day work set.

Holdovers: The crew is allowed a 2-hour maximum holdover each day during the work set, i.e., these are non-work periods before or (preferably) after the shift for training or meetings.

Extended shifts: If the crew continues to perform work tasks past the 10-hour shift, i.e., an extended shift, then it can only work a maximum of 16 hours. The crew can only work 1 extended shift during a 14-day work set if that extended shift is 14-hours or more. The crew can only work 2 extended shift during a 14-day work set if the extended shift is 12-hours or more but less than 14 hours.. Any 14-day work set of 10-hour shifts with more than 2 extended shifts past 12-hours shall be considered as a 14-day work set of 12-hours shifts. The crew shall be given 8 hours off after any extended shift of 12 hours or more. Any 36-hour break resets the work set to day 1.

Scenario 2: A crew working 12-hour shifts is allowed to work a maximum of 14 consecutive shifts (a work set). After the 14th shift, the crew must take off 36 hour before beginning it's next 14-day work set.

Holdovers: The crew is allowed a 2-hour maximum holdover each day during the work set, i.e., these are non-work periods before or (preferably) after the shift for training or meetings.

Extended shifts: If the crew continues to perform work tasks past the 12-hour shift, i.e., an extended shift, then it can only work a maximum of 16 hours. The crew can only work 1 extended shift during a 14-day work set if that extended shift is longer than 14-hours. The crew shall be given 8 hours off after any extended shift of 14 hours or more, and 10 hours off after any extended shift of 16 hours or more. Any 36-hour break resets the work set to day 1.

2. Ergonomic equipment may be used such as anti-fatigue mats for standing, lift assist devices for repetitive lifting and other ergonomic devices as deemed appropriate. Consideration will be given by the Safety Department and Field Supervision.

3. Work tasks to control fatigue will be analyzed and evaluated periodically. Confined Space Hole Watch and Hot Work Fire Watch are (2) activities known to be susceptible to fatigue issues in extreme temperatures. Switching employees out for other activities is an acceptable control.

4. Chairs may be provided for workers to sit periodically, and will provide periodic rest breaks for personnel conducting activities outside of the norm or under certain elements.

5. Employees must report fatigue / tiredness, and lack of mental acuity to supervision. Supervision must take appropriate action to prevent loss.

6. Employees must not chronically use over-the-counter or prescription drugs to increase mental alertness. Employees should be discouraged from taking any substance known to increase fatigue in that employee, including fatigue that sets in after the effects of the drug wear off.

JOB HAZARD ANALYSIS – 055

STOP WORK AUTHORITY

KEY POINTS

- All employees are empowered and obligated to stop any task or operation where concerns or questions regarding the control of HSE risk exist. This goes for work that they are performing or witnessing.

- No work will resume until all stop work issues and concerns have been adequately addressed and Supervisors have been notified.

- Any form of retribution or intimidation directed at any individual or subcontractor for exercising their right to issue a stop work authority will not be tolerated by J. J. White, Inc.

- It is the desired outcome of any Stop Work Intervention that the identified safety concern(s) have been addressed to the satisfaction of all involved persons prior to resuming work. Most issues can be adequately resolved in a timely manner at the job site, occasionally, additional investigation and corrective actions may be required to identify and address root causes.

THOSE INITIATING INTERVENTION ARE EXPECTED TO BE A PART OF THE SOLUTION.

JOB HAZARD ANALYSIS – 055 STOP WORK AUTHORITY	
PURPOSE :	Educate and empower employees to stop unsafe work.
JOB HAZARD :	Employees unaware of or accepting risk.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	Educate, empower, and training employees on what stop work authority is and what is expected of them.
REFERENCES :	N/A.

PROCEDURE:

1. J. J. White, Inc. employees will receive Stop Work Authority training before initial assignment. The training will be documented on a standard signature sheet including the employee name, the date of training, and the subject.

2. All employees are empowered and obligated to stop any task or operation where concerns or questions regarding the control of HSE risk exist. This goes for work that they are performing or witnessing.

3. No work will resume until all stop work issues and concerns have been adequately addressed and Supervisors have been notified.

4. Any form of retribution or intimidation directed at any individual or subcontractor for exercising their right to issue a stop work authority will not be tolerated by J. J. White, Inc.

5. J. J. White, Inc. employees are responsible to initiate a Stop Work Intervention and management is responsible to create a culture where Stop Work Authority is freely exercised. Management is also expected to evaluate the use of the program and measure its effectiveness.

6. When an unsafe condition is identified, the Stop Work Intervention will be initiated, coordinated through the supervisor, initiated in a positive manner. Notify all personnel and supervision of the stop work issue, correct the issue, and resume work when safe to do so.

   THOSE INITIATING INTERVENTION ARE EXPECTED TO BE A PART OF THE SOLUTION.

7. All Stop Work Interventions will be documented, investigated for lessons learned, and corrective measures to be put into place.

8. Stop Work reports will be reviewed with supervision in order to measure participation, determine quality of interventions and follow-up, trend common issues, identify opportunities for improvement, and facilitate sharing of learning.

9. It is the desired outcome of any Stop Work Intervention that the identified safety concern(s) have been addressed to the satisfaction of all involved persons prior to resuming work. Most issues can be adequately resolved in a timely manner at the job site, occasionally, additional investigation and corrective actions may be required to identify and address root causes.

JOB HAZARD ANALYSIS – 056

FALLING OBJECTS

KEY POINTS

- Even a small object falling from a height can cause serious or fatal injuries or impede workplace activities.
- A dropped object is “any object in the work area which has the potential for falling from its previous, static, elevated position, and by virtue encountering any external force exerted upon that object arising from either the environment, the immediate work activity, or by the objects own static weight”.
- When referring to dropped objects, consider hand tools being used at heights; operations conducted at height; lifting operations; residual solid, liquid, or vapor products released during line breaking activities; etc.
- The consequences of a falling object can damage equipment, structures, release hydrocarbons or start a fire, impact work schedules, and cause injury or death.
- J. J. White, Inc. is committed to the prevention and elimination of falling object damages and injuries. The following items should be considered in order to make good decisions :
    - Take responsibility for our actions;
    - Look after our colleagues;
    - Maintain good housekeeping;
    - Employ approach boundaries to the proximity of potential risk areas;
    - Stop unsafe activities by using our Stop Work Authority;
    - Make observations and report incidents;
    - Perform a dropped objects topic in an upcoming Toolbox Talk;
    - Consider dropped objects in all JSAs;
    - Utilize netting between the mid-rail and toe boards on scaffolds where exposure to people at grade may be a concern.

JOB HAZARD ANALYSIS – 056 FALLING OBJECTS	
PURPOSE :	To describe measures to prevent the occurrence of dropped objects and align with industry best practices.
JOB HAZARD :	Injuries to employees from being struck by tools and equipment from height.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	This procedure covers behavior and work practices in order to avoid and prevent the potential of objects falling from their previous static, elevated position.
REFERENCES :	Dropped Objects Hazard Recognition and Mitigation Plan

PROCEDURE:

A. General.

1. Even a small object falling from a height can cause serious or fatal injuries or impede workplace activities. The purpose of this plan is to describe measures to prevent the occurrence of dropped objects and align with industry best practices through :

   a. Identification and understanding of potential workplace dropped objects hazards

   b. Understanding the various levels of protection that are available to prevent dropped objects.

   c. Selecting and supplying the correct level of mitigation.

   d. Raising the overall awareness level of dropped objects.

2. Definitions.

   a. For the purposes of this plan, a dropped object is “any object in the work area which has the potential for falling from its previous static, elevated position, and by virtue encountering any external force exerted upon that object arising from either the environment, the immediate work activity, or by the objects own static weight”.

   b. When referring to dropped objects, consider :

i) Hand tools being used at heights.

ii) Hand tools / equipment left behind after working at height.

iii) PPE.

iv) Operations conducted at height.

v) Equipment mounted at height that, following contact, vibration, or environmental conditions, could fall (i.e. piping, lights, cameras, rigging gear, etc.)

vi) Temporary equipment at height.

vii) Where personnel are working on a level directly below and / or immediately below and adjacent to the work site.

viii) Lifting operations.

ix) Residual solid, liquid, or vapor products released during line breaking activities.

B. Why Focus on Dropped Objects?

1. Dropped objects are regularly the principal causes of incidents and contribute to the total risk level our workers face.

2. The consequences of a falling object include :

i) Personal injury / death;

ii) Structural damage;

iii) Damage to equipment;

iv) Release of hydrocarbons / fire;

v) Schedule impacts or delay of client productivity.

C. Identification of Potential Risk Areas

1. The identification of potential risk areas is necessary to establish appropriate controls for the given area of elevated work. A listing of potential risk areas is as follows :

i) Below lifting operations;

ii) Cranes;

iii) Elevated work areas or platforms;

iv) Work spaces where equipment is mounted overhead;

v) Temporary / portable equipment;

vi) Elevated man baskets and high reach platforms;

vii) Pipe racks;

viii) Forklift trucks;

ix) Pole Trucks;

x) Poorly stacked or poorly cribbed materials;

xi) Flatbed trailers;

xii) Ladders (permanent or fixed);

xiii) Scaffolding;

xiv) Permanent decking or grated decks.

D. What Creates Dropped Objects?

1. Causes of past falling objects can serve as guidance to crews involved with tasks in elevated work areas or other potential risk areas mentioned above :

i) Poor housekeeping;

ii) Weather;

iii) No restraints;

iv) Insufficient planning;

v) Load miscalculation;

vi) Lack of risk assessment;

vii) Errors in space requirements;

viii) Instability;

ix) Ineffective control of equipment or tools taken aloft (netting, planking, etc.)

x) No lanyards on tools used at height;

xi) Improperly secured or inappropriate loads;

xii) No regular inspection procedures;

xiii) Carrying equipment while at height.

E. Past Examples of Dropped Objects & Lessons Learned.

1. Can of welding rod rolled off scaffold;

2. Dropped hand wrench from scaffold;

3. Gasket inadvertently kicked off of permanent deck;

4. Welding / grinding operations showered work crew below with sparks / slag;

5. Pulled blank / blind and residual product / wash solution poured onto work crew below;

6. Overturned pale of bolts from elevated walk way allowed bolts to fall, striking vehicle passing below;

7. Untethered wedge sprung loose during blinding operation and fell into walk way below;

8. Ice accumulated in overhead pipe rack due to steam leak fell due to elevated temperatures and struck individual below;

9. Employee dropped maul from high reach into unguarded walkway below;

10. Piece of unsecured confined space shelter plastic tent caught by high winds and blown off deck and down to ground level.

F. Prevention and Elimination.

1. J. J. White, Inc. will employ the following items to make good decisions in the prevention and elimination of falling object potentials. Have the

understanding that not all areas of work will permit the use of each item and that there may be other considerations not listed below that might be the appropriate actions to be taken for a given task.

i) Take responsibility for our actions;

ii) Look after our colleagues;

iii) Maintain good housekeeping;

iv) Employ approach boundaries to the proximity of potential risk areas;

v) Stop unsafe activities by using our Stop Work Authority;

vi) Make observations and report incidents;

vii) Perform a dropped objects topic in an upcoming Toolbox Talk;

viii) Consider dropped objects in all JSAs;

ix) Utilize netting between the mid-rail and toe boards on scaffolds where exposure to people at grade may be a concern;

x) Check areas after all work is completed for unsecured items;

xi) Participate in a client sponsored audits and inspections;

xii) Investigate all incidents, including near misses;

xiii) Secure all tools and equipment when working at heights;

2. Complete a pre-job risk assessment such as a JSA before beginning any job / task, with the following goals in mind :

i) Identify any dropped object hazards before starting a job or task and communicate these at a toolbox talk;

ii) Include discussions on tools and equipment in the JSA;

iii) Ensure all personnel are involved in the discussion, understand the associated hazards, and implement the mitigation plan.

3. J. J. White, Inc. will track all deficiencies in the following manner :

i) During safety audits, such discovered items will be logged on the eTracker5 audit form and / or the Near-Miss/Good Catch form.

ii) Deficiencies will be addressed with all site work crews at the next scheduled toolbox safety talk, or sooner, as applicable.

JOB HAZARD ANALYSIS – 057 TEMPORARY LIFTING AND SUSPENDING OF FLOATING ROOFS	
PURPOSE :	To address the construction procedure for raising an internal or external floating roof by means of jacks mounted under the roof.
JOB HAZARD :	Oxygen-deficiency, toxic or flammable vapors, difficulty in access and egress, fall hazards.
PROTECTIVE EQUIPMENT :	Basic P.P.E., Full Body Harness, Proper Lanyard System, Anchor Straps.
SCOPE :	**This procedure does not address the requirements for safe entry including the evaluation of the roof for stability or anti-rotation**. All work shall conform to the latest edition of API 653 and should only be used on tanks covered by that standard.
REFERENCES :	API 2015 – Requirements for Safe Entry & Cleaning of Petroleum Storage Tanks, API RP 2016 – Guidelines & Procedures for Entering & Cleaning Petroleum Storage Tanks, API 653 – Above Ground Storage Tank Inspector Program.

PROCEDURE:

A. Equipment. Only non-sparking hydraulic / pneumatic air tools shall be used during these types of operations.

1. Hydraulic pump – hand or air actuated @ 10,000 psi.

    a. ENERPAC PATG-1102N Turbo II or equal.

    b. ENERPAC P-141 or equal.

2. Hydraulic Cylinder Ram – 25-ton

    a. ENERPAC RC-258 or equal.

3. Floating Roof Jack Assembly

B. Procedure.

1. Verify that all aspects of Safe Tank Entry program have been implemented. This shall include, but not be limited to, inspection of the existing legs for structural integrity. It is strongly suggested to have an API-certified Tank Entry Supervisor (TES) review the plan before commencing operations.

2. Inspect that all equipment is in good working order.

3. Start at the outside of the floating roof. Place jack under a floating roof bulkhead, if possible, to take advantage of the inherent stiffness of the structure.

4. With a $^{3}/_{8}$" thick x 12" diameter steel plate on top of the jack, engage the jack and lift the roof to lift the nearest leg no more than 6" above the tank floor.

5. Place a stack of block composed of 6"x6" hardwood under the leg with a ¼" thick steel plate between the leg and the wood to avoid crushing.

6. Extend the adjacent cribbing with a combination of wood and shims to bring back into contact with the underside of the floating roof.

7. Tighten the anti-rotation cables.

8. Repeat the process on the adjacent floating roof legs until all outer periphery legs have been raised equally.

9. Continue process on interior legs, progressing in rings from the outer to the tank center until all legs are raised. When jacking interior deck legs, place jack at deck weld seams, as close as possible to a leg.

10. Start the process again from the outside if additional elevation of the floating roof is needed.

JOB HAZARD ANALYSIS – 058

COLD CUTTING TANK BOTTOMS

PURPOSE :	To address the construction procedure for removing sections of floor plate on a tank bottom that has been determined to contain LEL's above 5% by use of non-sparking tools and equipment.
JOB HAZARD :	Oxygen-deficiency, toxic or flammable vapors, difficulty in access and egress.
PROTECTIVE EQUIPMENT :	Basic P.P.E.
SCOPE :	**This procedure does not address the requirements for safe entry into a confined space**. All work shall conform to the latest edition of API 653 and should only be used on tanks covered by that standard.
REFERENCES :	API 2015 – Requirements for Safe Entry & Cleaning of Petroleum Storage Tanks, API RP 2016 – Guidelines & Procedures for Entering & Cleaning Petroleum Storage Tanks, API 653 – Above Ground Storage Tank Inspector Program.

PROCEDURE:

A. Equipment. Only non-sparking air tools shall be used during these types of operations.

1. Diesel Powered Air Compressor.

    a. INGERSOLL RAND 185 or equal.

2. Pneumatic Rivet Buster with splitting steel ripper bit

    a. INGERSOLL RAND 9001 series or equal.

    b. INGERSOLL RAND 9001-295-9-1/2 bit or equal.

3. Cooling solution.

    a. Light cutting oil

B. Procedure.

1. Verify that all aspects of Safe Tank Entry program have been implemented.

2. Inspect that all equipment is in good working order.

3. Ensure that all air line connections are secure and pinned properly.

4. Ensure that constant monitoring of the confined space is performed during this activity. While cold cutting the tank floor, if LEL vapors start to fill the tanks atmosphere to a level of 6%, work **must then stop and the crew exit the tank.**

5. Starting at the ¼" testing hole in floor plate, place cooling solution on area that needs cut and with the rivet buster gun, work the ripper bit into the sample hole to begin ripping a slice in the flor plate.

6. Because of the "peeling" effect of the thin strip of floor plate versus an actual "cutting" effect is what ensures a cold cut.

7. Continuing to apply the cooling solution to area. Remove the thin slice of floor plate in a direction to achieve your desired size and placement of your sample hole.

8. Once the slice has been connected from start to finish, this will allow the center section to be removed for sampling.