

SAFETY AND LOSS PREVENTION MANUAL FOR CONTRACTORS

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THE DOW CHEMICAL COMPANY
Engineering & Construction Services
February, 1970

*4-26-90
R. J. [signature]*

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"It is the objective of Engineering and Construction Services to establish and maintain an active, successful accident prevention program that will ultimately result in top safety performance by contractors doing work for The Dow Chemical Company."

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**SAFETY MANUAL FOR CONTRACTORS
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This manual supersedes Safety Manual and
Procedures for Contractors dated February, 1966.

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INTRODUCTION

This safety manual contains the minimum safety rules and procedures for performance of work by contractors and their subcontractors as required by Engineering and Construction Services, The Dow Chemical Company, for any division, subsidiary or affiliate, hereinafter referred to as "owner." This manual will apply at all Engineering and Construction Services project locations unless the owner has an existing set of safety rules specifically for contractors. Exceptions to this manual, or any part thereof, will be agreed upon prior to starting any field work. The owner will be represented on construction as defined in the contract and hereinafter referred to as "owner's representative."

Contractor assumes and has the full responsibility and liability for the safety of its agents, servants and employees and for the compliance of its subcontractors and anything contained herein does not relieve the contractor of such responsibility or liability.

Safety rules and procedures are an integral part of each contract and must be carried out fully, as any other specification for the job. The contractor will be held responsible for his subcontractors conforming with these safety rules and procedures. Any exception to the rules set forth herein, during the course of any project, must have prior written authorization from the owner's representative.

Contractors and contractor supervision unable or unwilling to secure personnel performance in keeping with these rules will not be acceptable as supervisors. Contractor employees who exhibit a poor attitude toward safe work and safety procedures will not be acceptable. Employees leaving a job due to safety violations will not be allowed to return to any owner's work without proper authorization from the owner. The contractor's safety record will be one criteria used to judge his qualifications for bidding.

In addition to the rules set forth herein, contractors working in or near an existing operating facility must be cognizant of and conform to owner's safety rules for that area and any federal, state or local laws governing.

Should any procedure set forth herein conflict with applicable federal, state or local laws, the latter will apply.

1.0 GENERAL SAFETY RULES

1.1 The contractor shall actively and adequately promote safe working performances on the part of his employees. He shall participate in activities to this end, such as safety organizations, incentive award programs, contractor-owner programs, etc. It is expected that each contractor will conduct his own safety programs to best suit his particular needs.

1.1.1 American Standards Association, Z-16.1 Standard, "Recording and Measuring Work Injury Experience," shall be used as a guide to classify contractor injuries.

1.2 Prior to starting any field work on each job, the owner's representative will conduct a prejob safety conference with an authorized representative of the contractor, a manufacturing representative, when available, available subcontractor's representatives and owner's Safety Department representative, when available. At this time, the nature of any chemical hazards or special safety rules for the area will be reviewed with the manufacturing representative and the contractor will be provided with printed copies of area rules where applicable. The "prejob safety check sheet" form (see sample) will be prepared by

E & C'S CONSTRUCTION DEPARTMENT
PRE-JOB SAFETY CHECK SHEET

DATE _____ JOB _____ PLANT _____

C O NUMBER	CONTRACTOR		
1	Standard Emergency signals fully understood?	Yes	No
2	Contractor responsibility in time of emergency understood?	Yes	No
3	Fire and ambulance telephone numbers known?	Yes	No
4	Access for accessible evacuation designated?	Yes	No
5	Fire protection requirements known and plans made for provision of adequate equipment?	Yes	No
6	Special safety rules and signals for this area known? (Owner will provide printed special rules where applicable)	Yes	No
7	Hazards of chemical or toxic materials for area reviewed with Manufacturing Representative?	Yes	No
8	Special safety equipment for this area known?	Yes	No
9	Safety showers and eye wash locations known?	Yes	No
10	Safe work permit understood? (Designated persons to obtain know it)	Yes	No
11	Red Tag rule understood?	Yes	No
12	Smoking area designated?	Yes	No
13	Contractor scaffold rules known?	Yes	No
14	Cross connection and critical life processes understood?	Yes	No
15	Do you have a copy of and understand "Safety & Loss Prevention Manual for Contractors?"	Yes	No
16	Contractor maintain responsibility for and control of their vehicles entering the plant for compliance with owner safety rules and regulations?	Yes	No
17	Are your Subcontractors aware of these rules and procedures?	Yes	No

REMARKS (Explain all No answers):

Contractor Representative	Date	Subcontractor	Date
Owner's Representative	Date	Subcontractor	Date
Manufacturing Representative	Date	Subcontractor	Date
Owner's Safety Representative	Date	Subcontractor	Date

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the owner's representative and a copy furnished to the contractor.

1.3 An effective system of indoctrination and education of employees in safety and loss prevention shall be provided by each contractor. Contractors shall inform all their employees of all safety rules and all safety procedures before working in an owner's plant.

1.3.1 Contractors shall inform all of their employees of the location and the use of nearest safety shower, eye bath and emergency equipment such as gas masks, fire extinguishers, and fire blankets.

1.4 Contractors shall use a regular system of work inspection to detect and correct hazardous conditions, safety rule violations and unsafe working conditions. These safety inspections shall be reported to owner's representative in writing each week.

1.4.1 Orderliness is a basic requirement for all jobs and must be maintained at all times. Special attention must be given to maintaining clear walkways and roadways, removal of trash, removal of slipping and tripping hazards and proper storage of materials. Contractors must make every effort to keep mud, slush or other slippery substances off of plant roads. In cases where this cannot be avoided, contractors must clean the roadways immediately.

1.5 Temporary buildings and material storage areas shall be set up as neatly as possible to present an orderly appearance.

1.5.1 Temporary building shall be sheeted with noncombustible material, such as transite or metal siding and roof, and each must be identified with the contractor's name.

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telephone as soon as possible that all employees in the area are accounted for or that specific employees cannot be accounted for.

1.5.2 Metal buildings served with electricity must have the skin of the building properly grounded as well as the service entrance switch.

1.6 Contractors must furnish trash containers made of metal, each with metal covers kept in place.

1.7 Contractors must report to the owner's representative, by name, those employees discharged for safety rule infractions.

1.8 Contractors shall maintain continuous safety planning to cover jobs where circumstances have changed and new hazards require new controls.

2.0 EMERGENCY PROCEDURES

2.1 Contractors must inform their employees of existing plant procedures for first aid and ambulance calls. If none exist, the contractor shall submit to the owner's representative prior to starting work, an outline of the procedure to be followed.

2.2 In the event of an explosion or fire, contractor personnel working in the area affected must observe the following rules.

2.2.1 Shutdown all equipment in operation and leave the area at once.

2.2.2 Report to your company field office immediately, in person or by phone.

2.2.3 DO NOT re-enter the area until authorized by the owner's representative.

2.2.4 The contractor shall notify the owner's representative in person or by

2.3 If operating a motor vehicle in an affected area, turn off engine, get out of the vehicle, and be prepared to leave the area if necessary. Motor vehicles, other than emergency units, must not be driven into an area downwind of a gas release. Barricades across plant roads must be honored by all vehicles at all times.

2.4 Contractors shall inform their employees of pertinent emergency signals and procedures for the area in which they work. If none exist, the contractor shall outline and inform employees of steps to be taken in the event of disaster emergencies that could arise.

3.0 FIRST AID—INJURIES—REPORTS

3.1 The owner's representative shall be notified immediately in the event of any death, occupational disease, disabling injury or potentially significant injury to a contractor employee (whether or not it is determined that "lost time" will be involved) while at work on the owner's job.

3.1.1 The contractor must thoroughly investigate, determine and report all details of an accident and cooperate with the owner's inspection teams.

3.1.2 A written report must be submitted on every injury requiring medical treatment of any kind, to the owner's representative on the job, no later than 10:00 a.m. of the day following the injury. Also any near miss, potentially serious or hazardous condition that occurs, must be reported in the same manner, although no injury

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make sure that adequate washing is accomplished, shoes and clothing covering affected parts must be removed. The owner's representative must be consulted before reuse of clothing and shoes that may have been contaminated.

4.0 INDIVIDUAL ACTION

4.1 Horseplay in any form is not allowed.

4.2 Running in the job site must be avoided except in case of an emergency.

4.3 Personnel must not climb through, under, over, or between railroad cars of a train except in the performance of assigned duties.

4.4 Personnel must not make inoperative or operate safety devices such as relief valves, deluge valves, gate valves, electrical and mechanical interlocks, guards, electrical switches, etc.

4.4.1 Any accidental interruption of lines or equipment in service or any irregularities observed must be reported to the owner's representative immediately.

4.5 Unsafe shortcuts, such as walking pipelines, sliding down pipe or stanchions and cutting corners to save a few steps, must be avoided.

4.6 Tools, materials or equipment must not be intentionally dropped or thrown from one level to another unless adequate precautions have been taken to assure that no injury to persons or damage to equipment will occur.

4.7 Personnel must not ride a load being handled by a crane. Slings, hooks, etc., must not be ridden, except where a crane basket or a bosuns' chair and safety belt are used.

4.8 Personnel must not walk, drop or jump onto a transite roof. Care should be exercised while erecting new transite roofs.

5.0 VEHICLES AND TRAFFIC

5.1 Personnel will comply with all safety rules and signs regarding traffic and vehicles at all times.

5.2 The maximum speed limit on open roads in the plant is 25 miles per hour and 10 miles per hour within work areas, unless otherwise designated by signs.

5.3 Vehicles stopped on plant roadways for the purpose of loading or discharging passengers must not be passed in either direction except, after coming to a complete stop, the vehicle may be passed at no more than 10 miles per hour provided the way is clear.

5.4 Fuel tanks on motorized equipment must not be filled while the engine is running or when welding or other hot work is being done nearby. Smoking will not be allowed during fueling operations.

5.5 Equipment such as welding machines, pumps, etc., shall not be transported with the engine running.

5.6 All equipment must be in safe mechanical working condition at all times. In addition to complying with state requirements as to brakes, lights, signals, horns, mufflers, etc., vehicles must be periodically inspected by a representative of the contractor. Necessary repairs and adjustments must be made prior to their use on owner's property.

5.7 The use of winch trucks, flatbeds, stakebeds, etc., as transportation for personnel

will not be permitted unless adequate safety provisions are made and the vehicle is adapted for that purpose. In any case, the number of personnel must not cause overcrowding.

5.8 Riding of "Cherry Pickers" or cranes is permitted only when adequate safety provisions such as seats, platforms, rails, etc., are provided for passengers.

5.9 The maximum number of people who may ride in a pickup truck is three in the cab and six seated on the floor of the bed, or on approved "built-in" seats.

5.10 Personnel must be sitting down at all times when the vehicle they are riding is in motion and must not have any part of their body over the sides.

5.11 Pedestrian paths and walkways must be used whenever provided. In their absence, personnel using streets and roadways must walk facing approaching traffic, on left-hand side of road.

5.12 The following rules must be observed in the operation of cranes, cherry pickers, winch trucks and other equipment having booms or extended loads which extend 15 feet or more in front of or to the rear of the equipment.

5.12.1 Stop at all stop signs.

5.12.2 At intersections, when the equipment is to proceed straight across a thoroughfare or turn either way, the equipment must stop; the flagman must get off the equipment, clear all traffic, then flag the equipment through the intersection or around the corner.

5.12.3 Before entering any thoroughfare, street, road, etc., from a

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work area, the flagman must clear the traffic and flag the equipment onto the road.

5.12.4 All booms or loads extending more than 15 feet must be marked or flagged with high visibility material when moving on plant roads.

5.12.5 A flagman must be provided and swinging must be controlled with a tag line when moving in a congested area or where there is personnel.

5.12.6 Hauled material that overhangs the sides or ends of a truck must be red flagged at the extent of the overhang. Loads must not be hauled from a single suspension cable that allows free swinging beyond the sides of the vehicle. Loads or vehicles that extend out of the normal road lanes require flagman or escorts.

5.12.7 Contractors must check vertical clearances on the route to be used prior to moving equipment or high loads.

5.13 Contractors must determine from the owner's representative when and which roads are to be used, prior to moving extremely heavy loads such as large rubber-mounted equipment and low-boy loads.

6.0 PROTECTIVE EQUIPMENT AND CLOTHING

6.1 The contractor and his employees shall recognize the importance and the use of special protective equipment and clothing.

6.1.1 The contractor shall be responsible for knowing and enforcing special owner area or job rules requiring special personnel protection.

6.1.2 Contractors shall provide their employees with the proper protective equipment required.

6.2 Approved safety glasses shall be a minimum requirement on all jobs at all times. Safety glasses with side shields are required when grinding, chipping or performing any job where side shields would afford protection from flying particles.

6.2.1 Approved safety glasses must fulfill federal requirements (GGG-G-513) for drop ball testing and safety code for polarized "Strain" pattern.

6.2.2 Employees wearing contact lens must wear chemical goggles.

6.3 Chemical goggles, approved prior to their use, are required for working in or entering certain chemical areas which are posted with signs, or while doing chipping or power tool cleaning work on pressurized lines or equipment which contains hazardous chemicals.

6.3.1 All employees working in the vicinity of hazardous chemicals must know where the nearest safety shower and eye bath facilities are located.

6.3.2 When chemical type goggles are in use, the headband must be around the back of the head, not around the safety hat.

6.4 Approved safety hats are required for all contractor work. Metal hats must not be used where electrical hazards exist.

6.4.1 Approved safety hats must fulfill requirements in Federal Specification GGG-11-142b. The major requirement in

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this specification says, "The specimen must withstand the drop of an 8-pound spherical weight, approximately 3.8 inches in diameter, from a distance of 5 feet, without breaking the hat, bottoming out or breaking suspension." Most skull caps, scalp guards, bump helmets, etc., will not meet this test. Safety hats shall not be drilled or punched for ventilation holes, or edges trimmed off hats.

6.5 All personnel shall wear air hoods, or equivalent, supplied with filtered air, when sandblasting or applying volatile or toxic material inside tanks, rooms or any other area not adequately ventilated.

6.6 Safety belts or harnesses, with lifelines attached, are to be worn by employees when performing work in elevated positions where the use of scaffolds or ladders is impractical and where a slip might result in a serious fall.

6.7 Personnel must wear owner approved life jackets or otherwise be protected by handrails or lifelines when working over water wherein a drowning hazard exists.

6.8 Personnel shall wear personal clothing that is safe and proper for their job. Wearing of canvas shoes, sneakers or house shoes and working in an undershirt, shorts or stripped to the waist is prohibited. Safety shoes are strongly recommended.

6.9 Fixed blade knives used as tools of the trade must be carried in sheaths while not in use.

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7.0 FIRE PROTECTION

7.1 Accumulation of trash, oily rags, combustible materials and similar fire hazards of any nature will not be permitted.

7.2 The area around welding operations must be kept free of hoses and flammable material of all kind.

7.2.1 There must be a fire extinguisher or water hose easily accessible for each welding, cutting, burning or other such operations, located in close proximity to the operation. It is the contractor's responsibility to obtain the required fire extinguishers for his welding operations.

7.2.2 Special care must be taken during overhead welding operations to safeguard personnel and prevent falling sparks from starting a fire.

7.3 All tarpaulins shall be fire-retardant and identified as such by stenciling: "FR-treated (date)" with a minimum of 2" letters in diagonal corners. In lieu of this treatment, fire-proof blankets such as fiberglass or asbestos are acceptable.

7.3.1 Contractors must inspect and test all tarpaulins at least once each six months to be sure that they are still fire-retardant. Tarpaulins needing it must be retreated or removed from the plant immediately. At this time the tarpaulins must be restenciled in the same manner as in 7.3 above.

7.4 Fire plugs, extinguishers, hose racks and other emergency equipment, shall not be covered or blocked and fire equipment lanes must always be kept clear.

7.5 All heating units for offices, shops, work areas, change rooms, etc., must be in good working order and periodically inspected. Gas units must be provided with "flame-out" protective devices and electrical units must be

grounded. All heating units must be turned off at the end of each work day.

7.6 Flammable or explosive type material such as fuel, oil, cleaning agents, etc., must be properly contained, clearly identified, separately stored and kept clear of work areas. Appropriate signs must be provided in storage areas.

7.7 All cans used for transporting or transferring gasoline or fuel must be labeled by Underwriters' Laboratories or Factory Mutual Laboratories.

7.8 Fuel storage tanks, filler hoses and the dispensing vehicle or containers must be properly grounded.

7.8.1 A quick shut-off valve is required on the dispensing end of fuel hoses.

7.8.2 Equipment fuel tanks must not be filled while the engine is running.

7.8.3 Smoking, welding or any spark- or flame-producing operation must be stopped in the immediate area during refueling operations.

7.9 Welding rod cabinets presenting a fire or safety hazard will not be permitted. Cabinets of fireproof materials equipped with strip heaters are recommended. If light bulbs are used, they must be securely guarded with adequate spacing in regard to the cabinet and to stored material. Metal cabinets must be grounded in an approved manner.

7.10 Volatile materials must not be applied near an open flame. If such material is to be applied in a vessel, or other poorly ventilated, confined area, only explosion-proof lights and connections will be used. The contractor must designate such areas as "No Smoking."

7.11 Heating equipment for freeze protection of concrete must be approved by the owner's representative prior to use.

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8.0 MACHINERY, TOOLS AND EQUIPMENT

7.12 Welding or cutting torches and hoses must not be connected to cylinders when stored in any enclosure or building. When work is shut down and equipment is unattended, close all valves at the gas and oxygen cylinders, bleed lines and check five minutes later for pressure build-up. If there is no build-up, bleed hoses at the torch, remove hoses from cylinders and store. No smoking will be permitted during this shutdown procedure.

7.13 Gas and oxygen cylinders must be handled with care, properly supported in an upright position away from any source of heat or flame and securely tied off. All cylinders not in use must have their caps in place and stored as above.

7.13.1 Oxygen cylinders in storage and not in use must be separated from gas cylinders by a fire retardant partition or a minimum distance of 10 feet.

7.13.2 When gas and oxygen cylinders are lifted by hoisting equipment, a basket, a cradle, or similar handling device must be used. Cylinders must not be lifted by the valve protection caps.

7.14 All "No Smoking" restrictions must be strictly observed. Smoking is not permitted in vehicles in designated "No Smoking" areas.

7.15 Compressed gases must not be used for cleaning of clothes, the body or work areas. Oxygen must not be used for pressure testing purposes.

7.16 Adequate ventilation must be provided when cleaning agents are used.

7.17 Contractors must not dump flammable or toxic materials into sanitary sewers or waste water system without prior clearance of the owner's representative.

8.1 The safe designed capacity of any tool or piece of equipment must not be exceeded. Tools and equipment must not be modified in any manner that reduces the original safety capacity.

8.2 All contractor owned, leased or rented equipment must be in safe mechanical working condition to render safe service at all times.

8.2.1 Equipment must be inspected by contractor supervision prior to its use on a job and periodically thereafter to insure that it is in safe working order. Crane inspection must be submitted in writing to owner's representative using the owner's "Hoisting Equipment Inspection" form. (See Sample.) Special attention must be given to such items as cables, guards, booms, blocks, hooks, grounds, electrical cords and safety devices. Equipment must be shut down before repairs or adjustments are made.

8.2.2 Defective tools and equipment must be removed from the job immediately and if repairable, must be properly repaired before reuse on owner's job.

8.2.3 Machinery, tools and equipment must not be operated without all guards and safety devices in place and functioning properly.

8.2.4 The contractor has the complete responsibility for a safe operation when using hoisting equipment to make lifts. The contractor shall verify weights of loads to be lifted. No load shall be lifted which exceeds the manufacturer's rated capacity of the crane. When one of the

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following conditions prevail, the contractor must submit in writing, using the owner's "Critical Lift Check Sheet" (see sample), an outline of the safety planning for the lift to the owner's representative prior to starting the lift.

- The load exceeds 80% of rated load charts for crane.
- The load exceeds 50% of rated load chart for crane, and possible failure would endanger existing facilities.
- Two booms are required to make the lift.
- Poles or derricks have been erected for this specific lift.

8.2.5 If burning of lugs or other such flame producing operations may be required during crane hoisting operations, arrangements for proper safe work permits must be made before the lifting operations begin.

8.3 Equipment with exposed gears, belts, couplings, etc., must be provided with proper guards.

8.4 Electrical tools and equipment operating at more than 32 volts must be properly grounded. Certain test equipment such as oscilloscopes, vacuum tube voltmeters and signal generators, as well as certain areas where exposed d-c equipment is used, do not require grounding and proper operational procedures must be ascertained from the owner's representative.

8.5 Only 32-volt, or less electrical service is to be used in connection with drop lights when working inside metallic vessels, unless 115-volt service is essential for the operation of equipment.

LIFTING EQUIPMENT INSPECTION REPORT

(Use Hydraulic Crane Inspection Form for Hydraulic Cranes)

OWNER _____	DATE _____
MANUFACTURER/MODEL _____	CERTIFICATE NO. _____
MAXIMUM CAPACITY _____	
SERIAL NO. _____	
NAME OF MANUFACTURER _____	
COUNTERWEIGHT FOR NORMAL USE _____	
BOOM LENGTH FOR NORMAL USE _____	
COUNTERWEIGHT FOR CAPACITY LIFT _____	
BOOM LENGTH FOR CAPACITY LIFT _____	
CAPACITY CHART POSTED IN CAB () 155 () 90	

	CONDITION
1. Identification and high visibility markings	
2. Booms (pin-sockets)	
3. Boom sheaves and blocks (straps)	
4. Traveling block (pin-socket fittings)	
5. Cable drums (loading and unloading)	
6. Latch lock (seen on boom)	
7. Clutch (hand-pin-socket pin)	
8. Whip line (condition of cable, age)	
9. Lash line (condition of cable, age)	
10. Boom line (condition of cable, sheave, age)	
11. Boom and jib pendant (condition of cable, sheave, age)	
12. Main boom (structural members - pins)	
13. Jib (structural members - pins)	
14. Carriage (A-frame) - (pin-socket-strap)	
15. Lifting hook	
16. Hydraulic or air system	
17. Lighting system	
18. Painting	
19. Drive chains (couplers)	
20. Tires (old structure-damage)	
21. Steering mechanism	
22. Counterweights (adequacy or not)	
23. Cab, platform, handrails, steps, etc. (screws)	
24. Fire extinguisher	
25. Boom hook safety device	
26. Power lowering - whip line	
27. Power lowering - lash line	
28. Boom base pins	
29. Soundbeeping	

OVERALL EVALUATION OF CONDITION

() Good, Safe () Fair, Safe () Unsafe

Inspector (Name) _____
 Audited by (Name) _____
 Tag No. _____ Date _____

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Check List for
Critical Lifts

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CHECK LIST FOR CRITICAL LIFTS

1. ACC. #/U.O.# _____
2. JOB DESCRIPTION _____
3. LOCATION _____
4. DOW REPRESENTATIVE _____
5. PLANNING DATA:
 - A. 1. CONTRACTOR _____
 2. SUPERINTENDENT _____
 3. SUPERVISOR RESPONSIBLE FOR LIFT _____
 - B. DESCRIPTION OF ITEM TO BE RAISED _____
 - C. MAJOR HOISTING EQUIPMENT TO BE USED (Must include inspection tag number and date. Tags are valid for (six months.)
 1. _____
 2. _____
 3. _____
 4. _____
 - D. EQUIPMENT AND LIFT RELATIONSHIP
 1. OPERATING RADIUS _____
 2. BOOM LENGTH _____
 3. ALLOWABLE LOAD (FROM LOAD CHART) _____
 4. RATIO OF LIFT TO ALLOWABLE LOAD _____
 5. CLEARANCE BETWEEN BOOM & LIFT _____
 6. CLEARANCE TO SURROUNDING FACILITIES _____

- E. SCHEDULE OF OPERATIONS (INCLUDE TIME FOR RIGGING AND EQUIPMENT INSPECTIONS.) _____
6. BASIS FOR CRITICAL LIFT:
 - A. LOAD EXCEEDS BOX OF LOAD CHART FOR CRANE OR DERRICK _____
 - B. LOAD EXCEEDS 50% OF LOAD CHART, AND FAILURE WOULD ENDANGER EXISTING FACILITIES _____
 - C. TWO BOOMS ARE REQUIRED _____
 - D. POLES OR DERRICKS HAVE BEEN SELECTED FOR THIS SPECIFIC LIFT _____
7. HOW WEIGHT OF CRITICAL LIFT WAS OBTAINED:
 - A. CERTIFIED SCALE WEIGHT _____
 - B. CALCULATED INDEPENDENTLY BY MORE THAN ONE SOURCE.
 1. SOURCE _____ WEIGHT _____
 2. SOURCE _____ WEIGHT _____
 - C. IF LIFT IS AN EXISTING ITEM (BEING REMOVED OR DEMOLISHED), THE WEIGHT IS TO BE RECALCULATED, TAKING INTO ACCOUNT ALL MODIFICATIONS INCLUDING INTERNAL AS WELL AS AN ALLOWANCE FOR SCALE, SEDIMENT, SLUDGE, INSULATION, LIQUID, ETC.
 1. SOURCE _____ WEIGHT _____
 2. SOURCE _____ WEIGHT _____
8. CONDITION OF HOISTING EQUIPMENT & RIGGING
 - A. HAS EQUIPMENT BEEN REINSPECTED FOR THIS LIFT? _____
 - B. HAS ALL EQUIPMENT & RIGGING BEEN INSPECTED AND FOUND IN ACCEPTABLE CONDITION FOR THIS LIFT? _____
9. CUTS, ANCHORS AND CUTS:
 - A. ADEQUACY OF FOUNDATION FOR FOOT BLOCKS _____
 - B. ADEQUACY, NUMBER AND LOCATION OF CUTS & ANCHORS _____
 - C. FOOT BLOCKS ARE TO BE ANCHORED _____



Check List for
Critical Lifts

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CHECK LIST FOR
CRITICAL LIFTS

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D. CONDITION OF ALL CABLE, INCLUDING SPLICES, CLAMPS, THIMBLES,
AND OTHER HARDWARE _____

10. STABILITY OF GROUND AREA:

A. CHECK SOIL BEARING ALLOWABLE LOAD _____

B. WILL MATS BE REQUIRED? _____

C. ANY UNDERGROUND INSTALLATIONS REQUIRING SPECIAL TREATMENT _____

11. OPERATORS:

WHAT IS OPERATOR'S EXPERIENCE ON THIS EQUIPMENT AND THIS TYPE OF
LIFT? _____

12. REMARKS:

NOTHING IN THIS SUBMISSION AND/OR ACCEPTANCE OF THIS CHECK LIST
IS TO BE CONSIDERED AS RELIEVING THE CONTRACTORS OF ANY RESPON-
SIBILITY FOR A SAFE OPERATION.

CONTRACTOR

BY: _____

TITLE: _____

RESUME OF ACTUAL SCHEDULE:

DATE OF LIFT _____

INSPECTIONS COMPLETED _____

LIFT STARTED _____

PERMANENT SUPPORTS COMPLETED _____

TOTAL TIME _____

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9.0 LADDERS AND SCAFFOLDS

8.6 When arc welding is being done in an area restricted by a safe work permit, the grounding lead must be connected to the work within the limits as provided in the safe work permit.

8.7 Any contract provision for connections to an owner's plant services for construction use must be cleared with the owner's representative. Authorized connections must be made under the direction of the owner's personnel. The turning off and on of the supply shall be done only by authorized owner's personnel.

8.8 Gloves must not be worn while using grinders, drills, saws or any tools where gloves are apt to become entangled.

8.9 Loose clothing must not be worn while working around machinery.

8.10 Personnel must not crank any machinery with their feet.

8.11 Hose connectors and adaptors must be of a standard manufacture and used only for the type of service intended.

8.11.1 In order to insure positive locking at all times, connectors must be in good condition and not abused. Sandblast hose connections shall be the safety lock type which prevents accidental disengagements.

8.11.2 Air pressure on pneumatic tools must be bled down before tools are disconnected from air supply.

9.1 All ladders must be of the proper length and in good condition before using them. All unacceptable ladders must be immediately removed from owner's property.

9.1.1 Ladders are not to be painted with anything other than clear paint or linseed oil.

9.1.2 All straight ladders must be tied off or held. Stepladders higher than ten feet must be tied off at the top or held at the bottom by another workman. Personnel must not stand on the top step of any stepladder.

9.1.3 When climbing a ladder, personnel must face the ladder and keep both hands free for climbing.

9.1.4 Set straight ladders so that the bottom is out from the vertical about one-fourth of the distance from the upper support to the bottom.

9.1.5 All ladders should be provided with nonskid adjustable feet or properly supported on a level surface.

9.1.6 The area around the bottom of all ladders must be free from slippery substance and tripping hazards.

9.1.7 Ladders are not to be used as pencil or scaffold boards.

9.1.8 The top section of extension ladders are not to be used by themselves.

9.2 The use of No. 9 soft annealed wire should be minimized on scaffolds.

9.2.1 When No. 9 soft annealed wire is used, a minimum of two separate strands must be used to tie scaffold handrails.

✓ Included

braces, etc. The ties must be crossed to form a lock and prevent slipping in any direction.

9.2.2 Do not reuse No. 9 wire for any purpose.

9.3 Makeshift scaffolds such as boxes, crates and drums must not be used.

9.4 Wood scaffolding, aluminum ladders, aluminum scaffolds and aluminum pencil boards are not permitted except in special cases as specified in operating area rules and job specifications or by prior written approval from the owner's representative.

✓ 9.5 The following rules apply to all patented metal scaffolds:

9.5.1 Scaffolds must be erected with proper fixtures made for each type of scaffolding. Scaffolds and associated equipment must not be modified in any manner that reduces the manufacturer's designed performance.

✓ 9.5.2 All scaffolds and allied equipment must be kept in good repair.

✓ 9.5.3 Equipment that is damaged or deteriorated to the extent that it is unsafe shall not be used. Such equipment shall be removed from the owner's property.

✓ 9.5.4 Compensate for unevenness of ground by using adjusting screws in addition to proper blocking.

✓ 9.5.5 Do not force braces to fit. Adjust evenness of scaffold until the proper fit can be made with ease.

✓ 9.5.6 Use ladders when climbing scaffold rather than the cross braces and handrails.

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? 9.5.7 Personnel shall use ladders when climbing scaffold rather than the cross braces.

✓ 9.5.8 Horizontal diagonal bracing shall be used at bottom and intermediate levels of thirty feet to prevent racking of all scaffolds.

✓ 9.5.9 Planking overhang shall be 3-5/8" on stackup scaffolds. 1" by 4" wood cleats shall be nailed across top of planking at each end outside end frames. 2" by 2" cleats shall be bolted underside each end of plank with 2-1/4" stove bolts.

✓ 9.5.10 The maximum span for guying or tying off all fixed towers is every 18' of elevation.

✓ 9.6 The following rules apply to rolling tower scaffolds:

9.6.1 The minimum base dimensions for towers shall be 5' x 7'.

✓ 9.6.2 Towers of a height greater than three times the minimum base dimension must be guyed or tied off while being erected, used or dismantled.

✓ 9.6.3 Caster brakes must be applied when not in motion.

✓ 9.6.4 Towers must be free of men, material and equipment while being moved. Care must be exercised while moving.

✓ 9.6.5 Surface area where tower is being moved shall be free of rubble or any material that may cause the tower to tip.

✓ 9.6.6 Do not attempt to move a rolling tower without sufficient help.

- ✓ 9.6.7 Do not extend adjusting screws beyond the limits specified by the equipment manufacturer.
- ✓ 9.6.8 The minimum size for casters shall be 6". Scaffolds higher than 25' must be stabilized either with outriggers or hand lines while being moved.
- ✓ 9.6.9 Horizontal diagonal bracing is to be used at the bottom and at intermediate levels of 30 feet.
- ✓ 9.6.10 Do not use knee braces or cantilevered brackets on rolling towers.
- ✓ 9.7 The following rules apply to suspended scaffolds:
 - ✓ 9.7.1 Chains or 1/4" (minimum) steel cable shall be used to support suspended scaffolds. All suspended scaffolds shall be anchored to prevent swinging. Chains so used shall be made of not less than 1/4" links* and shall be inspected immediately prior to each use.
 - ✓ 1/4" proof coil loading chain
Safe Load 900 lbs.
 - ✓ 5/16" proof coil loading chain
Safe Load 1,360 lbs.
 - ✓ 5/16" proof coil loading chain
Proof-tested Safe Load 2,720 lbs.
 - ✓ 5/16" proof coil loading chain
Unlimited Safe Load 5,440 lbs.
 - ✓ 9.7.2 The suspended support must be insulated when arc welding is to be performed from platform, thus avoiding accidental arcing and subsequent failure.
 - ✓ 9.7.3 Block and falls shall be a minimum of two sheaves for 3/4' rope and the minimum size rope shall be 5/8". Acid resistant rope shall be used in

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acid or caustic areas. Tail ropes shall be placed in an open container for protection while used in an acid area or above operating machinery, pumps, etc. All ropes and blocks must be inspected and tested prior to each use and taken down and stored inside at the end of each work day.

9.8 The following rules apply to all scaffolds:

- ✓ 9.8.1 Scaffolds and related material shall be carefully inspected at regular intervals and particularly just before using.
- ✓ 9.8.2 Provide sufficient sills or underpinning on all scaffolds to be erected on filled or otherwise soft ground. Scaffold boards shall not be used for this purpose.
- ✓ 9.8.3 All scaffolds must be plumb and reasonably level at all times.
- ✓ 9.8.4 Anchor running scaffolds to wall approximately every 28' of length and 18' of height. Use additional care when using pulley arms.
- ✓ 9.8.5 Handrailing and access ladders must be used on all scaffolds regardless of height. Scaffolds higher than 30' around columns, tanks, etc., must have access ladders constructed on the inside, ~~unless a ladder cage is provided.~~ Handrails must be at a height sufficient to provide maximum personnel safety.
- ✓ 9.8.6 Scaffolds must not be used as material hoist towers or for mounting derricks without first determining the loads and stresses involved.
- ✓ 9.8.7 Erect scaffolds in such a manner that ladder is accessible and lined up from top to bottom.

9.8.8 Lumber used in the construction of platforms shall be of good quality and reasonably straight grained. It shall be free from defects such as injurious ring shakes, checks, splits, cross grains, unsound knots, knots in groups, decay and growth characteristics or any other defect which materially decreases the strength of the lumber. Planking shall not be painted all over, as this would conceal any defects. Scaffold boards shall be identified by painting each end. All scaffold boards shall be used exclusively for that purpose. Nothing less than 2" x 4" material shall be used as handrails on wooden scaffolds.

9.8.9 The normal size of planking shall be determined from Table I. These values are for planks with the wide face up, with the loads concentrated at the center. Loads given in the table are net. Allowance has been made for the weight of the planking. If select structural coast region Douglas fir, merchantable structural square and sound southern pine are used, the loads may be increased 45 percent.

9.8.10 Planks used for platforms shall be of uniform thickness, laid close together. These planks must be overlapped at the bearers. An overlap of at least 2' must be allowed with the bearing in the center of the overlap. When planks overhang a bearer more than one-tenth of the length of the span, the planks must be securely fastened to the bearer at the opposite end to prevent tipping.

9.8.11 All nails used in scaffold construction shall be driven full length. If double headed nails are used, they shall be driven to the first head only and may not be used on platforms or walkways. No nail smaller than 8d shall be used in this construction. The design must be such that no nail is subject to a direct pull.

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9.8.12 Where beams are used in scaffolding, the schedule of loads shown in Table II shall be followed. Loading on cantilever type beams for tool and material hoists is shown in Table III. It should be noted that the loading at the center of bearing point is 4 times as great as the load being lifted and the bearing should be checked to ascertain if it will support the contemplated load. The inboard end of the beam has a force upward of twice the load and must be securely fastened with no nails in direct pull.

9.8.13 Platforms shall be kept clear of slippery substances and tripping hazards.

10.0 DANGER, WARNING & CAUTION TAGS

10.1 Danger Tags (Red)

10.1.1 To insure that operating status of equipment is not changed while it is being used or worked on, red danger tags must be attached to the controls so that personnel will know not to use them. These tags must be used to protect personnel exposed to hazards of equipment and must be respected by all personnel. The personnel responsible for the operation of equipment or their designee must clear and tag the equipment. Any personnel whose safety could be endangered while working on this equipment must affix their tag. Violation of red danger tag rules will result in disciplinary action up to and including rejection from any work on owner's property.

10.1.2 No control such as a valve, switch, clutch, etc., is to be operated by anyone while a red danger tag is attached. If a control must be operated intermittently such as for testing equipment, the red danger tag must be properly removed before each operation.

TABLE I
SAFE CENTER LOADS FOR SCAFFOLD
PLANKS IN POUNDS

Span in Feet	SIZE OF PLANK			
	2 x 10 Dressed To 1 5/8 x 8 1/2	2 x 12 Dressed To 1 4/8 x 11 1/8	3 x 10 Dressed To 2 5/8 x 8 1/2	3 x 12 Dressed To 2 5/8 x 11 1/8
6	296	308	667	807
8	182	232	500	606
10	163	196	400	484
12	128	166	323	404
14	110	133	286	346
16		116	250	303

TABLE II
SAFE CENTER LOADS ON TIMBER USED AS
BEAMS IN POUNDS

Nominal Timber Size	LENGTH OF SPAN IN FEET							
	5	6	8	10	12	14	16	20
2 x 4	440	280	210					
4 x 4	725	575	420	330	260	215		
2 x 6	780	650	470	380	290	240	190	
2 x 8	1400	1150	850	660	530	460	370	190
2 x 10	2180	1820	1360	1060	860	710	600	460
2 x 12	2800	2400	1960	1530	1260	1060	900	710
3 x 4	2100	1700	1290	990	810	680	580	470
3 x 6	3290	2760	2120	1680	1300	1070	900	710
3 x 8	4570	3840	2920	2200	1680	1370	1140	900

TABLE III
SAFE LOADING FOR SIMPLE MATERIAL
HOIST ON CANTILEVER BEAM IN POUNDS

Beam Size	LENGTH OF CANTILEVER IN FEET						
	2	3	4	5	6	7	8
4 x 4	220	180	106	80	65		
4 x 6	496	328	260	180	150	125	105
6 x 6	746	490	360	265	230	180	160
8 x 8	1376	876	650	515	420	350	300
8 x 6	1766	1165	865	685	560	470	400

Horizontal dimension from front bearing to rear anchor must be equal to or greater than cantilever. Proportion "B" in table.

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Attachment of danger tags to equipment controls does not mean that equipment has been cleared to work on. When work is to be done on tagged-out equipment, personnel responsible for the operation of the equipment are responsible for clearing the equipment and making it safe for others to work on.

10.1.3 Whenever the operation or use of any equipment may endanger anyone, a request must be made to supervision of the group which operates the equipment to clear and tag the equipment. "Clearing" means making the equipment inoperable and safe for others to work on. The authority to clear and tag equipment may be delegated by this supervision to any qualified personnel after supervision has assured themselves that the person delegated can properly clear the particular job involved.

10.1.4 After the group which operates the equipment has cleared and tagged the equipment, each worker or group of workers who may be exposed to the hazards must tag the equipment for their protection. When red danger tags are attached to equipment by persons other than those responsible for its operation, prior approval from the person responsible shall be obtained.

10.1.5 As the individual jobs have been completed, each worker or group of workers must remove their tags immediately.

10.1.6 The group responsible for the equipment must place their tag first and remove their tags last.

10.1.7 Red danger tags may be removed only upon authorization of the person designated on the tag. The supervisor of any person who fails to remove a red danger tag when a job has been

completed may authorize the removal of the tag after he has determined to his complete satisfaction that the equipment can be operated in a safe manner. In the space on the tag entitled "Removal Will Be Ordered By" it is permissible to designate a classification such as shift foreman, electrician, or machinist instead of a specific individual's name.

10.1.8 At the discretion of the supervisor, locks may be used on valves and switches in addition to, but not replacing red danger tags.

10.1.9 Tags removed must be filled out and turned in to the owner's representative.

10.2 Warning Tags (Green)

10.2.1 When it is necessary to convey instructions or information prior to operation of equipment controls, green "warning" tags are to be attached to the controls.

10.2.2 Green "warning" tags should be removed when conditions set forth on the tag have been met.

10.3 Caution Tags (White)

10.3.1 White caution tags are affixed to mechanical or electric equipment by the owner's representative to prevent operation of such equipment by anyone until items on the tag have been completed.

10.3.2 The tag provides spaces for meggering, rotation, final alignment and lubrication of equipment. When appropriate action has been taken, the personnel performing the work signs and dates the tag.

10.3.3 When tagged equipment is released to the owner, a representative of

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operations and the owner's representative sign the tag which is kept by the owner's representative until job completion.

11.0 SAFE WORK PERMITS

11.1 Safe work permits issued by the owner to contractor personnel may be required for certain hazardous locations and conditions. These permits are designed to provide a means of checking at the job site the safety of such jobs as, but not limited to, entering closed vessels; working on electrical gear; welding, cutting on, breaking into or repairing pipelines or vessels in operation or under pressure or that have contained hazardous materials. These permits also cover work involving the use of flame or spark producing equipment in hazardous areas or near an open ditch and work on machinery.

11.2 Contractor supervision must be in close contact with the progress of work as well as communicating with the owner's representative for up-to-date status of operations. Further, contractor supervision must be certain that all personnel involved are informed as to specific procedures and changes in the situation.

11.3 Safe work permits are to be initially requested through the owner's representative and issued by the owner's operating area or facility supervision involved on any job where the safe work permit is applicable. More than one safe work permit may be required on certain jobs which will be ascertained upon obtaining each safe work permit. Permits are issued on a day-to-day basis.

11.4 Personnel must give a careful and complete description of the work to be done to the person issuing the safe work permit.

11.4.1 Where a job presents a serious man hazard due to chemical, mechanical, electrical, temperature or height exposure, it is mandatory that a written safe job procedure accompany the

request for the safe work permit. This procedure is to be signed by the owner's representative, process representative, and the contractor, who thereby agree that the procedure allows the job to be done safely.

11.5 Directions and restrictions noted on safe work permits must be carefully followed.

11.6 A safe work permit must be reissued for a job if there is evidence that conditions have changed subsequent to the issuance of the original safe work permit.

11.7 Permits issued for jobs that last longer than one day will normally be issued for that job each day. By mutual consent of the parties involved, permits for these jobs may be issued for longer or shorter periods of time.

11.8 Vessels in an existing facility to be entered must be made safe for personnel by such measures as disconnecting, blinding, or double block and bleed on connecting piping. If such precautions are impractical, a detailed procedure for performing the work in a safe manner must be prescribed as specified in Paragraph 11.4.1.

11.9 Vessels in an existing facility to be welded on, or cut, must be positively checked inside for flammable or explosive gas and/or liquids and and safe work permits issued before heat is applied.

11.10 The contractor may request safe work permits for his own protection. Safety checks by the owner for dangerous gases or chemicals should be requested through the owner's representative when there is any uncertainty.

11.11 All safe work permits in the area affected are automatically cancelled when an emergency signal is sounded and must be reissued after the all clear signal.

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12.0 EXCAVATIONS, FLOOR OPENINGS, BARRICADES

12.1 Where a safety hazard would be created for any personnel, excavations such as ditches, trenches, or bell holes should be sloped sufficiently to prevent cave-ins or slides. If sloping is impractical, shoring must be used in cases whenever the vertical dimension exceeds four feet.

12.1.1 Personnel removing shoring after completion of work must not be in the bottom of the excavation. Shoring must be removed in such a manner to prevent cave-in on personnel.

12.2 Contractors must provide adequate barricades, covers, handrails, signals, flagmen, or other appropriate warning devices to protect personnel near any hazardous operation or excavation. Floor openings, open trenches, excavations, etc., shall be covered when handrails or barricades do not provide adequate protection to personnel.

12.2.1 Contractors must notify the owner's representative of necessary obstruction on road shoulders on the day it occurs.

12.2.2 Contractors must obtain approval from the owner's representative at least one day prior to cutting roads or otherwise obstructing traffic on plant roads.

12.3 Grade lines, ropes, chains, etc., must be sufficiently marked in order to be visible day or night.

12.4 No obstruction of any kind, whether permanent or temporary, is permitted within 8'-9" horizontally from the center line of any railroad track and within 22'-6" vertically from the top of the rail. Specific authorization from the owner's representative as well as blue flags are required prior to boring under or excavating adjacent to railroad tracks. Blue

flags must be placed on railroad tracks when the entrance of a train would present a hazard to personnel or equipment.

12.5 In locations where strictly temporary loading or unloading operations are to be undertaken, portable derrails must be used by personnel engaged in these operations to prevent overrunning of the cars by a train.

12.6 Blue flags meeting ICC specifications, available through the owner's representative, must be placed on railroad tracks when the entrance of a train would present a hazard to personnel or equipment and in addition to, or in conjunction with, derrails during loading or unloading operations. Blue lights, available from the owner's representative, must be attached to blue flags at night.

12.6.1 Blue flags must be placed on the tracks so they will be in unobstructed view of the train crew and they must be placed a minimum of two-car lengths (100 feet) in front of the end car they are intended to protect. Exceptions to the minimum distance may be made by the owner's representative where existing installations do not allow sufficient space.

12.6.2 Blue flags must be removed immediately when the hazard for which they were installed no longer exists.

13.0 RADIATION

13.1 All state and/or federal laws governing use, storage or handling of a radiation source must be complied with.

13.2 A minimum of two qualified people are required for the performance of any radiographic work.

13.3 In locations where a radiation source is used or stored, regulations require that it be marked with a "Radiation Material" sign. This sign is for the purpose of informing anyone in

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the area that such material is present, and not that a safety hazard due to radiation exists.

13.3.1 Only authorized personnel may enter an area marked by "Radiation Area" sign.

13.3.2 All areas where a radiation hazard exists must be roped off and marked conspicuously by standard signs at a safe distance from the source of radiation. These signs bear the radiation symbol of magenta (or purple) on a yellow background with the words "Caution—Radiation Area."

13.3.3 "Radiation Area" signs must be removed when a radiation hazard no longer exists in the affected area.

13.4 Equipment containing a source of radiation must not be handled, uncrated or installed without prior clearance with the owner's representative.

14.0 DEMOLITION

14.1 This section specifically covers the demolition (removal of facilities that have been abandoned. Due to the inherent hazards in this type of work, special care must be devoted to safe procedures, scope understanding and communications concerning the safe clearance of work.

14.2 It is not appropriate to make assumptions in any stage of a demolition job. Responsibilities must be delegated only to those whose profession qualifies them to make the necessary judgments and decisions that are required to assure the safest possible prosecution of the job. From start to finish, each person connected with a demolition job must adopt an attitude of "prepare for any possibility."

14.3 The contractor shall make certain that all lines, services and equipment have been cleaned

or purged and properly cleared for safe removal. All lines (including water and steam) are to be considered hot until positive safe clearance has been obtained.

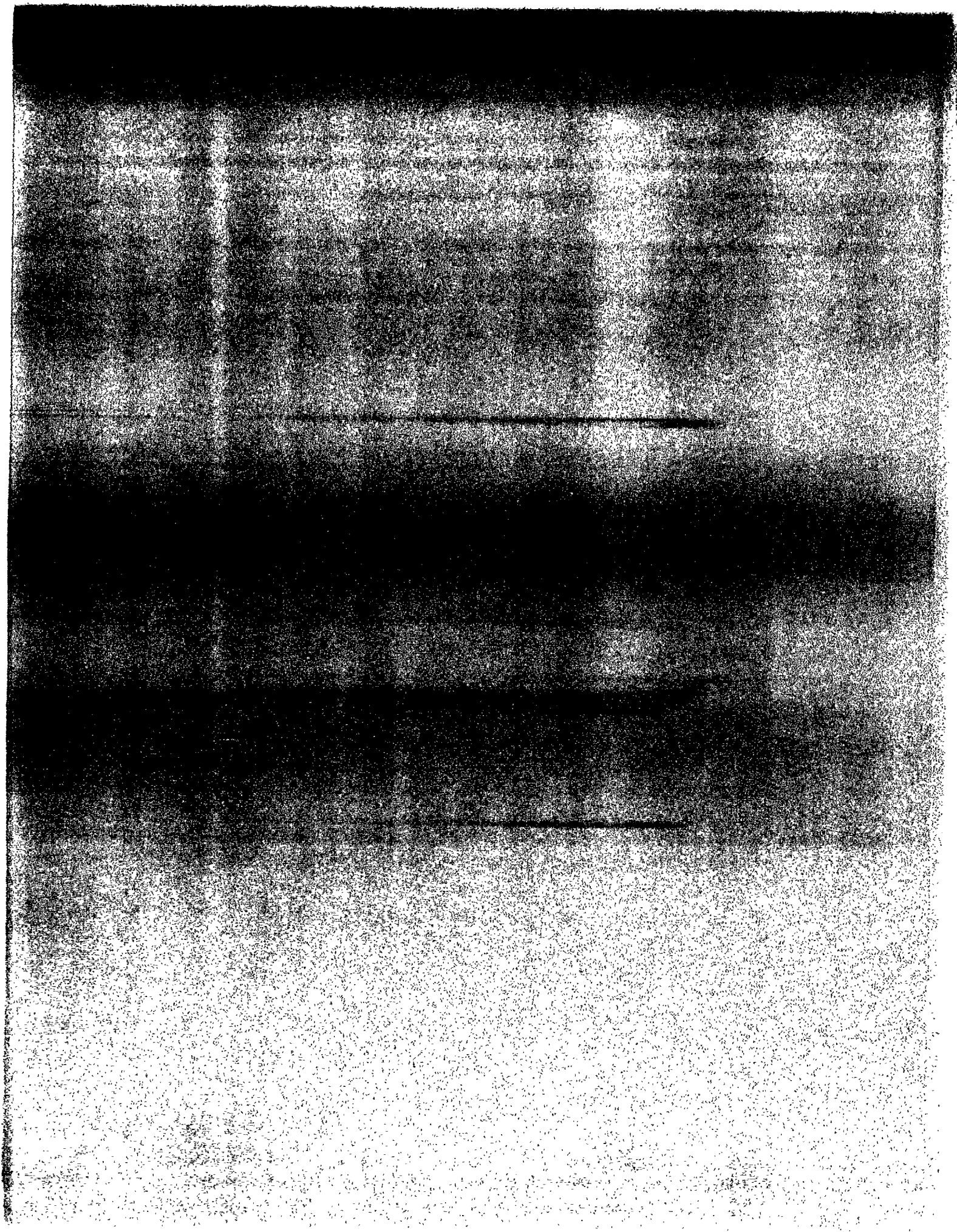
14.4 Special care shall be exercised to locate and mark old underground or otherwise hidden lines, cables and sewers using the best available information and owner's assistance.

14.5 The prejob safety meeting with the contractor, as covered in Section 1 of this manual, shall devote special attention to preplanning the safety aspects of demolition jobs.

14.5.1 Steps of dismantling and loads to be handled shall be reviewed with the owner's representative prior to starting work.

14.5.2 Temporary provisions must be made where safety showers, eyewash baths and fire extinguishers are being moved in the work area.

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PLAINTIFF'S EXHIBIT

DOW-2916

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**SAFETY AND LOSS
PREVENTION MANUAL
FOR CONTRACTORS**



AMBULANCE
FIRE
ACCIDENTS
EMERGENCIES



DIAL
666

THE DOW CHEMICAL COMPANY
TEXAS DIVISION
April, 1970

**SAFETY AND LOSS PREVENTION
MANUAL FOR CONTRACTORS**

**FOR USE BY ALL CONTRACTOR PERSONNEL
WORKING IN THE TEXAS DIVISION**

**THE DOW CHEMICAL COMPANY
TEXAS DIVISION**

April, 1970

(Supersedes Safety and Loss Prevention Manual
for Contractors dated January, 1969)

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INTRODUCTION

This safety manual contains the minimum safety rules and procedures for performance of work by contractors and their sub-contractors as required by the Texas Division, The Dow Chemical Company. Contractor assumes and has the full responsibility and ability for the safety of its agents, servants and employees and for the compliance of its sub-contractors, and anything contained herein does not relieve the contractor of such responsibility or liability. The Dow Chemical Company is hereinafter referred to as Owner. The Owner will be represented on construction as defined in the contract and hereinafter referred to as "Owner's Representative."

Safety rules and procedures are an integral part of each contract and must be carried out fully, as any other specification for the job. The contractor will be held responsible for his sub-contractors conforming with these safety rules and procedures. Any exception to the rules set forth herein must have prior written authorization from the Owner's Representative.

Contractors and contractor supervision unable or unwilling to secure personnel performance in keeping with these rules will not be acceptable. Contractor employees who exhibit a poor attitude toward safe work and safety procedures will not be acceptable. EMPLOYEES LEAVING A JOB DUE TO SAFETY VIOLATIONS WILL NOT BE ALLOWED TO RETURN TO ANY OWNER'S WORK WITHOUT PROPER AUTHORIZATION FROM THE OWNER. The contractor's safety record will be one criterion used to judge his qualifications for bidding.

In addition to the rules set forth herein, contractors working in or near an existing operating facility must be cognizant of and conform to Owner's safety rules for that area and any federal, state or local laws governing.

Should any procedure set forth herein conflict with applicable federal, state or local laws, the latter will apply.

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1.0 GENERAL SAFETY RULES

1.1 The contractor shall actively and adequately promote safe working performance on the part of his employees. He shall participate in activities to this end, such as contractor safety organizations (e.g., Contractors' Safety Council of Brazosport), incentive award programs, contractor owner programs, etc. It is expected that each contractor will conduct his own safety programs to best suit his particular needs.

1.1.1 American National Standard, Z-16.1, "Recording and Measuring Work Injury Experience," shall be used as a guide to classify contractor injuries.

1.2 Prior to starting any field work on each job, the Owner's Representative will conduct a pre-job safety conference with an authorized representative of the contractor, a Manufacturing Representative, available subcontractors' representatives and Owner's Safety Department representative, when available. At this time, the nature of any chemical hazards or special safety rules for the area will be reviewed with the Process Representative and the contractor will be provided with printed copies of area rules where applicable. The "pre-job safety check sheet" form (see sample) will be prepared by the Owner's Representative and a copy furnished to the contractor.

CONSTRUCTION
PRE-JOB SAFETY CHECK SHEET

DATE _____
BLOCK _____

JOB or C.D. NUMBER _____ CONTRACTOR _____

1. Are all employees properly fully indoctrinated?	Yes ☐ No ☐ N.A. ☐
2. Contractor responsible for safety of employees understood?	Yes ☐ No ☐ N.A. ☐
3. Free and unobstructed emergency exitways?	Yes ☐ No ☐ N.A. ☐
4. Location of portable electrical equipment?	Yes ☐ No ☐ N.A. ☐
5. Are all electrical equipment adequately grounded?	Yes ☐ No ☐ N.A. ☐
6. Are electrical equipment located and placed away from potential of electrical equipment?	Yes ☐ No ☐ N.A. ☐
7. Are all electrical equipment properly grounded?	Yes ☐ No ☐ N.A. ☐
8. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
9. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
10. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
11. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
12. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
13. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
14. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
15. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
16. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
17. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
18. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
19. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐
20. Are all electrical equipment properly grounded and protected with proper grounding equipment?	Yes ☐ No ☐ N.A. ☐

REMARKS _____

Contractor Representative	Date	Subcontractor	Date
Owner's Representative	Date	Subcontractor	Date
Inspector or any other person	Date	Subcontractor	Date
Owner's Representative	Date	Subcontractor	Date

1.3 An effective system of indoctrination and education of employees in safety and loss prevention is expected of each contractor. Contractors shall inform all their employees of all safety rules and all safety procedures before working in an Owner's plant.

1.3.1 Contractors shall inform all of their employees of the location and use of nearest safety shower, eye bath and emergency equipment such as gas masks, fire extinguishers and fire blankets.

1.4 Contractors shall use a regular system of work inspection to detect and correct hazardous conditions, safety rule violations and unsafe working practices. These safety inspections shall be reported to the Owner's representative in writing each week.

1.4.1 Orderliness is a basic requirement for all jobs and must be maintained at all times. Special attention must be given to maintaining clear walkways and roadways, removal of trash, removal of slipping and tripping hazards and proper stacking of materials. Contractors must make every effort to keep mud, slush or other slippery substances off plant roads. In cases where this cannot be avoided, contractors must clean the roadways immediately.

1.5 Temporary buildings and material storage areas shall be set up as neatly as possible to present an orderly appearance.

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1.5.1 Temporary buildings or combustible materials must not be located under power lines or pipeways. Overnight parking of equipment or vehicles under power lines or pipeways is not permitted.

1.5.2 Temporary buildings shall be sheeted with non-combustible material, such as transite or metal siding and roof, and each must be identified with the contractor's name and building number.

1.5.3 Contractors' temporary buildings must be properly tied down upon placement at the job site. A minimum of four 4-inch screw anchors a minimum of two feet in the ground are required. A minimum of two such anchors are required for portable toilets.

1.5.4 Metal buildings served with electricity must have the skin of the building and the service entrance switch separately grounded. Jumpers must be used, if necessary, to tie the roof and sides of the building together to insure complete grounding.

1.5.4.1 Ground rods shall be $\frac{3}{4}$ " minimum galvanized steel and shall be driven to a depth of 10 feet.

1.6 Contractors must furnish trash containers made of metal with metal covers kept in place.

1.7 Contractors must report immediately in writing to the Owner's Representative, by name, those employees DISCHARGED for safety rule infractions. The reason for the discharge must be given.

1.8 Contractors shall maintain continuous safety planning to cover jobs where circumstances have changed and new hazards require new controls.

2.0 EMERGENCY PROCEDURES

2.1 The following procedure must be used to call an ambulance, report a fire, spill of hazardous materials or release of hazardous gases.

2.1.1 Dial "666" and state the type of emergency.

2.1.1.1 If the "666" number does not answer immediately, dial "O" (Operator).

2.1.2 Give your name, the nature of the emergency and its exact location, including building number and door letter, if applicable.

2.1.3 Stay on the line until sure that the message is understood and confirmed.

2.1.4 Station someone on the road to direct emergency equipment to the scene.

2.2 Personnel must know the location of any plant alarm horns. In case of a gas release, observe the wind direction as indicated by the alarm horn and wind vane indicator and proceed to go crosswind. STANDARD EMERGENCY SIGNALS ARE AS FOLLOWS:

2.2.1 GAS RELEASE _____
(Continuous)

Shut down all of your equipment in operation. Stop smoking. All Safe Work Permits in that area are automatically cancelled. Personnel in other areas downwind must be alert for signals in their area or verbal instructions.

2.2.2 ALERT
(Series of short blasts)

Shut down all of your equipment in operation. Stop smoking. All Safe Work Permits in that area are automatically cancelled. Personnel in other areas downwind must be alert for signals in their area or verbal instructions.

2.2.3 EVACUATE
(Series of 3 short blasts)

Evacuate according to the unit emergency plan of the plant in which you are working or, lacking such a plan, observe the wind direction as indicated by the alarm horn and wind vane indicator and proceed to go crosswind or, if that direction is not possible, upwind.

2.2.4 ALL CLEAR _____
(Series of 3 long blasts)

When this signal is given, personnel may re-enter the work area. Safe Work Permits must be reissued prior to starting work.

2.3 If operating a motor vehicle in an area where emergency signals are given, turn off the engine, get out of the vehicle, and be prepared to leave the area if necessary. Motor vehicles, other than emergency units, must not be driven into an area downwind of a gas release signal. Barricades across plant roads must be honored by all vehicles at all times.

2.4 In case of fire, explosion or other emergency, the contractor shall notify the proper Owner's Representative or his headquarters in person or by telephone as soon as possible that all employees in the area are accounted for or that specific employees cannot be accounted for.

2.5 Emergency horns are tested each Monday at 12:00 noon with the "All Clear" signal given first and last in the test cycles.

3.0 FIRST AID - INJURIES - REPORTS

3.1 The Owner's Representative shall be notified immediately in the event of any death, occupational disease, disabling injury or potentially significant injury to a contractor employee (whether or not it is determined that a "disabling injury" will be involved)

while at work on the Owner's job. He shall also be notified immediately of the occurrence of any potentially serious incident (no injury involved) or of any hazardous condition observed.

3.1.1 The contractor must thoroughly investigate, determine and report all details of an accident and cooperate with the Owner and Contractors' Safety Council inspection teams.

3.1.2 A written report must be submitted on every injury requiring medical treatment of any kind, to the Owner's Representative on the job, no later than 10:00 a.m. of the day following the injury. Also, any near-miss, potentially serious incident or hazardous condition that occurs, must be reported in the same manner, although no injury to personnel may be involved. Forms for these reports, "Notice of Contractor Accident and Property Loss", are available through the Owner's Representative. (See sample)

3.1.3 All fires must be reported, regardless of duration or extent.

3.2 Employees must report any injury to their immediate supervisor even though it may be considered slight.

3.2.1 The contractor shall make sure that all injured personnel report to a recognized medical facility. A First Aid

NOTICE OF CONTRACTOR ACCIDENT OR PROPERTY LOSS

The notice to be submitted by contractor to the Owner Representative as soon as possible, but not later than 10:00 a.m. the day after any injury requiring medical treatment of any kind, or for any potentially serious incident or hazardous condition occurring, although no injury was involved.

CONTRACTOR _____ SUB CONTRACTOR _____

P. O. No. _____ DATE _____ TIME _____ A.M. P.M. LOCATION _____

NAME OF INJURED _____ AGE _____

CRAFT _____ CLOCK NUMBER _____

EXTENT OF INJURY _____

WHERE TREATED _____

IS THIS A DISABLING INJURY YES () NO () INDEFINITE ()

WHAT HAPPENED _____

CAUSE _____

CORRECTIVE ACTION TAKEN _____

SAFETY INVESTIGATION MADE BY _____

_____(Foreman) _____ DATE _____ (Owner Representative) _____ DATE _____

_____(General Foreman) _____ DATE _____ (Dow Construction Sub.) _____ DATE _____

_____(Prime Contractor Sub.) _____ DATE _____ DATE _____

Station is available at Plant A and Industrial Medical Facilities and the Community Hospital at Plant B. The contractor is responsible for furnishing treatment reports if a medical facility other than the above is used.

3.2.2 In the event of accidents, ambulance runs, etc., contractors must exert all possible effort to keep onlookers from the scene. The only personnel required in such areas are those directly engaged in assisting in the emergency.

3.3 Employees must not attempt to remove foreign material from the eyes, except by washing with water. If foreign material, either solid or liquid, gets in the eye, the eye must be washed immediately with potable running water, preferably at an eyewash station, and the washing continued uninterrupted for at least fifteen minutes. It is vital that the injured employee and others who are able to help him make sure that thorough and complete washing of the eye is accomplished. THE AMBULANCE MUST BE CALLED.

3.4 If chemicals come in contact with the body, the affected parts must be washed with running water for at least fifteen minutes. To make sure that adequate washing is accomplished, shoes and clothing covering affected parts must be removed. The Owner's Representative must be consulted before reuse of clothing and shoes that may have been contaminated.

4.0 INDIVIDUAL ACTION

4.1 Horseplay in any form is not allowed.

4.2 Running in the plant must be avoided except in case of an emergency.

4.3 Personnel must not climb through, under, over or between railroad cars of a train except in the performance of assigned duties necessitating such action.

4.4 Unless specifically authorized to do so by the Owner's Representative, contractor personnel must not make inoperative or operate safety devices such as relief valves, deluge valves, gate valves, electrical and mechanical interlocks, guards, electrical switches in an operating plant.

4.4.1 Any accidental interruption of lines or equipment in service or any irregularities observed must be reported to the Owner's Representative and/or the Owner's operating personnel immediately.

4.5 Unsafe shortcuts, such as walking pipelines, sliding down pipe or stanchions and cutting corners to save a few steps, must be avoided.

4.6 Tools, materials or equipment must not be intentionally dropped or thrown from one level to another unless adequate precautions have been taken to assure that no injury to persons or damage to equipment will occur.

4.7 Lifting of personnel by a crane is prohibited unless done by means of a bosun's chair and safety harness or by means of a crane basket and safety belt or harness.

4.8 Personnel must not stand, sit, walk, drop or jump on a transite roof. Where a permanent platform or walkway is not provided, a temporary walkway or spread footing shall be used to distribute the load over a large area of the transite.

4.8.1 In lieu of using a temporary walkway or spread footing, contractors installing transite roofs may hang safety nets under the erection area. Such nets must be of acid resistant material, and designed and installed for the specific purpose of catching personnel who might fall.

5.0 VEHICLES AND TRAFFIC

5.1 Personnel working on Owner's property will comply with all safety rules and signs regarding traffic and vehicles at all times.

5.2 Seat belts, as required by law in vehicles, shall be used whenever a vehicle is in motion.

5.3 The maximum speed limit is 30 miles per hour on open roads in the plant and 10 miles per hour within block limits, unless otherwise designated by signs.

5.4 When approaching a plant bus from either direction while it is stopped on a plant road to load or discharge passengers, vehicles must come to a complete stop. Provided that the way is clear, they may then proceed past the bus at no more than 10 miles per hour.

5.5 Smoking will not be permitted in vehicles in designated "NO SMOKING" areas.

5.6 Hauled material that overhangs the sides or ends of a truck must be red-flagged at the extent of the overhang. Loads must not be hauled from a single suspension cable that allows free swinging beyond the sides of the truck. Dragging or skidding material and objects along plant roadways is prohibited.

5.7 Fuel tanks on motorized equipment must not be filled while the engine is running or is hot, nor while welding or other hot work is being done nearby. Smoking will not be allowed in the immediate vicinity during the fueling operations.

5.8 Motorized equipment such as trucks, dozers, cranes, graders, etc., must not be left running and unattended.

5.9 Equipment such as welding machines, pumps, etc., shall not be transported with the engine running.

5.10 All equipment must be in safe mechanical working condition at all times. In addition to complying with state requirements as to brakes, lights, signals, horns, mufflers, etc., vehicles must be periodically inspected by a representative of the contractor. Necessary repairs and adjustments must be made prior to their use on Owner's property.

5.11 The use of flatbeds, stakebeds, etc., as transportation for personnel will not be permitted unless adequate safety provisions are made and the vehicle is adapted for that purpose. In any case, the number of personnel must not cause overcrowding.

5.12 Riding of "Cherry Pickers," yard cranes or winch trucks, is permitted only when adequate safety provisions such as seats, platforms, rails, etc., are provided for passengers.

5.13 The maximum number of people who may ride in the cab of a pickup is three. Personnel riding in the back must be seated on the floor of the bed, or on approved built-in seats.

5.14 Vehicles must yield to pedestrians crossing streets in marked pedestrian lanes.

5.15 Pedestrian paths and walkways must be used whenever provided. In their absence, personnel using streets and roadways must walk facing approaching traffic.

5.16 The following rules must be observed when moving cranes, cherry pickers, winch trucks and similar equipment having booms or extended loads in excess of 15 feet in front of or to the rear of the equipment.

5.16.1 A flagman must be provided.

5.16.2 At intersections, when the equipment is to proceed straight across a main

thoroughfare or turn either way, the operator must stop; the flagman must get off the equipment, clear all traffic, then flag the equipment through the intersection or around the corner.

5.16.3 Before entering any thoroughfare, street, road, etc., from a work area within a block, the flagman must clear the traffic and flag the equipment onto the road.

5.16.4 All booms extending more than 15 feet must be marked with high visibility material when moving on plant roads. Loads extending more than 3 feet in front of or behind a vehicle must be flagged. Traveling speeds must be safe and prudent, depending upon loads, traffic, road conditions, etc.

5.16.5 A flagman must be provided and swinging of loads must be controlled with a tag line when moving in a congested area or where load swinging would present a hazard to personnel or property.

5.16.6 Loads or vehicles that extend out of the normal road lanes require flagmen or escorts.

5.16.7 Contractors must check vertical clearances and bridge load limits on the route to be used prior to moving equipment or high loads.

5.17 Prior to moving extremely heavy loads,

contractors must determine from the Owner's Representative which roads are to be used, and when.

5.18 Motor vehicle accidents, including those involving personal cars on company property, must be reported to Industrial Security and the Owner's Representative immediately.

6.0 PROTECTIVE EQUIPMENT AND CLOTHING

6.1 The contractor and his employees shall recognize the importance of the use of special protective equipment and clothing whenever and wherever prescribed.

6.1.1 The contractor shall be responsible for knowing and enforcing special Owner area or job rules requiring special personnel protection.

6.1.2 Contractors shall provide their employees with the proper protective equipment required and shall enforce its use.

6.2 Approved safety glasses with approved side shields are a minimum requirement on all contractor jobs at all times and shall be properly fitted to the wearer.

6.2.1 Approved safety glasses with side shields must fulfill federal requirements (GGG-G-513) for drop-ball testing and safety code for polarized "Strain" pattern.

6.2.1.1 Prescription glasses with side shields are acceptable only if they meet the requirements of Paragraphs 6.2 and 6.2.1.

6.2.2 Employees wearing contact lenses must wear chemical goggles.

6.3 Chemical goggles, approved prior to their use, are required for working in or entering certain chemical areas which are posted with signs, or while doing chipping or power tool cleaning work on pressurized lines or equipment which contains hazardous chemicals.

6.3.1 All employees working in the vicinity of chemicals must know where the nearest safety shower and eye bathing facilities are located.

6.3.2 When chemical type goggles are in use, the headband must be around the back of the head, not around the safety hat.

6.4 Face shields, together with side shield safety glasses or chemical goggles, must be worn while grinding, chipping or buffing.

6.5 Approved plastic safety hats are required for all contractor work. The use of metal safety hats is prohibited.

6.5.1 Approved plastic safety hats must fulfill requirements in Federal Specifica-

tion GGG-H-142C. The major requirement in this specification says, "The specimen must withstand the drop of an 8 pound spherical weight, approximately 3.8 inches in diameter, from a distance of 5 feet, without breaking the hat, bottoming out or breaking suspension." Most skull caps, scalp guards, bump helmets, etc., will not meet this test. Safety hats shall not be drilled or punched for ventilation holes, or edges trimmed off hats.

6.6 When sandblasting or applying volatile or toxic material inside tanks, rooms or other inadequately ventilated areas, air hoods or equivalent equipment, supplied with filtered air, shall be worn.

6.6.1 The enclosed area must be sufficiently ventilated to prevent the build-up of an explosive mixture.

6.7 Safety belts or harnesses, with lifelines attached, are to be worn by employees when performing work in elevated positions where the use of scaffolds or ladders is impractical and where a slip might result in a serious fall.

6.8 Personnel must wear Owner approved life jackets or otherwise be protected by handrails or lifelines, when working over water wherein a drowning hazard exists.

6.9 Employees are expected to wear personal clothing that is safe and proper for their jobs.

Wearing of canvas shoes, sneakers or house-shoes, and working in an undershirt, shorts or stripped to the waist is prohibited. Loose sleeves, long watch chains or rings should not be worn where there is a potential hazard. The wearing of safety shoes is strongly recommended.

6.10 Fixed blade knives used as tools of the trade must be carried in sheaths while not in use.

7.0 FIRE PROTECTION

7.1 Accumulation of trash, oily rags, combustible material, or fire hazards of any nature will not be permitted.

7.2 The area around welding and cutting operations must be kept free of flammable material of all kinds (wood, paper, cardboard, flammable liquids, etc.

7.2.1 There must be a fire extinguisher, water hose, or other fire control equipment easily accessible for each welding, cutting, burning or other such operation.

7.2.1.1 It is the contractor's responsibility to obtain any required fire extinguishers through the Owner's Representative. It is also the contractor's responsibility to arrange, through the Owner's Representative,

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for the recharging and resealing of extinguishers immediately after each use.

7.2.1.2 When such work is being done in a grassy area where an adequate water hose is not available, mops and buckets of water shall be kept on hand for the control of possible grass fires.

7.2.2 Special care must be taken during overhead cutting and welding operations to safeguard personnel and prevent falling sparks from starting a fire. Warning signs must be posted at each level below the area of any overhead welding, burning or cutting operation. Warning signs are available through the Owner's Representative.

7.2.3 A Safe Work Permit must be obtained prior to cutting or welding along or above a railroad right-of-way. A blue flag must be placed on the track if sparks or slag could constitute a fire hazard to passing railroad cars. In the event it becomes necessary to remove the flag and move rail cars, the Safe Work Permit is cancelled and must be reissued before the work is resumed.

7.2.4 When rail cars that contain combustible or flammable material are within 50 feet of the work area, they must be moved prior to starting any hot work.

7.3 All tarpaulins shall be fire-retardant and identified as such by stenciling: "FR-treated (date)" with a minimum of 2-inch letters in diagonal corners. In lieu of this treatment, fire-proof blankets such as fiberglass or asbestos are acceptable.

7.3.1 Contractors must inspect and test all tarpaulins at least once each six months to be sure that they are still fire-retardant.

7.3.1.1 Tarpaulins passing the test must be re-stenciled to show the date of the test.

7.3.1.2 Tarpaulins failing the test must be removed from the Owner's property immediately. They may be returned only if re-treated, re-tested, approved and re-stenciled.

7.4 Fire protection must not be impaired by unauthorized use of, or interference with, fire protection equipment.

7.4.1 Fire hydrants, fire hose racks, extinguishers and other emergency equipment shall not be covered or blocked.

7.4.2 Access lanes for fire fighting equipment must not be blocked by unattended contractors' equipment after working hours. During working hours, contractors must be able and ready to clear access roads and fire lanes at any time.

7.4.3 Tie-ins with hose or piping shall not be made on any sprinkler system or monitor nozzle.

7.4.4 The hose on fire-hose racks is for emergency use only and shall not be used as service hose.

7.4.5 Temporary hose connections may be made to fire hydrants only if other water supply is not available, the tie-ins have been approved by the Owner's Fire Department through the Owner's Representative, and such connections are removed at the end of each work period (except in cases where a special waiver is granted by the Fire Department).

7.5 All heating units for offices, shops, work areas, change rooms, etc., must be in good working order and periodically inspected. Gas units must be provided with "flame-out" protective devices and electrical units must be grounded. Gas units shall not be connected by means of rubber hose. All heating units must be turned off at the end of each work day.

7.6 Flammable or explosive type material such as fuel, oil, cleaner, etc., must be properly contained, clearly identified, separately stored and kept clear of work areas. Appropriate warning signs must be provided in storage areas.

7.7 All containers used for transporting or transferring gasoline or fuel must be labeled by Underwriters' Laboratories or Factory Mutual Laboratories.

7.8 Fuel storage tanks, filler hoses and the dispensing vehicle or container must be properly grounded, and be equipped with contractor furnished fire extinguisher. Storage tanks must be identified with the contractor's name.

7.8.1 A quick closing shut-off valve is required on the dispensing end of fuel hoses.

7.8.2 Smoking, welding or any spark-or flame-producing operation in the immediate area must be stopped during refueling operations.

7.8.3 The Contractor shall provide and maintain "NO SMOKING" signs in fuel storage areas.

7.9 Welding rod cabinets presenting a fire or safety hazard will not be permitted. Cabinets of fireproof materials equipped with strip heaters are recommended. If light bulbs are used, they must be securely guarded with adequate spacing in relation to the cabinet and to stored material. Metal cabinets must be grounded in an approved manner.

7.10 Volatile materials must not be applied near an open flame or in inadequately venti-

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lated areas. If such material is to be applied in a vessel, or other confined area, only explosion-proof connections, lights or other equipment shall be used. The contractor must designate such areas as "NO SMOKING."

7.11 Heating equipment for freeze protection of concrete must be approved by the Owner's Representative prior to use.

7.12 Welding or cutting torches and hoses must not be left connected to cylinders when stored at the end of the work day. When work is shut down and equipment is unattended, close all valves at the gas and oxygen cylinders, bleed lines and check five minutes later for pressure build-up. If there is no build-up, bleed hoses at the torch, remove hoses from cylinders and store. No smoking will be permitted during this shutdown procedure.

7.13 Gas and oxygen cylinders must be handled with care, properly supported in an upright position away from any source of heat or flame and securely tied off. All cylinders not in use must have their caps in place.

7.13.1 Oxygen cylinders stored in buildings shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease) a minimum distance of 20 feet, or by a non-combustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

7.13.2 Oxygen cylinders stored outdoors must be separated from fuel-gas cylinders a minimum distance of 10 feet or by a fire-resistant barrier.

7.13.3 When gas and oxygen cylinders are lifted by hoisting equipment, a basket, cradle or similar handling device must be used. Cylinders must not be lifted by the valve protection caps.

7.13.4 When oxygen or gas cylinders are transported by any means over plant roads, valve protection caps must be in place.

7.14 All "NO SMOKING" restrictions in specified areas must be strictly observed. Smoking is not permitted in vehicles in designated "NO SMOKING" areas.

7.15 Compressed gases, including air, must not be used for cleaning of clothes, the body or work areas. Oxygen must not be used for pressure testing purposes.

7.16 Adequate ventilation must be provided when cleaning agents are used.

7.17 Contractors must not dump flammable or toxic materials into sanitary sewers or waste water system without prior clearance of the Owner's Representative.

8.0 MACHINERY, CRANES, TOOLS, AND EQUIPMENT

8.1 The safe design capacity of any tool or piece of equipment must not be exceeded. Tools or equipment must not be modified in any manner that reduces the original safety capacity.

8.2 All contractor owned, leased or rented equipment must be in safe mechanical working condition to render safe service at all times.

8.2.1 Defective tools and equipment must be removed from service immediately and, if repairable, must be properly repaired before reuse on Owner's job.

8.3 Equipment with exposed gears, belts, couplings, fans, etc., must be provided with proper guards.

8.3.1 Machinery, tools and equipment must not be operated without all guards and safety devices in place and functioning properly.

8.4 All cranes, including hydraulic cranes (cherry pickers, pole cats, bucket trucks, etc.) must be inspected by the contractor and approved by the Owner on a regular frequency of four months. Crane inspections must be submitted in writing to the Owner's Representative, using the Owner's "Hoisting Equipment Inspection Report" or "Hydraulic Crane

Inspection Report" form, whichever is applicable (see samples on following pages). Equipment must be shut down before repairs or adjustments are made. Each inspection report will be audited by the Owner and, if approved, a numbered and dated decal will be affixed in the cab of the crane. Except as noted in Paragraph 8.4.1, no crane without the proper decal affixed is to be used on the Owner's property.

8.4.1 The Owner's Representative shall visually check each crane prior to initial use on a job to assure himself that it is satisfactory for use on the job at hand. The Owner's Representative may give temporary permission to use the crane pending the completion of an inspection and audit, provided, however, that a critical lift (see Paragraph 8.4.3) is not involved and that the inspection/audit procedure is initiated immediately.

8.4.2 All "bucket trucks" or "pole cats" must be ground tested before lifting personnel. During use, a standby man must be ready to take over controls in case of an emergency.

8.4.3 The contractor has the complete responsibility for a safe operation when using hoisting equipment to make lifts. The contractor shall verify weights of loads to be lifted. No load shall be lifted which exceeds the Manufacturer's rated

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HOISTING EQUIPMENT INSPECTION REPORT (Use Hydraulic Crane Inspection Form for Hydraulic Cranes)

OWNER _____ DATE _____
EQUIPMENT NO. _____
MANUFACTURER/MODEL _____
MAXIMUM CAPACITY _____
SERIAL NO. _____
DATE OF MANUFACTURE _____
COUNTERWEIGHT FOR NORMAL USE _____
BOOM LENGTH FOR NORMAL USE _____
COUNTERWEIGHT FOR CAPACITY LIFT _____
BOOM LENGTH FOR CAPACITY LIFT _____
CAPACITY CHART POSTED IN CAB () YES () NO

	CONDITION
1. Identification and high visibility markings	_____
2. Hooks (pins-swivel)	_____
3. Boom chains and blocks (links)	_____
4. Traversing block (pins-grass fittings)	_____
5. Cable drums (flange and bracket)	_____
6. Hook limit (hook on bracket)	_____
7. Chained blocks (pins-grass fittings)	_____
8. Wire line condition of cable, eye	_____
9. Lead line condition of cable, eye	_____
10. Boom line condition of cable, eye, hook, eye	_____
11. Boom and jib portions (condition of cable, eye, hook, eye)	_____
12. Main beam (structural members-pins)	_____
13. Jib (structural members-pins)	_____
14. Gantry (A-frame) (Pins-chains-cables)	_____
15. Swivel base	_____
16. Hydraulic or air system	_____
17. Lifting system	_____
18. Pulleys	_____
19. Drive shafts (brakes)	_____
20. Tires (air pressure-damage)	_____
21. Steering mechanism	_____
22. Counterweights (adequate or not)	_____
23. Cab, platform, handrails, steps, glass, etc. (access)	_____
24. Fire extinguisher	_____
25. Boom hook safety device	_____
26. Power lowering—wind line	_____
27. Power lowering—load line	_____
28. Boom base pins	_____
29. Hoisting device	_____

OVERALL EVALUATION OF CONDITION
() Good, Safe () Fair, Safe () Unsafe

Inspector (Owner) _____
Audited by (Owner) _____
Tag No. _____ Date _____

HYDRAULIC CRANE INSPECTION REPORT

Owner _____ Date _____
Equipment Number _____
MANUFACTURER/MODEL _____
SERIAL NUMBER _____
DATE OF MANUFACTURE _____
MAXIMUM CAPACITY _____
BOOM LENGTH AT MAXIMUM LIFT CAPACITY _____
CAPACITY CHART POSTED IN CAB () YES () NO

	CONDITION
1. Identification and high visibility markings	_____
2. Hooks (pins-swivel)	_____
3. Boom blocks (pins-grass fittings)	_____
4. Boom Tip (flange)	_____
5. Cable Drum (flange and bracket)	_____
6. Hook Limit (hook on bracket)	_____
7. Main Boom (structural members-pins)	_____
8. Boom extensions (structural members-pins)	_____
9. Cable Guides	_____
10. Boom Hook Safety Device (check valve)	_____
11. Hydraulic System (hoses, pump, control, reservoir)	_____
12. Hydraulic Outriggers	_____
13. Power Unit (instrumentation)	_____
14. Tires (air pressure-damage)	_____
15. Steering Mechanism	_____
16. Cab, Platform, Handrails, Steps, Glass, etc. (access)	_____
17. Lifting System	_____
18. Pulleys	_____
19. Fire Extinguisher	_____
20. Hoisting device	_____

OVERALL EVALUATION OF CONDITION:
() Good, Safe () Fair, Safe () Unsafe

Comments _____

Inspector (Owner) _____
Audited by (Owner) _____
Tag No. _____ Date _____

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CHECK LIST FOR CRITICAL LIFTS

DATE _____

1. ACC. No. / W.O. No. _____

2. JOB DESCRIPTION _____

3. LOCATION _____

4. DOW REPRESENTATIVE _____

5. PLANNING DATA:

A. 1. CONTRACTOR _____

2. SUPERINTENDENT _____

3. SUPERVISOR RESPONSIBLE FOR LIFT _____

B. DESCRIPTION OF ITEM TO BE RAISED _____

C. MAJOR HOISTING EQUIPMENT TO BE USED (MUST INCLUDE INSPECTION TAG NO. AND DATE. TAGS ARE VALID FOR FOUR MONTHS):

1. _____

2. _____

3. _____

4. _____

D. EQUIPMENT AND LIFT RELATIONSHIP

1. OPERATING RADIUS _____

2. BOOM LENGTH _____

3. ALLOWABLE LOAD (FROM LOAD CHART) _____

4. RATIO OF LIFT TO ALLOWABLE LOAD _____

5. CLEARANCE BETWEEN BOOM AND LIFT _____

6. CLEARANCE TO SURROUNDING FACILITIES _____

E. SCHEDULE OF OPERATIONS (INCLUDE TIME FOR RIGGING AND EQUIPMENT INSPECTION):

6. BASIS FOR CRITICAL LIFT:

A. LOAD EXCEEDS 80% OF LOAD CHART FOR CRANE OR DERRICK _____

B. LOAD EXCEEDS 80% OF LOAD CHART AND FAILURE WOULD ENDANGER EXISTING FACILITIES _____

C. TWO BOOMS ARE REQUIRED _____

D. POLES OR DERRICKS HAVE BEEN ERECTED FOR THIS SPECIFIC LIFT _____

7. HOW WEIGHT OF CRITICAL LIFT WAS OBTAINED:

A. CERTIFIED SCALE WEIGHT _____

B. CALCULATED INDEPENDENTLY BY MORE THAN ONE SOURCE

1. SOURCE _____ WEIGHT _____

2. SOURCE _____ WEIGHT _____

C. IF LIFT IS AN EXISTING ITEM (BEING REMOVED OR DEMOLISHED), THE WEIGHT IS TO BE RECALCULATED, TAKING INTO ACCOUNT ALL MODIFICATIONS INCLUDING INTERNAL AS WELL AS AN ALLOWANCE FOR SCALE, SEDIMENT, SLUDGE, INSULATION, LIQUID, ETC.

1. SOURCE _____ WEIGHT _____

2. SOURCE _____ WEIGHT _____

8. CONDITION OF HOISTING EQUIPMENT AND RIGGING:

A. HAS EQUIPMENT BEEN REINSPECTED FOR THIS LIFT? _____

B. HAS ALL EQUIPMENT AND RIGGING BEEN INSPECTED AND FOUND IN ACCEPTABLE CONDITION FOR THIS LIFT? _____

9. GUY ANCHORS AND GUYS:

A. ADEQUACY OF FOUNDATION FOR FOOT BLOCKS _____

B. ADEQUACY, NUMBER AND LOCATION OF GUYS AND ANCHORS _____

C. FOOT BLOCKS ARE TO BE ANCHORED _____

D. CONDITION OF ALL CABLE, INCLUDING SPLICES, CLAMPS, THIMBLES, AND OTHER HARDWARE _____

10. STABILITY OF GROUND AREA:

A. CHECK SOIL BEARING ALLOWABLE LOAD _____

B. WILL MATS BE REQUIRED? _____

C. ANY UNDERGROUND INSTALLATIONS NEEDING SPECIAL TREATMENT _____

11. OPERATORS:

WHAT IS OPERATOR'S EXPERIENCE ON THIS EQUIPMENT AND THIS TYPE OF LIFT? _____

12. REMARKS

Nothing in the submission and/or execution of this CHECK LIST is to be considered as relieving the Contractor of any responsibility for a safe operation.

Contractor _____

By: _____

Title: _____

RESUME OF ACTUAL SCHEDULE:

DATE OF LIFT _____

INSPECTIONS COMPLETED _____

LIFT STARTED _____

PERMANENT SUPPORTS COMPLETED _____

TOTAL TIME _____

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capacity of the crane. When one of the following conditions prevail, the contractor must, using the Owner's "Critical Lift Sheet" (see sample), submit a written outline of the safety planning for the lift to the Owner's Representative, prior to starting the lift.

- a. The load exceeds 80 percent of rated load chart for crane.
- b. The load exceeds 50 percent of rated load chart for crane, and possible failure would endanger existing facilities.
- c. Two cranes are required to make the lift.
- d. Poles or derricks have been erected for this specific lift.

8.4.4 If burning of lugs or other such flame producing operations may be required during crane hoisting operations, arrangements for proper Safe Work Permits must be made before the lifting or burning operation begins.

8.5 The following rules must be observed when operating a crane, cherry picker, winch truck or similar piece of equipment.

8.5.1 A flagman must be provided whenever equipment in operation partially blocks a plant road or whenever else operation of the equipment could present a hazard to personnel or property.

8.5.1.1 Personnel shall be kept out from under any load being lifted.

8.5.2 When mobile equipment (cranes, draglines, cherry pickers, winch trucks, etc.) is used near overhead power lines or D.C. bus bars, the following listed safe working distances shall be observed:

- a. Five feet minimum clearance—circuits up to 480 volts. (Telephone wires and telephone cables are not hazardous but must not be contacted or damaged.)
- b. Eight feet minimum clearance—480 volts to 2,400 volt circuits, open wire unprotected on insulators—D.C. power lines and bus bars—15,000 volts shielded or armored power cables on messenger cables in pole lines.
- c. Sixteen feet minimum clearance—15,000 volts and 132,000 volt bare (uninsulated) bus in 132 KV substations and conductors on 132 KV power lines. When it is necessary to work over or under a power line or D.C. bus or within the above listed minimum safe working distances, it shall be the contractor's responsibility to notify the Owner's Representative prior to performing any work. This is not intended to restrict electrical work performed by linemen.

8.6 All pressure vessels of construction equipment must be hydrostatically tested annually. Items in this category are those exceeding 6

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inches (inside diameter) and with internal or external operating pressure exceeding 15 psi, or those protected by a relief valve with a setting greater than 18 psig, or by a rupture disc whose bursting pressure is greater than 25 psig.

8.6.1 These tests must be performed during the month of January each year by the owner or renter of the equipment. Equipment with untested pressure vessels and arriving in the plant for the first time after the January test period must be visually inspected and approved by the Owner's Representative and must meet the above test requirements within 10 days. Such equipment must be retested the following January.

8.6.2 Relief valves must be removed and the vessels hydrostatically tested to one and one-half times the maximum allowable working pressure of the unit. A thorough visual external inspection must be made.

8.6.3 As a part of these test procedures, relief valves must be properly sized and set for the vessel involved and checked for proper operation, apart from the vessel test.

8.6.4 Metal identification tags must be attached to relief valves bearing pressure setting, date of test, name of company

conducting test and name of person conducting the test.

8.6.5 Contractors will furnish the Owner's Representative a test certificate for each piece of equipment. Each certificate must be signed by the test conductor and a representative of the company owning the equipment.

8.6.6 The Owner's Representative will forward each certificate to the E & CS Construction Department Central Office, B-2402, where an equipment number will be assigned and the certificate will be kept on file. The contractor will be informed of the assigned number by the Owner's Representative.

8.6.7 Contractors shall paint or stencil the assigned equipment number in plain view on the equipment. The numerals shall be painted or affixed on a colored background. They shall be approximately 3" high and of a color contrasting with the background color. The background color for the calendar year 1970 shall be yellow. The background color will be changed for each calendar year thereafter, and contractors will be notified in December as to the color for the following year.

8.7 Electrical tools and equipment operating at more than 32 volts must be properly grounded. Certain test equipment such as oscilloscopes, vacuum tube voltmeters and signal generators, as well as certain areas where exposed D.C. equipment is used, do not require grounding and proper operational procedures must be ascertained from the Owner's Representative in the above areas. Electrical office equipment and coffee pots shall be grounded.

8.8 Locking buttons on electrical tools must be removed or otherwise rendered inoperative.

8.9 Only 32 volt or less electrical service is to be used when working inside metallic vessels. Drop lights shall have protection guard over globe. Transformers must be kept outside vessels.

8.10 When arc welding is to be done, the grounding lead should, to minimize the possibility of intermediate arcing, be connected as close as practical to the work piece.

8.10.1 When arc welding is to be done in an area restricted by a Safe Work Permit, the grounding lead MUST be connected to the work piece within the limits specified in the permit.

8.10.2 All leads and lead connections

shall be in good condition and free of any exposed conductors.

8.11 Gloves must not be worn while using pedestal or bench mounted grinders, drills, saws or any tools where gloves are apt to become entangled.

8.12 Loose clothing must not be worn while working around machinery.

8.13 Personnel must not crank any machinery with their feet.

8.14 Hose connectors and adaptors must be of a standard manufacture and used only for the type of service intended.

8.14.1 In order to insure positive locking at all times, hose connectors must be in good condition and not abused. Sand-blast hose connections shall be the safety lock type which prevents accidental disengagement.

8.14.2 Spring-loaded snap-on "Cleco" quick hose connections must be reserved for use on air and cold (under 140° F.) water hoses only. A part of the "Cleco" connector must not be left connected to a process line or equipment.

8.14.3 "Boss-type" union connectors must be used on steam and hot (140° F and above) water hoses.

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8.14.4 Air pressure on pneumatic tools must be bled down before tools are disconnected from air supply.

8.14.5 Care must be exercised not to allow air hoses to come in contact with steam lines or hot equipment.

8.15 Powder-actuated fastening guns shall be used only in accordance with the following procedure.

8.15.1 Whenever it is planned to use such equipment on a job, the Contractor's Representative shall submit to the Owner's Representative:

- a. Written notice of intent to use such equipment.
- b. A written safe work procedure covering use of the equipment, and
- c. The qualifications of the men who will use the equipment.

8.15.2 The Owner's Representative shall, if satisfied with the submitted procedure and the qualifications, give the Contractor's Representative written permission to proceed.

8.15.2.1 Use of the equipment shall not be allowed until such written permission is in hand.

9.0 LADDERS AND SCAFFOLDS

9.1 All ladders must be in good condition and of the proper length for the job at hand.

9.1.1 Wooden ladders are not to be painted with anything other than clear paint or linseed oil. All metal parts must be hot dipped galvanized.

9.1.2 All straight ladders must be tied off or held and stepladders higher than ten feet must be tied off at the top or held at the bottom by another workman. Personnel must not stand on the top step of any stepladder.

9.1.3 When climbing a ladder, personnel must face the ladder and keep both hands free for climbing. Where practical, grasp ladder by side rails, rather than the rungs.

9.1.4 Set straight ladders so that the bottom is out from the vertical about one-fourth of the distance from the upper support to the bottom.

9.1.5 All straight ladders must be provided with non-skid adjustable feet.

9.1.6 The area around the bottom of all ladders must be free from slippery substance and tripping hazards.

9.1.7 All wooden ladders must be stored

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according to guidelines in ASA Code No. A14.1

9.1.8 The top sections of extension ladders are not to be used by themselves.

9.1.9 All portable metal ladders and platform ladders must conform to ASA Code No. A14.2.

9.1.10 All portable wooden ladders must conform to the requirement of ASA Code No. A14.1. Portable stepladders must be ASA type.

9.1.11 Ladders are not to be used as pencil or scaffold boards.

9.1.12 Unacceptable ladders shall be removed from the Owner's property immediately.

9.2 The use of No. 9 soft annealed wire is not recommended and its use should be minimized on scaffolds.

9.2.1 When the use of No. 9 soft annealed wire is absolutely necessary, a minimum of two separate strands must be used to tie scaffold handrails, braces, etc. The ties must be crossed to form a lock and prevent slipping in any direction.

9.2.2 Do not reuse No. 9 soft annealed wire for any purpose.

9.3 Makeshift scaffolds such as "Coke" boxes, crates and drums must not be used.

9.4 Wood-framed scaffolding, aluminum ladders, aluminum scaffolds and aluminum pencil boards are not permitted except in special cases as specified in job specifications or by prior written approval from the Owner's Representative.

9.5 The following rules apply to all patented metal scaffolds.

9.5.1 Scaffolds must be erected with proper fixtures made for each type of scaffolding. Scaffolds and associated equipment must not be modified in any manner that reduces the manufacturer's designed performance.

9.5.2 All scaffolds and appurtenances must be kept in good repair.

9.5.3 Equipment that is damaged or deteriorated to the extent that it is unsafe shall not be used. Such equipment shall be removed from the Owner's property.

9.5.4 Compensate for unevenness of ground by using adjusting screws in addition to proper blocking.

9.5.5 Do not force braces to fit. Adjust evenness of scaffold until the proper fit can be made with ease.

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9.5.6 Use ladders when climbing scaffold rather than the cross braces and handrails.

9.5.7 Horizontal diagonal bracing shall be used at bottom and intermediate levels of thirty feet to prevent racking of all scaffolds.

9.5.8 Planking overhang shall be a maximum of 4 inches on stackup scaffolds. 1 x 4-inch wood cleats shall be secured or fastened across top of planking at each end outside end frames. A minimum of 2 x 2-inch cleats shall be bolted underside each end of plank with 2 1/4 inch carriage bolts. Scaffold boards shall not rest upon steam lines or other hot equipment.

9.6 The following rules apply to rolling tower scaffolds:

9.6.1 The minimum base dimensions for towers shall be 5 x 7 feet.

9.6.2 Towers of a height greater than three times the minimum base dimension must be guyed or tied off while being erected, used or dismantled.

9.6.3 Caster brakes must be applied when not in motion.

9.6.4 Extreme care must be exercised while moving a rolling scaffold.

9.6.4.1 Towers must be free of men

material and equipment before being moved.

9.6.4.2 Surface area where tower is being moved shall be free of rubble or any material that may cause the tower to tip.

9.6.4.3 Do not attempt to move a rolling tower without sufficient help.

9.6.5 Do not extend adjusting screws beyond the limits specified by the equipment manufacturer.

9.6.6 The minimum size for casters shall be 6 inches. Scaffolds higher than 25 feet must be stabilized, either with outriggers or hand lines, while being moved.

9.6.7 Horizontal diagonal bracing is to be used at the bottom and at intermediate levels of 30 feet.

9.6.8 Do not use knee braces or cantilevered brackets on rolling towers.

9.7 The following rules apply to suspended scaffolds:

9.7.1 Chains or 1/4-inch (minimum) steel cable shall be used to support suspended scaffolds. All suspended scaffolds shall be anchored to prevent swinging. Chains so used shall be made of not less than 1/4-inch links and shall be inspected immediately

prior to each use. Chains shall be securely fastened by the use of double wrapped No. 9 wire through the links or fastened with a stove bolt.

***Safe Load Limits for Scaffold Chains**

1/4" proof coil loading chain, proof tested to 2350 lbs. Safe Load -- 1175 lbs.

5/16" proof coil loading chain, proof tested to 3500 lbs. Safe Load -- 1750 lbs.

9.7.2 The suspending support must be insulated when arc welding is to be performed from platform, thus avoiding accidental arcing and subsequent failure.

9.7.3 Block and falls, if required, shall be a minimum of two sheaves for 3/4-inch rope and the minimum size rope shall be 5/8-inch. Acid resistant rope shall be used in acid or caustic areas. Tail ropes shall be placed in an open container for protection while used in an acid area or above operating machinery, pumps, etc. All ropes and blocks must be inspected and tested prior to each use and taken down and stored inside at the end of each work day.

9.8 The following rules apply to all scaffolds:

9.8.1 Scaffolds and related material shall be carefully inspected at regular intervals and particularly just before using.

9.8.2 Scaffold boards shall be used exclusively for work platforms.

9.8.3 Provide sufficient sills or underpinning on all scaffolds to be erected on filled or otherwise soft ground. Scaffold boards shall not be used for this purpose.

9.8.4 All scaffolds must be plumb and level at all times.

9.8.5 All scaffolds shall be guyed or tied off at every 18 feet of elevation. Anchor running scaffolds to wall approximately every 28 feet of length. Use additional care when using pulley arms.

9.8.6 All work levels of a scaffold must, if practical, be fully planked. If, of necessity, a work platform is not completely planked, personnel working on that platform must use properly tied-off safety belts.

9.8.7 Handrailing and access ladders must be used on all scaffolds regardless of height. Scaffolds higher than 30 feet around columns, tanks, etc., must have access ladders constructed on the inside, unless a ladder cage is provided. Handrails must be at a height sufficient to provide maximum personnel safety.

9.8.8 Scaffolds must not be used as material hoist towers or for mounting

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derricks without first determining the loads and stresses involved.

9.8.9 Erect scaffold in such a manner that ladder is easily accessible and lined up from top to bottom.

9.8.10 Lumber used in the construction of platform shall be of good quality and reasonably straight grained. It shall be free from injurious ring shakes, checks, splits, cross grains, unsound knots, knots in groups, decay and growth characteristics which materially decrease the strength of the lumber. Planking shall not be painted all over, as this would conceal any defects. Scaffold boards shall be identified by painting each end. When wooden handrails are to be installed, nothing less than 2 x 4-inch (nominal) material shall be used for the purpose.

9.8.11 The normal size of planking shall be determined from Table 1. These values are for planks with the wide face up, with the loads concentrated at the center. Loads given in the table are net. Allowance has been made for the weight of the planking. If select structural coast-region Douglas Fir or merchantable structural square and sound southern pine is used, the loads may be increased 45 percent.

9.8.12 Planks used for platforms shall be

of uniform thickness, laid close together. These planks must be overlapped at the bearers. An overlap of at least two feet must be allowed with the bearing in the center of the overlap. When planks overhang a bearer more than one-tenth of the length of the span, the planks must be securely fastened to the bearer at the opposite end to prevent tipping.

9.8.13 All nails used in scaffold construction shall be driven full length. If double headed nails are used, they shall be driven to the first head only and may not be used on platforms or walkways. No nail smaller than 8d shall be used in this construction and enough nails must be driven to support the designed loads. The design must be such that no nail is subject to a direct pull.

9.8.14 Where beams are used in scaffolding, the schedule of loads shown in Table II, shall be followed. Loading on cantilever type beams used for tool and material hoists is shown in Table III. It should be noted that the loading at the center of bearing point is four times as great as the load being lifted and the bearing should be checked to ascertain if it will support the contemplated load. The inboard end of the beam has a force upward of twice the load and must be securely fastened with no nails in direct pull.

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9.8.15 Platforms shall be kept clear of slippery substances and tripping hazards.

9.8.16 Scaffolds shall be so erected that any heated pipelines or equipment will not come in contact with wind breaks or scaffold boards.

TABLE I
SAFE CENTER LOADS FOR SCAFFOLD
PLANK IN POUNDS

Span in Feet	Size of Plank			
	2 x 10 Dressed to 1-5/8 x 9-1/2	2 x 12 Dressed to 1-5/8 x 11-1/2	3 x 10 Dressed to 2-5/8 x 9-1/2	3 x 12 Dressed to 2-5/8 x 11-1/2
6	256	308	667	807
8	192	227	500	606
10	153	186	400	486
12	128	155	323	404
14	110	133	286	346
16		116	250	303

TABLE II
SAFE CENTER LOADS FOR SCAFFOLD
PLANK IN POUNDS

Nominal Timber Size	Length of Span in Feet									
	5	6	8	10	12	14	16	20	24	
2 x 4	440	290	210							
4 x 4	725	575	420	330	260	215				
2 x 6	780	650	410	360	290	240	190			
2 x 8	1400	1150	850	660	530	450	370	270	190	
2 x 10	2190	1820	1350	1050	860	710	600	450	320	
2 x 12	2800	2630	1950	1570	1250	1050	890	670	510	
3 x 8	2100	1730	1290	990	810	680	560	410	290	
3 x 10	3290	2750	2120	1590	1200	1070	900	670	490	
3 x 12	4525	3940	2920	2300	1880	1570	1340	1000	660	

TABLE III
SAFE LOADING FOR SIMPLE MATERIAL
HOIST ON CANTILEVER BEAM IN POUNDS

Beam Size	Length of Cantilever (L) in Feet							
	2	3	4	5	6	7	8	
4 x 4	220	180	105	80	65			
4 x 6	485	320	250	190	150	125	105	
6 x 6	740	490	380	285	220	180	160	
8 x 8	1325	875	650	515	420	350	300	
8 x 8	1785	1165	865	685	560	470	400	

Horizontal dimension from front bearing to rear anchor must be equal to or greater than cantilever projection "L" in table.

10.0 DANGER, WARNING AND CAUTION TAGS

10.1 Danger Tags (Red)

10.1.1 To insure that operating status of equipment is not changed while it is being used or worked on, Red Danger Tags must be attached to the controls.

10.1.1.1 No control such as a valve, switch, clutch, etc. is to be operated by anyone while a Red Danger Tag is attached.

10.1.1.2 Red Danger Tags must not be altered or used for more than one job.

10.1.1.3 If a control must be operated intermittently such as for testing equipment, the Red Danger Tag must be properly removed before

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each operation. The Red Danger Tag may be reused on the same job if the scope of the job has not changed.

10.1.1.4 Violation of Red Danger Tag rules will result in disciplinary action up to and including rejection from any work on Owner's property.

10.1.2 Attachment of Red Danger Tags to equipment controls does not mean that equipment has been cleared to work on. When work is to be done on tagged-out equipment, personnel responsible for the operation of the equipment are responsible for clearing the equipment and making it safe for others to work on.

10.1.3 Whenever the operation or use of any equipment may endanger anyone, a request must be made to supervision of the group which operates the equipment to clear and tag the equipment. "Clearing" means making the equipment inoperable and safe for others to work on. The authority to clear and tag equipment may be delegated by this supervision to any qualified personnel after supervision has assured themselves that the person delegated can properly clear the equipment for the particular job involved.

10.1.4 After the group which operates the equipment has cleared and tagged the equipment, each worker or group of workers who may be exposed to the

hazards must tag the equipment for their protection. When Red Danger Tags are attached to equipment by persons other than those responsible for its operation, prior approval from the person responsible shall be obtained.

10.1.5 As the individual jobs have been completed, each worker or group of workers must remove their tags immediately.

10.1.6 The group responsible for the equipment must place their tags first and remove their tags last.

10.1.7 Red Danger Tags may be removed only upon authorization of the person designated on the tag, except in the following specific instances. The supervisor of any person who fails to remove a Red Danger Tag when a job has been completed may authorize the removal of the tag by another person in his organization after he has determined to his complete satisfaction that the equipment can be operated in a safe manner. Authorization across line organizations is not permissible except for those cases where Section 10.1.5 ("As the individual jobs have been completed, each worker or group of workers must remove their tags immediately.") has been violated and no supervision in the violating organization is in the plant. In such cases, the Operating Department supervisors must contact

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supervision in the violating organization to obtain authority to remove the tag. The Operating Department supervisor must first determine that the equipment can be operated in a safe manner and that all non-operating workers have left the immediate area. In the space on the tag entitled, "Removal will be ordered by _____," it is permissible to designate some classifications, such as foreman, electrician, pipefitter, etc., instead of a special individual's name.

10.1.8 At the discretion of the supervisor, locks may be used on valves and switches in addition to, but not in place of Red Danger Tags.

10.1.9 Tags removed must be filled out and turned in to the Owner's Representative.

10.2 Warning Tags (Green)

10.2.1 When it is necessary to convey instructions or information prior to operation of equipment controls, Green Warning Tags are to be attached to the controls.

10.2.2 Green Warning Tags should be removed when conditions set forth on the tag have been met.

10.3 Caution Tags (White)

10.3.1 White Caution Tags are affixed to mechanical or electrical equipment by the Owner's Representative to prevent in-service operation of such equipment by anyone until items on the tag have been completed.

10.3.2 The tag provides spaces for measuring, rotation, final alignment and lubrication of equipment. When appropriate action has been taken, then personnel performing the work signs and dates the tag.

10.3.3 When tagged equipment is released to the Owner, a representative of operations and the Owner's Representative sign the tag which is kept by the Owner's Representative until job completion.

11.0 SAFE WORK PERMITS

11.1 Safe Work Permits issued by the Owner to contractor personnel are required for certain hazardous locations and conditions. These permits are designed to provide a means of checking at the job site the safety of such jobs as, but not limited to, entering closed vessels; working on electrical gear; performing hot tap work; welding, cutting on, breaking into or repairing pipelines or vessels in operation or under pressure or that have contained hazardous materials. These permits also cover work involving the use of flame or spark producing equipment in hazardous areas, near an

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open ditch, or for work on machinery.

11.1.1 Safe Work Permits are specifically required for any excavation work done with machinery (gradalls, draglines, augers, pile drivers, ditching machines, etc.). These can be obtained only with the approval of the Owner's Representative and after he has completed a prescribed Safety Clearance for Machine Excavation.

11.1.1.1 "Excavation" is defined as the penetration, in any manner, of the ground.

11.2 Contractor supervision must be in close contact with the progress of work and must be in constant communication with the Owner's Representative for up to date status of operations. Further, contractor supervision must be certain that all personnel involved are informed as to specific procedures and changes in the situation.

11.3 Safe Work Permits are to be initially requested through the Owner's Representative and issued by the Owner's operating area or facility supervision involved on any job where the Safe Work Permit is applicable. More than one Safe Work Permit may be required on certain jobs which will be ascertained upon obtaining each Safe Work Permit.

11.3.1 Safe Work Permits will be issued only after a physical check of the job site by the person issuing the permit.

11.4 Personnel must give a careful and complete description of the work to be done to

the person issuing the Safe Work Permit.

11.4.1 Where a job presents a serious man hazard, it is mandatory that a written Safe Job Procedure accompany the request for the Safe Work Permit. If, on jobs of a repetitive nature, it is necessary to have a written procedure, one that is already written will do in lieu of writing one if the contractor says he can follow the procedure and do the job safely. New procedures are to be signed by the Manufacturing Representative, the Owner's Representative, and the Contractor's Representative. If previously approved procedure is to be used, it must be initialed and dated by the above-named representatives.

11.5 Directions and restrictions noted on Safe Work Permits must be carefully followed.

11.6 A Safe Work Permit must be revoked and reissued for a job if there is evidence that conditions have changed subsequent to the issuance of the original Safe Work Permit.

11.7 Permits issued for jobs that last longer than one day will normally be issued for that job each day. By mutual consent of the parties involved, permits for these jobs may be issued for longer or shorter periods of time.

11.8 Existing vessels to be entered must be made safe for personnel.

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11.8.1 The requirements set forth in the following sub-paragraphs must be accomplished by the Owner before entry of any personnel is permitted.

a. Vessels to be entered must be isolated by blinding or disconnecting from process and service systems. Double block and bleed may be permitted if the foregoing methods are impractical.

b. Hazardous materials contained in the vessels and related piping must be removed or reduced to a safe level by washing, steaming, or purging.

c. Tests must be made with an approved combustible gas indicator to detect the presence of any flammables.

d. Tests must be made with an approved oxygen indicator for excess or deficient oxygen content.

11.8.2 A Safe Work Permit must be obtained.

11.8.3 Rescue breathing apparatus, tested just prior to entry, must be on hand nearby on the outside of the vessel.

11.8.4 Whenever personnel are working inside a closed vessel (one entered through a manhole), an attendant must be stationed outside one entrance to warn of external danger or summon help if needed.

11.9 A Safe Work Permit shall be obtained before working on pipelines or other equipment which contain or have contained hazardous material.

11.9.1 The proper protective clothing and equipment (slicker suits, face shields, full-face gas masks, chemical goggles, rubber gloves, etc.), as specified in the Safe Work Permit, must be worn.

11.10 Prior to any welding or burning, either inside or outside, on an existing vessel, the vessel must be positively checked inside for flammable or explosive gases or liquids, and a Safe Work Permit must be obtained before heat is applied.

11.11 The contractor may request Safe Work Permits for his own protection. Safety checks by the Owner for dangerous gases or chemicals should be requested through the Owner's Representative, when there is any uncertainty.

11.12 All Safe Work Permits in the area affected are automatically cancelled when an emergency signal is sounded and must be reissued after the "All Clear" signal.

12.0 ELECTRICAL WORK

12.1 Work on energized electrical equipment shall be minimized and if such work is found to be necessary, it shall be given sufficient careful planning to protect personnel from electric shock and flash burns and all other foreseeable hazards.

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12.1.1 Electrical equipment of 460 volts (nominal) or more, or equipment of less than 460 volts that is protected by a fuse or circuit breaker of 100 amperes or more, shall not be worked hot unless and until the Owner's Representative has received a written Safe Job Procedure from the Contractor's Representative AND has obtained the written approval of the Major Production Manager(s) and the Major Service Group Manager(s) in whose area(s) of responsibility the work will be performed, and then it shall be done only by personnel specifically qualified for this type of work.

12.1.1.1 The following jobs are exempt from this "hot work" policy.

- a. Trouble shooting on control circuits of 460 volts or less which are isolated and protected by a fuse or breaker of 30 amps or less.
- b. Work on equipment with nominal voltage levels of 230 volts or less which is isolated and protected by a fuse or breaker of less than 100 amps.
- c. Checking of fuses.

The use of proper shock protection equipment, such as rubber gloves, fuse pullers, hot sticks and insulated tools, shall be required on any such work.

12.1.2 IF ELECTRICAL EQUIPMENT

OF ANY VOLTAGE CAN NOT BE DE-ENERGIZED, AND THE PROPOSED WORK ON IT CAN NOT BE SAFELY DONE HOT, THE WORK SHALL NOT BE DONE.

12.2 Procedures for Working on 115/230 Volt Equipment.

12.2.1 The Contractor's Representative shall request permission from the Owner's Representative to work on the equipment.

12.2.2 If it has been decided that the equipment is to be de-energized for the work, the Owner's Representative shall arrange with the Manufacturing Representative for the equipment to be de-energized.

12.2.2.1 The Manufacturing Representative, or his designee, shall de-energize the equipment, attach his Red Danger Tag to each disconnecting device involved, and then issue an Electrical Safe Work Permit to the Contractor's Representative.

12.2.2.2 The Contractor's Representative, or his designee shall, with a voltage indicating device, confirm that the equipment is de-energized and then attach his Red Danger Tag to each disconnecting device red-tagged by the Manufacturing Representative or his designee.

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12.2.3 If the equipment can not be de-energized and can safely be worked hot, the Contractor's Representative, or his designee, must obtain an area Safe Work Permit from the Manufacturing Representative, or his designee, before proceeding with the work. This permit shall be issued only upon presentation of a properly drawn up and approved Safe Job Procedure (See Paragraph 11.4.1).

12.2.3.1 Equipment, instruments, tools, barricades and protective clothing (See Paragraph 12.7) to be used shall be noted in the written Safe Job Procedure.

12.3 Procedures for Working on 460 Volt Equipment.

12.3.1 The Contractor's Representative shall request permission from the Owner's Representative to work on the equipment.

12.3.2 If it has been decided that the equipment is to be de-energized for the work, the Owner's Representative shall arrange with the Manufacturing Representative for the equipment to be de-energized.

12.3.2.1 The Manufacturing Representative, or his designee, shall de-energize the equipment, attach his Red Danger Tag to each disconnect-

ing device involved, and then issue an Electrical Safe Work Permit to the Contractor's Representative.

12.3.2.2 The Contractor's Representative, or his designee, shall, with a voltage indicating device, confirm that the equipment is de-energized and then attach his Red Danger Tag to each disconnecting device red-tagged by the Manufacturing Representative, or his designee.

12.3.2.3 When a visible check can not be made for verification of open disconnects or disconnected leads on the 460 volt supply source, grounds shall be applied to the system. When grounds are to be installed, this information shall be noted on associated Red Danger Tags. Upon completion of the job, the grounds shall be removed before the Red Tags are detached.

IF IN DOUBT, GROUND IT!

If grounds are needed but can not be installed, the work shall be performed as if the equipment is energized (See Paragraph 12.3.3).

12.3.3 If the equipment can not be de-energized and can safely be worked hot, the Contractor's Representative shall prepare a written Safe Job Procedure and submit it for approval by the Owner's

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Representative, the Manufacturing Representative, the Major Production Manager(s) AND the Major Service Group Manager(s) in whose area(s) of responsibility the work will be performed. Only upon presentation of a properly approved Safe Job Procedure shall the Manufacturing Representative, or his designee, then issue an area Safe Work Permit to the Contractor's Representative, or his designee.

12.3.3.1 Equipment, instruments, tools, barricades and protective clothing to be used shall be noted in the written Safe Job Procedure.

12.3.3.2 The Contractor's Representative must be present during the entire job, and if the geographical area of the work makes close observation by one man impossible, additional non-working supervisors must be assigned to assist him.

12.3.3.3 Immediately prior to commencing work, the Contractor's Representative and the Owner's Representative shall conduct a safety meeting to review the Safe Job Procedure with the personnel assigned to the job.

12.4 Procedures for Working on or in Close Proximity to 2400 Volt and Higher Voltage Equipment.

12.4.1 The Contractor's Representative shall request permission from the Owner's Representative to work on the equipment.

12.4.2 If it has been decided that the equipment is to be de-energized for the work, the Owner's Representative shall arrange with the Manufacturing Representative for the equipment to be de-energized. The following procedures shall then be followed.

12.4.2.1 Equipment under the control of the Utilities Department Power Dispatcher (includes all Electrical Distribution facilities of 2400 volts or higher voltage).

12.4.2.1.1 The Manufacturing Representative, or his designee, shall obtain a Power Dispatcher's order to de-energize the equipment. He shall then proceed to carry out the order, attaching a Power Dispatcher's Red Danger Tag to each disconnecting device involved. This having been accomplished, the Owner's Representative shall obtain a clearance from the Power Dispatcher to proceed with the job. The Manufacturing Representative, acting for the Power Dispatcher, shall then issue an Electrical Safe Work Permit (ESWP) to the Con-

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tractor's Representative. The Clearance Number shall be noted on the ESWP and the ESWP Number shall be given to the Power Dispatcher by the Owner's Representative.

12.4.2.2 Equipment NOT Under the Control of the Utilities Department Power Dispatcher.

12.4.2.2.1 The Manufacturing Representative, or his designee, shall de-energize the equipment, attach his Red Danger Tag to each disconnecting device involved, and then issue an Electrical Safe Work Permit to the Contractor's Representative.

12.4.2.3 Following receipt of the Electrical Safe Work Permit, the Contractor's Representative, accompanied by the Owner's Representative, shall check the protection applied, attach his Red Danger Tag to each disconnecting device tagged by the Manufacturing Representative, and test each piece of equipment to be worked on with a voltage indicating device to prove that it is de-energized.

12.4.2.4 Except as noted below, grounds shall be applied in all cases.

12.4.2.5 Grounds may be omitted in the case of single-ended 2400 volt to 4160 volt circuits, such as motor circuits, where disconnecting devices can be visibly checked and locked out and attachment of grounds is so difficult as to be impractical. Omission of grounds must, however, be agreed to by the Manufacturing Representative, the Owner's Representative and the Contractor's Representative. In such a case, the equipment shall be considered "hot", and procedures for hot work shall be followed.

12.4.2.6 The location of grounds applied to 15 KV shielded power cable conductors is critical in many instances in relation to the maximum safety of workmen. Grounds shall be applied ONLY as specified by the Owner's Representative.

12.4.2.7 When grounds are to be applied, the Power Dispatcher shall be so notified and the fact noted on the Electrical Safe Work Permit and the Clearance. Upon completion of the job, the grounds shall be removed before the Red Tags are detached.

12.4.2.8 Red Danger Tags authorized by the Power Dispatcher shall be removed only with his permission.

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12.4.3 15 KV and higher voltage equipment shall not be worked hot.

12.4.4 If 2400 - 4160 equipment can not be de-energized and can safely be worked hot, the Contractor's Representative shall prepare a written Safe Job Procedure and submit it for approval by the Owner's Representative, the Manufacturing Representative, the Major Production Manager(s) AND the Major Service Group Manager(s) in whose area(s) of responsibility the work will be performed. Only upon presentation of a properly approved Safe Job Procedure shall the Manufacturing Representative, or his designee, then issue an area Safe Work Permit to the Contractor's Representative, or his designee.

12.4.4.1 Equipment, instruments, tools, barricades and protective clothing to be used shall be noted in the written Safe Job Procedure.

12.4.4.2 When work is to be performed on equipment under the control of the Utilities Department Power Dispatcher, the Owner's Representative must notify the Power Dispatcher just prior to commencing work. With the Power Dispatcher's permission, Yellow Work Tags shall be attached by the Manufacturing Representative, or his designee, and the Contractor's Representative to

any relayed or fused device that will open should a fault occur during the course of the job. The purpose of these tags is to prevent reclosure until the fault has been corrected and personnel moved out of danger.

12.4.4.3 The Contractor's Representative must be present during the entire job, and if the geographical area of the work makes close observation by one man impossible, additional nonworking supervisors must be assigned to assist him.

12.4.4.4 Immediately prior to commencing work, the Contractor's Representative and the Owner's Representative shall conduct a safety meeting to review the Safe Job Procedure with the personnel assigned to the job.

12.4.4.5 Before work is commenced, ground fault indicators, if any, shall be checked and any existing fault corrected.

12.4.4.6 If the Power Dispatcher is involved, the Owner's Representative shall notify him of the completion of the job and obtain permission for the removal of his Yellow Work Tags.

12.5 On jobs involving work on energized

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electrical equipment, the contractor shall follow the approved Safe Job Procedure faithfully.

12.5.1 If, during the course of a job, any minor deviation from the approved Safe Job Procedure should be deemed necessary or advisable, the Contractor's Representative shall obtain the written approval of the Owner's Representative and the Manufacturing Representative before proceeding. Should the proposed deviation be significant, however, the written approval of all signers of the original Safe Job Procedure must be obtained before proceeding.

12.6 Voltage indicating devices used to confirm the de-energizing of circuits or equipment shall be tested and proven operable immediately prior to and after use.

12.7 Yellow barricade tape or other approved methods of barricading shall be used to protect personnel from open energized electrical equipment of 50 volts or more.

12.8 Protective Clothing

12.8.1 A fire-resistant plastic face shield with hood and flash protective clothing, consisting of 10 oz. "Nomex" jackets and pants or full-length coat, must be worn as outer garments under certain conditions, as follows:

a. When working on any energized 230 volt equipment or circuit that is protected at more than 100 amps.

b. When working on any energized 460 volt equipment or circuit that is protected at more than 30 amps.

c. When working on or within reach of any energized 2400 volt or higher equipment or circuit that is not electrically shielded or mechanically protected.

12.8.1.1 Linemen may be exempted from wearing a face shield and hood and flash protective clothing if they are not handling energized facilities in a confined location. This exemption must be stated in, and approved as part of, the written Safe Job Procedure.

12.8.2 Rubber gloves shall be worn whenever installing or removing grounds as specified in Paragraphs 12.3.2.3 and 12.4.2.4.

12.9 With the exception of the 138 KV Substations, smoking shall not be permitted in Power Distribution substations.

13.0 EXCAVATIONS, FLOOR OPENINGS, BARRICADES

13.1 Where a safety hazard would be created for the personnel involved, and/or others,

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excavations such as ditches, trenches, or bell holes should be sloped sufficiently to prevent cave-ins or slides. If sloping is impractical, shoring must be used in cases wherever the vertical dimension exceeds four feet.

13.1.1 Personnel removing shoring after completion of work must not be in the bottom of the excavation. Shoring must be removed in such a manner to prevent cave-in on personnel.

13.2 Contractors must provide adequate barricades, covers, handrails, signals, flagmen, or other appropriate warning devices to protect personnel near any hazardous operation or excavation. Floor openings, open trenches, excavations, etc., shall be covered when handrails or barricades do not provide adequate protection to personnel.

13.2.1 Contractors must notify the Owner's Representative of necessary obstructions on road shoulders on the day such obstructions occur.

13.2.2 Contractors must obtain approval from the Owner's Representative at least one day prior to cutting roads or otherwise obstructing traffic on plant roads.

13.2.3 All barricades must be honored at all times.

13.2.4 When the necessity for barricades

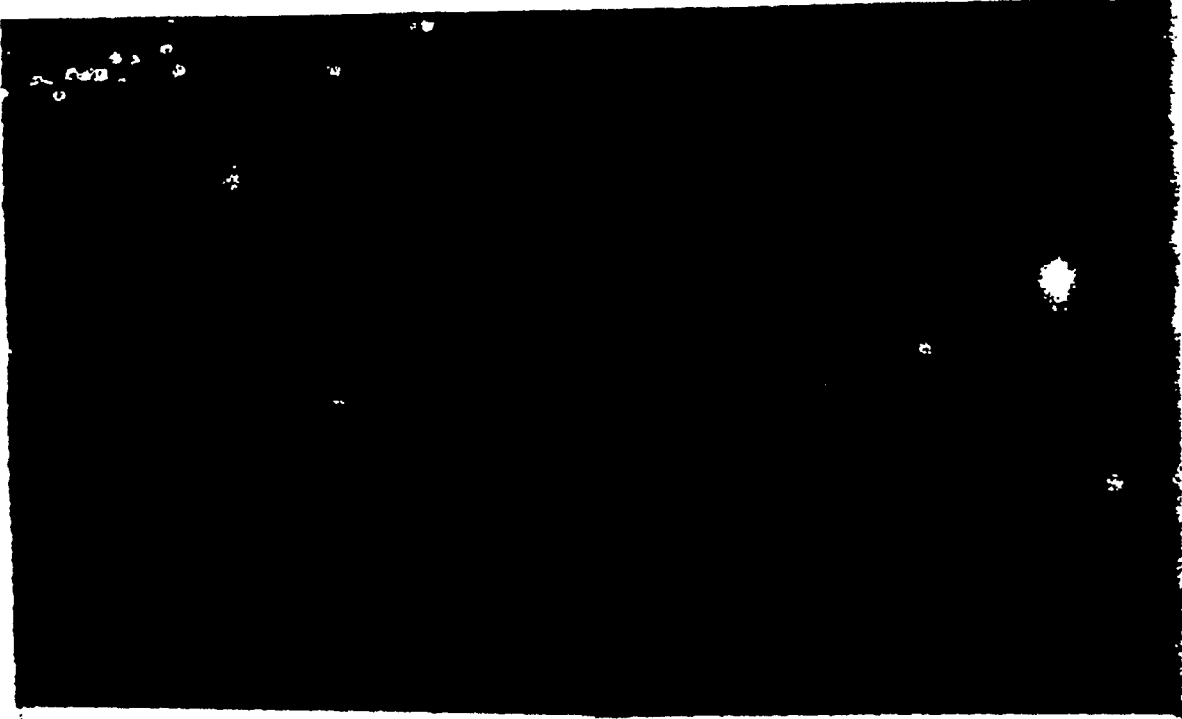
no longer exists, they shall be removed immediately.

13.3 Grade lines, ropes, chains, and other tripping hazards must be sufficiently marked to be clearly visible day or night.

13.4 No obstruction of any kind, whether permanent or temporary, is permitted within 8'9" horizontally from the centerline of any railroad track and within 22'6" vertically from the top of the rail.

13.5 In locations where strictly temporary loading or unloading operations are to be undertaken, blue flags and portable derails available through the Owner's Representative, must be used to prevent over-running of the work by a train. Blue lights, also available through the Owner's Representative, must be attached to blue flags at night. Placement of blue flags and portable derails must have prior clearance with the Owner's Representative, who will in turn obtain clearance from the Railroad Department.

13.5.1 Blue flags/blue lights must be placed on the tracks so they will be in unobstructed view of the train crew and they must be placed a minimum of two car lengths (100 feet) in front of the area they are intended to protect. Exceptions to the minimum distance may be made by the Owner's Representative where existing installations do not allow sufficient space.



13.5.2 Blue flags and portable derrails must be removed immediately when the hazard for which they were installed no longer exists.

13.6 Specific authorization from the Owner's Representative as well as the proper placing of blue flags, blue lights and portable derrails is required prior to boring under or excavating adjacent to railroad tracks when passage of a train would create a hazard for personnel or equipment.

14.0 RADIATION

14.1 All state and/or federal laws governing use, storage or handling of a radiation source must be complied with.

14.2 A minimum of two qualified people are required for the performance of any radiographic work.

14.3 In locations where a radiation source is used or stored, regulations require that it be marked with a "Radiation Material" sign. This sign is for the purpose of informing anyone in the area that such material is present, and not that a safety hazard due to radiation exists.

14.3.1 Only authorized personnel may enter an area marked by "Radiation Area" sign.

14.3.2 All areas where a radiation hazard

exists must be roped off all the way around the area and marked conspicuously by standard signs at a safe distance from the source of radiation. These signs bear the radiation symbol of magenta (or purple) on a yellow background with the words "Caution—Radiation Area."

14.3.3 "Radiation Area" signs must be removed when a radiation hazard no longer exists in the affected area.

14.3.4 Equipment containing a source of radiation must not be handled, uncrated or installed without prior clearance with the Owner's Representative.

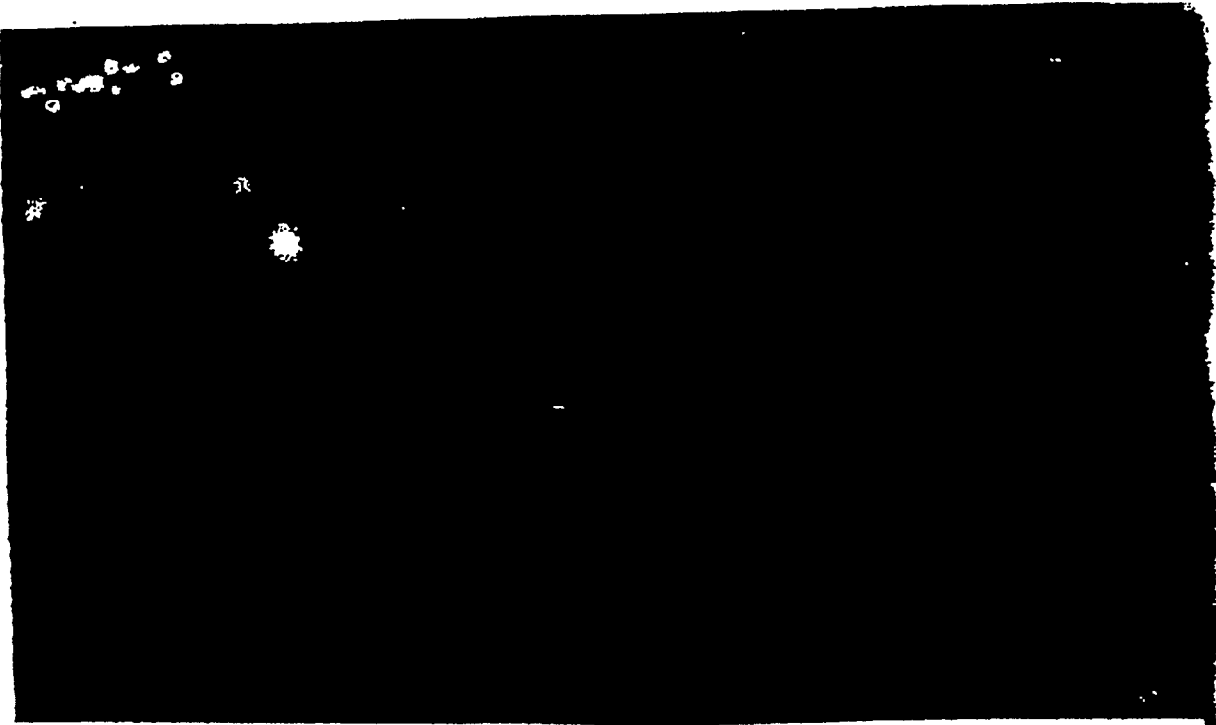
15.0 DEMOLITION

15.1 Due to the inherent hazards in demolition work, special care must be devoted to safe procedures, scope understanding and communications concerning the safe clearance of work.

15.2 Responsibility for field supervision of demolition work must be delegated only to those whose experience qualifies them to make the necessary judgments and decisions that are required to assure the safest possible prosecution of the job.

15.3 The contractor shall make certain that all lines, services and equipment have been cleaned or purged and properly cleared for safe removal. All lines (including water and

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steam) are to be considered "hot" until positive safe clearance has been obtained.

15.4 Special care shall be exercised to locate and mark old underground or otherwise hidden lines, cables and sewers using the best available information and Owner's assistance.

15.5 The pre-job safety meeting with the contractor, as covered in Section 1 of this manual, shall devote special attention to pre-planning the safety aspects of demolition jobs.

15.5.1 Steps of dismantling and loads to be handled shall be reviewed with the Owner's Representative prior to starting work.

15.5.2 Temporary provisions must be made where safety showers, eye wash baths and fire extinguishers are being moved in the work area.

15.5.3 Special attention shall be given to the marking of hazards and the barricading of hazardous areas for the protection of all personnel, including those not directly involved in the demolition work.