

PLAINTIFF'S EXHIBIT

SH-3402

SAFETY RULES
AND
INSTRUCTIONS



SHELL OIL COMPANY
HOUSTON REFINERY

OCTOBER, 1957

HUT-113366

ABS-002819

**SAFETY RULES
AND
INSTRUCTIONS**



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HOUSTON REFINERY**

OCTOBER, 1957

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FOREWORD

This booklet has been prepared to guide you in the safe performance of your job. Many years of experience have shown us practices which may lead to personal injury or property damage, and practices and methods which will get the job done with maximum safety for all personnel and equipment.

It is expected that you will become thoroughly familiar with all the General Safety Rules and with those other sections of the booklet covering jobs and methods which you encounter in the performance of the work assigned you.

It is obviously impossible to formulate rules for every conceivable combination of circumstances that may occur in the day-to-day operation and maintenance of a complex refinery. Accordingly, situations may arise when the experience of the Safety Department and Supervisory personnel justifies some addition, deviation, or alteration of procedures given herein.

An alert mind and good, sound judgment can do much to attain the objective of reducing accidents to personnel and equipment. Consult your supervisor or a safety man when in doubt.

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GENERAL SAFETY RULES

1. Strike - anywhere matches and open top mechanical lighters must not be carried in the plant.
2. Scuffling and horseplay of any nature often have unexpected and dangerous consequences and are not permitted.
3. When walking or riding bicycles on Refinery roads, use the left side of the road, facing vehicular traffic. Do not run.
4. Do not use compressed air to remove dust from clothing. Entrained particles may puncture the skin or enter the eyes. Never direct the force of an air hose at yourself or another person.
5. Good housekeeping eliminates the cause of many accidents. Therefore, whether you are a craftsman, operator, or an employee of any other classification, you are expected to keep the area in which you are working clean and orderly. Trash and waste should be placed in the containers provided. New materials being used or old equipment being removed should be placed in an orderly manner near the jobsite pending actual use or removal from the area. Oil spills, litter, etc. should be promptly cleaned up.
6. Gasoline, naphtha, alcohol, or other volatile liquids should not be used for cleaning clothing, mechanical equipment, etc., except under conditions approved by the Safety Department.
7. Safety signs, including traffic signs on roads and parking areas are posted in various locations for your protection and benefit. You are expected to be governed by the directions given.
8. Should travel over a road or walkway become hazardous because of the presence of excavations or undesirable fumes, gases or liquids,

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GENERAL SAFETY RULES (Continued)

- suitable traffic warning signs or barricades should be promptly set up.
9. Wherever practicable avoid working where overhead hazards are present. If necessary to do so, arrange for proper protection.
 10. Protruding nails must be immediately removed or bent down on any boxes, boards, etc., even though the material is to be hauled to scrap.
 11. Oil soaked rags, old clothing, etc. should not be accumulated in piles. Spontaneous combustion may result. Such material should be placed in a covered metal container.
 12. Correct and safe procedures are known by our experienced craftsmen, operators, and foremen. Avoid makeshifts where possible and discuss any potentially hazardous situation with your supervisor or the Safety Department before continuing.
 13. Only approved electric lights and hand lights may be used. All extension cords should be inspected by the Electric Department after each job and any necessary repairs made before re-use.
 14. Material should not be thrown to or dropped from elevated places, unless the area is properly fenced or other adequate precautions are taken to keep all personnel in the clear.
 15. Employees having no business in operating unit areas should not loiter in or walk through these units.
 16. When lifting heavy objects:
 - a. Get directly over the load.
 - b. Secure a solid foothold.

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GENERAL SAFETY RULES (Continued)

- c. Squat over the load.
 - d. Keep the back as straight as possible.
 - e. Rest the elbows on the legs and use them as levers.
 - f. Secure a good hand-hold.
 - g. Be sure the body is in balance and not twisted.
 - h. Lift load principally by use of your legs.
 - i. If load is too heavy get someone to help you.
17. All buildings should be well ventilated to avoid concentrations of gases or fumes.
18. It is unsafe to walk on roofs made of transit or other brittle materials. Ceilings of many rooms are not constructed to support the added weight of a man. Therefore, if working in an attic, always step on beams or other structural members and not on the ceiling of the room below.
19. Maintenance and construction work should be held to a safe and practical level on units and equipment during operation.

FIRST AID

1. A well equipped plant hospital is maintained for the purpose of giving first aid treatment to injured employees. A registered nurse is on duty at all times. Trivial injuries, if left unattended, may result in a serious conditions. For your protection, have each injury, no matter how small, treated immediately at the plant hospital. Instructions of the nurse should be followed until discharged from further treatment.

2. In some types of injuries, such as severe fractures, movement by inexperienced personnel is dangerous to the injured person. Call the nurse and ambulance to the scene. In case of electrocution, asphyxiation, or a severed artery, the nurse and ambulance should be summoned, the employee moved to a safe location, and suitable first aid (such as artificial respiration or the application of a tourniquet to a severed blood vessel) administered at once. Do not "gag up" around the patient; leave plenty of room for those administering first aid and for necessary fresh air.

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SAFETY EQUIPMENT AND CLOTHING

I. RESPIRATORY EQUIPMENT

At times it becomes necessary to work in places where pollutants in the atmosphere would interfere with normal breathing. Several types of respiratory equipment are provided to cope with such conditions. Some of them, such as canister masks, are designed to give protection against certain specified hazards; others have more general use. Generally equipment is provided in the operating units for use of the operators for meeting conditions that may be expected to arise there. Craftsmen should obtain necessary respiratory equipment from the tool room.

Clean all such equipment with soap and water after each use. Someone else will probably use it next time.

A. CANISTER TYPE GAS MASKS are designed to give protection against certain specified contaminants in low concentrations (not over 2%).

The chemical in the canister gradually becomes spent with use. It is, therefore, important to record, on the form provided, the exact length of time the canister has been in use.

1. Be sure you are using the canister specified for the gas encountered.
2. Where possible, work on the windward side of a job when wearing a canister mask.
3. Carefully adjust the face or head piece to avoid leakage. If you can still smell the gas, either the canister is spent, the head piece is not fitted properly, or the concentration of gas is too high to be effectively removed. In either case leave the contaminated area immediately and attempt to determine and correct the deficiency before returning.

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SAFETY EQUIPMENT AND CLOTHING (Continued)

B. HOSE MASKS are supplied with fresh air from an external source and may be used in any atmosphere. The pump which supplies the air must always be on the windward side of the jobsite and well in the clear of any air pollution.

C. SELF-CONTAINED breathing apparatus may be used in any atmosphere except that care must be taken to keep the inside of the oxygen hoses and connections clean. Oil or grease on oxygen equipment may react violently with oxygen.

D. RESPIRATORS contain cloth or other media to filter the air you breathe. They should be used when working in dusty areas.

II. Clothing

A. NORMAL WORK CLOTHING — Certain types of clothing are furnished for your protection when working under abnormal conditions. However, the type of clothing you wear each day while performing your normal duties can be an important factor in your continued safety and well-being.

1. Wear sufficient well-fitting clothing to cover the body. Going shirtless or in shorts or wearing of sleeveless shirts is all right on the beach, but not in the refinery. Wool is less flammable than cotton or some of the synthetic fabrics.
2. Greasy or oily clothing should be removed. It may burn like a torch, if you get too close to a flame. For the same reason avoid wearing flammable (such as celluloid) sun visors or hats.
3. Loose clothing, such as dangling sleeves, gloves, ties, etc. have caused many accidents around moving machinery; for example, lathes, drill presses, emery wheels, rotating shafts, and motors.

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SAFETY EQUIPMENT AND CLOTHING (Continued)

4. Leather gloves are recommended when handling rough or sharp material, but leave them off when operating a grinding wheel or working on rotating or moving machinery.

5. Safety shoes with thick soles, metal toe cap, and non-sparking nails are recommended. Open toe shoes or sandals definitely invite injury and pain—leave them home or in your locker.

B. Clothing and Safety Equipment for Special Jobs

1. Hard hats may be obtained from the tool room. They are quite comfortable to wear, and have prevented serious injury to many people. They must be worn while working under many conditions and are recommended for all who have occasion to walk through operating units or other work areas.

2. Flashbacks occasionally occur in furnaces, especially when lighting the burners. Asbestos hoods, gloves, and flame-proof coats are furnished for your protection when working on or adjacent to lighted furnaces.

3. Defective or damaged protective apparel or other safety equipment should not be worn or used, but should be promptly replaced or repaired.

4. The manufacturer gave much thought to the design of the safety apparel and equipment provided. Don't change or alter it, without first obtaining the agreement of your Safety Inspector.

SAFETY EQUIPMENT AND CLOTHING (Continued)

5. Life belts with tag lines, all in good condition, should be worn by men working at heights wherever, practical and when indicated in tank cleaning, excavation or pit work.

6. The wearing of goggles will protect your eyes from many hazards encountered in a refinery. Obtain and wear the proper type when welding, chipping, or working in a dusty atmosphere or on jobs where chemicals or other liquids or gases that are painful or harmful to the eyes may be released.

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FIRE EQUIPMENT

1. To insure maximum protection, all fire-fighting equipment must be instantly available. Therefore, cars, trucks, or other equipment must not be left in front of firehouse doorways or within 10 feet of any fireplug. Areas adjacent to hand extinguishers, fire blankets, etc., should be kept free of all obstructions.
2. Chemicals from fire extinguishers are to be used for fire fighting only, and not for any other purpose. To insure that all extinguishers are ready to use at all times, be sure to request the Safety Department to check and refill it when one has been partially or completely discharged.
3. The immediate availability of blankets has saved many lives; therefore, do not remove them from their boxes except in case of emergency.
4. Water is a conductor of electricity. A solid water or foam stream should not be used for extinguishing electrical fires. However, water fog from a fog nozzle is very effective and safe if the operator of the nozzle remains over 15 feet from the fire. Water fog should only be used as directed by experienced supervision. Carbon tetrachloride, CO_2 , or dry powder extinguishers may also be used. Some fires of this type can be readily controlled by covering with blankets or sand.
5. Carbon tetrachloride and CO_2 extinguishers should be used with caution inside buildings, vessels, and enclosures. Carbon tetrachloride, as well as the phosgene gas, liberated, when carbon tetra-

FIRE EQUIPMENT (Continued)

- chloride comes in contact with fire, and CO_2 are toxic. If any difficulty in breathing is observed you should leave the area immediately.
6. If your duties necessitate detailed instructions in fire fighting procedures, study the "Fire Fighting Manual" which is available in your departments.
 7. Tie-ins on the fire water system should be approved by the Fire and Safety Department.

PERMITS AND WARNING TAGS

I. FIRE AND SAFETY PERMITS

A. General

1. Except in the shops and other specific areas, written Fire and Safety Permits are required before starting certain types of work listed below. Such permits are to be signed by the Safety Department, a supervisor, or delegated representative of the operating or other department in which the work is done, and by the craftsman (or his foreman) assigned to do the work. At nights or during holidays the Shift Maintenance Supervisor may issue and sign Fire and Safety Permits instead of the Safety Department.

2. Permits should include any applicable special instructions or precautions to be observed, as well as the period of time the permit is to be in effect.

3. It is the responsibility of the operating representative to see that jobsite conditions comply with the permit regulations before permitting the craftsman to start work. However, it is the duty of each and every one of us to be continually on the alert for changing conditions that may affect the safety of the job we are doing.

4. Permits issued for an extended period of time will be void if the job is discontinued for longer than 24 hours. When a job is being done under such a permit the jobsite should be inspected each day by an authorized representative. If favorable conditions still exist the permit should be re-signed and re-dated before any craftsmen start to work.

B. Type of Work Requiring Fire and Safety Permits

1. Lighting of open fires, welding, cutting, lead burning, or metallizing. This applies to

PERMITS AND WARNING TAGS (Continued)

welding, cutting, burning, etc., in shops on equipment which has been in service.

2. Starting of any electric operated tools, including soldering irons. (Note exceptions paragraphs B-12, Page 15 and C-1, Page 16)

3. Entering any tank, vessel, or tower for any purpose. Usually each craft should have separate permits; however, permits may be issued covering all crafts.

4. Sawing, chipping, or cutting metal, or drilling on tanks, vessels, lines, pumps, or other closed equipment. In all cases water or heavy oil should be used on the cutting tool.

II. SAFETY AND WORK PERMITS

A. General

Safety and Work Permits must be obtained by craftsmen or others before starting certain types of work outlined below. These permits are to be issued by the operating supervisor (or one whom he designates) or by the Zone Supervisor or foreman and the original given to the craftsman. The carbon copy should be retained by the operating department and signed by the craftsman when the job is completed. Craftsmen must always obtain verbal approval from the operating department in which the work is being done before starting work that does not require a written permit.

1. Night Orders—When maintenance work is necessary in your department during the night shifts or on Saturday, Sundays, and holidays, the Shift Foreman will contact the Shift Maintenance Supervisor on duty. When the assigned craftsman has reported and when a Fire Permit is not required, the Shift Foreman or other delegated personnel will fill out partially the night order

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PERMITS AND WARNING TAGS (Continued)

form (01941-2, Revised 12-52). At this time the required information will be:

Date
Craft or Craft Code Number
Department and Unit
Badge Number of Craftsman
Description of Job
Normal and Special Safety Precautions
Time craftsman reported to the job
Shift Foreman's signature

One of the back copies will be given to the craftsman as his authority and work permit to commence working.

When a fire permit is required, the usual form (01512/7-40) will be issued by delegated personnel, before the craftsman is authorized to start the job.

After the assigned craftsman has completed the job, he will return his copy to the Shift Foreman who will record on all night order copies the time craftsman completed the job.

The original copy of the order will then be given to the craftsman who will return it to the Shift Maintenance Supervisor for further processing. Other copies will be held for the departmental office for review by the Department Manager at the earliest opportunity.

D. Permits Issued by the Operating Department

1. For any repairs on tanks or stairs, except tank vent inspections. However, in this case the tank vent inspector should obtain permission from the operator before starting his work.

PERMITS AND WARNING TAGS (Continued)

2. For opening tanks, vessels, equipment, and lines (except planned jobs to be done during a general shutdown).

3. For attaching cable or rope blocks in operating areas.

4. For insulating lines and other equipment during operation.

5. For building and removing scaffolds during operation.

6. For electrical, mechanical, and rigging work in operating areas.

7. For painting, when necessary to climb on operating equipment.

8. For construction work in operating areas.

9. For laborers to wash trenches and overhead platforms during operation of units; also to use picks during excavation.

10. Before automotive equipment (gasoline, diesel, or electric drive) enters or is started in operating areas.

11. For using air motors for drilling or chipping on metal, concrete, and brick, including work on open tanks or vessels, if they are clean, blinded, and gas-free. Oil or water must be used on drills while doing this work, also when using metal saws and cutting tools.

12. For using electric soldering irons in control rooms or open areas where flammable hazards are not present.

In case a unit is down, the general shutdown report will be used as a work permit to cover the work for all crafts doing work in the area. Verbal approval must be obtained from the operating personnel before starting any job.

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PERMITS AND WARNING TAGS (Continued)

C. Permits Issued by Zone Supervisors or Foremen

After checking with the affected operating department and being satisfied that operating conditions will permit maintenance or construction work in the area, Zone Supervisors or Foremen may issue Work Permits for:

1. Using electric soldering irons and electric powered tools in open areas where flammable hazards are not present. This does not include work inside tanks and vessels or on closed lines or equipment, or open containers which might have flammable material or gas inside.

2. Caulking tanks when not in operation. Caulking, of course, must be done below the level of the liquid and necessary precautions taken.

3. All other jobs that do not require the use of open flames, or other equipment that may create sparks, or the opening of vessels, lines, or equipment.

D. Work Permits are Not Necessary:

1. On jobs where Fire Permits are issued.

2. Where zone craftsmen are working in their respective areas, except drilling and hot work.

3. Small jobs in operating areas where equipment or lines are not involved.

4. When job orders are issued by the supervisor in charge during the night. Job orders should show hazards of job and any special precautions to be taken.

5. On jobs requiring more than one craft, the lead craft only will obtain a Work Permit. Assisting crafts may work on the same permit, provided

PERMITS AND WARNING TAGS (Continued)

the lead craft has not left the job. In this case another Work Permit must be secured.

6. When jobs run into more than one shift, a Work Permit may be passed to the craftsman's relief but should be signed by the relieving operating supervisor or delegated representative before work proceeds. However, if the original is unavailable, the relief mechanic and operating supervisor (or representative) must sign the carbon copy, which is maintained at the operator's desk.

III. WARNING TAGS

Before repair work is done on machinery or equipment having moving parts, certain procedures have been developed as insurance that the work may be done without personal injury. The procedures include the use of warning tags attached to the switch or valve controlling the source of power. All tags should be signed and dated by the person installing them, and also show the reason for taking the equipment out of service.

- A. The operator should shut down the equipment, and close off the source of power by blind- ing the line and/or shutting the throttle valve and opening bleeders to relieve line pressure, or opening the circuit breaker, or having an electrician pull the fuses in the electrical circuit.

- B. The operator should then install his tag on the closed throttle or block valve, open circuit breaker, or fuse box. This tag should remain in place until the job is finished and may then be removed only by an operator or the supervisor.

- C. Good practice dictates that blinds should usually be installed in product lines connected to equipment, and in steam, water, gas, or air lines supplying power to the equipment being

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PERMITS AND WARNING TAGS (Continued)

worked on. However, the operating supervisor, after giving full consideration to the products handled, the work to be done, the pressures and other hazards involved, may decide that a specific job may be safely done by omitting some or all blinds and may issue a Work Permit, and place warning tags as required.

D. Each craft working on the drives or driven equipment will check with the shift foreman or operator to verify that equipment is depressured and clean and in a safe condition to be worked on, and will only then place their tag in the same place as the operator's.

E. It is the responsibility of each craft working on tagged equipment to notify the operator immediately after completion of their part of a job. That craft's tag should then be removed by the craftsman or the supervisor.

F. The operator's tag should be left in place until all others have been removed and he has checked to determine that all necessary work has been done and the equipment is safe to operate. (An electrician should replace any fuses that were removed prior to starting the work.)

EXCAVATIONS, STAIRS, LADDERS, PLATFORMS, SCAFFOLDS

I. EXCAVATIONS

A. Provide all ground openings with rope enclosures, hand rails, or covers and provide safe warning lights where necessary at night.

B. Excavations and ditches more than five feet deep must be properly shored or sloped.

II. STAIRS, LADDERS AND PLATFORMS

A. All stairs, ladders and platforms must be kept free of obstructions. Interferences shall be provided for loose materials which must be left on platforms.

B. Wood ladders, stairs, and valve box covers should not be painted, because of danger of paint hiding rotted wood. Linseed oil treatment is recommended for this material except where treated lumber is used.

C. Always have the free use of both hands when climbing or descending ladders. Always face a ladder when ascending or descending. One hand must be free for use of handrail on all stairways.

D. Employees should not work off ladders or stepladders unless the ladders are securely tied or a co-worker is standing them on the ground. This rule does not apply to stepladders and platform ladders when used on solid and level surfaces and when work of a light nature is involved.

E. All ladders (except stepladders) should have ladder shoes.

F. Extension ladders should be tied when the top part of the ladder is extended for use.

EXCAVATIONS, STAIRS, LADDERS PLATFORMS, SCAFFOLDS (Continued)

III. SCAFFOLDS

A. Where practical, scaffolds 4 feet to 10 feet from the ground shall be provided with a single handrail 42 inches above the scaffold boards and toe boards.

B. Scaffolds 10 feet or more in height shall be provided with a toe board; an intermediate rail, the center of which shall be 18 inches above the scaffold boards; and a top handrail which shall be 42 inches above the scaffold boards. Proper access to scaffold platform, such as a ladder, should also be provided.

C. Scaffold boards must be placed sufficiently close together to prevent materials from falling through.

D. To be safe, the distance between scaffold stanchions or supports for handrails must not exceed eight feet.

E. Inspect all timbers used in the construction of scaffolds. See that all are of ample strength to hold the load to which they may be subjected. Be sure all scaffolds have safe footings.

TANKS OR VESSELS

1. CLEANING

A. General.—The necessity for cleaning tanks or other vessels occurs regularly. Many products are handled, under many different conditions. Consequently, when a vessel (tank) has been drained and is ready for cleaning, we may find it to be nearly clean, or that it may contain substantial quantities of hydrocarbon, coke, chemical, sludge, etc. It is not practical to try to write detailed cleaning instructions that will be applicable in every case. However, good judgment and the following general procedures have proven effective in getting these jobs done with a minimum of hazard. Other craftsmen working in uncleaned tanks should observe the same applicable precautions.

1. The operation department shall notify the Engineering and Safety Departments in writing that a vessel or tank is to be taken out of service, specifying the date and time it will be available, type of work to be done, the commodities likely to be found in the vessel, and will be responsible for properly draining the contents from the vessel proper and all internals prior to the start of work. Floating roofs should be lowered to the highest level permitted by the supports.

2. Before a vessel or tank is to be opened for further cleaning or internal repairs, all interconnecting lines must be blinded at the vessel or tank.

Exceptions:

- (1) Foam lines should not be blinded until the vessel is clean and gas-free.
- (2) Blinds should not be placed in vent lines of equipment not designed to operate under vacuum until other openings have been made.

TANKS OR VESSELS (Continued)

- (3) Where adjacent vessels are to be worked on, it is permissible to blind them as a unit. However, each such case must be carefully studied, and all interconnecting lines carefully cleaned and purged.
3. It is preferable that tanks and vessels be made gas-free before entering them. However, this is not always possible. The Safety Department will investigate each job and specify the conditions under which a man may work inside the tank, the respiratory equipment he must wear, and whether a man should be stationed outside the tank.
4. Ventilation and lighting of tanks and vessels shall be carried out in conformance with safe standards and practices, as approved by the Safety Inspector.
5. A Fire and Safety Permit should be issued before anyone enters a tank or vessel. (See page 13, paragraph B-3—Permits and Warning Tags).
6. Certain hydrocarbons cause the formation of pyrophoric deposits on the inside of vessels. These deposits may heat to a glowing condition merely from contact with oxygen in the air. By keeping the deposits wet with water at all times this heat reaction should not occur. These deposits should be promptly removed and buried or burned at a safe location.
7. Cylinders holding oxygen, or cylinders containing acetylene, or other explosive or highly flammable material should not be placed inside tanks or vessels, unless approved by the Safety Department.
8. In general, the use of air to blend or mix hydrocarbon material or to displace hydrocarbon lines is hazardous and should be avoided. In some cases air can be used with safety, but before a

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TANKS OR VESSELS (Continued)

- routine practice is established or a specific application undertaken, the department involved and the Safety Department must be in agreement as to procedure.
- B. In ventilating tanks for cleaning, steam injection should not be used. Air aspiration has been found more effective and safer.
 - B. When Tetraethyl Lead is Present—In addition to the procedures outlined above, additional precautions are necessary when cleaning tanks (including disposal of sludge therefrom) which have contained products in which tetraethyl lead is present.
 1. The dust and scale on inside surfaces may be quite harmful if breathed. Therefore, avoid creating a dusty atmosphere by keeping all inside surfaces wet. As a further precaution wear proper respiratory protection.
 2. Clean clothing is provided each day for workmen engaged in cleaning tanks which have tetraethyl lead or leaded products. The gloves and boots, especially, should be in perfect condition.
 3. Remove work clothing and thoroughly wash face and hands before eating. Remove work clothing and take a shower at the end of each day's assignment. Clothing must be laundered and boots and gloves cleaned after each day's use. Clothing accidentally soaked with leaded products or sludge from the tank must be changed at once.
 4. Sludge from the tank must not be left where anyone will come in contact with it. The sludge should be taken from the tank in a wet state and buried at some point where workmen will not uncover it in making excavations.

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TANKS OR VESSELS (Continued)

II. SANDBLASTING

Dry Sandblasting operations are usually accompanied by the formation of sparks which can ignite flammable vapors or liquids which may be present. Except in certain designated areas, therefore, this work should be done only after getting a permit from the Safety Department, who will also specify any special working conditions or restrictions that should be observed, and the type of respiratory equipment, goggles, etc., to be worn.

III. GAUGING AND SAMPLING

A. When gauging, draining lines or equipment, or taking samples, always stand on the windward side if possible.

B. Gauge and thief hatches should be kept closed at all times, except when in use. This will reduce the possibility of the accumulation of dangerous concentrations of vapors. Where practical all containers of volatile liquids shall be properly vented at all times. All containers should be grounded electrically when being filled with a stream of flammable material. Whenever practicable, subsurface filling should be followed, with the filling line in tight contact with the opening of the container. Only the minimum amounts of flammable or volatile liquids should be accumulated or stored at any location where ignition or toxic hazards exist, as in the laboratories or certain control rooms. Avoid inside storage of any hazardous material whenever possible, except in certain designated places, such as sample storage rooms. Bottles should be transported in protective receptacles for the purpose, so as to prevent breakage and spillage. Never tape gauge or sample tanks while mechanical mixers are in operation unless working through a sealed gauge well.

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TANKS OR VESSELS (Continued)

IV. WORKING ON TANKS IN SERVICE

A. When climbing or descending ladders, both hands are needed for safely supporting the body and other objects should not be carried in them. Carry gauge tapes, sample bottles, etc., in suitable slings or other apparatus fastened to the body.

B. When ascending or descending stairways always have a grasp on the handrail with at least one hand. In order to prevent the buildup of static electricity on the body, gloves should not be worn on this hand.

C. When a floating roof is more than ten feet below the top of the tank, a blower-type hose mask or self-contained breathing equipment must be used by anyone while working inside the tank below the top level of the shell.

D. Because of the increased hazards during an electrical or thunderstorm, all persons should remove themselves from tanks containing flammable products.

E. Avoid oil spills on tank roofs or shells and do not leave rags or other loose material on top of tanks or on stair or ladder platforms.

F. If you have occasion to work on tank roofs, use great caution until assured that the roof will support your weight. If in doubt consult the Safety and/or Inspection Department or the department involved. It is advisable, for your own protection, to keep a co-worker informed of your activities, especially if the tank contains H₂S in dangerous concentrations.

G. Use only designated walks and stairways when entering or traveling in storage tank areas.

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ABS-002836

TANKS OR VESSELS (Continued)

V. DISPOSAL OF EMPTY CANS & DRUMS

In order to eliminate any potential hazard to employees in handling empty oil and chemical containers, the following is to be observed.

A. Containers from one pint to and including five-gallon size, before they are discarded by any department should be emptied, rinsed out to flush contents, and have all caps removed.

B. Unless drums are being used for shipping or storage products or materials, they should all be sent to the salvage yard for disposition with bungs in place. Automotive Department will not pick up for disposal partially filled drums or drums without caps and bungs in place, unless special arrangements are made for dumping.

C. Automotive will haul empty metal containers, one-pint to and including five-gallon size, to a designated area at disposal yard.

D. All empty oil and chemical drums will be taken to the salvage yard where they will be steamed free of flammable or explosive mixtures. The Store Department will make disposition of all such drums. If they are to be moved to Jones Lake area, the bungs should be removed.

E. No drums which have been in hazardous liquid or bulk service may be either disposed of or released by salvage yard until they are properly steamed or cleaned thoroughly by other means.

F. Automotive will regulate disposal areas in the location near Jones Lake in a manner where burning of trash will not be done where it will endanger the safety of employees while working.

TANKS OR VESSELS (Continued)

G. When it is necessary to dispose of full or partially filled drums of chemical, etc. which cannot be emptied into the oil sewer, special arrangement for disposal will be made through the Effluent Control Department and Automotive Department. In some instances it may be advisable to bury the drums in the Jones Lake area.

H. The above is not intended to cover empty lube oil drums from various departments. On such drums the bungs and caps should be in place and the drums returned to Stores for refilling. These containers should be properly painted and stenciled to prevent mixing or contamination with other grades of lube or other products.

HUT-11384

ABS-002837

TANK CARS AND TANK TRUCKS

(Loading, Unloading, Cleaning)

I. GENERAL

A. Blue flags, lights, and derails should be used, as outlined in the Railroad Section of these regulations.

B. Use only the handrails, ladders, runways, etc. provided when moving over, along, or from one car to another.

II. LOADING AND UNLOADING CARS AND TRUCKS

A. Dome covers and outlet caps must be securely fastened before tank cars are moved within the refinery.

B. When opening dome covers, stand to windward side so as not to breathe escaping gas.

C. In case of unavoidable spillage, the equipment and area involved should be cleaned to remove hazardous liquids and vapors.

D. All lines through which flammable materials are loaded into or unloaded from a car, truck, or other container should be electrically bonded to a ground connection. Overhead loading or filling spouts should extend to the bottom of, and be bonded to the receiving vessel with metal wire or cable during the entire filling operation. If the receiving vessel is a non-conductor of electricity, a special ground connection should be provided.

E. In addition to the applicable foregoing regulations, the following should be observed when loading tank trucks:

1. Shut off engine and set brakes when truck is spotted.

TANK CARS AND TANK TRUCKS

(Continued)

2. Trucks should not pass or be started adjacent to trucks being filled with flammable materials.

3. Cable provided for grounding the truck should be connected.

4. All dome covers, except the one in use, should be closed.

5. Self-closing valves which are on some loading lines should be held open manually, and not tied or braced in an open position.

III. CLEANING TANK CARS AND TRUCKS

Follow the same general regulations and precautions as for cleaning other tanks and vessels.

HUT-113385

ABS-002838

CHEMICALS

I. GENERAL

A. Protective clothing such as rubber goggles or hoods, gloves, suits, and boots are available when opening or working on lines or equipment which have been in chemical service or when handling chemicals. Judgment should be exercised in the clothing worn, and if the hazard is such that the entire body would be endangered, then the body should be completely protected. If, on the otherhand, only small quantities of chemicals are involved, possibly only rubber goggles, gloves and an apron would provide sufficient protection. In all cases when a rubber hood is not required, rubber goggles or other approved eye protection must cover the eyes when handling chemicals. All rubber clothing should be properly cleaned by the wearer after using. The necessary protective clothing should be worn as long as the hazard exists. Craftsmen may obtain protective clothing from the tool room. Similar appropriate equipment is available for operators in the operating units.

Persons handling small quantities of chemicals, normally encountered in laboratory testing, should acquaint themselves with, and follow safe practices.

B. Water is very useful in removing practically all chemicals. Consequently, on exposure to harmful chemicals, quickly remove contaminated clothing and apply copious quantities of water to the exposed part of your body. Quick acting showers and eye wash fountains are located in many parts of the plant for this purpose. After receiving first aid at the jobsite, report immediately to the plant hospital for further treatment.

C. Chemical gas masks, hose masks, face masks, or respirators, and rubber goggles must be worn by employees working in areas made

CHEMICALS (Continued)

dusty by chemical or mineral dusts, such as asbestos, coke, rock, sand, clay, etc. Where practicable, blower fans should be used for removing dust from working areas.

D. Protective creams should be used on exposed parts of the body when working near chemical dusts and chemical fumes.

E. All containers, such as sample cans, bottles, etc., used for transporting corrosive chemicals within the refinery, must have a red lettered tag attached until the contents have been removed and the container has been thoroughly cleaned. A supply of red lettered tags can be obtained from the Refinery Laboratory.

II. AMMONIA

A. Ammonia gas is explosive. Keep open flames and sparks away from tanks.

B. Leaks of ammonia gas and liquid can usually be dissipated by the use of large quantities of water sprayed over the area. Blower fans are also helpful to remove the vapors.

III. PHENOL

A. Phenol is commonly known as carbolic acid. Every precaution must be taken to avoid contact with the skin, as severe burns and poisoning will result unless promptly removed. For immediate treatment of phenol burns, remove contaminated clothing, wash the exposed area, preferably with alcohol, or, if not available, large quantities of water. Bottles of alcohol (in green containers) and safety showers are located at appropriate locations for your use. However, do not allow the alcohol to get into your eyes.

B. Phenol is inflammable and the usual precautions must be followed when hot work is necessary in the area.

CHEMICALS (Continued)

C. It is the responsibility of the operators, in units handling phenol, to keep the bottles of alcohol filled and clean.

IV. CAUSTIC SODA AND POTASH

(Sodium and Potassium Hydroxide)

The above chemicals have quite similar properties. They are both strong alkalis, and in contact with the skin will produce disagreeable burns. Wool and leather are rapidly deteriorated; cotton to a lesser extent; rubber is practically unaffected by them.

If any part of the body or clothing comes in contact with these chemicals, it should be washed immediately with copious amounts of water. The application of weak acetic acid or vinegar will also give relief.

V. SULFURIC ACID—HYDROCHLORIC ACID

Both acids present quite similar hazards and will produce painful burns to the body. Wool clothing is more resistant to acid than cotton, and rubber gives very good protection. Water is very effective in washing acid from the body.

VI. TETRAETHYL LEAD

This chemical is poisonous if allowed to remain in contact with the skin. Strict regulations apply to operators and others working with this chemical, and special clothing is required. (See page 23).

The Safety or Operating Department should prescribe working conditions for craftsmen and others working on tanks or equipment which have contained leaded products. (Refer to page 23 for instructions for cleaning tanks or vessels when tetraethyl lead is present.)

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CHEMICALS (Continued)

VII. CHLORINE

Chlorine liberates vapors which irritate the respiratory system, initially inducing coughing. Leave contaminated areas immediately and obtain proper respiratory protection.

VIII. HYDROGEN SULPHIDE

This is a highly toxic gas liberated from sour crude, sour crude products, and some chemical mixtures. It smells like rotten eggs, but soon paralyzes the sense of smell, so that you may not realize the gas is still present. Therefore, leave contaminated area immediately and obtain proper respiratory equipment before returning.

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ABS-002840

DOCKS

Appropriate Refinery Safety Rules along with instructions in the booklet, "Regulations for Safe Loading and Discharging of Oil Vessels", will apply for all dock operations.

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UTILITIES DEPARTMENT

1. All operating conditions and procedures established by State Codes and Insurance standards shall be observed in accordance with directions from the Utilities Department Management.

2. Boilers down for any reason shall be secured in accordance with strict departmental regulations which include disconnecting and/or blinding each individual gas burner line. When the boiler is to be entered for inspection or maintenance, all pressure lines to the units shall be blocked off and the valves locked. Pressure equipment being opened shall be completely emptied and depressured before being opened. The responsibility for the proper security and the custody of the lock keys lies with the shift foreman and cannot be delegated.

3. Burners in boilers shall be lighted in accordance with the department "Procedures for Lighting Piers and Boilers" under the direct supervision of the shift foreman. The requisite check forms shall be completed and signed before lighting any burners.

4. Utilities Department operators will confine their electrical switching operations to switch gear of the dead front or remotely controlled types. Electricians will be called to operate live front equipment such as knife or fuse disconnects, fuses, etc.

5. Tie-ins to domestic water lines should be approved by the Utilities Department.

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HUT-11388

ABS-002841

FURNACES

Experience has shown that certain procedures must be followed in shutting down and starting up a furnace to insure maximum safety to personnel and equipment. The following basic procedures apply, in general, to all furnaces, although certain safe, modified, or additional precautions have been developed for certain individual units, such as boiler furnaces equipped with forced and induced draft fans, high pressure absorber, platformer furnaces, etc.

I. FURNACE SHUT-DOWN

A. Steam, gas, oil, and all other lines into a furnace must be disconnected, blinded or plugged before workmen are permitted to enter the furnace. Gas and oil lines should be blinded immediately after fires are cut out.

I. FURNACE START-UP

Shift foremen should make every effort to be present and to directly supervise the lighting of the fires in a furnace. If this work is delegated to an operator or fireman, the following form, or one more applicable to specific conditions, is suggested for use by the operator and should be approved by the shift foreman before any fire is lighted.

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FURNACES (Continued)

SHELL OIL COMPANY HOUSTON REFINERY

Please complete the following and present to Shift Foreman or Stillman for approval before lighting furnace fires:

1. Furnace has been purged 20 to

30 minutes _____

2. All burner and pilot valves are closed and have been checked _____

3. Fuel line blind has been removed _____

4. Unit _____

Date _____ Time _____

Signed _____
Foreman or Operator

Approved _____

A. All furnaces and stack ducts that have been opened during a shutdown must be checked before starting operations to see that no personnel or foreign material such as lumber, rags, etc., have been left inside.

B. Check to determine that all blinds in fuel lines are in place or that fuel lines are disconnected.

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AES-002842

FURNACES (Continued)

needed and that block valves, burner valves and pilot valves are closed.

C. Purge furnace for 20 to 30 minutes, then remove blinds from fuel lines, or connect fuel lines, after again checking position of valves. Immediately proceed to light the burners. If burners have been disconnected, and conditions permit, each one should be lighted as soon as connected. In no event should blinds in fuel lines be removed or fuel lines connected before furnace is ready to be fired.

D. Burners should always be lighted with torches approved by Operating and Safety Departments.

TOOLS

I. GENERAL

A. All tools should be used only on work for which they are designed. Do not place excessive stress on tools or abuse them to the damage point. Maintain your tools in clean and safe working condition. Examine tools carefully before using them to see that they are safe. Do not use tools with loose or split handles, buried heads, wrenches with jaws spread, etc. Send them to the tool room at once. The tool room attendant shall be sure that all tools issued are safe and in good working order.

B. Chisels designed for pneumatic tools must not be struck with a hand hammer; they may be distorted, making them unsuitable in power equipment.

C. Supervisors must watch very closely to see that men working with shovels, picks, axes, etc., are spaced far enough apart to eliminate the possibility of their striking each other.

D. Tools must not be thrown; pass them by hand or use tail lines or receptacles to raise and lower tools.

E. Keep air, electric, or other powered tools pointed away from yourself or other persons. Such tools should be directed downward wherever possible.

F. Approved goggles should be worn while using tools for grinding, machining, chipping, and other hand or tool operations where chips or other particles may be released.

G. In so far as possible, use only grounded electric tools, and be sure the ground connection on the tool is connected to a reliable ground.

II. CABLE AND HOISTS

A. Inspect and test any cables, ropes, hoists, swains chairs, or swinging scaffolds before using.

TOOLS (Continued)

also all rope or cable blocks and slings. Destroy any defective ropes or cables to prevent others from using.

D. Remove cranks from vehicles and similar equipment when not in operation.

C. All chain hoists, blocks, ropes, and cables in the refinery shall be periodically inspected by the Rigging Department or other designated personnel. Any defective equipment shall be replaced or repaired immediately.

D. Do not suspend tackle with ropes over sharp corners of cornice or edge of tank roof. Use a cable with a suitable cushion on edge.

E. Crane operators and winch operators are responsible for the condition of cables, etc., and are authorized to have cables taken out of service when considered unsafe.

F. Cords must be exercised in using hoisting equipment not to attempt to lift a heavier load than that for which the hoist is designed.

III. PRESSURE TYPE TOOLS, INCLUDING SMALL PRESSURIZED CONTAINERS

All pressure type tools, air containers, and/or equipment of the following type should be periodically inspected by the Engineering Inspection Department:

Spray guns	Water hammers
Paint spray pots	Air receivers and dryers
Propane and other gas cylinders	Blowtorches
Sample bombs	Sandblast equipment
Experimental vessels	Bus air tanks
	Fuel gas containers

TOOLS (Continued)

IV. DRIVE-IT GUN

A. The Master Mechanic, Shops, will train men of his crafts to use the gun and notify the Fire and Safety Department who these men are. This training may be rotated among the craftsmen.

D. Gun must be issued only by Tool Room Foreman, Master Mechanic, or Assistant Chief Engineer, on written request of a Craft Supervisor. One shell only should be issued for each stud required on the job. This must be checked by the Craft Foreman and Tool Room Foreman.

C. Before and after the gun is used on a job it must be checked by the Craft Foreman to be sure that it is not loaded, and a dated, signed note placed in the gun box stating this fact. The gun must always be unloaded when not in use.

D. A Fire and Safety Permit must be obtained from the Fire and Safety Department only. In addition, a Craft Foreman, Zone Foreman or Safety Inspector must be present the entire time the job is being performed with the gun and see that all the regulations listed herein are followed.

E. Whenever the gun is being used, all other craftsmen must be in the clear of the general direction in which studs are to be driven. This applies particularly to work on thin walls or metals where the studs may accidentally be driven through as a bullet.

F. The gun must not be left at the jobsite but the job should be so planned that the gun can be checked out, used and returned immediately by the craftsman to the tool room, where it must be locked in a sturdy box.

TOOLS (Continued)

V. GRINDERS

A. Tool rests on emery wheels must be kept adjusted close to the wheel. This is required to prevent the material to be ground from being caught between the tool rest and the wheel, which could cause serious injury to the fingers.

B. Emery wheel and buffer guards should be in place when the machine is in operation.

VI. METALLIZING

A. The operator of a metallizer shall wear clothing that covers and protects as much of the skin as possible from the deposit of free metal discharged from the gun. Skin necessarily remaining uncovered shall be protected by a suitable cream, such as anhydrous lanolin.

B. Goggles and respirator must be worn by metallizer operator at all times when gun is lighted and metal is being fed through it. Any air lines used to supply air for respiratory equipment must have proper filter.

C. Where metallizing work is being performed inside, a hood or proper ventilating and dust collecting system must be provided at the machine to prevent release of dusts in the area. When working outside, respiratory equipment should be worn and other precautions taken to avoid unnecessary exposures.

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OPERATION OF VALVES AND RELATED SAFETY APPLIANCES

(Includes Governors, Relief Valves, Overspeed Trips, Instrument Valves, Valves in Operating Equipment)

I. SAFETY APPLIANCES

Safety appliances such as governors, pop valves, vents, overspeed trips, etc., are provided for the safety of personnel and equipment, and no one but authorized employees may make any adjustments to the settings. Each department will determine the employees who will have this responsibility according to their conditions and requirements.

A. When such equipment is not functioning properly, it is advisable, where practical, to shut down the piece of equipment in question until proper repairs or adjustments can be made. When equipment must be operated with governors or overspeed trips blocked out, it is imperative that a man be stationed at the throttle constantly, with specific instructions that under no circumstances is he to leave his post without proper relief by a person who has been thoroughly instructed as to his duties in connection with this special assignment.

B. Except in emergencies, no such equipment should be blocked out without specific approval of the department manager or his assistant. A record must be made on the operating log sheets noting what equipment has been blocked out and the reason for so doing.

C. With the exception of emergencies, a pop or pressure relief valve setting is not to be changed, or the block valve under the pop valve closed on any equipment, while the unit is in operation, without specific approval of the de-

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ABS-002845

OPERATION OF VALVES AND RELATED SAFETY APPLIANCES Continued

partment manager or his assistant, who will in turn notify the respective Assistant Superintendent. It must also be recorded on the log sheets at any time such action is taken.

D. Pressure relief of vessels operating at atmospheric pressure is sometimes attained by the use of vent lines. Block valves in safety relief lines or in lines connecting a pop valve to a pressure vessel should be locked open or sealed, and no blinds should be placed in them while the vessel is in service.

E. These instructions are not intended to change the method of setting pop valves on boilers or boiler equipment at the power plant before placing a boiler on the line.

II. Valves in Operating Equipment

Valves in operating lines or equipment normally should be opened or closed by operating personnel only. However, because of size, location, or other practical reasons there may be instances where the assistance of others is needed. When outside personnel are designated to operate valves, the work should proceed under the direct instruction of or, preferably, in the presence of the operating supervisor or the individual operator of the unit. For example, instrumentmen may at times be required to manipulate valves, either to take instruments out of service or to place them in operation; other personnel may have to operate valves while drawing special samples; or the operator needs physical assistance in manipulating a valve.

It should be emphasized that responsibility remains entirely with the operating personnel and others should not change valve settings without the specific knowledge of the operator.

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PUMPS, COMPRESSORS, MACHINERY

1. All connections for hose or bleeders on all lines must be pointed downward. All hose-off connections should be properly grounded to discharge static. Draining or bleeding of equipment and lines should be done carefully to avoid release of chemicals, vapors or hot liquids in hazardous concentrations. Do not release flammable material where it will come in contact with hot surfaces or other sources of ignition. Valves on lines or equipment must be opened or closed by or under direct supervision of the operating department personnel. All lines wherever practical should be labelled to denote service.

2. Proper guards must be provided to protect employees from exposure to moving parts of pumps, compressors, and other machinery. Employees should be careful to keep body clear of such equipment at all times. When necessary to operate equipment without guards, extreme care must be taken by the employee.

3. Before maintenance work is started on pumps or compressors they must be prepared and tagged according to the "Permit and Warning Tag" section of these regulations. (Page 12)

4. When working on pumps or compressors the usual safety work permit should be obtained according to present practices, and workmen should wear proper protective apparel. Generally speaking, equipment should not be purged with air (see Page 22, paragraph 8). Craftsmen will be responsible for the observance of the necessary safety precautions while on the job.

5. Pump packing and minor repairs where equipment is not opened may be completed without blinding, but bleeders must be open and equipment drained. If conditions are safe and proper permission obtained from the operating department, packing glands and connections may be tightened while equipment is in operation.

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ABS-002846

PUMPS, COMPRESSORS, MACHINERY
(Continued)

6. Be sure all steam chests, steam turbines, etc., are drained of condensate before starting.
7. Do not attempt to put, or kick, belts on, or off, running machinery.
8. Do not set in motion any machinery until you are sure that no one is in a position to be injured.
9. Drains or bleeders that may discharge flammable products to the atmosphere and which are blocked with a valve should also be plugged, unless the plug would interfere with the necessary frequent use of the valve.

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AUTOMOTIVE

1. When hand cranking any automotive equipment, have gears in neutral and grasp the crank with the thumb parallel with the fingers, not hooked around the crank. If possible, crank in half turns only.
2. Do not ride on running boards of automotive equipment. Always be seated when vehicle is in motion and do not let arms or legs or other parts of the body extend over the outside edges of the vehicle. Wait for the driver's OK before getting out of the vehicle.
3. Drivers of automobiles, trucks, and tractors must keep to the right-hand side of the road, drive at a safe rate of speed, and sound the horn before passing other vehicles or pedestrians.
4. It is the responsibility of the driver to see that brakes, lights, windshield wiper, and horn are in good operating condition on the vehicle being driven.
5. As a protection to employees working in the garage or shops building, cars must first stop and sound the horn before entering.
6. Truck drivers must not unload passengers inside the parking areas at the garage.
7. When a truck is being loaded with a crane or mechanical loader, employees should dismount from the truck body and move to a safe distance so as to avoid injury by material being loaded.
8. Dry ice (solid carbon dioxide) must not be transported in a closed vehicle. The gas evolved may make breathing difficult or impossible.
9. Where it is necessary to carry gasoline to a crane, compressor, etc., an approved container must be used. Under all conditions motors must be stopped when filling gas tanks of automotive equipment.

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ABS-002847

AUTOMOTIVE (Continued)

10. If gasoline is spilled while filling a tank, the tank must be wiped dry, the area thoroughly flushed with water or the car or truck pushed far enough away from the spilled gasoline to prevent ignition when starting the motor.
11. Protective caps should be on all gas cylinders while being transported, except when in proper receptacles such as on welding trucks.
12. Do not drop gas cylinders from vehicles or platforms and do not carry them on booms of trucks or tractors. All cylinders must be securely tied down when being hauled.
13. A red flag, as a warning signal, should be hung near the end of any load that extends beyond the sides, front or rear of a truck, trailer or tractor.
14. When loading, unloading, or handling material:
 - A. Start unloading from the top of the load.
 - B. Watch your footing.
 - C. Arrange material in orderly piles.
 - D. Keep hands, feet, and rest of body in the clear.
 - E. Observe close teamwork when handling equipment and be sure to let the other man know in advance what you are going to do.
15. When preparing to move material with hoisting equipment, always make the cable tie your last operation. This will prevent hasty movement of the material in case the hoisting equipment controls should be accidentally moved.

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AUTOMOTIVE (Continued)

16. Whenever winch or hoisting equipment is in operation, a workman must be at the controls. This applies also when the cable is tied to material.
17. In event that it is necessary for a workman to hold a tight winch line during winding operations, in the absence of a load, the man holding the line should never allow his hands to be closer than five (5) feet from the winch.
18. Care should be taken when handling cable that the operator does not have loose clothing which could be caught and pulled into the winch.
19. Workmen may work off crane booms only when permission is obtained from the Safety Department. Crane booms must stay ten feet from hot electrical wires unless approved by the Safety Department and proper protection of electrical equipment provided.
20. Fork lifts should not move from place to place with a raised load. Have load near ground for such movements to avoid making the fork lift top-heavy.
21. Passengers should not ride on fork lifts nor should they ride on loads which are being raised or lowered. Safety Department approval must be secured for deviation from these regulations.
22. In addition to the use of chain blocks or jacks for suspending cars, block must also be placed under the axle while mechanics are working under a car, truck, etc.

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HUT-113395

ABS-002848

RAILROADS

1. Except for special purposes, only locomotive operators and switch crews are permitted to ride in or on locomotives and railroad cars.
2. The supervisor, or one whom he designates, shall always place blue flags in the daytime and blue lights at night, and set derails between the spur switch and the first car on the spur when workmen are working on or inside cars (repairing, cleaning, loading, unloading, etc.).
3. Trainmen should never move blue flags, blue lights, and derails. These should only be moved by the foreman in charge of work being done or an employee given this specific responsibility.
4. Where possible, a clear distance of 100 feet should be maintained at all times on closed side of blue flags, lights, and derails, and three railroad car lengths clearance should be maintained at all railroad crossings.
5. A flag, lamp, flare, hat, or any object swung across the track or waved violently signifies danger and is a signal to stop.
6. All engines and trains must display head and tail lights at night and at other times when conditions warrant. When cars are being pushed ahead of an engine at night, a trainman must be on the head end with light displayed.
7. All trainmen must carry an approved electric lantern at night, and at other times when conditions warrant, while in the performance of their duties.
8. No movement of locomotives or cars shall take place in the refinery without a rider stationed on the first car, except on the tracks assigned to classification work.

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RAILROADS (Continued)

9. Switch engines must use necessary cover cars to keep clear of hazardous areas and for protection when moving tank cars under hazardous conditions.
10. Engines should not move into or past a loading rack without the consent of the loading rack foreman.
11. Flying switches are not permitted in the refinery.
12. Trainmen and switchmen should familiarize themselves with the pines around the plant where there are close clearances, and always be on the lookout for signs reading, "DANGER, NOT ENOUGH CLEARANCE FOR MAN ON SIDE OF CAR".
13. Train crews should always be on the lookout for defects in cars, trucks, and other equipment and report to the refinery authorities.
14. Any damage to cars, refinery trackwork, gates, or plant equipment must be reported immediately to the loading rack foreman, who will, in turn, notify the various departments interested.
15. Trainmen must not go between cars to make a coupling unless it is necessary and can be done safely.
16. Trainmen should never kick coupling knuckles open with their feet.
17. Stepping on the front of engines or trains from the middle of the tracks is prohibited. When necessary to mount cars or engine in motion, stand outside of rail.
18. In addition to the ringing of the bell, the whistle must be blown whenever such signal is necessary to warn pedestrians and/or vehicles.

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ABS-002849

RAILROADS (Continued)

19. Main crossings or passageways must not be blocked by cars or engines. Trainmen are responsible for safety at railroad crossings. When it is necessary to place cars or engine near such crossings or passageways, trainmen must see that there is ample clearance for traffic.

20. Do not walk on railroad tracks if it can be avoided.

21. Switching crews are subject to the proper orders of the company employees in charge of the loading rack in the moving of engines and cars from place to place within the refinery.

22. All trainmen, while within refinery yards, are subject to all safety rules and practices governing Shell employees.

23. Track repairmen must wear goggles when cutting rails, bolts, or nuts.

24. Track laborers are cautioned to stand back far enough from passing cars to avoid being struck by objects sticking out or falling off.

25. Rail tongs must be used in handling rails whenever possible. Tie hooks must always be used in carrying the ties.

26. Track repairmen, if they have occasion to throw switches, must always line them back as they were found.

27. Switch engines, both steam and automotive type, should have approved spark arrestors on stacks or exhaust pipes to prevent possible ignition of gas which may be present in the atmosphere.

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ELECTRICAL

1. PROCEDURES

A. Electric light globes may be changed by anyone, providing ladders are not required, but fluorescent light tubes must be changed by the electric craft. Old fluorescent light tubes must be broken and disposed of by the electric craft. Care should be exercised to avoid cuts from glass fragments, and disposal should be in an area where other people are unlikely to come in contact with the broken pieces.

B. Proper precautions must be taken to avoid exposure of the body to arcweld burns, flash burns, or electric shock.

C. If anyone should come in contact with "live" wires or cables, and be unable to release his grasp on the wires, do not attempt to pull him off with bare hands. Shut off the current. If possible, and protect the hands with rubber gloves; or if they are not available, use thick folds of cloth to cover the hands, before attempting to release the victim. If the wires are lying directly on top of the victim, use a dry stick to remove them.

D. Standard practice is to work on electrical equipment when the circuits are "dead"; however, when it is absolutely necessary to work on or near "live" equipment, every precaution must be taken to protect the body from contacts by covering with suitable insulating material other "live" lines or equipment adjacent to the jobsite.

E. When necessary to work on "live" electrical equipment, an assistant should be available to render aid in case of an emergency.

F. When piking pole, support pike at shoulder, not at waist.

G. In opening box-type or other cutouts, shield the eyes from the flash. In opening cutouts of

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any kind, wear rubber gloves. A disconnecting pole should be used on high voltages.

H. Use a "Hot Stick" to open air gaps on electrical equipment.

I. Only persons designated by the electric foreman shall have authority to connect or disconnect the transformers used in electric welding.

J. If a motor is to be shut down for work on the motor, electric circuit, or the driven equipment, the procedure described under "Warning Tags" must be followed.

K. Rules for safety grounding:

1. The neutral wire of 110-220 volt 3-wire services must be grounded at transformer, first service switch, and cabinet.

2. Grounding must be in accordance with fire underwriters' rules.

3. Frames of all electric machines must be grounded.

4. All service switch boxes, motors, and conduit systems must be grounded.

L. Electricians, linemen, and their helpers must not wear metal protective hats. Composition hats are used by this craft.

II. FUSES

A. Never bridge a fuse with wire.

B. See that all fuses are enclosed, that fuse boxes are kept shut.

C. All fuses must be put in and placed by an electrician, except that instrument men and garage mechanics may remove and install fuses when working on their respective equipment.

ELECTRICAL (Continued)

D. Only fiber or insulated fuse pullers may be used in removing fuses.

III. TOOLS

A. The handles of all electric tools must be properly insulated to assist in preventing short circuits across them.

B. Craftsmen are responsible for maintaining their safety belts, gloves, rubber covered material, insulated tool handles, and all other equipment in good condition at all times.

C. Extension cords must not be tied on metal rods or nails, nor allowed to come in contact with water or oil. Rubber insulated cords only must be used.

IV. EQUIPMENT

A. Defective electrical equipment should be reported immediately. Where possible the power should be cut off to prevent exposure to others.

B. Open-type electrical equipment should never be used or located where flammable materials may be present without approval of the Safety Department.

C. All switchboards or electric rooms must be free of obstacles and should not be used for storage of materials.

D. All live face lighting and power cabinets must be kept closed at all times.

E. High voltage signs must be placed on all high voltage equipment.

F. All underground electric cable or conduit must be covered with pink-colored concrete.

G. Supervisors or Operators in charge should use discretion and judgment in determining when it is necessary to call on electrician to handle electrical equipment.

PIPE

1. Flange spreaders are available in the tool room and pipefitters must use them, when possible, instead of wedges for opening flange joints. Use of spreaders facilitates the work and eliminates two definite hazards:

- a. Ignition of vapors or liquids by sparks created by the hammer striking the wedge.
- b. Injury to personnel by a wedge flying through the air because of a misdirected hammer blow.

On jobs where it is necessary to use a wedge, the hazard may be reduced by drilling a hole in the wedge so that it may be secured with wire to a bolt on the flange.

2. Before assembling pipelines and connections the pipefitter must be positive that the lines are absolutely free of foreign materials, such as dirt, rocks, sticks, etc.

3. Pipelines should not be installed above ground in such a manner that they will present a stumbling hazard. If necessary to make such installations over roads, walkways, or other passage areas, they should be covered with gradually sloping ramps of wood, metal, or earth.

4. Wood inserts must be used when handling and stacking pipe to avoid possibility of pinching the hands.

WELDING

1. GENERAL

A. When welding or burning in an operating area, consideration will be given to provision of an operator or gauger to stand-by on the job. This man will watch for emergency conditions which might arise, and prevent other operators from bleeding lines and drawing samples, etc. After the Safety and Operating Departments have reached a joint decision, the former will advise, on their Fire and Safety Permits, when this practice is necessary.

B. When welders are working off swinging scaffolds in tanks or vessels, the cables or ropes must be covered to protect them from burns from welding operations.

C. Welders must plug their ears when doing overhead welding, particularly in bell holes, to prevent hot flux or scale from falling into the ear passage.

D. All nearby sources of flammable gases and material, such as bleeders, sewers, leaking valves, etc., should be sealed or closed to prevent leakage while welding or burning. Sewer closures should be opened when hot work is completed or stepped for a period longer than sixteen hours.

E. When it is necessary to do welding on closed pipelines or equipment, the following regulations should be followed:

1. The metal must be of sufficient thickness to support welding.
2. Lines or equipment should be full of gas or liquid.
3. Pressure or vacuum should be equalized with atmospheric or as near thereto as practicable, and Safety, Operating, and Engineering Departments should jointly agree that it is safe to proceed.

WELDING (Continued)

4. Where lines or equipment are full and at atmospheric or liquid head pressure, a vent should be opened to the atmosphere at a safe distance, or to a tank or vessel in which the liquid level is above the height of the line.

F. After a line is open, welding may be done under the following conditions:

1. Both openings should be mudded off with at least ten inches of mud. The weld should be at least four inches from the mud pack. A mechanical seal may also be used.
2. The section of line should be blinded or isolated at both ends. Vents should be provided at the location of the blinds or at a safe distance from the weld in a location between the mud packs and the blinding spots.
3. Where possible the line should be washed and purged free of flammable gas and materials.

II. ELECTRIC WELDING

A. Electric welders and helpers shall wear welding shields. In addition, the welder shall see that the welding area is shielded to protect the eyes of other workmen in the vicinity.

B. The 440-volt "hot" lead to an electric welding machine must be kept as short as possible. If electric welding is to be done a considerable distance from the power source, this distance must be made up with the electrode lead rather than the high voltage lead.

C. Where it is necessary for the 440-volt lead to reach quite a distance, it must be hung on poles rather than placed along the ground.

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WELDING (Continued)

D. Only persons designated by the electrical department shall have authority to connect or disconnect the transformers. This equipment must not be allowed to remain alive overnight, or for any extended period during the day when not in use.

E. Daily inspections must be made on all electric welding cable; all bare wires or connections should be taped or repaired.

F. When electric welding off metal staging which is suspended by a cable, always ground the stage to prevent travel of electric current through the cable.

III. GAS WELDING

A. Oxygen and acetylene valves must be closed when changing torches at ends of tubing. Never pinch the hose while doing this work.

B. Oxygen and acetylene bottles must not be placed under fractionating apparatus, as oil spills might come in contact with the bottle valves and cause a serious explosion.

C. When gas welding is being done in tanks, keep the gas cylinders and as much of the hose as possible outside of the tank, so as to minimize the possibility of an accumulation of explosive gas in the tank.

D. Keep valves, gauges and all other fittings free from grease, and do not handle with greasy hands or gloves. Do not attempt to lubricate any of these valves or fittings. Failure to follow these instructions may result in a serious explosion.

E. Cylinders must not be exposed to excessive heat, as heat expands the gas and increases the pressure in the cylinder.

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F. Valves on acetylene cylinders must be kept closed when not in use or when empty. Explosions and loss of lives have resulted from leaving these valves open.

G. Do not use cylinders as a work bench. Instances have occurred where the workman, forgetting the work rested upon a cylinder, cut through the cylinder.

H. Do not use cylinders as rollers.

I. Handle cylinders carefully. Rough handling may cause them to explode or to leak, with consequent danger of a fire or an explosion.

J. Defective hose, regulators, gauges, or valves must be brought to the shop at once for repair or replacement.

K. At intervals, a few inches of the hose next to the torch must be cut off, and reattached to prevent leakage of the part that is subjected to the hardest use.

L. Should the oxygen hose catch fire, never attempt to extinguish it by pinching the hose. Close the valve at the cylinder.

M. When starting up, or when connecting a hose to a fresh cylinder, allow gas to flow through the hose for a few seconds to insure pure gas reaching the torch.

N. Gas welders and welder helpers shall wear goggles with shaded lenses at all times while welding or cutting.

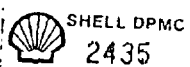
O. Before any acetylene cutting may be done on a line, it must be blinded or completely isolated. It should be empty, clean, and gas-free. At least one end should be open.

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