

safety
manual



Your First Job
Is To Make It Safe



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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 on Refinery roads, use the left side of the road, facing vehicular traffic. Do not run. When riding bicycles, travel on the right side of the road and observe the same regulations as other vehicles.
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 job site 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

GENERAL SAFETY RULES (Continued)

- excavations or undesirable fumes, gases and liquids, suitable traffic warning signs or barricades should be promptly set up.
9. Wherever practical, 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, and disposed of regularly.
 12. Correct and safe procedures are known by our experienced craftsmen, operators, and foremen. Avoid makeshifts where possible and discuss any potential hazardous situation with your supervisor or the Safety Department before continuing.
 13. Only approved electric lights and hand lights may be used. The tool room should have necessary inspections and repairs made on all electric extension cords.
 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.

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 transite or other brittle material. 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. Major maintenance or construction work performed by engineering crafts on units or equipment in operation should be well planned in advance between Operating and Engineering Departments. Regulations of our Permit System should be observed and in general we should avoid excessive concentrations of work, equipment and manpower in areas during operation.

FIRST AID

1. A well equipped plant hospital is maintained for the purpose of giving first aid treatment to injured employees. Trivial injuries, if left unattended, may result in a serious condition. For your protection, have each injury, no matter how small, treated immediately at the plant hospital. Instructions of the doctor or 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 "gang up" around the patient; leave plenty of room for those administering first aid and for necessary fresh air.

3. In case of fire the nurse and ambulance will not respond to an alarm. If the nurse and ambulance are needed, dial 333 on plant phone and be sure to state the exact location of the injured.

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. Others 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. SELF CONTAINED BREATHING APPARATUS may be used in any atmosphere. Be sure face piece is properly fitted, hose connections tight, air pressure adequate and regulator valve working before entering contaminated area.

1. Cylinders are charged with compressed air and provide 15 or 30 minute use. Practically all cylinders in operating areas have a 15 minute supply of air, but be sure you check the limit before using. Watch your pressure gauge when using any cylinder and allow yourself sufficient time to leave the area before air content of cylinder is exhausted.

2. Do not use oxygen cylinders with this equipment.

B. 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

SAFETY EQUIPMENT AND CLOTHING (Continued)

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 and obtain other proper respiratory protection before returning.

C. 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 job site and well in the clear of any air pollution.

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 sleeveless shirts is all right on the beach, but not in the refinery. Wool is less flam-

SAFETY EQUIPMENT AND CLOTHING (Continued)

mable 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 clothing with celluloid or other synthetic materials which have high burning rates.

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.

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, 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. As a general rule each employee (operating and engineering) will wear a hard hat in all operating areas. This also applies to any work areas where a head hazard may exist.

2. Flashbacks occasionally occur in furnaces, especially when lighting the burners. Flame proof hoods, gloves, and coats are furnished for your protection when working on or adjacent to lighted furnaces. Hand type face shields are provided for use in periodical viewing of the inside of operating furnaces. They must be used by anyone when making such visual checks.

3. Defective or damaged protective apparel

SAFETY EQUIPMENT AND CLOTHING (Continued)

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. Do not change or alter it, without first obtaining the agreement of your Safety Inspector.

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

6. Wearing 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.

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 report to the Safety Department 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 close extinguishment of electrical fires. However, water or foam hose streams may be used 10 to 15 feet from fires. 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 on contact with fire liberates phosgene gas which should be avoided, as it is toxic to the human system.

FIRE EQUIPMENT (Continued)

Excessive CO_2 in an enclosure or atmosphere creates an atmosphere which will not support normal breathing. If any difficulty in breathing is experienced 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 department.

7. Tie-ins on the fire water system should be approved in advance 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 and a supervisor, or delegated representative of the operating or other department in which the work is done, and by the workman (or his foreman) assigned to do the work. On night shifts, week ends and holidays, the Safety Department will either issue Fire and Safety Permits or designate someone in a supervisory capacity to do so.

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 department representative to see that job site conditions comply with the permit regulations before permitting the workman to start work. However, it is the duty of each 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 job site 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 workmen start to work.

B. Type of Work Requiring Fire and Safety Permits

1. Lighting of open fires, welding, cutting, lead burning, or metallizing. This also 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 in areas where flammable conditions are a potential hazard.

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. DEPARTMENTAL WORK PERMITS WRITTEN OR VERBAL

A. General

In order to maintain safe working conditions in operating areas for the performance of work of any nature, by persons outside that department, it is essential that written or verbal approvals be obtained from the operating supervisor or one whom he designates, before such work is started. No work is to be done without the knowledge and permission of the above operating personnel. Permissions of this nature are called Departmental Work Permits. Departmental Work Permits are not required for work covered by a Fire and Safety Permit.

B. Responsibility

It is the responsibility of the operating personnel to prepare the operating equipment for the work to be done and to see that the safe working conditions initially established are maintained while the job is in progress. Since there are so many different situations under which jobs must

PERMITS AND WARNING TAGS (Continued)

be performed, it is not possible to list individual precautions to be taken and the operating department personnel's best judgment will dictate the safety preparations to be made. There must be clear and understandable communications between operating personnel and the individuals who are to do the work. It is the latter party's responsibility to obtain permission and instructions from operating persons to enable him to supplement his procedures with safe work practices while performing the job.

C. Type of Permission

There are two types of permits to be used as Departmental Work Permits, written or verbal. The objectives of this system are: first, to make the job site safe for necessary work; second, to have approval of an authorized operating person to do the work; and third, to be sure that the person or persons outside the department are thoroughly familiar with the conditions and precautions to be taken when doing the work.

D. Written Departmental Work Permits

Written Departmental Work Permits will be issued if special precautions or procedures are to be included on the permit to insure a safe job performance. Typical examples of the comments covering special situations are:

- Equipment in chemical, hot liquid or toxic gas service—wear protective equipment.
- Lines or equipment have been depressured and drained but material may be trapped by plugs—wear proper protective equipment.
- Adjacent equipment in operation; use or wear proper protective equipment when necessary.
- Have water hose handy for immediate use.
- Tanks or vessels in hazardous material serv-

PERMITS AND WARNING TAGS (Continued)

ice; wear proper protective equipment when opening.

- Provide guards for excavations.
- Underground lines and electrical conduit in vicinity; use caution when excavating and using picks, pneumatic tools, etc.
- For work inside furnaces where lines are to be blinded—personal protective equipment is required.
- Use oil or water on chipping and drilling tools while in operation.
- Hot lines or equipment in the job area—a burn hazard.
- Obtain operators approval before proceeding with each phase of job, since necessary to recheck after each step.
- Mats are necessary to protect underground lines from heavy automotive equipment.
- Electrical lines, conduit, or other operating lines present hazard to hoisting operations.
- Use caution when lifting loads over operating lines or equipment.

Written Departmental Work Permits are also required:

- For work on or inside of firewalls as chemicals or hydrocarbon materials or vapors may be present—avoid contacts with valves or lines.
- For work on jobs which extend to more than one shift in order that continuity of job procedures and any specific precautions will be understood and observed by all parties involved.

E. Verbal Permission

Verbal permission or approval may be given on request to enter an operating department to

PERMITS AND WARNING TAGS (Continued)

do necessary work in any instance where no specific precautions or procedures are indicated, for example:

- Where automotive equipment must enter private unit roads to deliver or remove materials.
- To use power mowers in operating areas.
- To do clean-up work in operating areas.
- To use electric soldering irons on instruments inside control rooms.
- When making surveys, taking measurements and inspections of fire and safety equipment.
- For most cold repairs to buildings, windows, doors, and equipment other than lines or operating equipment.
- For minor jobs of sign repairs.
- On painting jobs and insulation repairs when no specific precautions are indicated.

F. Disposition of Written Departmental Work Permits

When a written Departmental Work Permit is issued, the original will be given to the proper person entering the department to do the work, and a carbon copy will be retained by the maker. In all instances, on written permission, the person doing the work or his superior should inform the operating personnel verbally as to the job status if it is not completed by the end of the shift. If and when it is completed the workman will simply sign the complete section of the written permit. Verbal approvals should be handled in the same manner except, of course, no written notices are involved.

It is to be understood that a written work permit is to be signed by the operating supervisor or one whom he designates or a new work permit written where jobs extend to a shift beyond the

PERMITS AND WARNING TAGS (Continued)

one on which it was started or last worked. Verbal approvals and job status information must be handled in the same manner. In other words, on a job continuing through several shifts or days, the workman on any shift must have written or verbal permission, whichever is required, from the operating personnel on that same shift.

III. WARNING TAGS

Before maintenance 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. Following are the practices in their proper order:

1. The operating personnel should shut down the equipment by closing off the source of power, i.e., shutting off the throttle valve and/or blinding the power line and opening any bleeders to relieve pressures. On electrical power controls, the operating personnel may open control switches and circuit breakers, use a hot stick or manipulate handle of electric switches, and push buttons to raise or lower circuit breakers for energizing or disconnecting power to equipment which is to be or has been repaired.

2. After all preparatory work has been completed by operating department, the operating personnel will attach their warning tag to the power control mechanism or valve. This tag will be dated and signed by the person who installs it, and must be left in place until all work is completed.

3. 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 worked on. However, the operating super-

PERMITS AND WARNING TAGS (Continued)

visor, 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 written Departmental Work Permit, and place warning tags as required.

4. When workmen have reported to the operating personnel and completed all permit regulations, and before starting any work, each craft will attach its dated and signed warning tag and leave it in place at the same location as the operating personnel's tag until all work is completed by the individual craft. When each craft has completed its work, before leaving the job, one of its workmen or his supervisor will remove that specific craft's tag.

5. Warning tags should not be removed by others but only by the operating personnel or their supervisor, or the workman or his supervisor, who have originally installed them.

6. After repair work has been completed, and all craft warning tags removed by workmen or their supervisors, the operating personnel or their supervisor may remove their tag and proceed to operate the control valves, bleeders, remove blinds, and manipulate electric switches or circuit breakers to restore power for operation of the equipment.

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 automotive equipment 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. All signs regulating traffic on the roads prohibiting or limiting access to operating or storage areas, etc., are to be observed. Operation of automotive equipment inside tank firewalls or inside operating areas require express permission of operating department personnel. Automotive equipment operation on other than permissible roads also requires specific permission from operating or engineering supervision.

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. All vehicles used after sundown or for night driving or other times when visibility is not adequate must be properly lighted.

5. As a protection to employees working in the garage or shops building, cars must first stop and sound the horn before entering.

6. 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.

AUTOMOTIVE (Continued)

7. Dry ice (solid carbon dioxide) must not be transported in a closed vehicle. The gas evolved may make breathing difficult or impossible.

8. 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.

9. If gasoline is spilled while filling a tank, the area should be flushed thoroughly with water before starting the motor of the vehicle.

10. Protective caps should be on all gas cylinders while being transported, except when in proper receptacles, such as on welding trucks.

11. 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.

12. 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 any vehicle.

13. 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.

14. When preparing to move material with hoisting equipment, always make the cable tie your last operation. This will prevent hasty

AUTOMOTIVE (Continued)

movement of the material in case the hoisting equipment controls should be accidentally moved.

15. 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, which is in balance or suspension.

16. 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.

17. Care should be taken when handling cable that the operator does not have loose clothing which could be caught and pulled into the winch.

18. Workmen may work off crane booms only when permission is obtained from the Safety Department. Crane booms must stay ten feet from hot electrical lines, unless approved by the Safety Department, and proper protection of electrical equipment provided.

19. 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.

20. 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.

21. 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.

CHEMICALS

I. GENERAL

A. Protective clothing such as 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 other hand, only small quantities of chemicals are involved, possibly only goggles, gloves and an apron would provide sufficient protection. In all cases when a protective hood is not required, other approved eye protection must cover the eyes when handling chemicals. All protective clothing should be properly cleaned by the wearer after using. The necessary protective clothing should be worn as long as the hazard exists. Workmen 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 job site, report immediately to the plant hospital for further treatment.

C. Chemical gas masks, hose masks, face masks, or respirators, and proper goggles must be worn by employees working in areas made dusty by chemical or mineral dusts, such as asbestos, coke, rock, sand, clay, etc. Where prac-

CHEMICALS (Continued)

ticable, 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 tag attached until the contents have been removed and the container has been thoroughly cleaned. A supply of red tags can be obtained from the Refinery Laboratory.

II. AMMONIA

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

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 phenol formula, or if not available, large quantities of water. Bottles of phenol formula (in green containers) and safety showers are located at appropriate locations for your use. However, do not allow the phenol formula 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 phenol formula filled and clean.

IV. CAUSTIC SODA AND POTASH (Sodium and Potassium Hydroxide)

The above chemicals have quite similar properties. They are both strong alkalies, 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. Special clothing is required when connecting or disconnecting TEL tank cars, and opening lines, vessels or equipment, also for entering and cleaning vessels. A shower should be taken and clothes changed before the conclusion of the shift also. A shower bath should be taken immediately if contact with TEL actually occurs and contaminated clothes laundered before reusing. Special clothing will not be required or showers taken by personnel handling closed equipment operations of this material.

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, even in small quantities, 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.

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.

ELECTRICAL

I. PROCEDURES

A. Electric lights may be changed by anyone. Wherever possible, the electric current should be cut off when changing lights. All fluorescent type tubes should be disposed of in the same manner as other discarded glassware to avoid exposure to broken glass by personnel handling trash. Except for broken glass, there is no hazard involved in handling these tubes. No poisonous materials are present in the tubes used in the refinery.

B. Proper precautions must be taken to avoid exposure of the body to creosote 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 job site.

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.

ELECTRICAL (Continued)

G. In opening box-type or other cutouts, shield the eyes from the flash. A disconnecting pole should be used on high voltages.

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

I. 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.

J. 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 accepted electrical codes.
3. Frames of all electric machines must be grounded.
4. All service switch boxes, motors, and conduit systems must be grounded.

K. 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.

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

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

ELECTRICAL (Continued)

III. TOOLS

A. The handles of all electric tools must be properly insulated to assist in preventing short circuits across them. Electric power tools should be properly grounded when in use.

B. Workmen 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. Rubber or plastic 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 which will interfere with adequate working space around electrical equipment.

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

E. All electric substations and electric rooms should be posted with warning signs.

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 an electrician to handle electrical equipment.

EXCAVATIONS, STAIRS, LADDERS, PLATFORMS, SCAFFOLDS

I. EXCAVATIONS

A. Provide all ground openings with rope enclosures, hand rails, or covers and provide safe warning lights or reflectorized markings 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. Receptacles 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; treated lumber should be 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 steadying 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 more than 10 feet in height will be provided with top and intermediate handrails and toe boards at working platforms. Proper access to platforms, such as ladders, should be provided unless other safe access is available. No toe boards are required on partial platforms where materials will not be stored. For scaffolds 10 feet or under, the use of toe boards and handrails should be made according to good judgment for safety of workmen in the vicinity and on the scaffold.

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.

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 SHUTDOWN

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.

II. FURNACE STARTUP

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.

FURNACES (Continued)

SHELL OIL COMPANY HOUSTON REFINERY

Please complete the following and present to Shift Foreman 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_____

Fireman 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 discon-

FURNACES (Continued)

nected 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.

OPERATION OF VALVES AND RELATED SAFETY APPLIANCES

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

I. SAFETY APPLIANCES

Safety appliances such as 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 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.

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 department manager or his assistant, who will in turn notify the respective Process 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

OPERATION OF VALVES AND RELATED SAFETY APPLIANCES (Continued)

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.

PIPE

1. Flange spreaders are available and may be used 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 on the wedge so that it may be secured with wire to a bolt on the flange.

2. Before assembling pipelines and connections, the workmen must be positive that the lines are 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, earth, or stairways.

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

PUMPS, COMPRESSORS, MACHINERY

1. All connections for hose or bleeders on all lines must be pointed downward. Hose 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. Crow Foot connections may be used on water or air lines only. Exceptions to this regulation may be made on agreements between the Department involved and the Safety Department; for example, where air is used on lube oil and wax facilities.

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.

4. When working on pumps or compressors, a safety work permit should be obtained. Workmen should wear proper protective apparel. Generally speaking, equipment should not be purged with air. Workmen will be responsible for the observance of the necessary safety precautions while on the job.

PUMPS, COMPRESSORS, MACHINERY (Continued)

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, packing glands and connections may be tightened while equipment is in operation.

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. Departments will determine the need for plugs or caps on bleeder or drain lines off pumps or compressors and advise operating personnel accordingly.

RAILROADS

1. Except for special purposes, only authorized personnel 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 one railroad car length clearance should be maintained on each side of 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 performing their duties.
8. A rider should be stationed on the first car when the train is crossing roadways in the refinery except in classification or work track areas where considerable switching is involved and proper precautions have been taken.

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 track without the consent of the loading track foreman.
11. Flying switches may be made with proper precautions to protect railroad crossings.
12. Trainmen and switchmen should familiarize themselves with the places 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, tracks, and other equipment and report same to their supervisors.
14. Any damage to cars, refinery trackage, gates, or plant equipment must be reported immediately to the appropriate supervisor.
15. Trainmen must not go between cars to make 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, or when approaching a crossing.

RAILROADS (Continued)

19. Main crossings or passageways must not be blocked by cars or engines, except during switching operations. In event of a refinery fire alarm, all such crossings should be cleared. 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.

TANKS OR VESSELS

I. 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, it may be nearly clean, or 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 proved effective in getting these jobs done with a minimum of hazard. All workmen working in uncleaned tanks shall observe the same applicable precautions.

1. The operating 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. They will be responsible for 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 cleaning or internal repairs, all inter-connecting 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.
- (4) Where other arrangements have been agreed to by Operating, Engineering and Fire and Safety.
 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.
 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

TANKS OR VESSELS (Continued)

lines is hazardous and should be avoided. In some cases, air can be used with safety, but before a routine practice is established or a specific application undertaken, the department involved and the Safety Department must be in agreement as to procedure.

9. In ventilating tanks for cleaning, steam injection should not be used. Air aspiration has been found more effective and safer.

10. Departments will determine the bleeders, off tanks and vessels, which will require plugs or caps and instruct operating personnel accordingly.

B. When Tetraethyl Lead is Present—In addition to the procedures outlined above, additional precautions are necessary when cleaning tanks and equipment (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. 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 and a shower taken at once.

4. Sludge from the tank may be spread (about 2" thick) on the ground at a designated and

TANKS OR VESSELS (Continued)

properly marked location. After weathering and laboratory testing, warning markers may be removed and the sludge will be harmless. Areas where such sludge has been buried should be permanently marked as it is a hazard so long as it is in the buried state.

II. SANDBLASTING

Fire and Safety Permits must be obtained from Fire and Safety Department for sandblasting tanks, vessels, equipment or lines where hazardous materials have been or may be present.

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. Where practical, all containers of volatile liquids shall be properly vented at all times. All containers, over 1 qt. capacity, should be grounded electrically when being filled continuously with a stream of flammable material having a flash below 150°F. 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 to prevent breakage and spillage. Never tape gauge or sample tanks while mechanical mixers are in operation unless working through a sealed gauge well.

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, you should 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 H_2S in dangerous concentrations.

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

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. Where practical, containers from one pint, to and including five-gallon size, should be emptied, rinsed out to flush contents, and have all caps removed before being discarded.

B. Unless drums are being used for shipping or storage of 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. Empty containers of any type taken from the refinery by employees should be clean and approved by the Safety Department before removal from the plant. Purchasing-Stores will handle container disposals with other parties involved.

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

F. When it is necessary to dispose of full or partially filled drums of chemicals, etc., which cannot be emptied into the oil sewer, special arrangements for disposal will be made through the Effluent Control Department and Automotive Department.

TANKS OR VESSELS (Continued)

G. 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.

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, or have adequate ground through its own pipe or structure system. 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.

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, burred heads, wrenches with jaws spread, etc. Return defective tools to the tool room for repairs or replacement. Tool Room will issue only tools which are in good working order.

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

C. Supervisor's 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, or carry in belt or tool bag.

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 or proper shield used while using tools for grinding, machining, chipping, and other hand or tool operations where chips or other particles may be released.

G. Use grounded electric tools, and be sure the ground connection on the tool is connected to a reliable ground.

TOOLS (Continued)

II. CABLE AND HOISTS

A. Inspect and test any cables, ropes, boat-swains chairs, or swinging scaffolds before using, also all rope or cable blocks and slings. Destroy any defective ropes or cables to prevent others from using.

B. 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 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 should call any unsafe condition to the attention of their supervisor for correction.

F. Care 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 heaters
Paint spray pots	Air receivers and dryers
Propane and other gas cylinders	Blowtorches
Sample bombs	Sandblast equipment
Experimental vessels	Automotive vehicle air tanks
	Fuel gas containers

TOOLS (Continued)

IV. DRIVE-IT GUN

A. The Tool Room supervisor will keep the drive-it gun and ammunition under lock in the Tool Room. He will issue it only to workmen having a written request from his supervisor. Only one shell should be issued for each stud.

B. A supervisor should be sure his workmen are properly instructed in the safe use of the gun. The drive-it gun should be checked out only when the job is ready to start, then returned as soon as possible when stud driving is complete. All persons should be in the clear when gun is being used, especially on opposite side of walls or materials.

C. Drive-it gun is not to be loaded except when actually driving studs. A Fire and Safety Permit must be obtained from Fire and Safety Department for use of the gun at any time or place.

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.

TOOLS (Continued)

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.

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 fuel 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. Equipment being opened shall be completely emptied and depressured before opening. 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 Fires and Boilers" under the direct supervision of the shift foreman. The requisite check forms shall be completed and signed before lighting any burners.

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

WELDING

I. GENERAL

A. When welding, burning or other hot work (except work authorized under Departmental Work Permits) is done in operating unit areas, the operating supervisor and Safety Department Inspector will determine the safe procedure to be followed and so indicate on the Fire and Safety Permit. It will be Operating Department personnel's responsibility to see that no flammable or other hazardous material is released from lines or equipment and to stop any maintenance or construction work if operating conditions are not considered safe in the unit area before or after starting the job.

B. When welding or burning 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 protect 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 stopped 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 practical,

Encl. Comm.

DATE REC'D:

August 1, 1972

8/2/72

☒ JGP Private & Confidential

☒ RWE WAB

☐ WAB R. L. Maycock - H.C. Eng., Environmental Engineering

☐ BSB

☐ GPB

☐ JRC

☒ HLI

☒ BHK

☒ IRM

☐ EMR

☐ AGS

Attached for your information is a memo summarizing our activity relative to asbestos handling. Will appreciate your comments.

☐ Attachment

Pls. Handle

File mgx

cc - Mr. A. J. Martin

Mr. J. G. Pratt

THIS COPY FOR

Original Signed By W. A. GABIG

W. A. GABIG

DPMC-01476

LAM 007999

SHELL CHEMICAL COMPANY

WHE
721.1
12/26PRIVATE AND CONFIDENTIAL

DATE JULY 19, 1972

TO HOUSTON PLANT - MANAGER

FROM SUPERINTENDENT-
ENGINEERING -
HOUSTON PLANTSUBJECT ASBESTOS HANDLING PROGRAM

Further to your question regarding an asbestos handling program for the Houston Plant, the Engineering and Safety-Training Departments have reviewed potential asbestos dust problem areas and determined the following action items applicable to the immediate goal of control.

1. The existing ventilation system in the insulator building must be altered to remove and efficiently trap asbestos dust particles from the building air space as well as work tables and cutting equipment. An RFE is currently being estimated by the Job Engineering Department and will be completed by July 21, 1972. Assuming AFE approval is imminent, the installation of dust control would be completed in approximately four months.
2. We have been advised by Head Office Engineering to use "appropriate substitutes for asbestos containing materials where available and economical". However, this advisory was deficient in detail concerning prospective substitute candidates. A cursory review by Job Engineering Department of insulation materials such as calcium silicate, fiber glass, mineral wool and expanded perlite indicates material substitution today, may substitute a pending legislation health hazard for a legislated health hazard, i.e. a large majority of the substitutes contain silica in significant quantities. We understand that silica dust regulations are currently pending in Washington. In view of the uncertainties regarding suitable material substitutes we will request Head Office Engineering to develop specific material substitution recommendations. A memo to Head Office Engineering - Manager Engineering concerning this subject will be prepared by July 19, 1972.
3. An immediate program to monitor and control the effect of peripheral dust hazard and contract insulator controls will be undertaken by the Engineering Department. Head Office Engineering-Construction will be advised to bring construction insulation contractors under the controls established. We feel this direct interface with the construction contractor is necessary in view of the potential hazard associated with Shell personnel working in the proximity of a contract insulator. These control procedures will apply equally to maintenance contracts. OMC and Hydrocarbon will be instructed to advise us of their control measures pertaining to Title 29.

DPMC-01477

LAM 008000

4. Regarding the Plant-wide abolition of asbestos bearing insulation materials, we advocate a controlled use continuance until such time that Head Office Engineering can effectively digest the engineering quality of new or existing asbestos substitutes. We understand Owens Corning and Johns Manville have new products about to be placed on the market. Additional, the degree of measured hazard is to be determined by a combined DOSH, Manufacturing Engineering effort at Wood River Refinery. The data obtained from insulating practice tests using asbestos bearing materials will be very useful in determining the extent of precaution and control. The practice and control tests are scheduled to begin July 24, 1972, at Wood River; however, we do not have target information as to when the test results may be summarized for Company use. In any event, substitute materials will only partially alleviate the problem since existing insulation will continue to need maintenance.
5. Steps have been taken to prevent personnel from eating in the Insulator Shop.
6. Steps have been taken to get the insulator shop cleaned thoroughly and a shop vacuum cleaner is on order.
7. Provisions will be made to purchase, in bags, all asbestos - containing insulation cement and mortar. These materials will be mixed with water in other bags before use.
8. The possible need to provide special clothing to the Insulators will be determined, based on review, after air samples are taken subsequent to installation of ventilation equipment (Item 1), and after receipt of guidance from DOSH.
9. A Plant Safety Order is in preparation to cover precautions to be observed in the handling, demolition and disposal of insulation on equipment being repaired or dismantled. This order will be ready for review by July 21, 1972.
10. Nature of warning signs, as specified in OSHA, are on order for the Insulator Shop and CA Cell Room. We have also ordered warning labels to be used in disposal of insulation scraps.
11. Subject to your approval, we plan to set up physical examinations for the Insulators and Cell Room operators who handle asbestos. If further batches of Epocryl containing asbestos are made, the personnel involved in the direct handling of the asbestos should be included. The standard calls for examination of personnel within 30 days of assignment to asbestos handling. We interpret this to mean that the first examinations should be within 30 days after approval of the standard.

with
DOSH
Continued

12. Within six months, but subsequent to installation of the Insulator Shop ventilation equipment, air samples will be obtained under typical working conditions. This effort will be coordinated with the DOSH program, which will involve extensive sampling in the shops and field at Wood River.

WHG/EWS:mlp


For: J. G. Massey

cc - HJB
RLB/LSA
P&C File

DPMC-01479

LAM 008002

SHELL CHEMICAL COMPANY
HOUSTON PLANT

GASKETING AND VALVE PACKING

MAINTENANCE M-3
PAGE 1 OF 1
AUGUST 16, 1972

Prompt and timely action to stop leaks is necessary to avoid hazards, prevent damage, and reduce maintenance requirements and costs. This is most apparent in corrosive and/or high pressure services where a small gasket leak can quickly corrode or erode a large groove in a flange, resulting in a costly repair. Prompt and timely corrective action to stop leaks is part of the responsibilities of each operator within his assigned facilities.

Each operator is expected to check his facilities at least once each shift and to take appropriate action to stop any leaks. Such action includes tightening or regasketing flanges and tightening, adding, or replacing packing in valve stuffing boxes. Should the operator's efforts fail to stop the leakage, the Operating Shift Foreman is to be consulted to determine appropriate further action.

The attached Engineering Standard 302H dated January 1972 provides a guide to gasketing and packing recommendations for various chemical services. These tables are arranged with the economic choice for a service at the top of the list. For example, compressed asbestos gaskets are the economic choice for dry chlorine service. Teflon jacketed asbestos would also work, but costs many times the price of compressed asbestos gaskets without any advantages in most cases. Therefore, compressed asbestos is the selection.

Attachment

Responsibility for Updating
Manager - Maintenance Engineering

DPMC-01480

LAM 008003