PLAINTIFF'S
EXHIBIT
KRC-175

ITEM #34 —

SUN OIL COMPANY

Accident Prevention Manual for Refineries



S 0287

ACCIDENT PREVENTION MANUAL

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SUN OIL COMPANY

REFINERIES

SEPTEMBER, 1975

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ACCIDENT PREVENTION MANUAL

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FOREWORD

An effective safety program is based on the mutual understanding of problems and solutions by both Company management and individual employees. Both must contribute support; both will benefit abundantly. The Company accepts its share of that responsibility because it values employees as its most important asset. Your personal, active cooperation is solicited.

Federal regulations, State laws or Company rules, essential as they may be, do not constitute an effective safety program. Such a program can only be achieved by people who want to work together safely. Actually, safety is the application of common sense to the performance of your job, and this remains an individual responsibility.

The safety rules which are adopted come from the experience of fellow employees. Through the years, people like yourself have uncovered hidden dangers and have passed along the benefit of their knowledge. Certainly some of that experience was bought with pain, suffering, and sorrow. It just does not make sense to ignore those lessons, to learn the hard way, to pay the price again and again. Striving to put these rules into effect, making them a part of every job you do, no matter how small, is your part of the mutual responsibility for safety. We sincerely hope that as

you go about your work you will report to your supervisor any hidden danger or unsafe situations which might be corrected and thereby prevent injury to yourself or to some other employee.

Many of the rules presented will also have application in your home and recreational activities. Constant vigilance off the job as well as during working hours is in your best interest.

To prevent all accidents and injuries is our goal. Together we can reach that goal.

SAFETY POLICY

Sun Oil Company has an established policy concerning safety which applies to all parts of the organization.

The following paragraphs, which have been extracted from it, were judged to be of the most interest to the readers of this Manual and were quoted for your information.

POLICY

Sun Oil Company will provide and maintain safe and healthful working conditions for all employees, and will avoid operating practices which would endanger the well-being of employees, customers, community neighbors, and the general public.

RESPONSIBILITY

Managers have the authority and responsibility for initiating actions necessary to provide safe and healthful working conditions. These include the implementation of specific policies, rules of conduct, operating procedures, employee training, equipment maintenance, and any other measures that can reasonably be expected to protect the health of employees and prevent damage to the Company's physical facilities.

Supervisors and foremen are responsible for assuring that safe and healthful working conditions are provided and maintained.

Each employee is responsible for helping to maintain safe and healthful working conditions by exercising sound judgment and for complying with all safety instructions and regulations.

Willful violation of safety regulations, or failure to comply with regulations, is cause for disciplinary action, at all levels.

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INTRODUCTION

The purpose of this Accident Prevention Manual is not to cover in detail all safety regulations which have been or will be adopted by the Company, but rather to point out the hazards which have caused serious accidents in the past, and which will cause future accidents unless special caution is observed.

OBJECTIVES

The prime objective of the Company Safety Program is to prevent injury or occupational illness to any employee.

Secondary objectives are to prevent damage to refinery equipment, loss of production, and waste of material as the result of accidents. Our efficiency and overall cost of processing a barrel of oil depend greatly on our ability to prevent accidents.

FORMAT

This Manual covers hazards and rules which are applicable to all of the Company's refineries. Some of the hazards pointed out are not followed by specific rules, because the situation may differ sufficiently from one refinery to another so as to cause the rules to differ. In these cases, the Manual refers you to your local supervisor for specific rules governing your location.

Since the location and procedure for drawing or replacing safety and personal protective equipment will vary from one refinery to another, this Manual does not cover such specific instructions. Check with your supervisor for the rules at your location.



CHANGES

Safety is a living, changing concept because it deals with people and their work situations. Although the safety rules as set out in this booklet are the result of many hours of serious thought and consideration, it may be necessary to change these rules with the passage of time. Any such changes will be posted on bulletin boards by authority of the refinery manager and will supersede any rule which appears in this booklet. Employees are expected to stay current on safety rules as well as other notices published for their guidance and protection.

DEFINITIONS

The terms "must", "shall", and "will" as used in this Manual are intended to designate mandatory rules. The term "should" designates a strongly recommended practice, but one which is not necessarily mandatory in all locations or under all circumstances.

CREDITS

Safety Cartoons are used courtesy National Safety Council.

Standard Hand Signals for Crane Operations from American National Standards Institute Publication B 30.5, 1968.

Recommended Eye and Face Protector Selection Chart and Applications table from American National Standards Institute Publication Z87.1, 1968.

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CLEANING FLUIDS

The danger of serious burns when cleaning with gasoline or other highly volatile and flammable liquids is so great that it should never be used for cleaning, scrubbing, washing, or scouring. Friction, a static spark, open flame, or a hot surface in the vicinity may easily cause an explosion. When cleaning agents are required, an approved non-volatile substance should be used. If such an approved cleaner is not available, an approved naphtha with a flash point of 130°F or above may be substituted on cold, ambient temperature surfaces only.

1. Know the hazards of the cleaning agent before you use it.



2. Follow the manufacturer's instructions. If you have any questions, ask your foreman.

3. Do not smoke, even when using non-flammable solvents. Smoking makes some solvent vapors more toxic.

4. If a cleaning agent other than naphtha-like material splashes on your skin, wash it off at once with soap and water; if on your clothing, change it.

5. Use cleaning agents only in well ventilated areas.

6. Approved naphthas or other flammable liquids shall not be used for cleaning clothing.

7. Permission to use certain oils for special cleaning problems shall be obtained from your Foreman or Safety Personnel.

CLOTHING



1. Clothing, preferably made of cotton or wool covering the entire body, should be worn at all times. Long sleeve shirts are recommended to offer protection against contact with hot lines, flash fires, etc.

2. The use of synthetic clothing material which would plasticize and stick to the skin when subjected to fire should be avoided.

3. Shirt sleeves should be tight fitting and shirt tails tucked in when working around moving machinery.

4. Droopy or torn trousers can be dangerous. Trouser legs should be of ankle length and be without cuffs. If cuffs are worn, they should be sewn up so they cannot catch foreign material or catch on a projection and cause you to trip.

5. Safety toe shoes are recommended in most jobs. The steel cap protects your toes. Instep

protection is often required. Canvas type shoes or sandals shall not be worn in the refinery.

6. Jewelry (rings, bracelets, neck chains, etc.) should not be worn while using tools or working around machinery or electrical equipment.

7. If you work outdoors in winter, wear warm but fairly light-weight clothing. It is warmer, generally, to wear two thin layers than one thick layer.

8. Employees will not be permitted to work without a shirt or with trousers cut off at the knees.

9. Greasy or oily clothing is hazardous around a refinery and must not be worn.

10. Hot water, steam or compressed air will not be used to clean clothing, boots, or shoes while worn on the body.

COMPRESSED AIR

When it is necessary to use compressed air as a cleaning medium, it must be realized that the chips or dust blown by the air may strike or injure a fellow employee, unless precaution is exercised by the person using the air hose. All employees have the responsibility to use compressed air in such a way as not to endanger themselves or those working around them.

1. When used for cleaning purposes, compressed air pressure must be reduced to less than 30 pounds per square inch in such a way that pressure will not

build to more than 30 lbs per sq. inch even if air flow is totally blocked at the nozzle exit. If more pressure than this is required to do the job, some other means of cleaning must be used instead.

2. If cleaning air is regularly used in an area where employees would be exposed to injury by flying chips or dust, chip guards must be provided, and eye protection must be worn by all employees within range of the blown material.



3. Hold the compressed air hose nozzle securely in order to prevent it from kicking.

4. Air lines will not be kinked to cut off the air because this will weaken the hose. Do not attempt to change or adjust pneumatic tools or connect or disconnect air hoses by kinking the hose. All pressure must be off the hose before connections are broken.

5. Compressed air will not be used for cleaning or cooling one's person other than in approved "air cooled" equipment or clothing.

6. If it is necessary to lay hose across roadways, provisions must be made to prevent damage to the hose by vehicles.

7. Because of the danger to fellow employees of flying dust and particles, compressed air is not to be

used for cleaning of platforms, decks, stairways, steps, passageways, or roadways.

8. Under no circumstances will compressed air be used in practical jokes. Compressed air hoses will not be pointed at yourself or anyone else. Severe injuries and even death have been caused by workers with a misguided sense of humor who try to be funny with compressed air.

COMPRESSED GAS CYLINDERS





1. Compressed gas cylinders may contain oxygen, acetylene, nitrogen, ammonia, chlorine, hydrocarbons, or other gases. Be sure you choose the right one.

2. All cylinders will be used, stored, and transported with extreme care. Protective caps shall be on all gas cylinders when not in use or while being transported.

3. All cylinders will be securely fastened and supported at all times, and in event of a permanent installation, are to be bracketed with chains or cables.

4. When exposed to heat, the pressure within the cylinder will increase. Cylinders, including CO_2 fire extinguishers, are protected from overpressure by either a relief valve, melt plug, or frangible disk. If the cylinder temperature exceeds 130°F. the melt plug may release the entire cylinder content, which could be a hazard in itself. In the case of a frangible disk, the entire cylinder content will be released if overpressure causes it to blow. Protect cylinders from such heat sources as steam lines, radiators, flames, engine exhausts, or electric arcs.

5. The number of cylinders used on a job in an operating area is to be kept at an absolute minimum.

6. Oxygen and acetylene cylinders stored at the same location are not to be intermingled and will be separated by a fireproof barrier or separated by a distance of at least 20 feet.

7. If a cylinder is left unattended with the hose and torch connected, the cylinder valve is to be closed.

8. Cylinders will not be carried by boom or winch line except in carriers designed for this purpose.

9. Cylinders will not be used for rollers or workbenches.

10. Discharge valves on cylinders shall be opened slowly. Pressure released suddenly may damage regulators and pressure gauges.

11. Defective regulators, valves, or gauges shall be reported at once to your supervisor. Do not attempt to force valves with hammers, or with wrenches when hand wheels are normally used.

12. Oxygen under pressure forms an explosive mixture with oil and grease. Oxygen cylinder regulators, valves, gauges, or fittings shall not have any oil, grease, or lubricant used on them; nor shall they be handled with greasy hands or gloves. These cylinders must not be subjected to oil sprays, mists, or oil spills.

13. Oxygen shall never be used in starting engines or equalizing pressure on any equipment.

14. Acetylene cylinders will always be used, stored, and transported in an upright position.

15. All oxygen and acetylene used in an operating area will be removed at the end of each day and/or immediately upon completion of the job. Under certain conditions, with permission of the Operating Supervisor, cylinders may be left overnight at locations designated by the Supervisor provided the cylinders are properly capped and secured.

ELECTRICAL EQUIPMENT

Electricity is a good servant when standard and approved equipment is used to control it. Safe operation depends on the proper installation, maintenance and use.

1. No employee other than an electrician or maintenance supervisor shall open a live electrical enclosure. Other employees must disconnect the circuit ahead of the enclosure before opening.

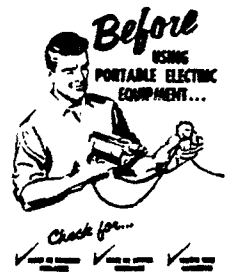
2. Electrical devices shall be unloaded before operating the disconnect switch. This will eliminate exposure to flash burns as the contacts open.

3. In operating a disconnect switch, employees should stand to one side rather than in front of the switch box.

4. Motor control boxes and disconnect switch handles should be checked with the back of the hand before grasping.

5. The line or main switch shall be opened whenever possible before the lid of the control box is opened.

6. All defective or unsafe electrical equipment or appliances shall be tagged and promptly reported to a supervisor.



7. Repairs to electrically driven equipment and electrical facilities will be made by authorized and qualified personnel only. Unless expressly authorized, no repairs shall be made on electrically operated equipment until the disconnect switch has been opened. This switch will be locked or tagged in the "Open" position, following the "Lock Out or Tag Out" procedure.

8. In case of overheating or sparking of wiring and

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other electrical equipment, the employee shall turn off the power and report the condition to the supervisor.

9. Ground wires are installed for the protection of employees and shall not be disturbed. Before using electrical equipment, employees should check to be sure the electrical ground is connected. Broken wires (especially ground wires), poles, guy lines, and other similar conditions are to be reported to the Supervisor as soon as they are discovered.

10. When working under or near electrical lines, employees shall keep adequate clearance between the lines and objects being moved or handled. Care shall be used with gin poles, booms, or other equipment when raised near electrical lines. A minimum distance of 10 feet must be maintained from all power lines. (In some states the minimum distance may be greater than 10 feet.) For voltages over 50,000 extreme care must be used and the minimum distance from a line increased. Consult your supervisor.

11. Power line poles shall not be used as a snub or "Dead Man".

12. Clothes lines, or other similar lines shall not be attached to power line poles.

13. Hands, shoes, clothing and protective equipment should be dry (if at all possible) when electrical equipment is handled.

14. Extension cords should be checked carefully

for burned spots or other defects by the person using the extension cords. Three wire extension cords with the third wire as ground will be used. Extension cords shall not be used in areas where explosive vapors exist except as directed by the supervisor. When it is necessary to use extension cords in explosive atmosphere, they shall be equipped with explosion-proof fittings. In such explosive atmospheres, the cord shall not be connected to or disconnected from live outlets unless these outlets are explosion-proof.

15. In areas where hazardous vapors may exist and explosion-proof equipment has been provided, light bulbs and fuses should not be installed or removed while the current is on. Replacements for fuses originally installed shall be no greater than the design capacity. Material such as pennies, tinfoil, etc., will not be substituted for the proper fuse, and fuses shall not be wired around.

16. Explosion-proof and vapor-proof cover globes, where required, shall be kept in place.

17. Employees shall regard all electric transmission wires as dangerous and shall not allow any object to come into contact with them. The insulation on the wire is no guarantee against instant death.

18. Employees shall never break into concrete when digging or excavating unless approved by authorized personnel. Some but not all electrical conduits are covered with colored concrete as a warning that electrical lines are in the area.

19. All portable electrical equipment used must be of the three wire grounding type and extension cords used with this equipment must also be of the standard three wire grounding type.

20. Extension or trouble light cords used on wet jobs, inside boilers, tanks, vessels or other hazardous locations, should be equipped with a portable transformer to reduce the voltage on such cords to approximately 12 volts.

ELECTRIC BONDING OR GROUNDING OF STATIC CHARGES

Static electrical charges are generated by the separation of like or unlike bodies. For such charges to accumulate in a significant amount, the separated bodies must become and remain insulated with respect to each other. Static electric charges may also arise from friction or rolling contact between the bodies being separated.

The most important example of static electricity to the petroleum industry probably is that which is generated when flow of liquids takes place. Such charges may be generated when hydrocarbon liquids flow through pipes or filters, drip from the end of loading tubes, spray out the end of a pipe, or splash on another surface. Even turbulent flow in the body of liquid contained in a tank may generate such charges. When these charges occur, they may accumulate until sufficient potential is reached to cause a spark to jump between two differently

charged surfaces. Such a spark may or may not cause ignition of a flammable hydrocarbon vapor, depending on the energy released. The existence of such a possibility causes the industry to follow certain rules concerning bonding and grounding. Such rules are intended to provide a path for dissipating static currents as they are generated, thus preventing a build-up sufficient to cause an ignition type spark.

It is important to realize that hydrocarbon liquids may vary in electrical properties from one time to another and that flow characteristics may vary also. Even though a person were able to violate the bonding rule sometimes and not cause an ignition, there is no way a person can violate the rules and still be safe. The rules posted at your location apply to you and are to be followed every time.

Generally, the rules posted at truck, rail car, or small container loading facilities are specific and easy to follow. Unfortunately, there are other circumstances which might generate static charges which would not be so obvious and, therefore, require special alertness on your part. Such circumstances might involve the wearing of nylon or other synthetic fabric clothing into an area where flammable vapors exist. Another such circumstance might involve metal containers being sandblasted. Air or steam leaks near insulated objects can also cause accumulation of static charges. Moving belts might generate such a charge. Insulated metal floats or objects in a tank may accumulate a charge from the moving liquid surface. The list is endless and only by being alert to

the possibility can you form intelligent decisions as to when bonding or grounding should be done.

If a rule concerning bonding or grounding has been posted for a particular operation, be sure to follow it every time. If no rules are posted, be on the alert for necessity of bonding which may arise out of unusual circumstances.

EYE PROTECTION

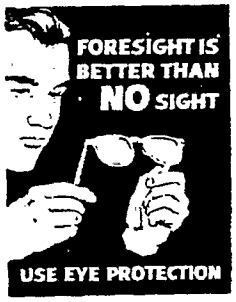
Removing foreign bodies from eyes is no job for amateurs. Employees who receive an eye injury or foreign body in the eye while on the job must report to the first aid or medical facility for treatment immediately.

In those areas requiring eye protection, employees shall wear only approved types which are provided by the company. Removing side shields or making other changes to the eye protection equipment is prohibited.

It is not practical to list all the possible situations where eye protection is advisable but the following points out a number of jobs where such protection is specifically required. All employees are cautioned to wear appropriate eye protection when performing any of the jobs listed. Other jobs may require eye protection and be so designated by signs in the area; employees are urged to use eye protection any time, whether warned or not, when common sense

indicates the danger that a foreign body may strike the eye and cause damage.

Operations Requiring Eye Protection



1. Grinding on abrasive wheels, even when glass guards are provided.

2. Chipping, cutting, or breaking of stone, concrete, pitch, coke, cast iron, steel, brass, babbitt, or any other metal or material where a flying chip hazard is involved.

3. Handling molten metals, pitch, or asphalt.

4. Handling materials in powder or semi-powder form where a dust hazard exists.

5. Using or handling acids, caustics, or other irritating chemicals.

6. Using air blast for cleaning away dust, dirt, or metal particles.

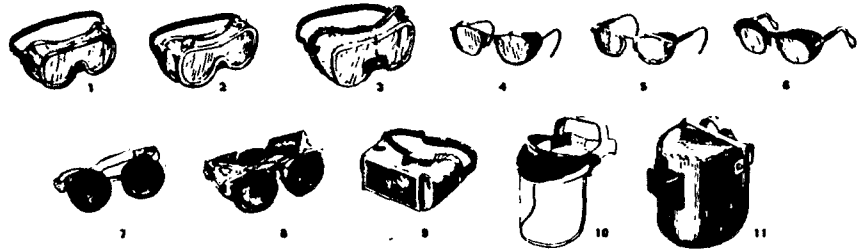
7. Scraping and cleaning, such as scraping paint from a metal or wood surface, sand blasting or sand drying.

8. Replacing or tightening of gauge glasses under pressure, including tubular, reflex, and see-through type.

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Selection Chart

Recommended Eye and Face Protectors for Use in Industry, Schools, and Colleges



1. **GOGGLES,** Flexible Fitting, Regular Ventilation
2. **GOGGLES,** Flexible Fitting, Hooded Ventilation
3. **GOGGLES,** Cushioned Fitting, Rigid Body
*4. **SPECTACLES,** Metal Frame, with Sideshields
*5. **SPECTACLES,** Plastic Frame, with Sideshields
*6. **SPECTACLES,** Metal-Plastic Frame, with Sideshields
** 7. **WELDING GOGGLES,** Eyecup Type, Tinted Lenses (Illustrated)
7A. **CHIPPING GOGGLES,** Eyecup Type, Clear Safety Lenses (Not Illustrated)
** 8. **WELDING GOGGLES,** Coverspec Type Tinted Lenses (Illustrated)
8A. **CHIPPING GOGGLES,** Coverspec Type, Clear Safety Lenses (Not Illustrated)
** 9. **WELDING GOGGLES,** Coverspec Type, Tinted Plate Lens
10. **FACE SHIELD** (Available with Plastic or *Mesh Window)
11. **WELDING HELMETS

* NON-SIDESHIELD SPECTACLES ARE AVAILABLE FOR LIMITED HAZARD USE REQUIRING ONLY FRONTAL PROTECTION
** SEE CHART "SELECTION OF SHADE NUMBERS FOR WELDING FILTERS" - ANSI Z87.1

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APPLICATIONS
FOR EYE AND FACE PROTECTOR TYPES SHOWN IN SELECTION CHART

OPERATION	HAZARDS	RECOMMENDED PROTECTORS: Bold Type Numbers Signify Preferred Protection
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	**7, 8, 9**
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	**2, 10** (For severe exposure add 10 over 2)
CHIPPING	FLYING PARTICLES	**1, 3, 4, 5, 6, 7A, 8A**
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	**9, 11** (11 in combination with 4, 5, 6, in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	**7, 8, 9** (For severe exposure add 10)
GRINDING-LIGHT	FLYING PARTICLES	**1, 3, 4, 5, 6, 10**
GRINDING-HEAVY	FLYING PARTICLES	**1, 3, 7A, 8A** (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	**2** (10 when in combination with 4, 5, 6)
MACHINING	FLYING PARTICLES	**1, 3, 4, 5, 6, 10**
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	**7, 8** (10 in combination with 4, 5, 6, in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	**1, 3, 4, 5, 6, 10**

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9. Removing retaining bands from bundled material.

10. Using air, steam, or other agents under pressure to open plugged line or vessel. Cleaning and blowing tubes in boilers or exchangers, turbining lines or furnace tubes, cleaning economizers, flues, and stacks.

11. Tapping lines or while making the initial opening in vessels, exchangers, pumps, or lines which have been under pressure.

12. Welding or burning; protection required for other employees exposed to the rays of an electric arc.

13. Cutting, grinding, removing, or installing thermal insulation materials.

14. When operating wood and metal lathes, grinders, buffers, drill presses, and penumatic tools.

15. Operating cement gun; mixing refractory materials.

EXCAVATION

1. All excavations, open ditches, manholes, or similar places shall be protected with barricades and warning signs. If any lights are necessary, they must be an approved type.

2. Be especially careful when entering an excavation to check for hydrocarbon or other heavy vapors which might fill the trench and exclude sufficient oxygen to support life.

3. If you have reason to believe that cave-in of an excavation is an imminent danger, get out of the hole immediately and advise your supervisor of the condition.

4. All excavations through fire walls or tank dykes must be cleared with designated people before the work is started. It is important to follow the procedure at your refinery so that in event of a fire or other emergency the Safety and Fire Department people will be aware of the fact that the dyke is open.

5. All excavations should be closed as soon as the work has been completed. Excavations through tank dikes or fire walls presents a special problem since spills which might occur will not be contained while the excavation is open. Openings in tank dykes which adjoin public property, railroads, highways, streets, etc., should receive special attention and shall never be left open longer than is essential to the work. If at all possible, such dykes should be restored before workers leave the site.

FIRE PREVENTION AND CONTROL

All employees have a wide range of responsibilities in preventing and fighting fires. Many of the specific points made throughout this Manual are aimed at preventing fire or explosion and it is not practical to

reiterate them all here. The following broad principles must be followed and each employee is expected to be familiar enough with this Manual and other instructions for his or her safety to know the specific rules which have been developed at his or her location.



a) Report fire hazards to your supervisor.

b) Comply with the hot-work permit procedures for your plant.

c) Observe the no smoking rules.

d) Always follow the rules for bonding and grounding.

e) Strictly comply with rules for sampling, transporting, and storing samples.

f) Use cleaning fluids and flammable liquid containers in accordance with the rules in your refinery.

g) Fire equipment shall be kept in designated locations and shall be unobstructed. No tools, clothing or other material shall be laid on a fire extinguisher or any other fire equipment.

h) Fire hydrants and monitor nozzles are not to be used for utility purposes (any use other than fire

fighting or other emergency action such as flushing after a spill) without authorization to do so from the Fire or Safety Department.

i) Good housekeeping is essential. Keep paper, rags, wood, and other combustible material cleaned up. Use covered metal containers for oily rags and metal cans for other trash. Clean up oil spills immediately.

All employees are expected to know how to use the portable fire extinguishers furnished and the type hazard for which each is designed. In event of fire those employees within the immediate vicinity are expected to: 1) turn in the fire alarm immediately; and 2) extinguish the blaze if it is within the capability of the equipment at hand. Certain employees have specific duties in event of fire and are expected to know and perform these duties.

FLAMMABLE LIQUID CONTAINERS

1. Flammable liquids may only be stored or transported in safety cans or metal sample containers which have a safety relief opening. An exception to this rule allows chemically pure laboratory reagents to be stored in glass containers, but special handling of these containers is required.



2. All sources of ignition are prohibited in areas where flammable liquids are stored.

3. All storage, handling, or use of flammable liquids shall be under the supervision of qualified persons. No one who has not been fully instructed in the safe handling and use thereof shall be permitted to handle or use flammable liquids.

4. All buildings, rooms, and areas where flammable liquids may be stored, or used shall be properly ventilated in accordance with recommendations of the National Fire Protection Association.

5. Shipment of all flammable liquids shall be in approved containers and properly tagged.

6. Flammable liquid samples should not be taken into control rooms, offices, locker rooms, shop areas or other locations where sudden release of the contents would produce hazardous atmosphere.

FLASHLIGHTS

Only flashlights furnished by the Company are permitted to be used in a refinery.

FURNACES AND FIREBOXES

A safe heater light-off begins with the assumption that undesirable fuel can be present in the firebox,

much like the assumption that all guns are loaded. The procedure for start-up outlined and posted for each furnace or boiler is extremely important and is to be followed exactly each time a furnace or boiler is lit. NO SHORT CUTS ARE ACCEPTABLE unless cleared with your supervisor prior to performing the start-up.

Study the normal as well as the emergency shutdown procedures, and follow these exactly.

In performing your duties around furnaces or boilers, follow these rules (in addition to proper operating procedure rules):

1. Avoid standing directly in front of firebox openings, especially when lighting a fire.

2. Do not store material of any nature under a furnace.

3. Do not block sewer drains under a furnace because in event of furnace tube rupture, drainage will be very important. Report clogged drains to the appropriate supervisor.

4. Always use eye protection when looking into a firebox opening. Remember that a firebox may be under positive pressure; when opening an inspection door be prepared for hot gases to be forced out the opening.

5. Report any observed furnace tube or boiler leaks immediately.

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6. If lighting a fire in a furnace or boiler which is not equipped with electric igniters, use a lighter torch of sufficient length that you can stay well in the clear while sticking the torch into the pilot burner.

GAUGING TANKS AND VESSELS

1. Caution must be exercised when ascending or descending ladders or stairs. Extreme care must be used when ice or snow covers steps or rungs. In climbing ladders, carry gauging and sampling equipment in a container and put handle over arm to have both hands free to use side rails or rungs.



2. Breathing equipment may be necessary when gauging a tank which possibly contains hydrogen sulfide or other poisonous gas.

3. Gauging of a floating roof tank should be with automatic equipment or be performed manually from the platform located at the top of the tank if at all possible. A gauger or other employee who must descend to a floating roof where the atmosphere is suspected of containing toxic vapors must wear a fresh air mask or other self-contained breathing apparatus. Another employee with air mask available must remain on the tank platform to give assistance if needed. No one should enter a floating roof tank shell

while products are being pumped into or out of the tank.

4. Never leave any material such as tapes, plumb-bobs, thermometer, rags, or bottles on the tank roof. Wipe up spilled oil from tank top or stairway.

5. Use steel tape instead of gauge pole if overhead power or telephone lines are present.

6. Do not slam hatch open or shut. Never leave gauge hatch open unless requested to do so by your supervisor. Do not gauge tanks during an electrical storm or while mixer is running.

7. It is dangerous to walk on the roof of a cone-roof tank without special provision to distribute your weight over a large area. Unseen corrosion may weaken the roof sheets. Large planks, grating, walk-ways, or similar devices may be used if it is necessary to leave the gauging platform.

8. Barges, tanker compartments and large tanks containing military jet fuel (JP-4), kerosene, benzene, toluene-xylene, or cyclohexane shall be allowed to settle for thirty minutes before gauging or sampling operations are performed. Tank trucks and tank cars should be allowed to settle for at least one minute before gauging.

GLASS EQUIPMENT AND CONTAINERS

1. Glass equipment should be carried or transported in protective containers.

2. Glassware should be inspected frequently for cracks or chips; defective glassware should be discarded.

DON'T PICK IT UP—

3. All glassware shall be emptied of liquids before being cleaned or discarded.

4. Glassware containing acids or other hazardous chemicals being transported shall be in plastic or other non-breakable, protective containers or carriers.

GUARDS AND HANDRAILS

Standard safety guards such as coupling guards over power-driven machinery, handrails, and other similar devices are for your protection. For proper type of guard, employees should consult their supervisor or the Safety Department.

1. Guards shall not be removed or changed except to make adjustments or repairs.

2. All guards, handrails, and other safety equipment shall be replaced and completely secured by the employee on completion of any repair job.

3. It is a responsibility of the operator to be sure that all guards have been replaced and properly secured before machines are placed in operation.



4. Defective guards or other equipment not in proper condition shall be reported at once to immediate supervisor.

5. Employees should check to see that all new or rebuilt equipment is equipped with standard guards before placing it in operation.

HAND TOOLS

1. Defective hand tools shall not be used. Employees using hand tools are responsible for the condition and maintenance of them. Damaged tools shall be returned to the toolroom for replacement. Examples:

a) Pipe wrench jaws shall be clean and sharp in order to grip the pipe properly.

b) Chisels shall be returned if the head is mushroomed.

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2. Use the proper tool for the work at hand. For example:

a) Be sure the wrench fits properly and take a position which would not result in injury if the wrench slips. A box wrench is preferred over an open end wrench. "Cheaters" or extension handles used to gain leverage should not be used.

b) Screwdrivers or files shall not be used to pry. Neither tool should be held in a manner to cause injury should the tool slip. Files may not be used without handles.



3. Tools must not be dropped from overhead structures.

4. Jack handles shall be removed when the jack is not being operated. Work shall not be conducted under a load supported by jacks alone.

HAZARDOUS MATERIAL HANDLING

Hazardous material is used in this Manual to mean any material, which may cause injury or illness by:

a) Skin or eye contact
b) Inhalation
c) Swallowing

A number of substances would fall into this category, i.e. acids, caustics, carbon tetra-chloride, aromatic compounds, such as benzene. Special attention to the handling of this type material is necessary. Your Safety Department or supervisor should be consulted for instructions on any hazardous material since the special procedures are so numerous as to make a complete listing here impossible.

The following are only a few of the many precautions which must be observed when handling hazardous material:

1. Do not gauge caustic or acid tanks while material is being unloaded into them.

2. Hazardous material containers should be clearly marked as to contents. Glass containers should not be on high shelves, walkways, or steps.

3. When necessary to dilute acid, pour acid into water slowly. Never pour water into concentrated acids. Avoid to whatever extent possible draining acid into sewers, except specially designed acid disposal systems.

4. When sending a valve, fitting or piece of equipment which has been in hazardous material service to a shop, it should be tagged with a large, highly visible tag stating the type material handled.

5. When working with hazardous material or in

operating areas where contact with such material is possible, wear approved protective clothing and have water for flushing the skin or eyes available in the vicinity of the work. For persons with especially sensitive skin, nose, or throat, extra precautions should be observed, i.e. use of skin cream, close fitting cuffs and collars.

6. Be thoroughly familiar with the first aid procedures required in event of exposure to hazardous chemicals.

HOISTING OPERATIONS

1 During heavy or large hoisting operations, "DANGER" signs or similar warning signs should be so located as to warn those working in or passing through the area, and the area should be roped off whenever possible.

2. Personnel engaged in hoisting operations are to keep clear of the suspended load and warn those who come within the danger area. Also, keep clear of horizontal loaded cable on power tuggers.

3. Hands are to be kept off moving wire rope. One or more tag lines are to be used, when necessary, to guide or control the load.

4. Inspect chain blocks, chains, hooks, and cables before using. Never use a hoist for a load greater than its rated capacity.

5. Personnel are not to ride material hoists, crane blocks or chain loads except when other means are less safe and then only when in a boatswain's chair or a cage.



6. Chainfalls or other hoisting devices are not to be supported by pipes or conduit without the prior approval of the unit supervisor involved.

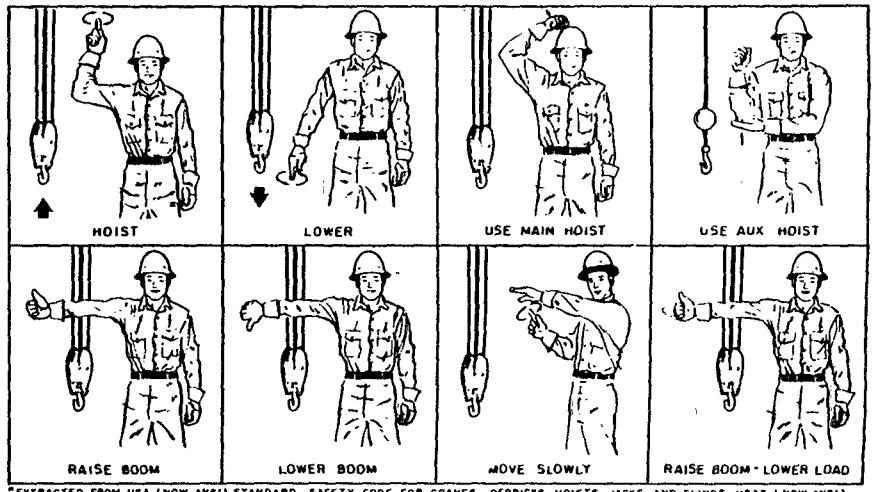
7. Synthetic fiber slings must not be used to lift objects heated above 150° F.

8. Wooden strips or blocks are to be used whenever necessary to protect slings and chokers against damage from sharp corners or edges.

9. Sketches showing the "Standard Signals To Be Used When Working With The Crane" appear in this Manual. Only one employee will give hand signals to the crane operator while lifting or lowering the load.

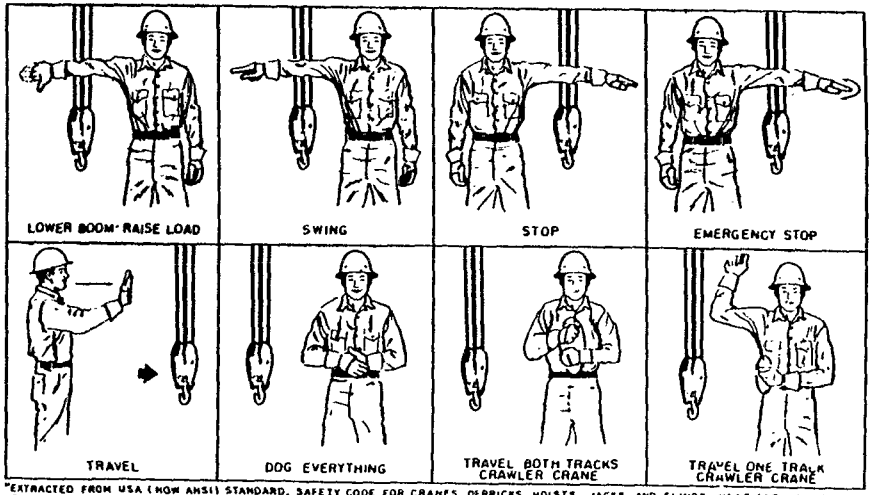
10. Hoist machine operators must be constantly alert and must keep their eyes on the employee giving signals. The operator shall not allow cables to stack up on the side of the drum.

STANDARD HAND SIGNALS FOR CONTROLLING CRANE OPERATIONS



"EXTRACTED FROM USA (NOW ANSI) STANDARD, SAFETY CODE FOR CRANES, DERRICKS, HOISTS, JACKS, AND SLINGS, USAS (NOW ANSI) B30.5-1968, CRAWLER, LOCOMOTIVE AND TRUCK CRANES, WITH THE PERMISSION OF THE PUBLISHER, THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, UNITED ENGINEERING CENTER, 345 EAST 47TH STREET, NEW YORK, NY 10017"

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INSTRUCTIONS TO SIGNAL MEN

1. ONLY ONE PERSON TO BE SIGNALMAN.
2. MAKE SURE THE OPERATOR CAN SEE YOU AND ACKNOWLEDGES THE SIGNAL GIVEN.
3. SIGNALMAN MUST WATCH THE LOAD - THE OPERATOR IS WATCHING YOU.
4. DON'T SWING THE LOAD OVER OTHER WORKERS, WARN THEM TO KEEP OUT OF THE WAY.

HORSEPLAY

Practical jokes, scuffling, wrestling, throwing things and acts which may startle or distract other employees are not allowed on company property.

HOUSEKEEPING

To be safe, efficient, and pleasant to work in, a work place must be clean and orderly.

Materials and other equipment should be kept out of the aisles and returned to proper storage after use. You may prevent a serious accident by picking up tripping hazards such as nails, pieces of wire, and scraps.

1. Before any job is considered complete, the work site must be cleared of any waste material and junk equipment, and any hazardous conditions created by the work crew must be eliminated.

2. All boards shall have protruding nails removed or bent down.

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3. Pipe shall be stacked and blocked in an area which does not obstruct traffic.

4. Tools, bolts, and other material or equipment must not be placed where they may become a tripping hazard.



5. A container shall be provided when landings and platforms are used for temporary storage of material and equipment during turnarounds.

6. Lamps, globes, and reflectors shall be kept clean.

7. Windows shall be kept clean and in good repair.

8. Oily rags, rubbish, and paper shall be placed in appropriate covered metal containers.

9. Aisles, passageways, stairs, platforms, ladders, and floors must be kept clean and clear of obstruction. Access to fire escapes must not be blocked. Stair treads, handrails, and flooring shall be kept in good repair.

10. An area around all fire hydrants, monitor nozzles, and hose reels, equal to a circle with a minimum radius of 5 feet is to be kept clear of tools, equipment, vehicles, and debris.

11. Tanks, lines, and valves shall be kept free from leaks and in good condition. All leaks shall be reported promptly.

12. Oil spills are to be cleaned up immediately.

13. Cooperate in keeping change rooms, lockers, smoking areas, showers, and toilets clean. Dispose of trash, lunch wrappings and paper towels in the receptacles provided. Keep oil soaked clothing or rags out of lockers. Report any unsanitary conditions.

LADDERS (PORTABLE)

1. Ladders, like any other tool, must be cared for, inspected and returned to the shop if found defective. Use only approved ladders.

2. Wood ladders should not be stored in locations exposed to the elements, near radiators, stoves, steam pipes, or other areas subjected to excessive heat or dampness.

3. Portable rung or cleat type ladders should be used at such a pitch that the horizontal distance from the ladder foot to the vertical support is about one quarter of the working length of the ladder.

4. The ladder shall be so placed as to prevent slipping, or it shall be lashed or held in position. No ladder should be placed in front of a door opening toward the ladder unless the door is blocked open,

locked, or guarded. In passageways or aisles an employee should be stationed at the foot of the ladder as guard.

5. Ladders shall not be placed on boxes, barrels, or other unstable base to gain height. The side rails should have a secure footing with the top rest reasonably rigid and supporting both side rails.



6. When ascending or descending, the climber must face the ladder and keep a firm grip on the ladder.

7. Except for specially designed ladders, not more than one person should use a ladder at a time.

8. A ladder should never be used in a horizontal position as platform, runway, or scaffold. A ladder should not be used as a guy, brace, skid, or gin pole.

9. The top of the ordinary type step ladder should not be used as a step.

10. Aluminum or other metal ladders should be inspected frequently for burrs or loose rivets. If the side rails or rungs are bent or badly dented, the ladder should be returned to the shop for inspection. Metal ladders shall not be used in areas where they may come in contact with electric wires or electric equipment.

11. When climbing onto a roof or platform with a portable ladder, the ladder must extend a minimum of 3 feet above the support at the roof line or platform.

12. Avoid carrying objects in the hands when using ladders. The free use of hands is essential to safety. Tool bags should be used and preferably hoisted to the work level.

LIFE LINES

When it is impractical to perform elevated work from an approved scaffold or platform, a life line shall be used for employee's personal safety. Life lines are also required when entering a hazardous enclosure, vessel, tank or manhole. The following precautions should be observed when using a life line:

1. Life lines are to be of an approved type. If in doubt, consult your supervisor.



2. When life lines are for the purpose of retrieval, they must be under the direct control of a fellow worker at all times while in use.

3. When life lines are for the purpose of breaking a fall, they must be secured above the point of operation to an

anchorage or structural member supported independently of any scaffold, deck, or carriage from which the job is being done.

4. The life line must be adjusted so as to limit the maximum fall to 6 feet.

5. The life line and hardware must be inspected before each use to establish its ability to support the required load. If a life line has once been subjected to an actual in-service loading because of a fall, as opposed to static loading tests, the line must be removed from service and shall not be used again for employee safeguarding.

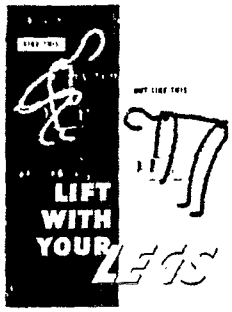
LIFE PRESERVERS

At times your job may require that you work over the water in boats or skiffs, where the danger of drowning would exist if you fall overboard. In these cases the wearing of U. S. Coastguard approved life jacket or work vest is required.

In some locations the use of life jackets when working on a dock, platform, wharf, or tied-up barge may be required either by Coastguard regulations or by the local refinery management.

Before using a life vest, inspect it to determine that the straps and fasteners work, and that the unit has not been damaged in such a way to alter its strength or bouyancy. Defective units must not be used.

LIFTING



1. Ask for help when lifting too heavy loads. Use a hoist or winch for lifting heavy loads where possible.

2. When lifting, assume a proper position by keeping the back straight, bend the knees so that lifing will be done by using the leg muscles and not by the back muscles. Avoid lifting when the feet are spread wide apart or on different levels. Do not lift with the body in a cramped or twisted position.

LIQUID THERMAL EXPANSION

Vessels or pipes completely full of liquid may rupture when exposed to sun light or other heat sources due to the expansion of the liquid. Unless some type of relief valve or opening is provided, gaskets may be ruptured, gauge glasses broken, or even the steel itself ruptured. For this reason, it is essential that a line or vessel full of liquid which may be subjected to heating not be blocked in unless a relief valve or other relief opening has been provided to relieve pressure above the normal operating pressure. An example of this situation might be a heat exchanger shell full of water or other liquid with blocked inlet and outlet valves.

If relief openings are to be created, care must be used to conduct any liquid or vapor expelled from the line or vessel to a safe place.

LOW TEMPERATURE OPERATION

There are three principle hazards associated with the operation of low temperature equipment: explosion or fire, toxic effects from the gases used, and freeze burns.

1. Explosion or fire may result from the overpressuring of the system. Since some refrigerants are flammable, the release of gas or liquid into the air may allow a flammable mixture to be created.

2. Some gases used as refrigerants are toxic, such as ammonia or sulfur dioxide. Before releasing a refrigerant into a room or closed area, be sure to determine that it is not toxic, or wear protective clothing and warn other occupants.

3. Since cold surfaces in a refrigeration system or process area using refrigeration may vary from plus 50°F to minus 250°F, extreme care must be used to prevent freeze burns caused by touching cold surfaces. Flesh can freeze quickly when brought into contact with extremely cold metals and may stick to the surface touched. Gloves should be worn anytime the hands may come into contact with surfaces less than 20°F, and all other body parts must be protected from direct contact with such cold surfaces.

MACHINERY IN MOTION

Do not perform any mechanical repair on machinery while it is in motion if it is practical to shut it down. Keep all machinery guards in place while machinery is in motion.

1. No major repair work should be done above moving machinery. When working close to moving machinery other than shop tools, a temporary guard should be provided between the machine and the workers.

2. There may be "LOCK-OUT" procedures at your refinery to prevent accidental starting of certain machines during repair. Check with your supervisor for identification of such equipment.

3. The operation of any machine is prohibited except by workers designated by supervision.

4. Employees must not wear neckties, dangling sleeves or other loose clothing if operating or working close to moving machinery. Gloves should not be worn while using abrasive or buffing wheels. Hair must be worn in such a manner that it does not constitute a hazard around moving machinery.

5. Tool rests on emery wheels should be adjusted to within 1/8 inch of wheel and above the center line of the wheel.

MATCHES

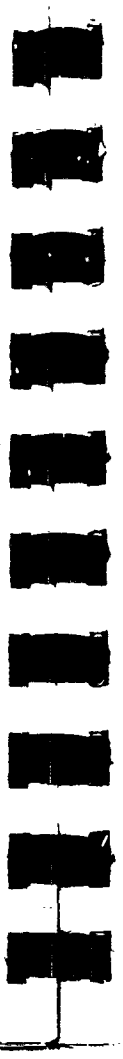
Household matches (non-safety type), open top lighters, and lighters having visible plastic fuel reservoirs are not to be carried in the refinery, tank farm, and wharf area.

MOBILE EQUIPMENT

All employees using mobile equipment must know and observe traffic rules and regulations of the area where the equipment is operated. Vehicles will be operated in a safe manner based on the conditions at the time and are not to be operated unless they are in a safe mechanical condition. No vehicle will be operated while driver's ability or alertness is so impaired through fatigue, illness, or any other cause as to make it unsafe to drive. Drivers of automotive equipment on public roads or streets shall have a valid operator's license appropriate for the equipment being operated.

1. Drivers shall be held responsible for the safe operation of the vehicle and all its equipment, and for the immediate reporting of defects in all its equipment to the appropriate supervisor.

2. Drivers shall be responsible for the safe transportation of employees riding on their vehicles. They shall see that employees do not ride on running boards, fenders, bumpers, or tailgates and that employees riding in a truck bed are properly



positioned so that their arms and legs do not extend beyond the truck bed.

3. No more than two passengers and the driver of a vehicle will be permitted in the cab of the vehicle at one time.

4. No person will get on or off a vehicle while it is in motion.

5. No person is permitted to ride any load or material being pulled behind a vehicle.

6. No person other than the operator is permitted to ride a fork-lift truck, road grader, bull dozer, front loader, crane, tractor, or similar work vehicles.

7. Drivers should use caution on roadways blanketed with steam and fog. If another roadway is not available, drivers shall approach the edge of obstructed area, come to a full stop, turn on lights, sound horn, and then proceed slowly.

8. Drivers shall leave the cab while trucks are being loaded by power shovels or cranes, or when transport trucks are being loaded with products.

9. Loads that project beyond the truck shall have flags attached to the end of the load in accordance with the law of the area. Projecting loads should not be permitted to swing and sway.

10. Working under a vehicle supported only by a

common jack will not be permitted. The vehicle will be blocked to prevent it from accidentally falling; wheels must be blocked to prevent accidental rolling.

11. All trucks, passenger cars and mobile equipment are to travel on regular roadways and not to enter any operating or tank dyke area without permit.

12. Before leaving a parked vehicle, the driver should shut off the motor, set the hand brake, put the vehicle in gear, and if on grade, turn the wheels into the curb or shoulder of the street or road. Wheels shall be blocked in accordance with state laws or local loading rack regulations.

13. Workers are not to be used to counterbalance a load which causes the front end of the truck to raise. The gin pole should be adjusted to properly handle the load.

14. All workers shall stand clear of suspended loads and of the area where a winch line could whip.

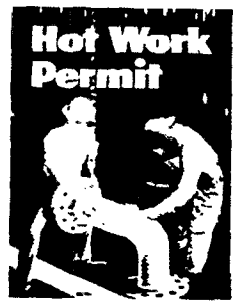
15. When traveling over the road with loads on flat bed trucks or trailers, extreme caution must be used to tie down or block the load securely.

16. Cranes or trucks will not be used to walk suspended loads without properly tying off the load to prevent swinging.

17. When leaving the refinery, drivers of vehicles are responsible for proper utilization of all seat belts.

PERMITS

A system of permits has been adopted which insures that the proper people will be advised before any work is done that might jeopardize employee safety or company property. This permit procedure is your assurance that proper safeguards will be taken to protect your life and that of your fellow employees during the proposed job. It is essential that you follow the permit procedure at your particular refinery; this procedure may vary somewhat from one refinery to another. The following comments apply to all refineries.



1. Hot work (including oxyacetylene cutting, welding, sandblasting, the use of open fires, the operation of motorized vehicles, cranes, hoists, etc., involving internal combustion engines, or the use of other equipment producing flames or sparks) is not to be started in any operating area unless a fire permit has been issued.

2. A fire permit is good only for the time specified on the permit; it may be renewed depending on local rules.

3. If in doubt as to whether a fire permit is necessary, consult your supervisor or Safety Department before proceeding with the work in an operating area.

4. When it is necessary to enter and clean any vessel, tank, or tower, such entry and cleaning is to be done in accordance with special procedures developed for such work.

5. Work is not to be started on the outside or the inside of any tank, vessel, boiler, or railroad tank car without appropriate permit.

6. If in doubt as to whether an entry permit has been issued and the requirements of such permit complied with, consult your supervisor before starting the work.

PERSONAL CLEANLINESS

Personal cleanliness is important in an oil refinery to prevent skin irritation. Exposure to oil, gasoline, solvents, or chemicals is much more apt to produce an irritation if this material remains in contact with the skin over long periods of time. Work clothing that becomes soiled with irritating oils or chemicals can present serious problems unless these clothes are changed and laundered. Follow these suggestions:

1. Avoid prolonged skin contact with oils when possible. Special care must be taken to avoid skin contact with heavy oils which have been identified as containing high boiling aromatic compounds, such as cat cracker bottoms, cat cracker cycle oil, clearified slurry oil, etc.

2. If exposure of skin to oils, additives or solvents does occur, wash the skin thoroughly with soap and warm water as soon as possible, and immediately before eating or using toilet facilities. Waterless hand cleaner may be used when soap and water are not available.

3. When skin exposure to high boiling aromatic oils is likely due to the nature of the work, wear protective clothing or protective cream, as instructed by your supervisor.

4. If clothing becomes heavily contaminated with oils, additives or solvents, especially those oils containing high boiling aromatic compounds, clothing should be changed promptly to prevent prolonged skin contact.

5. Wear a fresh change of underclothing each day, and change outer clothing if these are apt to bring oil or chemical into contact with the skin.

6. Since the hair may trap oils or chemicals and provide contact with the skin, it should be washed more frequently than usual when exposed to these materials.

PROTECTIVE EQUIPMENT AND CLOTHING

Protective devices and clothing are provided to safeguard you when in the performance of your job you might otherwise be exposed to some risk. Certain operations, for example, working with equipment containing HF acid, entails hazards which can be anticipated and protected against. Other operations may expose you to hazards only in the event of a mishap, for example, a wrench dropped from an overhead platform. In either case the equipment made available will protect you from injury only if it

is worn as prescribed. It is your responsibility to take care of this equipment and to know how and when to use it. Specific instructions concerning the availability and location of protective equipment have been issued at each refinery because the jobs may require different equipment at each refinery. The following comments apply to all refineries.



1. Hard hats must be worn at all times when in a refinery operating area, shop, or tank farm.

2. Hearing protection must be worn in all areas designated by signs, which call attention to the need.

3. Your supervisor will determine what protective equipment is required in any particular situation.

4. Facial hair must not interfere with the proper fit of respiratory equipment or expose the individual to unnecessary hazards.

5. Equipment assigned for your personal protection is your responsibility. It must be kept in repair and in a clean, sanitary condition. To prevent disease or infection, particular attention must be paid to respiratory protection equipment and devices to be inserted into the ears.

6. Find out where to turn-in defective equipment for replacement. Learn how to test a respirator facial piece for leaks. If using canister masks, learn how to

be sure the canister is still effective. Know how to check and replace filters if used.

7. Special care must be exercised in disposing of used Chem-Ox canisters because these generate pure oxygen. Contact with oil, grease, or other flammables will produce a dangerous situation. If you use this type equipment, follow the local rules for disposal or return to the Safety Department for special handling.

8. Be completely familiar with the location in your area of community protective equipment such as eye wash basin, emergency shower, fire blanket, air-pack respirator.

RADIOACTIVE MATERIALS AND TESTING



The users of radioactive materials shall comply with the State's rules and regulations for radioactive protection, together with the Atomic Energy Commission's Regulation.

The use of radioactive materials for radiography shall be permitted only under the guidance of the designated representative of the refinery and with a written permit.

Area patrol may be required to prevent personnel from entering restricted area.

RAILROADS

Clearance, including overhead, on tracks shall be

maintained so as not to interfere with their use. Check with your supervisor for the required distance.



All railroad cars and other track equipment must be blocked to prevent movement, and the brakes set manually.

Federal Department of Transportation recommended flags should be installed between the cars and main track.

The required permit must be obtained prior to work on any part of the railroad right-of-way.

REPORTING HAZARDS

It is the duty of each employee to be alert to hazardous situations which may develop and to report these conditions to the supervisor promptly.

REPORTING INJURIES

All injuries must be reported immediately to your supervisor. Medical treatment as provided by the Company is required for all injuries.

Injury report forms must be properly completed by the injured and the supervisor.

SAMPLING

Safety in sampling should be governed by the following considerations:



1. Get permission from operations before obtaining samples in an operating area.

2. Use approved sample points only.

3. Wear proper protective clothing.

4. When encountering plugged sample lines, get assistance to remove the plug safely.

5. If sampling in an unfamiliar area, get instructions from your supervisor.

6. Stand clear of sample vents and up-wind of escaping gas.

7. Avoid using a wrench or heavy tools on a sample container under pressure—release the pressure before altering the fittings.

8. Operate valves and gauge latches smoothly and without excessive force to prevent mechanical failure.

9. Transport and handle sample containers only in

equipment designed for the protection of the container and the employee.

10. Never leave a sample container under pressure in a building without full consideration for possible leaks and/or breakage of the container.

SCAFFOLDS

Scaffolds shall be used by persons engaged in work that cannot be done safely from the ground or from solid construction. The building of safe scaffolding depends on good design, good material, and careful workmanship. Persons not familiar with the requirements of safe scaffolding should not attempt to build make-shift work platforms. If you need a temporary work platform to perform your job, contact your supervisor.

The supervisor will see that a safe scaffold is erected or suggest alternative methods of doing the job. DO NOT USE A MAKE-SHIFT SCAFFOLD.

The following rules must be followed when using scaffolds:

1. Use a tag line when hoisting materials onto a scaffold.

2. Do not work on a scaffold during storms or high winds.



3. Do not work on scaffolds which are covered with ice or snow, unless all ice or snow is removed and planking sanded to prevent slipping.

4. Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

5. Do not alter a scaffold unless specifically authorized to do so by your supervisor.

6. Do not move a scaffold horizontally while in use or occupied.

7. Report any damaged or weakened scaffold to your supervisor immediately so that repairs can be made. Do not use a damaged scaffold unless specifically authorized to do so by your supervisor.

SMOKING

The danger of smoking in an area where flammable mixtures may be present stems from three sources:

1. The matches or lighter used to light the tobacco.

2. The possibility of ignition from the lighted

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cigarette, pipe, etc., while being smoked.

3. The possibility of a discarded cigarette or cigar butt smoldering and causing ignition.



In order to prevent this possible source of ignition within our refineries, we have designated certain areas where smoking is permitted; in all other areas of the refinery smoking is prohibited. Smoking rules apply to visitors as well as employees.

Regarding smoking at your particular refinery, do the following:

1. Determine where the approved smoking areas are located. Use only approved areas.

2. Carry only safety matches or an approved lighter in to the refinery. This will prevent accidental lighting of strike-anywhere type matches.

3. Before leaving the smoking area, butts should be properly disposed of and completely extinguished.

4. In event of a gas alarm or other serious emergency signals, extinguish all smoking material since it may not be possible to predict the drift of a flammable gas cloud through the plant.

5. If you see a visitor or even a forgetful employee light up in a non-approved area, stop that person immediately and point out the potential danger to oneself and to others. Remember that violation of smoking regulations can result in disciplinary action.

SWITCH LOADING

Switch-loading is a term used to designate the operation when a low vapor pressure material is being loaded into a truck, barge, rail car, or tank which previously has been loaded with a high vapor pressure material. An example of such a switch-load would be the loading of No. 2 Fuel Oil into a truck which contained gasoline vapors from the previous haul.

Studies of explosions which have occurred during truck or rail loading of low vapor pressure materials show that such occurrence is much more frequent when switch-loading has taken place. Switch-loading is not permitted at refinery loading facilities except under very closely controlled conditions.

Check with your supervisor before switch-loading.

WELDING AND CUTTING

1. Welding on company projects will be done only by qualified welders or employees who are assigned this task by their supervisor. No welding may be done in an operating area without a properly signed "Hot Work" permit.

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2. When welding or cutting is being done, adequate fire protection must be available at the work site. In some cases large extinguishers may be required because of the nature of the hazard.

3. For details on handling oxygen and acetylene cylinders refer to *Compressed Gas Cylinders* section of this Manual.

4. Avoid breathing welding fumes. Use proper ventilation or respiratory protection. Rods, coatings, or fluxes may contain zinc, fluorine, beryllium, lead, or cadmium which produces fumes that may be above toxic limits.

5. Never enter a bell hole or enclosure for welding or cutting until a gas check shows the atmosphere to be safe for flame.

6. Goggles, helmets, and shields that give adequate eye protection for each type welding process must be worn by welders, and their helpers. Eye screens must be erected to protect other employees in the area if they are not wearing individual eye protection.

7. High top shoes or boots are less likely to allow sparks to fall onto the foot than low cut shoes. Flame resistant leggings will prevent sparks from falling into low top shoes. Ear plugs or screens will prevent sparks from falling into the ears.

8. Protect welding hoses and cables from falling sparks and from oil or grease and vehicular traffic.

Exercise extreme care when cutting or welding to assure that sparks will not fall into combustible material in the vicinity.



9. While the danger from electric shock is not great, such shock should be avoided by not changing electrodes with bare hands or with wet gloves while standing on wet floors and grounded surfaces. Hot electrode holders should not be dipped in water for cooling because this can cause the welder to be exposed to electrical shock. If cable insulation becomes damaged and exposes bare conductor, cover with plastic or friction tape equivalent to the original covering. Special instructions must be followed in splicing cables.

10. Welding grounds should be made as close to the work as possible. Grounding must be such that the current does not flow through tanks or vessels containing flammable liquids or gases. The use of pipe racks as grounds should be avoided if flammable liquid lines are on the rack.

11. The welding generator shall be shutdown when the equipment is unattended. Great care must be exercised to avoid placing a welding machine where the air is or may be contaminated with flammable vapor.

12. When electrode holders are to be left unattended, the electrode shall be removed and the electrode holder so placed that it cannot make electrical contact with employees or conducting objects.

13. Welding torches should not be ignited with matches, cigarette lighters, or from hot work. Special lighters are provided for this purpose and must never be carried into an area containing combustible vapors unless they are open so that the flint and steel are not in contact.

14. Fuel gas cylinders require special handling and the following instructions must be followed:

a) Before hooking up a fuel gas regulator to a fuel cylinder, the cylinder valve must be cracked slightly to clear the valve of any dirt or debris which might enter the regulator. The person cracking the valve must stand to one side and must be sure that fuel gas released does not reach welding work, sparks, flame, or other source of ignition.

b) The cylinder valve must always be opened slowly to prevent damage to the regulator. The valve on a fuel cylinder should be opened only 1 1/2 turns so that it can be quickly closed in an emergency. If a wrench is necessary to close the fuel gas valve, this wrench must be left on the valve while the cylinder is in use.

c) Fuel gas from a cylinder should not be used through torches or other devices with a shut-off valve unless the pressure has been reduced through a suitable regulator.

d) Before removing a regulator from a fuel gas cylinder, always check to be sure the cylinder valve is closed.

e) Do not use a fuel cylinder with gas leaking around the valve packing. If the leak cannot be stopped, tag the cylinder and remove it from work area.

f) If a leak should develop at a fuse plug or other safety device, the cylinder should be tagged and removed from the work area.

[redacted]

On this Date I received a copy of the "Accident Prevention Manual" with instructions to promptly read its contents.

Signed _____

Date _____