

SAFETY HANDBOOK

HUMBLE OIL & REFINING CO.
BATON ROUGE REFINERY

EM004161

PLAINTIFF'S
EXHIBIT

tabbles®

EXX-210

HUMBLE OIL & REFINING COMPANY

BATON ROUGE, LOUISIANA 70821

STANDARD DIVISION
AN OILFIELD COMPANY

POST OFFICE BOX 201

May 27, 1968

TO: Holders of Humble Safety Handbook

Attached are the latest revisions of Safety Standards

105	Nitrogen
114	Gas Testing
115	Daily Hot Work Permits
116	Daily Cold Work Permits

These standards are in the proper size to fit the loose leaf handbook and the manual "Gas Testing Procedures and Equipment." The hot and cold work permit books are being revised to conform to these revisions. The changes are shown in italics.

Please insert these in your handbook and discard the previous revisions.

Very truly yours,



E. G. Miller, Head
Safety Department

EGM/LMcK
Attachments

cc Lists D-4 D-7 D-8 D-16 D-19 D-20 D-21 D-22 D-15
Plastics Plant (10)

EM004162

HUMBLE OIL & REFINING COMPANY
ENJAY CHEMICAL COMPANY
Baton Rouge, Louisiana

Safety Standard No. 105
Nitrogen

Revision I

I. SCOPE

This safety standard covers the basic points in the protection of personnel from the harmful effects of nitrogen. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable if the judgment of the supervisors involved so indicates.

II. GENERAL INFORMATION

Nitrogen is used in large quantities in the plant as an inert gas for flushing process equipment. Nitrogen is also obtained in cylinders for laboratory and other work where the small quantities suffice. Liquid nitrogen is available for laboratory use in the plant. Nitrogen is a colorless gas or colorless liquid. It is one of the components of atmospheric air. Air contains about 78% nitrogen. The melting point of nitrogen is -336°F . and its boiling point is -320°F . Nitrogen is not toxic but in high concentrations is a simple asphyxiant.

III. PRECAUTIONS FOR NITROGEN

1. Flush with air all vessels that have been filled with nitrogen, or other inert gas and test for oxygen content to be sure that sufficient oxygen - 21% - is present before entering without a fresh air mask. When necessary to enter a nitrogen contaminated area, wear an air supplied mask.
2. Store nitrogen cylinders in a cool place and where they will not be exposed to a source of heat. Store or strap the containers in suitable racks to prevent them from falling over.
3. Always wear gloves and goggles when handling liquid nitrogen.
4. A person who is overcome by nitrogen gas must be removed to fresh air immediately. If breathing has stopped, start artificial respiration at once. Call the Refinery Medical Department at 7666.

Safety Department
May 17, 1968

Raton Rouge, Louisiana

Safety Standard No. 116
Gas Testing

Revision II

SCOPE

This standard covers the gas testing procedures. Use this standard as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable in the judgment of the supervisors or operators.

DEFINITIONS

1. Hot work is an operation that may produce enough heat to ignite flammable gas-air mixtures or flammable materials.
2. Cold work is work that ordinarily does not create enough heat to ignite flammable gas-air mixtures.
3. A gas test is a test made to determine whether:
a) flammable or b) toxic gas is present or to determine the presence of c) oxygen.
4. Vessel means all closed containers such as tanks, drums, towers, barrels, pipe lines, barges and tank cars; also enclosures such as furnaces, which are used to confine flammable gases or vapors; and pits, trenches and open-top containers greater than 4' in depth.
5. Unit operator is any employee in charge of a process unit.

SECTION I - DUTIES AND RESPONSIBILITIES

Process supervisors or unit operators shall:

1. See that the equipment has been properly prepared prior to requesting gas tester.
 - a) *The temperature of the equipment shall be as near ambient as possible.*

2. Designate on the work permit the exact area and piece of equipment to be worked on and to be gas tested.
3. Check off on the permit form the types of tests to be performed.
4. See that gas tests have been made so that a safe job will result.
5. Call for rechecks by the gas tester whenever it is felt that such action is warranted.
6. Issue a permit only when a complete, satisfactory gas test has been made where required. Unit operators approve only nonflame hot work and cold work permits.
7. *A process employee will satisfy himself that the gas tests were made at the specific locations required.*

Laboratory gas tester shall:

1. Furnish process supervisor or unit operator accurate and comprehensive information regarding the presence ~~and growths~~ of flammable, toxic or ~~oxygen~~ gas in the area which the process employee has designated.
2. Indicate the results of his tests on the work permit form with any additional comments he may have that would add to the safety of the job.
3. Insure that the entire area and immediate surroundings have been representatively tested.
4. Request the process supervisor or unit operator to take the necessary steps so that a complete gas test is issued.
5. Note on the permit form "Limited Test" if the process supervisor or unit operator requests a limited test on the equipment.
6. Note conditions in the area and surroundings which might lead to the presence of gas or vapor. If such conditions exist, they should be discussed with the process supervisor or unit operator and noted on the permit form.

SECTION II - GAS TESTS - GENERAL

A. Types of Gas Tests

The gas tests required can be classified in the following three general groups:

1. Combustible Gas Tests are conducted to determine the percentage of combustible gases or vapors present in an atmosphere. Some of the combustible gases and vapors found in Baton Rouge operations are included in Appendix I attached.
2. Tests for Toxic Gases - Some toxic gases that are likely to be present in Plant equipment, the permissible levels and methods of determining concentrations are included herewith.
3. Oxygen tests are conducted to ascertain the volume percent of oxygen present in an atmosphere. In addition to insuring enough oxygen for personnel, oxygen tests may be used to determine if there is enough oxygen present to support combustion. *When inerting, the oxygen content is suppressed to a level where it will not support combustion.*

B. Gas Test Requirements for Various Situations

1. (a) Insuring Against the Presence of Oxygen in Equipment Being Returned to Service

Purging with inert gas for reduction of oxygen content is usually more difficult than by other methods. Inert gas is composed primarily of nitrogen and carbon dioxide but may contain traces of hydrogen, carbon monoxide, oxygen, and nitrogen oxides. Alternate pressuring and venting the vessel to atmospheric pressure will reduce the oxygen content of the atmosphere within it. After purging with inert gas, a sufficient number of tests shall be made with an approved oxygen analyzer to give complete assurance that a mixture is not present in the vessel which contains more than 5% oxygen.

Where hydrogen, hydrogen sulfide or carbon monoxide may be present, the O₂ content should be reduced to no more than 2% due to the wide explosive range of these gases. These tests for oxygen content before admitting hydrocarbons need be made only in the case of equipment purged with inert gas.

When steam or water is used for displacing air, the procedures and visual check methods provide sufficient assurance of the exclusion of air.

- (b) *Inert atmospheres can be produced through oxygen depletion caused by chemical reactions, painting, rusting, etc.*

2. Special Problems in Gas Testing Long Pipe Line

The foregoing requirements for gas testing are intended to be applied to work on or in pipe lines as well as larger vessels. Quite often, however, it is impractical to obtain gas tests at enough locations in a pipe line to assure a gas-free condition. The decision in each case is to be made by the operating foreman based on his own judgment and that of the gas tester.

The following general rules should be observed where practical:

- (a) The section of line which is to be tested should be limited in length by blanking it off from adjoining sections.
- (b) Gas tests should be obtained at the ends of the line section, at or close to the point where the hot work is to be performed, at trapped sections (high or low points), and at intermediate points every 100-200 feet throughout the length of the line.
- (c) If the line cannot be gas-freed or properly gas-tested, three alternates are possible:
 - 1) Fill the line with an inert material, such as water, and isolate the point where hot work is to be done by means of a dam.
 - 2) Cold-cut the line and insert expandable plugs or use Weld+Ends before doing hot work. (Safety Standards Nos. 146 and 147).
 - 3) Make a hot tap with the line in service if a branch connection is required. (Safety Standard No. 143).

3. Special Precautions for Materials More Flammable than Ordinary Petroleum Hydrocarbons

Some materials, such as ethyl ether and carbon

disulfide, have lower ignition points than ordinary petroleum hydrocarbons and can be set afire by heat sources which would not have any effect on petroleum hydrocarbons. It is important that extensive and careful combustible gas tests be made before authorizing work within vessels or in areas where these materials are handled.

SECTION III - GAS TESTING PROCEDURES

A. Groups Authorized to Conduct Gas Tests

Gas tests shall be conducted only by qualified employees. The selection of qualified persons for conducting gas tests and the responsibility for insuring that all of these employees are satisfactorily instructed shall rest with the heads of the laboratories and/or process divisions.

1. The process supervisor at the Maryland and Anchorage Tank Farms is authorized to make all combustible gas tests at those tank farms. It is the responsibility of the process supervisor to see that all requirements of this standard are met. It is also his responsibility to have the gas detector checked for accuracy before and after each time that it is used. This checking will be done using the known mixture furnished by the Petroleum Products Laboratory. It is the process supervisor's further responsibility to have the detector and the standard sample inspected every 60 days by the Petroleum Products Laboratory. The Laboratory should keep a record of these inspections and should notify the supervisor when inspections are overdue.

When tests are required for toxic materials, the process supervisor is responsible for seeing that these tests are made by authorized personnel.

2. Oxygen tests made with an approved oxygen analyzer may be conducted by the operating personnel. It is the process supervisor's responsibility to see that (a) the testing device is maintained in proper working order similar to that specified for combustible gas test instruments mentioned above. (b) the tests are conducted by only properly trained employees, and (c) the provisions of this standard are complied with.

B. Gas Testing Techniques

1. General

The two instruments commonly used for combustible gas

When steam or water is used for displacing air, the procedures and visual check methods provide sufficient assurance of the exclusion of air.

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 - 1) Fill the line with an inert material, such as water, and isolate the point where hot work is to be done by means of a dam.
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2. Oxygen tests made with a Beckman oxygen analyzer may be conducted by the operating personnel. It is the process supervisor's responsibility to see that (a) the testing device is maintained in proper working order, (b) the tests are conducted by only properly trained employees, and (c) the provisions of this standard are complied with.

B. Gas Testing Techniques

1. General

The two instruments commonly used for combustible gas tests are the MSA and the JW explosimeters. The MSA explosimeter is calibrated with normal hexane and has a scale graduated in percent of the lower explosive limit (l.e.l.). The JW explosimeter is calibrated on normal pentane and has a scale graduated in decimal fractions of l.e.l. For example, a reading of 0.2 on the JW is equivalent to 20% on the MSA.

- a. In testing for gases in an open area, the tester shall go over the entire area and make tests at frequent intervals to be assured that the entire area and immediate surroundings are free of combustible gas.
- b. In vessels gas tests should be conducted at all openings, whenever practicable. In the case of very large vessels such as bubble towers which have manholes or handholes located at very close intervals, it may be necessary to remove only part of the cover plates to insure a satisfactory test.
- c. In vessels that have been gas-freed by steaming, or are above atmospheric temperature for any other reason, a sufficient cooling period shall have elapsed before the gas test is made so that the vapor temperatures approach that of the atmosphere. This requirement should prevail wherever gas tests are made of any hot heavy oil vapors. Such vapors have a tendency to condense in the tubing of the combustible gas detector and give an erroneously low reading. A portable combustible gas alarm, available at the laboratories, may be used in the vessel to overcome delays in letting the equipment cool.
- d. The latest threshold value for 1962 for gasoline vapor without respiratory protection is 500 parts per million (American Conference of Governmental Industrial Hygienists). For entry into a vessel which has contained gasoline vapor, a reading less than 0.05 of l.e.l. on the JW explosimeter or 5% on the MSA explosimeter is required. For entry in the same vessel with

air-supplied respiratory protection, the reading must be below 0.5 of l.e.l. on the JW and 50% on the MSA explosimeter. For hot work all readings must be zero.

2. Combustible Gas Tests

- a. The combustible gas detector shall be checked with a standard sample of hydrocarbon vapor to assure its operability before leaving the laboratory and also after returning to the laboratory. This will assure that all tests made on a given trip are reliable.
- b. Combustible gas detectors are calibrated for pentane-air or hexane-air mixtures and readings obtained with other combustible mixtures may be in error. Judgment must be used since only qualitative readings are required.
- c. The combustible gas detector machine operates on the principle of burning the combustibles contained in the atmosphere, and, in order to obtain a reading, a burning of the gas must take place. When high concentrations of the combustibles are present, there may be insufficient air to burn the gas, and an erroneous reading will be obtained. In such cases, the needle pointer will immediately be deflected full scale as the first traces of gas are drawn through the machine and are diluted by the air already present in the suction line of the machine. As the combustible gas concentration increases within the detector machine, the needle will quickly drop back to zero and remain there, giving the impression that no combustible gases are present. Consequently, close observance of the machine is necessary in the early stages of the test, to insure against obtaining an erroneous reading. As a further safeguard, whenever the pointer indicates no combustible gases, the machine should be removed to fresh air and aspirated several times. If there is a high concentration of combustibles present in the machine, a reading will be obtained on the machine as this dilution takes place. Explosimeters are equipped with a leak valve which can be cracked to admit air when mixtures above the upper explosive limit are suspected.

3. Oxygen Tests

Tests should be made at a sufficient number of points within the area or vessel to insure complete coverage in the same manner as described previously for the combustible gas test.

Beckman analyzers are used for conducting oxygen tests.

C. Maintenance of Gas Testing Equipment

The respective laboratory groups are charged with setting up mechanisms to insure the satisfactory operation of the detecting devices required for their use. The process operating group is responsible for the maintenance of any gas analysis devices which are assigned for their use. The laboratories, when called on, will assist in any way possible in the maintenance of these instruments.

Safety Department

Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24

APPENDIX I

FLAMMABLE MATERIALS

There are listed below flammable liquids, vapors, and gases normally found in the plant. This list is not intended to be all-inclusive and each new material must be carefully studied and considered. It is intended that this list be revised from time to time to keep it up current.

Ordinary Petroleum	Ammonia
Hydrocarbons	Benzene
Acetone	Ethers
Aldehydes	Methyl Chloride
Carbon Disulfide	Toluene
Carbon Monoxide	Ethane
Alcohols	Propylene
Ethylene	Butadiene
Ethylene Dichloride	Isobutylene
Hydrogen	Mixed Butylenes
Hydrogen Sulfide	Isoprene
Methanol	Methyl Ethyl Ketone
Oxo and Aldox Syn Gas	Acetylene
Oxo and Aldox Aldehydes	Methyl Isobutyl Ketone
Olefins	Xylene
Denaturants for Ethyl Alcohol	Liquid HC Streams
principally Acetaldehyde	from Steam Cracking
Cyclopentadiene Dimer	
Methyl Cyclopentadiene Dimer	Acetonitrile
Phenol	Ethyl Mercaptan
Natural Gas or Methane	Cyclopropane
Acid Extracts	Pentane
Dimethyl Ether	Isobutane
Diethyl Ether	Diisopropyl Ether
Cyclohexane	Diisobutylene

August 13, 1963

APPENDIX II
TESTING FOR TOXIC GASES

Some gases and vapors are toxic in concentrations far below their lower explosive limit. Other toxic gases will not be indicated by the combustible gas indicator in any range.

In assuring safe working conditions in areas or vessels where toxic gases or vapors may be encountered, the effect of a single exposure to high concentrations of the toxic material must be considered. While there are many gases and vapors that are toxic, those that have the following characteristics are most important.

1. Not revealed by combustible gas indicator in toxic levels.
2. Have poor warning properties, i.e., they are not particularly unpleasant in odor nor do they produce sufficient irritation of eyes or respiratory tract to prevent harmful exposures.
3. Produce sudden or imminent injury or illness of a serious and permanent nature.

	<u>Permissible Level - PPM</u>	<u>Method of Determining Concentrations</u>
Acetonitrile	40	A
Alcohol, Methanol	200	B
Benzene	25	B
Carbon Disulfide	20	B
Carbon Monoxide	100	B
Carbon Tetrachloride	25	B
Dioxane	100	B
Hydrogen Sulfide	20	B
Methyl Chloride	100	C
Nickel Carbonyl	0.001*	D
Phenol	5	D

- A. Collect Bladder Sample - Determine by Gas Chromatogram.
- B. Indicator Tubes - MSA - Draeger - Kitagawa.
- C. Collect Bladder Sample - Flame Test.
- D. Special Analytical Procedure Required.

* Any test positive for Nickel Carbonyl shall be grounds for prohibiting entry of vessel, except when supplied-air mask (Scott Air-Pak) or equivalent is worn.

**TOXIC MATERIALS WHICH MAY BE
ENCOUNTERED IN TANK OR VESSEL WORK**

In addition to flammable or toxic materials that may be present in vessels or other enclosures from feed, product or by-product materials, certain metals, plastics and polymers may present serious health problems when decomposed by burning or welding operations. Coatings on some welding rods can cause toxic fumes, such as Fluorides, Nitrogen Oxides, etc., to be evolved when welding.

In most cases, supplied-air masks (Scott Air-Pak) will be necessary for workers inside the vessel during burning and welding in addition to, or in place of, ventilation. Since gas tests for flammable or toxic materials will not reveal these special hazards, the gas tester and the process supervisor or operator should advise mechanical workers of the existence and toxic effects of any of the following:

Metals

Arsenic
Brass
Cadmium
Copper
Galvanized (Zinc)
Lead (including lead
primer paints)
Mercury
Monel
Stainless Steels
Vanadium
Zinc

Plastics

Epoxy Resin
Coatings or
Paints
Phenolic Resins
or Coatings
Teflon, Kel-F

Polymers

Rubber

August 13, 1963

Baton Rouge, Louisiana

Safety Standard No. 115
Daily Hot Work Permits

Revision I

SCOPE

This standard covers the hot work permit system. A hot work permit is required whenever any hot work is done. Use the daily permit (Form No. 39-0290B).

Use this safety standard as a source of information and as a guide wherever applicable. In some circumstances deviation from these practices may be safe and desirable.

DEFINITIONS

1. Hot work is an operation that may produce enough heat to ignite flammable gas-air mixtures or flammable materials.
2. A gas test is a test made to determine whether flammable or toxic gas is present or to determine the presence of oxygen.
3. Vessel means all closed containers such as tanks, drums, towers, barrels, pipelines, barges and tank cars; also enclosures such as furnaces, which are used to confine flammable gases or vapors; and pits, trenches and open top containers greater than 4' in depth.
4. Unit operator is any employee in charge of a process unit.
5. Permit or Permit Form - Form No. 39-0290B.

SECTION I - DUTIES AND RESPONSIBILITIES

A. Process supervisors shall:

1. Have complete responsibility for the safety of the work.

2. See that the equipment has been properly prepared.
 3. Designate on the hot work permit the exact area and piece of equipment to be worked on and to be gas tested.
 4. Exercise proper control over adjoining operations.
 5. Check off on the permit form the types of gas tests to be performed.
 6. Accompany the gas tester to the location where the tests are to be made.
 7. See that gas tests have been made so that a safe job will result.
 8. Call for rechecks by the gas tester whenever it is believed necessary.
 9. Issue a permit only when a complete, satisfactory gas test has been made.
8. Employees doing hot work shall:
1. Do only the specific work called for by the permit.
 2. Discontinue all hot work if conditions are such that it is believed continuation of the work is unsafe. Such conditions shall be reported at once to the process supervisor or unit operator.
 3. Request the process supervisor or unit operator to extend a permit which has expired but on which additional work needs to be done.
 4. Notify the unit operator immediately upon completion of the work so that the permit may be canceled.

SECTION II - GENERAL

A. Who May Issue

1. Flame-type hot work permits and any work permits for work in vessels, whether flame or nonflame,

are authorized by process supervisors. Flame-type hot work includes burning, welding, open flames, electric arcs, hot riveting, forging, torch soldering and megering. (See Safety Standard No. 146 covering the use of seal plugs and Safety Standard No. 147, Procedure for Welding on Weld-End Couplings in Service.)

2. Nonflame-type hot work permits may be issued by unit operators except when the work is in a vessel. Nonflame-type hot work includes use of power tools, grinding, chipping, drilling, power wire brushing, sandblasting, concrete cutting, soldering with soldering iron, using normally nonarcing electronic instruments, internal combustion engine-powered equipment.

B. Life of Permit

1. Hot work permits are good for one process shift. By endorsing the permit it can be extended another process shift. Permits expire and must not be extended past 6:00 a.m., except that permits issued at the end of "C" shift within two hours of beginning work at 7:00 a.m. are valid until the end of "A" shift unless otherwise voided.
2. Permits are void if the work is stopped for safety reasons and the permit must be endorsed by the issuing party before work is resumed.

C. Procedures for Issuing

1. The hot work permit is made in triplicate. The person doing the work gets the original, the gas tester gets the last (yellow) copy and the white copy remains in the book. When a gas test is not required, the yellow copy can be destroyed.
2. Every section of a permit form is provided for a purpose. Each section should be carefully completed.
3. Generally employees receiving a work permit know little of process operations involved in the work to be done. These employees should be told about process factors involved in the job. Special precautions should be checked and written

out on the permit. The employee receiving the permit should be instructed verbally to insure complete understanding.

If the employee who issues the permit wishes the employee who does the work to check with him prior to starting the work, he should check the square provided for this purpose on the permit form.

4. Since fires may result from hot work, fire extinguishers and/or hose with pressure to the nozzle shall be in ready standby before issuing hot work permits.
5. The area where the work is to be done must be clean initially and kept clean as the work progresses. The person issuing the permit certifies that the area contains no barrels, drums, rags, cartons, bottles, trash, oil or other material which may be ignited by hot work in the area.

SECTION III - GAS TESTS

A. Gas Test Requirements for Various Situations

1. Hot work on the outside of vessels which are closed and contain hydrocarbon, or other flammable material, steam, water, natural or inert gas, requires gas tests. For the method, see Safety Standard No. 143. Hot work on the outside of vessels which are open and gas-free requires that all lines be slip-blinded.
2. For vessels which must be entered with or without hot work:
 - a. All lines connected to the vessel shall be slip-blinded with blinds of the proper rating or the lines shall be disconnected and blanked with blind flanges before the permit is issued. See Safety Department Sketch #39-134A and Engineering Drawing #0-1-1-41 attached. Quarter-inch thick slip blinds have an undrilled neck, series 15 slip blinds have one 3/8" hole drilled in the neck and series 30 slip blinds have two 3/8" holes drilled in the neck.

- b. Combustible gas tests shall be made. There shall be no indication of any combustible gases or vapors.
- c. If there is a possibility of having inert gas present, tests for oxygen deficiency or carbon monoxide content should be made.
- d. If there is a possibility that any other toxic material is present, tests should be made to insure that concentrations of such materials are below the allowable maximum. Toxic materials for which tests are required are listed in Safety Standard No. 114. Tests for hydrogen sulfide shall be made every time combustible gas tests are made.
- e. Special precautions must be taken where there are materials such as iron sulfide, acetylides or polymers present which may go afire spontaneously.

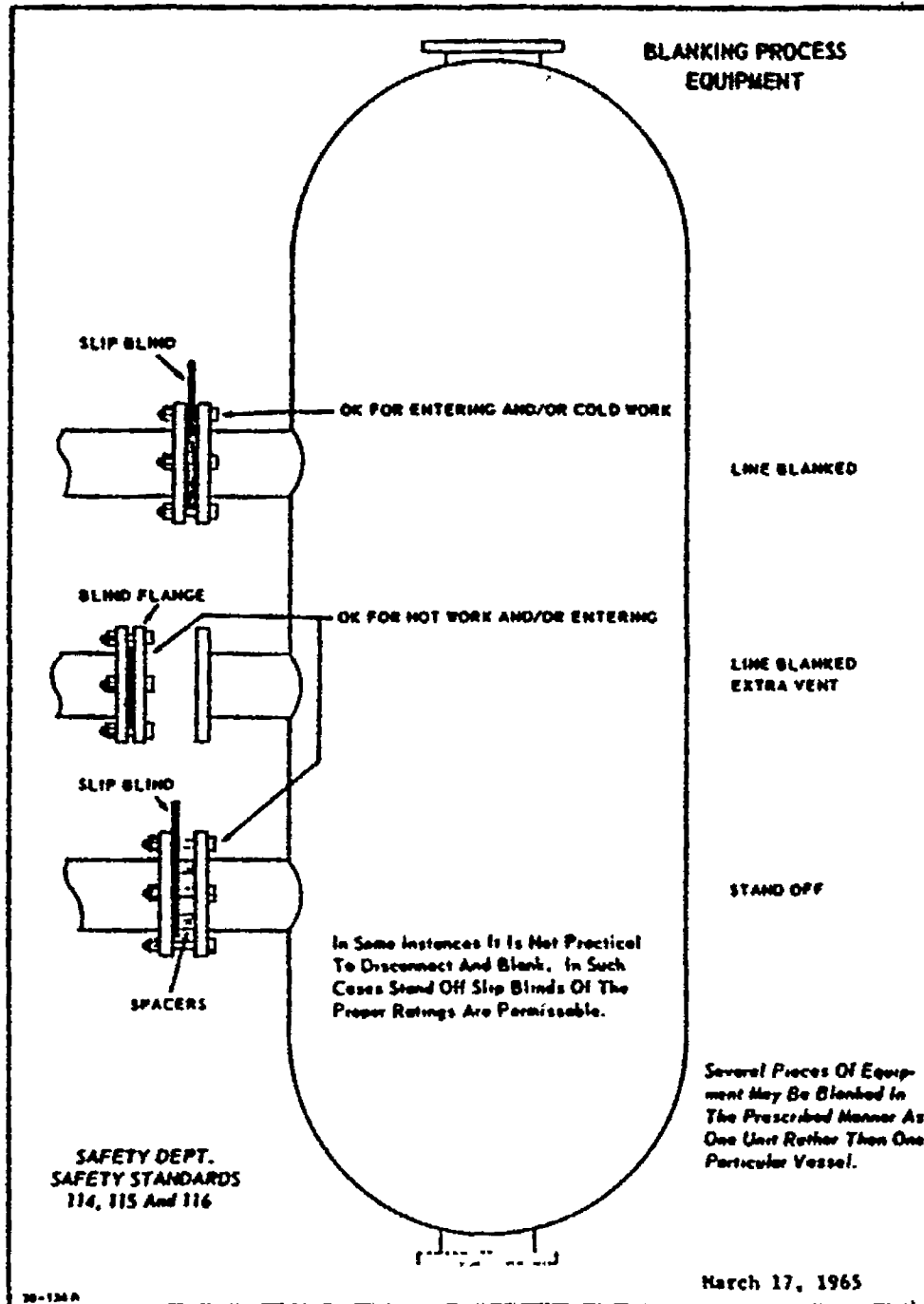
3. Hot Work in Open Areas

Where, in the opinion of the process supervisor, there may be combustible or toxic gases in an open area where hot work is to be performed, gas tests shall be made. A hot work permit shall be issued only if there is no indication of combustible gases or vapors. The process supervisor may issue a hot work permit without a gas test if, in his opinion, the area is gas-free.

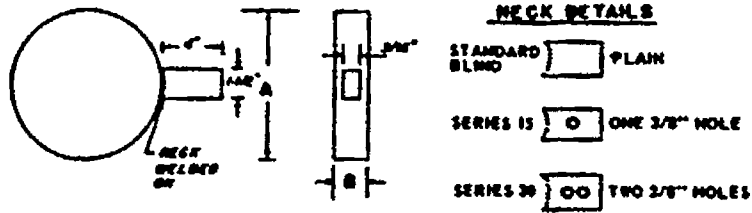
Safety Department

Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24



PLAIN SLIP BLINDS FOR RAISED FACE FLANGES



ALL DIMENSIONS IN INCHES

NOMINAL PIPE SIZE	STANDARD BLIND	SERIES 15 RATING	SERIES 30 RATING
	B	B	B
1	1/4	1/4	1/4
1-1/2	1/4	1/4	1/4
2	1/4	1/4	1/4
2-1/2	1/4	1/4	3/8
3	1/4	1/4	3/8
4	1/4	3/8	1/2
6	1/4	1/2	3/4
8	1/4	1/2	7/8
10	1/4	3/4	1
12	1/4	3/4	-
14	1/4	7/8	-
16	1/4	1	-
18	1/4	-	-
20	1/4	-	-
24	1/4	-	-

NOTES

PLAIN BLINDS MAY BE USED IN EITHER RAISED FACE OR RING JOINT FLANGES, EXCEPT USE RING JOINT WHERE REQUIRED TO MEET OPERATING CONDITIONS.

GASKETS SHOULD ALWAYS BE USED ON BOTH SIDES OF BLINDS AND FLANGES BOLTED TIGHT

HOLE IN NECK OF BLIND OFFERS FOR EACH PRESSURE RATING TO FACILITATE IDENTIFICATION

ALL BLINDS SHOULD BE STAMPED TO INDICATE PIPE SIZE AND PRESSURE RATING

Engineering Drawing #0-1-1-41

March 17, 1965

Baton Rouge, Louisiana

Safety Standard No. 116
Cold Work Permits

REVISION I

SCOPE

This standard covers the cold work permit system.

Use this safety standard as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable in the judgment of the supervisors or operators.

DEFINITIONS

1. Cold work is work that ordinarily does not create enough heat to ignite flammable gas-air mixtures.
2. Hot work is an operation that may produce enough heat to ignite flammable gas-air mixtures or flammable materials.
3. A gas test is a test made to determine whether flammable or toxic gas is present or to determine the presence of oxygen.
4. Vessel means all closed containers such as tanks, drums, towers, barrels, pipelines, barges and tank cars; also enclosures such as furnaces, which are used to confine flammable gases or vapors; and pits, trenches and open top containers greater than 4' in depth.
5. Unit operator is any employee in charge of a process unit.
6. Permit or Permit Form - Form No. 39-0300A.

SECTION I - DUTIES AND RESPONSIBILITIES

A. Process supervisors and unit operators shall:

1. Have complete responsibility for the safety of the work.
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5. Check off on the permit form the types of gas tests to be performed.
6. Accompany the gas tester to the location where the tests are to be made.
7. See that gas tests have been made so that a safe job will result.
8. Call for rechecks by the gas tester whenever it is believed necessary.
9. Issue a permit only when a complete, satisfactory gas test has been made.

B. Employees doing cold work shall:

1. Do only the specific work called for by the permit.
2. Discontinue all work if conditions are such that it is believed continuance of the work is unsafe. Such conditions shall be reported at once to the process supervisor or unit operator.
3. Request the process supervisor or unit operator to extend a permit which has expired but on which additional work needs to be done.
4. Notify the unit operator immediately upon completion of the work so that the permit may be cancelled.

tests are the MSA and the JW explosimeters. The MSA explosimeter is calibrated with normal hexane and has a scale graduated in percent of the lower explosive limit (L.E.L.) The JW explosimeter is calibrated on normal pentane and has a scale graduated in decimal fractions of L.E.L. For example, a reading of 0.2 on the JW is equivalent to 20% on the MSA. Both mean 20% of the lower explosive limit.

- a) In testing for gases in an open area, the tester shall go over the entire area and make tests at frequent intervals to be assured that the entire area and immediate surroundings are free of combustible gas.
- b) In vessels gas tests should be conducted at all openings, whenever practicable. In the case of very large vessels such as bubble towers which have manholes or handholes located at very close intervals, it may be necessary to remove only part of the cover plates to insure a satisfactory test.
- c) In vessels that have been gas-freed by steaming, or are above atmospheric temperature for any other reason, a sufficient cooling period shall have elapsed before the gas test is made so that the vapor temperatures approach that of the atmosphere. This requirement should prevail wherever gas tests are made of any hot heavy oil vapors. Such vapors have a tendency to condense in the tubing of the combustible gas detector and give an erroneously low reading.

Planning should include sufficient time for the equipment to cool before the gas tester arrives. A portable combustible gas alarm, available at the laboratories, may be used in the vessel to overcome delays in letting the equipment cool.

- d) The 1968 threshold value for gasoline vapor with respiratory protection is 500 parts per million (American Conference of Governmental Industrial Hygienists). *Since gasoline may contain many different materials, the toxicity of some component may be controlling. For example, if benzene is present, the maximum allowable concentration without respiratory protection is 10 PPM.*

For entry into a vessel which has contained gasoline or gasoline components a reading less than 0.05 of L.E.L. on the JW explosimeter or 5% on the MSA explosimeter is required. For entry in the same vessel

with air-supplied respiratory protection, the reading must be below 0.5 of L.E.L. on the JW and 50% on the MSA explosimeter. For hot work all readings must be zero.

2. Combustible Gas Tests

- a) The combustible gas detector shall be checked with a standard sample of hydrocarbon vapor to assure its operability before leaving the laboratory and also after returning to the laboratory. This will assure that all tests made on a given trip are reliable.
- b) Combustible gas detectors are calibrated for pentane-air or hexane-air mixtures and readings obtained with other combustible mixtures may be in error. Judgment must be used to ~~judge~~ ^{interpret} the qualitative readings.
- c) The combustible gas detector operates on the principle of burning the combustibles contained in the atmosphere. When high concentrations of the combustibles are present, there may be insufficient air to burn the gas, and an erroneous reading will be obtained. In such cases, the needle pointer will immediately be deflected full scale as the first traces of gas are drawn through the machine and are diluted by the air already present in the suction line of the instrument. As the combustible gas concentration increases within the detector, the needle will quickly drop back to zero and remain there, giving the impression that no combustible gases are present. Consequently, close observance *by* the tester is necessary in the early stages of the test, to insure against obtaining an erroneous reading. As a further safeguard, whenever the pointer indicates no combustible gases, the instrument should be removed to fresh air and aspirated several times.

If there is a high concentration of combustibles present *in the instrument*, a reading will be obtained as dilution takes place. Some explosimeters are equipped with a leak valve which can be cracked to admit air when mixtures above the upper explosive limit are suspected.

4. Testing for Toxic Gases

Some refinery gases and vapors are toxic in concentrations far below their lower explosive limit. Other toxic gases will not be indicated by the combustible gas indicator in any range.

In assuring safe working conditions in areas or vessels where toxic gases or vapors may be encountered, the effect of a single exposure to high concentrations of the toxic material must be considered. While there are many gases and vapors that are toxic, those that have the following characteristics are most important.

1. Not revealed by combustible gas indicator in toxic levels.
2. Have poor warning properties, i.e., they are not particularly unpleasant in odor nor do they produce sufficient irritation of eyes or respiratory tract to prevent harmful exposures.
3. Produce sudden or imminent injury or illness of a serious and permanent nature.

	<u>Permissible Level - PPM</u>	<u>Method of Determining Concentrations</u>
Acetonitrile	40	A
Alcohol, Methanol	200	B
Benzene	10	B
Carbon Disulfide	20	B
Carbon Monoxide	50	B
Carbon Tetrachloride	10	B
Dioxane	100	B
Hydrogen Sulfide	10	B
Methyl Chloride	100	C
Nickel Carbonyl	0.001*	D
Phenol	5	D

-
- A. Collect Bladder Sample - Determine by Gas Chromatogram.
 - B. Indicator Tubes - MSA - Draeger - Kitagawa.
 - C. Collect Bladder Sample - Flame Test.
 - D. Special Analytical Procedure Required.
- * Any test positive for Nickel Carbonyl shall be grounds for prohibiting entry of vessel, except when supplied-air mask (Scott Air-Pak) or equivalent is worn.

3. Oxygen Tests

Tests should be made at a sufficient number of points within the area or vessel to insure complete coverage in the same manner as described previously for the combustible gas test.

C. Maintenance of Gas Testing Equipment

The respective laboratory groups are charged with setting up mechanisms to insure the satisfactory operation of the gas detecting devices required for their use. The process operating group is responsible for the maintenance of any gas analysis devices which are assigned for their use. The laboratories, when called on, will assist in any way possible in the maintenance of these instruments.

Safety Department
Revised May 10, 1968

cc Lists D-8 D-10 D-16 D-20 D-24
Plastics Plant

APPENDIX I

FLAMMABLE MATERIALS

There are listed below flammable liquids, vapors, and gases normally found, at present. This list is not intended to be all-inclusive and each new material must be carefully studied and considered. It is intended that this list be revised from time to time to keep it up current.

Acetone	Ethylene Dichloride
Acetonitrile	Hydrocarbons
Acetylene	Hydrogen
Acid Extracts	Hydrogen Sulfide
Alcohols	Isobutane
Aldehydes	Isobutylene
Ammonia	Isoprene
Benzene	Liquid HC Stream from
Butadiene	Steam Cracking
Carbon Disulfide	Methanol
Carbon Monoxide	Methyl Chloride
Cyclohexane	Methyl Cyclopentadiene
Cyclopentadiene Dimer	Dimer
Cyclopropane	Methyl Ethyl Ketone
Denaturants for Ethyl Alcohol	Methyl Isobutyl Ketone
Principally Acetaldehyde	Mixed Butylenes
Diethyl Ether	Natural Gas or Methane
Diisobutylene	Olefins
Diisopropyl Ether	Ordinary Petroleum
Dimethyl Ether	OXO and Aldox Aldehydes
Ethane	Oxo and Aldox Syn Gas
Ethers	Pentane
Ethyl Mercaptan	Phenol
Ethylene	Propylene
	Toluene
	Xylene

May 10, 1968

**TOXIC MATERIALS WHICH MAY BE
ENCOUNTERED IN TANK OR VESSEL WORK**

In addition to flammable or toxic materials that may be present in vessels or other enclosures from feed, product or by-product materials, certain metals, plastics and polymers may present serious health problems when decomposed by burning or welding operations. Coatings on some welding rods can cause toxic fumes, such as Fluorides, Nitrogen Oxides, etc., to be evolved when welding. Consult "Safe Practices in Welding, Burning, Brazing and Related Processes", available from the Safety or Medical Departments.

In most cases, supplied-air masks (Scott Air-Pak) will be necessary for workers inside the vessel during burning and welding in addition to, or in place of, ventilation. Since gas tests for flammable or toxic materials will not reveal these special materials and the process supervisor or operator should advise mechanical workers of the existence and toxic effects of any of the following:

<u>Metals</u>	<u>Plastics</u>	<u>Polymers</u>
Arsenic	Epoxy Resin	Rubber
Brass	Coatings or paints	
Cadmium	Phenolic Resins or	
Copper	Coatings	
Galvanized (Zinc)	Teflon, Kel-F	
Lead (including lead primer paints)		
Mercury		
Moel		
Stainless Steels		
Vanadium		
Zinc		

HUMBLE OIL & REFINING COMPANY
Baton Rouge, Louisiana

Safety Standard No. 115
Daily Hot Work Permits

Revision II

SCOPE

This standard covers the hot work permit system for the refinery. A hot work permit is required whenever any hot work is done in the refinery. This is the daily permit (Form No. 390290C).

Use this safety standard as a source of information and as a guide wherever applicable. In some circumstances deviation from these practices may be safe and desirable.

DEFINITIONS

1. Hot work is an operation that may produce enough heat to ignite flammable gas-air mixtures or flammable materials.
2. A gas test is a test made to determine whether (a) flammable or (b) toxic gas is present or to determine the presence of (c) oxygen.
3. Vessel means all closed containers such as tanks, drums, towers, barrels, pipelines, barges and tank cars; also enclosures such as furnaces, which are used to confine flammable gases or vapors; and pits, trenches and open top containers greater than 4' in depth.
4. Unit operator is any employee in charge of a process unit.
5. Permit or Permit Form - Refinery Form No. 390-0290C.

SECTION I - DUTIES AND RESPONSIBILITIES

A. Process supervisors shall:

1. Have complete responsibility for the safety of the work.

2. See that the equipment has been properly prepared. *The temperature should be as near ambient as possible and there should be sufficient room or means to insert the gas testers' probe into the line or vessel.*
 3. Designate on the hot work permit the exact area and piece of equipment to be worked on and to be gas tested.
 4. Exercise proper control over adjoining operations.
 5. Check off on the permit form the types of gas tests to be performed.
 6. See that gas tests have been made so that a safe job will result.
 7. Call for rechecks by the gas tester whenever it is believed necessary.
 8. Issue a permit only when a complete, satisfactory gas test has been made.
 9. *A process employee will satisfy himself that the gas tests were made at the specific locations required.*
- B. Employees doing hot work shall:
1. Do only the specific work called for by the permit.
 2. Discontinue all hot work if conditions are such that it is believed continuation of the work is unsafe. Such conditions shall be reported at once to the process supervisor or unit operator.
 3. Request the process supervisor or unit operator to extend a permit which has expired but on which additional work needs to be done.
 4. Notify the unit operator immediately upon completion of the work so that the permit may be cancelled.

SECTION II - GENERAL

A. Who May Issue

1. Flame-type hot work permits and any work permits for work in vessels, whether flame or nonflame, are authorized by process supervisors. Flame-type hot work includes burning, welding, open flames,

electric arcs, hot riveting, forging, torch soldering and mugging. (See Safety Standard No. 146 covering the use of seal plugs and Safety Standard No. 167, Procedure for Welding on Weld+End Couplings in Service).

2. Nonflame-type hot work permits may be issued by unit operators except when the work is in a vessel. Nonflame-type hot work includes use of power tools, grinding, chipping, drilling, power wire brushing, sandblasting, concrete cutting, soldering with soldering iron, using normally nonarcing electronic instruments, internal combustion engine-powered equipment.

B. Life of Permit

1. Hot work permits are good for one process shift. By endorsing the permit it can be extended another process shift. Permits expire and must not be extended past 6:00 a.m., except that permits issued at the end of "C" shift within two hours of beginning work at 7:00 a.m. are valid until the end of "A" shift unless otherwise voided.
2. Permits are void if the work is stopped for safety reasons and the permit must be endorsed by the issuing party before work is resumed.

C. Procedures for Issuing

1. The hot work permit is made in triplicate. The person doing the work gets the original, the gas tester gets the last (yellow) copy and the white copy remains in the book. When a gas test is not required, the yellow copy can be destroyed.
2. Every section of a permit form is provided for a purpose. Each section should be carefully completed.
3. Generally employees receiving a work permit know little of process operations involved in the work to be done. These employees should be told about process factors involved in the job. Special precautions should be checked and written down on the permit. The employee receiving the permit should be instructed verbally to insure complete understanding.
4. Since fires may result from hot work, fire extinguishers and/or hose with pressure to the nozzle shall be in ready standby before issuing hot work permits.

5. The area where the work is to be done must be clean initially and kept clean as the work progresses. The person issuing the permit certifies that the area contains no barrels, drums, rags, cartons, bottles, trash, oil or other material which may be ignited by hot work in the area.

SECTION III - GAS TESTS

A. Gas Test Requirements for Various Situations

1. Hot work on the outside of vessels which are closed and contain hydrocarbon, or other flammable material (*but not a flammable mixture*), steam, water, natural or inert gas, requires gas tests. For the method, see Safety Standard No. 143. Hot work on the outside of vessels which are open and gas-free requires that all lines be slip-blinded.

2. For vessels which must be entered for hot work:

- a) All lines going to the vessel shall be disconnected and blanked with blind flanges before the permit is issued. (See Safety Dept. Sketch #39-134A attached). Where blind flanges cannot be used, a standoff slip blind of the proper rating is permissible. If a standoff blind cannot be used, a slip blind of the proper rating may be used.

Quarter-inch thick slip blinds have an undrilled neck, series 15 slip blinds have one 3/8" hole drilled in the neck and series 30 slip blinds have two 3/8" holes drilled in the neck.

- b) Combustible gas tests, H_2S tests and oxygen tests shall be made. There shall be no indication of any combustible gases or vapors or H_2S . Entry where no hot work is to be done is permitted if the combustible is 5% of L.E.L. (0.05 JW) or less. Entry can be made with an air supplied mask if the hydrocarbon is 50% (0.5 JW) of L.E.L. or less. No entry permitted under any conditions above 50% of L.E.L. (0.50 JW).
- c) If there is a possibility that any other toxic material is present, tests should be made to insure that concentrations of such materials are below the allowable maximum. Toxic materials for which tests are required are listed in Safety Standard No. 114.

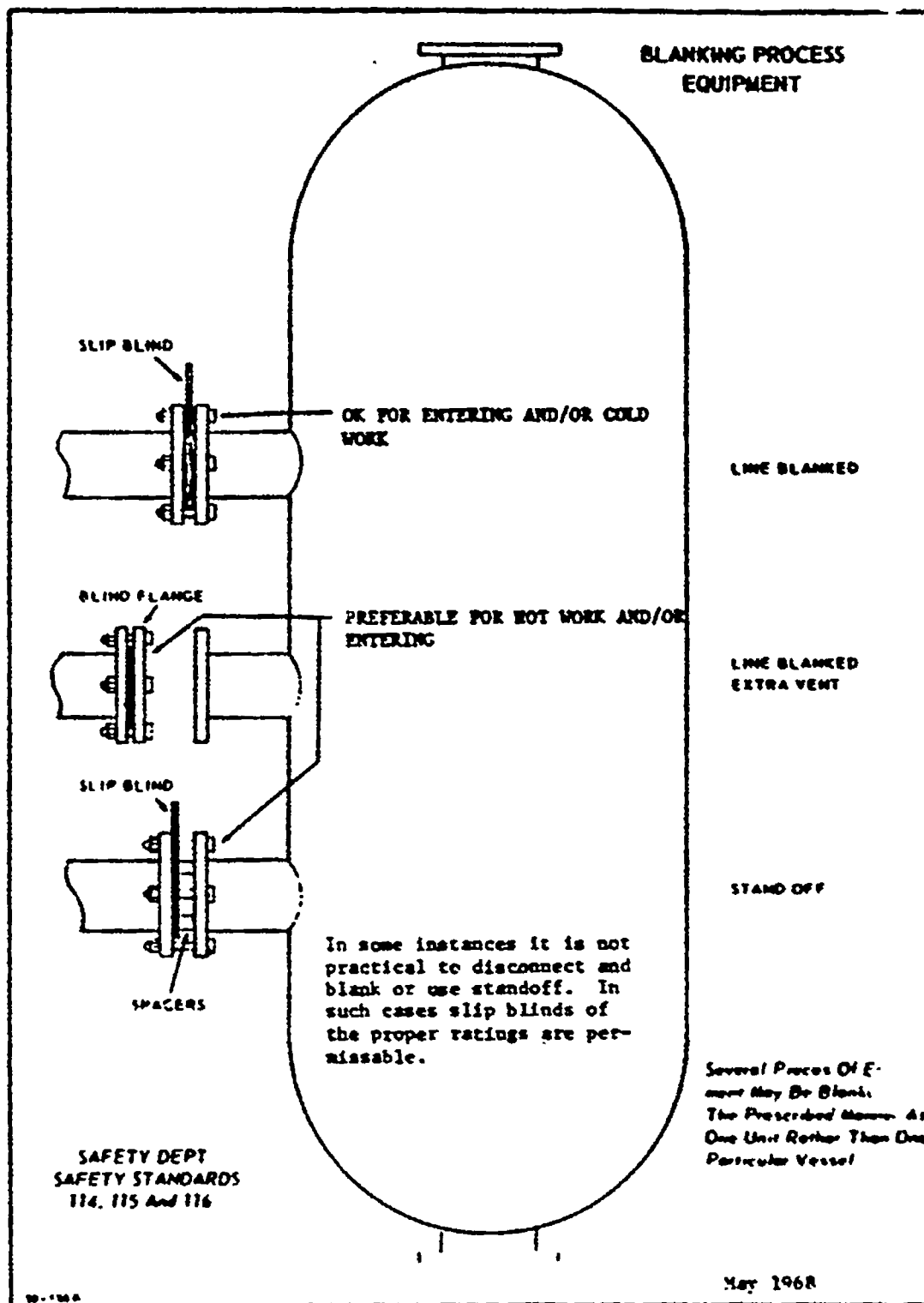
- d) Special precautions must be taken where there are materials such as iron sulfide, acetylides or polymers present which may ignite spontaneously.

3. Hot Work in Open Areas

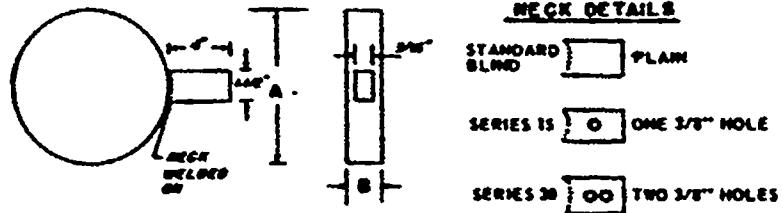
Where, in the opinion of the process supervisor, there may be combustible or toxic gases in an open area where hot work is to be performed, gas tests shall be made. A hot work permit shall be issued only if there is no indication of combustible gases or vapors. The process supervisor may issue a hot work permit without a gas test if, in his opinion, the area is gas-free.

Safety Department
Revised May 14, 1968

cc: Lists D-8 D-10 D-16 D-20 and D-24
Plastics Plant (10)



PLAIN SLIP BLINDS FOR RAISED FACE FLANGES



ALL DIMENSIONS IN INCHES

NOMINAL PIPE SIZE	STANDARD BLIND	SERIES 15 RATING	SERIES 30 RATING
	8	8	8
1	1/4	1/4	1/4
1-1/2	1/4	1/4	1/4
2	1/4	1/4	1/4
2-1/2	1/4	1/4	3/8
3	1/4	1/4	3/8
4	1/4	3/8	1/2
6	1/4	1/2	3/4
8	1/4	1/2	7/8
10	1/4	5/8	1
12	1/4	3/4	-
14	1/4	7/8	-
16	1/4	1	-
18	1/4	-	-
20	1/4	-	-
24	1/4	-	-

NOTES PLAIN BLINDS MAY BE USED IN EITHER RAISED FACE OR RING JOINT FLANGES, EXCEPT USE RING JOINT WHERE REQUIRED TO MEET OPERATING CONDITIONS.

GASKETS SHOULD ALWAYS BE USED ON BOTH SIDES OF BLINDS AND FLANGES BOLTED TIGHT

HOLE IN NECK OF BLIND DIFFERS FOR EACH PRESSURE RATING TO FACILITATE IDENTIFICATION

ALL BLINDS SHOULD BE STAMPED TO INDICATE PIPE SIZE AND PRESSURE RATING

Revised Drawing #0-1-1-41

May 1968

Baton Rouge, Louisiana
Safety Standard No. 116
Cold Work Permits

Revision II

SCOPE

This standard covers the cold work permit system for the plant.

Use this safety standard as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable in the judgment of the supervisors or operators.

DEFINITIONS

1. Cold work is work that ordinarily does not create enough heat to ignite flammable gas-air mixtures.
2. Hot work is an operation that may produce enough heat to ignite flammable gas-air mixtures or flammable materials.
3. A gas test is a test made to determine whether (a) flammable or (2) toxic gas is present or to determine the (c) presence of oxygen.
4. Vessel means all closed containers such as tanks, drums, towers, barrels, pipelines, barges and tank cars; also enclosures such as furnaces, which are used to confine flammable gases or vapors; and pits, trenches and open top containers greater than 4' in depth.
5. Unit operator is any employee in charge of a process unit.
6. Permit or Permit Form - Refinery Form No. 39-03008.

SECTION I - DUTIES AND RESPONSIBILITIES

- A. Process supervisors and unit operators shall:
 1. Have complete responsibility for the safety of the work.

2. See that the equipment has been properly prepared. *The temperature should be as near ambient as possible and there should be sufficient room or means to insert the gas tester's probe into the line or vessel.*
 3. Designate on the work permit the exact area and piece of equipment to be worked on and to be gas tested.
 4. Exercise proper control over adjoining operations.
 5. Check off on the permit form the types of gas tests to be performed.
 6. See that the gas tests have been made so that a safe job will result.
 7. Call for checks by the gas tester whenever it is believed necessary.
 8. Issue a permit only when a complete, satisfactory gas test has been made.
 9. *A process employee will satisfy himself that the gas tests were made at the specific locations required.*
8. Employees doing cold work shall:
1. Do only the specific work called for by the permit.
 2. Discontinue all work if conditions are such that it is believed continuance of the work is unsafe. Such conditions shall be reported at once to the process supervisor or unit operator.
 3. Request the process supervisor or unit operator to extend a permit which has expired but on which additional work needs to be done.
 4. Notify the unit operator immediately upon completion of the work so that the permit may be cancelled.

SECTION II - GENERAL

A. Authority to Issue

Cold work permits are authorized by process supervisors, unit operators or assistant operators.

B. Requirements

1. Cold work permits are required for all mechanical work in process areas where hot work permits are not required, except work on meters and instruments in control houses, may be done with permission of the process supervisor or operator.
2. Cold work permits are not required for work in Mechanical Shops, on roads, fences, or buildings outside operating areas.

C. Single Permits

1. The work covered by a single permit shall be limited to that which can be adequately described and for which proper precautions can be specified. Unless safety considerations make it inadvisable, such work as pump checks, plug valve greasing and clean-up may be covered by a single permit.

D. Life of Permits

1. Cold work permits are good for one process shift. By endorsing the permit it can be extended another process shift. Permits expire and must not be extended past 6:00 a.m., except that permits issued at the end of "C" shift within two hours of beginning work at 7:00 a.m. are valid until 3:30 p.m., unless otherwise voided.
2. Permits are void if the work is stopped for safety reasons and the permit must be endorsed by issuing party before work is continued.

E. Procedure for Issuing

1. The permit is made in triplicate. The mechanic gets the original, the gas tester gets a copy and a copy remains in the book.

When a gas test is not required, one copy can be destroyed.
2. Every section of a permit form is provided for a purpose. Each section should be completed.
3. Generally employees receiving work permits know little of process operations involved in the work to be done. If the employee who issues the permit

wishes the employee who does the work to check with him prior to starting the work, he should check the square provided for this purpose on the permit form.

SECTION III - GAS TESTS AND BLINDING

A. Gas Test and Blanking Requirements for Cold Work

Gas tests are required for the following activities:

1. Entry into a vessel with or without the performance of cold work
 - a) All lines connected to the vessel shall be slipblinded with blinds of the proper rating or the lines shall be disconnected and blanked with blind flanges before the permit is issued. See Safety Department Sketch #39-134A and Engineering Drawing #0-1-1-41 attached. Quarter-inch thick slip blinds have an undrilled neck, series 15 slip blinds have one 3/8" hole drilled in the neck and series 30 slip blinds have two 3/8" holes drilled in the neck.
 - b) Combustible gas, oxygen and H_2S tests shall be made. It will normally be necessary to have the vessel completely freed of combustibles as indicated by a zero reading on the gas testing machine before permitting entry. In the cases where only ordinary petroleum hydrocarbons are handled, if for some good reason it is not possible to eliminate completely the combustibles from the atmosphere, cold work may be permitted with concentrations up to 5% of the lower explosive limit. This is the maximum concentration for entry without air-supplied respiratory protection.

An air-supplied mask is required for concentrations from 5 to 50% of L.E.L. (0.05 to 0.5 JW). No entry permitted above 50% L.E.L. Steps should be taken to insure that changing conditions do not result in an increased gas concentration. This may require that the gas tester stand by to test the atmosphere at frequent intervals.
 - c) If there is a possibility of having inert gas present, tests for oxygen deficiency and carbon monoxide content shall be made.
 - d) If there is a possibility that any other toxic material is present, tests shall be made to insure that concentrations of such materials are below the allowable maximum.

Toxic materials for which tests are required are listed in Safety Standard No. 114. Test for hydrogen sulfide shall be made every time combustible gas tests are made.

2. Cold Work in Open Areas

Where, in the opinion of the unit operator or the process supervisor, there may be excessive concentrations of combustible or toxic gases in some open area where cold work is to be performed, gas tests shall be made to insure the safety of the work. The requirements in this case are the same as for "Entry Into a Vessel", as outlined in Paragraph A 1 above.

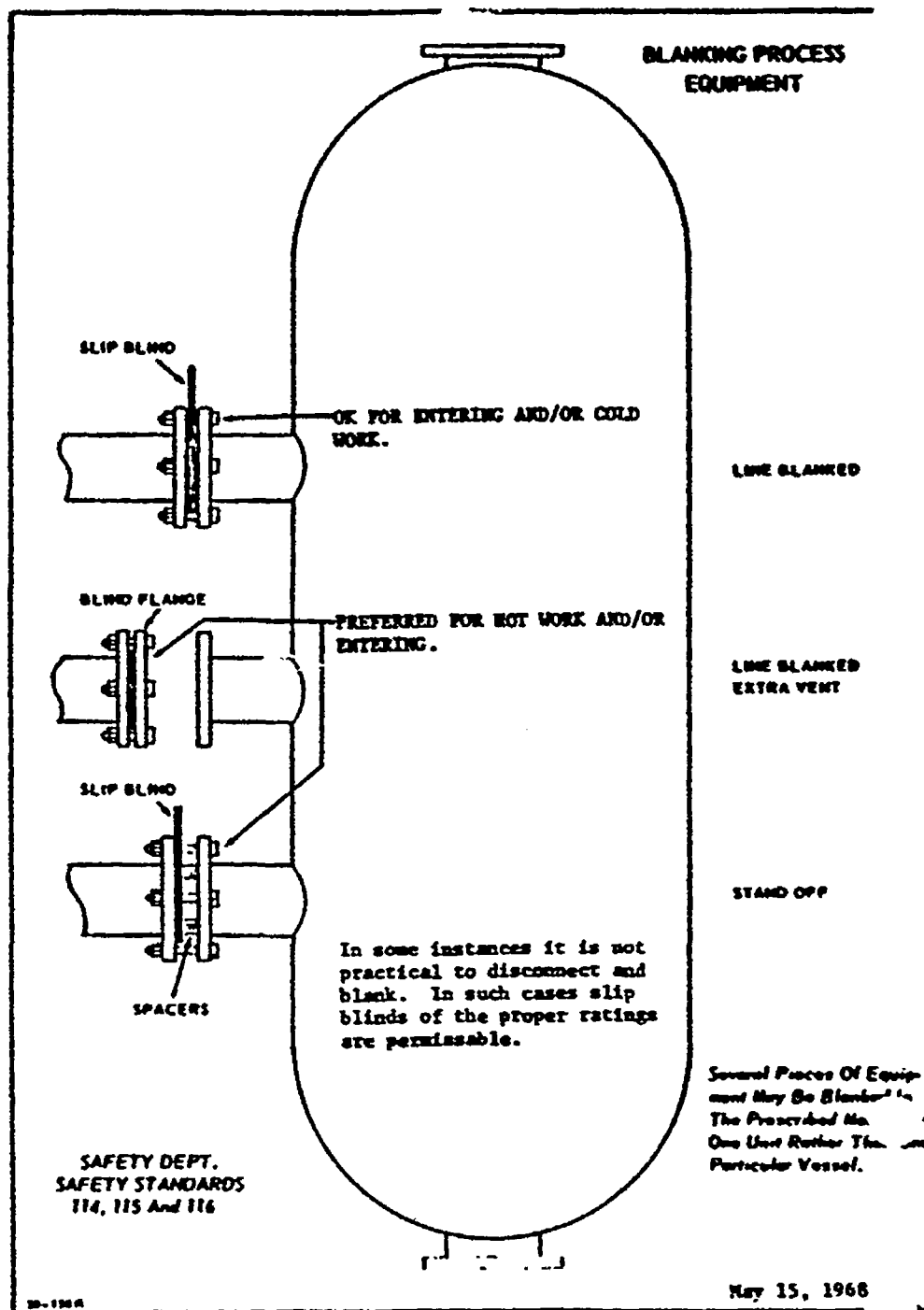
The process supervisor or unit operator may issue a cold work permit without a gas test if, in his opinion, the area is suitable for the work.

3. Cold Work Requiring Contact with Flammable Liquids

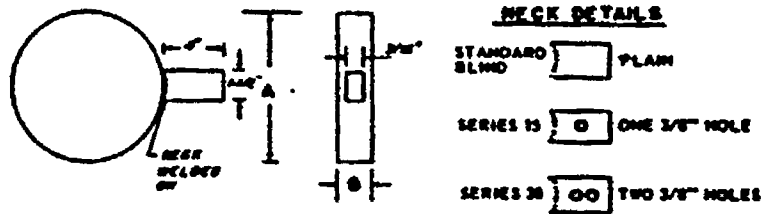
In some jobs, particularly cleaning work, it is necessary for the work to be performed near flammable liquids. In such cases the provisions applying to cold work in an enclosure or in an open atmosphere, as the case may be, shall be followed with regard to the general atmosphere. Necessary steps are to be taken to make certain that ignition of the flammable vapors does not occur.

Safety Department
Revised May 14, 1968
Attachments

cc Lists D-8 D-10 D-16 D-20 D-24
- Plastics Plant (10)



PLAIN SLIP BLINDS FOR RAISED FACE FLANGES



ALL DIMENSIONS IN INCHES

NOMINAL PIPE SIZE	STANDARD BLIND	SERIES 15 RATING	SERIES 30 RATING
	0	0	0
1	1/4	1/4	1/4
1-1/2	1/4	1/4	1/4
2	1/4	1/4	1/4
2-1/2	1/4	1/4	3/8
3	1/4	1/4	3/8
4	1/4	3/8	1/2
6	1/4	1/2	3/4
8	1/4	1/2	7/8
10	1/4	5/8	1
12	1/4	3/4	-
14	1/4	7/8	-
16	1/4	1	-
18	1/4	-	-
20	1/4	-	-
24	1/4	-	-

NOTES PLAIN BLINDS MAY BE USED IN EITHER RAISED FACE OR RING JOINT FLANGES, EXCEPT USE RING JOINT WHERE REQUIRED TO MEET OPERATING CONDITIONS.

GASKETS SHOULD ALWAYS BE USED ON BOTH SIDES OF BLINDS AND FLANGES BOLTED TIGHT

HOLE IN NECK OF BLIND DIFFERS FOR EACH PRESSURE RATING TO FACILITATE IDENTIFICATION

ALL BLINDS SHOULD BE STAMPED TO INDICATE PIPE SIZE AND PRESSURE RATING

Reering Drawing #0-1-1-41

May 15, 1968

EM004188

FOREWORD

The Company is vitally interested in operating the Baton Rouge Plant safely to protect you, your fellow employees, and others against accidents and injuries.

Equipment and machinery in the Plant are equipped with safety devices. There are many types of personal protective equipment available to you. Safety discussions are held frequently to acquaint you with safe work methods and to stress the importance of safety. Safety topics are included in such publications as the daily News Bulletin and Esso News. The Company wants you to be safety conscious; however, any program of this type requires certain rules and standards of personal conduct. Since the unsafe act of one person may endanger not only himself but others, the Company must establish safety rules and enforce them. This "Safety Handbook" has been prepared to furnish you a ready reference to:

1. The General Safety Rules of the Company, and
2. Specific Safety Instructions you should follow in certain situations to avoid accidents.

Your specific job may require additional precautions not outlined in this Handbook. Your supervisor is responsible for seeing that you are acquainted with the additional precautions which may apply.

The safety devices and equipment, plus the various procedures, merely provide the proper environment. However, in the final analysis, the success of our Accident Prevention Program depends on the actions of each individual.

General Safety Rules

You should become thoroughly familiar with the General Safety Rules. These rules are basic

fundamentals and apply generally to all employees in their daily activities in the Plant. These rules must be observed.

Specific Safety Instructions

There are certain types of situations that have caused accidents at Baton Rouge. Recommended practices which should prevent recurrence of similar accidents are included in this Handbook.

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GENERAL SAFETY RULES

General Safety Rules

1. *Comply with all specific safety instructions such as posted signs, those given by your supervisor, and those listed in this Safety Handbook where applicable.*

There are many areas where conditions require that special signs be posted to control the safety of a job or operation. Also, your supervisor may determine that certain precautions are necessary in addition to those normally used for a particular job.

2. *"Horseplay" is prohibited on Company property.*
3. *Operate equipment, machinery, or power tools only when authorized to do so.*

Operating equipment includes turning valves, throwing switches, driving motorized equipment, adjusting controls, or any other act which may affect a potential source of power. Certain employees operate or control the operation of equipment in the normal course of their work. These individuals are trained and possess the skill required to operate the equipment safely. In addition, your supervisor may authorize you to operate some particular equipment outside your normal routine.

4. *Obey all traffic signs, signals, markers and persons directing traffic.*

Traffic in the Plant is regulated in much the same manner as city and state highway traffic is regulated by laws. Many of the general rules are identical with those of the city and state. Traffic

signs are posted throughout the Plant to control traffic.

5. *Wear the personal protective equipment prescribed for your particular job.*

Personal protective equipment may be prescribed on posted signs and special written instructions. Also, your supervisor may prescribe protection in addition to the minimum requirements normally recommended for the particular job. The Company furnishes certain personal protective equipment designed to protect employees in specific circumstances provided the equipment is properly used.

This equipment should be kept clean and properly stored to prevent damage. You should not alter or modify protective equipment. When repairs or replacements are needed, return the equipment to the place where it was issued or to a location designated by your supervisor.

6. *Smoking is prohibited on Company property except in designated areas.*

There are certain areas and specific locations where smoking is permitted. These places are posted with signs or symbols indicating the exact boundaries of the smoking area. When you enter a smoking area, check the sign to be sure that the area has not been temporarily banned from smoking. Never smoke where hydrocarbons have been spilled.

7. *Strike-anywhere matches and open trigger operated lighters are prohibited on Company property.*

The three basic ingredients for a fire are (1) fuel, (2) oxygen, and (3) heat. Strike-anywhere matches and open trigger operated lighters may inadvertently provide the "heat" at the wrong

time. Employees are advised to carry safety matches, or lighters with hinged covers.

8. *A Hot Work Permit must be obtained for any job classed as "hot work" in the Plant.*

Hot work is work which may create sufficient heat to ignite flammable gases. Some examples of hot work are: welding, burning, hot riveting, cold riveting, power tool metal chipping, and power tool metal drilling, flash cameras, and operation of portable or mobile internal combustion engines within battery limits of operating units.

Hot Work Permits are required to do any job classed as hot work. A Hot Work Permit is issued daily for one shift unless the hot work is done under a blanket permit issued for certain areas. Daily Hot Work Permits are issued by authorized personnel — usually shift foremen. Blanket Hot Work Permits are obtained by the department head of the area involved.

I. GENERAL

I. General

Any questions or comments concerning safety practices or specific unsafe conditions are to be directed to your supervisor.

Report all accidents and injuries to your supervisor.

Get instructions from your supervisor before starting work with which you are not familiar.

If conditions arise which make it unsafe to proceed with your assigned job, stop and immediately notify your supervisor.

When you work alone in an isolated location, keep in contact with the person designated by your supervisor.

Notify the process personnel on a unit in service whenever you enter the unit.

A. Fire Control

1. "Hot Work" is the leading cause of fire in the Plant. A "Hot Work Permit" is required for any job classed as "Hot Work." The General Safety Rules cover the definition of "Hot Work" and Section I, Subsection E, contains specific instructions concerning use of permits.
2. Smoking is covered under "General Safety Rules."
3. Other safe practices to prevent fire are:
 - a. Discard paint or oil-soaked rags in metal trash containers. (Remove such rags from your clothes and work place at the end of each shift.)
 - b. Switch off engines and engine driven equipment, and radios before refueling the vehicles.
 - c. Avoid refueling when open flames, torches, arc welding, or other sources of ignition are nearby.
4. Fire Extinguishment
 - a. IN CASE OF FIRE, DIAL TELEPHONE

NUMBER 7555. GIVE YOUR NAME, AND THE LOCATION AND NATURE OF THE FIRE.

- b. Never block access to fire equipment or fire escapes.**
- c. Never misuse any fire fighting equipment.**
- d. Notify the Fire Department if you use a fire extinguisher.**

B. First Aid and Health

1. Personal Care

- a. Report to the Plant hospital if you are injured or become sick on the job.**
- b. Follow any specific instructions received from hospital personnel.**
- c. If practicable, obtain permission from your supervisor to leave the job and notify him when you return from the hospital.**

2. Eye Care

- a. Never attempt to remove a foreign body from the eye.**
- b. Have your eyes examined regularly and wear glasses if correction is needed. The Company furnishes prescription safety glasses, if your job requires them.**
- c. Refer to Section One D. for protective equipment.**

3. Drinking Water

- a. Drink water only from approved water containers or dispensers.**
- b. Use drinking water cans only for ice and water. Never remove seals on drinking water cans except on instructions from your supervisor.**
- c. Take salt tablets to prevent heat sickness from excessive perspiration. (Exception: Some individuals are under doctor's orders to refrain from taking salt.)**

4. Care of Others

When you need an ambulance:

- a. Phone 7666.**
- b. State clearly**
 - (1) Your name,**
 - (2) Exact location where ambulance is needed, and**
 - (3) Nature of injury.**
- c. Station yourself or someone else in a location near the scene to direct the ambulance when it arrives.**

- 5. Stretchers and blankets are provided in stretcher boxes throughout the Plant. These are for first-aid treatment only.**

C. Housekeeping

- 1. Put trash into the proper containers. Never throw scrap material or trash on the floor or ground.**
- 2. Clean up all oil spills and leaks promptly.**
- 3. Put your empty soft drink bottles in the racks provided for that purpose.**
- 4. Keep aisles, walks, and roads clear of material.**
- 5. Keep steam and water hoses stored in racks provided.**
- 6. Your job is not complete until you have removed all unneeded material.**
- 7. Before throwing broken glass in trash cans wrap it to protect others from injury.**
- 8. Never leave protruding nails in boards, boxes, barrels, or kegs. Pull or bend nails.**
- 9. Keep your work area or control house clean.**
- 10. Store clothing and other materials in control houses in the lockers or cabinets provided for that purpose.**
- 11. Provide adequate storage for janitorial supplies and avoid the use of mechanical rooms for such storage.**

D. Clothing and Personal Protective Equipment

1. Clothes

- a. When actively engaged in Plant work, except around moving machinery, have your body, arms, legs and shoulders covered by clothing.
- b. Never wear loose-fitting sleeves when working on moving machinery.
- c. Wear adequate clothing for the particular job and conditions.
- d. Wear gloves when needed to protect hands against injury.
- e. Wear safety shoes. (Sandals and canvas shoes are not permitted in shops, laboratories or for field work in the Plant.)
- f. Avoid wearing loose neckties, rings, wrist-watches, watch chains, and other ornamental jewelry when working on equipment.

2. Personal Protective Equipment

This is a listing of some of the types of personal protective equipment and their proper use. These are minimum requirements. Your supervisor may prescribe additional protection. Refer to the Personal Protective Equipment Catalog for more details.

a. Head Protection

- (1) Wear your safety hat while on duty except in buildings or personal vehicles or while in transit between control houses or change house and exit gate. Wear your safety hat in buildings when your job requires it.
- (2) When you work within six feet of exposed electrical conductors or equipment, wear a non-metal safety hat.
- (3) Adjust your safety hat suspension to prevent the hat shell from touching your head.

b. Eye Protection

The table below gives the minimum eye protective equipment required for all Plant employees when performing the operations listed. Equipment giving more protection is to be worn when specified by your supervisor for a particular job or jobs. Also, eye protective equipment is to be worn while performing operations not listed if specified by your supervisor.

Safety Spectacles or Goggles	Safety Spectacles With Side Shields, Goggles, or Face Shields	A Face Shield in Addition to Goggles or Spectacles	SPECIAL EQUIPMENT	
			Protective Equipment Required	Operation
—Operating shop machine tools.	—Using portable power tools except wire brushes and grinders.	—Opening or working around process equipment containing corrosive or extremely hot materials.	—Welding shield and spectacles with colored lenses.	—Arc welding.
—Using stand grinders or wire brushes.	—Charging sandblast or gunite machines.	—Operating cleaning vats.	—Safety spectacles with colored lenses.	—Working around arc welding.
—Using hammers, mauls, or picks.	—Guniting.	—Pouring or handling strong acid, caustic or other corrosives.	—Cup goggles or safety spectacles with side shields and with number 4, 5, or 6 tinted lenses.	—Burning, gas welding, heating or brazing.
—Driving scooters.	—Blowing with compressed air.	—Hand spraying with molten asphalt.	—Face shield.	—Hosing down using hot water.
—Handling wet cell batteries.	—Working with steel wire or bands (banding, cutting steel wire or cable, etc.)	—Handling molten metals and other molten materials.	—Sandblast hood.	—Sandblasting.
—Soldering.	—Working under vehicles or dirty equipment	—Operating portable wire brush machines and grinders.		
—Electric spot welding.	—Handling loose asbestos.	—Drawing samples of hot, cold or corrosive materials.		
—Submerged arc welding.	—Hand wire brushing or scraping.	—Starting equipment or operating equipment in corrosive, hot or cold service.		
—Opening all process equipment not containing corrosive materials or extremely hot materials.	—Mixing lime mortar.	—Chipping or cutting brittle metals such as cast iron.		
—Hand wire brushing or scraping below eye level.	—Catching catalyst samples.			
—Operating power lawn mower.				

NOTE: "Bubble Goggles" are not intended to resist impact or liquid splash. Use them only for protection against non-toxic dust.

c. Breathing Protection

There are several types of breathing protection equipment available. The list below shows the type of equipment and use. Your supervisor will instruct you concerning when to use each type.

Type	Designed Usage
Air-supplied breathing apparatus. (Air Pak)	To be used in tanks, pits, or areas where gas tests show harmful amounts of gas, dusts, mists, vapor, or lack of oxygen.
Cartridge or filter respirator	Protection against low concentrations of dust, fumes, gases, or mists.

d. Hand, Foot, Body, and Leg Protection

- (1) When exposed to corrosive or toxic liquids wear
 - (a) Plastic-coated gloves
 - (b) Rubber boots, rubber shoes, or rubber overshoes.
 - (c) Plastic-coated jacket and trousers.
- (2) Wear canvas or leather leggings, aprons and sleeves when you are exposed to molten metal or when you handle hot asphalt.
- (3) Wear canvas sleeves and aprons when using a wire buffing wheel.

e. Safety Belts

Safety belts are available for your use when working at elevations or when directed to do so by the supervisor. Section V. E. of this handbook outlines the cases where safety belts are required.

E. Work Permits

1. General

A definition of "Hot Work" is covered under the General Safety Rules.

- a. Hot and cold work permits expire:
 - (1) At the end of the mechanical shift during which the permit was issued unless properly endorsed by an authorized employee.
 - (2) Permits are void if the work is stopped for safety reasons and the permit must be endorsed by the issuing party.
 - (3) In all cases, at the end of the Plant day on which issued (except as noted in following paragraph).
- b. Permits issued at the end of "C" shift within two hours of beginning work at 7:00 a.m., are valid to 3:30 p.m., unless otherwise voided.
- c. The official time that a permit is issued is the time that the gas test was made, when a gas test is required, or the time the permit is written.

2. Cold Work Permits

- a. Cold work is work that will not ordinarily result in heat that can cause ignition of flammable gases. The following jobs are classed as cold work:
 - Using hammer, maul, or other hand impact tools
 - Cleaning up
 - Using hand-operated tools
 - Inspection
 - Using pneumatic-operated impact wrenches.
- b. Cold work permits are required for all mechanical work in process areas where hot work permits are not required, except work on meters and instruments in control houses may be done with the permission of the Process Supervisor or Operator.
- c. The work covered by a single permit shall be limited to that which can be adequately described and for which proper precautions

can be specified. Unless safety considerations make it inadvisable, such work as pump checks, plug valve greasing and clean up may be covered by a single permit.

- d. Cold work permits are not required for work in mechanical shops, on roads, fences, or buildings outside the operating area.
- e. Cold work permits are issued by authorized process unit personnel and supervisors.

3. Gas Tests for Permits

- a. A gas test is required whenever you enter a vessel. (See Subsection 1 above for general regulations on gas tests.) An authorized supervisor is required to determine from the gas test results and other information if it is safe for you to enter.
- b. A gas test is required whenever hot work is done in or on a vessel or in an open excavation of 4 feet depth or greater.
- c. In all other cases the person authorized to issue Hot Work Permits determines if a gas test is needed.

II. MATERIAL HANDLING AND STORAGE

II. Material

A. Material Handling

1. Manual Lifting and Handling

- a. Use mechanical material handling equipment whenever practicable.
- b. When lifting a heavy object bend your knees, keep your back straight, and use your legs to lift.
- c. Never carry an object that prevents you from seeing where you are going.
- d. Avoid throwing objects to another person.
- e. Avoid throwing material from elevations unless specifically authorized by your supervisor. It is required that the area into which material is thrown be roped off or guarded to keep persons out.
- f. Keep your hands and fingers out of the ends of pipe or other tubular material.
- g. When rolling a drum on its side, push with your hands against the sides of the drum. Never grasp the ends of the barrel or use your feet to push it.
- h. Use a mechanical aid or get help when you need to upend a full barrel.
- i. Double back ends of wire used for baling, tying, and binding.

2. Team Lifting and Carrying

- a. When two or more persons carry a long object, carry the object from the same side.
- b. The person in the rear gives the signals for lifting, carrying or lowering.

B. Material Storage

1. When material is placed on vehicular roadways, place it as near the edge of the road as possible.

2. Use barricades and/or lights to warn others of material left in traffic lanes.
3. Chock round objects to prevent them from rolling.
4. Store sheet material flat whenever it is not stored in racks.
5. Avoid overloading a floor or other surface with stacked material.
6. Before you work on or near stacked objects or piled material, examine them to be sure they will not fall, topple or slide.

C. Operation of Fork Lift Trucks

1. Refer to Safety Standard No. 125.

III. TOOLS AND EQUIPMENT

III. Tools and Equipment

A. Electrical Equipment

Only personnel authorized by supervisors are permitted to:

1. Repair or alter electrical equipment.
2. Remove or install fuses.
3. Enter electrical substations or switch rooms.
4. Perform Electrical Hot Work which includes:
 - a. Work performed in contact with bare energized circuits and apparatus above 50 volts.
 - b. Work performed within 6 feet of bare energized circuits and apparatus that are not barricaded or covered except on controls and instruments operated on nominal 120 volts power or lower.
 - c. Cutting red concrete.
5. Climb electrical poles.
6. Bring personally owned electrical equipment into the Plant.
7. Operate any 13,800-volt or any 2400-volt circuit switching device except motor starters which are operated from pushbutton stations.

Additional safety rules and practices for personnel authorized to perform the above operations are included in Electrical Practices Memo No. 15 and Instrument Practices No. 1. Supervisors should refer to the memo "Electrical Hot Work" in Section 13.050 M&C Procedures.

Listed below are certain safety instructions for individuals working around electrical equipment:

General

1. Keep extension cords out of water and avoid standing in water when using electrical equipment.
2. Avoid tying electric cords to metal rods or rails.

3. Use a 32-volt hand lamp, battery lamp, or flashlight when entering vessels.
4. Never direct a stream of water on electrical equipment or electrical conductors.
5. Never anchor hoisting equipment to electrical poles, electrical towers, or any other electrical apparatus.
6. Provide welding cable grounds as close as possible to your work. Grounds are permitted to be spot-welded to flanges but not to walls of piping. Keep welding cables clean and protect the insulation from damage.
7. Never cut or break street curbs until certain power is off.
8. Use goggles with side shields when working with iron or steel wire.
9. Check your testing devices and protective equipment before using.
10. Open the main switch and tag it before performing "cold work" on electrical equipment.
11. Identify circuits and check for voltage, current flow, and backfeeds before working on electrical circuits.
12. Electrically-operated breakers shall be moved to test or lowered position before working on circuit.
13. Before working on circuits 2300-volts or above, install safety grounds or obtain permission from your supervisor to work the circuit ungrounded.
14. Never open energized current transformer secondaries.
15. If a protective device trips, "megger" circuit before reclosing except in urgent cases when you are permitted to turn it to the "on" position (reset) one time and then only when there are no signs of a serious electrical failure. If it trips out again, notify your supervisor.
16. Mark for future identification any circuits you install or change.

17. Never operate disconnect switches unless the interrupting capacity is known.

B. Hand and Portable Power Tools

1. Hand Tools

Hand tools are furnished by the Company. The repair and replacement costs of small tools is a large expense item. The Company wants each employee to have the best tools available to use in his work.

- a. Check your tools regularly and return defective ones for replacement.
- b. Transport and store tools in a tool box, trailer or bag as provided.
- c. Carry and store tools with sharp points or edges down and away from the body whenever possible.
- d. Avoid throwing tools.
- e. Keep your tools out of aisles and walkways.
- f. Avoid leaving tools in places where they can fall.
- g. Use only files equipped with handles.
- h. Never hammer, strike, or pry with a file.
- i. When using a knife, cut away from your body.
- j. Hold chisels, punches, and pins in the hollow of your hand, palm up, when using them.
- k. Never hold work in your hands while using a sharp tool—the tool may slip and puncture your hand.
- l. Never hammer with a wrench.
- m. Avoid striking together tempered tools.
- n. Use a nonmetallic hammer to strike case-hardened metal.
- o. Stand aside when a fellow worker is using a sledge hammer.
- p. Strike wrench with hammer or maul only if

the wrench is provided with a striking surface.

- q. Avoid striking an adjustable wrench or pipe wrench with a hammer.
- r. When using jacks, block up the object being raised as it is raised.
- s. Remove jack handles when the jack is not being raised or lowered.
- t. Avoid use of makeshifts, such as pipe, iron bars or boards as a substitute for crow bars or pinch bars.
- u. Avoid use of extensions ("cheaters") on pipe wrenches.
- v. Use only hot sticks with nonmetallic heads on electrical equipment.

2. Portable Power Tools

General

- a. Ground electric-powered tools before using.
- b. Check your source of supply before connecting air-powered tools.
- c. Keep guards in place on power tools that you use.
- d. Avoid laying air hoses and electric cords on surfaces where people walk.
- e. Protect air hose laid across roadways.
- f. Disconnect power tools from power source before making repairs or adjustments.

Use of Grinders

- a. Never use a grinding wheel that is rated at fewer RPM's than the driver.
- b. Never use a grinding wheel that has a hole larger than the arbor of the driver.
- c. Remove the wheel from a grinder before you return them to the toolroom.

Other Power Tools

- a. Never operate a power impact tool unless

the tool or plunger is against a solid object to prevent it from being thrown out.

- b. Only authorized supervisors are permitted to withdraw powder-actuated tools (stud drivers) from the toolroom. Only employees who have been instructed in the proper use of these tools are permitted to use them.

C. Hoisting Equipment, Elevators and Conveyors

1. Hoisting Equipment

a. General

- (1) Inspect all hoisting equipment before using.
- (2) Never exceed the rated capacity of blocks, slings, cables, ropes, or other hoisting equipment.
- (3) Stand clear of all lines under strain.
- (4) Never stand in the bight of a line.
- (5) Apply power to load lines slowly. Avoid jerking load lines.
- (6) Assign only one person at a time to give signals to operators of hoisting equipment.
- (7) Use only trolleys designed for the size of the trolley beam where it is to be hung.
- (8) Attach wire rope clips with the "U" bolt on the "dead end" of the rope.
- (9) When other means have been found inadequate, a qualified employee may, at the discretion of the supervisor, ride a crane hook, headache ball or crane load provided he is equipped with an approved safety belt and short length of lifeline securely fastened to the crane load line.

b. Proper Use of Slings and Guide Lines

- (1) Use sling of proper diameter and strength. Never use two single slings in parallel to get double strength.
- (2) Never use chains as a sling.
- (3) Never use a manila rope sling on material contaminated with caustic or acids.
- (4) Never use barricade rope for hand lines or slings for handling materials.
- (5) Attach hand (guide) ropes to loads. Never attach hand ropes to the slings.
- (6) When rope is not in use, store so that it will stay dry. When you have finished with a rope, return it to the toolroom.
- (7) When ropes are used in acid or caustic areas, be sure to note "acid" or "caustic" on the tag when returning them to toolrooms.
- (8) Protect ropes against cutting on sharp edges.

c. Rigging

- (1) Use a bar to guide the cable or line onto a drum of a hoist. Never use your hands or feet.
- (2) When it is necessary to stretch cables or lines across roads or walks, block the road or walk if the cable or line is lower than 14 feet above roads or less than 7 feet above walks.
- (3) Seat chain links into a hook by hand pressure. Never hammer a chain link onto a hook.
- (4) Never connect or repair chains by bolting links together.
- (5) Use shackles, bolts with nuts, and other positive locking devices to fasten together hoisting equipment. Never use drift pins or pin wrenches. Never an-

chor hoisting equipment with the use of drift pins or pin wrenches.

d. Chain Blocks

- (1) Avoid having more than one person at a time pull on the pull chain of a chain block.
- (2) Never use the load chain as a sling for lifting.
- (3) Straighten chains and make every link seat before lifting. Never put a strain on a kinked chain.
- (4) Use wire rope to suspend or anchor chain blocks. Never use manila rope.

e. Conveyors

- (1) Never ride or walk on a conveyor.
- (2) Never step or walk on rollers of gravity conveyors.
- (3) Never take short cuts by climbing over conveyors.
- (4) Stop conveyors before you repair them or attempt to clear them.
- (5) Never place your hands on the side of packages or drums where they could be struck by other packages coming down or off conveyors.

f. Elevators

- (1) Never load an elevator in excess of its rated capacity.
- (2) Never enter an elevator machinery house without authorization from your supervisor.
- (3) Push material-handling vehicles into elevators instead of pulling them in.

D. Ladders, Scaffolds, and Working Surfaces

1. Ladders

a. General

- (1) Use only the portable ladders supplied by the Company.
- (2) Use only portable straight ladders that are equipped with shoes.

b. Installation of Ladders

- (1) Place a straight ladder with its feet approximately $\frac{1}{4}$ of the ladder length away from a line that is vertical with the top support.
- (2) When you place a ladder in front of a door which opens towards the ladder, lock, block, or guard the door against opening.
- (3) Place both ladder rails against a solid surface. Never rest a ladder against a window pane, window sash, screen, awning or loose objects.
- (4) Provide solid footing for bases of ladders.
- (5) Never place a ladder on a movable object.
- (6) Completely open a step ladder before using it. Never use a step ladder as a straight ladder.

c. Climbing on Ladders

- (1) Never use ladders in horizontal position to stand on or support weight.
- (2) Have only one person on a ladder at a time.
- (3) When climbing up or down on a straight ladder, place your hands on the rungs.
- (4) Use both of your hands when climbing

up or down ladders. (Avoid carrying tools in your hands while climbing a ladder.)

- (5) Face the ladder when you climb or come down. Never slide down ladders.
- (6) Never reach from a ladder farther than is permitted by keeping the trunk of your body between the ladder rails.
- (7) Get off ladders to move them. Never "walk" a ladder.
- (8) Never climb higher than the third rung from the top of straight or extension ladders nor the second tread from the top of step ladders.

d. Storage

- (1) Turn defective ladders into the tool-room. Never use a defective ladder.
- (2) Barricade or guard ladders against being struck when placed in aisles, walks, or roads.
- (3) Securely tie erected ladders when you leave them unattended.

e. Miscellaneous Uses of Ladders

- (1) When a ladder is used on a scaffold, anchor both ends of the ladder.
- (2) Never splice single ladders together.
- (3) Use wooden ladders when working within 6 feet of open electrical equipment.

2. Scaffolds

a. Use of Horse Trestles

- (1) Place horse trestles on a firm foundation. Never put them on loose objects such as bricks, tile or uncompacted earth.
- (2) The maximum height for horse trestle scaffolds is 12 feet.

- (3) The maximum distance between horse trestles for scaffolds is 8 feet. The minimum platform is four 2" x 10" planks at least 10 feet long for trestles on 8-foot centers.

b. Height Requirements

- (1) All scaffolds over 4 feet in height are required to have a ladder or some other device to permit persons to climb to the platform. Use a ladder that extends 3 feet above the scaffold landing.
- (2) Provide handrails for all scaffolds higher than 12 feet.
- (3) Head clearance of 7 feet is required for scaffolds erected over pedestrian passageways.

c. Special Cases—Scaffolds

- (1) A 6-foot horizontal clearance and 22-foot vertical clearance are required for scaffolds erected over or near railroads.
- (2) Use red flags during daytime and red lights at night as a warning when scaffolds are erected in roads or walks.

3. Miscellaneous Working Surfaces

- a. Whenever a handrail is removed, protect the opening with a rope, line, or other device.
- b. Never stand on barrels or use them for supporting platforms.
- c. Use a wire rope for the sling of a boat-swain's chair whenever open flames are apt to be near the sling.

- e. Before opening pumps and compressors, open the bleeders and drain the equipment.
- f. Before removing pump cover plates, loosen the bolts on the side opposite you and insert a wedge to release any trapped pressure.
- g. Never put your hands through valve ports into compressor cylinders.
- h. Block the crosshead to prevent movement before working on compressor cylinders.
- i. Block the flywheel of engines on compressors when work is done within the crankcase.

3. Machine Tools

- a. Clamp material in place before drilling on a drill press.
- b. Use a brush to remove chips or shavings from work. Never use your feet or hands.
- c. Adjust the work rest on a grinder before using it.
- d. Never grind on the side of a grinder wheel.
- e. When cutting brick with a power saw, turn on the suction fan and wear eye shields or safety spectacles with side shields.
- f. Turn off machine tools when not in use or when left unattended.
- g. Align material in a hydraulic press before applying pressure.

4. Other

- a. Before working on an electrically driven piece of equipment, open and tag out the circuit breaker for the equipment. Also, before any work is done, operate the starting push button or control switch to be sure the equipment will not run.
- b. Use a fresh air hood when operating sand-blasting equipment. Use respiratory protective equipment and eye shields or safety spectacles with side shields when working near sand blasting equipment.

E. Machines—Pumps, Compressors, Machine Tools, etc.

1. General

- a. Before you start machinery, see that all persons are clear of moving parts.**
- b. Before you start a machine, see that all guards are in place.**
- c. Remove guards from machines only when necessary to repair, oil, and adjust the machine. Replace the guards when the job is done.**
- d. You are permitted to adjust or repair machine that is in motion only when its motion is necessary for adjustment or repair. Obtain permission from your supervisor before doing a job of this type.**
- e. Never clean unguarded parts of machinery in motion.**
- f. Never remove or install belts on moving equipment.**
- g. Avoid working above moving machinery until it has been covered or guarded against falling objects.**
- h. Avoid talking to others while operating machinery.**

2. Pumps and Compressors

- a. Before starting a steam pump, open the bleeds on the steam end and drain the liquid. Open the valve on the steam exhaust before turning steam into the pump.**
- b. Avoid standing beneath a steam exhaust when a pump is started.**
- c. Never stand in front of the steam or liquid heads of a pump when starting it.**
- d. Before opening a pump, motor, compressor or turbine, see that it has been tagged out of service.**

- e. Before opening pumps and compressors, open the bleeders and drain the equipment.
- f. Before removing pump cover plates, loosen the bolts on the side opposite you and insert a wedge to release any trapped pressure.
- g. Never put your hands through valve ports into compressor cylinders.
- h. Block the crosshead to prevent movement before working on compressor cylinders.
- i. Block the flywheel of engines on compressors when work is done within the crankcase.

3. Machine Tools

- a. Clamp material in place before drilling on a drill press.
- b. Use a brush to remove chips or shavings from work. Never use your feet or hands.
- c. Adjust the work rest on a grinder before using it.
- d. Never grind on the side of a grinder wheel.
- e. When cutting brick with a power saw, turn on the suction fan and wear eye shields or safety spectacles with side shields.
- f. Turn off machine tools when not in use or when left unattended.
- g. Align material in a hydraulic press before applying pressure.

4. Other

- a. Before working on an electrically driven piece of equipment, open and tag out the circuit breaker for the equipment. Also, before any work is done, operate the starting push button or control switch to be sure the equipment will not run.
- b. Use a fresh air hood when operating sand-blasting equipment. Use respiratory protective equipment and eye shields or safety spectacles with side shields when working near sand blasting equipment.

F. Pressure Vessels and Piping

1. Opening and Connecting

- a. When opening flanges, first loosen only the bolts on the side opposite you. Then drive a wedge in the side opposite you to release any trapped pressure before you proceed.
- b. When opening piping or vessels in corrosive or toxic liquid service, have a hose and running water on hand, and know the location of safety showers.
- c. Never connect sanitary well water (sanitary, drinking, high or low pressure) lines directly into process equipment.
- d. Obtain approval of supervision before connecting utility lines into process equipment.
- e. Tighten all bolts on flanges, fittings and blanks in pressure piping even when installed for temporary use.

2. Blocking Out

- a. Never block out equipment that contains liquid unless that equipment is protected by safety valves or is equipped with bleeders that are open.
- b. Leave flow meters and seal or condensate pots of liquid blocked off only when vented.

3. Miscellaneous

- a. Use liquid for pressure testing piping and vessels unless air or gas is authorized by your supervisor.
- b. Avoid caulking cast-iron piping that is under pressure.
- c. Avoid putting insulation over leaks in piping or vessels.
- d. Drain liquid from behind insulation by punching a hole in the insulation before removing the insulation.

IV. TRAFFIC

IV. Traffic

A. General Regulations

1. All non-Company vehicles are required to have a permit to enter the Plant.
2. Signal others when you stop, slow down, turn or pull from curb.
3. Hang a red flag on all materials that extend over the sides or ends of a vehicle.
4. Never pass on curves or at any place where visibility is obstructed.
5. Keep to your right when driving except when passing. Pass others on the left. Park on your right.
6. Avoid making "U" turns.
7. Park your vehicle only where parking is permitted. Never block fire equipment or pedestrian walkways or doorways.
8. Never ride any motor vehicle without permission of the operator.
9. Wait until a vehicle stops before you get on or off. Never jump from a vehicle—climb down.
10. Report all motor vehicle accidents that occur in the Plant to the Security Department (Telephone 7953).

B. Company Vehicle Operators

Only authorized persons are permitted to drive or operate a Company vehicle.

1. Check brakes, horns, lights and windshield wipers.
2. Report faulty equipment to your supervisor promptly.
3. Check the brakes after a vehicle has been loaded.

4. Fasten loads before operating a vehicle.
5. When towing a vehicle on a highway, use a safety chain properly attached.
6. Stop machinery before lubricating.
7. Never leave a crane cab without first lowering the load to ground, disengaging the master clutch, and engaging safety locks.
8. Avoid operating motorized equipment closer than 8 feet to electric lines. Where necessary for equipment to be operated closer than 8 feet to electric lines, obtain approval from your supervisor.

C. Trucks, Buses and Passenger Cars

1. Observe the speed limit signs as posted.
2. Drive slower than the posted speed limits in congested areas.
3. All motor vehicles entering into and operated in the Plant are required to have a muffler in good condition.
4. Motor vehicles operated in the Plant at night are required to have headlights and taillights in accordance with Louisiana law.
5. Keep your headlights on low beam at night in the Plant.
6. Nontransparent materials in the place of windshields or windows of vehicles are prohibited.
7. A maximum of three persons is permitted in the front seat or cab of a motor vehicle and then only when space is provided for all three.
8. When you ride a motor vehicle, ride seated in the passenger compartment, truck bed, or other seats provided.
9. Keep your arms, legs and other parts of your body inside the bed or body when you are riding in a vehicle.
10. You are not permitted to ride in the bed of a vehicle that carries a shifting load.

D. Motor Scooters

(other motor vehicle rules apply in addition to ones below)

1. Only Company-owned motor scooters are permitted in the Plant.
2. Never exceed 15 mph on a motor scooter.
3. Only the driver is permitted to ride on a scooter. Never carry passengers.
4. Company scooters are not permitted on public highways. (Note: Scooters are permitted to cross over the Gulf States Road.)
5. Carry loads only in the motor scooter compartment. Never carry over 200 pounds in excess of driver's weight.
6. Before you lend a Company scooter to another employee be sure he knows how to operate it safely.
7. Never leave a motor scooter unattended with the engine running.

E. Bicycles

1. Bicycles operated at night are required to be equipped with a reflector front and rear.
2. All bicycles are required to be equipped with chain guards.
3. Ride your bicycle on the right-hand side of the road.
4. Ride your bicycle in single file except in bicycle lanes.
5. Never ride your bicycle inside a building or through process units.
6. Never stunt or race on bicycles.
7. Never hold on to a moving vehicle.
8. Only one person at a time is permitted to ride on a bicycle.
9. Avoid weaving in and out of traffic.
10. Give pedestrians right of way on walkways.

11. Avoid riding on walkways where vehicular roads are available.
12. Bicyclists are required to obey traffic control signs.
13. Fasten all objects carried on bicycles.
14. Never carry objects in the hands while riding a bicycle.
15. The maximum cargo load for bicycles is 25 pounds on the front or 40 pounds in the rear.
16. Park your bicycle in a bicycle rack where provided, or on the bicycle stand where racks are not provided.

F. Pedestrians

1. Never run in the Plant unless you are in immediate danger.
2. Where there are walkways, use them. When you walk on the road, walk on your left facing traffic.
3. Avoid short cuts over pipe bands.
4. Never walk through process units going to or from your work place.
5. Enter and leave vehicles from the right-hand side.
6. When going up or down stairways, keep one of your hands on the handrail.
7. Never stand closer than 6 feet to a moving train.

G. Railroads

1. Never take short cuts by climbing over, under or through railroad cars.
2. Before unloading or loading cars, place standard railroad warning signs 75 feet from both ends of cars exposed to switching tracks.
3. Before loading or unloading cars, throw "de-rails" where provided.
4. Never park vehicles, leave bicycles, store ma-

terials, leave open excavations or make an installation above grade within 6 feet of railroad tracks.

5. Never use railroad tracks as anchors.
6. Maintain 22 feet of clearance above top of railroad rails.
7. After loading or unloading cars, pick up materials from the grounds.

**V. USE OF CHEMICALS,
FLAMMABLE LIQUIDS,
GASES, AND RADIOACTIVE
MATERIAL**

V. Use of Chemicals, Flammable Liquids, Gases and Radioactive Material

A. Corrosive and Toxic Chemicals

1. General

- a. Ask your supervisor for information about what personal protective equipment to wear for protection against the following chemicals:

Acid	Mercury
Ammonia	Methyl Ethyl Ketone
Caustic Soda	Aluminum Chloride
Tetraethyl Lead	Chlorine
Phenol	Bitumastic
Hydrogen Sulfide	Cobalt Carbonyl
Methyl Chloride	Methyl (Wood) Alcohol
Carbon Monoxide	Nickel Salts
Carbon Dioxide	Nickel Carbonyl
Benzol	Sulfur Dioxide
Aromatic Oils	Inhibitors

Catalysts

- b. Never manually gauge or sample tanks while they are being filled with acids, caustics, or corrosive liquids.
- c. Reinstall warning signs after completing repairs to equipment that contains or has contained corrosive or toxic chemicals.

2. Safety Instructions

(Certain Corrosive and Toxic Materials)

- a. Wear a fume respirator when burning galvanized iron or lead-coated materials or when welding monel in enclosed vessels.
- b. Wear white coveralls, rubber gloves, boots and air supplied positive pressure masks

when cleaning tanks that have contained tetraethyl lead.

- c. Never put caustic or acid solutions in galvanized iron containers.
 - d. Load and unload corrosive liquid tank cars from the top unless otherwise instructed by your supervisor.
 - e. Clean up spilled mercury. Never pour mercury into drains. Store and transport mercury in approved closed containers.
3. **First Aid for Employees Who Contact Chemicals**
- a. Use clean water to wash chemicals from your eyes. Wash your eyes for 15 minutes. Use eyewash fountains where available.
 - b. If you are splashed by chemicals, leave your goggles in place until chemicals have been washed off unless chemicals have entered the eyes under the goggles. Remove eye protection only after chemicals have been removed by washing.
 - c. Report to the Plant Hospital for treatment after washing chemicals from eyes.
 - d. Use water to wash your skin free of chemicals. Use a safety shower where available. When it is necessary to remove clothing, remove it while under shower or water spray.

B. Flammable Liquids and Solvents

- 1. Use plastic-coated gloves when using solvents for washing or cleaning equipment. Wear plastic-coated gloves and respiratory equipment when spraying solvents.
- 2. Remove your clothing immediately if it becomes contaminated with flammable, corrosive or toxic liquids.
- 3. Wash flammable liquids from your skin with soap and water.

4. Never use gasoline or carbon tetrachloride for cleaning purposes.
5. Only laboratory samples of flammable liquids are permitted in glass containers.
6. Flammable liquids, stored or carried, for use in the Plant are permitted only in "safety" cans or approved metal containers.

C. Gases

1. Proper Usage

- a. Use only air for ventilation or cooling. Never use oxygen for ventilating or cooling purposes.
- b. Never use oxygen in place of compressed air.
- c. Use only air for operating instruments unless another gas is authorized by your supervisor.
- d. Never use compressed air, gas, or oxygen to clean clothing, or skin and never aim compressed air or gas at another person.
- e. Use vacuum, brushes or other tools to clean with. Avoid using compressed air for cleaning.

2. Gas Cylinders

- a. Replace the caps on gas cylinders before moving them except when moving a burner buggy by hand.
- b. Never oil, nor allow oil to come in contact with, oxygen regulators, or the valves of oxygen cylinders.
- c. Stand acetylene cylinders in a vertical position. Never lay them on their side.
- d. Use gas cylinders to store only the gases intended for them. Never use cylinders to support work, for rollers, or any purpose other than gas storage.

- e. Protect gas cylinders from heat in excess of that caused by sunlight.
 - f. Close cylinder valves when cylinders are left unattended or when emptied.
 - g. Never drop a compressed gas cylinder.
 - h. Secure gas cylinders to prevent them from falling over.
 - i. Where gas cylinder valves are equipped with a valve wheel, use only the hands to open and close the valve. In other cases use key, wrench or other tool provided specifically for such valves.
3. **Miscellaneous**
- a. Never leave a gas-burning or welding torch unattended in a drum, pipe, or vessel.
 - b. Keep aisles open to compressed gas cylinders that are in use.

D. Radioactive Materials

W A R N I N G

Radioactive materials injure the body by destroying body cells. The amount of damage done to the body depends upon the distance from the material and the length of time the body is exposed. Radioactive materials are poisonous if swallowed or inhaled. Areas where these materials are used or stored are restricted. Signs or barriers are installed around the area at safe distances. Damage to the body will not occur if these distances are maintained. There are other specific rules for employees who use radioactive materials. The following rules apply to persons who are not engaged in work with radioactive materials.

- 1. Safety in the use of radioactive materials is the responsibility of the supervisor in charge of that work.
- 2. Never touch or disturb any radioactive source without your supervisor's authorization.

3. Never enter an area where radioactive material has been spilled.
4. Never opening shipping containers containing radioactive materials without permission from the supervisor to whom the material is sent.
5. Enter a restricted or roped-off area only in case of emergency. Remain in the area only long enough to take care of the emergency. Notify the supervisor in charge when necessary to enter.

**VI. WORKING AROUND
SPECIFIC LOCATIONS —
SPECIFIC CONDITIONS**

VI. Working Around Specific Locations—Specific Conditions

A. Central Mechanical Building

The following list contains certain safe practices recommended for specific phases of shop work.

1. Flush gas-fired furnaces 15 minutes with steam or air by forced draft before lighting.
2. Use an air-operated drill to vent piston before heating.
3. Preheat bearing shell or housing to drive out moisture before pouring babbitt.
4. File in piston ring grooves only when lathe is stopped.
5. Never stand in back of a circular rip saw in operation or operate it without a guard.
6. Use push sticks when operating power table saws or planers.
7. Use adjustable stands or flat surface blocks for supporting vehicles before working under them.
8. Block dump truck bed securely before working under the raised bed.
9. Place gear shift lever in neutral position and set emergency brakes before cranking an engine.
10. Open switch before removing a battery from the charging line.
11. Always use the guard rack when inflating reassembled tires equipped with lock rings. Stand to one side when inflating tires on a vehicle equipped with lock rings.

B. Laboratories

1. General

- a. Store sample bombs only in designated laboratory areas.

- b. Store volatile material in the laboratory only with the approval of your supervisor.
 - c. Dispose of light hydrocarbon samples in stack provided at laboratory.
 - d. Use gloves, rags, or specially designed equipment when inserting glass tubing in stoppers or tubing. Use fire polished tubing and lubricate with water or glycerine.
 - e. Never put food in or eat or drink from laboratory apparatus.
 - f. Work under a hood when handling volatile chemicals that are toxic or irritating.
 - g. Never use your mouth to suck liquids into a pipette—use a syringe.
 - h. Pick up spilled mercury promptly with facilities provided.
 - i. Handle carbon tetrachloride only in a well-ventilated area.
 - j. Repair cracked or broken glassware promptly or discard in approved containers.
- 2. Sampling and Sample Handling**
- a. Place caustic or acid samples in safety carriers before transporting.
 - b. Transport hot samples in closed containers placed in sample carriers.
 - c. Stopper or cap sample bottles or containers before transporting. Encase sample bottles one gallon and larger before transporting.
 - d. Wear gloves when sampling high boiling oils, inhibitors, and refined waxes.
 - e. Avoid skin contact with high boiling oils, unrefined waxes and inhibitors.
- 3. Recommended Precautions for Technical Personnel and Test Men**
- a. General
 - (1) Never operate ungrounded electrical equipment.

- (2) Use only approved containers to catch samples.
- (3) Never completely fill a liquid sample container.
- (4) Inspect test equipment before using.

b. Distillation Equipment

- (1) Add inhibitor before distilling a liquid hydrocarbon or other material likely to form peroxides. Inhibit this material before storing.
- (2) Blanket liquids in fractional distillation equipment with natural gas or nitrogen when shutting down the distillation.
- (3) Use a transparent shield between the operator and vacuum distillations, lamp or torch combustions or similar apparatus where there is a possibility of explosion.

c. Miscellaneous Activities (Test Men)

- (1) Keep hands below safety bars at all times when operating laboratory rubber mills.
- (2) Store glass tubing to prevent it from rolling off the shelf. Never allow tubing to project into aiseways.
- (3) Keep poisonous materials in tightly stoppered and properly labeled containers.
- (4) Use tongs or heavy gloves when handling dry ice. Wear goggles when you grind dry ice in a crusher.
- (5) Strap, chain or place gas cylinders in special holders to prevent them from falling.

C. Offices

L. General

- a. Keep desk and file drawers closed when they are not being used.

- b. Discard tobacco ashes and matches into ash trays.
- c. Never stand on drawers, chairs, desk tops, waste cans, or other similar objects.
- d. Never lean in a straight chair. Before leaning back in a swivel chair, have one chair leg directly in back of the chair.

2. Office Machines

- a. Clean only the parts of the office machine that your supervisor authorizes you to clean.
- b. Use only solvents furnished by stationery supply for cleaning office machines.
- c. Turn off electric office machines before you clean them. Never smoke while cleaning an office machine.

3. Precautions Against Hand Injuries

- a. Carry pens and pencils point down in your pocket.
- b. Never use straight pins to fasten papers.
- c. Use a knife from stationery supply; never use a razor blade.
- d. Pick paper up at corners instead of at the edges.
- e. Place your hands on handles of doors and drawers to open or close them.

D. Process Operations

1. General

- a. Never leave unattended manually operated water drains open to the atmosphere.
- b. Avoid release of light hydrocarbons to the atmosphere.
- c. Check equipment for tightness before putting it back in operation.
- d. Check to see that fire fighting and safety

equipment is available and in good condition.

2. Unit Procedures

- a. Have available and follow detailed furnace, compressor, and exchanger operating procedures.
- b. Prepare equipment according to written unit procedures before turning it over to mechanical people for repairs.

3. Miscellaneous

- a. Wet down with water, and remove to a safe area, deposits taken from gas lines and process equipment.
- b. Car seal cocks open in safety valve and emergency pulldown lines.
- c. Install clamps on lines only with approval of supervisor.
- d. Make connections from high pressure river water lines to process equipment only with approval of the Fire Department and your supervisor. Install a check valve to prevent flow from the process equipment into the fire water system. If the fire whistle blows, discontinue the use of high pressure river water at once.

E. Working at Elevations/Below Grade

1. Working at Elevation

a. Equipment Required

- (1) Use a ladder to reach elevations when other means are not provided or other methods are not prescribed for your work.
- (2) Install barricades and warning signs to prevent people from going beneath overhead work.
- (3) Wear a safety belt when using a boat-swain's chair.

- (4) Wear a safety belt when working on poles.
- (5) Wear a safety belt when working on high pitch roofs ($\frac{1}{4}$ pitch or greater).
- (6) A suspended platform, cage or tank maintainer shall be grounded whenever electric welding is done from it to avoid the welding current flowing through the load or supporting cable.

b. Climbing Precautions

- (1) Avoid standing or walking directly below another person who is working overhead.
- (2) Never stand beneath suspended loads, nor stand on suspended loads.
- (3) Never walk on corrugated asbestos or plastic roofs.
- (4) Determine if the roof of a tank will hold your weight before walking on it. (Contact the Mechanical Engineering Department if in doubt.)
- (5) Avoid use of meter or gauge lines for support.
- (6) Have both of your hands free when climbing.
- (7) Keep one hand on rail when ascending or descending stairs.

2. Working Below Grade

- a. All excavations 5 feet deep or deeper are required to be shored or sloped 45 degrees to prevent caving.
- b. Barricade, cover, or rope off excavations. Mark excavations at night with red warning lights.
- c. Provide a ladder to get in and out of excavations 4 feet deep or deeper. Use a ladder that projects at least 3 feet above the excavation.

- d. **Pile material 2 feet or more away from the edge of an excavation.**
- e. **Avoid undermining foundations with excavations until foundation supports are provided.**

HUMBLE OIL & REFINING COMPANY

HATON ROUGE, LOUISIANA 70821

REFINING DEPARTMENT
HATON ROUGE REFINERY

POST OFFICE BOX 881

November 25, 1969

TO: Holders of Refinery and Chemical Plant
Safety Handbooks

Attached is the most recent revision of Index of Safety Standards.

Please discard your previous copy from your Safety Handbook and
insert this one.

Sincerely,

B. E. Crawford / Ely
B. E. Crawford
Safety Coordinator

EDP:msn
Attachment

Distribution: List D-2 D-3 D-4 D-5 D-6 D-7 D-8 D-9 D-10 D-11
D-12 D-13 D-15 D-16 D-17 D-18 D-19 D-20 D-21 D-22
D-23 D-24 27 Plastics Plant (10 Copies)

EM004243

MUMBLE OIL & REFINING COMPANY
ENJAY CHEMICAL COMPANY

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123	Recommended Safe Practices in Working With and Handling Epoxy Resins and Their Curing Agents
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144*	Scaffolds
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146*	Hot Work Jobs on Pipelines Where Seal Plugs are Used
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152*	Unplugging Bleeder Valves
153	Equipment and Procedures for Handling Light Hydrocarbon Samples
154	Work by Railroad Company Employees in Baton Rouge Refinery
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157*	Electrical Safety Tags
158*	Checking and Testing Equipment and Piping

*Indicates standards included in loose-leaf edition of Safety Handbook.
Letter-size copies of other standards are available from the Safety
Department.

Baton Rouge, Louisiana

Safety Standard No. 103
Safety Showers and Eye Wash Fountains

Revision I

I. SCOPE

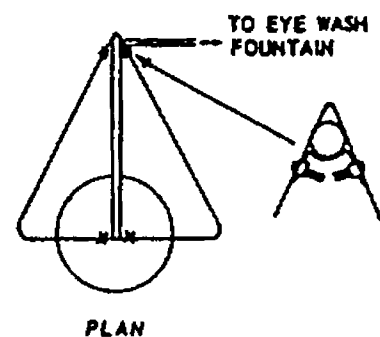
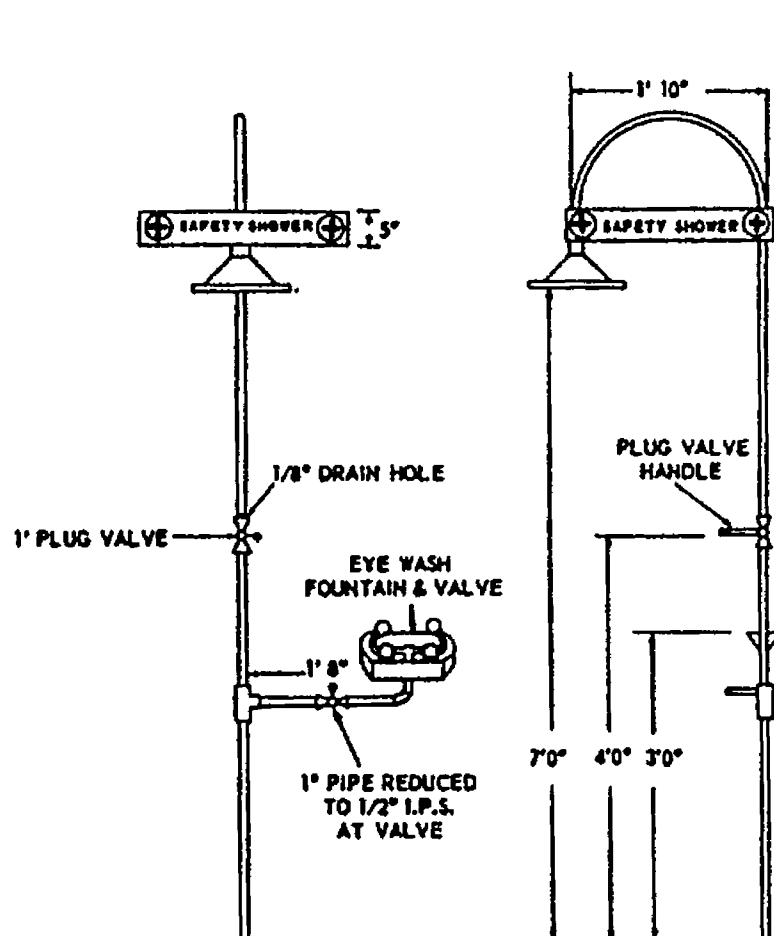
This safety standard is written to insure that our employees will have immediately available the safety showers and eye wash facilities needed to flush corrosive liquids from their clothing, skin, and eyes.

II. DESCRIPTION

1. Safety showers and eye wash fountains shall be provided in areas where there are corrosive liquids and within 50 feet of the corrosive operation. Construct showers according to the attached drawing. (Shower Head - self-cleaning, 8" O.D., with 1" connection for Speakman No. S-2075 emergency shower, Symbol No. 63664-357. Fountain Head - Haws eye wash fountain, Model No. 8930, modified, Symbol No. 63524-180.)
2. Connect safety showers and eye wash fountains to sanitary water. Weld or rivet handles to the plug valves.
3. For quick identification purposes paint the pipe, valves, etc., used in constructing the safety showers alert orange.
4. Provide a metal identification sign on each safety shower. The sign can be obtained from Stor:is, Symbol No. 15720-259.
5. It is the responsibility of the operating supervisor to see that safety showers and eye wash fountains are tested weekly so that they will be maintained in good operating condition and free of leaks.
6. Questions concerning safety showers and eye wash fountains should be referred to the Safety Department.

Safety Department
Revised May 25, 1966

cc: Lists D-8, D-10, D-15, D-20 and D-24



Notes:

1. Weld handle to plug valve.
2. Connect showers & fountains to fresh water only.
3. Use metal signs, shower heads & fountain heads from Stores stock.
4. Paint shower alert orange.
5. Locate shower within 50 ft. of corrosive operations.

STANDARD INSTALLATION - SAFETY SHOWER & EYE WASH FOUNTAIN

10-0020

Baton Rouge, Louisiana

Safety Standard No. 114
Gas Testing

SCOPE

This standard covers the gas testing procedures for the Plant.

Use this safety standard as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable in the judgment of the supervisors or operators.

DEFINITIONS

1. Hot work is an operation that may produce enough heat to ignite flammable gas-air mixtures or flammable materials.
2. Cold work is work that ordinarily does not create enough heat to ignite flammable gas-air mixtures.
3. A gas test is a test made to determine whether flammable or toxic gas is present or to determine the presence of oxygen.
4. Vessel means all closed containers such as tanks, drums, towers, barrels, pipe lines, barges and tank cars; also enclosures such as furnaces, which are used to confine flammable gases or vapors; and pits, trenches and open top containers greater than 4' in depth.
5. Unit operator is any employee in charge of a process unit.

SECTION I - DUTIES AND RESPONSIBILITIES

A. Process supervisors and unit operators shall:

1. See that the equipment has been properly prepared.

2. Designate on the work permit the exact area and piece of equipment to be worked on and to be gas tested.
 3. Check off on the permit form the types of tests to be performed.
 4. Accompany the gas tester to the location where the tests are to be made.
 5. See that gas tests have been made so that a safe job will result.
 6. Call for rechecks by the gas tester whenever it is felt that such action is warranted.
 7. Issue a permit only when a complete, satisfactory gas test has been made where required. Unit operators approve only nonflame hot work and cold work permits.
- B. Laboratory gas tester shall:
1. Furnish process supervision and unit operator accurate and comprehensive information regarding the presence of flammable or toxic gas in the area which the process employee has designated.
 2. Indicate the results of his tests on the work permit form with any additional comments he may have that would add to the safety of the job.
 3. Insure that the entire area and immediate surroundings have been representatively tested.
 4. Request the process supervisor or unit operator to take the necessary steps so that a complete gas test is issued.
 5. Note on the permit form "Limited Test" if the process supervisor or unit operator requests a limited test on the equipment.
 6. Note conditions in the area and surroundings which might lead to the presence of gas or vapor. If such conditions exist, they should be discussed with the process supervisor or unit operator and noted on the permit form.

SECTION II - GAS TESTS - GENERAL

A. Types of Gas Tests

The gas tests required in the Plant can be classified in three general groups.

1. Combustible Gas Tests are conducted to determine the percentage of combustible gases or vapors present in an atmosphere. Some of the combustible gases and vapors found in Baton Rouge Plant operations are included in Appendix I attached.
2. Tests for Toxic Gases. Some toxic gases that are likely to be present in Plant equipment, the permissible levels and methods of determining concentrations are included in Appendix II attached.
3. Oxygen Tests are conducted to ascertain the volume percent of oxygen present in an atmosphere. In addition to insuring enough oxygen for personnel, oxygen tests may be used to determine if there is enough oxygen present to support combustion.

B. Gas Test Requirements for Various Situations

1. Insuring Against the Presence of Oxygen in Equipment Being Returned to Service

Purging with inert gas is usually more difficult than by other methods. Inert gas is composed primarily of nitrogen and carbon dioxide but may contain traces of hydrogen, carbon monoxide, oxygen, and nitrogen oxides. Alternate pressurizing and venting the vessel to atmospheric pressure will reduce the oxygen content of the atmosphere within it. After purging with inert gas, a sufficient number of tests shall be made with an approved oxygen analyzer to give complete assurance that a mixture is not present in the vessel which contains more than 5% oxygen. Where hydrogen sulfide or carbon monoxide may be present, the O₂ content should be reduced to no more than 2% due to the wide explosive range of these gases. These tests for oxygen content before admitting hydrocarbons need be made only in the case of equipment purged with inert gas.

SECTION II - GENERAL

A. Authority to Issue

Cold work permits are authorized by process supervisors, unit operators, or assistant operators.

B. Requirements

1. Cold work permits are required for all mechanical work in process areas where hot work permits are not required, except work on meters and instruments in control houses may be done with permission of the process supervisor or operator.
2. Cold work permits are not required for work in Mechanical shops, on roads, fences, or buildings outside operating areas.

C. Single Permits

1. The work covered by a single permit shall be limited to that which can be adequately described and for which proper precautions can be specified. Unless safety considerations make it inadvisable, such work as pump checks, plug valve greasing and clean-up may be covered by a single permit.

D. Life of Permits

1. Cold work permits are good for one process shift. By endorsing the permit it can be extended another process shift. Permits expire and must not be extended past 6:00 a.m., except that permits issued at the end of "C" shift within two hours of beginning work at 7:00 a.m. are valid until 3:30 p.m., unless otherwise voided.
2. Permits are void if the work is stopped for safety reasons and the permit must be endorsed by issuing party before work is continued.

E. Procedure for Issuing

1. The permit is made in triplicate. The mechanic gets the original, the gas tester gets a copy and a copy remains in the book.

When a gas test is not required, one copy can be destroyed.

2. Every section of a permit form is provided for a purpose. Each section should be completed.
3. Generally employees receiving work permits know little of process operations involved in the work to be done. If the employee who issues the permit wishes the employee who does the work to check with him prior to starting the work, he should check the square provided for this purpose on the permit form.

SECTION III - GAS TESTS AND BLINDING

A. Gas Test and Blanking Requirements for Cold Work

Gas tests are required for the following activities:

1. Entry Into a Vessel With or
Without the Performance of Cold Work
 - a. All lines connected to the vessel shall be slipblinded with blinds of the proper rating or the lines shall be disconnected and blanked with blind flanges before the permit is issued. See Safety Department Sketch #39-134A and Engineering Drawing #0-1-1-41 attached. Quarter-inch thick slip blinds have an undrilled neck, series 15 slip blinds have one 3/8" hole drilled in the neck and series 30 slip blinds have two 3/8" holes drilled in the neck.
 - b. Combustible gas tests shall be made. It will normally be necessary to have the vessel completely freed of combustibles as indicated by a zero reading on the gas testing machine before permitting entry. In the cases where only ordinary petroleum hydrocarbons are handled, if for some good reason it is not possible to eliminate completely the combustibles from the atmosphere, cold work may be permitted with concentrations up to 5% of the lower explosive limit. This is the maximum

concentration for entry without air-supplied respiratory protection. Steps should be taken to insure that changing conditions do not result in an increased gas concentration. This may require that the gas tester stand by to test the atmosphere at frequent intervals.

- c. If there is a possibility of having inert gas present, tests for oxygen deficiency and carbon monoxide content shall be made.
- d. If there is a possibility that any other toxic material is present, tests shall be made to insure that concentrations of such materials are below the allowable maximum. Toxic materials for which tests are required are listed in Safety Standard No. 114. Test for hydrogen sulfide shall be made every time combustible gas tests are made.

2. Cold Work in Open Areas

Where, in the opinion of the unit operator or the process supervisor, there may be excessive concentrations of combustible or toxic gases in some open area where cold work is to be performed, gas tests shall be made to insure the safety of the work. The requirements in this case are the same as for "Entry Into a Vessel", as outlined in Par. A. 1. above.

The process supervisor or unit operator may issue a cold work permit without a gas test if, in his opinion, the area is suitable for the work.

3. Cold Work Requiring Contact With Flammable Liquids

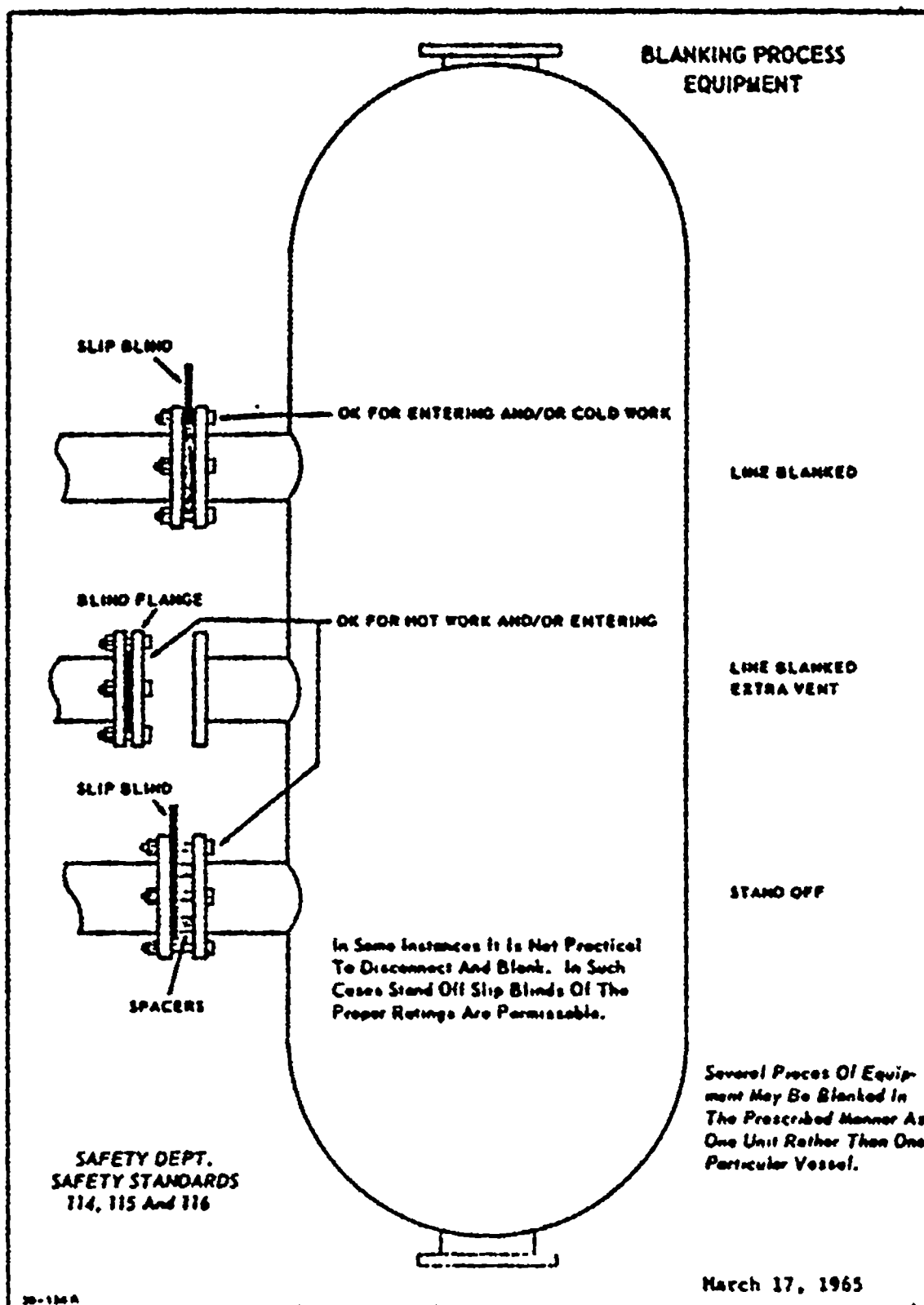
In some jobs, particularly cleaning work, it is necessary for the work to be performed near flammable liquids. In such cases the provisions applying to cold work in an enclosure or in an open atmosphere, as the case may be, shall be followed with regard to the general atmosphere. Necessary steps are to be taken to make

certain that ignition of the flammable
vapors does not occur.

Safety Department
Revised May 25, 1966
Attachments
cc: Lists D8, D10, D16, D20 and D24

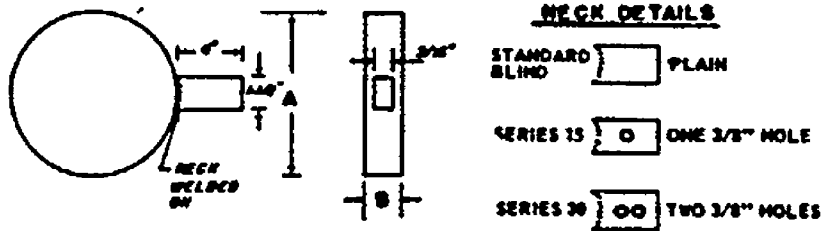
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EM004272



EM004273

PLAIN SLIP BLINDS FOR RAISED FACE FLANGES



ALL DIMENSIONS IN INCHES

NOMINAL PIPE SIZE	STANDARD BLIND	SERIES 15 RATING	SERIES 30 RATING
	B	B	B
1	1/4	1/4	1/4
1-1/2	1/4	1/4	1/4
2	1/4	1/4	1/4
2-1/2	1/4	1/4	3/8
3	1/4	1/4	3/8
4	1/4	3/8	1/2
6	1/4	1/2	3/4
8	1/4	1/2	7/8
10	1/4	5/8	1
12	1/4	3/4	-
14	1/4	7/8	-
16	1/4	1	-
18	1/4	-	-
20	1/4	-	-
24	1/4	-	-

NOTES

PLAIN BLINDS MAY BE USED IN EITHER RAISED FACE OR RING JOINT FLANGES, EXCEPT USE RING JOINT WHERE REQUIRED TO MEET OPERATING CONDITIONS.

GASKETS SHOULD ALWAYS BE USED ON BOTH SIDES OF BLINDS AND FLANGES BOLTED TIGHT

HOLE IN NECK OF BLIND DIFFERS FOR EACH PRESSURE RATING TO FACILITATE IDENTIFICATION

ALL BLINDS SHOULD BE STAMPED TO INDICATE PIPE SIZE AND PRESSURE RATING

Engineering Drawing #0-1-1-41

March 17, 1965

Baton Rouge, Louisiana

Safety Standard No. 117
Safety in Operation of Industrial Furnaces

REVISION I

I. SCOPE

This safety standard outlines the recommended operation of industrial furnaces. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide whenever it is applicable. Where it is necessary, the foreman or supervisors involved may change these practices.

II. GENERAL INFORMATION

It is important that everyone concerned with the operation of furnaces in the plant be acquainted with safe operating procedures. Furnaces burn an air-fuel mixture which, if not satisfactorily controlled, could result in explosions with resultant serious injury to personnel and destruction of facilities.

A torch of the asbestos wick type for use with equal parts of fuel oil and gas oil is generally used for lighting burners. Burners can be safely lighted by use of the pilots. The improved pilots may be lighted from a small torch applied at the air-gas mixing head located outside of the firebox. The pilots and burners normally have separate fuel sources.

III. SPECIFIC RULES

A. Lighting Burners in Cold Firebox

1. See that the fuel main block valve is closed.
2. See that the individual fuel block valves at the burners are closed.
3. Be sure all (blanks or slip blinds) have been removed from the fuel lines.
4. Make sure the fuel gas pressure is satisfactory.
5. Drain all liquid from the fuel gas manifold which serves the individual burners, as well as from the fuel gas separator.
6. Open all air registers and dampers before ventilating firebox.

7. Open steam wide into firebox for at least 15 minutes. Operate draft fan, where provided, for 15 minutes in lieu of steam.
8. After blinds are removed, the fuel main lateral block valve may be opened. After steaming the box, the bypass block valve at the automatic fireman control valve may be opened for starting up the furnace manually.
9. Adjust air registers or air intakes to burners to proper setting for lighting burners.
10. It is important that a check be made to assure that a draft (negative pressure) exists in firebox before attempting to light any burners.
11. Procure a torch lighter from the torch holder, light it and insert into furnace at burner, stand to one side, open the burner fuel block valve and ignite the fuel, then adjust the air to give desired flame adjustment. In event pilots are used, each pilot should be ignited with the torch. Each burner should then be lighted from its pilot. Stand to one side as the fuel valve is opened. Light all burners similarly. Never attempt to light a burner from a hot wall or from an adjacent burner.
12. If the first burner that is attempted to be lighted fails to catch after a reasonable time, withdraw the torch or shut off pilot and again ventilate the firebox following procedure outlined in preceding directions.
13. If one or more burners go out but others remain lit, immediately shut off the fuel gas to all those that are out. Relight the burners progressively, using torch or pilots.
14. If all of the burners in a firebox or in one section of a firebox go out, immediately stop the total flow of gas to that section by closing the block valve in the fuel gas lateral. Close the individual burner valves. Steam out the furnace or operate the draft fan for a period of 15 minutes. Again relight furnace progressively in accordance with procedure outlined in preceding directions.
15. The burner manifold pressure should be maintained above 5 psig after a furnace is in normal operation. It may be necessary on certain occasions to cut off one or more burners to maintain satisfactory pressure and insure that no burner will "pop" out.

16. When temperatures come within range of control, the automatic fireman may be placed in operation by partially closing the bypass valve. The bypass valve is not shut off completely unless a second bypass is provided for keeping the burners lighted should the control valve jam shut, or unless approved pilots are used. If a low pressure fuel gas cutoff is installed on the fuel gas controller, the bypass valve around the fuel gas controller must be closed after the burners are lighted.
17. To shut down furnace, reduce progressively the fires in intensity by adjustments of fuel gas control valve or lateral block valve. When the intensity of the fires has reached a sufficiently low point, the fuel gas supply may be completely stopped by successively closing the burner block valves. Before closing the last burner valve, close the lateral block valve and allow the pressure entrapped in the lateral line to be expended by burning the gas at the last burner. Close the last burner valve after which blanks can be installed in the lateral line as necessary.

IV. OPERATING PROCEDURES FOR STEAM ATOMIZED LIQUID FUEL BURNERS

Follow the same general procedure as outlined for gas fired furnaces, with the following modifications.

Prior to permitting the fuel to enter the burners, be sure that all condensate is drained from the atomized steam system, then open and adjust steam into the burner. Open the fuel oil lateral valve and light the burners successively. In shutting down burners, close oil valve first and allow the steam to blow the burner clear of any remaining oil. The precautions of steaming the furnaces and the other fundamental safety procedures with oil burners are identical with those for gas fired furnaces. Except for the above modifications, follow the steps outlined in the previous section for gas fired furnaces.

EGMiller:MBF
Safety Department
Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24

Baton Rouge, Louisiana

Safety Standard No. 119
Recommended Safe Practices in Working With and
Handling Amine-Type Additives and Tertiary Butyl Catechol

REVISION II

I. Scope

This safety standard covers the basic points in the protection of personnel from the harmful effects of the following additives:

1. Tenasene 2 (DuPont 22 - UOP 5)
2. DuPont Metal Deactivator (FX-509)
3. Primine 81-R and HO 4
4. DuPont Aviation Fuel Additive No. 1 (AFA #1)
5. Tertiary Butyl Catechol (TBC)
6. Walco 262 Antifouling Agent
7. Dodecylamine (ENJ 3472)
8. Bis-(Hydroxyethyl) Cocoamine Oxide (ENJ 3732)

It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. When it is necessary, the foreman or supervisor involved may change these practices.

II. General Information

These additives are used in many areas of the Refinery. They have a severe irritation effect to the skin and eyes and are considered toxic. They may cause acute systemic poisoning. These materials are received in 55-gallon drums or in tank cars. They are normally stored in a central location from which small amounts are withdrawn for general use in the Refinery. Wherever these materials are stored or used there is the possibility of skin contact. Wear proper protective equipment when handling these materials.

III. Specific Precautions in the Handling of
Amine-Type Additives and TBC

- A. Use hand pump or similar equipment to avoid splashing when transferring these materials from a storage drum to a portable container. Use an approved type of safety can as a portable container to prevent leakage and splashing while in transit.

- B. Wear a face shield, protective gloves, and protective suit when connecting or disconnecting lines to tank cars or storage vessels containing or having contained mine-type additives. Wear face shield and protective gloves when drawing samples from 55-gallon storage drums.
- C. Wear rubber footwear when walking in an area that may have been contaminated as a result of an additive spill or when the specific job is such that an additive spill may occur.
- D. Clean up leaks or spills of additives immediately.
- E. Work clothing contaminated with these materials should be changed and laundered.
- F. Additives should be removed from the skin with soap and water. Report to the Medical Department if additives get on the skin.
- G. If chemical should get in eyes, flush with water for 15 minutes and report to the Medical Department.
- H. Properly label additive storage drums and portable containers.
- I. Never permit empty additive storage drums to remain in process area. Have them transported to the burning pit area for reconditioning or disposal.
- J. Avoid excessive breathing of vapors.

Safety Department
Revised August 15, 1966

cc: Lists D8, D10, D16, D20 and D24

Safety Standard No. 125
Safe Practices for the Operation of Fork Lift Trucks

I. SCOPE

This safety standard covers the basic practices to be followed for the safe operation of fork lift trucks. In some circumstances deviation from these practices may be safe and desirable if the judgment of the foremen or supervisors so indicates.

II. GENERAL

Safe equipment and safe working conditions alone will not prevent all accidents. Safe operators are also needed. Only a safe operator can perform his job efficiently and properly.

A lift truck can be compared to an automobile. The causes of most lift truck accidents are usually the same as the causes of traffic accidents--unsafe acts and violations of rules--things that the driver can control.

The following safe practices are based on an examination of the causes of lift truck accidents and their remedies.

III. BEFORE STARTING WORK

1. Check your brakes, steering apparatus, horn, lift mechanism, controls, guards, and tires.
2. On gasoline trucks, make sure you have plenty of gasoline and oil.
3. Report any defects immediately to your supervisor.

IV. USE OF TRUCK

1. Never operate a defective truck. If trouble develops on the job, stop and consult your supervisor.
2. Never allow any unauthorized person to operate your truck.

3. Never permit anyone to ride on any part of your truck. Exception: Supervisors may authorize two persons to ride when one is undergoing training.
4. Never overload your truck. To do so may damage the hoisting mechanism or result in an accident.
5. Never use your truck as a battering ram.
6. Never tow rail freight cars with your truck. They may get away and drag the truck.
7. Pushing a lift truck with another in order to get it started is prohibited.
8. Avoid using a gasoline-powered truck in small buildings without proper ventilation. Carbon monoxide poisoning may be result.

V. PARKING

1. Never step out of your truck until it has come to a stop.
2. When you leave your truck set the brakes.
3. Never leave your unattended truck with motor running.
4. Park your truck so it will not interfere with passage of other vehicles or persons. Never park on, or within six feet of, railroad tracks.
5. If necessary to park on incline, set the brakes and chock the drive wheels.
6. Park indoors with forks under a flat pallet or bench to prevent tripping. Out of doors, put your forks on the ground.

VI. DRIVING

1. Never drive with wet or greasy hands.
2. Obey all traffic regulations.
3. Avoid driving over objects lying on floors or roadway. Driving over scrap lumber, piping, or other such materials will cause damage to the truck and may shift or topple the load.

4. Always drive at a safe speed. Slow down when making turns.
5. Drive slowly over rough roads. Watch for uneven spots. This is particularly important when making turns, or when operating trucks with a narrow width or short length in proportion to the height.
6. Approach blind corners slowly, keep to your right, and sound horn.
7. Watch for persons who may dart out in front of you and for other approaching vehicles.
8. Always give warning when you approach anyone from the rear.
9. Your horn is to be used only as a warning to others and not to demand the right-of-way.
10. Keep your feet and hands inside the truck except when signaling.
11. Give proper hand signals for turning, slowing, or stopping.
12. When driving without load, keep forks 4 in. to 6 in. above floor or ground.
13. Before crossing railroad tracks, make sure way is clear. When crossing tracks, hold steering wheel firmly. Cross rails diagonally.
14. Stop, look, and sound horn when leaving buildings.
15. Approach floor openings, elevator wells and loading platforms slowly.
16. Before entering an elevator be sure that its capacity is sufficient for the weight of the truck plus the load.
17. When you enter an elevator, lock brakes and turn off power of truck.
18. Keep away from the edges of platforms or ramps.
19. Test brakes before driving down ramps or slopes. Never allow pedestrians to walk ahead of you down ramps or slopes.

20. Keep sufficient clearance between the lift truck and other objects or materials. Never cut corners around stacks of material or stationary objects, such as machines or columns. When entering doorways, freight cars, or elevators, make sure you have proper clearance on both sides as well as overhead.
21. Avoid turning around in crowded aisles.
22. When following another truck keep a safe distance behind. Minimum: 15 feet indoors; 30 feet outdoors.
23. Never travel abreast of another truck. Never race another truck.
24. Where possible, face in the direction of travel.
25. If necessary, back down ramps or inclines to avoid spilling the load.

VII. STOPS AND STARTS

1. Avoid sudden stops and starts. These may cause skidding or toppling the load.
2. Travel slowly on slippery surfaces.
3. Never use reverse as a brake. Stop vehicle with brakes before changing direction of travel.
4. Always look to see that the way is clear before starting ahead or backwards.
5. On three-wheel trucks, check position of trail wheel before starting or truck may swing unexpectedly.

VIII. GASEOUS AREAS

1. Never operate your truck in gaseous area.
2. Keep alert for spills or other similar conditions.

IX. CARRYING A LOAD

1. Never load your truck beyond its rated capacity.
2. Always carry loads 4 to 6 in. above floor in warehouse, and 6 to 8 in. in yard. Carrying loads close to floor reduces possibility of turning truck over or dumping load.

3. Never carry a load so high that you cannot see ahead. If necessary, operate truck in reverse.
4. Avoid carrying loose material on forks. Use pallets wherever possible.
5. Pile material securely on the pallet at all times. Block round objects such as pipe or drums so that they cannot roll.
6. Place a red flag on material that projects on either side.
7. Carry the weight close in on the forks.
8. Never allow anyone to stand under elevated loads.

X. USE OF LIFTING DEVICE

1. Before lifting be sure that loads are stable and properly balanced.
2. Pick up the load under the center of its weight to avoid tipping the truck over or shifting the load.
3. Tilt the load against the backrest before moving the truck.
4. Be sure to return tilt to vertical before lowering or picking up load.
5. Run the forks as far as possible under load to be lifted. Never pick up load until forks are properly placed beneath the pallet.
6. Lower your load slowly. A sudden stop will cause machine to tilt forward and may tip machine or throw operator.

XI. STACKING AND REMOVING MATERIAL

1. Never overload floors when stacking material.
2. Be sure there is sufficient head room when raising loads. Watch for beams, pipe lines, lights and other obstructions.
3. Be sure stacked materials are not top heavy. Poorly piled materials are dangerous.

4. When placing or when picking up pallets, be sure not to unbalance pile.
5. Warn other employees to stand clear when stacking or removing material.
6. Avoid stacking material in roadways or aisles. Allow ample room for passageways.
7. Observe clearance rules at aisles, sprinkler heads, railroad tracks and the like.
8. Never obstruct fire fighting equipment.
9. Keep fire doors clear.
10. NEVER attempt to reach through uprights. To do so may result in serious injury.

XII. LOADING AND UNLOADING CARS AND TRUCKS

1. Before entering freight cars, highway trucks or trailers, be sure their brakes are set. Use chocks if needed to prevent movement.
2. Before entering freight cars, trucks or trailers at loading platforms, be sure the loading plates are secured.
3. Never use dock boards or loading plates that are damaged.
4. Before driving into freight car, walk in car and inspect floor.
5. Always have both doors open before operating gasoline lift trucks inside box cars.
6. Enter and leave freight cars and trucks slowly.

XIII. CONDITION OF SURFACES AND PALLETS

1. Maintain floors, ramps, road surfaces and the like in good condition and free of debris at all times. Report any bad spots immediately to your supervisor.

2. Report slippery conditions around warehouses, ramps and platforms promptly.
3. Never use defective pallets.

XIV. REFUELING ENGINE-DRIVEN TRUCKS

1. Never refuel a lift truck inside a building.
2. Make sure hose nozzle makes contact with tank while filling. This will prevent static sparks.
3. Shut off engine and set brakes before refueling.
4. Avoid overfilling the fuel tank. In the event of a spill, wipe up before starting motor.
5. Store and carry gasoline in safety cans where pump is not used.

XV. SPECIAL PRECAUTIONS FOR ELECTRIC-DRIVEN TRUCKS

1. Never use reverse controls for brakes.
2. Never operate with weak batteries.
3. Cut off power and set brakes before starting to change battery. Make sure master switch on charging circuit is off before plugging in for charging or unplugging after charging.
4. Keep open flames away from battery. Hydrogen gas may be present which may cause an explosion or fire.
5. Keep all live parts protected.
6. When lifting batteries with chain slings or metal grips, avoid short circuits by preventing metal parts from touching the contact terminals.

XVI. PROPER DRESS FOR HANDLING MATERIALS

1. Wear gloves and goggles when handling dangerous materials.
2. The wearing of safety shoes is recommended.
3. Wear a safety hat while operating a fork lift truck.

4. Wear goggles when handling sand, cement or loose material.

Safety Department
Revised May 25, 1966
cc: Lists D-8, D-10, D-16, D-20 & D-24

Baton Rouge, Louisiana

Safety Standard No. 126
Working from Crane Load Line Platforms or Cages

I. Scope

This safety standard contains guide rules for working from platforms or cages suspended from crane load lines. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. In some circumstances, deviation from these practices may be safe and desirable if the judgment of the foreman or supervisors involved so indicates.

II. General

Workers shall be permitted to work from platforms suspended from crane load lines only if the supervisor considers this practice safer than other available methods. The following rules shall apply.

A. Working from Suspended Platforms or Cages

1. Each job should be reviewed with a Safety Advisor before the job is started.
2. Only platforms or cages approved by MED as being suitable from the standpoint of strength, durability, and balance shall be used.
3. The platform or cage is to be inspected visually for defects before each use.
4. The number of workers or weight on a platform or in the cage shall not exceed the number or weight for which it was designed and which is posted on the platform.
5. Workers shall be qualified to work at elevations and instructed in the use of crane hand signals.

6. Only one worker shall give signals to the crane operator.
7. Positive locking devices, such as threaded shackles, shall be used to attach the platforms or cages to the load line.
8. Avoid sudden starts and stops or jerking motions on load line.
9. Use most direct, clear path between points of origin and destination.
10. Avoid taking path over or through operating equipment and hot, corrosive or toxic materials, units, vessels, or tanks.

Safety Department
Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24

Safety Standard No. 129
Chlorine

Revision II

I. Scope

This safety standard covers the basic points in the protection of personnel from the harmful effects of chlorine. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. In some circumstances, deviation from these practices may be safe and desirable if the judgment of the foremen or supervisors involved so indicates.

II. General Information

Chlorine is a toxic material. It is recognized by its pungent odor and greenish color. Liquid chlorine causes blisters and damage to the skin. In liquid or gaseous states it can cause damage to the eyes and respiratory system. At concentrations of 1,000 parts per million it is fatal. It mixes readily with other chemicals. Violent explosions have occurred where chlorine was reacted with hydrocarbons, particularly when the chlorine is in the liquid state. Any process where chlorine is reacted with hydrocarbons should be carefully studied prior to the operation and accurately controlled during the operation.

Chlorine is normally stored in the plant in one ton, high-pressure cylinders. It is used from these cylinders primarily in cooling tower water, in making sodium hypochlorite, and in experimental projects. In the Chemical Plant area it is used in making chlorobutyl rubber. Chlorine for this purpose is stored in a tank car and small tank next to the substation west of No. 2 Steam Cracking Unit. In the Petroleum Operations area chlorine is used in making sodium hypochlorite at the Light Oils Finishing Plant.

Chlorine is taken directly from the tank car through the sodium hypochlorite blending system.

III. Specific Precautions

- A. Wear rubber protective clothing when there is a possibility of exposure to high concentrations of pure chlorine.
- B. Avoid breathing chlorine gas. When investigating leaks, wear a self-contained, supplied-air mask.
- C. Never try to locate a chlorine leak by smelling. Use a rag soaked with strong ammonia water and held on the end of a stick or rod. As the rag is passed along the piping or valves to be tested, a white vapor (ammonium chloride) will indicate a leak.
- D. Never allow moisture to enter chlorine piping while it is disconnected from the cylinder or car. This will rapidly corrode the pipe.
- E. One ton and 150-lb. chlorine cylinder and tank car emergency repair kits are available through the 7510 Mechanical Shift Foreman. They are stored near the 7510 office area, northwest corner of the Central Mechanical Building. Call telephone 7510 or 7486 (Mechanical Shift Foreman). In the event of major trouble, it may be desirable to call Solvay Co., telephone EL 5-6661 (8:00 a.m. - 4:30 p.m., Monday through Friday) or EL 5-8024 (after 4:30 p.m. and on Saturdays, Sundays and holidays).
- F. If chlorine is detected in the air, either by sight or smell, remember the following points:
 - Get out of the area.
 - Keep head high; chlorine seeks lowest level.
 - Refrain from coughing if possible.
 - Avoid deep breathing.
 - Keep mouth closed.
- G. Observe the following precautions with chlorine tank cars, cylinders, and lines:

1. Never drop chlorine cylinders or permit them to strike each other violently. Remove valve caps only when the cylinder or car is being prepared for use.
2. Keep valves closed when cylinder or car is not in use, even when empty. (Moisture must not be allowed to enter cylinder or car.)
3. Open valves slowly, using only handles provided.
4. Use only connections made specifically for chlorine valves. The outlet of these valves is not a standard pipe thread.
5. Cylinders or cars are not to be altered in any way. No repair is to be made on cylinders, cars, or valves except in case of an emergency. Call 7510 when emergency repairs are necessary.
6. Never try to remove any of the fusible plugs in the ends of the cylinders.
7. Store one-ton chlorine cylinders horizontally. Never subject cylinders to heat since the fusible plug melts at about 160° F.
8. Only one cylinder of chlorine should be delivered to a location at one time, except where high chlorine consumption would make this impractical. The practice of having a spare cylinder on hand at a location only increases the exposure to a larger quantity of chlorine should trouble arise.
9. External pressure regulators, installed in chlorine lines, should be as near the cylinder or car as possible to minimize condensation. In the presence of moisture, both gaseous and liquid chlorine are extremely corrosive to metals.
10. Keep chlorine lines at minimum pipe size (1/2" will probably suffice) and length.

11. In case of fire in an area adjacent to a chlorine cylinder or can, water from a monitor or spray nozzle should be sprayed on the container to prevent possible pressure build-up due to heat. Excessive heat may cause the fusible plug to rupture and release chlorine to the atmosphere, thus creating a problem of fighting a fire in a toxic atmosphere.
12. If the "shock treatment" cycle of water treating is to be used, chlorine should be shut off at the cylinder or car after each periodic or intermittent treating. Never block the chlorine flow at the chlorinator. By blocking at the cylinder or car, the residue chlorine in the line will bleed off to the cooling tower rather than remain trapped in the line.

Safety Department
Revised 5/25/66

cc: Lists D8, D10, D16, D20 and D24

Baton Rouge, Louisiana

Safety Standard No. 139
Hydrogen Sulfide

REVISION II

I. SCOPE

This safety standard covers the basic points in the protection of personnel from the harmful effects of hydrogen sulfide. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. In some circumstances, deviation from these practices may be safe and desirable if the judgment of the supervisors involved so indicates.

II. GENERAL INFORMATION

Over the years in the oil and other industries, many employees have been severely injured and some killed by highly toxic hydrogen sulfide gas, commonly known as " H_2S ". In many cases, these were older, more experienced employees who became complacent about this deadly gas. And, in many cases, the injured did not realize how toxic this gas really is.

Important Physical and Chemical Properties

Hydrogen sulfide is a colorless gas with an offensive "rotten egg" odor. The gas is slightly heavier than air. It is a flammable gas having a flammable range of 4.3 to 46% by volume in air. The auto ignition temperature is 500°F.

Toxicity

The most important consideration about hydrogen sulfide is its toxicity because it is so deadly. The chart included is graduated from 0% by volume in air to 1/10 of 1% by volume in air. In order to more clearly outline the toxic profile, we have placed the corresponding parts per million along the scale.

At ten parts per million in air it will be noted the gas can be distinctly smelled due to its offensive "rotten egg" odor.

Twenty parts per million is the recognized threshold limit value or the concentration in which a person can stay eight hours without injury. Stop for a minute to consider the small amount which a person can breathe for eight hours, twenty parts per million, as contrasted with the least amount that will burn and explode in air, 43000 parts per million.

As we go up the scale, 100 parts per million will deaden the sense of smell in 3 to 15 minutes. This can cause the victim to be lulled into the feeling that there is no longer any gas where he may be working when in reality the concentration has not changed.

At 200 parts per million, the sense of smell is deadened quickly. If the victim stays in 500 parts per million, he may lose sense of reasoning and balance. The effect on the nervous system is very pronounced. With this concentration, respiratory paralysis sets in quickly. Unless the victim is rescued, brought into fresh air and given immediate artificial respiration, he may die. It is extremely important that the man making the rescue wear the proper respiratory protective equipment.

At 500 parts per million, unconsciousness will be rapidly produced. The injured will continue to breathe at a diminishingly lower rate until breathing stops and the victim will die unless rescued and given artificial respiration in fresh air.

At 1000 parts per million and above, the victim will become unconscious at once and his breathing will shortly stop. In any case, where the breathing stops for more than 4 minutes, permanent brain damage may occur.

In Summary:

- (a) The victim may have encountered 100 to 200 parts per million for short periods and gotten by. He may become over-confident of his ability to rescue himself.
- (b) His sense of smell may be deadened very quickly.
- (c) The effect on his brain may cause him to stumble, fall and crawl, and impair his ability to reason. He may not know where or how to escape.
- (d) A quick change in wind direction or concentration of the gas may trap the victim. He cannot hold his breath very long, particularly under stress, and with air unsafe to breathe, he is in a bad way.

Flammability

Hydrogen sulfide is a flammable gas. In mixtures in air between 4.3 and 46% by volume, it is explosive. This explosive range is one of the broadest of the chemicals.

As an example, the explosive range of gasoline vapors in air is from 1 to 6%. When hydrogen sulfide burns, it forms sulfur dioxide and water. The auto ignition temperature or the surface temperature which will ignite a flammable mixture of hydrogen sulfide in air is 500°F. This figure is lower than most gases or vapors handled in the refinery.

Precautions for handling or working in areas where there may be hydrogen sulfide gas:

1. Never stand on the side of any opening or leak where escaping hydrogen sulfide will blow toward you. Always stand "up-wind".
2. Never try to determine the presence of hydrogen sulfide by sense of smell. The Industrial Hygienist, Gas Testers in laboratories and Safety Department have hydrogen sulfide indicators. Call them if you are in doubt.
3. If a break in a line carrying hydrogen sulfide occurs, leave the zone of exposure and do not re-enter without a self-contained breathing apparatus (Scott Air-Pak).
4. When gauging or sampling ships, tanks, barges, compartments containing sour crudes or sour distillates, wear self-contained breathing apparatus (Scott Air-Pak).
5. Inspect cylinders containing hydrogen sulfide carefully for leaks at valves and connections. Never store cylinders in an enclosed area unless there is adequate ventilation.
6. In the laboratory, handle hydrogen sulfide or hydrogen sulfide bearing materials under a hood.
7. When opening equipment which has contained hydrogen sulfide, self-contained breathing apparatus must be worn.
8. If an employee is overcome by hydrogen sulfide, wear self-contained breathing apparatus to rescue him since he is, in all probability, in a sufficient H_2S concentration to knock you out. Take him to a fresh air area and if he has stopped breathing administer artificial resuscitation by any method you know. Have someone else summon the ambulance.
9. Caustic soda which has been used to strip H_2S from a stream will liberate its H_2S if it encounters an

acidic stream. A detailed survey of the potentials should be made if you plan to put such caustic to a sewer.

10. Sources of ignition must be kept away from concentrations of hydrogen sulfide since the flammable range in air is so broad.
11. Units where H_2S may be released or encountered have signs indicating the possible presence of the gas. Pipe lines carrying the material are marked H_2S or hydrogen sulfide. One source of H_2S is flare line gas. The Hydrogen Sulfide Removal Unit (HSRLA) removes hydrogen sulfide from refinery streams. Hydrofiners produce hydrogen sulfide when they remove sulfur from refinery streams.

EGMiller:MBF
Safety Department
June 25, 1966

cc: Lists D-8, D-10, D-16, D-20 and D-24

TOXICITY OF HYDROGEN SULFIDE

<u>I</u>	<u>Parts per</u> <u>Million</u>		
0.1	1000	-	Victim becomes unconscious at once. Permanent brain damage may result unless rescued promptly and given immediate artificial resuscitation.
		-	
0.07	700	-	Victim becomes unconscious quickly. Breathing will stop and death result unless rescued promptly and given artificial resuscitation.
		-	
0.05	500	-	Victim loses sense of reasoning and balance. Respiratory paralysis in a few minutes. Victim needs prompt artificial resuscitation.
		-	
		-	
0.02	200	-	Deadens sense of smell quickly. Stings eyes and throat.
0.01	100	-	Deadens sense of smell 3 to 15 min. Stings eyes and throat.
0.002	20	-	Safe for 8-hour exposure 20 ppm.
0.001	10	-	Can smell 10 ppm.
0.0		-	

Baton Rouge, Louisiana

Safety Standard No. 143
Hot Work on Refinery Equipment in Service
Containing Hydrocarbons or Other Flammable Materials

(Hot Tap Procedure)

I. SCOPE

This safety standard outlines the minimum safety precautions for hot tapping, installation of electrical connections or cathodic protection devices and other hot work on equipment in service containing hydrocarbons or other flammable materials. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. Where it is necessary, the foreman or supervisors involved may change these practices.

II. GENERAL INFORMATION

Hot work on equipment in service containing hydrocarbons is safe if proper precautions are taken. Each job should be considered on an individual basis and be properly justified before authorization is given. Cancel hot work permit when specific hot work job is finished. The Process Section Supervisor in charge of the equipment involved authorizes each job. Where hot work is done on a pipeline passing through one supervisors' area but the operation is controlled by another, both will be required to approve.

III. APPROVALS

To maintain control of the conditions under which hot tapping can be done responsible Process Section Supervisor will:

- A. Determine that the contents of the system will permit hot tapping. Hot taps on lines or vessels containing corrosive or toxic materials, such as

hydrogen sulfide, caustic soda, sulfuric acid, ammonia, etc., should be given special consideration. Certain materials may cause metallurgical changes in the heat zone. Carbon steel, for example, is changed metallurgically at elevated temperatures in the presence of caustic or elemental sulfur. Hot tapping machines, depending on their design, are limited to use up to their maximum pressure-temperature conditions. Some steels and some thicknesses of metal require stress relieving.

Hot tapping should never be done where equipment is operated over its rated working pressure and temperature, nor on equipment operating at less than atmospheric pressure. Welding should not be done where internal pressure exceeds 350 psig.

The Inspection Section of the Mechanical Engineering Department should always be consulted to make sure all the above factors have been considered.

Hot tapping equipment containing an air-vapor mixture or compressed air lines or equipment should be done only after thorough investigation and approval by the Safety Department and the Inspection Section of the Mechanical Engineering Department.

Heating compressed air lines may cause detonation if lubricating oil has been vaporized and distributed through the system by the compressor.

- B. A hot work permit must be issued. State conditions under which hot tapping may be done. A gas test of the hot work area may be required. An inspection of the parent metal is necessary.
- C. Avoid hot tapping adjacent to flanged or threaded connections since the welding may cause them to open and leak.
- D. Observe the operation to make sure these conditions set forth are being followed during the job.

IV. PROCEDURE FOR HOT TAPPING

- A. Make sure the correct equipment or line has been selected to be hot tapped.

- B. The necessary approvals should be obtained. Consult with Mechanical supervision and always obtain approval of the Inspection Section of the Mechanical Engineering Department when making hot taps. In certain instances you may wish to consult with the Safety and Fire Departments.
- C. A hot work permit should be issued. Provide at least one 30-lb. chemical extinguisher and a 1-1/2" fire hose connected and with water at nozzle.
- D. It should be determined by the Inspection Section of the Mechanical Engineering Department by use of hammer testing, ultrasonic thickness devices, Radiography, or by the use of other approved thickness measuring devices that the equipment to be hot tapped is of sufficient strength and thickness to receive the connection. Previous inspection records and data on corrosion rates will be found helpful in making this determination.
- E. Studies have indicated that steels should be pre-heated before welding when the fluid or metal temperature is under 50°F. Special treatment is required for high tensile alloy steels and special welding rods must be used.
- F. Select the proper fitting to be used in making the connection. There are many types of connecting fittings available, such as Weldolets, saddles, nozzles, and plain mitres. Design connection and reinforcing pad, if necessary, according to proper code, i.e.: ASME Pressure Vessel Code, API 650 Specification for Welded Storage Tanks, or ASA B 31.3 Code for Pressure Piping. Be sure the fitting is of proper length to accommodate the high tap machine.
- G. The maximum temperature of the Hilco hot tap machine is limited by the packing to 700°F. The pressure-temperature rating of this machine is equal to the rating of a 300-pound flange. If an adapter spool is used, 300-pound to 150-pound, the lower flange rating of the adapter is the limiting factor. If the temperature or pressure above those specified is desired, the Inspection Section of the Mechanical Engineering Department will develop particular application with the supplier of the machine. The machine, its cutter and pilot drill should be carefully inspected before a hot tap is made to be sure it is in satisfactory condition for use.

- H. The fitting should be welded to the equipment to be hot tapped. Avoid the use of large size welding rods to prevent burning through lines while welding. The fitting must be properly positioned to prevent misalignment of the tapping machine when the cut is made. The machine is usually set at right angles.
- I. A full opening gate valve is next attached to the branch nozzle. It may be necessary to grind the seat ring lugs off to permit the cutter to pass through.
- J. The finished welding should be tested before cutting is started. If testing is determined impractical, the Inspection Section of the Mechanical Engineering Department should be advised before welding in order that welding methods may be followed closely. If the line or vessel is above 200°F, an air test soaping the welds for leaks may be used.
- K. Install cutting machine on gate valve. The small vent connection on the machine should be open. Extend boring bar through opening several times to be sure the cutter does not jam or drag.
- L. Adjust boring bar stops and drill entry point. When pilot drill penetrates equipment, close vent valve on cutting machine. In addition to the machine stop setting, it can be determined when the cut is finished by speeding up of the air motor. Running the machine a few turns will remove burrs.
- M. Retract boring machine, close valve, and open bleeder. In event the blank or coupon is lost, no attempt should be made to "fish" for it. The equipment may have to be shut down to recover it.
- N. The cutting machine is removed and the connection is ready for use.

V. SPECIAL CONSIDERATIONS

A. Pipelines

- 1. In doing hot work jobs of this type below grade level, provide an excavation to permit

quick access and exit by personnel. If the excavation is greater than four feet in depth, a gas test should be made. Use an air siphon or some other positive means to ventilate the excavation. If the job is above ground in a congested area, take the necessary precautions to prevent trapping personnel.

2. Flow should be maintained until after welding operations have been completed. If the line is long and heat can be dissipated without flow, it may be discontinued. The line should be kept filled but care must be taken that liquid expansion is relieved. A line containing a flammable mixture (1 to 6% hydrocarbon in 94 to 99% air) should never be heated.
3. Definite arrangements should be made for prompt communication with those at the job site to give notice of changed conditions within the line, such as interrupting flow.
4. In certain cases such as flare lines or others where there may be insufficient or no flow, it is necessary to flush the line with steam, inert gas, or hydrocarbon gas and keep it flowing during the welding operation.
5. Where a line is underground and runs through a casing, be sure that the line and not the casing is being hot tapped.

B. Tanks

1. All Tanks - Never pump in or out of, or agitate the contents of, tanks involved in hot work. If the vapor space is above 50% of lower explosive limit or within explosive range, do not do hot work. The agitator switches should be tagged open.

Close and tag "DO NOT OPEN" all valves at the tanks except:

- a. The gas blanketing valves.
- b. The heater coil valves where vapor space tests above explosive range. (Blank steam

inlet valve if vapor space is less than
50% of lower explosive limit.)

2. Cone Roof Tanks - Maintain at least three feet of liquid head above the hot work area when welding or burning or similar hot work is being done. Make a tape gauge.
3. Floating Roof Tanks - Make hot tap at any point below the wind girder on the outside of the tank shell providing it is 3 feet below the liquid level. Never do welding or burning or similar hot work on the roof, on the sleeves of the roof legs and pontoon hatches.

Safety Department
Revised May 25, 1966

cc: D8, D10, D16, D20 and D24

HUMBLE OIL & REFINING COMPANY

BATON ROUGE, LOUISIANA 70621

**REFINING DEPARTMENT
BATON ROUGE REFINERY**

POST OFFICE BOX 96

February 11, 1969

Safety Standard No. 144 - Scaffolds

**Refinery and Chemical Plant
Mechanical Supervisors**

Gentlemen:

Attached is a copy of Safety Standard No. 144 on Scaffolds. This is a revision of scaffold safety rules issued by the Mechanical Division in 1958.

Scaffold boards are no longer available in 2" thickness. Stores expects to stock 1-3/4" x 7-3/4" x 9'-0" and 18'-0" long, No. 1 dense yellow pine scaffold planks.

We suggest this safety standard, which has been approved by the Mechanical Departments, be put in your loose leaf safety handbook cover.

Very truly yours,


E. G. Miller

**EGM/LMK
Attachment**

cc LJS LAC SLD EWM EDF JKV POW

Distribution: D21 D22 D23 D24

EM004305

Baton Rouge, Louisiana

Safety Standard No. 144
Scaffolds

SCOPE

This standard covers the safety rules covering the erection of all types of scaffolding presently in use in the plant. Use this standard as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable in the judgment of the supervisors or operators. It is desirable to clear any proposed changes with your supervisor before making them.

These rules are intended to supplement the scaffold rules contained in the Safety Handbook.

I. All Types of Scaffolds

1. Provide a suitable foundation for scaffold to prevent settling or shifting.
2. Make sure decking boards are of good quality, free from knots and meets load requirements.
3. Scaffold boards 1-3/4" thick should not be used for spans over 12' because of the deflection. (See tables in Appendix)
4. All scaffolds over four feet in height are required to have a ladder or some other device to permit persons to climb to the platform. Extend ladder up three feet past the deck.
5. Use red flags in the day and red or yellow lights at night as a warning when scaffolds are erected in roads or walks.
6. Keep scaffolds plumb and level at all times.
7. Provide handrails for all scaffolds higher than 12 feet.
8. Never stand on barrels or use them for supporting platforms.
9. Head clearance of seven feet is required for scaffolds erected over pedestrian passageways.
10. A six-foot horizontal clearance and a 22-foot vertical clearance is required for scaffolds erected over or near railroads.
11. If a scaffold is intended for holding rivets, bolts, flanges, bricks, tools, etc., it should have a suitable toe-board installed to prevent material from falling.

12. Before erecting scaffolds near electric lines or exposed electrical equipment, employees shall consult their supervisors to determine what special precautions may be necessary.
13. Keep all equipment in good repair, avoid rusting. The strength of rusted material is not known.
14. Never climb on cross braces.

II. Sectional Scaffolds - Equivalent to "Safeway"

1. Sufficiently brace and tie fixed scaffolds to wall, building, or other firm support every 20 feet of height and every 25 feet of length. Temporary supports should be provided where permanent supports are not available for bracing.
2. Do not force braces to fit. Adjust evenness of scaffold until the proper fit can be made with ease.
3. Check all wing nuts and locks for tightness.

VI. Suspended and Swinging Scaffolds

1. All equipment required for suspended or swinging scaffolds should be assembled, checked and inspected by the supervisor before being erected or used.
2. Safety belts and handrails should be used where the elevation exceeds 12'.

VII. Special Scaffolds

1. Maximum allowable loads on scaffolding which utilizes unit structures as deck supports will be determined by the safe working loads of the decking, see tables in Appendix.

GENERAL

When scaffold sections and material are returned to Stores, any sections damaged beyond repair should be discarded. Salvageable sections are sent to the Central Mechanical Building for repairs. All employees using scaffolds should be encouraged to take proper care of them at the job site to prevent damage caused by material or equipment passing over it or dropping on it. Arrangements should be made to return all scaffolding to

Stores promptly upon completion of the job for which it was obtained. A speedy return of scaffolding to Stores will accomplish a dual purpose:

1. It would assure the scaffolding is not damaged or lost while not being used; and
2. It will be available for re-use on other jobs, thus eliminating the need for unnecessary purchase or rental of additional equipment.

ECN/UMCK
Safety Department
February 12, 1969

Revised from Mechanical Department Safety Rules - 1958

APPENDIX

TABLE NO. 1
SAFE WORKING LOADS FOR 1-3/4" x 7-3/4" PLANK LAID FLAT (LBS.)

Number of Planks Supporting Load

LENGTH OF SPAN FEET										
	1	2	3	4	5	6	7	8	9	10
2	1140	2280	3420	4560	5700	6840	7980	9120	10,260	11,400
3	760	1520	2280	3040	3800	4560	5320	6080	6840	7600
4	565	1130	1695	2260	2825	3390	3955	4520	5085	5650
5	430	860	1290	1720	2150	2580	3010	3440	3870	4300
6	370	740	1110	1480	1850	2220	2590	2960	3330	3700
7	315	630	945	1260	1575	1890	2205	2520	2835	3150
8	270	540	810	1080	1350	1620	1890	2160	2430	2700
9	240	480	720	960	1200	1440	1680	1920	2160	2400
10	210	420	630	840	1050	1260	1470	1680	1890	2100
11	190	380	570	760	950	1140	1330	1520	1710	1900
12	170	340	510	680	850	1020	1190	1360	1530	1700

Safety Department
February 12, 1969

EM004309

APPENDIX

TABLE NO. 2

SAFE WORKING LOADS FOR 1-3/4" x 7-3/4" PLANK LAYED ON EDGE [LBS.]

SPAN IN FEET	LOAD	
2		5065
3		3375
4		2530
5		2020
6		1680
7		1440
8		1255
9		1115
10		1000
11		900
12		825
13		760
14		700
15		650
16		605
17		565
18		535
19		500
20		475

Safety Department
February 12, 1969

Baton Rouge, Louisiana

Safety Standard No. 146
Hot Work on Pipelines
Where Seal Plugs Are Used

REVISION I

I. Scope

This safety standard outlines the minimum safety precautions for use of seal plugs in hot work jobs. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever applicable. Except in emergencies, deviations may be made in these practices only after the supervisor who writes the permit has consulted with his supervisor about the deviations.

II. General Information

Hot work on piping out of service containing hydrocarbons is safe if proper precautions are taken. Where seal plugs are used each job should be considered on an individual basis and be properly justified before authorization is given. The Section Supervisor in charge of the equipment involved authorizes each job. Where hot work is done on a pipeline passing through one supervisor's area, but the operation is controlled by another, both will be required to approve. In some cases the Section Supervisor may wish to review the work to be done with the Mechanical Division supervisors and representatives of the Safety, Mechanical Engineering, and Fire Departments.

III. Specific Procedure for hot work on pipelines where seal plugs are to be used:

- A. The origin and destination of the line and connecting laterals should be determined and all operators involved should be notified of the work being done so that the line will not be used until all work is completed.
- B. Remove all pressure from the line to be worked.

- C. Blank the line to be worked and all connecting lines at the point nearest the work.
- D. A hot work permit must be issued and at least one 30-pound chemical extinguisher and a 1-1/2" fire hose connected and with water pressure at the nozzle should be at the scene of the work.
- E. In cases where a line is cold-cut or opened and a blind flange cannot be used to close the ends, a plug must be placed in the open ends of the line. The plug is so designed that it forms a vapor-tight seal in the line. It is not designed for use against pressure. An adequate sized vent must be provided to vent any gases and prevent pressure on the plug. This vent must be far enough away from the hot work so that gases released will not be ignited by the hot work. Checks should be made to make sure that the vent bleeder connection in the seal plug, as well as the vent hose, is free from any obstruction. Venting should be done by the following methods.
 - 1. The seal plug is to be used only to effect a vapor-tight seal. The seal plug must not be used to withstand pressure.
 - 2. The seal plug is designed with a vent at its center point. The seal plug vent must be used. The vent is extended by pipe or hose a minimum distance of 25 feet from the hot work. The end of the pipe or hose must be immersed in a bucket of water so that gas released may be positively detected by bubbles in the bucket of water. Periodic checks should be made of the bucket of water to determine if any bubbling is taking place. A release of gas causing an unusual amount of bubbling is an indication to discontinue hot work and investigate. Additional venting will be required to reduce the pressure in such cases.
 - 3. In order to provide adequate vent to prevent pressure on the plug it may be necessary to provide vents in addition to 2 above. These should be adequately sized drains, bleeders, spread flanges or other openings far enough from the point of hot work to present no hazard. The vents shall be located so that traps, bends, and loops in the line do not nullify the ability of the vent to prevent pressure on the plug because of liquid head.

- F. Never do hot work, locate ground connections for the welding machines, or operate internal combustion engine driven equipment near the vent or opening. Ground connections should be made on the same line or vessel as that upon which welding is done.
- G. Never do hot work on the line until the plug is installed. Make a gas test of the hot work area and in the 12-inch opening between the end of the pipeline and the seal plug.
- H. In congested areas containing other lines or equipment, existing pipeline identification maps and/or piping index should be readily available for use in case of an emergency.
- I. Avoid standing or working in line with a seal plug. They have been known to blow out.

Safety Department

Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24

Baton Rouge, Louisiana

Safety Standard No. 147
Procedure for Welding on
Weld+End Couplings in Service

REVISION I

I. SCOPE

This safety standard outlines the minimum safety precautions for hot work (welding) on Weld+End couplings on equipment in service containing hydrocarbons or other flammable materials. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. Where it is necessary, the foreman or supervisors involved may change these practices.

II. GENERAL INFORMATION

Hot work on equipment in service containing hydrocarbons is safe if proper precautions are taken. Each job should be considered on an individual basis and be properly justified before authorization is given. The section supervisor in charge of the equipment involved authorizes each job. Where hot work is done on a pipeline passing through one foreman's area but the operation is controlled by another, both will be required to approve.

III. APPROVALS

To maintain control of the conditions under which welding on Weld+End couplings in service can be done, responsible Process Supervisor will:

- A. Determine that the contents of the system will permit Weld+Ends welding. Special technical consideration should be given when welding on alloy lines, on lines containing corrosive or toxic materials (such as hydrogen sulfide, caustic, acid, ammonia, etc.) and on lines containing hydrogen, air-vapor mixtures or compressed air.

Manufacturers' instructions are furnished with each new coupling; however, the maximum allowable pressures prior to welding as shown (70% to 80% of actual test pressures for coupling slippage) are considered excessive for normal usage. Modified allowable pressures that may be applied before welding, based on plant tests, are included in the table (Appendix I). To avoid a blowout of the line during welding, the line pressure should not exceed 350 psi for extra strong 2" piping and standard weight larger size piping (Appendix I) without careful review of the circumstances by process and inspection personnel. When welding is approved for pressures above 350 psi, use small size electrodes to avoid excessive heating of the pipe metal. After welding, pressures attainable with the couplings approach the maximum for the commonly used piping (Appendix I).

Welding on Weld+End equipment should never be done on equipment above its rated working pressure and temperature, nor on equipment operating at less than atmospheric pressure.

The Chemicals Technical Department or the Mechanical Engineering Department should always be consulted to make sure all the above factors have been considered.

Weld+Ends welding on equipment containing an air-vapor mixture or compressed air lines or equipment should be done only after thorough investigation and approval by the Safety Department, the Chemicals Technical Department or Mechanical Engineering Department, and the process department concerned.

Heating compressed air lines may cause detonation if lubricating oil has been vaporized and distributed through the system by the compressor.

- B. A hot work permit must be issued. State conditions under which Weld+Ends welding may be done. A gas test of the hot work area may be required. An inspection of the parent metal is necessary.
- C. Observe the operation to make sure these conditions set forth are being followed during the job.

IV. PROCEDURE FOR WELDING ON WELD+ENDS IN SERVICE

- A. When seal welding Weld+Ends, general hot work procedures should be followed with equipment containing hydrocarbons. The Chemicals Technical Department or

Mechanical Engineering Department should be notified before the line has been cut.

- B. An inspector can determine that pipe wall thicknesses are satisfactory for welding the coupling before cutting or welding.
- C. Prior to welding, Weld+End couplings should be equipped with gasket seals suitable for temperature during welding and process operations. Temperature limits of available seals are as follows:

Standard Neoprene Seal	250°F
Silicone Seal	500°F
Asbestos Mica Seal	1000°F

Although the standard Neoprene seal is satisfactory for fluid temperatures up to 250°F, the silicone seal should be used where a coupling is installed on a pipeline handling a gas that has a low flow rate. More welding heat is transmitted to the seal when a gas is in the line than when the line contains oil or other liquids.

- D. Both lines shall be cleaned to insure seating of gasket seals. (Beveled side of gasket toward center of coupling.) Leave approximately 1/4" space between pipe ends and slide coupling on pipe to center it over joint.
- E. Tighten the side clamping screws, centering the coupling on the pipe. These screws resist end pull of the pipes and center the coupling so that the gasket will seat properly and so that seal welding can be done properly.
- F. Tighten the end thrust screws until snug. Then start going around from screw to screw, giving each screw a 1/8th turn each time. Do this for eight to ten rounds. These screws push against a thrust ring which compresses a packing ring and provides a pressure-tight seal.
- G. Use of couplings on light-wall piping requires caution in tightening screws and welding. Clamping screws should not be excessively tightened since the ends of the piping may be pushed inward and cause seal leakage. The coupling should be carefully centered over the pipe joint. The allowable pressures during welding must be determined for each case, and use of small size welding electrodes is necessary to avoid burning through the pipe wall.

H. Contact Process Supervisor to start and maintain flow through line. After flow has been initiated the welding should be completed promptly. Otherwise, problems with seal leakage might occur or the piping might work loose, if not properly anchored, and pull from the coupling. If it is imperative to consider delaying the welding, each installation should be reviewed separately as to operating conditions, anchors and support points to assure safe use of the pipeline.

I. Welding Procedure

1. Remove one side clamping screw from each end of the coupling to vent coupling while welding.
2. Check for leakage.
3. Burn off the remaining side clamping screws and seal weld the screws to the couplings. Weld the end thrust screws last as they can be tightened to stop leakage if it develops.
4. Fillet weld coupling ends to pipe with weld of minimum width of 1-1/4 times the pipe wall thickness.
5. During welding, the temperature of the metal at the gasket surface should not exceed the gasket temperature limits listed in Par. III. C. This can be checked with temperature indicating sticks and controlled by welding slowly. Temperature indicating sticks can be obtained from inspector who is following the work. High temperature gasket seals are available for the Weld+End couplings, Silicone for up to 500°F., and asbestos mica for up to 1000°F.
6. Special care in welding is required when using half couplings, of sizes 3" and under, which are made by cutting the Weld+End couplings at mid-points. In these sizes, the full coupling is equipped with an inside ring (or sleeve) at the mid-point where the housing (or outer cylinder) is butt welded. Since the ring and housing are separate parts, it is essential that a complete full-fillet weld be provided at the cut end of the half coupling when it is attached to a pipeline. The weld must join the ring, housing and pipe all together.

7. Steps should be taken to avoid possible movement of line in coupling because of thermal changes or hydraulic shock during welding operations. Such movement could release hydrocarbons during welding operations.
8. Provide at least one 30-lb. chemical extinguisher and a 1-1/2" fire hose connected and with water at nozzle.
9. In congested areas containing other lines or equipment, existing pipeline identification maps and/or piping index should be readily available for use in case of an emergency.

APPENDIX I

<u>Pipe Sizes</u>	<u>Maximum Allowable Pressures (1)</u> <u>Up to 500°F Pipe Wall Temperature</u>		
	<u>Prior to Welding(2)</u>	<u>During Welding(3)</u>	<u>After Welding(4)</u>
2"	1690 psig	350 psig	1820 psig
3"	1050	350	1050
4"	890	350	1040
6"	605	350	860
8"	465	350	880
10"	370	350	600
12"	310	310	500
14"	290	290	685
16"	250	250	600
18"	220	220	695
20"	200	200	630
22"	180	180	580
24"	170	170	535
30"	130	130	440

- NOTES: (1) Where proper coupling seal is used, calculable pressures remain about constant for different temperatures up to 500°F, but decrease substantially as temperature is increased above 500°F. The lower allowable pressures before and after welding should be determined for each case where the temperature exceeds 500°F.
- (2) Allowable pressures before welding are based on approximately one-half the pressure causing slippage of coupling lugs on unanchored pipe, as determined by tests.
- (3) Line pressure upper limit of 350 psig is considered good practice to avoid blowout in the heated area during welding, where pipe wall thickness is not less than extra strong for 2" size pipe and standard weight for larger size pipe. Lower pressures during welding are shown for 12" and larger pipe to conform with pressures allowed prior to welding.
- (4) Allowable pressures after welding are based on calculations of couplings with 0.05" corrosion allowance, and may be attained only where the pipe wall thickness is adequate.

Safety Department
Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24

Baton Rouge, Louisiana

Safety Standard No. 150
Procedures to Be Followed for
Painting Tanks in Service

REVISION II

I. Scope

This safety standard outlines the minimum safety precautions for surface preparation and painting Plant storage tanks containing hydrocarbons and other flammables. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. Where it is necessary, the foremen and supervisors involved may change these practices.

II. General Information

Consider each tank-painting job on an individual basis. Obtain the proper work permit before starting a tank-painting job. Tanks containing stock with 0.05 cubic feet or more of hydrogen sulfide per 100 gallons are to be cleaned and painted only after the tank is free of oil and is gas-free. If conditions under which the work started should change, work should be stopped and the men should leave the tank. The necessary tests must be made before work is resumed.

Safe practices to be followed are:

- A. Equip all air-powered brushes with spring-loaded, quick-closing valves that will positively shut off power whenever the machine is dropped or the handle otherwise released.
- B. Wear goggles, face shield, canvas apron, canvas sleeves, and gloves while operating an air-powered brush or while working adjacent to the operation.
- C. Wear goggles when hand scraping or wire brushing or when working in close proximity to men who are hand scraping or wire brushing.

- D. The mechanical supervisor in charge of the job will check with the Inspection Section of the Mechanical Engineering Department concerning the structural condition, tightness, and grounding of the tank before sending men on the roof or wind girder. The cathodic protection shall also be turned off while working on the tank.
- E. Wear a respirator while spray painting.
- F. Wear a life belt under the following conditions:
 - 1. While working on any cone roof tank within six feet of the roof edge.
 - 2. At all times while working on a high pitch, cone-type roof (more than 1/4 pitch).
- G. When using rolling hangers for hanging scaffolds on cone-roof tanks, secure the rolling hangers to the vent or painter's clip in the center of the roof with 3/4" rope (1/2" polypropylene).
- H. Secure hanging scaffolds to the wind girder on floating roof tanks by means of eye-bolts through the drain holes of the wind girder. Provide a large washer under nut on top of girder.
- I. Sandblasting equipment including the sandblast hose nozzle shall be bonded to the tank through properly connected electrical bonding wire. On a floating roof tank both the shell and the roof of the tank shall be bonded.
- J. Adequate fire fighting equipment should be available on the roof. Provide at least two 30-pound, dry powder fire extinguishers on floating roofs.

III. Specific Procedures for Cone Roof Tanks

A. General

- 1. Pumping into a tank while work is in progress is not permitted.
- 2. It is desirable that the tank be filled to minimize vapor space.

B. Work Below the Liquid Level

Cleaning and painting, use of hand or air-powered tools, or sandblasting may be done on any outside

surface below the liquid level provided the area is suitable for hot work.

C. Work Above the Liquid Level

Cleaning and painting, use of hand or air-powered tools, or sandblasting may be done on any outside surface above the liquid level provided that:

1. The area is suitable for hot work.
2. All roof vents are fitted with 8-foot vertical stacks sealed at the base and all other openings are tightly sealed.
3. The vapor space in the tank is maintained below 50% of the lower explosive limit or above the upper explosive limit with oxygen analysis not more than 9% by volume. The latter may be achieved by temporary gas blanketing. Pumping out of a tank under these conditions is permissible while the work is in progress.
4. Gas blanketing should be maintained on tanks so equipped.
5. Mechanical mixers should be tagged out and the steam coil inlet valve blanked if the vapor space is to be maintained below 50% of the lower explosive limit.

IV. Specific Procedures for Floating Roof Tanks

- A. Pumping into a tank is permissible while the surface is being cleaned or painted or while rigging is being installed in preparation for cleaning and painting provided the roof is below the top of the shell.

Pumping out is permissible for all roof positions, provided the roof is floating.

- B. Cleaning, painting, use of hand or air-powered tools, and sandblasting may be done on:
1. Any outside shell surface providing the outside area is satisfactory for hot work and the roof is floating. Sandblasting should not be done on the shell above the wind girder when the roof is at the top.

2. The roof and inside of the shell providing that:
 - a. The roof is down not more than one-half the shell height, or roof seal is below the top of the shell.
 - b. The area above the roof within the shell, and each of the pontoons, tests less than 20% of the lower explosive limit.
 - c. The gauge pole is sealed to a height of 8 feet above roof deck. Other openings in the roof deck shall be tightly sealed.

Safety Department
Revised May 25, 1966

cc: D8, D10, D16, D20 and Mechanical Division

Baton Rouge, Louisiana

Safety Standard No. 152
Unplugging Bleeder Valves

I. Scope

This safety standard covers the basic points in the protection of personnel working on unplugging bleeder valves. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. In some circumstances deviation from these practices may be safe and desirable if the judgment of the supervisors so indicates.

II. Methods of Unplugging

- A. Pushing rod through soft plugging deposit. Using device shown on MED Dwg. 1436-1.
- B. Drilling through hard plugging deposit. Using device shown in Sketch No. 1.
- C. Forcing out plugging deposit by hydraulic or nitrogen pressure, using equipment and procedure described herein.
- D. No other method of unplugging bleeder should be attempted without receiving permission from both Process and Mechanical Supervisors involved.

III. General Precautions

- A. To maintain control of the conditions under which unplugging of bleeder valves can be done, responsible Process Operator will:
 - 1. Determine that the contents of the system will permit use of unplugging device;
 - 2. Issue the necessary cold work permit; and
 - 3. Select the proper unplugging procedures and observe the operation to make sure that correct procedures are followed.

- B. Bleeders should not be unplugged by inserting welding rods or similar objects into them.
- C. Before exerting mechanical or hydraulic force to unplug a bleeder, it should be ascertained that the bleeder and associated nipples are in good condition and suitable for the unplugging operation. Where mechanical force is to be used, the Process Operator makes this determination. Where fluid (oil or nitrogen) pressure is to be used, the MED inspector should first be consulted.
- D. The unplugging device and its connection to the bleeder must be adequate to withstand the pressure and temperature of the contents of the vessel to which the bleeder is attached. The maximum allowable pressure and temperature of the unplugging tool should be stamped on it.
- E. Means of controlled depressuring of the unplugging device (usually by attached petcock) must be provided.
- F. Where a drill pipe unplugging device is used, care must be taken that drill does not penetrate wall of bleeder valve or nipple.

IV. Specific Procedures

- A. Pushing rod through plugging deposit using device as shown on MED Dwg. 1436, Sheet 1. (Sufficient clearance available at bleeder.)

Screw unplugging tool into plugged bleeder using the proper size adapter. After tightening this connection, open the bleeder valve. Push rod into plugged bleeder by turning unplugging tool handle clockwise. Test by opening petcock on unplugging tool to determine if bleeder is unplugged. Withdraw rod and close bleeder valve. Open petcock and depressure unplugging tool. Unscrew unplugging tool.

NOTE: In cases where insufficient clearance is available to use the above unplugging tool, use method in paragraph IV C.

- B. Drilling through plugging deposit using device shown in attached Sketch No. 1. (Sufficient clearance available at bleeder.)

Try to clear the bleeder by turning the drill by hand or tapping on the stem with a hammer. If an air or electric motor is to be used on the drill stem, the Mechanical Supervisor must get the approval of his Zone Supervisor.

Attach drill type bleeder unplugged to bleeder. Open bleeder. Drill through plug in bleeder. Test by opening petcock on unplugged to determine when bleeder is unplugged. When pressure is obtained at petcock withdraw drill. Close bleeder valve. Open petcock and depressure unplugged. Unscrew unplugged.

- C. Forcing out plugging deposit by hydraulic pressure. (Can be used where clearances are at a minimum.)

Install Alemite or similar grease fitting on plugged bleeder. Install suitable gauge to read fluid pressure. Attach grease gun to fitting. Open plugged bleeder valve. Force grease into bleeder. Do not exceed design pressure of bleeder valve as determined by grease pressure gauge. When grease pressure decreases bleeder is unplugged. Close bleeder valve. Remove grease gun.

NOTE: This method may be used in bleeder locations where there is insufficient clearance to install the devices used in IV A or B.

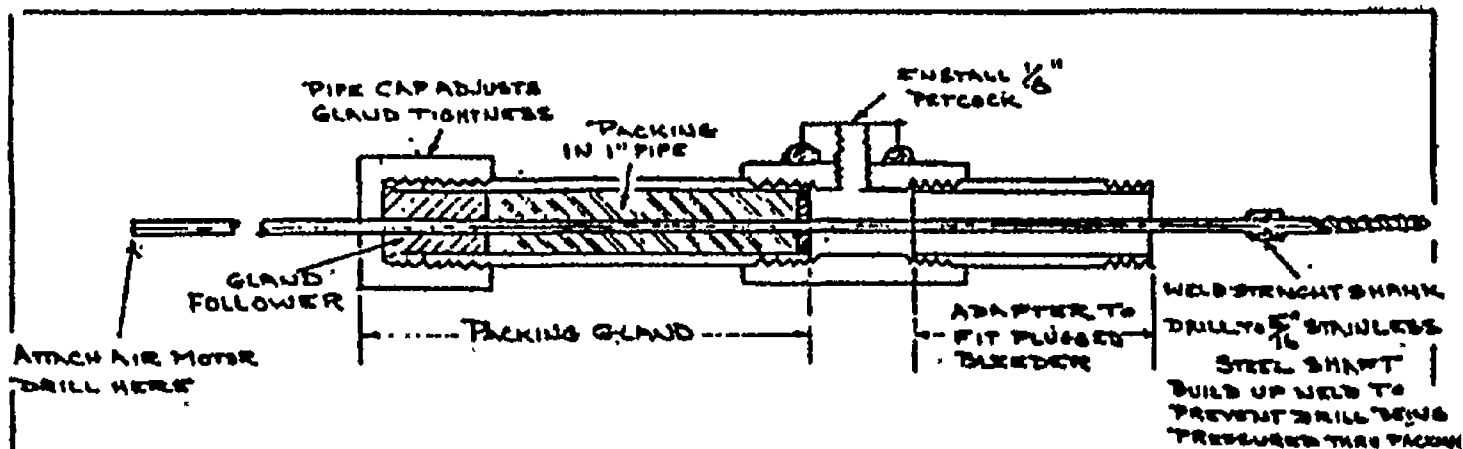
- D. In some cases, it may be possible to use gas pressure supplied by a nitrogen cylinder to unplug bleeders. Since nitrogen pressure in these cylinders may greatly exceed most bleeder valve design pressures, APPROVED PRESSURE REDUCING REGULATORS AND A PRESSURE GAUGE MUST BE INSTALLED ON THE CYLINDER.

V. Personal Protective Equipment

Workers should use suitable personal protective equipment for the type materials being handled. Provide adequate emergency fire fighting equipment such as an extinguisher and a fog nozzle.

Safety Department
Revised May 25, 1966
Attachments

Lists D8, D10, D16, D20, D24



FOR CLEARING BLEEDERS PLUGGED

WITH HARD COKE-LIKE DEPOSITS

NOTE

ALL NIPPLES DOUBLE
EXTRA HEAVY SEAM-
LESS STEEL
NIPPLE, PIPE CAP &
COUPLING TO BE
3000 lb RATING -

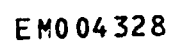
SKETCH No. 1

MECHANICAL ENGINEERING
DEPT.

DEVICE FOR UNPLUGGING
BLEEDERS

JNK - 8801

12-1-63



Safety Standard No. 155
Blinding Flare Lines

REVISION I

I. SCOPE

Special safety procedures are recommended for blinding flare lines because of the interconnection of flare systems to other units which are usually operating while the blinding is being done. In some cases, there are no block valves to blind against at the unit blowdown drum. Where such valves are available, they sometimes leak. Flare lines are generally large, the volume of gas contained in them is large even though they are at only several pounds pressure. Hydrocarbon vapors will be released to the atmosphere. The gases they contain in many cases contain traces of toxic gases.

This safety standard covers the basic points for the protection of employees blinding flare lines. It is intended to be a general statement of good practices that apply under normal circumstances. Use it as a source of information and as a guide wherever it is applicable. In some circumstances, deviation from these practices may be safe and desirable if the judgment of the Section Supervisors so indicates.

II. PRELIMINARY PROCEDURES

- A. A review should be made by Process and Mechanical Supervisors to determine which units go to the flare in question.
- B. A cold work permit shall be issued by Process Operator or Supervisor outlining precautions Mechanical employees should take.
- C. Unless there is definite evidence that toxic gases are not present, it should be assumed they are present.
- D. Any known leakage into the flare system should be eliminated if possible.
- E. Unit Operators of the units served by the flare system must be notified when the work is to be done so they can refrain from controllable releases into the system. Specific

arrangements should be made for warning communications to the job site from a unit which may be upset and foresee a safety valve release or need to pull down unit pressure to the flare.

- F. Natural gas bleed-ins should be shut off.
- G. A fire hose with a fog nozzle shall be provided at the site with water pressure at the nozzle.
- H. All bolts shall be free-running. This can be done by removing bolts one at a time and oiling them or by using new bolts and nuts.
- I. The Fire Department shall be notified.

III. PRECAUTIONS

- A. Where the blinding is to be done at an elevation where there is no permanent platform, an adequate sturdy scaffold should be provided, complete with handrails. Two or more avenues of egress should be available to those doing the work.
- B. Where blinding is done, self-contained breathing apparatus shall be worn. The supply of air lasts only 15-20 minutes from the small cylinders. An alarm is provided on the sling Pak type which sounds four minutes before the cylinder is empty. If one man is to work longer or if more than one man is to work at this location, the full size cylinder (200 cu. ft.) with high pressure hose should be provided.
- C. In order to disperse any gas and keep the Mechanical employees out of a cloud of flammable or toxic gas, an explosionproof blower or air mover should be used to dilute and drive away the released gas.
- D. Depending on wind direction, velocity, etc., it may be necessary to barricade roadways and warn others in the area.

IV. OTHER CONSIDERATIONS

It is preferable to be able to blind against a closed block valve. An evaluation should be made where flare lines must be repeatedly blinded to see if the installation of valves is justified. If valves are to be installed, it is recommended knife-type valves be installed since they are more effective in fouling service. Figure 8 blinds should be used since time is reduced to "turn" the blind.

Safety Department
Revised May 25, 1966

cc: Lists D-8, D-10, D-16 D-20 and D-24

Baton Rouge, Louisiana

Safety Standard No. 156
Preparing Tank Bottoms for Hot Work

I. Scope

The purpose of this safety standard is to outline safety precautions for preventing accidental fires and/or explosions while making hot work repairs to tank bottoms.

With this in mind, the information contained herein will refer only to procedures used for preparing tank bottoms for hot work and does not include the preliminary preparations required for tank entry.

II. Introduction

Special techniques are required in the performance of hot work on tank bottoms to prevent the ignition of flammable liquids or vapor that may be entrapped under the tank.

Tanks which have contained flammable liquids, regardless of age and type of construction, must be considered unsafe for hot work until proper safety inspection proves it otherwise.

Although each repair job must receive careful individual consideration, the safety procedures described herein provide various methods for preparing tank bottoms for hot work which may be applicable to almost any given situation.

III. General Precautions

- A. The tank must be safely isolated, cleaned and ventilated before authorization is given to enter and/or perform hot work operations. Reference should be made to applicable tank cleaning standards.
- B. Visual inspections of the hot work area are necessary. The conditions and safety precautions under which hot work is to be performed

must be clearly stated. The person or persons responsible for authorizing the hot work should designate the precautions to be followed.

- C. A 1-1/2" fire hose with water pressure to the nozzle and one 30-lb. dry powder extinguisher should be available and ready for instant use. Workmen should be instructed in the proper use of this equipment.

IV. Specific Precautions

The specific precautions adopted will be determined by the condition of the tank bottom, the type and extent of the hot work repairs to be performed, and inspection results.

NOTE: The precautions included in this safety standard are not intended to cover all the different types of tank bottom hot work repairs that may be encountered. They do, however, describe a variety of situations which point out the basic principles of safety that can be applied.

- A. Tank must be properly prepared for entry and hot work.
- B. Work permits for tank entry and hot work must be properly signed and issued before starting work.
- C. An air mover or movers should be in operation at all times during entry and hot work.
- D. Lines to and from the tank should not be disturbed or dismantled during entry and/or hot work.
- E. Prior to hot work the metal surfaces of tanks previously used in TEL service must be sand-blasted or power brushed at least 12 inches on each side of heat contact. A new lead test should be made if tank remains idle more than one week without any work going on in tank.
- F. Welding machine grounding leads should be attached directly to the tank where hot work is to be performed.

- G. Compressed gas cylinders used for burning operations should be securely fastened in an upright position and kept outside the tank well away from open manholes. Cutting torches and hoses must be shut off at the cylinder valves and removed from the tank when not in use.
- H. The area inside and outside of the tank should be kept clear of combustible material.

V. Inspection Procedure

A standard procedure for the safety inspection of all tank bottoms, as previously mentioned, must be followed regardless of the knowledge of existing or non-existing leaks when hot work repairs are contemplated.

- A. Approximately 6" diameter openings should be made in the tank bottom in the area or areas where hot work is to be performed to make visible inspections and combustible gas tests.
- B. Cold cutting or drilling with hand or air-operated tools is considered safe from an ignition hazard for use in the above operation. Water should be applied to the cutting edge of such tools to reduce the heat of friction. Soil samples and the results of combustible gas indicator tests taken from the underside of the tank bottom will determine the correct work procedure to be followed.

VI. Minor Repairs

- A. This type of hot work usually involves the welding of supports, braces, corrosion pits, patches or other repair jobs localized to small areas.
 - 1. Drill and tap a 1/2" hole adjacent to the repair area.
 - 2. With metal tubing connect 50 lb. CO² cylinder to the 1/2" tap.
 - 3. Inert underside of tank bottom in the area of welding with CO² and continue a steady bleed during hot work.
 - 4. Remove tubing, plug hole and back weld as required.

VII. Major Repairs

- A. When repair jobs involving most of the tank bottom are planned, it may be desirable to displace the flammable liquid and/or vapor by water flooding.
1. Drill and tap 1/2" holes in the bottom of the tank at high points sufficiently spaced to assure proper inspection and dispersment of water.
 2. Install pipe nipples in these holes to be used as vents, check points and for the application of water. Height of nipples should exceed the dike mentioned in 3 below.
 3. Construct an earthen dike around the tank's outer shell higher than the highest floor plate.
 4. Fill space under tank bottom with water. Continue flow of water to maintain a constant high water level within the dike.
 5. Watch for leaks and temporarily plug with clay or asbestos as necessary to keep tank bottom dry.
 6. After repairs are completed, remove nipples, plug and back weld as required.

VIII. Perimeter Repairs

- A. Repairs around the periphery of a tank bottom may be made safely after the following preparations:
1. Excavate under the tank edge. Such excavations should extend a minimum of 12 inches beyond the point of any hot work area and must be large enough for a man to work in with safety and comfort.
 2. Seal off all openings between the floor plates and the tank foundation by packing with mud, asbestos or some other suitable material.
 3. Use a combustible gas indicator to check floor plate, tank foundation seals, and excavations.

4. A portable air blower may be used for ventilation purposes.

IX. Sectional Repairs

- A. When making sectional repairs to tank bottoms, the following methods may be used:
 1. With hand or air-operated tool cold cut and remove the section of tank bottom to be replaced. Water should be applied to the cutting edge of such tools to reduce the heat of friction.
 2. Remove earth from under the section to be replaced. Seal the perimeter of patch area with mud, clay, asbestos or other suitable non-corrosive material. Fill with sand.
 3. Use a combustible gas indicator to be sure an effective seal has been made.
 4. When hot work is being done in the course of installing a new section, maintain an inert atmosphere under the patch area. This may be accomplished by using a CO₂ cylinder or dry ice.

X. Double Bottom Installation

- A. When constructing a double bottom in a tank, the following procedures are considered a standard safe practice.
 1. With air or hand operated tools drill and tap 1/2" holes in the tank bottom sufficiently spaced to permit proper inspection.
 2. If combustible gas indicator tests prove tank bottom is gassy, purge with steam, water, air or other suitable means until gas-free.
 3. Place at least four inches of hot road mix asphalt over existing floor.
 4. Install new bottom by welding.

Safety Department
Revised May 25, 1966

cc: Lists D8, D10, D16, D20 and D24

Baton Rouge, Louisiana

Safety Standard No. 157
Electrical Safety Tags

Scope

Electrical safety tags are an effective safeguard against accidents. There are sound and correct practices regarding the use of electrical safety tags at Baton Rouge. Unless instructed otherwise by his supervisor, an employee shall follow these practices.

I. Why do we use safety tags?

Safety tags are sentinels which warn all persons not to close circuits which are tagged open. Tags protect lives and property.

II. What types of safety tags are used?

Two types are used - the white "DANGER" tag and the red "DANGER - HOLD" tag. Each of these tags is designed for a specific use as described below. Tags other than these two types are not used as electrical safety tags. No electrical safety tag is used a second time, but is destroyed when removed. Electrical safety tags are stocked in all tool rooms.

III. Responsibility for Tagging

White

White "DANGER" Tags for Mechanical Work on Electrically Driven Equipment.
The white "DANGER" tag is used when mechanical work is done on electrically driven equipment. This includes inspection work such as climbing on or handling moving parts. Responsibility for such tagging lies with the operators of the equipment, and they normally perform the tagging

Red

Red "DANGER - HOLD" Tags for Electrical Work on Electrical Equipment or Circuits. When electrical work is to be done on electrical equipment or circuits, the equipment or circuit must be tagged out. The red "DANGER - HOLD" tag is used. Responsibility for the tagging lies with the operators of the equipment and with the employee performing the work. Tagging shall be done by the employee performing the work.

White

Red

operation. Any employee who may be exposed to injury by the electrical equipment starting should assume some responsibility by making sure that the equipment is properly isolated and tagged.

IV. Responsibility for Removal of Tag

Tags are removed after definite proof is established that all personnel and equipment are in the clear. Those responsible for removal of tags are:

White

Red

1. The signer of the white "DANGER" tag (the employee who tagged the circuit) may remove it.

1. The red "DANGER - HOLD" tag can be removed only by the employee who signed and installed it.

2. When the signer is not immediately available the white "DANGER" tag may be removed by operators of the equipment, by qualified employee or by supervisors.

V. Placement of Safety Tags on Equipment

The main switch or circuit breaker is to be opened and the operating handle, lever, or control switch tagged. Tagging pushbuttons, pressure switches or other pilot devices does not give absolute protection and is prohibited. These devices are in the low voltage control circuit and not in the main high voltage power circuit.

White

Red

When MECHANICAL WORK is to be done on motor driven equipment, the motor shall be shut down in the normal manner, and the white "DANGER" tag attached to the circuit breaker operating handle. If the equipment is supplied by 2400-volt switchgear located in sub-

When ELECTRICAL WORK is to be done on circuits or equipment, the circuit breaker or switch supplying the circuit or equipment is opened in the normal manner, and the red "DANGER - HOLD" tag is then filled out and attached to the

White

stations, or by 2400-volt cubicle or tank type starters, the motor shall be shut down in the normal manner, and the instructions on the blue and yellow plate attached to the starting equipment followed. Operators shall not open any doors or panels on motor starting equipment.

Red

switch or breaker operating handle by the employee doing the work. If the circuit or equipment is supplied by switchgear type breakers, the breaker is opened in the normal manner, when the control circuit is de-energized by opening its switch or pulling the fuses.

After checking the circuit to make sure it is de-energized, the disconnects are opened, or the circuit breaker lowered, as the case may be, and the red "DANGER - HOLD" tag is then filled out and attached to the control switch handle by the employee doing the work.

VI. Precautions after Tagging

1. Before working on the equipment powered by the circuit or before giving assistance to others who have to work on such equipment, try the pushbutton or other control devices provided to be sure that the equipment will not start.
1. Before working on the circuit or associated electrical equipment, test for voltage. Be sure your testing device is working properly. Try it on a known live circuit whenever possible.
2. Ground the de-energized circuit before working on it where possible.
3. Where a motor is removed for repairs, bond the power leads securely together with a bolt and tape with a few layers of tape. This creates a short and prevents the possibility of energized leads being exposed.

VII. The Use of Safety Tags

The White "DANGER" Tag

1. When Used

The white "DANGER" tag is used when the circuit is de-energized for reasons other than the performance of electrical work on the circuit. It is used on circuits of any voltage. Principal uses are:

- a. Tagging main breaker or switch for the performance of mechanical work on pumps, compressors, blowers and similar equipment powered by the circuit involved.
- b. Tagging circuits to protect equipment from damage.
- c. Tagging circuits temporarily to prevent electrical overloading.
- d. Tagging circuits temporarily incomplete but not being worked on.

2. Information Needed on White "DANGER" Tag

- a. Signature of person tagging out the circuit.
- b. Date tagged out.
- c. Reason for tagging out.

The Red "DANGER - HOLD" Tag

1. When Used

The red "DANGER - HOLD" tag is used when the circuit is de-energized to permit work to be performed on the circuit conductors and equipment. This is the sole purpose of this tag. This tag is used on circuits of any voltage.

When all employees are in the clear and work ceases, to be resumed at some later time, the red "DANGER - HOLD" tag is removed and a white "DANGER" tag is attached. When work is resumed, a new red "DANGER - HOLD" tag is attached.

2. Information Needed on Red "DANGER - HOLD" Tag

- a. The tagger fills in all information requested on the tag, including his signature.
- b. The stub is filled out and detached. This stub is retained by the tagger until he removes the tag.

Red

- c. When work laps over into two or more shifts, the first shift tagger removes and destroys his tag in the presence of the second shift tagger. The second shift tagger then attaches a new tag which he has filled in and removed and retains his stub. This practice continues until work is completed, then "DANGER - HOLD" tag is removed and destroyed.

157-5

EM004340

WRITE "DANGER" TAG

Front Side

()

DANGER

ELECTRICAL EQUIPMENT
DO NOT REMOVE THIS TAG

SEE OTHER SIDE.

Back Side

000110

()

DANGER

ELECTRICAL EQUIPMENT
DO
NOT
OPERATE

 **Signed by** _____
Date _____

DANGER-HOLD

ELECTRICAL EQUIPMENT
 HAS DANGEROUS VOLTAGE ON OTHER SIDE
 EMPLOYEE WORKING ON CIRCUIT
 DO NOT CUT IN

STATION
 BY SERVICE
 FEEDER OR
 RECEPTACLE
 TAGGED BY (NAME) _____
 GROUNDED BY _____
 TIME TAGGED OUT _____ AM POSSIBLE
 REASON FOR REMOVAL _____
 FROM SERVICE _____
 SIGNED BY (NAME) _____
 DATE SIGNED _____ TIME SIGNED _____ AM
 PM

STATUS FOR EMPLOYEE
 WORKING ON CIRCUIT
 HAS DANGEROUS VOLTAGE ON OTHER SIDE

STATION
 OR SOURCE
 FEEDER OR
 RECEPTACLE
 TAGGED OUT AND GROUNDED ☐ GROUNDED ☐ NOT GROUNDED
 SIGNED BY (NAME) _____
 DATE SIGNED _____ TIME SIGNED _____ AM
 PM
 I am clear of the above feeder or receptacle and am a safe distance from it as
 my work is completed
 SIGNED BY (NAME) _____
 DATE SIGNED _____ TIME SIGNED _____ AM
 PM

DANGER-HOLD

ELECTRICAL EQUIPMENT
 HAS DANGEROUS VOLTAGE ON OTHER SIDE
 EMPLOYEE WORKING ON CIRCUIT
 DO NOT CUT IN

INSTRUCTIONS FOR USE OF THIS TAG

1. Use this tag only when employees are actively engaged on circuit. Use white "Danger" tag when circuit is out for other reasons.
2. Tag is to be filled in and attached by employee who is actually doing the circuit work.
3. If this is lost, employee working on circuit may report it clear by signing tag below.

Employee on circuit — Examine all station switches, grounds, etc., to see that the proper precautions have been taken for your safety.

Each man responsible for work on high voltage apparatus. In lines — tag each apparatus or line before starting work; thoroughly ground the line.

Order lines cut in person if at all possible. If telephone must be used, be certain job is clearly understood by both parties.