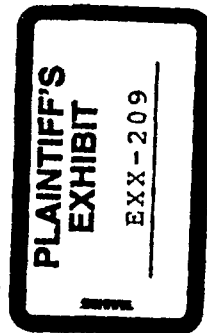


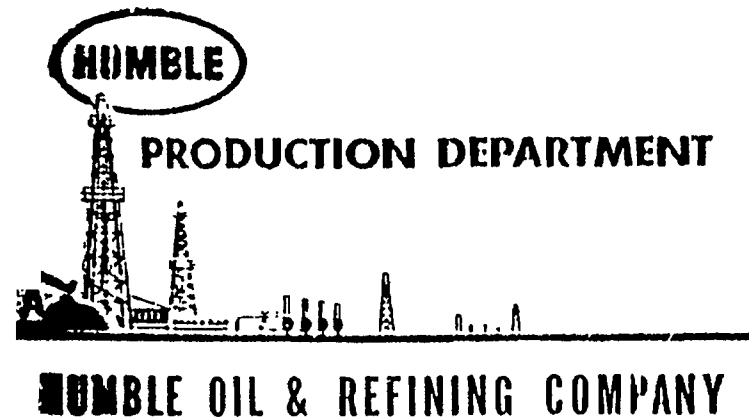
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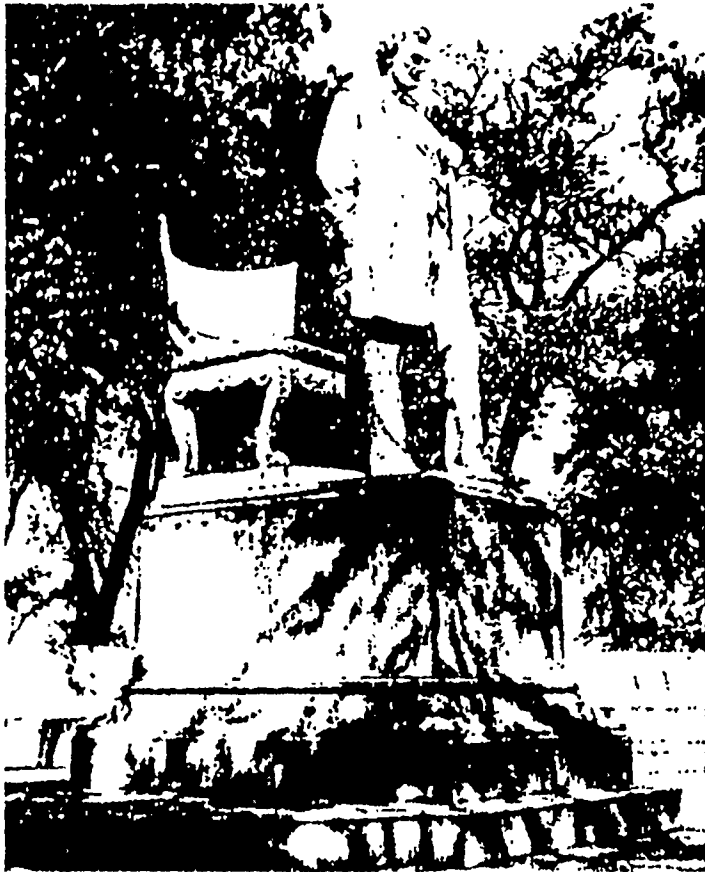
SAFETY MANUAL

Production Department



Humble Oil & Refining Company

May, 1953



It is the duty of every man to protect himself and those associated with him from accidents which may result in injury or death.

ABRAHAM LINCOLN

FOREWORD

Safety is an integral part of efficient operations. In the petroleum industry certain situations and operating conditions are hazardous and can produce accidents if safe, proper procedures are not followed. This justifies the development of the safety rules and safe practices which have been assembled and constitute this Safety Manual.

Almost without exception, each safety rule or practice in this manual is the result of not one accident but of many. They are not derived from the experience of one man, one district, or one division, but are from the collected experience of the Company and the petroleum industry.

Therefore, it follows that the individual who attempts to match his own good experience against this collected experience often takes a definite risk of injury. If the safety rules and safe practices contained in this manual are observed, most accidents can be prevented. Each employee is responsible to see that they are followed and supervisors are held responsible for their enforcement. These instructions can not possibly cover all situations which may arise. Employees must still be alert to unforeseen dangers and realize that changing conditions will present new problems.

It is the policy of the Company to provide safe equipment, good tools, and necessary protective devices. Each employee is expected to be a safe worker, to keep tools and equipment in good condition, and to use the protective devices which the Company supplies. It is expected that he will be a safe worker as well as an efficient worker.

R. C. Barbour
Manager, Production Department



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GENERAL DIVISION

GENERAL SECTION

General

1. The prevention of accidents is of first importance and no employee should allow a condition hazardous to life or limb to exist without remedying the defect or reporting it to his supervisor immediately.
2. A supervisor should call his men together at least once each day, or on such other occasions as new or hazardous work arises, to discuss safety and allow the men to make suggestions.
3. An employee's immediate supervisor should make certain that he clearly understands the safe practices and the condition of the job which he is to undertake or on which he is engaged.
4. Premises must be kept clean and in order.
5. Employees should avoid strains when lifting by keeping their backs as nearly upright as possible, using the leg muscles instead of the back or stomach muscles. They should not attempt to lift more than can be safely handled. They should be sure there are enough men to handle the load.
6. Scuffling, practical joking, or any horseplay among employees on duty is positively prohibited.
7. Smoking is not permitted around shale shakers, on or under the floors of drilling rigs, in the immediate vicinity of tank batteries, oil, and gas wells, and at any location where "No Smoking" signs are displayed. Any area subject to contamination by inflammable liquids or gas should be designated by local management as a "No Smoking Area."
8. All tools and equipment must be inspected regularly. Defective and unsafe tools or equipment

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must be reported to the supervisor as soon as they are found to be in poor condition and be repaired or replaced at once.

9. First-aid kits and snake bite kits must be kept filled and available for use at all times.
10. Drinking water containers shall have spigots and individual sanitary cups shall be provided.
11. Baggy, loose, or ragged clothing must not be worn by employees working around moving machinery.
12. Good shoes should be worn. Safety shoes are recommended.
13. Safety hats must be worn wherever head injury hazards exist.
14. Anyone near other persons who are doing work which requires the use of goggles must also wear them.

Equipment

15. Bleeders should be placed in all lines that may contain pressure.
16. Celluloid eye shields or celluloid visors must not be worn; a spark or intense heat may set them on fire and cause serious injury.
17. Braided or hydraulic flexible type hose that is used in lengths greater than 18 inches and for air, gas, or liquid pressures in excess of 150 psi shall be adequately marked to identify the rated working pressure of the hose. Such marking may be applied to an aluminum or other suitable metal tag that is attached to the hose.
18. Braided or hydraulic flexible type hose in lengths greater than 18 inches and which may be used to handle air, gas, or gas-liquid mixtures is to be restricted to services where source pressure on the hose will not exceed 250 psi except that short lengths of hose not exceeding 10 feet

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in length and which are adequately anchored by clamps and chain may be used for source pressures up to, but not exceeding, 500 psi. Source pressure means the maximum pressure that is available from the pressure source to which the hose is connected. Any exception must have the approval of the division superintendent.

19. Natural gas or liquefied gas, such as butane or propane, furnished any Company or employee buildings from the Company gas system must be regulated to a pressure not to exceed 8 ounces. Natural gas or liquefied gas used for this purpose should be odorized. Pop valves should be installed downstream to the system regulator.
20. Gas should not be piped to storm cellars, nor should storm cellars be placed within 25 ft. of gas lines.
21. The use of rubber hose from a gas stove to a gas line is not recommended.
22. Gloves will prevent many minor injuries when employees are handling material and pipe. Their use is recommended whenever practicable.
23. Standard handrails for walkways must be 42 inches high with intermediate rails.
24. Hooks on all blocks, including snatch blocks, shall be provided with safety bridles. Rig builders' and electricians' hooks are exceptions to this rule.
25. Permanent ladders shall be securely fastened at top and bottom.
26. All oil and gas lines should be buried deeply enough or protected in some manner at road crossings to prevent being broken from traffic. The presence of these lines should be marked properly with road signs at such crossings.
27. A leaking valve on a high-pressure connection must never be stopped with a bull plug. A nipple and an extra valve should be used and the ex-

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tra valve should be open while the connection is being made.

28. Safe working loads (in pounds) for standard Manila rope (3 strand) based on safety factor of five on the minimum breaking strength.

Diameter In Inches	When Used Straight	When Used at 40° Angle from Path of Load Travel	When Used at 45° Angle from Path of Load Travel	When Used at 60° Angle from Path of Load Travel
1/2	530	460	370	270
3/4	1,080	940	760	540
7/8	1,540	1,340	1,090	770
1	1,800	1,560	1,270	900
1 1/4	2,700	2,340	1,910	1,340
1 1/2	3,700	3,200	2,610	1,850
1 3/4	5,300	4,590	3,740	2,650
2	6,200	5,370	4,380	3,100

29. Safe working loads (in pounds) for 6 x 19 plow steel, bright wire hemp center wire rope based on safety factors of five on the minimum breaking strength.

TWO-PART SLINGS

Diameter In Inches	Single Rope	Straight	When Used at 60° Angle	When Used at 45° Angle	When Used at 30° Angle
* 3/8	2,000	4,000	3,400	2,800	2,000
1/2	3,600	7,200	6,300	5,200	3,600
5/8	5,700	11,400	9,800	8,000	5,700
3/4	8,100	16,200	14,000	11,400	8,100
7/8	10,900	21,800	18,900	15,500	10,900
1	14,200	28,400	24,600	20,000	14,200
1 1/8	17,800	35,600	30,900	25,200	17,800
1 1/4	22,000	44,000	38,000	31,000	22,000
* 6 x 7 plow steel, bright wire hemp center.					

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To determine safe working loads for improved plow steel rope, multiply above values by 1.15, and to determine the safe working loads for galvanized wire rope, multiply values by 0.90.

The above values are based on strength of the wire rope only and do not consider the efficiency of the rope attachments in the sling. Efficiency of properly applied wire rope attachments, considering breaking strength of rope as 100 per cent, should be considered as being 80 per cent even though in some sizes and types of attachments values somewhat higher than this may possibly be obtained. For spliced eye without thimble reduce the percentage to 70. This rule does not apply to wire rope when used as a drilling line. Because equipment and conditions are different on drilling rigs, safe hooks loads, safety factors, and instructions on the use of drilling lines are carried in the Equipment Specifications and Petroleum Engineering Division Instruction Manuals.

30. Average breaking strengths and safe working loads (in pounds) for American Chain & Cable Company HC (high carbon) High Test heat-treated electric-weld steel loading chain:

Nominal Size In Inches	Size Material In In.	Average Breaking Strength	Safe Working Load
1/4	9/32	7,750	2,500
5/16	11/32	11,500	4,000
3/8	13/32	16,200	5,100
7/16	15/32	20,700	6,600
1/2	17/32	26,000	8,200

31. Stem-packed valves should not be used for domestic gas utility service. Air cocks are recommended for houses.

Practices

32. Belt dressing is to be used only in emergency. The belt should be cut to such a length that it

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will not slip. If necessary to apply the belt dressing, the operator should stand as far as possible from the intake pulley and should apply the dressing to the center of the belt on the outgoing side.

33. Relief crews coming on duty must be informed of any changes which have taken place since they were last on tour that might present a hazard.
34. Gasoline, kerosene, naphtha, varsol, or any other inflammable liquid must not be siphoned by mouth suction from tanks or containers.
35. Gasoline containing tetraethyl lead must not be used except for motor fuel.
36. The use of gasoline as a cleaning agent in Company houses or on Company property is strictly forbidden. It is recommended that employees do not use gasoline as a cleaning agent in their own homes.
37. Kerosene, varsol, or any other approved cleaning fluid may be used to clean tools, machinery, and similar equipment, provided it is used in an area which is thoroughly ventilated.
38. Workmen should keep in the clear of any object that is being raised.
39. An employee should have free use of both hands when climbing up or down a ladder.
40. Machetes should have the existing tips rounded off and kept blunt one-half inch from end of tips and three inches from handles to prevent accidental cuts to employees.
41. Machetes should always be carried in scabbards when not in use.
42. For work requiring that several men use shovels,

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picks, axes, or machetes, a safe distance between individuals should be maintained.

43. When clearing right of ways or locations, employees should be spaced so that the danger of injury from falling trees is eliminated. All men should be in the clear and all those nearby should be warned before a tree is ready to fall.
44. All underbrush and all low-hanging branches should be cleared before a tree is cut down. Employees should select a clear place to stand.
45. A tree should never be left partly cut.
46. No matches or cigarette lighters should be carried in gaseous areas.
47. Mercury and its compounds should be handled with care, and then the hands should be washed with soap before other parts of the body are touched. Breathing mercury fumes should be avoided.
48. Nails around tops of kegs, barrels, and boxes should always be removed, for if they are left there, they form a hazard to anyone reaching into the receptacle.
49. Boards should never be thrown down or allowed to lie around with nails sticking up. The nails should be removed or bent down, preferably removed.
50. Paint should not be removed with lye. Paint should be removed by paint remover or it should be scraped off. Goggles should be worn. Most paint removers are inflammable and must not be used around open flames or other sources of ignition.
51. Employees carrying pipe on their shoulders should all carry the pipe on the same shoulder.

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Carrying calipers are recommended where the weight of pipe justifies their use.

52. Employees should keep feet and hands from underneath pipe when it is lowered into a ditch.
53. Waste oil pits should not be located near power lines.
54. A high-pressure line must never be opened or closed suddenly.
55. When gas manifolds are frozen up, all pressure should be released and the manifold thawed out before putting system back into operation.
56. All pressure must be removed from all lines, regulators, meters, fittings, and connections before disconnecting or working on them.
57. When bleeding down high pressure gas lines, before starting repairs, welding, cutting, and so forth, sufficient time should be allowed for thawing out ice plugs which may have formed in the line.
58. Employees should not hammer or pound on lines or fittings under pressure.
59. Precautions should be taken to protect the operator from sand or line scale when he is relieving pressures and blowing lines.
60. Blocking of roads is an emergency measure to be used only in case of necessity and every precaution must be taken to see that the public is adequately protected. When a highway must be blocked, guards furnished with red flags must be stationed at least 100 yds. in both directions from the point where the highway is blocked to stop approaching cars. A white rag, newspaper flag, or some other readily visible object should be tied to the line to attract the attention of approaching motorists. This added

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precaution is necessary because motorists might mistake the men sent out as guards for hitchhikers and refuse to stop when waved down. Although such work should be done in the daytime, if a road must be blocked at night, the places where the guards and blocks are placed must be adequately lighted. Public authorities should be notified where possible.

61. Personal radio and television aerial installations should not be tied to rigs, line poles, or to other Company equipment. Refer to Electrical Section.
62. Oily waste, rags, or clothing must not be left lying around or left in enclosed spaces other than suitable receptacles. Spontaneous combustion may result and cause fire.
63. Only authorized persons are permitted to change the settings on regulators.
64. Proper shoring and bracing should be provided on excavations deeper than 4 ft. where soil conditions might allow a cave-in.
65. Tools, equipment, or material must not be thrown up or down from one working level to another. They should be carried or sent up or down by the use of a handline or other safe, suitable method.
66. Hand tools should be used in the manner and on work for which they are designed.
67. A valve should never be opened or closed unless the employee knows what purpose it serves. Valves must not be jammed open or closed unless specifically designated by manufacturer of said equipment.
68. Regular walkways and steps are to be used. Employees should not take short cuts.

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69. Jack handles should be removed when the jacks are not being used. When men are working under a load raised on jacks or suspended by hoisting equipment, the load should be blocked.
70. Hot water heaters should be installed with vents at least as large as the collars on the heaters. Vents should lead to the outside 6 inches or more above the roofs and should be equipped with bonnets.
71. No gas leak should be allowed to remain near, under, or in a building, but should be stopped immediately and the building aired.
72. When testing for gas leaks, use soapsuds — never use flame.
73. Gauge glasses should be changed whenever they lose their transparency.
74. Gauge glasses should be stored in suitable containers before they are used and immediately disposed of after use. These glasses have been known to explode with violence because of unrelieved internal stresses.
75. Unauthorized persons must not attempt to make repairs to electrical equipment unless authorized by district or division management. All unsafe appliances, lines, and electrical apparatus, should be reported to the electrician or supervisor. Refer to Electrical Section.
76. Employees should exercise extreme caution when working near the electric welding arc, as it will severely burn the eyes.
77. If the tank is an integral part of the motor or unit, no gasoline should be supplied to a motor fuel tank while the motor is running.

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ELECTRICAL SECTION

78. Since the National Electrical Code represents a minimum of safe practices, it is recommended that electricians and other personnel be governed by its rules. The following rules are based on this Code and are for the guidance of those employees whose duties require the operation of electrical equipment.
79. Avoid working on energized circuits but, if it becomes necessary to do so, provide all protection possible through use of approved rubber gloves, rubber insulating blankets, and other insulating material appropriate for the voltage involved; also, provide an insulated place or support on which to stand. Where it is impossible to insulate all of the nearby wires, work slowly and very carefully to avoid a contact which could result in shock.
80. Insulated tools and rubber protective devices, such as gloves and shields, which are used for protecting a workman from energized electric lines and apparatus, shall be of approved types and shall be inspected for condition before each use. In case of any doubt of condition, they should be sent to the nearest power company for a high potential test.
81. At least two men should always be present when work is being done on an energized circuit, one of whom should be in the clear so as to render aid if necessary. Work on an overhead energized line should be done by an experienced lineman with two assistants, one of whom is equipped and able to climb to his aid if necessary.
82. All employees authorized to work on electrical circuits and their assistants should be trained and prepared to render effective artificial respiration and should be aware of the importance

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of avoiding delay in its application when it becomes necessary.

83. Avoid contact with low voltage as well as high voltage electrical lines; contact with low voltage lines, such as 110-volt household lighting circuits, can result in death.
84. In operating electrical equipment, employees should proceed according to instructions. They should not experiment. If equipment does not operate properly, they should call an electrician.
85. Motors should always be started and stopped with the push-button type or other approved type of starting switch which is provided. Main disconnecting switches should never be opened while motor is running or is energized and stalled.
86. When it is necessary that a structure be built close to any electric line, the Company electrician should be notified.
87. Water, particularly salt water, is a good conductor of electricity, therefore, great care should be taken when steam or water hose is used to wash the area near electric motors.
88. Transformer banks shall be so constructed as to prevent access to energized circuits by children, other personnel, or livestock, who might receive a severe or fatal shock. Transformer banks located on or near school grounds or campsites with platforms less than 7 ft. above the ground shall be fenced. Such banks shall have not less than one "DANGER — HIGH VOLTAGE" sign displayed in the most prominent place.
89. As a protection to linemen, no signs, fences, clothes lines, or other encumbrances should be attached that might affect the safety of the linemen when climbing a power line or telephone pole.

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90. Switches which are opened to permit work on circuits or equipment should be tagged with danger signs to warn against closing them.
91. "Hot sticks" should be kept in weather proof containers and inspected regularly.
92. Ground wires are for the protection of the workmen and shall not be disturbed. It is imperative that they be properly maintained.
93. Rubber mats laid on ventilated wood mats should be provided for employees to stand on while operating switch panels in generating houses. Outdoor switches and controls in arid areas shall have some protection other than normal for personnel. This shall consist of a heavy metal mesh screen laid on the surface where the operator stands and connected to the switch case with a #8 or larger copper wire. This protection is especially warranted when the ground is slightly wet on the surface.
94. Guards must be placed around switch panels at points where wires are exposed.
95. When moving high loads with truck or tractor, a lineman should accompany the load if overhead power lines must be cleared.
96. Employees must not use a power line pole as a snub for a winch when material is moved or the truck is pulled when stuck, as there is danger of shorting the wires when the strain is taken off the pole. The contact of two wires may cause a short which results in burning and parting of the wires, thereby allowing the parted wires to fall to the ground.
97. When working under or near high voltage lines, employees should take care that gin poles, guys, or other objects are not moved into or near them.

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98. Metal boxes used to enclose electric meters, switches, and other electrical apparatus shall be grounded.
99. The exposed metal frame and housing of portable electrical tools shall be grounded through the third wire of a 3-conductor cord which shall be used to connect the tool to the power supply.
100. Pennies and other solid metals shall not be used to restore services when a fuse plug fails.
101. In most instances, fuses are between the load and the disconnect switch. If there is any doubt, call the electrician. If no doubt exists, open the disconnect before an attempt is made to replace a fuse.
102. Brass key sockets or uninsulated pull-chain sockets should not be used in bathrooms or close to sinks.
103. Electrical switches in new construction shall be so placed that persons standing in bath tubs or otherwise in contact with a conducting surface can not reach them. Existing toggle switches are considered safe when equipped with an insulated handle, plate, and plate screws.
104. Broken light globes should be replaced as soon as possible after they are discovered. The circuit should be cut off at the master switch.
105. All vapor proof globes and flood light lenses should be kept clean to allow a maximum of light.
106. Should switches or other electrical apparatus become energized, proper precautions should be made immediately to prevent injury to personnel and the services of an electrician obtained at the earliest possible moment.

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107. All generating buildings shall have screen doors or other protection to exclude unauthorized persons or small animals.
108. A danger sign of warning must always be placed on equipment where there are automatic switches. If an employee is working around or on the equipment, the disconnect switch must be opened.
109. Pole top switches are not operated very often and as a consequence, a blade may become stuck or inoperative for some cause or another. After operating the opening mechanism, the operator should step back a sufficient distance and see if all three blades are disconnected. A periodic inspection should be given these switches to be sure that all the mechanism is in good working order. When opening air gap or pole switches, rubber gloves should be used.
110. Installed electrical equipment should be cleaned only with solvents approved by the Safety Division. Employees should be careful to avoid breathing solvent fumes. Fans or blowers may be necessary in confined areas to insure a fresh air supply.
111. Care should be exercised to avoid breakage when handling fluorescent lamps. If a fluorescent lamp is accidentally broken, avoid handling broken fragments and avoid breathing dust or vapors given off from the broken lamp.
112. If a person is accidentally cut by glass from broken fluorescent lamps, the wound should receive immediate medical attention for thorough cleansing.
113. Burned out fluorescent lamps should be disposed of in a manner that will not expose children or other people to vapors or fragments of broken fluorescent lamps.

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114. When television antennas are installed at Company houses, the following precautions should be taken:

- A. Bond the aerial mast to the water piping with a No. 8 copper wire or larger. Use solderless ground connectors for attachment.
- B. Install guy strain insulators in the guy wires. For small guy wires No. 500 strain insulators are suitable and for $\frac{1}{4}$ " to $\frac{3}{8}$ " guy wires No. 502 or No. 504 strain insulators.

GOGGLES SECTION

115. To insure maximum eye protection and comfort, all types of goggles used should be adjusted properly to each individual's face. Spectacle-type goggles have adjustable bridges which must be adjusted to fit the nose bridge properly to provide adequate eye protection. When adjusting cup-type and chemical goggles, the head bands must be set properly on the head and adjusted to allow lenses and face piece to cover the eye area thoroughly. Head bands should not be worn any tighter than is sufficient to hold goggles in place. When excessive fogging of goggle lenses occurs, various types of "anti-fogging" compounds are available for application to the lenses to limit fogging conditions. Necessary repair parts to goggles will be furnished by the Company.
116. Employees who only occasionally are exposed to eye hazards should have standard cup-type or cover glass cup-type goggles (for use over corrective glasses) available for eye protection when exposed to eye hazards.
117. Spectacle-type goggles are furnished to certain employees whose occupations expose them to

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frequent eye hazards. If these employees normally wear corrective glasses, spectacle-type goggles will be furnished with the employee's prescription ground in the lenses. In these cases, employees are required to furnish their own prescriptions.

118. It is recommended that employees who are issued spectacle-type goggles wear them during their entire tour of work except when there is a need for additional protection, such as handling chemicals, working around excessive dusts, or when working in an area where flying particles might enter the eye area through the side of the goggles.
119. Full protection chemical goggles should be used when handling hazardous chemicals, such as in the mixing of chemicals for drilling muds, cleaning material with chemical solutions, handling creosoted material, working with molten metal, pitch, asphalt, or bitumastic compounds, or in any other operation where the employee's eyes may be exposed to hazardous chemical liquids, powders, or vapors.
120. Employees must wear impact-type goggles (spectacle-type, spectacle-type with side shields, or cup-type, whichever is issued) when chipping, scraping, buffing, or breaking any metal or material which will involve a flying chip hazard such as:
- A. Renewing or tightening gauge glasses.
 - B. Hammering or sledging on chisels, cold cuts, chisel bars, fittings, connections, and so forth.
 - C. When cutting wire lines.
 - D. When using wire brush to clean threads or fittings.

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- E. When sledging rock bits, core heads, and so forth, to loosen or tighten them.
 - F. When driving tong keys or driving pins in and out of chains.
 - G. When painting hot boilers.
 - H. When using a pick.
 - I. When cleaning tubes in boilers, economizers, flues, and stacks.
 - J. When driving, heating, or holding rivets.
 - K. When shearing metal scrap.
 - L. When chipping and caulking seams, rivets, and pipe line leaks.
 - M. When grinding on abrasive wheels or buffing with buffing wheels even when glass guards are provided.
 - N. When using compressed air or steam to clean machinery or equipment.
 - O. When working on a lathe.
 - P. When grinding old asbestos or removing asbestos insulation not in sectional form.
 - Q. When working around rolling or stationary mechanical equipment, such as shop machines, motor vehicles, locomotives, and cranes.
 - R. When using a soldering iron.
 - S. When handling dirty or rusty wire lines, pipe, connections, and so forth.
 - T. When handling materials in powder or semi-powder form where a dust hazard exists.
121. When welding or cutting material with acety-

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lene gas, workmen should use No. 5 or No. 6 shade lenses.

- 122. Helpers for acetylene welders or cutters should use No. 4 shade lenses or their equivalent.
- 123. For electric arc welding, workmen should use welding helmets or hand shields with No. 10 or No. 12 shade lenses.
- 124. Helpers for electric welders must use No. 6 shade lenses.
- 125. Cover glasses should be used with all welding goggles, helmets, and shields.

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PRODUCTION DIVISION

TOOLS & EQUIPMENT SECTION

Equipment

1. No ells, tees, or other obstructions should be connected to the ends of bleeder lines from gas lift meter manifolds, pressure vessels, or any other installations which require the relief of high pressure water, oil, or gas.
2. All high pressure (100 lbs. or greater) bleeder lines must be equipped with adequate tiedowns. For specifications, refer to Derrick Guying Subsection, Equipment Section, Petroleum Engineering Division Instruction Manual.
3. All engine houses and pumpers' offices should be ventilated.
4. Chemical goggles and gloves are recommended for employees handling lumber or pipe that has been treated with creosote or other protective materials that might cause skin irritations. Exposed parts of the body must be protected by any cream with a lanolin base.
5. Crown blocks should be fastened to water table beams with U-bolts or other approved type tiedowns.
6. All crown sheave journals shall be provided with bearing caps or metal straps to prevent the sheaves from jumping out of the bearings.
7. The pump end of all drilling hose should be securely fastened to the derrick by a cable or chain clamped to the hose and the derrick leg. The swivel end of the hose shall be secured by a chain or cable clamped to the hose, and the other end shall be fastened to the body of the swivel. The cable or chain should not be fas-

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tened to the swivel gooseneck as the gooseneck may break. The safety cable shall be not less than $\frac{5}{8}$ in. in diameter and the chain not less than $\frac{1}{2}$ in.

8. All tubing elevators with detachable bails shall have bolts or pins through the holes in the ears, or other positive locking means, to hold the bails in place. If bolts or pins are used, cotter keys must be used to hold them in place.
9. First aid kits and snakebite kits should be available to all gangs and pumpers.
10. All "dead" oil and gas wells which might flow must have proper control equipment installed and must be properly choked or attended if left open to the atmosphere.
11. Gas lines to pumpers' offices must be equipped with drips, regulators, and odorizers. The drips should be installed upstream from the regulator.
12. Signs should be put on each side of the highway where there is an oil or gas line so that highway graders won't drop the blade too deep.
13. All gas stoves in pumpers' offices should be vented.
14. Guardrails should be installed around power-engine clutches and belts.
15. Guards should be placed around cranks and all other hazardous moving equipment on pumping units.
16. Guardrails should be put around open flywheels on internal combustion engines. These guardrails should be in place at all times while engines are operating.
17. When wells that may head up and flow are

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being pulled, life lines and safety buggies must be installed as part of the derrick equipment.

18. A lift nipple in good condition, as strong as the pipe to be lifted, should be used where a lift nipple is required.
19. Air-intake lines should be extended outside of buildings and located away from exhaust lines.
20. Exhaust lines for all internal combustion engines shall extend outside buildings, and should be insulated where passing through buildings to prevent fire hazards.
21. Force-feed lubricators should be used throughout on the power unit where practicable.
22. Pressure relief holes should be drilled in the housings of all bourdon tube type pressure gauges.
23. Ladders should be constructed on all Sampson posts if it is necessary for a man to leave the ground to grease walking beam bearings.
24. Rod strippers equipped with suitable drains are recommended in localities where paraffin conditions prevail.
25. Rod and tubing boards must be attached to the girts by U-bolts.
26. All rod and tubing boards shall cover the space from the working edge back to the legs of the derrick.
27. Rod wrenches of adequate length for size and tightness of rod joints should be used at all times.
28. All gas separator installations shall be equipped with at least one safety valve each which shall be set to pop at a safe pressure.

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29. The weights on dead-weight safety valves on separators should be securely attached to the nipples on the traps.
30. All high pressure separators should have safety heads pointing straight up in accordance with Company equipment standards in addition to the safety valves.
31. Approved type pedestal block installations and tractor hold downs are to be used when wells are pulled with tractor winches and pulling machines.
32. Gang trucks shall be equipped with fire extinguishers, first-aid kits, salt tablets, and paper drinking cups.
33. Tubing blocks shall be provided with safety housing containing no square boltheads or other abrupt projections that might hang up on tubing collars or tubing board. Housing shall be arranged with holes or slots for cables to pass through before reaching the sheaves in order to prevent men's fingers from being drawn in between the sheaves and the cable.
34. A wireline is preferable to a chain for raising or lowering the beam or other heavy equipment.
35. Wire lines must not be subjected to overloading. Swabbing lines must not be used to pull heavy strings of rods. Strength specifications of wire lines will be found in Rule No. 29, General Division.
36. Wire line drums should be equipped with approved type guards.
37. An extension device 3 ft. long, or longer, to prevent employees from coming in contact with line or drum must be used when wire lines are being guided on drums. When this operation is

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being performed, someone must be at the drum controls.

Practices

38. Sufficient flags should be placed on the bailing line to stop the bailer or swab at a safe distance from the oil saver.
39. Beam hangers must not swing free while a well is being serviced but should be tied back.
40. If it is necessary for a bleeder line to be directed toward the working level of a burning pit, the line should be given a gradual dip near its end to allow unrestricted flow and prevent sudden pressure shock which causes jetting or thrusting action on the end of the line.
41. No liquid shall be drawn from a high pressure separator bleeder line to an open vessel for any use whatsoever.
42. All new burning pits should be at least 150 ft. from tank batteries. In some localities, the nature of oil and gas produced, prevailing wind, and terrain may necessitate extension of the distance greater than 150 ft.
43. Cellars around producing wells shall be covered or filled.
44. When working in cellars or other excavations, employees should recognize possible hazards from gas vapors or cave-ins and adequate protection should be provided when it is needed.
45. If a person's clothing becomes saturated with oil while a well is being pulled, he should remain at a safe distance from the tractor or any other place where a fire hazard exists. Clothing should be changed as soon as possible.
46. All load possible should be removed from a

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pumping derrick and no pipe racked in the derrick before any derrick members are removed.

47. All employees must use approved derrick belts while working on platforms above the derrick floors.
48. Derrick belts should be dated when they are put in use and should be replaced when damaged or worn.
49. Work on the derrick floor should be suspended and workmen should get out of the way while the derrickman is using hand tools in the derrick.
50. Employees should stand on the windward side in pouring dope on a line. The bucket or other application device should be held close to the pipe. Care should be taken that dope is not poured on pipe that is damp or wet.
51. When doping pipe, employees should wear chemical goggles and long sleeved shirts with cuffs buttoned over tops of gloves. Trouser cuffs should be tied outside shoe tops.
52. Employees must exercise extreme care when putting tar or dope in heaters, when heating dope, and when carrying dope.
53. When B. S. is being drained from a tank to a burning pit through the permanent drain line, the drain line valve should be closed before the burning pit is lighted. When B. S. is drained in any other manner, suitable methods must be used to prevent the fire from flashing back to the tanks.
54. Drive belts must not be tightened while they are in motion.
55. When working on any internal combustion engine, the ignition should be released on the igni-

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tion type, and compression should be released on the Diesel type or the engine may fire when it is turned over.

56. The impulse coupling on magneto-type engines should be inspected for proper operation before the engines are started.
57. Before engines which start on air are spotted, spark plug wires should be removed.
58. When cranking small engines using a rope to turn motor, employee should never wrap rope around hand or wrist. Starting rope should be of adequate material and be equipped with handle.
59. If necessary to crank by hand, the engine should never be spun. It should be started by pulling up one-quarter turn. The crank should never be pushed downward.
60. The clutch lever should always be placed where it can be reached without the necessity of the employee's reaching over the drive pulley.
61. Workmen must not stand in line with the clutch while it is in motion because there is always the danger of breakage and flying clutch shoes.
62. The clutch on an internal combustion engine must not be adjusted while the engine is running.
63. When the position of a counterweight is being changed, the crank should always be spotted so there will be no movement of counterbalance when it is loosened and the brake should be set.
64. All heaters in gun barrel service on flow lines and in flow treaters must have water over the fire box before being fired and normally at all times when in use.

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65. When a heater or flow treater is opened for cleaning the heater, making inspections, or making repairs, extreme caution should be exercised regarding open fires, matches, or sparking tools around the open vessel. Any pit fire should be extinguished and lines leading from the vessel to the pit should be closed with valves or the lines should be disconnected. The fuel supply to the heater should be cut off and the line disconnected.
66. Any repairs made on heaters or flow treaters on the lease which involve the use of welding or cutting should follow procedures designated by the Division Safety Engineer.
67. When iron sulfide is found on the inside or outside of the fire box and on the inside of a vessel that has been opened, the iron sulfide should be kept wetted with either water or oil as long as it is in contact with air.
68. When the fire box is to be removed from a flow treater, any soot accumulated in the fire box and in the stack should be wetted with either salt water or fresh water and kept wet as long as the vessel is open. Also, soot should be kept wetted down when the fire box is in place but out of service while connection work is done in the vicinity of the heater which could involve the release of gas.
69. When gun barrels or flow treaters are being installed and put into service, all fires including gas flares in the vicinity of the installation must be extinguished until the air has been displaced from the vessel being installed.
70. When a treater or gun barrel is constructed or is to be opened and vented for repairs and where fluids will be bled normally to a burning pit, a valve must be installed in any pipe line carry-

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ing salt water or gas from the treating plant to the burning pit. This valve should be kept closed until the air has been displaced from the vessel and enough salt water has been accumulated to require continuous bleeding of salt water. Valves normally installed immediately adjacent to the tank should be kept closed until needed. A flame can not propagate through a pipe that is full of liquid.

71. During paraffin drilling operations or similar operations that require the use of a lubricator, the well valve must be closed and the pressure bled from the lubricator before it is unflanged or removed.
72. It is advisable to attach guy lines to the lubricator under certain conditions such as working during windstorms, using lubricators more than 20 ft. in length, working with extremely high pressure, or working on deep wells.
73. Men using paint sprays must always wear respirators designed for such usage.
74. When disconnecting bolted couplings, plugs, or choke cage caps, the bolt and fitting should always be loosened and pressure bled off before bolts are removed to prevent fitting blowing off in case pressure is on the line.
75. With the exception of special portable mast type well-servicing units, pulling machines should be placed at least 150 ft. from the well in such a way that the operator has good view of all men working in the derrick and on the floor.
76. When pumping heated oil under high pressure, employees should remain a maximum practical distance from injection point or flow line as the failure might spray them with scalding oil.

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77. If possible, all tool houses and pumpers' offices should be situated on hills because gases are likely to collect in valleys.
78. Pumpers' offices should be 150 ft. or more from tank batteries or producing wells, depending upon local climatic conditions.
79. If a gasoline-driven pump is used for removing B. S. from a tank, the pump should be located outside the fire wall. Engines not provided with non-sparking equipment should be located at least 150 ft. from tank batteries.
80. Pumping units must be stopped while employees are working on units. All electrical power units with main switches must be thrown if time clocks are used.
81. When operating the double-throw switch on a pumping unit motor from high to low, or from low to high, the employee should press the stop button before changing speeds. This will prevent a flash and eliminate a fire hazard.
82. Rod hangers shall be inspected before each rod job, and if they show signs of weakness, this condition must be reported and repairs made immediately. Several serious injuries have resulted from falling rods and these could have been prevented if the hangers had been properly inspected and maintained. Only approved rod hangers should be used.
83. Tests on rod hook latching mechanisms should be made before every job and as often as practical during each job in accordance with Production Department standards.
84. Keep feet from under rods when hanging rods in the derrick.
85. No tools should be placed in the rod basket, and before each rod job the rod hanger chains should

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be untied and straightened out before rod hanger leaves the floor.

86. Derrickman shall inspect and report to his supervisor on the condition of rod and tubing boards and other overhead equipment. Any defective material should be repaired before starting work.
87. Tanks should not be cleaned during an electrical storm.
88. Tank cleaning should be done in the daylight hours only.
89. Whenever possible, tanks should be cleaned by flushing with water or steam or by using long handled wood or belting drags from the outside. The water or steam hose nozzle must be grounded. Wire wrapped hose may be grounded through the external wire. Non-wrapped hose may be grounded by dragging a chain welded to the nozzle.
90. The district superintendent's authority must be secured and protective equipment approved by the Safety Division used when it is necessary for men to enter a tank that has contained crude oil or other petroleum products.
91. Fresh air or blower-type masks must be used by men entering tanks which have contained oil. Life lines must be used in conjunction with blower-type masks. Blowers must be located where gas or vapors can not contaminate them.
92. If it is necessary for men to go inside a tank that has contained oil, all lines including manifold vent lines must be blanked off at the tank to prevent any gas or oil from entering the tank.
93. Men working in the near vicinity of the opening of sour crude tanks should wear canister type masks. Time records on the use of canisters must be kept and canister replacements must be

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made as recommended by the manufacturer and the Safety Division.

94. If it is necessary for men to enter a tank, a cleanout section large enough for easy passage must be opened.
95. All work on the inside of a tank that has contained inflammable liquids must be done with sparkproof tools.
96. Extreme care must be taken that motor vehicles are not driven or motor or gas engines are not used within gaseous areas such as around tank batteries, gassing wells, burning pits, and low points.
97. When testing for plugs, leaks, or when cleaning lines no more than a predetermined maximum pressure may be used.
98. All tools and equipment must be inspected, oiled, cleaned, and repaired regularly. All repairs and replacements must be made without delay.
99. Any part of a hoisting tool subjected to direct load should not be repaired locally by welding. Only repairs that can be made by replacement with new parts should be made locally. No attachments should be welded to the hoisting equipment.
100. Tubing, rod, sand, and safety lines should never be dropped from derrick.
101. Employees should use at least two lines from the traveling block when pulling tubing on any well.
102. All men should be out of the derrick when tubing is lifted off the bottom or when any unusual strain is placed on the derrick. When unseating tubing packers, weight indicators should be used to pick up the tubing. Before lifting

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tubing off bottom, the valve on the casing should be opened after the men, so far as is possible, have left the derrick and floor.

103. When tubing is run in a well, extreme caution should be exercised when the bottom of the tubing is passing through the top of the liner because it might hang momentarily and then slip off, thereby causing the tubing to part, tubing line to break, or the derrick to fail.
104. Two in. and 2½ in. tubing and 2¾ in. drill pipe, unless supported at the approximate midpoint by an additional derrick board, should not be racked in lengths more than 65 ft.
105. The crown block should be inspected before each rod and tubing job.
106. Gloved or bare hands must not be used for stripping oil or paraffin from sucker rods.
107. When swabbing, scraping paraffin, or using bailing line, no one should stand near the cable as it might part or throw slack and catch him.
108. Studs and bolts holding safety housing of tubing blocks in place should be inspected regularly.
109. Work on the floor should be suspended while stringing or unstringing tubing block in the derrick.
110. A belled nipple made of a non-sparking material or approved rod stripper should be used in the top of tubing to prevent sucker rods from hanging up on tee while rods are being run in hole.
111. Extreme care should be exercised when employees are working near a winch line because it may become taut or slack without warning.

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Employees should never step over such a winch line.

112. When a wire line is to be cut, the line should be wrapped on each side of the point where the cut is to be made. An approved wire rope cutter is recommended.
113. Proper wrenches should be used to prevent slipping which might result in injury to employees.

PORTABLE DERRICKS & MAST SECTION

114. One man must be at the controls at all times when the cathead is being used.
115. All catheads on pulling machines must be equipped with catline dividers.
116. When the telescoping derrick is cradled, all slack should be taken out of the telescoping winch line and the winch should be locked.
117. Tension on hoisting screws of Frank's equipment should be partially released when the derrick is cradled.
118. A concrete foundation designed to support portable derrick units is desirable. However, if a temporary foundation is used, it must be placed on firm ground and leveled before the derrick is raised. No lumber thinner than 3 in. should be used.
119. When raising from and lowering to the cradle, and telescoping up or down, no one should be allowed to stay in the cab.
120. The operator should consult with his immediate supervisor before raising or lowering the derrick in a high wind.

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121. The operator is responsible for the inspection of the automatic brake, telescoping chain, and wire line each time before the upper part of the derrick is lifted.
122. Before the derrick is raised off the cradle, the jacks under the rear end should be tightened. After the derrick has been raised approximately one foot off the cradle, the jacks will loosen and should be retightened.
123. All persons except the operator should stay clear while the derrick is being raised, lowered, and telescoped up or down.
124. No one is to be allowed in the derrick while it is being raised or lowered.
125. When telescope-type derricks are raised, the lugs holding the top section of the derrick should be inspected so the operator is sure they are seated before any additional work on the derrick is performed.
126. Because of the irregularity of the derrick ladder, extreme caution should be exercised when employees are ascending or descending.
127. The water-cooled exhaust manifold, sparkproof ignition, exhaust spark arrester, and any other engine fireproofing equipment should be inspected at least once each week and kept in good repair.
128. When the unit is used to drive a rotary, chain guards must be supplied.
129. A derrick or mast should be properly positioned at the well and leveled before it is guyed. Guy line tension should not be used to bring crown block over the well.
130. Guy wires and the safety slideline should be fastened only to approved anchors.

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131. All guy wires should be properly tightened before any load is put on the derrick. Particular attention should be given to equalizing tension in intermediate guys on pipe masts. Excessive tension on all guys must be avoided.
132. When the unit has been left unattended for as much as one tour, all guy wires and leg screws should be inspected before work is begun.
133. Employees should never step on wrenches and tongs when additional leverage is needed.
134. All loose equipment such as blocks, elevators, and mud hose, should be securely tied before unit is moved.
135. When pulling rods or tubing, the derrickman must stay on the ground until after the first stand has been pulled.
136. Stuffing boxes should not be supported on the polish rod by hand while stabbing and making up but by a clamp or some other suitable method.
137. Pulleys used for telescoping operations should be inspected and lubricated at intervals depending upon conditions under which the units are used.
138. The telescoping line should be spooled evenly to prevent jerks when telescoping up or down.
139. Bridges, overhead wires, and soil conditions on unimproved roads should be checked before a portable derrick is moved over unfamiliar roads.
140. The truck should be moved only when the derrick is in a horizontal position. If the unit is found to be spotted incorrectly over a well, the derrick should be lowered to a horizontal position before the position of the truck is changed.

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- 141. Operators should check the hoist and winch gears to be sure that they are disengaged before the truck is changed into road gear.
- 142. The driver should remember that excessive weight prevents sudden emergency stops. Therefore, when moving a portable derrick or mast he should not drive at speeds unsafe for road or traffic conditions.
- 143. No welding is to be done on the portable derrick or mast without the proper authority.

PUMPING SECTION

Equipment

- 144. Drips on wet-gas lines should be drained at specifically stated times.
- 145. The firing controls in heaters should be adjusted, as suggested in the OIL TREATING HANDBOOK under "Operation of Heaters."
- 146. Employees gauging or sampling tanks which contain oil having a hydrogen sulphide content must wear canister-type gas masks.
- 147. All gauge hatches that are not of the spark-proof type shall be provided with lead gaskets or some other non-sparking material.
- 148. Night pumpers shall be provided with approved lights.
- 149. When the polish rod stuffing box is packed, the top half of the box must be held by the special safety clamps designed for this purpose. Before a polish rod stuffing box is packed, bleeder valves shall be opened.
- 150. Pressure elements on meters must be able to withstand line pressure. A 50-lb. element should not be used when a 100-lb. element is required.

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- 151. Centrifugal shakeout machines should be attached to substantial bases. The operators should take care that their hands do not come in contact with the revolving tube holders. While a machine is in operation, the operator should not stand so that, should one of the tubes burst, it will strike him in the face. Bowl-type guards on gas driven centrifuges are recommended.

Practices

- 152. The pumper's job is such that he must usually work alone. He should realize that his safety rests with himself and with his method of working.
- 153. Lung pressure is not to be used to blow dirt from the bowl of the meter. Air or gas should be used. Goggles should be worn.
- 154. When changing a choke, the operator should stand to one side to avoid being struck should the choke blow from choke cage by unreleased pressure.
- 155. When necessary to use chlorine in salt water systems, always work to the windward side.
- 156. Open flames must not be permitted near calodrant. All non-returnable calodrant cans should be destroyed immediately after they have been emptied.
- 157. Before an engine is cranked, the floor in the cranking area must be free of all objects, oil, and grease so that a stable footing may be maintained.
- 158. Generator or water pump belts should be put on or taken off by turning the flywheel by hand. The spark plugs should be removed.

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159. When the band wheel is to be oiled or repaired, the engine should always be shut down.
160. Foreign substances must not be removed from the belt or pulley while it is in motion.
161. When the idler is oiled, the oiler should stand on the off-side of the pulley.
162. Workers must not approach the vicinity of unguarded moving belts unless absolutely necessary.
163. Before removing bolts from flange connections, fittings, or installations, pipe connections should be supported properly.
164. When shutting in a flowing well, the valve on manifold at tank battery should be left open to protect low pressure fittings.
165. All greasy waste and rags should either be destroyed or placed in covered metal receptacles.
166. All gas leaks should be repaired when discovered, or as soon thereafter as possible.
167. When necessary to make repairs during which the flow of gas cannot be controlled, gas masks approved by Division Safety Engineer should be worn by repairmen.
168. Thief hatches on tanks must be kept closed except during gauging and cleaning operations. Employees must stay off tanks and tank walks during electrical storms in the tank area.
169. Anyone who opens the hatch of a tank shall first ground himself by touching the steel hand-rail on steel tank walkways or by touching the tank on wooden walkways.
170. Employees should not stand or walk on tank

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- roofs while sampling or gauging. If the gauge hatch cannot be reached from the walkway, the walkway should be extended to the hatch.
171. Employees should never stand directly in front of the fire box when inserting a lighting torch, opening the pilot fuel supply, or opening the main gas valve.
 172. When the fire goes out in a heater, the fuel gas and pilot gas valves should be closed for at least 5 minutes before relighting the pilot.
 173. When a flow treater is put into operation for the first time, any fires in the burning pit should be extinguished and relit only after all air in the vessel has been displaced by gas.
 174. Any oil present in the fuel gas should be removed upstream of the firing controls on heaters.
 175. Employees should never light burning pits by throwing lighted matches into the pits.
 176. Employees should remember when lighting flares that the escaping gas can settle to the ground around the flares and under certain atmospheric conditions may spread over wide areas.
 177. Should it be necessary to light flares or burning pits by throwing lighted torches, every effort should be made to determine the extent to which gas may have spread. Those performing this operation should always stand on the windward side at a safe distance and not on the firewall of the burning pit.
 178. In localities where continuous gas pressure is available, pilot lights have been satisfactory for lighting flares.

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179. In localities where continuous gas pressure is not available, the local application of several mechanical methods that have been developed for lighting flares and burning pits from a safe distance should be considered.
180. Oil should not be allowed to remain on the engineroom floor.
181. Orifice plates should not be blown out of flanges.
182. Screw drivers should be used when gaskets and orifice plates are installed, to prevent mashing the employee's fingers.
183. When carbiding flow lines the orifice meter plates should be run out.
184. When an employee uses his hand to determine the condition of regulator valve seats, the adjusting nut or bleeder should not be moved because the inner valve may crush his hand against the seats.
185. A sparkproof hammer must be used for pounding, if necessary, while gas is escaping.
186. Smoking is not permitted around shale shakers, on or under the floors of drilling rigs, in the immediate vicinity of tank batteries, oil, and gas wells, and at any location where "No Smoking" signs are displayed. Any area subject to contamination by inflammable liquids or gas should be designated by local management as a "No Smoking Area."
187. All tank steps and walks should be free of obstructions.
188. Tank tops should be kept free of all loose objects or material.

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189. The gas vent lines on stock tanks should be inspected frequently and kept open.
190. Tools or material should never be stored under separators.

WAREHOUSE AND PIPE YARD SECTION

191. Goggles should be worn when cleaning threads on pipe and casing. Leather palm gloves should also be worn.
192. Crowbars, chain tongs, piston rods, and so forth, must be placed in their proper racks and not leaned in corners.
193. Never open more than one drawer of a file cabinet at one time.
194. All greasy waste and rags should either be destroyed or placed in covered metal receptacles.
195. If heavy fittings are placed in bins, strips should be placed across the lower part of the bins to keep such fittings from falling out when one of them is removed.
196. When marking equipment with a stencil, employees should wear goggles.
197. Material must never be piled within 8 ft. 6 in. of the center of a railroad track.
198. All material should be placed so it will not fall on a passer-by. In addition, no material should be left in aisles or walkways where it will constitute a stumbling hazard.
199. Proper provision shall be made to reach material in the higher shelves safely.
200. Whenever possible, steel pipe should not be racked in piles higher than 4 ft. Tiers must

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be separated with substantial strips and blocked at the ends.

201. Pipe should be racked evenly, joint above joint, in a vertical direction to avoid bending and breaking of strips.
202. Pipe should be racked so that it overhangs the pipe racks approximately the same amount at each end.
203. All pipe should be stripped with at least 1-inch materials.
204. All pipe less than 7 in. OD should be securely blocked with 1-inch thick blocks nailed to the sill or strip. All pipe 7 in. OD or over should be securely blocked with 2-inch blocks nailed to the sill or strip. Approved scotch blocks are permissible.
205. Pipe racks should be kept in an orderly and safe condition. The shop rack pipe usually is old and bent material and should be handled with care.
206. A suitable hardwood hand stick should be used for handling threaded pipe 3 in. or over.
207. It is sometimes the practice to store heavy materials such as paint, chemicals, clays, and sands in the attics of offices and warehouses, which may result in damage to the buildings and possible injury to employees. The maximum safe load for attics of new buildings of this type is 50 lbs. per sq. ft. The weight of materials stored in attics should be distributed as evenly as possible, and all precaution should be used to guard against overloading.
208. Stairways to attic storage areas in warehouses must be equipped with adequate railings.

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RIG BUILDING DIVISION

Equipment

1. All bolts used in the erection of derricks must have lock washers or lock nuts. The heads of the bolts must be on the inside of the legs in order that the relegs, if used, will be in alignment.
2. Canvas bags with safety chains and hooks should be used for handing bolts, nuts, washers, and water into the derrick.
3. The cathead must be free from rust, mud, and rope grooves worn by the rope.
4. The well must be properly guarded when relegs are removed or the derrick is dismantled. The framework which covers the Christmas tree must be 8 in. by 10 in. and have not less than 2 in. boards on the sides.
5. Guy lines must not be spliced except in an emergency. If spliced, either an electrician's service splice or two 3-bolt wire-line clamps should be used and the rig builder should be notified.
6. All defective guy lines, anchors, and safety lines should be replaced.
7. The eyelet of guy line anchor rods should be within 6 in. to 2 ft. above the ground surface level to prevent corrosion of wire lines and fittings and permit inspection.
8. Three-bolt spiral grooved galvanized guy clamps should be used in anchoring guy lines.
9. All guy lines on the derrick must have the prescribed derrick corner attachment for attaching the guy wire to the derrick.

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10. Motor equipment should be kept in good condition. A safety line or safety switch should be attached to the distributor wire before the cat-head is put into use.
11. Rig building trucks should be equipped with steps having toe plates and handrails.
12. Approved-type jack screws should be used at the top section of the derrick relegs. Lee C. Moore jacks may be used as designed by the manufacturer.
13. Releg jacks must be screwed snugly to the water table. When shims are used, they should be enclosed in a collar and clamped so they will not slip down.
14. Relegs must have a minimum of one clamp located at each derrick girt, and should be placed above and as close to the girt as possible.
15. All new and replaced permanent production derricks' run-arounds and crows' nests should be floored with galvanized steel crete mesh.
16. Special reels should be used to handle derrick safety lines.
17. Scaffolding should be of undressed lumber and of the best material available. The National Safety Council recommends the following procedure for testing scaffold planks: Block them up one foot from the ground; place supports the same distance apart as the scaffold supports on which they are to be used; put as close to the center as possible loads three times that which they will be required to support in actual use.
18. Scaffold boards must be of such length that they will overlap the supporting girts by at least 10 in. or they must be properly secured.
19. Good shoes should be worn and overalls should

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- be cut off above the shoe tops. Safety shoes are recommended.
20. Tools and equipment should be kept in good condition at all times.

Practices

21. Only men in good general physical condition with good vision and hearing should be in a crew.
22. Each man must work safely and look out for his fellow workers at all times.
23. Derrick parts or scaffold boards must not be dropped or thrown from the derrick. They should be lowered with a line.
24. It should be understood that derricks, racks, and so forth, should be left complete in every detail. This is for the safety of all men who follow the rig builders.
25. After the derrick is completed, the rig builder supervisor should be held responsible for a proper inspection to see that loose bolts, nuts, shims, or any other materials are not lying on the girts, run-arounds, or header.
26. When derricks are built by contract, a qualified Company representative must inspect the derrick upon completion of construction.
27. A man must not try to do a job alone when assistance is needed; he should call for help. Full length sills and other heavy material should be handled by enough men to perform the job.
28. There must be no unnecessary talking and yelling as the work requires the undivided attention of each man.
29. Ground men should avoid being under men working in the derrick whenever possible.

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30. All men working on the ground must use safety hats while they are working under the men in the derrick.
31. Only the supervisor or an employee designated by the supervisor may handle the rope on the cathead. The cathead and line should be kept free and clear of seeds and brush at all times.
32. Derrick legs or any other compression members must not be used after they have been bent or kinked.
33. A derrick line must never be spliced. Ragged lines must never be used.
34. No derrick member shall be removed while any pipe load is on or in the derrick. (See Rule 140, Drilling Division.)
35. In areas where guy wires are used, the derrick should be guyed with the bottom set of wires as soon as the proper height is reached.
36. The ladder should be inspected so that all rungs are secure and in place and that the fasteners are secure to each girt.
37. Rig builders must see that loose nuts and washers are not left in the derrick or on the scaffold boards.
38. Material should not be hoisted until it is ready to be bolted or nailed in place.
39. All nails must be removed from secondhand material.
40. When removing or installing relegs, the operator should take two turns around the releg and should hook the line back. A double half hitch must never be used.
41. The sills and floor boards for the derrick floor

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- and pipe racks should be inspected for soundness and strength before they are used.
42. The starting legs on the "v" side should be braced before men are allowed on the scaffold.
 43. All substructure members must be bolted securely before a derrick is raised or lowered by jacks preparatory to skidding it for any other purpose.
 44. When a derrick or substructure is skidded, the base channel and other interfering members should not be removed until the derrick is close to the Christmas tree and should be replaced and bolted securely immediately after the substructure has reached a point where it is possible to permit their re-installation.
 45. When the derrick is skidded with the rig on the floor, the skids on the base of the substructure corner column should be hobbled while the base beam is out of place.
 46. Wooden stiffeners, usually 8 in. by 10 in., should be placed between the corners of the substructure by which the derrick is pulled when it is being skidded.
 47. A thorough inspection for loose equipment should be made before the derrick is raised preparatory to skidding.
 48. If the skidding job can not be completed in one day, at least one set of temporary guy wires should be placed for overnight protection.
 49. Extreme care must be exercised when tools are used in the derrick as a falling tool will seriously injure a floorman.

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DRILLING DIVISION

RIGGING-UP SECTION

Equipment

1. Drilling boilers must be placed at least 150 ft. from the center of the well. Exceptions can be made by division management where boiler barges are involved.
2. Protruding keys or key seats on all catheads shall be covered with thimble-type guards.
3. The chain-long rack shall be anchored so it will be steady and can not be pulled over.
4. The crown block shall be securely fastened to the water table.
5. At least a two-line stringup must be used when crown blocks are lowered or landed. When handled as a single unit, the lines should be strung through the stringup block attached to the gin pole and through the center sheave of the crown block. The lines should be dead-ended at the gin pole crosspiece.
6. When crown blocks are lowered after wells are completed, workers should take special precautions to guard the Christmas trees.
7. Drips should be provided for gas flare systems. They should be opened and lighted before flares are lighted.
8. All drawworks, chains, and sprockets shall be equipped with approved guards.
9. Derrick floors should be as even as possible to eliminate stumbling hazards. The tops must be of rough, unfinished lumber. Broken boards should be replaced.

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10. On rigs where a thribble board is used for rack-ing drill pipe, the space between the drawworks drum and the rotary table guard shall be floored to the level of the rotary. Flooring shall conform with the curve of the rotary table guard. The space over the rotary drive shaft and bearing, between the rotary chain sprocket and the rotary table, shall be covered.
11. A suitable flow line should be laid from the derrick floor to the reserve pit or tank and connected to control head prior to opening a drill stem test tool.
12. The pinion shaft and drive pinion on every chain-drive rotary shall be guarded with metal shields to prevent an employee's foot from becoming entangled with the moving parts.
13. Eye-bolts or handles should be installed near the center of gravity on all heavy machine guards. This will eliminate the hazard of wrapping chains around the guards.
14. All chains, V-belts, or geared drives must have guards built over them.
15. All clutch-shifter dogs and fingers on all types of engines and motor friction clutches must be guarded.
16. Shear-pin-type relief valves should have suitable guards to protect employee from piston action of valve stem and from flying parts of sheared pins when the valves relieve.
17. Standard handrails should be provided when four or more steps are required.
18. The pump end of all drilling hose should be securely fastened to the derrick by a cable of not less than $\frac{3}{8}$ in. in diameter or chain not less than $\frac{1}{2}$ in. clamped to the hose and the derrick

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leg. The swivel end of the hose shall be secured by a similar chain or cable clamped to the hose, and the other end shall be fastened to the body of the swivel. The cable or chain should not be fastened to the swivel gooseneck, as the gooseneck may break.

19. A continuous steel cable shall be clamped to each section of all steel drilling hose to prevent any section from flying in case of a blowout. This cable shall be anchored to the derrick leg and swivel.
20. Only hose which is electrically bonded internally or wire wrapped shall be used for steam at drilling wells, and this hose shall be properly grounded to avoid any static charge. The hose should be grounded by one end of the wire attached securely to the nozzle and the other end to the steam line.
21. Manila rope used for a jerk line on tongs must be at least 1 inch in diameter.
22. Derrick ladders, except where landing platforms are used, shall extend in a straight line from the derrick floor to the top of the gin pole. Ladders should not extend below the derrick floor.
23. The ladder on a derrick should be on the side next to the driller and should be fastened to the derrick floor.
24. Each drilling derrick shall be equipped with a life line to be used as an emergency exit for the derrickman. This line shall be of 1/2-inch, 6 x 7 galvanized marine cable, and shall extend from above the derrick safety landing platform to a deadman. It shall be tightened to a tension of approximately 800 lbs., or so that a man hanging on the line will touch the ground from 20 to 25 ft. from the anchor. The length of lines for derricks 94 ft., 122 ft., and 136 ft. high are 196

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ft., 285 ft., and 285 ft., respectively. A standard safety buggy shall be placed on each line. This buggy shall be mounted on the cable and held in position by a Humble-type hanger. Exceptions may be made in marine operations but only with approval of division management.

25. Monkey board should be snubbed to derrick with 5/8 in. steel safety cable.
26. Fingers on monkey boards should be secured to finger beam with cable or chain to prevent fingers falling from derrick in case of breakage.
27. Monkey board and its supports should be secured to derricks with galvanized U-bolts and not J-bolts.
28. When using the monkey board method of racking pipe, a suitable steel bumper is recommended to be placed across derrick from racked pipe and securely fastened to prevent loose pipe from bending girts.
29. No welding or splicing should be done on finger beams of monkey boards. If finger beam is not long enough for derrick size, the proper size finger beam should be obtained.
30. It is recommended that rigs equipped with monkey board have an additional safety line from the breakout tongs to an approved anchor diagonally opposite the driller for protection of the pipe racker when laying down pipe or coming out of hole.
31. The mud box or any weight suspended on cables should not be tied to a girt of the derrick unless approval is given and the girt is properly reinforced.
32. Each drilling derrick shall be equipped with a suitable platform extending at least 2 ft. past

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the handrail to facilitate the use of the safety buggy. Derricks with the quarter runaround and safety buggy platforms are not required to have this platform extension.

33. A pressure relief valve of an approved type shall be part of the discharge manifold on every power driven pump. It shall be placed ahead of any valve on the line. Relief valves should be turned so that discharge will be directed away from employees and equipment. When discharge extensions are necessary they should be properly anchored.
34. The space around casing racks shall have no obstructions which might cause employees to stumble or fall during loading and unloading operations.
35. The rathole casing should extend at least 18 in. above the working floor level. The mousehole should be flush with the derrick floor and covered when not in use.
36. A runaround platform shall be installed on all permanent working platforms, including the water table. A $\frac{1}{4}$ -runaround is permissible where monkey board is used and should be level with the monkey board.
37. If rotary hose is connected to wash down pipe, it must have a safety line clamped from the hose to the elevator bail.
38. The hook of the snatch block shall be closed or bridled into the eye of the eyebolt.
39. Standpipe clamp bolts shall be equipped with cotter pins, lock nuts, or lock washers to prevent loosening of nuts from vibration.
40. All steps around the rig should have a suitable non-skid surface.

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41. Derrick floors more than 2 ft. above ground level should have steps equipped with hangers and these steps should be located at two or more places. Steps should be securely fastened to the derrick floors.

42. A suitable stringup chain shall be provided at each rig.
43. The thribble board or fourble board shall cover the space from the working edge to the legs and girt of the derrick and shall be securely fastened to the derrick.
44. Breakout and backup tongs should have safety lines to confine their swinging to definite areas.
45. Suitable means shall be provided for holding all traveling blocks while they are being strung and unstrung.
46. Every traveling block shall be equipped with safety housing that has no square boltheads or other abrupt projections. The housing shall be arranged with holes or slots for cables to pass through before reaching the sheaves, so that workmen's hands and fingers may not be drawn in between sheaves and cables.
47. A traveling block guard should be installed with through bolts at top and bottom, and each finger on the guard should have holes for these bolts. There should be some means provided for handling traveling block guards with catline, preferably have holes cut in guards.
48. The weight indicator should be connected before a well is started. The weight indicator diaphragm should be tied back to the derrick so that it will not be thrown across the floor when a sudden shock is placed on the drilling line.

49. The individual boards of all working platforms

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in the derrick shall be held together by at least two metal strips at least $\frac{1}{2}$ inch by 4-inch, one on each end of the boards. The strips shall be bolted, not nailed or screwed, to each individual board.

Practices

50. Chain hoists and snatch blocks should not be fastened to girts because any bending of girts weakens the derrick.
51. Core barrel overshot, while not in use, should be securely fastened back or set in a suitable rathole.
52. Derrick boards shall be landed by the catline and held by it as long as all or any portion of a board is not securely fastened to the derrick.
53. If gas flares are used for lighting, the control valves shall be placed at least the length of one joint away from the flare upright.
54. When tees or bonnets are placed on gas flare uprights, they shall be at right angles to the gas supply lines.
55. All electric rigs shall be properly grounded and guarded.
56. The all-metal tool houses must be grounded.
57. J bolts should never be used for tying down equipment and materials in the derrick.
58. The operating valve on slush pit or other jet lines shall be far enough from the jet so that if the steam line blows loose from the jet, it will not hurt the operator. Flexible hand wash-down hoses should never be used on the slush pump discharge.
59. All lines which may be subjected to high pressure or a high rate of flow shall be anchored.

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60. Water and steam lines should never be converged into one discharge.
61. All passageways, exits, ladder approaches, and working floor space must be kept clear, in good repair, and free from nails and other obstructions. Tools and other material should not be kept on floors or walkways.
62. The end of any pressure relief line should be anchored securely.
63. The opening for the rotary must be kept closed when the rotary is not in place.
64. All traveling blocks shall be strung and unstrung on the derrick floors.
65. When a wire line is to be cut, the line should be wrapped on each side of the point where the cut is to be made. An approved wire-rope cutter is recommended.

DRILLING OPERATIONS SECTION

Equipment

66. On rigs equipped with air operated clutches, a plug valve with bleeder valve downstream shall be provided in the main air line leading to air control valves, such as clutch levers, in order that accidental engagement of clutches and other apparatus can be prevented during repairs.
67. An approved wire line blowout preventer should be installed when any wire line tool is run in well.
68. Breakout tong line counterbalances should be used in such a manner that counterbalances will not rest on derrick sub-flooring, derrick sub-structure sills, or other obstructions and should allow for 8 ft. tong travel for tongs placed on

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drill pipe to break out pipe. Counterbalances should be checked frequently in this respect during the drilling of each well.

69. The safety line from breakout tong handle to the derrick floor sill adjacent to the rotary drive shaft should be short enough to restrict raising of breakout tongs before the counterbalances would rest on the derrick sub-flooring or derrick substructure sills.
70. In order to facilitate the quick detection of dangerous leaks in the butane storage and piping system, all butane must be odorized with some acceptable malodorant. Every load of butane delivered should be checked to determine if it has been adequately odorized.
71. If butane storage tanks must be recharged during darkness, precaution must be taken that the light used is explosion-proof. A floodlight directed on the tank from the rig should be adequate.
72. Butane tanks for a drilling rig should be 150 ft. or more from the rig. They should be on as high ground as possible, on the leeward side of the rig (with respect to the prevailing wind). They should be parallel to, not pointing toward, the rig.
73. Each butane rig should have at least two fire extinguishers approved for use on pressure gas fires.
74. All piping and fittings on butane rigs must have a safe working pressure of at least 125 lbs. per square inch. Steel piping for the mains and heavy copper tubing for small connections are recommended. Cast-iron fittings are prohibited. The piping system shall be tested and proved free of leaks at one and one-half times the pressure to which it may be subjected.

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75. Piping for butane shall be run as directly as possible, without sags. Provision shall be made for expansion, contraction, jarring, vibration, and settling of the container.
76. Piping from above-ground butane storage to the rig shall be buried or in some other way protected from mechanical injury or freezing.
77. The butane storage tank should have a spring-loaded relief valve. No unauthorized person should tamper with this relief valve setting.
78. All drilling rig catheads should be equipped with approved catline dividers for separating the first wrap of catline or spinning line.
79. A badly worn, grooved, or otherwise damaged cathead should be replaced or repaired.
80. No drilling rig catline shall be less than 1½ inches in diameter.
81. A minimum tolerance of ⅜ of an inch should be maintained between catline divider and spool of cathead. Dividers should be closely observed for sharpening caused by catline wear and should be dressed down if found sharpened.
82. Wire line clamps of proper size should be used on tong safety lines at all times and should be properly installed.
83. Additional weights on the counterbalance must be securely fastened to it.
84. The rotary clutch mechanism shall be equipped with approved, positive-acting, safety lock to prevent clutch from being engaged accidentally.
85. All block clutches shall have springs on the yokes so they will not become engaged while a trip is being made.
86. Hose connections to the control head during a

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drill stem test must be securely fastened to the elevator bails.

87. If a steam pump or other steam equipment is connected to an exhaust manifold, a bleeder valve shall be installed between the pump and the main exhaust gate valve so that pressure build up due to leakage of gate valve can be prevented during repair jobs.
88. Electric powered and internal combustion engine powered rigs shall have suitable fire extinguishers located where they are easily reached.
89. Every drill pipe hook or casing hook must be guarded to prevent the elevator or swivel bails from becoming accidentally disengaged from the hook.
90. Each member of a drilling crew is provided with goggles and it is recommended that they be worn during the entire tour.
91. Safety hats with seasonal headbands are provided by the Company and should be worn by all members of the drilling crews. The management recommends that all other personnel visiting drilling rigs wear safety hats during their visits.
92. Lift lines shall be of 5/8-inch soft laid cable for pipe 10 3/4 inches in diameter or smaller. For all other pipe up to and including 13 3/4 inches, they shall be of 3/4-inch soft laid cable. A lift line shall never be used on pipe larger than 13 3/4-inch pipe.
93. Respirators and goggles shall be used by the men at the cutting table and those working in the immediate vicinity when a well is cemented. Provisions should be made to keep respirators clean and sanitary when they are not in use.

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94. Employees should wear well constructed shoes or boots with leather or composition heels and soles while on drilling rigs. Safety shoes are recommended.
95. If tubing is run in doubles, a safety slide line shall be installed at the tubing board platform.
96. Spinning chains should be high strength chains only (1/2 inch minimum--breaking strength 7750 lbs.) and should have a short plaited rope section attached to the end to prevent employees being struck with end of chain should it come loose from pipe.
97. Spinning lines less than 3/4 of an inch in diameter should not be used on drilling rig cat-heads.
98. Temporary working platforms such as stabbing boards or swabbing boards shall consist of two boards at least 3-inch by 12-inch, fastened together by bolted iron straps. These platforms must be fastened to the derrick by an approved method.
99. Tail lines on derrick belts should be of 1-inch Manila rope or approved flexible cable and should be securely fastened to the derrick. They should be carefully and regularly inspected. No excess slack should be allowed in tail lines. Tail lines should not be fastened to the same girt as the monkey board snub line. Damaged lines must be replaced.
100. The proper size tong jaws should be used on each size of pipe.
101. Tools should be inspected regularly. Any tool not in good condition should be repaired or discarded. Chisels, punches, and cutter heads in poor condition should be dressed down and all

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burrs removed. End wrenches with spread jaws should be discarded.

102. A wellhead capable of sealing off pressures is recommended to eliminate the overflow in the cellar and the escape of oil or gas on and under the floor.

Practices

103. Before acidizing operations are begun, the working pressures of all wellhead and injection line fittings should be checked to be sure they will withstand any injection pressure encountered.
104. As some of the acid used for acidizing may contain auxiliary reagents which are dangerous to skin cuts, all actual handling of the acid, including repair of acid leaks in injection lines, should be left to the acid company's employees.
105. When pumping acid at high pressures, employees should remain a safe distance from the injection lines and pumps as the failure of a gasket or some other equipment might cause the employees to be sprayed with acid.
106. Acid accidentally spilled on the skin or clothing should immediately be washed off with plenty of water.
107. When raising any boards with a line, employees should make certain that boards are securely fastened.
108. On rigs with conventional type brake, the operator should not leave the brake without tying it down.
109. Operators should be constantly alert to avoid injury from the kicking of the brake lever.
110. If possible, employees should use breakout

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blocks for making up and breaking out all bits, to eliminate the hazard of using sledge hammers in making up bits.

111. Breakout cathead line should be removed from breakout tongs when going in hole in case automatic cathead should become engaged.
112. The driller should inspect the drive bushing when going on tour and see that the bushings are in safe working condition.
113. Any unloading practices of the butane distributor which appear unsafe should be reported to the supervisor immediately so they can be investigated.
114. The cathead should never be turned any faster than is necessary when the catline or spinning line is in use.
115. A tension should always be kept on a rope used on a cathead so the loose rounds will not be thrown around the cathead and entangle the operator.
116. The lineshaft should be turning slowly as the first wraps are placed on the cathead.
117. It is hazardous for anyone to stand on the coil of rope under the cathead when the line is being drawn in or let out.
118. If an employee in the derrick receives even a minor injury, the catline shall be attached to his derrick belt and kept fast until he has climbed down the ladder to the derrick floor. If an employee is knocked unconscious, he must be lowered to the floor by the catline. Each rig should be equipped with proper facilities to lower an injured employee in an emergency.

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119. Both ends of the catline should be securely anchored when the catline is not in use.
120. Only properly instructed employees shall use the catline, and then some responsible person must be at the throttle valve to stop the line-shaft should the catline become entangled.
121. A frazzled catline shall never be put on the cathead until the frazzle has been removed. A spliced line should never be used except when a combination line is in use and these spliced connections should be inspected regularly.
122. All slack must be pulled out of the catline before any wraps are put on the cathead.
123. When an empty catline is being raised to the derrickman, it should be pulled up by hand.
124. When picking up material with catline, the line shaft should be operated at a safe speed.
125. The catline should be guided so it will not rub on derrick girts or any other sharp edge.
126. When a catline fouls, the operator must not try to untangle the line. He should notify the man at the throttle to stop the lineshaft.
127. When caustic is mixed for mud treatment, the caustic should always be added slowly to cold water; the water should never be added to the caustic. Chemical goggles shall be worn during this operation.
128. The caustic-tannic acid solution used in treating rotary mud will severely burn the flesh, but because of dilution and chemical reaction, it is not injurious after it is thoroughly mixed with the mud. In case of skin contact, employees should wash freely with fresh water. If this solution should get in the eyes, they should be thoroughly washed immediately with water. A

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- boric acid solution may be used for eyewash. See a doctor if necessary.
129. Empty caustic cans should be washed thoroughly with water and stored upside down if they are to be used for later refilling. If cans are not to be refilled, they should be punctured so they will not hold water and then disposed of permanently. Chemical goggles should be worn during such operation.
 130. When drilling in with oil, shooting wells with nitroglycerine, pulling drill stem tests where the well flows or heads, the cellar should be kept full of water to prevent fire hazard.
 131. Cellars should be covered or adequate footing provided when work is being done at floor level over the cellar.
 132. The driller or any other operator should not leave the controls while the hoisting drum is in motion.
 133. Someone other than the coring unit operator should guide core reel line when it is in operation.
 134. On all counterbalances suspended above the derrick floor, one end of a safety cable shall be attached to the balance and the other end tied to the derrick leg in such a manner that, should the supporting cable break, the balance would be held in the corner of the derrick.
 135. It is the duty of the day derrickman to inspect and report to the driller the condition of the derrick above the first girt, noting loose nuts, slack guy wires, and the condition of the safety slide line in particular. The morning and evening tour derrickmen must note and report changes in condition of the derrick or hazards that have developed during their tours.

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- 136. Derricks showing any signs of weakness must be repaired by the rig builders.
- 137. Cutting or welding on any derrick or derrick substructure is prohibited.
- 138. An approved derrick belt shall be worn by every employee working above the level of the derrick floor, except while making inspections.
- 139. Derrick belts should be dated when they are put in use and should be replaced when damaged or worn.
- 140. Pipe should be set on slips, no pipe should be racked in derricks, traveling block should be laid down, and all possible weight should be removed from the derrick before derrick members are removed. Refer to Rule 34, Rig Building Division.
- 141. Derrickmen should never be out on hayrake fingers when the traveling block and hook are passing.
- 142. When drilling in with oil, circulation should be through a separator and tank at least 100 ft. from the well. Accumulation of oil on the pits should be kept at a minimum. If dead oil is being circulated, the trap may be bypassed.
- 143. If drill pipe is set too high for convenient working level, it should be picked up and reset in the slips to lower the working level for proper breaking of tool joints.
- 144. If oil or gas is obtained in the drill pipe during drill stem tests, pulling operations should cease at night and the control head should be closed in until daylight.
- 145. Drillers should never engage the rotary clutch without watching the rotary.

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- 146. An employee should never place his foot on the rotary when it is in motion.
- 147. Men should not work on the floor while work is in progress overhead unless their help is necessary for the overhead job.
- 148. The derrick floor and steps should be washed after each trip or at any other time they are muddy.
- 149. The floor shall be kept in order at all times.
- 150. Before entering cellars where there is danger of gas accumulation, employees should put on proper protective equipment.
- 151. Direct connections from carburetors to gasoline drums shall be used for gasoline motors. A hose from the carburetor dropped in an open can or drum bung-hole should never be used.
- 152. When going in the hole, the pipe should be stopped with the brake before the rotary helpers put the slips in the rotary.
- 153. Employees should never attempt to grease moving machinery.
- 154. An employee should never place his hand or any part of his body under a joint of pipe when it is off the floor, as there is always danger that the pipe will drop and injure him.
- 155. All drilling hooks shall be kept closed while round trips are being made.
- 156. All inspection plates or windows on guards must be kept closed during normal operation.
- 157. All lift plugs for flush joint pipe should be tightly hammered to prevent their backing out.
- 158. When measuring pipe in or out of the hole,

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the derrickman should not climb on the pipe. A satisfactory method is for the derrickman to be equipped with a rod on which the tape can be hooked.

- 169. Monkey board fingers should not be dropped into position by derrickmen. They should be eased down by hand or with safety cable or chain. Dropping fingers causes bending and subsequent breakage of fingers.
- 160. Monkey board should be moved to one side and fingers tied up next to the derrick when not in use.
- 161. All drill pipe when picked up out of "V" should be handled with elevators, power lift, rat hole elevators, or an approved pickup line. Double half hitch with chain or catline is not recommended.
- 162. When pulling stuck pipe or when making any unusually hard pull, only the driller and one man stationed by the engine should be on the derrick floor.
- 163. Two inch and 2½-inch tubing and 2¾-inch drill pipe, unless supported at the approximate midpoint by an additional derrick board, should not be racked in lengths of more than 65 ft.
- 164. When racking pipe in the derrick, if the stand of pipe is not close enough, the driller should pick up the stand and allow the pipe racker to reset it. This will eliminate the hazard which results when the pipe racker drives the stand in place with a sledge hammer. Use of walking bar is permitted.
- 165. While mixing radioactive materials with cement, the employee should wear rubber gloves, a dust respirator, and a rubber apron.

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- 166. Employees shall not ride the safety buggy from the derrick except in emergency. The buggy should be tried out on the ground so the operator is sure it is in good working order.
- 167. No employee shall at any time ride the traveling block or hook, or slide down pipe or catline, when coming out of the derrick. The driller and rest of crew shall be held equally responsible for any breach of this rule.
- 168. One inch rope, or larger, shall be tied to one corner of the derrick, extended across the "V", and snubbed to the other corner of the derrick so a man can stand in the clear while snubbing pipe in from the walk.
- 169. Chemical goggles should be worn by all members of the crew and all other employees working nearby while sodium silicate is being mixed by means of the conventional mud hopper. When silicate mud is being used, all members of the crew should wear goggles while making trip with drill pipe, while making a connection, or while running wire line for any purpose. Men repairing pumps should wear goggles.
- 170. Members of the crew handling sodium silicate should keep their sleeves rolled down with cuffs over the tops of their gloves. While making trip, derrickmen and pipe rackers should wear jackets with waterproof sleeves and shoulders.
- 171. Employees working at rotary should be alert to possible unwinding of spinning chain when this method is used in making up pipe.
- 172. Smoking is not permitted around shale shakers, on or under the floors of drilling rigs, in the immediate vicinity of tank batteries, oil, and gas wells, and at any location where "No Smoking" signs are displayed. Any area subject to

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contamination by inflammable liquids or gas should be designated by local management as a "No Smoking Area."

173. Spinning chains should not be made up on tool joint box of pipe in mousehole until ready to make connection. This will prevent chain fouling on rotary drive bushings when rotating.
174. When mixing starch preservatives, the employee should wear chemical goggles, rubber gloves, and a respirator.
175. When steam is turned into a cold line, the valve should be opened very slowly to prevent water hammer. As the line heats and expands, the valve can be gradually opened. Accumulated water should be drained from lines.
176. Steam should be carefully admitted into a hose and the nozzle should be attached or held securely while steam is turned on. The person operating the steam hose shall be well braced and shall use care in handling this hose, being particularly careful not to point it in the general direction of anyone in the vicinity.
177. Work shall not be performed on engines, motors, drawworks, hoists, chains, tables, or other motive equipment unless the steam valve back of the throttle valve on the steam engine is closed, the steam is bled from the cylinders, and the cylinder cocks or bleeders are open. If an electric motor is used, the main electric switch must be opened. If a gas engine is used, ignition wiring must be disconnected.
178. During well completions, swabbing should not be performed at night.
179. When combination Manila rope and wire rope catlines are used, a swivel must be used at the

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connection point of the Manila rope and wire rope.

180. Swivels on combination Manila rope and wire rope catlines should be inspected frequently. If wear of the swivel ball and socket joint is visible, the swivel should be replaced.
181. Swivels on forked lines should be inspected frequently. If wear is detected in swivel ball and socket joint, the swivel should be replaced.
182. Tongs should not be placed on drill pipe tool joints when making round trips or connections until drill pipe is set in slips and stopped.
183. The rotary should never be used as power to make up or break out bits. Use tongs.
184. The rotary clutch must not be engaged for any reason if either rotary tong is latched around drill pipe, bit, drill collars, or any piece of equipment in the rotary. The only exceptions to the rule are:
 - A. When a tong is used to hold a joint or stand of pipe as it is spun out with the rotary after the connection has been broken or loosened with two tongs.
 - B. When a back-up tong is tightened to such an extent that it can not be released after a joint has been broken unless the rotary is turned slightly.
185. Do not hold latch with hand to keep latch from jumping out when a strain is taken on break-out and make-up tongs. Do not use pinch bars or end wrenches to help make jaws bite.
186. When any unusual strain is taken on the tongs, all employees except the person required to operate the drawworks should stand in the clear.

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- 187. Use two pairs of tongs to break tool joints. The rotary should never be used as power in breaking tool joints.
- 188. Unless they are in use, tools, machine parts, or material of any kind shall not be kept in the derrick above the floor. When they are in use, adequate means must be taken to prevent their falling on anyone below.
- 189. Tools should be kept neatly on the tool bench so they may be easily found when needed.
- 190. When unlatching elevators, the operator should stand on the side of the pipe where the elevators are latched.
- 191. No field welding is permitted on tongs, elevators, bails, or other heat treated equipment.
- 192. Adjustable pipe wrenches and crescent wrenches should be adjusted to take a full but snug grip on the pipe or nut, and the pull should be made toward the open jaws of the wrench. This tends to tighten the grip and does not put undue strain upon the wrench.

MARINE DRILLING SECTION

Equipment

- 193. An adequate fire alarm system shall be installed and maintained on all quarterboats. Fire drills should be held at definitely specified intervals.
- 194. Boiler house should be equipped with a light steel ladder with prongs at the base to set in grating to allow men to ascend to tops of boilers. Step ladders should not be used.
- 195. An adequate number of life preservers and ring buoys should be provided on drilling and boiler

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barges. This equipment should be of the type approved for Company use.

- 196. When water compartment manhole covers on boiler barges are left off, a steel grill should fill in this opening.
- 197. Barge rig stairways should be equipped with steps providing a solid trend and a heel stop at edge of step. Steps should be kept free of mud, grease, and obstructions.
- 198. All barge rigs should be equipped with basket type stretchers.
- 199. Barge rigs and other landing points should be equipped with adequate facilities to accommodate the rise and fall of the tide where it is necessary to do so. On canal operated barge rigs, a floating wooden platform may be provided adjacent to the barge with access from the platform to the barge by way of an inclining stairway attached to the barge and hinged at the top and supported at the bottom by a line or lines whose adjustment will raise or lower the foot of the stairway as is necessary to clear the floating wooden platform at prevailing tide levels.

Practices

- 200. When work is done on blowout preventers, the slot in a drilling barge shall be decked temporarily in the working area.
- 201. Firemen should determine that no boats are near exhaust of blow off lines when blowing down boilers.
- 202. Two employees should be in boiler house when boiler barge is being submerged or raised and a standby boat kept adjacent to the boiler barge during these operations. Operations involving

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marine equipment shall observe all applicable governmental safety requirements such as those of U. S. Coast Guard and the U. S. Public Health Service.

203. When raising or lowering catwalk on drilling barge not less than two men should operate crank on winch. Catwalks operated by power hoists should be lowered by gear. The catwalk should never be lowered by use of brake.
204. Always use crank to lower catwalk. The catwalk should never be lowered by use of brake on winch.
205. When driving well piling from drilling barges using the cathead and shop-made pile driver, employees should stand where they will not be struck by pile driver should it slip off end of piling.
206. When dropping spuds, crank handles should be removed from winches.
207. A suitable evacuation system shall be provided for each quarterboat, in case of fire, and the quarterboat supervisor shall be responsible for drilling the personnel of quarterboat in the proper procedure in case of fire.
208. No hot work should be allowed outside of an approved shipyard on fuel or water compartments of boiler barges until it is determined the compartments are gas freed. The same stipulation applies to any compartments on other barges which may have received oil or flammable liquids.
209. Barges containing inflammable volatile materials shall be kept at a safe distance from quarterboats. The following distances are prescribed:
Diesel fuel oil--200 ft.

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Gasoline (unless fueling)--600 ft.
There shall be no open fire (including internal combustion engines) within 200 ft. while refueling.

210. Live oil should never be used in fuel oil compartments on boiler barges. No oil should be allowed in boiler water compartments.
211. Loose equipment such as lube drums, bits, rope reels, and so forth, should be stored in an orderly manner on upper and lower decks of barge rigs. Secure to prevent rolling or shifting with a barge movement.
212. When removing and replacing connecting beams between barge sections, employees should keep hands in the clear of possible mashing or shearing action between pieces of equipment.

GUN PERFORATING SECTION

Since gun perforating is performed in both drilling and workover operations, this section applies to drilling and production personnel. Gun perforating involves the firing of high velocity charges with sufficient force to penetrate well casing, cement, and formations. Careless handling of perforating guns can result in serious accidents at the surface. Therefore, the following practices should be understood and followed by all concerned with well perforating.

Section A — Company Personnel and Contract Drilling Crews on Humble Wells

213. The service company should be furnished a thoroughly planned perforating program when they are called to do a particular job.
214. A Humble supervisor will be in charge of each perforating operation and on the job to coordinate the work of service company and Humble personnel.

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- 215. Prior to starting a perforating operation on a Humble job, a meeting should be held on the job between the Humble and service company supervisors to determine the hazards involved and safety precautions to be followed.
- 216. After Humble and perforating company supervisors have agreed on the procedure to be followed during the operation, the Humble supervisor will hold an adequate meeting with the rig crew to outline the work to be done and to point out hazards of the perforating operation.
- 217. During operations, rotary should be securely locked.
- 218. Humble personnel will stay at a safe distance from the perforating gun during loading and unloading operations. The safe-working area for Humble employees will be determined by the Humble supervisor.
- 219. All persons except those required to lower the perforating gun in the hole should remain off the derrick floor and away from the general area of the well bore.
- 220. Persons required to work near the perforating gun while it is lying on the rig floor should stand beyond the ends of the gun rather than alongside the gun.
- 221. No work should be done under the derrick floor while the perforating gun is on the floor or being lowered to the cellar except on specific permission of the Humble supervisor.
- 222. The Humble supervisor will take steps to prevent vehicles from running into the perforating cable when it extends across open areas.
- 223. The above rules apply to all types of perforating guns including electrically-fired guns, mechan-

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- ically fired guns, and combination perforator and testing tools. Because of the greater probability of accidentally firing mechanically-fired guns, these guns should be thoroughly understood by the Humble supervisor before the tool is handled on a Humble job.
- 224. Humble supervisors should be aware of the hazard of swabbing a well while pulling each of the various types of perforators out of the hole, particularly the tools which are run in the hole on pipe.
- 225. The time of starting on a gun perforating operation is defined as that time when the perforating gun or guns are removed from the perforating truck in preparation for loading the chambers, connecting detonating sub and electric cables prior to running the gun in a well.
- 226. Radio and radar transmitters are to observe strict radio silence when their antennas are within 500 ft. of the perforating gun operations, electrically-fired "back-off shots," or electric blasting caps not actually stored in grounded metal containers. In case of emergency where it is necessary to break radio silence during gun perforating operation, the service company supervisor and Humble's supervisor should ascertain that the perforating gun is disconnected from the detonating head and electric cable prior to activating the radio equipment in the vicinity of the rig. In cases of extreme emergency it will also be permissible to activate radio providing the gun perforator is in the well below 1000 ft. from the surface. In this latter case, it should be understood that operation of radio on the rig floor may cause detonation and firing of gun perforator; thus, penetrating the casing at a point other than the desired perforating depth.
- 227. During the entire perforating operation, safety

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must not be sacrificed for speed at any time.

- 228. Humble supervisor should be familiar with rules issued to perforating companies and should see that these rules are carried out.
- 229. Extreme caution should be exercised in handling perforating guns on the surface during thunder and lightning storms due to the possibility of accidental firing.
- 230. The perforating truck and equipment, the rig, and derrick or mast must be properly grounded.
- 231. All violations of safe practices by perforating companies should be reported to the district superintendent by the Humble supervisor.

Section B -- Perforating Company Personnel

- 232. One service company man should be designated as operator-in-charge of each perforating job, regardless of the number of perforating crews on the job.
- 233. The perforating company's operator-in-charge should report to the driller to determine who is Humble's supervisor on the perforating job.
- 234. The Humble supervisor and the perforating company supervisor will then plan the job so as to expeditiously complete the operation with a minimum of risk to all persons.
- 235. After Humble and perforating company supervisors have agreed on the procedure to be followed, the perforating company supervisor will hold a safety meeting for his crew to point out the hazards involved and precautions to be taken on the particular job.
- 236. The operator-in-charge should personally supervise all aspects of the service company's operations at the well, including the loading and un-

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loading of the firing chambers, movement of the gun to the derrick floor, and placement of the gun in the well bore.

- 237. Solid body guns should not be unloaded at the job unless there is danger of accidental firing resulting from abnormally high temperatures in the well. If it is deemed advisable to unload the solid body gun after running in a high temperature well, the unloading operation should be accomplished at a safe distance from the well, this distance being determined by the Humble supervisor in charge of the perforating job.
- 238. The perforating truck should not be parked so that the truck or perforating cable will be near or under power lines, except where special authorization is obtained from the Humble supervisor.
- 239. It is the responsibility of the service company to see that no explosives remain around the Humble location after the job is completed.
- 240. The firing circuit of the perforator should not be closed after the perforating truck arrives on the job without checking with the Humble supervisor immediately prior to closing the circuit. This applies to testing the firing circuit prior to running the gun in the hole as well as closing of the circuit in order to fire the perforating gun. Both supervisors should be entirely aware of all hazards involved.
- 241. Adequate precautions should be taken to insure that the detonator of the jet-type gun is not prematurely fired by static electricity or low voltage testing.
- 242. The time of starting of a gun perforating operation is defined as that time when the perforating gun or guns are removed from the per-

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forating truck in preparation for loading the chambers, connecting detonating sub and electric cables prior to running the gun in a well.

243. Contractor's radio and radar transmitters are to observe strict radio silence when their antennas are within 500 ft. of the perforating gun operations, electrically fired back off shots, or electric blasting caps not actually stored in grounded metal containers. In case of emergency where it is necessary to break radio silence during gun perforating operation, the service company supervisor and Humble's supervisor should ascertain that the perforating gun is disconnected from the detonating head and electric cable prior to activating the radio equipment in the vicinity of the rig. In cases of extreme emergency it will also be permissible to activate radio providing the gun perforator is in the well below 1000 ft. from the surface. In this latter case, it should be understood that operation of radio on the rig floor may cause detonation and firing of gun perforator; thus, penetrating the casing at a point other than the desired perforating depth.

RIG LIGHTING SECTION

244. Any installation or practice that tends to destroy proper illumination at a drilling rig shall be considered a hazard.
245. Only persons authorized by the division superintendent should make repairs to electrical equipment. All unsafe conditions should be reported to the electrician or supervisor.
246. All lighting units, receptacles, and switches in the derrick and within 60 ft. of the drill hole shall be installed and maintained vapor tight.
247. No floodlight shall be mounted so as to blind persons approaching or leaving an area.

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248. Floodlight brackets clamped to derrick legs or girths (as on portable derricks) shall be provided with a safety chain when single belt floodlight hangers are used. Floodlights with double belt hangers do not require safety chain.
249. A hand lamp used in the hazardous area shall be vapor tight and have at all times both a globe and a guard. The same kind of a hand lamp should be used in a non hazardous area for its water tight properties; however, the use of an open type hand lamp with a guard is permissible.
250. The evening tour shall have the responsibility of keeping the floodlight lenses and vapor tight globes clean; however, these should be cleaned as soon as possible after being splashed with mud. Where Hutchison lighting units have guards, these should be removed permanently to facilitate cleaning.
251. The derrick man when inspecting the derrick should note the condition of the floodlight strings, and report any defects to the driller.
252. Rig wiring shall be installed in such a manner as to protect it from abrasion, being trampled, or burned by steam piping. Cable should not be strung atop girths except when unavoidable. Wiring shall be insulated to resist weather, chemicals, and handling and shall be replaced as soon as insulation is damaged.
253. When relamping a fixture, the circuit must be open. If it is necessary to relamp with a live circuit, carefully test metal parts that are to be handled with a voltmeter or by tapping lightly with back of bare hand.
254. Illumination for boiler water level gauge glasses shall be of an intensity to permit a clear reading at night from a distance of 30 ft.

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- 255. Governors on direct current turbo generators are factory set to operate at constant speed with steam pressure varying between 300 and 350 p.s.i. All speed adjustments shall be made by changing the pressure of the governor spring. Only electricians or factory service men should do this work.
- 256. Steam piping for turbo generators shall bypass the lubricator and have sufficient steam capacity to maintain normal speed under all operating conditions.
- 257. Avoid stepping on or handling live wiring, lighting units, or handlamps found lying on the floor or ground, especially in damp areas. Remedy a condition of this kind by opening the circuit and restoring the items to the proper place.
- 258. Protection against electric shocks is provided by a third wire in cable to fixtures, connection boxes, switch boxes, and so forth, and by a bonding wire to piping or a ground rod for houses and machinery isolated from a good ground by boards or skids on dry earth. Constant vigilance should be maintained on the grounding systems and any deterioration quickly remedied.
- 259. Electrical apparatus subject to heavy sparking, as D.C. generators and motors and magnetic contactors, shall be enclosed so as to practically prevent the entrance of an explosive atmosphere when located within 60 ft. of the drill hole. The enclosure may be type NEMA 4 (watertight) for switches and controls and Totally Enclosed Fan Cooled for generators and motors, or a non-vaportight enclosure that is force-ventilated with air picked up at least 60 ft. from the well. The blower for the air supply system shall be as near the end of the suction duct as possible. Where space limita-

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tions do not allow placing the suction of the air supply at a 60 ft. minimum distance from the well, the Electrical Engineering Section of the Petroleum Engineering Division should be consulted.

NOTE: For additional precautions regarding the operation of motors, generators, controls, circuits, and switches, refer to the Electrical Section of the General Division.

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BOILER DIVISION

Equipment

1. Blowoff nipples shall not be welded to the shell of the boiler. When the threads in the boiler opening become worn, the opening shall be repaired by the installation of a threaded steel bushing installed from the inside. This bushing shall have an integral flange, larger than the blowoff opening, on the inside and shall be welded to the boiler shell on the outside. This repair should be done by one familiar with the A. S. M. E. Boiler Code, or under the supervision of the boiler inspector.
2. Each boiler shall have a bottom blowoff pipe fitted with two slow-opening valves, or with one slow opening valve and one other approved type valve, in direct connection with the lowest water space practicable. The size of pipe and fittings shall be the same as the size of the bottom opening. Only valves approved for blowoff service by the Company's book of standards for valves shall be used.
3. Each boiler gas manifold or regulator shall have a 40 foot extension on the blowoff gas valve. The outlet of this line should be at least 50 ft. from the nearest boiler and should not be pointed at the main gas line control valve.
4. Blowoff piping shall be as straight as possible and not run into a common header except in the case of approved special installations. Where the exception exists the headers should be securely anchored.
5. Blowoff lines must extend at least 20 ft. from the boiler and be secured in a manner that will not interfere with expansion or contraction. Special blow off line assemblies for barge rigs are permissible.
6. The feed pipe shall be provided with a check valve near the boiler and a valve between the check valve and the boiler. When two or more boilers are fed from a common source, there shall also be a globe valve on the branch to each boiler, between the check valve and the source of supply. Wherever globe valves are used on feed piping, the inlet shall be under the disc of the valve.
7. Each boiler shall have at least two means of feeding, one of which must be a pump; the other may be a pump, injector, or inspirator. As a rule, boilers should not be fed with water at a temperature of less than 100° F.
8. All fittings between the boiler and valve shall be of extra heavy steel.
9. A flag or some other means of indicating the action of the feed-water pump shall always be visible from the rig floor, where practicable.
10. Flexible joints shall be provided to allow for the expansion and contraction of steam mains connected to boilers so that no undue strain is transmitted to the boiler.
11. Either rigid or flexible steel connections should be installed between the boiler gas regulator and the gas line.
12. Each boiler shall have three or more gauge cocks located within the range of the visible length of the water glass except when such boiler has two water glasses with independent connections to the boiler, located on the same horizontal line and not less than 2 ft. apart. A locomotive-type boiler, not over 36 in. in diameter, need have but two gauge cocks.
13. A uniform ladder and walkway installation or a light portable ladder which can be carried and

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then secured to the boiler is recommended for getting to the top of boilers. Loose boards should not be used on the tops of boilers to get from one boiler to another.

14. Fuel gas pressures in excess of 300 lbs. per square inch should be reduced by means of regulators at a distance not closer than 150 ft. from the boiler or rig, whichever is nearer, marine drilling excepted.
15. Safety valves shall have a connection to boilers independent of any other steam connections and shall be attached as close as possible to the boiler. They shall be in an upright position with the spindle vertical. No valve of any kind shall be between a safety valve and the boiler. When safety valves are enclosed, the exhaust outlet should project from the building roof, with a water drain provided to prevent the accumulation of water on the top of the disc of the safety valve.
16. Dead-weight safety valves are not to be used for boiler service.
17. Safety valves shall not be used on boilers unless plainly marked by the manufacturer in such a way that the marking will not be obliterated in service. Each safety valve shall have stamped on its casing the pressure at which it is to blow and the size of the valve in inches. The capacity in pounds of steam discharged per hour at the rated pressure shall also be given. Each safety valve shall be provided with suitable means for sealing and shall be sealed in such a manner that changes in relieving pressure can not be made without breaking the seal.
18. All safety valves should have cable attached so the operator can reach them easily when he is standing on the ground.

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19. Each boiler shall have a steam gauge connected to the steam space. The steam gauge shall be connected to a siphon which has been filled with water and has sufficient capacity to keep the gauge tube filled with water. The gauge should be so arranged that it can not be shut off from the boiler except by a cock placed near the gauge and provided with a tee or lever-handle so arranged as to parallel the pipe in which it is located when the cock is open. Connections to gauges shall be of approved material for pressures encountered.
20. The dial of the steam gauge shall be graduated to approximately double the pressure at which the safety valve is set but in no case to less than $1\frac{1}{2}$ times this pressure.
21. Steam gauges that are inaccurate by more than 10 per cent should be replaced.
22. Each superheater shall be equipped with at least one drain so located that it will effectively provide for the proper operation of the apparatus. This drain shall be left open when boilers are fired up until steam is drawn from boilers to supply a load.
23. Every superheater shall have one or more safety valves near the outlet which shall be set a few pounds below the main safety valve relief pressure.
24. Every safety valve used for superheated steam shall be made of suitable material to withstand high temperatures and shall be of the outside spring-loaded type.
25. Each steam discharge outlet, except the safety valve and superheater connections, shall be fitted with a stop valve located as near the boiler as practicable. When such outlets are over 2 in. in pipe size, the valve or valves used on

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the connection shall be of the outside screw and yoke, rising stem type.

26. When two or more boilers are connected to a common steam main, either
 - A. Two stop valves with an ample free-flow drain between them shall be placed in the steam connection between each boiler and the steam main, or
 - B. One valve may be used provided that before anyone enters the shell of the boiler, the boiler is unflanged from the valve and a blanking off plate of the unbolted, slip-blank type at least $\frac{1}{2}$ in. thick is inserted between the faces of the flange connection in such a manner that any steam leaking past the valve will be deflected to the atmosphere and not enter the shell of the boiler.
27. The main stop valves of boilers shall have a rated steam working pressure at least as high as that of the boilers.
28. The valve on the main gas line shall be placed at least two joints from the gas regulator.
29. The valve for regulating the fuel on a drilling boiler must be set back 20 ft. from the boiler firebox if it is located in front of the boiler. Exceptions may be made on barge rigs but only with the approval of the division superintendent.
30. There shall be a valve on each end of the gauge glass of a boiler, between the gauge glass and the boiler, to cut off the steam should the gauge glass break.
31. Each boiler shall have at least one water gauge glass with connections not less than $\frac{1}{2}$ in. pipe size. The water gauge glass shall be equipped with a drain valve. The lowest visible part of the water glass shall be not less than three inches

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above the highest point of the crown sheet in accordance with ASME rules for power boilers. At least three inches of water should be maintained visible in the gauge glass of each boiler when in use.

32. If wet gas is used for fuel, a gasoline trap should be installed some distance from the boiler, preferably in a low place in the line. This is to prevent raw gasoline from entering the firebox and causing a flashback. The drain line from gasoline traps should lead away from the boilers and drip at least 50 ft.

Practices

33. Only one boiler should be blown down at a time.
34. Firemen should not leave boilers while blowing down same.
35. A fireman should never close the water off the water glass and blow out with dry steam because it will burn the gasket, cause leaks, and will probably burst the glass.
36. Pipe should never be used to take clothing out of a blow barrel unless one end is plugged. A wooden pole is preferable.
37. Cast-iron plugs or cast-iron bushings must not be used in the shell of a boiler. If holes must be plugged, a steel bull plug should be used. If holes must be reduced, a swaged nipple or steel bushing should be used.
38. The boiler feed pump shall always take suction from the storage tank or pit and never from the branch or main line.
39. All fuel lines and steam lines into and out of the boilers shall be disconnected and blanked

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off before hot work is done in the boilers or before a boiler or firebox is entered.

10. Fusible plugs shall be renewed each time a boiler is washed or at least every thirty days. Only approved plugs shall be used.
11. Firemen should use No. 4 shade or medium calor lens in the goggles they wear when inspecting fireboxes burning liquid fuels.
12. The fireman shall leave the boilers only when his presence is required elsewhere, such as during the making of round trips, and then he must not be absent longer than fifteen (15) minutes at any time.
43. Men should not enter the barrel of a boiler unless
 - A. Steam header lines are blanked off in such a manner that no steam can enter the shell of the boiler. If the header valve arrangement consists of two main stop valves with a drain connection between them, then both main stop valves must be tightly closed and the drain valve must be opened. If only one valve is in the header, then the boiler must be unflanged from the valve and a steel blanking-off plate of the unbolted, slip-blank type at least $\frac{1}{2}$ in. thick must be inserted between the valve and the boiler outlet flange.
 - B. Fuel and feed water lines are disconnected.
 - C. Miscellaneous steam lines and feed-water lines are disconnected, if other than atmospheric temperature is used.
 - D. A stand by or readily-contacted individual remains in the vicinity.
 - E. The blow down lines are disconnected where

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a common blow down header has been authorized.

44. Going on duty. At the beginning of each tour, the man tending the boilers must do the following things and be sure that everything is in good order:
 - A. Blow down the gauge glass and make sure the water returns freely to the glass.
 - B. Test the try cocks to see that the gauge glass indicates the true water level.
 - C. Lift the seat of the safety valve by means of the lever or pull cord.
 - D. If any defects are found, report them to the supervisor.
45. On tour. The man tending the boilers must do the following:
 - A. Keep a uniform water level. If the water should drop below sight in the gauge glass, the operator must immediately test the lowest try cock. If water does not show, shut off fuel and feed water valves until the boiler has cooled. Careful judgment on the part of the fireman will be necessary to determine when the boiler has cooled enough so it can be safely filled and refired. If water shows at the lowest try cock, filling should be carefully controlled until the water level is brought up to normal.
 - B. The gauge glass must be blown down once an hour.
 - C. Each boiler must be blown down at least twice a tour. Abnormal water conditions will require more frequent attention. Specific instructions should be secured in such cases.

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- D. Do not carry more steam pressure than that allowed by the insurance boiler inspector.
- E. The operator should check safety valves once a day during the daylight tour by running up the boiler pressure to see that they blow at the pressure at which they are set. If the safety valve does not blow at the pressure at which it is set, the supervisor should be notified at once. The operator must not try to reset the safety valves.
- F. The low water alarm whistle when used should be inspected at least once each hour.
- G. Men should not stand in front of the fire door, especially when relighting or starting a fire.
- H. No repairs to a boiler shall be made until the pressure is below half the allowable working pressure.
- I. Steam must never be turned into a cold boiler, to do so may blow it up. A cold boiler should be slowly warmed with a fire and the steam pressure brought up to approximately that carried in the other boilers on the line, then the valve should be slowly opened until the pressure is equalized.
- J. Fuel lines should be disconnected before anyone is permitted to enter the boiler firebox.
- K. Wait until the next tour man comes on duty before leaving the job.
- L. Each fireman upon relieving the fireman on duty shall accompany him to the boilers. The relieving fireman must be informed of present working conditions and any changes that have been made.
- M. The boiler plant must be kept neat and the

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fireman must remain attentive to his job while he is responsible for the boilers.

- 46. Employees should stand in the clear when handhole covers are removed from boilers.
- 47. Handhole covers must not be kicked out of boilers; a long stick or hammer used correctly should be the tool for this operation.
- 48. Each boiler shall be prepared for internal inspection as follows: The boiler and setting shall be allowed to cool sufficiently to allow the water to be drained from the boiler without danger of undue heating of the boiler parts. The handhole plates and manhole covers shall then be removed and the boiler washed out with a water hose. All ashes and soot shall be removed from the tubes and firebox and all brick which would prevent the inspector from having access to vital parts of the boiler should be removed.
- 49. Boilers shall be lighted only by means of a torch, extension at least 12 ft. in length to allow the employee to stand well in the clear of the flare-back and to one side of the opening.
- 50. Mud rings should be protected against direct or radiant heat.
- 51. Changes in safety valve settings are to be made only under the specific directions of the district management and in accordance with instructions in the Petroleum Engineering Section of the Production Operating Department Instruction Manual.
- 52. Drilling boilers should always be spaced at least 30 in. apart in order to eliminate the hazard of burning an operator.
- 53. Telltale holes in the stay bolts shall have no

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plugs or other material driven into them. A leak indicates that a cracked or broken stay bolt requires replacement.

64. New water glass should be allowed to warm gradually before any steam or hot water is allowed to come in contact with it. Men should stay in the clear.

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SHOP AND WELDING DIVISION

Equipment

1. Acid stores should have suitable means of extracting the fluid from the container.
2. Damaged acetylene cylinders should be vented, tagged, and returned to owner.
3. All overhead hooks should have bridles.
4. Cables and ropes should be used whenever possible for hoists and slings and should be inspected and replaced when necessary.
5. The operator handling pipe for the threading and straightening machine must use chain hoist equipped with hooks. Pipe should be suspended from the center to facilitate changing ends for threading or other purposes.
6. The faces of sledges, hammers, and mauls should be slightly tempered; heads of flatters, cutters, and other anvil tools should never be tempered. This preserves tools and prevents flying-chip hazards.
7. All belts, chains, and sprockets should be adequately guarded.
8. The handles of all sledges, hammers, and mauls should be properly wedged into the heads.
9. The handles of all anvil tools, such as flatters, hot and cold cutters, swages, and so forth, should be fitted loosely.
10. The lattice walk should extend along the floor the full length of the lathe bed. This permits cuttings to fall through and thus eliminates stumbling hazards.
11. Pipe racks should be kept in a safe condition.

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The shop-rack pipe is usually old and bent material and should be handled with care.

12. Suitable pipe skids must be provided for the safety and convenience of employees.
13. The operator should wear a chemical cartridge respirator while using paint spray.
14. Rubber gloves, a rubber apron, and chemical goggles should be worn when acids are handled.
15. Shop machines shall not have any exposed gears or set screws that would catch on workmen's clothes.
16. Spout-type oil cans should have flexible or bent spouts.

Practices

17. No unauthorized person should be allowed to visit field shops.
18. Men must not try to do a job alone when assistance is needed; help should be called.
19. The hose on oxy-acetylene welding units should be racked properly when not in use. Master valves on oxygen and acetylene cylinders should be closed and pressure should be bled from regulators and hoses after use.
20. Safety or relief valves on acetylene generators should be checked frequently. Automatic feed control should function properly at all times.
21. Acetylene generators must be placed at least 25 ft. from any source of heat and at a greater distance if possible. Installation of either a flash pot or check valve between generators and hose should be made.
22. Acetylene generators should be washed and

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cleaned with water each time they are recharged.

23. Acetylene generators should be protected from freezing and heat.
24. No open flame or equipment capable of producing a spark shall be used in acetylene generator house or in the gas cylinder storage rooms.
25. Caution should be exercised when water is turned into the acetylene generator as dry carbide might have collected in the generator while the water was drained off. Bleeders should be opened when they are filled with water or carbide.
26. Flashback pots on generators should be filled with water after each charging.
27. Leaks and bruises in the oxygen or acetylene hose must be repaired immediately.
28. Full drums of oxygen and acetylene should be securely fastened in racks, conveniently located, so that gauges and hose may remain attached without the necessity of their being moved from place to place. Oil and grease must be kept off oxygen hose and gauge connections.
29. Oxygen and acetylene drums must not be stored together and should be stored on the outside. All valves should be closed when empty.
30. All chemical containers should be kept well sealed and should be plainly marked. Empty containers should be disposed of in a manner that will avoid creating hazards.
31. Chuck wrenches must be inspected so they will fit snugly, thus preventing slipping and subsequent splitting of the sockets of screws and pins.
32. Care should be exercised when creosote or creos-

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note base paint is used as either will blister the skin if spilled and perhaps cause nausea. Protective cream of the type that is not soluble in oil should be smeared on exposed parts of the body. Chemical goggles should be worn.

33. The cuttings and filings from lathes, drill presses, and shapers should not be removed with the bare hands; scoops and shovels are safer.
34. Any defective electrical equipment should be reported to the electrician immediately.
35. Fire hazards should be eliminated. Cans of oil, kerosene, oily rags, waste, and so forth, should not be allowed near stoves, furnaces, or gas fires. After cleaning fittings in kerosene, employees should wash their hands with soap and water.
36. All fittings, with the exception of collars, must be removed from the pipe before being stored or placed in the threading and straightening machine.
37. Pieces of hot metal must not be left where other workmen might get burned by handling or stepping on them. It is a good practice to post the sign "Hot" on a cooling object.
38. Climbing overhead to oil bearings on lineshaft, counter-shaft, and so forth, must not be done while machinery is in motion. Employees' hands must be free of grease.
39. Employees must not stand directly in front of buffers, emery wheels, and grinders. On all emery wheels Perkes' safety washers must be used. Employees should stand to one side of the plane of rotation and should wear proper goggles. Tool rests should be 1/16 of an inch from the emery wheel.

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40. A machine must not be operated if the material is not securely fastened.

41. A machine must never be left while it is in operation, nor should a chuck wrench be left inserted in the chuck when the machine is idle.
42. When using a pipe machine for pulling or setting up couplings, the operator must stand at the controls and to one side of the backup tongs.
43. Mercury stills, acid cleaners, and so forth, should be placed in the open air when being used. Concentrated acid must be used only in the open or in well-ventilated rooms.
44. All material should be placed so it will not fall on a passer-by. In addition, no material should be left where it will constitute a stumbling hazard.
45. Orderliness is necessary for safety. Piles of junk should not be allowed to accumulate, and the shop should be kept in a sanitary condition at all times.
46. The use of open shop pits should be discontinued.
47. Paint and insect sprays are usually inflammable. Their use near open flames should be avoided.
48. Paint thinners, including banana oil and turpentine, should be handled with care and breathing mist from the spray gun should be avoided.
49. No fabrication of, or repairs to, any Company or contract machine shop-made, fired or unfired, pressure vessels may be performed in the field without conforming to the Production Department "Shop-Manufactured Products Policy."
50. Sledge work should be so arranged that sledging in a horizontal arc is not necessary. If the sledge

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has to be swung in a horizontal arc, the footing should be as secure as possible. All observers must stand in the clear.

51. All steel drums, barrels, or other closed vessels which have contained volatile liquids or gases must be thoroughly steamed or filled with water before the cutting or welding torch is applied.
52. The right tool for a particular job should be used. All tools must be inspected regularly and the unsafe tools turned in immediately for replacement.
53. Torches and blowpipes should be examined closely for leaky valves, leaky nozzles, and leaky tips.
54. No unauthorized person shall be allowed to use any welding equipment.
55. Welders will be held responsible for the maintenance of their equipment and for the protection of passers-by. Electric welders should provide protective screens around the arc and should not permit anyone to look at the arc without proper protection. In shops where electrical arc welding is carried on, signs must be displayed of the danger to the eyes.
56. Welders should exercise care in securing a proper fit for the goggles to prevent flying sparks from entering the eyes.

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TRANSPORTATION DIVISION

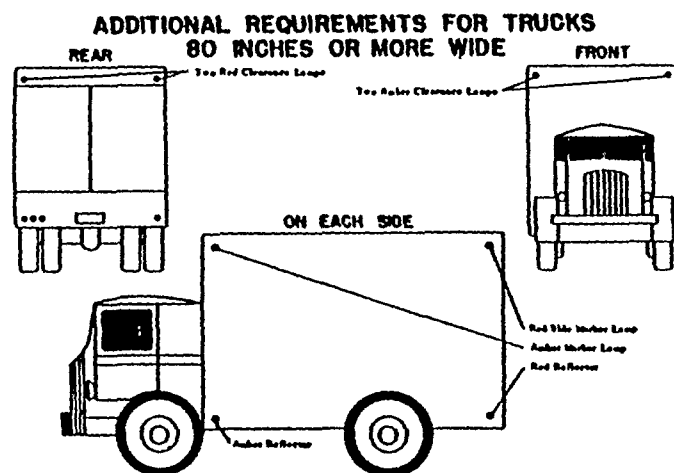
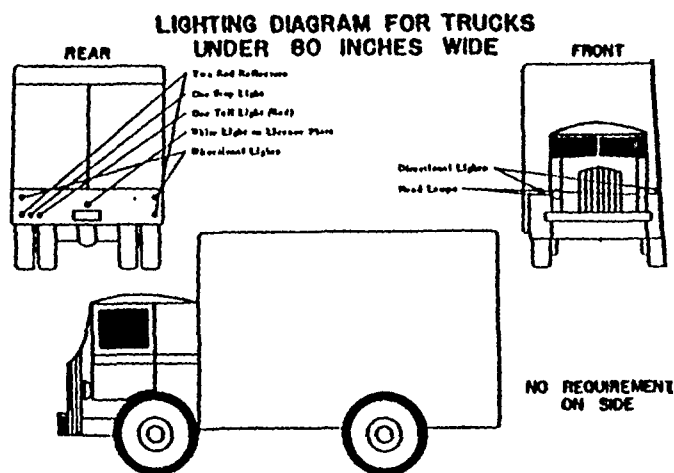
GENERAL SECTION

1. All drivers of Company vehicles shall familiarize themselves with the State traffic regulations in the states in which they drive and they must be governed accordingly. All drivers must have required driver's or chauffeur's licenses for the states in which they operate Company vehicles.
2. Company vehicles should be driven at safe speeds in accordance with conditions of vehicle, road, traffic, and weather.
3. Giving lifts to hitchhikers or carrying passengers, other than Company employees, in Company trucks or cars is forbidden.
4. Cars and trucks shall be kept in good mechanical condition, especially lights, horns, brakes, windshield wipers, and steering assemblies.

EQUIPMENT SECTION

5. Every gang truck should be equipped with a metal cab to protect the men in inclement weather. All outside seats on gang trucks should have arm rests for the men to hold onto.
6. All trucks with dual rear wheels will be equipped with approved mud flaps.
7. When heavy equipment is moved with a crane, a line shall be attached to the load to enable the man to stand in the clear and still control the load.
8. The Uniform Traffic Code, effective in Texas, requires that every vehicle be equipped with certain lights. The following drawing shows the required lights:

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9. Trucks operating in Texas shall be equipped with three approved reflectors. When the truck is disabled on the roadway or shoulder of the highway, the reflectors shall be placed as follows: One at a distance of 100 feet in front of the vehicle, one at a distance of 100 feet to the rear of the vehicle, and in addition at night, one at the traffic side of the vehicle 10 feet to the front or rear. Substitutes for reflectors are described in THE TEXAS DRIVING HANDBOOK. Vehicles operating in states other than Texas will conform to the regulations of the state in which they operate.

10. Trailers being pulled by coupling poles should have safety chains of sufficient size to hold loads if the coupling pins break, or suitable means of preventing the coupling pins from getting out of place.

11. The bolsters of trucks shall be inlaid with wood so that the pipe will always rest on wood instead of steel. This will insure a secure binding of the load.

12. Tank trucks must be equipped with ground chains and special precautions are to be taken that drain lines do not leak.

13. Winch lines should be cut back or replaced when wire strands begin to wear out.

14. Every truck that is equipped with a winch must be equipped with the approved winch guard. This protects the driver from flying winch lines and shifting pipe.

15. Loads extending over rear end of truck must be flagged during daylight hours with red bunting at least 12 in. x 12 in. At night, a red light must be used.

16. Pipe skids should be made of oak material. Use

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2 in. x 10 in. with pipe smaller than 7-inch O.D., and 3 in. x 10 in. with pipe 7-inch O.D. or larger. When extremely heavy pipe is handled, judgment should be used in blocking up under pipe skids for added strength.

17. Leather or leather-palm gloves should be worn by personnel handling pipe.
18. All trucks and cars shall be equipped with automatic windshield wipers, which must be kept in first-class condition at all times. When necessary, defrosters shall be provided.
19. Where permanent dual cabs are used, gang trucks should be equipped with a signalling device.
20. Volatile liquids must not be carried on gang trucks unless carried in special approved containers. This does not apply to paints which may be handled in the customary shipper's packages.

OPERATIONS SECTION

21. Transportation of men to and from work is a job requiring greatest care. Truck drivers should remember that when they transport men they are transporting the most valuable load anyone is ever called upon to carry. The men must be careful how they ride in the truck. They should not hang their legs over the edge and should not get on and off the truck while it is moving. Also, tools should be loaded in the truck in such a manner that the jolting of the truck will not cause injury to any of the employees. Where permanent cabs are used, trucks should be equipped with buzzer for signal purposes.
22. Riding on trucks not equipped with adequate facilities for transporting men is prohibited except in an emergency. In this case, extreme

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caution must be taken to prevent injury to riders.

23. When approaching a railroad crossing, the truck driver should be sure that no train is coming before he crosses the track.
24. Before driving onto a highway from a side road, the truck driver should stop and look in both directions.
25. A truck driver should look around his truck before starting off after stopping for any length of time.
26. When necessary to back vehicle, driver should assure himself that the way is clear either by personal inspection or using another person to guide him into the clear.
27. The drivers of all loaded trucks, when starting down a hill, should shift gears to such a position as is necessary to insure complete control.
28. Drivers should drive their trucks on the right-hand side of the road except:
 - A. When passing another vehicle.
 - B. When making a left turn.
 - C. On a one-way street.
 - D. When directed by an officer of the law.
29. When approaching a blind curve, drivers should sound their horns and proceed slowly with their vehicles under control.
30. Many traffic accidents occur when drivers go to sleep. If the driver feels that he might go to sleep, he should let someone else drive if there is a qualified and licensed driver available. If not, he should drive off the highway, park, and take a nap.

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31. Several trucks making hauls to the same destination should maintain a distance of at least 500 feet between trucks.
32. Extreme care should be exercised when vehicles are towed, and the speed of the vehicles should be governed closely.
33. When a vehicle is being carried on a truck bed or towed with its front wheels on the truck bed, the vehicle being carried or towed must be securely fastened with a safety chain and the wheels turned to the right.
34. When loads are handled by gin poles, loads and gin poles must be securely snubbed to truck bed.
35. No load should extend directly over the truck cab unless the truck is properly equipped for such hauling.
36. Walking under a gin pole, whether it is loaded or not, is a hazardous practice and should be done only in the line of duty, such as when tying loads and hooking and unhooking the tail chain.
37. Truck beds should be kept free of oil and grease.
38. Care must be taken so that equipment being hauled over railroad tracks does not foul or drag across the tracks. Adequate protection for tracks should be provided.
39. The driver of a winch truck is responsible for the condition of his winch lines.
40. When winch line is being used, only one man should give signals to operator and operator should never tighten up or slack off on line until signal is given.
41. Employees should not use winch lines for assistance in getting on truck beds.

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42. A winch line must not be spooled by hand unless a man is at the controls.
43. The tail chain on the winch line of a crane truck must never be pulled against the pulley or gin pole since it might become fouled or otherwise create a hazard.
44. The hooks on the end of any truck winch line should be secured or controlled when not in use.
45. Power line poles, guys, or anchors must not be used as snubs for a winch when material is moved or when the truck is stuck, as there is danger when the strain is taken off the pole, guy, or anchor.
46. When crane trucks or other high loads pass under power lines, caution must be taken to see that load clears the line sufficiently to avoid possible jump spark from high voltage lines.
47. While the truck motor is running, men must not stand between the end of the truck and a load being pulled with a winch.
48. Men must not act as a counterweight on truck bumpers or hoods for loads that may cause the front end of the truck to tilt upward.
49. Truck loads should be boomed on the side and to the right, if possible. Heavy duty boomers should be used on heavy loads.
50. One boomer chain should be securely fastened on a load before anyone gets under the load to perform any other work, including the placing of additional boomer chains.
51. Four binding chains should be used on pipe loads, chains being placed as follows:
 - A. Around front and rear bolsters and pipe.

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B. Around pipe and coupling pole near rear bolster to support coupling pole.

C. Around pipe only and in center of load to prevent pipe from spreading should front chain fail.

52. When pipe or timber of any multiple unit load is hauled, the load shall first be boomed as tightly as possible, and then after a short distance is traveled, the chains shall be tightened, as all pipe or timber loads will invariably settle and cause the chains to loosen.
53. Loose ends of boomer chains should not be allowed to drag.
54. Employees should not stand directly over boomer handle when releasing boomer chains.
55. A truck or wagon from which pipe is to be unloaded should be in a direct line with the pipe rack in order to insure an even roll of pipe down the skids to the pipe rack.
56. Before pipe is unboomed on truck or wagon, preparatory to being unloaded, it should be examined closely so that stakes on both sides of the truck or wagon bed will be securely set to prevent pipe from rolling when the boomers are released.
57. If load on a truck starts to roll off, the men should not try to stop it.
58. Employees should not get between unloading skids unless necessary. If the work necessitates their getting between skids, the fellow workmen should be notified in order that pipe will not be released.
59. Employees should roll pipe from the ends or from behind in order to get out of the way if the joint gets out of control.

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60. In stringing pipe, the men should stay behind the truck while it is moving.

61. Wheels of trucks should be checked at least once a week so that all lug bolts and axle flange nuts will be tight.

62. When inflating truck tires, employees should always stand in the clear to avoid injury if retaining rings or rims should spring out of place.

63. In cranking a caterpillar tractor with the flywheel, the operator should stand on the track and keep clear of the bar of the flywheel. The correct use of the bar is for the operator to pull the flywheel slowly with his right hand until the firing center is near the top, at which point he should take a new hold in another notch and pull the flywheel quickly through the firing center. This usually forces the bar clear of the flywheel when the motor fires. The operator must keep his feet in the clear, and he must see that there is no one else in position to get hurt.

64. The operator should take care to see that crane truck is securely anchored while using crane. If brakes are not adequate, wheels should be blocked to prevent the truck from moving while load is suspended on crane.

SPEEDBOAT SECTION

65. The following safety rules shall be posted in each speedboat, and observance should be enforced:

A. Blowers must be operated for at least five minutes before starting motors.

B. Blowers must be operated for at least five minutes after refueling.

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- C. Refueling must not take place while motors are running.
 - D. Smoking is prohibited in areas where refueling takes place.
 - E. No one except the operator should be allowed on a speedboat until the motors are running.
 - F. Boats should be loaded and unloaded from the stern where possible.
 - G. All persons should remain seated while boat is in operation where possible.
 - H. The operator's attention should not be distracted while the boat is in operation.
 - I. Operators should familiarize themselves with Company marine safety rules.
 - J. Operators should be responsible for the safe operation of the boat while in transit.
 - K. Smoking should be avoided on boats until it is certain motors are performing properly.
 - L. Passengers should remain seated until boat is stopped and tied up (except for one person who lies up boat).
 - M. Operator should be familiar with marine pilot rules and copy of these rules should be kept in boat at all times.
 - N. Horseplay should not be practiced in boats, boathouses, or any other areas.
 - O. Operators should be warned of hazardous conditions during transit and should report them to those responsible for maintenance.
66. A five-man life raft must be provided for all of the larger type speedboats, and life raft attached to top of cabin with approved type bracket.

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- 67. Life rafts must be equipped with an approved water light and light attached to raft by approved type bracket.
- 68. Where window and windshield are not considered adequate for emergency escape route, speedboats must be provided with emergency escape hatches.
- 69. Only designated and qualified operators should be allowed to handle speedboats.
- 70. Any boat operating in open water shall carry an approved marine type compass which should be checked semi-annually. All boats should be provided with charts of the operating area.
- 71. All boats should be provided with a suitable first-aid kit.
- 72. A sign should be displayed showing the number of life preservers carried on Company or contract boats, and at no time should the number of passengers on board exceed the number of life preservers.
- 73. Motors should be idled until warmed up.
- 74. Life rafts and life preservers should be accessible for immediate use.
- 75. Good housekeeping practices should be observed on Company boats. Oily rags and waste should be kept off boats and bilge kept clean at all times.
- 76. Passengers should ride inside cabin. Riding in cockpit is not permitted unless accompanied by another passenger. Riding on front deck or on top of cabin is not permitted.
- 77. The clutch should be in neutral and motor idle before the switch is turned off to prevent back-fire.

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78. Adequate fire fighting equipment should be supplied in boathouses in accord with regulations contained in the Company manual Operation and Maintenance of Fire Extinguishers.
79. Automatic carbon dioxide fire extinguisher systems with remote manual control should be used on all closed engine compartment Company boats. Manually operated carbon dioxide systems are recommended for open type boats. These systems should be inspected and tested at regular intervals by qualified personnel.
80. The position of the head of the carbon dioxide system cutter valve should be observed before starting the motor. If the red plunger is flush to the head, the system has been discharged. Any failure or discharge of these systems should be reported immediately to the supervisor in charge.
81. Each boat should be equipped with approved portable type fire extinguishers. These extinguishers must be kept charged at all times.
82. All Company boats except completely open type driven by gasoline or volatile fuel engines must be equipped with blowers to ventilate engine compartment and bilge.
83. Blowers should be equipped with proper suction lines to bilge area.
84. Automatic gas detectors should be tested daily and kept in working order.
85. A gas detector should be in each engine hatch and synchronized with blower and horn system.
86. Each boat should be equipped with a backfire trap or flame arrester on motor carburetors.
87. Backfire traps should be removed from carbure-

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- tors and washed in kerosene each time oil is changed.
88. Wiring systems, lights, windshield wipers, horns, and blowers must be in operating order at all times.
89. Adequate lighting shall be provided at landings on drilling barges, boathouses, or other points used for landings.
90. Gas tank filler pipes must be tapped with overflow lines which discharge out of boat. Gas tanks should be equipped with adequate vent pipe.
91. All gasoline lines and connections should be checked frequently for wear and leaks.
92. Boat motors should be equipped with approved type automatic water temperature cut off.
93. All safety and operating rules and regulations outlined in the Petroleum Engineering Division pamphlet on speedboat operations should be rigidly adhered to by operators and employees and a copy of these requirements should be kept in each boat.
94. All requirements prescribed by U. S. Coast Guard, regarding equipment in use on boats must be adhered to. A copy of these requirements should be kept on each boat. 
95. Boat landings must be kept in a safe condition at all times.
96. All recommended safety rules and safe practices pertinent to Company boats should be exercised and observed on contract boats. 

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FIRE PROTECTION DIVISION

1. The prevention of fires is of utmost importance. Good housekeeping and equipment maintenance should be followed to keep fire hazards at a minimum.
2. It is important that people who use fire extinguishers know how to use them properly. All employees and supervisors should be instructed in the proper use of available fire fighting equipment.
3. All accidental fires on Company property, no matter how small, shall be reported to the superintendent.
4. Fire extinguishers are first-aid equipment to be used on small fires to prevent their getting out of control. It is necessary that extinguishers operate at top efficiency the instant they are needed.
5. Qualified personnel should be assigned by the local managements the responsibility for proper inspection and maintenance of all fire equipment. This personnel should supervise the inspection, record inspection information for fire extinguisher inspection report, and direct the recharging and repair of equipment when required.
6. Fire extinguishers should be located in a conspicuous place, free from obstructions, where they will be immediately available at all times in the event of fire. The extinguishers should be located as close as possible to the likely fire hazard.
7. Fire drills should be held at regular intervals to familiarize personnel with location and operation of fire extinguishing equipment.
8. Class "A" fires are those in ordinary combustible

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materials, such as paper, wood, textiles, rubbish, and so forth, where the quenching effect of water is indicated.

9. Class "B" fires are fires of flammable liquids, greases, oils, paints, and so forth. A blanketing or smothering effect is required to extinguish them.
10. Class "C" fires are fires in live electrical equipment which call for the use of a non-conducting extinguishing agent.
11. Class "D" fires (Humble rating) are fires involving gas under pressure.
12. Type of fire extinguishers recommended for the above classes of fires are:
 - A. Class "A"—loaded stream (water base), foam, or water.
 - B. Class "B"—carbon dioxide type, dry chemical, or foam.
 - C. Class "C"—dry chemical or carbon dioxide.
 - D. Class "D"—dry chemical or carbon dioxide.
13. Never attempt to extinguish a fire on or about electrical apparatus with water or a water base extinguisher (loaded stream).
14. Fire extinguishers, approved for electrical fires, should be used for extinguishing fires on or near electrical equipment. Extinguishers approved are carbon dioxide gas or dry chemical. Other chemicals will conduct electricity and the stream from the extinguisher will act as a conductor on which the current may flow back.
15. Fire extinguishers should be kept filled. Manufacturers' instructions for refilling and maintaining extinguishers must be followed.
16. No repairs shall be made to the outer shells of

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fire extinguishers which depend on pressure of chemicals for operation.

17. All fire extinguisher hose and nozzles should be kept free of obstruction at all times.
18. A tag bearing the date of inspection and the name of the inspector should be attached to each fire extinguisher. A metal tag with inspection date stenciled on the tag is preferable to a cloth tag on outside locations since ink or pencil markings wear off in damp weather.
19. The instructions on fire extinguishers should be lacquered in order to preserve the instructions.
20. Personal radio and television aerial installations on Company houses must be equipped with lightning arresters and properly grounded. Aerials should not be tied to derricks, line poles, rigs, or to other Company equipment.
21. When testing for gas leaks on domestic gas connections, use soap suds. Never use an open flame.
22. No gas leak should be allowed to remain near or in a building, but should be stopped immediately and the building aired.
23. No matches or cigarette lighters should be carried in gaseous areas. In other locations only safety matches are recommended.
24. Smoking is not permitted around shale shakers, on or under the floors of drilling rigs, in the immediate vicinity of tank batteries, oil, and gas wells, and at any location where "No Smoking" signs are displayed. Any area subject to contamination by inflammable liquids or gas should be designated by local management as a "No Smoking Area."
25. Oil waste, rags, or clothing must not be left ly-

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ing around or left in enclosed spaces other than suitable receptacles. Spontaneous combustion may result and cause fire.

26. Fire hazards should be eliminated. Cans of oil, kerosene, oil rags, waste, and so forth, should not be allowed near stoves, furnaces, or gas fires. After cleaning fittings in kerosene, employees should wash their hands with soap and water.
27. Gasoline containing tetraethyl lead should be used for motor fuel only.
28. The use of gasoline as a cleaning agent in Company houses or on Company property is strictly forbidden. It is recommended that employees not use gasoline as a cleaning agent in their own homes.
29. Electric-powered and internal-combustion, engine-powered rigs shall have suitable fire extinguishers located where they are easily reached.
30. Each butane rig should have at least two fire extinguishers approved for use on pressure gas fires.
31. If a person's clothing becomes saturated with oil, clothing should be changed as soon as possible.
32. Paint and insect sprays are usually inflammable. Their use near open flames should not be practiced.
33. One No. 20 dry chemical fire extinguisher should be carried on welding trucks.
34. One No. 30 dry chemical fire extinguisher should be carried on portable derrick truck.
35. Gang trucks should be equipped with a No. 20 dry chemical fire extinguisher.

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36. Stoves in pumpers' offices shall be located so that passage is not obstructed in the event of fire.
37. Exhaust lines for all gas or oil engines shall extend outside buildings, and should be insulated where passing through buildings to prevent fire hazards.
38. Automatic carbon dioxide fire extinguisher systems with remote and manual control should be used on all closed engine compartment Company boats. Manually operated carbon dioxide systems are recommended for open type boats. These systems should be inspected and tested at regular intervals by qualified personnel.
39. Each boat should be equipped with approved portable type fire extinguishers. These extinguishers must be kept charged at all times.
40. An adequate fire alarm system should be installed and maintained on all quarterboats.
41. A suitable evacuation system should be provided for each quarterboat in case of fire. The quarterboat supervisor shall be responsible for drilling the personnel of quarterboat in the proper procedure to follow in case of fire.
42. More detailed information on fire extinguishing principles and equipment is available in the Company manual Operation and Maintenance of Fire Extinguishers. This manual should be kept in each district office and other places where needed for ready reference.

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ACCIDENT REPORTING DIVISION

Since all accidents should be reported, this division has been included in the manual, not as rules, but as a guide, for employees' use if an accident is sustained.

1. ACCIDENTS THAT DID NOT CAUSE INJURY:

Employee

Report orally to your immediate supervisor.

Supervisor

Complete form A-1369 and forward to the district office.

District Office

Comply with instructions in "Employee Relations Manual."

2. NON-DISABLING INJURY:

Employee

Report orally to your immediate supervisor.

Supervisor

*A. If medical attention is necessary, complete form A-183, "Order for Medical Treatment."

B. Complete form A-1740, "Foreman's Analysis," and sections A, C, D, & E, form A-910, "Report of Accident to Employee," in pencil and forward to district office.

C. All copies of form A-910 must be signed.

District Office

Complete form A-910 and comply with instructions in "Employee Relations Manual."

Use form A-183 in Texas and Louisiana.

Use form A-183A in states other than Texas and Louisiana.

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3. DISABLING INJURY:

Employee

If able, report orally to immediate supervisor, or if he is not available, report to any other supervisor who is available. If employee is unable to report, a fellow employee should report as prescribed above. If employee is working alone, first employee discovering injured employee should report as prescribed above.

Supervisor

- *A. Complete form A-183, "Order for Medical Treatment."
- B. Notify superintendent through immediate supervisor.
- C. Superintendent shall notify division safety engineer and others listed in the Accident Reporting Section of the "Employee Relations Manual" as soon as possible.
- D. Complete form A-1740, "Foreman's Analysis of Accident," and sections A, C, D, & E of form "Report of Accident to Employee," in pencil and forward to district office.
- E. All copies of form A-910 must be signed.

District Office

Complete form A-910 and comply with instructions in "Employee Relations Manual."

4. AUTOMOBILE ACCIDENTS

Driver at Scene of Accident

- A. Render all aid possible to injured.
- B. Send for nearest police officer.
- C. Get word to your immediate supervisor.
- D. Get all pertinent information possible and secure names of witnesses to accident.

Use form A-183 in Texas and Louisiana.

Use form A-183A in states other than Texas and Louisiana.

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- E. Take all safety precautions necessary to keep accident from getting worse.

Supervisor

- F. Notify superintendent through immediate supervisor.
- G. Superintendent shall notify division safety engineer and others listed in the Accident Reporting Section of the "Employee Relations Manual" at once.
- H. Assist driver in completing state form for accident reporting and Company form G-100, "Automobile Accident Report."
- I. Forward completed forms to district office.

District Office

Complete forms for driver's signature and comply with instructions in "Employee Relations Manual."

NOTE: If loss of life or personal injuries are involved, follow instructions listed under "Disabling Injuries."

5. FIRE OR EXPLOSION:

Employee & Supervisor

In case of loss of life or personal injury, follow instructions listed under "Disabling Injuries."

District Office

Letter report of all fires and explosions must be submitted even if no personal injuries are involved.

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