Interoffice Communication

To : Distribution

From : J. C. Greene

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Subject : VCM TANK FARM OPERATING MANUAL

Attached is the operating manual for the VCM tank farm. This manual has been revised to incorporate new equipment and procedures in the VCM tank farm area.

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Process Engineer

bls

Attachments

c: JF, CRM, PEM, CRS, LDH (7), MLN, VEM, VLT, AHS, DJM, RAF

VCM UNLOADING OPERATING MANUAL

ABERDEEN PVC PLANT

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I. INTRODUCTION (Cont.)

A. Operator Responsibilites (Cont.)

This operating manual will cover the normal responsibilities and duties of the yard operator when unloading VCM railcars. Each phase of the unloading procedure will be covered. In addition to normal operating procedures it will also discuss operations under abnormal conditions. The operator must be prepared to meet these situations with temporary measures until the abnormal condition is corrected or ceases to exist.

The goal for VCM overexposure to employees is "ZERO". This is accomplished by operating the equipment as designed, prompt attention given to leaks per continuous monitor sensors and follow up work orders for maintenance. As we meet our goals for overexposure, all governmental guidelines will also be kept.

Safety takes second place to no plant activity. The safety of the plant personnel and equipment is to be carefully considered before any job is started. The Conoco safety slogan is "Our work is never so urgent or important that we cannot take time to do it safely". Safety on the job must be our first and most important consideration. When we do a good job of planning our work with safety in mind, we are less likely to suffer injury or cause an accident. This allows us to meet our plant goal of employees going home unhurt.

I. INTRODUCTION (Cont.)

B. General Process Description (Cont.)

into T-601 which is commonly called the "sphere". This is done using the five Corken compressors at the tank farm. They are commonly referred to as Compressor No. 1, Compressor No. 2, Compressor No.3, Compressor No. 4, and Compressor No. 5, from north to south, respectively. Compressors No. 3 and No. 5 combined have about the same capacity as either Compressor No. 1, No. 2, or No. 4. The tankcars are connected to the compressor piping and the sphere piping with flexible hoses. The compressors pull vapor from the top of the sphere and compress it into the tankcars, forcing liquid out of the cars through a stand pipe, into the bottom of the sphere.

Each tankcar has three valved connections in the dome of the car (two liquid lines and one vapor line). The liquid lines are 2" lines and point toward each end of the tankcar. The vapor line is a 1½" line and points toward the side of the car. Refer to the photograph in the Appendix. Only one liquid line is usually hooked up on a car because the car does not unload significantly faster with two lines and it takes longer to hook up the car. Both liquid lines have to be hooked up on some type of cars (ACFX and PPGX cars) because the excess flow valves are set to close at lower rates than our normal unloading rate of 65-95 gpm.

The operator can tell when all the liquid has been unloaded from a car by watching the sight glass in the liquid transfer line. When the tankcar has been emptied, the 4-way valves on the compressor are reversed such that the compressor evacuates vapor from the car and discharges it into the top of the sphere. When the specified amount of vapor is removed from the tankcar, the compressors are shut down and the transfer lines

I. INTRODUCTION (Cont.)

B. General Process Description (Cont.)

system has been revised and vapor from the sphere is used. The volume of VCM kept in the sphere is usually large enough that sufficient vapor is available for the compressors. When the bullets were used, there was not enough vapor available and the tankcars unloaded very, very slowly, if at all.

Other equipment at the tank farm includes the bullets, T-201 (west) and T-202 (east). These are not used for unloading VCM, even though each one presently contains a small amount of liquid VCM. They are piped up to take inerts from the recovered vinyl receivers if the incinerator should be down for an extended period of time.

The transfer pumps on the bullets (Conoco Nos. 72-211 & 72-218) and the sphere (Conoco Nos. 72-217 & 72-270) are the responsibility of the vinyl department. The sphere transfer pumps send liquid VCM through a 4" line to the old and new reactor modules where it is charged into reactors and made into PVC. The bullet transfer pumps are not used at the present time.

The emission recovery system knockout pot is also located at the tank farm, northwest of the compressor shed. The emission recovery system is located in the vinyl department old reactor module and is designed to collect and contain miscellaneous VCM emissions. It runs continuously. The knockout pot is connected to it via a 2" line that runs to the tank farm. A 15" Hg. vacuum should be maintained on this line at all times. This line is used to evacuate the VCM vapors from the transfer lines prior to unhooking cars. The knockout pot is the responsibility of the

I. INTRODUCTION (Cont.)

B. General Process Description (Cont.)

under the sphere have relief valves that discharge into a 1" line that goes to the knockout pot. The 1" valve on the line south of the compressor shed is locked open. The line runs into the header at the west side of the knockout pot, where the main 2" valve is also locked open.

g. Compressor No. 1 Liquid Line Relief Valve Discharge- This relief valve is piped up to the compressor relief valve header through a locked open valve.

h. Vapor Line Knockout Pot Relief Valve Discharge- This knockout pot is equipped with a relief valve whose discharge is piped through a locked open valve into the compressor relief valve header. The compressor relief valve header is connected to the emission recovery system knockout pot.

i. VCM Recycle Pump Relief Valve Discharge- The VCM recycle pump located below the liquid line knockout pot is equipped with a relief valve which is piped up to the compressor relief valve header.

A second knockout pot, called the vapor line knockout pot, is located just north of the emission recovery system knockout pot. The purpose of the vapor line knockout pot is to collect liquid VCM that may have collected in the main vapor line and prevent this liquid from slugging the compressors. A VCM recycle pump is located below this knockout pot and is used to pump the contents of the pot to the sphere. The pump is started and stopped by two level switches in the pot.

II. OPERATING PROCEDURES

A. Railcar Hookup

After VCM cars are brought into the plant, the yard operator "hooks up" each car by connecting transfer hoses to it. Vapor can then be transported into the car and the liquid VCM can be sent into the sphere. In the summer, two cars can be hooked up at each transfer station for unloading. During winter operation or when a rapid change in the weather is anticipated during unloading, only one car can be unloaded from each transfer station.

Fresh air masks must be worn under the compressor shed, while opening or closing the railcar dome, or while connecting and disconnecting the transfer hoses. Gloves must be worn while handling the nipples and the transfer hoses. VCM cars are not to be hooked up during an electrical storm.

Equipment Required

1. Fresh Air Mask
2. 1 1/2" Teflon Tape
3. O-rings for Weco fittings (if needed)
4. Gloves

Procedure

1. Get a fresh air mask and a roll of 1 1/2" Teflon tape, from the yard scale house. Also get "O" rings that are needed to replace the ones at the tank farm. Inspect the "O" rings individually for cracks and nicks. Do Not Use Defective "O" Rings.

II. OPERATING PROCEDURES (Cont.)

A. Railcar Hookup (Cont.)

Procedure (Cont.)

6. (Continued)

and eliminates dangerous sparking which could ignite any VCM leaks. It also prevents loss of the ground clamp if it is left connected during switching.

Should one of the grounding clamps or cables be damaged, use the backup cable located on the south liquid boom arms at each spot except Spots No. 4 and No. 9 which have no backup cables.

7. Drain the water from the breathing air filter if necessary. (The filter is located between the rail tracks).

8. Climb the stairs to the unloading platform. If the stairs are wet or icy, be especially careful. Always be sure to use the handrail.

9. Go to the station you want to unload from, loosen the locks on the walkramp, and use your foot to push the ramp onto the car dome. The ramp will not operate if it is not in the middle of the platform opening. Adjust the height and length of the ramp and lock the ramp into place. Watch for pinch points when positioning the ramp and do not put any unnecessary strain on your back.

10. Unlatch the vapor and liquid line(s) and swing each line over the railcar dome area. Be careful not to let the lines swing back and catch your arm or hands. (The vapor line is the 1½" line).

11. Remove the nipples from the holders and peel off the old Teflon tape. Inspect the threads and retape them with new tape up to 2" from the end of the threads. If the threads are worn, write a work order to replace the old nipples with new ones.

II. OPERATING PROCEDURES (Cont.)

A. Railcar Hookup (Cont.)

Procedure (Cont.)

19. Push the port hole covers aside and screw the nipples into the valve opening until they are hand tight. Then tighten the nipples with the pipewrench. Be careful not to let the wrench slip. The nipples must be very tight or they will leak. Double check them after installing.

20. Close the vacuum breaking valves on the end of the transfer line booms. Make sure they are fully closed so that VCM will not leak to the atmosphere.

21. Unhook the flexlines and or Weco fittings from the holders on the booms. Be careful to minimize bending and twisting the flexlines during hookup. Excessive bending of the flexlines causes early failure of the lines. Visually inspect the flexlines for small holes or extremely worn areas of the armored weave. If a flexline is punctured, badly twisted or damaged, or in your judgment has a likely potential for failure during operation, contact maintenance and have the hose replaced.

22. Inspect the "O" rings individually and install them in the slots. The "O" ring must be evenly seated to prevent leaks. "O" rings with cuts or nicks should be discarded.

23. Press the Weco union attached to the flex hose against the nipple inserted in the railcar. Check the alignment of the "O" rings to make sure there is a good seal. "O" rings that are pinched or crooked will cause leaks. Completely tighten the Weco hammerlock to prevent leakage.

II. OPERATING PROCEDURES (Cont.)

B. Unloading Railcars

After the VCM cars at the tank farm are hooked up, the cars are unloaded using the Corken compressors. The compressors take vapor from the top of the sphere and compress it into the tank cars, forcing the liquid in the cars to flow into the bottom of the sphere. It usually takes 4-6 hours to unload the liquid VCM from a tankcar.

It is very important for the valves on the compressors to be set up correctly or the compressor will dead-head. Running the compressors in a dead-headed condition will raise the compressors' relief valves and force VCM into the emission recovery knockout pot T-201. A pressure switch on T-201 will shut down all compressors if the pressure in the pot reaches 70 psig.

Equipment Required

1. Fresh Air Mask.

Procedure

1. After hooking up the cars, carefully come down the stairs from the unloading platform, using the handrails. Check the valves that are between the railroad tracks going to each unloading station, which is to be used for unloading cars. All the valves should normally be open. Initial the checklist if the valves are open. If any of the valves are closed, do not startup any compressors going to that unloading station.
2. Go to the compressor shed and put on the fresh air mask, check for face seal, and connect it to the fresh air hose.

II. OPERATING PROCEDURES (Cont.)

B. Unloading Railcars (Cont.)

Procedure (Cont.)

Initial the checklist after checking the vapor valve for each compressor.

8. Check the level of the VCM in the vapor line knockout pot by observing the sight glass located on the east side of the pot. The level should be below the pot's high level switch before unloading is started. The level in the pot is automatically controlled by high and low level switches. Should the instruments malfunction and the level be above the high level switch, notify the yard supervisor and proceed to drain the pot manually. Do this by placing the VCM recycle pump switch in the "hand" position. This switch is located on a panel on the south side of the knockout pot. The recycle pump will pump the contents of the pot to the sphere. When the level in the pot has lowered to the low level switch, place the pump switch back in the "auto" position.

9. Turn the handle of each 4-way valve so that the handle is in the vertical position. This sets up the compressor to pull from the sphere and discharge into the tank cars. (NOTE: The handles can be installed in the opposite direction. If maintenance works on a 4-way valve, check the arrows on the valve and make sure the flow is from the sphere to the tankcars when the valve handle is vertical. This must be checked before signing off the work order.)

10. Check the suction pressure of each compressor. It should read the same as the sphere pressure. If the pressure is 0 psig, the liquid trap may be full of liquid which closes the high level shutoff valve in the trap and will not allow any flow to the compressor. The trap can be drained

II. OPERATING PROCEDURES (Cont.)

B. Unloading Railcars (Cont.)

Procedure (Cont.)

14. Check the discharge pressure on each compressor. If it is under 100 psig, go to the sight glasses and watch for liquid flow. If the discharge pressure is above 110 psig, one of the valves between the compressor and the tank car is closed. Shut off the compressor and retrace the piping until the valve is opened.

15. Check for liquid flow to the sphere in all the sight glasses. Lack of flow may indicate a closed valve between the tank car and the sphere.

16. Check to see that the Jamesbury valves on the compressor suction liquid traps are closed.

17. Take off the fresh air mask, disconnect it, and roll up the hose.

18. Record the identification numbers of the railcars being unloaded and log into log book.

II. OPERATING PROCEDURES (Cont.)

C. Recovering Vapor From Railcars (Cont.)

Procedure (Cont.)

on the same transfer station and that the sight glass for that transfer station shows vapor flow).

A. Go to the dome of railcar A and close the liquid valve(s). This allows you to check the sight glass and see if the liquid has blown out of railcar B.

B. Go to the sight glass and check for liquid blowing through the line. If liquid flow shows in the sight glass, railcar B has not blown out. Finish unloading it by closing the vapor valve on railcar A.

C. When the sight glass shows that railcar B has blown out, go back to the platform and open the liquid and vapor valve(s) on railcar A.

D. Next, close the liquid valve(s) on railcar B to make sure that railcar A has blown out.

E. Check the sight glass as in step B (Above). If liquid flow shows in the sight glass, railcar A was not blown out and must be unloaded. Close the vapor valve on railcar B.

F. When the sight glass shows that railcar A has blown out, re-open the liquid and vapor valve(s) on railcar B.

G. After all the cars have blown out, reopen any valve that you closed to check or unload the railcars.

2. Put on the fresh air mask, check for face seal, and connect it to the fresh air hose.

II. OPERATING PROCEDURES (Cont.)

D. Unhooking Railcars (Cont.)

Procedure

1. Go to the tank farm and climb the platform stairs. Be especially careful if the stairs are wet or icy and be sure to use the hand-rail.

2. Check the pressure on each transfer station according to the gauges on the platform. Make sure that the car(s) at each transfer station have been pulled down to 6-8 psig.

   NOTE: If one of the transfer stations has reached the proper evacuation pressure before the others, close the valves at the platform for that transfer station. Since the compressors are on one common header, this will allow the other transfer station(s) to evacuate faster. When all the transfer stations have been properly evacuated, reopen the valves on the transfer lines which you closed.

3. Climb down from the platform (carefully). Go to the compressor shed and put on the fresh air mask, check for face seal, and then connect it to the fresh air hose.

4. Turn off the compressors.

5. Close the 4" main vapor valve from the sphere and the 6" main liquid valve to the sphere that are on the west side of the compressor shed.

6. Check the pressure gauge on the line to the emission recovery system. (Gauge is at the southwest corner of compressor shed.) It must read at least 10" Hg vacuum. Open the four manual valves that evacuate the transfer lines to the emission recovery system.

   NOTE: If there is not at least 10" Hg vacuum on the line, notify the vinyl control room. It is the vinyl department's responsibility to maintain at least 10" Hg vacuum on the line.

II. OPERATING PROCEDURES (Cont.)

D. Unhooking Railcars (Cont.)

Procedure (Cont.)

Be careful not to let the pipewrench slip and trap your hands or fingers against the railcar.

15. Select the correct size wrench to fit the railcar valve plugs and screw them tightly into the valve opening. Once again, do not let the wrench slip while tightening the plugs. All the plugs must be in place tight and have chain attached.

16. Put the nipples, pipewrench and wrench on the transfer station walk ramp and close the railcar dome lid. Be careful not to let the lid trap your hands or fingers. Slide the latching bar shut to hold the lid closed. Seal lid and record the lid seal number on the checklist.

17. Unhook the fresh air mask and take the pipewrench, nipples, and wrench back to the main platform. Place them in the racks provided for them. Be careful not to drop the nipples or damage the threads.

18. Turn off the switch to close the actuated valves that evacuate the transfer lines to the emission recovery system.

19. Latch the transfer line booms to the platform. Be careful not to let them pinch your arms or hands. Do not bend or twist the flex-lines excessively. This can cause early failure of the flexlines.

20. Loosen the locks on the walk ramp and pull it away from the tank car. Lock it after raising it into the vertical position.

21. Repeat steps 9-20 to unhook the other railcars.

II. OPERATING PROCEDURES (Cont.)

E. Troubleshooting and Miscellaneous Operating Procedures

This section describes various problems that occasionally occur in connection with the Corken compressors and unloading the VCM tank cars. The standard operating procedure for solving each problem is given after the problem description. Normal rules concerning the use of safety equipment apply in all of these situations. Fresh air masks must be worn under the compressor shed.

1. Liquid in the Compressor Suction

   The symptoms of this problem and the solution are given in the operating procedures on unloading railcars, step No. 8.

2. High Pressure on the Sphere or Bullets (or Evacuation)

   Occasionally, the pressure on the bullets or the sphere needs to be reduced. This can be done by opening the appropriate valves and letting the emission recovery system pull on the vessel(s).

   A. To pull vapor from the sphere:

      a. Close the five valves on the west side of the compressor shed that are on the sphere vapor line.

      b. Open the main 4" valve on the sphere vapor line.

      c. Open the valve on the bullets vapor line that connects to the sphere vapor line.

      d. Open the 2" valve on the line that connects the bullets vapor line to the emission recovery knockout pot at the northwest corner of the compressor shed. This is the same line that the compressor relief valves discharge into. The knockout pot is set up to relieve any pressure over 3 psig to the emission recovery system.

II. OPERATING PROCEDURES (Cont.)

E. Troubleshooting and Miscellaneous Operating Procedures (Cont.)

3. Evacuating a Compressor for Maintenance (Cont.)

Compressor No. 5 must be evacuated by a different procedure than the other compressors.

a. Using the emission recovery system:

NOTE: Not for Compressor No. 5.

(1) Close the 3" valve coming off the sphere vapor line for the compressor to be evacuated. Tag the valve with a "Do Not Operate" tag.

(2) Close and tag the 3" valves on the east side of the compressor shed that are on the transfer lines coming from the compressor that is to be evacuated. The valves on the transfer line and the valve from Compressor No. 5 must be closed and tagged.

(3) Close and tag the valve on the compressor liquid trap and the valve above the rotameter.

(4) Open the 1" manual valve that will evacuate the blocked off lines to the emission recovery system.

(5) Open the actuated valve that evacuates the line to the emission recovery system. On some of the valves this can be done by overriding the valve and blocking off the air. On the ones without overrides, block the air off on the valve to the liquid line (to keep it closed) and open the vapor valve by using the switch at the transfer stations (on the platform).

II. OPERATING PROCEDURES (Cont.)

E. Troubleshooting and Miscellaneous Operating Procedures (Cont.)

3. Evacuating a Compressor for Maintenance (Cont.)

(4) Same as step (4) in (a) above.

(5) Same as step (5) in (a) above.

(6) When the pressure reaches less than 0 psig on Compressor No. 5, block off the Compressor No. 5 block valve on the east side of the compressor shed and tag it.

(7) Close the actuated valve that was opened in step (5) and reopen any air that was blocked off.

(8) Open the blocked in 3" valves on the east and west side of the compressor shed that were closed in step (2). Compressor No. 5 should now be ready for maintenance.

4. Lack of Liquid Flow in Sight Glass

Occasionally, there will be little or no liquid flow in one or more of the liquid sight glasses after starting up the compressor, even though all the valves are open. This may be caused by a lower pressure on one of the railcars, more pressure drop in one of the lines due to length of pipe, or other reasons. This problem only occurs occasionally and it usually happens in only one of the transfer lines. If there is not a closed or partially closed valve in the line, the problem usually corrects itself after 5-10 minutes. To speed up this process, use the following operating procedure.

a. First, trace all the lines and check the valves going to and from the transfer station that is giving the problem. Make sure that all the valves are fully open and that the compressor discharge pressure is normal.

II. OPERATING PROCEDURE (Cont.)

E. Troubleshooting and Miscellaneous Operating Procedures (Cont.)

5. Tank Car Excess Flow Valve Closing (Cont.)

combination of the following procedures:

a. Partially close the liquid valves on the dome of the car. This will slow down the flow and should reseat the valve. If this reseats valve, reopen all partically closed valves.

b. Turn off the compressor and let the car unload itself for a period, then reopen all valves partially closed and restart the compressors. This can usually be done only in summer conditions. NOTE: If the excess flow valves shut in a car that has both liquid lines hooked up, this indicates that the valve is probably faulty. The car number should be noted so that it can be shopped after unloading. On ACFX and PPGX cars, the excess flow rates are set at a lower flow rate than on most UTLX, RTMX, and NATX cars. For the ACFX and PPGX cars, the liquid lines should always be hooked up to each car.

6. Evacuating The VCM Vapor Line Knockout Pot and Recycle Pump For Maintenance

Before taking the knockout pot and recyclye pump down for maintenance; the pot, pump, and related piping must be isolated and the VCM vapors removed (down to below 0 psig). This will be done by using the emission recovery system.

a. Close the 4" inlet and outlet valves to the knockout pot. Tag these valves with "Do Not Operate" tags.

b. Close and tag the recycle pumps's 1½" discharge and recirculation valves.

A

III. EQUIPMENT INDEX

A. T-601 (Sphere) - Conoco No. 93-001

Purpose : VCM storage tank which holds fresh VCM taken from railcars for use in the reactor units.

Description : Spherical tank, mounted on 9 columns, 54' - 9" diameter, 57' overall height, with capacity of 640,594 gallons, carbon steel construction, built in 1975.

Normal Operating Conditions : Ambient Temperature and 10-60 psig.

Design Conditions: 125°F and full vacuum to 100 psig.

Relief Settings : Rupture discs (2) = 100 psi @72°F.
Safety valves (2) = 100 psi.

B. Bullets: T-201 (West) and T-202 (East) - Conoco Nos. 89-201 & 89-202

Purpose : Spare VCM storage tanks to hold fresh VCM from railcars for the reactor units or to store inerts from RVCM receivers if incinerator goes down.

Description : Horizontal-mounted, 80' straight wall length, 10' - 10¼" diameter, with approximate capacity of 61,450 gallons, carbon steel construction, built in 1962.

Normal Operating Conditions : Presently kept at ambient temperature and approximately 0-20 psig.

Design Conditions: 250 psig maximum allowable working pressure.

Relief Settings : Rupture discs (2 per vessel) = 136 psi @72°F.
Safety valves (2 per vessel) = 150 psi.

C. Big Corken Compressors (Compressors No. 1, No. 2, and No. 4)

Purpose : Unloading and evacuation of VCM tankcars.

Description : Corken model 690, 2-cylinder, 825 RPM vapor compressor.

Normal Operating Conditions : Rated for 60 ICFM at 825 RPM, 295 psig maximum discharge pressure.

Relief Settings : North - Cannot read tag, 250 psi when purchased.
South - 225 psi.

III. EQUIPMENT INDEX (Cont.)

H. VCM Knockout Pot (T-202) - Conoco No. 45-061

Purpose : To remove liquid VCM from the vapor line and prevent liquid slugging of the compressors.

Description : Vertically mounted on supports 6 feet above grade, 5-foot straight wall height, 2.5-foot diameter, with capacity of 150 gallons.

Normal Operating Conditions : 70°F and 40 psig.

Design Conditions: 150 psig @ 200°F.

Relief Valve Setting : 150 psi.

I. VCM Recycle Pump (P-250)

Purpose : Removal of knockout pot contents to sphere.

Description : CMP model #3 x 1½ x 5, canned centrifugal pump, 3 HP driver.

Normal Operating Conditions : 10 GPM @ 58 feet of differential head.

Relief Valve Setting : 170 psi.

J. Compressor Low Pressure Switches

Purpose : To shut off compressors at the end of vapor recovery from railcars.

Description : Static-O-Ring diaphragm type.

Set Point : 6 psig decreasing.

K. Vapor Line Knockout Pot Level Switches - High and Low

Purpose : To start and stop VCM recycle pump as liquid VCM collects in the knockout pot.

Description : Robertshaw switches.

IV. SAFETY EQUIPMENT AND SYSTEMS (Cont.)

B. VCM Canister Masks

VCM Canister Masks may be used under the following conditions:

1. Working in a contaminated area of less than 10 ppm VCM for up to 10 hours. NOTE: If the HNU monitor reads greater than 10 ppm VCM, a fresh air mask must be used.

2. Performing leak detection operations when Honeywell units are indicating between 1 and 10 ppm VCM.

3. Escape from an area of high concentration of VCM to obtain a Scott Air Pack.

C. Scott Air Packs

Scott Air Packs are self-contained breathing equipment and must be worn when entering concentrations of VCM which are above 1000 ppm or in unknown concentrations. Scott Air packs are located south of the sphere near the electrical breaker switches and north of the compressor shed.

D. Firewater System

The firewater system consists of a deluge system on the bullets and compressor shed, a 6" weir to the top of the sphere, and fire monitors. All firewater to the tank farm deluge systems and monitors is supplied by the six diesel operated fire pumps from the firepond and Number 5 waste water pond. Process water can be used in fire fighting by hooking hoses to the fire hydrant south of the tankfarm in the MCC area.

1. Fire Monitors

There are four fire monitors located around the diked area at the VCM tank farm. Three of these are kept pointed toward the bottom of the sphere with the manual valve to them open. Water can

IV. SAFETY EQUIPMENT AND SYSTEMS (Cont.)

D. Firewater System (Cont.)

3. Deluge System (Cont.)

Thermal sensors under the compressor shed or on the bullets can also set off the deluge system. The deluge system is designed to lower VCM concentrations in the bullets and compressor shed area, to cool the bullets in the event of fire in the area, and help put out fires. Because of the dikes around the sphere and bullets, fire-water should be used judiciously in the area. The dikes are designed to contain any VCM spill from the vessesl. The VCM will float on water, and if the dikes are overfilled liquid VCM will be allowed to escape from the area, enlarging the hazard. The dikes can be drained with post-indicator valves on the west side of the dikes. If a dike is drained, make sure that the drain is closed after draining. The valves are to be checked daily. The person draining the dike should stay in the area and close the valve when draining is completed. The four actuated valves on the sphere inside the dike can be closed from the old module charge panel in the vinyl control room or from switches outside of the dike, south of the sphere. (These are the valves that are tested every Wednes-day - See Appendix B for checklist).

E. Fixed Point VCM Monitor

A fixed point VCM monitor is used to detect VCM and record the VCM concentration at various locations at the VCM tank farm. The recorder and alarm annunciator are located in the vinyl control room. The vinyl panel operators will inform the yard operator of any high readings at the VCM tank farm.

VI. APPENDIX

A. VALVE SETUP CHECKLIST FOR UNLOADING VCM

VALVES THAT MUST BE CLOSED FOR UNLOADING:

_____1. 4 - 1" manual valves on evacuations lines, east side of the compressor shed.

_____2. Main 2" overhead manual valves on evacuation line, southwest corner of compressor shed.

VALVES THAT MUST BE OPENED FOR UNLOADING:

_____1. Main liquid valve to sphere

Located Under Sphere

_____2. Main vapor valve from sphere

_____3. Check sphere level _____ Feet _____ Inches.

_____4. Both valves on liquid and vapor lines hooked to car.

_____5. Valves inside car dome for vapor and liquid.

_____6. Vapor and liquid going to stations between railroad track.

_____7. Vapor and liquid valves under sight glasses on each station being unloaded from.

_____8. Sphere liquid and vapor valve on main headers on west side of compressor shed.

_____9. 4-way valves on each compressor being used must be in vertical position (handle).

_____10. Vapor line knockout pot inlet and outlet valves on west side of compressor shed.

VALVES THAT MUST BE OPENED FOR RECOVERING VAPOR FROM RAILCAR:

_____11. Same as above except 4-way valves on compressor being used in horizontal position (handle).

WHAT TO CHECK FOR UNLOADING:

1. Pressure gauages on compressors:

   a. Inlet Side - 20 to 50 pounds. If 0, compressor is full of liquid.
   b. Outlet Side - 60 to 110 pounds. If over 120, compressor is dead headed.

2. Sight glasses on liquid lines (flow of liquid).

3. Jamesbury valves on knockout pots closed to evacuation system.

4. No valve mentioned above partially closed.

5. Liquid VCM avove the low level switch in the vapor line knockout pot.

CAR NUMBERS BEING UNLOADED:

_____ _____ _____ _____

_____ _____ _____ _____

C. EMPTY OUTBOUND VCM TANK CAR

INSPECTION REPORT

Note: This inspection report is to be completed by the yard operator responsible for unhooking car.

Operator's Name: _____

Time: _____

Date: _____

Car No.	Seal No.(1)	Due Date

	YES	NO
1. All unloading fittings removed		
2. All product openings capped or plugged tightly		
3. All plugs and fittings equipped with chains		
4. Placards reversed and upright (4)		
5. Chocks removed		
6. Blue flag put down		
7. Derailer removed		
8. Visual evidence of any car defects		

NOTIFY SUPERVISOR OF ANY ACTUAL OR SUSPECTED DEFECTS.
DEFECTIVE CARS ARE NOT TO LEAVE THE PLANT.

(1) Note: All dome lids are to be sealed shut and corresponding seal numbers recorded.

The above cars have been inspected and prepared for shipment. To the best of my knowledge these cars have no defects.

_____
Operator's Signature

Conoco Chemicals Company
Conoco Inc.
P. O. Box 91, New Highway 25
Aberdeen, Mississippi 39730
(601) 369-8111

PVC PLANT SAFETY AND HEALTH MANUAL
ABERDEEN, MS

SUBJECT: Fire Prevention Plan

EFFECTIVE DATE: March 18, 1983

PREPARED BY: A. H. Scothern Safety Director

APPROVED BY: John Trimble Manager

References: CFR 1910, Subpart L-Fire Protection, 1910.134

Purpose: The potential for personal injury and property damage in operating plants that handle flammable and toxic materials can be serious if the hazards are not properly controlled. Conscientious operation of our plant and adherence to sound operating practices are the only consistent methods that can be used to control these hazards. This plan is therefore being issued to:

1. Minimize the potential for fires and related emergencies through positive housekeeping and control of flammable materials and ignition sources.

2. Insure that all fire protection systems operate properly by routine testing and maintenance of critical systems.

FIRE PREVENTION PLAN

Fire related losses which can occur in industries like ours are particularly severe. Due to the nature of the materials which are routinely handled in our plant (primarily VCM, natural gas, propane, and other hydrocarbon raw materials and fuels), operating personnel must exercise preventive control of hazards which can lead to fires.

Many of the materials used to make PVC and its compounds are flammable or combustible. Table I, below, is a list of commonly used materials which are flammable or combustible and can be fire hazards if not properly controlled. The majority of these materials are supplied as finely divided dusts and in some cases are capable of causing an explosion if dust accumulations are allowed to form an ignitable cloud.

DRY BLEND DEPARTMENT

Flammable

Gasoline

Combustible

"Acryloid" Products
Acrawax
"Advastab" Products
Advawax
Calcium Stearate
Cardboard Boxes
Diesel Fuel
"Mark" Products
Paper Bags
Thermolite 101, 175
Wax Lubricants
(polyethylene, petroleum)

PLASTICIZER DEPARTMENT

Flammable

Gasoline

Combustible

Alcohols
Phthalic Anhydride
"Darco" Carbon Black

Cardboard Boxes
Diesel Fuel
Bisphenol A
Paper Bags
Sulfonic Acid Catalyst (liquid)
(Scott Air Pak and turnout gear required for fire fighting)

MAINTENANCE DEPARTMENT

Flammable

Acetylene
Amercor Mark III
Anhydrous Ammonia
Gasoline
Hydrogen Gas
Natural Gas
Propane
Paints and Thinners
Sulfuric Acid (generates hydrogen gas)

Combustible

Agitene (regular, super)
Amerzene 35
Ammonium Nitrate (highly dangerous if mixed with oils)
BETZ KI-2
Cardboard Boxes
Conoco lube oils and greases
Diesel Fuel
Mitee Thread Cutting Oil
Neutrameen NA-7
Polysperse Plus
Slimicide C-31
Slimicide C-68
UCON Lubricants and heat transfer fluids

TABLE II (Continued)

Equipment	Areas Of Coverage
Fire Monitors (portable)	Emergency equipment station, initiator storage freezers.
Dry Chemical Wheeled Fire Extinguishers	New reactor module, old reactor module, south compound cooling tower.
Dry Chemical Hand Portable Fire Extinguishers	Various locations plant-wide.
Hose Houses and Fire Hydrants	Various locations plant-wide.
Fire Turnout Clothing (hats, coats, boots & gloves)	Available for use plant-wide, stored in the Emergency Equipment Station.
Extra Handline Fire Hoses, Nozzles, and gated wyes	Selected hose houses in vinyl areas.
Extra Fire Hose (3-inch hose with 2½-inch couplings)	Hose reel cart in Emergency Equipment Station.
Scott Air Paks	Various locations plant-wide.
Additional Firefighting Nozzles and related equipment	Available for use plant-wide, stored in the Emergency Equipment Station.
CO_2 (Carbon Dioxide) Fire Extinguishers	Laboratory and Motor Control Centers.
Halon 1211 Fire Extinguishers	Behind vinyl control panel and in telephone switching room.

HOUSEKEEPING

Along with the proper control of flammable and combustible materials, maintenance of high housekeeping standards is critically important. The proper disposal of trash from the various plant operations will minimize the accumulation of combustible materials and thereby reduce the potential for fire. The following is a list of basic housekeeping requirements for fire prevention purposes:

TABLE III

FIRE PROTECTION SYSTEM AND EQUIPMENT MAINTENANCE

System/Equipment	Frequency	Checkout Requirements
Fire Pumps	Weekly	1) All engines start on pressure drop and sequence. 2) Battery and charger condition. 3) Engine operating temperature. 4) Engine oil pressure. 5) Engine hours. 6) Fuel levels. 7) Flowing and static pressure. 8) Engine RPM
	Semi Annual	1) Flow studies. 2) Verify engine RPM with tachometer. 3) Cooling system flush and charge with fresh coolant (annual). 4) Verify thermostat operation.
Deluge Systems (Reactors & Tank Farm)	Weekly	1) Flow gas over gas detector field sensors on gas detection system - check for system release. 2) Proper operation of deluge valves-trip and reset.
	Monthly	1) Systems drain freely. 2) No breaks in deluge piping systems.
	Quarterly	1) Check flowing pressure on each system.
VCM Storage Sphere	Weekly	1) Remote and local control operation of actuated valve (pit). 2) Nozzle orientation directed at bottom half of sphere.
Stationary Fire Monitor Nozzles	Semi-Annual	1) Free operation of valve. 2) Flush until water is clear. 3) Nozzle free of debris.
Sprinkler Systems	Annual	1) Flow test at inspector check point. 2) All systems protected by antifreeze solution if wet.
Post Indicator Block Valves and Other Fire System Valves In Each Unit	Weekly	1) Check to insure that firewater supply valves to unit deluge valves are open and locked. 2) Verify all thermostatic release air line valves are open and locked.

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PVC PLANT SAFETY AND HEALTH MANUAL
ABERDEEN, MS

SUBJECT: Emergency Plan-Immediate Actions

EFFECTIVE DATE: March 18, 1983

PREPARED BY: A. H. Sattler — Safety Director

APPROVED BY: J. A. Tweed — Manager

References: CRF 1910, Subpart L-Fire Protection, 1910.1017 Vinyl Chloride

Purpose: The Aberdeen Plant Emergency Plan is broken into two separate and supporting parts. This section, entitled Emergency Plan-Immediate Actions, contains the essential steps necessary to control an emergency condition in the plant. The primary objectives of this section are to:

1. Insure the safety and welfare of employees and the general public in the event of a plant emergency;

2. Minimize property damage and provide for the resumption of normal operations following a plant emergency;

3. Satisfy the legitimate concern of employees, their families, and the general public by providing prompt, accurate information concerning the extent and effects of plant emergencies.

Definition Of Plant Emergencies

A plant emergency is any unexpected event or condition which requires immediate action to prevent injury to personnel and/or damage to equipment. Plant emergencies include, but are not limited to: fires, explosions, release of toxic, flammable, or corrosive materials, or an injury which requires removal of an employee from an elevated location.

Significant vapor release conditions can cause human overexposures and/or fire. The conditions that warrant vapor or any alarm are described in Attachment A. Follow-up announcements must be made as noted to prevent exposure and maintain a clear area.

Immediate Actions To Be Taken In Event Of A Plant Emergency

Immediate actions are the direct responsible of the Emergency Officer. In his absence, they are the responsibility of the Emergency Crew Chief (Shift Supervisor).

II. Use The Proper Emergency Equipment

Protective equipment needs are dictated by the emergency conditions. Personnel responding to an emergency must evaluate the risks before they attempt to correct problems. For emergencies involving VCM or propane vapor releases, the minimum requirements for personnel protective equipment would be a Scott Air Pak. For more serious releases where flammable vapors have been released into an area where an ignition could occur, protective equipment needs could reasonably include full fire turnout equipment, Scott air packs and water sprays from deluge systems, fire hose handline or all again depending upon the needs.

III. Evacuate Non-Essential Personnel From Danger Areas

Always evacuate non-essential personnel and all personnel not properly equipped with personnel protective equipment which is appropriate for the hazards present. Emergency crews are to report to the emergency location as directed in the Emergency Crew utilization section below. Evacuated personnel shall not be allowed to return until the emergency situation has been corrected. In all cases, evacuated personnel shall immediately proceed to primary evacuation areas as noted below. If the wind directs hazardous vapors into the primary evacuation areas, evacuated personnel shall proceed to the secondary evacuation area at the guardhouse and assemble in departmental groupings as noted on the fence located east of the parking lot and south of the guardhouse. If that area is noted as being contaminated by VCM vapor, evacuated personnel will be moved to a safe location along the property line north of the plant. ALL EVACUATIONS MUST BE PROMPT AND ORDERLY - RUNNING SHOULD BE AVOIDED!

Supervisors must designate non-emergency personnel to act in their place for head count purposes (noted below) if the emergency condition requires the activation of the Emergency Crews or Emergency Organization.

Wind direction at the time of fire or vapor emergency will play an important role in the choice of escape routes. Evacuation routes should always be at right angles to the wind (cross-wind). Use the wind socks located on silos 415 and 281 or slurry blend tank 502 to determine the wind direction.

PRIMARY EVACUATION AREAS

Vinyl Area - At pad north of the control room.

Lab & Compound/Plasticizer - Warehouse at northwest corner of the staging area directly south of the plant auditorium.

Maintenance, Receiving Warehouse/Stores, Yard - Main Shop

Off Shift (Evenings Nights, and Weekends) Stores/Warehouse - Guard House

VI. STOP ALL HOT WORK! - Motor vehicles, portable transfer systems, the incinerator, welding machines and other sources of ignition must be positively shutdown immediately whenever the plant emergency alarm is activated! Shut down and secure operations as required to prevent further injury to personnel or damage to equipment.

VII. Stop flow of:

A. Flammable materials feeding fires or potential fires, including dryer and incinerator gas burners.

B. Boilerhouse operation is to be shutdown only in cases where unfavorable wind conditions and flammable material release is great enough to present a hazard. Boilerhouse shutdown can occur only on direct orders from the Emergency Crew Chief, the Emergency Officer, or the Safety Director.

VIII. Fire Control

This section is divided into two interrelated parts - Activation Of Fire Protection Systems And Emergency Organization Utilization. Although they are treated separately in this plan, actual emergency conditions in the plant will dictate a coordinated effort using every safe and reasonable control method at our disposal.

Activation of Fire Protection Systems

The fire protection system available in the plant should be used to control ignition sources in event of vapor release or to remove heat in event of fire. Whenever a vapor release occurs, deluge systems or fire monitors should be put into operation immediately to disperse vapors and reduce ignition sources, depending upon the conditions. In the reactor modules, vapor sensors detect the presence of flammable gases and at preset concentrations, these sensor units will "trip" or activate the unit deluge valves automatically. Other methods of fire water activation for the deluge systems include:

A. Operation from the control room panel;

B. Manual release at the deluge valves; and

C. Thermostatic release sensors. (High heat or rapid rate of temperature rise such as fire or direct steam impigement will cause a trip condition.)

(The above tripping methods simply release control air from the top chamber of the deluge valves. Loss of control air causes the valve to open and allows fire water to flow through the deluge valve into field piping.

Emergency Crew Utilization

Recently, many of the fire hose stations in the Vinyl operating areas were put on the new fire water system. This resulted in higher operating pressures available to fight fires at these stations. Increased supply pressure causes increased nozzle reaction forces (more effort is required to control the hose when water is flowing). The operating pressures from the north (#1) and south (#2) fire pump houses are 140 and 155 psig respectively at design flow rates. This high pressure requires additional manpower for hose handling. Previously, a five man hose crew was planned. A seven man hose crew should be used now to handle the hand lines and nozzles (three (3) men for each of two (2) hoses and a Crew Chief). No changes have been made in the basic structure of the Emergency Crews since no additional staffing is available for this work. The Emergency Organization is shown in Attachment C.

The utilization of the Emergency Crews must be directed to controlling fires and vapor releases as follows.

A. In the event of any serious emergency, the Emergency Crew Chief is to activate the Emergency Organization.

Activation Of Emergency Organization - Whenever the acting Emergency Officer (Operations Superintendent of affected area - alternate - on duty supervisor) determines that the Emergency Organization must be activated, it shall be done in the following manner.

1. Weekdays - Announce "ACTIVATE EMERGENCY ORGANIZATION" three (3) times over the paging systems (P. A. and Gaitronics).

2. Off Hours - Instruct the plant guard to initiate call out of the Emergency Organization using the current Emergency Organization Call List (Attachment B.)

The on-duty Supervisor can instruct a lead operator to initiate either action.

In the event of a fire alarm, Emergency Crews are to assemble upwind of the fire and await further instructions. In the event of a vapor release alarm, Emergency Crews will assemble only if requested by general plant announcement. An assembly point must also be announced as directed by the Emergency Officer.

B. Use stationary fire protection systems to our greatest advantage. Use deluge systems and fire monitors to remove heat from a fire, reduce ignition sources, disperse flammable vapors, and protect nearby equipment and structures. Supplement stationary equipment with portable fire protection equipment such as monitors, fire hose and nozzles using a ground loop as necessary to protect personnel or equipment.

In the event that an emergency condition necessitates the assistance of the Aberdeen Fire Department, the following guidelines must be understood.

1. The Aberdeen Fire Department has agreed to provide assistance in the areas of manpower and fire water pressure boosting for handlines.

2. The Emergency Officer is responsible to determine if Fire Department assistance is necessary to control a fire. If he determines that they are needed, he must initiate the call by notifying the guard to make the call. (This can be done by radio to the control room and a lead calls the guard.) He must also assign someone to meet the fire trunk at the guard-house. The guard should be informed as to who has been assigned to meet the fire truck so he can tell the fire truck driver who to follow. The guard will hold the fire truck until the escort arrives. Specific instructions should be given to the employee assigned to meet the fire truck so the route of travel and destination are understood.

3. The Emergency Officer shall retain control of all fire fighting operations.

4. Additional manpower from the fire department may arrive at the plant in personal vehicles. They should be allowed to pass through any roadblock. They are to park in the employee parking lot. Any fire department personnel who do not have protective equipment should be stopped at the gate. Fire department personnel are to assemble at the gate and will be escorted to the fire location by a CONOCO employee, designated by the Emergency Officer. Aberdeen Fire Department personnel must be equipped with fire turnout equipment that covers all body parts to fight fires of a serious nature in the vinyl or propane areas. For fires in other areas, full fire turnout equipment may not be required. The Emergency Officer must judge the needs and send firemen back if the turnout equipment is inadequate. Outside fire fighting personnel must be escorted at all times by CONOCO escorts.

Have local police warn adjacent plant and residential areas if they are threatened by fire, flammable material releases or toxic gases (chlorine or hydrogen chloride (HCl) as a result of a VCM fire). Plant Manager approval is required prior to contacting the police department unless the delay increases the danger to the community. (See Public Alert section in Safety And Health Manual Section 1.232 Emergency Plan-Reporting Requirements and Emergency Organization Duties.)

ATTACHMENT A
PLANT ALARM SYSTEM
TRIGGER LEVELS

CONDITION	RESPONSE
Three (3) consecutive readings on the Honeywell at or above 5 ppm - VCM at any point (EPA leak).	1. Notify unit or Chief Operator to clear personnel from affected area and keep them clear. 2. Find and properly report leak.
Known release, three (3) consecutive readings on the Honeywell's 10 ppm-VCM or greater, or a major vapor release in any VCM or propane handling area.	1. Sound VAPOR RELEASE ALARM. 2. Announce which unit is affected and should be cleared on the Gaitronics and public address systems. (Announce 3 times - each system.) 3. Dispatch Supervisor, Chief or unit operator to find leak, check size of leak, clear personnel, and report conditions to control room personnel. THIS MUST BE DONE ON A TOP PRIORITY BASIS.
Fire	1. Sound Fire Alarm. 2. Announce location of fire on Gaitronics and public address systems (3 times each system). 3. Announce Emergency Crew assembly point as specified by Supervisor. 4. Activate Emergency Organization as directed by Supervisor/ Emergency Officer.
Evacuation	1. Sound Evacuation Alarm. 2. Announce Plant Evacuation over Gaitronics and Public Address systems (as noted above).
Severe Weather/Tornado	1. Sound Severe Weather Alarm as specified by Supervisor or guard (if tornado is seen). 2. Initiate steps to control reactors or rapidly shut down equipment. 3. Seek shelter in protected area.

ATTACHMENT C

EMERGENCY ORGANIZATION

MANAGEMENT GROUP

Plant Manager, Plant Superintendent, Employee Relations Director

EMERGENCY OFFICER

Operations Supt. Vinyl/ Compound, Operations Supv. Same Area (Alternate or Assistant)

MESSENGER

Mechanical Engineers

SECURITY OFFICER

Safety Supervisor

Guards

COMMUNICATIONS CHIEF

Dir. Administrative Services
Alternate: Plant Accountant

Switchboard Operator

MESSENGER

Mechanical Engineer

ASSISTANT EMERGENCY OFFICERS

Chief Process Engineer, Alt: Sr. Process Engineer

SAFETY DIRECTOR

EMERGENCY CREW CHIEF

Vinyl or Compound Shift Supervisor

MECHANICAL CHIEF

Mechanical Supt.

FIRST AID CHIEF

Nurse, Alt: Lab Shift Supv.

LAB SUPPORT GROUP

Chief & Manufacturing Chemist

MESSENGER

Vinyl Op. Engr.

SUPPORT GROUP

Maintenance, Yard, Utilities and Warehouse Personnel

FIRST AID ASSISTANT

Lab Lead Technician

ASSISTANT EMERGENCY CREW CHIEF

#1 EMERGENCY CREW

- All Vinyl Department Employees Except Reactor A's,and Reactor Leads
- Yard Operator To Secure Operations And Report To Emergency Scene

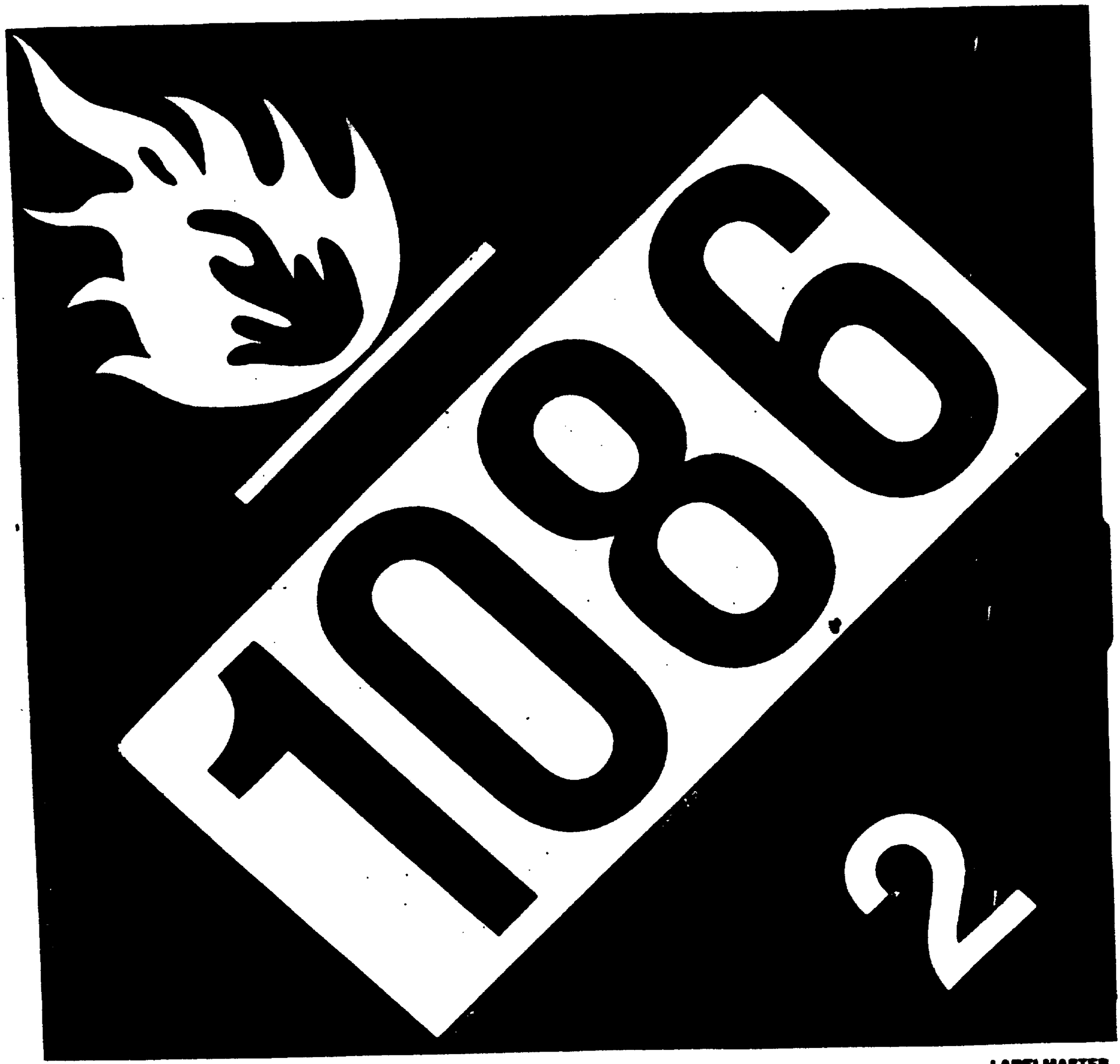
#2 EMERGENCY CREW

All Compound Employees Except P-1 Operator,Line I and Line III Compounders,And Line III Compound Operator. These Employees Are To Shut Down Their Equipment And

FIRE PUMP OPERATOR

- Toolroom Mechanic - Days - #1 Fire Pump House
- Shift Mechanic - Days - #2 Fire Pump House, Off Shift (When Staffed) Both Areas.
- Guard Until A Mechanic Is Called And

E. SAMPLE RAILCAR PLACARD



TSS FLAMMABLE GAS

LABELMASTER

F. PHOTOGRAPHS

FIG. 1 - VCM TANK CARS "SPOTTED" FOR UNLOADING AT EAST SIDE OF TRANSFER STATION NO. 1

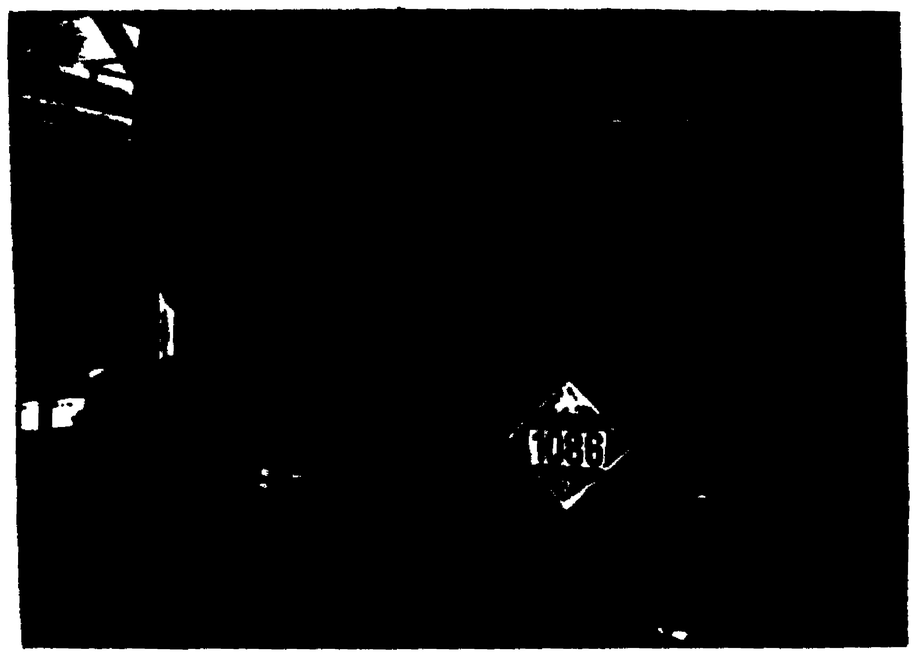


FIG. 2 - VIEW OF HANDBRAKE LOCATED AT THE END OF TANKCAR

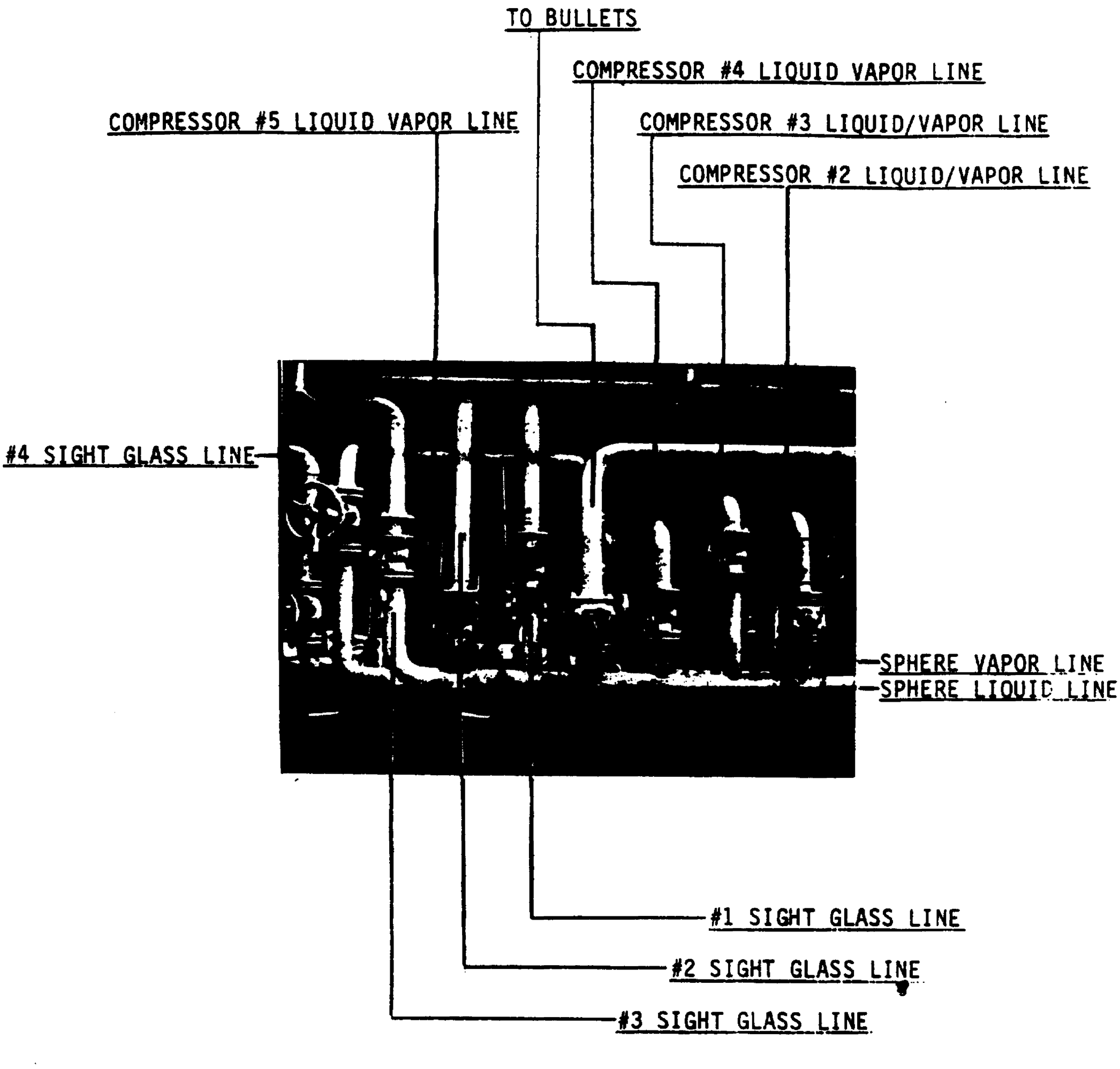


FIG. 4 - PIPING AND VALVES ON WEST SIDE OF THE COMPRESSOR SHED

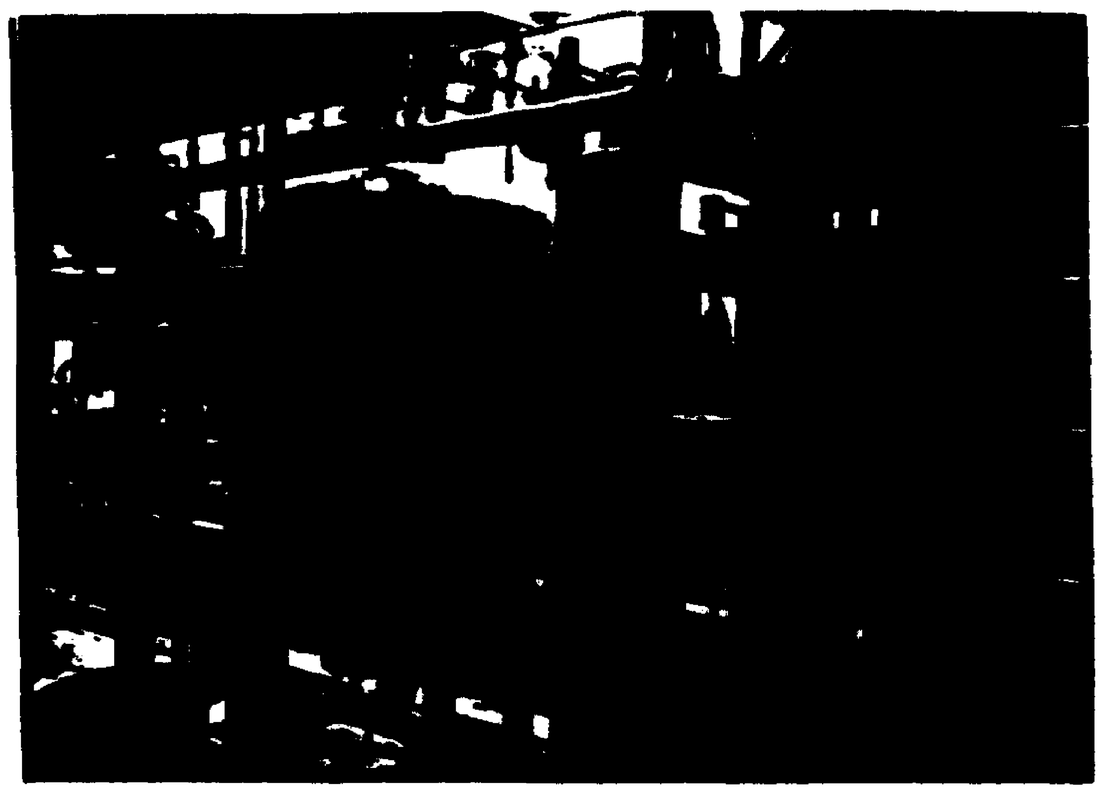


FIG. 7 - T (201) EMISSION RECOVERY SYSTEM KNOCKOUT POT-

NORTHWEST CORNER OF COMPRESSOR SHED

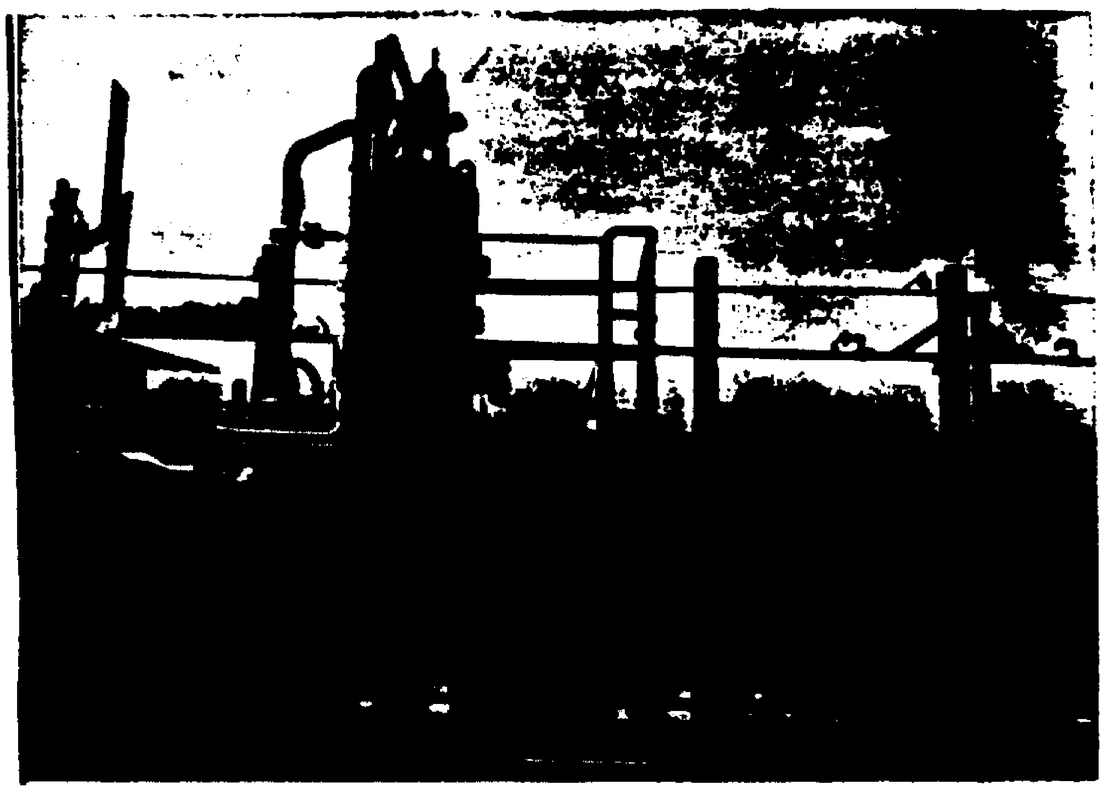


FIG. 8 - T (202) VCM KNOCKOUT POT - NORTHWEST CORNER

OF COMPRESSOR SHED