

CHEMICALS



Exhibit 14-3

INTEROFFICE / LAKE CHARLES

TO See Below

DATE February 24, 1971

FROM C. L. Payne *CLP*

SUBJECT

~~CONFIDENTIAL~~

Attached is your copy of the EC Hazard Review recently completed by Don Metzger with the assistance of those listed in the report as members of the review team.

There are several items in the report which need to be reviewed by executive management in order to determine if the recommendations pertaining to these items are to be implemented.

I recommend that those receiving this report study it and that a meeting then be held on Tuesday, March 2, at 10:00 A. M. in Dewey's office to discuss the findings of the review. At this time Don could more fully explain the situation or condition as found and his recommendation to correct same. Unless I hear from you to the contrary it will be assumed that this meeting will be held as scheduled.

In a meeting attended by O. Cromeans, T. Taylor and myself the consensus was that the contents of this report should be classed as confidential and that the report would be sent only to those included in the distribution list.

CLP/ar

Distribution List:

D. L. Duncan
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SL 050600



TO C. L. Payne

DATE February 18, 1971

FROM Don Metzger

SUBJECT Hazard Review of Ethyl Chloride Plant

Hazard Review Team: Alleman, Byars, M. Davis, McVicker, J.L. Duhon, C. L. Payne, Metzger.

Summary

An extensive list of questions and recommendations were formulated during the Hazard Review of the Ethyl Chloride plant. The unresolved questions which require further consideration and/or action are listed on page 2. Questions which are resolved, but require further action begin on page 3. A list of recommendations starts on page 11. Recommendations 25 through 36 apply to the general plant. Some of the more important problems encountered were plugging of the Bottoms Dopp Kettle SRV, poor reliability of the HCl Compressor SRV's, possible vapor clouds from the operation of SRV's, the use of glass sight ports and sight glasses, a weakness in the vapor detector system and the need for more specific training on safety and the fire prevention and protection systems.

Introduction

This report covers the conditions found in the Hazard Review of the Ethyl Chloride plant. As a result of the review two groups of questions have been formulated, followed by a list of recommendations. The first group is composed of unresolved questions which require further consideration and/or action. The second set of questions are resolved or at least partially answered, but in most cases require some action to correct or improve the conditions found. Some of this second set of questions involve procedures which are already adequate, but are presented for future reference. The recommendations are a combination of those arrived at by the Hazard Review Team and by the author. Some of these recommendations apply to the plant as a whole or to other areas.

Discussion

The Hazard Review of the EC plant included operating procedures, instructions, training, equipment design, chemical and process safety and personnel safety. Equipment condition is also an integral part of Hazard Reviews, and inspections of equipment and safety devices are being scheduled. A total of approximately 30 hours of interviews with the operating supervisors were held over a one month period to review the plant. The Hazard Review manual, with the associated worksheets, was used during the meetings as a check list and as a source of discussion promoting questions.

Unresolved Questions

1. Most of the excess flow ball checks have been removed from the sight glasses in the area because of operating problems. Should the sight glasses be blocked off when not in use, or have the ball checks installed, or is the probability of a large spill low enough to allow continued operation without ball checks? See Recommendation No. 25.
2. The frequent operation of the Catalyst Chamber presents a potential source of a major spill. A spill, caused either by operator error or equipment failure, is difficult to isolate because the isolation block valves are adjacent to the Catalyst Chamber. Should changes be made to allow remote isolation of the chamber? See Recommendation No. 2.
3. The EC Bottoms Dopp Kettle is now operated with the feed valve, steam valve and vapor line valve fully open. The kettle sometimes runs liquid full, as evidenced by tar build-up around the agitator packing gland. In addition, the SRV nozzle has been plugged occasionally when inspected. The pressure, level and temperature of the Dopp Kettle are not continuously monitored or alarmed. Should additional instrumentation be added to monitor pressure, temperature and level? Also, should the operating procedure be changed so that the feed valve is throttled to control a level in the kettle? See Recommendation No. 3.
4. The HCl Compressors are equipped with SRV's on the discharge side which vent back to the suction if the difference between the discharge and suction pressures exceeds 155 psig. The past history of SRV reliability is poor: the SRV's have been inoperable on several inspections. The SRV's serve as back-up for the back-pressure control system, as well as their protective job for the compressors. What steps must be taken to improve the SRV's reliability? See Recommendation No. 4.
5. Operation of the SRV's in the EC plant or EC Day Tank area could conceivably result in flammable vapor clouds which could reach known ignition sources. The prevailing wind is such that the VC furnaces are downwind of the plant or Day Tank area an appreciable part of the time. Are existing control measures adequate to prevent this from occurring? Should routing of the SRV discharges to a vent stack be considered? See Recommendation No. 24.
6. It is conceivable that an EC vapor cloud could reach the control room fresh air inlet and reach exposed electrical gear. What additional precautions, if any, should be taken to prevent this from occurring?
7. The Horton Spheres are rated at -6.39 psig and do not have an integral vacuum relief device. The nitrogen pad is routinely blocked off. Also, the pressure transmitter (which actuates an alarm) can be blocked off either manually or by condensation in the vent line. What should be done to insure that the spheres are not subjected to a vacuum? See Recommendation Nos. 18 and 19.

8. The EC Reactor level is continuously monitored by a level transmitter, but the sight glass is not used for cross check because of nozzle plugging and sight glass fouling problems. Either high or low levels in the reactor could conceivably create a hazardous situation. Is back-up level indication needed? See Recommendation No. 5.
9. The HCl feed to the EC Reactor contains about 1500 ppm acetylene. Concentration of acetylene in the vent could conceivably create a hazard, particularly if the vent is reclaimed in the future. What happens to the acetylene in the system and can hazardous concentrations of acetylene or acetylene derivatives occur? See Recommendation No. 1.
10. The Flasher and Bottoms Dopp Kettles gear reducers do not have spare parts. Also, no spare exists for the Flasher motor. Should spare parts and motor be set up?
11. The Vent Condensate pump is not spared. When maintenance is required, the Vent Condensate Tank is bypassed and a substantial amount of liquid EC is put to the Scrubber. Do the hazards involved in the sewer system and the economics of lost EC warrant the installation of a spare pump?
12. If an EC spill occurs in the process area and the sprinklers are turned on, will the pad overflow in such a way as to carry EC into other areas and create another hazard?
13. If a major spill occurs at the Dock Sphere area, does the probability of a vapor cloud reaching an ignition source warrant further controls?
14. Is the effectiveness of the Vapor Detector system appreciably lowered by the single alarm relay circuit feature? See Recommendation No. 28.
15. The barge or ship vapor space is routinely analyzed for oxygen before loading begins. Are there any foreseeable circumstances when other impurities could represent a hazard in the sphere or the vent system?
16. The Carrier refrigeration compressors in the plant and the York compressor at the docks have internal relief valves, backed up by high discharge pressure shutdowns, for overpressure protection. Should the internal relief valves be periodically checked?
17. The HCl Compressor discharge temperature is now continuously monitored, but not alarmed. Should an alarm be installed?
18. Can foreseeable excessive temperature damage the nitrogen compressor?
19. Is fire protection needed on the heat exchangers on the second deck?

Resolved Questions:

A. Operating Procedures, Instructions and Training

1. Question: Are adequate written operating procedures available to operating personnel?

Answer: Standard Operating Procedures (SOP) in the EC areas are in written form. Changes or additions are written in the Operating Log Book. A loose leaf SOP manual is available, but is not up to date and is not an integral part of the normal communications. The Operating Manual has not been revised since 1965. Several equipment and operating changes have been made which are not included in the manual. See Recommendation Nos. 20 and 21.

B. Agitators

1. Q: Are guards needed over the exposed rotating shaft on the Flasher and Bottoms Dopp Kettle agitators?
A: A full cover guard would hinder routine tightening of packing; however, a partial guard could be used to effectively cover the exposed protruding part and still allow access to the packing gland. See Recommendation No. 6.

C. Columns

1. Q: Would the drains on the column SRV's impinge on the columns if they were venting?
A: Yes. This is true of all SRV's in the area. See Recommendation No. 26.
2. Q: Has the pressure rating of the Primary Stripper been checked, with a copy of the calculations in the files, in light of the corrosion noted on Report No. 426?
A: Formal calculations have not been made. See Recommendation No. 7.
3. Q: Is the nitrogen system susceptible to contamination by back flow from the nitrogen pad tie-in at the Heavies Still Condenser?
A: This nitrogen tie-in is not used and will be removed.
4. Q: Are pressure gauges between rupture discs and SRV's checked and logged?
A: No. See Recommendation No. 36.

D. Drying Equipment

1. Q: Are the SRV's on the Primary Stripper Feed Dryers susceptible to plugging by the desiccant or fiberglass role?
A: An expanded metal spacer basket was originally installed. A work order has been written to check for the existence of the basket on the next recharge of the Dryers.
2. Q: Will isolation of one of the Primary Stripper Feed Dryers full of liquid present a hazard?
A: Yes; the operation of the SRV on heat-up could result in a vapor cloud. However, the operators are adequately trained to either clear the drier or to not completely isolate it.

3. Q: Do the glass sight ports on the inlets to the Primary Stripper Feed Dryers present a potential hazard?
A: Yes. Breakage of the glass would result in a large EC spill. The sight ports are not used and will be removed.

E. Compressors

1. Q: Can liquid accumulate in the HCl Compressor suction header and result in carryover and subsequent compressor damage?
A: The header is periodically drained as a check for liquid level. Normally, liquid only accumulates when the HCl temperature from MC is high. Better communication of HCl temperature problems from MC would further improve the situation.
2. Q: Are adequate spare parts on hand for the HCl Compressors?
A: No. Ingersoll-Rand has given very poor service on spare parts for the compressors. The fact that only two of the three compressors are required for operation at full rate has held production losses to a minimum.
3. Q: Does the discharge header need an SRV?
A: The header cannot be pressurized unless the compressor is tied in. Thus the compressor SRV provides header protection. These SRV's are covered in Recommendation No. 4.
4. Q: Should the inside of all HCl Compressor flywheels and belt pulleys be fully guarded?
A: Mechanics and oilers are exposed to the flywheel when working on operating compressors. Guards should be provided. See Recommendation No. 8.
5. Q: Can air be pulled into the HCl Compressors through the shaft packing gland?
A: No. The front distance piece is open to the scrubber, and will always be at 2 to 3 psig. The suction pressure is 25 psig; thus, flow will be from compressor into the distance piece. The back distance piece has an air purge.
6. Q: Is a preventive maintenance schedule needed for automatic shutdown devices for refrigeration compressors?
A: Automatic shutdown devices should be checked periodically. See Recommendation No. 9.
7. Q: Is secondary protection needed against overpressure by blocked discharge on the HCl compressors, Day Tank and Dock Storage vent compressors?
A: If the HCl compressor SRV reliability can be improved, secondary protection is not needed. The Day Tank and Dock Storage vent compressors are small, belt driven and are started up only when personnel are in the area. The automatic pressure switch start-up feature will be removed.

8. Q: Should a regular inspection be set up on the couplings and alignment for the Carrier refrigeration units.
A: These couplings are non-lubricated type and no problems have occurred on alignment.

F. Filters

1. Q: Should the Primary Stripper Feed Filters have SRV's?
A: SRV's are not needed because of the small size of the filters. Also, the SRV on the driers will protect the filter from overpressure when in service.
2. Q: The Primary Stripper Feed Filters are not directly protected with water sprinklers, but will get some overspray from other sprinklers. Should they be better protected?
A: No: the small volume reduces the hazard. Also, the filter has a single tongue and groove gasket. Thus, it can be thought of as a piece of pipe.

G. Heat Exchangers

1. Q: Should the Secondary Vent Condenser have an SRV on the F-22 side?
A: An SRV should be installed. See Recommendation No. 10.
2. Q: Water can leak into the process from condensers under some conditions. No adequate moisture test exists for the EC streams that are rich in HCl and iron. Does the probability of leaks of water into the process side warrant finding an adequate test?
A: A quick and reliable test is needed. See Recommendation No. 11.

H. Pumps

1. Q: The Reactor Recirculating pumps, Primary Stripper Feed pumps and Barge Loading pumps present exceptional hazards when the seals leak. Are further precautions necessary?
A: No. The frequency of seal failure is decreasing and the remote operated valves have permitted quick isolation. Also, vapor detectors are strategically located to indicate seal failure. Lip seals are used on all these pumps except the Barge Loading pump, thus reducing the size of seal leak. The remote operated valves sometimes overclose slightly, allowing some leak-through. This should be corrected.
2. Q: The Rework Pump can be blocked off at the plant and is thus susceptible to being run against a blocked discharge. Can a hazard develop?
A: A hazard could develop, but operators are trained to remember to shut down the pump. Also, the vapor detectors would indicate a seal leak.

3. Q: Is the internal oil-side SRV adequate to prevent over-pressure in the Lapp Gland Seal Flush pumps?
A: Yes. The system is small and the piping is rated well over any pressure which could develop.

I. Tanks

1. Q: Glass sight ports are used on both the Flasher and Bottoms Dopp Kettles. Are these sight ports needed?
A: The Flasher sight port is not needed and will be removed. The status of the Bottoms Dopp Kettle sight port is dependent on the outcome of unresolved question number 3. See Recommendation No. 12.
2. Q: Have any plugging problems occurred on the Flasher or Flasher Entrainment Separator SRV nozzles?
A: No.
3. Q: The SRV on the Tar Buggy is not checked on a short frequency and is susceptible to plugging. What changes will be made to insure an unplugged SRV and nozzle?
A: This SRV and nozzle will be checked each time the Bottoms Dopp Kettle SRV is checked. See Recommendation No. 13.
4. Q: The Flasher SRV has a block valve between the SRV and the Flasher, with no chain or tag to keep it open. Is the valve needed, and if so, should it be locked or tagged open?
A: The block valve is needed because the Flasher material could prevent the SRV from closing properly if it did open up. Wires with lead clips have been used as tag out in the past, but are corroded or lost. Operations personnel feel that a lock out procedure might create a problem because of the time required to get a key and use it. See Recommendation No. 14.
5. Q: The nitrogen pad is normally blocked off at the EC Day Tanks. The tanks were found at atmospheric pressure during the Hazard Review. What should be done to assure a positive pressure on the tanks?
A: The operators will be retrained on the necessity of maintaining a positive pressure on the tanks. See Recommendation No. 18.
6. Q: Does the Vent Knock-Out Pot need an SRV?
A: Yes. An SRV will be installed.
7. Q: The Flasher, Bottoms Dopp and Vent Knock-Out Pot do not have standlegs or bottom inlets to prevent liquid free-fall. Does the probability of ignition of a flammable vapor space by static electricity warrant any changes?
A: No. This is common practice on kettles - the safeguard lies in keeping the vapor space out of the explosive range. The Vent Knock-Out Pot does not carry significant amounts of liquid and the vapor space is kept out of the flammable range by a continuous nitrogen purge.

8. Q: The Reactor Dump Tank, Tar Buggy, Flasher Entrainment Separator, Vent Condensat Receiver and Vent Knock-Out Pot are not directly protect d by sprinklers. Should these vessels be protected?

A: No. The Reactor Dump Tank rarely has any EC in it. The other vessels contain only small amounts.

9. Q: The Reactor Dump Tank is normally isolated and is not continuously monitored for pressure. Operator rounds do not include any readings on the tank. Is surveillance needed?

A: Yes. The pressure will become a part of the operators rounds and he will be instructed to maintain a positive pressure on the tank.

J. General Area

1. Q: Is grounding routinely checked in the plant?

A: Yes. A check list is provided for periodic checks.

2. Q: The filter elements on the instrument air to the control board are not routinely changed. Should a schedule be set up?

A: Yes.

3. Q: Should control room pressure be continuously monitored?

A: Yes. See Recommendation No. 27.

4. Q: A vapor tight lamp enclosure was found to be broken at the EC Reactor. What needs to be done to prevent this type of occurrence?

A: More complete surveillance should be made. See Recommendation No. 15.

5. Q: Nitrogen is piped directly into the control room via the tubing for the remote operated reactor valves. Is this permissible?

A: The tubing is small and a major leak would have to develop to create a hazard. This type of leak would be heard.

K. Layout

1. Q: Is the walkway to the Bottoms Dopp Kettle adequate for all foreseeable circumstances?

A: No. A ladder at the north side would provide an emergency route. See Recommendation No. 16.

L. Piping

1. Q: The transfer line to the docks is currently protected from over-pressure by lining it up to one of the spheres. Is this adequate?

A: The transfer line could be isolated under some circumstances. See Recommendation No. 17.

2. Q: Will water be tied, via a double block and bleed, to the Primary Vent Condenser - cooling tower water is normally used. Should the tie-in be removed to prevent possible well water contamination?
A: The spoolpiece will be rolled out.
3. Q: Should a routine check be made on the operation of steam traps on steam headers?
A: This is saturated 30 psig steam and represents a low probability of damage.

M. Sewers

1. Q: The sewer openings at the southeast and northeast corners of the VC Furnace area could contain EC vapors. Are the existing controls adequate to prevent ignition by traffic to the control room or by the furnaces?
A: The sewers are equipped with vapor detectors to indicate spills. The operation of these vapor detectors has lowered the effectiveness of the rest of the system due to the single alarm relay circuit feature. See Recommendation No. 28.
2. Q: The EC plant is not isolated from the main sewer by liquid seals. Are liquid seals needed to prevent back migration of flammable vapors?
A: EC is the first plant on the sewer and thus the probability of back migration is very low.

N. Vents and Vent System

1. Q: The scrubber does not have a liquid seal to prevent back migration of flame into the system. Is the existing purge adequate to prevent back propagation?
A: Yes.

O. Fire Protection

1. Q: Is vehicle access properly controlled?
A: The ropes along the Area "B" road are not kept up properly. Also, the control room access road does not require a permit. See Recommendation No. 29.
2. Q: Are existing personnel and all new personnel thoroughly trained in the purpose and use of fire protection and fire fighting equipment?
A: The operators have received training in occasional safety meetings, but could be better trained. See Recommendation No. 31.
3. Q: Are the procedures to be used in the event of a fire thoroughly understood by all concerned?
A: No. There are difference of opinion on how to fight a fire. See Recommendation No. 30.

4. Q: Do all operation supervisors have a copy of the Standard Operating Procedure for Fire Water Protection System?
A: The new Technical Assistants do not have this and it has not been reviewed recently by some other supervisors.
5. Q: Are the appropriate people always notified when Post Indicator valves are closed?
A: No, Post Indicator valves have been found closed recently without the knowledge of the General Foreman or Foreman. See Recommendation No. 31.
6. Q: Will an adequate number of monitor nozzles at the EC Dock Sphere area be accessible under foreseeable wind and fire conditions?
A: No. The monitor nozzles are located along the north side of the EC Spheres. A hydrant is available on the south side. See Recommendation No. 22.
7. Q: Is the position of the Vapor Detector - Sprinkler System trip bypass switch periodically logged and are guidelines established on the maximum length of time the switch can be bypassed without notifying supervision?
A: No. See Recommendation No. 32.
8. Q: Are the screens on the vapor detector head periodically inspected to insure that no tears or holes have developed (thus creating an ignition source)?
A: No. See Recommendation No. 33.

P. Personnel Safety

1. Q: Do new personnel entering the department get any formal (checklist type) safety training, or instructions in the safe use of fork lifts, etc.?
A: No formal training exists for general safety subjects. Specific training, such as fork lift operation, are not always scheduled. See Recommendation No. 23.
2. Q: Is plant air used for breathing in sandblaster's hoods or other respiratory equipment?
A: There is no procedure for area control of outside people using plant air. Also, the air and nitrogen utility drops use the same fittings. See Recommendation No. 34.
3. Q: Are all persons not regularly assigned to an area required to check in at the control room before entering the area.
A: "Unauthorized Personnel" signs are posted, but no clear directive exists on this problem. See Recommendation No. 35.

RECOMMENDATIONS

1. The concentration of acetylene and acetylene derivatives should be determined in the EC plant. An approximate material balance should be made to check accountability of the acetylene.
2. A method of remotely isolating the catalyst chamber in emergency situations should be installed.
3. Operation of the Bottoms Dopp Kettle should be changed to stop the plugging of the SRV. The instrumentation and procedures used at the MC Dopp Kettle should be used on the EC Bottoms Dopp Kettle. Also, the waste stream should be periodically analyzed.
4. Changes must be made to improve the reliability of the HCl Compressor SRV's. A different type of rupture disc should be considered for isolation of the SRV from the HCl.
5. A back-up method of monitoring EC Reactor level should be made available and consistently used. The first method which should be considered is the periodic use of the sight glass, with the practice of leaving it blocked off when not in use.
6. A partial guard should be installed over the exposed rotating shafts on the Flasher and Bottoms Dopp Kettles.
7. A formal calculation of the pressure rating of the Primary Stripper should be made and copies of the calculations should be placed in the equipment files.
8. Guards should be provided on the inside of all flywheels and belt pulleys on the HCl Compressors.
9. Automatic shutdown devices on refrigeration compressors should be checked on a periodic schedule.
10. An SRV should be installed on the F-22 side of the Secondary Vent Condenser.
11. A reliable method of determining the moisture level in the EC plant streams should be developed and made available to field personnel.
12. The glass sight port on the Flasher should be removed. The glass sight port on the Bottoms Dopp Kettle should be removed if not needed to fulfill the requirements of Recommendation No. 4.
13. A history of the condition of the SRV and nozzle on the Tar Buggy should be compiled. If a plugged SRV or nozzle is found, changes should be made to alleviate the problem.
14. An acceptable lock out procedure must be set up for the valve under the Flasher SRV; otherwise, the valve should be removed.
15. More thorough surveillance needs to be made of the condition of lighting enclosures and other vapor tight or explosion proof gear.
16. A ladder should be provided at the north side of the Bottoms Dopp Kettle platform for an emergency exit.

17. An SRV should be installed on the EC transfer line to the docks to protect against overpressure when isolated.
18. The nitrogen pad systems at the EC Spheres and the EC Day Tanks should be put in continuous service and set at a low (3 - 5 psig) pressure. The regulators should be periodically checked for leak-through.
19. The pressure transmitter at the EC Spheres should be relocated so that it cannot be made in error by condensation in the system.
20. The Operating Manual should be updated.
21. The SOP Manual should be updated and used to provide better communications on changes in operating procedures.
22. The location of the monitor nozzles at the EC Spheres should be re-evaluated.
23. Specific training sessions, such as fork lift operation, should be set up for all new personnel entering the area.
24. Serious consideration should be given to routing the outlets of the SRV's in the EC Process Area to a vent stack.

RECOMMENDATIONS CONCERNING THE GENERAL PLANT

25. The potential of sight glasses for causing hazardous leaks or vapor clouds should be thoroughly evaluated, and a policy should be formulated for sight glass usage.
26. The drains on all SRV's should be piped so that impingement on piping and vessels does not occur when the SRV's operate.
27. The pressure in control rooms which are designed to be kept under a positive pressure should be monitored and logged.
28. Separate alarm relay circuits should be installed for vapor detectors which are in independent areas of the plant. The existing system is not as effective as it could be because all the areas covered on a panel board are tied to a single alarm relay circuit.
29. The road barrier ropes along Area "B" road are not being kept in position. All personnel must be trained to properly use these ropes.
30. Discussions should be held among supervisors and the Fire Chief for determining some guidelines on what procedures to use in the event of a fire.
31. A training session on the use of fire protection systems should be held. Emphasis should be made of the necessity of keeping systems in service and proper communications when systems are isolated. This session should be repeated periodically to inform new personnel and retrain older personnel.
32. The position of the Vapor Detector-Sprinkler System trip bypass switch should be logged periodically. Guidelines should be established on notification of supervision when it is bypassed for more than a short time.

33. The vapor detector head could be an ignition source if the flame arrester screen has a hole in it. A schedule should be set up to inspect the screens on vapor detector heads periodically.
34. The question should be resolved as to whether plant air should be used for breathing purposes. If plant air is to be used, a procedure should be derived for close control of the use of it for breathing purposes.
35. Consideration should be given to issuing a directive for all outside personnel to check into control rooms before entering an area.
36. The pressure between rupture discs and SRV's should be checked at least once per shift and logged. The frequency on services which are inaccessible and which have a low probability for problems could be decreased accordingly.