

CHEMICALS



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TO See Distribution

DATE June 1, 1972

FROM Don Metzger *DM*

SUBJECT Hazard Review - EDC Plants

CONFIDENTIAL

Attached is your copy of the EDC Hazard Review Report.

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Attachment

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TO C. L. Payne DATE June 1, 1972
FROM Don Metzger SUBJECT Hazard Review - EDC Plants

Hazard Review Team: Lynch, Muery, J.M. Davis, Duhon, Gorton, Metzger

Summary

The EDC Plants Hazard Review was conducted during the fall of 1971 and spring of 1972. No major problems were found. Some of the more significant questionable areas include the operation of a stripper reflux dryer without overpressure protection, the failure position of some of the control valves, the need for redundancy on reactor level instrumentation, and the ignition potential of the air compressor building.

Discussion

The Hazard Review of the EDC Plants included equipment design, operating procedures, equipment condition, personnel safety and process safety. The questions raised during the review which are unresolved are listed below. The more important resolved questions are also listed to provide a readily accessible record of the review.

Unresolved Questions

1. No. 1 Stripper Reflux Dryer has a 50 psig design pressure and has no overpressure protection. The dryer routinely operates at 56 psig and can be exposed to 94 psig under the worst possible condition. Does the potential for rupture and formation of a significant vapor cloud warrant the replacement of this dryer?
2. Is additional instrumentation needed to prevent liquid chlorine from being fed to the reactors?
3. Does the ignition potential presented by the instrument air compressor building justify taking steps to eliminate the ignition sources?
4. Do the Area "B" road warning lights and Parish Road traffic control arms provide adequate control of vehicle traffic?
5. Does the existing Area "B" entrance gate provide adequate entrance for personnel and vehicles during an emergency?

6. Are additional means of speed control needed on Area "B" road?
7. No analysis, either periodic or continuous, is now made on ethylene feed to the plant. A polyethylene plant recycle stream is now blended into our ethylene feed. Is analysis of the ethylene feed justified?
8. The ethylene feed to the plant occasionally contains oil. The composition and end effects of this oil are unknown. What are the potential problems that could result from the oil entering the EDC Plant, and is our system adequate to give warning and handle the problems?
9. Hydrogen can be fed to the EDC reactors in significant amounts in the cell gas. This impurity could conceivably result in reactor overpressure. Does the warning system now provided for air provide adequate warning of high hydrogen contents? Also, does the hydrogen present any uncontrollable reaction potentials in the EDC vent system?
10. The "Anti-Air" system has provided warning and protection for massive amounts of air in the cell gas and thus has eliminated the majority of problems created by air. However, significant amounts of air are still allowed to enter the cell gas and give the potential for blowing a rupture disc in the EDC system. Is more protection needed for the problem of air entering the reactors via the cell gas?
11. The methane to the plant contains some liquid (distillate), and breakthrough to the plant could conceivably occur. What is the composition of the liquid and could it cause any problems in the EDC system?

Resolved Questions

A. Columns

1. Question: Should the vent scrubbers be protected against going into the explosive range due to the back-up of air from the vent stack?

Answer: This protection is now needed during shutdowns and will be even more necessary after start-up of the incinerator. Consideration is being given to purging or seals to prevent back-flow.
2. Question: Is the fire protection on column skirts in the two plants adequate?

Answer: This coverage will be observed during the next routine trip of the sprinkler system.

B. Dryers

1. Question: Should the pressure between SRV and rupture disc combinations be routinely monitored?

Answer: These pressures will be checked and logged weekly.

2. Question: Can the SRV nozzles on the Instrument Air Dryers be plugged by the dessicant?

Answer: Plugging of the nozzles could conceivably occur; however, the only sources of pressure are the compressors. The compressors are provided with SRV's which would open-up before the pressure reached the dryer design pressure. This is considered to be adequate protection.

3. Question: Does the TCE Reactor Feed Dryer need fire protection?

Answer: Area supervision will initiate an engineering work order to provide sprinkler protection on the dryer and transfer pump area.

C. Reactors

1. Question: Does No. 2 EDC Reactor have adequate fire protection?

Answer: The coverage of this reactor will be observed during the next routine sprinkler test.

2. Question: Should excess flow valves be provided on the EDC Reactor sight glasses?

Answer: The recently adopted sight glass policy requires only that a suitable block valve be available for sight glasses in EDC service.

D. Tanks

1. Question: Are adequate control measures provided to prevent No. 1 Still Reflux Drum from overpressuring due to nitrogen pad malfunction?

Answer: A small SRV will be installed on the nitrogen line to the still to prevent overpressure from occurring.

D. Tanks (cont'd.)

2. Question: Does the EDC Still Bottoms Tank in No. 2 Plant need fire protection or a dike?

Answer: No. The bottoms material stored in this tank is relatively nonflammable.

E. Instruments

1. Question: Are the levels in the EDC Reactors adequately monitored?

Answer: The sight glasses on Nos. 1 and 3 Reactors will be revised to coincide with the method now successfully used on No. 2 Reactor. In addition, consideration will be given to providing a redundant level transmitter on each reactor.

2. Question: The pressure transmitter on No. 3 Reactor is mounted downstream of the reactor condensers. Is adequate warning provided against overpressure due to overfilling of the Reactor Gas Separator?

Answer: A work order has been written to install a pressure transmitter on the reactor.

3. Question: Failure of any of the ethylene control valves in the closed position, or the chlorine control valves in the open position will cause the swapover from ethylene to chlorine excess. This situation has somewhat more potential in No. 1 Plant because the condenser and vent system would be exposed to chlorine coming from one reactor and ethylene coming from the other reactor. What potential problems can result from these malfunctions?

Answer: During normal operations, a swapover to chlorine excess will result in an explosive mixture of the wave front of the chlorine excess mixture. It is felt that the volume of this explosive mixture is small and that the probability of igniting it and the extent of the potential damage are also small. The chlorine excess mixture itself should be below the fuels lower explosive limit under foreseeable circumstances.

A significant volume of chlorine-ethylene explosive mixture could be formed during start-up or shutdown; however, it is felt that close surveillance during these periods adequately limits the probability of occurrence.

E. Instruments (cont'd.)

4. Question: No. 1 EDC Still could be overpressured by overfilling of the reflux drum. Is more instrumentation needed on the still to warn of this and other associated problems?

Answer: A temperature alarm will be installed on the still.

5. Question: Do all control valves in the area fail in the desired position on air failure?

Answer: Consideration is being given to changing the failure position on the following control valves:

- (1) No. 3 Reactor LCV - change to fail open
- (2) No. 2 Stripper Gas Separator LCV - change to fail open
- (3) No. 1 Still Reflux Drum LCV - change to fail open
- (4) No. 2 Still Reflux Drum LCV - change to fail open
- (5) Cooling Tower LCV's - change to fail open
- (6) Methane to No. 1 Plant Vent - will install a bypass
- (7) Methane to No. 2 Plant Vent - change to fail closed

F. Piping

1. Question: Are all piping systems in the area protected against over-pressure?

Answer: The 30 psig steam header is designed for 150 psig at 500°F maximum. The line could conceivably be exposed to 250 psig superheated steam via the make-up pressure control valve. This line should be protected by an appropriate safety valve.

G. Personnel Safety

1. Question: Are all walkways leading to vehicle traffic areas arranged so that good vision is assured by the person in the walkway and by the vehicle drivers?

Answer: A work order has been written to provide a walkway and barrier on the Area "B" road north of the Per-Tri ammonia tank.

2. Question: Are all potentially hazardous areas properly identified?

Answer: A work order has been turned in to install a sign at the sulfuric acid tank.

G. Personnel Safety (cont'd.)

3. Question: Do any of the walking surfaces become slippery when wet?

Answer: The reactor areas have been skidproofed to prevent slippage. The skidproofing is peeling and further evaluation will be conducted on skidproofing materials.

4. Question: Are all containers used for carrying liquids adequately guarded against splashing?

Answer: The drained sample containers in EDC are provided with lids; however, consideration will be given to other methods of handling the drained organic liquids.

5. Question: Are personnel properly protected when working with sulfuric acid?

Answer: Adequate personnel protection is used by operators when working with the acid. A permanent air hose will be installed to prevent the operator from using a wet hose when transferring acid from the acid egg to the tank.

H. Fire Protection

1. Question: Are all PIV's properly marked?

Answer: The PIV's at the million gallon EDC Storage Tank should be marked so that the PIV used to control flow to the monitor nozzles are easily distinguished.

2. Question: Are vapor detectors needed in the EDC area?

Answer: The consensus is that vapor detectors are not needed in this area due to relatively low volatility of EDC.

I. Chemical and Process Safety

1. Question: Does nitrogen trichloride in the liquid chlorine concentrate at any point in the EDC system?

Answer: The logical place for concentration to occur is the chlorine vaporizer. Several checks for NCl_3 have been made in the vaporizer in the past and no build-up has been seen.

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1. Chemical and Process Safety (cont'd.)

2. Question: Can Dowtherm contamination of the OHC-EDC cause problems in the EDC Plants?

Answer: Dowtherm causes severe tar formation, plugging lines and Dumpster boxes. Catalyst activity is probably decreased. These problems have been satisfactorily handled in the past.

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