

H. Waltemate

Cleveland

J. W. Gressler

Pedricktown

11-18-72

LOST TIME ACCIDENT - REPETITIVE #6 "CHEMICAL EXPOSURE"  
MASS RESIN, PEDRICKTOWN

On Saturday, November 11, 1972, at approximately 5:00 p.m. a lost time Repetitive Accident #6 "Chemical Exposure" was experienced in the Mass Resin Building (512). A technician trainee fell into Reactor 8100 while cleaning the manhead collar. It is believed that he was overcome by a combination of VCl and N<sub>2</sub> fumes. An acting lead technician climbed into the autoclave to give assistance and he too was overcome. The acting lead technician recovered upon being removed from the reactor. The technician trainee was admitted to Salem Memorial Hospital, intensive care unit. He was released on Tuesday, November 14 and returned to work on his regular shift November 1, 1972.

The incident was reviewed with the personnel involved following the incident. A Board of Inquiry was held on Monday, November 13, at 3:00 p.m. with the following in attendance:

|             |   |                              |
|-------------|---|------------------------------|
|             | - | Lab Technician               |
| H. Evans    | - | Industrial Relations Manager |
|             | - | Resin Technician             |
|             | - | Acting Lead Technician       |
| J. Gressler | - | Safety Engineer              |
|             | - | Resin Lead Technician        |
| W. Reed ✓   | - | Mass Resin Manager           |
|             | - | Computer Console Technician  |
| A. Webber   | - | Plant Manager                |
|             | - | Latex Technician Trainee     |

Facts Before the Incident

On Friday, November 10, 1972 Cesco, Inc., a high-pressure-water-blasting company, was in the plant to clean the reflux condensers on Reactors #8100 and #8300. A small amount of Rock Drill Oil (Texaco Product) was added, by Cesco, to the water as a lubricant. An oily residue with a diesel odor was left in the reactors following the high pressure water cleaning. Cesco finished cleaning reactor 8300 at approximately 3:00 p.m., November 10, 1972. The cleaning equipment was moved to reactor 8100 where the cleaning was finished at approximately 4:45 p.m., November 10, 1972. Cesco could not remove all of the plugs from 8100.

*No direct action because the circumstances for entering the vessel did not clearly come out in the investigation. was discharged 2 days later*

NGC 15770

REDACTED

NOV 27 1972

2/12/1

Facts Before the Incident (Continued)

On Friday, November 10, the 4-12 shift put a vinyl chloride rinse in 8300, recovered the vinyl, pulled a vacuum, broke the vacuum with nitrogen, pulled a second vacuum and again broke it with nitrogen. The Saturday 12-8 shift opened the vessel, prepared it for entry and evacuated for approximately one hour before entry was permitted. The vessel was cleaned without incident.

The 12-8 shift then went to reactor 8100 and worked on removing more of the plugs. The Saturday, 8-4 shift charged a vinyl rinse to 8100 at 12:54 p.m. The reactor was recovered, a vacuum was pulled and broken with nitrogen, a second vacuum pulled and it too was broken with nitrogen. The last nitrogen break was at 3:48 p.m. From 3:48 p.m. thru 4:51 p.m. other work in the building was performed and 8100 was left idle.

Sometime after 4:51 p.m. 8100 was partially prepared for entry. The prepoly hamer blind was turned and put in the blank position. The air transfer hamer blind was turned and put in the blank position. The emptying port was opened and the manhead removed. It should be noted that the VCI charge line was not blanked, the keys were still in the agitator drive and the evacuation hose had not been installed.

, acting lead technician, removed the manhead and activated the mechanical standby. The mechanical standby was activated for light, so the autoclave could be inspected. , technician trainee, obtained a wire brush and started to clean the manhead collar had his back to and was working on the manhead approximately two feet away from L heard yell for help, he turned around saw that was in the vessel and struggling to get out, then climbed into the reactor to help.

Facts at the Time of the Incident

*Violation of procedure, but  
certainly a natural instinct*

G... , computer console technician, received an alarm in the computer room indicating that one of the vessel alarm systems had activated. He called Mass Resin, via the terryphone system, to determine the problem. After approximately 15 seconds there was no response. He again called Mass Resin, but received no response. resin lead technician, was in the computer room. asked ... to remain in the computer room while he went to Mass Resin to investigate. Upon entering the building heard the vessel alarm but did not see the warning light. He went to the port end of the vessels, looked in 8100 and noticed two men on the bottom of the vessel. He ran to the second floor office and called in the computer room for help then inserted an evacuation hose in 8100. called the lab and contacted the poly building for help. , resin technician, reported to the computer building to man the computer. then reported to Mass Resin. Upon arrival decided to pull the fire alarm for additional help. resin technician, heard the first emergency call and reported to Mass Resin. looked for emergency rescue equipment. They found an air line respirator but did not know where to make the connection. By this time arrived. later instructed to call an ambulance.

Facts at the Time of the Incident (Continued)

\_\_\_\_\_ decided that too much time had been wasted and told the group that he was going in the vessel. \_\_\_\_\_ held (\_\_\_\_\_ by the collar. It should be noted that the autoclave is horizontal and 5'9" deep. \_\_\_\_\_ grabbed \_\_\_\_\_ and handed him out to \_\_\_\_\_ then grabbed \_\_\_\_\_ and handed him out to \_\_\_\_\_. Both men were then taken out to fresh air. Gressler arrived shortly after the men had been taken to fresh air. \_\_\_\_\_ revived almost immediately. I \_\_\_\_\_ was unconscious but breathing. The Pedricktown First-Aid Squad arrived at 5:10 p.m. \_\_\_\_\_ was put into the ambulance, along with \_\_\_\_\_ and sent to Salem Memorial Hospital, Salem, New Jersey.

Facts Following the Incident

All of the personnel involved, except \_\_\_\_\_ were interviewed but could not add any information. An air content reading was taken on the vessel with a J & W combination meter. At the port end of the vessel the reading was 21% oxygen and 0% explosive mixture. At the manhead the reading was 16% oxygen and 0% explosive mixture. When the readings were taken the evacuation hose had been in the vessel approximately 20 minutes, so they were not true readings. It is believed that \_\_\_\_\_ were overcome by a combination of VCl and N<sub>2</sub>. As \_\_\_\_\_ recovered his reactions were different than what might be expected from VCl asphyxiation, (he was very excited and hyperactive). At first Dr. Charles Norton, Plant Physician, indicated that there were signs of either xylene or benzene poisoning. As a result of Dr. Norton's thinking we thought that there might be contamination in one of our raw materials or that the Rock Drill Oil might have a toxic ingredient. Cesco was contacted to determine if any product they might have used would cause such a reaction. Cesco referred us to Texaco, because the only ingredient used other than water was Texaco's Rock Drill Oil.

Texaco's Eagle Point Plant in Westville, New Jersey, was contacted for information about Rock Drill Oil, however, they could not help us. They said that somebody would be in contact with us shortly. Within 15 minutes Mr. Ron Richards, Head of Toxicology for Texaco, New York Office, contacted us with some basic information about Rock Drill Oil. Mr. Richards called a second time with the complete formula. With the information from Texaco Dr. Norton was convinced that there was no connection between the incident and the oil.

We took samples of our nitrogen, fresh vinyl chloride, recovered vinyl chloride, an air sample of the vessel, an expired breath sample from Poulson and an oxygen sample from our resuscitator. The samples were sent out to be analyzed. The results can be found in "Exhibit 1".

\_\_\_\_\_ was released Saturday evening. \_\_\_\_\_ was admitted for treatment and observation. \_\_\_\_\_ was released on November 14 and returned to work on his regular shift November 16, 1972.

Additional Facts

returned to the plant Saturday evening. The incident was then reviewed with He could not add anything to what we had already learned. Since back was to he was not sure how got into the vessel, but thought that he might have fallen. ( reason for going in after was that he thought he would be able to jump into the vessel, help l out, and jump back out himself. However, the last thing remembers is having half-way out of the vessel. ?

mass resin technician, was not in the building at the time of the incident. He was in the catalyst building weighing catalyst. Robert Synder, Allied serviceman assigned to mass resin, was not in the building. He had taken a sample to the lab.

W. A. Reed, J. W. Gressler, and William West, lead technician of the shift involved, went to Salem Hospital Sunday afternoon to talk to I was interviewed, however, he has no recollection of the Saturday incident. With all the information, as it is, we must presume that was overcome and fell into the vessel.

Corrective Action

- ① The vessel entry and vessel rescue procedures have been reviewed with all employees.
- ② A vessel rescue station will be provided in each of the polymerization buildings.
- ③ All air line respirator connections will be identified.
- ④ We have started rescue crosstraining between areas.
- ⑤ If it should be necessary to high pressure clean the condensers again, following the vinyl rinse, the manhead will be raised approximately 6 inches and the evacuation hose installed for 30 minutes before any work is done on the vessel.
6. Letters of commendation have been sent to the personnel involved in the rescue, the Pedricktown First-Aid Squad and to the guard that was on duty.

Corrective Action (Continued)

7. The incident was reviewed with all personnel in the plant.

J. W. Gressler

JWG:rp

Attached

cc: D. L. Dowell - O. F. Beckmeyer  
J. L. Nelson - R. D. Scott  
F. D. Terry  
E. W. Harrington  
W. E. Brodine  
G. Pow  
R. A. Kelley (Akron)  
Area Managers  
File

This accident points  
out the need for vessel  
rescue drills on a periodic  
basis.

The acting lead tech entering  
the vessel to rescue the victim  
is a very poor practice. This  
could have resulted in two  
fatalities.

The third man entering for  
the rescue (being held by collar)  
was not good, but his decision  
and action may have prevented  
fatalities.

11-29-72

NGC 15774

## EXHIBIT 1

### Nitrogen

99+% N<sub>2</sub>  
Less than 4 ppm O<sub>2</sub>  
No argon  
No CO<sub>2</sub>  
.35% VC1

### Fresh VC1

99+% VC1  
Less than .1% N<sub>2</sub>  
Less than .001% O<sub>2</sub>  
Less than .001% argon  
No hydrogen

### Recovered VC1

99+% VC1  
.30% N<sub>2</sub>  
.030% O<sub>2</sub>  
.0030% argon  
Less than 10 ppm O<sub>2</sub>  
No hydrogen

### Air Sample of Vessel

80+% N<sub>2</sub>  
19.0% O<sub>2</sub>  
.93% Argon  
.050% CO<sub>2</sub>  
.0024% VC1

### Expired Breath

. 75% N<sub>2</sub>  
23.5% O<sub>2</sub>  
.9% argon  
.070% CO<sub>2</sub>

### Oxygen

Pure breathing O<sub>2</sub>, no contaminates

All samples were tested using a mass spectrometer. They were scanned from mass 2 thru mass 150.

NGC 15775

1972 Type #7 Incident #2

H. Waltemate

Cleveland

J. W. Gressler

Pedricktown

11-20-72

NEAR MISS - REPETITIVE #7 "EXPLODING BOOBY TRAP" - PEDRICKTOWN

On Tuesday, October 10, 1972, at approximately 3:30 p.m. a Repetitive Accident Type #7 "Exploding Booby Trap" was experienced at the Pearl-Paste Polymerization Building (513). An explosion occurred within paste reactor #26. No injuries resulted; however, two roof panels and a roof ventilator above the reactor were dislodged and a wall panel on the pearl side of the building was separated slightly.

A Board of Inquiry was held following the near miss, with the following in attendance:

- Lead Technician
- H. T. Evans - Industrial Relations Manager
- J. W. Goetsch - Resin Manager
- G. E. Higby - Sr. Electrical Engineer
  - Technician
  - Technician
  - Technician
- J. M. Smith - Plant Engineer
- A. R. Webber - Plant Manager

Facts Before the Incident

Paste Polymerizer #26 had gone through the normal sequence of events without incident. The reactor was put on transfer at 3:00 p.m. and had finished the transfer and recovery phases by 3:20 p.m. ., paste technician, opened the manhead and inserted a Crouse-Hinds type EVH 106 drop light into the reactor. He then started flushing the reactor with a D.M. water hose. He had been flushing the reactor for approximately 5 minutes when he noticed water and some small chips setting on the bottom of the reactor. He called to the computer console technician, via the two-way radio, to find out if the sewer valve had been opened. The console technician replied that it had been opened. then went to the first floor to double-check the position of the Yarway valve. While was checking the Yarway the explosion took place.

Facts at the Time of the Incident

., lead technician, technicians, and a technician trainee, r were on the Pearl side of the building when the explosion occurred. was inside poly #3, cleaning the reactor. All five employees heard the explosion but were not sure of the source. and stood by while got out of poly #3. Cawman had the computer technician put the building to "hold."

NGC 15776

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NOV 21 1972

Facts at the Time of the Incident (Continued)

ran from the first floor to the second floor, noticed an acrid odor, sounded the gas alarm and put on a Scott Air-Pak. went to their gas alarm stations. complaining of a ringing sensation in his ears was sent to the Dispensary. put on a Scott Air-Pak.

wearing Scott Air-Paks, went to poly #26, installed an evacuation hose, disconnected the drop light and checked the area. Both, and , noted the hole in the roof, but saw no other physical damage.

Facts Following the Incident

The roof panels immediately above the poly were dislodged and a hole approximately 4' x 12' was opened in the roof. The roof ventilating fan above poly #26 was pushed upward from its base and the electrical conduit pulled loose. No evidence of a fire or explosive force was noted in the vessel; however some charring was present on the roof beams just above the reactor. The rupture disc, rated at 235 psi, was blown. The drop light fixture was blown out the roof and found 10 feet from the S.E. corner of the building.

An investigation of the incident and a thorough check of the area was conducted by J. W. Goetsch, G. E. Higby, J. M. Smith, and H. T. Evans before the "all clear" was given at 3:45 p.m. The investigation and subsequent board of inquiry drew the following conclusions:

- ① Residual vinyl from the previous paste charge was ignited by an electrical spark.
- ② The Crouse-Hinds EVH 106 drop light was not equipped with a supporting chain. The light cord was secured at the manhead with the full weight of the light fixture supported by the cord.
3. The trainee, , was tested and sustained no damage to his ears.
4. Poly #26 remained out of service until a thorough inspection and hydrostatic tests were conducted.
5. The manual vent line on poly #26 was slightly bent but did not require replacing.
6. Normal operations were resumed in the building at approximately 4:15 p.m.
7. All employees responded to the emergency calmly and efficiently. The employees in the building, especially , were most effective.

NGC 15777

Additional Facts1. The cause of the explosion is due to one of three possibilities:

a. The light separated from the cord causing an arc and the ensuing explosion.

OR

b. Water may have been accidentally sprayed on the hot globe causing it to crack thus causing a short and the ensuing explosion.

OR

c. The drop light may have slipped hitting the bottom of the reactor causing the globe to break, a short and the ensuing explosion.

2. All drop lights were equipped with supporting chains; however, the particular drop light involved did not have a supporting chain.
3. The drop light was a low voltage, explosion-proof type but was not waterproof.
4. The transformer did not short out and the breaker did not trip. According to the reason for the transformer not shorting or the breaker not tripping is that the cord was found with the wires separated and not touching.
5. Drop lights are inspected quarterly, however this particular drop light was two weeks past due.
6. Mr. W. E. Brodine was contacted and concurred with the inspection and test of the vessel. The vessel was entered, visually inspected and measured. No variations were apparent. The agitator was removed to protect the oil seal during the hydrostatic test. The reactor was filled with water and pressured to 375 psi. The pressure was held for one hour with no noticeable loss of pressure. The vessel was hydrostatically tested according to ASME code.

Corrective Action

1. All drop lights were removed from service immediately.
2. Explosion-proof hand lanterns have been purchased and are in use.
3. Drop lights ordered in the future will be explosion proof and waterproof.
4. The inspection of electrical cords and appliances was re-emphasized.

Corrective Action (Continued)

- ⑤ The incident was reviewed with all employees.

J. W. Gressler

JWG:rp

cc: D. L. Dowell - O. F. Beckmeyer  
J. L. Nelson - R. D. Scott  
P. D. Terry  
E. W. Harrington  
W. E. Brodine  
G. Pow  
R. A. Kelley (Akron)  
Area Managers  
File

*This accident points out the need for explosion proof drop lights that are also water proof on submersible. Each plant is to phase out <sup>drop</sup> lights that are not.*

*It also points out the need for routine inspection of drop lights and the need for a supporting chain.*

*Employees should also be aware of what the drop light is design for - such as low voltage, not water-proof etc.*

*W. W. Altman*

11-28-72

NGC 15779