

Bill Fultz - Plant Manager, Pedricktown Plant  
FROM: Ron Szmerda - Latex and Tank Farm Mgr., Pedricktown Plant  
DATE: February 7, 1991

Near Miss Incident  
Vinyl Chloride Gasket Leak

SUMMARY

On Sunday, February 3, 1991, at 1441 hours, a one inch piece of flange gasket on the pipe side of an operated valve on a vinyl chloride storage sphere blew out. A 10% LEL alarm was logged in the immediate area. An estimated 100 pounds of vinyl chloride was lost and no injuries resulted.

BOARD OF REVIEW

A board of review was held on Tuesday, February 5, 1991, with the following in attendance:

|                |                                   |
|----------------|-----------------------------------|
| Al Matyger     | Paste Resin Manufacturing Manager |
|                | Paste Resin Lead Tech             |
| Terry McGovern | Sr. Process Engineer              |
|                | Tank Farm Technician              |
|                | Tank Farm Technician              |
| Greg Kaswell   | Sr. Safety Engineer               |
| Todd Bretz     | Safety Engineer                   |
| May Johnson    | Sr. Environmental Engineer        |
| Bill Fultz     | Plant Manager                     |

NARRATIVE

*No comment on R.O.P.*

At 1441 hours a "Tank Farm Emergency" alarm was logged at the dispersion computer console. went out to the tank farm to investigate. After checking around the Dispersion charge pump, they proceeded to sphere 1 to check a hissing noise and found a leak at the sphere valve flange on the pipe side of the crosstie line to sphere 2. They returned to the Dispersion charge pump and shut it down. went to the tank farm office to get Tom Verdinelli. The plant guard was notified to stop all traffic from entering the plant.

and stated they went to the bottom of the sphere to check the liquid valves' positions. The Dispersion charge valves, the recycle valve and the unloading valve were open, which is normal. One of the two sphere crosstie valves where the leak occurred was open, which is not normal. The switch settings for the valve operators matched the valves' actual position.

The LEL sensors under sphere 1 reached the 25% level and shut off all the tank farm vinyl chloride valves and pumps. moved the crosstie valve switch from open to closed, with watching. There was a little frost on the crosstie valve flange and a leak of gas only. A water spray was put on the leak with a hose. The Dispersion area attempted recovering the crosstie line through the charge pump.

began working on tying in the Large Poly Area (LPA) recovery. A jumper to the unloading line was opened to add recovery capacity. These attempts did not actually recover the problem spot because of a closed butterfly valve in between the leak and the line under recovery.

REDACTED

NGC 13703

2  
were called in and arrived around 1500 hours.  
A jumper hose was connected to the section of pipe with the gasket leak and the recovery system. Recovery was begun. Subsequently, Al Matyger and Jim Kiel arrived.

An attempt was made to pump liquid out of the pipe section using the recycle pump. When the LEL system was reset, the crosstie valves opened repressuring the flange leak. The crosstie valve switches were now found set in the open position. The pump was tied into the line for about 5 seconds, before the LEL system again shut it down. The deluge was turned on to the sphere automatically by the LEL system. The deluge turned in a fire alarm, with the plant brigade responding. A second, unsuccessful attempt was made to pump out the liquid. Recovery was then used to evacuate the line into a vacuum.

*Time 2*  
FACTS SURROUNDING THE INCIDENT

1. At least one crosstie valve was noted open at the start of the incident. There is no reason to have the crosstie valves open except during a sphere turnaround. The crosstie line had been left closed and evacuated since the last sphere turnaround, two years ago.
2. There was no unloading going on into sphere 1 at the time. There is no need for a tank farm operator to use the switch station for the sphere's valve operators because the unloading valves are left open at all times.
3. The LEL system is tested once per quarter and functioned perfectly during the incident. The checksheet for the last test on 10/2/90, showed the crosstie valves closed at the start and finish of the test.
4. The 10% LEL alarm was computer logged at 1441 hours with the 10 PPM total hydrocarbon alarm (THA) logged 14 minutes later. This is a normal lag time for the THA and indicates that the release started instantaneously, and did not gradually increase. The procedure to call the tank farm operator that the computer alarms had been logged was not done. The Dispersion Lead Technician responded to the alarm, because he did not know the tank farm technician was present.
5. The hydrostatic protection for the section of pipe that leaked was valved out. The hydrostatic relief valve had last been confirmed valved-in correctly in October of 1990. When the paint was cleaned off the relief valve it was found to be pointed in the wrong direction since its original installation in 1979, also preventing hydrostatic relief of the section in question.
6. After the incident, it was reported that the flanges in question were difficult to mate up in the last sphere turnaround in 1988. Since the line had not been used since then, this could have been the first exposure to vinyl for the gasket in question. All the lines had been pressure tested at the end of the last sphere turnaround.
7. The temperature rose sharply to 74 degrees F that day, compared to previous winter-like conditions. The crosstie line is exposed to sunlight.
8. The response team used methods other than the gas alarm to control the traffic, etc. in the area. The gas alarm would have been a better method to do this and should have been sounded.

NGC 13704

## CONCLUSION

A misoperation must have occurred since vinyl was in a line that should have never been opened. As long as the valve was open, a lack of hydrostatic protection should not have caused the leak, unless the valve was reclosed after introducing vinyl to the line. The weakest point was the misaligned flanges where the gasket failed. The misalignment was not the likely cause of the incident. A hydrostatic overpressure is the most plausible cause of the incident.

## CORRECTIVE ACTIONS

Install quick disconnection fittings on the air supply to the valve operators and leave the air disconnected on the crosstie valves when not in use.  
R. Szmerda, done

Relocate the valve switch station more remote from the sphere and the walkway. Separate the recovery valve switch from the others, since it is the only one normally used. Install remote position indicators.  
H. Ramierz, by 6/15/91

Install a local alarm for the LEL and THA systems.  
R. Wilson, by 6/15/91

Provide a recovery point for the crosstie line and other lines as necessary.

Remove the spacers (old excess flow valve bodies) during the next sphere 1 turnaround.

R. Szmerda, 1993 turnaround

Correct the misalignment of the flanges on the crosstie line at the operated valves.

E. Ransome, done

Develop a procedure to monitor and keep recovered the crosstie line, between sphere turnarounds.

R. Szmerda, by 5/15/91

Develop a procedure to place the crosstie line in service without line hammer. Develop a procedure to remove the crosstie line from service.

/R. Szmerda, by 6/91

Review the emergency response and incident command system at the fire brigade officers meeting.

R. Szmerda, done 2/12/91

Install better lighting beneath sphere 1.

H. Kline, by 6/30/91

Label hydrostatic relief valve piping for flow direction.

by 4/15/91

Establish a plant hydrostatic relief valve testing/changeout frequency.

J. Fletcher, by 5/1/91

Establish a hydrostatic relief system checklist.

R. Szmerda, C. Stolfo, A. Matyger  
by, 9/1/91

Reinforce the use of the Work Order Release and Capital Project Closure Review as the method tank farm operators use for acceptance of work performed.

R. Szmerda, ongoing

NGC 13705

HW  
F4I

April 15, 1991

To: Bill Fultz

Subject: Vinyl Chloride Gasket Leak - 2/13/91

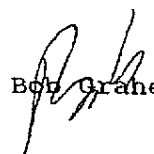
After reading the narrative report regarding this incident, Herm Waltemate and I have some questions and concerns about what actually happened.

- 1) The amount of VCM released was estimated to be 100 lbs. How was that quantity determined?
- 2) A number of people responded to the "Tank Farm Emergency" alarm. What type of protective gear did have on when they made the initial response?

After the initial assessment by Ron Szmerda, Al Matyger and Jim Kiel were all called and responded. What PPE did they have on? The same question applies to Bill Risley if he also responded to the area.

- 3) What type of Emergency Response training, as required by HAZWOPER 1910.120 (q), did the individuals in (2) have?
- 4) The LEL sensors under sphere 1 reached the 25% level. Later, the deluge system was tripped automatically by the LEL system. Was the automatic trip at the 50% LEL level as required by safety standard SA-132? 50% LEL is 18,000 ppm which, considering the location of the sensor points, would indicate a very significant leak.
- 5) Considering the gasket failure and the 25% and 50% LEL levels of VCM, the release was probably reportable to OSHA, as required under 1910.1017 (n)(2). Was it reported? If not, why not?
- 6) Was the release reported to anyone at the division level? Under the "Release Reporting Guidelines" it should have been.
- 7) The initial alarm was logged at 1441 hours. At what time was the equipment secured and the line under vacuum?
- 8) Was it ever determined how or why the crosstie valve was open? The valve was found "open" when responded initially to the LEL alarm. Later, when the LEL reset, the valves were again activated. Could the automatic function of the LEL, at some previous time, opened and closed the crosstie valve, trapping VCM in the line, without anyone realizing it?

Bill, would you please have someone respond to these questions. -

  
Bob Granek

NGC 13706

TO: Bill Fultz - Plant Manager, Pedricktown Plant  
FROM: Ron Szmerda - Latex and Tank Farm Mgr., Pedricktown Plant  
DATE: February 7, 1991

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NARRATIVE *No comment on R.O.P.*

At 1441 hours a "Tank Farm Emergency" alarm was logged at the dispersion computer console. [redacted] went out to the tank farm to investigate. After checking around the Dispersion charge pump, they proceeded to sphere 1 to check a hissing noise and found a leak at the sphere valve flange on the pipe side of the crosstie line to sphere 2. They returned to the Dispersion charge pump and shut it down. Jim White went to the tank farm office to get [redacted]. The plant guard was notified to stop all traffic from entering the plant.

[redacted] stated they went to the bottom of the sphere to check the liquid valves' positions. The Dispersion charge valves, the recycle valve and the unloading valve were open, which is normal. One of the two sphere crosstie valves where the leak occurred was open, which is not normal. The switch settings for the valve operators matched the valves' actual position.

The LEL sensors under sphere 1 reached the 25% level and shut off all the tank farm vinyl chloride valves and pumps. [redacted] moved the crosstie valve switch from open to closed, with [redacted] watching. There was a little frost on the crosstie valve flange and a leak of gas only. A water spray was put on the leak with a hose. The Dispersion area attempted recovering the crosstie line through the charge pump. Bill Risley began working on tying in the Large Poly Area (LPA) recovery. A jumper to the unloading line was opened to add recovery capacity. These attempts did not actually recover the problem spot because of a closed butterfly valve in between the leak and the line under recovery.

NGC 13707

## CONCLUSION

A misoperation must have occurred since vinyl was in a line that should have never been opened. As long as the valve was open, a lack of hydrostatic protection should not have caused the leak, unless the valve was reclosed after introducing vinyl to the line. The weakest point was the misaligned flanges where the gasket failed. The misalignment was not the likely cause of the incident. A hydrostatic overpressure is the most plausible cause of the incident.

## CORRECTIVE ACTIONS

Install quick disconnection fittings on the air supply to the valve operators and leave the air disconnected on the crosstie valves when not in use.

R. Szmerda, done

Relocate the valve switch station more remote from the sphere and the walkway. Separate the recovery valve switch from the others, since it is the only one normally used. Install remote position indicators.

H. Ramierz, by 6/15/91

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by 4/15/91

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Reinforce the use of the Work Order Release and Capital Project Closure Review as the method tank farm operators use for acceptance of work performed.

R. Szmerda, ongoing

NGC 13708

1. How was the 100 pounds of VCM loss determined?

2. Was this reported as required under OFC Release Reporting Guidelines?

3. Who received this notification?

4. What protective gear did wear

when responding to the "Tank Farm Emergency" alarm? Also

Bill Rivley?

~~5. What was the LEL~~

What about -  
Ron Szumada, Al Matyga,  
and Tim Kriel.

5. Are these 8 individuals who responded trained as required under 1910.120(g)?

6. At what level LEL does the

sprinkler system trip?

SA-132 require the deluge system to activate at 50% LEL.

7. With an equipment failure and levels exceeding 25% + 50% LEL, this release

is repeatable under  
DCHA 1910.1017 (a) (2).

8. How did the  
erosive valve get  
in the open position?

W. E. Altemate

4/12/91

NGC 13710

To: Bob Grahek Cleveland, Ohio  
From: Ron Szmerda Pedricktown, N.J.  
Latex and Tank Farm Manager  
4/30/91

*HW  
FYI  
Pabls  
5/6*

Re: Vinyl Chloride Gasket Leak of 2/3/91

I am writing in response to a set of eight questions (attached) you directed to Bill Fultz after reading the narrative of this incident.

1. The amount of VCM released was estimated to be 100 pounds. This was the quantity reported to the DEP at the time the incident was ongoing. There was no calculation made at that time to determine this quantity. The maximum the section of pipe held was 96 gallons (730 pounds). The leak was at the highest point of the pipe section, so almost all of the liquid stayed in the pipe (see attached sketch). Early in the incident the vinyl in the pipe had chilled sufficiently so that by the time I arrived 45 minutes later, the leak was only a small vapor hiss. The 50% LEL was reached by resetting the LEL system which opened the valves to the leaking section of pipe to liquid from the sphere. These valves immediately reclosed automatically as a result of the system's action.

The nearest LEL sensor was 23 feet directly downwind, 2 feet off the ground. This was also the direction of water flow, from the spray the team had put on the leak. To make a 50% LEL concentration in an area 23 feet square by 2 feet tall would require a minimum of 3.3 pounds of VCM. Although the narrative may not be clear on this point, this concentration lasted a very small time (less than 5 minutes). During the majority of the incident, the concentrations immediately downwind were 1000 ppm. The two other sensors the same distance away, upwind and cross wind, did not see concentrations anywhere near this high.

*How do they know this?*

2. went out to the tank farm to respond to an alarm at the Dispersion computer console. They were investigating a 10% LEL alarm, without the shutdown of equipment that would have occurred automatically at 25% LEL. They expected to find a minor leak. From a distance of 50 to 60 feet from the sphere, they could see and hear a small vapor leak under sphere 1. Before entering the dike to assess the magnitude and cause of the leak, they brought out airline hoses and respirators. When I arrived 45 minutes later, the respirators were still hooked up at the edge of the dike and were used to approach and gauge the leak.

*what type?*

3. HAZWOPER 1910.120 calls for 40 hours of off site training or a certification program to ensure that existing responders have the training that they need. We need a more formal program of emergency response, which includes certification and documentation. Certified training programs are just being put together this year.

NGC 13711

Of course this does not mean that the response team members did not have any training. is a fire brigade captain, and has trained with the brigade for the incident command system. First Responder and Operations, a N.J. state certified course, was recently conducted for all the technicians involved. and I attended a 16 hour, Clyde Strong certified, training course on "Emergency Response to Vinyl Chloride Incidents", in December of 1990. For the most part, all of the types of training called for in HAZWOPER have been done, but no formal certification program is yet in place. This training was adequate for the team members to handle the situation.

4. The 50% LEL trip was done automatically, by the system set up in accordance with SA-132, the Vinyl Chloride Storage Sphere Standard. At the time that it was reset, the LEL meters were reading less than 1% LEL. The reason the system was reset, was an attempt to use the Dispersion recirculation pump to pump the remaining VCM liquid from the isolated section of pipe with the gasket leak. This pump had been shutdown by the Technicians responding.

The LEL system was reset by the Technician that had been called in. He expected the switches for the valves to be in their normal operating position (closed), and failed to check that they were before resetting the system. Because the switches for the crosstie valves were set (in error) for open, the valves opened recharging the pipe section with liquid VCM from the sphere. The valves were actually open for less than a minute.

5 & 6. Three official agencies were notified of the incident: the New Jersey Department of Environmental Protection, the Salem County Office of Emergency Management and the National Response Center (NRC). OSHA was not notified in accordance with our interpretation of the regulation. Division management was notified the next morning which - who was Monday. Based on the emergency event notification criteria, we feel we did not have a massive release of vinyl chloride. Additionally, as in the past, division management is not notified immediately every time we have an incident involving state, local, or even NRC notification.

7. Recovery was put on the pipeline about 1700 hours, through a one half inch line. This was not sufficient to totally stop the gas leak, but the leak was very minor. It was after this that we decided to try to pump any liquid out of the line. This was a bad move even when done correctly as it made the leak worse rather than better. At 2000 hours, we decided to keep the line on recovery until it was completely recovered to a vacuum, which took until noon the next day. During the recovery phase I would say the leak was under control.

8. It was never determined how or why the crosstie valve was open at the start of the incident. . . though the technicians have stated this to be the case, I suspect that they may have been mistaken. One theory is that the valve was opened in error at some time in the past, maybe even weeks or months prior. Not realizing a mistake was made, the valve was reclosed, trapping vinyl in the section. This was the first warm day to hit after many cold days of winter, and the temperature went from the 30's and 40's to the 70's. With the hydrostatic relief valve both valved out and installed backwards, the expanding liquid pushed the gasket out.

I can personally testify that when the LEL system was reset around 1800 hours, the switches for both the crosstie valves were set to open. This leads me to believe, that someone was moving the switches during the incident, probably in an attempt to stop the leak, before I got there.

As far as the LEL system accidentally opening and closing these valves, I do not consider this likely. We test this system at least once per quarter and almost always, I participate in the test. I use it as a training session and do it as part of our tank farm safety meetings. The valve positions are checked before and after the LEL trip. They are then checked at the conclusion of the test to be sure that they return to their correct operating position (see the checksheet attached). In these many tests, no valve has opened that was not supposed to open. The test does not require the use of the switch station for these valves, since the valve position at the conclusion of the test are always the same as at the start. When you include maintenace people performing weekly checks on this system, I suppose that it is always possible to induce an equipment malfunction. I do not believe this is likely in this case.

The lack of hydrostatic relief is the most likely cause of this incident. The hydrostatic valve was installed incorrectly in 1979 as part of the Large Poly construction project. Pointed in the direction that it was installed, it would not have provided the intended safeguard, even if the valves on either side of it were in the proper (open) position.

I hope that this answers your questions, but if I can paint in any more of the detail, please give me a call at extension 8675 in Pedricktown.

NGC 13713

April 15, 1991

To: Bill Fultz

Subject: Vinyl Chloride Gasket Leak - 2/13/91

After reading the narrative report regarding this incident, Herm Waltemate and I have some questions and concerns about what actually happened.

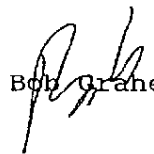
- 1) The amount of VCM released was estimated to be 100 lbs. How was that quantity determined?
- 2) A number of people responded to the "Tank Farm Emergency" alarm. What type of protective gear did \_\_\_\_\_ have on when they made the initial response? 50-60' - air-line & respirator?

After the initial assessment by \_\_\_\_\_

Ron Szmarda, Al Matyger and Jim Kiel were all called and responded. What PPE did they have on? The same question applies to Bill Risley if he also responded to the area.

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Bill, would you please have someone respond to these questions.

  
Bob Grahek

NGC 13714

# TANK FARM AUTOMATIC VALVE TEST

Participants RON - JOE - TOM

Shift on duty DAYS Date 2 OCT 90

OTE: Inform both consoles before starting the test. DONE TV

## SPHERE 1 VALVE

|                                              | Position<br>After LEL<br>Trip | Position<br>After LEL<br>Restart | Normal<br>Position |
|----------------------------------------------|-------------------------------|----------------------------------|--------------------|
| Large Poly crosstie (yellow operator) North  | <u>closed</u>                 | <u>closed</u>                    | Closed             |
| Large Poly crosstie (yellow operator) South  | <u>closed</u>                 | <u>closed</u>                    | Closed             |
| Inloading line (red operator)                | <u>closed</u>                 | <u>Open</u>                      | Open               |
| Recycle line (blue operator)                 | <u>closed</u>                 | <u>Open</u>                      | Open               |
| Mass-Paste charge line (blue operator) north | <u>closed</u>                 | <u>open</u>                      | Open               |
| Mass-Paste charge line (blue operator) south | <u>closed</u>                 | <u>open</u>                      | Open               |
| Recovery valve (on top of sphere)            | <u>closed</u>                 | <u>closed</u>                    | Closed             |
| Level Transmitter                            | <u>Open</u>                   | <u>Open</u>                      | Open               |

## SPHERE 2 VALVE

|                   | Position<br>After LEL<br>Trip | Position<br>After LEL<br>Restart | Normal<br>Position |
|-------------------|-------------------------------|----------------------------------|--------------------|
| Inloading valve   | <u>closed</u>                 | <u>open</u>                      | Open               |
| Charging valve    | <u>closed</u>                 | <u>open</u>                      | Open               |
| Crosstie valve    | <u>closed</u>                 | <u>closed</u>                    | Closed             |
| Level Transmitter | <u>open</u>                   | <u>Open</u>                      | Open               |
| Recovery          | <u>closed</u>                 | <u>closed</u>                    | Closed             |

Method used to trip the valves:

Sphere 1 Lel Shutdown Button at LEL

Sphere 2 \_\_\_\_\_

Mass-Paste cutoff valve (valve 6601)

Separates the Tank Farm from Mass/Paste

Call the Paste console to operate operates okay

IM/PROC/TFLEL

Page 4

Page 4 updated 8/9/89

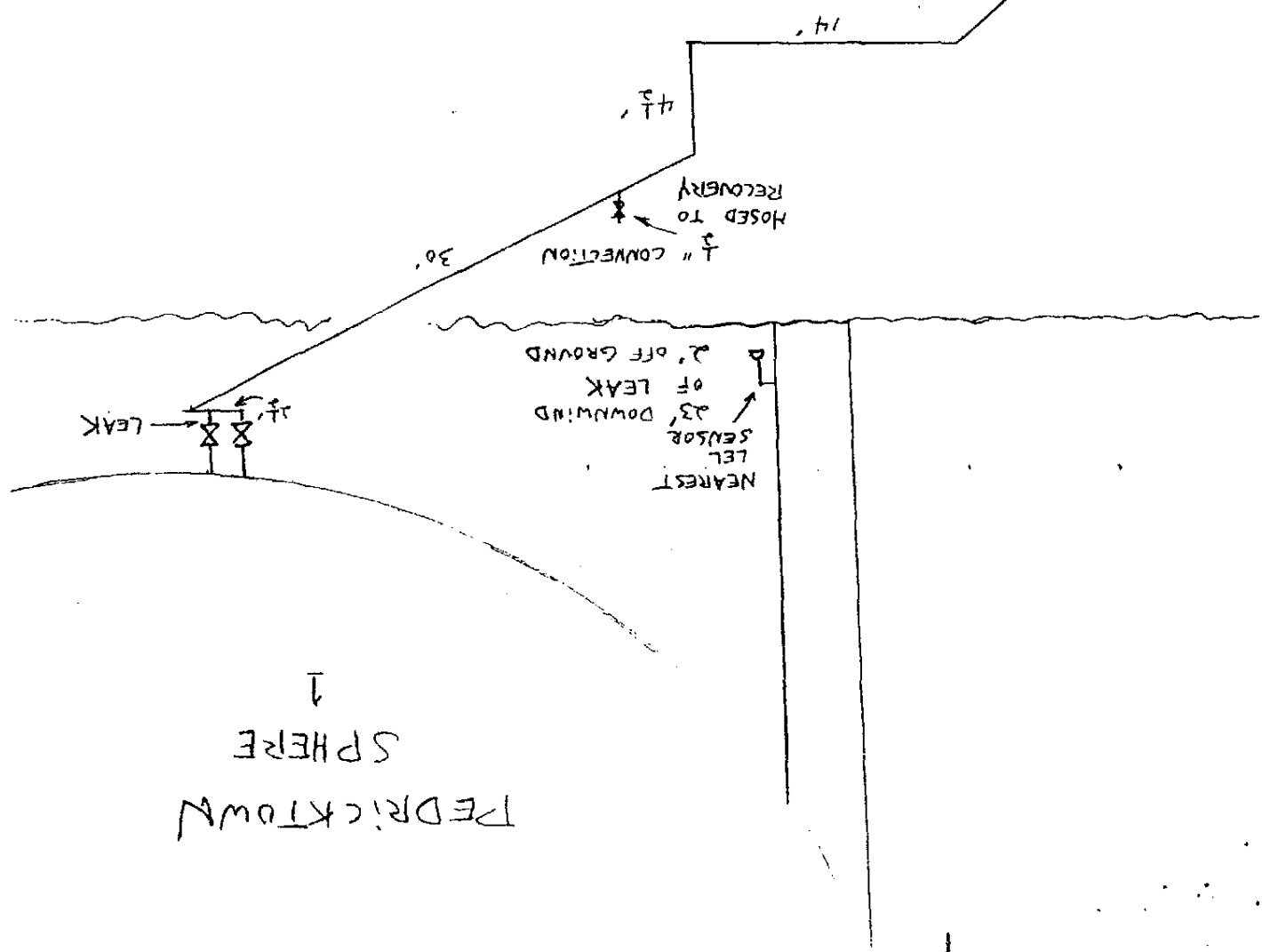
NGC 13715

NO SCALE  
R. SZMERDA

NGC 13716

EXCEPT FOR THE TWO  
4" VALVES ON THE BOTTOM OF  
THE SPHERE+ THE IMMEDIATE PIPING  
THE MAJORITY OF THE  
OF LINE IS 6" DIAMETER.  
THE VOLUME IN THE LINE IS  
96 GALLONS

CLOSED 1/2" VALVES  
ON EITHER SIDE OF  
THE HYDROSTAT  
TO RELIEVE IN THE  
WRONG DIRECTION  
VALVE INSTALLED  
HYDROSTATIC RELIEF  
1/2"



PEDRICKTOWN  
1  
SPHERE