conoco

Interoffice Communication

To R. A. Conrad

From M. J. Allen

Date August 31, 1983

Subject Administrative Actions to Prevent Relief Valve Discharges

A study was conducted to examine the causes of past relief valve liftings in vinyl chloride service and to determine possible administrative actions which would help prevent future relief valve discharges. Some administrative actions evaluated include tagging of selected valves, a check out form for equipment in vinyl chloride service, warning signs on pump start buttons, etc. Based on the study, it is recommended that warning signs be installed on the start button of five pumps in vinyl chloride service with the potential for creating an overpressure condition. In addition, it is recommended that annual relief valve training sessions be upgraded to supplement the reinforcing effect of counseling and add to the Plant's training program. The training sessions will be conducted by the Operations Department following a monthly safety meeting.

The study showed that the relief valve discharge prevention methods used by the VCM Plant, including the Caustic Decanter Containment system and present administrative actions, account for 82.3% of past relief valve incidents. The addition of the warning signs and annual relief valve training sessions will increase the prevention statistic towards the goal of 100%.

In addition to this study of possible additional administrative actions, the Process Engineering Department will be conducting a specific study concerning thermal relief valve discharges.

Attached is a detailed discussion of the administrative action study including a breakdown of the causes of each past relief valve incident. If you have any questions or comments, please contact me at 5128.

M. J. Allen
Process Engineer

br
cc: JWW-RB-MLA-DLD-ESW-JCL-MGH-PE

CWH 000001216

Relief Valve Lifting Prevention Study

A study was conducted to examine the cause of each relief valve lifting in vinyl chloride service since January 1977, the present actions which are taken to prevent recurrences, and possible additional administrative actions to prevent future releases. The causes have been arranged into three general groups: Valve Misalignments, Nitrogen in Equipment, and other. Below is a breakdown and discussion of each group.

Valve Misalignments

Seven relief valve incidents, or 41.2% of all relief valve incidents since January 1977, were caused by valve misalignments. Four incidents involved the Check Tanks, two incidents involved the Flake Caustic Dryers, and one incident involved the Vinyl Column.

The six incidents which involved valve misalignments at the Check Tanks and Flake Caustic Dryers all resulted in relief valve liftings on the Caustic Decanter (S-206) and /or the Flake Caustic Dryers (S-207 A&B). The Caustic Decanter Containment System was installed in November 1982 and now eliminates discharges to the atmosphere from these three vessels (both S-206 and S-207 A and B relieve into the containment vessel). Nonetheless, some additional administrative actions were considered to supplement the containment system. A valve tagging procedure on the rundown line to the Check Tanks and a check out form for switching Flake Caustic Dryers were investigated. But because the end result of these two types of valve misalignments (i.e. a discharge to the atmosphere from S-206, S-207 A and B) is now prevented by the containment system, these redundant administrative actions are unnecessary. The containment system's "track record" is 2 for 2 in successfully preventing a discharge to the atmosphere (May 8, 1983 and August 23, 1983).

The third type of valve misalignment involved the Vinyl Column. During startup of the column, a pump was started to inventory the column with vinyl. A misaligned valve on the feed line to the column caused the feed line to pressure up and a relief valve to lift. The outside operator was counseled on the correct procedures he had been trained to perform. In addition, a survey was made of all pumps in vinyl chloride service to determine the deadhead pressure of each pump and the relief valve set pressure of the relief valves downstream of each pump. The results of the survey show seven pumps with the potential for lifting a relief valve: the Vinyl Column Feed Pumps (P-203 A/B), the Vinyl Column Reflux Pumps (P-204 A/B), and the Vinyl Transfer Pumps (P-401 A/B) in series with the Vinyl Rework Pump (P-415).

The Vinyl Column Reflux Pumps have the potential to lift the relief valve on the Caustic Decanter. Because the containment system protects S-206 from relieving to the atmosphere, no action is required for the reflux pumps. However, a warning sign on the start button of the five remaining pumps (feed pumps, transfer pumps, and rework pump) should be installed as a reminder to re-check the valve line up before starting the pump (see next page). This action serves not only to prevent an identical incident on the vinyl column, but also to prevent a relief valve incident with a similar underlying cause in other areas of the plant.

WARNING: CHECK VALVE LINE-UP BEFORE STARTING PUMP TO PREVENT A POSSIBLE VCM RELIEF VALVE DISCHARGE

Nitrogen in Equipment

Three relief valve incidents (17.6% of total) were caused by nitrogen in equipment. Two incidents involved N_2 in the Check Tanks, and one involved N_2 in the Cracking Furnaces.

The end result of both cases with N_2 in the Check Tanks was a relief valve lifting on the Caustic Decanter. Again, the containment system now eliminates this source of discharge and requires no further redundant action. Following the Cracking Furnace incident, a new procedure was instituted to purge the Cracking Furnaces of N_2 before startup. This procedure has been successful in preventing a relief valve lifting of the same type.

Other

Seven relief valve incidents (41.2%) were caused by the unique occurrences included in this group. The causes in this group include a manufacturing defect, mechanical failure of equipment, thermal expansion, and failure to properly adjust a controller.

The two incidents caused by a manufacturing defect, one incident due to mechanical failure of equipment, and one of the relief valve liftings due to failure to properly adjust a controller resulted in relief valve liftings on S-206 and/or S-207 A and B. The containment system now eliminates this source of discharge regardless of the cause and, therefore, requires no further action.

The second relief valve lifting due to the incident of failing to properly adjust a controller resulted in a lifting on the Vinyl Column. The operator was counseled on the cause of the incident, proper operation of the controller, and how to prevent a recurrence.

The remaining two incidents were caused by thermal expansion. As a result of the first case of thermal expansion, a new line packing procedure was instituted along with installation of a thermal relief valve which relieves to the storage spheres. In the second case of thermal expansion, the operator was counseled on the cause of the incident and how to prevent a recurrence. These measures have been successful in preventing relief valve liftings of the same type.

The table below summarizes the three general groups:

CAUSE	Form of Prevention		
	Containment System	Administrative Action (1)	Counseling
Valve Misalignments	35.3%	0%	5.9% (2)
N_2 in Equipment	11.7%	5.9%	0%
Other	23.5%	5.9%	11.8%
	70.5%	11.8%	17.7%

(1) Administrative actions include new procedures, methods, checklists, etc.

(2) In addition to counseling, warning signs will be placed on the start button of five pumps in vinyl chloride service.

The present prevention methods used by the VCM Plant, including the containment system and administrative actions, account for 82.3% of the relief valve incidents. With the addition of warning signs to the five pumps in vinyl chloride service with the potential for creating an overpressure condition, the prevention statistic increases to 88.2% (82.3 + 5.9). The remaining 11.8% due to unique occurrences are prevented by counseling of the operator. It is the VCM Plant's philosophy that a thorough training program is an effective procedure to prevent relief valve discharges due to employee inattention. Therefore, it is recommended that annual relief valve release avoidance training sessions be added to the plant's existing training program and to supplement the reinforcing effect of counseling. The training sessions, conducted by the Operations Department following a monthly safety meeting, should cover the causes of past relief valve incidents along with action steps to prevent a recurrence to be used in day-to-day operation of the plant.

5-27-86
L.A. Johnson

Per telephone conversation with A.L. Thomas, the following are his comments concerning the Incinerator Burner Modifications vendor selection (Consent Decree) document of 5-19-86.

A. Recommends John Zink

1. Acceptance should be contingent upon us obtaining a written guarantee covering at least:
   a) Mechanical performance
   b) Destruction efficiency
   c) Proof of the above by a mutually agreeable testing program (partial withholding of purchase price until completion)

2. We need to inform John Zink of all the past difficulties encountered with their old burners.

3. Reasons:
   a) Least expensive
   b) Least complex
   c) Despite past experiences with Zink they are the most experienced and competent of the 3 companies for this job.

d) In general: John Zink has provided quality and timely assistance companywide. It is considered that we may have just gotten a lemon with the existing system. We need to give Zink another chance.

B. Coen DAZ problems:

1. Higher price
2. Higher complexity ∴ higher maintenance/unreliability
3. Concerned about high ΔP and if the existing blower will supply the head, without modification, for proper operation.

C. Sur-Lite Problems

1. Higher price
2. Higher complexity ∴ higher maintenance/unreliabili
3. Totally unknown track record (to me)

D. General:

1. Current difficulties with moisture carryover agree being reduced by steam jacketing of lines is temporary. The source of the problem may be in the demister design. This needs to be checked