

CONOCO

Interoffice Communication

To : John Friend

From : Incident Investigation Team

Date : May 18, 1984

Subject : 742/743 VCM VALVE CHANGEOUT INCIDENT

Summary

On Wednesday, May 2, 1984 maintenance personnel were scheduled to pull both VCM valves on 742 reactor and mistakenly removed a VCM valve on 743 reactor manifold. Although no one was injured or overexposed as a result of the incident, the action could have been catastrophic. Besides possibly causing injury or fatality to the mechanics, the safety of the entire plant could have been in jeopardy.

Incident Narrative

The following incident narrative was constructed from information obtained through interviews with all personnel involved. The narrative basically agrees with the account given by the operations personnel. Although the mechanics description differed in one area, it is felt that according to all the facts obtained, the operations account is what actually took place. The differences in accounts are discussed in the next section.

Both VCM valves on 742 reactor were scheduled to be changed out on Wednesday, May 2, due to the internal leakage (See Exhibit 1 - Work Order Copy). Maintenance personnel Bill McAllister, David Roberts, and Dale Andrews were assigned to the job and reported to the Vinyl control room for a work permit at approximately 0730. Vinyl Shift Supervisor Don Johnson informed the mechanics that the VCM manifold was not fully recovered at that time and there would be a delay in starting the job. Preparation for the job involves closing a manual valve on the VCM header to 741, 742, and 743 reactors and recovering the header through an empty evacuated reactor including the short section of piping between the two VCM valves on each of these three reactors. Don issued the mechanics a permit with instructions that the line would have to be checked out for proper evacuation before the job was started. (See Exhibit 2 - Work Permit Copy). There was a question by the mechanics on the exact location of blank installation on the header. Blanking is required when working on equipment or valves in VCM service. Don drew a sketch showing the location of the flange to be blanked on the header along with the two VCM valves to be changed on 742 reactor (See Exhibit 3 - VCM Header Sketch Copy). Don then went to the new module to finish preparing the VCM header. After he had all the VCM removed and the header under a good vacuum, Don returned to the control room to inform the mechanics that the line was ready to be blanked. Since the weather was

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threatening, Don decided to stay in the control room in case the situation worsened and the word to kill reactors early was needed. Don sent Chief Operator Bud Stone to the job site to recheck the vacuum and to show the mechanics where to put the blank. As an extra precaution, Don instructed Bud to shut off the air to all valves on the bottom of 741, 742, and 743 reactors except the main dump and slurry dump valves on 743 as this reactor had just been recovered and was ready to dump. Without these valves disabled, the possibility of someone accidentally opening a valve and introducing hot slurry, caustic, etc. into the VCM header exists. Bud then left for the new module with the mechanics. Upon finding the VCM header still under a good vacuum, he showed the maintenance personnel where to insert the blank. While the mechanics were preparing to install the blank, Bud began shutting off the air supply to the reactor valves mentioned leaving the ladder beneath 743 reactor when he finished. Mechanic Bobby Ward then asked Bud to sign off a job that he had completed on the mechanical seal flush line to one of the recovered VCM charge pumps in the new module. While McAllister, Roberts, and Andrews finished installing the blind, Bud inspected the job completed by Ward and signed off the work order. Bud then returned to the job on 742 reactor and found that the mechanics had left for their 9:00 a.m. break. Bud then went back to the control room.

Upon returning to the control room, Bud was given additional assignments including locking out number 5 rotary dryer for cleaning and setting up a job in the old module to changeout a valve on D-400 reactor. While Bud was working on the other items, the mechanics on the 742 VCM valve job returned from break to the field and began preparing to remove the valves. Having 743 reactor confused with 742 reactor, the mechanics started to pull the 743 VCM valve nearest the reactor on the manifold per the job plan on the work order. They noticed that the piping on the reactor side of this valve was hot so the decision was made to pull the VCM valve farthest from the reactor first. The hot piping on the reactor manifold was due to the fact that 743 was in the process of dumping hot slurry to the blend tanks. The mechanics successfully removed the VCM valve on the header and took it back to the maintenance shop for pressure testing. The test showed no sign of internal leakage through the valve. The mechanics informed Don Johnson of the results of the testing. Don instructed the mechanics to pull and pressure check the other VCM valve. The mechanics then told Don of the hot piping they had encountered on the reactor manifold. Don then went to the new module to investigate the cause of the hot piping on the manifold. It was then that Don discovered the mechanics had pulled the VCM valve off of 743 reactor instead of 742. The mechanics then reinstalled the 743 VCM valve and pulled the VCM valves on 742. (See Exhibit 4 - Don Johnson's Incident Write-Up).

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Personnel Interviews

The interviews with the operations personnel and with the mechanics differed in one area. Operations stated that the mechanics installed the blind and went on break before pulling the valve. This agrees with the incident narrative in that the chief operator left the job sight only after the mechanics had gone on break. The mechanics on the other hand stated that they installed the blank and pulled the valve before going on break. This would mean that the chief operator left the job sight before the mechanics. The time table for the job was as follows:

1. The mechanics obtained the work permit at 0740.
2. Don Johnson went to the new unit to finish recovering the VCM header.
3. Don then returned to the control room.
4. Bud Stone was given instructions by Don.
5. Bud then went to the new module with the mechanics.
6. Bud rechecked the vacuum and then showed the mechanics where to install the blank.
7. Bud then got a ladder and turned off air to bottom valves on 741, 742 and 743.
8. Bobby Ward got Bud to check out the job on the RVCM charge pump.

If the mechanics recollection is correct, the valve was pulled at this time, before the 9:00 a.m. break. Since the permit was not obtained until 0740, this leaves approximately 75 minutes for all the steps listed above to take place in addition to pulling the valve. It is not likely that all of the events could have occurred in this short time frame. Another possible indication of when the valve was pulled can be obtained from the "Reactor Daily Production and Status Report" (See Exhibit 5). The report shows that 743 was not dumped until 0920. If the mechanics felt the hot reactor manifold, which was probably caused by hot slurry, before deciding which valve to pull first, it had to be after the 9:00 a.m. break.

In addition to the description of the incident, the mechanics brought up several other items. For one they stated that the action of cutting off the air to the valves added confusion to the job. The mechanics also recommended a valve tagging procedure similar to the plant's steam tagging system as well as stenciling at the reactor bottoms.

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Conclusion

The cause of the incident was clearly inattention by the mechanics involved. Although neither Don or Bud physically put their hands on the valves, these mechanics are familiar with the Vinyl area (being assigned to Area I) and should have been able to distinguish 743 from 742. Each mechanic stated that they knew 742 was the reactor to be worked on. The work order and work permit clearly state this. Although the job delay and the action of cutting off the air to the valves on the bottom of the reactors could have added some confusion, the mechanics still should have been able to distinguish the difference between reactors.

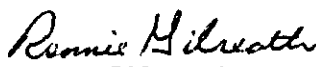
Recommendations

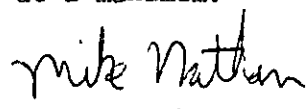
1. To develop and implement a valve tagging procedure similar to the plant's existing steam leak tagging procedures. Each valve to be changed out should be tagged, with the other half of the numbered tag attached to the work order. The mechanics should be instructed not to work on a valve unless the valve is tagged with the correct number. This positively identifies the valve since each of the tags has different numbers. If the mechanics cannot find the valve with the tag, they will be forced to contact operations personnel for valve location. This procedure will follow issuance of a work permit by the area supervisor or qualified personnel. Depending on the job, the operations supervisor or chief operator may be required to go to the site.
2. To provide additional stenciling on the bottom and top of all reactors. Stenciling will help to identify each individual reactor since all piping manifolds are similar in appearance. Stenciling of the initiator pots and condenser lids is recommended.
3. To require all shift supervisors and chief leads to explain preparation procedures for all jobs. This will inform the mechanic of exactly what will be or has been done to prepare the equipment for maintenance work and will eliminate any confusion on what is being done.

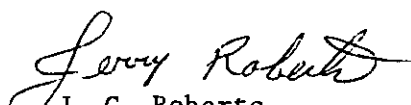
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Secondary Recommendations

1. As a secondary recommendation, installation of separate manual valve on VCM headers to each individual reactor would be highly advantageous. Besides improving the integrity of the blanking procedure, blanking each individual reactor instead of one blank for several reactors, the individual block valves would keep reactor downtime during a VCM valve changeout to a minimum and production at a maximum.


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bls



c: CRM, PEM, DWH, CWT, CRS, RAF,
RGG, AHS, JGR, RWR