

Freeze Precautions

TO Wilton Wallace DATE January 27, 1984

FROM Jon Manns SUBJECT Liquid Cl₂ User Upsets During
December Hard Freeze

During the hard freeze the last week of December, 1983, three liquid Cl₂ users, TE-II, Tetra and VCM-II, suffered upsets that resulted in a significant increase in the Cl₂ flow to their vaporizers subsequently shutting them down. There was a concern in Plant A of a potential hazard of filling up a Cl₂ surge drum and getting liquid Cl₂ into the reactor. Supervisors from the involved units were interviewed about the sequence of events during the upsets. The following is a result of these discussions.

On December 24 at 6:10 p.m., the TE-II operator observed that the Cl₂ line pressure from Liquefaction had dropped ≈60 psi and notified Liquefaction. The initial thought in both control rooms was that the excess flow check valve had seated. The Liquefaction "B" operator responded by putting the backup TE-II liquid feed tank in operation and lined it up to them. When he went to take the original feed tank out of service he noticed that it had not seated the check and reported this to the lead operator. Liquefaction personnel called back TE-II and informed them that they had apparently never stopped receiving Cl₂ feed. The TE-II operator then investigated his unit and found that the steam chest pressure impulse line was not giving a correct indication and shut the unit down. It is felt that the impulse line had frozen up.

At 8:30 p.m. that same night, the Tetra operator responded to a low steam chest pressure alarm on the Tetra Cl₂ vaporizer by raising the set point on the steam pressure control valve. Shortly afterwards, the SRV on the steam chest blew, indicating too much steam pressure. The operator lowered the set point on the steam pressure controller until the SRV seated. At approximately the same time the Tetra liquid Cl₂ feed pressure dropped significantly. The Liquefaction Lead Operator sent the "B" operator up to check the Tetra pump and called the Tetra control room, suspicious they might be having problems similar to TE-II. The Tetra operator knew that the Cl₂ line pressure fluctuations were caused by his steam pressure control problems but apparently felt it would line out.

When the Liquefaction "B" operator verified that the Tetra pump was still feeding Tetra and the line pressure continued to drop, the Liquefaction Lead Operator again called Tetra to express concern. During the phone conversation Tetra tripped on low temperature in the Cl₂ surge tank. It was determined that the vaporizer steam chest pressure impulse line had frozen.

On December 26, at 7:45 p.m. the VCM-II unit got an alarm on low liquid Cl₂ feed pressure. A supervisor, present at the time, observed the vaporizer steam chest pressure indication had pegged out due to a frozen impulse line and directed the operator to trip the unit.

In recounting these events with the Plant "B" supervisors, they point out that each of their units have two shutdown devices to protect the facility from overfilling a Cl₂ surge drum with liquid Cl₂. The Cl₂ surge drum inlet line from the

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vaporizer and the bottom of the surge drum have temperature indication that shuts down the unit and closes the Cl₂ pressure control valve in the event of low temperature (EDC #1 plant only has 1 low temperature trip on each of its surge drums). In the Tetra incident it was one of these shutdown devices that tripped the unit. All the supervisors felt confident that these shutdown devices adequately protected their facility from a disaster similar to the 1971 Tetra explosion. (The Tetra facility at that time did not have these protective devices.)

It was recommended to each supervisor that since each of the operating liquid Cl₂ users suffered the exact same problem during the hard freeze that some method of forewarning the operators of the probability of this occurrence and what the symptoms are should be part of their freeze precautions.

/da

cc: J. M. Porter

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