CCPS CENTER FOR CHEMICAL PROCESS SAFETY
An AIChE Industry Technology Alliance

Process Safety Beacon

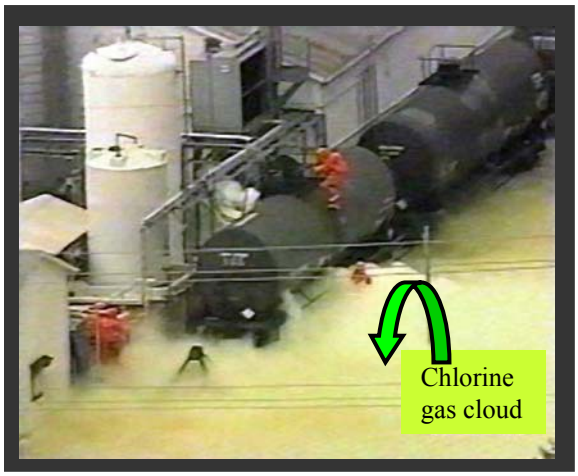
http: //www.aiche.org/ccps/safetybeacon.htm

Messages for Manufacturing Personnel

Investigated by U.S. Chemical Safety and Hazard Investigation Board
http://www.csb.gov

Chlorine Transfer Hose Failure

August 2004



See the CSB investigation report summary on their web site, http://www.csb.gov/completed_investigations/docs/CSB_DPC FinalDigest.pdf

Here's What Happened:

Chlorine was being transferred from a railroad tank car when the transfer hose burst. Both automatic and manual emergency shutdown systems failed so the release was unabated for about three hours. Approximately 48,000 pounds (21,800 kg) of chlorine escaped before emergency responders were able to stop the release. They entered the chlorine cloud wearing "Class A" safety gear and climbed on top of the car to close the manual shut off valves.

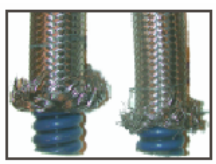
Near by neighbors either evacuated or "sheltered-in-place." The adjacent Interstate was closed to traffic for 1 ½ hours. Of the 63 people that sought medical evaluations due to respiratory distress, 3 were hospitalized. The release also damaged trees and other vegetation in the area.

What YOU Can Do

✔ Know what to do in an emergency! Always check to ensure that emergency shutdown equipment has a current test tag. If it does not, report it. Test the entire shut down loop before you rely on it. Your job—make sure it will work when needed!

✔ Conduct a pre-use check before using any replaceable equipment, such as hoses, sample containers, instruments, etc. to be sure that they are fit for the service. If in doubt—do not use it!

✔ When receiving new equipment make sure that it is exactly what was ordered. Some materials are difficult to tell from others, but performance may be significantly different!


Hastelloy (left) and stainless steel hoses appear identical.

✔ Ask for "positive materials identification" testing where different materials look alike. This is especially important where a mix-up can lead to a hazardous event. Make this part of the area's process hazards analysis.

How Did this Happen?

? The ruptured hose should have had an inner Teflon liner reinforced with a Hastelloy C-276 exterior metal braiding. Instead, the exterior metal support braiding was stainless steel and was easily corroded by chlorine permeation through the Teflon liner. The hose failed after less than 2 months of service.

? Both the purchase and shipping papers indicated that the hose was constructed of the proper materials, but it was not tested or verified upon receipt.

? An emergency shut down system activated by an employee before evacuation failed to work because of severe build up on the valve ball.

PSID members see Free Search—hose

Make Sure What You Install is Adequate for the Service

This edition is also available in German, French, Spanish, Portuguese and Chinese. Contact CCPS at ccps_beacon@aiche.org for information.