



Fire in Indiana

On February 2, 2001, two employees of the Bethlehem Steel Corporation's Burns Harbor Mill in Chesterton, Indiana died in a fire at the plant. The accident occurred during work to remove a furnace — and associated piping — that had been decommissioned in 1992. This batch furnace had been isolated from coke ovens through the use of a 10-inch valve. One month prior to the accident, a leak had been discovered in this valve, likely the result of water from the accumulation of coke oven gas condensate that had frozen and cracked the valve.


Two employees were assigned to remove the valve. They first installed a slip blind at the upper flange of the valve on January 5. However, this action allowed flammable condensate liquid from the coke-making process to collect in a deadleg upstream of the valve. On the day of the accident, the employees were to complete the job by replacing the blind and the cracked valve with a drain assembly. When they loosened the bolts around the blind, liquid began to seep out. Then, the liquid sprayed the employees when they further loosened the bolts. This liquid ignited, likely from an infrared heat lamp or a space heater being used in the maintenance operation. The two employees were engulfed in flames and died, while others in the area were burned from spraying liquid and the resulting fire.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) found that the management systems for overseeing maintenance were inadequate, especially with regard to the decommissioning process. According to the CSB, the work should not have continued without a plan to control the hazards related to flammable materials. In addition, the employees who died had not been made aware of the hazards of this work, and they had not been informed of previous conden-

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sate incidents. The CSB also found that the employees could not easily evacuate the area once the emergency occurred because the escape routes had been blocked by demolition work. In addition, the company did not have a program to analyze hazards and implement safeguards related to decommissioning and demolition, according to the CSB.

Lesson Learned: A majority of engineering efforts are focused on design, development and operation of systems. But at some point, systems will wear out, be damaged or become obsolete. Hazards related to the disposal of equipment are often different from those of nominal operation and must be evaluated. Organizations should explicitly identify disposal and decommissioning hazards, plan for decommissioning early in the lifecycle and identify special procedures and equipment needed for handling and disposal.

Readers are encouraged to review the full accident and mishap investigation reports referenced here to understand the often complex conditions and chains of events that led to each accident discussed here. Additional lessons learned are available at www.system-safetyskeptical.com. 

References

1. U.S. Chemical Safety and Hazard Investigation Board. “Investigation Report: Steel Manufacturing Incident (2 Killed, 4 Injured), Bethlehem Steel Corporation, Burns Harbor Division, Chesterton, Indiana, February 2, 2001,” Report No. 2001-02-I-IN, January 2002.
2. Flint, L. “Chem Demil Plant Decommissioning & Closure System Safety Engineering Lessons Learned,” *Proceedings of the 27th International System Safety Conference*, 2009.