

December 2004

## Bhopal—A Tragic Event



Union Carbide Bhopal Plant

### What Happened?

It was just after midnight, December 3, 1984 in Bhopal, India. A succession of events occurred in the Union Carbide India Limited facility that led to the release of ~40 metric tons of methyl isocyanate (MIC) gas. The consequences were tragic: according to the Indian government, more than 3800 people died shortly after the release and thousands were injured.

### What You Can Do

- ☞ More than any other in the history of the chemical industry, this incident demonstrates why robust safety systems are critical when handling hazardous materials. This incident was also one of the driving forces which defined process safety management as we know it today.
- ☞ Understand the reactivity hazards of all materials in your process. Read the reactivity section of your MSDS's, fully understand all reactivity instructions in your operating procedures and be knowledgeable about why your safety systems (e.g. interlocks, relief devices, scrubbers) are there and how they work.
- ☞ If a material in your area reacts with water: 1) be cautious when washing equipment for maintenance or whenever a water hose is used, and 2) remember that compressed air may contain condensed water – be sure process air is free of water before blowing lines.
- ☞ Understand the emergency procedures you are to take if the temperature or pressure increases quickly in vessels storing hazardous materials, especially those which are reactive.
- ☞ Encourage your management and technical group to have a discussion about the “worst case” for the facility you work in and what safeguards have to be maintained to prevent that scenario from occurring.

### How Did This Happen?

- ? The basic cause has been agreed upon by most experts who investigated this event: a significant quantity of water entered the MIC storage tank. Water reacted with MIC, temperature and pressure rose and several safety systems could not deal with the event. Eventually, the vessel's relief device lifted, releasing MIC vapor.
- ? 20 years later, the exact water source remains controversial. However, it is clear that installed safety systems did NOT prevent a large release of toxic gas.

**Understand the "worst case scenario" & "layers of protection" for your facility!**

AIChE © 2004. All rights reserved. Reproduction for non-commercial, educational purposes is encouraged. However, reproduction for the purpose of resale by anyone other than CCPS is strictly prohibited. Contact us at [ccps\\_beacon@aiche.org](mailto:ccps_beacon@aiche.org) or 212-591-7319