

## Stored Chemicals are Still Hazardous

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▲ **Figure 1.** Chemical explosions in the (a) U.S., (b) China, and (c) Lebanon were all caused by improperly stored ammonium nitrate. These disasters highlight the importance of recognizing the hazards and proper handling of dangerous stored materials.

This month marks the 40th anniversary of the Bhopal disaster, in which highly toxic methyl isocyanate (MIC) was released from a storage tank, causing thousands of fatalities. None of the safeguards designed to mitigate a release of MIC, including the scrubber, flare, and deluge system, worked. The company did not recognize that materials in storage are just as hazardous as those being created or used in a process.

There have been many catastrophic incidents caused by improperly stored material. Several involve ammonium nitrate (AN):

- In 2013, a fire led to the detonation of an estimated 40–60 tons of AN in the West Fertilizer Company's storage and distribution facility in West Texas, U.S. This event killed 15 and injured 260 (Figure 1a).
- In 2015, the detonation of about 800 tons of AN in the port of Tianjin, China, caused 173 fatal injuries and 798 non-fatal injuries (Figure 1b).
- 2,400 tons of AN from an abandoned ship was stored for six years in Beirut, Lebanon, before it exploded in 2020. 218 people died, and 7,000 were injured (Figure 1c).

### Did You Know?

- It is critical to understand the hazards, amounts, and conditions of stored chemicals.
- Tank farms and other large storage facilities are often seen as “just storage” and may not get the process safety attention they deserve.
- The three AN incidents noted in this Beacon occurred in warehouses, not tank farms. Buildings storing chemicals need to have functional process safety systems to ensure the material is safely stored.
- Some materials have a shelf life, *i.e.*, the amount of time after which the stored material is no longer safe. Beyond that time, the materials may degrade, become unstable, and cause a fire or explosion. If the material is no longer needed, remove it for proper disposal.
- There have been many incidents involving hot work in tank farms. In many cases, the hazards of the materials stored in the tanks were not recognized during the permit review and approval process.

### What Can You Do?

- Recognize the materials currently stored in your area and know their hazards.
- When participating in process hazard analyses (PHAs), do not forget to review all the materials in the process, including the feed materials and stored products.
- If your area handles or stores materials with a known shelf life, know how they need to be managed. If you see materials that are near or beyond their expiration date, notify your supervisor.
- When permitted work is planned in a material storage area, the hazards of the materials in the area need to be reviewed and understood before approving the permit.

**Know the hazards of the materials stored in your area!**