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Messages for Manufacturing Personnel

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Mixing Incompatible Materials in Storage Tanks

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On October 21, 2016 two incompatible chemicals, sulfuric acid and sodium hypochlorite (bleach) were inadvertently mixed during a routine delivery to a plant in Atchison, Kansas, USA by a raw material supplier. These chemicals reacted and released a cloud of chlorine gas into the surrounding community. Approximately 100 people received medical treatment, several schools were evacuated, and about 11,000 residents were advised to shelter indoors for 2 hours.

Similar incidents have happened in the past, all releasing chlorine gas clouds:

- May 2013, Portland, Oregon, USA – A supplier truck driver pumped a mixture of nitric and phosphoric acids into a tank containing sodium hypochlorite at a dairy.
- October 2007, Frankfurt, Germany – Hydrochloric acid was accidently transferred into a sodium hypochlorite tank. Approximately 200 kg of chlorine were released, and more than 60 people were injured. The operator who finally stopped the transfer was fatally injured from exposure to chlorine.
- August 2001, Coatbridge, UK – A tanker driver transferred sodium hypochlorite solution and hydrochloric acid into the same tank at a swimming pool. 30 people required medical treatment.
- August, 1993, Stockholm, Sweden – A truck driver pumped phosphoric acid into a storage tank containing sodium hypochlorite at a swimming pool.
- March 1985, Westmalle, Belgium – Hydrochloric acid was pumped into a tank containing residual sodium hypochlorite.
- November 1984, Slaithwaite, UK – A plant expected a delivery of sodium hypochlorite, but received ferric chloride solution (an acidic solution) instead. The ferric chloride was unloaded into the sodium hypochlorite tank.
- September 1984, Hinckley, UK – Hydrochloric acid was unloaded into a tank containing sodium hypochlorite.

What can you do?

- Understand potential hazardous interactions among different materials that you unload into your plant's storage tanks. The July 2016 *Beacon* describes the "Chemical Reactivity Worksheet," a tool which your engineers and chemists can use to help understand chemical interactions.
- Always check (and then double check!) all of the documentation and labeling on incoming shipments of raw materials to confirm that you are receiving the material you expect.
- Follow your plant procedures for identification of incoming raw materials and for unloading those materials.
- Make sure that all of the piping and equipment in your raw material unloading areas are clearly labeled. Also, there should be no connections between pipes serving different tanks containing incompatible materials.
- If your raw material unloading area has confusing piping, or incompatible materials are unloaded in locations near to each other, inform your management and engineers about the issue so that improvements can be made.
- If supplier or transportation company truck drivers unload materials into storage tanks at your plant, make sure they are familiar with your unloading facilities and can ensure that they unload materials into the correct tank.
- See the March 2009 and April 2012 *Beacons* (available at www.sache.org) for other incidents in which an incompatible material was unloaded into a tank.

Always put the right stuff in the right place!

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