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Center for Chemical Process Safety

Process Safety Beacon

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Major Spills and Environmental Incidents

• November 1986 — A fire in an agricultural chemical warehouse in Basel, Switzerland, released tons of pollutants into the Rhine River. The pollution traveled the length of the Rhine, through four countries, and caused serious environmental damage.
• November 2005 — A plant explosion in Jilin, China, resulted in the release of 100 tons of benzene into the Songhua River, creating a slick that extended 80 km downstream. The city of Harbin had to shut off the water supply to almost 4 million people for five days.
• December 2008 — 1.1 billion gal of coal fly ash slurry (a mixture of ash and water) spilled when a containment area dike ruptured at a power plant in Kingston, TN. The slurry spilled across the Emory River onto the opposite shore. It covered 300 acres of land, damaged homes, and contaminated water in other nearby rivers. This is the largest fly ash release in U.S. history.
• January 2014 — Thousands of pounds of 4-methyl-cyclohexane-methanol (MCHM) were released through a 1-in. hole in a storage tank in Charleston, WV, into the Elk River. The spill was upstream of the intake for the drinking water supply for up to 300,000 people. Hundreds of people sought medical treatment after the spill.

▲ (1) A damaged storage tank and a spill into a containment dike; (2) Spill containment and cleanup efforts; (3) Aerial view of the Kingston spill.

Do You Know?

• We may think of process safety incidents as fires, explosions, and immediate injuries from exposure to toxic, corrosive, or otherwise hazardous materials. However, major spills of hazardous materials, especially into rivers or other bodies of water, are also process safety incidents. They have the potential to impact large numbers of people, including people far away from your plant.
• Some of the incidents listed above occurred because of a leak from a pipe, vessel, or containment pond, while others were a consequence of another process safety incident (a fire or explosion).
• For spills or leaks, properly designed and maintained dikes around storage tanks and other process vessels, and containment pads in areas where spills might be more likely (for example, loading and unloading areas), are important protection systems to contain hazardous material spills.

What Can You Do?

• Know what you are expected to do if you observe any material leaking from pipes or vessels in your plant. Understand what immediate action you should take, who to report the leak to, and how to activate spill and leak response procedures for your plant.
• Check your plant's emergency response procedures and make sure they include required actions to prevent the release of hazardous material into rivers or other waterways in case of a fire, explosion, or other incident.
• Inspect containment dikes and spill containment pads around pumps, loading and unloading areas, and other places where spills might be more likely. Make sure they are properly maintained and in good condition.
• Pump rain water out of containment dikes around storage tanks promptly. If the dike is already full of water, it won't be able to contain a spill.
• Participate in emergency response drills and know what actions you need to take to prevent spilled hazardous material from escaping from your plant.

Process safety is also about protecting the environment!

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