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Details Matter in Process Safety

An exothermic chemical reaction took place in a drum of radioactive waste material in a nuclear waste repository. The drum ruptured, releasing small amounts of radiation, exposing other waste drums to elevated temperature, and contaminating 20 workers with low levels of radiation. Other drums containing similar waste material were in danger of rupture. The facility had to be shut down and the recovery cost is expected to be several hundred-million dollars.

The reaction occurred in a drum that contained acidic waste material and oxidizing chemicals, including nitrate salts, as well as an organic absorbent. This mixture can react to generate heat and pressure.

While a final determination of causes has not been made, newspaper reports indicate that a typographical error in a revision to a facility policy may have led to the use of the wrong absorbent. The revised policy specifically stated that an organic absorbent should be used, when it should have specified the use of an inorganic absorbent (a clay-based absorbent). The error was not recognized and the absorbent was changed, which could have caused the incident. Details matter — those two letters, "i" and "n" — make a huge difference in the characteristics of the absorbent.

Some other examples

- Small-diameter tubing connecting a pressure gage to process piping ruptured, releasing flammable material that ignited. The resulting fire destroyed a plant (October 2012 Beacon). The detail: a few inches of small tubing in thousands of feet of pipe.
- An ungrounded instrument probe in a duct accumulated a static electric charge. The duct was pneumatically conveying a combustible solid powder. A spark ignited a dust explosion. The detail: a single ungrounded piece of conductive equipment out of thousands of components that were properly grounded.
- A small hose on an offshore oil platform failed and released methanol which ignited, causing a significant fire. The hose was leaking and had been repaired with duct tape (July 2007 Beacon). The detail: a single small hose leak on a platform containing large piping and equipment.
- Many explosions have occurred because a centrifugal pump was run with both the suction and discharge valves closed, allowing temperature and pressure to build up in the pump (October 2002 and August 2013 Beacons). The detail: one or two valves out of hundreds in the plant were in the wrong position.

What Can You Do?

- Whatever your job — operations, maintenance, supervision, engineering, management — pay attention to the details in your work. There are no unimportant details in process safety. You never know which apparently minor detail can initiate a major event, so you have to pay attention to all of them.
- If you are asked to review a procedure or other process safety information, really review it. Don't regard the review as a formality; go over it carefully.

Pay attention to details in your job – they are important!