

Mine Safety Agency Issues Serious Accident Alert on Safe Handling of Chemicals

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The Mine Safety and Health Administration has issued a serious accident alert on handling dangerous chemicals, recommending best practices.

MSHA highlighted a November 3, 2017, accident in which an explosion occurred when incompatible chemicals were mixed in a tank. A miner had unloaded a truckload of sodium hydrosulfide (NaHS) solution into a chemical storage tank that contained calcium polysulfide (CaPS) solution. NaHS and CaPS are hazardous chemicals that give off hydrogen sulfide (H₂S), a flammable and toxic gas that produces a “rotten-egg” odor. MSHA said the operator had installed a charcoal filter on the tank’s vent line to control the odors. “When these chemicals came into contact in the tank, an explosive concentration of H₂S gas was liberated,” the agency noted. According to the agency, “The concentration of H₂S exceeded the filter’s capacity, resulting in a chemical reaction generating enough heat to ignite the filter. H₂S vapors in the tank ignited, causing a violent explosion damaging the tank, surrounding area, and building. This accident occurred because the operator changed its processes, which resulted in the mixing of incompatible chemicals.”

To avoid similar accidents, MSHA issued specific “best practices” for operators to implement. These include:

- Prior to implementing a process change, such as the introduction of a new chemical, thoroughly evaluate hazards, including chemical compatibility and reactivity.
- Establish procedures for the safe handling and storage of chemicals, ensuring chemical compatibility with the process and equipment.
- Equip chemical storage tanks with properly designed pressure relief devices that are safely vented.
- Ensure that chemical filters and scrubbers are properly designed and rated for the intended application.
- Conduct continuous H₂S monitoring in areas where it may be liberated.

- Do not use pressurized air to off-load NaHS solution.
- Train miners on chemical hazards and emergency response procedures.
- Use proper personal protective equipment during chemical handling.
- For additional safe practices and precautions when handling NaHS, refer to the U.S. Chemical Safety and Hazard Investigation Board's Safety Bulletin No. 2003-03-B (November 2004).

In 2004, the U.S. Chemical Safety and Hazard Investigation Board, an independent federal agency investigating chemical accidents, issued a [report](#) on “preventing harm” when using sodium hydrosulfide. It noted, “Despite its pungent rotten egg odor, H₂S can deaden the nerves that detect odors, thereby preventing those exposed from being able to smell life-threatening airborne concentrations. This condition is referred to as ‘olfactory fatigue’ and must be considered when designing NaHS safety systems.”

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National Law Review, Volume VII, Number 188

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