Federal report criticizes lack of regulation and safety in West, Texas fertilizer plant explosion

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More than 1,300 facilities nationwide store the type of agricultural chemical—fertilizer-grade ammonium nitrate—that set off an explosion in the central Texas town of West on April 17, 2013 at a fertilizer production plant. Fifteen people were killed, more than 160 were injured, with more than 150 buildings damaged or destroyed.

A federal report released recently by the US Chemical Safety Board criticized both state and federal officials for having failed to issue regulations governing such facilities. Fertilizer-grade ammonium nitrate is not categorized as an explosive or hazardous material. In the case of the West facility, the fertilizer was stored at the plant in a wooden warehouse in wooden bins, in a building without a sprinkler system.

The report makes note of the fact that Texas has no statewide fire code and state law actually prohibits most smaller rural counties from adopting a fire code.

According to the report: "Not only were the warehouse and bins combustible, but the building also contained significant amounts of combustible seeds, which likely contributed to the intensity of the fire."

It also notes that: "Industry has developed other forms of ammonium nitrate that are reported to reduce or eliminate the risk of accidental detonation. For example, compounding the ammonium nitrate with calcium carbonate (limestone) practically eliminates any risk of explosion in its storage, transportation, and handling, while preserving the AN's nutritive value."

Ammonium nitrate is predominantly used in industrial agriculture as a high-nitrogen fertilizer. It consists of 34 percent nitrogen.

The explosion at the West Fertilizer Company plant was one of the deadliest industrial disasters in Texas history. The explosion occurred while emergency services personnel were responding to a fire at the facility. Those living in and around the site reported that the blast felt like an earthquake.

The US Chemical Safety Board released its report January 28, 2016 in Waco, Texas, 20 miles south of West. The report calls into question the West plant's handling of the fertilizer and the training of the firefighters who responded to the initial blaze.

Proximity of homes and schools to the plant in West also contributed to the widespread damage, death and injury caused by the blast, and a lack of regulations has put other communities at risk of a similar disaster. As one example of the dangers, the West Intermediate School is located about 200 feet from the property line of the plant.

The report issued warnings concerning the dangerous locations of many other fertilizer plants both in Texas and around the US. In the case of West, most of those injured were within 1,500 feet of the explosion. The report noted that "risk to the public from a catastrophic incident exists at least within the state of Texas, if not more broadly."

Recommendations issued by the Chemical Safety Board include revision of a federal chemical-safety program to include fertilizer-grade ammonium nitrate and requiring automatic fire-sprinkler systems for indoor storage of the chemical.

The CSB concludes its findings by noting an exemption from hazardous chemical reporting for "fertilizer held for sale by a retailer to the ultimate customer."

"West reported the presence of up to 270 tons of ammonium nitrate, as well as anhydrous ammonia, at

the site… There is no indication that West's filing with local authorities resulted in an effort to plan for an ammonium nitrate emergency."

Explosions and disasters involving ammonium nitrate are not unprecedented events in the state of Texas. In 1947 a French vessel docked in the port of Texas City with a cargo of approximately 2,300 tons of ammonium nitrate. It detonated, killing over 500 people in a series of chain reaction explosions.

The nitrogen fixation process that produces high nitrogen agricultural fertilizer goes back to the work of German chemists Fritz Haber and Carl Bosch, who developed it in the first half of the 20th century. During World War I it provided Germany with a source of ammonia for the production of explosives. This ammonia is the base of the synthetic nitrogen fertilizers widely used around the world today.

The major source of the hydrogen used as part of the production is methane from natural gas. The Haber process now produces about 450 million tons of nitrogen fertilizer per year.

In 1921 an explosion at a BASF ammonium nitrate factory in Oppau, Germany killed between 500 and 600 people and injured 2,000.

The Haber process and the resulting high-nitrogen fertilizers have also been criticized by many agricultural and soil scientists for producing serious imbalances to the nitrogen cycle of the soil as well as its requirement for high fossil fuel energy inputs. It has also been shown, when used as a sole source for soil nitrogen, to have negative effects on soil organisms and soil organic matter, which feeds food plants intended for human and animal consumption.

Excess runoff from the fertilizers' production has polluted rivers and caused ocean "dead zones."