



U.S. CHEMICAL SAFETY BOARD

An independent federal agency investigating chemical accidents to protect workers, the public, and the environment.

CSB Releases Safety Bulletin on the Dangers of Purging Gas Piping into Buildings, Urges Outdoor Venting of Gases

Washington, DC, October 2, 2009 – In a new [safety bulletin](#) based on preliminary findings from the [ConAgra Foods natural gas explosion](#) in Garner, North Carolina, the U.S. Chemical Safety Board (CSB) urged companies, gas installers, and contractors to follow safe practices during gas purging operations, including venting purged gases outdoors whenever practicable.

The explosion, which occurred at the Slim Jim meat processing plant on June 9, 2009, killed three workers when a large section of the building collapsed. The blast critically burned four others and sent a total of seventy-one people to the hospital. About 18,000 pounds ammonia were released from the plant's refrigeration system as a result of the explosion and subsequent emergency response activities. ConAgra has announced that approximately 300 employees will be laid off due to the accident.



The explosion occurred during the installation of a new natural gas-fired industrial water heater located in an interior utility room of the plant. An employee of Energy Systems Analysts, a North Carolina firm under contract to ConAgra, was purging a new three-inch gas line in preparation for commissioning the heater. Purged gases were vented directly into the utility room. Although a number of individuals noticed the smell of gas, purging was continued intermittently over several hours, eventually leading to the accumulation of natural gas above the lower explosive limit (LEL). Combustible gas detectors were not used during the purging operation to monitor the concentration of gas within the utility room. Over 200 employees were inside the building at the time of the purging.

The [CSB safety bulletin](#) emphasizes five key lessons to prevent fires and explosions during fuel gas purging operations. The CSB urged that companies ensure that their personnel and contractors vent purged gases directly to a safe location outdoors, away from people and ignition sources, whenever practicable. Purging indoors should be restricted to situations where outdoor purging is not practicable and should require strict safeguards, including the evacuation of non-essential personnel, the elimination of ignition sources, proper ventilation, and the use of gas detectors to always maintain the gas level well below the LEL.

The bulletin identifies several other serious gas explosions that occurred during purging operations, including a 2008 blast at a Hilton Hotel in San Diego that injured 14 and an explosion at a Cary, North Carolina, fitness center a decade ago. All were linked to venting gas indoors without proper monitoring or safeguards. The bulletin warns against relying on odor alone to detect the release of fuel gases, noting that an individual's ability to detect odor is highly variable and subject to "odor fatigue" during prolonged exposures. New gas pipes also have a tendency to absorb the odorant from natural gas and propane, an effect termed "odor fade."

The North Carolina Building Code Council, which oversees the state's fuel gas code, enacted emergency changes to the code last month in response to preliminary findings from the ConAgra investigation. The council adopted new safety measures including a requirement that workers purging fuel gas lines vent the gases outdoors.

"I strongly commend North Carolina for taking immediate action to protect workers following this tragic explosion," said CSB Chairman John Bresland. "I urge code officials around the country to review the new safety bulletin as well as heed the positive steps taken by North Carolina."

The CSB investigation of the ConAgra explosion is continuing, with a final report expected next year. The collapsed section of the building remains too dangerous for investigators to enter. Following the explosion, ConAgra developed a new procedure for gas purging that requires venting outdoors, personnel evacuation, and extensive gas monitoring.

The CSB is an independent federal agency charged with investigating industrial chemical accidents. The agency's board members are appointed by the president and confirmed by the Senate. CSB investigations look into all aspects of chemical accidents, including physical causes such as equipment failure as well as inadequacies in safety regulations, codes, standards, management systems, training, and industry practices.

The Board does not issue citations or fines but does make safety recommendations to plants, industry organizations, labor groups, and regulatory agencies such as OSHA and EPA. For more information, please visit our website, www.csb.gov.

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