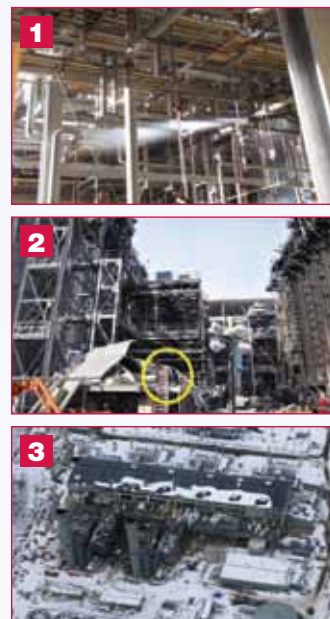


## Flammable Vapor Release Hazards in Congested Areas

**O**n February 7, 2010, six workers were killed and at least 50 others were injured in a natural-gas explosion at a power plant under construction in Middletown, CT. The explosions resulted from planned work activities that led to large releases of flammable natural gas in the presence of workers and ignition sources.

At the time of the incident, workers were conducting a “gas blow,” in which natural gas is forced through the piping at a high pressure and volume to remove debris, part of the commissioning and startup phase of the project. Natural gas was being blown from an open-ended pipe between two large structures in an area near the power generation building (photo 1). This location, while outdoors, was congested because of surrounding power generation equipment (photo 2). Efforts were made to eliminate or control potential ignition sources in the area. However, ignition sources remained, both outside and inside the building. The released natural gas found an ignition source and exploded (photo 3).

This incident occurred during construction and startup of a power plant, and involved a large amount of flammable gas. However, it is not uncommon for many kinds of process plants to be required to vent flammable liquid or vapor from piping or equipment for maintenance or shutdown. Recent Process Safety Beacons (January 2011 and May 2011) have discussed vapor cloud explosions outdoors and inside buildings. This incident is another example.



### Did You Know?

- A congested area means an area that contains a lot of equipment, piping, structures, buildings, and even natural features such as irregular terrain or trees.
- Release of a small amount of flammable vapor in a congested area can result in a dangerous vapor cloud.
- The explosion of a flammable vapor cloud in a congested area is likely to be more violent and destructive than a similar vapor cloud explosion in a more open area.
- The U.S. Chemical Safety and Hazard Investigation Board (CSB) has recommended to industry and regulatory organizations that the practice of releasing flammable gas to the atmosphere for the purpose of fuel-gas pipe cleaning be prohibited, and that alternative, nonflammable gases be used.

### What Can You Do?

- Do not assume that hazardous gas or vapor vented outdoors will disperse safely. Inspect the area and think about the effects of confinement.
- If releasing flammable liquid or gas is unavoidable, vent to a safe location away from personnel and ignition sources, preferably to a vent system designed to safely treat hazardous vapors. Avoid congested areas or other places where vapors could accumulate rather than disperse.
- Do a thorough hazard analysis whenever hazardous material venting is necessary, to minimize the release, control potential sources of ignition, and safeguard people and property.
- **Never** rely on your sense of smell to detect the presence of hazardous gas.
- See the January 2011 and May 2011 Beacons for additional suggestions.

***Never assume that outdoor release of flammable gas is safe!***

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