

# Dangers of Purging Gas Piping and Recommendations

“Who’s at Risk...

Personnel who manage, install, repair, inspect, or place into operation fuel gas piping and equipment....”

Chemical Safety Board

# Dangers of Purging Gas Piping

- Two major events in 8 month span of 2009/2010
  - Con Agra Slim Jim plant in NC on June 9, 2009
  - Kleen Energy power plant construction site in CT on February 7, 2010
- Seven similar incidents identified by CSB since 1997

## Con Agra Slim Jim Explosion – Gas Purging

- Explosion/roof collapse killed four people and injured more.
- Explosion also caused a release of anhydrous ammonia.
- Explosion was the result of a *gas purge*, following pressure testing.
- Contract employees believed difficulty starting a new gas water heater was caused by residual air in line.
- Forced natural gas through the pipe, venting into an interior space, over 2 ½ hour span.

# Con Agra Slim Jim Explosion – Gas Purging



Photo from CSB Website

## Con Agra Slim Jim Explosion – Gas Purging

- Combustible gas detectors were *not* in use.
- Non-essential workers were in the area and unaware of the activity.
- Purged gas reached a concentration above the  $\sim 4\%$  lower explosive limit and found ignition source.
- CSB recommended that the NFPA and AGA revise the national fuel gas codes allowing venting indoors. (NFPA has agreed to move forward with CSB recommendations).

# Con Agra Slim Jim Explosion – Gas Purging



Photo from CSB Website

# Con Agra Slim Jim Explosion – Gas Purging

- Additional CSB recommendations:
  - Purge gases to a safe location outdoors, away from people and ignition sources.
  - **Limit** indoor purging. If not practicable, then ensure:
    - Non-essential employees are evacuated;
    - Control/eliminate ignition sources;
    - Ventilate sufficiently to maintain concentrations below LEL.
  - Never rely on odor for gas detection.
  - Always use combustible gas monitors during purging.
  - Ensure personnel are trained and knowledgeable.

## Kleen Energy Explosion – Gas Blow

- Explosion was the result of a “gas blow” procedure - high-pressure natural gas forced through piping to remove debris.
- A “common practice” within the gas industry.
- Natural gas at 650 psi was vented at pre-determined locations outside of, but in a congested area next to, power block building.
- Gas monitors were in use (per news article).
- The concentration exceeded the lower explosive limit of ~4% in presence of ignition source.

# Kleen Energy Explosion – Gas Blow



## Kleen Energy Explosion – Gas Blow

- Explosion killed six workers and injured many more.
- CSB recommends that industry cease the venting of high-pressure flammable gases in or near worksites.
- Possible alternative practices include substitution of air, steam, water or nitrogen for “blowing” or use of combustion devices (such as flares) to safely destroy the flammable gas.
- CSB encourages the gas power industry to strongly consider the “positive actions” of the NFPA and AGA for the national gas codes.

# Kleen Energy Explosion – Gas Blow



Photo from CSB Website

# Duke Actions

1. Identify if similar activities that vent flammable gases are performed at Duke Energy.
2. If so, identify if written practices, procedures or policies are in place.
3. If yes, do these practices, procedures or policies meet the recommendations of CSB?
4. If no, such written documents must be developed/ revised before next gas purge.