

Do You See the Hazard?

April 2004



You Can't. The Hazard is Invisible !

What Happened?

An employee was assigned to sample the atmosphere in a reactor by using a flexible hose equipped with a rubber hand pump. To do so, he went to the open top man way and was later found dead. The reactor had been opened for catalyst unloading and was being purged with nitrogen. While the cause of this accident has not been positively determined, it is quite possible that nitrogen exiting the vessel overcame (asphyxiated) the employee.

What You Can Do to Prevent it from Happening to You

We all recognize the hazard of entering a confined space with an atmosphere containing a low oxygen level, but we should also remember that....

While purging an open vessel:

- Be aware that possible **oxygen deficient areas** can extend beyond a confined space, especially during initial gas testing and monitoring of a vessel.
- If there are any doubts, use a self contained breathing apparatus and an observer to call for help, if needed, when working near purged equipment openings. – This is especially true for emergency responders to a possible asphyxiation accident.
- **Control access** to the potentially dangerous area, post **Danger Signs** at vessel openings, and use a Safe-to-Work permitting system that includes a sign-in/sign-out log system separate from the Confined space log.

See the Chemical Safety and Hazard Investigation Board (CSB) Web site, http://www.csb.gov/safety_publications/docs/SB-Nitrogen-6-11-03.pdf, for additional information on nitrogen asphyxiation.

How Did This Happen?

Since nitrogen is a colorless, odorless gas that does not provide any indication of danger, it is truly an **invisible hazard**.

Air normally contains approximately 20.8% oxygen. However reducing that level just a little reduces a person's ability to function.

Atmospheres with less than 19½% oxygen are defined by OSHA as "oxygen deficient" and can be fatal over a relatively short period of time.

Normal breathing is controlled by the amount of carbon dioxide in the body. Excess exposure to nitrogen can replace the carbon dioxide and cause breathing to stop completely.

Nitrogen "tricks" the body into not breathing.

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If in Doubt... Please Stay Out !!!