



U. S. Chemical Safety and Hazard Investigation Board RECOMMENDATIONS STATUS CHANGE SUMMARY

Report:	Airgas (Air Liquide) Nitrous Oxide Explosion
Recommendation Number:	2016-04-I-FL-R6
Date Issued:	March 17, 2017
Recipient:	Cryostar USA, LLC
New Status:	Closed – Acceptable Action
Date of Status Change:	June 19, 2017

Recommendation Text:

Provide effective warning about nitrous oxide decomposition hazards

Modify nitrous oxide pump product literature to include warnings about nitrous oxide decomposition hazards, illustrated by examples from historical incidents, and refer users to this CSB investigation report for additional information.

Board Status Change Decision:

A. Rationale for Recommendation

On August 28, 2016, a nitrous oxide trailer truck exploded at the Airgas manufacturing facility in Cantonment, Florida. The explosion killed the only Airgas employee present and heavily damaged the facility, halting nitrous oxide manufacturing at Cantonment indefinitely. The CSB determined that the most probable immediate cause of the incident was, during the initial loading of a trailer truck, a pump heated nitrous oxide above its safe operating limits. Exceeding these critical safety limits appears to have started a nitrous oxide decomposition reaction that propagated from the pump into the trailer truck, causing the explosion. Additionally, one of the pumps used at the Cantonment facility was manufactured by Cryostar USA, LLC. Their product literature provided few, if any, details about pump hazards related to nitrous oxide service. As a result, the CSB made a recommendation to Cryostar USA, LLC to update its product literature to include warnings about nitrous oxide decomposition.

B. Response to the Recommendation

In a letter dated June 8, 2017, Cryostar USA, LLC provided the CSB with their updated User's Manual pages that specifically address the CSB recommendation. They informed the CSB that they have been providing their clients and customers with the updated information since May 31, 2017.

C. Board Analysis and Decision

As a result of the above information, the Board voted to change the status of CSB Recommendation No. **2016-04-I-FL-R1** to: **“Closed – Acceptable Action.”** Additionally, the Board highly commends Cryostar USA, LLC for taking such immediate action and implementing this life saving recommendation.