



U. S. Chemical Safety and Hazard Investigation Board

RECOMMENDATION STATUS CHANGE

SUMMARY

Report:	Fatal Liquid Nitrogen Release at Foundation Food Group
Recommendation Number:	2021-03-I-GA-R10
Date Issued:	December 11, 2023
Recipient:	Compressed Gas Association (CGA)
New Status:	Open – Awaiting Response or Evaluation/Approval of Response
Date of Status Change:	Not Applicable – Initial Status

Recommendation Text:

Update P-76 Hazards of Oxygen-Deficient Atmospheres. At a minimum, the updated standard should:

- a) *require that atmospheric monitoring systems shall be utilized with processes, equipment, and piping systems capable of producing oxygen-deficient atmospheres;*
- b) *require that atmospheric monitoring systems provide both visible and audible alarm indication distinct from a building's fire alarm system and at a continuously attended location;*
- c) *require that processes, equipment, and piping systems capable of producing oxygen-deficient atmospheres shall be equipped with remotely operated emergency isolation valves (ROEIVs); and*
- d) *include guidance on the adequate safe location of emergency stop devices. At a minimum this guidance should be harmonized with the requirements of ISO 13850 Safety of machinery – Emergency stop function – Principles for design. As necessary, augment the general guidance of ISO 13850 with guidance specific to processes, equipment, and piping using cryogenic asphyxiants and inert gases.*

Board Status Change Decision:

A. Rationale for Recommendation

On January 28, 2021, liquid nitrogen overflowed from an immersion freezer located inside Plant 4 at the Foundation Food Group (FFG) facility in Gainesville, GA. The release occurred while two maintenance employees were troubleshooting the equipment. Once the liquid nitrogen was released, it quickly vaporized and accumulated inside the room in which the equipment was located, creating an oxygen deficient atmosphere.

The two maintenance employees were fatally injured. Upon discovering the two fatally injured employees, an emergency response was initiated which included attempts by other employees to rescue them and isolate the freezer from its liquid nitrogen source. During these activities, four additional employees of FFG were fatally injured. Additionally, three more FFG employees and

one firefighter were seriously injured, presenting symptoms of oxygen deprivation. The incident resulted in an estimated \$1.95 million in damage.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the incident and found several safety issues including faulty equipment design, inadequate precautions for using liquid nitrogen, the lack of atmospheric monitoring and alarms, inadequate emergency preparedness, a lack of a safety management system, and a lack of regulatory coverage for cryogenic asphyxiants. As a result of these findings, the CSB issued two recommendations to the Compressed Gas Association (CGA). This status change summary addresses **CSB Recommendation No. 2021-03-I-GA-R10**.