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From: Meredith Brown <racer@lanl.gov>

Subject: Blue Alert: Inadequate Procedure for Liquid Nitrogen Drops

Title: Lack of Procedure during Liquid Nitrogen Drops Can Cause Problems

Identifier: Formal Lessons Learned Report, 1998-KO-SNL-0004

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Lessons Learned Statement: Many SNL facilities contain two valve drops for dispensing liquid nitrogen (LN2) that allow the venting of gaseous nitrogen (GN2) into the building exhaust system. If the drop is operated improperly, there is a potential to drain the entire contents of the LN2 source (i.e., a large storage tank) into the building exhaust system causing the loss of significant amounts of LN2 and creating the potential for the dumping of large amounts of GN2 into the building itself. Such drops should be continuously attended and monitored when they are in operation.

Discussion of Activities: On December 4, 1997, an operator was filling an LN2 dewar from an LN2 drop on the second floor of Building 890. The bypass valve, which vents GN2 into the building exhaust system, was left open in anticipation of a further need for LN2. When the experiment concluded without further need of LN2, the personnel involved went home without closing the bypass valve.

On December 5, 1997, an arriving employee noticed suspicious fumes coming from a light fixture in the basement of Building 890. The area around the fumes was frozen. The responding Incident Commander quickly located and closed the open valve. The Incident Commander noted a substantial build up of "ice" in the building exhaust duct. The oxygen level in the pipe chase surrounding the exhaust duct was lowered slightly but had not dropped to a life threatening level.

Analysis: The investigation revealed the potential for a rupture of the building exhaust duct due to the build up of ice. A root cause analysis was conducted using a cause and effect technique. The direct cause of the incident was the failure of the responsible personnel to properly close down the LN2 drop by closing the bypass valve. The root cause was determined to be a failure of the Hazard Analysis and Identification process to identify all of the potential hazards associated with the operation of the LN2 drop. Contributing causes were the lack of current and adequate SOP for the operation and the failure of operating personnel to follow the instructions provided on a posted Operator Aid.

Consequences: In this incident, the LN2 and GN2 were confined to the building exhaust system. The potential for rupture of the building exhaust duct was created by the build up of "ice." Such a rupture would allow the release of significant amounts of GN2 into the building. This could result in a potentially life threatening situation for building residents.

Recommended Actions: Such drops should be continuously attended and monitored when they are in operation.

Originator: Alan R, Stemm, Center 05700 ES&H Coordinator, (505) 845-9017
Contact: Merri Lewis, SNL Lessons Learned Coordinator ES&H Lessons Learned Program
Sandia National Laboratories, Albuquerque, NM 87185-1177
Compliance and Metrics Department, 7571, MS 1177, (505) 844-6523
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Information in this report is accurate to the best of our knowledge. As a means of measuring the effectiveness of the SNL Lessons Learned Program, please inform Merri Lewis at (505) 844-6523 of any action taken within your area, as a response to this report, or of any technical inaccuracies you have found. Your feedback is important and appreciated.