

Physics Division ESH Bulletin 99-1

GAS REGULATOR FAILS INSPECTION

On January 26, 1999, a replacement stainless steel regulator was to be installed into a nitric oxide system in an ORNL facility. The craftsman noted that the standard inspection tag was not on the regulator and took it to be inspected. The regulator failed inspection due to a gross, audible leak when pressurized with nitrogen. Nitric oxide is a "class A" poison with pulmonary damage occurring after an 8 hour exposure to as little as 25 ppm with a few breaths of 200 - 700 ppm being possibly fatal. The regulator had been bought on a credit card, and no receiving inspection had been specified or performed. ORNL procedure ORNL-SH-P36, issued October, 1998 changed regulator inspection requirements to "The user should assess the need for formally inspecting and testing regulators (new and used) prior to placing them into service." A note in the procedure urges the user to "strongly consider having the regulator and relevant pressure-controlling apparatus inspected and tested prior to being used" when the job hazard evaluation identifies circumstances where failure could produce undesirable consequences. The vendor has agreed to replace the defective compressed gas regulator.

ANALYSIS: It is also standard practice, though not documented, to test the system connections for leaks once the regulator is installed. Because it was emergent work, the installation was not documented on a work request. Although there was no safety work permit generated, the craftsman used gloves, lab coat, apron and safety glasses. No respiratory protection equipment was used or staged nearby as suggested by the MSDS in case of leakage. A gross leak would have been detected by the system test, however, not without exposure to the craftsman.

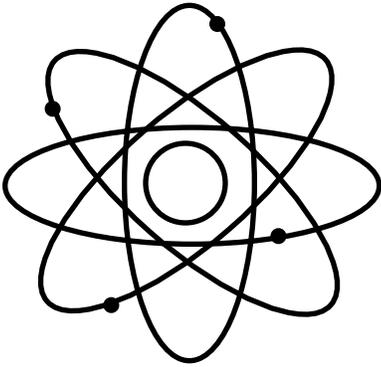
From 1/1/1997 to 1/31/1999 (25 months), 21 compressed gas regulators failed acceptance testing out of 333 tested. This was a 6.3% failure rate. The average cost of a compressed regulator test is Π hour of craftsman time charged to the using organization and Π hour of inspector time charged to an overhead account.

The only items routed automatically for receiving inspection are compressed gas cylinders and ladders. Per SAP procedures, all other items are delivered directly to the customer and it is their responsibility to obtain any needed inspections prior to use.

RESOLUTION/RECOMMENDED ACTIONS: Consider inspection of compressed gas regulators prior to installation based on intended use. Inspection should be considered if the regulator is to be used on toxic or hazardous gas. For other applications, where a 6.3% failure rate is unacceptable, testing prior to installation should be carefully considered.

Check inspection status prior to installation of compressed gas regulators into hazardous systems. Any compressed gas regulator that has been inspected will have a serialized, blue and white plastic QE&I inspection tag attached.

Check the MSDS prior to conducting any work on hazardous or toxic gas systems.



Physics Division ESH Bulletin 99-1

ORIGINATOR: Lockheed Martin Energy Research Corporation
M. H. Carpenter, 423-574-6245
Office of Quality Services

VALIDATOR: Lockheed Martin Energy Research Corporation
P. B. Hoke, 423-574-7234
Office of Quality Services

CONTACT: Connie Arnwine, 423-241-3134, ORNL Lessons Learned Program

PRIORITY DESCRIPTOR: Yellow / Caution

DOE Functional Category: Occupational Safety and Health

LMER Functional Category: Safety and Health

KEYWORDS: Regulator, compressed gas, inspection

REFERENCES: N/A

FOLLOW-UP ACTION: Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report, please notify Connie Arnwine at 423-241-3134 or e-mail a93@ornl.gov of any action taken is a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.