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GDP 06-1044

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Paducah Gaseous Diffusion Plant (PGDP)
Docket No. 70-7001, Certificate No. GDP-1
Event Report ER-06-04

Pursuant to 10 CFR 76.120 (d)(2)(i), enclosed is the final written event report pertaining to the failure of a C-337-A Process Gas Leak Detector (PGLD) during testing on November 7, 2006. The Nuclear Regulatory Commission (NRC) was verbally notified on November 8, 2006, at 0752 hours. NRC assigned notification number 42971 to the event.

Any questions regarding this event report should be directed to Steve Cowne at (270) 441-6796.

Sincerely,

Mark Kuhlbar
Steven R. Penrod
General Manager
Paducah Gaseous Diffusion Plant

SRP:MLB:mjw

Enclosure: As Stated

cc: NRC Region II Office
NRC Resident Inspector, PGDP

IE72

EVENT REPORT
ER-06-04

A. Description of Event

On November 7, 2006, Process Gas Leak Detector (PGLD) head No. YE-613-21 failed to fire during quarterly Technical Safety Requirement (TSR) testing at the C-337-A Feed Vaporization Facility. The subject detector head is located in the north piping trench in the facility autoclave area. Following replacement of the detector head and successful testing of the detector head by Operations representatives, the Plant Shift Superintendent (PSS) declared the C-337-A PGLD system operable at approximately 1520 hrs the same day.

PSS evaluated the failure for reporting to Nuclear Regulatory Commission (NRC). Understanding the failure occurred in response to the TSR surveillance, with no apparent failure mode, PSS questioned if there was any historical evidence that may indicate the detector may have been inoperable prior to the test. To answer this, PSS reviewed the detector testing history. PSS identified the subject detector head had passed its most recent quarterly test, but had failed a quarterly TSR test on May 9, 2006, and had experienced other failures during quarterly testing. PSS felt there was evidence, based on the failure history, that the detector head may have been inoperable when required by TSR to be operable. As a compensatory measure, a daily test of the subject detector head was initiated on November 7, 2006.

On November 8, 2006, at 0752 CST, the NRC Headquarters Operations Office was notified of the event in accordance with 10 CFR 76.120(c)(2) (NRC No. 42971).

B. Description of Equipment Failure

There are two detector heads located in the pipe trench at C-337-A (YE-613-21 and YE-613-22). A steam pipe passes within an inch of the north trench detector head. On November 8, 2006, a thermographic survey of the trench detector heads was completed. The steam pipe was measured within a temperature range of 258.2° to 293.1°F, and the shroud over the detector head measured 126.1°F. The detector head could not be directly observed; however, it was closer to the steam pipe than the shroud. The temperature survey determined the subject detector head was exposed to temperatures in excess of 126°F. The failed detector head was taken to the instrument shop where it would not respond to further tests. The detector head (YE-613-22) located in the south trench at C-337-A was measured at a temperature of 94.1°F.

On November 9, 2006, the two trench detector heads at the C-333-A Feed Vaporizer Facility were also inspected. There were no similar conditions of an elevated temperature pipe/component in as close proximity to the detector heads. The temperatures of the detector shrouds measured at 116.7°F and 120.5°F. In the absence of a direct heat source, such as the C-337-A North Trench steam piping, the shroud temperatures may be considered to be the same temperature as the detector heads.

An Operability Evaluation was performed in 1996 (OE-PR-PAD-96-4232, Rev. 0) which references a manufacturer's published practical application temperature range for the DI-4A heads of 14° to 140°F. The C-333-A East and West Trench heads and the C-337-A South Trench head were measured to be within that range.

The failure history was reviewed back to January 2001 for all of the detector heads located in the Feed Vaporization Facilities (C-333-A and C-337-A); including the detector heads located above the autoclaves, in the autoclave housings, and the pipe trenches. The detector heads located in the trenches have a mean time between failures ranging from 0.87 years to 1.50 years. The detector heads located at the autoclaves have mean time between failures of 3.12 years at C-337-A and 4.96 years at C-333-A. From the failure history of the detector bases, it can be concluded that they have a service life greater than 5 years.

Even though TSR 2.2.4 credits each detector head in the vaporizer facility separately as having operability, there are other detectors in close proximity that would have alarmed had an actual release of UF_6 occurred.

C. Exact Location of Event

C-337-A Feed Vaporization Facility, north pipe trench.

D. Description of Isotopes, Quantities, and Chemical and Physical Form of the Material Involved

None.

E. Causes of the Event

1. Direct Cause of the Event

   The direct cause of this event was the failure of the C-337-A north trench detector head to fire during quarterly testing on November 7, 2006, and the adverse history of failures during quarterly testing. The subject head failed a quarterly TSR test earlier in the year on May 9, 2006, and it had previously failed during quarterly tests conducted in October 2004, April 2004, July 2003, October 2001, and July 2001.

2. Root Cause of the Event

   The root cause for this event was the exposure of the detector head to elevated temperatures in excess of that recommended by the manufacturer due to its proximity to steam piping.

F. Corrective Actions Taken

1. On November 17, 2006, the C-337-A North Trench detector head YE-613-21 was repositioned per ESO ZA9870 and WOT 061758101. The detector head and base were also replaced at this time per WOT 061727901.

2. On December 05, 2006, Preventative Maintenance Requests (PMR)-105453 and PMR-105454 were submitted to implement tasks for replacing the C-333-A and C-337-A trench detector heads every 6 months and the heads at the autoclaves every 36 months. PMR-105455 was also submitted to replace all of the PGLD detector bases at C-333-A and C-337-A every 5 years.

G. Corrective Actions Planned

By February 15, 2007, the tasks associated with PMR 105453, 105454, and 105455 will be established in the PM system.

H. Results of Any Evaluations or Assessments

None.

I. Extent of Exposure of Individuals to Radiation or to Radioactive Material

None.

J. Lessons Learned

None.

List of Commitments

By February 15, 2007, the tasks associated with PMR 105453, 105454, and 105455 will be established in the PM system.