USEC
A Global Energy Company

February 15, 2013
GDP 13-1008

U.S. 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
USEC Event Report ER-12-02

Pursuant to PGDP Safety Analysis Report event notification and reporting criteria of Table 6.9-1, Item J.2, the United States Enrichment Corporation (USEC) provides the 60-day written event report pertaining to three safety system actuations of the Process Gas Leak Detection System (PGLD) in the C-360 Toll Transfer and Sampling facility on December 22, December 23, and December 29, 2012. The events occurred during UF_6 cylinder sampling operations. Enclosure 1 contains the events' details and Enclosure 2 is a list of commitments made in the report. The Nuclear Regulatory Commission (NRC) was notified verbally in a late report on January 17, 2013, at 1550 hours. NRC assigned No. 48680 to the notification.

Should you require additional information regarding this event, please contact Vernon Shanks, Regulatory Affairs Manager at 270-441-6039.

Sincerely,

Michael A Buckner

Michael A. Buckner, (Acting) General Manager
Paducah Gaseous Diffusion Plant

DCS: mcl

Enclosures: As stated

cc: NRC Region II Office
NRC Senior Resident Inspector – PGDP

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NMSS

United States Enrichment Corporation
Paducah Gaseous Diffusion Plant
P.O. Box 1410, Paducah, KY 42002

Event Report
ER-12-02

A. Description of Event

This event report addresses three separate actuations of the Process Gas Leak Detection System Zone 1 in the laboratory/sampling room of the C-360 Toll Transfer and Sampling Facility. The circumstances surrounding each actuation will be addressed separately. Each actuation occurred while a UF6 sampling operation was being conducted in Sampling Cabinet Number 3 for Autoclave Number 3. These were conservatively reported in accordance with PGDP Safety Analysis Report event notification and reporting criteria of Table 6.9-1, Item J.2, "Safety Equipment Failure/Actuations," of "Q" safety systems.

Event 1

On December 22, 2012, at 2320 hours, a Zone 1 UF6 Release Alarm was received. At the time the alarm occurred, a UF_6 sample was being withdrawn on Sample Cabinet Number 3. Operators obtaining the sample reported smelling an electrical-type smell, but they saw no smoke or signs of a UF_6 release. Following the alarm, the building was evacuated per alarm response procedure CP4-CO-AR8360, "Alarm Response for C-360," followed by a HAZMAT controls response per procedure CP4-CO-CE5017a, "UF_6 Release in C-310, C-310A, C-315, C-333A, C-337A, or C-360." All Hydrogen Fluoride (HF) gas samples taken during the incident response were negative and Health Physics smears showed no evidence of a release. The equipment was left in service based on there being no indications to verify a UF_6 release. The alarm was assumed to be due to something overheating electrically and not producing visible smoke.

Event 2

On December 23, 2012, at 1305 hours, a Zone 1 UF_6 Release Alarm was received. At the time the alarm occurred, a UF_6 sample was being withdrawn on Sample Cabinet Number 3. The operator obtaining the sample reported smelling a similar electrical-type smell as the earlier incident, and again saw no smoke or visible signs of a UF_6 release. Following the alarm, the building was evacuated per alarm response procedure CP4-CO-AR8360, "Alarm Response for C-360," followed by a HAZMAT controls response per procedure CP4-CO-CE5017a, "UF_6 Release in C-310, C-310A, C-315, C-333A, C-337A, or C-360." All HF gas samples taken following the incident were negative and Health Physics smears showed no evidence of a release. Sample Cabinet Number 3 was removed from service for investigation. On December 26, 2012, Sample Cabinet Number 3 and associated equipment was checked for leaks. All mechanical connections and valves associated with Sample Cabinet Number 3 were leak checked by pressurizing the cabinet tubing and soap testing for leaks. The investigation revealed one small leak on the tubing between the sample chamber and the pressure transducer PE-355 in the sample cabinet. Repairs to the tubing were performed under work package 1221396-01 and Sample Cabinet Number 3 was placed back in service.

Event 3

On December 29, 2012, at 2220 hours, a Zone 1 UF_6 Release Alarm was received. At the time the alarm occurred, a UF6 sample was being obtained on Sample Cabinet Number 3. The operator reported no smell, smoke, or any signs of a UF_6 release. Following the alarm, the building was evacuated per alarm response procedure CP4-CO-AR8360, "Alarm Response for C-360," followed by a HAZMAT controls response per procedure CP4-CO-CE5017a, "UF_6 Release in C-310, C-310A, C-315, C-333A, C-337A, or C-360." All HF gas samples taken during the incident were negative and Health Physics smears showed no evidence of a release. On December 30, 2012, Sample Cabinet Number 3 and associated equipment was checked for leaks. Sample Cabinet Number 4 and associated equipment was also checked for leaks, as this sample cabinet for Autoclave Number 4 was also in use at the time of the alarm. The investigation revealed a small amount of uranium oxide visible on the POE-340 valve (one of the UF_6 evacuation valves for Sample Cabinet Number 3) at the body to bonnet screwed connection and at the valve stem. No leaks were identified on Sample Cabinet Number 4. Replacement of the POE-340 valve was performed under work package 1221537-01 and Sample Cabinet Number 3 was placed back in service.

B. Description of Equipment Failure Investigation

Event 1

HF gas samples were taken of the area with negative results and Health Physics technicians swiped the area and no evidence of uranium oxide was found. Bioassay samples were provided by the operators involved. With no evidence of a leak the equipment was returned to service.

Event 2

HF gas samples were taken following the incident with negative results and Health Physics smears showed no evidence of a release. Bioassay samples were provided by the operators involved. Sample Cabinet Number 3 was removed from service for investigation. On December 26, 2012, Sample Cabinet Number 3 and associated equipment was checked for leaks. All mechanical connections and valves associated with Sample Cabinet Number 3 were leak checked by pressurizing the cabinet tubing with plant air between 20 and 55 PSIA and soap testing for leaks. The investigation revealed one small leak on the 3/8-inch by ¼-inch copper reducer coupling in the tubing between the sample chamber and the pressure transducer PE-355 in the sample cabinet. Repairs to the soldered connection between the reducer and tubing were performed under work package 1221396-01 and Sample Cabinet Number 3 was placed back in service.

Event 3

HF gas samples taken during the incident were negative and Health Physics smears showed no evidence of a release. Bioassay samples were provided by the operators involved. On December 30, 2012, Sample Cabinet Number 3 and associated equipment was checked for leaks using plant

air. The investigation revealed a small leak and small amount of uranium oxide visible on the body to bonnet screwed connection of POE-340 valve (one of the UF_6 evacuation valves for Sample Cabinet Number 3) and at the valve stem above the valve bellows. Sample Cabinet Number 4 and associated equipment was also checked for leaks by pressurizing with helium gas and "sniffing" with a Varian portable hand held leak detector Model PHD-4 Sniffer. This sample cabinet for Autoclave Number 4 was also in use at the time of the alarm. No leaks were found. Valve number POE-340 is a Swagelok BG Series Bellows Valve, Part Number M-8BG-V19-5C. Following replacement of POE-340 a helium leak check was performed on Sample Cabinet Number 3 and no leaks were found.

The failed valve was dismantled by the plant metallurgist and its bellows was found to have leaked, not a body to bonnet gasket leak. This is considered to be a very small incidental leak typical of other bellows leaks seen in the past. These size valves are generally replaced rather than repaired.

Prior to each sampling operation at the C-360 sample cabinets a procedurally driven leak rate test is performed on the sample cabinet tubing and associated valves. A Preventive Maintenance task is also performed on each sample cabinet on a six month frequency that pressurizes and soap tests the sample cabinet and heated housing valves and associated tubing.

C. Root Cause

For Event 1, no root cause was determined, since no evidence of a leak other than the audible alarm was found.

For Event 2, the leak was so small that no attempt was made to characterize the cause of the leak since the solder repair effectively sealed the leak.

For Event 3, the root cause was a failure of the internal bellows of the subject valve.

D. Corrective Actions

1. The soldered connection was repaired by applying additional solder material to the reducer to tubing connection described for Event 2. This was completed on December 27, 2012.

2. The subject valve in Event 3 was replaced on December 31, 2012.

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

The isotopes involved were U^{234}, U^{235}, and U^{238} in the form of UF_6 gas, and UO_2F_2 as a solid due to UF_6 release(s).

F. Extent of Exposure of Individuals to Radiation or to Radioactive Materials

There were no radiation exposures of concern with a committed effective dose equivalent of less than 1 mrem for each individual present during the event and with intakes in all cases of less than 0.1 mg of uranium, NRC's annual dose limit for radiation exposure is 5,000 mrem.

For Event 1, special urine bioassay samples were performed on two UF_6 Handling Operators and were above initial action or recall level of 5 µg/L (12 µg/L and 6.4 µg/L). The recall bioassay results for these operators were below the follow-up recall limit of 5 µg/L. Positive urine results and intakes were due to a UF_6 release(s) at the C-360 Number 3 sample cabinet.

Investigation into Event 2 and 3 PGLD alarms and a chemical odor during multiple shifts led to the discovery of the tubing leak and the valve problem. Special urine bioassay samples were obtained on six additional UF_6 Handling Operators working in the C-360 lab during the period of the release(s). All results on these operators were below the action level with no exposures of concern detected.

List of Commitments
ER-12-02

There are no new commitments in this report.