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April 21, 1997

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

**Portsmouth Gaseous Diffusion Plant (PORTS) - Docket No. 70-7002 - Event Report 97-01**

Pursuant to the Safety Analysis Report (SAR), Section 6.9, Table 6.9-1, J (2), Enclosure 1 is the required 45 day written Event Report for an occurrence involving an actuation of the Cascade Automatic Data Processing (CADP) smoke detection system at the Portsmouth Gaseous Diffusion Plant. Enclosure 2 is a list of commitments made in the report.

Should you require additional information regarding this event, please contact Scott Scholl at (614) 897-2373.

Sincerely,

Dale Allen  
General Manager  
Portsmouth Gaseous Diffusion Plant

DIA:SScholl:kp

Enclosures

cc: C. Cox/D. Hartland, NRC Resident Inspectors, PORTS  
NRC Region III

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United States Nuclear Regulatory Commission

April 21, 1997

Page Two

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Docket No. 70-7002

Enclosure 1

Page 1 of 3

## Event Report 97-01

### Description of Event

On March 20, 1997, at 1409 hours while performing withdrawal operations at the Tails Side Withdrawal Station, the Cascade Automatic Data Processing (CADP) smoke detector, designated as SSWL, alarmed in Area Control Room (ACR) #2 in the X-330 Process Building. Operations personnel investigated the alarm and observed smoke emanating from the area of compressor 30 WB-1, which had been operating in the withdrawal mode. Operations personnel in the area followed the "See & Flee" policy and evacuated the affected area. Building recall was sounded to have all personnel report to their respective areas.

According to the Technical Safety Requirements for the Portsmouth Gaseous Diffusion Plant, the CADP smoke detectors are required to be operable when the Tails Withdrawal Station is operating in Modes II, III, or IV. In this instance, the Tails Side Withdrawal was operating in Mode III, which would make the actuation of this smoke detector alarm reportable in accordance with the Safety Analysis Report, Section 6.9, Table 6.9-1, J(2).

Prior to initiating the withdrawal, the compressor was out of service for repair of a leak at the compressor flange. At 1755 hours on March 19, 1997, compressor 30 WB-1 was started. At 2330 hours, compressor 30 WB-1 was charged with UF<sub>6</sub> and valved into service. On March 20, 1997 at 1315 hours, the Tails Side Withdrawal was started. Within 54 minutes, at 1409 hours, CADP smoke detector SSWL, located above compressor 30 WB-1, actuated. At 1412 hours, the Pyrotronics smokehead XAH300B1, which provides a redundant smoke detection system in Tails, also fired. At 1417 hours, the compressor was shut down from the ACR and the alarm on SSWL cleared. At 1419 hours, an Operator wearing proper personnel protective equipment responded to the area and found smoke emanating from the area of compressor 30 WB-1.

Additional emergency personnel were called and responded to the area. Emergency responders monitoring the area did not detect airborne contaminants. Health Physics reported all air samples and radiological surveys as less than detectable and no evidence of an UF<sub>6</sub> release. An "All Clear" was given on the building recall at 1506 hours.

Following the All Clear, Operations and Maintenance personnel investigated the affected equipment and found no evidence of a failed compressor seal, which was considered the most likely source of a UF<sub>6</sub> leak in this area. Since there was no evidence indicating that the smoke originated from a UF<sub>6</sub> release, plant personnel initiated an investigation to determine the source of the smoke.

Docket No. 70-7002

Enclosure 1

Page 2 of 3

### **Event Report 97-01**

On March 23, 1997, maintenance removed a housing panel and found residue indicating that  $\text{UF}_6$  outgassing had occurred. Visible contamination was found on and around the WWB-27 compressor discharge block valve. A leak check performed on the valve bellows at 1715 hours determined there was a leak. On March 24, 1997, following confirmation of an  $\text{UF}_6$  outgassing as the cause of the CADP alarm, it was determined the occurrence was reportable to NRC.

The valve with the failed bellows which caused the outgassing was a 4-inch, model G-17 gate valve, manufactured by the Crane Company.

The material that outgassed was enriched  $\text{UF}_6$  at approximately 3.0% U-235.

#### **Cause of Event**

The direct cause of the  $\text{UF}_6$  release was failure of the bellows on the WWB-27 compressor discharge block valve. The leaking bellows allowed the process gas to escape which set off the smoke detectors above the nearby compressor. The CADP  $\text{UF}_6$  Smoke Detection System SSWL smokehead and Pyrotronics smokehead XAH300B1 actuated in the Tails Withdrawal Area.

The root cause of the outgassing was the design of the valve buffer system. The purpose of the valve buffer is to prevent the buildup of  $\text{UF}_6$  in the valve stem cavities by keeping the buffer pressure approximately 5 psi above the maximum process gas pressure. The valve buffer system was designed to automatically switch from a low pressure (10 psig) to a high pressure (25 psig) buffer supply as the process gas pressure increases. The high pressure supply flows through an orifice which limits the buffer air flow rate. The bellows leak caused the buffer pressure to drop low enough, allowing the process gas to escape. To improve the ability of the buffer system to prevent a  $\text{UF}_6$  release, an enhancement to the system design has been identified. A new design will provide a variable pressure buffer system which will maintain the buffer air supply at a constant differential above the process pressure. Installation of the new design is scheduled to be completed in 1997.

The Tails Side Withdrawal Station remains out of service pending completion of repairs to the G-17 valve bellows.

Docket No. 70-7002

Enclosure 1

Page 3 of 3

### **Event Report 97-01**

#### **Corrective Actions**

By December 31, 1997, installation of a new, upgraded variable buffer system which will maintain a buffer pressure above the process pressure at the Tails Withdrawal Station will be completed.

#### **Extent of Exposure of Individuals to Radiation or Radioactive Materials**

There were no exposures to individuals from this incident to radiation or radioactive materials. The operator who investigated the smoke alarm submitted a sample for urinalysis. The results were below 5 ug/liter for soluble uranium (flag level). The calculated intake was 1.25 micrograms of uranium. The limit for occupational workers is 10,000 micrograms of uranium.

#### **Lessons Learned**

Personnel responded appropriately to this event in accordance with the "See and Flee" policy.

A correctly operating buffer air system is necessary to mitigate the effects of small bellows leaks and prevent releases from occurring.

Docket No. 70-7002

Enclosure 2

Page 1 of 1

**Event Report 97-01**  
**List of Commitments**

By December 31, 1997, installation of a new, upgraded variable buffer system which will maintain a buffer pressure above the process pressure at the Tails Withdrawal Station will be completed.