

Title: Ames Blue Alert- HF System Component Failure

Date: March 8, 2000

Lessons Learned- Systems with higher risk potential may need more frequent inspections and parts replacement to remain operating in a safe state.

Discussion of Activities- A system using hydrogen fluoride gas developed a leak at a stainless steel fitting. The system was in a hood, with interlocked HF detectors that automatically valved off gas flow and annunciated an alarm at a central station. The research group had developed a response guide and had stored response gear in a separate location. When the alarm was received after-hours, the call list was used to contact the appropriate personnel. Following the response procedure and using a portable HF detector provided, the responder was able to monitor HF levels during entry to the area, and determine that the engineered safety systems had brought the system to a safe state, as designed. Gaseous HF was found only in the hood itself, and was most likely due to the continued argon purge of the research system. Evaluation of the event the following day determined that a stainless steel fitting had eroded sooner than expected. The failure may be due to the combination of moisture and HF interacting on the stainless steel. The system had been in operation for nearly two years. The system was given a full evaluation by the research group to determine if other parts need to be replaced, and a search was started for replacement parts with properties that may be more resistant to the effects of HF.

Analysis- Though visual inspections failed to identify the problem before failure occurred, the corrosive nature of hydrogen fluoride and its toxicity had led the original evaluation team to recommend that engineering controls, training and prior planning for the event assure the safety of the public and protection of the environment and the responding personnel.

Recommended Actions- The system was fully evaluated for other weakened components. Replacement parts made of PFA, a thermoplastic co-polymer version of Teflon, were procured and installed. The system changes were reviewed and approved by the Program Director, the Safety Review Committee and the Laboratory Director, and the system was returned to normal operation.

ISMS Core Function- Provide feedback and continuous improvement.

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