

**ABERDEEN**

RA97/617  
August 29, 1997

Bill Beach, Regional Administrator  
U. S. Nuclear Regulatory Commission, Region III  
801 Warrenville Road  
Lisle, Illinois 60532-4351

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**Subject: CONTINUED SAFE OPERATION OF DRY HF SCRUBBERS**

Dear Mr. Beach:

The purpose of this letter is to discuss the hydrogen fluoride leaks we have been experiencing with the oxide conversion dry scrubbers, and to describe our actions taken to assure the continued safe operation of these scrubbers. This subject was discussed by telephone with Mr. Patrick Hiland of your staff and Mr. Walt Schwink and others at NRC Headquarters on August 20, 1997. An additional conversation was held with Mr. Hiland on August 21, 1997.

The dry scrubbers, located outside of the oxide conversion process building, were designed to remove approximately 90% of the hydrogen fluoride (HF) from the UF<sub>6</sub> to UO<sub>2</sub> conversion process offgas. The scrubbers are filled with crushed limestone (CaCO<sub>3</sub>) which reacts with HF to produce inert calcium fluoride (CaF<sub>2</sub>):



There are three primary scrubbers operating in parallel plus a secondary scrubber following in series that is intended to further reduce the HF emissions to the environment. Two of the primary scrubbers are normally on line when the conversion process is operating. The scrubbing system exhausts to a 55 foot stack that has a flow of about 18,000 cubic feet per minute. A flow diagram of the UF<sub>6</sub> to UO<sub>2</sub> conversion process is attached.

Due to the corrosive nature of HF and the need to frequently empty spent limestone (calcium fluoride) from gate valves at the bottom of the scrubbers, minor leaks have been experienced with this system throughout its 30 year history. In 1994 the dry scrubber system was replaced with a new system which has proven to be more susceptible to minor leaks. Although the leaks are generally minor, they can result in a detectable HF odor, particularly in the UF<sub>6</sub> cylinder storage area. The permissible exposure limit (PEL) as codified in 29 CFR 1910.1000 for HF is 3 ppm (for an 8-hour time weighed average exposure). The IDLH (immediately dangerous to life or health) limit for HF is 30 ppm. The odor detection threshold is about 1 ppm and is very noticeable at the PEL.

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Combustion Engineering has contracted an outside expert to design an improved scrubber system which is expected to (1) reduce the potential sources of HF leakage thereby preventing unexpected exposure to HF, (2) improve scrubbing efficiency, thereby reducing HF emissions to the environment and lowering effluent concentrations, and (3) reduce maintenance requirements, thereby reducing the potential for personal exposure to HF. The new system is based on wet absorption technology and will produce a usable hydrofluoric acid product. On August 12, 1997, Combustion Engineering filed an application with the NRC describing the wet scrubbing system and requesting permission for unrestricted release of the HF product. The new wet scrubber system has been ordered and is scheduled to begin operation in late October or early November of this year.

Until the new system is operational, interim compensatory measures are being taken to avoid significant exposure to HF. These measures include:

1. A daily check for HF leakage using ammonium hydroxide is made by Health Physics in areas where personnel exposure is likely to occur in the vicinity of the scrubbers when the system is operating. A visible white smoke of ammonium fluoride reaction product will form if HF is present at levels that could result in the 3 ppm PEL being exceeded. If the white smoke is observed in any area where unexpected exposure could occur, a measurement of the actual level will be made with Dräger tubes. This check is made in accordance with Hematite's procedure SET 2196. Obtaining readings in an accessible area above the action level of 3 ppm will result in the area being roped off and respiratory protection being required for entry.
2. Monthly preventive maintenance will be performed on the gate valve packing, which has been the most frequent source of leaks.
3. The secondary scrubber increases back pressure in the system, exacerbating leaks in the primary scrubbers. Since it is not necessary for operation of the conversion process or compliance with the license or other regulatory requirements, has been taken off line to reduce the pressure in the primary scrubbers. The secondary scrubber will remain off line until the source of the back pressure is determined and corrected.
4. Training on the hazards associated with HF and avoidance of exposure to HF has been routinely given to operators and others who work in the oxide conversion area. This training will be extended to cover other site personnel and visitors who may have cause to visit the area near the dry scrubbers.

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We are confident that the above interim compensatory measures will assure continued safe operation of the dry scrubber system until the new wet system is put into operation. As stated above, the new system is expected to be operational by early November.

We will continue these interim compensatory measures during oxide production until the new wet scrubber system has been installed

It should be noted that the dry scrubber system will continue to serve a limited backup function for the new wet system, so occasional use may be necessary. Necessary repairs and maintenance of the new system will normally be scheduled during shutdown periods. Since it takes about 48 hours to preheat the dry scrubbers to operating temperature, and most repairs to the new system could be accomplished in this time, use of the dry scrubbers as backup is expected to be infrequent. The compensatory measures listed above will be used during these periods when the dry system is in use.

Thus, we have taken adequate compensatory measures to assure the continued safe operation of the dry HF scrubbers and have an active plan for their replacement. To permit our use of the wet scrubber system, it is important that NRC approve the amendment requesting unrestricted release of the HF product. We will inform the NRC if there is any change to the above schedule and will be glad to answer any questions you may have.

Very truly yours,

COMBUSTION ENGINEERING, INC.



Robert W. Sharkey  
Director, Regulatory Affairs

cc: Pat Hiland  
Walt Schwink