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**Department of Energy**

Washington, DC 20585

SEP 30 1996

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DNF SAFETY BOARD

Mr. John T. Conway  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW  
Suite 700  
Washington, D.C. 20004

Dear Mr. Chairman:

This is in response to your letter of May 9, 1996, transmitting the Defense Nuclear Facilities Safety Board's staff report entitled, "Safety of HEPA Filter Units in Hanford B-Plant Exhaust Ventilation System." An interim response letter on this subject was previously sent to you on May 23, 1996.

A review of your staff's report has been completed, and a response prepared (see Enclosure). One of the safety concerns raised in the report was the continued use of the D-Filter, one of the HEPA filters at B Plant. On July 10, 1996, the D-Filter was isolated from the exhaust airstream, and a new filter, E-Filter, was activated.

If you have any additional questions, please contact Beth Bilson of my staff at (301) 903-4483.

Sincerely,

A handwritten signature in cursive script that reads "Alvin L. Alm".

Alvin L. Alm  
Assistant Secretary for  
Environmental Management

Enclosure

cc:  
J. Wagoner, DOE-RL



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 Response to the April 15, 1996, DNFSB Report "Safety of HEPA Filter Units in Hanford B Plant Exhaust Ventilation System"

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This enclosure provides a response to the Board's staff observations identified in an April 15, 1996, report by Roger Zavadoski, David Lowe, and Larry Zull, entitled: "Safety of HEPA Filter Units in Hanford B Plant Exhaust Ventilation System". The report discusses several issues related to the existing B Plant canyon exhaust filters. In particular, it expressed concern regarding the current condition of the filters, continued safe operation, and plans for disposition of the radiological inventory contained in the filters.

B Plant is in the midst of an aggressive deactivation program which addresses those concerns. The program includes: filter characterization and safety analysis; accelerated hazard reduction; and eventual transfer of the entire B Plant facility to the Environmental Restoration program.

The following discussion addresses the five specific conclusions presented in the report:

#### E-Filter Activation

**Observation:** The D-Filter is near the accumulated radiation exposure at which other B Plant HEPA filters were retired (about  $10^8$  rads) and appears to be showing signs of failure (i.e., breakthrough). Retiring the D-Filter and placing the E-Filter in operation, after appropriate testing, would significantly reduce the potential and severity of radiological releases during normal operations and accidents. In addition, the F-Filter could be made ready for service and placed in standby.

**Response:** B Plant placed E-Filter into service on July 9, 1996. This new filter will provide improved protection against potential radiological releases from the other four filters (i.e., A, B, C, and D). In addition, use of the E-Filter will simplify the task of physically inspecting the retired D-Filter. The improved E-Filter radiation instrumentation will also provide new data on contamination levels in the exhaust airstream.

E-Filter will be in service for the two year interim period until Project W-059, "B Plant Canyon Ventilation Upgrade," is completed. This period is short, relative to the 17 year service life of D-Filter. In addition, the activities planned during the deactivation phase will result in a lower rate of dust and contamination loading to E-Filter than that experienced by D-Filter during processing. The Richland Operations Office expects E-Filter to provide reliable service until Project W-059 is completed, without the need to bypass any filters (prefilters or HEPA).

E-Filter performance and condition will be monitored during operation. The plant will utilize standard acceptance criteria (undamaged filters) for overall filter efficiency and differential pressures.

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Installed instrumentation will indicate any unexpected increase in radiation fields. If the radiation fields within E-Filter reach the order of 10 R/hr ( $10^5$  R/yr) or if operating parameters dictate, B Plant will revisit the operational acceptance criteria and expedite preparation of either F-Filter or the new W-059 filter system.

### Accident Analysis Consequences

**Observation:** In the B Plant interim safety basis (ISB) accident analysis, Westinghouse Hanford Corporation (WHC) calculated a hypothetical dose of approximately 200 rem Effective Dose Equivalents (EDE) on site and approximately 100 mrem EDE off site from a postulated failure of the filter units. This safety analysis assumes structurally sound HEPA filters--not HEPA filters weakened by very large radiation exposures, aging, and repeated wetting. Therefore, the potential exposures may be significantly greater than those indicated in the B Plant ISB.

**Response:** The ISB referenced in the report was a draft, and the Richland Operations Office is currently reviewing the latest ISB submittal and estimates the review to be completed by the end of November 1996.

### Isolating Retired Filters

**Observation:** The outlet water seals do not provide reliable isolation of the retired HEPA filter units. The water seals will be used to keep the retired A- through C-Filters isolated until the decommissioning phase, when the final disposal of the filters will be addressed. However, the water seals are subject to evaporation, potential leaks, and inadvertent steam jetting. The Board's staff believes that leaving the outlet water seals in their present configuration for several more years does not appear to be prudent. It appears that additional effort is warranted to identify an alternative that would provide enhanced reliability and not adversely impact future remediation of the filters.

**Response:** The water seals do not provide a reliable, cost effective means of long-term filter isolation; Project W-059 was developed to provide that long-term isolation. The project alternative was based upon the results of an engineering analysis<sup>1</sup>. An earlier safety analysis<sup>2</sup> concluded that relying on the water seals during the interim until completion of Project W-059 would carry an acceptable degree of risk.

Project W-059 is a Fiscal Year 1997 line item project which will provide positive mechanical barriers installed both upstream and downstream of the filter units and will eliminate any reliance on the water seals for isolation. Through a facilitated Value Engineering

(VE) study<sup>3</sup>, an alternative configuration has been identified which will allow an accelerated project completion by September 1998.

### **Expeditious Remediation of HEPA Filters**

**Observation:** The current deactivation plans for B Plant include the bypass and isolation of the HEPA filter units. The remediation of these filters, which contain large amounts of radionuclides (approximately 750,000 Curies of cesium-137 and strontium-90), will be deferred to the decommissioning phase. There are no firm plans or estimates of when the remediation of the filters will take place. Considering the large source term, a history of intrusions (i.e., flooding of filter cells), and the potential for a large release to the environment, it would be prudent to expedite the remediation of these filter units.

**Response:** The inventory present in the 291B filters presents a potential safety hazard. The Richland Operations Office (RL) funded a joint VE session<sup>4</sup> with Bechtel Hanford Incorporated, facilitated by a certified value specialist from ICF Kaiser Hanford, to identify risk reduction alternatives for the retired filters, both before and after plant deactivation. Recommendations from the session offer potential safety improvements which are continuing to explore.

In addition, RL has commissioned an independent technical expert to review the issues related to the existing filter system and associated stack and to provide recommendations for interim and long-term disposition. The study report will be issued by December 31, 1996.

### **Serviceability Standards for High Exposure HEPAs**

**Observation:** There is no DOE standard or consensus industry standard that provides definitive criteria for HEPA filters subject to high radiation exposure, aging, and adverse environmental conditions. The lack of such a standard subjects all DOE defense nuclear facilities to a greater uncertainty regarding the ability of aging HEPA filters to prevent the inadvertent release of nuclear materials to the environment. It also leads to the operation of HEPA filters in a realm beyond available experimental data.

**Response:** Since E-Filter has been activated, B Plant no longer uses HEPA filters subject to significant radiation damage. E-Filter will not be in service long enough to accumulate significant (i.e., greater than 106 R) exposure, and doses to new filters installed under Project W-059 will be limited by the need to manually change filters. Other Hanford facilities' final exhaust filters also receive limited doses due to filter handling requirements.

Nevertheless, the technical background and analysis developed on high exposure HEPAs might prove useful to others within the DOE complex. To that end, B Plant plans to publish an article on the filter issues. The proposed article would include: a description of the B Plant filter history, operating experience, safety concerns, characterization efforts and references.

The information will be made available to others within the complex by providing reference to the article in appropriate forums such as: the EH nuclear safety technical bulletin, facility owners' group meetings and the Remedial Action Program Information Center (RAPIC).

**References:**

1. *B Plant Retired HEPA Filters Engineering Study*, WHC-SD-W059-ES-002, Rev 0 by BNFL, Inc, dated March 1994.
2. *B Plant Exhaust Filter Outlet Seal Analysis*, WHC-WD-WM-TI-554, Rev 0, dated March 7, 1993.
3. *W-059 B-Plant Canyon Ventilation Upgrade Value Engineering Report*, Roger N. Stemen, ICF KH, ETS-W-96-741, dated February 16, 1996.
4. *291B Retired Filter Risk Reduction/Remediation Value Engineering Report*, Roger N. Stemen, ICF KH, ETS-W-96-1416, dated July 19, 1996.