



**Department of Energy**  
Washington, DC 20585

April 19, 2000

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DNF SAFETY BOARD

The Honorable John T. Conway  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW  
Suite 700  
Washington, DC 20004

Dear Mr. Chairman:

The Department has completed two actions in response to the May 1999, Technical Report 23, *HEPA Filters Used in the Department of Energy's Hazardous Facilities*. These actions were described in the *HEPA Filter Program Infrastructure* report and action plan (referred to as "action plan" below) that was submitted to you on December 6, 1999.

Action 1.1 of the action plan commits the Deputy Secretary to task the field offices to conduct vulnerability assessments of facilities that rely on High-Efficiency Particulate Air (HEPA) filters for accident mitigation, and to provide guidance for performing the assessments. The enclosed March 1, 2000, memorandum directed the field offices to perform these assessments, following guidance developed by the Secretarial Safety Council.

Action 6.0 of the action plan commits the Department to improve information exchange on the subject of ventilation filtration. In a January 12, 2000, letter to you, I committed the Office of Environment, Safety and Health to develop an Internet web site for sharing of information and lessons learned within the ventilation filtration community. I am happy to report that the site is up and running, and can be accessed at [www.eh.doe.gov/hepa](http://www.eh.doe.gov/hepa).

If you have any questions, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "David Michaels".

David Michaels, PhD, MPH  
Assistant Secretary  
Environment, Safety and Health

Enclosure

cc: Mark Whitaker



The Deputy Secretary of Energy  
Washington, DC 20585

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March 1, 2000

MEMORANDUM FOR DISTRIBUTION

FROM:

T. J. Glauthier

SUBJECT:

**Action:** Assess Potential Vulnerability Due to Degraded High-Efficiency Particulate Air (HEPA) Filters in Nuclear Facilities

In May 1999, the Defense Nuclear Facilities Safety Board (Board) released Technical Report 23 – *HEPA Filters Used in the Department of Energy's Hazardous Facilities* – that discussed the Department's HEPA filter program. In a June 1999 letter to the Secretary, the Board requested a plan outlining the steps required to maintain the infrastructure that supports the program, and assigned the highest priority to assessing the potential vulnerability due to degraded filters, where filters are relied upon to mitigate accidents in nuclear facilities. In response, the Department submitted an action plan to the Board in December 1999. Action 1 of the plan addresses vulnerability assessments of HEPA filters.

In order to address Action 1 of the plan, I am directing the field offices, under the direction of the Offices of Environmental Management; Defense Programs; Nuclear Energy, Science, and Technology; and Science, to assess the potential vulnerability due to degraded HEPA filters. The assessment is limited to Hazard Category 1 and 2 nuclear facilities and any Category 3 facilities that, because of special circumstances such as material form, hazard type, or proximity to other facilities or the site boundary, depend on HEPA filters for protection of persons inside or outside the facility. Guidance for performing the assessments is attached to this memorandum.

The results of the assessments are to be reported to me, through the appropriate cognizant Secretarial Office, with a copy to the Assistant Secretary for Environment, Safety and Health, no later than May 26, 2000. Corrective action plans approved by the respective operations office managers are to be entered into the Corrective Action Tracking System by June 30, 2000. Guidelines for developing these plans will be provided by the Safety Management Implementation Team by March 31, 2000.

Thank you for your attention to this important matter. This package has been reviewed by the Field Management Council. Please direct questions to Marty Mathamel, EH-1, 202-586-6857, fax 202-586-0956, or e-mail [marty.mathamel@hq.doe.gov](mailto:marty.mathamel@hq.doe.gov).

Attachment

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**Attachment 1**  
**Guidance for Assessing Potential Vulnerability Due to**  
**Degraded High-Efficiency Particulate Air (HEPA) Filters in Nuclear Facilities**

(Criteria and Review Approach Document – CRAD)

### **1.0 Objective**

The assessment will verify whether HEPA filters that perform a safety function during an accident are likely to perform as intended to limit release of hazardous or radioactive materials, considering aging effects and the accident environment.

### **2.0 Scope**

The assessments should:

- (a) include Hazard Category 1 and 2 nuclear facilities, and any Category 3 facilities that may, because of special circumstances (e.g., material form, hazard type, or proximity to site boundary), rely on HEPA filters for accident mitigation for protection of persons inside or outside of the facility.
- (b) include all filters that perform an accident mitigation function (including standby or bypass filter banks), and not be limited to those filters “credited” in a safety analysis report (SAR).
- (c) consider situations where degradation over time (e.g., aging, including the effects of environmental conditions during normal service life such as wetting, humidity, radiation or chemical exposure, or excessive pressure drop) may result in a filter’s inability to perform its intended safety function during accident conditions that may stress the filter.
- (d) consider accident environments and the ability of HEPA filters to perform their safety function in these environments (e.g., during explosions, fires, sprays, and high temperature exposure).
- (e) provide information on how long the installed filters have been in service, and existing policies and programs relating to maintenance, testing, and change-out.

### **3.0 Criteria**

The approach outlined in 4.0 below applies under the following criteria:

- (a) SARs, Basis of Interim Operations (BIOs), or other safety basis or backup documentation provide the following in accordance with Department of Energy (DOE) Orders:
  - Analysis of accident conditions – 5480.23, paragraph 8.b.(k).
  - Safety analyses including application of reliability engineering appropriate to control of vulnerabilities of the facility to accidents and accidental releases – 5480.23 Attachment 1, p.30, 11a.
  - Determination of whether or not the barriers to release will fail when challenged by the conditions resulting from the accident – 5480.23 Attachment 1, p.32, e.

- (b) The system design and technical information documentation meets criterion (a) requirements for accidents.
- (c) Filters are intact and there is no reason to believe that the assumptions of criteria 3.0 (a) or (b) would be invalidated. Conditions within the ventilation system do not cause filter degradation beyond that assumed in the design and authorization basis.
- (d) A filter maintenance, testing, and change-out program is in place and current.

Not meeting any one of these criteria is a potential vulnerability and should be reported as in 4.0 below.

#### **4.0 Approach**

- (a) Review the SAR or other safety basis documentation and references for information required by DOE Order 5480.23, as described in 3.0 above. If above information is not included in the safety basis documentation or its references, use guidance from DOE-STD-3009-94, Chapter 4, sections 4.3.X.4 and 4.4.X.4, and review available design and safety information.
- (b) Determine if HEPA filters that perform an accident mitigation function are subject to degradation over time, or conditions that may cause failure during an accident. Determine if filter maintenance, testing, and change-out policies have been followed.
- (c) In reporting the results of the assessments in (d) below, stipulate what criteria and basis were used to determine HEPA filter vulnerability. Guidelines for determining if HEPA filters are degraded and represent a potential vulnerability are contained in the following published documents:

"Adverse Operating Conditions" contained in the Lawrence Livermore National Laboratory Health and Safety Manual, Section 12.05, "High Efficiency Particulate Air Filter System Design Guidelines for LLNL Applications."

"Criteria for Calculating the Efficiency of Deep-Pleated HEPA Filters With Aluminum Separators During and After Design Basis Accidents," UCRL-JC-119798, contained in the proceedings of the 23<sup>rd</sup> DOE/NRC Nuclear Air Cleaning and Treatment Conference.

"Maximum HEPA Filter Life," UCRL-AR-134141, Lawrence Livermore National Laboratory.

These documents are available through the Office of Environment, Safety and Health web site at <http://www.tis.eh.doe.gov/beta/hepa>.

- (d) Report the results of the assessments, including identified vulnerabilities, to the cognizant Secretarial Office with a copy to the Assistant Secretary for Environment, Safety and Health, no later than May 26, 2000. The results will be forwarded to the Deputy Secretary and the Secretarial Safety Council. Corrective action plans approved by the respective operations office managers are to be entered into the Corrective Action Tracking System by June 30, 2000. Guidelines for developing these plans will be provided by the Safety Management Implementation Team by March 31, 2000.