DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
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February 1, 1994

The Honorable Thomas P. Grumbly
Assistant Secretary for Environmental
Restoration and Waste Management
Department of Energy
Washington, DC 20585

Dear Mr. Grumbly:

Enclosed for your consideration and action, where appropriate, are the observations developed by two members of the Defense Nuclear Facilities Safety Board staff concerning ventilation and filtration systems in selected facilities at the Rocky Flats Plant. These observations are based on reviews of available documents and discussions with Department of Energy staff and contractor personnel at Rocky Flats on October 18-20, 1993.

The report cites some discrepancies between the operational safety requirements and the referenced technical documents, and a concern with only testing the last stage of High Efficiency Particulate Air (HEPA) filters in some facilities. The report provides a number of constructive suggestions for further improvements. The concern with testing of only the last stage of HEPA filters is of particular note given the recent failures to meet specified filtration requirements during testing of first and second stage HEPA filters in Buildings 559 and 707. Testing of all HEPA filter stages is only performed in Buildings 559 and 707.

The report is being provided for whatever actions you may deem appropriate in the furtherance of our mutual interests in safe operations. If you need additional information, please let me know.

Sincerely,

John T. Conway
Chairman

c: Dr. Tara O'Toole, EH-1
Mr. Mark Whitaker, Acting EH-6

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 9, 1993

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: Roger Zavadoski

SUBJECT: Trip Report on Ventilation/Filtration Systems in Buildings 371, 707 and 771 at the Rocky Flats Plant

1. **Purpose:** This report documents the results of a DNFSB staff visit to the Rocky Flats Plant to conduct a review of the ventilation/filtration systems in Buildings 371, 707, and 771 and site testing of HEPA filters. This review was conducted by R. Kasdorf and R. Zavadoski of the DNFSB staff during the period of October 18-20, 1993.

2. **Summary:**

   a. The scope of this review included the ventilation/filtration systems at Buildings 371, 707, and 771 and the filter test facility.

   b. Discrepancies were noted in the operational safety requirements (OSR) and the referenced technical documents.

   c. At some facilities only the last stage of HEPA filtration was required to be dioctylphthalate (DOP) tested annually, while at others, all stages were tested annually. Credit is being taken in the accident analyses for all stages being present.

   d. The role of the ventilation/filtration systems during transition and during decontamination and decommissioning is ill-defined.

3. **Background:**

   a. Ventilation/Filtration Systems are used extensively at the Rocky Flats Plant to reduce airborne effluents to minute levels both during normal operations, including anticipated transients, and during potential design-based accidents. This review focused on the layout, design, operation and testing of the ventilation/filtration systems in Buildings 371, 707, and 771. A tour of Building 771 was part of this review.

In addition, the filter test facility at Rocky Flats was reviewed through presentations, procedures and a facility tour. This facility serves as a DOE quality assurance test facility for HEPA filters used at the Rocky Flats Plant as well as other DOE facilities.

4. **Discussion/Observations:**

a. The EG&G Rocky Flats staff presented detailed discussions on the status design, operation, maintenance, OSR requirements and testing of the ventilation/filtration systems in Buildings 371, 707, and 771. The status included current Limiting Condition of Operation (LCO) compensatory measures and current occurrence reports. In addition to the emergency ventilation/filtration systems presentations, the status and operation of the HEPA test facility were reviewed. After the presentations and reviews, the ventilation/filtration systems of Building 771 and the HEPA test facility were toured by the DNFSB staff.

b. During the course of the discussions, the DNFSB staff learned that although ASNI N510, "Testing of Nuclear Air Treatment Systems" is invoked in toto in the OSR's, only selected portions of the standard are actually utilized. There are many requirements and prerequisites in ANSI N510 that are difficult or impossible to meet for systems not designed to ANSI N509, ANSI N510's companion design standard. Those portions of the ANSI N510 standard that present the most difficulty in meeting involve the uniformity of air flow, total air flow, uniformity of aerosol distribution, calibration of photometers, frame leakage (especially for systems with shared hold down bolts). However, there are portions of the standard concerning visual inspections that represent little difficulty. None of these items is addressed in the current filter testing procedure.

c. The OSR's for Buildings 371 and 771 call for "an annual" DOP test of only the "final stage" HEPA filters in a bank. They also call for a determination of a "RF" (reduction factor) of greater than "1.25 E +11." This reduction factor assumes all stages of HEPA filtration are operating efficiently. There is considerable guidance in the literature as well as internal correspondence that suggests that each stage should be tested when credit is taken for the filter in mitigating an accident. In addition, the filter test procedure is devoid of any information on calculating or comparing an RF.

d. Various consultants draft reports (e.g. Dr. Melvin W. First, Draft Report on Filter Systems at Rocky Flats Plant, July 16, 1990 and James Martin, ACNFS Member, et. al, Review Report, Air Effluent Control, Monitoring, Testing and Environmental Impact at Rocky Flats, Draft 4, July 20, 1990) have addressed various potential or known problems or considerations with the ventilation/filtration systems at Rocky Flats. The various topics include (a) testing of each stage of filtration; (b) frequency

of testing; (c) service life of HEPA filters; (d) test agent aerosol size; (e) back to back mounting (filter testing considerations); (f) common bolt hold-downs; (g) visual inspections; (h) interstage aerosol sampling; (i) pressure drop monitoring and (j) consideration of new test standards. Several issues and items have not been included in this short list. What is not obvious is just how each of the issues raised has been resolved.

e. At present all the filters field tested at the Rocky Flats plant (approximately 10,000 filters of which approximately 4,000 are annually tested) are done by a shoud technique. Such a method requires the positioning of four to five people inside the filter plenums that are either contaminated or potentially contaminated. Many of the smaller units (of 40,000 to 50,000 SCFM) could be tested by a mass flow procedure which would save on time and potential exposure. Presently, only units up to 12,000 SCFM are being considered for the mass flow technique.

f. The role to be played by the ventilation/filtration systems in the future decontamination/decommissioning of the Rocky Flats Plant facilities is not at all clear. The accident analysis that take into consideration partial ventilation zones, material in the ductwork, plugged filters, etc., may have to be revisited to establish a safety envelope that bounds the use of these systems. The current OSR's may or may not conservatively cover these foreseeable modes of operation.

g. Tours of the filter test facility and a review of their procedures did not indicate any major discrepancies.

5. **Future Staff Actions:** The DNFSB Staff will continue to review the ventilation/filtration systems at the Rocky Flats Plant. In particular, the role of the ventilation/filtration systems at an active building, like Building 559, will be reviewed by the staff for consistency with their OSR requirements. The mechanism that ensures the applicability and longevity of the OSRs will be reviewed. These issues will be scheduled for review in mid-1994. In addition, any building considering major decontamination and decommissioning should have a detailed ventilation/filtration plan for protection of the workers and the general public that is consistent with its SAR and updated accident analysis. The Staff will follow DOE's pursuit of this issue.