Environmental Management

Implementation Status of the Measures Related to High-Efficiency Particulate Air (HEPA) Filters

In its January 9, 2003, letter related to HEPA filters, the Defense Nuclear Facilities Safety Board (Board) requested the Department of Energy (DOE) to document the implementation history for each action listed in the enclosure to the Department's June 4, 2001, letter and provide the justification and technical basis for any changes.

The enclosure to the June 4, 2001, letter defined six actions. The commitments made by the Department were formally established as direction to the Program Offices for implementation. These commitments were assigned to the line organizations in a Secretarial memorandum on June 4, 2001. The implementation status of these actions is provided below.

(1) Conduct 100 percent QA testing at the DOE Filter Test Facility (FTF) of new HEPA filters that are used in confinement ventilation systems for Category 1 and 2 nuclear facilities that perform a safety function in accident situation, or are designated as important to safety (i.e., safety class or safety significant per STD-3009).

Department facilities continue to send HEPA filters to the FTF for inspection and testing. In fiscal year (FY) 2001 and 2002, the FTF received almost 5,000 HEPA filters. The rejection rate based on flow testing remained low in both years (below 2 percent).

In December 2001, Hanford performed an evaluation of the FTF resulting in a number of significant findings. As a result, some sites did not send filters for testing until the deficiencies were corrected. Despite the delay caused by the need to implement corrective actions at the FTF, the percentage of new HEPA filters tested at the FTF before installation in Safety Class (SC) and Safety Significant (SS) systems for EM facilities was 89 percent overall for FY 2000 through March 2003. Of this, EM sites ensured that 100 percent of installed HEPA filters for SC systems were tested at the FTF. The majority of EM sites ensured that 100 percent of installed HEPA filters for SS systems were tested at the FTF, with the exception of Savannah River Site (SR) and the Office of River Protection (ORP). At SR approximately 300 filters installed in SS systems were not tested at FTF during the period that quality issues were being addressed at FTF. In installing these filters at the site, SR considered the very low FTF flow test rejection rate and the many other elements of its program to ensure HEPA filters perform their

function such as procurement specifications requiring flow testing by the NQA-1 approved vendor, onsite vendor inspections, SR receipt inspections, installation requirements and in-place testing and periodic surveillance required by the Technical Safety Requirements. At the ORP it was discovered that the DOE had not provided direction to its contractor to meet the 100 percent FTF testing requirement for SC and SS systems. This situation has been remedied through ORP direction to its contractor. Consequently, five HEPA filters installed in a SS system were not tested at FTF. The hazard associated with this system has been removed and the hazard classification for this facility is in the process of being downgraded. EM is continuing to evaluate both of these matters further.

Since FTF has corrected the quality deficiencies, all EM sites are performing 100-precent HEPA filter testing for all HEPA filters installed in SS and SC systems. EM has reiterated its expectations to its sites that 100 percent of the filters to be installed in SC, SS, and habitability systems must be sent to FTF for testing.

(2) Conduct 100 percent QA testing at the FTF of HEPA filters necessary for habitability systems, e.g., filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation.

EM has reviewed its facilities and has not identified any HEPA filtered habitability systems.

(3) For all other applications where HEPA filters are used in confinement ventilation systems for radioactive airborne particulates, develop and document an independent, tailored filter QA testing program that achieves a high degree of fitness for service. The program should include the testing of a sample of filters at the FTF. The size of the sample to be tested should be large enough to provide sufficient statistical power and significance to assure the required level of performance.

The majority of EM sites continue to send newly procured HEPA filters to the FTF for inspection and testing. For the remaining sites there is no difference in the current vendor's manufacturing/testing process by functional use. Similar evaluation would be conducted in the event any other vendor is used in the future. Therefore, it is considered that with the SC/SS HEPA filters tested at the FTF, this sample size is large enough to provide sufficient statistical power to assure the required level of performance.

(4) Periodically analyze and publish FTF data to provide filter reliability and performance information for the complex. The analysis would include the vendor, product description, and type of deficiency.

The FTF generates, on a semiannual basis, reports on testing results, including the customer, filter vendor, and the type of deficiency. To date, these reports were provided directly to the Quality Assurance Working Group (QAWG). Briefs on HEPA filter testing were presented to the QAWG in conference calls. However, while the sites did not receive these reports on a regular basis, the FTF data are available on demand and used when needed. The EH Quality Assurance organization will publish the FTF data on a semiannual basis.

(5) Funding for the FTF shall be maintained by DOE Headquarters so as not to discourage FTF usage. Funding will be provided by the Office of Environmental Management (EM) until such time as the FTF is required to move, at which time the funding arrangement will be reviewed.

The FTF budget is managed from EM Headquarters directly, not as a part of the Oak Ridge operating funds. EM continues to fund the FTF at the needed level, until such time as the facility is scheduled for deactivation and decommissioning, expected in April 2005.

(6) Establish a formal self-assessment program to evaluate the above protocols and procedures and determine their continued benefit and cost-effectiveness, and to identify opportunities for improvement and lessons learned. Task the DOE Quality Assurance Working Group to develop and execute an appropriate implementation strategy, including supporting program objectives, evaluative criteria, assessment procedures, and periodic status and assessment reports.

The Department strongly believes that the configuration and reliability of vital safety systems is essential to the performance of our facilities and for protection of the public, workers, and environment. Line management is responsible to assure that robust HEPA filter management programs are implemented and the self-assessments are conducted.

The QAWG has been marginally involved in the HEPA filter testing programs. While the QAWG is made up of staff level QA professionals, they do not have the necessary responsibility or authority and cannot replace line management responsibility for safety. The Assistant Secretary for Environment, Safety and Health (EH) is establishing a corporate QA function for DOE, to identify and resolve crosscutting quality assurance issues within the Department, including the evaluation of HEPA filter testing data.

With respect to self-assessments, since June 2001, the EM line management directed two major assessments to improve the HEPA filter programs.

In December 2001, DOE Richland (RL) directed Fluor Hanford Inc. (FHI) to evaluate the FTF for inclusion on the FHI Evaluated Supplier List (ESL) for use as a HEPA QA testing vendor. The review consisted of two evaluations: QA evaluation against the ASME NQA-1 requirements as imposed by the State of Washington for air emissions from an operating stack and a technical evaluation against the DOE standards governing FTF operations. FHI found a number of issues had to be resolved for the FTF to meet NQA-1 requirements and be placed on the FHI ESL. The FTF resolved these findings and was placed on the FHI ESL list in December 2002.

FHI also found noncompliance with the DOE standards. Many of these were due to deficiencies within the DOE technical standards related to HEPA filters. The DOE will address the recommended changes to these standards once the revision of the Nuclear Air Cleaning Handbook is completed.

Following a review of the EM HEPA filter management programs; EM has identified Savannah River and Hanford sites as having comprehensive programs supporting complex activities. In order to ensure that EM facilities are applying and maintaining the highest technical standards and based on their experience, the Assistant Secretary for Environmental Management directed SR and RL Operations Offices to identify a consistent set of requirements for a comprehensive EM HEPA filter management program. The set spanned identification of technical standards, procurement specifications, on-site vendor inspections, performance testing, receipt inspection, installation, shelf life, service life, maintenance and quality.

Assessments were performed on selected EM sites to evaluate the "health" of the EM sites HEPA filter programs based on these requirements. Detailed assessments were performed on the SR and one of the significant Hanford HEPA filter programs (Project Hanford Management Contract). A high-level assessment was performed on Rocky Flats and Idaho sites. It was found that the EM sites are consistently implementing the minimum requirements of a robust HEPA filter management program.

The team made several recommendations meant to strengthen EM HEPA filter programs. The Assistant Secretary for Environment, Safety and Health is evaluating these recommendations for implementation throughout the EM complex. This effort will include evaluation of the continued benefit and cost-effectiveness of performing independent inspection and testing at the FTF.

National Nuclear Security Administration

Implementation Status of the Measures Related to High-Efficiency Particulate Air (HEPA) Filters

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The enclosure to the Department's June 4, 2001, letter contained six actions. The commitments made by the Department's were formally established as direction to the Program Offices for implementation. These commitments were assigned to the line organizations in a Secretarial memorandum on June 4, 2001. The implementation status of these actions is provided below.

(1) Conduct 100 percent QA testing at the DOE Filter Test Facility (FTF) of new HEPA filters that are used in confinement ventilation systems for Category 1 and 2 nuclear facilities that perform a safety function in accident situation, or are designated as important to safety (i.e., per DOE STD-3009).

NNSA Specific Requested Information: For NNSA operations during FY 2001 and FY 2002, how many new HEPA filters does each Site have in the category and what percent of these were QA tested at FTF?

Sandia National Laboratory (SNL): The one operating Category II nuclear facility at SNL, Annual Core Research Reactor (ACRR) relies on HEPA filters for defense-in-depth only. Therefore, these HEPA filters at ACRR are not considered safety class or safety significant. However, five HEPA filters were installed in FY 2001 and FY 2002 and all five were tested at FTF. The other Category II facility at SNL, the Sandia Pulsed Reactor (SPR), is currently not operational and no new HEPA filters were installed in the SPR during FY 2001 and FY 2002.

Nevada Test Site (NTS): The Device Assembly Facility (DAF) does not yet have an approved Documented Safety Analysis meeting 10 CFR 830 requirements. However, DAF is considered a Category II nuclear facility. Although the DAF has 114 HEPA filters installed in its facility, none have yet to be determined as safety class or safety significant. During FY 2001 and FY 2002, 23 HEPA replacement filters were procured and certified at the FTF. The remaining original HEPA filters at DAF were tested at the FTF prior to installation.

Pantex: There are no safety class or safety significant confinement ventilation systems in the Pantex Category II nuclear facilities.

Lawrence Livermore National Laboratory (LLNL): LLNL has two Category II nuclear facilities: the Plutonium Facility (B-332) and the B-251 Heavy Element Facility. For the B-251, facility the glove-box exhaust, hood exhaust and room exhaust, including individual room systems, as well as some grouped systems, are credited by the DSA as safety significant for a fire scenario. The facility Heating, Ventilation and Air Conditioning (HVAC) itself is not considered a safety system. For Building B-332, the DSA credits the GB Exhaust as Safety Class as well as Final HEPA filtration. During FY 2001 and FY 2002, two new HEPA filters were installed and all HEPA filters are to be tested at the FTF per LLNL procedures.

Y-12: Currently, there is only one HEPA ventilation exhaust system that has been designated in the Bases for Interim Operations (BIO) as safety significant. This is the Building 9215 Stack 3 system. In the new SAR, which is in the review process, this system is not being designated as a safety significant system. In addition, there are four HEPA systems that have been designated in the current BIO as important to safety. These are the Building 9212 system stack filter-houses 38 (AFH-1-HEPA), 48 (AFH-1-HEPA and AFH-2-HEPA), 110 (AFH-101), and stack 27 (SOP-AG-9-HEPA). The intent of the Y-12 HEPA filter test program, as documented in Engineering specifications and site SRIDs, is to perform 100% testing of HEPA filters at the FTF in accordance with DOE-STD-3020-97 requirements.

Los Alamos National Laboratory (LANL): 345 HEPA filter were processed and delivered to LANL from the FTF during FY 2001 and FY 2002. All HEPA filters used in LANL nuclear facilities are purchased in accordance with DOE-STD-3020-97 ("Specifications for HEPA Filters Used by DOE Contractors"). This standard requires, among other things, that filters will be delivered to the FTF for acceptance testing prior to installation and use.

Savannah River Site (Tritium Facilities): None. The Tritium Facilities do not have HEPA filter systems that perform a safety function in accident conditions designated as important to safety (i.e., safety class or safety significant equipment per DOE-STD-3009-94.)

Kansas City Plant (KCP): None. The Tritium Facilities do not have HEPA filters systems that performed a safety function in accident conditions are designed as important to safety (i.e., safety class or safety significant equipment per DOE-STD-3009-94).

(2) Conduct 100 percent QA testing at the FTF of HEPA filters necessary for habitability systems, e.g., filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation.

NNSA Specific Requested Information: For FY 2001 and FY 2002, how many new HEPA filters have been installed in systems necessary for habitability systems (e.g., filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation) related to Category I and II nuclear facilities? What implementing procedures establish a commitment to QA testing of HEPA filters for habitability ventilation systems at your site?

Sandia National Laboratory (SNL): Tech Area-V, including ACRR, has no locations with habitability requirements in emergency situations; all workers can evacuate. TV-A Evacuation Building is the initial assembly point for workers during emergency situation, and has a ventilation system using HEPA filters. No new HEPA filters were installed in the TA-V Evacuation Building during FY 2001 and FY 2002.

Nevada Test Site (NTS): The DAF does not have HEPA filters that must perform a habitability function in emergency situations.

Pantex: Pantex does not have HEPA filters relied upon to perform a habitability function (i.e., filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation).

Lawrence Livermore National Laboratory (LLNL): All HEPA filters for nuclear systems at LLNL are tested at the FTF. This is done per LLNL procedures.

Y-12: It has been determined at Y-12, as documented in Engineering specifications and the SRIDs, that 100% testing of HEPA filters should be conducted at the FTF in accordance with DOE-STD-3020-97 requirements.

Los Alamos National Laboratory (LANL): All HEPA filters used in nuclear facilities are purchased in accordance with DOE-STD-3020-97 ("Specifications for HEPA Filters Used by DOE Contractors"). This standard requires, among other things, that filters be delivered to the FTF for acceptance testing prior to installation and use. For non-nuclear applications, LANL follows the minimum requirements of the Institute of Environmental Sciences and Technology ("IEST-RP-CC001.3 and ULPA Filters").

Savannah River Site (Tritium Facilities): The Tritium Facilities have no HEPA filters systems that perform a habitability function (i.e., filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation).

Kansas City Plant (KCP): The Kansas City Plant has no HEPA filters systems that perform a habitability function (i.e., filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation).

(3) For all other applications where HEPA filters are used in confinement ventilation systems for radioactive airborne particulates, develop and document an independent, tailored filter QA testing program that achieves a high degree of fitness for service. The program should include the testing of a sample of filters at the FTF. The size of the sample to be tested should be large enough to provide sufficient statistical power and significance to assure the required level of performance.

NNSA Specific Requested Information: What percent had QA testing in FY 2001 and FY 2002? What actions were undertaken to prepare tailored HEPA Filter Testing Programs, what was the conclusion of testing, and what implementing documents executes the tailored approach?

Sandia National Laboratory (SNL): New filters were installed in the Auxiliary Hot Cell Facility (Cat III) during FY 2001 and FY 2002 as well as the Radioactive and Mixed Waste Management Facility. All of these filters were tested at the FTF. Therefore, a tailoring program has not been established.

Nevada Test Site (NTS): Twenty-three HEPA filters were procured during the time frame FY 2001 and FY 2002 and certified at FTF. Currently, 100% of the HEPA filters at the DAF have been procured during the time frame FY 2001 and FY 2002 and certified at the FTF. Consideration of a tailored HEPA Filter Testing Programs, if appropriate, will be part of the Technical Safety Requirements review process, under 10 CFR 830.

Pantex: The Pantex Plant has no confinement ventilation systems that use HEPA filters to control radioactive airborne nuclides. (HEPA filters are used to filter incoming air as a quality assurance measure, not a safety measure). The current monitoring and replacement practices are meeting the quality assurance requirements.

Lawrence Livermore National Laboratory (LLNL): All HEPA filters for nuclear systems at LLNL are tested at the FTF. This is done per LLNL procedures. Therefore, a tailoring program has not been established.

Y-12: It has been determined at Y-12, as documented in Engineering specifications and the SRIDs, that 100% testing of HEPA filters should be conducted at the FTF in accordance with DOE-STD-3020-97 requirements.

Los Alamos National Laboratory (LANL): All HEPA filters used in LANL nuclear facilities are purchased in accordance with DOE-STD-3020-97 ("Specifications for HEPA Filters Used by DOE Contractors"). This standard requires, among other things, that all filters used in nuclear facilities be delivered to the FTF for acceptance testing prior to installation and use. For non-nuclear applications, LANL follows the minimum requirements of the Institute of Environmental Sciences and Technology ("IEST-RP-CC001.3 and ULPA Filters"). The Laboratory therefore has not established a policy or procedure for tailored quality sampling.

Savannah River Site (Tritium Facilities): Approximately 200 (40%) HEPA filters are randomly selected from site stores and are sent to the FTF each year from the site's Tritium Facilities. The size of the sample (40%) is considered sufficient to assure the required level of performance of the Tritium Facility HEPA filters since these filters are classified as production support and not safety class or required for habitability for emergency situations. The results of the 40% samples are available for review upon request.

Kansas City Plant (KCP): KCP has no other applications where HEPA filters are used in confinement ventilation systems for radioactive airborne particulates. Therefore, KCP has not developed an independent, tailored filter QA testing program.

(4) Periodically analyze and publish FTF data to provide filter reliability and performance information for the complex. The analysis would include the vendor, product description, and type of deficiency.

The FTF generates, on a semiannual basis, reports on testing results, including the customer, filter vendor, and the type of deficiency. To date, these reports were provided directly to the Quality Assurance Working Group (QAWG). Briefs on HEPA filter testing were presented to the QAWG in conference calls. However, while the sites did not receive these reports on a regular basis, the FTF data are available on demand and used when needed. In the future, it is our understanding that the EH Quality Assurance organization will publish the FTF data on a semiannual basis and provide the information to applicable sites.

(5) Funding for the FTF shall be maintained by DOE Headquarters so as not to discourage FTF usage. Funding will be provided by the Office of

Environmental Management (EM) until such time as the FTF is required to move, at which time the funding arrangement will be reviewed.

In a recent memorandum to the Board on the subject of HEPA Filters programs, the Office of Environmental Management stated that the FTF budget is managed from EM Headquarters directly and that EM will continue to fund the FTF at the needed level until such time as the facility is scheduled for deactivation and decommissioning, expected in April 2005.

(6) Establish a formal self-assessment program to evaluate the above protocols and procedures and determine their continued benefit and cost-effectiveness, and to identify opportunities for improvement and lessons learned. Task the DOE Quality Assurance Working Group to develop and execute an appropriate implementation strategy, including supporting program objectives, evaluative criteria, assessment procedures, and periodic status and assessment reports.

NNSA Specific Requested Information: Have NNSA organizations perform assessments either of the Filter Test Facility, site HEPA programs or participated in another Site's HEPA program?

Sandia National Laboratory (SNL): A Vital Safety System assessment was performed in FY 2002 at the ACRR that covered the High Bay Ventilation & Exhaust System, the Cavity Purge Ventilation System and the Shielded Cell Ventilation System. Ninety percent of the action items have been completed to date. As result of this assessment, new specifications have been established for HEPA filters in-service life as well as new performance requirements on filter maintenance and testing.

Nevada Test Site (NTS): To date, there has not been a self-assessment done on the NV HEPA filter program nor has there been assessment conducted by NVO or its contractors of the FTF or another site's HEPA program.

Pantex: This requirement does not apply to the Pantex Plant because the protocols and procedures described in the first three items do not apply to Pantex. The Plant does not have any confinement ventilation that use HEPA filters to control radioactive airborne nuclides, nor does it have any HEPA filters that protect workers who must not evacuate in emergency situations because of the necessity to shutdown or control the situation.

Lawrence Livermore National Laboratory (LLNL): The Livermore Site Office recently conducted an oversight audit of the LLNL in-place HEPA filter testing procedures. Findings are being tracked. No other assessments have been done of the FTF or another site's HEPA program.

Y-12: In FY 2002, an assessment was performed for Stack 3 that included, among other things, the HEPA filters and their testing. Y-12 has not conducted its own assessment of the FTF at Oak Ridge. However, Y-12 was provided a summary of the FTF assessment performed by the Oak Ridge Operations Office, as well as other internal and external FTF assessments results.

Los Alamos National Laboratory (LANL): LANL's Institutional Quality Management Group has reviewed findings of other DOE assessment groups of the FTF operation. It has not performed its own FTF assessment. LANL Policy requires that responsible line managers are to insure that in-place HEPA filter performance tests are conducted annually or at intervals specified by facility safety documents on all facility and portable HEPA filtered exhaust systems used to control emissions to the environment and that protect personnel. No other self-assessments of the LANL HEPA filter program were conducted

Savannah River Site (Tritium Facilities): DOE-SR relied upon a Richland Operations Office assessment of the FTF in March 2002. Richland and Savannah River completed assessments of each other's program in October 2002 that included the Tritium Facilities.

Kansas City Plant (KCP): None. KCP has no applications where HEPA filters are used in confinement ventilation systems for radioactive airborne particulates. Therefore, KCP has not established a formal self-assessment program for HEPA filters.

NNSA strongly believes that the configuration and reliability of vital safety systems is essential to the performance of our facilities and for protection of the public, workers, and environment. Line management is responsible to assure that robust HEPA filter management programs are implemented and that self-assessments are conducted.

The Assistant Secretary for Environment, Safety and Health (EH) is establishing a corporate QA function for DOE, to identify and resolve crosscutting quality assurance issues within the Department. EH will identify and resolve crosscutting safety issues, including the evaluation of HEPA filter testing data.