



Department of Energy

Washington, DC 20585

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LNUF SAFETY BOARD

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

In a letter dated October 1, 2010, the Office of Environmental Management (EM) committed to provide you with an update on our progress in achieving closure of ventilation system gaps for our top six priority facilities as identified in our *Active Confinement System Upgrade Team Office of Environmental Management Proposed Upgrades to Confinement Ventilation Systems Review Report and Recommendations* dated June 25, 2010.

A review was performed to evaluate modifications recommended for EM facilities and provide the Department of Energy decision makers a way to focus on and prioritize those modifications to active confinement ventilation systems that are most likely to significantly improve safety performance across the EM facilities that were evaluated under the Defense Nuclear Facilities Safety Board Recommendation 2004-2, *Active Confinement Systems*.

Of the six top priority facilities identified, five are at the Savannah River Site (SRS) and one is at the Hanford site and includes the following:

- Priority 1; SRS/Savannah River National Laboratory (SRNL) Gap 21; Section B/F and Section C Off-Gas Standby Fan Autostart;
 - Priority 2; SRS/F and H Labs;
 - Priority 3; SRS/SRNL Gaps 1 through 5; Sections B and C Central Hood Exhaust HEPA Bank Blanks;
 - Priorities 3 and 4; SRS/SRNL Gaps 26, 28 through 31 and 32; E-Wing Supply and Exhaust Interlocks;
 - Priority 4; SRS/SRNL Gaps 8 through 12; Sections B and C Tertiary Exhaust Interlocks;
 - Priority 5; Richland/Waste Encapsulation and Storage Facility; and
 - Priority 6; SRS/SRNL Gaps 35 through 40 and 42; E-Wing Ventilation Project



An update is provided for each of these facilities in the enclosure to this letter. As noted, the SRS F and H Labs modifications have been cancelled.

If you have any further questions, please contact me, at (202) 586-5151 or Mr. Todd Lapointe, Director, Office of Safety Management, at (202) 586-4653.

Sincerely,



A handwritten signature in black ink, appearing to read "MM". To the right of the signature, the word "for" is written in a smaller, cursive font.

Matthew Moury
Deputy Assistant Secretary for
Safety, Security, and Quality Programs
Environmental Management

Enclosure

cc: David Moody, SR
Matthew McCormick, RL
David Huizenga, EM-1
Richard Lagdon, EM-1
Tracy Mustin, EM-2
Alice Williams, EM-2.1
Kenneth Picha, Jr., EM-20
Frank Marcinowski, EM-30
Todd Lapointe, EM-41

Enclosure

**Savannah River Site (SRS)/Savannah River National Laboratory (SRNL) Gap 21;
Section B/F and Section C Off-Gas Standby Fan Autostart**

This project is to provide an auto standby fan start capability for the 773-A Section B/F and Section C Off-Gas Exhaust (OGE) systems. The OGE systems perform a Safety Significant function to exhaust gloveboxes and cells (reference SRNL TSR LCO 3.2.5). The current system design activates an alarm in the control room if the OGE system static pressure drops below the required set-point. The system requires the control room operator to manually shut down the online fan and manually start the standby fan. Closure of this gap will remove the active steps required by the control room operator and move then to verification steps that the automatic functions have operated properly while retaining the ability to manually control the system.

Project Baseline

- Schedule- Project Complete September 30, 2012

Fiscal Year (FY) 2011 Accomplishments

- Baseline Change Proposal (BCP) CR11M0149 approved to establish project baseline
- Performed constructability review of conceptual design
- Performed Safety Basis review of implementation strategy
- Issued final design for review

FY 2012 Accomplishments

- Implemented SRNL TSR Revision 11, which includes Bases wording change necessary to implement the project
- Approved final design
- New Section C OGE system controls operational August 10, 2012
- New Section B OGE system controls operational August 31, 2012
- Completed B Punch List items

FY 2013 Plans

- Close-out of Modification Traveler Change

SRS/F and H Labs

SRS has made a change concerning modifications to the confinement ventilation system for the F/H Laboratory. Initially, installation of building confinement zone separation and pressure instrumentation to monitor differential pressure between building interior and outside environments were to be installed. Savannah River Nuclear Solutions (SRNS) prepared a preconceptual design and concluded that the modifications would provide no discernible protection against the release of radiological and hazardous materials during normal and emergency operations. This conclusion prompted SRNS to

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perform an alternative analysis and a new strategy was identified that would employ physical modifications to the existing ventilation system in lieu of the building confinement zone separation. This new strategy would include seismically qualifying the existing main exhaust fans and the installation of a seismically qualified diesel generator, Programmable Logic Controller, and duct misting system.

After careful consideration, the Department of Energy (DOE) has concluded that neither the previously identified building confinement zone separation modifications nor the alternatives are viable options at this time. This decision was based on the minimal benefit of performing the confinement zone separation modifications, without added substantial cost and complexity. If new hazards associated with additional missions will be introduced to the facility, appropriate modifications commensurate with the hazard/risk of the operation will be analyzed and modifications implemented as necessary. The basis for this decision is summarized below.

Building 772-F is a Hazard Category (HC)-2 non-reactor nuclear facility. It is a laboratory facility that supports chemical separations processing activities in H-Area, Tank Farms, Effluent Treatment Facility, the reactor area programs, and the site waste characterization and remediation effort. Samples received from these customers are subjected to required radiological and chemical analysis in laboratory modules.

Building 772-F was designed in 1952 as a Class I, blast-resistant structure. It was evaluated for structural integrity and confinement under Performance Category (PC)-3 moderate hazard earthquakes and tornado loads (which envelopes wind) and was found to be adequate. The building is a two level structure with the lower level located below grade. The building houses approximately 35 laboratory modules for sample receipt, handling, analysis, and return of samples and it also houses approximately 175 containment units consisting of gloveboxes, radiohoods, and radiobenches, the high/low activity drain systems, and confinement ventilation systems in conjunction with filtration building 772-4F.

Approximately 25 lab modules are located in the contaminated areas (CA) north of the change rooms. The lab modules south of the change rooms are mostly water quality labs used to conduct chemical analyses. The total activity of alpha emitters permitted by the TSR in building 772-F is 310 Ci (which includes the high activity drain tank).

A Defense Nuclear Facilities Safety Board (Board) 2004-2 evaluation was completed and in June 2007 SRS issued the "Active Confinement Ventilation Evaluation Report" which identified eight discretionary gaps where improvements may be warranted. None of the gaps involved a discrepancy between the Safety Basis and facility designs. None of the gaps were perceived to result in a discernible reduction in material release reducing overall risk for any of the bounding accidents; however, a Facility Evaluation Team (FET) recommended closure of four of the eight gaps for system enhancements to improve worker protection, pending funding.

In July 2009, a DOE/Independent Review Panel (IRP) indicated that implementing Gap #1 will move the facility closer to meeting current codes and standards definition of zone boundaries and aid in adding a minor ability to minimize the spread of contamination between internal zones. Gap #1 would enhance confinement zone separation and provide instrumentation to monitor differential pressure (D/P) between the building interior and the outside environment, and between internal zones. A rough order of magnitude (ROM) cost estimate of \$832K to \$1.664M was identified in 2006 for this effort.

DOE identified the gap for the F/H Labs as offering the most benefit based on an investment cost of \$1.3M. Additional reviews of the F/H Lab gap ROM cost estimate revealed that the added costs associated with potential impacts to existing facility systems and disruptions to analytical and operational activities, due to implementation were not completely considered. Subsequently, a revised ROM cost estimate of \$5.1M was provided in May 2010 and a final estimate of \$3.8M in August 2010. SRNS prepared a pre-conceptual design of the modifications required to install doors for zone separation and instrumentation to monitor differential pressure and concluded the modifications would provide no discernible protection against the release of radiological and hazardous materials during normal and emergency operations. The design guidelines require a D/P between secondary and tertiary zones of -0.03" to -0.15" WC. The current D/P is approximately -0.008" WC and after barriers are installed, the D/P would be approximately -0.01" WC. To obtain the desired results, the complexity and cost of the project would increase. Permanent barriers above the false ceiling in a radiological contamination area would be required to be installed. DOE evaluated SRNS's position and subsequently agreed with their assessment that no discernible protection against the release of radiological material would be achieved. Based on this conclusion, DOE-SR directed SRNS to cease design activities for zone separation.

In conjunction with the pre-conceptual design review, SRNS performed an alternative analysis review. The purpose of this review was to improve the safety posture of the facility through physical plant modifications. SRNS developed 13 alternatives and of the 13, one was further analyzed and presented to DOE-SR as an option. This alternative, at a cost of approximately \$9M, would consist of the following:

- Seismically qualifying existing main exhaust fans, motors, couplings, transition pieces and interlocks;
- Installation of a seismically qualified diesel generator dedicated to support the active confinement ventilation system;
- Replace the Control Relay Panel with a seismically qualified Programmable Logic Controller; and
- Installation of a seismically qualified duct misting system and ember screens.

Although the above modifications would significantly improve system response during a seismic/fire event, the cost is not justified based on the typical amount of material at risk, the Documented Safety Analysis driven bounding risk, nor the

original 2004-2 evaluation criteria. DOE-SR will continue to monitor the current and future mission of the F/H Laboratory and if new hazards associated with additional missions will be introduced to the facility, appropriate modifications commensurate with the hazard/risk of the operation will be analyzed and modifications implemented as necessary.

SRS/SRNL Gaps 1 and 5; Sections B and C Central Hood Exhaust HEPA Bank Blanks

This project is to install ten sets of blanks between 1950's vintage HEPA Filter banks for the 773-A Sections 8 and C Central Hood Exhaust (laboratory fume hoods). These filter banks perform a Safety Significant function (SRNL TSR LCO 3.2.2). Installation of the blanks will decrease the number of filters that are in-place aerosol leak tested at one time from a maximum of six filters to a maximum of three filters such that the testing meets the intent of ASME Standard N510. This will provide a more reliable picture of HEPA filter performance.

Project Baseline

- Schedule- Project Complete revised from September 30, 2013 to March 31, 2015

FY 2011 Accomplishments

- Baseline Change Proposal (BCP) CR11M0149 approved to establish project baseline
- Developed model design and work package for installing blanks
- Developed TSR mode change process to integrate TSR LCO 3.2.2, Administrative Control 5.7.2.5 and Design Feature 6.7 requirements
- Installed one set of blanks

FY 2012 Accomplishments

- Installed two sets of blanks

FY 2013 and Outyear Plans

- Install two additional sets of blanks in FY 2013
- Install three additional sets of blanks in FY 2014
- Install final two sets of blanks in FY 2015

SRS/SRNL Gaps 26, 28 thru 31 and 32; E-Wing Supply and Exhaust Interlocks

This project is to provide supply and exhaust fan interlock capability for the E-Wing confinement ventilation system. Upon the loss of a primary confinement system, the associated tertiary and secondary confinement zone supply fan (Gap 26) and the associated tertiary confinement zone exhaust fan (Gaps 28-32) will shut down and an isolation damper will close. Installation of the interlocks will reduce the spread of contamination within the secondary and tertiary confinement zones and prevent a release to the environment from the tertiary confinement zone exhaust fans.

Project Baseline

- Schedule- Project Complete revised from December 31, 2013 to March 31, 2014

FY 2011 Accomplishments

- Baseline Change Proposal (BCP) CR11M0149 approved to establish project baseline
- Performed Safety Basis review of implementation strategy
- Issued final design for review

FY 2012 Accomplishments

- Approved final design
- Ordered long lead materials and bulk materials
- Initiated work package to install raceways

FY 2013 Plans

- No work due to lack of funding

FY 2014 Plans

- Complete installation of raceways and field wiring
- Install new isolation dampers and fan controls cabinets
- Connect all components to Control Room and test system
- Complete project close-out

SRS/SRNL Gaps 8 thru 12; Sections B and C Tertiary Exhaust Interlocks

This project is to provide exhaust fan interlock capability between the primary confinement exhaust (B and C Central Hood Exhaust systems) and the tertiary confinement zone exhaust fans (change rooms). Upon the loss of a primary confinement exhaust system, the associated tertiary confinement zone exhaust fan will shut down and the associated isolation damper will close. Installation of the interlocks will prevent a release to the environment from the tertiary confinement zone exhaust fans if contamination enters the change rooms while the workers relocate from the secondary confinement zone.

DOE-SR re-evaluated the impacts from closure of this set of gaps (8 through 12) and concluded they do not provide the best long-term improvement to the SRNL building 773-A Confinement Ventilation systems as compared to other discretionary gaps.

SRNL is proceeding with addressing gaps 3 and 4 which were the highest priority gaps recommended by the facility for closure. Addressing these gaps provides better risk reduction than closing gaps 8 thru 12. The proposed two new sub-projects and associated scopes are as follows:

- B & C Supply and Exhaust Interlocks Preliminary Design (Gap 3)
Prepare a conceptual design (Class 3 as defined in AACE.05.3) baseline estimate and baseline schedule to install interlocks between the 29 supply fans and the four associated primary confinement exhaust systems in 773-A Sections B and C. The design will evaluate the incremental cost of closing Gaps #9 (Tertiary confinement exhaust interlock and status to Control Room for two fans) and #13 (B&C Supply Fan Status to Control Room for 29 fans) at the same time as closing Gap #3. This conceptual design would start in FY 2014 and complete by September 30, 2014.
- Replace B&C CHEX Tape-In-Place HEPA Filter Housings Pilot (Gap 4)
Replace up to 10 of the 146 Tape-in-Place HEPA Filter housings in the 773-A Sections B and C Central Hood Exhaust systems as a pilot to determine an average cost per filter housing replacement. This work would start in FY 2014 and complete by September 30, 2015.

These two new sub-projects would be used as the basis for FY 2015 and beyond funding requests as the facility continues to close gaps in the SRNL Board Recommendation 2004-2 Final Report. This alternative scope was reviewed with the Board staff.

Project Baseline

- Schedule- Start October 1, 2014, Project Complete June 30, 2015

FY 2011 Accomplishments

- Baseline Change Proposal (BCP) CR11M0149 approved to establish project baseline

FY 2012 Accomplishments

- Received approval from DOE-SR for alternate scope to address Gaps 3 and 4 (SROO-OLo to EM-20 Letter of 3/20/12)

RL/WESF

The purpose of this update is to inform you of schedule changes for completion of the upgrades to the Waste Encapsulation and Storage Facility (WESF) ventilation system. A Board 2004-2 evaluation of WESF ventilation systems was performed and concluded that these systems are adequate in meeting their role as defense-in-depth (DID) systems. At the DOE and Environmental Management (EM) Technical Authority Board (TAB) request, the WESF ventilation system was re-evaluated as a safety significant system, and this time a gap was identified in the WESF K-1 ventilation system (serves the WESF pool area).

The TAB reviewed the EM complex ventilation gaps and recommended the K-1 ventilation system be upgraded. As a result, EM requested that RL upgrade the K-1 ventilation system using American Recovery and Reinvestment Act (ARRA) funds and

resulted in a schedule with a completion date of November 2012. Subsequently, EM determined that ARRA funding could not be utilized and that "Base" funding be used.

In addition to the K-1 system, the K-3 ventilation system (serves the WESF canyon and hot cells) will be upgraded at the same time to support future cesium and strontium capsule disposition (dry storage) and facility Deactivation and Decommissioning. Current funding determination has not yet been made for all FY 2013 work scope, but it appears likely that the previous schedule shown below will slip. RL is working to develop a new schedule.

- The conceptual design has been completed (April 2011). The final design was planned for completion during FY 2013 and construction was planned for completion during FY 2014.
- None of the WESF analyzed accidents results in an unmitigated dose consequence to a member of the public greater than 10 percent of the 25 rem evaluation guideline. Several analyzed accidents results in unmitigated dose consequences to the collocated worker greater than 10 percent of the 100 rem evaluation guideline. The WESF K-1 ventilation system is not relied upon to perform a confinement function for any safety basis accident scenarios.
- The K-1 ventilation system provides a preventative DID control to reduce hydrogen concentration during accident conditions. Without K-1 ventilation, it takes nine days to accumulate hydrogen to the lower flammability limit (LFL) (4 percent hydrogen).
- Opening a pool area door within 24 hours precludes reaching the LFL. This action is part of a Technical Safety Requirement control. Although installation of the modification sooner might make the existing ventilation system more reliable in the near term, the slowly developing nature of the accidents, combined with simple corrective actions, do not provide significant benefit from such changes compared to the benefit provided by other high priority cleanup activities.
- The new schedule to upgrade the WESF K-1 ventilation system supports progress in other critical site cleanup activities and allows efficiency benefits be realized from combining the K-1 and K-3 ventilation system upgrades.

SRS/SRNL Gaps 35 thru 40 and 42; E-Wing Ventilation Project

This project is replacing obsolete, 1950's and 1960's vintage secondary confinement zone exhaust process ventilation systems in 773-A, Section "E" Wing. It is a reauthorization of an older project (Y189) which specified and ordered the engineered material. The existing systems will be replaced with a single exhaust system that meets current national consensus standards (a Board 2004-2 Evaluation Guidance). The project addresses closure of seven gaps (six identified in EM letter plus Gap 36) pertaining to HEPA filter systems, fan redundancy and fan standby power.

Project Baseline

- Schedule- Project Complete revised from March 31, 2013 to December 31, 2013

FY 2011 Accomplishments

- Baseline Change Proposal (BCP) CR11M0149 approved to establish project baseline
- Engineered material maintained in storage
- Added Gap 38 to scope of the project
- Performed constructability and maintainability review of preliminary design
- Performed Safety Basis review of implementation strategy
- Approved final D&R design
- Issued balance of final design for review

FY 2012 Accomplishments

- Issued final design
- Set Engineered equipment in field
- Completed site preparation work
- Completed outside D&R
- Installed electrical power to engineered equipment
- Initiated installation of outside ductwork

FY 2013 Plans

- Complete inside and balance of outside work to support start-up testing in April
- Complete balance of D&R work post system start-up testing

FY 2014 Plans

- Complete project close-out