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DNFSB 2004-2 VENTILATION SYSTEM EVALUATION FINAL REPORT FOR THE L MATERIAL STORAGE FACILITY DISASSEMBLY BASIN SECTION

Ref: WSRC-SA-2004-00002, Rev. 2 - *L Material Storage Area Documented Safety Analysis Report, 7/07*

This letter transmits the Final Report of the Defense Nuclear Facility Safety Board (DNFSB) Recommendation 2004-2, Active Confinement Systems for the L Area Material Storage Facility to the Department of Energy (DOE). Per "Recommendation 2004-2: Facility Ventilation System Evaluations Priority Listing", only the Disassembly Fuel Storage (Disassembly Basin) section of the L Reactor facility is required to be included in the L Area Material Storage Facility evaluation. No other sections of the facility such as heavy water storage, low level waste or deionizers are included.

The L Area Material Storage Facility (MSF) has been identified as a Hazard Category 2 facility. The Disassembly Basin (DB) section of the facility has both underwater and dry storage of spent nuclear fuel. There is no confinement ventilation system (CVS) for the underwater fuel storage or for the dry fuel storage in the DB. The primary ventilation fan for the DB is out of service and inoperable. This fan and any associated equipment are not credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility Documented Safety Analysis (DSA). Other credited Safety Class (SC) and Safety Significant (SS) controls either prevent or reduce the mitigated onsite and offsite dose to negligible (<5.0 rem for onsite and <0.5 rem for offsite) for all accidents except for criticality accidents. Criticality accident doses are reduced to low (<25.0 rem) for the onsite worker and negligible (<0.5 rem) for the public.

The Department of Energy (DOE) guidance document requires a functional review of the facility CVS using a system evaluation approach. Functional design and performance attributes are defined to provide a structured approach to the evaluation and to address a generic set of attributes potentially applicable to a CVS. The DOE guidance document requires a review of the Hazard Category 2 facilities Documented Safety Analysis (Ref. 1) and the generic performance criteria provided in the DOE guidance document to identify gaps in the ventilation system and/or safety basis documents.

With guidance from the Site Evaluation Team and the DOE-HQ Independent Review Panel, a Table 5.1 gap analysis is not warranted and was not completed for the L Area Material Storage Facility Disassembly Basin section since there is currently no CVS installed. The Facility Evaluation Team

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(FET) recommends no facility modifications at this time. This recommendation is based on the following:

- With current credited controls in place, radiological doses to the worker and to the public are significantly below minimum Evaluation Guides (EGs) required to establish additional safety significant or safety class controls per WSRC E7 Manual, Procedure 2.25, Functional Classification.
- The significant cost of providing a confinement structure and CVS for the DB.
- Additional controls could be developed to reduce the consequences to the facility (onsite) worker in a criticality accident.

There were no inadequacies in the Material Storage Facility Documented Safety Analysis discovered during this evaluation.

A rough order of magnitude estimate for a generic General Service (GS) classification CVS has been completed. This CVS would provide no significant dose reduction to the already negligible consequences to the public in a criticality accident, but would possibly lower the low consequences to the facility worker in the same accident. The cost range of the generic GS CVS for the Disassembly Basin using an estimate prepared by Site Estimating is $20,000,000 (-30%/+50%).

Facility Evaluation Team Concurrence:

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Sincerely,

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Savannah River Site
L Material Storage Facility Disassembly Basin
DNFSB Recommendation 2004-2
Ventilation System Evaluation

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Definitions

Confinement	A building space, room, cell, glovebox, or other enclosed volume in which air supply and exhaust are controlled, and typically filtered.
Confinement System	The barrier and its associated systems (including ventilation) between areas containing hazardous materials and the environment or other areas in the facility that are normally expected to have levels of hazardous material lower than allowable concentration limits.
Hazard Category	Hazard Category is based on hazard effects of unmitigated release consequences to offsite, onsite and local workers.
Ventilation System	The ventilation system includes the structures, systems, and components required to supply air to, circulate air within, and remove air from a building/facility space by natural or mechanical means.

Acronyms

AHU	Air Handler Unites
CVS	Confinement Ventilation System
DB	Disassembly Basin
DFSA	Dry Fuel Storage Area
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DSA	Documented Safety Analysis
EG	Evaluation Guideline
FET	Facility Evaluation Team
GS	General Services
IRP	Independent Review Panel
ITC	Instrumented Test Canisters
MAR	Material at Risk
MSF	Material Storage Facility
SC	Safety Class
SET	Site Evaluation Team
SNF	Spent Nuclear Fuel
SS	Safety Significant

Executive Summary

On December 7, 2004, the Defense Nuclear Facilities Safety Board (DNFSB) issued Recommendation 2004-2, Active Confinement Systems. Recommendation 2004-2 noted concerns with the safety system (Safety Class/Safety Significant) designation strategy utilized in several facilities to confine radioactive materials during or following accidents. The DNFSB main issue is that for the purpose of confining radioactive materials through a facility level ventilation system, safety system designation should be based on the active safety function (forced air though a filter system) rather than reliance on a passive confinement system.

The DOE agreed to review all Hazard Category 2 and 3 defense nuclear facilities and developed a methodology to perform a system evaluation for the identified facilities. This confinement ventilation evaluation is for the Disassembly Basin section of the L Material Storage Facility at the Savannah River Site (SRS). The evaluation was performed in accordance with the requirements of Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems, Revision 0, January 2006.

The DOE guidance document requires a functional review of the facility Confinement Ventilation System (CVS) using a system evaluation approach. Functional design and performance attributes are defined to provide a structured approach to the evaluation and to address a generic set of attributes potentially applicable to a CVS. The DOE guidance document requires a review of the Hazard Category 2 facilities DSA and the generic performance criteria provided in the DOE guidance document to identify gaps in the ventilation system and/or safety basis documents.

The L Area Material Storage Facility (MSF) has been identified as a Hazard Category 2 facility. The DB section has been modified and now primarily serves as a storage location for spent nuclear fuel, with dry and underwater storage of fuel. There is no CVS for the underwater fuel storage or for the dry fuel storage in the DB. There is no CVS credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility Documented Safety Analysis (DSA). Other credited Safety Class (SC) and Safety Significant (SS) controls either prevent or reduce the mitigated onsite and offsite does to negligible for all accidents except for criticality accidents. Those doses are reduced to low for the onsite worker and negligible for the public by the credited controls.

With guidance from the Site Evaluation Team (SET) and the DOE-HQ Independent Review Panel (IRP), a Table 5.1 gap analysis is not warranted and was not completed for the L Area Material Storage Facility Disassembly Basin section since there is currently no CVS installed and maximum gaps exist for all performance criteria. The FET recommends no facility modifications at this time. This recommendation is based on the following:

- With current credited controls in place, radiological doses to the worker and to the public are significantly below minimum EGs required to establish additional safety significant or safety class controls per WSRC E7 Manual, Procedure 2.25, Functional Classification.
- Significant cost of providing a confinement structure and CVS for the DB.

- Additional controls could be developed to further reduce the low consequences to the facility worker in a criticality accident.

There were no inadequacies in the Material Storage Facility Documented Safety Analysis discovered during this evaluation.

A rough order of magnitude estimate for a generic General Service (GS) classification CVS has been completed. This CVS would provide no dose reduction to the already negligible consequences to the public in a criticality accident, but would possibly lower the low consequences to the facility worker in the same accident. The cost range of the generic GS CVS for the Disassembly Basin using an estimate prepared by Site Estimating is $20,000,000 (-30%/+50%).

1. Introduction

1.1 Facility Overview

The L Area Material Storage Facility was originally known as L Reactor Facility. The facility began operation as a production reactor in the early 1950s, and operated until it was shut down in 1968, when its production capacity was not needed. The L Reactor was restarted in 1985 and again shutdown in 1988. In 1990, the decision was made to use the L Reactor Facility as a backup source of tritium production. In 1993, DOE directed WSRC to place the L Reactor in a shut-down condition with no capability for restart. In the mid 1990s, the L Facility MSF was directed to begin the receipt and storage of Foreign Research Reactor Fuel and Domestic Research Reactor Fuel in the DB section of the facility. By laying up equipment not associated with the ongoing storage and handling operations, potential hazards associated with the Material Storage Facility were reduced.

The DB section has been modified and now primarily serves as a storage location for spent nuclear fuel. The Savannah River Site plans to continue receiving spent nuclear fuel from research reactors and other miscellaneous nuclear material and storing it in the DB section until alternative interim storage facilities are available or final disposition of the material can be accomplished.

Typical activities performed at the L Area DB section include:

- Receipt, store, assay, handle and/or ship non fissile SRS reactor components, research reactor fuel, radiological material, and irradiated and unirradiated scrap underwater in the disassembly basin
- Handle Special Nuclear Material in the DB area and store dry in the Dry Fuel Storage Area (DFSA) and in the Dry Cave
- Receive and ship spent fuel casks
- Perform varied cask handling tasks
- Stage and handle waste generated by the facility

The majority of the fuel stored in the DB section is stored underwater. A small quantity of fuel is stored dry in the DFSA and in the Dry Cave. The DFSA is a totally enclosed, isolated area within the DB for the dry storage of fuel. The DFSA was designed as a critically safe and environmentally sound location for the dry storage of special nuclear material. The DFSA provides an effective four hour fire rated barrier wall. The Dry Cave is a partially enclosed, isolated area within the Disassembly Basin. The Dry Cave contains two Instrumented Test Canisters (ITCs). Each canister contains one assembly and has the capability to provide temperature, pressure and gaseous concentration data.

1.2 Confinement Ventilation System/Strategy

The purpose of the ventilation system in the DB section is to provide personnel comfort. The DSA does not have a requirement to maintain the DB at a negative pressure with respect to the outside environment or to provide either controlled or filtered releases to the

environment. The EP 918 fan was used in years past to provide the air circulation in the MSF. The EP 918 is out of service. Active ventilation is not operable in the DB. Personnel cooling is provided by five air handler units (AHU) installed in the DB. These AHUs only cool and recycle DB air and provide no confinement function. The EP 918 fan is not credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility DSA. The confinement strategy for the facility is provided by the credited SC and SS controls in place in the DB.

1.3 Major Modifications

There are no major modifications planned for the MSF ventilation system. Recently, the EP 918 fan was taken out of service.

2. Functional Classification Assessment

2.1 Existing Classification

There are no credited active CVS in the DB.

2.2 Evaluation

The purpose of the ventilation system in the DB section is to provide personnel comfort. The DSA does not have a requirement to maintain the DB at a negative pressure with respect to the outside environment or to provide either controlled or filtered releases to the environment. Active ventilation is not operable in the DB. The EP 918 fan is not credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility DSA. All equipment associated with the DB ventilation system is classified as General Services (GS). Passive ventilation is provided by external access doors (which may be open or closed) in the Transfer Bay area of the DB and through exterior ventilation openings. Passive ventilation and the exterior ventilation openings are initial conditions assumed in the Hazards Analysis section of the DSA or in supporting calculations. These initial conditions are utilized to determine the intensity of a fire in the Disassembly Area. Passive ventilation is not credited as a preventor or a mitigator in the L-Area DSA. All equipment associated with passive ventilation is also classified as GS. There is also ventilation equipment located in the DB that is used for personnel heating and cooling. This equipment is also not credited in the DSA and is classified as GS.

The DB section of the facility has both underwater and dry storage and handling of spent nuclear fuel. Confinement is not credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility DSA. The Material at Risk (MAR) in the DB section includes Spent Nuclear Fuel (SNF) stored underwater in the DB, SNF staged in casks above water in the transfer bay, SNF stored above water in the Dry Cave and Dry Fuel Storage Area, as well as the basin water and basin sludge. Events were postulated in the DSA for fires, explosions, loss of confinement, direct shine, criticality, external hazards, and Natural Phenomena Hazards. Existing credited controls include the disassembly basin structure, pump suction break, basin water, disassembly area structure, dry fuel storage area

fire barrier, Area Radiation Monitors, emergency response procedures for basin water makeup, combustible controls, fuel casks, dry fuel storage container, limited building footprint, and fuel handling procedures. With the existing credited controls these postulated releases do not challenge offsite radiological evaluation guidelines or onsite criteria.

With the above controls in place radiological releases from the DB Section for all the postulated DSA events except one will either be prevented or mitigated with negligible consequences. Those prevented events include a fire or explosion releasing radionuclides from the underwater fuel, a fuel melt initiated by loss of water over the fuel, release of radionuclides in the basin sludge, a fire induced criticality or radiological release from SNF stored inside the dry fuel storage area, a process or fire induced in-air criticality, or a radiological release from a spent fuel cask initiated by a fire or explosion. Those mitigated events with negligible consequences include a release of the radionuclides from the basin water, the nuclear material stored in the dry cave, material in a cask, or a single dry fuel storage container staged outside of the DFSA. The one exception is an underwater criticality. If this event occurred the water above the criticality would substantially reduce the consequence. The 12 rad zone would be located under water. The water also scrubs the gases but some fission product gases are released. The Area Radiation Monitors are designed to alarm and provide an early warning to alert the facility workers to evacuate the area. Workers are trained to stop work immediately and to proceed directly away from the alarm location. As shown in the DSA the consequence to the offsite public would be negligible. Consequences onsite would be low to the co-located worker and facility worker. Additional controls could be developed to further reduce the consequences to the co-located and the facility worker.

The current consequence analysis for the Spent Fuel Project utilizes 50% meteorology onsite and 95% meteorology offsite. The current DOE interim guidance requires that facilities, such as those found in SFP, recalculate Safety Basis consequences that involve new or revised consequence calculations using the higher meteorology and then present a recommendation to DOE. SFP activities involving new or revised consequence calculations will include the interim guidance.

2.3 Summary

There is no confinement ventilation system for the underwater fuel storage or for the dry fuel storage in the DB. No CVS equipment is credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility DSA. Other credited SC and SS controls reduce the mitigated onsite and offsite does to negligible for all accidents except for criticality accidents. These doses are reduced to low for the onsite worker and negligible for the public.

Since no active or passive equipment associated with DB ventilation is credited in the DSA, the equipment is appropriately functionally classified as General Services.

3. System Evaluation

3.1 Identification of Gaps

The DOE guidance document requires a functional review of the facility CVS using a system evaluation approach. Functional design and performance attributes are defined to provide a structured approach to the evaluation and to address a generic set of attributes potentially applicable to a CVS. The DOE guidance document requires a review of the Hazard Category 2 facilities DSA and the generic performance criteria provided in the DOE guidance document to identify gaps in the ventilation system and/or safety authorization basis documents.

Guidance from the SET and the DOE-HQ IRP concluded that a Table 5.1 evaluation is not required for the DB. There is no credited active CVS installed for the DB due the other controls in place to reduce the consequences of the postulated facility accidents. If the Table 5.1 Performance Criteria Evaluation was performed, it would show the widest possible gaps in all of the evaluation areas.

3.2 Gap Evaluation

The credited controls for the operation of the DB as summarized above and as included in the DSA provide adequate protection for the facility worker, the co-located worker and the public. The addition of an active confinement system for the Disassembly basin section is not warranted to further reduce the consequences of any postulated accidents.

For events that have either been prevented and mitigated or have negligible consequences, the addition of a ventilation system to mitigate the release would have insignificant benefit. Current controls in place reduce the consequences of postulated events to below EGs. To further mitigate the already low consequences of an underwater criticality by the use of a CVS would be difficult. To build such a system would be impractical. Major modifications would be required to an area of the facility that was not originally designed for confinement. Fission product gasses released during a criticality would emanate from the water filled basin. A ventilation system that would have ductwork overhead would exhaust the gasses past the operators at the scene and would not substantially mitigate an exposure as the gases are removed. Any reduction of consequences would be minimal. Exhaust ductwork installed at water level would hamper normal operations and is not a viable alternative. For the facility worker gases escaping from the basin would have to be removed.

The current postulated dose to the co-located worker is low from a criticality accident. There are currently no programmatic controls (emergency preparedness, evacuation, etc.) in place to mitigate the dose to the co-located worker. Although the dose to the co-located worker could be reduced by the installation of a CVS, simpler more cost effective means could be utilized to reduce the dose.

3.3 Modifications and Upgrades

Since there is no existing CVS in the DB, major facility modifications would have to be completed to provide any confinement capabilities in the DB. The DB is fortified to provide security, but it is not designed as a sealable confinement structure. A rough order of magnitude estimate was developed to provide a General Services classified CVS for the DB. Existing controls reduce the consequences of all accidents below the EG at which a SC or SS CVS would be required for further dose reduction. The GS system included in the estimate provides an idea of the cost and level of effort required to provide any CVS for the DB. Further development of the confinement strategy for the DB and Safety Basis work may show that a SC or SS system would be required, but the generic GS system does provide a starting point for the cost and impact.

The estimate summary sheets provide details of a CVS which includes:

- Fan(s)
- Ductwork
- Electrical Supply
- Instrumentation
- Costs to Seal the DB for Confinement
- A Stack
- Site Preparations
- Testing
- Site Overheads, Labor Costs and Contingencies

The cost range of the CVS for the Disassembly Basin using an estimate prepared by Site Estimating is $20,000,000 (-30%/+50%). This estimate does not include safety basis work, fire analysis work, procedures, training or numerous other areas that would be affected. No schedule for design, construction and testing was developed, but is it reasonable to assume that the L-Area core business of cask receipts and fuel storage would experience many delays and the programs would be impacted as the CVS was installed.

The potential reduction in doses due to the installation of the CVS in the DB was not quantified for this report. The only accident where the CVS would possibly reduce doses is to the facility worker in the underwater criticality; all other accidents are prevented or mitigated below EGs with existing controls. Since the mitigated doses to the facility worker for this accident are low, no additional SC or SS controls are required. The CVS in the DB would be considered an additional GS system that would further reduce the already low doses from this accident. Additional controls could be developed to accomplish an equivalent dose reduction. The CVS is not needed in the DB.

4. Conclusion

There is no active confinement system for the underwater or for the dry fuel storage in the DB. Active ventilation is not credited as a mitigator or a preventor for any accidents identified in the L Area Material Storage Facility DSA. The credited controls for the

operation of the DB as summarized above and as included in the DSA provide adequate protection for the facility worker, the co-located worker and the public. The addition of an active confinement system for the Disassembly Basin section is not warranted to further reduce the consequences of any postulated accidents.

5. References

1. WSRC-SA-2004-00002, Rev. 2 - L Material Storage Area Documented Safety Analysis Safety Analysis Report, 7/07

2. WSRC Memorandum M&O-SFP-2007-00022, Revision 1, from D. B. Rose to C.A. Everatt, "Transmittal of Spent Fuel Project DNFSB Recommendation 2004-2 Active Confinement Systems Table 4.3 Evaluation"

Att. 1 - 2004-2 Table 4.3, Disassembly Basin Underwater Fuel Storage Ventilation System Data Collection Table

Ventilation System Evaluation Guidance									
L Reactor Material Storage Facility, Underwater Storage			Hazard Category 2				Performance Expectations			
Bounding	Type Confinement		Doses Bounding Unmitigated/Mitigated (Onsite Worker 1, Onsite Worker 2, Offsite Receptor)	Confinement Classification			Function	Functional Requirements	Performance Criteria	Compensatory Measures
	Active	Passive		SC	SS	DID				
Fire in the disassembly basin section that causes a criticality. DB-1b	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Fire in the disassembly basin transfer bay that causes a criticality. DB-1c	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Tractor, truck or train fire in transfer bay. DB-3	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, Low/Negligible, Negligible, Negligible	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Explosion in transfer bay during fuel loading or unloading. DB-9	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/Negligible, Negligible, Negligible	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA

Att. 1 - 2004-2 Table 4.3, Disassembly Basin Underwater Fuel Storage Ventilation System Data Collection Table

Basin draindown from filtration/deionizer system leakage. DB-15	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/High, High, Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Airborne SNF and liquid release from basin draindown. DB-24	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Criticality in disassembly basin due to fuel handling, etc. DB-32, DB-33, DB-34, DB-37, DB-38, DB-39, DB-42, DB-43, DB-44	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/Low, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Criticality in disassembly basin due to fuel handling, etc. DB-35, DB-36, DB-40, DB-41, DB-45, DB-46	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/ Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Criticality in disassembly basin due to fuel handling, etc. DB-44b	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/ Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA

Att. 1 - 2004-2 Table 4.3, Disassembly Basin Underwater Fuel Storage Ventilation System Data Collection Table

Radiological release due to external fire. DB-51	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/Negligible, Negligible, Negligible Mitigated consequences are similar to DB-1	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Release of radiological material from disassembly basin due to large aircraft crash. DB-54	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Release of radiological material from disassembly basin due to small aircraft crash. DB-55	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Seismic event damage permits loss of basin water. DB-63	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/ Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA

Notes:

1. NA (Not Applicable) in the dose column means that the doses for that accident, after the frequency or preventive/mitigative features were considered, were sufficiently low that no further evaluation was warranted.

2. All of the GE (General) accidents were omitted for this section because the dominate material at risk for the GE accidents is the heavy water stored in the facility. The heavy water is not included in the CVS evaluation.

3. The events in the Table 4.3 are given a high, moderate, low or negligible unmitigated consequence for the onsite worker 1, onsite worker 2 and the offsite receptor. Table 3.3-8 of the DSA quantifies the radiological consequence levels for the different hazard receptors as follows:

Att. 1 - 2004-2 Table 4.3, Disassembly Basin Underwater Fuel Storage Ventilation System Data Collection Table

Consequence Level	Offsite Receptor Consequences	Onsite Worker #1 Consequences (Inside the facility)	Onsite Worker #2 Consequences (Outside the facility)
High	Greater than or equal to 25.0 rem	Prompt worker fatality, acute injury that is life threatening or permanently disabling or consequences greater than or equal to 100 rem	Consequences greater than or equal to 100 rem or prompt worker fatality, acute injury that is life threatening or permanently disabling
Moderate	Consequence greater than or equal to 5.0 rem and less than 25.0 rem	Serious injury, no immediate loss of life, no permanent disabilities or consequences greater than or equal to 25 rem and less than 100 rem	Consequences greater than or equal to 25 rem and less than 100 rem or serious injury, no immediate loss of life, no permanent disabilities
Low	Consequence greater than or equal to 0.5 rem and less than 5.0 rem	Minor injuries, no hospitalization and consequences greater than or equal to 5 rem and less than 25 rem	Consequences greater than or equal to 5 rem and less than 25 rem or minor injuries, no hospitalization
Negligible	Consequence less than 0.5 rem	Consequences less than Low levels and less than 5.0 rem	Less than 5.0 rem and consequences less than Low levels

Att. 2 - 2004-2 Table 4.3, Disassembly Basin Dry Fuel Storage Ventilation System Data Collection Table

Ventilation System Evaluation Guidance										
L Reactor Material Storage Facility, Dry Storage			Hazard Category 2				Performance Expectations			
Bounding	Type Confinement		Doses Bounding Unmitigated/Mitigated (Onsite Worker 1, Onsite Worker 2, Offsite Receptor)	Confinement Classification			Function	Functional Requirements	Performance Criteria	Compensatory Measures
	Active	Passive		SC	SS	DID				
Unsafe geometry caused by fire results in criticality. DB-1d	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/ Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Unsafe geometry caused by fire results in criticality. DB-1e	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Explosion in instrumented test container (ITC). DB-13	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	Low, Negligible, Negligible/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Explosion near dry fuel. DB-13a	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	Low, Negligible, Negligible/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA

Att. 2 - 2004-2 Table 4.3, Disassembly Basin Dry Fuel Storage Ventilation System Data Collection Table

Radiological release due to loss of confinement (ITCs). DB-27	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	Low, Negligible, Negligible/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Radiological release due to loss of confinement (storage container). DB-27a	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	Low, Negligible, Negligible/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Criticality in dry fuel handling areas due to fuel handling, etc. DB-40, DB-46, DB-50, DB-50b, DB-50c and DB-50e	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, Moderate, Negligible/Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Radiological release due to external fire. DB-51	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/ Negligible, Negligible, Negligible Mitigated consequences are similar to DB-1	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Radiological release due to large aircraft crash. DB-54	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/ Prevented	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA
Radiological release due to small aircraft crash. DB-55	Ventilation is not credited in the DSA to provide confinement	Ventilation is not credited in the DSA to provide confinement	High, High, High/NA, NA, NA	NA	NA	NA	There are no ventilation functions credited in the DSA	There are no ventilation functional requirements credited in the DSA	There are no ventilation performance criteria credited in the DSA	There are no ventilation compensatory measures credited in the DSA

Att. 2 - 2004-2 Table 4.3, Disassembly Basin Dry Fuel Storage Ventilation System Data Collection Table

Notes:

1. NA (Not Applicable) in the dose column means that the doses for that accident, after the frequency or preventive/mitigative features were considered, were sufficiently low that no further evaluation was warranted.

2. All of the GE (General) accidents were omitted for this section because the dominate material at risk for the GE accidents is the heavy water stored in the facility. The heavy water is not included in the CVS evaluation.

3. The events in the Table 4.3 are given a high, moderate, low or negligible unmitigated consequence for the onsite worker 1, onsite worker 2 and the offsite receptor. Table 3.3-8 of the DSA quantifies the radiological consequence levels for the different hazard receptors as follows:

Consequence Level	Offsite Receptor Consequences	Onsite Worker #1 Consequences (Inside the facility)	Onsite Worker #2 Consequences (Outside the facility)
High	Greater than or equal to 25.0 rem	Prompt worker fatality, acute injury that is life threatening or permanently disabling or consequences greater than or equal to 100 rem	Consequences greater than or equal to 100 rem or prompt worker fatality, acute injury that is life threatening or permanently disabling
Moderate	Consequence greater than or equal to 5.0 rem and less than 25.0 rem	Serious injury, no immediate loss of life, no permanent disabilities or consequences greater than or equal to 25 rem and less than 100 rem	Consequences greater than or equal to 25 rem and less than 100 rem or serious injury, no immediate loss of life, no permanent disabilities
Low	Consequence greater than or equal to 0.5 rem and less than 5.0 rem	Minor injuries, no hospitalization and consequences greater than or equal to 5 rem and less than 25 rem	Consequences greater than or equal to 5 rem and less than 25 rem or minor injuries, no hospitalization
Negligible	Consequence less than 0.5 rem	Consequences less than Low levels and less than 5.0 rem	Less than 5.0 rem and consequences less than Low levels

Attachment 3

Facility Evaluation Team Composition and Biographical Sketches

W. E. Petty – WSRC FET Spent Fuel Project Lead Engineer

Ed Petty has a Bachelor of Science Degree in Mechanical Engineering from the University of South Carolina. He has 28 years experience at SRS in operations, engineering, training and work planning. He has held positions in Reactor Operations, FB-Line Startup, H-Canyon Engineering and is currently assigned as the ventilation system engineer in Spent Fuel Projects in L-Area. Ed served as the lead for the Spent Fuel Project DNFSB 2004-2 efforts.

J. A. Guy – WSRC FET Spent Fuel Project Regulatory Engineering Manager

Jon Guy has a Bachelor of Nuclear Engineering from the University of Florida, Master of Mechanical Engineering from the University of South Carolina and has 17 years of engineering experience at SRS. His experience includes plant system engineering for rotating mechanical and electrical equipment, spent nuclear fuel handling and storage, regulatory programs and engineering management. He has held positions in the Savannah River Sites Reactor areas, the D-Area Heavy water facility and the F-Area Material Storage Facility. He currently is assigned to the Spent Fuel Project as the Regulatory Programs Engineering Manager.

Dr. S. C. DeClue – DOE FET Federal Project Director Spent Fuel

Dr. Scotty DeClue received his Doctorate of Education from NOVA Southeastern University, an MS in Engineering Management from the University of Alaska, and a BS in Chemical Engineering from the University of Missouri. He is a licensed Professional Engineer in South Carolina and has his Project Management Professional certification.
Dr. DeClue is the Federal Project Director for the Spent Fuel Project at Savannah River Site and is the Integrated Project Team Leader for the Spent Nuclear Fuel Transfer project. Previously, he served as a Facility Representative in H-Canyon, HB-Line, FB-Line, F-Canyon, 235-F, K-Area and L-Area. He has served as a team member for numerous facility assessments including the Nevada Test Site Transuranic Waste Storage Facility Readiness Assessment, the H-Canyon LEU Loadout Readiness Assessment, the HB-Line Phase II Readiness Assessment, the HB-Line Mixed Scrap Readiness Assessment, and oversight of the contractor's readiness assessments for K-Area Material Storage Phase II and the Americium/Curium Transfer to High Level Waste.

R.D. Faris – WSMS SFP Regulatory Lead

Robert Faris has a Bachelor of Mechanical Engineering degree from the Georgia Institute of Technology. He has over 31 years experience in the nuclear industry including 13 years associated with the nuclear power industry and 18 years associated with SRS. His experience includes diverse Engineering and Regulatory assignments. He has been involved in various aspects of spent fuel storage since 1997, and has lead the development, implementation, and maintenance of Spent Fuel Projects nuclear safety documents since 2001.