United States Government **Department of Energy**

memorandum

Idaho Operations Office

Date: April 5, 2007

Subject: Transmittal of Idaho Nuclear Technology and Engineering Center (INTEC) Process Equipment Waste Evaporator (PEWE) Facility Ventilation System Evaluation to Deputy Assistant Secretary for Safety Management and Operations (OS-QSD-07-042)

To: Dae Y. Chung, Deputy Assistant Secretary
for Safety Management and Operations
DOE-HQ, EM-60/FORS

Reference: (1) Memo, I. Triay to Distribution, Subject: Office of Environmental Management Expectations for Implementation of Commitment 8.6 under the Department of Energy Implementation Plan Responding to Defense Nuclear Facilities Safety Board Recommendation 2004-2, dated June 9, 2006

(2) Report, Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2004-2 – Active Confinement Systems, Revision 1, dated June 2006

Attached is the final evaluation report for the Idaho Nuclear Technology and Engineering Center (INTEC) Process Equipment Waste Evaporator (PEWE) System Ventilation System Evaluation. The attachment is part of the interim milestones identified in Reference 1 to show completion of the evaluations required by the DOE 2004-2 implementation plan.

If you have questions or comments regarding this transmittal, please contact Ken Whitham 208-526-4151 or Arnold Preece 208-526-2911.

Richard B. Provencher, Deputy Manager
Idaho Cleanup Project

Attachment

RPT-377
Revision 0

Idaho Cleanup Project

Process Equipment Waste Evaporator Ventilation System Evaluation

March 2007

Idaho Cleanup Project

Process Equipment Waste Evaporator Ventilation System Evaluation

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REVIEWS AND APPROVALS

Facility Evaluation Team (See Attachment 1 for Bios)

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE), *Ventilation System Evaluation Guidance Document*, provides guidance for performing ventilation system evaluations in accordance with a plan that implements Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-2. Recommendation 2004-2 noted concerns with the confinement strategy utilized or planned for in several facilities to confine radioactive materials during or following accidents. The DNFSB prefers active confinement systems that rely on motive force and filters over passive confinement systems that use facility structures and components (e.g., facility enclosure without the motive force).

The evaluation for the Process Equipment Waste Evaporator (PEWE) was performed in three phases. Phase I involved data gathering using Table 4.3 of the DOE guidance document and was submitted to the DOE Independent Review Panel (IRP) for concurrence in December 2006. Phase II involved a ventilation system evaluation using DOE guidance document Table 5.1 and associated evaluation criteria and was submitted to the IRP for review in February 2007. Phase III involved completion of the final evaluation report and submittal to the IRP.

The PEWE is a Hazard Category 2 facility designed with a combination of passive structures and a ventilation system for contamination control and worker protection. The documented safety analysis (DSA) does not credit safety-significant or safety-class ventilation features. Therefore, functional requirements and performance criteria are not identified for the confinement ventilation system.

Per the evaluation guidance for Hazard Category 2 facilities, the performance criteria for safety-significant ventilation systems are used to evaluate the ventilation system. The result of the evaluation is that the design of the facility ventilation system meets all but one of the nondiscretionary performance criteria for safety-significant ventilation systems, as specified in Table 5.3 of the DOE evaluation guidance document. See Section 3 for more information.

CONTENTS

ACRONYMS

APS	Atmospheric Protection System
CPP	Chemical Processing Plant
CVS	confinement ventilation system
CWI	CH2M–WG Idaho, LLC
DCS	Distributed Control System
DID	defense in-depth
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DSA	Documented Safety Analysis
HAD	Hazards Analysis Document
HEPA	high-efficiency particulate air
ICP	Idaho Cleanup Project
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IRP	Independent Review Panel
LET&D	Liquid Effluent Treatment and Disposal (facility)
LPF	leak path factor
LWFCP	Liquid Waste Facility Closure Project
MACCS	MELCOR Accident Consequence Code System
MCP	Management Control Procedure
NA	not applicable
NPH	natural phenomena hazard
PEWE	Process Equipment Waste Evaporator
POG	process off-gas

PISA	potentially inadequate safety analysis
RCRA	Resource Conservation and Recovery Act
SAR	Safety Analysis Report
SC	safety class
SS	safety significant
SSC	system, structure, or component
TEDE	total effective dose equivalent
TFF	Tank Farm Facility
TPR	Technical Procedure
TSR	technical safety requirement
USQ	Unreviewed Safety Question
VOG	vessel off-gas

Process Equipment Waste Evaporator Ventilation System Evaluation

1. INTRODUCTION

The following sections provide a facility overview of the Idaho Nuclear Technical and Engineering Center (INTEC) Process and Equipment Waste Evaporator (PEWE) and an overview of the confinement ventilation system strategy. The PEWE is designated Hazard Category 2 in the documented safety analysis (DSA).[1]

1.1 Facility Overview

The PEWE was originally constructed from 1950 to 1952, and began operation in 1953 to treat radioactive liquid waste from Idaho Nuclear Technology and Engineering Center (INTEC) processes. The PEWE is located in the Rare Gas Plant/Waste Building (CPP-604). The PEWE reduces the volume of hazardous wastes needing to be stored. The PEWE evaporates the wastes, producing concentrated wastes (bottoms) and vapor condensates (overheads). Originally, the concentrated bottoms were sent to the Tank Farm Facility (TFF) and overheads were transferred to the Service Waste System. In preparation for TFF closure, transfers of newly generated liquid waste solutions to the TFF are administratively prohibited as of September 30, 2005. Currently, the concentrated bottoms are drained to a bottoms tank for transfer or recycling for further processing.

The PEWE System includes various collection systems. The Fuel Process Building [Chemical Processing Plant (CPP)-601] collection system was constructed from 1950 to 1952, and began operation in 1953. CPP-601 fuel processes are no longer operating and have been flushed due to a change in the INTEC mission. The CPP-601 collection tanks are known as the CPP-601 Deep Tanks and still collect waste that is treated in the PEWE. The CPP-641 collection tanks were constructed in 1961 to collect process equipment waste from CPP-640. Aqueous radioactive liquid wastes are also collected from facilities at the INTEC other than CPP-601 and CPP-641, and are concentrated in the PEWE. Although fuel processing has ceased at the INTEC, the PEWE continues to treat liquid waste from various sources. Vessels that feed into the PEWE are sampled prior to transfer of contents to the PEWE feed tanks.

The concentrated bottoms from the PEWE are transferred to the TFF (administratively out of service), CPP-604 Tank Farm tanks (when converted to bottoms storage) for interim storage for treatment. The overheads are transferred to the Liquid Effluent Treatment and Disposal LET&D facility in CPP-1618. Liquid waste is transferred to, within, and out of the PEWE System by steam jets, pumps, or gravity draining. Valve boxes provide access to the valving, transfer lines, leak detection points, and associated equipment in the boxes for purposes of inspection and repair. An extensive system of underground waste transfer lines and decontamination lines exists, all with encasements providing secondary containment.

1.2 Confinement Ventilation/Strategy

Confinement of the liquid radioactive waste in the PEWE collection systems in the Fuel Process Building (CPP-601) and the Westside Waste Holdup Tank System (CPP-641), and the Rare Gas Plant/Waste Building (CPP-604) is provided by the collection tanks and vessels, the concrete walls, and liners of the cells and vaults where the tanks and vessels are located. All liquid Resource Conservation and Recovery Act (RCRA)-regulated waste transfer lines in use have secondary containment.

The PEWE waste collection vessels in the CPP-641 and CPP-601 buildings, and the CPP-604 PEWE System evaporators, evaporator feed tanks, and bottoms tanks are located in either concrete cells or vaults beneath the buildings, or in underground cells or vaults outside the buildings. All cells and vaults are lined with stainless steel, epoxy paint, or Hypalon.

The vessel off gas (VOG) system is directly connected to the process off gas (POG) portion of the INTEC Atmospheric Protection System (APS). The VOG maintains a vacuum on the PEWE System vessels. The VOG and POG APS provide high-efficiency particulate air (HEPA) filtration prior to discharge to the INTEC Main Stack (CPP-708).

The CPP-604 ventilation air is drawn into the facility through an air-handling unit, is discharged into the CPP-604 corridors, flows into the cells, and then exits into a ventilation tunnel. The CPP-604 ventilation tunnel circles the building and discharges into the ventilation APS that runs from CPP-601 to the prefilters (CPP-756) and HEPA filters located at CPP-649 prior to being discharged to the environment, via the INTEC Main Stack. The CPP-604 POG and ventilation portions of the APS are described in Hazards Analysis Document (HAD)-278. The CPP-641 vaults vent directly to the atmosphere. The CPP-601 vaults vent to the APS.

2. FUNCTIONAL CLASSIFICATION ASSESSMENT

The following sections discuss the appropriateness of the existing functional classification of the ventilation and supporting systems.

2.1 Existing Classification

A potentially inadequate safety analysis (PISA) unreviewed safety question (USQ) was determined to exist for the PEWE because an accident scenario in the DSA assumed a leak path factor (LPF) less than one in performing unmitigated consequence analysis. To resolve the PISA, the consequence was redone with an LPF of 1, the MELCOR Accident Computer Code System (MACCS) consequence analysis system, and new inventory data. The revised DSA was submitted to DOE during the annual review and update process. DOE approval of the revised DSA is expected sometime in April 2007. The table in Attachment 2 lists the DSA confinement information from the revised SAR. This table corresponds to Table 4.3 in the DOE guidance document.

2.2 Evaluation

The process used in performing the functional classification evaluation was to review the DSA to identify applicable release scenarios and confinement conditions assumed in determining the consequences of mitigated and unmitigated releases, and determine if ventilation is properly credited as a safety-significant or safety-class system. If ventilation is credited, the DSA would also be reviewed to identify credited system functions and required performance criteria.

The hazard analysis in the PEWE DSA evaluates credible scenarios for radiological hazards, nonradiological hazards, fire and explosion, external events, and natural phenomena hazards (NPHs). All the scenarios listed in Attachment 2 are considered during the ventilation system evaluation.

The following scenario categories from the PEWE DSA are excluded from consideration during the Phase II ventilation system evaluation.

1. Nuclear Criticality. There are no credible criticality scenarios. With the phase out of fuel reprocessing, there are no significant sources of uranium or other fissile materials at the INTEC that could be processed

through the PEWE. Therefore, releases from a criticality scenario are excluded from the Phase II evaluation.

2. Direct Radiation. Confinement systems provide no safety function for the hazards of direct radiation.

3. Tornado. Potential releases from a tornado are excluded from Phase II evaluation. DOE-STD-1020-92, Natural Phenomena Hazards Design, and Evaluation Criteria for Department of Energy Facilities,[2] specifically excludes INL facility evaluation and design for tornado hazards.

4. Lightning. The design and construction of the PEWE includes lightning protection. Lightning protection is standard feature for all nuclear facilities at the INL.

5. Flooding. An active ventilation system could not be credited as a mitigative feature for a release caused by flooding.

Attachment 2 lists the classifications for each of the scenarios considered in the evaluation. The format for the classification table in Attachment 2 is derived from Table 4.3 of the DOE ventilation system evaluation guidance document.[3]

The information in Attachment 2 was submitted to the DOE Independent Review Panel (IRP) in December 2006. In that submittal, a commitment was made to compare the ventilation system design to the criteria for safety-significant systems. The IRP response to the submittal is included as Attachment 3.

2.3 Summary

The hazard and accident analyses in the DSA do not credit the confinement ventilation system for any event; therefore, the system is not designated safety-significant or safety-class and functional requirements and performance criteria are not identified. The ventilation system provides protection for workers under the purview of the radiation protection program (contamination control). Further evaluation will apply safety-significant criteria in accordance with DOE evaluation guidance for safety-significant systems.

3. SYSTEM EVALUATION

The Site Evaluation Team and the Facility Evaluation Team agreed that the system evaluation should be performed against the attributes of a safety-significant system. These attributes are found in Table 5.1 of the DOE ventilation system evaluation guidance document.[3] All the applicable nondiscretionary attributes of a safety-significant system were considered mandatory by the Site and Facility Evaluation Teams.

The system evaluation involved a review of the Fire Hazards Analysis[4] and the DSA[1]. A facility walk down was performed by the facility and site evaluation teams.

Attachment 4 shows the results of the facility ventilation system evaluation against the criteria for safety-significant systems. The system evaluation results demonstrate that these systems meet all but one of the nondiscretionary attribute of a safety-significant system. The PEWE supply and exhaust fans are not interlocked. However, the PEWE supply fans will automatically shutdown in a high pressure condition. The APS fans also provide supply air to the PEWE confinement ventilation system. There is no interlock between these fans and the exhaust fans and they will not automatically shutdown on a high pressure condition. They are procedurally shutdown by operators when the alarm sounds indicating a loss of PEWE exhaust air.

There are no plans to interlock the APS and PEWE supply fans to PEWE exhaust fans. No safety credit for this interlock function is required by the PEWE DSA and evaporation operations within the PEWE will be discontinued either this or next year.

4. CONCLUSION

Based on the results of the hazard and accident analyses, the PEWE confinement ventilation system is not required to be designated as safety-significant or safety-class. The ventilation system is defense-in-depth for protection for workers under the purview of the radiation protection program (contamination control). The system was evaluated against the performance attributes expected of safety-significant ventilation systems and meets all but one of those attributes. There is not an interlock between the supply and exhaust fans. There are no plans to upgrade this system to include an interlock (see Section 3).

5. REFERENCES

1. SAR-108, "Safety Analysis Report for the Process Equipment Evaporator Facility System," Rev. 2, August 2006.

2. DOE-STD-1020-2002, "Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities," U.S. Department of Energy, January 2002.

3. DOE, "Deliverables 8.5.4 and 8.7 of Implementation Plan for Defense Nuclear Safety Board Recommendation 2004-2," Rev. 0, U.S. Department of Energy, January 2006.

4. HAD-86, "INTEC Process Equipment Waste Systems And Fuel Processing Facilities," Idaho Cleanup Project, Rev. 3, January 24, 2007.

Attachment 1

Facility Evaluation Team Biographical Sketches

Patrice McEahern
Safety Basis Subject Matter Expert

Ms. McEahern is the Director of Nuclear Safety for CH2M-WG Idaho (CWI). She provides senior-level technical and strategic guidance to the nuclear safety program. Ms. McEahern is participating as a contributing author to the DOE TRU Waste Standard development team. Her experience includes providing support to many DOE sites, such Oak Ridge, Hanford, Rocky Flats, Lawrence Livermore, Los Alamos, Savannah River Site, Mound, Fernald and Brook Haven. Ms. McEahern is also working with a team for the International Atomic Energy Agency to develop an international standard for developing the decommissioning safety case. Ms. McEahern has more than 23 years of experience in the nuclear industry, including experience in systems engineering, quality systems engineering, and nuclear safety analysis. She has a bachelor's degree in engineering science from Colorado State University.

Rod Peatross
Facility Safety Basis Subject Matter Expert

Mr. Peatross is the Nuclear Safety Project Manager for the CWI Liquid Waste Facility Closure Project (LWFCP) which includes the PEWE. He is responsible for leading a group of safety analysts in providing nuclear safety support. His group develops and maintains regulation-compliant DSAs, TSRs, and unreviewed safety question assessments, and works with facility management and Department of Energy Idaho Operations Office (DOE-ID) to resolve nuclear safety issues. Mr. Peatross has 17 years of experience in implementing, reviewing, and developing safety-basis documents for new and existing nuclear and nonnuclear facilities at the INL. He has a masters of science degree in occupational safety from the University of Idaho.

Steve Henderson
PEWE Ventilation Subject Matter Expert

Mr. Henderson is the System Engineer assigned to the Atmospheric Protection System and the Process Off-Gas Systems. He maintains the system baseline and ensures the continued operability of the APS. Mr. Henderson has 16 years of experience in the design, operation, and maintenance of off-gas, ventilation, filtration, and monitoring of nuclear systems. He has a bachelor's of science degree in industrial technology from the University of Idaho.

Attachment 2

System Functional Classification Table (Table 4.3)

Table 4.3 confinement information from the PEWE DSA.

PEWE Facility			Hazard Category 2				Performance Expectations			
Bounding Accidents	Confinement Type		Unmitigated Bounding Doses (rem)	Confinement Classification			Function	Functional Requirements	Performance Criteria	Compensatory Measures
	Active	Passive		SC	SS	DID				
Nitrated-Organic Explosion Accident	None credited	None credited LPF = 1	100 m = 5.5E+02 13.7 km = 8.9E-02	None required	Evaporator Cell shield walls	None required or credited	Prevent worker overexposure to direct radiation	The concrete walls and ceilings attenuate the exposure to the facility worker during normal operations and during a criticality	The concrete walls and ceilings attenuate the general body field external exposure rate to less than 0.5 mR/h in normally occupied areas outside the cells and vaults. The concrete floors must support the weight of the walls and ceilings. The concrete walls and ceilings must provide adequate shielding to meet the radiation dose limit of 25 rem to an individual outside the shielded area in the event of a criticality.	NA
Main Stack Collapse onto CPP-604	None credited	None credited LPF = 1	100 m = 1.0E+00 13.7 km = 6.1E-04	None required	None required	None required or credited	Not applicable (NA)	NA	NA	NA
Seismic Event	None credited	None credited LPF = 1	Off-Site Public: L Co-located Workers: L Facility Workers: M (See Note below)	None required	None required	None required or credited	Not applicable (NA)	NA	NA	NA

Note: The consequences are qualitative. A consequence level of Low (L) is defined as < 1 rem TEDE to the off-Site public (13.7 km from the release) and < less than 25 rem TEDE to the co-located workers (100 m from the release). A consequence level of Medium (M) for the facility worker is defined as consequences less than High, but well above normal allowable radiological or chemical exposure. A consequence level of High is defined as acute worker fatality, serious injury, or significant radiological and chemical exposure.

Attachment 3

Independent Review Panel Report

The IRP had not issued the referenced letter of concurrence at the time this evaluation report was due.

Attachment 4

System Evaluation Table (Table 5.1)

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Ventilation System-General Criteria			
Pressure differential should be maintained between zone and atmosphere.	Number of zones as credited accident analysis to control hazardous material release; demonstrate by use considering in leakage.	The accident analysis in the documented safety analysis (DSA) does not credit contamination zone pressure differentials to control hazardous material releases. Pressure differentials are maintained between confinement zones per the requirements for contamination control.	Safety Analysis Report (SAR)-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Materials of construction should be appropriate for normal, abnormal and accident conditions.	None	The confinement ventilation system (CVS) is designed for high temperature conditions in the evaporator cell for normal operating conditions throughout the facility.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Exhaust system should withstand anticipated normal, abnormal and accident system conditions and maintain confinement integrity.	As required by the accident analysis to prevent a release.	The CVS is not credited for any scenario in the hazard or accident analysis sections. The accident analysis in the DSA does not credit the exhaust system capabilities of withstanding abnormal and accident system conditions to maintain confinement integrity.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Confinement ventilation systems shall have appropriate filtration to minimize release.	Address: 1) Type of filter (e.g. HEPA, sand, sintered metal); 2) Filter sizing (flow capacity and pressure drop); 3) Decontamination factor vs. accident analysis assumptions.	The CVS exhaust runs through the Atmospheric Protection System (APS) high efficiency particulate air (HEPA) filter system. The flow capacity of HEPA filters is 1,500 scfm at 1 in water column pressure. The accident analysis in the safety basis makes no assumptions regarding decontamination factors for HEPA filters.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator

PEWE CONFINEMENT VENTILATION SYSTEM EVALUATION

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Ventilation System – Instrumentation and Control			
Provide system status instrumentation and/or alarms.	Address key information to ensure system operability (e.g., system delta-P, filter pressure drop)	Pressure differentials between zones, airflow through the system, and filter pressure drops are monitored and displayed by the Distributed Control System (DCS) located in the control room at Chemical Processing Plant (CPP)-1683. The DCS alerts operators to off-normal conditions through visual displays and audible alarms.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Interlock supply and exhaust fans to prevent positive pressure differential.	None	There is not an interlock between the PEWE supply and exhaust fans. However, the PEWE supply fans will automatically shutdown if a high pressure condition exists. The APS fans will however, continue to run and could pressurize the PEWE system if not manually shutoff. There are three exhaust fans. Two of the fans are in continuous operation and one fan is on standby. Failure of a primary exhaust fan will result in automatic startup of the standby fan. Pressures throughout the system are continuously monitored by the DCS. There are no release scenarios in the safety basis that would require PEWE and APS supply fans to be interlocked to the PEWE exhaust fans. The consequences of high-pressure events in the cells would be limited to contamination spread.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Post accident indication of filter break-through.	Instrumentation supports post-accident planning and response: should be considered critical instrumentation for safety class.	Pressure differential instruments monitor filter build up. A low-pressure differential instrument indicates filter damage and activates an alarm in the control room. Radiation monitoring instrumentation in the APS exhaust stack activates an alarm in the CPP-1683 control room if preset limits are reached.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Reliability of control system to maintain confinement function under normal, abnormal and accident conditions.	Address, for example impact of potential common mode failures from events that would require active confinement function.	The reliability of the control system to maintain confinement is not credited by the facility DSA for accident conditions. Compliance with applicable codes and standards ensures that an acceptable level of system reliability is achieved for normal and abnormal conditions.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator

PEWE CONFINEMENT VENTILATION SYSTEM EVALUATION

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Control components should fail-safe.	None	Major control system component failures will result in the CVS going to a fail-safe configuration. The system dampers will fail safe in the open position to assure a negative pressure in confinements by air draw through the APS stack.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Resistance to Internal Events - Fire			
Confinement ventilation systems should withstand credible fire events and be available to operate and maintain confinement.	Required for new facilities; as required by the accident analysis for existing facilities (discretionary). Must address protection of filter media.	The Process Equipment Waste Evaporator (PEWE) is not a new facility. The CVS is not credited for any scenario in the hazard or accident analysis sections the safety basis accident analysis. The exhaust filters are not protected by a fire protection system.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Confinement ventilation systems should not propagate spread of fire.	Required for new facilities; as required by the accident analysis for existing facilities (discretionary). Address fire barriers, fire dampers arrangement.	The CVS is not credited by the safety basis accident analysis for preventing the propagation of a fire.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator

PEWE CONFINEMENT VENTILATION SYSTEM EVALUATION

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Resistance to External Events – Natural Phenomena - Seismic			
Confinement ventilation systems should safely withstand earthquakes.	If the active CVS system is not credited in a seismic accident condition there is no need to evaluate that performance and/or design attribute for the confinement ventilation system (discretionary). Also, any seismic impact on the confinement ventilation system performance will be based on the current functional requirement in the DSA. NOTE: Seismic requirements may apply to Defense in-Depth items indirectly for the protection of safety SSCs.	The CVS is not credited directly or as a defense in-depth system by the safety basis in a seismic accident.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Resistance to External Events – Natural Phenomena – Tornado/Wind			
Confinement ventilation system should safely withstand tornado depressurization.	If the active CVS system is not credited in a tornado condition there is no need to evaluate that performance and/or design attribute for the confinement ventilation system (discretionary). Also, any tornado impact on the confinement ventilation system performance will be based on the current functional requirement in the DSA.	The CVS is not credited by the safety basis in a tornado condition. DOE Standard DOE-STD-1020-2002 does not identify tornado criteria for the INL.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Confinement ventilation system should withstand design wind effects on system performance.	If the active CVS system is not credited in a wind condition there is no need to evaluate that performance and/or design attribute for the confinement ventilation system (discretionary). Also, any wind impact on the confinement ventilation system performance will be based on the current NP analysis in the DSA.	The CVS is not credited by the safety basis in a high wind condition.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Other NP Events (e.g., flooding, precipitation)			
Confinement ventilation system should withstand other natural phenomena events considered credible in the DSA where the confinement ventilation system is credited.	If the active CVS system is not credited for this event there is no need to evaluate that performance and/or design attribute for the confinement ventilation system (discretionary). Also, any impact on the confinement ventilation system performance will be based on the current natural phenomena analysis in the DSA.	The CVS is not credited by the safety basis in any natural phenomena condition.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator

PEWE CONFINEMENT VENTILATION SYSTEM EVALUATION

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Range Fires/Dust Storms			
Administrative controls should be established to protect confinement ventilation systems from barrier threatening events.	Ensure an appropriately thought out response to external threat is defined (e.g., pre-fire plan).	There are no Technical Safety Requirement (TSR) level administrative controls that directly address protecting confinement barriers from range fires or dust storms. There are TSR level administrative controls for establishing safety management programs for emergency preparedness and fire protection.	TSR-108, Technical Safety Requirements for the Process Equipment Evaporator TSR-100, INEEL Standardized Technical Safety Requirements (TSR) Document
Testability			
Design supports the periodic inspection & testing of filters and housing, and tests and inspections are conducted periodically.	Ability to test for leakage per intent of ASME N510.	The design of the CVS includes ports for testing the integrity and installation of HEPA filters. The filters are tested at least annually.	Management Control Procedure (MCP)-2746, Purchasing, Maintaining, and Using HEPA Filters Technical Procedure (TPR-5054, HEPA Filter In-Place Testing
Instrumentation required to support system operability is calibrated.	Credited instrumentation should have specified calibration/surveillance requirements. Non-safety instrumentation should be calibrated as necessary to support system functionality.	The DSA does not credit CVS instrumentation in any accident scenario. Non-safety instrumentation are calibrated per the instrument calibration program described in MCP-6303.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator MCP-6303, Calibration of Installed Facility Process and Control Instrumentation

PEWE CONFINEMENT VENTILATION SYSTEM EVALUATION

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Integrated system performance testing is specified and performed.	Required responses assumed in the accident analysis must be periodically confirmed including any time constraints.	Periodic testing of blowers is specified by procedure. The accident analysis in the DSA does not identify required responses for the ventilation system.	SAR-108, Safety Analysis Report for the Process Equipment Waste Evaporator
Maintenance			
Filter service life program should be established.	Filter life (shelf life, service life, total life) expectancy should be determined. Consider filter environment, maximum delta-P, radiological loading, age, and potential chemical exposure.	Instructions for replacing, operating, and in-place (aerosol testing) filter components are specified in procedures. Filters are replaced if in-place testing indicates filter damage or leakage.	MCP-2746, Purchasing, Maintaining, and Using HEPA Filters TPR-5054, HEPA Filter In-Place Testing
Single Failure			
Failure of one component (equipment or control) shall not affect continuous operation.	Criteria does not apply to safety-significant systems.	Not applicable	Not applicable
Automatic backup electrical power shall be provided to all critical instruments and equipment required to operate and monitor the confinement ventilation system.	Criteria does not apply to safety-significant systems.	Not applicable	Not applicable
Backup electrical power shall be provided to all critical instruments and equipment required to operate and monitor the confinement ventilation system.	None	The CVS and associated DCS functions that monitor and control the ventilation system are connected to the Idaho Nuclear Technology and Engineering Center (INTEC) standby power supply system.	System Description Document (SDD)-2, INTEC Electrical Distribution System

PEWE CONFINEMENT VENTILATION SYSTEM EVALUATION

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Other Credited Functional Requirements			
Address any specific functional requirements for the confinement ventilation system (beyond the scope of those above) credited in the DSA	None	Not applicable	Not applicable