United States Government **Department of Energy**

memorandum

Idaho Operations Office

Date: April 2, 2007

Subject: Transmittal of Idaho Nuclear Technology and Engineering Center (INTEC) Laboratory Facilities Ventilation System Evaluation to Deputy Assistant Secretary for Safety Management and Operations (OS-QSD-07-040)

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) Laboratory Facilities 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 Roger Harshbarger 208-526-0568.

E Ziemianski for

Richard B. Provencher, Deputy Manager
Idaho Cleanup Project

Attachment

RPT-378
Revision 0

Idaho Cleanup Project

INTEC Laboratory Facilities Ventilation System Evaluation

March 2007

REVIEWS AND APPROVALS

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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 Idaho Nuclear Technology and Engineering Center (INTEC) Laboratory Facilities 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 INTEC Laboratory Facilities are Hazard Category 2 and are designed with a combination of passive structures and a ventilation system for contamination control and worker protection. The documented safety analysis (DSA) does not require that the ventilation system be safety-significant or safety-class system, structure or component (SSC). Therefore, functional requirements and performance criteria are not identified for the confinement ventilation system.

The ventilation system is being modified to enhance system reliability and maintainability. The system modifications are summarized in Section 1.3.

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 all but one of the design features of the facility ventilation system meets the nondiscretionary performance criteria for safety-significant ventilation systems, as specified in Table 5.3 of the DOE evaluation guidance document. The supply and exhaust fans are not interlocked as specified by the criteria. There are no plans to provide this interlocking function because the function is not a function that is required by the DSA and interlocking the fans may result in a loss of ventilation to a separate facility. See Section 3 for more information.

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ACRONYMS

ANL-E	Argonne National Laboratory-East
APS	Atmospheric Protection System
CPP	Chemical Processing Plant
CVS	confinement ventilation system
CWI	CH2M–WG Idaho, LLC
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
HEPA	high-efficiency particulate air
IAO	INTEC Area Operations
ICP	Idaho Cleanup Project
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IRP	Independent Review Panel
LPF	leak path factor
LWFCP	Liquid Waste Facility Closure Project
MCP	Management Control Procedure
NA	not applicable
NPH	natural phenomena hazard
R&D	research and development
SAR	Safety Analysis Report
SC	safety class
SS	safety significant

SSC	system, structure, or component
TEDE	total effective dose equivalent
TPR	Technical Procedure
TSR	technical safety requirement
UO	uranium oxide

INTEC Laboratory Facilities Ventilation System Evaluation

1. INTRODUCTION

The following sections provide a facility overview of the Idaho Nuclear Technology and Engineering Center (INTEC) Laboratory Facilities and an overview of the confinement ventilation system strategy. The INTEC Laboratory Facilities are designated Hazard Category 2 in the documented safety analysis.[1]

1.1 Facility Overview

The INTEC Laboratory Facilities [Chemical Processing Plant (CPP)-602 and CPP-630] were built in 1952 and 1956, respectively. CPP-630 was initially built as a maintenance shop. Modifications to the original facilities and equipment have been made since then. In the mid-1980s, a second story was added to CPP-630 for offices and a conference room. As a result, much of the INTEC Laboratory Facilities design and construction was completed before the introduction of more recent DOE requirements. Construction and modifications to these facilities were performed in accordance with the standards and requirements applicable at the time.

The INTEC Laboratory Facilities are primarily analytical and developmental facilities designed for chemical and radiochemical analyses, and bench-scale developmental work. Analytical and developmental work supports mainly INTEC projects, although the work in the laboratories also supports programs for other DOE operations and separately assigned research and development (R&D) projects. The analytical and developmental facilities include conventional chemical laboratories and radiochemical laboratories for radioactive materials. The INTEC Laboratory Facilities provide the following analytical capabilities:

- Organic analysis
- Spectrochemistry
- Special analysis
- Radiochemistry
- Radioactive and nonradioactive control processes
- Waste characterization and process development.

In addition to these analytical functions, uranium in the form of uranium oxide $(UO)_2$ in powder and pellets, UO_3 in powder, U_3O_8 in powder and pellets, and natural uranium metal in bricks, plates, pellets, and rods are stored in the facility. Two drums containing unirradiated materials have been transferred from CPP-651 to CPP-602 for temporary storage. This material consists of Argonne National Laboratory-East (ANL-E) material (residue from the CPP-627 Hot Chemistry Lab explosion).

1.2 Confinement Ventilation/Strategy

The primary confinement systems for the INTEC Laboratory Facilities consist of hoods, gloveboxes, and a hot cell. The laboratory hoods and hot cell rely on air velocity to confine gases and

prevent airborne materials from being released into the laboratory. The laboratory gloveboxes are sealed enclosures operated by gloves built into the gloveboxes. These systems are vented through roughing and high efficiency particulate air (HEPA) filters to the roofs of CPP-602 or CPP-630 or to the Atmospheric Protection System (APS) in CPP-649 via the CPP-601 east vent tunnel, which vents to the Main Stack.

The buildings are designed to have the highest pressure in the occupied areas with an adequate airflow through these areas. Hazardous and radioactive materials are handled in containment enclosures (hoods, gloveboxes, and the CPP-602 hot cell). Air enters these enclosures from the occupied area, then flows through the containment enclosure and HEPA filters, and is exhausted to the outdoors. Thus, at all times, ventilating air carries any harmful airborne materials away from personnel. Air inlet velocities for containment enclosures vary, depending on use. Inlet air velocities for the hoods are measured annually, and the maximum window opening corresponding to minimum velocity is marked on the hood.

In accordance with Idaho Cleanup Project (ICP) procedures, HEPA filters in the ventilation exhaust system are periodically checked for excess pressure drop. Each HEPA filter is checked for 99.97% efficiency of 0.3-micron-diameter-or-larger particulate. When the pressure drop is too high and flow cannot be maintained, or efficiency is too low (below 99.97%), the filters are replaced. HEPA filters are controlled in accordance with ICP procedures.

1.2.1 CPP-602 Laboratory Ventilation System

Ventilation air for the CPP-602 Laboratory heating and ventilation system is provided by an underground duct from CPP-606. This main duct splits into an east and west distribution system. Vertical risers in the northeast and northwest corners of the building distribute the incoming air into lateral east and west side ducts on every floor. On the second floor, a separate unit supplies conditioned air to Laboratories 212, 214, 216, 220, and Room 223.

All air is exhausted through HEPA filter systems in CPP-602 Room 330, on the roof of the CPP-630, or is vented via the CPP-601 vent tunnel to the APS. Most of the air in the basement is exhausted via the service corridor of CPP-601 or goes to the east vent tunnel via the hot cell, gloveboxes, and hoods of Laboratory 103A and the hood of Laboratory 121B. The northeast hood in Laboratory 103A, the hoods and gloveboxes in Laboratory 103B, the hood and denitrator product repackaging glovebox in Room 109, and the hoods and glovebox in Room 325 on the second floor are exhausted through HEPA filters on the roof of CPP-630. All of the air on the first-floor laboratories, Laboratories 315 and 327 on the second floor, and the product handling Room 102 is exhausted through HEPA filter banks in Room 330 to the roof of the CPP-602 Laboratory.

1.2.2 CPP-630 Mass Spectrometry Facility Ventilation System

Ventilation air for the heating and ventilation system for CPP-630 is supplied from two sources. Laboratory areas are supplied by heating and air conditioning equipment located on the ground just east of the building. Ventilation for office areas is supplied by heating and air conditioning equipment located in Room 228 on the second floor. Laboratory air from the various laboratories, hoods, and gloveboxes is exhausted through HEPA filters and blowers located on the roof of CPP-630.

1.3 Major Modifications

The CPP-602 and 630 supply ventilation systems are being modified. This project will refurbish the CPP-602 and CPP-630 heating, ventilation, and air conditioning system including sensors, controls, control systems, electrical, and instrumentation. The project will replace the controls necessary to allow equipment to properly regulate facility temperatures.

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

The functional classification of the ventilation system is documented in the DSA.[1] None of the scenarios in the DSA classify the confinement ventilation system as a safety-significant (SS) or safety-class (SC) structure, system, or component (SSC) required for reducing the consequences of a release.

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 facility DSA evaluates credible scenarios for releases due to fire, breach of confinement, explosion, external events, and natural phenomena hazards (NPHs). There are no credible criticality scenarios. Credible bounding scenarios evaluated are a facility fire, an earthquake, and confinement breaches.

The following provides a basis for excluding scenario categories from consideration in the ventilation system evaluation:

1. Nuclear Criticality. There are no credible criticality scenarios. Therefore, releases from a criticality scenario are excluded from the 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 Idaho National Laboratory (INL) facility evaluation and design for tornado hazards.

4. Lightning. Design and construction 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 each nondiscretionary attribute of a safety-significant system in all but one case. The supply and exhaust fans are not interlocked to prevent a confinement pressurization if the supply fan operates while the exhaust fan is down. There, are no plans to provide this interlocking function. The CPP-602 and CPP-601 share the same supply fan. Interlocking the supply fan with the CPP-602 exhaust fan could result in a loss of ventilation flow through CPP-601. CPP-601 is undergoing decontamination and dismantlement. Interlocking of the supply and exhaust fans is not a function credited by the INTEC Laboratory Facilities DSA. Pressurization of the system could only result in contamination spread.

4. CONCLUSION

Based on the results of the hazard and accident analyses, the INTEC Laboratory Facilities 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. Interlocking of the two fans is not a credited function in the DSA and interlocking could result in a loss of ventilation flow to another facility.

5. REFERENCES

1. SAR-121, "Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)," Rev. 6, March 2007.

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-84, "INTEC Laboratory Facilities (CPP-602 and CPP-630) Fire Hazard Analysis," Idaho Cleanup Project, Rev. 10, October 6, 2006.

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, LLC (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) and INTEC Area Operations (IAO) which includes the INTEC Laboratory Facilities. 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 and activities at the INL. He has a masters of science degree in occupational safety from the University of Idaho.

Bryan Barker
INTEC Laboratory Facilities System Engineer

Mr. Barker is the CPP-602/630 analytical facilities system engineer. He is responsible all of the facility systems within these buildings. He has 21 years experience at INTEC. This experience includes facility operations, maintenance work control, and system engineering. Mr. Barker's facility operations experience includes being a certified Senior Operator in the Fuel Reprocessing process and as the facility engineer for analytical equipment operations. He has been the system engineer for the analytical facilities for 6 years. He is currently completing the course work for a bachelor's degree in Industrial Technology.

Attachment 2

System Functional Classification Table (Table 4.3)

Table 1. Table 4.3 confinement information from the INTEC Laboratory Facilities DSA.

INTEC Laboratory Facilities			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				
Facility fire	None credited	None credited LPF = 1	100 m = 2.1E+00 13.7 km = 3.4E-04	None required	None required	None required or credited	Not applicable (NA)	NA	NA	NA
Seismic	None credited	None credited LPF = 1	100 m = 2.0E+01 13.7 km = 3.3E-03	None required	None required	None required or credited	NA	NA	NA	NA
Breach of confinement	None credited	None credited LPF = 1	Off-Site Public: L Co-located Workers: L Facility Workers: H (See note below)	None required	None required	None required or credited	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 High (H) for the facility worker 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)

INTEC LABORATORIES CONFINEMENT VENTILATION SYSTEM EVALUATION

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.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
Materials of construction should be appropriate for normal, abnormal and accident conditions.	None	The ducting and filter housings of the confinement ventilation systems (CVSs) are constructed of stainless steel. Stainless steel is appropriate for the conditions expected in the Idaho Nuclear Technology and Engineering Center (INTEC) Laboratory Facilities.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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.	A 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 systems capabilities of withstanding abnormal and accident system conditions to maintain confinement integrity.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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.	CVS exhaust systems are equipped with high efficiency particulate air (HEPA) filters. The flow capacity of HEPA filters is 1,000 scfm at 1 in pressure. The accident analysis in the safety basis makes no assumptions regarding decontamination factors for HEPA filters.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)

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)	The CVSs are equipped with local differential pressure instrumentation and local alarms that sound when pressure differential set points are reached.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
Interlock supply and exhaust fans to prevent positive pressure differential.	None	There is not an interlock between the CVS supply and exhaust fans. Failure of the exhaust fans would result in a localized pressure differential alarm. Response to the condition is addressed by local procedures which may require evacuation from the affected portions of the labs. There are no release scenarios that would require the fans to be interlocked. The consequences of high-pressure events in the labs would be limited to contamination spread.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
Post accident indication of filter break-through.	Instrumentation supports post-accident planning and response: should be considered critical instrumentation for safety class.	Filter build up is monitored by pressure differential instruments. A low-pressure differential instrument indicates filter damage and would set off a localized alarm.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Control components should fail-safe.	None	Dampers are designed to fail safe to ensure confinement is maintained. Major control system component failures will result in the ventilation system going to fail safe configurations.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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.	CPP-602 and CPP-630 are not new facilities. A CVS is not credited for any scenario in the hazard or accident analysis sections.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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.	A CVS is not credited for preventing the propagation of a fire.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)

INTEC LABORATORIES 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.	A CVS is not credited in a seismic accident.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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.	A 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-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)

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.	A CVS is not credited by the safety basis in a high wind condition.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
Other NP Events (e.g., flooding, precipitation)			
Confinement ventilation system should withstand other NP 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 NP analysis in the DSA.	A CVS is not credited by the safety basis in any natural phenomena condition.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)

INTEC LABORATORIES 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-121, Technical Safety Requirements for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility) TSR-100, ICP 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 facility CVSs includes ports for testing the integrity and installation of HEPA filters in the exhaust plenums. The filters are tested at least annually.	MCP-2746, Purchasing, Maintaining, and Using HEPA Filters 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 is calibrated per the instrument calibration program described in MCP-6303.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility) MCP-6303, Calibration of Installed Facility Process and Control Instrumentation

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 a CVS.	SAR-121, Safety Analysis Report for the INTEC Laboratory Facilities (CPP-602 Laboratory and CPP-630 Mass Spectrometry Facility)
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 by 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

CONFINEMENT VENTILATION SYSTEM COMPARISONS TO PERFORMANCE CRITERIA			
EVALUATION CRITERIA	**CRITERIA EXPLANATION**	**COMPARISON TO CRITERIA**	**REFERENCE**
Backup electrical power shall be provided to all critical instruments and equipment required to operate and monitor the confinement ventilation system.	None	The exhaust blowers are connected to the Idaho Nuclear Technology and Engineering Center (INTEC) standby power supply system.	System Description Document (SDD)-2, INTEC Electrical Distribution System
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