



Department of Energy  
National Nuclear Security Administration  
Washington, DC 20585



February 10, 2011

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

Dear Mr. Chairman:

The purpose of this letter is to notify you that the National Nuclear Security Administration (NNSA) has completed Deliverable 8.6.5 of the Department of Energy (DOE) Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (Board) Recommendation 2004-2, *Active Confinement Systems*. Per IP requirements, non-excluded facilities have been evaluated for compliance with performance criteria as identified in DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document and the site specific Documented Safety Analysis documents.

Each evaluation was documented in a Ventilation System Evaluation Report, which was subsequently reviewed by an Independent Review Panel, the NNSA's Office of the Chief of Defense Nuclear Safety, the NNSA Service Center and/or the NNSA's Office of Nuclear Safety, Nuclear Operations, and Governance Reform (NA-17). The results of the Ventilation System Evaluation Report reviews are contained in the enclosed report. Each individual Ventilation System Evaluation Report, along with its concurrence memo, has previously been transmitted to the Board.

Of the evaluated facilities, only the Los Alamos National Laboratory TA-55 Plutonium Facility (PF-4) was identified as having performance gaps requiring upgrades. The NNSA, however, has postponed the implementation of all PF-4 Recommendation 2004-2 related upgrades until the PF-4 analysis being performed as a response to Board Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, has been completed.

Serving as a consolidated response to Deliverable 8.6.5, this letter is conveying Program Secretarial Office concurrence and approval on the disposition of the gaps and upgrades identified in the Ventilation System Evaluation Reports submitted by the NNSA sites.

If you have any questions or comments, please contact me or Mr. James J. McConnell, Assistant Deputy Administrator for Nuclear Safety, Nuclear Operations, and Governance Reform, at 202-586-4379.



Sincerely,

A handwritten signature in black ink, appearing to read "Donald L. Cook". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Donald L. Cook  
Deputy Administrator  
for Defense Programs

Enclosure

cc: M. Campagnone, HS-1.1  
K. Smith, LASO  
A. Williams, LSO  
S. Mellington, NSO  
S. Erhart, PXSO  
P. Wagner, SSO  
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T. Sherry, YSO  
K. Boardman, Service Center  
D. Nichols, NA-2.1  
J. McConnell, NA-17

**NATIONAL NUCLEAR SECURITY ADMINISTRATION**

**Office of Nuclear Safety, Nuclear Operations,**

**and Governance Reform**

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**Review Report and Recommendations**

**For**

**Defense Nuclear Facilities Safety Board**

**Recommendation 2004-2**

**Confinement Ventilation Systems Evaluations**

**January 12, 2011**

## EXECUTIVE SUMMARY

This report identifies the results of the Ventilation System evaluation reports submitted by the National Nuclear Security Administration (NNSA) sites, in response to Deliverable 8.6.5 of the Department of Energy (DOE) Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (Board) Recommendation 2004-2. The purpose of Deliverable 8.6.5 is to obtain Program Secretarial Officer (PSO) concurrence and approval on the disposition of performance gaps and upgrades identified in the site specific ventilation system evaluation reports. The DOE IP was produced in response to DNFSB Recommendation 2004-2, *Active Confinement Systems*.

The methodology for systematically evaluating the ventilation systems at each site was governed by the DOE *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document (VSEG). In this process, facility heating, ventilation and air conditioning (HVAC) systems were evaluated for compliance with performance criteria as identified in the VSEG and the site specific Documented Safety Analysis (DSA).

Ultimately, twelve (12) of twenty eight (28) NNSA defense nuclear facilities were excluded from the evaluation. A ventilation system evaluation was performed by a facility evaluation team (FET) for the sixteen (16) facilities that were not excluded. Upon completion of their system evaluations, the FET's submitted their resultant reports for review. These reports were subsequently reviewed by a DOE Independent Review Panel (IRP), the NNSA's Office of the Chief of Defense Nuclear Safety (CDNS), the NNSA Service Center and/or the NNSA's Office of Nuclear Safety, Nuclear Operations, and Governance Reform (NA-17).

Of the 16 facilities evaluated only one, the Los Alamos National Laboratory (LANL) TA-55 Plutonium Facility (PF-4), was determined to have performance gaps that were recommended for upgrades. NA-17, however, recommended postponing the implementation of these gap upgrades until PF-4 evaluation activities resulting from DNFSB Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*, have been completed. A summary of the 2004-2 PF-4's evaluation is contained in Table-3: *LANL PF-4*, of this report.

Five (5) of the 16 facility ventilation system evaluation reports concluded that there were no gaps between the installed systems and the performance criteria. The report reviewers for those 5 sites concurred with the evaluation report conclusions. Those facilities are the Chemistry and Metallurgy Research Replacement Facility (CMRR) and the Radioactive Liquid Waste Treatment Facility (RLWTF) at Los Alamos National Laboratory, Lawrence Livermore National Laboratory's (LLNL) Plutonium Facility- Building 332, and the Y-12 National Security Complex's Uranium Processing Facility (UPF) and Highly Enriched Uranium Materials Facility (HEUMF)-Building 9720-82. Summaries of these facility evaluations and reviews are contained in Table-5: *Facilities Without Performance Gaps*, of this report.

While the remaining ten (10) facilities were identified as having performance gaps, upgrades to eliminate the gaps were not recommended. For these facilities there was either no or low benefit to the cost of implementing upgrades, the performance criteria used to evaluate the

facilities HVAC systems was not applicable, or a replacement facility was already in the planning or design phase. These facilities are: Pantex's Building 12-44 Cell 8, Building 12-64, and Building 12-116. It also includes the Nevada National Security Site's Device Assembly Facility/Criticality Experiments Facility (DAF/CEF), and Sandia National Laboratories' Annular Core Research Reactor (ACRR). In addition, it includes the Savannah River Site's Pit Disassembly and Conversion Facility (PDCF) and Waste Solidification Building (WSB), as well as, Y-12's 9212 Complex, 9215 Complex and the 9204/2E Facility. Summaries of the evaluations for these facilities are contained in Table-4: *Facilities With Reported Performance Gaps – Upgrades Not Recommended*, of this report.

Based on a review of the ventilation system evaluation reports, NA-17 concluded that the NNSA sites fulfilled the expectations for facility specific ventilation system evaluations, as identified in the DOE IP.

Although the NA-17 review of the Ventilation System Evaluation Reports only identified one (1) facility that requires upgrades or modifications to resolve performance gaps, the process of performing and reviewing the system evaluations that resulted from DNFSB Recommendation 2004-2 provided valuable information that will contribute to decision making processes for planning future system upgrades and or modifications at other NNSA sites.

## INTRODUCTION

This evaluation was required by the Department of Energy's Implementation Plan, Deliverable 8.6.5. The IP was produced in response to DNFSB Recommendation 2004-2, *Active Confinement Systems*.

The IP required that evaluations be performed to assess whether there are any performance gaps between existing and new confinement ventilation systems (CVS) and the expected performance attributes defined either through the site specific Documented Safety Analyses (DSA) or Table 5-1 *Ventilation System Performance Criteria of the VSEG*. The IP also required that a ventilation system evaluation report be submitted for review and approval for each facility/system that was not excluded from the evaluation. Per the IP, the overall focus of the system evaluations was to:

1. Verify that appropriate performance criteria were derived for ventilation systems.
2. Verify that the systems can meet the performance criteria, if applicable.
3. Determine if any physical modifications are necessary to enhance safety performance.

The DOE IP and *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* (VSEG) document provided specific guidance for the CVS evaluation process, the review process, and/or the performance criteria that the systems were evaluated against. The system evaluations were performed by facility evaluation teams (FET). The FETs were led by DOE site personnel and were composed of DOE, and Management & Operating (M&O)

contractor personnel. Upon completion of their evaluations, each FET provided an evaluation report that was subsequently reviewed by the IRP, CDNS, the Service Center and/or NA-17.

IP Deliverable 8.6.5 required the NA-17 review in order to provide concurrence and approval on the disposition of facility ventilation system performance gaps identified in the ventilation system evaluation reports. The NA-17 review also assessed the applicability and use of cost/benefit considerations that were included in the reports for the proposed modifications. The sixteen facilities/systems assessed for performance gaps are listed in Table-1.

**Table-1**

LANL	LLNL	NTS	Pantex	SNL	SRS	Y12
PF-4	332	DAF/CEF	12-64	ACRR	PDCF	UPF
CMRR			12-44 Cell 8		WSB	9212
RLWTF			12-116			9720-82
						9215
						9204/2E

## VENTILATION SYSTEM EVALUATIONS

### LOS ALAMOS NATIONAL LABORATORY (LANL)

#### **Technical Area-55 (TA-55), Plutonium Processing Facility (PF-4):**

Currently, PF-4 has a Safety Class (SC) “passive” confinement ventilation system, which includes, supply and exhaust HEPA filters, plenums, ductwork, and confinement doors used to enter and exit PF-4. It also has an “active” safety significant (SS) confinement system that consists of supply and exhaust fans, dampers/valves, and instrumentation and controls that provide ventilation, pressure control and space temperature control for the interior of PF-4. The ventilation exhaust system is defined as the glovebox exhaust, bleed-off exhaust and basement exhaust systems. Basement supply, corridor supply, recirculation and Isotope Fuels Impact Test Facility (IFIT) systems will remain safety significant. Currently during off-normal conditions, the active SS ventilation fans are shut down and the pressures between zones 1,2, and 3 are allowed to equalize. The remainder of the ventilation system is “Balance of Plant” and provides no safety function. This includes the basement recirculation filters, air conditioning plenums and the associated basement recirculation ductwork. Also included are the area 100, 200, and 300 Zone 1 air dryers and the ductwork upstream of the HEPA filter containment housings for the dryer outlets.

The *PF-4 Ventilation System Evaluation Report* identified numerous gaps between the currently installed PF-4 confinement ventilation systems and the performance criteria identified in the DOE VSEG document. The report also identified gaps between the performance criteria and proposed system modifications. Due to the high number of performance gaps that were

identified, the ventilation system evaluation report should be consulted for more definitive gap information.

Of the eleven (11) proposed modifications that were evaluated, four (4) required modifications or upgrades to the ventilation systems. Each of the four (4) ventilation system related upgrades were evaluated for performance compliance with the VSEG document. In addition, each of the eleven proposed modifications was evaluated for a calculated mitigated dose that was associated with the accident "Seismic Impact on PF-4 – With Fire".

The report concludes that seismically qualifying 100 glovebox support stands and upgrading the bleed-off system to SC would enhance overall protection to the public for all operational accidents, but would not be adequate for an evaluation basis earthquake (EBE). This option is estimated to cost \$104M and would result in a calculated mitigated dose of 9 rem.

The IRP concluded that the PF-4 Ventilation System Evaluation was, in general, performed in accordance with the 2004-2 VSEG. The review team recommended that the site pursue implementing the recommendations by upgrading the bleed-off system and seismically qualifying the glove boxes. The team further recommended "consideration of additional controls that could be used to ensure building integrity" and that further evaluation of the proposed modifications should be performed prior to NNSA approval.

NA-17 concurs with the IRP recommendations

***Recommendation 2009-2 Implications for LANL's PF-4 Facility:***

On October 26, 2009, the Board issued Recommendation 2009-2, *Los Alamos National Laboratory Plutonium Facility Seismic Safety*. The Recommendation states that the mitigated off-site consequences to the maximally exposed offsite individual from a seismically induced fire would exceed the Department of Energy (DOE) Evaluation Guideline of 25 rem by more than two orders of magnitude. According to the 2009-2 IP, by September 2011, PF-4 will have either an approved refined accident analysis and controls that demonstrate mitigated consequences for seismic events are well below the Evaluation Guideline or an executable strategy to achieve mitigated consequences that no longer challenge the evaluation guideline for seismic events.

Due to the duplication of effort and the overlap of objectives between Recommendation 2009-2 and Recommendation 2004-2, NA-17 recommends that the decision to implement previously identified Recommendation 2004-2 modifications or upgrades be postponed until the Recommendation 2009-2 IP has been completed.

**Chemistry and Metallurgy Research Replacement Facility (CMRR):**

The CMRR nuclear facility is a proposed new non-reactor facility to be constructed at the LANL TA-55 to replace the capabilities of the aging CMR facility. The current design of the SS Active Confinement Ventilation System (ACVS) is comprised of subsystems of the Security Category 1 Building HVAC System: HEPA Filtered Active Ventilation-Zones 1, 2, and 3 and HEPA Filtered

Active Ventilation-PF-4 Tunnel. These subsystems rely upon the SS portions of eight support systems to perform their safety function.

The ACVS is an important contributor to minimizing public and collocated worker exposure. System elements were designed to perform its safety function at the seismic Performance Category (PC)-3 level. The ACVS should be available to operate during all postulated design basis accidents (DBAs), with the possible exception of a seismic event. Even in a seismic event, where normal offsite electrical power is not lost, it is highly likely that the ACVS will continue to run due to the seismic qualification and degree of redundancy of the system and support systems. If normal off-site power is lost, the ACVS is designed to safely transition to provide passive confinement through fail safe operation of dampers, HEPA filters and other components.

The results of the ventilation system evaluation demonstrate that the CMRR ACVS design meets all the performance criteria for a SS active confinement ventilation system. As a result, no gaps were identified.

The NNSA Los Alamos Site Office and Service Center staff has reviewed the ventilation system evaluation and concur on the report. NA-17 concluded that the ventilation system evaluation and report met the requirements of Board Recommendation 2004-2, and the DOE IP and VSEG documents.

NA-17 concurs with the finding that no gaps were identified.

**Radioactive Liquid Waste Treatment Facility (RLWTF):**

The new RLWTF is currently in the definitive design phase. It is a replacement for the current RLWTF at TA-50 at LANL. The radioactive material at the RLWTF is comprised mostly of liquid wastewater and sludge.

The HVAC system consists of HVAC units that provide conditioned air to facility spaces and exhaust ventilation system that exhausts air from facility spaces. The exhaust system provides differential pressure control and ensures that air flows from clean areas to areas with an increasing potential of airborne contamination.

Although the ventilation system is classified as a non-safety (“defense-in-depth”) system, it was evaluated for adherence to the VSEG Table 5-1 SS performance criteria. The design of the RLWTF’s ventilation system complies with all applicable SS performance criteria related to system design. Performance criteria associated with external hazards, such as, tornados, floods, wind, etc. were determined to be “Not Applicable” because the ventilation system was not credited in the Preliminary Documented Safety Analysis (PDSA) for these types of events. As a result, the RLWTF ventilation system evaluation report concluded that no gaps between system design and the applicable criteria were identified.

An independent review of the RLWTF Upgrade Project ventilation system evaluation report performed by the NNSA Service Center concluded that the report was prepared according to the established guidance. The Service Center did, however, make several observations, including the following:

1. Some requirements of maintenance and operation need to be identified and satisfied during the design phase prior to the completion of final design.
2. Future revisions/upgrades of the PDSA should reconsider the basis for categorization of the facility as a Hazard Category (HC)-2 nuclear facility such that the facility would meet HC-3 criteria.

Although the Service Center was concerned about the design being very specific as to how some design and performance requirements would be realized, they ultimately concurred with the results of the ventilation system evaluation report.

NA-17 concurs with the finding that there are no gaps between the design and the VSEG Table 5-1 performance criteria.

### **LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL)**

#### **Plutonium Facility, Building 332:**

Building 332 (B332) is a Hazard Category 2 facility with SC building structure, SC and SS active ventilation systems with final HEPA filtration, and SC emergency power system (EPS) for containment control and worker protection. The CVS consists of three systems which are classified as SC for the corridor and lab areas and SS for the glove box area.

The confinement ventilation strategy consists of three increasingly negative pressure differential zones. This strategy promotes movement of contamination toward areas of higher contamination during off-normal events.

Some notable system characteristics are:

1. SC and SS ventilation systems are backed up by a safety class EPS.
2. The Zones 1 and 2 room ventilation system (RVS) and glovebox exhaust system (GBES) are credited to function during and after the design basis earthquake.
3. To prevent positive pressure differential, the RVS exhaust is interlocked with the RVS supply.
4. Systems have fan redundancy for protection against equipment outages
5. The facility uses a SC fire suppression system to mitigate fires that challenge the building confinement systems.

The confinement ventilation systems were evaluated against the Table 5-1 *Ventilation System Performance Criteria*. While no new gaps were identified during this evaluation, two existing safety enhancements have previously been identified and are noted in the DSA for B332.

Based on their evaluation, LLNL concluded that B332 confinement ventilation systems comply with the Table 5-1 performance criteria.

The IRP concluded that LLNL appropriately evaluated the confinement ventilation system against DOE's Ventilation System Evaluation performance criteria. The IRP accepted LLNL's conclusion that no gaps were identified and, as a result, recommended that the NNSA accept the evaluation.

NA-17 concurs with the finding that there are no gaps between the design and VSEG Table 5-1 performance criteria.

### **NEVADA NATIONAL SECURITY SITE (NNS)**

#### **Device Assembly Facility/Criticality Experiments Facility (DAF/CEF):**

The DAF is a two-story heavily reinforced, concrete multi-structure complex with approximately 100,000 ft<sup>2</sup>. The CEF is a line item construction project to modify the DAF, to accommodate four critical assembly machines (CAM) previously located within TA-18 at LANL.

CEF and DAF buildings that have not been categorically excluded were evaluated in accordance with the DOE VSEG document. Each non-excluded facility/system was evaluated to determine compliance with performance criteria, as well as the safety classification of the CEF and DAF active confinement ventilation systems.

In general, each of the DAF operations buildings has its own ventilation system, which includes supply, conditioning, recirculation and exhaust. For buildings where high explosive or radioactive material can be located, the ventilation system supply air and exhaust have single-stage HEPA filters. DAF operations buildings are maintained at a negative pressure differential relative to the corridor and the corridor is maintained at a positive differential pressure relative to the outside atmosphere. This ventilation strategy prevents external dust particles from entering the building and accidental releases are contained within DAF buildings.

The SS portions of the ventilation systems are the HEPA filters and the ductwork from the building to the HEPA filter, for both the supply and exhaust paths. The hazard and accident analyses determined that ventilation system components that provide passive confinement provide sufficient mitigation and the ACVS provides defense in depth (DID) and is designated as important to safety.

The DAF and CEF confinement ventilation systems do not meet some of the DOE VSEG Table 5-1 required SS performance criteria. They include:

1. There is no documented evidence that the confinement systems are able to withstand a design basis earthquake.
2. The ventilation system materials of construction do not provide an airtight confinement boundary.

3. The exhaust system cannot reliably withstand anticipated normal, abnormal and accident system conditions and maintain confinement integrity.
4. Seven gaps were identified pertaining to instrumentation and controls performance criteria. These gaps were determined to be acceptable vulnerabilities requiring no modification to the facility or safety analysis because no consequence reduction was taken for active confinement in the accident analysis.

The NNS DAF/CEF FET concluded that the identified gaps were acceptable vulnerabilities that required no modification to either the safety analysis or the facility because the active confinement ventilation system was not credited to provide any frequency or consequence reduction in the accident analysis. As a result, a cost/benefit analysis for correcting the gaps was not required.

The IRP recommended that the NNSA accept the DAF/CEF Confinement Ventilation System Evaluation.

NA-17 concurs with the IRP recommendation.

## **PANTEX PLANT**

### **Building 12-64:**

The HVAC systems for building 12-64 do not provide any safety function for accident mitigation, do not employ a confinement ventilation strategy, are not credited in the DSA and are therefore not classified as safety class, safety significant or important to safety. The design basis accidents for pit operations in Building 12-64 have the potential consequences of Mechanical Release and Burning Dispersal.

For Mechanical Release, the doses to the collocated worker and offsite personnel are much less than one (1) rem. For a Burning Dispersal, assuming the worst case scenario where all exposed pits are involved in the fire, the dose to the collocated worker is less than ten (10) rem and the dose to offsite personnel is less than one (1) rem.

Based on the controls to prevent a release and the consequences to the collocated worker and the public from a release involving a full facility fire, the HVAC system is not credited for any mitigation (based on existing analysis in the Site wide SAR).

Despite the lack of safety related functions for Building 12-64's HVAC system, the facility was evaluated for compliance with Table 5-1's Defense-In-Depth performance criteria. The ventilation system analysis concluded that there are significant gaps between the system and the performance criteria. Although the analysis identified six (6) required upgrades, with cost estimates, actual Table 5-1 results indicate that individual performance criterion was determined to be either not applicable (N.A.) because the system is "not credited in the accident analysis" or "criteria not met".

Evaluation of some of the performance criteria resulted in conflicting determinations. While the ventilation evaluation report states that the 12-64 facility does not have confinement ventilation systems, some of the evaluation results indicate “criteria not met” when the performance criterion was for a confinement system. These determinations, which should have led to findings of N.A., instead led to determination that there were gaps between the current systems and performance criteria.

Because these systems do not provide a safety function for accident mitigation and are not credited in the DSA, the Pantex Building 12-64 ventilation system FET concluded that there is no benefit to the costs associated with modifying/upgrading the ventilation system to eliminate the gaps.

The IRP recommended that Pantex perform a cost-benefit analysis in accordance with the 2004-2 ventilation system evaluation guidance in order to determine if any ventilation system improvements are warranted.

Considering that Building 12-64 does not have HEPA filtration, exhaust fans or confinement ventilation ductwork, and is not credited in the DSA, NA-17 agreed with the Pantex FET conclusion that there is no benefit to the costs associated with eliminating the identified gaps by modifying/upgrading the ventilation system to meet the criteria for an active confinement ventilation system.

**Building 12-44 Cell 8:**

The HVAC systems for Building 12-44, Cell 8 is designed to provide a clean, dust-free, pressure and temperature controlled environment in the cell. The systems do not provide any safety function for accident mitigation, do not employ a confinement ventilation strategy, are not credited in the DSA and are therefore not classified as safety class, safety significant or important to safety (defense-in-depth).

The design basis accidents for pit operations in Building 12-44 Cell 8 have the potential consequences of Mechanical Release and Burning Dispersal.

For Mechanical Release, the dose to the collocated worker is less than two rem, and offsite personnel are much less than one (1) rem. For a Burning Dispersal, assuming the worst case scenario where all exposed pits are involved in the fire. The dose to the collocated worker is less than ten (10) rem and the dose to offsite personnel is less than one (1) rem.

Based on the controls to prevent a release and the consequences to the co-located worker and the public from a release involving a full facility fire, the HVAC system is not credited for any mitigation.

Despite the lack of safety related functions for Building 12-44 Cell 8's HVAC system, the facility was evaluated for compliance with Table 5-1 performance criteria. The ventilation system

analysis concluded that there are significant gaps between the system and the performance criteria. Although the analysis identified six (6) required upgrades, with cost estimates, actual Table 5-1 results indicate that individual performance criterion was determined to be either not applicable (N.A.) because the system is “not credited in the accident analysis” or “criteria not met”.

Evaluation of some of the performance criteria resulted in conflicting determinations. While the ventilation evaluation report states that the 12-44 facility does not have confinement ventilation systems, some of the evaluation results indicate “criteria not met” when the performance criterion was for a confinement system. These determinations, which should have led to findings of N.A., instead led to the determination that there were gaps between the current systems and performance criteria.

The IRP recommended that Pantex perform a cost-benefit analysis in accordance with the 2004-2 ventilation system evaluation guidance in order to determine if any ventilation system improvements are warranted.

The 12-44 Cell 8 does not have HEPA filtration for nuclear filtration, exhaust fans or confinement ventilation ductwork, and is not credited in the DSA, as a result, NA-17 agreed with the Pantex FET conclusions that there is no benefit to the estimated costs associated with eliminating the identified gaps by modifying/upgrading the ventilation system to meet the criteria for an active confinement ventilation system.

**Building 12-116:**

The HVAC systems for building 12-116 do not provide any safety function for accident mitigation, do not employ a confinement ventilation strategy, are not credited in the DSA and are therefore not classified as safety class, safety significant or important to safety (DID).

The design basis accidents for pit operations in Building 12-116 have the potential consequences of Mechanical Release and Burning Dispersal.

For Mechanical Release, the dose to the collocated worker is less than one rem, and offsite personnel are much less than one (1) rem. For a Burning Dispersal, assuming the worst case scenario where all exposed pits are involved in the fire. The dose to the collocated worker is less than ten (10) rem and the dose to offsite personnel is less than one (1) rem.

There are a total of 11 air handling units that serve 12-116. These units provide for pressure, temperature and confinement of radioactive materials. Based on the controls to prevent a release, however, the HVAC systems are not credited in any of the hazard or accident analysis to provide confinement or containment.

Per the requirements of the Ventilation System Evaluation document, Building 12-116’s HVAC system, the facility was evaluated for compliance with Table 5-1 performance criteria. The ventilation system analysis concluded that there are significant gaps between the system and

the performance criteria. The analysis identified five (5) required upgrades, with cost estimates.

Although the 12-116 facility does have confinement ventilation systems, they are not credited to provide confinement or containment. Despite this fact, it was appropriate for Pantex to determine whether there were any performance gaps between the current systems and performance criteria. Additionally, even though Pantex provided an estimated cost for correcting each gap, they did not perform a cost benefit analysis per requirements of the 2004 Ventilation System Evaluation Guide.

The IRP concluded that the Building 12-116 ventilation system report was performed, in most aspects, in accordance with the 2004-2 VSEG. However, the cost/benefit analysis of modifications to eliminate the gaps was not consistent with the process outlined in the Guide. As a result, the IRP recommended that Pantex revise their ventilation system evaluation report, such that it includes a cost/benefit analysis that meets the intent of the Evaluation Guide.

NA-17 concluded that, although the cost/benefit analysis was not properly performed, the HVAC system does not contribute to passive confinement of nuclear materials and therefore, upgrading to active confinement ventilation would not be beneficial.

### **SANDIA NATIONAL LABORATORIES (SNL)**

#### **Annular Core Research Reactor (ACRR) Facility:**

The ACRR is a Hazard Category 2 facility designed with a combination of passive and active safety structures, systems, and components (SSC). However, the two ventilation systems at the ACRR (the High Bay ventilation and the Cavity Purge systems) are not identified as a SC or SS SSC, and they are not credited to prevent or mitigate any accidents identified in the DSA.

The reactor room is the space within building 6588 that houses the ACRR. The high bay ventilation system exhausts air from the ACRR and maintains negative pressure between the reactor room and its surrounding spaces. The Cavity Purge System maintains negative pressure differential with respect to the High Bay area. The air is filtered by a bank of HEPA and charcoal filters before release to the atmosphere. Although not required to mitigate any accident analysis and not required to function as a containment boundary, each system is available to control discharge of radioactive materials. Since the high bay ventilation and cavity purge systems are not designed and maintained to perform reliably under accident conditions these systems are shutdown in the event of an accident to eliminate a potential driving force for a radioactive material release.

The ventilation system evaluation results for the ACRR facility are contained in the original Ventilation System Evaluation report, dated July 30, 2007 and a follow-on Addendum, dated September 5, 2008. The original report evaluated the ACRR ventilation systems using the 2004-2 VSEG DID performance criteria. The Addendum provided an evaluation of the ventilation

systems using ten additional criteria identified for SS ventilation systems. Since the Addendum discussed two accident scenarios, the evaluation criteria for safety class were also addressed.

Based on the evaluated criteria, eight performance gaps were identified. While the ventilation systems would have an effect on normal, abnormal or anticipated accident conditions, major facility modification or construction of a new facility would be required to be able to take credit for the function in the Safety Analysis. The estimated costs of modifications to eliminate the performance gaps range from \$2-80M. Therefore, given the costs associated with modifying and/or upgrading the ventilation systems to meet the criteria for creditable active confinement ventilation systems, SNL determined that there is no benefit to the expense on implementing the upgrades.

The IRP concluded that Sandia Site Office's evaluation of the ACRR facility ventilation system was in most aspects performed in accordance with the process and criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.

NA-17 concurs with SNL and the IRP.

### **SAVANNAH RIVER SITE (SRS)**

#### **Pit Disassembly and Conversion Facility (PDCF):**

The PDCF project is for a new facility in the detailed design phase. The PDCF building complex is a Hazard Category 2 facility consisting of seven (7) individual building systems. One of those building systems, the Pu Processing Building is the only facility structure processing and storing hazardous materials for which confinement ventilation system safety functions are credited. Its ACVS is functionally classified as SC and is designed to meet PC-3 seismic criteria.

The primary confinement ventilation glovebox exhaust system, with the exception of the glovebox exhaust and plenum exhaust filters, is classified as SS and is designed to meet PC-2 criteria. Primary confinement ventilation glovebox exhaust is filtered through the SC sand filter, consequently the primary exhaust filters are not credited as providing confinement filtration functions.

The SC and SS CVS subsystems were evaluated for conformance with Table 5-1 performance criteria. The evaluation results were published in the Ventilation System Evaluation report (dated September 27, 2007). Three gaps, that were deemed to be discretionary, were identified. The evaluation did not identify any gaps involving a discrepancy between the safety basis requirements and the facility design. The FET recommended that one of the discretionary gaps, post accident indication of filter break-through, be carried forward to closure. The recommended closure action is to; (1) upgrade a sample collection system (to monitor radiological conditions) at the sand filter exhaust to PC-3 NPH criteria and (2) emergency power is warranted to enhance emergency management assessment and monitoring for postulated accidents. The estimated cost is \$100,000.

While there was no evidence of review of this system evaluation by an IRP, NA-17 concluded that the ventilation system evaluation performed by SRS generally complied with the evaluation process requirements. As a result,

While NA-17 concurs with the results and recommendations of this report there have been some recent developments affecting the SRS PDCF Facility. DOE has now decided to revisit the decision to build the new PDCF facility and is currently considering an alternative approach that involves modifying an existing facility, the K-105 Building, to accomplish the same mission. That project is referred to as the PDC Project (no "F".) If the PDC Project alternative is selected, then the PDCF ventilation system evaluation becomes irrelevant. In this scenario the PDC Project will conform to requirements of DOE O 420.1B, DOE O 413.3B and DOE-STD 1189-2008, in addition to the requirements of the 2004-2 evaluation criteria and other applicable orders and standards.

**Waste Solidification Building (WSB):**

The WSB will be a new two-story building that will process and solidify the liquid waste from the MOX Fuel Fabrication Facility (MFFF) and the Pit disassembly and Conversion Facility (PDCF). The WSB design includes an ACVS that has several subsystems, including a HEPA filter exhaust subsystem. Airflow cascades through the building's tertiary, secondary and primary confinement zones. Two of the ACVS subsystems are classified as SS, based on the PDSA and the Consolidated Hazards Analysis (CHA). The system is not expected to operate following a seismic event and is not credited to function in the accident analysis.

The ventilation system evaluation identified one performance gap; the design of the ACVS SS subsystems did not comply with the SC single failure criterion. To eliminate this gap would require a redesign of the Active Confinement Ventilation System (ACVS) and supporting electrical distribution system to safety class requirements. The cost of design and has been estimated to be between \$35 million to \$50 million.

Additional information included in the ventilation system evaluation report states that the current facility design provides sufficient passive and active features to mitigate the consequences well below the worker criteria or the ventilation evaluation criteria of 1 rem. As a result, it has been determined that there is no discernable benefit from eliminating the identified gap by elevating the functional classification of the WSB ACVS to SC.

The IRP reviewed SRS WSB Ventilation System Evaluation report and concluded that the report had appropriately followed the Ventilation System Evaluation Guide. The IRP recommended that the NNSA accept the WSB Ventilation System Evaluation report as fulfilling the expectations for the facility specific ventilation system evaluation identified in the DOE's Implementation Plan.

NA-17 concurs that the SRS WSB System Evaluation Report should be accepted as meeting the process requirements and performance criteria from DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document.

## Y-12 NATIONAL SECURITY COMPLEX

### Uranium Processing Facility (UPF):

At the time of the submittal of the ventilation system evaluation report the UPF project was in conceptual design phase awaiting CD-1 approval. Only the processing building will process and store hazardous materials for which confinement ventilation system (CVS) safety functions will be credited. The UPF will be provided with both primary and secondary confinement ventilation systems. The primary confinement will consist of the Primary Confinement Exhaust (PCE) systems and the Off-Gas system. These systems will be classified as SS and will be designed to meet PC-3 performance criteria. Table-2 lists the various systems and areas served.

**Table-2**

System	SC	SS	Area(s) Served	Operating Mode
Active Primary Conf. Exhaust (PCE)		X	Zone 1 Gloveboxes, enclosures and hoods	Normal & post accident
Active Off-Gas		X	Zone 1 tanks, vessels, dissolvers, etc.	Normal & post accident
Active Secondary Conf. Ex. Sys (SCES)		X	Zone 3 Hallways & catwalks	Normal & post accident
Non-active Normal Secondary Conf. (NSCS)			Zone 2 Process operating areas	Provides Defense in Depth during normal operations
Fire Barriers (passive)	X			Reduces the unmitigated doses to < 5 rem

The SS Confinement Ventilation Systems were evaluated using Table 5-1 performance criteria. The evaluation did not identify any gaps involving a discrepancy between the safety basis requirements, the facility design criteria, or DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document.

The IRP concluded that Y-12's evaluation of the UPF ventilation system was performed in accordance with the criteria in the 2004-2 Ventilation System Evaluation Guide and that an appropriate confinement strategy had been selected for the UPF. The IRP recommended that the NNSA accept the UPF Ventilation System Evaluation as fulfilling the expectations for facility specific ventilation system evaluations identified in DOE's Implementation Plan.

NA-17 concurs with the IRP recommendation.

**9212 Complex:**

The 9212 Complex is a Hazard Category 2 facility. The primary operations performed in the 9212 complex involve enriched uranium. A replacement facility is currently in preliminary design and is scheduled to be in operation in 2018. The ventilation system evaluation was conducted in accordance with DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document. The evaluation focused on two areas:

1. An evaluation of the appropriateness of the current functional classification of the ventilation systems as documented in the safety basis.
2. An evaluation of the ventilation systems against the ventilation system performance criteria (i.e. safety class or safety significant).

Ventilation within each wing of the 9212 Complex typically consists of some combination of a general area supply fan(s), localized general area exhaust fan and process exhaust systems. The general area exhaust systems contain no filtration features. As a result the focus of the report was on the 21 process exhaust systems. Of these 21 exhaust systems, only one system, the SS Stack 518, The Dock 8A Scrubber, is credited in the 9212 Complex SAR as a safety system (non-nuclear) to mitigate the release of Hydrogen Fluoride (HF). None of the 21 process exhaust systems have a safety function of mitigating the consequences of a release of radioactive materials.

Safety Class criteria were selected as the evaluation basis for Stacks 110 and 134. The other systems were evaluated against the Safety significant performance criteria. The result of the evaluation was that a few gaps were identified where installed systems did not meet certain performance criteria. Although some system modifications were recommended as a result of the gap analysis, the systems that were evaluated were process exhaust systems and not systems that were dedicated to the confinement of airborne radioactive material. While the suggested modifications may be advisable from a facility maintenance & repair perspective, their implementation is outside the scope of DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document.

Based on consideration of the full set of presently approved safety controls, Y-12 concluded that the benefits of upgrading to achieve full compliance are not justified by the cost. However, cost effective modifications have been proposed that are expected to significantly improve the current operating state of the process ventilation systems and provide a net reduction of the overall risk. The proposed modifications are as follows:

1. Replace the Stack 38 (classified as DiD) filter housing and exhaust fan (projected cost; \$850K).
2. Install HEPA filters in the Stack 43 (classified as DiD) system (projected cost; \$850K).
3. Deteriorated area exhaust fans should be replaced. (projected cost; \$200K)

These proposed modifications have been evaluated as a part of an overall Facility Risk Review (FRR). The FRR recommends and planning has been initiated for funding to accomplish the identified ventilation upgrades.

The NNSA CDNS and IRP concluded that Y-12's evaluations and results are technically sound and appropriate, and meet the intent of the IP.

NA-17 concurs with the IRP, CDNS and Y-12 recommendations

**Highly Enriched Uranium Materials Facility (HEUMF) Building 9720-82:**

At the time the ventilation report was submitted, The Highly Enriched Uranium Materials Facility (HEUMF) 9720-82 was a new design for a soon to be constructed facility. The HEUMF facility has since been constructed and is now in operation. It is a Hazard Category 2 non-reactor nuclear facility, consisting of a complex of buildings that includes a Mechanical and Electrical Support Building, Administration Building, Storage Building and Dock Area.

The principal safety function of the confinement system is to reduce the potential for release of radioactive or other hazardous particulate material from the confinement boundary during a design basis fire that could result in a release of hazardous material. The confinement system is referred to as the Secondary Confinement System (SCS). The SCS consists of the Secondary Confinement Boundary (SCB), the Secondary Confinement Isolation System (SCS/IS), the Secondary confinement Exhaust System (SCS/ES), and the Secondary Confinement Status Monitoring System (SCS/SM). These systems together provide for the credited safety function and, with the exception of the SCS/SM, are classified as SS.

The evaluation of the confinement system was performed in accordance with Table 5-1 performance criteria. No gaps with respect to design and operational requirements were identified.

As a result of its review, the IRP concluded that the evaluation of the HEUMF confinement ventilation system was performed in accordance with the criteria in the 2004-2 Ventilation System Evaluation Guide and that selection of a safety significant active ventilation system is appropriate for the HEUMF. The IRP recommended that the NNSA accept the HEUMF Ventilation System Evaluation as fulfilling the expectations for facility specific ventilation system evaluations identified in DOE's Implementation Plan.

NA-17 concurs with the IRP.

**9215 Complex:**

The 9215 Complex is a Hazard Category 2 facility. A replacement facility for the portions of the facility that perform enriched uranium operations is currently in design. The DSA for the 9215 Complex does not identify any ventilation systems as SC or SS. Based on its Hazard Category 2 classification, however, the HEPA filtered ventilation system (Stack 3) was evaluated against the SS performance criteria. The consequences of major facility events are primarily bounded by

large facility fires, which are controlled through the implementation of fire protection controls, which are designated safety significant.

The result of CVS evaluation revealed that there are significant gaps between the existing 9215 complex ventilation systems and the Table 5-1 performance criteria. The following gaps were identified:

1. Controls are not presently in place to maintain zone differential pressures.
2. Most materials of construction for ductwork, HEPA filter housings and HEPA filters are acceptable. Other materials are acceptable for normal and accident conditions except large fires and explosions.
3. The exhaust system and specifically the HEPA filtration cannot be relied on to withstand explosion events, nuclear criticality accidents, large fires, and natural phenomena accident system conditions and maintain confinement integrity.
4. The filtration is adequate for capture of particulate effluent, but will not capture gaseous effluent generated during accident conditions.
5. Exhaust and supply fans are not interlocked

Based upon the adequacy of existing controls within the facility, the significant costs of the proposed upgrades, the nominal reduction of total risk for the facility operations, and the limited remaining operational life, Y-12 recommended not implementing modifications to close gaps with the safety significant performance measures.

The NNSA CDNS and IRP concluded that the evaluations and their results are technically sound and appropriate, and meet the intent of the IP.

Because Building 9215's ventilation systems are not classified as SC or SS, and that a replacement facility, the Uranium Processing Facility (the UPF), is already planned to go into operation in 2018, NA-17 concurs with the IRP, CDNS and Y-12 recommendations.

#### **9204/2E Facility:**

The 9204/2E Facility is a Hazard Category 2 facility. The categorization is based on the potential for a nuclear criticality and the total amount of uranium present within the facility. The Uranium Processing Facility, a replacement facility for the facility's nuclear operations is currently in preliminary design. The schedule for the replacement facility to be operational is 2018.

The ventilation system evaluation was conducted in accordance with DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document. The evaluation focused on two areas:

1. An evaluation of the appropriateness of the current functional classification of the ventilation systems as documented in the safety basis.

2. An evaluation of the ventilation systems against the ventilation system performance criteria (i.e. safety class or safety significant).

The general building ventilation is not HEPA filtered, therefore, the ventilation report focused on the process exhaust systems. None of these systems are credited for a confinement or containment function. In addition, they are not credited for prevention or mitigation of consequences during a fire and or explosion event. Exhaust system components associated with the Disassemble Glovebox and the QE Linear Glovebox are classified as safety significant to prevent nuclear criticality accidents, primarily through preventing introduction of a moderator.

The gap analysis findings can be summarized into four categories;

1. Lack of confinement pressurization zones.
2. Lack of fire protection measures to maintain system operability during a fire event.
3. Lack of exhaust treatment systems capable of removing toxic gaseous effluents.
4. The lack of back-up power to assure continuous operability of the Disassemble Glovebox, the QE Linear Glovebox and Stack 101.

For the major facility events the establishment of active confinement ventilation zones could function to provide an alternative mechanism for mitigation from the current control set analyzed and prescribed by the safety analysis. Significant facility modifications, however, would be required to implement non-mandatory active confinement ventilation zones.

Identified upgrades include:

1. Fire Protection Measures (estimated cost \$6M)
2. Add wet scrubbers or charcoal absorbers (estimated cost \$3M)
3. Back up emergency power (estimated cost \$3M)

Based upon the adequacy of existing controls within the facility, the significant costs of the proposed upgrades, the nominal reduction of total risk for the facility operations, and the limited remaining operational life, Y-12 recommended not implementing modifications to close gaps with the safety significant performance measures.

The NNSA CDNS and IRP concluded that Y-12's evaluation and results are technically sound and appropriate, and meet the intent of the IP.

Due to their estimated costs and the potential duration for completion of the modifications (approximately 7 – 10 years), implementation of this modification would result in minimal benefit. As a result, NA-17 concurs with the IRP, CDNS and Y-12 recommendations.

## **SUMMARY**

Twenty eight (28) facilities were identified as requiring ventilation system evaluations per DOE's *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems*

document. Ultimately, nine (9) of the facilities were excluded from evaluation. Two (2) new design projects were canceled and one (1) existing facility is/will be deactivated. The remaining sixteen (16) facilities were evaluated and had system evaluation reports submitted for review.

In most of the ventilation system evaluations, the SSCs were evaluated against performance criteria applicable to their assigned safety function as identified in the DSA. When there was no assigned safety function SSCs were evaluated against Table 5-1 performance criteria for the safety class, safety significant or defense-in-depth categories.

Of the facilities that were identified as having performance gaps, the LANL PF-4 is the only facility that received the joint recommendation of the FET, the IRP and NA-17 that upgrades and/or modifications were needed to eliminate the performance gaps: A summary of the evaluation and reviews are contained in Table-3.

**Table 3: LANL PF-4**

<b>Performance Gaps</b>	<b>Recommended Gap Closure Strategy</b>	<b>Reviewing Organization Comments</b>
Significant and numerous gaps were identified: See the ventilation system evaluation report for specifics.	Per the evaluation report, none of the 11 gap closure strategy options would completely fill all the gap criteria. The following strategies were recommended: <ol style="list-style-type: none"> <li>1. Seismically qualify 100 glovebox support stands.</li> <li>2. Upgrade the bleed-off system to SC.</li> <li>3. Combinations of options should be further evaluated.</li> </ol>	The IRP/CTA review team endorsed the proposal to upgrade portions of the ACVS to SC, but recommends further evaluation of the proposed improvements be performed prior to implementation of gap closure strategies.  NA-17 concurs with the IRP/CTA review team.  The decision to implement gap closure strategies, however, will be postponed until completion of the Recommendation 2009-2 Implementation Plan.

Ten (10) other facilities with identified to have performance gaps when they were evaluated against DOE's, *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document. They include the; NNS DAF/CEF, Pantex 12-64, Pantex 12-44 Cell 8, Pantex 12-116, SNL ACRR, SRS PDCF, SRS WSB, Y-12 9212, Y-12 9215, and Y-12 9204/2E. Of these facilities/systems some did not have a safety function and were not credited to prevent or mitigate any accidents identified in the DSA. For other systems, although they did not perform a nuclear material confinement function, they were determined to have gaps when evaluated against Table 5-1 SC, SS or DID performance criteria, but were not recommended by

either the FET, the IRP or NA-17 for upgrades/modifications. Summaries of their evaluations are contained in Table-4.

**Table-4: Facilities With Reported Performance Gaps – Upgrades Not Recommended**

Facility	Gap Discussion	Reviewing Organization Comments
<b>NNSS DAF/CEF</b>	Evaluators concluded that the identified gaps were acceptable vulnerabilities that required no modification to either the safety analysis or the facility because no consequence reduction was taken for active confinement ventilation in the accident analysis.	The IRP concurred with NNSS's Ventilation System Evaluation Report.  NA-17 concurred with The IRP and NNSS's conclusions.
<b>Pantex 12-44 Cell 8</b>	The 12-44 Cell 8 does not have HEPA filtration for nuclear filtration, exhaust fans or confinement ventilation ductwork, and is not credited in the DSA. Pantex concluded that there is no benefit to the costs of implementing upgrades to meet non-applicable performance criteria.	The IRP recommended that Pantex perform a cost/benefit analysis per guide requirements.  NA-17 concurred with Pantex that there is no benefit to the cost of implementing upgrades.
<b>Pantex 12-64</b>	Pantex 12-64 does not have HEPA filtration for nuclear filtration, exhaust fans or confinement ventilation ductwork, and is not credited in the DSA.	The IRP recommended that Pantex perform a cost/benefit analysis per guide requirements. NA-17 agreed with Pantex that there is no benefit to the estimated costs of implementing upgrades.
<b>Pantex 12-116</b>	The Pantex 12-116 HVAC system does not perform any safety functions and are not credited for the confinement of nuclear materials. As a result, Pantex concluded that upgrades would not be beneficial.	The IRP recommended that Pantex perform a cost/benefit analysis per guide requirements. NA-17 concurred with Pantex that the upgrades would not be beneficial.
<b>SNL ACRR</b>	Based on SC, SS and DID evaluation criteria, eight performance gaps were identified. The DID ACRR facility HVAC systems, however, are not credited to prevent or mitigate any accidents. Given the costs associated with modifying and/or upgrading the ventilation systems to meet the criteria for creditable active confinement ventilation systems, SNL determined that there is no benefit to the expense on implementing the upgrades.	The IRP concluded that SNL's evaluation of the ACRRF ventilation system was in most aspects performed in accordance with the process and criteria in the DNFSB 2004-2 Ventilation System Evaluation Guide.  NA-17 concurs with SNL and the IRP.

<b>SRS PDCF</b>	SRS identified three (3) gaps that were deemed to be discretionary. SRS recommended that one of the discretionary gaps be resolved by upgrading a sample collection system to monitor radiological conditions at the sand filter.	NA-17 concurred with the SRS recommendation.  DOE is now revisiting the decision to build the new PDCF facility. An alternative approach is to modify an existing facility to house the PDC processes. Under this scenario, the PDC Project will conform to requirements of DOE O 420.1B, DOE O 413.3B and DOE-STD 1189-2008, in addition to the requirements of the 2004-2 evaluation criteria and other applicable orders and standards.
<b>SRS WSB</b>	One performance gap, the SC single failure criterion, was identified. To eliminate the gap would require a redesign of the ACVS and supporting electrical system to SC requirements. SRS concluded that the benefits of resolving the gap do not justify the costs (\$35 – \$50M).	The IRP accepted the gap analysis and recommendations. NA-17 concurs with SRS and the IRP.
<b>Y-12 9212 Complex</b>	The evaluation assessed process exhaust systems and not nuclear exhaust systems. As a result, Y-12 determined the evaluation to be outside the scope of DOE's Ventilation System Evaluation Guide. Y-12 concluded that resolving the gaps were not cost effective since a replacement facility, the Uranium Processing Facility (the UPF), was planned for operation in 2018.	The NNSA CDNS and IRP concluded that Y-12's evaluation and results are technically sound and appropriate, and meet the intent of the IP.  NA-17 concurs with the IRP, CDNS and Y-12 recommendations.
<b>Y-12 9215</b>	The non-SC and non-SS systems were evaluated to SS performance criteria. As a result, several gaps were identified. Y-12 concluded that resolving the gaps were not cost effective since a replacement facility, the UPF, was planned for operation in 2018.	The NNSA CDNS and IRP concluded that Y-12's evaluation and results are technically sound and appropriate, and meet the intent of the IP.  NA-17 concurs with the IRP, CDNS and Y-12 recommendations.

<b>Y-12 9204/2E</b>	The evaluation assessed process exhaust systems and not nuclear exhaust systems. As a result, Y-12 determined the evaluation to be outside the scope of DOE's Ventilation System Evaluation Guide. Y-12 concluded that resolving the gaps were not cost effective since a replacement facility, the UPF, was planned for operation in 2018.	The NNSA CDNS and IRP concluded that Y-12's evaluation and results are technically sound and appropriate, and meet the intent of the IP.  NA-17 concurs with the IRP, CDNS and Y-12 recommendations.
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Five (5) facilities were determined to not have performance gaps. They are LANL's CMRR, LANL's RLWTF, LLNL's 332, Y-12's UPF, and Y-12's 9720-82 (HEUMF). Summaries of their evaluations are contained in Table-5.

**Table-5 - Facilities Without Performance Gaps**

<b>Facility</b>	<b>Gap Discussion</b>	<b>Reviewing Organization Comments</b>
<b>LANL CMRR</b>	Based on its system evaluation, LANL concluded that the CMRR ACVS design meets all the performance criteria for a SS active confinement ventilation system. As a result, no gaps were identified.	The NNSA Service Center reviewed the report and concurs with LANL's findings.  NA-17 concurs with the finding that no gaps were identified.
<b>LANL RLWTF</b>	Although the ventilation system is classified as a non-safety ("defense-in-depth") system, it was evaluated for adherence to Table 5-1 SS performance criteria. Performance criteria associated with external hazards, such as, tornados, floods, wind, etc. were determined to be "Not Applicable" because the ventilation system was not credited in the PDSA for these types of events. As a result, the RLWTF ventilation system evaluation report concluded that no gaps between system design and the applicable criteria were identified.	The NNSA Service Center reviewed the report and concurs with LANL's findings.  NA-17 concurs with the finding that no gaps were identified.
<b>LLNL 332</b>	Evaluation of the facility's SC and SS ventilation systems did not identify any performance gaps.	The IRP concurred with LLNL's conclusion that there were no performance gaps. NA-17 concurs with LLNL and the IRP's findings.
<b>Y-12 UPF</b>	The SS Confinement Ventilation Systems	The IRP recommended that the

	were evaluated using Table 5-1 performance criteria. The evaluation did not identify any gaps involving a discrepancy between the safety basis requirements, the facility design criteria, or DOE's <i>Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems</i> document.	NNSA accept the UPF Ventilation System Evaluation as fulfilling the expectations for facility specific ventilation system evaluations identified in DOE's Implementation Plan. NA-17 concurs with the IRP recommendation.
<b>Y-12 9720-82 (HEUMF)</b>	All subsystems of the Secondary Confinement System, excluding the Secondary Confinement Status Monitoring System, provide for the credited safety function and are classified as SS. No gaps with respect to design and operational requirements were identified.	The IRP recommended that the NNSA accept the HEUMF Ventilation System Evaluation report. NA-17 concurs with the IRP conclusions.

### CONCLUSIONS

Based on NA-17's review of the evaluation reports submitted by the various NNSA sites, it is concluded that LANL's PF-4 confinement ventilation systems do not comply with performance criteria identified in the DOE *Ventilation System Evaluation Guidance for Safety-Related and Non-Safety Related Systems* document.

The ventilation system evaluation reports for five facilities concluded that there were no gaps between the installed systems and the performance criteria. The report reviewers for those 5 sites concurred with the evaluation report conclusions. Those facilities are LANL's CMRR and the RLWTF, LLNL's Plutonium Facility- Building 332, and Y-12's UPF and HEUMF-Building 9720-82.

While the remaining ten (10) facilities were identified as having performance gaps, upgrades to eliminate the gaps were not recommended. For these facilities there was either no or low benefit to the cost of implementing upgrades, the performance criteria used to evaluate the facilities HVAC systems was not applicable, or a replacement facility was already in the planning or design phase. These facilities are: Pantex's Building 12-44 Cell 8, Building 12-64, and Building 12-116. It also includes NNSS's DAF/CEF, and SNL's ACRR. In addition, it includes the SRS's PDCF and WSB, as well as, Y-12's 9212 Complex, 9215 Complex and the 9204/2E Facility.

Based on its review of the ventilation system evaluation reports, NA-17 concluded that the NNSA sites fulfilled the expectations for facility specific ventilation system evaluations, as identified in DOE's IP.

The NA-17 evaluation was performed by Thomas C. Orr, Jr., with input provided by Andrew F. De La Paz.

This NA-17 report was prepared by Thomas C. Orr, Jr. For questions concerning this report, please contact Thomas Orr at 202-586-8955.