Department of Energy
National Nuclear Security Administration
Washington, DC 20585

October 3, 2002

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

Consistent with the Department of Energy's Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2000-2, Configuration Management, Vital Safety Systems, I am forwarding an initial Phase II Assessment Report from the Nevada Operations Office, Waste Examination Facility, Visual Examination and Repackaging Building, Confinement Ventilation System. The final initial Phase II Report from Sandia National Laboratories will be forwarded upon completion.

If you have questions, please contact me at (202) 586-2179 or have your staff contact Mr. Jeff Kimball at (301) 903-6413.

Sincerely,

Everet H. Beckner
Deputy Administrator
for Defense Programs

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02-2069

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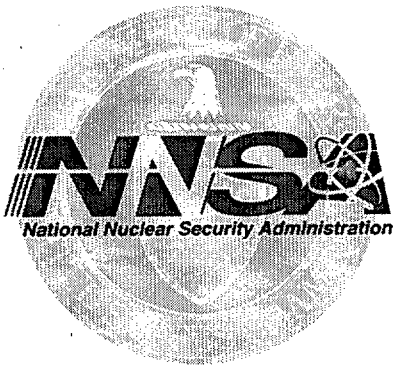
Nevada Operations Office (NNSA/NV)



Vital Safety System (VSS)
Phase II Assessment

Waste Examination Facility (WEF)
Visual Examination and Repackaging Building (VERB)
Confinement Ventilation System (CVS)

September 2002

REVIEW TEAM APPROVAL

of the

VISUAL EXAMINATION AND REPACKAGING BUILDING

Confinement Ventilation System Phase II Assessment

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DNFSB Recommendation 2000-2 Implementation Plan, Phase II Assessment of The Waste Examination Facility, Visual Examination and Repackaging Building Confinement Ventilation System Nevada Test Site, Nevada

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EXECUTIVE SUMMARY

This Assessment Team was chartered to evaluate the current operability and reliability of the VERB CVS, and to provide conclusions regarding the confidence in continued long-term operability and reliability of the system over its expected service lifetime. The Assessment Team performed reviews in four main topical areas: Safety Function, Configuration Management, Maintenance, and Surveillance and Testing. The detailed analysis of each criterion in all four areas is provided in the "Detailed Assessment Results" section of this report.

A U.S. Department of Energy (DOE)-wide team of experts in the areas of defense nuclear facility and CVS design, operations and maintenance developed the *Assessment Criteria and Guidelines To Ascertain the Current Condition of Confinement Ventilation Systems In Defense Nuclear Facilities* as an aid for conducting Phase II assessments across the complex. The guide was developed with a degree of rigor and breadth of scope suitable for facilities with a greater hazard categorization, and associated controls, than are currently in place at the VERB. The VERB is presently operating as a less than Hazard Category 3 nonreactor nuclear facility. As such, some of the detailed areas of inquiry in the guide are not applicable to this CVS. The Assessment Team evaluated the Safety Function, Configuration Management, Maintenance, and Surveillance and Testing criteria addressed within this guide, with the degree of detail tailored to the systems in place within this facility.

To accommodate increased material mass limits, the WEF is currently revising the safety basis documentation, which, when completed and implemented, will enable the facility to operate as a Hazard Category 2 nonreactor nuclear facility as opposed to the less than Hazard Category 3 limited threshold quantities, as defined in DOE-STD-1027, that are currently maintained. A Safety Analysis Report (SAR) had been developed for this facility, but was not implemented. While the next Documented Safety Analysis is being developed, the current safety basis document for VERB operations is the *Auditable Safety Analysis (ASA) for the WEF*, developed by using a graded approach to DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Non-reactor Nuclear Facility Safety Analysis Reports* as guidance.

It is noted that the Assessment Team did not reevaluate the underlying analyses that support the approved facility authorization and/or safety basis, nor did the Assessment Team perform a detailed review of the installed CVS design or its basis. When lines of inquiry during the course of the assessment led to questions concerning design or safety basis, they were addressed and captured in the detailed analysis.

The Assessment Team was tasked to estimate, based upon the assessment results and their engineering judgment, the ability of the CVS to reliably perform its safety function over the remaining system lifetime. The system appears to have operated satisfactorily under normal conditions in the past. However, the safety features relied upon to prevent an accident or mitigate the consequences of an accident have not all been challenged, neither by an accident, nor by surveillance and testing, during the lifetime of this facility.

Based upon the assessment results and our engineering judgment, the Assessment Team estimates the system could reliably perform its safety function during normal operations over the design lifetime of the facility, but the reliability of the untested systems to operate as designed, when challenged, is unknown.

OPPORTUNITIES FOR IMPROVEMENT

Safety Function

Opportunity For Improvement 1: The secondary containment (SC) and ventilation system which is Safety-Significant, and the air locks (engineered controls) ensure that the work area in the VERB shell is protected from potential radioactive contamination. The Radiological Control Technician (RCT) routinely uses a door in the SC that causes a loss of required differential pressure between the SC and it's outside environment, which is the VERB shell.

Conclusion: This practice presents a situation that has not been fully analyzed in the ASA, and compromises the SC as an engineered control that ensures the work area in the VERB shell is protected from potential radioactive contamination.

Recommended Action 1: Perform a hazard analysis on access to the Glove Box (GB) that results in a loss of differential pressure, and establish any controls necessitated by this analysis.

Configuration Management

Opportunity For Improvement 2: A limited walk-down of the GB Filtration System using Piping and Instrumentation Drawing (P&ID) JS-005-32-M5, Revision 1, identified discrepancies between the as-built drawings and the physical plant.

Conclusion: Drawings do not match the as-built configuration of the CVS.

Recommended Action 2: Update the as-built drawings to match the physical plant configuration.

System Maintenance

Opportunity For Improvement 3: No comprehensive maintenance program currently exists at this facility. Some of the components of safety significant systems are not on preventative maintenance (PM) schedules. PM was performed at intervals exceeding the scheduled PM for some components. Some components that may be subject to age-related degradation are not included in maintenance and inspection programs. The high-efficiency particulate air (HEPA) filters are inspected and/or changed out regularly.

Conclusion: There is no obvious evidence of age-related or operational degradation at this relatively young facility under the current maintenance practices. However, the current maintenance practice is insufficient to ensure operability of all systems over the projected life of this facility.

Recommended Action 3: Establish processes for corrective, preventative and predictive maintenance.

Opportunity For Improvement 4: The maintenance personnel maintain a configuration management process for the PM to be performed on a given piece of equipment. This schedule, and what is to be maintained, is established by the WEF supervisor. Also, these PM procedures have been changed by the WEF supervisor. There is no process in place at the facility to capture these changes to the PM procedures, nor is there a formal method to establish the basis for the PM to be performed.

Maintenance work packages at this facility typically do not address the reference or source for the maintenance requirements or frequency. The WEF supervisor informed the Assessment Team that vendor manuals were typically used to determine proper maintenance requirements.

The Assessment Team reviewed work order (WO) No. 02034752, which is for the 1000-cubic-feet-per-minute (cfm) and 3000-cfm blowers PM (semiannual for Building No. 5-32). The PM seemed complete, but no references were given for any of the requirements.

Conclusion: Maintenance source documents such as vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of CVS maintenance work packages.

Recommended Action 4: Maintenance source documents such as vendor manuals, industry standards, DOE Orders, and other requirements should be reviewed to establish CVS PM work packages. These PM work packages should be included within the facility configuration management process.

Opportunity For Improvement 5: Facility management reported that the facility has been experiencing approximately five or six power failures/outages a year. This loss of facility power causes actuation of the emergency diesel generator and lineup of the 200-cfm blower for the GB ventilation system. If the diesel generator system or the 200-cfm blower system fails for any reason, then both the secondary confinement and GB ventilation systems will be out-of-operation. This condition is not analyzed. There has been no actions taken to ensure a more reliable power supply, but the emergency generator has been functioning properly and has provided power to the back-up ventilation blower on each of the power outages to date.

Conclusion: While there have not been excessive CVS failures, there have been conditions that challenge some of the existing safety significant systems.

Recommended Action 5: Facility power failures should be investigated to determine methods to make the facility power supply more reliable.

Opportunity 6: In Recommendation 2000-2, the Defense Nuclear Facility Safety Board (DNFSB), expressed concern that many DOE nuclear facilities were constructed many years ago and are approaching the end of their design life. The DNFSB advised that as facilities age, a combination of age-related degradation and deficient maintenance may affect the reliability and ability of the system to perform its safety function as designed. The VERB is a relatively new facility (1997), and is within its expected design service lifetime, which was stated to be 10 years. The Assessment Team did not observe any CVS age-related degradation. However, the initial program supported by the VERB and the CVS was projected to have a 5-year duration. It is anticipated that the current mission will last another 5, or possibly more, years.

Conclusion: There is no formal program that addresses aging of the CVS, or for the inspection of other components of the system such as gaskets, as it was presumed that the gaskets would outlast the facility. There are no plans, or schedules, to perform monitoring, inspecting, replacement or upgrading of system components.

Recommended Action 6: The facility maintenance program should be modified to include additional components subject to age-related degradation in the facility inspection program, and to evaluate a potential replacement program based upon manufacturer's life expectancy data. A program designed to ensure long-term operability and reliability of systems and equipment important to safety should be developed and implemented during this relatively early period in the facility life cycle.

Surveillance and Testing

Opportunity For Improvement 7: Surveillance and testing procedures for the CVS do not exist at this facility. As a less than Hazard Category 3 nonreactor nuclear facility, no requirement exists to implement them. The *Formality of Operations Process Description* requires that all equipment be fully functional. This would invoke the need for some process that would test the complete system to insure all components can perform their specified function.

Conclusion: Many of the periodic equipment tests performed routinely are checks of a particular aspect of a system, and not a complete system operability test.

Recommended Action 7: Establish procedures to routinely test all components of the CVS to ensure they are capable of performing their intended function.

INTRODUCTION

The WEF at the Nevada Test Site (NTS) provides for the storage, staging, examination, characterization, repackaging and certification of legacy transuranic waste (TRU) stored at the

NTS. Ultimately, the disposition of this TRU waste will be permanent disposal at the Waste Isolation Pilot Plant (WIPP) underground repository near Carlsbad, New , Mexico. The facility is made up of different structures, each specializing in one aspect of the waste operations process.

In 1974, the NTS accepted TRU radioactive waste from the research and production of nuclear weapons at LLNL. The waste was stored in Area 5 of the NTS near the radioactive Low-Level Waste disposal site. The NTS TRU operations process that is required for disposing the TRU at WIPP is comprised of storage and handling, content assay and sampling operations, drum breaching, and drum content physical examination and repackaging.

When a drum's physical condition is not suitable for shipment to a waste repository, or acceptable knowledge of the drum contents is lacking, the drum must be repackaged. The VERB provides confinement for the intrusive opening, inspection, segregation and repackaging capability for drums containing TRU waste. Operational and radiological protection requirements were satisfied by a CVS design criteria for systems that include isolation barriers using a GB, a SC structure, HEPA filtration and ventilation systems, differential pressure monitoring systems, and fire protection systems.

This document details the assessment performed to ascertain the current condition of the CVS located within the VERB. This assessment satisfies the *U.S.* Department of Energy Configuration Management VSS *Implementation Plan for Defense Nuclear Facility Safety Board Recommendation 2000-2* Commitment 11, tasking field element managers to assemble teams to assess the condition of CVS that are important to safety, and detailing the operational readiness of these systems.

ASSESSMENT SCOPE

This assessment included all safety significant systems, structures, and components that comprise the GB and filtration system, and the SC and filtration system, that provide a preventive or mitigative function, or their function is considered a major contributor to defense in depth. Support systems, even those whose proper operation is essential to the accomplishment of the GB and SC safety function, were not part of this assessment.

The GB and filtration system, and the SC and filtration system, were reviewed using the *Assessment Criteria and Guidelines To Ascertain the Current Condition of Confinement Ventilation Systems In Defense Nuclear Facilities.* Assessments in four topical areas were performed. They are:

- Safety Function Definition
- Configuration Management
- System Maintenance
- System Surveillance and Testing

Not all areas were evaluated to the same level of detail. The current facility authorization does not require the degree of rigor expected in a facility with a greater level of risk. The current approved safety basis, authorization basis (AB), available design information and operations were reviewed and evaluated to identify and understand the system requirements, performance criteria and safety functions of the system.

VERB OPERATIONAL OVERVIEW

Design Features

The VERB is designed with multiple layers of protection in the event of an inadvertent, uncontrolled release of radioactive materials during handling and repackaging of waste. The waste is separated from the worker by at least one barrier, and the ambient environment by at least two barriers. The design features are:

- The differential pressure between the GB and the surrounding environment inside the SC is maintained at a negative pressure. Contamination released when a drum is breached in the GB will be mitigated by HEPA filters connected by duct work to the GB exhaust.

- A SC self-standing structure surrounding the GB is maintained at a negative differential pressure with respect to the outside atmosphere within the shell of the VERB. Any contamination released into the SC during GB operations or drum handling will be mitigated by HEPA filtration of the air in the SC.

- The VERB is sited outside any 100-year flood hazard zones.

- The VERB is within Seismic Zone 2B, and immediately adjacent to Seismic Zone 3. The WEF has been designed and built for stability against Universal Building Code (UBC) Zone 3 (minimum) seismic-induced ground motion for the building, equipment (e.g., GB, SC), and appurtenances.

- The VERB is designed to resist the UBC basic wind speed criteria of 70-miles-per-hour (mph) velocity wind pressure. Operating procedures specify that drum movement is restricted if wind speed exceeds 50 mph.

The principal components of the VERB CVS consist of a GB and air filtration system, a SC and air filtration system, service air system, and a fire protection system. These systems operate independently from other mechanical systems in the building.

These systems are designed to maintain the areas involving waste drums opening processes are maintained at a reduced atmospheric pressure relative to the surrounding areas. The HEPA filters on the exhaust air flowing from these areas mitigate any release of radioactive material. There is no process piping or other process connections that could transport contaminated

material to other parts of the facility or cause an interaction outside the facility itself.

GB and Air Filtration System. The GB and air filtration system provide the primary containment system to prevent dispersion of radioactive material into the work area. Major components of this system are the GB, interconnecting duct work, the normal (1000-cfm) HEPA filtration unit, the back-up (200-cfm) HEPA filtration unit, a 7.62-meter (25-foot), high outside vent stack, and associated instrumentation. Inlet air is supplied from within the SC and is ducted through an HEPA filter located on the top of the GB. Exhaust air exits the GB through a HEPA filter located on top of the GB, where it is ducted through a HEPA prefilter, the main HEPA filter, and ultimately through the outside vent stack.

SC and Air Filtration System

The SC system provides a secondary radiological barrier that contains contamination that may escape from the GB. It maintains the SC volume at a negative pressure relative to the surrounding VERB, and is interlocked with the GB system filtration units so that on low GB differential pressure, or loss of power to the primary GB blower, the SC unit stops to preclude the GB being at positive pressure relative to the SC.

The SC consists of a self-standing polished stainless steel containment structure inside the VERB, associated duct work, HEPA filtration unit, 3000-cfm blower, and dampers. Fresh, conditioned inlet air is supplied through HEPA filters from the surrounding VERB into the SC. Air is exhausted from the SC through a HEPA prefilter and a HEPA main filter. Dampers balance the filtered air so 85 percent is recirculated, and 15 percent is exhausted through a vent stack.

Service Air System

The service air system provides pressurized air to both the GB and the SC, along with the respective air filtration systems, for positioning dampers to maintain required differential pressures, and to maintain the balance between the inlet, return and exhaust air for the secondary confinement. Additionally, it supplies pressurized air for pneumatic tools within the GB, and utility air within the VERB.

The service air system consists of a compressor, air receiver, two actuator receivers, pressure regulators, filters, the distribution network, and the associated instrumentation and controls.

GB Fire Protection System. The GB fire protection system is a carbon dioxide gas designed to achieve a 75 percent minimum concentration of CO_2 inside the GB within the first 7 minutes of discharge without losing the differential pressure relative to the SC. The system will maintain the 75 percent concentration for an additional 20 minutes. This system is automatically activated by heat sensors located either within the GB or in the exhaust ducts. It is manually activated by pull stations located both on the GB and within the SC structure.

ON-SITE ASSESSMENT METHODOLOGY

The following activities were performed during this assessment:

1. Documents were reviewed in preparation for this assessment, and are listed in the Documents Reviewed section of this report. Other objective evidence specific to the CVS included:

    - Phase I assessment report
    - Secretarial HEPA Filter report
    - Hazard Analysis Report
    - CVS description and system design description
    - Applicable Operational Safety Requirements and surveillance test procedure
    - System piping and instrumentation drawings for confinement ventilation and support systems
    - Electrical one-line diagrams, logic diagrams, and other such diagrams
    - Design modification packages for any major work, changes, or modifications to the system, including related safety evaluations
    - DOE and other industry standards applicable to the CVS
    - Reports of studies and assessments related to the system
    - Maintenance history and occurrence reports for the system
    - Surveillance and testing records for the system
    - Checklists
    - Periodic inspection records
    - Operating Procedures

2. A site visit and facility tour was conducted to determine the overall material condition and physical layout of the VERB CVS.

3. System records were reviewed and facility personnel, including the facility manager, were interviewed to evaluate configuration management, maintenance, and testing processes.

4. Maintenance facility personnel were interviewed, the maintenance procedures were reviewed, and maintenance records analyzed.

5. Using drawings and procedures, a technical walk-down was performed of selected portions of the system to confirm that as-builts conform to the technical documents.

6. Filter efficiency test personnel were interviewed.

7. Design engineering personnel were interviewed.

8. The ability of the CVS to reliably perform its safety function over the estimated remaining life of the system was evaluated.

DETAILED RESULTS

Safety Function Definition. All applicable assessment criteria were satisfied except as noted in the following safety function definition detailed results section.

Criterion 1: Requirements in applicable DOE Rules and Orders are invoked for the CVS in the appropriate site documents.

Approach 1: Review the appropriate safety/AB documents, such as SARs, basis for interim operations, technical safety requirements, safety evaluation , and hazards and accident analyses, to determine if the definition/description of the safety functions of the CVS includes:

1-1: The specific role of the system in detecting, preventing, or mitigating analyzed events.

The following appropriate safety/AB documents were reviewed:

- ASA-4069-003 Revision 0, *Auditable Safety Analysis for the Waste Examination Facility*
- HA-4069-002, Revision 0, September 8, 1999, *Waste Examination Facility Hazard Assessment*

Results 1-1: Section 2.2.1 identifies the GB as the primary containment system that prevents dispersion of radioactive material into the work area " This statement is coupled to the Radiological Hazards in Section 3.2.3, which states "the waste characterization GB and filtration system (engineered barrier/control) is considered to be the first line of defense," Page 35.

Section 3.2.3 also addresses "The SC and ventilation system which is safety-significant and the air locks (engineered controls) ensure that the work area in the VERB shell is protected from potential radioactive contamination."

Section 4.2, page 45, lists the "... systems of the VERB [that] have been determined to be Safety Significant":

- GB and Filtration System.
- SC and Filtration System.
- Safety Analysis System (SAS) receivers, the interconnecting piping to selected GB dampers and to SC dampers.
- Diesel generator of the electrical distribution (ED) system.

The GB and SC provide the overall containment system for the VERB that minimizes the potential for release of radioactive material to the work area and to the environment under normal and off-normal conditions. Both of these systems are safety-significant."

Thus, the hazard and accident analysis identify the role of the containment system in mitigating the release of radioactive material. The specific role of the system in detecting, preventing, or mitigating analyzed events were included. The level of detail was consistent with, and appropriate for, a radiological facility with an ASA.

The facility personnel stated that the RCT routinely uses a door in the SC that causes a loss of required differential pressure between the SC and its outside environment, which is the VERB shell. This practice presents a situation that has not been fully analyzed in the ASA, and compromises the SC as an engineered control ensure that the work area in the VERB shell is protected from potential radioactive contamination.

1-2: ***The associated conditions and assumptions concerning system performance.***

The following appropriate safety/AB documents were reviewed:

- ASA-4069-003 Revision 0, *Auditable Safety Analysis for the Waste Examination Facility*

- HA-4069-002, Revision 0, September 8, 1999, *Waste Examination Facility Hazard Assessment*

Results 1-2: The associated conditions and assumptions concerning system performance were included, the specificity and level of detail was consistent with, and appropriate for, a radiological facility with an ASA.

The ASA states that normal operation of the VERB CVS meets the radiation protection standards of protection to the worker, public and environment established in Title 10 Code of Federal Regulations (CFR) 835, and implemented in the Radiation Control Manual.

Section 3.2.3, page 35. Waste is examined in the engineered GB that is maintained at a negative pressure to the SC. The GB exhaust is filtered prior to being released to the environment.

Section 2.2.2, page 24. The SC is maintained at a negative pressure with respect to the shell of the VERB. Negative pressure in the SC will prevent contamination from spreading to surrounding portions of the VERB. The SC filtration system continuously filters the air in the SC through HEPA filtration.

The magnitude of the negative pressure is not quantified, and the filtration efficiency is identified as 99.99999 (99.97 percent capture for each filter) for double HEPA filtration in

Section 3.3.1. No allowance is provided for any bypass around the filter assembly with this specification. With efficiency testing being performed annually to this same specification, a test that fails this criteria would mean that the filter would have been out of specification for an indeterminate period of time.

1-3: ***System requirements and performance criteria for the CVS and active components, including essential supporting systems, for normal, abnormal, and accident conditions relied upon in the hazard or accident analysis.***

The following appropriate safety/AB documents were reviewed:

- ASA-4069-003 Revision 0, *Auditable Safety Analysis for the Waste Examination Facility*

- HA-4069-002, Revision 0, September 8, 1999, *Waste Examination Facility Hazard Assessment*

Results 1-3: System requirements and performance criteria for the CVS and active components, including essential supporting systems, for normal, abnormal, and accident conditions relied upon in the hazard or accident analysis were discussed consistent with, and appropriate for, a radiological facility with an ASA.

Section 4.2, page 45, lists the "... systems of the VERB [that] have been determined to be Safety Significant:

- GB and Filtration System
- SC and Filtration System
- SAS receivers, the interconnecting piping to selected GB dampers, and to SC dampers
- Diesel generator of the ED

The GB filtration system description also includes:

- Electrically operated under-pressure relief damper
- Oil filled bubblers for passive overpressure and excess vacuum protection.
- Portable HEPA filtration unit

The performance requirements for the GB are identified as:

- Negative pressure to the worker environment
- Exhaust air is passed through a HEPA filter before being released to the environment

The magnitude of the negative pressure is not quantified and the filtration efficiency is identified as 99.999991 (99.97 percent capture for each filter) for the double HEPA

filtration in Section 3.3.1. This takes credit for the HEPA filters on the top of the GB and the HEPA filter adjacent the exhaust fans. There is a HEPA prefilter that is not credited in the ASA.

The ASA, page 23, discusses a portable HEPA filtration unit that can be connected to the GB in the event that both the normal and back-up GB filtration units fail. The Assessment Team could find no procedure to accomplish this, but was briefed that this would be installed by a Type 1 work package. Also, a portable filter is being used as an area filter, or as a task filter, as drums are being bagged into the GB. This activity, with this equipment, has not been analyzed or captured in a procedure.

Credit is taken for the airflow into the SC from the bubbler in the event of a GB over-pressurization through an organic filter and a HEPA filter to mitigate the release of volatile organics or radioactive materials into occupied areas. No testing, qualification, maintenance or change-out frequency, or procedure could be produced by the facility personnel. CVS HEPA filters utilized during normal operations are efficiency tested annually. HEPA filters that are not able to be efficiency tested are replaced annually, or as necessary, based on differential pressure readings.

Configuration Management. All applicable assessment criteria were satisfied except as noted in the following configuration management detailed results section.

Criterion 1: Changes to CVS safety basis requirements, documents, and installed components are designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures.

Approach 1-1: On a limited sample basis, evaluate the change control process and procedures.

1-1-1: ***Review procedures governing change control.***

The procedures reviewed on change control process were:

- OP-2151.504 *WEF Safety Evaluation Process Procedure*
- OP-2151.521 *WEF Training*
- OP-2151.523 *WEF Work Control Process*
- OP-2151.505 *WEF Configuration Management Plan*, Bechtel Nevada, September 27, 1999

Results 1-1-1: The change control process in place is consistent with a radiological facility.

There have been only minor physical changes and procedural changes for this facility. The facility procedures incorporate an unanswered AB question (UABQ) process, which is a unreviewed safety questions determinations (USQD)-like process. This UABQ process

requires change control for changes to procedures and physical changes.

1-1-2: Review design change packages and work packages to determine whether change control procedures are implemented.

There were no design change packages or work packages for the CVS and therefore this review could not be performed.

Results 1-1-2: A review was performed on "document only" changes that did verify the change control process was being performed as specified in the WEF procedures. This facility is designated as a radiological facility and a unreviewed safety questions (USQ)-like procedure called UABQ is followed.

1-1-3: *Interview a sample of cognizant line, engineering, quality assurance (QA) managers and other personnel to verify their understanding of the change control process and commitment to manage changes affecting design and safety basis in a formal, disciplined and auditable manner.*

The BN Waste Management Manager, the WEF supervisor, BN engineering and a waste handler were interviewed. The facility change log was also reviewed. There have been no design changes to the CVS.

Results 1-1-3: The BN Waste Management Manager, the WEF supervisor, BN engineering, and the waste handler interviewed understood the change control process, and all were committed to performing changes in a formal, disciplined, and auditable manner. Interviewed waste handlers stated that they would advise management if they thought any changes were advisable and that management would ensure that change control was implemented. The facility change log was reviewed, and there have been no design changes to the CVS.

Criterion 2: Limited technical walk-down of selected system components verifies that the actual physical configuration of these components conforms to documented design and safety basis documents for the system.

Approach 2-1: Walk-down selected CVS components and compare the actual physical configuration of these components to documentation in system design and safety basis documents, such as safety or AB documents, system design descriptions, or P&ID. Identify any temporary changes, or configuration discrepancies that call into question 1) the operability or reliability of the CVS, or 2) the adequacy of the change-control or document-control processes, including drawing revision, applied to the system.

Results 2-1: Discrepancies between the as-built drawings and the physical plant were identified. The GB filtration system was selected for walk-down. GB filtration system P&ID JS-005-32-M5, Revision 1, was provided for use during the walk-down by the WEF

supervisor.

No temporary changes were identified during the team walk-down.

Discrepancies were found between the installed physical plant configuration and the P&ID. The P&ID shows three access ports upstream of the prefilter GBF 205 and three access ports downstream of the HEPA GBF 206 on GBAH1000. The physical configuration is one access port upstream of the prefilter GBF 205 and no access ports downstream of HEPA GBF 206 on GBAH1000.

The drawings showed six access ports on the 1000-cfm filter, but the ports were physically located on the 3000-cfm filter bank. The drawings did not show the six access ports on the 3000-cfm filter bank. The drawings were not checked further for complete accuracy, given that the first item checked was found to be inaccurate.

The WEF supervisor was informed of the discrepancy.

Criterion 3: Changes to the CVS safety basis requirements, documents, and installed components conform to the approved safety/AB (safety envelope) for the facility; the appropriate change approval authority is determined using the USQ process; and consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents.

Approach 3-1: Review documentation, such as change travelers and change packages, and interview individuals responsible for processing selected changes made to CVS requirements, installed equipment, and associated documents. Determine whether:

3-1-1: ***Documents affected by the change are identified.***

Results 3-1-1: The Assessment Team was informed that there have been no requirements or installed equipment changes, and that no changes have been performed on the CVS.

3-1-2: Changes are accurately described, reviewed, and approved as appropriate.

Results 3-1-2: The Assessment Team was informed that no ventilation system or installed equipment changes have been performed on the CVS.

3-1-3: ***Systems, structures, and components affected by the change are identified for facility management, system engineer, users, operators, or others affected by the change.***

Results 3-1-3: The Assessment Team was informed that no ventilation system or installed equipment changes have been performed on the CVS.

3-1-4: ***Changes to the system are reviewed to ensure that system requirements and performance criteria are not affected in a manner that adversely impacts the ability of the system to perform its safety functions.***

Results 3-1-4: The Assessment Team was informed that no ventilation system or installed equipment changes have been performed on the CVS.

3-1-5: ***The USQ process (i.e., USQ screens and USQ safety evaluations/determinations) is used.***

Results 3-1-5: This facility is characterized as a radiological facility in the ASA. An UABQ process in accordance with OP 2151-504 *WEF Safety Evaluation Process Procedure* is used to evaluate changes to the facility. The UABQ process is similar to a USQD process and is tailored to be appropriate in scope for a radiological facility that is not a Hazard Category type 1, 2, or 3 nonreactor nuclear facility.

The Assessment Team reviewed a listing of UABQ screens, provided by the WEF supervisor, that had been performed for the WEF. One UABQ was reviewed in depth. This was UABQ 01-01 *Operation of the Visual Examination and Repacking Building (VERB) GB without annual testing of the HEPA filters for efficiency.* The evaluation concluded that this situation did not result in a change to the AB. This evaluation was performed in accordance with OP 2151.504, *WEF Safety Evaluation Process Procedure*

The required process is being performed for changes at the WEF and for the CVS.

3-1-6: ***Installation instructions, postmodification testing instructions, and acceptance criteria for turnover to facility operations are specified.***

Results 3-1-6: The Assessment Team was informed that no ventilation system or installed equipment changes have been performed on the CVS.

3-1-7: ***Important documents affected by the change are revised timely.***

Results 3-1-7: The Assessment Team was informed that no ventilation system or installed equipment changes have been performed on the CVS.

Criterion 4: Facility procedures ensure that changes to the CVS safety basis requirements, documents, and installed components are adequately integrated and coordinated with those organizations affected by the change.

Approach 4-1: Determine whether engineering (including the design authority and technical disciplines for process control, electrical, mechanical, chemical, heating, ventilation, and air conditioning, nuclear, criticality, structural, etc.), operations, and maintenance organizations are made aware of CVS changes that affect them, and are

appropriately involved in the change process. Verify integration and coordination with other organizations that could logically be affected by the change such as facility training, document control, construction, radiological control, Occupational Safety and Health Administration occupational safety, industrial hygiene, occupational medicine, hazard analysis/safety basis, safeguards and security, and fire protection.

Results 4-1: This facility is characterized as a radiological facility in the ASA and is not required to have all the same programs in place that a nuclear facility would. However, OP 2151-505 *WEF Configuration Management Plan* requires essentially all of the notifications listed above for changes.

The Assessment Team was informed that no changes have been performed on the CVS. This made it impossible to verify the integration and coordination with all the other organizations listed for changes to this system. However, the process is in place to satisfactorily meet this criterion.

Criterion 5: The quality of computer software used in system components or functions is assessed, documented, and maintained.

Approach 5-1: Review software QA controls applied to development or procurement of software for the system. Verify that facility staff has confirmed that software developers have used industry standards, and have provided documented evidence of compliance to national or local standards for software quality.

Results 5-1: The WEF supervisor informed the Assessment Team that no software is used for the CVS, and there are no computer controlled systems. No assessment of this criterion is possible.

Approach 5-2: Request facility staff to provide a list of computer programs and software used in instrumentation and controls used in the system. During system walk-down, assess the completeness of the list of computer programs and software used in the system.

Results 5-2: The WEF supervisor informed the Assessment Team that no software is used for the CVS, and there are no computer controlled systems. No assessment of this criterion is possible.

Approach 5-3: Review QA records. Determine whether:

5-3-1: Software in use has QA documentation.

Results 5-3-1: The WEF supervisor informed the Assessment Team that no software is used for the CVS, and there are no computer controlled systems. No assessment of this criterion is possible.

5-3-2: ***Procedures exist for software updates, changes, and version control.***

Results 5-3-2: The WEF supervisor informed the Assessment Team that no software is used for the CVS, and there are no computer controlled systems. No assessment of this criterion is possible.

Approach 5-4: Interview facility engineering or operating staff to determine their awareness of software QA requirements for system software programs under their cognizance.

Results 5-4: The WEF supervisor informed the Assessment Team that no software is used for the CVS, and there are no computer controlled systems. No assessment of this criterion is possible.

System Maintenance

Criterion 1: For the CVS, maintenance processes consistent with safety classification are in place for prescribed corrective, preventive, and predictive maintenance.

Approach 1-1: Verify that maintenance for the confinement ventilation satisfies system requirements and performance criteria in safety basis documents or other local maintenance requirements.

Results 1-1: There is no comprehensive maintenance program at this facility. The facility is operated by BN under an Activity Agreement with the NNSA/NV. This Agreement specifies the AB documents and the standards and requirements, which are the Work Smart Standards (WSS) identified in the BN contract. Within these WSS a process description titled *Formality of Operations* serves as the graded application of DOE Order 5480.19, *Conduct of Operations*, and is applied, again using a graded approach, to operational activities such as the CVS.

In accordance with the requirements of *Formality of Operations*, the CVS operation utilizes checklists to ensure equipment is aligned, and indicators are within established limits prior to operations start-up. Some equipment is also subject to periodic testing, and/or routine PM. Areas for improvement within maintenance program are: (1) Many of the periodic equipment tests performed routinely are checks of a particular aspect of a system, and not a complete system operability test. The *Formality of Operations* requires that all equipment be fully functional. (2) Not all Safety Significant CVS components are included in current periodic maintenance schedules. (3) PM requirements are not subject to configuration management control. (4) Not all CVS components are included in maintenance testing and verification.

Some PM is performed, but no requirement to perform this PM exists. Some of the components of safety significant systems were not found on a preventative maintenance

schedule. PM WO could not be located for the 200-cfm back-up GB blower. This blower was also not identified as an item on a preventative maintenance program. Components that were on a preventative maintenance program were found to have received preventative maintenance at intervals that were significantly longer than the scheduled intervals. Examples include the 1000- and 3000-cfm blowers that have not been maintained at 6-month intervals per the preventative maintenance program.

The adverse affects of this lack of a maintenance program are not really evident yet, since this facility is relatively young. HEPA filters are the exception, and are maintained periodically.

Approach 1-2: Evaluate maintenance of aging CVS equipment and components.

1-2-1: ***Determine whether there are criteria in place to accommodate aging-related system degradation that could affect system reliability or performance.***

Results 1-2-1: There is no documentation that supports the CVS has experienced age-related degradation. The Assessment Team's inspection of the facility did not detect any age- related degradation. HEPA filters are changed out annually if they cannot be tested, which assures that these filters will not be subject to age-related degradation, however this is performed for other than an aging issue.

Some components that may be appropriate for aging concerns are the GB gaskets, the gloves used in the GB, the gloves used in the annual HEPA filter change-out and the over-pressurization bubbler's HEPA filter. These components have not been evaluated for age-related degradation.

Even though the system may be subject to age-related degradation, and this degradation is not specifically addressed, due to the system's relative young age, system reliability and performance has not been adversely affected.

1-2-2: ***Review the plans and schedules for monitoring, inspecting, replacing, or upgrading system components needed to maintain system integrity, including the technical basis for such plans and schedules.***

Results 1-2-2: Plans and schedules exist for the monitoring, inspecting, and replacing HEPA filters based upon the ability to perform annual efficiency testing. There is no formal program that addresses aging of the CVS, or for the inspection of other components of the system such as gaskets, as it was presumed that the gaskets would outlast the facility. There are no plans or schedules to perform monitoring, inspecting, replacement, or upgrading of system components. The facility manager committed to investigating the need for including other components in the facility inspection program, and to evaluate a potential replacement program based upon manufacturer's life expectancy data.

1-2-3: ***Determine whether conditions that require filter replacement (replacement criteria) are specified, and how filter aging is accommodated in maintenance processes.***

Results 1-2-3: The HEPA main filters replacement is based on differential pressure (DP) increases or failure of annual filter efficiency test. The cannister HEPA filters on the GB are replaced annually since there is no provision to perform an efficiency test on them. The records indicate that the SC prefilters have been changed out due to increasing DP. The HEPA filter on the over-pressurization bubbler connected to the GB is not tested or changed out periodically.

Therefore filter aging is not an issue for the cannister HEPA filters. Aging of the main filters is addressed by increasing DP or filter efficiency test failure. The HEPA on the over-pressurization bubbler connected to the GB is not captured in any maintenance program.

Approach 1-3: Determine whether maintenance source documents such as vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of CVS maintenance work packages.

Results 1-3: Maintenance work packages at this facility typically do not address the reference or source for the maintenance requirements or frequency. The WEF supervisor informed the Assessment Team that vendor manuals were typically used to determine proper maintenance requirements.

The Assessment Team reviewed WO No. 02034752, which is for the 1000-cfm and 3000-cfm blowers PM (semiannual for Building No. 5-32). The PM seemed complete, but no references were given for any of the requirements. The maintenance personnel maintain a configuration management process for the PM to be performed on a given piece of equipment. The PM procedure for the blowers has been changed by the WEF supervisor. There is no process in place at the WEF to capture this change to the PM procedure within the WEF AB.

Criterion 2: The system is periodically walked-down in accordance with maintenance requirements to assess its material condition.

Approach 2-1: Verify that the system is inspected periodically according to maintenance requirements.

Results 2-1: The system is walked down daily to perform the daily checklist. Any off-normal conditions noted during this checklist would be reported to the WEF supervisor. However, this checklist is more of an operational lineup checklist than a material condition checklist.

The system does appear to be in an operable and reliable condition.

Approach 2-2: On a sample basis, inspect the material condition of installed components and determine whether any observed deficiencies have been already identified and addressed in a facility condition assessment or deficiency tracking system.

Results 2-2: No deficient conditions were noted by the Assessment Team during walk-down of portions of the CVS. The WEF does not maintain a separate in-house deficiency tracking system. The WEF relies on the BN system.

Approach 2-3: Review system or component history files for selected system components for the past 3 years.

2-3-1: ***Identify whether excessive component failure rates were identified.***

Results 2-3-1: Facility management reported that the facility has been experiencing approximately five or six power failures/outages a year with a frequency of occurrence of approximately once every other month. This loss of facility power causes actuation of the emergency diesel generator and lineup of the 200-cfm blower for the GB ventilation system. If the diesel generator system or the 200-cfm blower system fails for any reason, then both the secondary confinement and GB ventilation systems will be out-of-operation. This condition is not analyzed. Facility power failures should be investigated for determination of methods to make the power supply more reliable.

The facilities emergency generator has been functioning properly and has provided power to the back-up ventilation blower on each of the power outages to date. However, there has been no attempt to determine the source of the power failures or to take other measures that could lead to a more reliable power supply. Additionally, the emergency generator does not have a large enough fuel tank to enable the generator to run for a long (3- or 4-day) weekend. This could result in loss of ventilation to the GB in the event of a power failure that occurred shortly after the end of the work week.

Currently, no trending of component failures is done at the facility. Other support organizations review failures for trends. The WEF Supervisor reported that there have not been any excessive failure of components at the WEF or with the CVS. A failure of the assessment tracking system during a generator test was recorded in 1998. An emergency maintenance request to replace the belts on the 1000-cfm GB blower was recorded in 1999. There have been numerous reports of pin-hole-size leaks in gloves. The facility did report that efforts were made to find a solution to the pin-hole leaks, but no suitable alternative was found.

While there have not been excessive CVS failures, there have been conditions that challenge some of the existing safety significant systems.

2-3-2: ***Determine how failure rates were used in establishing priorities and schedules for maintenance or system improvement proposals.***

Results 2-3-2: Due to the very few recurring failures the use of this data to establish priorities and schedules for maintenance or system improvement proposals has not been utilized. The WEF supervisor did note that on recurring glove punctures, leather gloves were used under the GB gloves.

Approach 2-4: Review the procedure and process for performing walk-downs of the CVS. Verify through manager and worker interviews that personnel performing walk-downs understand operational features, safety requirements and performance criteria for the system.

Results 2-4: OP 2151.502 *Waste Examination Facility-Operating Systems* requires a walk-down of the system to establish the system is ready for operations. While this daily check is designed as a system lineup type check, it does require a look at most of the systems and would result in finding many deficient conditions if they existed.

System Surveillance And Testing

Objective: Surveillance and testing of the CVS demonstrates that the system is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria (e.g., safety basis requirements such as Technical Safety Requirements Limiting Conditions for Operation).

Criterion 1: Requirements in applicable DOE Rules and Orders are invoked for the CVS.

Approach 1-1: Determine whether DOE Rules and Orders that apply to surveillance and testing of confinement ventilation and essential support systems are incorporated in the appropriate documents.

Results 1-1: Surveillance and testing procedures for the CVS do not exist as procedures at this facility.

Criterion 2: Requirements for surveillance and testing necessary to demonstrate overall system reliability and operability are accommodated by the system design and are linked to the technical safety basis.

Approach 2-1: Identify the acceptance criteria from the surveillance test procedures used to verify that the CVS is capable of performing its safety functions. Compare the acceptance criteria with the safety functions, functional requirements, performance criteria, assumptions, and operating characteristics discussed in safety documents. Verify that there is a clear linkage between the test acceptance criteria and the safety documentation, and that the acceptance criteria are capable of confirming that safety/operability requirements are satisfied.

Results 2-1: An acceptance criteria for the HEPA filters is specified as determined from discussions with the person performing the HEPA efficiency tests. This value is assumed in the hazard analysis was determined to be the same value.

Acceptance values were not specifically called out in the ASA or hazards assessment for other components of the CVS.

Criterion 3: Surveillance and test procedures confirm that key operating parameters for the overall system and its major components are maintained within operating limits.

Approach 3-1: Review surveillance and testing procedures for the CVS's major components. Review a sample of the test results. Perform a walk-through of the surveillance test procedure with appropriate facility personnel and verify:

3-1-1: ***Validity of test results.***

Results 3-1-1: The 200-, 1000-, and 3000-cfm HEPA filters are efficiency tested annually. The efficiency test injection ports are not far enough upstream to allow for proper dispersion of the test material in the air stream. The Assessment Team was advised that the manufacturer had installed a dispersion manifold in front of the HEPA filters to facilitate efficiency test material dispersion, as this was stated in the manufacturer's operation manual. A concern was that the 1000-cfm filter is being throttled down to approximately 117 cfm, and it is possible that the dispersion system may be dependent on airflow rates and not able to perform adequately at the throttled down airflow rate. Discussions with the original vendor revealed that a dispersion manifold had not been installed in this system.

Another concern is that the sample ports are only a couple of inches past the HEPA filters in the 3000-cfm filter bank. The filter exhaust may not be adequately represented at the sample port.

The 1000-cfm system was not supplied with an injection manifold. Aerosol injection was accomplished via the duct work, far upstream of the system during the original vendor testing. The balance state of the GB in normal operation system is low, since the system is designed to handle the discharge of the CO_2 system as well. Since the duct work was opened via the injection cover located on the far end of the duct work, the actual flow rate under test was not the same as the normal balanced condition. The actual flow rate with the injection point cover removed is unknown. The flow rate within the system would more than likely affect the test aerosol distribution. Since the initial test was done on a gross upstream and downstream sample, after ample mixing by the duct work and fan, the dispersion characteristics of the aerosol could be expected to be uniform under the test condition, since it does not rely on a manifold that was qualified at a certain flow rate. However, if the annual testing does not utilize the same injection and sample points as the initial test, the validity of the test results could be suspect.

An example of system functions that are not tested but are relied upon in the analysis are: The securing of the 3000-cfm blower and the startup of the 200-cfm blower on low DP, loss of facility power or loss of service air. Due to frequent loss of facility power events, that scenario has been tested in actual use, however the other two initiating events have not been tested at all.

The SAS air actuated dampers on the glove-box are part of the fire protection system. The SAS has the compressor, tanks, accumulators tested periodically. However, the dampers themselves are not tested, but they are relied upon to maintain the safety function of the GB during off-normal fire conditions.

An example of a function that could have a surveillance requirement is the timing of securing the 3000 cfm and starting the 200-cfm blowers. It is conceivable under some conditions it might be possible to obtain a relative pressure spike inside the GB based on time for the 3000-cfm blower to coast down.

3-1-2: ***System performance meets system requirements***

Results 3-1-2: Paragraph 2.2.2 on page 24 of the ASA states "in the event of a contamination release during GB operations or overpack removal, the negative pressure in the SC will prevent the contamination from spreading to surrounding portions of the VERB." However, the next paragraph states "The SC filtration unit is interlocked with the GB system filtration units so that on low, GB DP or loss of power to primary GB blower, the SC unit stops. This precludes the possibility of the GB being at a positive pressure to the SC."

The designed shutdown of the SC ventilation system in the event of a loss of GB DP or a loss of power to the primary GB blower places the surrounding portions of the VERB at risk should there be a GB loss of containment. The SC is intended to remain at negative pressure relative to the remaining portions of the VERB so the remaining portions of the VERB will be protected from contamination in the event of primary loss of containment. The designed shut down of the SC ventilation system defeats the primary purpose of the SC ventilation system.

It should be noted that there are potential scenarios that would allow the GB to lose DP that could result in a loss of primary containment. One example would be the loss of a bag at the drum bag-in port. It should also be noted that the facility has one portable continuous air monitor (CAM) in the SC. However, there is no indication that the CAM location would ensure that a loss of GB containment would result in an alarm before contamination had an opportunity to travel to remaining portions of the VERB if the SC ventilation system was not operating. Additionally, the SC blower will not automatically restart in the event of a CAM alarm.

3-1-3: ***Performance criteria are appropriate for current facility mission life-cycle.***

Results 3-1-3: Surveillance does not check on status of some components (e.g., GB gaskets, seals) that are subject to age-related degradation. There is no age or efficiency test related criteria for replacement of the oil filled bubbler's HEPA filter. The back-up ventilation system testing criteria does not test for all of the potential initiators. The only initiator that is checked is loss of facility power.

3-1-4: ***Parameters that demonstrate compliance with the safety requirements can be measured.***

Results 3-1-4: Surveillance and testing procedures for the CVS do not exist as procedures at this facility. The GB and SC pressure differentials are checked via the daily checklist.

3-1-5: ***Test personnel are knowledgeable and able to satisfactorily perform the test.***

Results 3-1-5: Surveillance and testing procedures for the CVS do not exist as procedures at this facility. Technicians perform a daily inspection, documented on a checklist.

3-1-6: ***The procedure cites applicable Technical Safety Requirements/Limiting Conditions for Operation.***

Results 3-1-6: Surveillance and testing procedures for the CVS do not exist as procedures at this facility.

3-1-7. ***Limits, precautions, system and test prerequisite conditions, data required, and acceptance criteria are included.***

Results 3-1-7: Surveillance and testing procedures for the CVS do not exist as procedures at this facility. The daily checklist has upper and lower differential pressure parameters.

3-1-8: ***Appropriate data recording provisions are included or referenced and are used to record results.***

Results 3-1-8: Surveillance and testing procedures for the CVS do not exist as procedures at this facility. The daily check lists are retained.

3-1-9: ***The procedure includes provisions for listing discrepancies.***

Results 3-1-9: Surveillance and testing procedures for the CVS do not exist as procedures at this facility. The daily check list includes a field where actual values can be entered. Additionally, the facility manager is notified in the event that a checked item falls outside of the indicated parameters.

3-1-10: ***The procedure requires timely notification of facility management about any failure or discrepancy that could impact operability.***

Results 3-1-10: Surveillance and testing procedures for the CVS do not exist as procedures at this facility. The daily check list includes a field where actual values can be, and are, entered. Additionally, the facility manager is notified in the event that a checked item falls outside of the indicated parameters.

3-1-11: ***Appropriate personnel reviewed the test results and took appropriate action.***

Results 3-1-11: Surveillance and testing procedures for the CVS do not exist as procedures at this facility.

Criterion 4: Procurement, qualification, surveillance, and testing of HEPA filters (or other filter media) enable monitoring of filter performance and demonstrate filter reliability and operability.

Approach 4-1: Determine if HEPA filters were qualified to ASME AG-1, Section FC5000

Results 4-1: BN Engineering believes that the AG-1 was not a fully recognized standard when the WEF CVS was installed in 1996. The filters used/supplied with the system did, however, meet the requirements of MIL STD 51068 for construction and MIL STD 51079 for media, which form the base for the ASME AG-1 requirements.

Approach 4-2: Determine if procurement specifications reference such standards as DOE-STD-3020-97 and ASME Code AG-1, Section FC

Results 4-2: BN Engineering believes that these standards were not a fully recognized standard (beyond possibly a draft state, or partial implementation) when the WEF CVS was constructed and installed in 1996. The filters used/supplied with the system did, however, meet the requirements of MIL STD 51068 for construction and MIL STD 51079 for media, which form the basis for the ASME AG-1 requirements.

Approach 4-3: Determine if an in-place HEPA filter test was performed by the filter housing vendor and that testing met standard requirements in ASME Code AG-1, Section TA.

Results 4-3: The filter housings were tested in-place as part of the start-up of the WEF. AG-1 was not a recognized standard at the time. The in-place testing method did conform to the methods in ASME N510. The test was performed by injection of test aerosol (poly-alfa-olefins oil was used with a thermal generator) into a duct opening at the extreme end of the duct feeding the inlet side of the system. The single filter bank system (GB) was sampled by using the single upstream sample port to baseline the upstream concentration at 100 percent, and then sampled within the discharge ducting for the downstream

concentrations. For the 3000-cfm system which has a 3h x 1w filter housing, a single upstream sample port was used for each filter, and a single downstream sample port, with a distribution manifold used to assess the downstream concentrations. The filter housing is designed so that the flow through each filter is segregated, thus providing a higher assurance that the samples are representative of the flow and concentration through each filter. The systems do not have an upstream injection manifold for aerosol introduction. A comparison of this methodology to AG-1 Section TA has not been performed at this facility

Approach 4-4: Where applicable, determine whether visual inspection ports are installed in filter housings to enable *in situ* visual inspection of HEPA filters

Results 4-4: Visual inspection ports are not installed, based on the facility walk-down.

Approach 4-5: Determine whether the site has a HEPA filter life program

Results 4-5: A filter change-out program based on filter service life has not been established for the VERB. Considering the projected operational lifetime of the facility and the current operations, such a program may not be necessary. No filter change-out program was recommended (based on service life only, not dirt load) by NFS-RPS, Inc. CVS HEPA filters that are not able to be efficiency tested are replaced annually. Facility maintenance records indicate HEPA prefilters have been changed out, based on differential pressure.

Criterion 5: Instrumentation and measurement and test equipment for the CVS are calibrated and maintained.

Approach 5-1: For the surveillance and test procedures and records reviewed, determine whether the test equipment used for testing was calibrated.

Results 5-1: Test equipment utilized for performing annual HEPA filter efficiency testing was calibrated.

ACRONYMS

AB	Authorization Basis
ASA	Auditable Safety Analysis
BN	Bechtel Nevada
CAM	Continuous Air Monitor
cfm	cubic-feet-per-minute
CFR	Code of Federal Regulations
CVS	Confinement Ventilation System
DNFSB	Defense Nuclear Facility Safety Board
DOE	U.S. Department of Energy
DP	Differential Pressure
ED	Electrical Distribution
GB	Glove Box
HEPA	High-efficiency Particulate Air
LLNL	Lawrence Livermore National Labortory
mph	miles-per-hour
NNSA/NV	National Nuclear Security Administration Nevada Operations Office
NTS	Nevada Test Site
P&ID	Piping and Instrumentation Drawing
PAO	Poly-alfa-olefins
PM	Preventative Maintenance
QA	Quality Assurance
RCT	Radiological Control Technician
SAR	Safety Analysis Report
SAS	Service Air System
SC	Secondary Containment
TRU	Transuranic Waste
UABQ	Unanswered Authorization Basis Question
UBC	Universal Building Code
USQ	Unreviewed Safety Questions
USQD	Unreviewed Safety Questions Determinations
VERB	Visual Examination and Repackaging Building
VSS	Vital Safety System
WEF	Waste Examination Facility
WIPP	Waste Isolation Pilot Plant
WO	Work Order
WSS	Work Smart Standards

DOCUMENTS REVIEWED

48. BN, ASA-4069-003 *Auditable Safety Analysis for the Waste Examination Facility*, Revision 0, Bechtel Nevada, 9/22/1999

49. BN, HA-4069-002, *Waste Examination Facility Hazard Assessment*, Revision 0, Bechtel Nevada, September 8, 1999

50. BN, OP-2151.504 *WEF Safety Evaluation Process Procedure*

51. BN, OP-2151.521 *WEF Training*

52. BN, OP-2151.523 *WEF Work Control Process*

53. BN, OP-2151.505 *WEF Configuration Management Plan* Bechtel Nevada, September 27, 1999

54. BN, PD-0021.000 *Formality of Operations Process Description*, Bechtel Nevada, Revision 0, 3/15/2000

8. DOE, *Implementation Plan for DNFSB Recommendation 2000-2*

REFERENCES

1. 10 CFR 830.120, *Nuclear Safety Management (Subpart) Quality Assurance Requirements*
2. 10 CFR 835, *Occupational Radiation Protection*
3. ASME N509 and N510, and ASME AG-1 (*Code On Nuclear Air And Gas Treatment*)
4. ASTM F1471-93, *Standard Test Method For Air Cleaning Performance Of High Efficiency Particulate Air Filter System*
5. DNFSB Recommendation 2000-2, *Configuration Management, Vital Safety Systems*
6. DNFSB Tech 23, *HEPA Filters Used in the Department of Energy's Hazardous Facilities*
7. DNFSB Tech 26, *Improving Operations and Performance of Confinement Ventilation Systems at Hazardous Facilities of the Department of Energy.*
8. DNFSB Tech 3, *Overview of Ventilation Systems at Selected DOE Plutonium Processing and Handling Facilities*
9. DOE, *Assessment Criteria and Guidelines To Ascertain the Current Condition of Confinement Ventilation Systems in Defense Nuclear Facilities*
10. DOE, *Implementation Plan for DNFSB Recommendation 2000-2*
11. DOE O 420.1, *Facility Safety*
12. DOE Order 5480.21, *Unreviewed Safety Questions*
13. DOE Order 5480.22, *Technical Safety Requirements*
14. DOE Order 5480.23, *Nuclear Safety Analysis Report*
15. DOE Order 6430.1A, *General Design Criteria*
16. DOE/DP-0125, *Operating Experience Review -Ventilation Systems at Department Of Energy Facilities*
17. DOE-STD-3022, *HEPA Filter Test Program*
18. DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Non-reactor Nuclear Facility Safety Analysis Reports*
19. DOE-STD-3020-97, *Specification For HEPA Filters Used By DOE Contractors, U.S. Department of Energy*
20. DOE-STD-3025, *Quality Assurance Inspection And Testing Of HEPA Filters*
21. DOE-STD-3026-99, *Filter Test Facility Quality Program Plan*
22. ERDA-76-21, *Nuclear Air Cleaning Handbook*
23. Regulatory Guide 1.140, *Design Testing And Maintenance Criteria For Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water Cooled Nuclear Power Plants*
24. Regulatory Guide 3.12, *General Design Guide For Ventilation Systems Of Plutonium and*

Fuel Fabrication Plants

25. Regulatory Guide 3.32, *General Design Guide For Ventilation Systems For Fuel Processing Plants*
26. UL 586, *High Efficiency Particulate Air Filter Units*
27. UL 900, *Test Performance of Air Filter Units*

LESSONS LEARNED

There were no lessons learned identified during this assessment.

TEAM MEMBER BIOGRAPHIES

Team biographies are on file with the NNSA/NV. Please contact the National Security Support Division Director, at (702) 295-3128 to obtain a copy.