

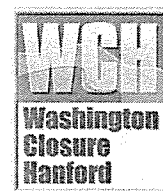
River Corridor Closure Contract

Washington Closure Hanford System Engineer Program FY 2010 Annual Report

October 2010

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor



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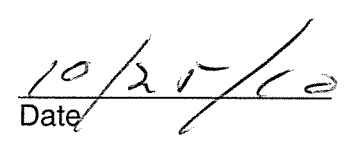
STANDARD APPROVAL PAGE

Title: Washington Closure Hanford System Engineer Program FY 2010
Annual Report

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Signature


Date

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Closure Contract** 

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EXECUTIVE SUMMARY

Washington Closure Hanford (WCH) prepared this annual report to the U.S. Department of Energy, Richland Operations Office as a summary of the assessments of the vital safety systems (VSS) that are administered under WCH's system engineer program.

The assessments determined that the safety functions of the VSS are being met. In addition, these assessments found that the operability, reliability, and configuration are being maintained. The assessments included periodic walkdowns by the system engineers and their annual assessments of each VSS as well as a self-assessment by the WCH Quality Assurance (QA) organization.

Currently, all VSS in WCH's program are located at the 324 Facility. There are a total of six VSS including a new VSS, Continuous Air Monitors – PDA Alternative (324-CAM/PDAA). The reason for this addition is discussed herein.

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1.0 INTRODUCTION

This annual report is provided to satisfy a requirement in the Supplemented Contractor Requirement Document (SCRD) (DOE O 420.1B, Rev. 4, Section B, paragraph 15) that requires "A report on the annual assessment results, including any independent assessments, shall be provided to DOE."

Washington Closure Hanford (WCH) is presently responsible for one facility at the Hanford Site that is hazard category 3 or greater and that has vital safety systems (VSS). The 324 Facility is a hazard category 2 facility and has a total of six VSS; one is classified as safety significant and the other five as general service – important to safety. Those VSS are identified in WCH's System Engineer and Design Authority list (SEDA-0001). A copy of this list is provided in Appendix A.

2.0 PURPOSE AND SCOPE

The purpose of this report is to provide the results of the annual assessments of VSS completed by the WCH system engineers.

The report includes the following:

- An overview of the WCH system engineer program
- A summary of the assessments of the WCH system engineer program completed during fiscal year (FY) 2010
- A discussion of the configuration management applied to the VSS
- Changes to the VSS or related systems during FY10
- Planned FY11 Deactivation, Decontamination, Decommissioning, and Demolition (D4) Project activities related to 324 Facility VSS
- A discussion of the status of system engineer qualification and training.

3.0 SYSTEM ENGINEER PROGRAM OVERVIEW

Three engineering procedures provide the basis for WCH's system engineer program. A brief description of the procedures content is as follows:

- ENG-1, *Engineering Services*, ENG-1-1.1, "Engineering Services Overview." The procedure identifies the major items of the system engineer program for VSS. The VSS are part of the

non-reactor nuclear facilities under WCH control. These programmatic items are detailed in Attachment 7 of the procedure.

- ENG-1-3.3, "Configuration Management." This procedure establishes the requirements for configuration management associated with WCH's work on the River Corridor Closure Contract (RCCC), including the system engineer program. Attachment 4 to this procedure is the timetable for required assessments of the VSS. Attachment 6 provides guidance on the items to be addressed in the system engineer's annual assessment.
- ENG-1-5.1, "Engineering Qualification and Training." The procedure provides the requirements for selection and qualification of system engineers and design authorities for the WCH system engineer program. The qualification card used in the system engineer qualification process is included on the WCH Engineering Services, System Engineer Program webpage (http://www.wch-rcc.com/engineer/sys_eng_prgrm.htm). SEDA-0001 provides a listing of each VSS and the assigned primary and alternate system engineer. This listing of assignments is maintained and available on WCH's System Engineer Program webpage.

4.0 ASSESSMENTS COMPLETED DURING FY10

The WCH assessments of VSS during FY10 included walkdowns and annual assessment by the system engineers. Regularly scheduled walkdowns were completed for each VSS by the system engineer during the year. During these walkdowns, the system engineer reviewed the configuration, reliability, operability, and trending/availability information for the VSS and noted if any corrective actions were needed. The walkdowns were documented on a walkdown/health report form. Based on the walkdown, the system engineer provided a statement on the walkdown form concerning the system's overall health and its ability to perform the design and safety functions. All walkdowns resulted in the system engineers confirming each system's ability to perform these functions.

Annual assessments on each VSS were prepared by the system engineers during FY10. These reports include the system engineer's assessment of the VSS safety function, configuration management, maintenance, surveillance/testing, and operability/reliability. Copies of the annual assessments are included in Appendix B.

In addition, WCH Quality Assurance (QA) organization completed a self-assessment (QA&S-2009-SA007) during FY10 to ensure that QA was performing overview actions on the D4 project's VSS at 324 Facility. This review included the areas of VSS system testing and restoration. The assessment concluded that all items reviewed were satisfactory.

5.0 CONFIGURATION MANAGEMENT

In accordance with WCH procedures, the system engineer is responsible for maintaining the configuration baseline for the VSS. This control is accomplished by maintaining a system

notebook, identifying and maintaining the essential drawings for VSS, completing periodic walkdowns, and system engineer involvement in design change notices that affect the VSS. A system notebook is in place for each VSS. Included in the notebook is a description of the system boundaries and support systems, an essential drawing list, performance monitoring data, results of the routine walkdowns completed by the system engineer, the safety basis/regulatory requirements for the VSS, operations and maintenance information, procedures, and the design requirements. These notebooks document the VSS configuration baseline. The system engineers maintained the content of the notebooks during FY10.

In accordance with 324 Facility procedures, the system engineer reviews work package activities associated with each VSS. Any changes to the VSS configuration followed the WCH design change procedure and were reviewed and approved by the system engineer. The essential drawings for the 324 Facility are maintained under the control of the system engineers. The drawings are stored in a filing area adjacent to the system engineers' office area. Following a redline procedure and the design change procedure, the configuration shown on the essential drawings is current. The system engineers completed periodic walkdowns of their assigned VSS during FY10. The results of each walkdown were recorded on a walkdown checklist/health report form, and the completed form was placed in the system notebook.

6.0 FY10 CHANGES TO VSS OR RELATED SYSTEMS

During FY10, as part of preparation for facility demolition, changes occurred to some structures, systems, and components within the 324 Facility. Where these changes could affect either a VSS or an associated system, nuclear safety and unreviewed safety question reviews and/or fire marshal permits were completed to ensure that compliance with the safety basis for the 324 Facility was maintained and that the VSS continued to provide its safety function.

The following is a brief description of these changes:

- Changed the 324 Facility ventilation system. The fume hoods in Room 147 and the Load Out Stall (LOS) in the truck lock have been deactivated and high-efficiency particulate air (HEPA) filters have been removed to facilitate the "By-pass Damper" modification. This provides an unfiltered path to the Zone I HEPA filters meeting final hazard analysis requirements during grouting activities.
- Demolition of the 324 Facility high bay.
- Completion of planning for the 324 Facility Zone I ventilation step out and final grout pour activities.
- Addition of new VSS. Preparations for applying fixative to the hot cells led to the decision to add one VSS (324-CAM/PDAA) at the 324 Facility. Installation of the new VSS was completed, and an initial walkdown of the operational system was done by the system engineer on September 23, at which time the system was accepted. The system was formally declared operational in a memorandum dated September 29. Because of its addition at the end of FY10, an annual assessment of the system was not completed. This new VSS consists of a series of continuous air monitor (CAM) units positioned in the gallery

areas surrounding the Radiochemical Engineering Cells (REC)/Shielded Material Facility (SMF) cells based on exhaust system airflow patterns. The system is designed to notify personnel working in the area of airborne radioactivity, which may be an indication of the loss of confinement of radioactive particulate inside the REC/SMF cells. The alarms will alert the gallery occupants to exit the area. The CAM units are Defense-in-Depth Important-to-Safety components. The CAM alarm system is a Vital Safety System alternative to the REC/SMF to gallery pressure differential alarms (VSS 324-HOTCELL Pressure Differential Alarms).

- Blanked the SMF south cell's exhaust HEPA filters to facilitate grouting. The containment for the south cell is maintained by exhausting through an existing transfer port into the east cell. Grout has been added to the SMF cell floor and to the B-Cell floor to stabilize radiological contamination.

7.0 FY11 D4 PROJECT ACTIVITIES RELATED TO 324 FACILITY VSS

Preparation for demolition of the 324 Facility will continue in FY11. WCH will maintain the operational status of 324 Facility VSS during FY11 as long as their safety functions are necessary to meet the important-to-safety requirements. Activities related to the VSS include the following:

- Stabilization of the 324 Facility hot cells, consistent with the approach validated in the Readiness Assessment, to allow for phased step-out of VSS hot cells Zone I ventilation. Completion of the hot cell stabilization will also allow step out of the VSS hot cell to gallery differential pressure alarms/supply and exhaust fan interlocks/CAM systems.
- Modification of the 324 Facility's ventilation system to allow for its operation in the absence of the primary power supply under a temporary power configuration. The temporary power configuration will also provide for the continued operation of the fire protection systems.
- Completion of the stabilization of the 324 Facility vault tanks and contaminated components in the balance of the building will provide for final step out of the fire protection and ventilation system VSS requirements allowing for open air demolition of the 324 Facility.

8.0 QUALIFICATION AND TRAINING

All of the WCH system engineers have been qualified by completing WCH Course 105969, Rev. 1, "Qualification Card System Engineer." Evidence of completion of this training course is maintained by the WCH Training Department.

During FY10, one system engineer position was added to WCH's program. The person selected to fill this position was already serving as an alternate system engineer for several of the VSS at the 324 Facility. The system engineer candidate successfully completed the qualification process to be the system engineer for the new VSS, 324-CAM/PDAA, at the

324 Facility. WCH choose to qualify only a primary system engineer for this VSS. This graded approach is in keeping with guidance from DOE O 420.1B and is based on our judgment of the limited size/complexity of the system and its relatively short mission life.

System engineers maintained their 324 Facility training by completing facility-specific and project-wide required reading and training. Required reading includes the authorization basis for the facility, as well as procedures covering the areas of conduct of operations, engineering, project activities, safety and health, quality assurance, and radiological control.

9.0 REFERENCES

DOE O 420.1B, 2007, *Facility Safety*, U.S. Department of Energy, Office of Environment, Safety and Health, U.S. Department of Energy, Washington, D.C.

ENG-1, 2008, *Engineering Services*, Washington Closure Hanford, Richland, Washington.

QA&S-2009-SA007, WCH Self-Assessment Report, Topic: D4-QA Overview of VSS Systems – 324 zone areas, January 27, 2010.

Supplemented Contractor Requirements Document (SCRD) O 420.1B, Rev. 4, *Facility Safety*, U.S. Department Of Energy, Richland Operations Office, Richland, Washington.

APPENDIX A
CURRENT LISTING OF VSS WITH ASSIGNED SYSTEM ENGINEERS
(SEDA-0001)

RECEIVED

System Engineer (SE) / Design Authority (DA) List

JUN 22 2010

SEDA-0001, Revision 7

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Approved By: _____

Date: 6/22/10

System Engineer (SE) List – VSS Systems

Facility	System ID	System	Class	Primary SE	Alternate SE
324	324-HVACE	HVAC Exhaust (VSS: final stage of Zone I/II HEPA Filters)	SS	Gregonis, Robert A	Johnson, Daniel L
324	324-HVAC INT	HVAC Supply/Exhaust Fan Interlocks	GS-ITS	Gregonis, Robert A	Johnson, Daniel L
324	324-HOTCELL PDA	REC/SMF to Gallery – Pressure Differential Alarms ¹	GS-ITS	Gregonis, Robert A	Johnson, Daniel L
324	324-FD/EVAC	Fire Detection/Evacuation Alarm System	GS-ITS	King, Opris Vincent	Horner, Alan M
324	324-FS	Automatic Fire Suppression System	GS-ITS	Gregonis, Robert A	Johnson, Daniel L
324	324-CAMP/DAA	Continuous Air Monitors – PDA Alternative ¹	GS-ITS	Johnson, Daniel L	N/A

Note: Systems 327-FS, 327-HVACE and 327-FD/EVAC were removed from the System Engineer - Vital Safety System List since 327 Facility was downgraded to less than hazard category 3. See CCN143970 SLFeaster/WCH letter to USDOE that documents completion of this downgrade.

Design Authority (DA) List

Facility	System ID	System	Class	DA
324	324-STRUC	Containment Structure ²	SC	Gregonis, Robert A
324	324-STKDUCT	Stack and Ducts from Bldg to Stack ²	SC	Gregonis, Robert A
324	324-HCW	Hot Cell Walls ²	SC	Gregonis, Robert A
324	324-CAM	Continuous Air Monitors	GS-ITS	Reeder, Rick J; Cooper, Jerry C
324	324-EFSR	Exhaust Fan Speed Restriction ²	GS-ITS	Gregonis, Robert A
324	324-HCWDP	Hot Cell Windows, Doors, Penetrations ²	GS-ITS	Gregonis, Robert A
324	324-SWC	Shielded Waste Containers ²	GS-ITS	Johnson, Daniel L
324	324-HCMFS	REC/SMF Deluge Fire Systems	GS	Johnson, Daniel L
324	324-CA	Compressed Air	GS	Gregonis, Robert A
324	324-CND	Condensate Return	GS	Gregonis, Robert A
324	324-EL	Elevator	GS	Gregonis, Robert A
324	324-EP	Emergency Power	GS	King, Opris Vincent
324	324-EQUIP	Process Mechanical Equipment	GS	Gregonis, Robert A
324	324-HVACS	HVAC Supply	GS	Gregonis, Robert A
324	324-IA	Instrument Air	GS	Gregonis, Robert A
324	324-IC	Instrumentation/Controls	GS	King, Opris Vincent (electrical), Gregonis, Robert A (pneumatic)
324	324-MAT	Cranes and Hoists	GS	Gregonis, Robert A
324	324-NP	Normal Power	GS	King, Opris Vincent
324	324-POG	Process Off Gas	GS	Gregonis, Robert A
324	324-PS	Process Sewer	GS	Johnson, Daniel L

System Engineer (SE) / Design Authority (DA) List

SEDA-0001, Revision 7

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Approved By: *John Winters*

Date: 6/22/10

Design Authority (DA) List

Facility	System ID	System	Class	DA
324	324-PW	Process Water	GS	Johnson, Daniel L
324	324-RADI	Radiological Instrumentation	GS	King, Opris Vincent
324	324-RADMON	Area Rad Monitors	GS	King, Opris Vincent
324	324-RLWS	Radioactive Liquid Waste	GS	Johnson, Daniel L
324	324-RPS	Retention Process Sewer	GS	Johnson, Daniel L
324	324-SS	Sanitary Sewer	GS	Johnson, Daniel L
324	324-SSEW	Safety Shower and Eyewash	GS	Johnson, Daniel L
324	324-STKMON	Exhaust Stack Monitors	GS	Johnson, Daniel L
324	324-STKSMPL	Exhaust Stack Samplers	GS	Johnson, Daniel L
324	324-STM	Steam Supply	GS	Gregonis, Robert A
324	324-SW	Sanitary Water	GS	Johnson, Daniel L
324	324-VAULT	High Level Vault (HLV)/Low level Vault (LLV) Piping	GS	Gregonis, Robert A
327	327-EL	Elevator	GS	Gregonis, Robert A
327	327-EQUIP	Canyon/Cell Equipment	GS	Gregonis, Robert A
327	327-HVACE	Temporary Ventilation System	GS	Gregonis, Robert A
327	327-MAT	Cranes and Hoists	GS	Gregonis, Robert A
327	327-RADI	Radiological Instrumentation	GS	King, Opris Vincent
327	327-RLWS	Radioactive Liquid Waste	GS	Johnson, Daniel L
327	327-RPS	Retention Process Sewer	GS	Johnson, Daniel L
327	327-STRUC	Containment Structure	GS	Gregonis, Robert A

- 1 – REC/SMF to Gallery – Pressure Differential Alarms currently provide the primary function to confirm confinement. The room Continuous Air Monitors can function as an alternate to the REC/SMF to Gallery – Pressure Differential Alarms.
- 2 – Although these are SC or ITS items, they are passive features and therefore not included in the VSS list.

APPENDIX B
COPIES OF ANNUAL ASSESSMENT FOR EACH VSS

Appendix B

324-HVACE.....	B-1
324-HVAC INT.....	B-6
324-HOTCELL PDA.....	B-10
324-FD/EVAC.....	B-14
324-FS.....	B-20

324-HVACE

2010 System Engineer Assessment of Vital Safety Systems

Project	D4-300	Facility	324 BUILDING			
System	324-HVACE HVAC EXHAUST (VSS: FINAL STAGE OF ZONE I/II HEPA FILTERS)					
System Engineer	R.A. GREGONIS					
Alternate System Engineer	D.L. JOHNSON					
	SAFETY FUNCTION DEFINITION					
1.						
1.a	What are the safety functions of the system? Where are they documented?					
	<i>Describe the safety classification, specific functions and performance requirements that the system must meet during normal and abnormal operations or under accident conditions as credited in a Documented Safety Analysis, Safety Analysis Report, Hazards Analysis, Fire Hazards Analysis, permit, or other safety basis documents. Cite specific documents, including section numbers where information can be verified.</i>					
	<p>The safety functions of the final stages of Zone I and Zone II HEPA filters for the 324 Building are to reduce the release of potentially contaminated particulates from the ventilation system. Filter efficiencies of at least 95 percent are required to meet the documented safety analyses requirements for this facility.</p> <p>WHC-140 Rev. 2 324 Building Basis for Interim Operation</p> <p>Last Stage of the HEPA Filters in the Zones I and II Ventilation Systems. The filters are defense-in-depth Safety Significant components that reduce doses and provide a margin of safety.</p> <p>WCH-199 Rev. 1 324 Building Safety Equipment List</p> <p>5.0 CONFIGURATION MANAGEMENT Table 1. Safety Equipment List</p> <table border="1" data-bbox="337 1276 1344 1365"> <tr> <td>Last stage of the HEPA filters in the Zone I and II ventilation systems.</td> <td>SS</td> <td>HEPA filters further reduce dose (must have 95% efficient filter)</td> </tr> </table> <p>WCH-141 Rev. 0 324 Building Technical Safety Requirements</p> <p>2.0 Safety Limits or Limiting Control Settings for the 324 BUILDING</p> <p>There are no Safety Limits or Limiting Control Settings for the 324 BUILDING.</p> <p>3.1 LIMITING CONDITIONS FOR OPERATION: Zone I and Zone II Filters</p> <p>LCO 3.1.1.</p> <p>1. Air exhausted from the Zone I and II ventilation systems shall pass through one OPERABLE stage of HEPA filtration with a filter efficiency of at least 95%.</p>			Last stage of the HEPA filters in the Zone I and II ventilation systems.	SS	HEPA filters further reduce dose (must have 95% efficient filter)
Last stage of the HEPA filters in the Zone I and II ventilation systems.	SS	HEPA filters further reduce dose (must have 95% efficient filter)				
1.b	How does the system provide the function required? What implementing documentation exists to assure that the system's functions are performed and maintained?					

324-HVACE (cont.)

	<p><i>Describe the specific components of the system that are required and the method in which it must be operated to assure that the safety functions are met. Identify baseline and operating documentation that exists to assure that functional and operational requirements are communicated to operations, maintenance, and technical personnel, e.g. system design descriptions, safety equipment lists, essential and support drawings, operating procedures, etc. For confinement ventilation systems, describe how the system is designed to react in the event of a fire or other natural phenomenon hazards that may impact the operation of the ventilation system. For example, is the ventilation system required to operate or shut down while fire fighting is ongoing? Describe how impacts associated with potential smoke or water damage to the filters are addressed? Include reference to specific sections of documents that demonstrate that the safety functions are being implemented.</i></p>
	<p>Preventive maintenance (per procedures 3I05008) assures that functional and operational requirements are met. The Zone I and Zone II HEPA filters are shown on the Exhaust Flow Diagrams H-3-49514, Sheets 1 & 2 and H-3-70224. A general description of the overall ventilation system is found in "324 Building Basis for Interim Operations", Section 2.5.1, "Heating, Ventilation and Air Conditioning Systems," and on the support drawings. All drawings are available through the Hanford Document Control System.</p> <p>The HEPA filters are changed out when (1) the airflow through the filter becomes restricted (high pressure drop); (2) radiation levels are elevated because of a buildup of radioactive material in the filter; (3) the filter has visible or suspected damage; and/or (4) the efficiency of the filter is below the minimum required value. The final stage HEPA filters are tested in place for efficiency, when installed and periodically thereafter, to ensure that the filters meet the minimum efficiency requirement.</p>
1.c	<p>What supporting systems are required to assure that the system can meet this function? What implementing documentation exists to assure that the support is provided? Are these documents up to date?</p>
	<p><i>Describe the supporting equipment necessary to assure that the system can perform its safety function in normal, abnormal, and accident conditions. For example – does the system require electrical power, instrument air, or steam to function? If so, how is that provided? In the event that normal power or other utilities are not available, does the system require uninterruptible power supply, emergency or standby power, or backup source of air or steam? If so, how is that provided? Include reference to specific sections of documents that demonstrate that the support is provided. Do the documents accurately reflect the system's functions and configuration?</i></p>
	<p>The Zone I and Zone II HEPA filters do not require support from the 324 Building utilities. Although the filter loading pressure indication is supported the instrument air system, the differential pressure is manually measured during the annual aerosol testing of the HEPA filters.</p>
2.	<p>CONFIGURATION MANAGEMENT</p>
2.a	<p>Are the documents described in 1.b and 1.c up-to-date?</p>
	<p><i>Do the documents accurately reflect the system's functions and configuration? Are they consistent with one another and with documents implementing safety functions on interfacing systems? Identify when the last review was conducted to confirm the accuracy and consistency. Identify who performed the review and how it was documented. Identify what discrepancies were found and whether they have been corrected.</i></p>
	<p>Yes. The BIO undergoes annual reviews and updates. The USQ process documents interim changes. The Essential drawings are maintained current by redline updates performed by the System Engineer following modifications. The drawings listed in section 1b above do accurately reflect the system's functions and configuration; this claim is based on entry made in 4/30/2000 and documented in HNF-6389, titled "Degradation Vulnerability Assessment of Safety-Related HEPA Filters in WMP, RCP and NMS Facilities", dated 5/24/2000. There have been no design changes made to the system since this report.</p>
2.b	<p>Have changes to system safety basis requirements, documents, and installed components been designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures?</p>

324-HVACE (cont.)

	<p>Identify recent changes [changes made in the last two years for the first report and changes made since the last status report for updates] made to the system and confirm that:</p> <ul style="list-style-type: none"> • Systems, structures and components and documents affected by the change are identified; • Changes are accurately described, reviewed and approved as appropriate; • Installation instructions, post-modification testing instructions and acceptance criteria for turnover to facility operations are specified; • Important documents affected by the change (e.g. operating and test procedures, Safety Equipment Lists, etc.) are revised in a timely manner; • 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 and design verification is completed as appropriate; • The USQ process (i.e., USQ screens and USQ safety evaluations/determinations) is being appropriately used; and • Consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents as changes are made.
	<p>No changes have been made to the safety basis requirements, nor have there been any changes to the final stage of ZONE I/II HEPA filters system during the last two years.</p>
2.c	<p>Verify that the actual physical configuration of the system components conforms to documented design and safety basis documents for the system.</p>
	<p>Identify when a physical walk down to confirm the configuration of the system and important components was last conducted. Identify who performed the verification and how it was documented. Identify what discrepancies were found, whether they have been corrected, and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down of the system configuration.</p>
	<p>A physical walk down was completed on 02/23/2010 by the VSS engineer and alternate. Completed walk down forms are kept in the VSS notebook and walk downs are scheduled quarterly by the VSS engineer.</p>
3.	<p>SYSTEM MAINTENANCE</p>
3.a	<p>How is the system addressed in the corrective, preventive, and predictive maintenance programs?</p>
	<p>Describe 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. Describe preventive maintenance activities on the system and explain the technical analysis used to establish performance frequencies. Describe how vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of maintenance work packages. Cite specific documents, including section numbers where information can be verified.</p>
	<p>The HEPA filters are walked down quarterly and aerosol tested annually.</p>
3.b	<p>Verify that cognizant personnel periodically walk down the VSS to assess material condition.</p>
	<p>Identify when a physical walk down to assess material condition of the system and important components was last conducted. Identify who performed the assessment and how it was documented. Identify what issues were found, whether they have been corrected and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down to assess material condition.</p>
	<p>The VSS implementation is currently in progress. The VSS note book has been prepared and a walk down of the system was performed on 02/23/2010. The walk down frequency is determined per the Discipline Engineering Manager per ENG-1, Engineering Services ENG-1-3.3 Attachment 4.</p>
3.c	<p>How is system and component history used to establish maintenance requirements?</p>
	<p>Review system or component history files for the past three years. Identify whether excessive component failure rates were identified. Describe how failure rates were used in establishing priorities and schedules for maintenance or system improvement proposals. Describe any evaluation conducted of actual failure rates compared to expected failure rates.</p>
	<p>The PM system ensures post-review by the system engineer, which maintains cognizance of system operability. Based on maintenance documentation the Zone II HEPA filter bank of 36 filters located in room 7 was changed out in 06/1997. The filter differential pressures remain low and recent efficiency tests show no indications of pending filter bank failures per annual aerosol testing for Zone I/II performed in work package 324 Filters #6, #7, #9 & 10 on 06/2009. The POG system has been permanently shut down, isolated and no longer exhausting directly to the stack.</p>
3.d	<p>For confinement ventilation systems, how are conditions that require filter replacement (replacement criteria) specified, monitored and accommodated?</p>

324-HVACE (cont.)

	<p>Identify filter replacement criteria, including those related to filter aging, radiation, chemical or water exposure, dust loading, pressure drop, etc. Describe how these conditions are monitored and what mechanism is used to trigger filter replacement when conditions requiring replacement exist. Cite specific documents, including section numbers where information can be verified.</p>				
	<p>WHC-140 Rev. 2 324 Building Basis for Interim Operation</p> <p>4.1 SURVEILLANCE REQUIREMENTS: Zone I and Zone II Filters</p> <table border="1" data-bbox="332 531 1344 661"> <thead> <tr> <th data-bbox="332 531 511 562">SURVEILLANCE REQUIREMENTS</th> <th data-bbox="511 531 1344 562">FREQUENCY</th> </tr> </thead> <tbody> <tr> <td data-bbox="332 562 511 661">SR 4.1.1 Test the last stage of HEPA filters exhausting from Zone I and Zone II and verify the filtration efficiency is $\geq 95\%$.</td> <td data-bbox="511 562 1344 661">Once per 18 months.</td> </tr> </tbody> </table>	SURVEILLANCE REQUIREMENTS	FREQUENCY	SR 4.1.1 Test the last stage of HEPA filters exhausting from Zone I and Zone II and verify the filtration efficiency is $\geq 95\%$.	Once per 18 months.
SURVEILLANCE REQUIREMENTS	FREQUENCY				
SR 4.1.1 Test the last stage of HEPA filters exhausting from Zone I and Zone II and verify the filtration efficiency is $\geq 95\%$.	Once per 18 months.				
	<p>Following annual tests, the PM work package is routed to the System Engineer for post review. Test results are compared against replacement criteria. When filters are found to meet replacement criteria, they are replaced through the corrective maintenance process.</p>				
4.	<p>SYSTEM SURVEILLANCE AND TESTING</p>				
4.a	<p>What testing and surveillance requirements demonstrate that the system continues to meet safety basis requirements and confirms that key operating parameters for the overall system and its major components are maintained within operating limits?</p>				
	<p>Identify where surveillance requirements for the system and components are established. Identify specific surveillance and testing procedures that implement these requirements. Identify the acceptance criteria from the surveillance test procedures used to verify that the system 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.</p>				
	<p>Ensuring that maintenance is periodically performed and that daily surveillance rounds are completed assures that safety documentation and system operability requirements are properly satisfied.</p> <p>The applicable testing procedures are listed below:</p> <ul style="list-style-type: none"> • 3I05008 Aerosol Testing of Zone I and Zone II HEPA Filters <p>The Ventilation and Balance technicians perform the PM's in accordance to approved procedures based on applicable ASME N-510 requirements. Annual aerosol testing of the Hot Cell HEPA filters is performed and documented.</p> <p>The applicable surveillance procedure is listed below:</p> <ul style="list-style-type: none"> • 3I-SOP-PWR-002 "Perform Stationary Operating Engineer Surveillance" <p>The surveillance procedure records the filter bank differential pressures from pressure gauges located on the VCP panel in Room 317 weekly.</p>				
4.b	<p>Have surveillance tests performed demonstrated that safety basis requirements and key operating parameters have been met?</p>				
	<p>Identify recent surveillance and testing results for the safety system's major components and confirm that:</p> <ul style="list-style-type: none"> • Test results are valid; • System performance meets system requirements; • Performance criteria are appropriate for current facility mission life-cycle; • Parameters that demonstrate compliance with the safety requirements can be measured; • Test personnel are knowledgeable and able to satisfactorily perform the test; • The procedure cites applicable Technical Safety Requirements/Limiting Conditions for Operation; • Limits, precautions, system and test pre-requisite conditions, data required, and acceptance criteria are included; • Appropriate data recording provisions are included or referenced and area used to record results; • The procedure includes provisions for listing discrepancies; • The procedure requires timely notification of facility management about any failure or discrepancy that could impact operability; • Appropriate personnel review the test results and took appropriate action. 				

324-HVACE (cont.)

	Operating Zone I/II HEPA filters demonstrate a filter efficiency of >95% efficiency.
4.c	Are system components properly calibrated?
	<i>Demonstrate that the equipment used for testing was calibrated. Demonstrate that Measurement & Test Equipment used for calibration is controlled consistent with quality assurance requirements. Demonstrate that installed components are calibrated in accordance with established requirements.</i>
	Ventilation and balance group provides the over-site required to assure calibrated instruments are maintained and used as required. A calibration data sheet is included in the work package to document instrument calibration data.
4.d	For confinement ventilation systems, how are reliability and operability of filter media assured?
	<i>Identify if HEPA filters were qualified to ASME AG-1, Section FC5000. Identify if procurement specifications reference such standards as DOE-STD-3020-97 and ASME Code AG-1, Section FC. Identify 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. Identify whether visual inspection ports are installed in filter housings to enable in situ visual inspection of HEPA filters and how they are used. Assure that filter tests are described in 4.b. Identify how the impacts of filter aging, radiation, chemical, or water exposure on filter integrity are addressed. Cite specific documents, including section numbers where information can be verified.</i>
	Reliability and operability of the filter media is assured through annual aerosol testing and routine surveillance of differential pressures.
5.	SYSTEM OPERABILITY AND RELIABILITY
5.a	What is the remaining mission life of the system?
	<i>Identify how long the system will be required to operate and meet current safety functions. Identify any planned or expected changes to the system mission or safety functions.</i>
	The building is scheduled to be demolished in March 2011 based on the current schedule. During this time period, and as safety basis and environmental step-out criteria are met, portions of the system will be deactivated as required to facilitate D & D operations.
5.b	Will the system continue to be operable and reliable over the planned mission life?
	<i>Describe the system's ability to continue to operate safely and reliably throughout the remainder of its mission life. Identify preservation activities that should be or must be performed to continue to support safety functions or meet performance requirements.</i>
	Based on all measures to date, the system should be able to operate safely, reliably and meet its performance requirements throughout the estimated mission life of < one year with the current levels of surveillance and maintenance. The system will be kept operable until stabilization of respective hot cells have been completed and until safety basis and environmental step-out criteria are met.

Assessment performed by: RA Gregonis *RA Gregonis* Date: 3/31/10
System Engineer

DL Johnson *DL Johnson* Date: 3-30-10
Alternate System Engineer

Reviewed by: JN Winters *JN Winters* Date: 4/6/10
Discipline Engineering Manager

324-HVAC INT

2010 System Engineer Assessment of Vital Safety Systems

Project	D4-300	Facility	324 BUILDING			
System	324-HVAC INT HVAC SUPPLY/EXHAUST FAN INTERLOCKS					
System Engineer	R.A. GREGONIS					
Alternate System Engineer	D.L. JOHNSON					
1.	SAFETY FUNCTION DEFINITION					
1.a	What are the safety functions of the system? Where are they documented?					
	<i>Describe the safety classification, specific functions and performance requirements that the system must meet during normal and abnormal operations or under accident conditions as credited in a Documented Safety Analysis, Safety Analysis Report, Hazards Analysis, Fire Hazards Analysis, permit, or other safety basis documents. Cite specific documents, including section numbers where information can be verified.</i>					
	<p>The three Zone I exhaust fans, two Zone II exhaust fans and the two main supply air fans are interlocked to ensure that the cascading zone pressure levels are maintained during normal operation, maintenance outages, and most credible failure modes.</p> <p>The interlocks are configured such that an exhaust fan serving an area with a higher potential for contamination must be in operation before an exhaust fan in the next lower area of potential contamination will operate.</p> <p>WCH-199 Rev. 1 324 Building Safety Equipment List</p> <p>5.0 CONFIGURATION MANAGEMENT Table 1. Safety Equipment List</p> <table border="1" style="width: 100%;"> <tr> <td>Supply/exhaust Fan interlocks</td> <td>GS-ITS</td> <td>Defense in depth feature reduces potential to defeat confinement function of the exhaust system.</td> </tr> </table>			Supply/exhaust Fan interlocks	GS-ITS	Defense in depth feature reduces potential to defeat confinement function of the exhaust system.
Supply/exhaust Fan interlocks	GS-ITS	Defense in depth feature reduces potential to defeat confinement function of the exhaust system.				
1.b	How does the system provide the function required? What implementing documentation exists to assure that the system's functions are performed and maintained?					
	<i>Describe the specific components of the system that are required and the method in which it must be operated to assure that the safety functions are met. Identify baseline and operating documentation that exists to assure that functional and operational requirements are communicated to operations, maintenance, and technical personnel, e.g. system design descriptions, safety equipment lists, essential and support drawings, operating procedures, etc. For confinement ventilation systems, describe how the system is designed to react in the event of a fire or other natural phenomenon hazards that may impact the operation of the ventilation system. For example, is the ventilation system required to operate or shut down while fire fighting is ongoing? Describe how impacts associated with potential smoke or water damage to the filters are addressed? Include reference to specific sections of documents that demonstrate that the safety functions are being implemented.</i>					
	The system provides function as described in 1.a., above. The HVAC Supply/Exhaust Fan Interlocks configuration is maintained on essential drawings are as follows: Electrical Elementary Diagrams Exhaust Fan Control H-3-304464 sheets 1-6.					
1.c	What supporting systems are required to assure that the system can meet this function? What implementing documentation exists to assure that the support is provided? Are these documents up to date?					
	<i>Describe the supporting equipment necessary to assure that the system can perform its safety function in normal, abnormal, and accident conditions. For example – does the system require electrical power, instrument air, or steam to function? If so, how is that provided? In the event that normal power or other utilities are not available, does the system require uninterruptible power supply, emergency or standby power, or backup source of air or steam? If so, how is that provided? Include reference to specific sections of documents that demonstrate that the support is provided. Do the documents accurately reflect the system's functions and configuration?</i>					

324-HVAC INT (cont.)

	The electrical system supports the fan interlocks. The electrical system is as described in the Building Basis for Interim Operation (BIO), WCH-140, Rev 2 and in the USQ determinations. The Essential drawings are maintained current by redline updates performed by the System Engineer following modifications.
2.	CONFIGURATION MANAGEMENT
2.a	Are the documents described in 1.b and 1.c up-to-date?
	<i>Do the documents accurately reflect the system's functions and configuration? Are they consistent with one another and with documents implementing safety functions on interfacing systems? Identify when the last review was conducted to confirm the accuracy and consistency. Identify who performed the review and how it was documented. Identify what discrepancies were found and whether they have been corrected.</i>
	Yes. The BIO undergoes annual reviews and updates. The USQ process documents interim changes. Essential drawings redline/update process also maintains configuration management. The documents listed in 1.b above reflect the system's functions and configuration. The Essential drawings are maintained current by redline updates performed by the System Engineer following modifications.
2.b	Have changes to system safety basis requirements, documents, and installed components been designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures?
	<i>Identify recent changes [changes made in the last two years for the first report and changes made since the last status report for updates] made to the system and confirm that:</i> <ul style="list-style-type: none"> • Systems, structures and components and documents affected by the change are identified; • Changes are accurately described, reviewed and approved as appropriate; • Installation instructions, post-modification testing instructions and acceptance criteria for turnover to facility operations are specified; • Important documents affected by the change (e.g. operating and test procedures, Safety Equipment Lists, etc.) are revised in a timely manner; • 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 and design verification is completed as appropriate; • The USQ process (i.e., USQ screens and USQ safety evaluations/determinations) is being appropriately used; and • Consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents as changes are made.
	No changes have been made to the safety basis requirements, nor have there been any changes to the Supply/exhaust fan interlocks during the last two years.
2.c	Verify that the actual physical configuration of the system components conforms to documented design and safety basis documents for the system.
	<i>Identify when a physical walk down to confirm the configuration of the system and important components was last conducted. Identify who performed the verification and how it was documented. Identify what discrepancies were found, whether they have been corrected, and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down of the system configuration.</i>
	A physical walk down was performed on 02/23/2010 by the VSS engineer and alternate. Completed walk down forms are kept in the VSS notebook and walk downs are scheduled quarterly by the VSS engineer.
3.	SYSTEM MAINTENANCE
3.a	How is the system addressed in the corrective, preventive, and predictive maintenance programs?
	<i>Describe 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. Describe preventive maintenance activities on the system and explain the technical analysis used to establish performance frequencies. Describe how vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of maintenance work packages. Cite specific documents, including section numbers where information can be verified.</i>
	There is no formal testing of the Supply/exhaust fan interlocks. The fan interlocks are exercised during maintenance activities involving starting and stopping the Supply/exhaust fans.
3.b	Verify that cognizant personnel periodically walk down the VSS to assess material condition.

324-HVAC INT (cont.)

	<i>Identify when a physical walk down to assess material condition of the system and important components was last conducted. Identify who performed the assessment and how it was documented. Identify what issues were found, whether they have been corrected and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down to assess material condition.</i>
	The walk down frequency for the Supply/exhaust fan interlocks system is quarterly. Operation personnel perform weekly surveillance of the building. The interlocks can not be visually inspected. Interviews with the SOE's during the walk down may reveal any operational problems.
3.c	How is system and component history used to establish maintenance requirements?
	<i>Review system or component history files for the past three years. Identify whether excessive component failure rates were identified. Describe how failure rates were used in establishing priorities and schedules for maintenance or system improvement proposals. Describe any evaluation conducted of actual failure rates compared to expected failure rates.</i>
	The 324 Building fan interlocks are not designed to allow maintenance to be performed without shutting off the Zone I and Zone II ventilation. The DSA states that at least one Zone I and Zone II exhaust fans must be operating at all times. Functional testing of fan interlocks occurs during fan switching to support operations and maintenance activities. This validates that the interlocks are functioning properly. Operability of the fan interlocks is 100%.
3.d	For confinement ventilation systems, how are conditions that require filter replacement (replacement criteria) specified, monitored and accommodated?
	<i>Identify filter replacement criteria, including those related to filter aging, radiation, chemical or water exposure, dust loading, pressure drop, etc. Describe how these conditions are monitored and what mechanism is used to trigger filter replacement when conditions requiring replacement exist. Cite specific documents, including section numbers where information can be verified.</i>
	See the HVAC assessment.
4.	SYSTEM SURVEILLANCE AND TESTING
4.a	What testing and surveillance requirements demonstrate that the system continues to meet safety basis requirements and confirms that key operating parameters for the overall system and its major components are maintained within operating limits?
	<i>Identify where surveillance requirements for the system and components are established. Identify specific surveillance and testing procedures that implement these requirements. Identify the acceptance criteria from the surveillance test procedures used to verify that the system 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.</i>
	No testing is performed.
4.b	Have surveillance tests performed demonstrated that safety basis requirements and key operating parameters have been met?
	<i>Identify recent surveillance and testing results for the safety system's major components and confirm that:</i> <ul style="list-style-type: none"> • Test results are valid; • System performance meets system requirements; • Performance criteria are appropriate for current facility mission life-cycle; • Parameters that demonstrate compliance with the safety requirements can be measured; • Test personnel are knowledgeable and able to satisfactorily perform the test; • The procedure cites applicable Technical Safety Requirements/Limiting Conditions for Operation; • Limits, precautions, system and test pre-requisite conditions, data required, and acceptance criteria are included; • Appropriate data recording provisions are included or referenced and area used to record results; • The procedure includes provisions for listing discrepancies; • The procedure requires timely notification of facility management about any failure or discrepancy that could impact operability; • Appropriate personnel review the test results and took appropriate action.
	There is no formal testing of the Supply/Exhaust fan interlocks. The fan interlocks are exercised during maintenance activities involving starting and shutting off the fans.
4.c	Are system components properly calibrated?

324-HVAC INT (cont.)

	Demonstrate that the equipment used for testing was calibrated. Demonstrate that Measurement & Test Equipment used for calibration is controlled consistent with quality assurance requirements. Demonstrate that installed components are calibrated in accordance with established requirements.
	N/A
4.d	For confinement ventilation systems, how are reliability and operability of filter media assured?
	Identify if HEPA filters were qualified to ASME AG-1, Section FC5000. Identify if procurement specifications reference such standards as DOE-STD-3020-97 and ASME Code AG-1, Section FC. Identify 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. Identify whether visual inspection ports are installed in filter housings to enable in situ visual inspection of HEPA filters and how they are used. Assure that filter tests are described in 4.b. Identify how the impacts of filter aging, radiation, chemical, or water exposure on filter integrity are addressed. Cite specific documents, including section numbers where information can be verified.
	See the HVAC assessment.
5.	SYSTEM OPERABILITY AND RELIABILITY
5.a	What is the remaining mission life of the system?
	Identify how long the system will be required to operate and meet current safety functions. Identify any planned or expected changes to the system mission or safety functions.
	The building is scheduled to be demolished in March 2011 based on the current schedule. During this time period, and as safety basis step-out criteria are met, portions of the system will be deactivated as required to facilitate D & D operations.
5.b	Will the system continue to be operable and reliable over the planned mission life?
	Describe the system's ability to continue to operate safely and reliably throughout the remainder of its mission life. Identify preservation activities that should be or must be performed to continue to support safety functions or meet performance requirements.
	Based on all measures to date, the system should be able to operate safely, reliably and meet its performance requirements throughout the estimated mission life of < one year with the current levels of surveillance and maintenance.

Assessment performed by: RA Gregonis *RA Gregonis* Date: 4/3/10
System Engineer

DL Johnson *DL Johnson* Date: 4-3-10
Alternate System Engineer

Reviewed by: JN Winters *JN Winters* Date: 4/12/10
Discipline Engineering Manager

324-HOTCELL PDA

2010 System Engineer Assessment of Vital Safety Systems

Project	D4-300	Facility	324 BUILDING			
System	324-HOTCELL PDA REC/SMF TO GALLERY – PRESSURE DIFFERENTIAL ALARMS					
System Engineer	R.A. GREGONIS					
Alternate System Engineer	D.L. JOHNSON					
	SAFETY FUNCTION DEFINITION					
1.						
1.a	What are the safety functions of the system? Where are they documented?					
	<i>Describe the safety classification, specific functions and performance requirements that the system must meet during normal and abnormal operations or under accident conditions as credited in a Documented Safety Analysis, Safety Analysis Report, Hazards Analysis, Fire Hazards Analysis, permit, or other safety basis documents. Cite specific documents, including section numbers where information can be verified.</i>					
	<p>An alarm system is used to notify the operators of potential increases in differential pressure (DP) between the cell and the gallery during operation to assure that filters have the capability of accepting contamination during a worst-case fire without plugging. A low DP alarm would warn operators that filters might be plugging.</p> <p>WCH-199 Rev. 1 324 Building Safety Equipment List</p> <p>5.0 CONFIGURATION MANAGEMENT Table 1. Safety Equipment List</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 30%;">Pressure differential alarms</td> <td style="width: 20%;">GS-ITS</td> <td style="width: 50%;">Alerts operations personnel in the event of a loss of hot cell confinement in the event of Zone I system plugging. Function may be met by operation of continuous air monitors.</td> </tr> </table>			Pressure differential alarms	GS-ITS	Alerts operations personnel in the event of a loss of hot cell confinement in the event of Zone I system plugging. Function may be met by operation of continuous air monitors.
Pressure differential alarms	GS-ITS	Alerts operations personnel in the event of a loss of hot cell confinement in the event of Zone I system plugging. Function may be met by operation of continuous air monitors.				
1.b	How does the system provide the function required? What implementing documentation exists to assure that the system's functions are performed and maintained?					
	<i>Describe the specific components of the system that are required and the method in which it must be operated to assure that the safety functions are met. Identify baseline and operating documentation that exists to assure that functional and operational requirements are communicated to operations, maintenance, and technical personnel, e.g. system design descriptions, safety equipment lists, essential and support drawings, operating procedures, etc. For confinement ventilation systems, describe how the system is designed to react in the event of a fire or other natural phenomenon hazards that may impact the operation of the ventilation system. For example, is the ventilation system required to operate or shut down while fire fighting is ongoing? Describe how impacts associated with potential smoke or water damage to the filters are addressed? Include reference to specific sections of documents that demonstrate that the safety functions are being implemented.</i>					
	<p>The PM's and SOE surveillance below confirm system is operating and maintained.</p> <p>3118004 RE CELL AND AIRLOCK DP ALARM SYSTEM 3118007 SMF STATIC PRESSURE ALARMS D4-200-3I-SOP-PWR-002 PERFORM STATIONARY OPERATING ENGINEER SURVEILLANCE</p>					
1.c	What supporting systems are required to assure that the system can meet this function? What implementing documentation exists to assure that the support is provided? Are these documents up to date?					

324-HOTCELL PDA (cont.)

	<i>Describe the supporting equipment necessary to assure that the system can perform its safety function in normal, abnormal, and accident conditions. For example – does the system require electrical power, instrument air, or steam to function? If so, how is that provided? In the event that normal power or other utilities are not available, does the system require uninterruptible power supply, emergency or standby power, or backup source of air or steam? If so, how is that provided? Include reference to specific sections of documents that demonstrate that the support is provided. Do the documents accurately reflect the system's functions and configuration?</i>
	The electrical system supports the differential pressure alarm systems. The electrical system is as described in the 324 Building Basis for Interim Operation, WHC-140, Rev. 2 and in the USQ determinations. The Essential drawings are maintained current by redline updates performed by the System Engineer following modifications.
2.	CONFIGURATION MANAGEMENT
2.a	Are the documents described in 1.b and 1.c up-to-date?
	<i>Do the documents accurately reflect the system's functions and configuration? Are they consistent with one another and with documents implementing safety functions on interfacing systems? Identify when the last review was conducted to confirm the accuracy and consistency. Identify who performed the review and how it was documented. Identify what discrepancies were found and whether they have been corrected.</i>
	Yes. The BIO undergoes annual reviews and updates. The USQ process documents interim changes. The Essential drawings are maintained current by redline updates performed by the System Engineer following modifications.
2.b	Have changes to system safety basis requirements, documents, and installed components been designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures?
	<i>Identify recent changes [changes made in the last two years for the first report and changes made since the last status report for updates] made to the system and confirm that:</i> <ul style="list-style-type: none"> • Systems, structures and components and documents affected by the change are identified; • Changes are accurately described, reviewed and approved as appropriate; • Installation instructions, post-modification testing instructions and acceptance criteria for turnover to facility operations are specified; • Important documents affected by the change (e.g. operating and test procedures, Safety Equipment Lists, etc.) are revised in a timely manner; • 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 and design verification is completed as appropriate; • The USQ process (i.e., USQ screens and USQ safety evaluations/determinations) is being appropriately used; and • Consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents as changes are made.
	No changes have been made to the safety basis requirements, nor have there been any changes to the pressure differential alarms system or safety basis requirements during the last two years.
2.c	Verify that the actual physical configuration of the system components conforms to documented design and safety basis documents for the system.
	<i>Identify when a physical walk down to confirm the configuration of the system and important components was last conducted. Identify who performed the verification and how it was documented. Identify what discrepancies were found, whether they have been corrected, and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down of the system configuration.</i>
	A physical walk down is scheduled for 02/23/2010 by the VSS engineer and alternate. Completed walk down forms are kept in the VSS notebook and walk downs are scheduled quarterly by the VSS engineer.
3.	SYSTEM MAINTENANCE
3.a	How is the system addressed in the corrective, preventive, and predictive maintenance programs?
	<i>Describe 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. Describe preventive maintenance activities on the system and explain the technical analysis used to establish performance frequencies. Describe how vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of maintenance work packages. Cite specific documents, including section numbers where information can be verified.</i>

324-HOTCELL PDA (cont.)

	The pressure differential alarms system is tested annually per PM's referenced in 1.b above.
3.b	Verify that cognizant personnel periodically walk down the VSS to assess material condition. <i>Identify when a physical walk down to assess material condition of the system and important components was last conducted. Identify who performed the assessment and how it was documented. Identify what issues were found, whether they have been corrected and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down to assess material condition.</i>
	A physical walk down is scheduled for 02/23/2010 by the VSS engineer and alternate. Completed walk down forms are kept in the VSS notebook and walk downs are scheduled quarterly by the VSS engineer.
3.c	How is system and component history used to establish maintenance requirements? <i>Review system or component history files for the past three years. Identify whether excessive component failure rates were identified. Describe how failure rates were used in establishing priorities and schedules for maintenance or system improvement proposals. Describe any evaluation conducted of actual failure rates compared to expected failure rates.</i>
	There is no formal system or component history files available, however the PM system maintains records. The PM system ensures post-review by the system engineer, which maintains cognizance of system operability. The system operability is 100 %.
3.d	For confinement ventilation systems, how are conditions that require filter replacement (replacement criteria) specified, monitored and accommodated? <i>Identify filter replacement criteria, including those related to filter aging, radiation, chemical or water exposure, dust loading, pressure drop, etc. Describe how these conditions are monitored and what mechanism is used to trigger filter replacement when conditions requiring replacement exist. Cite specific documents, including section numbers where information can be verified.</i>
	See the HVAC assessment.
4.	SYSTEM SURVEILLANCE AND TESTING
4.a	What testing and surveillance requirements demonstrate that the system continues to meet safety basis requirements and confirms that key operating parameters for the overall system and its major components are maintained within operating limits? <i>Identify where surveillance requirements for the system and components are established. Identify specific surveillance and testing procedures that implement these requirements. Identify the acceptance criteria from the surveillance test procedures used to verify that the system 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.</i>
	Annual calibrations are performed via the PM's listed in 1.b. above, and weekly surveillance is performed by the SOE per D4-200-3I-SOP-PWR-002 Perform Stationary Operating Engineer Surveillance. There is no surveillance testing by the SOE.
4.b	Have surveillance tests performed demonstrated that safety basis requirements and key operating parameters have been met? <i>Identify recent surveillance and testing results for the safety system's major components and confirm that:</i>
	<ul style="list-style-type: none"> • Test results are valid; • System performance meets system requirements; • Performance criteria are appropriate for current facility mission life-cycle; • Parameters that demonstrate compliance with the safety requirements can be measured; • Test personnel are knowledgeable and able to satisfactorily perform the test; • The procedure cites applicable Technical Safety Requirements/Limiting Conditions for Operation; • Limits, precautions, system and test pre-requisite conditions, data required, and acceptance criteria are included; • Appropriate data recording provisions are included or referenced and area used to record results; • The procedure includes provisions for listing discrepancies; • The procedure requires timely notification of facility management about any failure or discrepancy that could impact operability; • Appropriate personnel review the test results and took appropriate action.
	N/A

324-HOTCELL PDA (cont.)

4.c	Are system components properly calibrated?
	<i>Demonstrate that the equipment used for testing was calibrated. Demonstrate that Measurement & Test Equipment used for calibration is controlled consistent with quality assurance requirements. Demonstrate that installed components are calibrated in accordance with established requirements.</i>
	The WHC calibration program is documented in PAS-1 "Measurement and Test Equipment" and current calibration stickers are affixed to the respective instruments.
4.d	For confinement ventilation systems, how are reliability and operability of filter media assured?
	<i>Identify if HEPA filters were qualified to ASME AG-1, Section FC5000. Identify if procurement specifications reference such standards as DOE-STD-3020-97 and ASME Code AG-1, Section FC. Identify 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. Identify whether visual inspection ports are installed in filter housings to enable in situ visual inspection of HEPA filters and how they are used. Assure that filter tests are described in 4.b. Identify how the impacts of filter aging, radiation, chemical, or water exposure on filter integrity are addressed. Cite specific documents, including section numbers where information can be verified.</i>
	See the HVAC assessment.
5.	SYSTEM OPERABILITY AND RELIABILITY
5.a	What is the remaining mission life of the system?
	<i>Identify how long the system will be required to operate and meet current safety functions. Identify any planned or expected changes to the system mission or safety functions.</i>
	The building is scheduled to be demolished in March 2011 based on the current schedule. During this time period and as safety basis step-out criteria are met, portions of the system will be deactivated as required to facilitate D & D operations.
5.b	Will the system continue to be operable and reliable over the planned mission life?
	<i>Describe the system's ability to continue to operate safely and reliably throughout the remainder of its mission life. Identify preservation activities that should be or must be performed to continue to support safety functions or meet performance requirements.</i>
	Based on all measures to date, the system should be able to operate safely, reliably and meet its performance requirements throughout the estimated mission life of < one year with the current levels of surveillance and maintenance. The system will be kept operable until stabilization of respective hot cells have been completed.

Assessment performed by: RA Gregonis *RA Gregonis* Date: 4/8/10
System Engineer

DL Johnson *DL Johnson* Date: 4-8-10
Alternate System Engineer

Reviewed by: JN Winters *JN Winters* Date: 4/12/10
Discipline Engineering Manager

324-FD/EVAC

2010 System Engineer Assessment of Vital Safety Systems

Project	D4-300	Facility	324 BUILDING
System	324-FD/EVAC FIRE DETECTION/EVACUATION ALARM SYSTEM		
System Engineer	O.V. King		
Alternate System Engineer	A.M. Horner		
	SAFETY FUNCTION DEFINITION		
1.			
1.a	What are the safety functions of the system? Where are they documented?		
	<i>Describe the safety classification, specific functions and performance requirements that the system must meet during normal and abnormal operations or under accident conditions as credited in a Documented Safety Analysis, Safety Analysis Report, Hazards Analysis, Fire Hazards Analysis, permit, or other safety basis documents. Cite specific documents, including section numbers where information can be verified.</i>		
	<p>WCH-140 Rev. 2 324 Building Basis for Interim Operation</p> <p>2.5.5 Fire-Detection and Fire-Suppression Systems</p> <p>The 324 Building has both fire-alarm and fire-suppression systems. The fire-alarm system consists of a local fire-alarm control panel, manual fire-alarm pull boxes, audible and visual alarms, sprinkler water flow alarm switches, smoke detectors, heat detectors, and valve position supervisory switches. If the power fails, backup battery power is supplied to the fire-alarm control panel for a minimum of 24 hours.</p> <p>Manual fire-alarm pull boxes are provided at building exits. Sprinkler water flow alarm switches are installed to provide annunciation of water flow in the sprinkler system by zone, directly to the Hanford Fire Department. Audible and visual fire alarms are installed throughout the building to alert staff for evacuation. Sprinkler control valves are monitored to provide a trouble alarm if the valves are out of "normally open" position. The fire-alarm control panel is connected to a municipal-type radio fire-alarm box that transmits fire alarms to the Hanford Fire Department.</p> <p>The Hanford Fire Department, which provides manual fire fighting, is a fully staffed department with personnel and modern equipment available 24 hours a day. Fire department personnel tour the building regularly for familiarization with the facility and for fire protection inspections. The response time to the facility is estimated at less than 5 minutes. The Hanford Fire Department has a pre-fire plan for the 324 Building to address manual fire-fighting considerations.</p> <p>5.3.4 Additional Equipment Important to Safety</p> <p>The Safety Evaluation Report (03-ABD-0106) identifies additional equipment important to safety for the 324 Building. The USQ reviews need to address the following safety systems: Fire detection and suppression system.</p>		

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<p>HNF-SD-HT-FHA-002, Rev. 2 Building 324 Fire Hazard Analysis</p> <p>The 324 Building has fire alarm, detection, and fire suppression systems.</p> <p>4.1 Fire Alarm</p> <p>The fire alarm system consists of a local fire alarm control panel (Pyrotronics System 3) located in the 324 Building lobby (Room 104). The fire alarm control panel monitors or controls manual pull stations, heat detectors, smoke detectors, wet pipe sprinklers systems and audible and visible alarm notification appliances. The fire alarm control panel is supplied with normal electrical power. If the normal power fails, backup battery power is supplied to the fire alarm control panel for a minimum of 24 hours. Manual fire alarm pull stations are provided at building exits. Sprinkler water flow alarm switches are installed to provide annunciation of water flow in the sprinkler system by zone. The Fissionable Materials Storage Vault is equipped with smoke detectors to provide early warning of fire. Sprinkler and transformer deluge control valves are supervised to provide a trouble alarm if the valves are out of "normally open" position. The fire alarm control panel is connected to a municipal-type radio fire alarm box (# 3280) that transmits fire alarms to the Hanford Fire Department (HFD).</p> <p>WCH-199 Rev. 1 324 Building Safety Equipment List</p> <p>5.0 CONFIGURATION MANAGEMENT Table 1. Safety Equipment List</p> <table border="1"> <tr> <td>Automatic fire detection and alarm system</td> <td>GS-ITS</td> <td>The automatic fire detection and alarm system provides detection of fire conditions, initiates applicable local building alarms, and transmits alarm signals to the Hanford Fire Department.</td> </tr> </table>			Automatic fire detection and alarm system	GS-ITS	The automatic fire detection and alarm system provides detection of fire conditions, initiates applicable local building alarms, and transmits alarm signals to the Hanford Fire Department.
Automatic fire detection and alarm system	GS-ITS	The automatic fire detection and alarm system provides detection of fire conditions, initiates applicable local building alarms, and transmits alarm signals to the Hanford Fire Department.			
<p>1.b How does the system provide the function required? What implementing documentation exists to assure that the system's functions are performed and maintained?</p> <p><i>Describe the specific components of the system that are required and the method in which it must be operated to assure that the safety functions are met. Identify baseline and operating documentation that exists to assure that functional and operational requirements are communicated to operations, maintenance, and technical personnel, e.g. system design descriptions, safety equipment lists, essential and support drawings, operating procedures, etc. For confinement ventilation systems, describe how the system is designed to react in the event of a fire or other natural phenomenon hazards that may impact the operation of the ventilation system. For example, is the ventilation system required to operate or shut down while fire fighting is ongoing? Describe how impacts associated with potential smoke or water damage to the filters are addressed? Include reference to specific sections of documents that demonstrate that the safety functions are being implemented.</i></p>					
<p>The automatic fire alarm system provides flow/ pressure and heat detection of fire conditions, initiates applicable local building alarms, bells and strobes and transmits alarm signals to the HFD via the RFAR.</p> <p>Routine maintenance done by the fire department and semi-annual walk downs done by the VSS System engineer assure that the functional and operational requirements are communicated to operations, maintenance, and technical personnel.</p> <p>HNF-SD-HT-FHA-002, Rev. 2 Building 324 Fire Hazard Analysis</p> <p>4.2.9 Inspection, Testing and Maintenance</p> <p>The HFD is responsible for the inspection, testing and maintenance of most of the fire protection systems. Systems excluded from HFD responsibility are the manual deluge systems in the SMF and</p>					

324-FD/EVAC (cont.)

	REC cell areas and the Dry Chemical Systems. Inspection, testing and maintenance of fire protection systems is required to be performed in accordance with procedures and frequencies outlined in the Project Hanford Policy and Procedure System [HNF-RD-7899].
1.c	What supporting systems are required to assure that the system can meet this function? What implementing documentation exists to assure that the support is provided? Are these documents up to date?
	<i>Describe the supporting equipment necessary to assure that the system can perform its safety function in normal, abnormal, and accident conditions. For example – does the system require electrical power, instrument air, or steam to function? If so, how is that provided? In the event that normal power or other utilities are not available, does the system require uninterruptible power supply, emergency or standby power, or backup source of air or steam? If so, how is that provided? Include reference to specific sections of documents that demonstrate that the support is provided. Do the documents accurately reflect the system's functions and configuration?</i>
	The electrical system is the main support system required for the fire detection and alarm system. The fire-alarm control panel is supplied with normal electrical power. If the normal power fails, backup battery power is supplied to the fire-alarm control panel for a minimum of 24 hours.
2.	CONFIGURATION MANAGEMENT
2.a	Are the documents described in 1.b and 1.c up-to-date?
	<i>Do the documents accurately reflect the system's functions and configuration? Are they consistent with one another and with documents implementing safety functions on interfacing systems? Identify when the last review was conducted to confirm the accuracy and consistency. Identify who performed the review and how it was documented. Identify what discrepancies were found and whether they have been corrected.</i>
	The VSS walk downs performed semi-annually verify the system's function and configuration based on system drawings H-3-301501 sheets 1-8. The last walk down was performed on 02-25-2010, with participation from the System Engineer, Alternate System Engineer, the Responsible Manager, and the Fire Protection Engineer. System Health was good and no discrepancies were noted.
2.b	Have changes to system safety basis requirements, documents, and installed components been designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures?
	<i>Identify recent changes [changes made in the last two years for the first report and changes made since the last status report for updates] made to the system and confirm that:</i> <ul style="list-style-type: none"> • Systems, structures and components and documents affected by the change are identified; • Changes are accurately described, reviewed and approved as appropriate; • Installation instructions, post-modification testing instructions and acceptance criteria for turnover to facility operations are specified; • Important documents affected by the change (e.g. operating and test procedures, Safety Equipment Lists, etc.) are revised in a timely manner; • 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 and design verification is completed as appropriate; • The USQ process (i.e., USQ screens and USQ safety evaluations/determinations) is being appropriately used; and • Consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents as changes are made.
	YES, changes have been made to the automatic fire detection and alarm system during the last two years. Fire Marshall Permits have been completed allowing deactivation of the fire systems in the new office addition, highbay, the shop, and 324C. USQ reviews have concluded that systems in these areas are no longer required under the safety basis and may be taken out of service. The office addition, the shop and 324C have already been demolished and hauled away. As a result of some of the prior deactivations it was also determined that some of the gongs and strobes in the remaining areas of the building (outside of the operating gallery) were taken out of service as well. A walk down with the WCH FPE and HFD was

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	performed to determine if the deactivated components needed to be returned to service. It was determined that the coverage was adequate and a Fire Marshall Permit and USQ were issued to allow the system to remain in its current configuration.
2.c	Verify that the actual physical configuration of the system components conforms to documented design and safety basis documents for the system.
	<i>Identify when a physical walk down to confirm the configuration of the system and important components was last conducted. Identify who performed the verification and how it was documented. Identify what discrepancies were found, whether they have been corrected, and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down of the system configuration.</i>
	A physical walk down was performed on 02-25-2010. Completed walk down forms are kept in the VSS notebook and walk downs are scheduled semi-annually by the VSS engineer.
3.	SYSTEM MAINTENANCE
3.a	How is the system addressed in the corrective, preventive, and predictive maintenance programs?
	<i>Describe 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. Describe preventive maintenance activities on the system and explain the technical analysis used to establish performance frequencies. Describe how vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of maintenance work packages. Cite specific documents, including section numbers where information can be verified.</i>
	Preventive Maintenance Plans and Schedules Fire Systems Maintenance (FSM) maintains procedures to perform tests, inspections, and maintenance that is required by HNF-RD-7899, Fire Protection System Testing/Inspection/Maintenance/Deficiencies. The FSM group uses a recall system on their database to ensure the activities are performed at the required frequencies. Technical Bases Fire protection systems on the Hanford site are managed in accordance with the National Fire Protection Agency (NFPA) Codes and Standards. The document that identifies testing, inspections, maintenance, and deficiencies requirements is HNF-RD-7899, Fire Protection System Testing/Inspection/Maintenance/Deficiencies. The FSM maintenance, test, and inspection activities are performed in accordance with HNF-RD-7899 and appropriate vendor/manufacture information.
3.b	Verify that cognizant personnel periodically walk down the VSS to assess material condition.
	<i>Identify when a physical walk down to assess material condition of the system and important components was last conducted. Identify who performed the assessment and how it was documented. Identify what issues were found, whether they have been corrected and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down to assess material condition.</i>
	The walk down frequency for the automatic fire detection and alarm system is semi-annually. Operation personnel perform weekly surveillance of the building. A physical walk down was performed on 02-25-2010. Completed walk down forms are kept in the VSS notebook. No deficiencies were identified at this time.
3.c	How is system and component history used to establish maintenance requirements?
	<i>Review system or component history files for the past three years. Identify whether excessive component failure rates were identified. Describe how failure rates were used in establishing priorities and schedules for maintenance or system improvement proposals. Describe any evaluation conducted of actual failure rates compared to expected failure rates.</i>
	Monthly impairment reports provided by the fire department status the current condition of the fire systems. For the past year of which data has been recorded, there have been no major impairments of the 324 Building fire detection and alarm system. Copies of the impairment forms are kept in the

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	VSS notebook.
3.d	For confinement ventilation systems, how are conditions that require filter replacement (replacement criteria) specified, monitored and accommodated?
	<i>Identify filter replacement criteria, including those related to filter aging, radiation, chemical or water exposure, dust loading, pressure drop, etc. Describe how these conditions are monitored and what mechanism is used to trigger filter replacement when conditions requiring replacement exist. Cite specific documents, including section numbers where information can be verified.</i>
	N/A
4.	SYSTEM SURVEILLANCE AND TESTING
4.a	What testing and surveillance requirements demonstrate that the system continues to meet safety basis requirements and confirms that key operating parameters for the overall system and its major components are maintained within operating limits?
	<i>Identify where surveillance requirements for the system and components are established. Identify specific surveillance and testing procedures that implement these requirements. Identify the acceptance criteria from the surveillance test procedures used to verify that the system 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.</i>
	Weekly SOE surveillance and semi-annual VSS walk downs look for deficiencies and abnormal conditions in the system.
	The acceptance criterion, for the tests of the components, is that the components must operate as designed and tested. The safety basis does not specify acceptance criteria of the fire protection system and components. The safety basis requires that the system be maintained by the Fire Protection Program in accordance with NFPA requirements.
	The FSM preventive maintenance procedures implement testing and surveillance to demonstrate the systems perform their safety basis functions.
4.b	Have surveillance tests performed demonstrated that safety basis requirements and key operating parameters have been met?
	<i>Identify recent surveillance and testing results for the safety system's major components and confirm that:</i> <ul style="list-style-type: none"> • Test results are valid; • System performance meets system requirements; • Performance criteria are appropriate for current facility mission life-cycle; • Parameters that demonstrate compliance with the safety requirements can be measured; • Test personnel are knowledgeable and able to satisfactorily perform the test; • The procedure cites applicable Technical Safety Requirements/Limiting Conditions for Operation; • Limits, precautions, system and test pre-requisite conditions, data required, and acceptance criteria are included; • Appropriate data recording provisions are included or referenced and area used to record results; • The procedure includes provisions for listing discrepancies; • The procedure requires timely notification of facility management about any failure or discrepancy that could impact operability; • Appropriate personnel review the test results and took appropriate action.
	The test results are valid and meet the requirements of NFPA codes. Fire maintenance personnel perform the testing for the Hanford site as directed by the site Fire Marshal. Discrepancies are identified in the work packages and notice is made to facility management. An Impairment Status letter is issued monthly.

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4.c	Are system components properly calibrated?
	<i>Demonstrate that the equipment used for testing was calibrated. Demonstrate that Measurement & Test Equipment used for calibration is controlled consistent with quality assurance requirements. Demonstrate that installed components are calibrated in accordance with established requirements.</i>
	Fire Maintenance performs periodic testing and maintenance of the fire system per NFPA codes and standards. The fire department provides the over-site required to assure calibrated instruments are maintained and used as required.
4.d	For confinement ventilation systems, how are reliability and operability of filter media assured?
	<i>Identify if HEPA filters were qualified to ASME AG-1, Section FC5000. Identify if procurement specifications reference such standards as DOE-STD-3020-97 and ASME Code AG-1, Section FC. Identify 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. Identify whether visual inspection ports are installed in filter housings to enable in situ visual inspection of HEPA filters and how they are used. Assure that filter tests are described in 4.b. Identify how the impacts of filter aging, radiation, chemical, or water exposure on filter integrity are addressed. Cite specific documents, including section numbers where information can be verified.</i>
	N/A
5.	SYSTEM OPERABILITY AND RELIABILITY
5.a	What is the remaining mission life of the system?
	<i>Identify how long the system will be required to operate and meet current safety functions. Identify any planned or expected changes to the system mission or safety functions.</i>
	The building is scheduled to be demolished in December 2010 based on the current schedule. During this time period, portions of the system will be deactivated as required to facilitate D & D operations.
5.b	Will the system continue to be operable and reliable over the planned mission life?
	<i>Describe the system's ability to continue to operate safely and reliably throughout the remainder of its mission life. Identify preservation activities that should be or must be performed to continue to support safety functions or meet performance requirements.</i>
	Based on all measures to date, the system should be able to operate safely, reliably and meet its performance requirements throughout the estimated mission life of < three years with the current levels of surveillance and maintenance.

Assessment performed by: OV King *OKj* Date: 5-11-10
 System Engineer

Reviewed by: JN Winters *JN Winters* Date: 5/13/10
 Project Engineer or Discipline
 Engineering Manager

324-FS

2010 System Engineer Assessment of Vital Safety Systems

Project	D4-300	Facility	324 BUILDING
System	324-FS FIRE DETECTION & SUPPRESSION SYSTEM		
System Engineer	R.A. GREGONIS		
Alternate System Engineer	D.L. JOHNSON		
1.	SAFETY FUNCTION DEFINITION		
1.a	What are the safety functions of the system? Where are they documented?		
	<i>Describe the safety classification, specific functions and performance requirements that the system must meet during normal and abnormal operations or under accident conditions as credited in a Documented Safety Analysis, Safety Analysis Report, Hazards Analysis, Fire Hazards Analysis, permit, or other safety basis documents. Cite specific documents, including section numbers where information can be verified.</i>		
	<p>The 324 Building is undergoing D & D activities and the changes have not been reflected in the current safety basis. The following sections indicate three wet pipe systems are in service, however, two of the wet pipe systems have been demolished. These were associated with the new office building and the maintenance shop which were not VSS.</p> <p>WHC-140 Rev. 2 324 Building Basis for Interim Operation sections are quoted below:</p> <p>2.5.5 Fire-Detection and Fire-Suppression Systems</p> <p>The building is currently protected by three wet-pipe sprinkler system. The sprinkler systems provide coverage throughout the building except in the fissionable materials storage vault, REC cells, and SMF cells. The fissionable materials storage vault, which is not covered by the sprinkler system, is provided with smoke detectors. The oil-filled transformers near the southeast corner of the building are protected by an automatic-deluge water-spray fire-suppression system.</p> <p>The B-Cell is equipped with an operator-controlled, immediate response, small-orifice fire suppression hose. A comparable method will be established in the remaining process cells and airlocks as hot work or process operations demand. Additionally, a manually operated water-deluge system may provide fire suppression in the REC cells (the A-, B-, C-, D- and airlock cells).</p> <p>Each SMF cell (east, south, and airlock) is equipped with a manually operated deluge system. The discharged water is collected in tank 177 (see Figure 11). Dry chemical-fire-extinguisher connections have been installed in the SMF cell compartments and in the south cell. Fire extinguishers are installed throughout the building for trained building personnel to extinguish fires. Portable fire extinguishers are rated and labeled according to the accepted fire classifications.</p> <p>Four hydrants serve the 324 Building. The locations of the hydrants roughly correspond to the exterior corners of the building.</p>		

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<p>HNF-SD-HT-FHA-002, Rev. 2 Building 324 Fire Hazard Analysis</p> <p>4.2.3 Automatic Sprinkler Suppression</p> <p>The building is protected by three wet-pipe sprinkler system. The sprinkler systems provide coverage throughout the building except in the Fissionable Materials Storage Vault, the REC cells (A, B, C, and D Cells and Airlock), the SMF Cells (South and East Cells and Airlock), the High Level and Low Level Waste tank vault areas, and the exhaust tunnels.</p> <p>4.2.4 Automatic Deluge Water Spray Fire Suppression</p> <p>The oil-filled transformers near the southeast corner of the building are protected by an automatic deluge water spray fire suppression system (Grinnell Model "B" Flooding valve).</p> <p>4.2.5 Manual Deluge System-Radiochemical Engineering Cells</p> <p>Independently controlled, manually operated water deluge systems provide water in the REC cells (A-, B-, C-, D-, and Airlock Cells). The system is controlled by manual valves located in Room 307 (north wall). The quantity of water added to REC cells via the deluge system is metered thus limiting the amount of water added to the cells.</p> <p>WHC-199 Rev. 1 324 Building Safety Equipment List</p> <p>5.0 CONFIGURATION MANAGEMENT Table 1. Safety Equipment List</p> <table border="1"> <tr> <td>Automatic Fire Suppression System</td> <td>GS- ITS</td> <td>The automatic fire detection provides notification of a water flow to the Hanford Fire Department and the building occupants and controls the spread of a fire.</td> </tr> </table>			Automatic Fire Suppression System	GS- ITS	The automatic fire detection provides notification of a water flow to the Hanford Fire Department and the building occupants and controls the spread of a fire.
Automatic Fire Suppression System	GS- ITS	The automatic fire detection provides notification of a water flow to the Hanford Fire Department and the building occupants and controls the spread of a fire.			
1.b	<p>How does the system provide the function required? What implementing documentation exists to assure that the system's functions are performed and maintained?</p> <p><i>Describe the specific components of the system that are required and the method in which it must be operated to assure that the safety functions are met. Identify baseline and operating documentation that exists to assure that functional and operational requirements are communicated to operations, maintenance, and technical personnel, e.g. system design descriptions, safety equipment lists, essential and support drawings, operating procedures, etc. For confinement ventilation systems, describe how the system is designed to react in the event of a fire or other natural phenomenon hazards that may impact the operation of the ventilation system. For example, is the ventilation system required to operate or shut down while fire fighting is ongoing? Describe how impacts associated with potential smoke or water damage to the filters are addressed? Include reference to specific sections of documents that demonstrate that the safety functions are being implemented.</i></p>				
	<p>Essential drawings H-3-27926 sheets 1-10 provide the automatic sprinkler layouts.</p> <p>HNF-SD-HT-FHA-002, Rev. 2 Building 324 Fire Hazard Analysis</p> <p>4.2.9 Inspection, Testing and Maintenance</p> <p>The HFD is responsible for the inspection, testing and maintenance of most of the fire protection systems. Systems excluded from HFD responsibility are the manual deluge systems in the SMF and REC cell areas and the Dry Chemical Systems. Inspection, testing and maintenance of fire protection systems is required to be performed in accordance with procedures and frequencies outlined in the Project Hanford Policy and Procedure System [HNF-RD-7899].</p>				
1.c	<p>What supporting systems are required to assure that the system can meet this function? What implementing documentation exists to assure that the support is provided? Are these documents up to date?</p>				

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	<p><i>Describe the supporting equipment necessary to assure that the system can perform its safety function in normal, abnormal, and accident conditions. For example – does the system require electrical power, instrument air, or steam to function? If so, how is that provided? In the event that normal power or other utilities are not available, does the system require uninterruptible power supply, emergency or standby power, or backup source of air or steam? If so, how is that provided? Include reference to specific sections of documents that demonstrate that the support is provided. Do the documents accurately reflect the system's functions and configuration?</i></p>
	<p>The City of Richland supplies potable water to the 300 Area gridded water distribution system through a 16-inch supply main. This source provides normal flows at a pressure of 60 psi., and can supply in excess of 4000 gallons per minute (gpm) at 36 psi for four hours. The imported water supply is normally valved in a configuration to fill two ground level tanks, 382C and 382D.</p> <p>The tanks are normally cross-connected and water levels maintained within 6 inches of the top via a 6-in. fill valve operated by a level-controlled actuator. If water level drops to 2 feet above the standpipe, additional makeup flow is provided from the City of Richland supply line via 12-in. level control valve. The 12-in. valve is shut when level is restored to 4 ft. above the standpipe. In normal operating mode, the standpipe in the 282D tank supplies a suction header to the potable water pumps.</p> <p>Fire pumps are automatically started to supply the distribution grid if the pressure drops to 60 psi. If the second, independent, source of water is the sole supply, at the rate of 4100 gpm (combined usage) the water supply will last 5.7 hours without make up capacity. This is in excess of the four hour supply requirement previously identified. Additionally, valves can be aligned to connect directly to the City of Richland water supply.</p>
	<p>2. CONFIGURATION MANAGEMENT</p>
	<p>2.a Are the documents described in 1.b and 1.c up-to-date?</p>
	<p><i>Do the documents accurately reflect the system's functions and configuration? Are they consistent with one another and with documents implementing safety functions on interfacing systems? Identify when the last review was conducted to confirm the accuracy and consistency. Identify who performed the review and how it was documented. Identify what discrepancies were found and whether they have been corrected.</i></p>
	<p>Yes. The BIO undergoes annual reviews and updates. The USQ process documents interim changes. The Essential drawings are maintained current by redline updates performed by the System Engineer following modifications. A VSS walk down was performed on 2/23/2010 to verify the system's function and configuration based on system drawings H-3-27926 sh. 1 & 10. The completed walk downs are stored in the VSS notebook.</p>
	<p>2.b Have changes to system safety basis requirements, documents, and installed components been designed, reviewed, approved, implemented, tested, and documented in accordance with controlled procedures?</p>
	<p><i>Identify recent changes [changes made in the last two years for the first report and changes made since the last status report for updates] made to the system and confirm that:</i></p> <ul style="list-style-type: none"> • Systems, structures and components and documents affected by the change are identified; • Changes are accurately described, reviewed and approved as appropriate; • Installation instructions, post-modification testing instructions and acceptance criteria for turnover to facility operations are specified; • Important documents affected by the change (e.g. operating and test procedures, Safety Equipment Lists, etc.) are revised in a timely manner; • 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 and design verification is completed as appropriate; • The USQ process (i.e., USQ screens and USQ safety evaluations/determinations) is being appropriately used; and • Consistency is maintained among system requirements and performance criteria, installed system equipment and components, and associated documents as changes are made.
	<p>No changes have been made to the safety basis requirements, nor have there been any changes to the automatic fire suppression system identified as VSS during the last two years.</p>

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2.c	Verify that the actual physical configuration of the system components conforms to documented design and safety basis documents for the system.
	<i>Identify when a physical walk down to confirm the configuration of the system and important components was last conducted. Identify who performed the verification and how it was documented. Identify what discrepancies were found, whether they have been corrected, and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down of the system configuration.</i>
	A physical walk down was performed on 02/23/2010 and was accompanied by the VSS engineer. Completed walk down forms are kept in the VSS log book and walk downs are scheduled quarterly by the VSS engineer.
3.	SYSTEM MAINTENANCE
3.a	How is the system addressed in the corrective, preventive, and predictive maintenance programs?
	<i>Describe 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. Describe preventive maintenance activities on the system and explain the technical analysis used to establish performance frequencies. Describe how vendor manuals, industry standards, DOE Orders, and other requirements are used as technical bases for development of maintenance work packages. Cite specific documents, including section numbers where information can be verified.</i>
	The automated fire suppression system is a passive system consisting of sprinkler heads and piping. Thermally activated spray heads are not tested but are walked down quarterly. Systems are inspected monthly by the fire department. These inspections would trigger corrective maintenance if problems are discovered.
3.b	Verify that cognizant personnel periodically walk down the VSS to assess material condition.
	<i>Identify when a physical walk down to assess material condition of the system and important components was last conducted. Identify who performed the assessment and how it was documented. Identify what issues were found, whether they have been corrected and how open items are being tracked. Identify the schedule for conducting walk downs or the mechanism that triggers a walk down to assess material condition.</i>
	The VSS walk down frequency for the fire suppression system is quarterly. Operation personnel perform weekly surveillance of the building. A VSS walk down of the 324 Building Fire Detection & Suppression System was performed on 02/23/2010. No deficiencies were identified.
3.c	How is system and component history used to establish maintenance requirements?
	<i>Review system or component history files for the past three years. Identify whether excessive component failure rates were identified. Describe how failure rates were used in establishing priorities and schedules for maintenance or system improvement proposals. Describe any evaluation conducted of actual failure rates compared to expected failure rates.</i>
	Monthly impairment reports provided by the fire department status the current condition of the fire systems. For the past year of which data has been recorded, there have been no major impairments of the 324 Building fire suppression system. Copies of the impairment forms are kept with the VSS notebook.
3.d	For confinement ventilation systems, how are conditions that require filter replacement (replacement criteria) specified, monitored and accommodated?
	<i>Identify filter replacement criteria, including those related to filter aging, radiation, chemical or water exposure, dust loading, pressure drop, etc. Describe how these conditions are monitored and what mechanism is used to trigger filter replacement when conditions requiring replacement exist. Cite specific documents, including section numbers where information can be verified.</i>
	See HVAC assessment.
4.	SYSTEM SURVEILLANCE AND TESTING
4.a	What testing and surveillance requirements demonstrate that the system continues to meet safety basis requirements and confirms that key operating parameters for the overall system

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	and its major components are maintained within operating limits?
	<i>Identify where surveillance requirements for the system and components are established. Identify specific surveillance and testing procedures that implement these requirements. Identify the acceptance criteria from the surveillance test procedures used to verify that the system 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.</i>
	Fire maintenance personnel perform the monthly surveillance for the Hanford site as directed by the site Fire Marshal. Weekly SOE surveillance and quarterly VSS walk downs look for leaks in the system piping and sprinkler heads.
4.b	Have surveillance tests performed demonstrated that safety basis requirements and key operating parameters have been met?
	<i>Identify recent surveillance and testing results for the safety system's major components and confirm that:</i> <ul style="list-style-type: none"> • Test results are valid; • System performance meets system requirements; • Performance criteria are appropriate for current facility mission life-cycle; • Parameters that demonstrate compliance with the safety requirements can be measured; • Test personnel are knowledgeable and able to satisfactorily perform the test; • The procedure cites applicable Technical Safety Requirements/Limiting Conditions for Operation; • Limits, precautions, system and test pre-requisite conditions, data required, and acceptance criteria are included; • Appropriate data recording provisions are included or referenced and area used to record results; • The procedure includes provisions for listing discrepancies; • The procedure requires timely notification of facility management about any failure or discrepancy that could impact operability; • Appropriate personnel review the test results and took appropriate action.
	The test results are valid and meet the requirements of NFPA codes. Fire maintenance personnel perform the testing for the Hanford site as directed by the site Fire Marshal. Discrepancies are identified in the work packages and notice is made to facility management. An Impairment Status letter is issued monthly.
4.c	Are system components properly calibrated?
	<i>Demonstrate that the equipment used for testing was calibrated. Demonstrate that Measurement & Test Equipment used for calibration is controlled consistent with quality assurance requirements. Demonstrate that installed components are calibrated in accordance with established requirements.</i>
	Fire Maintenance performs periodic testing and maintenance of the fire system per NFPA codes and standards. The fire department provides the oversight required to assure calibrated instruments are maintained and used as required.
4.d	For confinement ventilation systems, how are reliability and operability of filter media assured?
	<i>Identify if HEPA filters were qualified to ASME AG-1, Section FC5000. Identify if procurement specifications reference such standards as DOE-STD-3020-97 and ASME Code AG-1, Section FC. Identify 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. Identify whether visual inspection ports are installed in filter housings to enable in situ visual inspection of HEPA filters and how they are used. Assure that filter tests are described in 4.b. Identify how the impacts of filter aging, radiation, chemical, or water exposure on filter integrity are addressed. Cite specific documents, including section numbers where information can be verified.</i>
	See HVAC assessment.
5.	SYSTEM OPERABILITY AND RELIABILITY
5.a	What is the remaining mission life of the system?
	<i>Identify how long the system will be required to operate and meet current safety functions. Identify any planned or expected changes to the system mission or safety functions.</i>
	The 324 Building is scheduled to be demolished in March 2011 based on the current schedule. During this time period, and as safety basis step-out criteria are met, portions of the system will be

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	deactivated as required to facilitate D & D operations.
5.b	Will the system continue to be operable and reliable over the planned mission life?
	<i>Describe the system's ability to continue to operate safely and reliably throughout the remainder of its mission life. Identify preservation activities that should be or must be performed to continue to support safety functions or meet performance requirements.</i>
	Based on all measures to date, the system should be able to operate safely, reliably and meet its performance requirements throughout the estimated mission life of < one year with the current levels of surveillance and maintenance.

Assessment performed by: RA Gregonis *RA Gregonis* Date: 3/31/10
System Engineer

DL Johnson *DL Johnson* Date: 3-30-10
Alternate System Engineer

Reviewed by: JN Winters *JN Winters* Date: 4/6/10
Discipline Engineering Manager

APPENDIX C

**SCHEDULE FOR FY11 ASSESSMENT OF WCH SYSTEM ENGINEER
PROGRAM**

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SCHEDULE FOR FY11 ASSESSMENT OF WCH SYSTEM ENGINEER PROGRAM

A schedule for the assessment of the WCH System Engineer Program is provided below in accordance with the Supplemented Contractor Requirement Document (DOE O 420.1B, Rev. 4, Section B, Paragraph 15).

- System Engineer Surveillances/Walkdowns - Quarterly
 - Regularly scheduled walkdowns of each vital safety system (VSS) will be completed quarterly by the system engineer, or as agreed to by the WCH discipline engineering manager. Presently, all but one of the VSS walkdowns occurs quarterly. Walkdown of the Fire Detection and Alarm Systems for the 324 Facility occurs semi-annually. The results of each walkdown are documented on a WCH Walkdown Checklist and Health Report form. Copies of the completed and signed forms are maintained in the system engineer notebook for each VSS. These walkdowns will continue while the VSS are serving a safety function and there is safe access to the facility to complete the walkdown.
- Annual System Engineer Assessments – FY11
 - Typically, the system engineer for each VSS will complete their annual assessment during the third quarter of the fiscal year. In the assessment, the system engineer addresses the system's operability, reliability, and material condition. The assessment will address the system's ability to perform the design and safety function, physical configuration in comparison to the system documentation, and performance in comparison to established performance criteria. These assessments will be completed if the VSS are still providing a safety function at that time.
- Independent Team Assessment – Tentatively scheduled for FY11.
 - An independent team assessment of the 324 Facility and 327 Facility VSS was completed in FY08. The Contractor Requirement Document (DOE O 420.1B supplemented Rev 4) requires an independent team assessment of each VSS shall be completed every three years, at a minimum. If any 324 Facility VSS remain in service at the end of the third quarter of FY11 and the D4 project schedule shows the VSS continuing operation into FY12, an independent team assessment will be considered. It is quite possible that access to 324 Facility at that time will be limited and therefore an independent assessment will not be feasible.

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