

ENGINEERING CHANGE NOTICE

1. ECN 614399

Proj. ECN

2. ECN Category

- Supplemental
- Direct Revision
- Change ECN
- Temporary
- Standby
- Supersedure
- Cancel/Void

3. Originators Name, Organization, MSIN, and Telephone No.
R.D. KECK, 15510, T4-20, 3-1768

3a. USQ Required ?
 Yes No

4. Date
06/15/95

5. Project Title/No./Work Order No.
Seismic Fan Shutdown System

6. Bldg./Sys./Fac. No.
234-5Z/99B

7. App. Designator
SQ

8. Document Numbers Changed by this ECN
(includes sheet no. and Rev.)
WHC-SD-CP-SDD-004 Rev 1

9. Related ECN No(s)
702505

10. Related PO No.
N/A

11a. Modification Work

- Yes (do blk 11b)
- No (NA Blks 11b, 11c, 11d)

11b. Work Package No.
N/A

11c. Modification Work Completed
N/A

11d. Restored to Original Condition
(Temp. or Standby ECN Only.)
N/A

Cog. Engineer Signature & Date

Cog. Engineer Signature & Date

12. Description of Change

Complete update of rev. 1 including incorporation of ECN 702505

13a. Justification

- Criteria Change
- Design Improvement
- Environmental
- As-Found
- Facilitate Const.
- Const. Error/Omission
- Design Error/Omission

13b. Justification Details

Modify system design description to make it consistent with the original design intent, incorporate maintenance requirements, provide additional justification for excluding some equipment from safety boundary, updating references and incorporate ECN 702505.
See pages 3 and 4 for USQ.

14. Distribution

RD Keck T4-20
LE Edvalson T5-48
DR Groth T4-15
JP King T5-51
DA Connors T3-01
O.S.T.I. (2) A3-36
Central Files A3-88

S.B. Merrick T4-20
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Engineering Change Notice

15. Design Verification Required

- Yes
 No

16. Cost Impact

ENGINEERING

- Additional \$ NA
Savings \$ NA

CONSTRUCTION

- Additional \$ NA
Savings \$ NA

17. Schedule Impact (Days)

- Improvement N/A
Delay

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on page 1) that will be affected by the change describe in block 12. Enter the affected document number in block 19.

- | | | |
|---|---|--|
| <input type="checkbox"/> SSD/DD | <input type="checkbox"/> Seismic/Stress Analysis | <input type="checkbox"/> Tank Calibration Manual |
| <input type="checkbox"/> Functional Design Criteria | <input type="checkbox"/> Stress/Design Report | <input type="checkbox"/> Health Physics Procedure |
| <input type="checkbox"/> Operating Specification | <input type="checkbox"/> Interface Control Drawing | <input type="checkbox"/> Spare Multiple Unit Listing |
| <input type="checkbox"/> Criticality Specification | <input type="checkbox"/> Calibration Procedure | <input type="checkbox"/> Test Procedures/Specification |
| <input type="checkbox"/> Conceptual Design Report | <input type="checkbox"/> Installation Procedure | <input type="checkbox"/> Component Index |
| <input type="checkbox"/> Equipment Spec. | <input checked="" type="checkbox"/> Maintenance Procedure | <input type="checkbox"/> ASME Coded Item |
| <input type="checkbox"/> Constuction Spec. | <input type="checkbox"/> Engineering Procedure | <input type="checkbox"/> Human Factor Consideration |
| <input type="checkbox"/> Procurement Spec. | <input type="checkbox"/> Operating Instruction | <input type="checkbox"/> Computer Software |
| <input type="checkbox"/> Vendor Information | <input type="checkbox"/> Operating Procedure | <input type="checkbox"/> Electric Circuit Schedule |
| <input type="checkbox"/> OM Manual | <input type="checkbox"/> Operational Safety Requirement | <input type="checkbox"/> ICRS Procedure |
| <input type="checkbox"/> FSAR / SAR | <input type="checkbox"/> IEFD Drawing | <input type="checkbox"/> Process Control Manual/Plan |
| <input checked="" type="checkbox"/> Safety Equipment List | <input type="checkbox"/> Cell Arrangement Drawing | <input type="checkbox"/> Process Flow Chart |
| <input type="checkbox"/> Radiation Work Permit | <input type="checkbox"/> Essential Material Specification | <input type="checkbox"/> Purchase Requisition |
| <input type="checkbox"/> Environmental Impact Statement | <input type="checkbox"/> Fac. Proc. Samp. Schedule | <input checked="" type="checkbox"/> NONE - RPK 6/19/95 |
| <input type="checkbox"/> Environmental Report | <input type="checkbox"/> Inspection Plan | <input type="checkbox"/> |
| <input type="checkbox"/> Environmental Permit | <input type="checkbox"/> Inventory Adjustment Request | <input type="checkbox"/> |

19. Other Affected Documents: (Note: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number / Revision	Document Number / Revision	Document Number / Revision
NONE WHC-SD-CA-TI-108 Rev 14 ZSE-99B-001	RPK 6/19/95	

20. Approvals

OPERATIONS and ENGINEERING

Signature	Date
<i>RPK</i>	6/15/95
Cog. Engineer <i>[Signature]</i>	6/20/95
Cog. Mgr. <i>[Signature]</i>	6-19-95
QA <i>[Signature]</i>	6/21/95
Safety	
Security	
Environ.	
Projects/Program	
Design Eng. Mgr.	
Independent Review	
Checking	
Other <i>[Signature]</i>	6/19/95

ARCHITECT-ENGINEER

Signature	Date
PE	
QA	
Safety	
Design	
Environ.	
Other	
DEPARTMENT of ENERGY	
Signature or a control number that tracks the approval signature.	
Additional	

UNREVIEWED SAFETY QUESTION CHANGES SCREENING FORM

(Per MRP 5.12, Figure 3)

ECN 614399

Page 3 of 4

REFERENCE ITEM #: ECN614399

TITLE: Definition and Means of Maintaining the Supply Ventilation System Seismic Shutdown Portion of the PFP Safety Envelope**Description of CHANGE:** Modify system design description to make it consistent with the original design intent, incorporate maintenance requirements, provide additional justification for excluding some equipment from the safety boundary, updating references, and incorporating ECN 702505.**QUESTIONS** (Supporting information is required for each question. Attach additional pages as necessary. Specifically note SAR sections and/or TSRs reviewed to come to conclusion.)

Does the REFERENCED ITEM:

- A. Make PROPOSED CHANGES to the facility or procedures which differ from conditions described in the safety basis?

 N/A No Yes/Maybe

Basis: The requirement for the seismic fan shutdown system is provided in WHC-SD-CP-SAR-021, chapter 9, section 9.2.4A.3. The criteria requires "Automatic shutdown of building ventilation supply fans (and electrically-powered exhaust)". The changes to the SDD better define which fans must be shutdown as part of the safety envelope. Thus there is no impact to the safety basis.

- B. Make PROPOSED CHANGES that represent conditions that have not been analyzed in the safety basis?

 N/A No Yes/Maybe

Basis: The failure modes of the ventilation system have been analyzed previously. As a result the seismic fan shutdown system was installed to mitigate one failure scenario. This is noted in WHC-SD-CP-SAR-021, chapter 9, section 9.2.4A.3. The changes to this document are consistent with the safety analyses noted in the SAR.

- C. Describe tests or experiments which differ from those described in the safety basis?

 N/A No Yes/Maybe

Basis: No test or experiment is involved.

- D. Is a change to the TSRs involved?

 N/A No Yes/Maybe

Basis: The TSR for the seismic fan shutdown system is found in WHC-SD-CP-OSR-010, LCO 3.2.3. The change to the subject document will not change the LCO. The change does further refine the dry air process fans to be shutdown as the stage 2 fans. This refinement is consistent with the LCO.

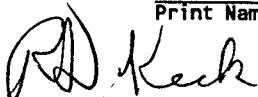
Note: If any of the questions are answered "Yes/Maybe" a Safety Evaluation shall be performed.

UNREVIEWED SAFETY QUESTION CHANGES SCREENING FORM
(Continued)

ECN 614399
Page 4 of 4

USQE No. 1 R. D. Keck

Print Name



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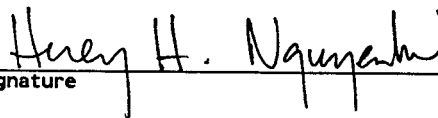
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Date

USQE No. 2

A. H. NGUYENHUU

Print Name



Signature

6/15/95

Date

RELEASE AUTHORIZATION

Document Number: WHC-SD-CP-SDD-004, REV 2

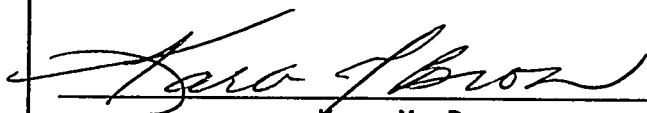
Document Title: Definition and Means of Maintaining the Supply Ventilation System Seismic Shutdown Portion of the PFP Safety Envelope

Release Date: 6/23/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:



Kara M. Broz

June 23, 1995

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SUPPORTING DOCUMENT

1. Total Pages 19

2. Title

Definition and Means of Maintaining the Supply Ventilation System Seismic Shutdown Portion of the PFP Safety Envelope

3. Number

WHC-SD-CP-SDD-004

4. Rev No.

2

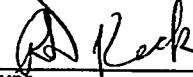
5. Key Words

HVAC, Ventilation, Seismic, Shutdown, Authorization Basis, Safety Envelope, OSR

6. Author

Name: R. D. Keck

Signature



Organization/Charge Code 15510/K6083

7. Abstract

The Supply Ventilation System Seismic Shutdown ensures that the 234-5Z building supply fans and the dry air process fans are shutdown following a seismic event as described in the PFP Final Safety Analysis Report. This document defines the safety envelope for the Ventilation System Seismic Shutdown and identifies the operability requirements, components, and procedures which ensure this safety envelope is maintained.

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Table of Contents

1.0.	PURPOSE	3
2.0.	BACKGROUND	3
3.0.	SYSTEM FUNCTIONAL REQUIREMENTS	3
3.1.	OSR REQUIREMENTS AND SYSTEM OPERATION	4
3.2.	OSR SURVEILLANCE AND RECOVERY ACTIONS	4
4.0.	SAFETY ENVELOPE (SE) EQUIPMENT	5
4.1.	SELECTION OF SE EQUIPMENT	5
4.2.	JUSTIFICATION FOR EXCLUSION OF EQUIPMENT FROM SE	8
5.0.	SAFETY ENVELOPE PROCEDURES	10
5.1.	SE OPERATING PROCEDURE	11
5.1.1	ZO-060-119, Perform Emergency Shutdown of Ventilation System	11
5.2.	SE ALARM RESPONSE PROCEDURE	11
5.2.1	ZO-060-811, Alarm Responses for Seismic Panel Alarms	11
5.3	EQUIPMENT MAINTENANCE AND REPAIR	11
6.0.	SAFETY ENVELOPE SURVEILLANCE REQUIREMENTS	11
6.1.	SURVEILLANCE REQUIREMENT SR 3.2.3.1	11
6.2.	SURVEILLANCE REQUIREMENT SR 3.2.3.2	12
	REFERENCES	13
	Appendix A - OSR Systems Compliance Sheet	14
	Appendix B - Master Component Index Input List	17
	Appendix C - SE Boundary Identification Drawings	19
	Appendix D - Essential Drawing List	19

1.0. PURPOSE

The purpose of this document is to record the technical evaluation of the Limiting Condition for Operation (LCO) described in the Plutonium Finishing Plant (PFP) Operational Safety Requirements, WHC-SD-CP-OSR-010, Rev. 0. May 1994, Section 3.2.3, "Supply Ventilation System Seismic Shutdown." This document, with its appendices, provides the following:

1. The system functional requirements for determining system operability (Section 3).
2. Evaluations of equipment to determine the safety boundary for the system (Section 4).
3. A list of annotated drawings which show the safety envelope boundaries (Appendix C).
4. A list of the safety envelope equipment (Appendix B).
5. Functional requirements for the individual safety envelope equipment, including appropriate setpoints and process parameters (Section 4.1).
6. A list of the operational, maintenance and surveillance procedures necessary to operate and maintain the system equipment within the safety envelope (Sections 5 and 6 and Appendix A).

2.0. BACKGROUND

The 234-5Z building in the Plutonium Finishing Plant (PFP) has been analyzed to determine the consequences of a 0.20 g safe shutdown earthquake (SSE). WHC-SD-CP-SAR-021, "Plutonium Finishing Plant Final Safety Analysis Report," Chapter 9, Section 9.2.4, "Seismic Event" concluded that the most serious spread of contamination from an SSE would occur if the building were pressurized by the main supply fans while the exhaust fans no longer functioned. In accordance with WHC-CM-1.3, section MRP 5.46, the supply ventilation system seismic shutdown system is designated Safety Class 1.

3.0. SYSTEM FUNCTIONAL REQUIREMENTS

The supply ventilation system seismic shutdown is provided to mitigate the consequences of exhaust fan failures during a seismic event which breaches the structural confinement barriers. On receipt of a signal from either of two accelerometers, the ventilation control circuits must remove electrical power from fans which may pressurize the building. Each accelerometer has two sensors mounted in the east-west and north-south directions. A vertical sensor is not

included¹. Each accelerometer is set to actuate (open a circuit) if it detects an acceleration greater than 0.07g.

3.1. OSR REQUIREMENTS AND SYSTEM OPERATION

As specified in WHC-SD-CP-OSR-010, LCO 3.2.3, an accelerometer-activated system shall shut down the 234-5Z supply ventilation in the event of an earthquake greater than 0.07g. More specifically, the building supply fans and the dry air stage 2 process fans (supply fans) must be secured, preventing the pressurization of the building. Power is removed from the undervoltage coil of the circuit breaker for the supply fan motors. A detailed sequence of equipment operation is provided in Section 4.1. Exhaust fans and minor supply fans are also shut down by this system to provide an orderly shutdown of the ventilation system, but this function is not a safety requirement.

The supply ventilation system seismic shutdown is considered inoperable if it fails to shutdown the supply fans upon occurrence of a greater than 0.07 g seismic event. In the event that a seismic event is sensed by the power operator and the supply ventilation seismic shutdown system fails to shut down the supply fans, the supply fans will be shutdown manually using either the manual seismic shutdown switch (appendix A, required action A.1) or individual controls (appendix A, required action A.2). Although not required by the OSR, the operator should shutdown 234-5Z exhaust fans to maintain ventilation balance and avoid possible excessive differential pressures throughout the building.

3.2. OSR SURVEILLANCE AND RECOVERY ACTIONS

Annual functional testing of the accelerometer-activated shutdown is required. The LCO requirement specifies the 0.07 g acceleration at which the seismic shutdown is to occur; therefore a surveillance is also required to verify the calibration of the accelerometer.

If the functional test or calibration have not been performed within the required interval or are unsatisfactory, the supply ventilation seismic shutdown system shall be considered inoperable. Operations will be limited such that no additional plutonium is brought into the 234-5Z and 236-Z buildings. If the system fails the functional test or calibration, repairs shall be initiated within 24 hours of failure. If the system is not

¹ A vertical sensor was not included for the following two reasons. First, seismic analyses determined that building damage that would result in a loss of containment are caused by the horizontal components of earthquakes. Second, tests determined that construction and general operating activities cause primarily vertical accelerations. Thus nuisance trips could be minimized without missing a potentially damaging earthquake by not including a vertical sensor.

returned to an OPERABLE condition within 10 days, the 234-5Z supply fans shall be shutdown or a written RECOVERY PLAN shall be initiated to remove DISPERSIBLE plutonium from the gloveboxes in 234-5Z and 236-Z.

Because the ventilation seismic shutdown system consists of two redundant channels of instrumentation, each capable of shutting down the building supply fans and the dry air stage 2 process fans (supply fans), the system shall be considered OPERABLE if at least one of the two channels is fully operational. This allows maintenance to be performed on one channel of the system while the other channel ensures compliance with the LCO. However, the ventilation seismic shutdown system is designed to operate under normal circumstances with both channels of instrumentation. Therefore, Plant Manager and PFP Safety approval is required for facility operation of more than 24 hours duration with only one channel of the ventilation seismic shutdown system OPERATIONAL. The inoperable accelerometer channel must be restored to an OPERABLE condition within 30 days. If the inoperable channel cannot be returned to an OPERABLE condition, a report must be submitted to the DOE regional office which addresses equipment failure, corrective actions taken, plan of action to restore channel operation, and compensatory measures.

4.0. SAFETY ENVELOPE (SE) EQUIPMENT

4.1. SELECTION OF SE EQUIPMENT

The following discussion describes the function of the equipment which forms the supply ventilation system seismic shutdown safety envelope and the justification for including this equipment in the safety envelope. Most safety envelope equipment for this system is relied upon in the FSAR to function to mitigate the uncontrolled release of radioactive materials following an earthquake which involves the failure of a physical barrier(s). The only exception to this is the "on-line/bypass" switches which indicate that the Seismic Shutdown System is not OPERABLE. (The information in parentheses indicates the location of the equipment on drawings H-2-78073 sheet 2, H-2-96422 sheet 1, and H-2-96436 sheet 4).

4.1.1 Accelerometers 1 and 2 (H-2-78073, sheet 2, lines 54 and 60) and contacts ACCLRM1 and ACCLRM2 (sheet 2, lines 51 and 57).

The accelerometers detect an earthquake greater than 0.07g and initiate the actions required to shutdown the 234-5Z ventilation supply fans and dry air process supply fans. When an earthquake greater than 0.07g has been detected, contacts ACCLRM1 and ACCLRM2 open.

4.1.2 Relays K1, K2, K3, K4 (H-2-78073, sheet 2, lines 51, 57, 52 and 58 respectively) and the associated contacts described below.

Relays K1, K2, K3, and K4 are normally energized. Following an earthquake of greater than 0.07g, relays K1, K2, K3, and K4 are deenergized when contacts ACCLRM1 and ACCLRM2 open. Deenergizing relays K1, K2, K3, and K4 opens their associated contacts as described below.

- Contacts K1-1, K2-1, K1-2 and K2-2 (H-2-78073, sheet 2, line 2).

Contacts K1-1, K2-1, K1-2 and K2-2 are closed when relays K1 and K2 are energized. Deenergizing relays K1 and K2 opens contacts K1-1, K2-1, K1-2 and K2-2. Opening contacts K1-1 or K2-1 deenergizes the undervoltage relays for supply fans S1, S2, S3 and S4. Opening contacts K1-2 or K2-2 deenergizes the undervoltage relays for supply fans S5, S6, S7 and S8.

- Contacts K1-3 and K2-3 (H-2-96436, sheet 4, line 18).

Contacts K1-3 and K2-3 are closed when relays K1 and K2 are energized. Deenergizing relays K1 and K2 opens contacts K1-3 and K2-3. Opening contacts K1-3 or K2-3 deenergizes the 15 HP, stage 2 process fan associated with the electric air dryer unit located on the second floor adjacent to column C19.

- Contacts K3-1 and K4-1 (H-2-96422, sheet 1, line 16).

Contacts K3-1 and K4-1 are closed when relays K3 and K4 are energized. Deenergizing relays K3 and K4 opens contacts K3-1 and K4-1. Opening contacts K3-1 or K4-1 deenergizes the 15 HP, stage 2 process fan associated with the steam air dryer unit located on the second floor adjacent to column C19.

4.1.3 Motor starter 3M in the electric air dryer control cabinet (H-2-96436, sheet 4, line 18) and associated 480V, 3-phase contacts (H-2-96436, sheet 4, zone 6F).

Motor starter 3M is energized when the electric dry air system is operating. Following a seismic event which initiates a ventilation shutdown, motor starter 3M is deenergized when contact K1-3 or K2-3 opens. Deenergizing motor starter 3M opens 480 volt, 3 phase contacts, which deenergizes the electric dry air, 15 HP, stage 2 process fan.

- 4.1.4 Motor starter 3M in the steam air dryer control cabinet (H-2-96422, line 16) and associated 480V, 3-phase contacts (H-2-96422, zone 6F).

Motor starter 3M is energized when the steam dry air system is operating. Following a seismic event which initiates a ventilation shutdown, motor starter 3M is deenergized when contact K3-1 or K4-1 opens. Deenergizing motor starter 3M opens 480 volt, 3 phase contacts, which deenergizes the steam dry air, 15 HP, stage 2 process fan.

- 4.1.5 Undervoltage relays for supply fan breakers 1 through 8 (H-2-78073, sheet 2, lines 3, 4, 5, and 6).

The undervoltage relays for supply fan breakers 1 through 8 must be energized for the breakers to remain closed. Following a seismic event which initiates a ventilation shutdown, the undervoltage relays are deenergized when contacts K1-1, K2-1, K1-2 and K2-2 open. Deenergizing the undervoltage relays opens the associated supply fan breakers due to spring pressure actuating the tripper bars.

- 4.1.6 Supply fan breakers for fans S1 through S8.

The supply fan breakers for fans S1 through S8 provide electrical power to the supply fans when the breakers are closed. Following a seismic event which initiates a ventilation shutdown, the supply fan breakers are opened, deenergizing supply fans S1 through S8, when the undervoltage relay for each breaker is deenergized.

- 4.1.7 Accelerometer 1 and 2 "on-line/bypass" switches (H-2-78073, sheet 2, lines 52, 81 and 87 and lines 58, 82 and 87) and associated wiring.

The accelerometer 1 and 2 "on-line/bypass" switches allow the accelerometers to be tested while preventing relays K1, K2, K3 and K4 from being deenergized. Additional contacts on the "on-line/bypass" switches energize the "seismic fan shutdown system disabled" horns and alarm light when both switches are placed in the bypass position. This latter function alerts plant personnel that the seismic fan shutdown system is not OPERABLE and justifies the inclusion of the switches and their associated wiring in the safety envelope.

This equipment is not required to function following a seismic event and therefore does not need to be seismically qualified.

- 4.1.8 Seismic fan shutdown system disabled alarm horns (2) and alarm light (H-2-78073, sheet 2, line 87 and below) and the associated wiring to the UPS power supply.

The seismic fan shutdown system disabled alarm horns and alarm light energize when both accelerometer 1 and 2 "on-line/bypass" switches have been placed in the bypass position. This alerts plant personnel that the seismic fan shutdown system is not OPERABLE. This justifies the inclusion of the alarm horns and light and associated wiring to the UPS power supply in the safety envelope.

This equipment is not required to function following a seismic event and therefore does not need to be seismically qualified.

4.2. JUSTIFICATION FOR EXCLUSION OF EQUIPMENT FROM SE

The components excluded from the safety envelope are not required to operate to satisfy WHC-SD-CP-OSR-010, LCO 3.2.3.

Specific components not included in the safety envelope and the reasoning behind their exclusion is discussed below.

- 4.2.1 120 VAC dedicated seismic shutdown uninterruptable power supply (UPS).

The seismic shutdown UPS is not included in the safety envelope because the seismic shutdown system utilizes a "fail-safe" design in which power is required to keep the fans operating. The seismic shutdown UPS is not required to ensure the shutdown of the 234-5Z supply fans and the dry air stage 2 process supply fans in the event of an earthquake greater than or equal to 0.07g. If the UPS power is lost, the seismic fan shutdown system will operate to deenergize the supply fans, as required. While an inadvertent loss of the seismic shutdown UPS and the resultant loss of ventilation in the facility will interrupt plant operations, this does not justify its inclusion in the safety envelope.

- 4.2.2 Seismic status panel with the exception of the seismic fan shutdown system disabled horns and alarm light.

The seismic status panel provides individual accelerometer bypass alarms, seismic detectors on line indication, seismic alarms, UPS available indication, and power available indication. None of the above alarms or indications are required to function to ensure that the seismic fan shutdown system operates properly or to alert personnel of the system's inability to operate properly. Therefore none of seismic status panel indications, alarms or components discussed above are included in the safety envelope.

4.2.3 Relays KES-5, KES-9, KES-10, and KES-13 and their associated contacts.

Relays KES-5, KES-9, KES-10 and KES-13 and their associated contacts function to shut down the 234-5Z exhaust fans following a 0.07g earthquake. The exhaust fans are not a safety concern since the fans cannot cause a pressurization of the building. As noted in section 2.0, pressurization of the building as the result of an earthquake is the safety concern that this system mitigates. Therefore, relays KES-5, KES-9, KES-10 and KES-13 and their associated contacts are not included in the safety envelope.

4.2.4 Relays KES-1, KES-4 and KES-6 and their associated contacts.

Relays KES-4 and KES-6 and their associated contacts function to shut down the electric and steam stage 1 process supply fans, filter frame supply fan (S-10) and the air conditioning supply fan to the inspection area (S-11) following a 0.07g earthquake.

The stage 1 process fans for the electric and steam dry air systems are 2 horsepower fans. The fans move air through the first drying stage of the air dryers. The stage 2, 15 horsepower fans (see 4.1.3 and 4.1.4) provide the motive force to supply air to the gloveboxes. Without the stage 2 fans operating, the stage 1 fans do not have the capacity to move a large volume of air to the gloveboxes. Thus the stage 1 fans will not cause a significant release of radioactive material following a seismic event.

Fan S-10 is driven by a $\frac{1}{2}$ horsepower motor. It uses air from Zone 1 to pressurize an annular space around each Zone 3 and Zone 4 filter in the final filter rooms. This prevents leakage during normal operation even if a filter gasket fails to seal. It does not provide any mechanism for a significant release after a seismic event.

Fan S-11 is driven by another small motor, and while it provides air to the Zone 3A inspection area, it is not fed from the supply plenum unless an adequate differential pressure is maintained in Zone 3A. If the pressure differential is lost and the fan continues to operate, any air that S-11 moves will come from the same zone. In view of the flow path and the volume of air moved by this fan, will not cause a significant release of radioactive material following a seismic event.

For these reasons, relays KES-4 and KES-6 and their associated contacts are not included in the safety envelope.

4.2.5 Relays KES-7, KES-11, and timing module KTD-8 and their associated contacts.

Relays KES-7, KES-11, and timing module KTD-8 and their associated contacts function to delay the shutdown of the exhaust fans for about 20 seconds after the supply fans have been shutdown by the seismic fan shutdown system. The shutdown of the exhaust fans is not a safety concern since the fans cannot cause a pressurization of the building. As noted in section 2.0, pressurization of the building as the result of an earthquake is the safety concern that this system mitigates. Therefore relays KES-7, KES-11, and timing module KTD-8 and their associated relays are not included in the safety envelope.

4.2.6 The wiring and junction boxes which connect safety envelope components.

The wiring and junction boxes which connect the seismic shutdown control panels, seismic status panel, undervoltage relays for supply fans S1 through S8, and the electric and steam air dryer starter cabinets are excluded from the safety envelope because the seismic shutdown system utilizes a "fail-safe" design in which power is required to keep the fans operating. The continuity of connecting wiring is not required to ensure the shutdown of the 234-5Z supply fans and the dry air process supply fans in the event of a 0.07g earthquake. If any of the connecting wiring in a conduit is severed or shorted together, the seismic fan shutdown system will operate to deenergize the required supply fans. While an inadvertent break in this wiring and the resultant loss of ventilation in the facility will interrupt plant operations, this is not justification for including the seismic shutdown systems connecting wiring in the safety envelope. Associated wiring identified in Section 4.1.13 is excluded from this section since the wiring is required to alert operators when the seismic shutdown system is not OPERABLE. Therefore, the wiring addressed in Section 4.1.13 is included in the safety envelope.

5.0. SAFETY ENVELOPE PROCEDURES

The following procedures and practices are required to ensure compliance with LCO 3.2.3 is achieved during all MODES. The procedures include operating procedures, alarm response procedures and maintenance procedures. Each procedure included in the Safety Envelope and the justification for its inclusion is presented below.

5.1. SE OPERATING PROCEDURE

5.1.1 Z0-060-119, Perform Emergency Shutdown of Ventilation System

One of the LCO 3.2.3 Actions requires the 234-5Z supply ventilation to be shutdown by the manual seismic shutdown switch or the individual supply fan switches when operations personnel sense a seismic event, if the supply fans were not shutdown by the accelerometer-activated ventilation seismic shutdown system. Z0-060-119 provides the procedural steps required to recognize this situation and manually shutdown the supply ventilation. Although not required by the OSR, Z0-060-119 also directs the operator to shutdown 234-5Z exhaust fans to maintain ventilation balance and avoid possible excessive differential pressures throughout the building.

5.2. SE ALARM RESPONSE PROCEDURE

5.2.1 Z0-060-811, Alarm Responses for Seismic Panel Alarms

This procedure provides instructions for responding to seismic alarms (Appendix B).

5.3 EQUIPMENT MAINTENANCE AND REPAIR

In house repair or attempted repair of the Safety Class 1 equipment except for the supply fan circuit breakers is not permitted. Repair of supply fan circuit breakers is permitted if followed by satisfactory performance of ZSE-12A-001 or ZSE-12A-002. Other Safety Class 1 equipment or parts within the equipment may only be replaced with like equipment or parts by in house work forces.

6.0. SAFETY ENVELOPE SURVEILLANCE REQUIREMENTS

6.1. SURVEILLANCE REQUIREMENT SR 3.2.3.1

OSR Surveillance Requirement SR 3.2.3.1 requires an annual FUNCTIONAL TEST of the accelerometer activated supply ventilation system seismic shutdown system. This test is performed by procedure ZSE-99B-001, "Annual Seismic Shutdown System In-Service-Test." To satisfy this requirement the procedure must exercise every component in the system from the accelerometers to the supply fan circuit breakers. The procedure must verify that a signal from either accelerometer results in a trip signal to each supply fan motor controller and that each motor controller interrupts power to its motor on receipt of a trip signal. ZSE-12A-001 and ZSE-12A-002 perform an annual test of the supply fan breakers undervoltage (UV) trip to ensure a loss of voltage to the undervoltage relay will open the circuit breaker.

6.2. SURVEILLANCE REQUIREMENT SR 3.2.3.2

OSR Surveillance Requirement SR 3.2.3.2 requires an annual calibration of each accelerometer channel. This calibration is performed by procedure ZSE-99B-002, "Annual Functional Test of Terra Technology Accelerometers." To satisfy the surveillance requirement, this procedure verifies the calibration of the accelerometer to ensure it provides a trip signal when stimulated by a force equivalent to a 0.07 g seismic event. If an accelerometer is found to be out of calibration, it is sent back to the manufacturer for calibration.

REFERENCES

- Rev 0, January 1995, Plutonium Finishing Plant Final Safety Analysis Report, WHC-SD-CP-SAR-021.
- Plutonium Finishing Plant Operational Safety Requirements, WHC-SD-CP-OSR-010, Rev 0, May 1994
- Operating Procedure, ZO-060-112, Respond to Alarms Related to Power Equipment.
- Maintenance Procedure, ZSE-99B-001, Annual Seismic Shutdown System In-Service Test.
- Maintenance Procedure, ZSE-99B-002, Annual Functional Test of Terra Technology Accelerometer.
- Maintenance Procedure, ZSE-12A-001, Annual Inspection and Testing Electrical Switchgear Breakers for Supply Fans SF-1 through SF-4
- Maintenance Procedure, ZSE-12A-002, Annual Inspection and Testing Electrical Switchgear Breakers for Supply Fans SF-5 through SF-8
- Operating Procedure, ZO-060-119, Perform Emergency Shutdown of Ventilation System.
- PFP Safety Equipment List, WHC-SD-CP-TI-108.
- Design Criteria PFP Seismic Fan Shutdown System, WHC-SD-CP-CR-028 Rev. 2A, December 12, 1989.

Appendix A - OSR Systems Compliance Sheet

OSR LCO COMPLIANCE SHEET			
APPLICABLE OSR LCO (WHC-SD-CP-OSR-010 Section 3.0):			
3.2.3 Supply Ventilation System Seismic Shutdown			
<p>LCO 3.2.3 The accelerometer activated 234-5Z supply ventilation system seismic shutdown shall be OPERABLE and set to shutdown building supply and dry air process fans (supply fans) in the event of a greater than 0.07 g seismic event.</p>			
<p>APPLICABILITY: ALL MODES</p>			
<p>ACTIONS:</p>			
CONDITION	REQUIRED ACTION	COMPLETION TIME	
<p>A. A seismic event greater than 0.07 g has been detected at PFP and the supply ventilation system seismic shutdown failed to shutdown the supply fans.</p>	<p>-----NOTE----- Building exhaust should also be reduced, in conjunction with ACTIONS A.1 and A.2, shutting down fans if necessary, to maintain building negative pressures within normal operating range. -----</p>		
	<p>A.1 Shutdown the 234-5Z supply fans with the manual seismic shutdown switch.</p>		IMMEDIATELY
	<p><u>OR</u></p>		
	<p>A.2 Shutdown the 234-5Z supply fans with the individual fan switches.</p>		IMMEDIATELY
<p>B. The accelerometer activated supply ventilation system seismic shutdown system is inoperable.</p>	<p>B.1 Enter MODE 2, Limited Plutonium Handling Operations. Limit operations such that no additional DISPERSIBLE plutonium is brought into the 234-5Z and 236-Z buildings.</p>	IMMEDIATELY	
	<p><u>AND</u></p>		
	<p>B.2.1 Restore supply ventilation system seismic shutdown OPERABILITY</p>	10 days	
	<p><u>OR</u></p>		
	<p>B.2.2 Reduce DISPERSIBLE plutonium to below accepted risk envelope quantities in accordance with a RECOVERY PLAN.</p>	10 days	
	<p><u>OR</u></p>		
	<p>-----NOTE----- Building exhaust should also be reduced, in conjunction with ACTION B.2.3, shutting down fans if necessary, to maintain building negative pressures within normal operating range. -----</p>		
	<p>B.2.3 Shutdown the 234-5Z supply fans.</p>	10 days	

OSR LCO COMPLIANCE SHEET	
APPLICABLE OSR LCO (WHC-SD-CP-OSR-010 Section 3.0):	
3.2.3 Supply Ventilation System Seismic Shutdown	
SURVEILLANCE REQUIREMENTS:	
	SURVEILLANCE
	FREQUENCY
SR 3.2.3.1	Perform FUNCTIONAL TEST of the accelerometer activated ventilation system seismic shutdown.
	Annually
SR 3.2.3.2	Perform a calibration of each accelerometer channel.
	Annually
APPLICABLE ACCIDENT ANALYSES (WHC-SD-CP-021, CH 9) SECTION/TITLE:	
9.2.4	Seismic Event
9.2.4A.6	Seismic Accident Analysis.
APPLICABLE PLANT/PROCESS DESIGN/OPERATION DESCRIPTION(S) [FSAR CHAPTER/SECTION]:	
1.5.5	Updating and Expanding Seismic Analysis
2.1.1.6	Earthquake
2.1.2.3	Earthquake
2.6	Seismic Risk Acceptance and Justification
4.2.5	Seismic Design
4.4	Classifications of Structures, Components, and Systems
5.4.1	Ventilation Systems
BOUNDARY IDENTIFICATION DRAWINGS:	
H-2-78073, sheet 2, Seismic shutdown system, electrical	
H-2-16318, sheet 1, Fan Control Schematic and Control Panel	
H-2-16318, sheet 3, Fan Control Schematic Emergency Shutdown	
H-2-96422, Steam dry air controller, electrical	
H-2-96436, sheet 4, Electric dry air controller, electrical	
ESSENTIAL SYSTEM DRAWINGS:	
H-2-78073, sheet 2, Seismic shutdown system, electrical	
H-2-16318, sheet 1, Fan Control Schematic and Control Panel	
H-2-16318, sheet 3, Fan Control Schematic Emergency Shutdown	
H-2-96422, Steam dry air controller, electrical	
H-2-96436, sheet 4, Electric dry air controller, electrical	
H-2-26538, sheet 1, 480-V Normal power one-line diagram	
IMPLEMENTING PROCEDURES/COMPLIANCE VERIFICATION	
OPERATING:	
Z0-060-811, Alarm Responses for Seismic Panel Alarms	
Z0-060-117, Perform Power Equipment Surveillance	
Z0-060-119, Perform Emergency Shutdown of Ventilation System	
Z0-060-102, Startup/Shutdown Ventilation System	
Z0-100-030, Perform Facility Surveillance and Responses	
LABORATORY: None	
HEALTH PHYSICS: None	
OPERATING SPECIFICATION(S): None	

OSR LCO COMPLIANCE SHEET			
APPLICABLE OSR LCO (WHC-SD-CP-OSR-010 Section 3.0):			
3.2.3 Supply Ventilation System Seismic Shutdown			
ADMINISTRATIVE: None			
MAINTENANCE: None			
SURVEILLANCE REQUIREMENTS	PROCEDURE NUMBER	DESCRIPTION	PROCEDURE FREQUENCY
SR 3.2.3.1	ZSE-99B-001	Functional test	Annual
	ZSE-12A-001	Electrical switchgear breaker functional test, SFs 1 through 4	Annual
	ZSE-12A-002	Electrical switchgear breaker functional test, SFs 5 through 8	Annual
SR 3.2.3.1	ZSE-99B-002	Functional test/Calibration	Annual
OTHER: None			
NOTES/COMMENTS: None			

Appendix B - Master Component Index Input List

APPLICABLE OSR LCO (WHC-SD-CP-OSR-010 Section 3.0):			
3.2.3 Supply Ventilation System Seismic Shutdown			
OSR SYSTEM EQUIPMENT/COMPONENT LIST			
MASTER COMPONENT INDEX NUMBER	FUNCTIONAL DESCRIPTION	MANUFACTURER PART/MODEL NUMBER	ESSENTIAL DRAWING NUMBER
ACCELEROMETER-1	Accelerometer 1	Terra Technology DCA-333	H-2-78073 Sheet 2
ACCELEROMETER-2	Accelerometer 2	Terra Technology DCA-333	H-2-78073 Sheet 2
RLY-K1-99B	Seismic shutdown control panel, relay K1	Nutherm, Inc #EGPI-003	H-2-78073 Sheet 2
RLY-K2-99B	Seismic shutdown control panel, relay K2	Nutherm, Inc #EGPI-003	H-2-78073 Sheet 2
RLY-K3-99B	Seismic shutdown control panel, relay K3	Nutherm, Inc #EGPI-003	H-2-78073 Sheet 2
RLY-K4-99B	Seismic shutdown control panel, relay K4	Nutherm, Inc #EGPI-003	H-2-78073 Sheet 2
MS-SEL1-99B	Seismic shutdown control panel, Accelerometer 1 ONLINE\BYPASS switch	Westinghouse #PB1KEH2AF1Q1	H-2-78073 Sheet 2
MS-SEL2-99B	Seismic shutdown control panel, Accelerometer 2 ONLINE\BYPASS switch	Westinghouse #PB1KEH2AF1Q	H-2-78073 Sheet 2
AL-HORN1-99B	Seismic status panel, system disabled horn	Mallory Sonalert SC110N #64F276	H-2-78073 Sheet 2
AL-HORN2-99B	Column A10, system disabled horn	Mallory Sonalert SC110N #64F276	H-2-78073 Sheet 2
I-LITE1-99B	Column A10, system disabled light	Westinghouse PB1GVRV7	H-2-78073 Sheet 2
RLY-UV1-12A	S1 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV2-12A	S2 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV3-12A	S3 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV4-12A	S4 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV5-12A	S5 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV6-12A	S6 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV7-12A	S7 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
RLY-UV8-12A	S8 breaker undervoltage relay	Westinghouse DK-25 Style Nos 1332 874 and 1241 581	H-2-78073 Sheet 2
FBX103	S1 circuit breaker	Westinghouse DK-25	H-2-26538

APPLICABLE OSR LCO (WHC-SD-CP-OSR-010 Section 3.0):

3.2.3 Supply Ventilation System Seismic Shutdown

F8X105	S2 circuit breaker	Westinghouse DK-25	H-2-26538
F8X106	S3 circuit breaker	Westinghouse DK-25	H-2-26538
F8X107	S4 circuit breaker	Westinghouse DK-25	H-2-26538
F8X205	S5 circuit breaker	Westinghouse DK-25	H-2-26538
F8X206	S6 circuit breaker	Westinghouse DK-25	H-2-26538
F8X207	S7 circuit breaker	Westinghouse DK-25	H-2-26538
F8X211	S8 circuit breaker	Westinghouse DK-25	H-2-26538
RLY-3ME-23D	Electric dry air controller, motor starter 3M	General Electric CR4G2WP	H-2-96436 sheet 4
RLY-3MS-23D	Steam dry air controller, motor starter 3M	General Electric CR4G2WP	H-2-96422

NOTES/COMMENTS: None

Appendix C - SE Boundary Identification Drawings

H-2-78073, sheet 2, Seismic shutdown system, electrical
H-2-16318, sheet 1, Fan Control Schematic and Control Panel
H-2-16318, sheet 3, Fan Control Schematic Emergency Shutdown
H-2-96422, Steam dry air controller, electrical
H-2-96436, sheet 4, Electric dry air controller, electrical

Appendix D - Essential Drawing List

H-2-78073, sheet 2, Seismic shutdown system, electrical
H-2-16318, sheet 1, Fan Control Schematic and Control Panel
H-2-16318, sheet 3, Fan Control Schematic Emergency Shutdown
H-2-96422, Steam dry air controller, electrical
H-2-96436, sheet 4, Electric dry air controller, electrical
H-2-26538, sheets 1 through 52, 480-V Normal power one-line diagram