FORM APF-05D-001-02, REV. 05

CALCULATION CHANGE NOTICE

CCN NO. XX-E-013 - 000 - CN005
(Base Calc No. - Rev No. - Sequence No.)

CALCULATION TITLE - Enter this item in *CALCULATION TITLE* field in EIS:

Post-Fire Safe Shutdown (PFSSD) Analysis

Status:	☒ FINAL	☒ ~~Committed~~ MRS 4-27-06	Associated Change Number:	011696

COMPUTER CODE: **VERSION:**

Administrative? ☐ YES ☒ NO

REGULATORY REVIEWS:
☐ N/A - only if Administrative
☐ Attached
☒ Attached to: 011696 **Evaluation #**

USAR STATEMENT:
☒ Requires a change to the USAR:
☐ Does not require a change to the USAR

COMMITTED			FINAL		
ORIG	Brian R. Fox *Printed Name* Brian R. Fox *Signature*	05/26/05 *Date*	ORIG	N/A *Printed Name* *Signature*	*Date*
VERF	William L. Selbe *Printed Name* William L. Selbe *Signature* **QUALIFICATION REQUIRED: ES9280479**	06/09/05 *Date*	VERF	WILLIAM L. SELBE *Printed Name* William L. Selbe *Signature* **QUALIFICATION REQUIRED: ES9280479**	04/20/06 *Date*
APP	Daniel W. Dandreo *Printed Name* D W Dandreo *Signature*	06/14/2005 *Date*	APP	Forrest J. Stackhouse *Printed Name* *Signature*	4/20/06 *Date*

BRIAN R. FOX
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18295
6/14/05
KANSAS
PROFESSIONAL ENGINEER

CALCULATION DATABASE INPUT	 CCN NO. XX-E-013 - 000 - CN005 Base Calc No. Rev No. Sequence No.

CALCULATION SUBJECT (Statement Of Problem) - Enter this in *SUBJECT* field in EIS:

This CCN incorporates changes to the PFSSD design as a result of generating document E-1F9910, Post-Fire Safe Shutdown Area Analysis. This CCN does the following: 1) Adds the following to the PFSSD Component List (Appendix 3): AEFV0039, AEFV0040, AEFV0041, AEFV0042, AEHS0080, AEHS0081, BGHV8106, BGHIS8106, GNPT0937, NG01ACR130, NG02ACR125; 2) Adds the following relays to the PFSSD Relay List (Appendix 4): K505, K519, 83XGK04 and 83XGK05; 3) Deletes the following from the PFSSD Component List (Appendix 3): ABZS0012A, ABZS0015A, ABZS0018A, ABZS0021A, NK4120, NK4410; and 4) Makes other technical and editorial corrections throughout the document as shown on the attached pages.

Link systems to the calculation/CCN in EIS.

Systems Affected:	AB, AE, BG, EP, GK, GN, NG, NK, RL

Develop relationships between interdependent calculations in EIS.

Additional Calculations Providing Input to this calculation:	None
Additional Calculations Impacted by this calculation:	None

Develop relationships between the calculation/CCN and controlled reference documents in EIS.

Additional Controlled Documents Inputs to this calculation:	None
Additional Controlled Documents Impacted by this calculation:	E-1F9433, E-1F9910

The reference documents listed below are those that cannot be linked to the calculation/CCN and shall be entered in the INDUSTRY REFERENCE field in EIS, e.g., ASME Codes, ANSI Standards, letters, etc.

Additional Other Reference Documents:	PIR 2004-0089

Link components to the calculation/CCN in EIS.

Additional Components:	AEFV0039, AEFV0040, AEFV0041, AEFV0042, AEHS0080, AEHS0081, BGHV8106, BGHIS8106, GNPT0937, RL026

REFER TO DESKTOP GUIDE FOR PROCESSING CALCULATIONS IN EIS

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LIST OF EFFECTIVE PAGES

CCN NO. XX-E-013 - 000 - CN005
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CCN Page No.	Calc. Page Affected DVR/SCRN/ Other	CCN Page No.	Calc. Page Affected /DVR/SCRN /Other	CCN Page No.	Calc. Page Affected /DVR/SCRN /Other	CCN Page No.	Calc. Page Affected /DVR/SCRN /Other
4, 5	APP 1 PAGE 5						
6	APP 1 PAGE 6						
7	APP 1 PAGE 7						
8	APP 1 PAGE 18						
9	APP 1 PAGE 25						
10	APP 1 PAGE 59						
11	NA						
12-14	APP 3 PAGES 11, 12, 15, 30, 49, 56, 70, 71, 73, 86, 103						
15	NA						
16	APP 4 PAGES 18, 22, 24						
A-1 to A-3	DVR						

DVR = Design Verification Report (if applicable)
SCRN = Regulatory Screening (if applicable)
AD = Applicability Determination

CALCULATION SHEET	Page 4 CCN NO. XX-E-013 - 000 - CN005 Base Calc. No. Rev. No. Sequence No

Calculation Appendix 1, Page 5 (3rd Paragraph)

Replace the 3rd paragraph with the following:

Given the Technical Specification requirements (394,000 gallon minimum RWST volume) ***minus the volume of water below the top of the outlet pipe (28,083 gallons)*** *and the USAR maximum required volume (83,754 gallons) to achieve cold shutdown conditions, greater than 4 times the volume of borated RWST water is available. Therefore, RWST level indication is not required to achieve cold shutdown conditions.* ***Note that Appendix R requires cold shutdown to be accomplished in 72 hours. If seal injection is performed for the entire 72 hour period at a rate of 32 gpm (8 gpm per seal) then the total quantity of water required in the RWST is:***

32 gpm x 72 hrs x 60 min/hr = 138,240 gallons

Therefore, a sufficient quantity of water is contained in the RWST to achieve cold shutdown conditions.

If cable damage and spurious operation occurs such that either EJHV8811A or EJHV8811B spuriously open and either BNHV8812A or BNHV8812B, respectively, cannot be closed, the RWST could drain to the containment sump. The following calculation demonstrates the amount of time available to complete manual actions to ensure the RWST does not drain to a level below that required for cold shutdown.

Minimum Tech Spec. Volume of RWST (506.2" level): 394,000 gallons (BN-20)

"EMPTY" water level in RWST (53" level): @ 41,500 gallons (9,361 gal/ft per BN-20)

Volume of water between Tech. Spec. and Empty: 352,500 gallons

Maximum Volume Needed to Achieve Cold PFSSD:

32 gpm (seal injection @ 8 gpm/seal) x 72 hrs (Per Appendix R) x 60 min/hr

= 138,240 gallons

Allowable volume lost to sump: 352,500 gal – 138,240 gal = 214,260 gallons

Based on Calculation BN-21, the equivalent pipe length from the RWST to the CCP B pump takeoff is:

L_{eq} from RWST to CCP B takeoff = 441.2' of 0.375" nom wall pipe (id = 23.25")

Based on Calculation BN-21, the equivalent pipe length from the CCP B takeoff to the containment sump is determined as follows:

L_{eq} from CCP B takeoff to RHR B takeoff = 48.3' of 0.375" nom wall pipe (id = 23.25")

L_{eq} from RHR B takeoff to BNHV8812B = 139.7' of 0.375" nom wall pipe (id = 13.25")

L_{eq} from BNHV8812B to Tee = 255.3' of sch 40 pipe (id = 13.12")

L_{eq} from Tee to EJHV8811B = 139.6' of sch 40 pipe (id = 13.12")

L_{eq} from BNHV8812B to Tee = 112.6' of 0.375" nom wall pipe (id = 13.25")

The water elevation in the RWST is approximately 2045'-0". The elevation of the top of the sump is 2000'-0", at which point water will overflow onto the containment floor. Therefore, the total head from the tank to the sump is 2045'-0" - 2000'-0" = 45.0 feet or 19.5 psi, which is the maximum pressure loss from the RWST to the sump. It is conservatively assumed that water level remains constant in the tank and sump. 32 gpm flows to the CCP and the remaining flows to the sump.

The Hazen and Williams equation is used to estimate flow from the RWST and is given below.

$$\Delta p = \frac{\left(4.52 \times Q^{1.85} \times L\right)}{\left(C^{1.85} \times d^{4.87}\right)}$$

where:

Δp = pressure difference (psi)
Q = flow (gpm)
L = pipe equivalent length (feet)
C = pipe coefficient (130)
d = pipe inside diameter (in)

With the help of a spreadsheet, the above equation was solved multiple times to determine the flow that produces a pressure drop of 19.5 psi across the pipe network. The flows were determined as follows:

Q from RWST to CCP B takeoff = 7,515 gpm

Q from CCP B takeoff to sump = 7,483 gpm

Therefore, with the CCP charging to the RCP seals and one flow path to the containment sump open, the maximum flow from the RWST is 7,515 gpm.

The maximum time allowed to isolate containment sump valve before the RWST drops to a level below that required for cold shutdown is:

214,260 gal / 7,515 gpm = 28.5 minutes

Reason for change: Clarification

Calculation Appendix 1, Page 6 (3rd and 4th Paragraphs)

Replace the 3rd and 4th paragraphs under the table with the following:

BGHCV0182, Charging Header Flow Control Valve, is not included as a post fire safe shutdown component because valves BGHV8105 and BGHV8106 are included in the PFSSD design to isolate this flow path in the event of a fire outside the control room. In addition, manual isolation valve BG8402B, installed upstream of BGHCV0182, is shut in accordance with OFN RP-017 if the fire occurs in the control room. With either BG8402B, BGHV8105 or BGHV8106 shut, charging flow (boration flow) is directed through the RCP seals.

BGHIS8105 and BGHIS8106 are included in the design to provide the capability to isolate the BGHCV0182 flow path from the control room.

Reason for Change: Valve BGHV8106 and hand indicating switch BGHIS8106 are being added to the PFSSD design as a redundant means for isolating the BGHCV0182 flow path. Currently, valve BGHV8105/BGHIS8105 and manual valve BG8402B are included in the PFSSD design to isolate this flow path. However, if BGHV8105 or BGHIS8105 are damaged due to a fire outside the control room, a manual action may be required to close manual valve BG8402B. Including BGHV8106 and BGHIS8106 will eliminate some of the manual actions associated with this flow path.

Calculation Appendix 1, Page 6 (Table)

Revise the BNHV0003 and BNHV0004 "Resolution" column as follows:

Containment spray pumps have to operate to cause a loss of RWST volume. ***Check valves ENV0002 and ENV0008 prevent draindown of the RWST into the containment sump if valves ENHV0001 or ENHV0007 spuriously open.*** *Containment Spray Pump Motors (DPEN01A & DPEN01B) are controlled (off) by OFN RP-017* ***if a fire occurs in the control room and ENHIS0003 and ENHIS0009 can be used to lock-out the containment spray pumps if the fire occurs outside the control room.***

Reason for Change: Clarification

Calculation Appendix 1, Page 6 (Table)

Add row to the end of the table as follows:

EJHV8811A EJHV8811B	Containment sump isolation valves	Valves are redundant to BNHV8812A and BNHV8812B and are closed to prevent draindown of the RWST into the containment sump.

Reason for Change: The table explains how RWST flow is isolated to ensure adequate RWST volume. Valves EJHV8811A and EJHV8811B are required as part of ensuring the RWST does not drain to the containment sump. Therefore, they should be included in the table.

CALCULATION SHEET	Page 7 CCN NO. XX-E-013 - 000 - CN005 Base Calc. No. Rev. No. Sequence No

Calculation Appendix 1, Page 7

Replace with the following:

Justification of Seal Water Leak off Loss

Closing BGHV8100 and BGHV8112 will lift relief valve BGV8121 and pass the seal leak off water to the pressurizer relief tank (PRT), and/or bypass the seal leak off water through valves BGHV8143 and BGHCV0123 (failed open as a result of the fire) to the PRT. This would result in a maximum loss of water from the primary system of up to 84 gpm (based on a maximum of 21gpm per failed seal). [However, angle valve BGV0202 is throttled to provide an acceptable backpressure on the RCP seals at 12 gpm leak off during normal operation (Reference STS BG-004)]. As noted earlier, ***138,240*** *gallons of borated water from the RWST is* ***the maximum Appendix R volume*** *needed to achieve cold shutdown conditions. The RWST is required by Technical Specifications to contain at least 394,000 gallons.* ***The unusable volume of water in the tank is 28,083 gallons****. Therefore, a margin exists of more than* ***227,000*** *gallons.*

At 84 gpm, there is a loss of 5040 gallons from the RWST each hour due to the potential leakage to the PRT through the above paths. At that rate, it would take ***1.8*** *days to deplete the margin of* ***227,000*** *gallons. Cold Shutdown can be achieved in less than twenty-four hours. At that time, valve BGV0202 can be manually closed to isolate the leak off flow path.*

CALCULATION SHEET

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Calculation Appendix 1, Page 18

Revise Reactor Coolant Makeup discussion, 3rd paragraph as follows:

EMHV8803A, EMHV8803B, EMHIS8803A and EMHIS8803B, charging pump discharge header to BIT isolation valves and hand switches, are included in the reactor makeup function design. ***The valve on the operating CCP Train*** ~~*At least one of these redundant parallel path valves*~~ *must be open to achieve post fire safe shutdown. EMHV8801A, EMHV8801B, EMHIS8801A and EMHIS8801B, BIT isolation valves and hand switches, are included in the reactor makeup function design. At least one of these redundant parallel path valves must be open to achieve post fire safe shutdown.*

Reason for Change: This revision makes it clear that the valve on the available CCP train needs to be available. The two valves are not redundant to each other.

CALCULATION SHEET	Page 9 CCN NO. XX-E-013 - 000 - CN005 Base Calc. No. Rev. No. Sequence No

Calculation Appendix 1, Page 25 (Main Feedwater Isolation)

Replace Main Feedwater Isolation discussion with the following text:

MAIN FEEDWATER ISOLATION

Three pumps, PAE01A, PAE01B and PAE02 supply main feedwater. Turbines (KFC01A and KFC01B) supplied by main steam, drive PAE01A and PAE01B and the motor for PAE02 is powered from PB0406.

Main feedwater must be isolated to prevent:

1. *Excessive cooldown rates caused by overfeeding the steam generators and*
2. *Filling the steam generators and main steam piping with water.*

Pumps PAE01A and PAE01B stop when the MSIV's are manually fast closed following reactor trip.

Pump PAE02 is prevented from starting by de-energizing the motor using AEHIS0104 at RL027 or PB0406HIS in the turbine building.

Feedwater isolation valves AEFV0039, AEFV0040, AEFV0041 and AEFV0042 are included in the decay heat removal design to isolate main feedwater flow to the steam generators and prevent flow diversion from the auxiliary feedwater system to the wrong train of steam generators. The auxiliary feedwater piping ties into the main feedwater piping at approximately 2028'-0" elevation. The main feedwater piping ties into the steam generators at approximately 2061'-6" elevation. The common 30" feedwater header from the feedwater pumps to all four steam generator branch lines is at approximately 2053'-0" elevation. Piping from the common header back to the main feedwater pumps is below 2053'-0" elevation.

With the main feedwater pumps stopped and the auxiliary feedwater system operating, backflow is prevented by the closure of the discharge check valves. However, due to the pipe elevations, the possibility exists for water to fill two of the four steam generators that are not being used. If level indication is affected, then operators may not know that the steam generators are over-filling.

Closing the feedwater isolation valves prevents steam generator over-filling and auxiliary feedwater flow diversion. The MFIV's can be closed using one of two fast-close hand switches (AEHS0080 and AEHS0081) located in the control room.

Reason for Change: Feedwater isolation valves AEFV0039, AEFV0040, AEFV0041 and AEFV0042 are being added to the PFSSD design to prevent flow diversion while operating the motor-driven auxiliary feedwater pumps.

CALCULATION SHEET	Page 10 CCN NO. XX-E-013 - 000 - CN005 Base Calc. No. Rev. No. Sequence No

Calculation Appendix 1, Page 59

Change "Isolated Component" ALPV0004 to A**B**PV0004.

Reason for Change: Typographical error.

APPENDIX 3
PFSSD COMPONENT LIST

CCN NO. XX-E-013 - 000 - CN005
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The following pages identify changes to Appendix 3 as a result of DCP 11696 and this CCN. Justification for most of the changes are documented in DCP 11696. For those changes that are not documented and justified in DCP 11696, the following provides the justification.

AEV0022 - The power source was changed to state "Mechanical Check Valve" instead of Manual Valve. This valve is actually a check valve and cannot be operated manually.

AEV0023 - The power source was changed to state "Mechanical Check Valve" instead of Manual Valve. This valve is actually a check valve and cannot be operated manually.

EPHV8808A, B, C and D - Hot standby function is being removed from these components. The SI accumulators are pressurized to 700 psi and are required to be isolated to prevent inadvertent injection into the RCS. The valves are normally closed during shutdown prior to the RCS reaching 1,000 psi. Hot standby can be maintained for an extended time period with the RCS above 1000 psi. The accumulators are isolated when going to cold shutdown and, therefore, are not considered hot standby components.

RL025 - Deleted reference to schematics and deleted the power source. Added note that states:

RL025 is included in the matrix because controls and indication are mounted on the panel. The controls and indication do not receive power from RL025

Changes are made due to removal of PFSSD components that were previously powered by the RL025 panel.

RL026 - Added RL026 to the PFSSD design because PFSSD controls and indication are mounted on the panel.

APPENDIX 3
PFSSD COMPONENT LIST

CCN NO. XX-E-013 - 000 - CN005
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System ID	Component ID	S/G	Description	Room	Fire Area	Instrument Location	SSD Fun	Sprtd Fun	Hot Stdby	Cold Shdwn	Normal Shdwn	Alt Shdwn	P&ID	Schematic / One Line	Other Drawings	Power Source	Notes
~~AB~~	~~ABZS0012A~~	~~4~~	~~Main Steam Iso Bypass Valve Loop 4 Limit Switch~~	~~1411~~	~~A-23~~	~~---~~	~~R, M, H~~	~~---~~	~~X~~	~~X~~	~~X~~	~~X~~	~~M-12AB02~~	~~E-13AB23A~~	~~---~~	~~NK4410~~	~~---~~
~~AB~~	~~ABZS0015A~~	~~1~~	~~Main Steam Iso Bypass Valve Loop 1 Limit Switch~~	~~1508~~	~~A-23~~	~~---~~	~~R, M, H~~	~~---~~	~~X~~	~~X~~	~~X~~	~~X~~	~~M-12AB02~~	~~E-13AB23A~~	~~---~~	~~NK4120~~	~~---~~
~~AB~~	~~ABZS0018A~~	~~4~~	~~Main Steam Iso Bypass Valve Loop 2 Limit Switch~~	~~1509~~	~~A-23~~	~~---~~	~~R, M, H~~	~~---~~	~~X~~	~~X~~	~~X~~	~~X~~	~~M-12AB02~~	~~E-13AB23A~~	~~---~~	~~NK4410~~	~~---~~
~~AB~~	~~ABZS0021A~~	~~1~~	~~Main Steam Iso Bypass Valve Loop 3 Limit Switch~~	~~1509~~	~~A-23~~	~~---~~	~~R, M, H~~	~~---~~	~~X~~	~~X~~	~~X~~	~~X~~	~~M-12AB02~~	~~E-13AB23A~~	~~---~~	~~NK4120~~	~~---~~
AE	AEFV0039	1, 4	Main Feedwater Isolation Valve	1411	A-23	---	H	---	X	X	X	---	M-12AE02	E-13AE14 E-13AE15	---	Air	Needed to ensure aux feedwater flow to the appropriate SG.
AE	AEFV0040	1, 4	Main Feedwater Isolation Valve	1412	A-23	---	H	---	X	X	X	---	M-12AE02	E-13AE14 E-13AE15	---	Air	Needed to ensure aux feedwater flow to the appropriate SG.
AE	AEFV0041	1, 4	Main Feedwater Isolation Valve	1412	A-23	---	H	---	X	X	X	---	M-12AE02	E-13AE14 E-13AE15	---	Air	Needed to ensure aux feedwater flow to the appropriate SG.
AE	AEFV0042	1, 4	Main Feedwater Isolation Valve	1411	A-23	---	H	---	X	X	X	---	M-12AE02	E-13AE14 E-13AE15	---	Air	Needed to ensure aux feedwater flow to the appropriate SG.
AE	AEHS0080	1	Main Feedwater Isolation Valves Fast Close	3601	C-27	RL006	H	---	X	X	X	---	M-12AE02	E-13AE14 E-11NK01	J-104-00296 J-104-00323 J-104-00324 J-200-00065 J-200-00069	NK5112	---

APPENDIX 3
PFSSD COMPONENT LIST

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System ID	Component ID	S/G	Description	Room	Fire Area	Instrument Location	SSD Fun	Sprtd Fun	Hot Stdby	Cold Shdwn	Normal Shdwn	Alt Shdwn	P&ID	Schematic / One Line	Other Drawings	Power Source	Notes
AE	AEHS0081	4	Main Feedwater Isolation Valves Fast Close	3601	C-27	RL006	H	---	X	X	X	---	M-12AE02	E-13AE15 E-11NK02	J-104-00296 J-104-00327 J-104-00328 J-200-00065 J-200-00070	NK5406	---
AE	AEV0022	---	SG Feedwater Pump B Discharge Check Valve	4301W	TURB	---	H	---	X	X	X	X	M-12AE01	---	---	Mechanical Check Valve	---
AE	AEV0023	---	SG Feedwater Pump A Discharge Check Valve	4301W	TURB	---	H	---	X	X	X	X	M-12AE01	---	---	Mechanical Check Valve	---
BG	BGHIS8106	1	Charging Pumps to Regen HX/Ctmt Iso VLv	3601	C-27	RL001	R, M	---	X	X	X	---	M-12BG03	E-13BG11A	J-200-00094 J-200-00098	NG01BBR1	---
BG	BGHV8106	1	Charging Pumps to Regen HX/Ctmt Iso VLv	1323	A-24	---	R, M	---	X	X	X	---	M-12BG03	E-13BG11A	---	NG01BBR1	---
EP	EPHV8808A	1	Accumulator Tank A Isolation Valve	RB2	RB-2	---	H	---	---	X	X	X	M-12EP01	E-13EP02A	---	NG01BGF3	Manually control valve if power not available
EP	EPHV8808B	4	Accumulator Tank B Isolation Valve	RB2	RB-2	---	H	---	---	X	X	X	M-12EP01	E-13EP02A	---	NG02BGF3	---
EP	EPHV8808C	1	Accumulator Tank C Isolation Valve	RB2	RB-2	---	H	---	---	X	X	X	M-12EP01	E-13EP02A	---	NG01BGF2	Manually control valve if power not available
EP	EPHV8808D	4	Accumulator Tank D Isolation Valve	RB2	RB-2	---	H	---	---	X	X	X	M-12EP01	E-13EP02A	---	NG02BHF2	---
GN	GNPT0937	1	Containment Pressure Transmitter	1409	A-17	---	S	---	X	X	X	X	M-12GN01	E-13GN05 E-13SB09 E-13SB01 E-13SB02 E-13NN01	M-767-00349 M-761-02007	NN0111	Safety Injection and Containment Spray could be initiated by high containment pressure.
NG	NG01ACR130	1	SGK05A Indication Circuit Relay (83XGK05)	3301	C-9	---	S	R, M, H	X	X	X	---	---	E-11NG21	---	NG01A	---

APPENDIX 3
PFSSD COMPONENT LIST

CCN NO. XX-E-013 - 000 - CN005
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System ID	Component ID	S/G	Description	Room	Fire Area	Instrument Location	SSD Fun	Sprtd Fun	Hot Stdby	Cold Shdwn	Normal Shdwn	Alt Shdwn	P&ID	Schematic / One Line	Other Drawings	Power Source	Notes
NG	NG01BBR1	1	Charging Pump to Regen Hx/Ctmt Iso (BGHV8106)	1410	A-18	---	S	R, M	X	X	X	---	---	E-13BG11A E-11NG20	---	NG01B	---
NG	NG02ACR125	4	SGK05B Indication Circuit Relay (83XGK04)	3302	C-10	---	S	R, M, H	X	X	X	---		E-11NG21	---	NG02A	---
~~NK~~	~~NK4120~~	~~1~~	~~Turbine Gen & Fdwtr Ctrl Pnl (RL025/RL026)~~	~~3408~~	~~C-16~~	---	~~S~~	~~R, M, H~~	~~X~~	~~X~~	~~X~~	---	---	~~E-13AB23A E-13RL08 E-13RL01~~	---	~~NK41~~	---
~~NK~~	~~NK4410~~	~~4~~	~~Turbine Gen & Fdwtr Ctrl Pnl (RL025/RL026)~~	~~3404~~	~~C-15~~	---	~~S~~	~~R, M, H~~	~~X~~	~~X~~	~~X~~	---	---	~~E-13AB23A E-13RL08 E-13RL01~~	---	~~NK44~~	---
RL	RL025	1, 4	Turbine Generator & Feedwater MCB	3601	C-27	---	S	H	X	X	X	---	---	---	---	~~NK4120 NK4410~~	RL025 is included in the matrix because controls and indication are mounted on the panel. The controls and indication do not receive power from RL025
RL	RL026	1, 4	Turbine Generator & Feedwater MCB	3601	C-27	---	S	H	X	X	X	---	---	---	---	---	RL026 is included in the matrix because controls and indication are mounted on the panel. The controls and indication do not receive power from RL026

APPENDIX 4
PFSSD RELAY LIST

CCN NO. XX-E-013 - 000 - CN005
Base Calc No. Rev No. Sequence No

The following pages identify changes to Appendix 4 as a result of DCP 11696 and this CCN. Justification for most of the changes are documented in DCP 11696. For those changes that are not documented and justified in DCP 11696, the following provides the justification.

83XGK02 - Corrected typo in the room number and fire area. Correct room number is 3302 and fire area is C-10.

K505 - Added due to addition of containment spray actuation logic to drawing E-1F9433.

K519 - Added due to addition of containment spray actuation logic to drawing E-1F9433.

APPENDIX 4
PFSSD RELAY LIST

CCN NO. XX-E-013 - 000 - CN005
Base Calc No. Rev No. Sequence No

Relay ID	S/G	Relay Name	Room	Fire Area	Relay Location	SSD Fun	Sprtd Fun	Hot Stdby	Cold Shdwn	Normal Shdwn	Alt Shdwn	Schematic / One Line	Other Drawing	Power Feeder Breaker	Notes	Logic Diagram (E-1F)
83XGK05	1	SGK05A Indication Circuit Relay	3301	C-9	RP139	S	R, M, H	X	X	X	---	E-13GK13	---	NG01ACR130	Required to indicate spurious shutdown of SGK05A	9444
83XGK02	4	GKHZ0040A/40B Auxiliary Relay	3302	C-10	RP140	S	R, M, H	X	X	X	---	E-13GK02C	---	NG04CLF121 NK4415	---	9442
83XGK04	4	SGK05B Indication Circuit Relay	3302	C-10	RP140	S	R, M, H	X	X	X	---	E-13GK13A	---	NG02ACR125	Required to indicate spurious shutdown of SGK05B	9444
K505	1	Containment Spray Master Relay	3605	C-27	SB029D	S	R, M, H	X	X	X	---	---	M-767-00374 M-767-00350	NK4118 NN0112	---	9433
K519	1	Containment Spray Master Relay	3605	C-27	SB029D	S	R, M, H	X	X	X	---	---	M-767-00374 M-767-00350	NK4118 NN0112	---	9433
K505	4	Containment Spray Master Relay	3605	C-27	SB032D	S	R, M, H	X	X	X	---	---	M-767-00374 M-767-00350	NK4416 NN0412	---	9433
K519	4	Containment Spray Master Relay	3605	C-27	SB032D	S	R, M, H	X	X	X	---	---	M-767-00374 M-767-00350	NK4416 NN0412	---	9433

DESIGN VERIFICATION REPORT	DOCUMENT NO. XX-E-013-000-CN005	REV. NA

DOCUMENT TITLE: Post-Fire Safe Shutdown Analysis

ORIGINATOR: Brian Fox, PE

DESIGN VERIFIED:	SAFETY CLASSIFICATION:	VERIFICATION METHOD:
☐ PRELIMINARY	☐ SAFETY-RELATED	☐ DESIGN REVIEW
☒ FINAL	X SPECIAL SCOPE	☐ ALTERNATE CALCULATION
☐ REVISION	☐ NON-SAFETY RELATED	☐ TESTING

X **INDIVIDUAL VERIFICATION** **SIGNATURE:** William K. Sells **DATE:** 06/09/05

QUALIFICATION REQUIRED— ES9280465 OR ES9280479

☐ **TEAM VERIFICATION**

Scope Verified:	SIGNATURE:	DATE:

TEAM LEADER SIGNATURE: **DATE:**

QUALIFICATION REQUIRED ES9280465 OR ES9280479

*** Team leader signature certifies that adequate interfaces and overlaps have occurred.**

OVERVIEW (PURPOSE AND SCOPE):

CCN XX-E-013-000-CN005 is issued with DCP 11696 to address issues discovered while preparing post-fire safe shutdown (PFSSD) area analyses. This CCN revises Appendices 1, 3 and 4 based on revised PFSSD methodology.

CRUCIAL AREAS:

1. Review CCN for consistency with E-15000 (SETROUTE) changes made in DCP 11696.
2. Review calculation of RWST draindown time.

ALTERNATE OR INDEPENDENT ITEMS USED FOR VERIFICATION:

1. DCP 11696
2. DDCN E-15000-65-14
3. Crane Technical paper 410, Flow of Fluids Through Valves, Fittings, and Pipe, twenty fifth printing, 1991

DESIGN VERIFICATION REPORT	DOCUMENT NO. XX-E-013-000-CN005	REV. NA

COMMENTS:	ORIGINATOR'S RESPONSE:
1. None	

CONCLUSIONS:

This CCN is consistent with the changes made in DCP 11696.
The calculation determining the RWST draindown time is accurate and conservative.

This calculation change notice is acceptable.

DESIGN VERIFICATION REPORT	DOCUMENT NO. XX-E-013-000-CN005	REV. NA

CHECKLIST A	Yes	N/A
1. Were the design inputs correctly selected and incorporated into the design?	X	
2. Are assumptions, necessary to perform the design activity, documented, adequately described and reasonable?	X	
3. Are the appropriate quality and quality assurance requirements specified?		X
4. Are the applicable codes, standards and regulatory requirements, including issue and addenda, properly identified and are their requirements for design met?	X	
5. Has applicable plant and industry construction and operating experience been considered?	X	
6. Have the hardware interface design requirements been satisfied?		X
7. Is the output reasonable compared to input?	X	
8. Are the specified parts, equipment and processes suitable for the required application?	X	
9. Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?		X
10. Have adequate maintenance features and requirements been specified?		X
11. Are accessibility and other design provisions adequate for performance of needed maintenance and repair?		X

DESIGN VERIFICATION REPORT	DOCUMENT NO. XX-E-013-000-CN005	REV. NA

CHECKLIST A	Yes	N/A
12. Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?		X
13. Has the design properly considered radiation exposure to the public and plant personnel?	X	
14. Have adequate pre-operational and subsequent periodic test requirements been appropriately specified?		X
15. Does each document contain the required signatures and date?	X	
16. If a computer program was used in the analysis, has the program been verified?		X
17. If a component has been added, has a Safety Classification Analysis been completed?		X
18. Were the commitments provided in the USAR and the Design Criteria documents correctly incorporated into the design documents?	X	
19. Have the appropriate design documents been identified and/or updated?	X	
20. Has warehouse stock been considered for modification or retirement?		X