Halter, Mandy

From: Sergi, Robert A
Sent: Friday, May 27, 2011 9:43 AM
To: Halter, Mandy; Cataldo, Paul C
Cc: Hill, John; Troy, Mary; Manzione, Stephen J; Timone, James D; Cheskis, Michael
Subject: Requested documents related to IP3 Relay 16-B Issue
Attachments: Fleet PM Template for Relay Replacements.pdf; TE-97-007147.pdf; DCP 00-3-063 (EC5000039543).pdf

Mandy/Paul:
As you requested, attached are copies of the following documents:

- DCP 00-3-063 (EC-5000039543), "IP3 Replacement of Westinghouse BFD Relays"

- TE-97-007147, Procurement Engineering Technical Evaluation for replacement of Westinghouse BFD Relays with Eaton Corp. NBFD Relays.

- Entergy Fleet PM Template for 18 Year Control Relay Replacement for PMO Category Code 1 or 3 Relays.

Please contact either myself or John Hill if you have any questions. If you need more information related to the Fleet PM Template, Jim Timone and Mike Cheskis of Programs & Components Engineering will be available next week.

Bob

A-50

DESIGN CHANGE PACKAGE CONTROL FORM

Design Change No. 00-3-063 ESS	**Rev:** 0	**WR** 99-05298

Design Change Type: [X] Type 1 [ ] Type 2 [ ] Type 3 [ ] Type 4

Title Replacement of Westinghouse Type BFD Relays

50.59 Process Used: [X] MCM-4 SCREEN OR [ ] NSE #________

Departmental & Programmatic Concurrence: (Print/Sign/Date)

[X] Design Discipline (I&C): [signature] 10/6/2000	[X] Design Discipline (C/S): [signature] 12/15/00
[ ] Design Discipline (Elec.):	[ ] Design Discipline (Mech):
[X] Operations (Always Req'd): [signature] 12/11/00	[ ] In-Service Inspection (ISI):
[ ] Maintenance:	[ ] MOV Program:
[X] I & C: [signature]	[ ] Maintenance Rule:
[ ] Construction Services:	[ ] Computer / EPIC:
[ ] Reactor Engineering:	[X] Procurement Eng: M. T[signature] 10/6/00
[X] Fire Protection: [signature] 12/18/2000	[X] System Engineering: John H[signature]
[ ] Emergency Plan:	[X] Planning: [signature] 12/11/00
[ ] Safety:	[ ] RES:
[ ] EQ:	[ ] ALARA:
[ ] In-Service Testing (IST):	[ ] Security:
[ ] Simulator:	[ ] Training:
[X] Other: [signature] Outage Planning	[ ] QA:
[ ] Other:	[X] OPS Test: MOURVEY [signature] 10/6/00

A/E Design Organization

Preparer: N/A (print/sign) / date A/E : N/A

ACCEPTANCE and APPROVAL

Responsible Engineer: Robert Sergi/ [signature] (print/sign) 10/6/00 date

Design Engineering Manager: Sam Petrosi/ [signature] (print/sign) 12/18/00 date

(PORC and SEO signatures N/A if NSE not required)

PORC: Mtg # N/A (print/sign) Chairperson: N/A / date

SEO Approval: N/A (print/sign) date

Hammer) who has continued to manufacture "identical" relays. There is no significant weight increase in the new NBFD relays. The relays are equivalent in form, fit and function with the exception of the overall width of the new relays. Due to manufacturing tolerances the new relays are slightly wider. As a result, the physical dimensions of the new relays will not allow for proper heat dissipation without changes to the spacing of the relays. This requires installation of new mounting plates and relocation of selected relays. The new mounting plates will ensure seismic mounting of the new relays and allow for proper heat dissipation due to adequate spacing of the relays. There is no adverse impact on the seismic adequacy of the CCR racks due to the relocation of these selected NBFD relays.

The BFD relay replacements included in the scope of this DCP are the following:

Model	Relay Number	Normal State	Sub System	Location
BFD120S				
	SI-11X	DeEnergized	SI Actuation Relay	CCR Rack G-3
	SI-21X	DeEnergized	SI Actuation Relay	CCR Rack G-5
BFD48S				
	C-A11X	DeEnergized	Actuation Logic	CCR Rack G-4
	C-A12X	DeEnergized	Actuation Logic	CCR Rack G-4
	C-A13X	DeEnergized	Actuation Logic	CCR Rack G-4
	C-A14X	DeEnergized	Actuation Logic	CCR Rack G-4
	C-A21X	DeEnergized	Actuation Logic	CCR Rack G-6
	C-A22X	DeEnergized	Actuation Logic	CCR Rack G-6
	C-A23X	DeEnergized	Actuation Logic	CCR Rack G-6
	C-A24X	DeEnergized	Actuation Logic	CCR Rack G-6
	FWX-12	DeEnergized	Actuation Logic	CCR Rack G-5
	FWX2	DeEnergized	Actuation Logic	CCR Rack G-3
	SI-12X	DeEnergized	SI Actuation Relay	CCR Rack G-3
	SI-13X	DeEnergized	SI Actuation Relay	CCR Rack G-3
	SI-22x	DeEnergized	SI Actuation Relay	CCR Rack G-5
	SI-23X	DeEnergized	SI Actuation Relay	CCR Rack G-5
	TR1-1	DeEnergized	SI Block Relay (Testing of Logic)	CCR Rack G-4
	TR1-2	DeEnergized	SI Block Relay (Testing of Logic)	CCR Rack G-6
	TR2-1	DeEnergized	SI Block Relay (Testing of Logic)	CCR Rack G-4
	TR2-2	DeEnergized	SI Block Relay (Testing of Logic)	CCR Rack G-6
	TR3-1	DeEnergized	SI Block Relay (Testing of Logic)	CCR Rack G-4
	TR3-2	DeEnergized	SI Block Relay (Testing of Logic)	CCR Rack G-6
BFD66S				
	AS1	DeEnergized	Actuation Logic	CCR Rack G-4
	AS2	DeEnergized	Actuation Logic	CCR Rack G-6
	C-B11X	DeEnergized	Actuation Logic	CCR Rack G-4
	C-B21X	DeEnergized	Actuation Logic	CCR Rack G-6
	CB-1R	DeEnergized	Actuation Logic	CCR Rack G-4
	CB-2R	DeEnergized	Actuation Logic	CCR Rack G-6
	CS-1R	DeEnergized	Actuation Logic	CCR Rack G-4
	CS-2R	DeEnergized	Actuation Logic	CCR Rack G-6
	F11X	DeEnergized	Actuation Logic	CCR Rack G-5
	F12X	DeEnergized	Actuation Logic	CCR Rack G-5
	F13X	DeEnergized	Actuation Logic	CCR Rack G-5
	F14X	DeEnergized	Actuation Logic	CCR Rack G-5

Design Change 00-3-063 ESS	Rev. 0	Replacement of Westinghouse Type BFD Relays

EVALUATION OF DIFFERENCES

Model Number: As documented in Westinghouse Technical Bulletins NSD-TB-76-16 dated Nov. 22, 1976, NSD-TB-79-05 dated Aug. 14, 1979 and NSD-TB-81-14 rev. 1 dated Jan. 15, 1982, Westinghouse recommends changing relays designated as BFD with NBFD. As described in these documents, this change resolves a potential coil burnout problem associated with these relays: coil burnout, confirmed by tests, is due to high voltage spikes generated when the relay coil current is interrupted. Design change DC 95-3-254 was generated to evaluate replacing the BFD44S and BFD66S with their IE qualified counterparts. A letter from Westinghouse to Mr. J. Odendahl of NYPA indicates that "The NBFD66S relay is the safety related version of the BFD66S relay. The two relays are physically and functionally identical. The NBFDS relay can be substituted for the BFD66S relay in all applications. "Accordingly, both relays have the same contact arrangement - six (6) normally open and six (6) normally closed contacts. Both have identical dimensions and mounting configuration and both will be installed in the same fashion using the existing supports in the racks. The BFD66S was manufactured to Westinghouse commercial grade program. The NBFD66S is supplied for safety related (IE) applications and is the environmentally qualified version of the BFD66S. This evaluation also applies to all other BFD relays installed in the plant. On this basis, the new NBFD relay is found to be an acceptable replacement for the original BFD relays installed at various plant tag locations.

Coil Bobbin Material: In accordance with Westinghouse (ref. Technical Bulletin NSD-TB-76-16 dated November 22, 1976), a thermoset coil bobbin material was used in lieu of a thermoplastic as the thermoset is more suited for use at a higher temperatures.

Magnet Anti-Stick Disks: In accordance with NSD-TB-76-16, "The magnet anti-stick disks which ensure that residual magnetism will not allow the relay to remain closed was soldered in as opposed to epoxied" for improved reliability.

Armature Pin: In accordance with Westinghouse Technical Bulletin NSD-TB-76-16, the armature pin was epoxied to the cross bar to elminiate any chance of rubbing on the external case and causing a relay malfunction.

Coil Dimensions (width): Although the difference in dimensions are less than 1/16" and probably within the manufacturer's tolerances. The physical

Design Change 00-3-063 ESS	Rev. 0	Replacement of Westinghouse Type BFD Relays

D. PREREQUISITES:

The work associated with the replacement of Westinghouse type BFD relays will take place in the Central Control Room (CCR).

The replacement of the original Reactor Trip BFD relays with NBFD relays in CCR Racks E and F has already been completed. This DCP will remount these relays on a new mounting plate to allow for proper heat dissipation. The SI initiation BFD relays in the CCR G racks are scheduled to be replaced/relocated during the RO12 Refueling Outage while the plant is below the cold shutdown condition (i.e. < 200°F). However, individual relays may be replaced, as needed, during any plant condition.

Shop work such as fabrication of new mounting plates and mounting of new replacement relays on the new mounting plates can be performed prior to the start of the RO11 (or RO12) outages.

Prior to performing any work, a work request (SPO-SD-01) shall be approved by the Operations Department. An approved clearance per applicable plant procedures shall also be obtained by the organization tasked to perform the modification installation.

The responsible engineer shall be notified prior to the start of work.

E. DESIGN INPUTS:

Design Input Report (MCM-1, Attachment 4). See Project File.

F. INSTALLATION REQUIREMENTS:

This design change is classified, as QA Category I. All work shall be performed in accordance with NYPAs Administrative Procedures. Implementation of this DCP is currently scheduled as follows:

- Cycle 11 – Fabricate new mounting plates for re-mounting of reactor trip relays in E & F racks.
- RO11 – Re-mount Rx trip relays in E2, E3, E4, E5 & F2, F3, F4, F5 racks (wider spacing). The original type BFD reactor trip relays were already replaced with NBFD relays.

Design Change 00-3-063 ESS	Rev. 0	Replacement of Westinghouse Type BFD Relays

H. AFFECTED DOCUMENTS:

(INST) – Required for Installation (ACTS 28461)	(T/O) – Turnover [See MCM-19]	(C/O) – Closeout [See MCM-19]	INST	T/O	C/O
DRAWINGS (NEW OR REVISED):					
9321-F-39983 2-1A					X
9321-F-39983 3-0A					X
9321-F-39983 4-3B					X
9321-F-39983 4A-2B					X
9321-F-39983 5-2A					X
9321-F-39983 6-0A					X
9321-F-39983 8-3A					X
9321-F-39983 9-4A					X
9321-F-39983 11-0A					X
9321-F-39983 12-0A					X
9321-F-39983 13-2B					X
9321-F-39983 13A-1B					X
9321-F-39983 14-2A					X
9321-F-39983 15-1A					X
9321-F-39983 16-1B					X
9321-F-39983 17-1A					X
9321-F-39983 18-2A					X
9321-F-39983 7-01B					X
113E301 1-11A					X
113E303 4-27A					X
113E303 5-13A					X
113E303 6-19A					X
113E303 7-20B					X
113E303 8-10B					X
618F106 1-7A					X
SK-00-3-063-001			X		
SK-00-3-063-002			X		
SK-00-3-063-003			X		
SK-00-3-063-004			X		
SK-00-3-063-005			X		
SK-00-3-063-006			X		
SK-00-3-063-007			X		
SK-00-3-063-008			X		
DRAWINGS (VOIDED AND SUPERCEDED): N/A					
CALCULATIONS (NEW OR REVISED): N/A					
PROCEDURES (OPERATIONS, MAINTENANCE, I&C, SURVEILLANCE AND ALL OTHERS)					X
OTHER (MAINTENANCE RULE, ISI, IST, & OTHER PROGRAMS, TECH MANUALS, ERDS) WESTINGHOUSE TECH MANUALS 439 -					X

ENTERGY
Indian Point 3 Station

PROCUREMENT ENGINEERING TECHNICAL EVALUATION

TECH EVALUATION 97-007147 REV 07
IEE EVALUATION NYPA-98-0014 REV 02

TOTAL PAGES 11+ (Including Cover) ATT A (3 pgs)
B (2 pgs)
ATT 1 (1 pg)

ORIGINAL

CONTROLLED

COPY # 207

Prepared By: Phil Daigle Date: 5/16/01 (19)

Reviewed By: Tim L. Benton Date: 5/19/01

QSR: N/A Date:
(as applicable)

Authorized By: Michael Tracy Date: 5/19/01
Procurement Engineering Supervisor

PURCHASE INFORMATION

23 Vendor/supplier	24 Ven. part	25 Vendor on VETS list as	27 QA Codes
EATON CORP.	NBFDXXS	10CFR50 APPENDIX B, ANSI N45.2 SUPPLIER, VETS LIST DATED 980612	0009, 0045, 0052, 0161, 0251, 4000
WESTINGHOUSE ELECTRIC CORP ENERGY SYSTEMS BUSINESS UNIT	NBFD66S	10CFR50 APPENDIX B, ANSI N45.2 SUPPLIER, VETS LIST DATED 970603	6003

11 Codes/standards 12 Codes 13 ASME requirements

Yes [X] No [ ] IEEE-323-1974, IEEE-344-1975 NA

38 Item on eng. hold 39 Explain

Yes [ ] No [X] NA

48 Item drawing no. 49 Remarks

NA NA

50 Tech. manual(s) 51 Remarks

NA NA

52 Ref. document(s) 53 Remarks

113E301 SHT 1 REV 11	REACTOR PROTECTION SYSTEM RACK LAYOUT DRAWING
113E301 SHT 8 REV 7	REACTOR PROTECTION SYSTEM SCHEMATIC
113E303 SH. 7	SAFEGUARDS ACTUATION SCHEME
113E303 SHT 6	SAFEGUARDS ACTUATION SCHEME
615B465 SHTS. 1 THRU 43	WIRE LIST REACTOR PROTECTION
618F106 SHT 1 & 2	REACTOR PROTECTION SYSTEM IDENTITIES LOGIC
9321-LL-21303 SHT 15 REV 8	SCHEMATIC DIAGRAM TURBINE GENERATOR

54 Add. data reqd. for purch.	Yes	No	55 Reference no. or explain
Host serial number	[ ]	[X]	NA
Host shop order no.	[ ]	[X]	NA
Host P.O. number	[ ]	[X]	NA
Other	[ ]	[X]	NA

69 Document type	70 Document number
MOD	DC 95-3-254
MWR	00-03106-00
	00-04771-00
	01-00040-00

ALSO NOTE THAT WESTINGHOUSE HAS DEVELOPED RELAY NO. NBFD65NR WITH COIL P/N 6717C76G01 (WAREHOUSE STOCK NO. I7440253) WHICH IN ACCORDANCE WITH FAX DATED 2/18/98 REPLACES ALL NBFD RELAYS. CHANGE TO THIS RELAY REQUIRES FURTHER EVALUATION AND IS NOT COVERED UNDER THIS TE.
REV. 02: THIS IS A GENERIC EVALUATION FOR NBFDXXS RELAYS, LISTED AS FOLLOWS: NBFD66S-I7440009, NBFD11S-I7440330, NBFD12OS-I7440263, NBFD20S-I7440331, NBFD22S-I7440332, NBFD40S-I7440033, NBFD44S-I0149961, NBFD75S-I7440334, NBFD80S-I7440335, NBFD84S-I7440166, NBFD48S-I7440336. THESE RELAYS ARE SUPPLIED BY EATON CORP. USING THE FOLLOWING NYPA QA CODES: 0009, 0045, 0112, 0161, 0219 & 4000. NOTE: XX IN THE EATON GENERIC P/N INDICATES THE NUMBER OF NORMALLY OPEN AND NORMALLY CLOSED CONTACTS.
SEE TE 98-001283 FOR NBFXXF (A.C. RELAY EVALUATION).

REV. 03: GENERATED TO ADDRESS THE NEWLY SUPPLIED RELAY CONFIGURATION. THE NEW RELAYS WERE SUPPLIED WITH "S" SHAPED WASHERS. THE SUBJECT WASHERS ARE UTILIZED ON THE RELAY TERMINAL/POSTS TO PREVENT BARE WIRE TERMINATIONS FROM INTERFERRING WITH THE RELAY INTERNALS. THE "S" SHAPED WASHERS ARE NOT NEEDED FOR NYPA'S CONFIGURATION AS RING TERMINAL CONNECTIONS ARE USED IN LIEU OF BARE WIRE CONNECTIONS. THEREFORE, THE WASHERS MAY BE REMOVED BY I&C.

REV 04 WAS ISSUED IN RESPONSE TO AN INSTALLATION DISCREPANCY IDENTIFIED DURING PERFORMANCE OF WR #'S 99-01705-01 THRU 12. REFERENCE ATTACHED LETTER FROM B. PARRY TO J. DEFRANCESCO DATED 10/9/99. THIS DISCREPANCY REQUIRED A REVISION TO THE TEE AND IDENTIFIED ADDITIONAL AFFECTED DOCUMENTS.

REV 05 WAS INITIATED TO INCLUDE NBFD02S RELAYS WITHIN THE SCOPE OF THIS T.E. (REF. NYPA STK # 11389) AND TO EMPHASIZE THAT FUTURE PROCUREMENT REQUESTS FOR ALL BFD RELAYS SHALL BE CHANGED TO NBFD RELAYS PER WP3-RPT-RD-024 WLK REV 05. ALSO ADDED TWO ADDITIONAL TAG NUMBERS (63-X1/AST-2 & 63-X1/AST-4) THAT WEREN'T INCLUDED ON THE ORIGINAL TAG LIST BECAUSE THEY DIDN'T EXIST IN PEDB AT THE TIME. THESE RELAYS ARE SCHEDULED FOR REPLACEMENT PER WR 00-04771-00.

REV 06 ISSUED IN RESPONSE TO PDCR 00-0595 WHICH DELETED THE REQUIREMENTS FOR QA CODES 112 AND 219 AND ADDED QA CODES 32 AND 251.

REV. 07 WAS INITIALLY GENERATED TO ADD A SINGLE COMPONENT ID (80X2/APPR1) TO SUPPORT MINOR MAINTENANCE WORK REQUEST 01-00040-00. HOWEVER, RATHER THAN REVISING THIS T.E. EACH TIME A NEW COMPONENT ID WAS IDENTIFIED ALL REMAINING PEDB TAG NUMBERS FOR "BFD" & "NBFD" RELAYS WERE ADDED. THE ABOVE TAG LIST INCLUDES A TOTAL OF 255 RELAYS. THE I&C DEPARTMENT SHALL NOTIFY ENG EACH TIME ONE OF THESE RELAYS IS REPLACED TO ENSURE THAT THE AFFECTED DOCUMENTS AND PEDB ARE PROPERLY UPDATED.

TECHNICAL BASIS

06 Item function: TO PROVIDE A MEANS ACTUATING NORMALLY OPEN OR NORMALLY CLOSED CONTACTS BASED ON ENERGIZATION OR DEENERGIZATION OF A MAGNETIC COIL.

08 Design specifications: WESTINGHOUSE E SPEC 677126

10 Quality basis: IN THE MOST RESTRICTIVE APPLICATIONS, THE SUBJECT RELAYS ARE INSTALLED IN THE SAFEGUARDS ACTUATION SCHEMES FOR SOURCE RANGE BLOCK, REACTOR TRIP, SI PUMP TRIP, MSIV ISOLATION/ALARM, CONTAINMENT SPRAY ACTUATION, CONTAINMENT ISOLATION PHASE A & B, FIREWATER ISOLATION AND SI RESET. THESE RELAYS PERFORM AN ACTIVE SAFETY FUNCTION OF CHANGING STATE (ENERGIZE/DE-ENERGIZE) IN RESPONSE TO VARIOUS ACCIDENT SIGNALS THAT MAY BE REQUIRED FOR REACTOR SAFE SHUTDOWN. AS SUCH, THESE RELAYS ARE CLASSIFIED AS SAFETY RELATED QA CAT I BASED MCM-6B CRITERIA. THERE ARE MANY OTHER APPLICATIONS WHERE THESE RELAYS ARE USED FOR CAT M OR NON-CAT COMPONENTS. THESE RELAYS HAVE BEEN INCLUDED IN THE SCOPE OF THIS T.E. BECAUSE ALL BFD RELAYS WITH 120 VDC RATED COILS MUST EVENTUALLY BE REPLACED WITH NBFD RELAYS THAT ARE SUITABLE FOR USE ON 125 VDC BATTERY CHARGING SYSTEMS. SINCE NBFD RELAYS ARE ALWAYS PROCURED AS QA CATEGORY I THEY ARE SUITABLE FOR USE IN CAT M AND NON-CAT APPLICATIONS. REFER TO THE PEDB FOR CLASSIFICATION SOURCE DOCUMENT FOR EACH RELAY.

17 Technical data	18 Explain
10CFR50.49 REQUIRED	NA
CHEMICAL CONTROL PROGRAM	NA
IN STORAGE MAINTENANCE REQUIREMENTS	NA
RADIOACTIVE MATERIAL REQUIREMENTS	NA
SHELFLIFE REQUIREMENTS	NA
SUPPLIER ON OERG RESTRICTED LIST; OERG LIST DATED 960228	IEIN-91-045 IS APPLICABLE TO THE SUBJECT NBFD RELAYS. THE PROBLEM WITH THESE RELAYS WAS THOROUGHLY REVIEWED IN DC 95-3-254 AND IP-TCS-95-398 MEMORANDUM DATED 9/6/95. IPP-81-557 INDICATED THAT THE NBFD RELAY # 5072A49 WITH COIL STYLE # 1271C50G01 IS ALSO RESTRICTED. THESE RELAYS WERE ORIGINALLY ORDERED UNDER P.O. 85-IP-3336. HOWEVER, THE PART NUMBERS OF THE ITEMS RECEIVED WERE RELAY # 5072A49G12, COIL STYLE # 1293C51G01. BASED ON WESTINGHOUSE LETTER DATED 3/27/86, THESE RELAY COILS ARE SUPPLIED ON ALL NBFD RELAYS AND THEY ARE "NUCLEAR GRADE" ITEMS WHICH ARE RATED FOR 125/130VDC. AS SUCH, THESE RELAYS WERE ACCEPTED AND RELEASED FOR STOCK. WESTINGHOUSE TECHNICAL BULLETIN WTB-81-014, WHICH WAS WRITTEN BEFORE THE WEC LETTER DATED 3/27/86, INDICATES THAT THESE RELAY COILS ARE ALSO RESTRICTED FOR USE. SINCE THESE TWO DOCUMENTS CONTRADICT EACH OTHER, IT IS CONSERVATIVELY ASSUMED THAT THIS COIL IS RESTRICTED FOR USE. HOWEVER, SINCE WESTINGHOUSE NOW OFFERS A DIFFERENT RELAY COIL (P/N 6717C75G22), IT IS APPARENT THAT COIL P/N 1293C51G01 IS OBSOLETE. REFER TO IEE NYPA-98-0014 FOR EQUIVALENCY EVALUATION BETWEEN THE ORIGINAL BFD66S RELAY AND THE IMPROVED NBFD66S RELAY WHICH IS NOW STOCKED PER 7440009.

APPLICABILITY DETERMINATION

If any answer is Yes, then an Equivalency Evaluation cannot be used to evaluate the proposed change.

Yes	No	
[ ]	[X]	Does the replacement item alter any established setpoints?
[ ]	[X]	Does the replacement item adversely affect the Electrical Distribution System (EDS)?
[ ]	[X]	If the replacement item has a weight capable of challenging existing structural supports, does the replacement item introduce a weight or center-of-gravity change in excess of 5%?
[ ]	[X]	Would installation of the replacement item require changes to the existing mounting configuration?
[ ]	[X]	Would installation of the replacement item require modification to surrounding systems, structures or components to accommodate an increased spatial envelope?
[ ]	[X]	Would installation of the replacement item require special installation/testing as defined in Section 6.0?
[ ]	[X]	Does any of the evaluated change parameters involve any change, interaction, or interface to a system, structure, or component, its function or its operability as described in the License Basis Documents, i.e. FSAR, Op Specs, or Tech. Requirements Manual, etc. for more details see SED-AD-24 Attachment 5, EQUIVALENCY EVALUATION GUIDELINES?

Reasons for change: THE EXISTING BFD RELAYS ARE OBSOLETE. WESTINGHOUSE HAS REPLACED THEM WITH MODEL NBFD. THESE RELAYS ARE USED THROUGHOUT THE SAFEGUARDS ACTUATION LOGIC CABINETS TO PERFORM SAFETY RELATED CONTROL FUNCTIONS SUCH AS ACTUATING REACTOR TRIP, MSIV, FEEDWATER ISOLATION AND CONTAINMENT SPRAY IN ADDITION TO VARIOUS OTHER CONTROL FUNCTIONS. THE SUBSTITUTION OF THE BFD66S RELAYS WITH NBFD66S AND THE BFD44S WITH NBFD44S RELAYS AT VARIOUS PLANT TAG NUMBERS HAVE PREVIOUSLY BEEN DOCUMENTED IN REVISION 0 TO 7 OF DC 95-2-254. THIS DC SHALL REMAIN A VALID AND APPROVED ENGINEERING JUSTIFICATION AT THOSE TAG LOCATIONS. THIS ITEM EQUIVALENCY EVALUATION JUSTIFIES AND DOCUMENTS THE INTERCHANGEABILITY OF THESE RELAYS AT OTHER PLANT LOCATIONS AS IDENTIFIED IN THE ASSOCIATED TECHNICAL EVALUATION. HOWEVER, IT SHOULD BE NOTED THAT THE LAST BATCH OF RELAYS RECEIVED FROM CUTLER HAMMER VIA P.O. S98-05901 HAVE SLIGHTLY LARGER COILS WHICH MIGHT AFFECT MOUNTING OF THE RELAY (SEE ATTACHED LETTER FROM B. PARRY TO J. DEFRANCESCO). THEREFORE, IT MAY BE NECESSARY TO RELOCATE THE RELAYS WITHIN THE PANEL TO ALLOW INSTALLATION. SEE DISCUSSION BELOW REGARDING COIL DIMENSIONS FOR FURTHER DETAILS.

CHANGE SUMMARY

No.	Parameter	Original Data	Replacement Data
01	MODEL NO.	BFD66S, BFD44S, BFD84S, BFD120S, BFDXXS	NBFD66S, NBFD44S, NBFD84S, NBFD120S, NBFDXXS
02	COIL BOBBIN MATERIAL	THERMOSET	THERMOPLASTIC
03	MAGNET ANTI-STICK DISKS	EPOXIED	SOLDERED
04	ARMATURE PIN	NOT FIXED	FIXED IN POSITION
05	COIL DIMENSIONS (WIDTH) FOR OLD &	1.865"	1.920"

References: (2) STOCK NO. I7440009
(3) WESTINGHOUSE TECH. BULLETIN NSD-TB-76-16 DATED NOV. 22, 1976.
(4) WESTINGHOUSE TECH. BULLETIN NSD-TB-79-05 DATED AUG. 14, 1979.
(5) LETTER DATED OCT. 20, 1981, M.E. ALBRIGHT TO W.A. JOSIGER
(6) WESTINGHOUSE LETTER DATED JL. 26, 1995, FIDLER TO ODENDAHL ATTACHED LETTER FROM B. PARRY TO J. DEFRANCESCO
DC 95-3-254 REV. 0 TO REV. 7

DOCUMENTS REQUIRING UPDATE FOLLOWING INSTALLATION

(Contact Civil/Structural if seismic calculation updates are indicated below.)

Host Identifier	Document Number	Description of Change
SEE TAG NOS. LISTED IN THE TE	AFFECTED DWGS.	UPDATE AFFECTED DWGS. AS LISTED IN PEDB AS NECESSARY. EXAMPLES: 618F106 SHT 1 & 615B465 (FOR THE REACTOR TRIP RELAYS REVISE THE MODEL NUMBER AND THE POSITION NUMBERS TO REFLECT THE CURRENT LOCATION.)
	PEDB	CHANGE THE MANUFACTURER MODEL NO. FROM BFD66S TO NBFD66S FOR THE 6 N.O. AND 6 N.C. RELAY UPON COMPLETION OF THE ASSOCIATED WORK REQUEST AND FROM BFDXXS TO NBFDXXS WHERE XX IS THE POLE CONFIGURATION AS NOTED IN THE APPROPRIATE COMPLETED WORK REQUEST. PEDB UPDATE GROUP IS TO REVISE ALL BFD665 RELAYS SHOWN INCORRECTLY IN PEDB TO THE CORRECT BFD66S DESIGNATION.

Remarks: ****** REV 02 TO THIS IEE IS ONLY PERTINENT TO THE NBFD66S RELAYS. SPECIFIC COIL DIMENSIONS FOR THE OTHER MODELS ARE EXPECTED TO BE THE SAME BUT ARE UNKNOWN AT THIS TIME.****** BASED ON THE ABOVE EVALUATION, THE NBFD66S RELAYS (STOCKED PER WAREHOUSE STOCK NO. I7440009) AND OTHER NBFD RELAYS STOCKED UNDER OTHER STOCK NOS. ARE THE SAME IN FORM, FIT AND FUNCTION AND ARE ACCEPTABLE REPLACEMENTS FOR THE BFD RELAYS WITH SIMILAR POLE CONFIGURATION WHICH ARE CURRENTLY INSTALLED AT VARIOUS PLANT TAG LOCATIONS AS IDENTIFIED HEREIN. AS DOCUMENTED IN IP3-ECCF-337 (ATTACHED), THE REPLACEMENT OF THE ORIGINAL BFD66S RELAYS WITH THE NBFD66S RELAYS DO NOT INVOLVE A CHANGE IN ELECTRICAL LOADING. BY EXTENSION THE REPLACEMENT OF OTHER BFD RELAYS WITH NBFD RELAYS DO NOT INVOLVE A CHANGE IN ELECTRICAL LOADING AS WELL. THIS WAS DOCUMENTED IN IP3-ECCF-384 AND 614 FOR OTHER BFD44S AND BFD66S RELAYS ACCORDINGLY, ADDITIONAL ECCF CALCULATIONS ARE NOT REQUIRED AND ALL FUTURE RELAY REPLACEMENT WILL BE PERFORMED IN ACCORDANCE WITH THIS IEE. **NOTE** THE LAST BATCH OF RELAYS RECIEVED FROM CUTLER HAMMER (REF. P.O. S98-05901) HAVE SLIGHTLY WIDER COILS AND MIGHT ADVERSELY AFFECT INSTALLATION. THE IMPACT OF THIS CHANGE WILL NEED TO BE EVALUATED ON A CASE-BY-CASE BASIS UNTIL FURTHER NOTICE.

IP3-ECCF-377 EVALUATION

TO-DP-EE-MP-0400-014
TE97-007147

CONTAINMENT ISOLATION PHASE A RELAY PG 2 OF 3
TRAIN B RELAY CA-2B, MODEL (W) BFD66S
IS BEING REPLACED BY (W) NBFD66S.
THIS RELAY IS FED FROM 125 VDC PANEL 2A
CKT 18.

BASED ON letter from G. FIDLER (WESTINGHOUSE)
to J. ODENDAHL (NYPA) DATED 7/26/95,
BOTH THE BFD66S AND NBFD66S
ARE PHYSICALLY AND FUNCTIONALLY IDENTICAL.
Therefore the demand is the same
and the replacement is acceptable.

SINCE LOAD DEMAND IS UNCHANGED the
125VDC Component SIZING Calc,
125VDC VOLTDROP CALC AND
125VDC SHORT CIRCUIT CALC'S ARE
NOT AFFECTED.

R. Brechtl 7/26/95

Indian Point 3
Nuclear Power Plant

NewYorkPower Authority

Memorandum

ATTACHMENT B
TO DP IEE NYPA-98-00147
76 97-007147
PS 1 of 2

February 9, 1998
IP-DEE-98-031

TO: ANGELO VAI

FROM: S. D'AURIA

SUBJECT: PEDB / ROME STORES RESEARCH FOR WESTINGHOUSE MODEL "BFD" RELAYS IN SUPPORT OF MODIFICATION # 95-3-254, REV 7 & ECCF NO. 614 REV 3

ATTACHMENTS:
1. LIST OF PEDB COMPONENT ID's THAT CAN BE REPLACED BY THE NBFD SERIES RELAYS.

DISCUSSION

Attachment 1 is a listing of the Component ID's in the Plant Equipment Database (PEDB), of the model number BFD relays which can be replaced by the in-stock supply of model number NBFD relays via a Technical Evaluation. The list was reviewed to ensure a like-for-like replacement, and matches the model numbers with the exception of the "N" designator.

Note: The model number NBFD24S and NBFD02S relays shown on the bottom of Attachment 1 have no replacement relays in stock.

If you have any questions contact Sal D'Auria at x2346 or Tim Cogdill at x2083.

Prepared by:

Timothy C. Cogdill
T. COGDILL (IDEE)

Approved by::

S. D'AURIA (IDEE)

cc: Memo File

IC 97-007147
ATT 1
Pg 1 of 1

From:	Parry, Brian
Sent:	Saturday, October 09, 1999 2:39 PM
To:	Defrancesco, Joseph
Cc:	Sitler, Brian; Daigle, Phil; Petrosi, Sam; Boccio, John
Subject:	RPS relays RT-1A - RT-RT-16A and RT-1B - RT-16B (Westinghouse type BFD66S)

During the implementation of predictive maintenance WRs 99-1705-1 through 32 i.e., replacement of the reactor trip relays RT-1A through RT-16A and RT-1B through RT-16B, some cracking around the coil casings were noticed as well as some burned off insulation on the coil wires. Comparing the existing NBFD66S relay to the replacement NBFD66S revealed a slight dimensional increase in the coil casing for the new model. This slight increase in the coil casing prevented more than two new relays being mounted adjacent to each other. Other existing NBFD66S relays in the RPS racks were mounted more than two in a row. It's probable that the new replacement relays which are now manufactured by Cutler Hammer (they purchased the line from Westinghouse)are slightly different dimension wise.

To accommodate this slight dimensional difference the replacement relays were mounted two together with one relay space between. The area of contact between the two adjacent relays is miniscule and the additional one relay space between pairs of relays provides a greater air volume for cooling than the original mounting arrangement i.e., four relays together. I & C recorded a thermography readings of 170°F on the area of the coils of the original four relay arrangement (with the relays energized) and recorded a reading of 170°F on the same area for the new relay installation (with relays energized). The new mounting arrangement had no impact on the relay's heat dissipation characteristics.

Joe Defrancesco told John Semrai of I & C that engineering (Phil Daigle and Brian Parry) thought that the installation of the new reactor trip relays in the A train (i.e., RT-1A – RT-16A) is acceptable. Phil Daigle will issue Tech Eval 97-007147 Rev 4 to address the difference in size and will discuss the heat dissipation issue. The new position of the relays on the mounting panel in Racks E-2 – E-5 and F-2 – F-5 will be addressed in a drawing change through the RDC process. The necessary RDC to change the drawings will be issued after completion of installation and testing. The following drawings will require updating,; 615B465 and 618F106 sheet 1.

Refer to Section 5.5.3 for additional information

Component ID: SEE ATTACHED EXCELL SPREADSHEET LIST	Initiation Date: 5/16/11	AR #: 00121475
PMRQ#: NONE	PM Category Code Category Code: 1 OR 3	Discipline: ICPM

Task Description: 18 YEAR CONTROL RELAY REPLACEMENT

Type of Change: (CHECK ALL THAT APPLY)

☐ Frequency Change	☒ PM Addition	☐ PM Deletion
☐ Scope Addition	☐ Scope Deletion	☐ Due Date Change
☐ Editorial	☐ Online	☐ Refuel
☐ Criticality Change		

Proposed Due Date: SEE ATTACHED LIST Requested Frequency: 18 YEAR

Component Classification	Duty Cycle	Service Condition
☐ Single Point Failure (SPF)	☒ High	☒ Severe
☒ High Critical	☐ Low	☒ Mild
☐ Low Critical		
☐ Non Critical		
☐ Run to Failure		

Description of Change(s): ADD 18 YEAR PM FOR THE REPLACEMENT OF HIGH CRITICAL, NORMALLY ENERGIZED CONTROL RELAYS IN ACCORDANCE WITH THE ENTERGY NUCLEAR PM TEMPLATE.

Reason and Justification: SEE ATTACHED RISK EVALUATION WHICH WAS PRESENTED TO PMOG AND APPROVED BY URT & THE IPEC SITE GMPO ON 4/25/11. THE CONCLUSION FROM THE PMOG PRESENTATION WAS TO REPLACE 12 HIGH CRITICAL NORMALLY ENERGIZED CONTROL RELAYS PER REFUEL OUTAGE. SEE ATTACHED LIST WHICH CONTAINS THE REPLACEMENT SCHEDULE.

Adobe Acrobat Document

Microsoft Excel Worksheet

Searches were performed on both internal (Indian Point) and external OE for causes of control relay failures (see attached results). In the last 3 years, IPEC had four high critical control relay failures: 2 were due to high contact resistance, 1 was due to a burnt out coil relay, and 1 was due to a human error during installation of a new relay. A sample of external OE found 3 coil related failures (one of which was a normally de-energized relay) and 1 failure due to high contact resistance. The 18 year relay replacement PM task (per the EN template) is aimed at preventing relay failures mostly due to coil insulation failures. Of the IPEC failures 2 were due to high contact resistance which will be found during surveillance testing. The EN template recommends functional testing as the best method to prevent these types of failures since functional testing will physically clean the contacts by changing the contact state. The other 2 failures at IPEC were due to a coil failure which the replacement PM will prevent and due to a human error during relay installation which the replacement PM will introduce. Given the added risk due to new failure modes which will be introduced by the replacement PM and minimal gain, P&CE has initiated EN-DC-324 Attachment 9.10 as attached to allow PMOG to make a risk based decision to address the 18 Year replacement PM implementation. P&CE will present proposal to PMOG of replacing 12 relays per refuel outage.

IPEC OE for control relay failures from 2008 to 2011 (level 'B' CRs):

CR-IP2-2008-01421: During performance of 2-PT-R14, SIS initiation and black out testing, 22 SIS pump breaker from 2A (52/SI2A) did not close as required due to the failure of relay 3-2.

Apparent Cause – Random failure of the contact 17-21 on the 3-2 Westinghouse BFD relay due to high contact resistance.

This relay failure is attributed to a high resistance contact.

CR-IP3-2009-02727: During testing of 32 Steam Generator level bistables (3-PT-Q97), operators were not able to return to automatic control of 32 Main Feed Regulating Valve from manual.

Contributing Cause – Random failure of the R/427 relay contacts.

R/427 relay contact resistance readings were not repeatable following cleaning of contacts and manual actuation of the relay.

Apparent Cause – Possible improper PM component classification of R/427 as run to failure.

This relay failure is attributed to a high resistance contact.

CR-IP3-2009-03780: While transferring from manual to automatic control during 3-PT-Q97, STEAM GENERATOR LEVEL ANALOG FUNCTIONAL (step 4.6.30) 32 FRV would not control in automatic as expected. This has occurred during the last two performances of 3-PT-Q97 (June and September).
Direct Cause: High Resistance terminal connection on terminal 1 of R/427.
AC1 – Latent installation deficiency where ring lug termination were never installed per original design drawings and specifications
CC1 – Unawareness (D1) – Skill Based – inadequate communications
High Resistance Connection: Found loose termination on terminal 1 of the lower relay contact stack. This cause was further investigated utilizing the Why Staircase (Attachment II).
The following is the last three questions of the Why Staircase (Attachment II)
Q3 Why was there high resistance on terminal 1?
A3 Ring terminals were never installed as specified in original design drawings
Q4 Why weren't ring terminals installed?
A4 There were no ring lugs installed during original installation and the technicians returned the relay to its original configuration.
Q5 Why weren't ring lugs installed during the original installation?
A5. The Team was unable to determine why the ring lug terminations were not installed during original installation.

This relay failure is attributed to a high resistance terminal connection due to a human error during installation of a new relay.

CR- IP3-2010-2440: During performance of 3-PT-M13B1 "Reactor Protection Logic Channel Functional Test" (WO 52266847) Relay 17-B 'Intermediate Range Block' emitted a burning odor. The test was stopped and the relay was replaced.

AC-1: The apparent cause was less than adequate Preventative Maintenance strategy for obsolete low critical component. There is no replacement PM for the Intermediate Range Block relays.

CC-1: There was a known problem with the Westinghouse BFD relays, which are obsolete. The design deficiency was with the BFD coils, associated with coil burnout due to high voltage spikes generated when the relay coil current is interrupted.

Why did relay 17-B fail?

The coil burned out when the relay was de-energized during performance of PT-M13B1.

Why did the coil burn out?

This is a known potential failure mode of the Westinghouse BFD type relays, as documented by Westinghouse Tech Bulletins NSD-TB-76-16, NSD-TB-79-05, and NSD-TB-81-14. There is a potential coil burnout problem with these relays due to high voltage spikes generated when the relay coil current is interrupted. Westinghouse recommended replacing the BFD relays with NBFD relays.

Why was the BFD relay with known potential failure mode not replaced?

EC: 5000039543 addressed the replacement of Westinghouse Type BFD relays. Only certain relays in the control circuits associated with Reactor Protection System and Engineered Safeguards System were selected for replacement, based on physical rack layout location. The replacement NBFD relays are physically wider, resulting in the coil casings touching each other. Relocation of selected NBFD relays in the CCR racks was required to allow for proper heat dissipation. The Intermediate Range Block relays (17-A, 17-B, 18-A, and 18-B) were not included in this EC, and they were not included in the PM program for replacement.

This relay failure is attributed to a burnt out relay coil.

External OE for control relay failures:

OE22427 – Salem Unit 1 - Inability to Stop a Running Emergency Diesel Engine Due to a Control Relay Failure

On August 22, 2005, during the monthly surveillance run of the 1B Emergency Diesel Generator (EDG), the diesel engine would not stop on demand due to a failed HFA control relay.
COMPONENT INFORMATION (AS APPLICABLE): HFA relay
MANUFACTURER: General Electric
MODEL NUMBER: 12HFA51A42H
DESCRIPTION:
During the monthly surveillance run of 1B EDG, the engine would not stop running due to a failed control relay. Troubleshooting by maintenance personnel determined that a HFA type control relay had failed to reset. The affected relay is a General Electric HFA54 mechanically latching type relay that is labeled 'SRA' in the diesel generator 125 VDC control scheme. The failed relay is a normally de-energized relay that is exercised twice during the monthly diesel surveillance run. It had been installed for approximately two years.

CAUSES:
This event occurred because the relay's reset coil did not have sufficient insulation between the coil windings and the coil termination leads. By disassembling the relay technicians have determined that the reset relay coil that failed had experienced arcing damage. It was also noted that the affected relay had fiberglass insulating tape over the lower 80% of the coil. A similar relay, which failed in 2003, was found to have fiberglass insulating tape completely covering its coil.

CORRECTIVE ACTIONS:
The failed relay was replaced.

This relay failure was attributed to a coil failure. The failed relay was normally de-energized.

OE 30112 – Clinton Power Station Unit 1 - The Emergency Diesel Generator did not go to rated speed or voltage during surveillance testing (OE30112)

On 10/28/2009 with Clinton Power Station operating in Mode 1, Operations encountered problems during Division -1 Emergency Diesel Generator 1A Operability surveillance testing when the engine did not go to rated speed (900 RPM) and voltage (4160VAC Nominal). The cause of failure was determined to be a degraded Run/Idle control relay contact block (ITE/Gould Model J20A40).

Title:
ITE/GOULD J13 Run/Idle Control Relay Failure
(Note: The control relay was installed in 1992 and is Normally De-Energized)

Description:
On 10/28/2009 with Clinton Power Station operating in Mode 1, Operations encountered problems during Division -1 Emergency Diesel Generator 1A Operability surveillance testing when the engine did not go to rated speed (900 RPM) and voltage (4160VAC Nominal).

Subsequent troubleshooting by Engineering and Electrical Maintenance revealed that the Run/Idle control relay measured open across contacts 13/14 (High Resistance) de-energized, when the contacts should have been closed (Low Resistance). The open contacts caused the Division -1 Emergency Diesel Generator not to run at rated speed and voltage.

The relay contact block was replaced and the Division -1 Emergency Diesel Generator was restored to an Operable status.

Causes:
Based on Exelon PowerLabs Failure Analysis report CPS-70930 results, the high resistance across the relay contacts 13/14 was due to a light silver oxidation and minute surface contamination (wear products/dust) on the movable contact surfaces.

This relay failure was attributed to high contact resistance.

OE 28473 - Three Mile Island Unit 1 - Containment isolation valve CM-V-3 did not close during required Surveillance Testing (OE28473)

Component Information: Containment Isolation Control Relay, Manufacturer: Joslyn Clark
Model Number: 4U2-130 , Part Number: 200 56208

Description:
On February 9th, 2009 during performance of quarterly IST of Containment Isolation Valves CM-V-1, 2, 3, and 4, CM-V-3 failed to close. CM-V-3 was declared inoperable and a 48-hour Shut Down condition was commenced in Accordance With TMI Unit 1 Technical Specifications. The Control Room Operator held the control switch for approximately 4 seconds in the closed position with no valve response. Visual inspection of the 20X/CM-V-3 seal-in relay found the relay to be in the energized position. This relay is de-energized when the CM-V-3 control switch is taken to the closed position, and should have been in the de-energized position, in order to de-energize the valve solenoid and close CM-V-3. Surveillance testing continued on and CM-V-4 closed satisfactorily. The 48-hour Shut Down Condition was exited when CM-V-4 closed, meeting containment requirements. Troubleshooting found acceptable voltage across the 20X coil with the CM-V-3 control switch in the return to normal position with expected decrease to 0VDC when the switch was placed to the closed position. The CM-V-3 20X relay was replaced with a successful Post Maintenance Test stroke of the valve within IST required time. Inspection of the replaced relay found the coil discolored to a brown appearance. A slight acrid odor was noted from the CM-V-3 20X relay coil. There was no visible misalignment of the relay bracket and the relay cycled freely by hand.

The relay is constructed of a stationary DC coil with a movable plunger that passes through the center of the coil. This plunger rises when the coil is energized to actuate the relay contacts. The plunger and coil are separated by what appears to be a plastic sleeve or ring. Due to the tight tolerances between these components, it appears that the relay could become bound due to excessive heat. The cause of the failure appears to be mechanical binding of the CM-V-3 20X relay due to age related degradation and over-heating of the coil. The failed relay is a normally energized relay and was original plant equipment.

Causes:
The apparent cause of the failure appears to be mechanical binding of the CM-V-3 20X relay due to age related degradation and over-heating of the coil.

Corrective Actions:
The CM-V-3 20X relay was replaced with a successful Post Maintenance Test stroke of the valve within IST required time. Extent of condition replacement of similar relays has been prioritized based on relay criticality and normally energized status.

This relay failure was attributed to mechanical binding due to aged relation degradation and over heating of the coil. The failed relay was normally energized.

OE24524 – Brunswick Unit 2 - EDG#2 Trip and Relay Issues
Following the manual start of Emergency Diesel Generator (EDG) #2 on February 19, 2007, the EDG tripped and locked out with "low lube oil pressure trip" annunciated. Operations confirmed that there was not an actual low lube oil pressure condition. The Lube Pressure Shutdown Control Relay was found to be stuck in the operated position (contacts in the energized position, with coil de-energized / failed open) causing the trip. The analysis of the relay concluded that an end of life relay coil failure had occurred. Brunswick personnel had previously determined criticality of the EDG Allen Bradley type 700 DC relays

when developing the Preventive Maintenance (PM) basis by excluding a failure to the operated state as a potential failure mode. Brunswick's failure history for EDG associated relays was assessed, with a review of OE and EPIX data, for all the relay models to determine if time based replacement is appropriate and at what frequency. PM revision reviews are being submitted to revise frequency and PM basis for these relays to reasonably preclude failure.
MANUFACTURER: Allen Bradley
MODEL NUMBER: 700 DC relay
The relay was replaced and the failed relay was sent for failure analysis. The analysis identified that the relay coil had burned open and the contacts were stuck in the operated state.

This relay failure was attributed to a burnt out relay coil.

Sheet 1 of 1

Component ID: See attached list of high critical, normally energized, control relays at IPEC PMCR#:
Noun Name: N/A
Description of Change Requested: Create new 18 year PM replacement of control relays at IPEC that are high critical and normally energized in accordance with the EN fleet template.
Reason and Justification for Change: Replacement of control relays is done to preclude failures from thermal aging. Accelerated aging is most commonly caused by localized heat generated by a normally energized coil. The EN fleet template requires an 18 year PM replacement for high critical normally energized relays based on NUREG/CR4715 recommendations.
Risks Involved with Change: The risks involved with performing control relay change-outs includes both human errors during installation such as improper re-termination and infant mortality issues such as manufacturing defects.

PMOG Decision (circle one): ACCEPT REJECT

PMOG Decision Notes:

PMOG Chairman (print/sign/date):
PMOG members in attendance:

For changes affecting SPF components, the Site GMPO must approve:

Site GMPO (print/sign/date):

Completed form shall be attached to a PMCR for final documentation. Route to Engineering as applicable.

UNIT	SYSTEM	EQUIPMENT_NUMB	EQUIPMENT_NAME	EQUIPMEI	CRI	SAFETY_	MANUFAC	MODEL_NUMBER	replaced with this WO
2	RCS	LC-459G-X	LOW CHARGING FLOW ALARM	RELAY	3	SR			
2	RCS	LC-460C-X	PRESSURIZER LOW LEVEL ALARM / HEATERS CONTROL / LCV-459	RELAY	3	SR	W120	BF66F	
2	RCS	LC-460D-X	PRESSURIZER HIGH LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-470A-X	PRESSURIZER RELIEF TANK LEVEL HI ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-470B-X	PRESSURIZER RELIEF TANK LEVEL LO ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-486-X	24 REACTOR COOLANT PUMP STANDPIPE HIGH LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-488-X	23 REACTOR COOLANT PUMP STANDPIPE HIGH LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-489-X	23 REACTOR COOLANT PUMP STANDPIPE LOW LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-490-X	22 REACTOR COOLANT PUMP STANDPIPE HIGH LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-491-X	22 REACTOR COOLANT PUMP STANDPIPE LOW LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-492-X	21 REACTOR COOLANT PUMP STANDPIPE HIGH LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	LC-493-X	21 REACTOR COOLANT PUMP STANDPIPE LOW LEVEL ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	PC-403-X	RCS PRESSURE LOOP 4 VALVE 731 INTERLOCK	RELAY	3	SR			
2	RCS	PC-413XC	RCS OPS CHANNEL 1 PRESS DIFF HI TRIP ALARM	RELAY	3	SR			
2	RCS	PC-433XC	RCS OPS CHANNEL 2 PRESS DIFF HI TRIP ALARM	RELAY	3	SR			
2	RCS	PC-443XC	RCS OPS CHANNEL 4 PRESS DIFF HI TRIP ALARM	RELAY	3	SR			
2	RCS	PC-455F-X	PRESSURIZER HIGH PRESSURE OPEN PORV PCV-455C	RELAY	3	SR	W120	BF66F	
2	RCS	PC-455I-X	PRESSURIZER HIGH PRESS ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	PC-455J-X	PRESSURIZER LOW PRESS ALARM / BACK-UP GROUP HEATERS C	RELAY	3	SR	W120	BF66F	
2	RCS	PC-456F-X	PRESSURIZER HIGH PRESS ALARM / PCV-456 LOGIC	RELAY	3	SR	W120	BF66F	
2	RCS	PC-456G-X	PRESSURIZER LOW PRESS ALARM	RELAY	3	SR			
2	RCS	PC-457F-X	PZR HIGH PRESS ALARM / PORV PCV-456 INTLK & BLOCK VLV 536	RELAY	3	SR	W120	BF66F	
2	RCS	PC-472-X	PRESSURIZER RELIEF TANK HIGH PRESSURE ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	PC-474B-X	PZR HI PRESS ALARM / PORV PCV-455C INTLK & BLOCK VLV 535 IN	RELAY	3	SR	W120	BF66F	
2	RCS	TC-401-X	REACTOR VESEEL FLANGE LEAK TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-412S-X	HIGH PRESSURE STEAM DUMP	RELAY	3	NSR			
2	RCS	TC-422A-X	LOOP 2 TAVG DEVIATION ALARM AND STOP ROD MOTION	RELAY	3	SR	W120	BF66F	
2	RCS	TC-432A-X	LOOP 3 TAVG DEVIATION ALARM AND STOP ROD MOTION	RELAY	3	SR	W120	BF66F	
2	RCS	TC-442A-X	LOOP 4 TAVG DEVIATION ALARM AND STOP ROD MOTION	RELAY	3	SR	W120	BF66F	
2	RCS	TC-450-X	PRESSURIZER SURGE LINE LOW TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-451-X	PRESSURIZER SPRAY LINE LOOP 4 LOW TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-452-X	PRESSURIZER SPRAY LINE LOOP 3 LOW TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-453-X	PRESSURIZER HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-454-X	PRESSURIZER HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-463-X	PRESSURIZER RELIEF LINE HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-465-X	PRESSURIZER SAFETY VALVE 464 OUTLET HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-467-X	PRESSURIZER SAFETY VALVE 466 OUTLET HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-469-X	PRESSURIZER SAFETY VALVE 468 OUTLET HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RCS	TC-471-X	PRESSURIZER RELIEF TANK LIQUID HIGH TEMP ALARM	RELAY	3	SR	W120	BF66F	
2	RPC	NC-35D-X	INTERMEDIATE RANGE #1 P-6 CHANNEL A LOGIC RELY	RELAY	3	SR			
2	RPC	NC-36D-X	INTERMEDIATE RANGE #2 P-6 CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-41M-X	POWER RANGE PERMISSIVE CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-41N-X	NUCLEAR POWER > Y % CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-41P-X	POWER RANGE #1 LOW RANGE HIGH FLUX CHANNEL A LOGIC RE	RELAY	3	SR			
2	RPC	NC-41R-X	POWER RANGE HIGH RANGE HIGH FLUX CHANNEL A LOGIC RELA	RELAY	3	SR			
2	RPC	NC-42M-X	POWER RANGE PERMISSIVE CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-42N-X	NUCLEAR POWER > Y % CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-42P-X	POWER RANGE #2 LO-RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-42R-X	POWER RANGE HIGH RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-43M-X	POWER RANGE PERMISSIVE CHANNEL A LOGIC RELAY	RELAY	3	SR			

2	RPC	NC-43N-X	NUCLEAR POWER > Y% CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-43P-X	POWER RANGE #3 LO-RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-43R-X	POWER RANGE HI-RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-44M-X	POWER RANGE # 4 LO-RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-44N-X	NUCLEAR POWER > Y% CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-44P-X	POWER RANGE # 4 LO-RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	NC-44R-X	POWER RANGE HI-RANGE HI-FLUX CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	P10-1	REACTOR PROTECTION PERMISSIVE 10 CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	P10-1(B)	REACTOR PROTECTION PERMISSIVE 10 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P10-2	REACTOR PROTECTION PERMISSIVE 10 CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	P10-2(B)	REACTOR PROTECTION PERMISSIVE 10 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P7-1	REACTOR PROTECTION PERMISSIVE 7 CHANNEL A LOGIC RELAY	RELAY	3	SR	0	NBFD66S	2000 install date
2	RPC	P7-1(B)	REACTOR PROTECTION PERMISSIVE 7 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P7-2	REACTOR PROTECTION PERMISSIVE 7 CHANNEL A LOGIC RELAY	RELAY	3	SR	0	NBFD66S	
2	RPC	P7-2(B)	REACTOR PROTECTION PERMISSIVE 7 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P7-3	REACTOR PROTECTION PERMISSIVE 7 CHANNEL A LOGIC RELAY	RELAY	3	SR	0	NBFD66S	
2	RPC	P7-3(B)	REACTOR PROTECTION PERMISSIVE 7 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P7-4	REACTOR PROTECTION PERMISSIVE 7 CHANNEL A LOGIC RELAY	RELAY	3	SR	0	NBFD66S	
2	RPC	P7-4(B)	REACTOR PROTECTION PERMISSIVE 7 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P8-1	REACTOR PROTECTION PERMISSIVE 8 CHANNEL A LOGIC RELAY	RELAY	3	SR	0	NBFD66S	
2	RPC	P8-1(B)	REACTOR PROTECTION PERMISSIVE 8 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	P8-2	REACTOR PROTECTION PERMISSIVE 8 CHANNEL A LOGIC RELAY	RELAY	3	SR	0	NBFD66S	
2	RPC	P8-2(B)	REACTOR PROTECTION PERMISSIVE 8 CHANNEL B LOGIC RELAY	RELAY	3	SR			
2	RPC	TC-44A-X	OVERTEMP DELTA T CHANNEL A LOGIC RELAY	RELAY	3	SR			
2	RPC	TC-44C-X	OVERPOWER DELTA T CHANNEL A LOGIC RELAY	RELAY	3	SR			
3	DC	ASTX1	LSPD TEST TRIP AUX RELAY	RELAY	3	NSR	W120	NBFD02S	
3	DC	SOV-548 RELAY	SOV-548 ISOLATION VALVE CONTROL RELAY	RELAY	3	SR	W120	BFD	
3	FHS	FTS-CR-CAP1	CARRIAGE AT POOL RELAY	RELAY	1	QP	1920	C3-B30X/24AC/DC	
3	FHS	FTS-CR-CAP2	CARRIAGE AT POOL RELAY	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	FTS-CR-CAR	CARRIAGE AT REACTOR RELAY	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	FTS-CR-CMB	CARRIAGE WINCH BRAKE RELAY	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	FTS-CR-ES	EMERGENCY STOP RELAY	RELAY	1	QP	1920	UNK-	
3	FHS	FTS-CR-HTR-FS	POOL SIDE CONTROL CABINET SPACE HEATER CONTROL RELAY	RELAY	1	QP	1920	C4-A40X/120VAC	
3	FHS	FTS-CR-HTR-RS	CABINET SPACE HEATER CONTROL RELAY - RX SIDE	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	FTS-CR-LD	LOAD DIRECTION RELAY	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	FTS-CR-OR1	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120VAC	
3	FHS	FTS-CR-OR2	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120VAC	
3	FHS	FTS-CR-OR3	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120VAC	
3	FHS	FTS-CR-OR4	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	UNK-	
3	FHS	FTS-CR-OR5	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	UNK-	
3	FHS	FTS-CR-OT	OVERRIDE TRAVERSE RELAY	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	FTS-CR-PM	POOL SIDE CONTROL POWER RELAY	RELAY	1	QP	1920	C4-A40X/120VAC	
3	FHS	FTS-CR-RM	REACTOR SIDE CONTROL POWER RELAY	RELAY	1	QP	1920	C3-A30X/120VAC	
3	FHS	MC-CON-CA1/CA2	POLAR CRANE PERMISSIVE RELAY	RELAY	1	QP	324	KBP11AG120	
3	FHS	MC-CR-GLAT	GRIPPER LATCH RELAY	RELAY	1	QP	1920	C3-B30X/24V	
3	FHS	MC-CR-GR	GRIPPER CONTROL RELAY	RELAY	1	QP	1920	C3-A30X/120V	
3	FHS	MC-CR-GUNL	GRIPPER UNLATCH RELAY	RELAY	1	QP	1920	C3-B30X/24V	
3	FHS	MC-CR-HBC	HOIST BRAKE CONTROL RELAY	RELAY	1	QP	1920	C4-A40X/120VAC	
3	FHS	MC-CR-OR1	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120V	
3	FHS	MC-CR-OR2	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120V	
3	FHS	MC-CR-OR3	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120V	

3	FHS	MC-CR-OR4	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120V	
3	FHS	MC-CR-OR5	INTERLOCK OVERRIDE RELAY	RELAY	1	QP	1920	C4-A40X/120V	
3	FHS	MC-PLR	PHASE LOSS RELAY	RELAY	1	QP	A985	46F8517	
3	IA	IA-33-1CR	IA-33 MASTER CONTROL RELAY	RELAY	3	NSR	537	UNK-	
3	RCS	PC-402A-X	INTERLOCK PROHIBITS OPENING RHR VALVE 730	RELAY	3	SR	W120	BF66F	
3	RCS	PC-402B-X	INTERLOCK CLOSES RHR VALVE 730	RELAY	3	SR	W120	BF66F	
3	RCS	PC-403A-X	INTERLOCK PROHIBITS OPENING RHR VALVE 731	RELAY	3	SR	W120	BF66F	
3	RCS	PC-403B-X	INTERLOCK CLOSES RHR VALVE 731	RELAY	3	SR	W120	BF66F	
3	RCS	RCP31HI-X	REACTOR COOLANT PUMP #31 HI OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP31LO-X	REACTOR COOLANT PUMP #31 LO OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP32HI-X	REACTOR COOLANT PUMP #32 HI OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP32LO-X	REACTOR COOLANT PUMP #32 LO OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP33HI-X	REACTOR COOLANT PUMP #33 HI OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP33LO-X	REACTOR COOLANT PUMP #33 LO OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP34HI-X	REACTOR COOLANT PUMP #34 HI OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	RCP34LO-X	REACTOR COOLANT PUMP #34 LO OIL LEVEL	RELAY	3	NSR	W120	BF22F	
3	RCS	TC450-X	PRZR SURGE LINE LO TEMP ALARM RELAY	RELAY	3	QP	W120	BF22F	
3	RCS	TC451-X	PRZR SPRAY LINE LO TEMP ALARM RELAY	RELAY	3	QP	W120	BF22F	
3	RCS	TC452-X	PRZR SPRAY LINE LO TEMP ALARM RELAY	RELAY	3	QP	W120	BF22F	
3	RCS	TC453-X	PRZR LIQUID SPACE HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RCS	TC454-X	PRZR STEAM SPACE HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RCS	TC463-X	PORV TAIL PIPE HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RCS	TC465-X	PCV-464 TAIL PIPE HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RCS	TC467-X	PCV-466 TAIL PIPE HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RCS	TC469-X	PCV-468 TAIL PIPE HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RCS	TC471-X	PRT HI TEMP ALARM RELAY	RELAY	3	NSR	W120	BF22F	
3	RPC	1/NC-33A-X	SOURCE RANGE BLOCK	RELAY	3	SR	E059	NBF66F	WO I3-000276916 replaced in 2001
3	RPC	1/NC-33A-Y	SOURCE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-33A-Z	SOURCE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-33B-X	SOURCE RANGE BLOCK	RELAY	3	SR	W120	BF66F	WO I3-980348472 replaced in 1999
3	RPC	1/NC-33B-Y	SOURCE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-33B-Z	SOURCE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-38A-X	INTERMEDIATE RANGE BLOCK	RELAY	3	SR	E059	NBF66F	WO I3-000276919 replaced in 2001
3	RPC	1/NC-38A-Y	INTERMEDIATE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-38A-Z	INTERMEDIATE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-38B-X	INTERMEDIATE RANGE BLOCK	RELAY	3	SR	W120	BF66F	WO I3-980348473 replaced in 1999
3	RPC	1/NC-38B-Y	INTERMEDIATE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	1/NC-38B-Z	INTERMEDIATE RANGE BLOCK	RELAY	3	NSR	W120	BF66F	
3	RPC	UVX1/RTA	RP TRAIN A U/V AUX RELAY	RELAY	3	SR	324	MDR-5076-1	WO IP3-05-19346 replaced in 2005
3	RPC	UVX1/RTB	RP TRAIN B U/V AUX RELAY	RELAY	3	SR	324	MDR 137-8	WO I3-970222200 replaced in 1997
3	RPC	UVX2/RTA	RP TRAIN A U/V AUX RELAY	RELAY	3	SR	G080	12HGA111J2	WO IP3-05-19347 replaced in 2007
3	RPC	UVX2/RTB	RP TRAIN B U/V AUX RELAY	RELAY	3	SR	G080	12HGA111J2	WO I3-970221100 replaced in 1997