PINGP 279, Rev. 6
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Retention: Life

SAFETY EVALUATION

(NON-MODIFICATION)

SE No. 265
Addendum ____
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All Safety Evaluations for safety related changes and tests other than Modifications SHALL be submitted on this form.

TITLE: UNTRACEABLE MOLDED CASE CIRCUIT BREAKERS INSTALLED IN SAFETY RELATED APPLICATION

1. DESCRIPTION (Attach additional sheets as necessary)

SEE ATTACHED

2. YES |__| TECHNICAL SPECIFICATION/LICENSE AMENDMENT OR UNREVIEWED

   NO |X| SAFETY QUESTION

   a. Amendment Request Transmittal DATE: ____

   b. Authorizing Letter Received DATE: ____

PREPARED BY: Jean K McCloskey DATE: 4/28/89

REVIEWED BY: L M Benedict DATE: 4/28/89

OPERATIONS COMMITTEE REVIEW: ____ DATE: 4/25/89

APPROVED BY: R J Mendele DATE: 4/28/89
PLT. SUPT. ENG & RAD PROT.

COPY TO: Technical Support Training Supervisor____ DATE:____

SAFETY AUDIT COMMITTEE REVIEW DATE: ____

(For Technical Specification/License Amendments or Unreviewed Safety Questions the SAC SHALL review the change prior to implementation).

IBM

SE No. 265
Addendum ____________

INDEX to FUTURE NEEDS

YES	NO	Item	Code	#
	X	Drawing Revision Request	DRR	#
	X	New Drawing Request	NDR	#
	X	Drawing Deletion Request	DDR	#
	X	Construction File Submittal	CFS	#
	X	Technical Manual Addition	TAF	#
	X	Technical Manual Deletion	TDF	#
	X	Technical Manual Revision	TRF	#
	X	New or Revised Specifications	SPEC	#
	X	Technical Specifications Changes	Amndmnt	#
	X	USAR / FSAR Changes	Submitted	#
	X	10CFR 50.59 Report Summary	Submitted	#
	X	Fire Hazards Analysis	Submitted	#
	X	Safe Shutdown Analysis	Submitted	#
	X	Appendix R Submittals	Submitted	#
	X	NRC Submittal Review	Submitted	#
	X	Operating Procedures or Changes	Updated	#
	X	Surveillance Procedures	SP	#
	X	Maintenance Procedures	PM	#
	X	ASME Section XI Program (ISI/IST)	Submitted	#
	X	Data Files	CFN	#
	X	Modification Training Request	Submitted	#
	X	Installation Procedures	WR/WRA	#
	X	Pre-Op Test Procedures	WR/WRA	#
	X	Operational Test Procedures	WR/WRA	#
	X	Purchase Orders	PO	#
	X	Spare Parts	Ordered	#
	X	HOLDS		#
	X	Other Organizations	Contacted	#

Name: ____________

| | X | OTHER Future Needs: ____________

The above applicable Future Needs have been completed and/or submitted.

Responsible Engineer: [signature] Date: 5/3/84

SAFETY EVALUATION #265

UNTRACEABLE MOLDED CASE CIRCUIT BREAKERS
INSTALLED IN SAFETY-RELATED APPLICATIONS

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SUMMARY AND CONCLUSIONS

The purpose of this evaluation is to justify continued operation of Prairie Island Units 1 and 2.

With the issue of NRC IE Bulletin 88-10, concern was raised over the traceability of molded case circuit breakers (MCCBs) in safety-related applications. This bulletin instructed utilities to ensure MCCB's with safety-related applications (whether procured safety-related or commercial grade) could be properly traced to the circuit breaker manufacturer (CBM). Prairie Island's letter to the NRC dated March 31, 1989, identified six MCCBs installed in safety-related applications not properly traceable to the CBM. This document details Prairie Island's disposition of these untraceable MCCBs.

In summary, of the six breakers, two have been replaced with traceable QA I MCCBs, one has been evaluated as in a non-safety related application, one has been removed from use during plant operation by procedural control tags, one was replaced previously by a used breaker addressed by safety evaluation SE #252, and one has been analyzed to ensure that its failure would not affect the safety of the plant. A detailed analysis of this last breaker (#12 Instrument Bus Inverter) is outlined below.

As is shown below, failure of the #12 Instrument Bus Inverter AC output breaker will not impact the safety function of the instrument power system it supplies. Due to the integral static transfer switch, should the breaker open prematurely or experience a downstream fault, power will shift to the alternate source without loss of instrumentation. This equipment has been proven by Prairie Island operational experience during instrument power system transients. Therefore, the six untraceable MCCBs do not create the possibility for an accident or malfunction of a different type than evaluated previously in the USAR or any subsequent commitments.

They do not increase the probability of occurrence of an accident or malfunction of equipment important to safety previously analyzed in the USAR or subsequent commitments.

They do not increase the consequences of any accident or malfunction of equipment important to safety previously analyzed in the USAR or subsequent commitments.

They do not reduce the margin of safety as defined in the basis for any Technical Specification.

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ANALYSIS OF 12 INVERTER

There are many mechanisms that can cause a breaker to fail. This evaluation does not examine how a breaker fails, but looks at the effects of a failed breaker. There are basically two effects from a failed breaker:

1) It opens prematurely (no electrical fault downstream of breaker)
2) It opens late or not at all (fault downstream of breaker or it is the source of the fault)

If it opens prematurely, the individual load is lost. If it is delayed, it is assumed that the upstream breaker is actuated. This causes the inverter to be de-energized.

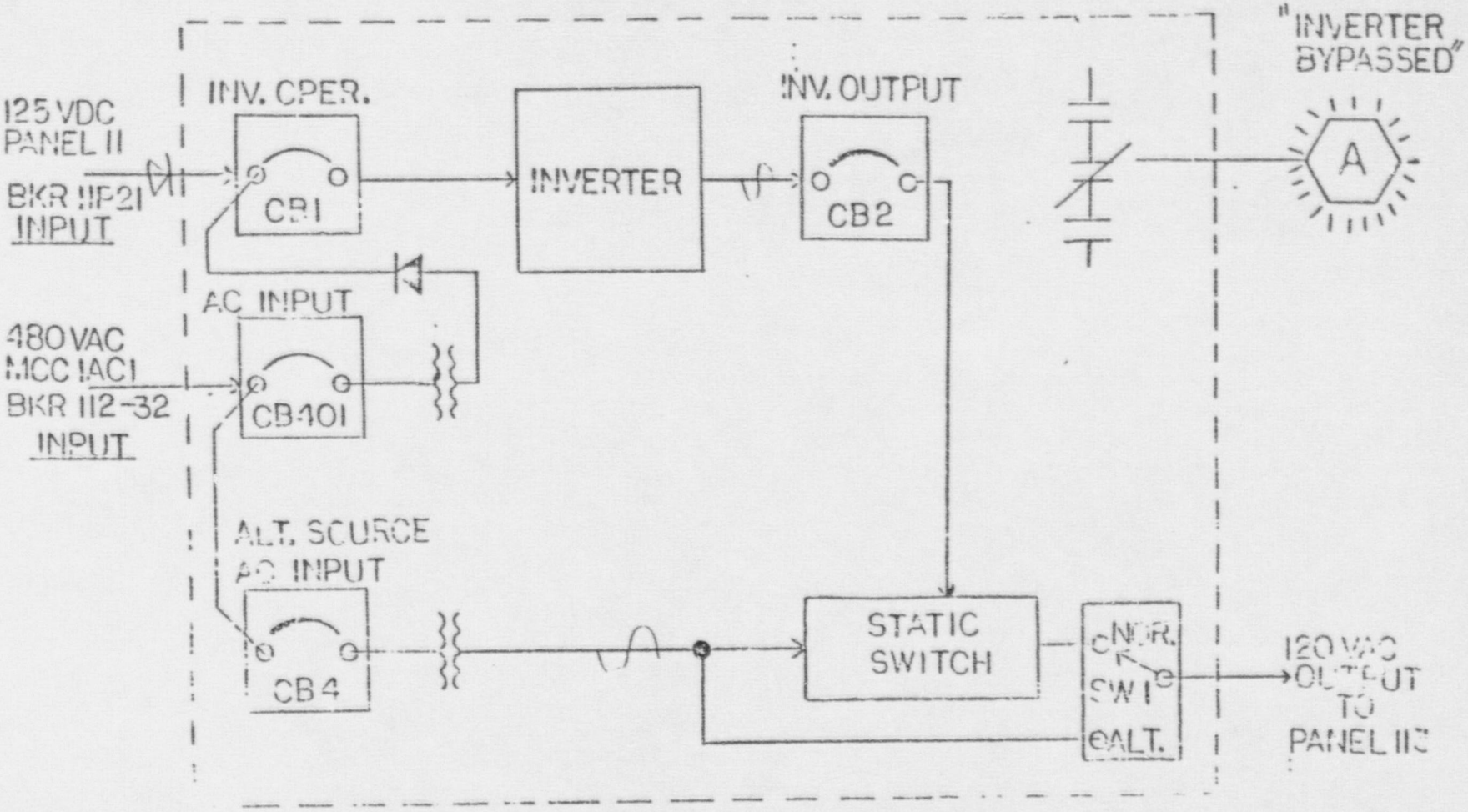
If the fault is located internal to the breaker, then the effect is the same as the case where the fault is downstream of the breaker and the breaker does not open on a fault.

The instrumentation inverter is actually an uninterruptable power supply whose output is fed to a Static Transfer Switch (see Figure 1). If the circuit breaker opens prematurely, the Static Transfer Switch automatically transfers the load to the alternate 120VAC source which is generated from the 480VAC source that supplies the inverter, through an alternate AC source breaker. This operation is completely automatic. An annunciator will notify operators that the inverter has been bypassed, either automatically, indicating inverter trouble, or manually when the unit is being tested or maintained. This prevents any breaker malfunction from going unnoticed.

Should a fault occur and the breaker fail to open, the upstream breaker (CB1) will open and cause the static transfer switch to switch as before.

INVERTER

BLOCK DIAGRAM



TYPICAL FOR ALL FOUR INVERTERS

FIGURE 1

In the unlikely occurrence that the entire #12 inverter is lost due to a failure of the CB2 breaker, plant safety will not be affected. This is because the inverter provides power to only one of four plant instrumentation channels (channel A). Technical Specification 3.5 allows continuous operation of the plant with the remaining three channels (maintaining a degree of redundancy of two). Thus, plant safety will not be diminished by loss of the inverter. Further, as Figure 2 shows, an alternate power supply to the #12 inverter loads is possible by manual alignment of power to panel 112 from panel 117 (permitted by tech. specification 3.7), thus restoring the instrumentation.

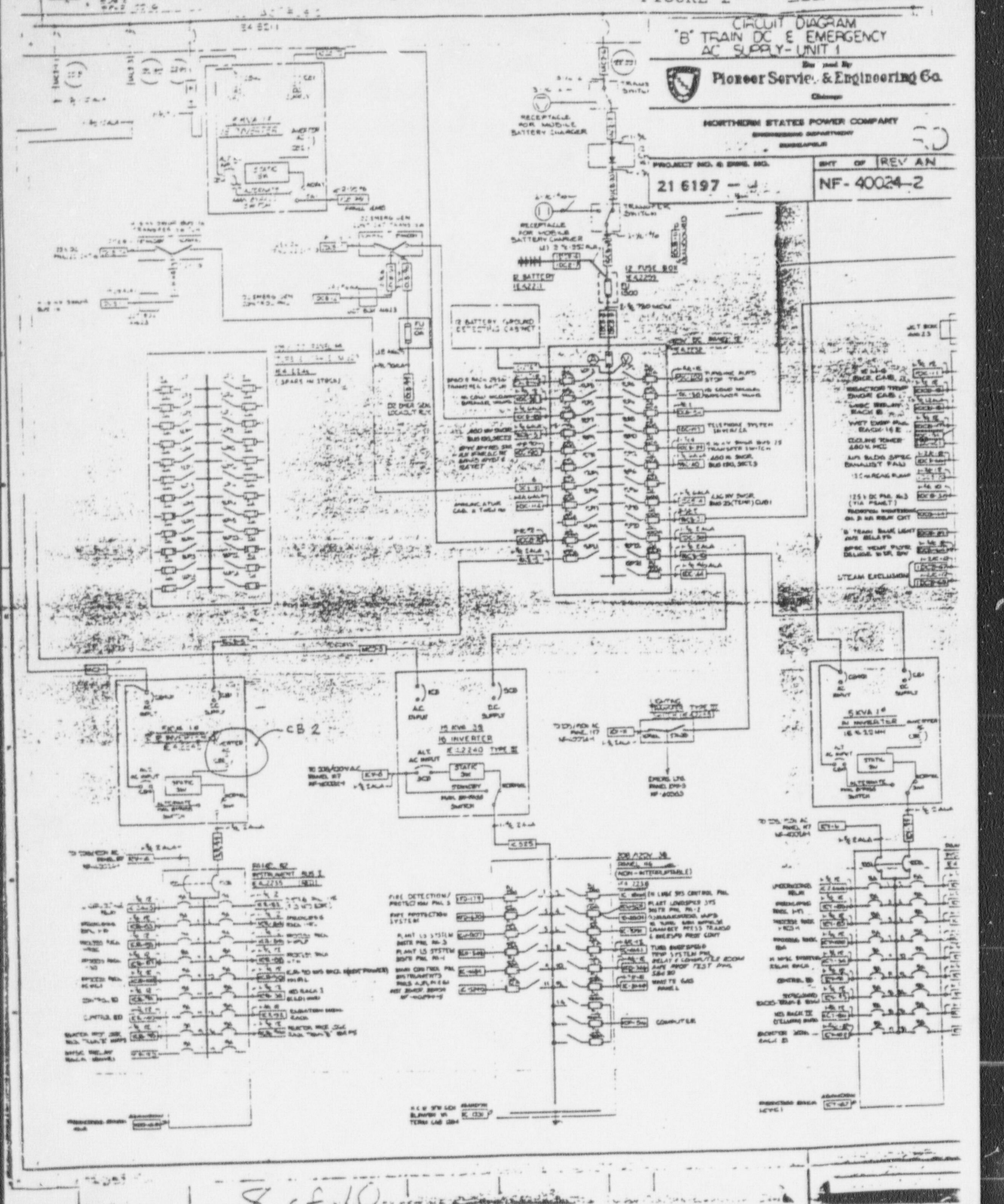
In the extremely unlikely occurrence of the concurrent malfunction of the #12 inverter output breaker and a loss of all AC power, plant safety would still be assured, since this is essentially the same scenario as loss of the inverter. Again, technical specification 3.5 allows operation of the plant with the three remaining instrumentation panels.

In the summary, the following possible occurrences and the safety analysis are:

OCCURRENCE	SAFETY ANALYSIS	SAFETY CONCERN
Breaker opens prematurely	Inverter power switches to alternate	NO
Breaker fails to open on fault	Upstream breaker provides protection	NO
Breaker causes entire inverter panel failure	Operation without one channel permitted by Technical Specification, manual transfer to alternate power (per tech. spec. 3.7)	NO
Breaker failure prevents transfer during loss of all AC	Operation without one channel permitted by technical specification 3.5	NO

Thus, the failure of the #12 inverter output breaker will not adversely impact the ability to safely operate the plant.

FIGURE 2


CIRCUIT DIAGRAM
"B" TRAIN DC & EMERGENCY
AC SUPPLY - UNIT 1
Pioneer Service & Engineering Co.
NORTHERN STATES POWER COMPANY
PROJECT NO. & DWG. NO.
21 6197
REV AN
NF-40024-2
RECEPTACLE FOR MOBILE BATTERY CHARGER
12 BATTERY
12 FUSE BOX
12 BATTERY GROUND DETECTING CABINET
CB 2
15 KVA 1Φ
15 INVERTER
STATIC SW
ALTERNATE
STANDBY
MAN. BYPASS SWITCH
5 KVA 1Φ
INSTRUMENT BUS II
NON-INTERRUPTABLE
COMPUTER
STEAM EXCLUSION

TRACEABILITY SEARCH

The #12 inverter AC voltage output breaker is a Westinghouse model QC 2100 MCCB. The only independent documentation indicating the source of the MCCB is a packing list, recording the shipment of the breaker from Westinghouse Electric Supply Co. in St. Paul, MN. This is insufficient documentation to completely verify traceability per the requirements of the 88-10 bulletin. However, there is no evidence at this time that this breaker was not a fully operative and legitimate MCCB at the time of delivery.

INSTALLATION AND WORK HISTORY

Upon installation of this MCCB in September of 1986, a thorough test for operability and proper tripping was performed. Since that time no abnormal occurrences are known to be associated with this circuit breaker.

DISPOSITION OF OTHER UNTRACEABLE CIRCUIT BREAKERS

I. Unit Two Circuit Breaker 226-33, G.E. Model THED 136015 WL (breaker to motor for valve MV-32235-RHR Letdown Valve to CVCS)

Since establishing traceability or replacement with a qualified spare was not possible at this time, this breaker was procedurally removed from service during plant operation. This motor valve is required to provide a pressure source for the purification function when the plant is at low pressure during startup and shutdown. Efforts are ongoing to procure a qualified spare to replace this circuit breaker.

II. Unit One Pressurizer Heater Alternate Power - Bus 180/MCC 1R1 G.E. Model THED 136070 WL.

Further research indicated that this circuit breaker does not have a safety-related function. No further action or analysis is necessary.

III. Unit One Battery Charger and Unit Two Feedwater Isolation Valve Motor Circuit Breakers - G.E. Model THED 136050 WL.

For the Unit Two FW isolation valve, a qualified, traceable replacement circuit breaker was on hand at Prairie Island for this application. Breaker replacement for the feedwater isolation valve motor circuit breaker has occurred (WR #M3292). No further action or analysis is required.

Further research indicated that the Unit One #11 Battery Charger breaker has been replaced by a THEF model evaluated previously in Safety Evaluation #252, dated 11/11/88. No further action is required.

IV. Unit One Steam Generator Blowdown Motor Valve G.E. Model THED 136030 WL Circuit Breaker.

A qualified, traceable replacement circuit breaker was on hand at Prairie Island. This breaker was replaced by the qualified spare (WR #N3609 EBQ) and no further actions or analysis is required.

PROCUREMENT OF REPLACEMENTS

Negotiations are ongoing to procure fully qualified, traceable replacement circuit breakers for these applications. Once obtained, these circuit breakers will be installed as necessary to replace untraceable breakers as the plant operating schedule permits. Long lead times for these items make accurate prediction of replacement dates impossible.