123 Main Street
White Plains, New York 10
914 681.6200

New York Power Authority

October 31, 1984
IPN-84-50

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

SUBJECT: Indian Point 3 Nuclear Power Plant (IP-3)
Docket No. 50-286
Engineered Safeguards Features Modification

A meeting was held in the Bethesda offices of the NRC Staff on September 11, 1984 during which our respective Staffs discussed modifications to the IP-3 Engineered Safeguards Features. The modifications are necessary to ensure that a full compliment of Engineered Safeguards Features is available for accident mitigation assuming the failure of Battery No. 32 followed by a postulated loss-of-coolant accident with offsite power available. The modification is designed to mitigate, in addition to other concerns, the postulated loss of power to 480 Volt Bus 3A and 6A caused by the assumed failure of Battery No. 32 and the sequence of events identified by Brookhaven National Laboratory.

The attachments to this letter provide the information requested by the NRC staff during the September 11, 1984 meeting regarding the subject modification. The attachment contains a description of the proposed final modification, the bases supporting it and the safety evaluation of the modification performed in accordance with 10 CFR 50.59. The safety evaluation concludes that this modification does not constitute an unreviewed safety question. The information contained in the attachment is currently under review in accordance with the Power Authority's administrative procedures. In the event the review of this material results in technical revisions, the Authority will advise the Staff promptly.

In fulfullment of the Staff's request at the meeting, the Power Authority has reviewed Regulatory Guide 1.41, "Preoperational Testing of Redundant On-Site Electric Power Systems to Verify Proper Load Group Assignments." The Authority has compared the guidance

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PDR ADOCK 05000286
P PDR

A001
1/1

provided in Regulatory Guide 1.41 to the actual preoperational test program conducted at IP-3. While the plant was not committed to the provisions outlined in the Regulatory Guide, the preoperational test program was submitted to, and approved by the NRC Staff (at that time the Atomic Energy Commission Staff) as documented in the September 21, 1973 Safety Evaluation Report.

The functional and operational test performed as part of preoperational testing verified that the on-site electrical distribution system and equipment was capable of performing its design function. It involved actual operation of the system and equipment under design or simulated conditions. The preoperational testing confirmed continuity, circuit integrity, and the correct and reliable functioning of the electrical apparatus. The preoperational testing did not test the on-site electric distribution system successively in the various combinations of power systems and load groups with all D-C and on-site A-C sources for one load group at a time disconnected.

The Authority intends to conduct testing to verify the operability of the modification and to ensure the modified system functions as designed. The objectives of this test will be to:

- o verify Diesel Generator Breaker 52/EG1 auxiliary switch and cell switch functions,
- o verify Tie Breaker 52/2AT3A closure on loss of power to Bus 3A,
- o verify load shed of lighting transformer and De-Icing Pump 31 from Bus 2A through breakers 52/LTIN and 52/DI1, respectively, with loss of power to Bus 3A, and
- o verify that Tie Breaker 52/2AT3A does not close on loss of power to Bus 2A with Bus 3A energized.

The Authority considers this testing satisfactory based on the following:

1. The modification described herein is not considered a major modification to the electrical distribution system.
2. The functional test to be performed on the system will verify that the equipment and system will operate correctly under its design or simulated design conditions.
3. The existing surveillance requirements of the Technical Specifications verify the correct operation and performance of the system as credited in the Technical Specification Bases and Final Safety Analysis Report. These tests are performed during each refueling outage.

4. In developing this modification, the Authority and its consultants have conducted reviews of the electrical distribution system design and its operation under various conditions which precludes the need for full system testing such as that described in Regulatory Guide 1.41.

5. A test performed in strict accordance with the guidance contained in Regulatory Guide 1.41 would present additional challenges to the Engineered Safeguards System and the Electric Power Systems that could place the plant in an undesirable configuration.

The final test procedure will be available on-site for review by the Resident Inspector.

We trust you find the attached information responsive to your requests. Should you or your staff have any questions regarding this matter please contact Mr. P. Kokolakis of my staff.

Very truly yours,

J. P. Bayne
First Executive Vice President
Chief Operations Officer

cc: Resident Inspector's Office
Indian Point Unit 3
U. S. Nuclear Regulatory Commission
P. O. Box 66
Buchanan, New York 10511

Attachment 1 to IPN-84- 47

Final Modification to Engineered Safeguards Features to Mitigate Potential Consequences of Battery No. 32 Failures

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286

NEW YORK POWER AUTHORITY
Indian Point No. 3 Nuclear Power Plant

CLASSIFICATION REQUEST

CLAS-84-03-083-EL, Rev. 0
NUMBER

Subject: Control Circuit Modification for 480V Switchgear Breakers 52/2AT3A, 52/LTIN and 52/DI-1

Requested By/Date

For Technical Services Department Reply

A. The system being installed/modified

X is
____ is not

listed in the QA Manual

B. The subject job has been determined to be

X Category I
____ Non-Category I
____ Category I with Non-Category I boundaries
____ Category M

C. The subject job

____ does
X does not

change the FSAR

Distribution:
QA Superintendent

Prepared by/Date
Reviewed
Tech. Serv. Engr./Date

Approved
Tech. Serv. Supr./Date

AP-12 REV. 8

ATTACHMENT 1

NEW YORK POWER AUTHORITY

INDIAN POINT NO. 3 NUCLEAR POWER PLANT

CATEGORY I

MODIFICATION PROCEDURE

Number: 84-03-083-EL - Rev. 0

Title: Control Circuit Modification for 480V Switchgear Breakers 52/2AT3A, 52/LTIN and 52/DI-1.

Purpose: The purpose of this modification is to ensure a backup power source to 480 volt Bus 3A, from Station Service Transformer No. 2A, via 480V Bus 2A to 3A Tie Breaker 52/2AT3A.

Prepared By: _____

Reviewed By: _____
Technical Services Engineer

Reviewed By: _____
Technical Services Superintendent

Reviewed By: _____
Engineering (Cagegory I & Category M only)

Reviewed By: _____
Quality Assurance (Category I & Category M only)

Reviewed By: _____
PORC (Category I and Category M only)

Approved By: _____ _____
Superintendent of Power Date

MOD 84-03-083-EL

CONTROL CIRCUIT MODIFICATION FOR 480V SWITCHGEAR BREAKERS

52/2AT3A, 52/LTIN & 52/DI-1

A. Scope

This modification covers removing the Emergency Generator 31 breaker (52/EG1) closure auxiliary contact (52a/EG1) and cell switch contact (33H/EG1) from the Bus 2A to 3A tie breaker (52/2AT3A) closing circuit. It also involves adding a signal for Bus 3A under-voltage into the Normal Lighting Feeder Breaker(52/LTIN) and De-Icing Pump No. 31 (52/DI-1) Feeder Breaker trip circuit.

B. Reference Documents

1.	Safety Evaluation	NSE-84-03-83-EL Rev. 0		
2.	Classification	CLAS-84-03-83-EL Rev. 0		
3.	Electrical Workmanship Std. Manual	EI-6009 Rev. 1		
4.	Test Procedure	ENG-136, Rev. 0		
5.	UE&C Drawings	9321-05-31173	Sht. 4,	Rev. 7
		9321-05-31173	Sht. 13,	Rev. 9
		9321-05-31173	Sht. 14,	Rev. 10
		9321-05-31173	Sht. 16,	Rev. 7
		9321-05-31173	Sht. 17,	Rev. 5
		9321-F-31683		Rev. 5
		9321-F-32183		Rev. 13
		FP9321-05-3263	Sht. 7	Rev. 0
		FP9321-05-3867		Rev. 7
		FP9321-05-3868		Rev. 9
		FP9321-05-3869		Rev. 7
		6604-248-L-1		Rev. 0
		6604-248-L-2		Rev. 0
		6604-248-L-3		Rev. 0
		6604-248-L-4		Rev. 0
		6604-248-L-5		Rev. 0
		6604-248-L-6		Rev. 0
		6604-248-L-7		Rev. 0
		6604-248-LL-8		Rev. 0
		6604-248-LL-9		Rev. 0
		6604-248-LL-10		Rev. 0
6.	Sketch	SK-MP-84-03-83-1		Rev. 0

C. Pre-requisites

1. The electrical work is Category I and is governed by the Authority's Quality Assurance Program. As such, all work shall be performed in accordance with the Authority's Adminsitrative Procedures and Quality Assurance Procedures, and shall include but may not necessarily be limited to the following requirements:

   a. Prior to use of any materials or components which fall under the Quality Assurance Program, these items shall be receipt inspected in accordance with Quality Assurance Procedure 7.3 by the Authority Quality Control Department.

   b. Prior to performing any work, a work request and clearance shall be approved by the Operations Department per AP-9 and AP-10.

   c. Prior to the start of work, the Authority Quality Control Supervisor shall be notified.

   d. Prior to the start of installation, the plant should be in a cold shutdown condition.

   e. Any field changes to drawings shall be processed in accordance with AP-12.

2. The following activities should be performed prior to installation of this plant modification. These recommended activities are performed to provide personnel and plant safety.

   a) Defeat auto start of Emergency Generator 31 at the Diesel Isolation Switch Cabinet (Node KH2).

   b) Verify that Bus 2A to 3A tie breaker (52/2AT3A) is open. Lock out breaker 52/2AT3A.

   c) Verify that Bus 3A to 6A tie breaker (52/3AT6A) and Bus 2A to 5A tie breaker (52/2AT5A) have been locked open.

   d) Energize suitable replacement for running loads on Bus 3A and Bus 2A.

   e) NOTE: Before performing step e, verify plant conditions will not be degraded.
   Trip the running loads on Bus 3A and Bus 2A.

f) De-energize 480V Switchgear Bus 3A by opening and locking out 6900V Switchgear Breaker 52/SS3.

g) De-energize 480V Switchgear Bus 2A by opening and locking out 6900V Switchgear Breaker 52/SS2.

h) De-energize 480V Switchgear Bus 2A and 3A control circuits by removing fuses. Verify circuits are de-energized.

i) Verify existing wiring configuration for switchgear wiring (See SK-MP-84-03-83-1)

D. Precautions and Limitations

1. This modification will be performed on existing electrical equipment.

2. This modification procedure will include directions to de-energize the circuits to be modified both for personnel safety and equipment protection. De-energization must be verified prior to actually working on the circuits. Although the circuits being worked on will be de-energized, live exposed circuits at the 125V DC and 480V 3 phase AC level may exist in the work area. Normal plant safety practices should be followed while working at or around electrical circuits.

3. The following is the recommended procedure to install this modification.

   a. Disconnect leads for the EG1 permissive in the 2AT3A tie breaker close circuit (Dwg 6604-248-L-2, 6604-248-L-4, 6604-248-LL-9).

   b. Add wire jumper to replace disconnected permissive from Step 3 a. above (Dwg 6604-248-L-3, 6604-248-LL-8, 6604-248-LL-9).

   c. Add wire leads to provide 480V Switchgear Bus 3A under-voltage trip to the lighting feeder breaker 52/LTIN (Dwgs. 6604-248-L-1, 6604-248-L-6, & 6604-248-LL-9).

   d. Add wire leads to provide 480V Switchgear Bus 3A under-voltage trip to de-icing pump No. 31 feeder breaker 52/DI1 (Dwgs. 6604-248-L-1, 6604-248-L-5, 6604-248-LL-9).

   e. Disconnect and remove jumper across auxiliary switch contacts stabs 29 and 30 on $\frac{52a}{EG1}$. (Ref. Jumper Log entry No. 630).

   f. Perform testing requirements identified in section H.

   g. Restore plant to condition as determined by Shift Supervisor.

E. Installation Documents

1. UE&C Drawings

6604-248-L-1	Rev. 0
6604-248-L-2	Rev. 0
6604-248-L-3	Rev. 0
6604-248-L-4	Rev. 0
6604-248-L-5	Rev. 0
6604-248-L-6	Rev. 0
6604-248-L-7	Rev. 0
6604-248-LL-8	Rev. 0
6604-248-LL-9	Rev. 0
6604-248-LL-10	Rev. 0

F. Material Requirements

The material requirements for this modification shall be supplied in accordance with the Bill of Materials shown on UE&C drawing 6604-248-LL-9. Procurement responsibility shall be IP-3 Maintenance Department.

G. Welding Requirements

None

H. Test Requirements

Perform operational and functional test of electrical circuitry in accordance with ENG-136, Rev. 0

I. Documents to Be Revised

UE & C	9321-05-31173	Sht. 4
	9321-05-31173	Sht. 13
	9321-05-31173	Sht. 14
	9321-05-31173	Sht. 16
	9321-05-31173	Sht. 17
	9321-F-31683	
	9321-F-32183	
	FP9321-05-3263	Sht. 7
	FP9321-05-3867	
	FP9321-05-3868	
	Indian Point Probabilistic Safety Study	
NYPA	Logic Diagram 5651072 Sht. 7	

AP-12, Rev. 8, Attachment 3

New York Power Authority

Indian Point No. 3 Nuclear Power Plant

Modification Package Review and Comment Sheet

_____
Date

TO:	Technical Services - Superintendent	X
	Operations (PORC)	X
	Maintenance	N/A
	Quality Assurance	X
	Radiation Safety	N/A
	Security & Safety	Safety
	I&C	N/A
	Engineering (NYPA)	X
	Superintendent of Power	X
	Fire Protection Superintendent	X
	Safety Review Committee (SRC)	X
	Nuclear Regulatory Committee (NRC)	X

FROM: Technical Services Engineer

SUBJECT: Modification Pagkage - 84-03-(later)-EL - Rev. 0

TITLE: _____

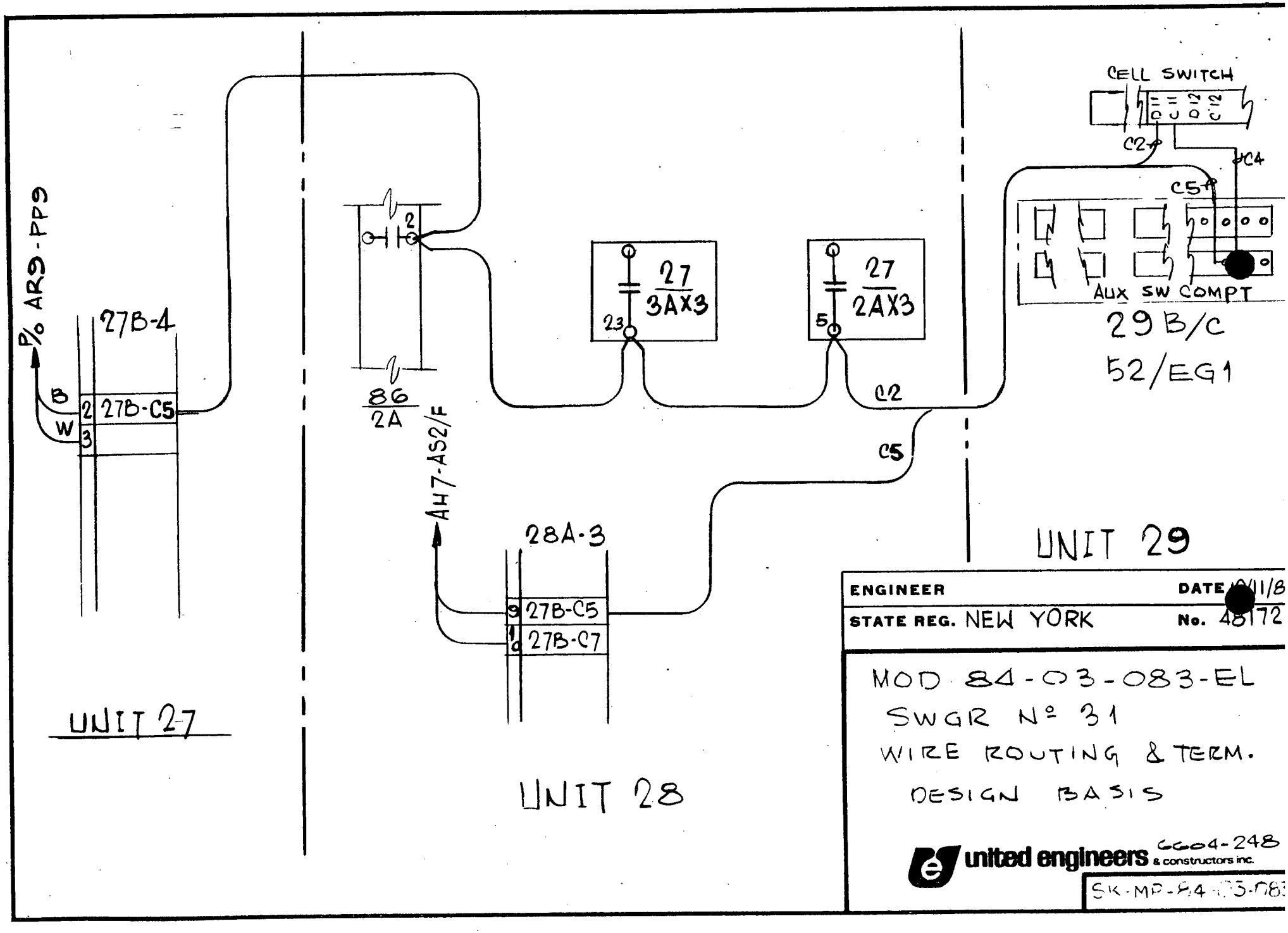
The subject modification is forwarded to you, for your review. Please attach any comments you may have, and indicate whether or not you consider an unreviewed safety question is involved. You should also indicate whether you believe the proposed modification renders the FSAR or subsequent safety analysis invalid, adversely effects the plant's environmental impact, or degrades the overall fire safety program, or the security system. Check boxes, as appropriate.

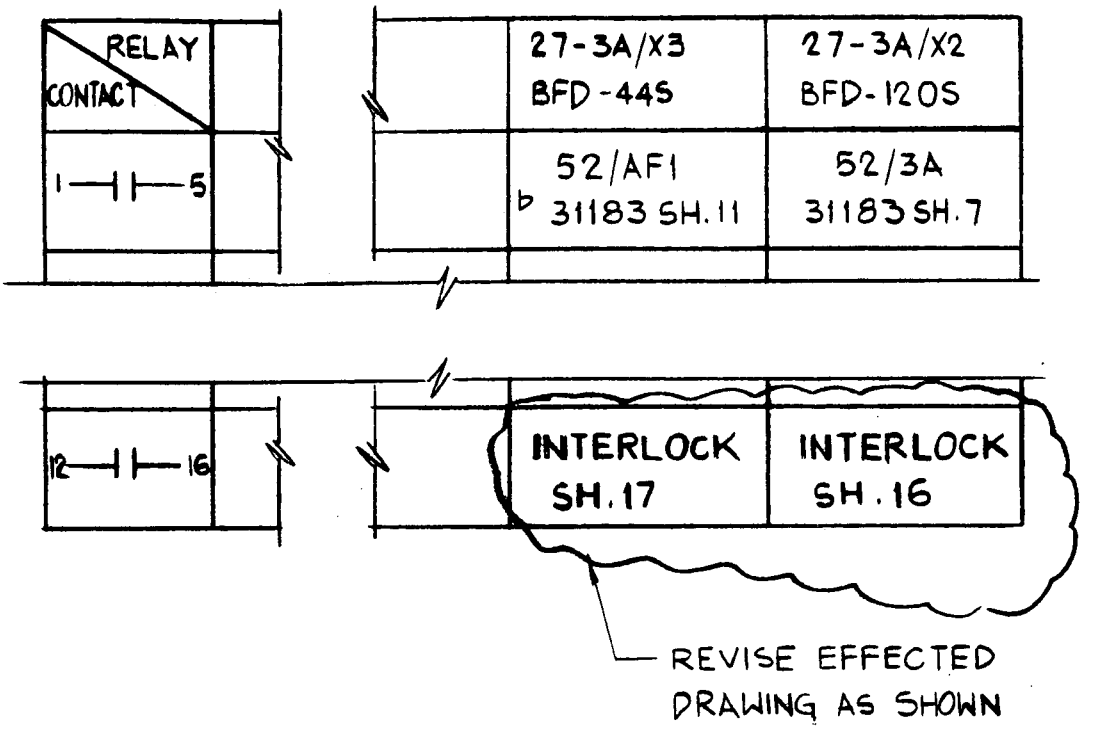
Return comments to: _____

By: _____

_____
Technical Services Engineer

Comments Resolved _____ Date: _____


P/O AR9-PP9
27B-4
B
W
2
3
27B-C5
86
2A
2
AH7-AS2/F
27
3AX3
23
27
2AX3
5
C2
C5
28A-3
9
10
27B-C5
27B-C7
UNIT 27
UNIT 28
CELL SWITCH
C2
C4
C5
AUX SW COMPT
29 B/C
52/EG1
UNIT 29
ENGINEER
DATE
STATE REG. NEW YORK
No. 48172
MOD 84-03-083-EL
SWGR Nº 31
WIRE ROUTING & TERM.
DESIGN BASIS
united engineers & constructors inc.
6604-248
SK-MP-84-03-083



NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº 3
WAH-151

SAFETY RELATED ITEM

DWG. EFFECTED 9321-LL-31173 SH. 4

ENGINEER Ronald W. [illegible] DATE 10/11/84

STATE REG. NEW YORK NO. 48172

SCHEMATIC DIAGRAM

480V SWITCHGEAR 31

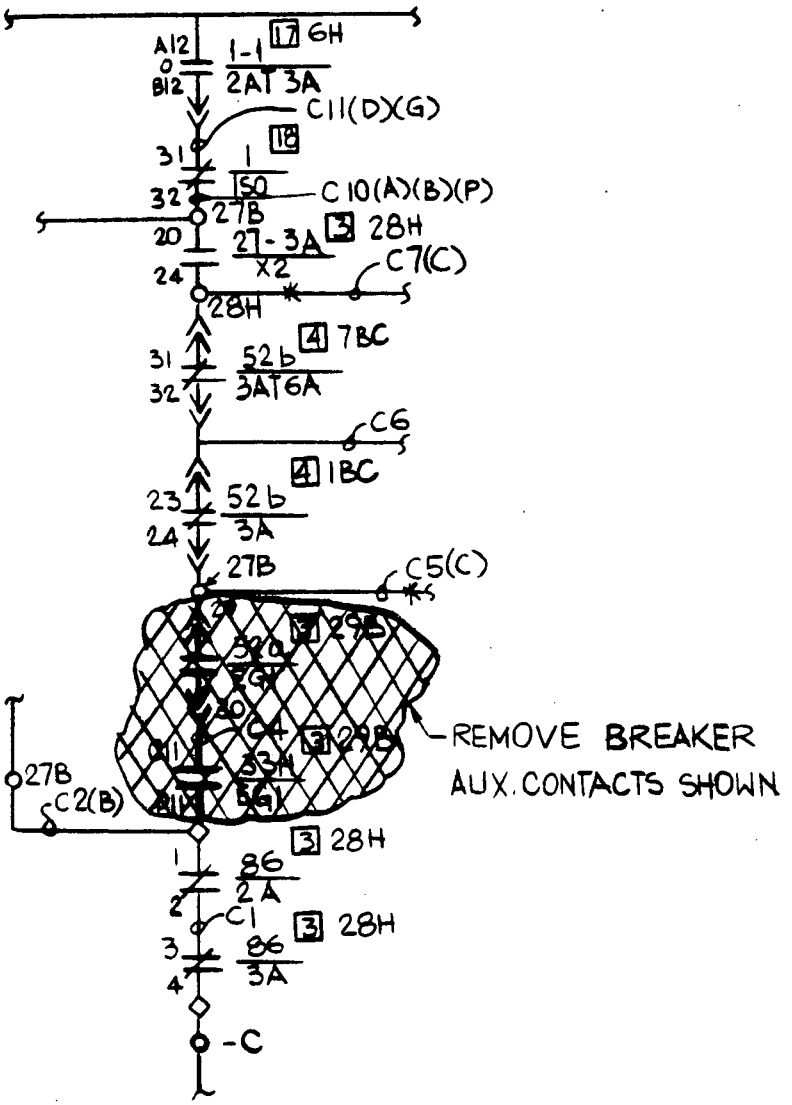
REV. NO.	DATE	CHK'R	ENGR
	10/11/84	DWG JOB	JES JSS
		D.S.	SDE

united engineers & constructors inc.

6604-248-L-1

8.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT

REV.	PIEC. NUCL	STRUCT	INSTR	QAE
0	[illegible]	JCFIORELLO	[illegible]	[illegible]



WORK THIS DRAWING
WITH 6604-248-LL-9

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT NO. 3
WAH-151

SAFETY RELATED ITEM

DWG. EFFECTED 9321-LL-31173 SH. 13

ENGINEER Ronald W. Barton DATE 10/11/84
STATE REG. NEW YORK NO. 48172

SCHEMATIC DIAGRAM

480V SWITCHGEAR 31

BREAKER 52/2AT3A, BUS 2A-3A TIE
CONTACT REMOVAL

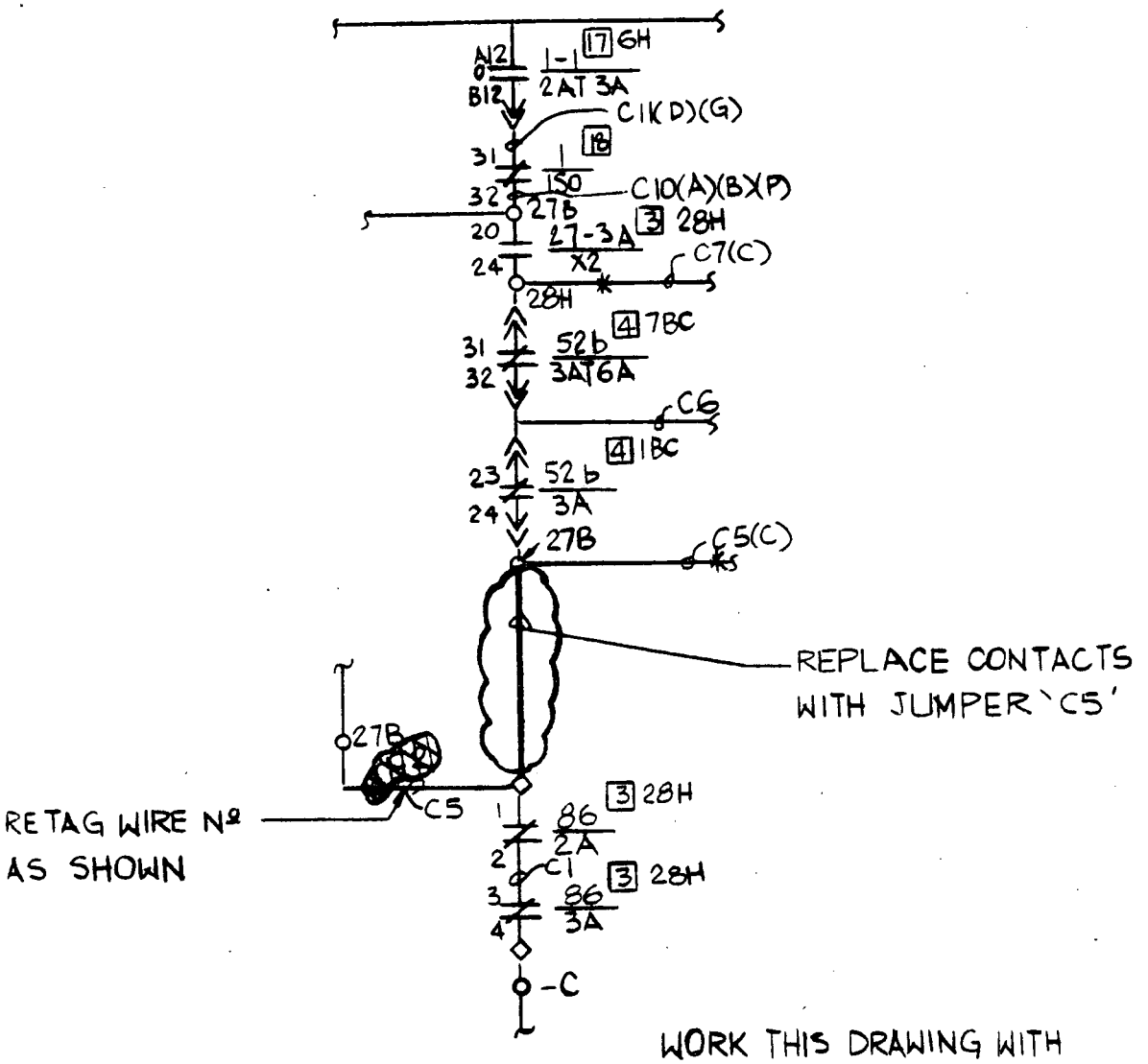
united engineers & constructors inc.

6604-248-L-2

REV. NO	DATE	CHK'R / D.S.	ENGR / SDE
	10/11/84	JOB	

REV.	MEC. NUC	STRUCT	INSTR	QAE
0		NC FIORELLI		

8.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT



WORK THIS DRAWING WITH
6604-248-LL-8
6604-248-LL-9

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº3
WAH-151

SAFETY RELATED ITEM

DWG. EFFECTED 9321-LL-31173 SH. 13

ENGINEER Ronald W. Barton DATE 10/11/84

STATE REG. NEW YORK NO. 48172

SCHEMATIC DIAGRAM

480V SWITCHGEAR 31

BREAKER 52/2AT3A, BUS 2A-3A TIE
JUMPER ADDITION

united engineers & constructors inc.

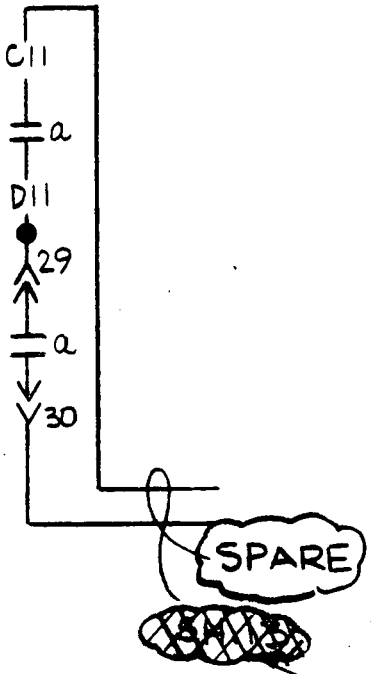
REV. NO	DATE	CHK'R / D.S.	ENGR / SDE
	10/11/84	JOB	

6604-248-L-3

REV	MEC. NUCL	STRUCT	INSTR	QAE
0	J.L. Simon	J.C. Fiorello		

6.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT

33



REVISE EFFECTED DRAWING AS SHOWN

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº 3
WAH-151

S
SAFETY RELATED ITEM

DWG. EFFECTED 9321-LL-31173 SH. 14

ENGINEER Ronald W. Barton DATE 10/11/84

STATE REG. NEW YORK NO. 48172

SCHEMATIC DIAGRAM

480V SWITCHGEAR 31

BREAKER 52/EG1, EMERG. GEN. 31

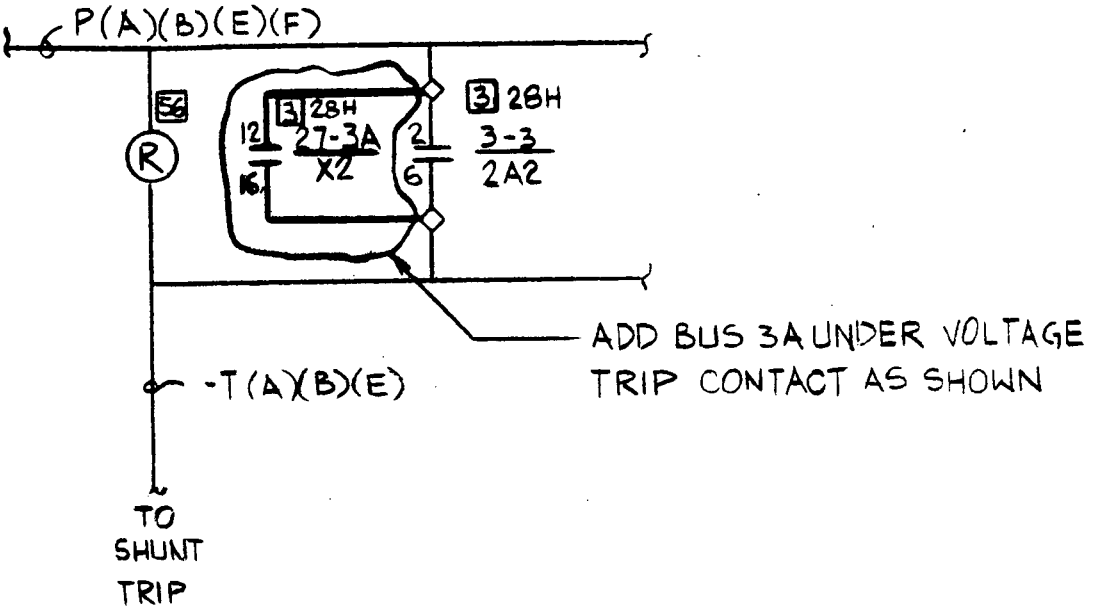
united engineers & constructors inc.

6604-248-L-4

REV. NO.	DATE	CHK'R / D.S.	ENGR / SDE
	10/11/84	DWB / JOB	[illegible]

REV	MEC NUCL	STRUCT	INSTR	QAE
0	[illegible]	JCFIORELLO	[illegible]	RPD

8.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT



WORK THIS DRAWING WITH
6604-248-LL-9

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT No 3
WAH-151

S
SAFETY RELATED ITEM

DWG
EFFECTED 9321-LL-31173 SH.16

ENGINEER Ronald W. Barton DATE 10/11/84
STATE REG. NEW YORK NO. 48172

SCHEMATIC DIAGRAM
480V SWITCHGEAR 31
BREAKER 52/DI1,
DE-ICING PUMP 31

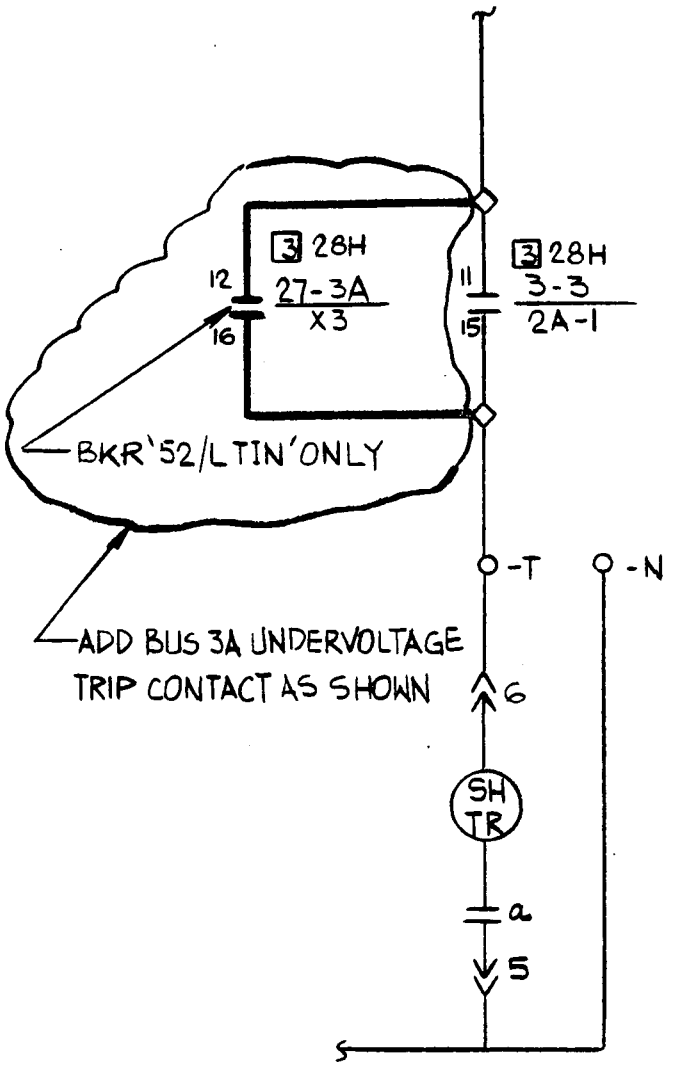
REV. NO.	DATE	CHK'R / D.S.	ENGR / SDE
	10/11/84	DWG / JOB	JES / JES

united engineers & constructors inc.

6604-248-L-5

REV.	MEC. NUCL	STRUCT	INSTR	QAE
0	[illegible]	JCFiorello	[illegible]	RPD

8.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT



WORK THIS DRAWING WITH
6604-248-LL-9

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº3
WAH-151

SAFETY RELATED ITEM

DWG. EFFECTED 9321-LL-31173 SH.17

ENGINEER Ronald W. Barton DATE 10/11/84

STATE REG. NEW YORK NO. 48172

SCHEMATIC DIAGRAM

480V SWITCHGEAR 31

52/LTIN-FLOODLIGHT(NORMAL FEED) 290KVA

REV. NO.	DATE	CHK'R / D.S.	ENGR / SDE
	10/11/84	DWG / JOB	JES / JES

united engineers & constructors inc.

6604-248-L-6

REV	MEC. NUCL	STRUCT	INSTR	QAE
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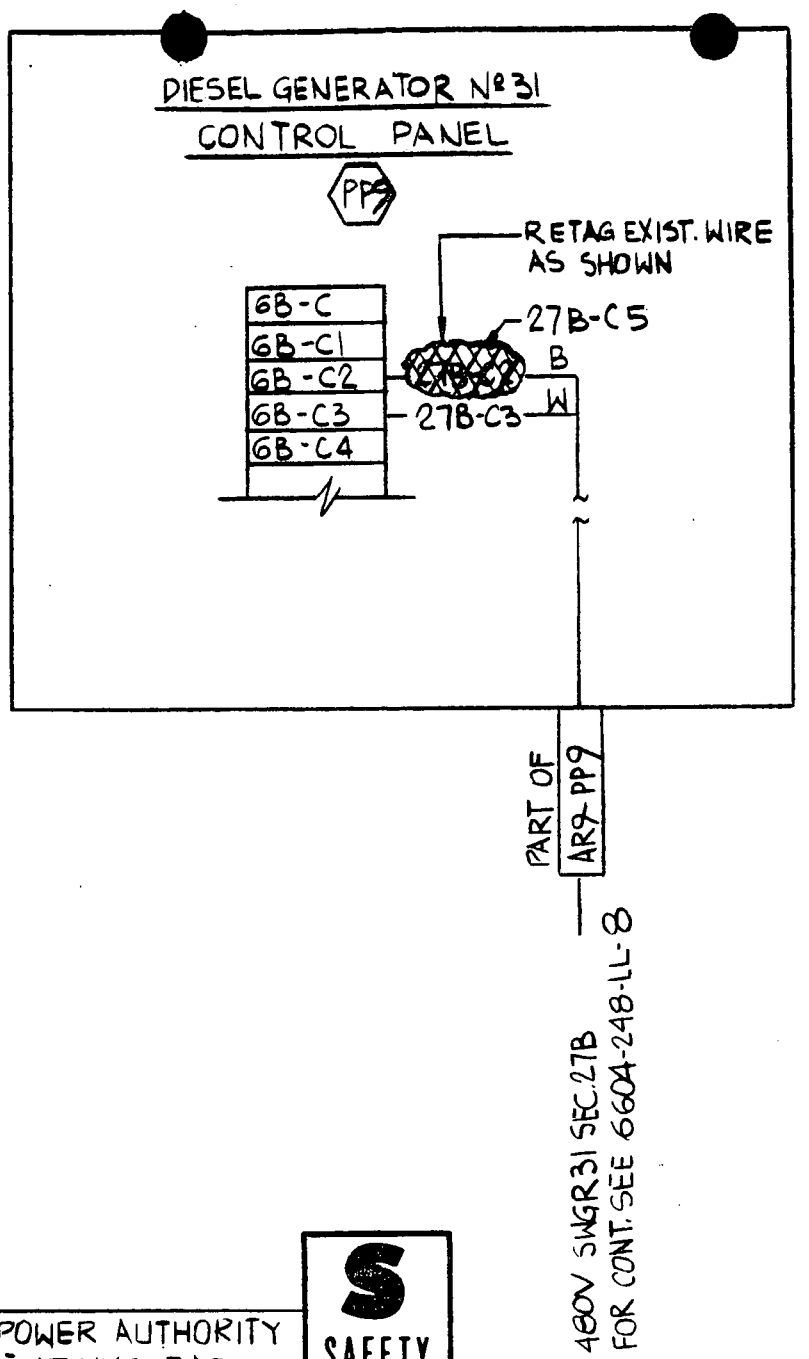
6.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT



NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº 3
WAH-151

SAFETY RELATED ITEM

DWG. EFFECTED 9321-F-32183-13

ENGINEER Ronald W. Barton DATE 10/11/84

STATE REG. NEW YORK NO. 48172

WIRING DIAGRAM
DIESEL GENERATORS 31
CONTROL PANEL

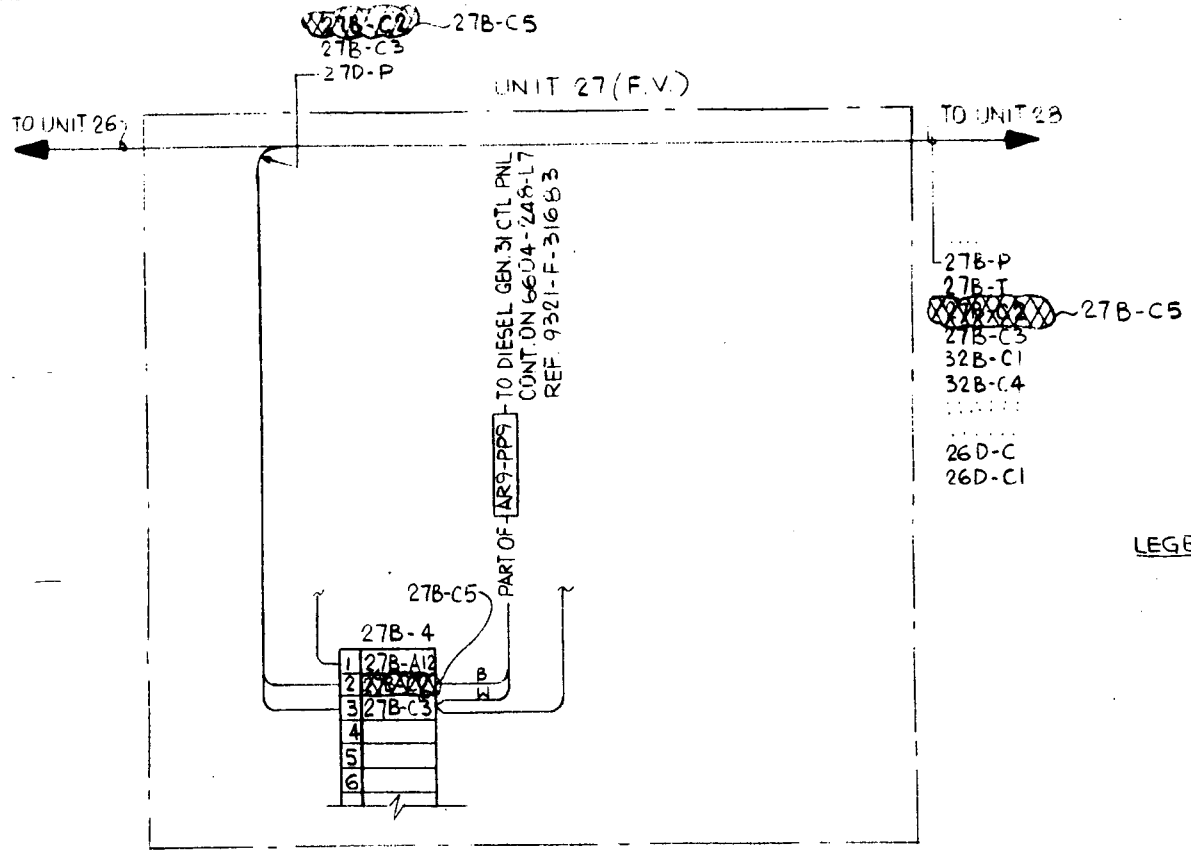
united engineers & constructors inc.

6604-248-L-7

REV. NO.	DATE	CHK'R / D.S.	ENGR / SDE
	10/11/84	DWG / JOB	7FS / 7JJ

REV	MEC. NUCL	STRUCT	INSTR	QAE
0	[illegible]	[illegible]	[illegible]	PPO

8.511-12 MAGNETICS 2-82 ARKWRIGHT 204-1AT



LEGEND: DENOTES EXISTING WIRE NUMBER TO BE RETAGGED.

9321-F-31683-5
DWG. EFFECTED F.P. 9321-05-3867

ENGINEER Ronald W. Barton DATE 10/11/84
STATE REG. NEW YORK NO. 48172

SAFETY RELATED ITEM

CONNECTION DIAGRAM
480V SWITCHGEAR Nº 31
BUS 2A, UNIT 27
TERMINAL BLOCK MARKING MODIFICATION
MOD 84-03-083-EL

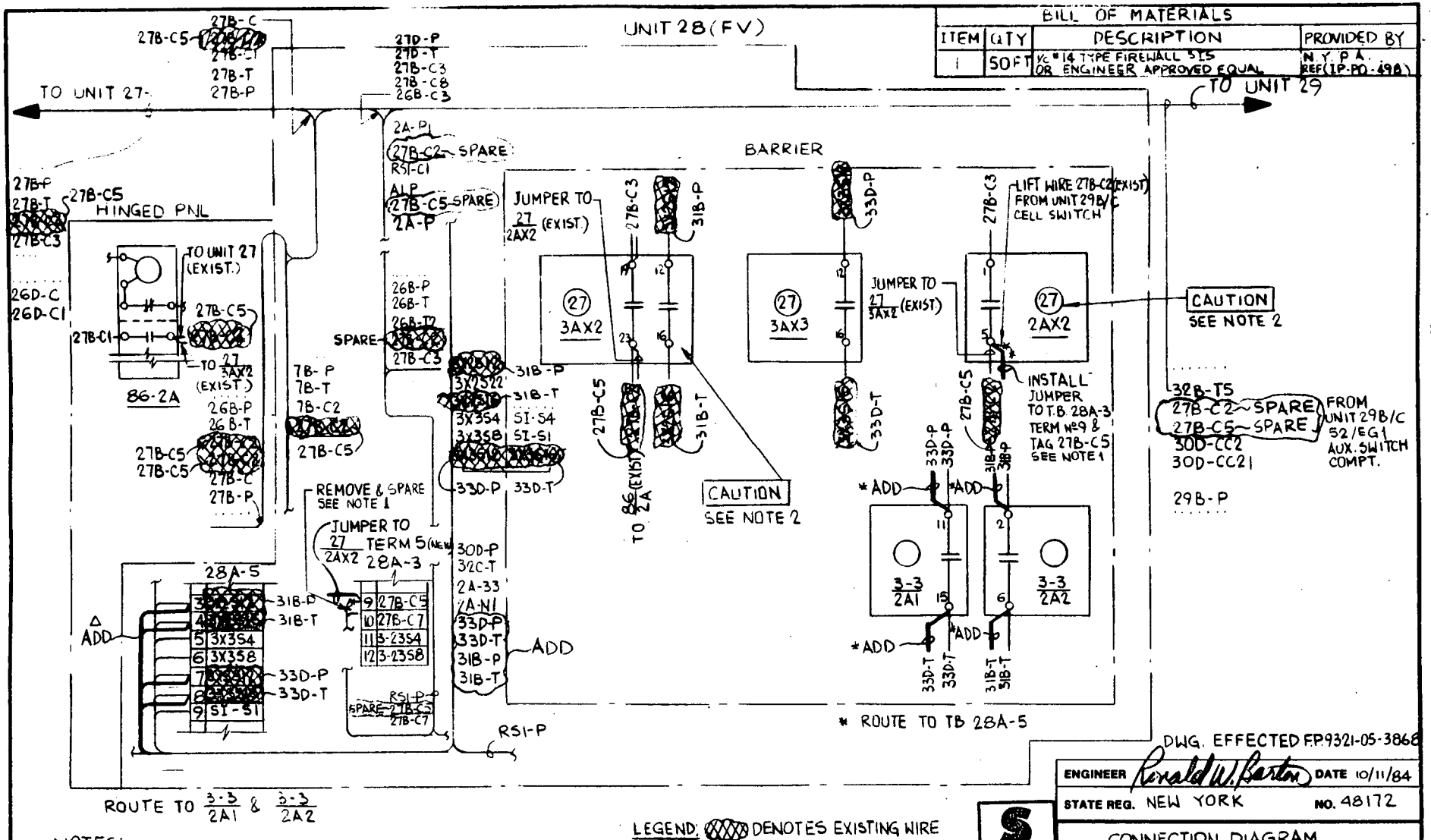
united engineers & constructors inc

6604-248-LL-8

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº3
WAH-151

REV. NO.	DATE	DESCRIPTION	CHK'R D.S	ENGR SDE
	10/11/84	FIRST ISSUE FOR CONSTRUCTION		

REV	MEC. NUCL	STRUCT	INSTR	QAE
0				



BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	PROVIDED BY
1	50 FT	1/2" #14 TYPE FIREWALL SIS OR ENGINEER APPROVED EQUAL	N.Y.P.A. REF (IP-PO-498)

DWG. EFFECTED FP9321-05-3868

ENGINEER Ronald W. Barton DATE 10/11/84

STATE REG. NEW YORK NO. 48172

NOTES:

1. SPARED WIRES ARE TO BE TAPED ON END & ISSOLATED
2. WIRE ROUTING & TERMINATION TO BE VERIFIED PRIOR TO INSTALLATION OF MODIFICATION; ALSO SEE SK-MP-84-03-083-1 PRIOR TO WORKING ON RELAYS 27/3AX2 & 27/2AX2.

LEGEND: DENOTES EXISTING WIRE NUMBER TO BE RETAGGED
INDICATES NEW WIRING
INDICATES EXIST. WIRING

SAFETY RELATED ITEM

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR GENERATING STATION UNIT Nº3
WAH-151

REV. NO.	DATE	DESCRIPTION	CHK'D	ENG'R
0	10/11/84	FIRST ISSUE FOR CONSTRUCTION	D.S.	SDE

REV | MECH | ELEC | STRUCT | INSTR | QAE

CONNECTION DIAGRAM
480V SWITCHGEAR Nº31
BUS 2A, UNIT 28
WIRING MODIFICATIONS
MOD 84-03-083-EL

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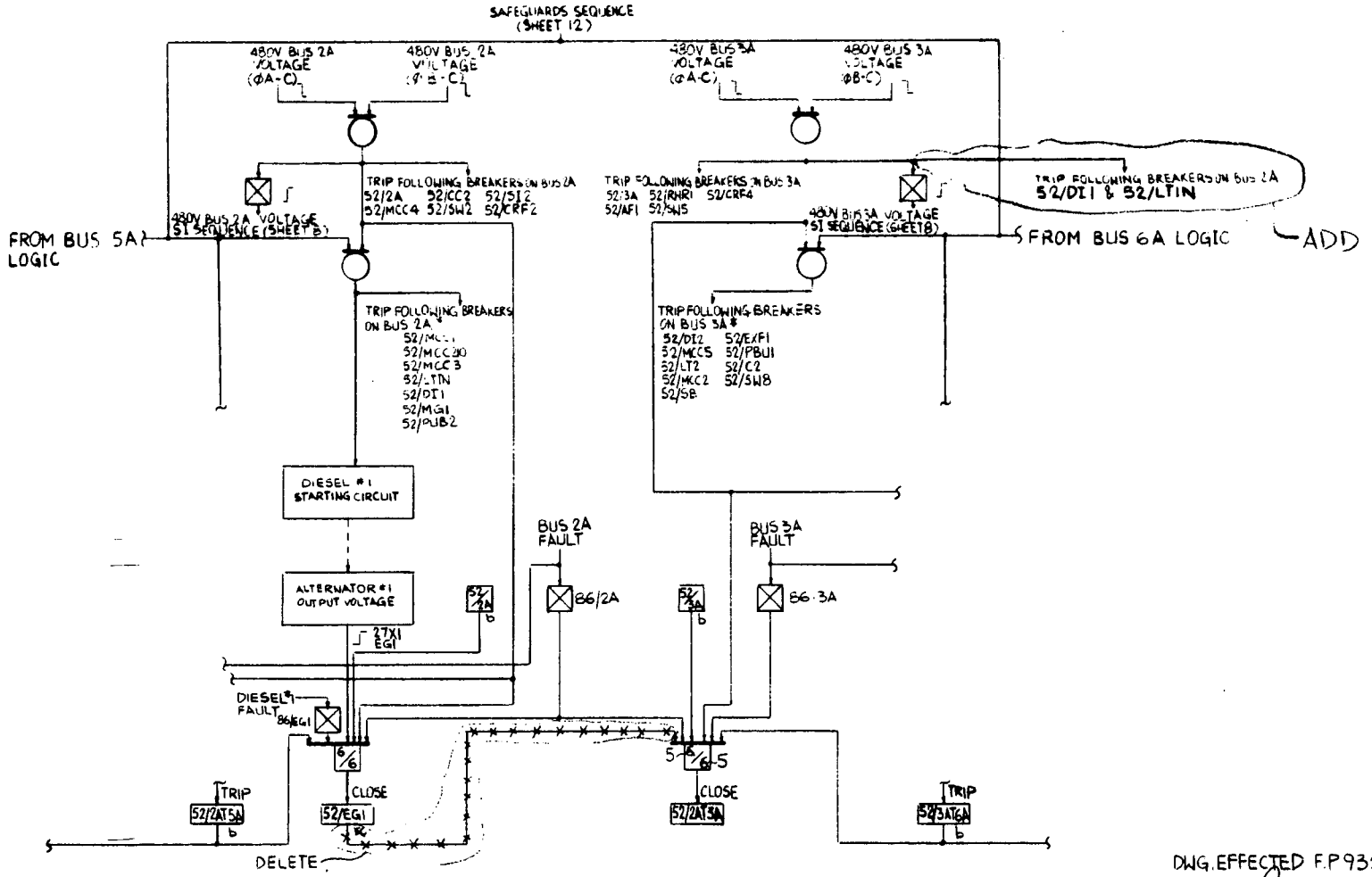

DWG. EFFECTED F.P 9321-05-3263 SH.7

ENGINEER Ronald W. Barton DATE 10/11/84

STATE REG. NEW YORK NO. 48172

SAFETY RELATED ITEM

LOGIC DIAGRAM
INDIAN POINT UNIT Nº3
EMERGENCY GEN STARTING
& 480V BUS CLEARING
52/2AT3A MODIFICATION
MOD 84-03-083-EL

united engineers & constructors inc

6604-248-LL-10

NEW YORK POWER AUTHORITY
INDIAN POINT NUCLEAR
GENERATING STATION UNIT Nº3
WAH-151

REV. NO.	DATE	DESCRIPTION	CHK'R	ENGR
	10/11/84	FIRST ISSUE FOR CONSTRUCTION		

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NEW YORK POWER AUTHORITY
Indian Point No. 3 Nuclear Power Plant

REQUEST FOR NUCLEAR SAFETY EVALUATION

NSE-84-03-083-EL, Rev. 1
NUMBER

Subject: Control Circuit Modification for 480V Switchgear Breakers 52/2AT3A, 52/LTIN and 52/DI-1

Requested by/Date

For Technical Service Department Reply

A. The proposed Installation, Test or Modification:

1. ( ) Does (X) Does not - Increase the probability of occurrence or consequences of an accident or malfunction of structures, systems, or components important to safety previously evaluated in the FSAR.

2. ( ) Does (X) Does not - Create the possibility of an accident or malfunction of safety-related structures, systems, or components of a different type than any previously evaluated in the FSAR.

3. ( ) Does (X) Does not - Reduce the margin of safety as defined in the basis for Technical Specification.

4. ( ) Does (X) Does not - Involve a change in the Technical Specifications.

5. ( ) Does (X) Does not - Degrade the Security Plan or the Detection and Suppression Systems of the Fire Protection System.

6. ( ) Does (X) Does not - Affect the environmental impact of the plant.

7. ( ) Does (X) Does not - Involve an unreviewed safety question

Prepared by/Date

Review
Tech. Serv. Engr./Date

Approved
Tech. Serv. Supr./Date

Reviewed
PORC/Date

Distribution:
SRC Chairman
PORC Chairman
Q.A. Superintendent

I. Purpose

This evaluation is being performed to determine if the following modifications meet the design criteria of the plant Electrical and Engineered Safeguards Systems.

a) Removal of the EG1 breaker auxiliary contacts from the 52/2AT3A breaker control circuit
b) Addition of bus 3A undervoltage trip signals to the 52/LTIN and 52/DI-1 breaker control circuits.

II. Description

General Design Criterion 17 requires that the on-site power system be designed to permit functioning of structures, systems and components important to safety. The safety function of the on-site power system is to provide sufficient capacity and capability to assure that:

1) Specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences.

2) The core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

The acceptability of the on-site power system, with regard to redundancy, is based on conformance to the same degree of redundancy required of safety related components and systems required by General Design Criteria (GDC)-33, -34, -35, -38, -41, and -44; namely:

> "Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capability shall be provided to assure that, for on-site electric power system operation (assuming off-site power is not available), and for off-site electric power operation (assuming on-site power is not available), the system safety function can be accomplished assuming single failure."

In the original design configuration, the tie breaker between Bus 2A and Bus 3A (52/2AT3A) would not close unless the following conditions were satisfied:

1) Control switch in the "Auto" position
2) Isolation switch closed
3) Undervoltage on bus 3A
4) 52/3AT6A tie breaker open
5) 52/EG1 diesel generator supply breaker closed
6) 52/3A feeder breaker open
7) No fault condition on bus 2A
8) No fault condition on bus 3A

Supply Breaker 52/EG1 will close only when an undervoltage condition exists in Bus 2A, i.e., the normal supply to 480 volt Bus 2A is not available.

The modification removed the requirement that 52/EG1 diesel generator supply breaker be closed in order to close 52/2AT3A tie breaker when an undervoltage condition exists in 480 volt Bus 3A.

The modification entailed the following changes to the electrical system:

1) Remove the two N.O. (normally open) contacts (52a/EG1 and 33H/EG1) in the 480 volt switchgear 31 52/2AT3A tie breaker control circuitry.

2) Add Bus 3A undervoltage trips in the control circuitry of the Normal Lighting feeder breaker and De-Icing Pump 31 feeder breaker control circuitry.

The requirement for item No. 2 above is to ensure that the Station Service Transformer No. 2 is not overloaded. The loading of Station Service Transformer No. 2A was evaluated for the worst case loading that could result from this modification. The evaluation's initial conditions were:

1) MCC 210 was not a connected load to Bus 2A but can be connected to the bus by direct operator action.

2) De-icing Pump 31 was a connected load to Bus 2A, and

3) Station Service Transformer No. 2A normal rating is 2000 KVA and forced cooling rating is 2666 KVA.

The results of this evaluation indicate that additional loads should be stripped off Bus 2A to ensure that Station Service Transformer No. 2A is not loaded above its forced cooling rating. The load for the normal Lighting Feeder (52/LTIN) was selected to be stripped off Bus 2A because:

1) It reduced the worst case loading on Station Service Transformer No. 2A to below the forced cooling rating,

2) It has an emergency back up that would power the lighting transformer independent of this condition, and

3) It is considered a non-essential load for engineered safeguards.

As part of the modification, the loads associated with De-Icing Pump 31 and the normal lighting feeder will be stripped off Bus 2A on an undervoltage condition on Bus 3A, as stated above. The load associated with MCC 210 is administratively controlled to maintain its breaker open.

A voltage study was performed based on the conditions assumed in the evaluation (i.e., with MCC 210 and De-Icing Pump 31 disconnected), and its results verify that the voltage will not degrade below that required to start the safety related equipment on Busses 2A and 3A.

The modification does not reduce the degree of conformance to the applicable separation and redundancy criteria required for the electrical system and safeguards systems and does not degrade the reliability nor the capability of these systems.

III. Evaluation

The evaluation of this modification has considered the following scenarios:

1) Failure of Battery 32 and a subsequent safety injection signal, with off-site power available.

2) Failure of Battery 32 and a subsequent safety injection signal coincident with loss of off-site power (LOOP).

3) Safety injection signal without single failure, with off-site power available.

4) Safety injection signal coincident with LOOP, but without single failure.

5) Safety injection signal coincident with LOOP and a single failure of the tie breaker (52/2AT3A).

6) Safety injection signal and a single failure of the tie breaker (52/2AT3A).

7) Loss of off-site power and a single failure of the tie breaker (52/2AT3A), without unit trip.

8) Loss of off-site power without single failure, and without unit trip.

9) Loss of off-site power and a single failure of the modified tie breaker (52/2AT3A), with unit trip.

10) Loss of off-site power without single failure, with unit trip.

11) Unit trip and a single failure of the modified tie breaker (52/2AT3A), with off-site power available.

The automatic sequence of events for each of the scenarios is as follows:

Scenario No. 1

- Battery No. 32 fails
- A safety injection signal is generated
- Diesels start/Unit trips
- Loads are stripped from the emergency buses and load sequencing is started
- 125 volt d-c Bus 32 is de-energized
- 480 volt a-c Bus 6A loses control power
- 6.9 KV breakers UT3, UT3-ST6, UT4 and UT4-ST6 become inoperable
- 480 volt a-c Bus 3A is de-energized

Scenario No. 1 (Cont.)

- Tie Breaker 52/2AT3A closes on under-voltage in 480 Volt a-c Bus 3A
- 480 Volt a-c Bus 3A is re-energized from 480 Volt a-c Bus 2A
- Accident mitigation can be safely achieved with Buses 5A, and 2A/3A supplying emergency power since only 2 of the 3 bus groups are required for accident mitigation.

Scenario No. 2

- Battery No. 32 fails
- A safety injection signal is generated, coincident with LOOP
- Diesels start/Unit trips
- Loads are stripped from the emergency buses and load sequencing is started
- 125 volt d-c Bus 32 is de-energized
- 480 volt a-c Bus 6A loses control power
- 6.9 KV breakers UT3, UT3-ST6, UT4 and UT4-ST6 become inoperable
- Breaker 52/EG1 closes on 480 volt a-c Bus 2A
- Breaker 52/2AT3A closes on 480 volt a-c Bus 3A
- Accident mitigation can be safely achieved with Buses 5A, and 2A/3A supplying emergency power since only 2 of the 3 bus groups are required for accident mitigation.

Scenario No. 3

- A safety injection signal is generated
- Diesels start/Unit trips
- Loads are stripped from the emergency buses and load sequencing is started
- 480 volt a-c buses 2A and 3A transfer to backup power supplies (off-site sources)
- Diesel generator output breakers remain open
- Tie Breaker 52/2AT3A remains open
- Accident mitigation can be safely achieved with Buses 5A, 6A, and 2A/3A supplying emergency power. Only 2 of the 3 Bus groups are required for accident mitigation, with the third Bus providing an increased margin of safety.

Scenario No. 4

- A safety injection signal is generated, coincident with LOOP
- Diesels start/Unit trips
- Loads are stripped from the emergency buses and load sequencing is started
- Diesel generator output breakers close on under-voltage in their respective buses (5A, 6A and 2A)
- Tie Breaker 52/2AT3A closes on 480 volt a-c Bus 3A
- Accident mitigation can be safely achieved with Buses 5A, 6A and 2A/3A supplying emergency power. Only 2 of the 3 Bus groups are required for accident mitigation, with the third Bus providing an increased margin of safety.

Scenario No. 5

- A safety injection signal is generated coincident with LOOP
- Diesel start/Unit trips
- Loads are stripped from the emergency buses and load sequencing is started
- Diesel generator output breakers close on under-voltage in their respective buses (5A, 6A and 2A)
- Tie Breaker 52/2AT3A fails to close (single failure)
- Accident mitigation can be safely achieved with Buses 5A, 6A and 2A supplying emergency power. Only 2 of the 3 Bus groups are required for accident mitigation, with the third Bus providing an increased margin of safety.

Scenario No. 6

- A safety injection signal is generated
- Diesels start/Unit trips
- Loads are stripped from the emergency buses and load sequencing is started
- Diesel generator output breakers remain open
- 480 volt a-c buses 2A and 3A transfer to backup power supplies (off-site)
- Tie Breaker 52/2AT3A closes while Buses 2A and 3A are energized (single failure)
- 480 volt Buses 2A and 3A may de-energize
- Accident mitigation can be safely achieved with Buses 5A and 6A supplying emergency power since only 2 of the 3 Bus groups are required for accident mitigation.

Scenario No. 7

- Off-site power is lost
- Diesels 32 and 33 start
- Loads are stripped from emergency Buses 5A and 6A and load sequencing is started
- Diesel generator output breakers close on undervoltage to Buses 5A and 6A
- Diesel generator output breaker 52/EG1 remains open
- Tie Breaker 52/2AT3A closes while Buses 2A and 3A are energized (single failure)
- 480 volt Buses 2A and 3A may de-energize
- Unit may trip. If unit trips, Diesel Generator 31 starts but output breaker 52/EG1 remains open
- Reactor shutdown can be safely achieved with Buses 5A and 6A supplying emergency power since only 2 of the 3 Bus groups are required for shutdown.

Scenario No. 8

- Off-site power is lost
- Diesels 32 and 33 start
- Loads are stripped from emergency Buses 5A and 6A and load sequencing is started
- Diesel generator output breakers close on under-voltage to Buses 5A and 6A
- Tie breaker 52/2AT3A remains open
- Reactor operation can be maintained or the reactor can be safely shutdown with Buses 5A, 6A, 2A and 3A, or if unit is tripped; Buses 2A and 3A are fed from diesel generator 31, and the reactor can be safely shut down, with Buses 5A, 6A, and 2A/3A supplying emergency power. Only 2 of the 3 Bus groups are required for safe shutdown with the third Bus providing an increased margin of safety.

Scenario No. 9

- Off-site power is lost/unit trips
- Diesels start
- Loads are striped from emergency buses and load sequencing is started
- Diesel generator output breakers close on under-voltage
- Tie Breaker 52/2AT3A fails to close (single failure)
- Reactor can be safely shut down, with Buses 5A, 6A and 2A supplying emergency power. Only 2 of the 3 Bus groups are required for safe shutdown, with the third Bus providing an increased margin of safety.

Scenario No. 10

- Off-site power is lost/Unit trips
- Diesels start
- Loads are stripped from emergency buses and load sequencing begins
- Diesel generator output breakers close on undervoltage
- Tie Breaker 52/2AT3A closes on 480 volt a-c Bus 3A
- Reactor shutdown can be safety achieved with Buses 5A, 6A and 2A/3A supplying emergency power. Only 2 of the 3 Bus groups are required for accident mitigation, with the third Bus providing an increased margin of safety.

Scenario No. 11

- Unit trips
- 6.9 KV Buses 1, 2, 3 and 4 fast transfer to 6.9 KV Buses 5 and 6
- Tie Breaker 52/2AT3A closes while Buses 3A and 2A are energized (single failure)
- 480 volt a-c Buses 2A and 3A may de-energize
- Reactor shutdown can be safely achieved with Buses 5A and 6A supplying emergency power since only 2 of the 3 Bus groups are required for safe shutdown.

The above scenarios assume, where applicable, that the normal lighting feeder breaker and deicing pump 31 trip on undervoltage on Bus 3A as part of the modification.

In addition to the scenarios postulated in the evaluation, the other accident/transient scenarios previously analyzed have been verified to remain applicable, since neither the failure of Battery 32 nor the failure of Tie Breaker 52/2AT3A (which are considered as independent single failure events following the modification) are the sequence of events which can be postulated for any other failure scenario in the IP-3 electrical system.

Specifically, the condition characterized by a unit trip and a safety injection signal followed by a partial loss of offsite power, wherein the main breaker is deenergized, the loads trip, the tie breaker closes and the loads are restarted in the sequential loading mode, has been evaluated and found acceptable.

As evidenced in the development of each scenario, the modification is acceptable based on the following conclusions:

A. This modification will not increase the probability of an occurrence or consequences of an accident or malfunction of equipment important to safety previously evaluated in the FSAR.

B. This modification does not create the possibility of an accident or malfunction of any type other than those previously evaluated in the FSAR.

C. This modification does not reduce the margin of safety as defined in the basis for the Technical Specifications.

D. This modification does not involve a change in the Technical Specifications.

E. This modification does not affect the environmental impact of the plant.

F. This modification does not degrade the Security Plan or the Fire Detection and Suppression Systems.

It is therefore concluded that this modification does not involve an unreviewed safety question.

References

The following references have been utilized in the preparation of this safety evaluation:

1) NUREG-0800, Standard Review Plan, Section 8.3.2, Rev. 2, July 1981.

2) Indian Point 3 Updated FSAR (through July 1984) pages 1.3-22 through 1.3-25, 8.2-4 through 8.2-6, 8.2-14 through 8.2-18, Tables 8.2-1 and 8.2-2, and Figures 8.2-4 through 8.2-9.

3) Indian Point 3 Technical Specifications, Section 3.7 (as revised through Amendment 34).