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NINE MILE POINT NUCLEAR STATION UNIT 2

ELECTRICAL PREVENTIVE MAINTENANCE PROCEDURE

PROCEDURE NO. N2-EPM-GEN-R520

"AC" LIMITORQUE OPERATORS (TYPE SMB, SB, AND SMC)
AND ASSOCIATED MOTOR CONTROL CENTER (MCC) UNIT

FOR INFORMATION ONLY

APPROVALS	SIGNATURES	DATE AND INITIALS REVISION 2	REVISION 3	REVISION 4
Site Superintendent Maintenance-Nuclear W. C. Drews	_____	MJF for JCD 2/1/89	_____	_____
Station Superintendent NMPNS Unit 2 R. B. Abbott	RB Abbott	2/1/89 RBA	_____	_____
General Superintendent Nuclear Generation J. L. Willis	[signature]	2/3/89	_____	_____

Summary of Pages

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1,2,4,7-12	February 1991 (TCN-17 and Publication Change *2)
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THIS PROCEDURE IS A GENERAL REWRITE.
NIAGARA MOHAWK POWER CORPORATION

THIS PROCEDURE NOT TO BE USED AFTER February 1993 SUBJECT TO PERIODIC REVIEW.

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"AC" LIMITORQUE OPERATORS (TYPE SMB, SB, AND SMC) AND ASSOCIATED MOTOR CONTROL CENTER (MCC) UNIT

1.0 PURPOSE

1.1 This procedure describes the steps necessary to perform a wiring, lubrication and cleaning inspection of the "AC" type Limitorque Operators, GE and ITE-Gould Motor Control Center (MCC) Units.

1.2 Applicability

This procedure is applicable to all Limitorque operators type SMB, SB, SMC and MCC units (refer to N2-EMP-GEN-517, Safety Related Limitorque Valve Listing, for safety related motor operated valves).

1.3 Frequency

Safety-Related EQ operators will be maintained at least once every two years. Remaining safety-related operators will be maintained at least once every four years. All other operators will be maintained as dictated by operating experience.

1.4 The Service Water Strainer Backwash valves (2SWP*MOV1A through 1F) will be maintained at or before the 1st refuel.

1.5 Quality Requirements

Safety Related, Non-Safety Related and quality program applies.

1.6 EQ and Safety Related Maintenance Requirements

1.6.1 The designated Limitorque operators listed in N2-EMP-GEN-517 are equipment qualified for a harsh and mild environment.

1.6.2 The EQ requirements of Equipment Qualification Required Maintenance 2MOV-1 are incorporated in this procedure, as applicable (refer to N2-EMP-GEN-517, Safety Related Limitorque Valve Listing, for safety related motor operated valves). *2

*2

*2

*2

2.0 REFERENCES

2.1 AP-3.3.2, "Radiation Work Permit Procedure" *2

2.2 NMPC Accident Prevention Rules

2.3 AP-4.2 "Control of Equipment, Markups"

2.4 AP-6.1, "Control of Equipment, Temporary Modifications" *2

2.5 Limitorque Type HBC Instruction and Maintenance Manual, NMPC File Seq. # N20697

2.6 Limitorque Type SMB Instruction and Maintenance Manual, NMPC File Seq. # N20407

2.7 ITE-Gould Instruction Manual (MCC Breaker/Starter Units), NMPC File Seq. # N20121

2.8 GE Instruction Manual (MCC Brkr Units), NMPC File Seq. # N20585

2.9 EQRM 2MOV-1 Revision 00 *2

2.10 12177-EP-410, Motor Operated Valve Setpoints & Operation Data

2.11 Drawing EE-9AE, "Selection of Thermal Overload Relay Heaters"

2.12 AE-003, Overload Heater List

2.13 N2-EMP-GEN-517, "Safety Related Limitorque Operator Valve List"

2.14 FDDR No. KG1-5502, HPCS Valve Actuators

2.15 Problem Report 8406, Torquing of Limitorque Electrical Component Mounting Hardware

2.16 SER 18-88, T-Drain Problems *2

3.0 TECHNICAL SPECIFICATION

3.1 Section 3/4.6.3, Primary Containment Isolation Valves.

3.2 Table 3.6.3-1, Automatic Isolation Valves, and Remote Manual Isolation Valves.

3.3 As determined by SSS on an individual basis.

4.0 SPECIAL TOOLS, MATERIALS AND M&TE

4.1 M&TE

4.1.1 Megger (500/1000VDC)

4.1.2 Multimeter (DVOM)

4.1.3 Clamp-on Ammeter

4.1.4 Stopwatch

4.1.5 Grease Gun

4.1.6 Torque Wrench (45 - 155 in.-lb.) TCN-18

4.2 Materials

4.2.1 Lubricants:

4.2.1.1 Nebula Grease EP-1 or EP-0 (calcium base)

4.2.1.2 Sun Oil Co. 50 EP or EP-740 Grease (lithium lead base)

4.2.1.3 Exxon Beacon-325 Grease (less than 150°F)

4.2.1.4 Mobil 28 (greater than 150°F)

4.2.1.5 "Never Seez" Nickel Special

4.2.2 CRC - Lectra Cleaner

4.2.3 Geared Limit Switch Gear Box Cover Gasket (PC. #51)(93-10-893) TCN-18

4.3 Special Tools

4.3.1 Socket head Allen wrenches

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Always wear rubber gloves when working with equipment that may be possibly energized.

5.2 Do not file contacts.

5.3 Always use extreme care when engaging or disengaging a MCC unit from an energized bus.

5.4 Ensure that the work area is clean to prevent entry of dirt or other foreign matter into exposed valve internals.

5.5 When performing work on a valve inside/outside containment penetration, ensure that the associated penetration containment isolation valve is closed or as directed by SSS.

5.6 Do not oil or grease magnetic mating surfaces.

5.7 When adding grease to a limitorque operator or limit switch compartment, ensure the correct grease is added.

5.8 Keep breaker compartment door closed at all times (except when actually inserting or withdrawing circuit breaker/starter unit).

5.9 Personnel shall comply with the requirements of NMPC Accident Prevention Rules. Install Safety grounds to steel surface when testing.

5.10 Repeated operation can cause overload device actuation or motor damage. Motors are not rated for continuous duty.

5.11 AP-6.1 shall apply when lifting or relanding wires during plant normal operation or as required by SSS. *2

5.12 If any reportable problems are determined while performing maintenance on the equipment, notify both the Assistant Maintenance Supervisor and SSS to determine if an Occurrence Report should be initiated.

5.13 If the molded case breaker load or line terminations are lifted, reference N2-EPM-GEN-V582 for testing and retermination of the connections.

5.14 Limit switch and torque switch adjustments shall not be made.

5.15 Do not allow CRC-Lectra Clean to enter into station water systems, drains, etc.

6.0 PREREQUISITES Initials/Date

6.1 The Electrical Maintenance and Operations Department shall determine the plant conditions, system conditions and plant impact (See Step 6.4) on an individual basis prior to obtaining SSS permission. This should normally be completed as part of a staging process.

Plant Conditions _____

_____

System Conditions _____

_____

Ops _____/_____

Maint. _____/_____

		Initials/Date
6.2	Plant Conditions as stated in 6.1 acceptable. Maint.	____/____
6.3	System conditions as stated in 6.1 acceptable. Maint.	____/____
6.4	Obtain permission from SSS to start work. SSS	____/____

PLANT IMPACT:
1. MARKED-UP BREAKER/VALVE WILL NOT BE AVAILABLE FOR SERVICE.
2. LEADS ARE LIFTED AS TEMPORARY MODIFICATIONS.
3. WHERE MAINTENANCE IS TO BE PERFORMED ON DOUBLE ISOLATION VALVES, THE ONE ISOLATION VALVE TO BE WORKED ON WILL BE INOPERATIVE. THE OTHER ISOLATION VALVE SHALL BE MARKED-UP CLOSED UNLESS OTHERWISE DIRECTED BY THE SSS.
4. OTHER IMPACTS:_____

6.5	Notify CSO of intent to perform maintenance. CSO	____/____
6.6	Markups - Obtain markups per AP-4.2. No. _____ Maint.	____/____
6.7	Radiation Work Permit (RWP) - Obtain an RWP in accordance with AP-3.3.2, Radiation Work Permit Procedure, stating location and elevation of required permit. No. _____ ☐ N/A - No RWP Required Maint.	____/____
6.8	Notify QA for safety related or "Q" equipment. Maint.	____/____
6.9	Obtain ISI Open/Close stroke times. Open _____ sec. Close _____ sec. ☐ N/A - No ISI Requirements. Maint.	____/____
6.10	Obtain torque switch settings from approved design documents (Ref. 2.10, EP-410 drawings) and record:	

	Open	Close		
Recommended	____	____		
Maximum	____	____	Maint.	____/____

* 3

6.11	Personnel performing this procedure have read it in its entirety and are thoroughly familiar with its contents. Maint.	____/____

Equipment Piece No. _____ Initials/Date

6.12 Verify test equipment is currently calibrated and record the test equipment as used.

Test Equipment	I.D. No.	Cal. Due Date
Megger		
Multimeter		
Clamp-on Ammeter		
Stopwatch		

Maint. ____/____

6.13 Those steps in this procedure not performed or applicable due to a particular situation should be marked "NA" on the Data Sheets with explanations noted in the Remarks Section. Maint. ____/____

7.0 PROCEDURE

NOTE: 1. AP-6.1 shall apply when lifting or relanding wires.

2. The sequence of steps is not critical and may be performed separately or in parallel.

7.1 Starter/Breaker Unit Removal

WARNING:

INTERLOCKING CONTROL CIRCUITS FROM OTHER SOURCES MAY STILL BE ENERGIZED.

7.1.1 Check all termination points to ground to ensure the MCC unit has no energized wires. Maint. ____/____

7.1.2 Lift all external unit wiring and record on Attachment 10.1, Lifted Lead and Jumper Log.

WARNING:

WEAR RUBBER GLOVES WHEN INSERTING OR WITHDRAWING MCC BREAKER/STARTER UNIT.

7.1.3 Withdraw the starter/breaker unit from the MCC, taking care that unit does not drop as it is withdrawn. Maint. ____/____

Equipment Piece No. _____ Initials/Date

7.2 Starter/Breaker Cubicle

7.2.1	Clean the starter/breaker cubicle.	Maint.	____/____	
7.2.2	Check all cubicle hardware for tightness.	Maint.	____/____	*2
7.2.3	Check all terminations and connections for tightness and wiring for insulation deterioration.	Maint.	____/____	*2
7.2.4	Check the unit's stabs and stab openings (bus) for deformation and discoloration.	Maint.	____/____	
7.2.5	At the breaker compartment check the door interlock for proper operation.	Maint.	____/____	

7.3 Starter/Breaker Bucket

7.3.1	Check the molded case circuit breaker as follows:			
7.3.1.1	Check the breaker connections for discoloration or signs of arcing, ensuring a proper electrical joint. Clean connections as required.	Maint.	____/____	
7.3.1.2	Check the breaker casing for cracks/breaks.	Maint.	____/____	
7.3.1.3	Check trip adjustment to verify that it agrees with appropriate setting sheet. (refer to Reference 2.12) ☐ N/A - No Breaker Trip Adjustment	Maint.	____/____	TCN-1
7.3.2	Check the starter as follows:			

CAUTION:

DO NOT LUBRICATE STARTER.

7.3.2.1	Check starter contacts for erosion, pitting or beads due to arcing.	Maint.	____/____	*2
7.3.2.2	Check the starter and overload relay casing for cracks.	Maint.	____/____	
7.3.2.3	Check the starter coil for insulation cracks/deterioration.	Maint.	____/____	
7.3.2.4	With coil removed, check interior of contactor for damage.	Maint.	____/____	

Equipment Piece No. _____ Initials/Date

7.3.2.5	Reassemble and manually cycle the starter checking for binding or seizing.	Maint.	____/____	*2
7.3.2.6	Manually cycle all control/auxiliary contacts to determine proper operation.	Maint.	____/____	*2
7.3.2.7	Check the overload relay heaters for evidence of corrosion or contamination and connections for tightness. Clean and tighten as required being sure to check the screw that connects the overload relay to the contactor (electrical connection).	Maint.	____/____	*2
7.3.3	Visually inspect the control transformer for physical defects or degradation.	Maint.	____/____	
*7.3.4	Check all fuse holders for tightness and fuse(s) for correct size and type. F1 Type _____, Size _____ F2 Type _____, Size _____	Maint.	____/____	
7.3.5	Check all terminations and connections for tightness and wiring for insulation deterioration.	Maint.	____/____	*2
7.3.6	Visually inspect, wire wraps, terminal blocks and miscellaneous devices for cracks and degradation.	Maint.	____/____	*2
7.3.7	Perform a starter/breaker megger test as follows (closed starter/breaker test - refer to Attachment 10.4).			
7.3.7.1	Remove control transformer primary and secondary connections. Record lifted wires on Attachment 10.1, Lifted Lead and Jumper Log.			
7.3.7.2	Establish test grounds on the line side of breaker (G1, G2 and G3 on Attachment 10.4).	Maint.	____/____	
7.3.7.3	Close breaker.	Maint.	____/____	
*7.3.7.4	Remove one test ground at a time and megger the line at 1000VDC with the open starter manually closed, and repeat with the close starter manually closed. Megger reading shall be $\geq$ 1.6 megohms. Repeat step for each phase, maintain grounds on the remaining phases.			

*Denotes Trendable Data.

Equipment Piece No. _____ Initials/Date

*7.3.7.4 (Cont'd)

Line to ground, close contactor closed.
A _____, B _____, C _____ Megohms

Line to ground, open contactor closed.
A _____, B _____, C _____ Megohms

Maint. ____/____

7.3.7.5 Remove all test grounds. Maint. ____/____

*7.3.7.6 Megger secondary of transformer to ground at 500VDC. Megger reading shall be ≥ 1.5 megohms.
_____ Megohms Maint. ____/____

*7.3.7.7 Megger primary of transformer to ground at 1000VDC. Megger reading shall be ≥ 1.6 megohms.
_____ Megohms Maint. ____/____

7.3.7.8 Open breaker. Maint. ____/____

7.3.7.9 Reconnect control transformer primary and secondary connections and record on Attachment 10.1, Lifted Lead and Jumper Log. Maint. ____/____

7.3.8 Cycle (open and close) the circuit breaker 6 times ensuring smooth mechanical operation.
Maint. ____/____ *2

7.3.9 Hand operate all electrical devices checking for binding or seizing. Use an ohmmeter to test for proper operation of all main and auxiliary contacts on the breaker, starter and overload relays. Maint. ____/____ *2

7.3.10 Check all bolted connections for tightness. Maint. ____/____

7.3.11 Check gaskets for sign of deterioration. Maint. ____/____ *2

7.3.12 Ensure the breaker is in the "off" position and reinstall the breaker/starter unit back into the MCC cubicle. Maint. ____/____

7.4 Limitorque Operator Electrical Components

7.4.1 Swing open or remove limit switch compartment cover.
Maint. ____/____

*Denotes Trendable Data.

Equipment Piece No. _____ Initials/Date

WARNING:

INTERLOCKING CONTROL CIRCUITS FROM OTHER SOURCES MAY STILL BE ENERGIZED.

7.4.2 Check all termination points to ground to ensure that the compartment has no energized wires.

_____/_____

7.4.3 Lift wiring as required and record on Attachment 10.1, Lifted Lead and Jumper Log.

7.4.4 Check the torque switches as follows:

*7.4.4.1 Record the "As Found" torque switch settings and verify in accordance with approved design documents (Reference 2.10, EP-410 drawings).

	Open	Close
Switch Setting	____	____
Limiting Plate	____	____
Label Rec.	____	____
Label Max.	____	____

Maint. _____/_____

*7.4.4.2 Record the spring pack ID No. Spring pack No. is located on torque switch nameplate attached to limit switch gear box cover. (See Attachment 10.2).

Spring Pack No. _____ Maint. _____/_____

7.4.4.3 Ensure that the contacts are free of pitting, corrosion or signs of arcing. Clean the contacts, as required, using CRC-Lectra Cleaner. (EQ) *2

Maint. _____/_____

*Denotes Trendable Data.

Equipment Piece No. _____ Initials/Date

7.4.4.4 Record the color of the torque switch insulation material and verify it is correct for the application per table below.
Color _____

NOTE 1: Some older size 00 operators may have size 000 style torque switches installed (see Sheet 1 of Attach. 10.3). If this is the case, use the size 000 guidelines.

NOTE: For the following actuators, red color torque switches are acceptable.

2CSH*MOV101	2CSH*MOV111	2RHS*MOV2A
2CSH*MOV105	2CSH*MOV112	2RHS*MOV2B
2CSH*MOV110	2CSH*MOV118	

Application	Torque Switch Color Brown	White	Red	Black
EQ Size 000	X			
Safety-Related Size 000 (Non-EQ)	X		X	
Non-safety Related Size 000	X	X	X	
EQ Size 00 through 5 (See Note 1)	X	X		
Non EQ Size 00 through 5	X	X	X	X

X = Acceptable Maint. _____/____

7.4.4.5 For SMB-000 valve operators, check that the color/material of the cam lug is brass. (See Attachment 10.3)
☐ N/A - Not an SMB-000 Valve Operator Maint. _____/____

7.4.4.6 For SMB-000 operators, check the torque switch ensuring that metal shims are installed under contact screws. See Attachment 10.3 (SER 67-84).
☐ N/A - Not an SMB-000 Valve Operator Maint. _____/____

7.4.4.7 Check that the torque switch mounting bolts are tight. Maint. _____/____

7.4.5 Check the limit switches for the following:

7.4.5.1 Ensure that the rotors and finger bases are free from cracks. Maint. _____/____

Equipment Piece No. _____ Initials/Date

7.4.5.2 Ensure that the rotors contacts are free of pitting, corrosion or signs of arcing. Clean the contacts, as required, using CRC-Lectra Cleaner. (EQ) Maint. ____/____ |*2

7.4.5.3 Record the color of the rotors and fingerbase insulation material and verify it is correct for the application per table below.

Rotor Color _____
Fingerbase Color _____

NOTE 1: Red and Black are acceptable for the following operators.

2CSH*MOV101	2CSH*MOV111	2RHS*MOV2A
2CSH*MOV105	2CSH*MOV112	2RHS*MOV2B
2CSH*MOV110	2CSH*MOV118	

Application	Rotor/Fingerbase Color Brown	White	Red	Black
EQ	X	X		
Non-EQ	X	X	X	X

X = Acceptable Maint. ____/____

7.4.5.4 Check all wiring, terminations, connections and plastic crimps for tightness, damage and deterioration. (EQ) Maint. ____/____ |*2

7.4.6 Check flex conduit for physical damage. Maint. ____/____

7.4.7 Ensure that the equipment ground is tight and free of corrosion. Maint. ____/____

7.4.8 Check the limit switch compartment for cleanliness. Clean as required. Maint. ____/____

7.4.8.1 Should moisture be evident, dry the compartment and components. (EQ) Maint. ____/____ |*2

7.4.9 Check terminal strips and blocks for cracks and ensure all lock nuts are tight (mounting hardware). (EQ) Maint. ____/____ |*2

7.4.10 Check that all internal jumper wiring is Rockbestos Firewall III (gray), Raychem Flamtrol (black), or XLPE 600V (black). Maint. ____/____

7.4.11 Reconnect wiring and record on Attachment 10.1, Lifted Lead and Jumper Log.

Equipment Piece No. _____ Initials/Date

7.5 Limitorque Valve Lubrications and Checks

NOTE: Steps 7.5.1.1 through 7.5.1.3 can be N/A if removal of limit switch is not required for limit switch gear box cover removal.

WARNING:

SHOCK HAZARD
CONTROL VOLTAGE MAY BE PRESENT ON SOME POINTS OF GEARED LIMIT SWITCH.

7.5.1.1 Clutch in set rods (for rotors) on geared limit switches to disengage rotors then record valve position.

N/A, Geared limit switch removal not required..... (__) 15899

Valve position..... (__) Maint. _____/____

7.5.1.2 Lift leads as necessary to allow removal of limit switch assembly. Record on Attachment 10.1, Lifted Lead and Jumper Log.

N/A, Lifted leads not required..... (__) Maint. _____/____

7.5.1.3 Remove limit switch mounting bolts and withdraw limit switch assembly.

N/A, Limit Switch removal not required..... (__) Maint. _____/____ 15899

7.5.1.4 Remove the limit switch gear box cover(s). Maint. _____/____

7.5.2 Check limit switch intermittent gears for broken or missing teeth. (EQ) Maint. _____/____

NOTES:
1. Limitorques located in high temperature areas > 150°F may be lubricated using Mobil 28 (color - dark red). (EQ)
2. Do not mix Exxon Beacon-325 (peanut butter color) with Mobil-28. (EQ)

7.5.3 Check lubricant for cleanliness and consistency. Lubricant should be soft to the touch. Lubricate with Exxon Beacon-325 (color/consistency - peanut butter), as required. (EQ)

Maint. _____/____

Equipment Piece No. _____ Initials/Date

7.5.4 Check the limit switch gear box housing gasket for cracking and deterioration. Replace gasket as necessary. Maint. ____/____

7.5.4.1 Clean gasketed surfaces on cover. Maint. ____/____

7.5.5.1 Install limit switch gear box cover(s). Maint. ____/____

NOTE: Steps 7.5.5.2 through 7.5.5.4 can be N/A if limit switch removal was not required for limit switch gear box cover removal.

7.5.5.2 Install limit switch assembly in operator and torque mounting bolts per Attachment 10.5, Torque Table.

N/A, Limit switch assembly not removed in Step 7.5.1.3..... (__) Maint. ____/____ 15899

7.5.5.3 Land leads lifted in Step 7.5.1.2 and record on Attachment 10.1, Lifted Lead and Jumper Log.

N/A, No leads lifted in Step 7.5.1.2.. (__) Maint. ____/____

7.5.5.4 Verify valve position is the same as Step 7.5.1.1 and declutch set rods (for rotors) on geared limit switches to engage rotors.

N/A, Set rods not clutched in per Step 7.5.1.1..... (__) Maint. ____/____

7.5.6 Check that the limit switch mounting bolts are tight. Maint. ____/____

NOTE: Excessive oil leaking from seals and joints may be an indication of mixed grease.

7.5.7 Visually check shaft penetrations for indications of leakage at the gear frame cover, cartridge assembly seal, torque switch seal and valve stem housing. (EQ)

Maint. ____/____

7.5.8 Check exposed valve stem for cracks, gouges and wear. Maint. ____/____

7.5.8.1 Clean and lubricate rising valve stem with "Never Seez" Nickel Special. (EQ)
☐ N/A, no rising stem Maint. ____/____

Equipment Piece No. _____ Initials/Date

NOTES:
1. Do not mix Sun Oil Co. 50-EP or EP-740 (lithium lead base) with Nebula EP-0 or EP-1 (calcium base).
2. Nebula EP-0 and EP-1 should be dark tan in color; Sun Oil Co. 50EP should be black in color.
3. Mixed grease separates into oil and solids.

7.5.9 Check the lubricant (Nebula EP-0, EP-1 or Sun Oil Co. 50-EP, EP-740) in main gear case to be free of contaminants and for proper consistency (lubricant should be of a butter like consistency). (EQ) Maint. _____/____

7.5.10 Check the grease level by removing the fill and or drain plug (the gear case should be approximately 90% full of grease and the worm should be totally immersed), add grease as required. (EQ) Maint. _____/____

7.5.11 Using the same lubricant as in the main gear case, lubricate the drive sleeve upper bearing through the zerk fitting in the housing cover. (EQ) Maint. _____/____

7.5.12 If applicable, lubricate handwheel grease fitting. Maint. _____/____

7.5.13 If applicable, check the lubricant (Nebula EP-0 or EP-1) in the HBC unit, ensuring that is is free of contaminants.
☐ N/A, No HBC Unit or no Inspection Plugs Maint. _____/____

7.5.14 Check the following for tightness:

7.5.14.1 Stem protector and stem protector cap (EQ) Maint. _____/____

7.5.14.2 Handwheel (EQ) Maint. _____/____

7.5.14.3 Declutch lever (EQ) Maint. _____/____

7.5.14.4 Operator mounting bolts and operator to valve yoke bolts (where accessible)
☐ N/A, Not Accessible Maint. _____/____

7.5.15 Verify that the torque switch setting is the same as "As Found". Maint. _____/____

Equipment Piece No. _____ Initials/Date

7.5.16 Replace the limit switch compartment cover while performing the following:

7.5.16.1 Check the limit switch compartment cover gasket for cracking or deterioration. Clean gasketed surfaces and replace gasket as necessary. (EQ)
Maint. ____/____

7.5.16.2 Ensure that cover gasket is properly seated and mounting bolts are tight. Maint. ____/____

7.5.17 Clean exterior of motor. Maint. ____/____

7.5.18 If present, remove and discard any plastic caps located on the grease reliefs. Maint. ____/____

7.5.19 Check T-drains (as-applicable) to ensure drain hole is not plugged. (EQ)
☐ N/A, No T-drains installed. Maint. ____/____

7.6 Maintenance Test

7.6.1 Reconnect motor external wiring at MCC and record on Attachment 10.1, Lifted Lead and Jumper Log.

*7.6.2 Megger the associated operator motor and power cable at 1000VDC to ground and record insulation resistance on Data Sheet. Insulation resistance shall be ≥ 1.6 megohms (EQ).

A_____, B_____, C_____ Megohms

Maint. ____/____

*7.6.3 Using a multimeter on the low ohm scale, check the motor and power cable phase resistance.

1-2_____ohms, 1-3_____ohms, 2-3_____ohms

Maint. ____/____

7.6.4 Reconnect external control wiring at MCC and record on Attachment 10.1, Lifted Lead and Jumper Log.

7.6.5 Lift wiring as needed (interlocks, etc.) and record on Attachment 10.1, Lifted Lead and Jumper Log.

*Denotes Trendable Data.

Equipment Piece No. _____ Initials/Date

7.6.6 Notify Operations to stroke the valve open to close and close to open and perform the following:

*7.6.6.1 Record stroke times by using indicating lights in Control Room.

Closed_____sec.
Open _____sec. Maint. _____/____

NOTE: Inrush current is an EQ item for actuators with magnesium rotors only.

*7.6.6.2 While stroking the valve, record the unseating current, running current, seating current, inrush current and cutoff current. (EQ)

Inrush Current _____amps Unseating Current _____amps
Running Current _____amps Running Current _____amps
Seating Current _____amps Cutoff Current _____amps

Maint. _____/____

7.6.6.3 Verify smooth operation with no binding. Maint. _____/____

7.6.6.4 Verify position indicators indicate proper valve position. Maint. _____/____

7.6.6.5 Using the operator handwheel, verify the valve is not backseating. Maint. _____/____ 15899

7.6.6.6 Compare recorded stroke times to Technical Specification allowable as listed in N2-EMP-GEN-517.

___
/__/ Not Applicable, no Tech. Spec. Maint. _____/____

7.6.6.7 Notify ISI to perform evaluation if stroke time(s) is greater than 75% of Technical Specification allowable. ISI to initial if evaluation is required. Use Remarks Section to record results of evaluation as necessary.

Maint. _____/____
___
/__/ Not Applicable, no evaluation required. ISI _____/____

*Denotes Trendable Data.

Equipment Piece No. _____ Initials/Date

CAUTION:

MOTORS ARE NOT RATED FOR CONTINUOUS DUTY.

7.6.7	Repeat Step 7.6.6.2 and note readings for comparison.	Maint.	____/____
7.6.8	Reconnect wiring lifted in 7.6.5 and record on Attachment 10.1, Lifted Lead and Jumper Log.		
8.0	RETURN TO NORMAL		
8.1	Return the RWP. ☐ N/A - No RWP Required	Maint.	____/____
8.2	Leads lifted as temporary modifications have been restored to normal.	Maint. SSS CSO	____/____ ____/____ ____/____
8.3	Surrender/clear the markups to Operations.	Maint.	____/____
8.4	Operations notified equipment is available for post maintenance test. The following test is recommended, as applicable.	Maint.	____/____
8.4.1	Cycle the valve (open and close) per applicable Operations Surveillance Test (see N2-EMP-GEN-517).		
9.0	ACCEPTANCE CRITERIA		
9.1	Megger readings shall be as follows:		
9.1.1	$\geq$ 1.6 megohms for equipment rating $\geq$ 600 volts.	Maint.	____/____
9.1.2	$\geq$ 1.5 megohms for equipment rating $\leq$ 600 volts.	Maint.	____/____
9.2	No unsatisfactory inspection items. Part replacement not required.	Maint.	____/____
9.3	Lubricants are in satisfactory condition and show no evidence of mixing.	Maint.	____/____
9.4	MCC electrical contacts operate properly.	Maint.	____/____
9.5	Torque switch set in accordance with design documents (Ref 2.10, EP-410 dwgs).	Maint.	____/____

Equipment Piece No. _____ Initials/Date

9.6 Valve stroke time(s) shall be in accordance with applicable Technical Specification (Reference N2-EMP-GEN-517).
☐ N/A - No Tech. Spec. Requirement Maint. _____/____

9.7 Valve stroke time(s) shall be in accordance with applicable ISI requirements.
☐ N/A - No ISI Requirement Maint. _____/____

Signature Table

	INITIALS	SIGNATURE	PRINTED NAME
Performed by:	_____	_____	_____
Performed by:	_____	_____	_____
Performed by:	_____	_____	_____
Performed by:	_____	_____	_____
Performed by:	_____	_____	_____

Results:

1. ( ) Acceptable

2. ( ) Acceptable with comments. Work Request No._____

3. ( ) Unsatisfactory, (Use Remarks Section as necessary and initiate a Work Request). Work Request No._____

Remarks:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Review

_____/____
Maintenance Man Date

_____/____
Assistant/Maintenance Supervisor Date

_____/____
ISI Date

10.0 ATTACHMENTS

10.1 Lifted Lead and Jumper Log

10.2 Torque Switch Calibration Nameplate

10.3 Torque Switch Layout

10.4 Test Configuration, Closed Contactor/Breaker

NIAGARA MOHAWK

LIFTED LEAD AND JUMPER LOG

1 UNIT:	2 TEMP. MOD. # ☐ NA
3 WORK DOC:	4 PROC. # ☐ NA

	WIRING DATA										APPLICATION		RETURN TO NORMAL	
#	CABLE NUMBER (if applicable)	WIRE NUMBER OR "JUMPER"	COLOR	"FROM" TERMINATION DEVICE	PT	LIFTED YES	LIFTED NO	"TO" TERMINATION DEVICE	PT	LIFTED YES	LIFTED NO	PERF'D INIT.	VERF'D INIT.	PERF'D INIT.	VERF'D INIT.
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															

		5. APPLICATION				6. RETURN TO NORMAL			
		SIGNATURE	INITIAL	DATE	TIME	SIGNATURE	INITIAL	DATE	TIME
313-253 R11-86	PERFORMED BY:								
SYMBOL NO.55-32-211	VERIFIED BY:								

NIAGARA MOHAWK

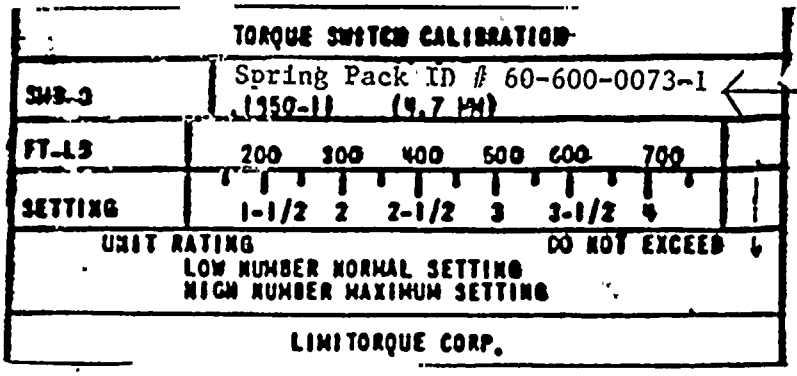
LIFTED LEAD AND JUMPER LOG

1 UNIT:	2 TEMP. MOD. # ☐ NA
3 WORK DOC:	4 PROC. # ☐ NA

	WIRING DATA										APPLICATION		RETURN TO NORMAL	
#	CABLE NUMBER (if applicable)	WIRE NUMBER OR "JUMPER"	COLOR	"FROM" TERMINATION DEVICE	PT	LIFTED YES	LIFTED NO	"TO" TERMINATION DEVICE	PT	LIFTED YES	LIFTED NO	PERF'D INIT.	VERF'D INIT.	PERF'D INIT.	VERF'D INIT.
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															

		5. APPLICATION				6. RETURN TO NORMAL			
		SIGNATURE	INITIAL	DATE	TIME	SIGNATURE	INITIAL	DATE	TIME
313-253 R11-86	PERFORMED BY:								
SYMBOL NO. 55-32-211	VERIFIED BY:								

TORQUE SWITCH CALIBRATION NAMEPLATE



Torque Switch Calibration Nameplate

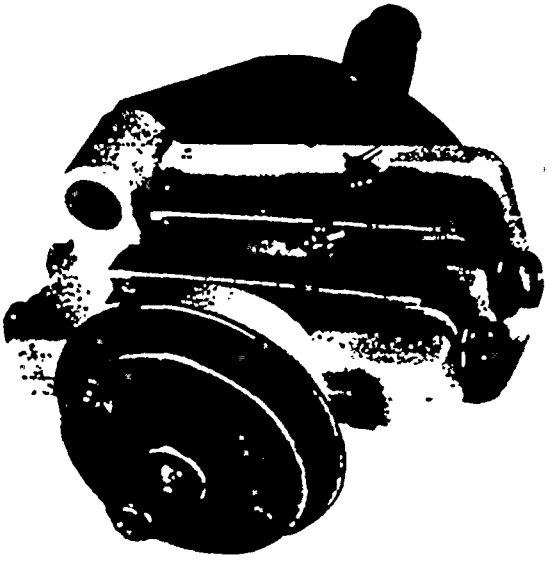
This nameplate is mounted inside the limit switch compartment on the gear box of the limit switch. The information on this plate relates to the torque switch and torque output of the unit.

Torque Switch Settings/Output Torque

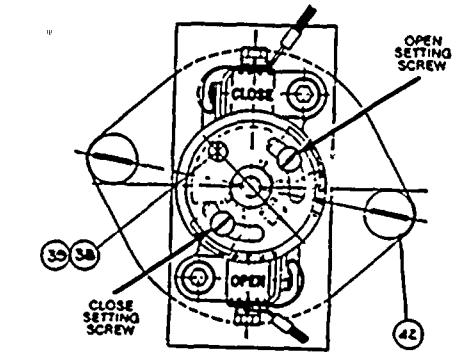
The nameplate has two scales of numbers, which represent settings of the torque switch and their respective output torques. the various output torques are listed directly above the respective torque switch settings.

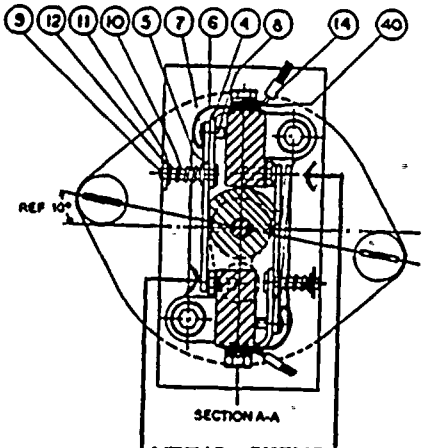
The torque switch scale usually ranges (in quarter-or half-increments) from 1 to 5. Two numbers on the torque switch scale will be indicated by punch holes. The one punched on the lower end of the scale will be the normal setting of the torque switch. This is the value to which the switch will initially be set by Limitorque. The output torque directly above this punched number represents the amount of torque needed to trip the torque switch. This value of torque was calculated by the valve manufacturer as required to seat the particular valve (under normal system operating conditions) the unit operates. This torque value will not be met or exceeded during normal cycling of the valve.

SMB-000 TORQUE SWITCH

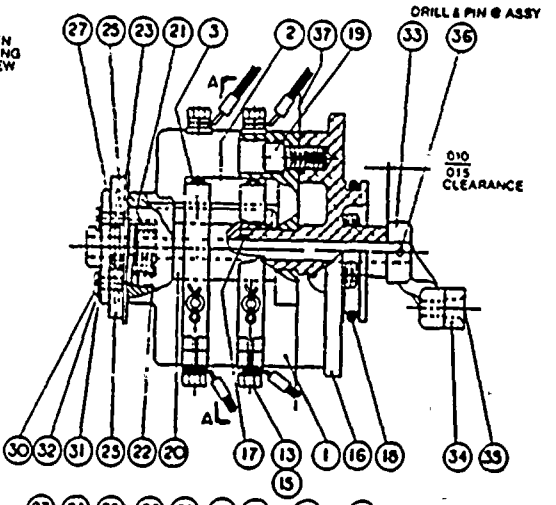


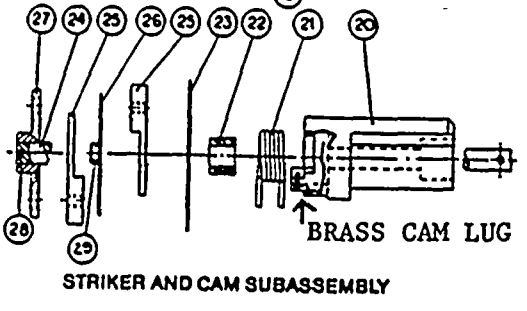
PC. NO.	NO. REQD.	DESCRIPTION
1	1	TERMINAL BLOCK
2	2	CONTACT BRIDGE
3	4	CONTACT SCREW
4	4	FINGER HOLDER
5	4	FINGER
6	4	SHUNT
7	4	SHUNT WASHER ¼ O.D. 3/32 I.D. 1/32 THK.
8	4	RIVET
9	4	FINGER SPRING STUD
10	4	COMPRESSION SPRING
11	8	SPRING CUP WASHER
12	4	COTTER PIN (3/64 x ¼)
13	4	HEX. HD. MACH. SCR. #10-32 x ⅜
14	4	RING TORQUE CONNECTOR 18" #16 AWG TYPE TU PIGTAIL
15	4	LOCKWASHER SHAKEPROOF
16	1	TORQUE SW. MTG. BRACKET
17	1	"O" RING
18	1	"O" RING
19	2	SOC. HD. CAP SCR. ¼-20 x ½ LG.
20	1	CAM
21	1	TORSION SPRING
22	1	SPRING MANDREL
23	1	DIAL
24	1	SHAFT
25	2	STRIKER
26	1	TORQUE LIMITING PLATE
27	1	STRIKER HUB
28	1	ROLL PIN 1/16 Ø x ½
29	1	#4 SWAGE NUT
30	2	PAN HD. SCREW #8-32 x 9/16 LG. SLOTTED
31	2	LOCKWASHER SHAKEPROOF
32	2	FLATWASHER 11/64 I.D. x 5/16 O. D. x .032 THK.
33	1	ARM
34	1	ROLLER
35	1	ROLLER PIN
36	1	GROOVE PIN 3/32 DIA. x ⅜
37	1	ARC BARRIER
38	1	PAN HD. SCR. #4-40 x ¼
39	1	LOCKWASHER, EXTERNAL TOOTH
40	4	WASHER 7/16 O.D. x. 13/64 I.D. x 1/32 THK.
42	2	RD. HD. MACH. SCR. 5/16-18 x ⅜





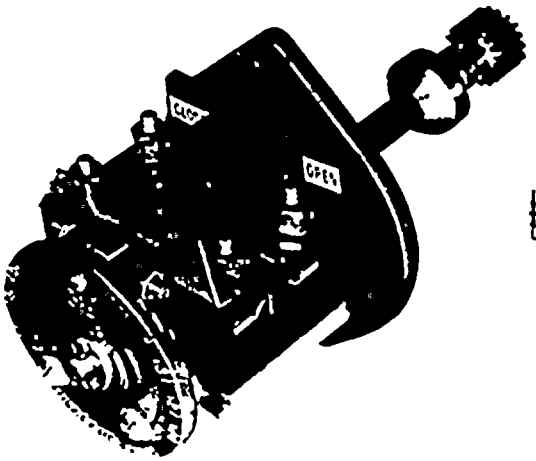
METAL SHIMS UNDER CONTACT SCREWS

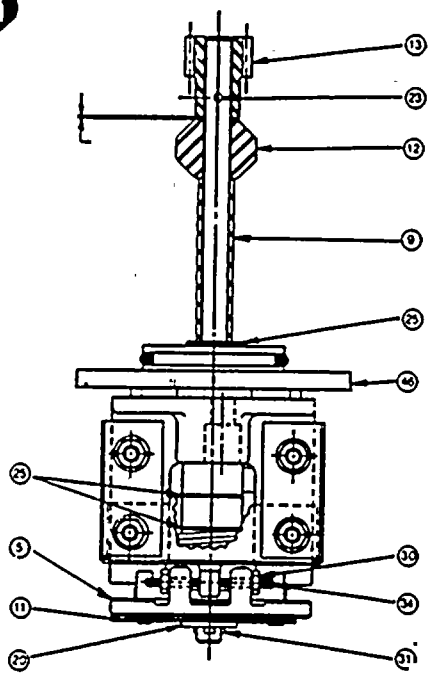


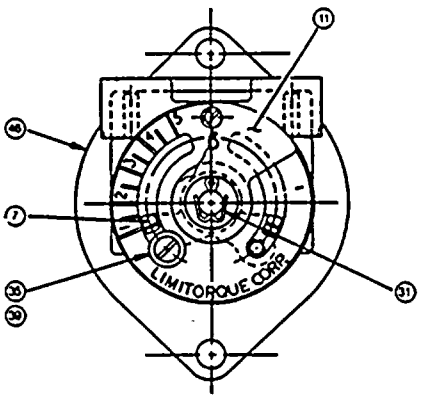


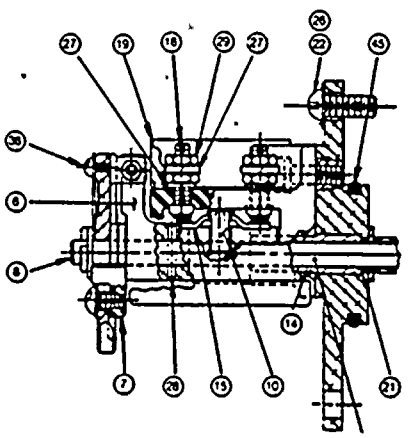
STRIKER AND CAM SUBASSEMBLY

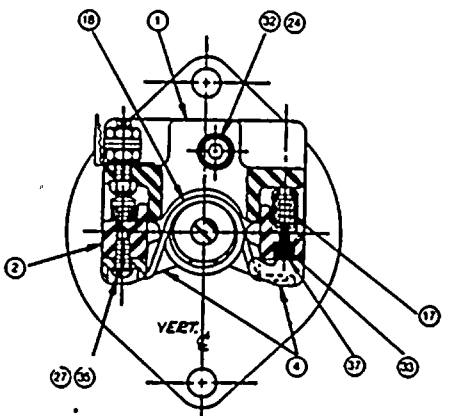
SMB-00 THROUGH SMB-5 TORQUE SWITCH

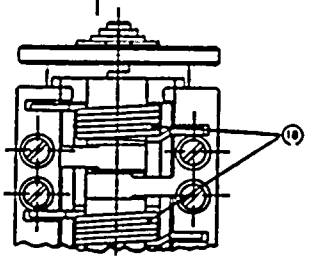






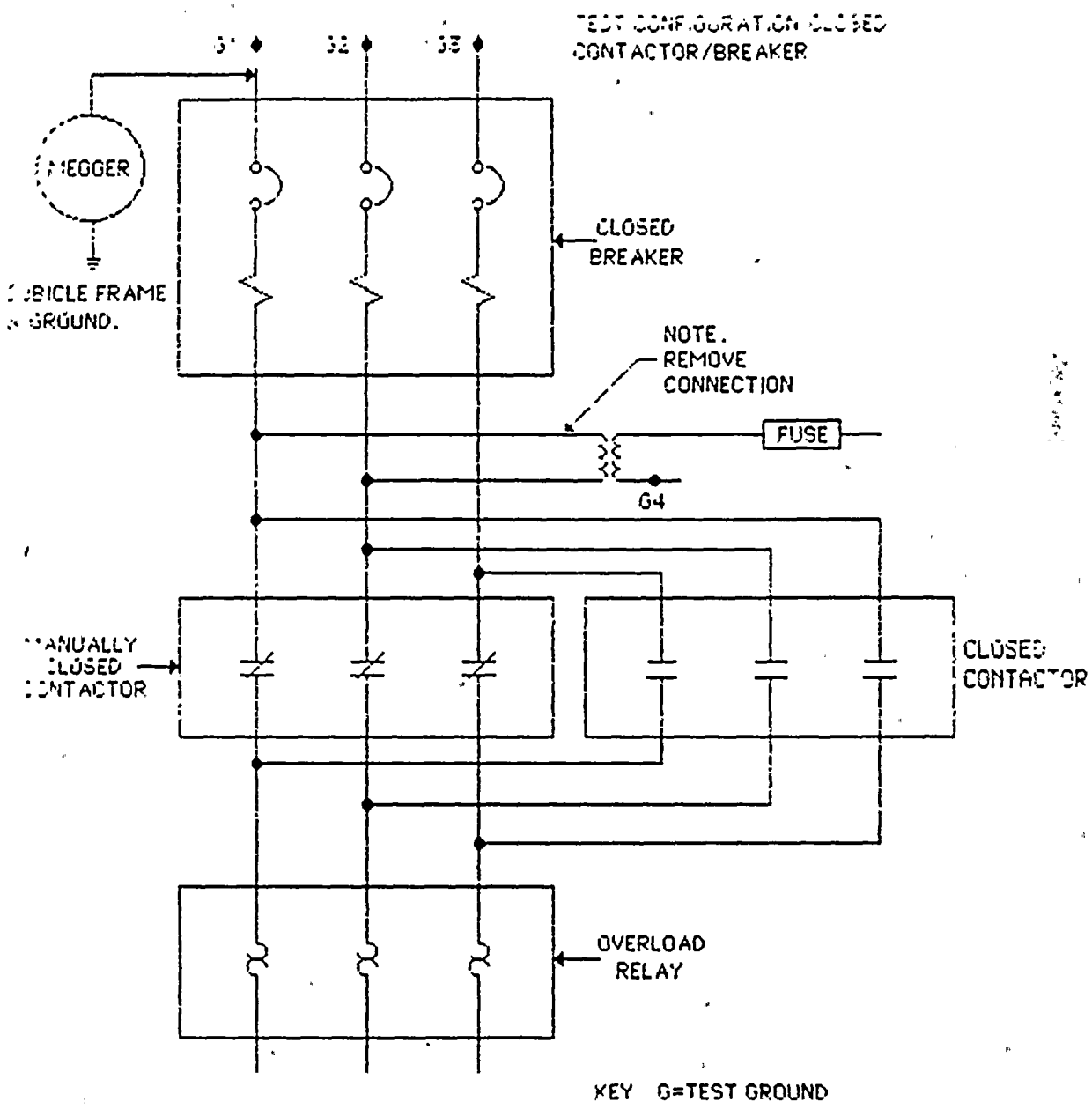






PC. NO.	NO. REQ.	DESCRIPTION
1	1	TERMINAL BLOCK
2	2	CONTACT BLOCK
4	2	ARM
5	1	DIAL
6	1	ACTUATING LINK
7	2	POINTER
8	1	SHAFT
9	1	SPACER
10	2	CONTACT SUPPORT
11	1	TORQUE LIMITER
12	1	BUSHING
13	1	T.SW. PINION
14	1	BEARING
15	2	CONTACT FINGER
16	4	TERMINAL STUD
17	2	COMPR. SPRING
18	2	TORSION SPRING
19	1	INSULATOR
20	1	FLAT WASHER
21	1	"O"-RING
22	2	SCREW-ROUND HD. SLOTTED 5/16-18 x 1/2 LG.
23	1	ROLL-PIN 3/32 DIA. x 5/8 LG.
24	1	LOCKWASHER-1/4
25	3	THRUST WASHER
26	2	5/16 LOCKWASHER
27	12	LOCKWASHER #10
28	1	ROLL PIN 3/32 DIA. x 3/4 LG.
29	8	HEX. NUT #10-32
30	2	HEX. NUT #6-32
31	1	COTTER PIN 3/32 DIA. x 3/4 LG.
32	1	SCREW-SOC. HD. CAP 1/4-20 x 3/4 LG.
33.	2	SCREW-PAN HD. SELF-TAPPING #4-40 x 1/4 LG.
34	2	SCREW-HEX. SOC. SET #6-32 x 5/8 LG.
35	6	SCREW-MACH. RD. HD. #10-32 x 3/8 LG.
36	1	SCREW-MACH. RD. HD. #5-40 x 3/16 LG.
37		WAX AS REQUIRED
39	2	LOCKWASHER
45	1	"O"-RING
46	1	MOUNTING BRACKET

TEST CONFIGURATION CLOSED CONTACTOR/BREAKER



TORQUE TABLE

TORQUE TABLE		
Screw Size	Application	Torque (in.-lb.)
1/4	Non Metallic Mountings	50 ±5
1/4	Metallic Mountings	110 ±5
5/16	Metallic Mountings	150 ±5

Give to reporter

NRC MEETING
ATTENDANCE SHEET

DATE 8-16-91 UNIT 2

LOCATION U-1 Sr. Conf Rm INSPECTION RPT #

SUBJECT IIT INSPECTOR

	NAME	TITLE	PHONE #
1.	Jack Rosenthal	Branch Chief (AEOD/ROAB)	492-4440
2.	Michael Jordan	Chief, Operator Licensing Section 1	790-5552 (708)
3.	Richard Conte	Chief, BWR Section, RI	FTS-346-5210
4.	Dennis Allison	Sr Program Mgr AEOD	301 492 4148
5.	GENE TRAGER	REACTOR SYSTEMS ENGINEER	(301) 492-4496
6.	Julio LARA	NRC Reactor Engineer RI	215-337-5144
7.	John KAUFFMAN	NRC SR Rx Sys. Eng, AEOD	(301)-492-4436
8.	Carl Sisco	OPERATIONS ENGINEER	(215) 337-5076
9.	STAN WILCZEK, JR.	VP Nuclear Support	315 428 7151
10.	B RALPH SYLVIA	EXEC V.P.-NUCLEAR	315-428 7494
11.	JOSEPH F. FIRLIT	VP - Nuclear Generation	315 349-2447
12.	Martin J. McCormick Jr	Plant Manager - Unit 2	315 349-2405
13.	James A Perry	VP-Quality Assurance	315 349-2660
14.	RICHARD B. ABBOTT	MGR. ENGINEERING NMP2	315-428-7147
15.	William F. Vatter	Asst. Mgr. Human Perf., INPO	404-859-1859
16.	CRAIG Z. GORDON	SR. EP SPLST., RI	FTS 346-5044
17.	Kim Dahlberg	Plant Manager Unit 1	ET 2443
18.			
19.			
20.			

NRC MEETING
ATTENDANCE SHEET

DATE 8-16-91 UNIT 2

LOCATION U-1 Sle. Conf Rm. INSPECTION RPT #

SUBJECT IIT INSPECTOR

	NAME	TITLE	PHONE #
1.	Steve Doty	Gen Supv Elect Maint	4594
2.	John Conway	Manager Tech Supt	2698
3.	JERRY HELKER	Gen Supv. Ops	7523
4.	Tom Tomlinson	Supv Reactor Eng	7340
5.	AL SALOMI	Director Engrg. PRRP.	4476
6.	RAY MAIN	Maint. Support Eng.	7297
7.	Jim Spadafora	ISEG	4220
8.	JOHN T. PAVEL	LICENSING	7441
9.	Nick Spagnoletti	Licensing	7452(sm)
10.	Joe BERATTA	Security	2864
11.	Rob Temps	U-2 RI	X7529
12.	CARL TERRY	VP-Nuc. ENG.	428-7449
13.	M.J. Adams	Manager - Operations-U2	7952
14.	DARRELL EISENHUT	SRAB	301-258-2524
15.	[illegible]	MATS	7125
16.	JIM EVANS	MATS	7120
17.	JOHN PARKINSON	NMPC	426-2577
18.	Guy Wheeler	NMPC	428-6937
19.	D K Greene	Mgr Licensing	428-7536
20.	A. K. JULKA	Supv. ELECT. DESIGN	428-7210

| | | |

07-149-9J

NINE MILE POINT UNIT 2
SCRIBA OSCILLOGRAPH
AUGUST 13, 1991 EVENT

HOUSE 1 DAU 1 RECORDING

CHANNEL	IDENTIFICATION	CALIBRATION	PT OR CT RATIO	BEFORE CM	BEFORE VALUE	DURING CM	DURING VALUE	AFTER CM	AFTER VALUE
01	$E_{(1-N)}$ 345KV BUS A	50V/cm	3000/1	1.4	210KV	1.2	180KV	1.4	210KV
02	$E_{(2-N)}$ 345KV BUS A	50V/cm	3000/1	1.42	213KV	.55	82.5KV	1.4	210KV
03	$E_{(3-N)}$ 345KV BUS A	50V/cm	3000/1	1.4	210KV	1.2	180KV	1.4	210KV
05	$I_{(PH2)}$ 345KV LINE 21	5AMPS/cm	2000/5	.32	640A	1.13	2260A	LOW	
08	$E_{(2-N)}$ 345KV LINE 21	50V/cm	3000/1	1.4	210KV	.54	81KV	1.4	210KV
10	$I_{(PH3)}$ 345KV LINE 23	5AMPS/cm	2000/5	.87	1740A	3.05	6100A	0	0
11	$I_{(R)}$ 345KV LINE 23	5AMPS/cm	2000/5	0	0	.75	1300A	0	0
12	E_0 345KV LINE 23	20VOLTS/cm	-	-	-	.3	18KV	-	-
13	$E_{(3-N)}$ 345KV LINE 23	50VOLTS/cm	3000/1	1.42	213KV	1.15	172.5KV	Generator Voltage Decay	

HOUSE 2/A RECORDING

1	$E_{(1-2)}$ 345KV BUS B	80V/cm	3000/1	1.56	374.4KV	.95	228KV	1.48	355.2KV
2	$E_{(2-3)}$ 345KV BUS B	80V/cm	3000/1	1.5	360KV	.85	204KV	1.47	352.8KV
3	$E_{(3-1)}$ 345KV BUS B	80V/cm	3000/1	1.53	367.2KV	1.4	336KV	1.5	360KV
5	$I_{(PH3)}$ 345KV LINE 20	5AMPS/cm	2000/5	.28	560A	.6	1200A	LOW	
9	$I_{(PH2)}$ 345KV LINE 20	5AMPS/cm	2000/5	.28	560	.88	1760A	LOW	

001536KK

07-150-91

File Copy
8/23/91

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA101
DIST PNL NO: 2CEC-PNL827
BKR NO:16

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL827

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	VALVE POSITON	DESCRIPTION/OTHER
2CNM-68C LSK-6-3,	X	X		X		X		FO	REACTOR FD PUMP 2FWS-P1C SUCTION FLOW/LOSS OF CONTROL OF 2FWR-FV2C
2CCP-24A/C LSK-9-1D	X	X		X					RB CLOSE LOOP COOLING WATER FROM DRYWELL 2DRS-UC2A/C TEMP
2CCP-30A/C LSK-4-1.3K	X	X		X					RBCLCW FROM DRYWELL 2DRS-UC1A/C TEMP
2CNM-38C, LSK-4-1.3K	X	X		X		X		FO	CNST BSTR PUMP P2C SUCTION FLOW/LOSS OF CONTROL OF FV38C
2CCP-74A LSK-9-1D	X	X		X					RB CLOSE LOOP COOLING WATER FROM DRYWELL 2DRS-UC3A TEMP
2SFC-2A LSK-34-2B	X	X		X		X			SPENT FUEL POOL WATER LEVEL
2CCP-129 LSK-9-1E	X	X		X					RB CLOSE LOOP COOLING WATER PUMP P1A, P1B, P1C DISCHARGE FLOW
2HDL-4C LSK-4-2.1B	X					X	X	FC	4TH POINT HTR 2CNM-E4C WATER LEVEL LOSS OF CONTROL OF LV4C
2HDL-35C LSK-4-2.1C	X					X		FO	4TH POINT HTR 2CNM-E4C DRAIN PUMP P1C FLOW/LOSS OF CONTROL OF FV35C
2CCP-51A LSK-90-1D	X								RB CLOSE LOOP COOLING WATER FLOW FROM 2RCSP1A COOLERS

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA101
DIST PNL NO: 2CEC-PNL827
BKR NO:16

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL827

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	VALVE POSITON	DESCRIPTION/OTHER
2HDL-41C LSK-4-2.1B	X					X			4TH POINT HEATER NO. 2CNM-E4C DRAIN PUMP DISCHARGE PRESSURE
2CCS-149 LSK-9-7A	X					X			TB CLOSE LOOP COOLING WATER PUMP DISCHARGE HEADER PRESSURE
2CMS*178 LSK-33-2E	X					X			CONTAINMENT DW PRESSURE AROUND 12.5 TO 17 PSIA
2CMS-179 LSK-33-2E	X					X			SUPPRESSION CHAMBER PRESSURE AROUND 12.5 TO 17 PSIA
2SFC-124 LSK-34-2D						X		FC	SFPC WATER CIRC DUMP VALVE/LOSS OF CONTROL OF FV124
2SFC-104 LSK-34-2D	X					X			SFPC TOTAL FLOW
2CCS-136 LSK-9-7C	X	X		X					TB CLOSE LOOP COOLING WATER FLOW BELOW 2 PUMP LIMIT, 1 PUMP LIMIT
2FWS-9C LSK-6.1.1D	X					X			REACTOR FEED WATER PUMP P1C DISCHARGE PRESSURE
2TML-108 LSK-16-2.3	X					X			OIL TANK OIL LEVEL
2CNM-45C LSK-4-1.1J	X		X			X	X		CONDENSER 1C VACUUM
2CNM-70C LSK-4-1.3K	X					X			REACTOR FEED WATER PUMP P1C SUCTION PRESSURE
2CCS-104 LSK-9-7B	X	X		X		X		FO	TB COOLING WATER HEAT EXCH. DISCH TEMP HIGH/LOSS OF CONTROL OF TV104

~~07-151-91~~
07-151-91

2VBB- UPS1B

8/22/91

○ 2VBS- PNL B101

- ☐ BKR# 1 LOSS OF TURB SUPERVISORY PNL ? WILL TURB TRIP / ? WILL TURB RESET } !
- ☐ BKR# 2 & BKR# 3 NONE. W/ MN TURB / GEN OFFLINE.
- * ☐ BKR# 4 *ANNUNCIATORS
- ☐ BKR# 5 & BKR# 6 LOSS OF RCS 'B' HPU (FV178 DRIFTS SHUT) ALSO LOSE RCS 'B' MODICON WILL ~~CHANGE TO~~ ~~PROTECT MEMORY~~ [SITE ENG WKG ON] TO 8/23/91 ~~FOR MODICON FROM A SOURCE~~ (TEMP MOD # 91-067 JAMES TING)
- ☐ BKR# 7 LOSE RPV TEMPERATURE INDICATION FROM RCS (B35-R650)
- ☐ BKR# 8 LOSE 'A' & 'B' RCS PUMP & MTR TEMP RECORDER (B35-R601) → RHR E12-R601.
- ? → ☐ BKR# 9 LOSE RCS A/B: THERMAL SHOCK INTERLOCKS, ΔP SEAL #1 & 2 IND TO B35-R650, RPV DOME PRESS TO THERMAL SHOCK INTERLOCK CKT., H. D.W. PRESS INPUT TO HPU'S. ? WILL WE HAVE 'A' HPU? > B35-N050A/B
  (margin: Hi D.W. TO BOTH HPU'S. INPUT INHIBIT)
- * ☐ BKR# 10 & BKR# 11 *ANNUNCIATORS
- ☐ BKR# 12 LOSE ALT SUPPLY TO ROD & DET DISPLAY (NORMAL FEED → UPS 1A) LOSE RSCS. & RWM
- ☐ BKR# 13 LOSS OF RPV COOLANT TEMP RHR HT XS INLET TEMP. E12-R601
- ☐ BKR# 14 LOSS OF F.W. TEMPERATURE B22-R643
- ☐ BKR# 15 LOSS OF: 'A' RPV NARROW RANGE LVL IND & RECORDER, 'A' RPV HI LVL TRIP INOP, FWS- LV 10'S LOCK UP AS IS, FWS S/D → NONE FOR REMAINDER OF CKT. ALSO GET RCS-A FCV RUNBACK ANN. 603131 (C33-R605 → UPS1) , 603139, 603141
  (margin: RCS RUNBACK)
- * ☐ BKR# 16 *ANNUNCIATORS
- ☐ BKR# 17 RWCU SYS LOSS OF; REJECT FLOW IND R602 & LOSS OF SYS. FLOW IND. -R609.
- * ☐ BKR# 18 *ANNUNCIATORS
- ☐ BKR# 19 & BKR# 20 SPARES.

*(NOTES ON PAGE

(CONTINUED ON PAGE 2)

- 2VBS-PNLB101 (CONTINUED)
  - ☒ BKR # 21 LOSS OF: D.W EQUIP DRNS LK RATE REC, TK LVL REC, PUMPS FLOW REC; D.W. FLOOR DRNS LK RATE REC, TK LVL REC, PUMPS FLOW REC; RBCLC FLOW TO D.W. UNIT CLR REC, CRD FILT. COND. REC., CRD O_2 CONC. REC., D.W FLOOR & EQUIP DRN LK RATE PROGRAM CONTROLLER, D.W. UNIT CLR A & B TEMP REC., D.W. MOIST ANALYSIS RECORDER.
  - ☐ BKR # 22 LOSS OF 2SST-IPNL154 ... NO PLANT IMPACT SYSTEMS ARE SHUTDOWN.
  - ☒ BKR # 23 GETARS - NONE.
  - ☐ BKR # 24 NONE (SST-IPNL284 ⇒ CRD SYS MONITORING)
  - ☐ BKR # 25 GETARS RCS A & B
  - ☒ BKR # 26 NONE (SST-IPNL285 ⇒ HDL)
  - ☒ BKR # 27 GETARS RPV DOME PRESS, LVL & RCS A & B ⇒ SUCT. TEMP, SPEED, SEAL ΔP
  - ☐ BKR # 28 GETARS FWS, RCS, CRD
  - ☒ BKR # 29 & BKR # 30 SPARE
  - ☒ BKR # 31 ⇒ BKR # 36 LOSS OF ESSENTIAL LGTING TO: → ANSO PACING SYS. CNTRL BLDG 306' CONTROL BLDG 286'; 306 WEST CABLE HALL AND SSS OFFICE.
  - ☐ BKR # 37 * ANNUNCIATOR
  - ☒ BKR # 38 * ANNUNCIATOR
  - ☒ BKR # 39 LOSS OF INDICATION LITES FOR SERVICE WATER VAC BKRS. AND PWR TO OPEN/SHUT SAME
  - ☒ BKR # 40 SPARE

* NOTES: ① NEED JOHN DOCKUM & AMIL JULKA TO CONCUR ON DUMPING ANNUNCIATOR RATHER THAN RISK D.L. ON 'A' SIDE AND BREAKING FOR SUPPLIES.

2VBB-UPS1B 8/22/91

• 2VBS-PNLB102

- ☐ BKR#1 SPARE
- ? ☐ BKR#2 LOSS OF STATION RADIOS (LEAKY WIRE → MAYBE PLUG INTO ANOTHER RECEPTACLE) (R?)
- ☐ BKR#3 LOSE - OXYGEN RECORDER SSR-AR130 & AR148 (RWCU), & WCS CONDUCTIVITY ALMS, TEMP IND G33-R607, * REJECT FLOW TO COND & RAD WASTE., RPV FLANGE TEMP RECORDER, TURBIDITY MONITORING., * RPV LVL INDICATION → SHUTDOWN RANGE, RECORDER * SSR-AR167, * NMS - RCS FLOW RECORDER B35-R614 (RWCU)

Swap LVL Control to RHR B

- ☐ BKR#4 * NO PLANT IMPACT REDUNDANT PWR SUPPLY TO 2CEC-PNL885 IS PWR FROM 2VBS-PNLA102
  * 2VBB-UPS1A IN-SERVICE AND PWR'G 2VBS-PNLA102
- ☐ BKR#5 LOSS OF PWR TO MAIN FIRE PANEL (2CEC-PNL849) NEED TO DISCUSS W/ FIRE DEPT re: LOSS OF FIRE DETECTION IN CONTROL ROOM FOR PLANT

Hi/Hr Fire Pnl - Surv No CWG

- ☐ BKR#6 NO PLANT IMPACT 2CEC-PNL PWRS905 FED FROM 2VBB-UPS1A
- ☐ BKR#7 LOSE INST PWR FOR 2SSR-IPNL145 (RWCU F/D's)
- ☐ BKR#8 LOSE ESSENTIAL LIGHTING AND POWER TO RECEPTACLES IN 2CEC-PNL880A, B, C & D * (NEED TO CHECK PNLS TO CHECK IF ANYTHING IS PLUGGED IN AND EVALUATE LOSS OF SAME) ALSO LOSE COMP. INPUTS FROM PNLS 880B & D TO ERF COMPUTERS (PROCESS RAD MONITORING)

CHECK OUTLETS NO. PLUGS

- ☐ BKR#9 SPARE
- ☐ BKR#10 LOSS OF 1/2 D.W. COOLING (2DRS-UC1B, UC1D UC2B, UC2D & UC3B)

Spare Controls

- ☐ BKR#11 → BKR#20 & BKR#24 SPARE.
- ☐ BKR#21, BKR#22 & BKR#23 → REFER TO LOAD LIST FOR: 2VBS-PNLB102 2VBS-PNLA 2VBS

8/21/91

2VBB-UPS1B

- 2VBS-PNLB111 (NORTH SWGR BLDG BATT ROOM 4A)
  - ☐ BKR 1 → BKR 32 PARTIAL LOSS OF RADIAX SYSTEM ?
    DEMOED IN EE-11BK CKTS RESERVED FOR NMPC RADIAX SYSTEM
    ? WHAT PART UNABLE TO FIND USA PRINTS
    NEED TO CHECK IN FIELD TO SEE IF CKTS HAVE BEEN USED
  - ☐ BKR 33 LOSS OF PAGING AREA 3 / GENERAL YARD
    E&DCR Y03801D
    2COP-PNL402 pg 27 of 76
  - ☐ BKR 34 E&DCR M40030A ~~HOW WAS THIS DETERMINED~~. AS PER BKR 36.
  - ☐ BKR 35. AS PER BKR # 33
  - ☐ BKR 36 E&DCR M40030A pg 7 of 11. LOSS OF ESSENTIAL LIGHTING
    ~~AND RECEPTACLE POWER~~ NORMAL SWGR BLDG STAIR ~~TOWERS~~ TOWERS AND AREA ESSENTIAL LITING
    EE-65H & 65J & 65K
  - ☐ BKR 37 AS PER BKR # 33
  - ☐ BKR 38 AS PER BKR 36

2VBB-UPS1B 8/21/91

- 2VBS-PNL B107
  - BKR# 1 → BKR# 7 RADWASTE RAD MONITORS LOSE INPUT TO ACMS: 851245 & RMSRC86
  - BKR# 8 LWS-CAB206 INOP.
  - * BKR# 9 → BKR# 13 RADWASTE RAD MONITORS LOSE INPUT TO ACMS: 851247 & RMSRC88
  - BKR# 14 & BKR# 15 SOLID WASTE SLUDGE FEED TO EXTRUDER/EVAPORATOR AND WASTE CONCENTRATE FEED TO EXTRUDER/EVAPORATOR RAD MONITORS LOSE INPUT TO ACMS: 851255 & RMSRC79
  - * BKR# 16 HVW-CAB195
  - BKR# 17 HVW-CAB196
  - BKR# 18 HVW-CAB197
  - BKR# 19 HVW-CAB199

  } RAD WASTE BLDG EXHAUST RAD MONITORS LOSE INPUT TO ACMS: 851254 & RMSRC76

  - BKR# 20 & BKR# 21
  - BKR# 22

  } POST ACCIDENT SAMPLING PNL. INOP

  - BKR# 23 → BKR# 28 SPARE

* BKR# 10 → RMS-RU146 BKR# 13 → RMS-RU147

BKR# 16 → HVW-RCPT1 → HVW-CAB195 NOT INCLUDED IN PACKAGE.

2VBB-UPS1B

8/22/91

o 2VBS-PNLB108

☒ BKRS #1 → BKR #19 TURB. BLDG. RAD MONITORS (INCLUDING URC AREA) ANNUNCIATOR 851245 AND COMP. PT. RMSRC86 WILL BE OUT OF SEVICE (LOSE INPUTS TO SAME)

☐ BKRS #20 → BKR #22 CONTROL BLDG RAD MONITORS LOSE INPUT TO ALMS 851246 & RMSRC87

☒ BKR #23 OFG-CAB13B } INOP ALMS 851253 & RMSRC75

☒ BKR #24 OFG-CAB13A }

☐ BKR #25 CWS-CAB157

☐ BKR #26 HVT-CAB206 PEZD-55A TURB. BLDG EXHAUST RAD MONITOR LOSE INPUTS TO ALMS: 851254 & RMSRC76

☒ BKR #27 LOSS OF INPUTS FROM GENERATOR TEMP. MONITORING AND LOGGING ~~OF~~ 2GMC-PNL141

2VBB-UPS 1B

8/22/91

- 2VBS-PNLB109

☑ BKR# 1 → BKR# 20 REACTOR BUILDING RAD. MONITORS COMPUTER POINT RMSRC84 AND ANNUNC. 851244 WILL BE OUT OF SERVICE. (NO COMP. PT NOR ANNUNC.)

☐ BKR# 21 2GTS-CAB105/RE105 (SGTS EXH. RAD MONITOR) ESK 7GTS04, 7CPS06 (NO HI RAD TRIP OF/FOR CONTAINMENT PURGE VALVES I.V.S.) - GROUP 9 →

☑ BKR# 22 MAIN STACK AREA RAD MONITOR OUT OF SERVICE (NO INPUT TO DRMS, NO INPUT TO/FOR COMP PT RMSRC86 & RMSRC89 NOR ANNUNCS 851245 & 851248

☒ BKR# 23 CCP-CAB115 (SFC HT X) P&ID-13E

☐ BKR# 24 CCP-CAB131 (RWCU NON-REGEN HT X) P&ID-13A

☒ BKR# 25 ~~EGR~~ SFC-CAB142 (SFC Pumps Disch.) P&ID-38A ~~NO INPUT TO ANN: 851255~~

WILL NOT GET ~~ALMS:~~ 851255 INPUTS TO ALMS: RMSRC79

☐ BKR# 26 HVR-CAB-229 (CR BLDG RECIRC) P&ID-52H CLOSE INPUT TO: 851254 AND RMSRC76

☐ BKR# 27 HVR-CAB237 (RHR HT X ROOM 'A') P&ID-52D CLOSE INPUT TO: 851254 AND RMSC76

☒ BKR# 28 HVR-CAB238 (RHR HT X ROOM 'B') P&ID-52B CLOSE INPUT TO: 851254 AND RMSC76

ALSO REFER TO NOTES IN LOAD LIST.

97-158-91

UPS 1B OUTAGE - ESTIMATED DURATION 4HR - 6HRS

SIGNIFICANT EQUIPMENT OUT OF SERVICE

LOSS OF TURBINE SUPERVISORY PANEL ANNUNCIATOR ONLY.

RCS 'B' MODICON - OUT OF SERVICE - REFER TO WR #194741.
RCS FLOW CONTROL, SHUTDOWN B HPU
MOTION INHIBIT, RCS RUNBACK

LOSS OF ABILITY TO MONITOR/RECORD RPV TEMPERATURE - USE 2RSS-TR10B IN REMOTE SHUT DOWN ROOM,REFER TO N2-OSP-LOG-@001. NOTE: THIS DOES NOT TAKE PLACE OF 12HR T.S. SHIFT CHECK - N2-OSP-LOG-S004/5.

ANNUNCIATORS - LOSS OF THE ANNUNCIATORS ON 800 AND 600 SERIES PANEL - NON-EMERGENCY OTHERWISE FOLLOW ACTIONS OF N2-OP-91A.
HOLD OUT HUNG SECOND TO LAST

LOSE 'A' NARROW RANGE RPV LVL IND/REC.
SOURCE OF RCS RUNBACK

LOSS OF RWCU REJECT FLOW AND SYSTEM FLOW - SHUTDOWN WCS LVL CONTROL TO RHS B. WILL INITIATE LEAK DETECTION ALARMS LOSS OF ISOLATOR POWER

S/O LOSS OF RWCU REJECT CONTROL

LOSS OF ESSENTIAL LIGHTING CONTROL BUILDING 288' AND 306' (WEST CABLE HALL). MAKE ANNOUNCEMENT.

LOSS OF D.W. FLOOR/EQUIPMENT MONITORING RECORDERS - REFERENCE WR #194740.

LOSS OF SERVICE H2O VACUUM BREAKERS

LOSS OF STATION RADIOS, LEAKY WIRE - LAST CIRCUITS TO BE POWERED DOWN. LAST TO BE SHUT DOWN

LOSS OF PWR TO CONTROL ROOM, MAIN FIRE PANEL. 1/2 HOUR ROUNDS ON EACH FIRE PANEL TO BE PERFORMED BY FIRE DEPT

LOSS OF ESSENTIAL LIGHTING AND POWER TO RECEPTACLES IN PANELS 880A, 880B, 880C, 880D. NOTHING IS PLUGGED IN AS OF 08/24/91.

LOSS OF 1/2 OF DRYWELL CLG. (1B, 1D, 2B, 2D, 3B WILL BE IN P&L)

LOSS OF RPV LVL INDICATION SHUTDOWN RANGE.

LOSS OF PAGING AREA 3/GENERAL YARD

LOSS OF ESSENTIAL LIGHTING NORMAL SWITCHGEAR BUILDING STAIR TOWER. MAKE ANNOUNCEMENTS.

LOSS OF R.W. BUILDING ARM'S AND EXHAUST RAD MONITORS INCLUDING LWS-CAB206. LWS-CAB206 TO BE POWERED DOWN PER N2-RTP-109.

LOSS OF TURBINE BUILDING RAD MONITORS AND HVT-CAB206.

LOSS OF CONTROL BUILDING RAD ARM'S MONITORS.

LOSS OF RX BUILDING RAD ARM'S MONITORS AND MAIN STACK AREA RAD MONITOR.

LOSS OF SGTS EXH. RAD MONITOR GTS-CAB105 - TO BE POWERED DOWN PER N2-RTP-109, GROUP 9 VALVES WILL BE ISOLATED, GROUP 9 SIGNAL WILL OCCUR.

LOSS OF RX BUILDING CCP RAD MONITORS

A RCS MOTION INHIBIT ON A&B FLOW CONTROL VALVES WILL BE INITIATED.

RAD PROTECTION IS REQUIRED TO DO ROUNDS IF OUTAGE EXTENDS PAT 6 HRS.

OPS TO MARK CHART RECORDER ONCE UPS 1B IS POWERED DOWN

TEMP LIGHTING INSTALLED IN STAIR NNS STAIR TOWER

UPS 1B OUTAGE - ESTIMATED DURATION 4HR - 6HRS

SIGNIFICANT EQUIPMENT OUT OF SERVICE

LOSS OF TURBINE SUPERVISORY PANEL ANNUNCIATOR ONLY.

RCS 'B' MODICON - OUT OF SERVICE - REFER TO WR #194741.
RCS FLOW CONTROL, SHUTDOWN B HPU
MOTION INHIBIT, RCS RUNBACK
A&B A&B
LOSS OF ABILITY TO MONITOR/RECORD RPV TEMPERATURE - USE 2RSS-TR10B IN REMOTE SHUT DOWN ROOM,REFER TO N2-OSP-LOG-@001. NOTE: THIS DOES NOT TAKE PLACE OF 12HR T.S. SHIFT CHECK - N2-OSP-LOG-S004/5.

ANNUNCIATORS - LOSS OF THE ANNUNCIATORS ON 800 AND 600 SERIES PANEL - NON-EMERGENCY OTHERWISE FOLLOW ACTIONS OF N2-OP-91A. HOLD OUT HUNG SECOND TO LAST

LOSE 'A' NARROW RANGE RPV LVL IND/REC.
SOURCE OF RCS RUNBACK

LOSS OF RWCU REJECT FLOW AND SYSTEM FLOW - SHUTDOWN WCS LVL CONTROL TO RHS B. WILL INITIATE LEAK DETECTION ALARMS LOSS OF ISOLATOR POWER

LOSS OF RWCU REJECT CONTROL

LOSS OF ESSENTIAL LIGHTING CONTROL BUILDING 288' AND 306' (WEST CABLE HALL). MAKE ANNOUNCEMENT.

LOSS OF D.W. FLOOR/EQUIPMENT MONITORING RECORDERS - REFERENCE WR #194740.

LOSS OF SERVICE H2O VACUUM BREAKERS

LOSS OF STATION RADIOS, LEAKY WIRE - LAST CIRCUITS TO BE POWERED DOWN. LAST TO BE SHUT DOWN

LOSS OF PWR TO CONTROL ROOM, MAIN FIRE PANEL. 1/2 HOUR ROUNDS ON EACH FIRE PANEL TO BE PERFORMED BY FIRE DEPT

LOSS OF ESSENTIAL LIGHTING AND POWER TO RECEPTACLES IN PANELS 880A, 880B, 880C, 880D. NOTHING IS PLUGGED IN AS OF 08/24/91.

LOSS OF 1/2 OF DRYWELL CLG. (1B, 1D, 2B, 2D, 3B WILL BE IN P&L)

LOSS OF RPV LVL INDICATION SHUTDOWN RANGE.

LOSS OF PAGING AREA 3/GENERAL YARD

LOSS OF ESSENTIAL LIGHTING NORMAL SWITCHGEAR BUILDING STAIR TOWER. MAKE ANNOUNCEMENTS.

LOSS OF R.W. BUILDING ARM'S AND EXHAUST RAD MONITORS INCLUDING LWS-CAB206. LWS-CAB206 TO BE POWERED DOWN PER N2-RTP-109.

LOSS OF TURBINE BUILDING RAD MONITORS AND HVT-CAB206.

LOSS OF CONTROL BUILDING RAD ARM'S MONITORS.

LOSS OF RX BUILDING RAD ARM'S MONITORS AND MAIN STACK AREA RAD MONITOR.

LOSS OF SGTS. EXH. RAD MONITOR GTS-CAB105 - TO BE POWERED DOWN PER N2-RTP-109, GROUP 9 VALVES WILL BE ISOLATED, GROUP 9 SIGNAL WILL OCCUR.

LOSS OF RX BUILDING CCP RAD MONITORS

A RCS MOTION INHIBIT ON A&B FLOW CONTROL VALVES WILL BE INITIATED.

RAD PROTECTION IS REQUIRED TO DO ROUNDS IF OUTAGE EXTENDS PAT 6 HRS.

OPS TO MARK CHART RECORDER ONCE UPS 1B IS POWERED DOWN

TEMP LIGHTING INSTALLED IN STAIR NNS STAIR TOWER

07-153-91 File Copy 8/21/91

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
DIST PNL NO: 2CEC-PNL884
BKR NO: 4

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL884

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2ASS-6A	X	X		X		X			AUX. STEAM FLOW TO AIR REMOVAL SYSTEM.
2MSS-103	X								2TMS-T1 FIRST STAGE PRESSURE/ GROUP 1 DRAIN VALVES
2WTS-243	X	X		X	X		X		NEUTRALIZER TANK LEVEL HIGH / INHIBIT THE START OF REGENERATION
2DSR-68A	X	X		X			X		REHEATER DRAIN RECEIVER TANK 6A WATER LEVEL / LOSS OF CONTROL OF LV68A
2FOF-101				X			X	X	FUEL OIL STORAGE TANK LEVEL /
1DSR-78A	X	X		X					SCAVENGING STEAM LINE A PRESSURE LOSS OF CONTROL OF MOV-86A
2MSS-104	X								2TMS-T1 1ST STAGE PRESSURE LOSS OF CONTROL OF AOV 85A, B, C, D, 2CNM-AOV 101
									GROUP III DRAIN VALVES AND 2CNM-AOV-107
2CNS-8A	X	X	X	X		X			CNDS. STOR. TK1A · LEVEL
2MSS-101	X								2TMS-T1 MAIN STEAM INLET HDR. PRESSURE LOSS OF 2ASS-STV112 & 2ASS-AOV145
2MSS-24A	X					X			E1A REHEATING STEAM TEMP.
2DSR-103	X								SCAVENGING STEAM HEADER PRESSURE.
2MSS-22A	X					X			MS/R REGULATED STEAM PRESSURE LOSS OF CONTROL OF 2MSS-PV28A AND 29A
2CRS-1A	X								HIGH PRESSURE TURBINE EXHAUST COLD REHEATER STEAM TO 2MSS-E1A SHELL
									PRESSURE
2CRS-2A	X								H.P. TURB. EXH. COLD REHEATER STEAM TO 2MSS-E1A SHELL PRESSURE.
2CRS-3A	X								HP TURB. EXH. COLD REHEATER STEAM TO 2MSS-E1A SHELL PRESSURE.
2CRS-16A	X								HP TURB. EXH COLD REHEATER STEAM TO 2MSS-E1A SHELL PRESSURE
2CRS-19A	X					X			REHEATER A COLD REHEAT PRESSURE
2ESS-1A	X					X			6TH POINT HTR 2FWS-E6A EXTR ST. PRESS.
2ESS-4A	X								TURB. 4TH STG EXTR STEAM PRESSURE
2ESS-7A	X					X			1ST POINT HTR 2CNM-E1A SHELL PRESSURE

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
DIST PNL NO: ~~2~~CEC-PNL884
BKR NO: 4

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL884

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2ESS-12A	X						X		2ND POINT HTR 2CNM-E2A SHELL PRESSURE.
2ESS-17A	X						X		3RD POINT HTR. 2CNM-E3A EXTR SHELL PRESSURE.
2ESS-25A	X						X		4TH POINT HTR. 2CNM-E4A EXTR. STEAM PRESSURE
2ESS-31A	X						X		5TH PT. HTR. 2CNM-E5A EXTR. STEAM PRESSURE.
2HRS-7A	X								2TMS-T2A LP TURBINE INL PRESS FR 2MSS-E1A
2HRS-8A	X								2TMS-T2A HRS FROM 2MSS-E1A
2HRS-9A	X								2TMS-T2A HRS FROM 2MSS-E1B
2MSS-23A	X			X					E1A. REHEATING STEAM FLOW
2MSS-52A	X			X					E1A. STEAM SUPPLY PRESS
2DSM-75A	X						X		MOISTURE SEP. DRAIN RECEIVER TK4A WTR LEVEL/LOSS OF CONTROL OF LVX, Y & 75A
2DSM-78A	X	X		X			X		MOIST. SEP. DRAIN RECEIVER TK4A WTR LEVEL/LOSS OF
									CONTROL OF LV78A
2DSR-65A	X						X		NORM WTR LVL OR CONTROL/ LOSS OF CONTROL OF LVX65A, LVY65A, AND LVZ65A
2CMS-72A,C	X					X			CONTAINMENT DEW POINT
2CNS-130	X								CONDENSATE DRAW OFF FLOW
2CNS-131	X								NORMAL CONDENSATE MAKEUP FLOW.

UPS NO: 2VBB-UPS1B
PNL NO: 2VBS-PNLB102
BKR NO: 4
UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
BKR NO: 5
DIS PNL: 2CEC-PNL885

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL885

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2CNS-8B	X	X	X	X		X			CNDS STOR TK B LEVEL
2CNS-114	X	X		X		X			CNDS XFR HDR FLOW HIGH/
									INHIBIT AUTO START OF 2CNS-P1A OR 2CNS-P1B
2CNS-102	X					X			COND HOTWELL LEVEL
2ESS-25B	X						X		4TH PT HTR EXTR ST PRESS
2ESS-17B	X						X		3RD PT HTR EXTR ST PRESS
2ESS-12B	X						X		2ND PT HTR SHELL PRESS
2MSS-52B	X					X			EIB STEAM SUPPLY PRESS
2MSS-24B	X					X			EIB. REHEATING STEAM TEMP
2MSS-23B	X			X					EIB REHEATING STEAM FLOW
2ESS-4B	X								TURB 4TH STG EXTR ST PRESS
2ESS-31B	X						X		5TH PT HTR 2CNM-ESB EXTR ST. PRESS
2MSS-22B	X					X			MS/R REGULATED STEAM PRESS / LOSS OF CONTROL
									OF REHEAT CONTROL VALVES PV28B & PV29B

UPS NO: 2VBB-UPS1B
PNL NO: 2VBS-PNLB102
BKR NO: 4
UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
BKR NO: 5
DIS PNL: 2CEC-PNL885

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL885

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2HRS-7B	X								2TMS-T. 2B LP TURBINE INL PRESS FR 2MSS-E1A
2HRS-8B	X								2-TMS-T 2B HRS FROM 2MSS-E1A
2HRS-9B	X								2-TMS-T 2B HRS FROM 2MSS-E1B
2ASS-6B	X	X		X		X			AUX STM FLOW TO A/R REMOVAL
2DSR-68B	X	X		X			X		DRAIN RECEIVER HIGH LEVEL/LOSS OF CONTROL OF LV168B
2DSR-65B	X						X		NORM WTR LVL DR CONTROL/ LOSS OF CNTRL OF LVX65B, LVY65B AND LVZ65B
2DSM-75B	X						X		MOISTURE SEP. DRAIN RECEIVER TK4B WTR LEVEL
									LOSS OF CNTRL OF LVX75B, LVY75B AND LVZ75B.
2DSM-78B	X	X		X			X		MOIST SEP DR RCVR TK4B WTR LEVEL / LOSS OF CNTRL OF LV78B
2DSR-78B	X	X		X					SCAVENGING STEAM LINE B PRESSURE / LOSS OF CONTROL OF MOV 86B
2ESS-7B	X				X				1ST PT HTR 2CNM-E1B SHELL PRESS
2ESS-1B	X				X				6TH PT HTR 2FWS-E6B EXTR ST. PRESS

UPS NO: 2VBB-UPS1B
PNL NO: 2VBS-PNLB102
BKR NO: 4
UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
BKR NO: 5
DIS PNL: 2CEC-PNL885

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL885

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2CRS-103	X					X			REHEATER 1B SHELL PRESSURE / LOSS OF CONTROL OF PV28A, PV28B, PV29A & PV29B
2CRS-1B	X								HIGH PRESSURE TURBINE EXH. COLD REHEATER STEAM TO 2MSS-E1B SHELL PRESSURE.
2CRS-2B	X								HP TURB EXH COLD REHEATER STEAM TO 2MSS-E1B SHELL PRESS
2CRS-3B	X								HP TURB EXH COLD REHEATER STEAM TO 2MSS-E1B. SHELL PRESS.
2CRS-16B	X								HP TURB EXH. COLD REHEATER STEAM TO 2MSS-E1B SHELL PRESS.
2CRS-19B	X					X			REHEATER B COLD REHEAT PRESS.
2CMS-72B,D	X					X			CONTAINMENT DOM POINT

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
DIST PNL NO: 2CEC-PNL886
BKR NO: 6

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL886

LOOP	PMS INDICATION	PMS ALARM		ERF INPUT		CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2AAS-113	X	X		X		X					BRTHG AIR HDR PRESS
2ARC-20B	X	X		X							AIR REMOVAL PUMP-1B SEAL WTR TEMP HI
2ASS-116	X	X		X		X					CLN STM REBLR STM PRESS
2ASS-122	X	X		X		X					AIR EJECTOR 2A STM PRESS
2ASS-127	X	X		X			X				OFFGAS STM PRESS
2CMS-72E,F	X					X					CONTAINMENT DEW POINT
2CMS-168	X					X					SUPPR CHAMBER PRESS NORM
2CND-267	X	X		X	X		X				LOW CONDUCTIVITY WASTE TK13 LEVEL
2CND-281	X						X				NEUTRALIZING TK12 LEVEL
2CPS-102	X	X		X		X					ENABLES 2CPS-FN1(DISCH TO STOP PERMISSIVES DRYWELL)
2CPS-103	X	X		X		X					ENABLES 2CPS-FN1(DISCH TO STOP PERMISSIVES SUPPR PL)
2CPS-125						X					PRIMARY CONTAINMENT PRESS N2 INLET FLOW/LOSS OF CONTROL OF FV125
2CPS-126	X	X		X		X					PRI CONTMT INLET NITROGEN FLOW
2CPS-127	X	X		X		X					PRI CONTMT INLET NITROGEN PRESS
2GSN-138		X		X		X					PRI CONTMT N_2 PURGE TEMP LOW
2HRS-7C	X										2TMS-T2C LPTURB INL FR 2MSS-E1A
2HRS-8C	X										2TMS-T2C HRS FROM 2MSS-E1A
2HRS-9C	X										2TMS-T2C HRS FROM 2MSS-E1B
2IAS-101	X	X		X		X					INSTR AIR HDR PRESS
2IAS-178	X	X		X		X					ADS CPRSR RCVR TANK *TK4 PRESSURE HIGH
2IAS-183	X	X		X		X					ADS CPRSR RCVR TANK *TK5 PRESSURE HIGH
2MWS-114	X	X		X	X	X					DMNRLZD WTR TK 1A OR 1B LVL
2MWS-116	X	X		X		X	X				DMNRLZD WTR PMP DISCH FL.

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA102
DIST PNL NO: 2CEC-PNL886
BKR NO: 6

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL886

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2SSR-124	X	X		X	X	X			CRD PUMP DISCH CNDT SAMPLE
2SSR-125	X	X		X	X	X			CRD PUMP DISCH O_2 SAMPLE
2SST-106	X	X		X	X	X			COND DMNRLZR INL CNDT SAMPLE
2SST-113	X	X		X	X	X			COND DEMIN OUT O_2 SAMPLE
2SST-114	X	X		X	X	X			COND DMNRLZR OUT CNDT SAMPLE
2SST-131	X	X		X	X	X			COM 6TH PT HTR OUT CNDT SAMPLE
2SST-132	X	X		X	X	X			COM 6TH PT HTR OUT O_2 SAMPLE
2SST-133	X	X		X	X	X			COM 6TH PT HTR OUT PH SAMPLE
2TML-132	X					X			OIL CLRS OUTLET OIL TEMP/ LOSS OF CONTROL OF 2CCS-TV43A
									AND 2CCS-TV43B
2ESS-1C	X						X		6TH PT HTR 2FWS-E6C EXTR STM PRESSURE
2ESS-7C	X						X		1ST PT HTR 2CNM-E1C SHELL PRESSURE
2ESS-12C	X						X		2ND PT HTR 2CNM-E2C SHELL PRESSURE
2ESS-17C	X						X		3RD PT HTR 2CNM-E3C EXTR STM PRESSURE
2ESS-25C	X						X		4TH PT HTR 2CNM-E4C EXTR STM PRESSURE
2ESS-31C	X						X		5TH PT HTR 2CNM-E5C EXTR STEAM PRESSURE

2VBB-UPS1A
UPS NO: 2VBB-UPS1B
PNL NO:
DIST PNL NO: 2VBS-PNLA102
BKR NO: 7
DIST PNL NO: 2VBS-PNLB102
BKR NO: 6

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL887

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2ARC-20A	X	X		X					AIR REM PPIA SEAL W TEMP H
2CNM-137						X			2FWS-P1A,B,C START UP BYPASS VALVE POSITION INDICATION
2CWS-47A	X					X			CLG TWR RETURN FLOW TO CWS
2DFR-106	X	X		X		X			DRYWELL FLOOR DRAIN LEAKAGE. ALSO LOSE CR/DW FLOOR DRAIN
									LEAKAGE RECORDER AND C.R. DW FLOOR DRAIN TK LEVEL RECORDER.
2DFR-137	X					X			DW FL DR PMPS P1A & P1B FLOW LOSE DW FLOOR DRAIN PUMP
									DISCH FLOW RECORDER (CONTROL ROOM).
2FWS-64A,B						X			FINAL FEEDWATER TEMP TO REACTOR
2GMC-110	X	X		X	X	X	X		GEN INL CNDCT HIGH. LOSE CR CONDUCTIVITY RCDR.
2GMC-111	X	X		X	X	X	X		GEN OUTLET CNDCT HIGH. CR CONDUCTIVITY RCDR.
2GMC-134	X					X			ALT CLR CLD AIR TEMP. LOSE CONTROL OF TURBINE BLDG
									CLOSED LOOP COOLING WATER VALVE 2CCS-TV32A AND B.
2GMH-105	X					X			GENERATOR GAS PURITY
2GMH-117	X					X			MACHINE GAS PRESS
2GMH-156						X			H_2 COLD GAS TEMP. TBCLC FLOW MODULATING VALVE 2CCS-TV109
									FAILS OPEN.
2GML-103	X	X		X					GEN LEADS CLR RET AIR TEMP
2GMO-103	X					X			HYDR SEAL OIL BRG 9 PRESS
2GMO-104	X					X			HYDRAUL SEAL BRG 10 PRESS
2LOS-126	X	X		X	X		X		DIRTY OIL STOR TK2 LEVEL. LOSS OF CONTROL FOR PUMP P2
2LOS-127	X	X		X	X		X		CLEAN OIL STOR TK1 LVL LOSS OF CONTROL FOR PUMP P2
2TME-15A,B	X					X			2TME-E1A & E1B REBLR DISCH PRESS
2TME-103	X					X			E1A&B DISCH HDR PRESS. LOSS OF CONTROL OF 2TME-MOV110, 2TME-SOV121

UPS NO: 2VBB-UPS1A
2VBB-UPS1B

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL887

PNL NO:
DIST PNL NO: 2VBS-PNLA102
BKR NO: 7
DIST PNL NO: 2VBS-PNLB102
BKR NO: 6

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
2TME-107	X					X			E1A&B STM SEAL RED PRESS. LOSS OF CONTROL OF 2TME-MOV110, 2TME-10V121
2TME-108	X					X			STEAM SEAL EXHAUSTER VAC
2TMI-127	X								EXH HOOD A GEN END TEMP
2TMI-128	X								EXH HOOD B GEN END TEMP
2TMI-129	X								EXH HOOD C GEN END TEMP
2TML-109	X					X			TURB BRG OIL PRESS
2TML-112	X					X			MN SFT OIL PMP DISCH PRESS
2TMS-151	X					X			EXH HOOD SPRAY PRESS
2TMB-105	X					X			EHC FLUID SUPPLY PRESSURE

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA101
BKR NO: 18
UPS NO: 2VBB-UPS1B
PNL NO: 2VBS-PNLB101
BKR NO: 18
DIS PNL: 2CEC-PNL888

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL888

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
ABM-110	X	X		X	X		X		AUX BOILERS STEAM HDR PRESS.
ABM-101	X	X		X	X		X		AUX BOILER DEAR. STM INL. PRESS.
CWS-66A,B		X		X					CLG. TWR. SCREENS WATER LVL HI
CWS-109	X	X		X					CLG. TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-135	X	X		X					CLG. TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-136	X	X		X					CLG. TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-138	X	X		X		X			CLG. TWR. FLUME WTR. TEMP.
CWS-137	X	X		X					CLG TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-147	X					X			CLG. TWR. BLOWDOWN FLOW / LOSS OF INDICATION ON 2SWP-FR602
CWS-140	X	X		X		X			CLG. TWR BASIN WTR. LVL/ LOSS OF CONTROL OF LV140
CWS-47B	X					X			CLG. TWR. RETURN FLOW TO CWS
SST-50A,B,C	X	X		X	X	X			2HDL-P1A,B,C TURBIDITY SAMPLE
SST-22A,B,C	X	X		X	X				MN COND A,B,C SHL EAST HALF CNDT
SST-21A,B,C	X	X		X	X				MN COND A,B,C SHL WEST HALF CNDT
SST-58A→J	X	X		X	X				CNDS DMNRLZR 1A→1J EFFLUENT CNDT
SST-53A,B,C	X	X		X	X				2HDL-P1A,B,C DISCH SAMPLE CNDT
SSR-156	X	X		X	X		X		CRD COM FLTR DISCH TURBIDITY
SWP-512	X					X			INTAKE CHANNEL WATER TEMP. LOSS OF CONTROL OF TV512
SWP-511	X					X			INTAKE TEMPERING WATER FLOW
SWP-509	X					X			JET MOTIVE PUMP FLOW
SST-142	X	X		X	X				COND DMNRLZR INL SAMPLE TURB.
WTS-323	X					X			DISCH FLOW TO LAKE

UPS NO: 2VBB-UPS1A
PNL NO: 2VBS-PNLA101
BKR NO: 18
UPS NO: 2VBB-UPS1B
PNL NO: 2VBS-PNLB101
BKR NO: 18
DIS PNL: 2CEC-PNL888

PLANT IMPACT: LOSS OF POWER TO 2CEC-PNL888

LOOP	PMS INDICATION	PMS ALARM	ERF INPUT	CR ANNUNCIATION	LOCAL ANNUNCIATION	CR INDICATION	LOCAL INDICATION	FIRE COMPUTER	DESCRIPTION/OTHER
ABM-110	X	X		X	X		X		AUX BOILERS STEAM HDR PRESS.
ABM-101	X	X		X	X		X		AUX BOILER DEAR. STM INL. PRESS.
CWS-66A,B		X		X					CLG. TWR. SCREENS WATER LVL HI
CWS-109	X	X		X					CLG. TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-135	X	X		X					CLG. TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-136	X	X		X					CLG. TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-138	X	X		X		X			CLG. TWR. FLUME WTR. TEMP.
CWS-137	X	X		X					CLG TWR. BASIN WTR. TEMP/ LOSS OF CONTROL OF MOG52A,B,C
CWS-147	X					X			CLG. TWR. BLOWDOWN FLOW / LOSS OF INDICATION ON 2SWP-FR602
CWS-140	X	X		X		X			CLG. TWR BASIN WTR. LVL/ LOSS OF CONTROL OF LV140
CWS-47B	X					X			CLG. TWR. RETURN FLOW TO CWS
SST-50A,B,C	X	X		X	X	X			2HDL-P1A,B,C TURBIDITY SAMPLE
SST-22A,B,C	X	X		X	X				MN COND A,B,C SHL EAST HALF CNDT
SST-21A,B,C	X	X		X	X				MN COND A,B,C SHL WEST HALF CNDT
SST-58A→J	X	X		X	X				CNDS DMNRLZR 1A→1J EFFLUENT CNDT
SST-53A,B,C	X	X		X	X				2HDL-P1A,B,C DISCH SAMPLE CNDT
SSR-156	X	X		X	X		X		CRD COM FLTR DISCH TURBIDITY
SWP-512	X					X			INTAKE CHANNEL WATER TEMP. LOSS OF CONTROL OF TV512
SWP-511	X					X			INTAKE TEMPERING WATER FLOW
SWP-509	X					X			JET MOTIVE PUMP FLOW
SST-142	X	X		X	X				COND DMNRLZR INL SAMPLE TURB.
WTS-323	X					X			DISCH FLOW TO LAKE

97-154-91

QUESTION/RESPONSE FORM

(Working Copy)

QUESTION # 12

DATE/TIME Aug. 24, 1991

INSPECTOR Jose Ibarra / NRC X1035

NMPC ESCORT/DEPT _____

INSPECTION CATEGORY _____

(Documentation, Walkdown, Procedures)

INSPECTOR

QUESTION/REQUEST What powers the local alarms to Fire Panels (Trouble & Fire)? What workload during the event?

NMPC RESPONSE:

Responding Individual: MONTGOMERY

Figure 1.6-1

INTERNAL CORRESPONDENCE
FORM 112-2 R 02-80 55-01-013

NIAGARA MOHAWK

FROM A. R. Andersen ARA

TO Distribution

DISTRICT Nine Mile Point Nuclear Station

DATE 15 August 91 FILE CODE

SUBJECT Nine Mile Point
Fire Protection Program
Post Event Interviews

After interviews conducted today with Fire Chief Bernie Harvey, and Firemen Pat Brennan and Mark Locurcio, and concurrence with Terry Vermilyea, System Expert Fire Detection and John Pavlicko of Caution Equipment Inc., I have reached the following conclusions.

1. Of the 20 fire panels at Unit 2, 18 maintained a normal power supply.

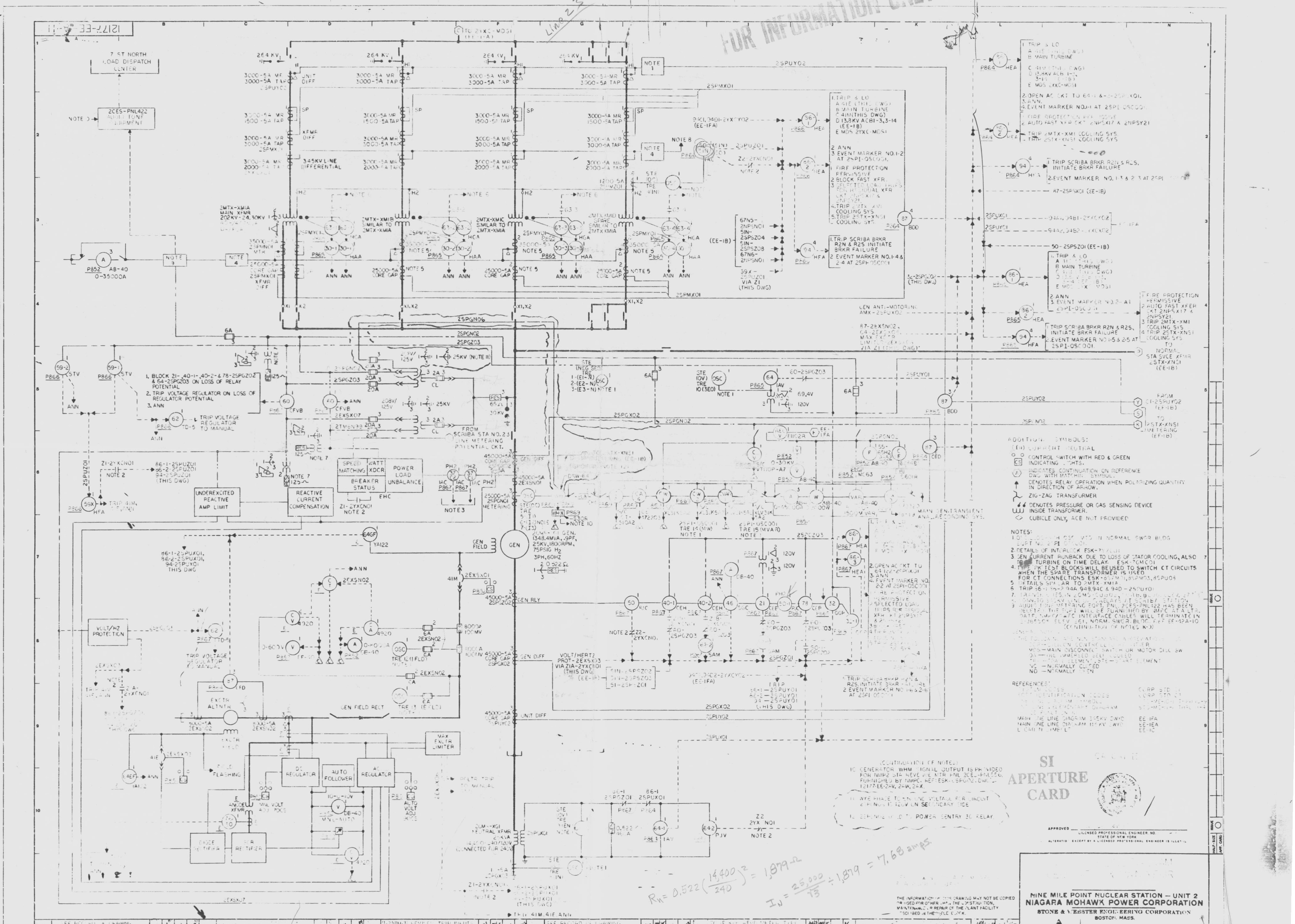
2a. Two fire panels LFCP113 and 123 transferred to internal battery backup.

2b. These two panels while on battery will still function normally as long as the 120 VAC is available in the LFCP, which it was.

There was no interruption or decrease of fire protection/ detection/suppression at the local fire panels.

Fire Panels 849 and 200/1 being fed from UPS did have a power interruption. This would have left the control switches operable at Panel 849, (as they are fed from LFCP), but Control Room with no fire annunciation. Any fire suppression/indication could also have been initiated locally.

ARA:dlc
Distribution
T. Tomlinson
A. Julka (FAX 7225 - SM)
D. Pringle



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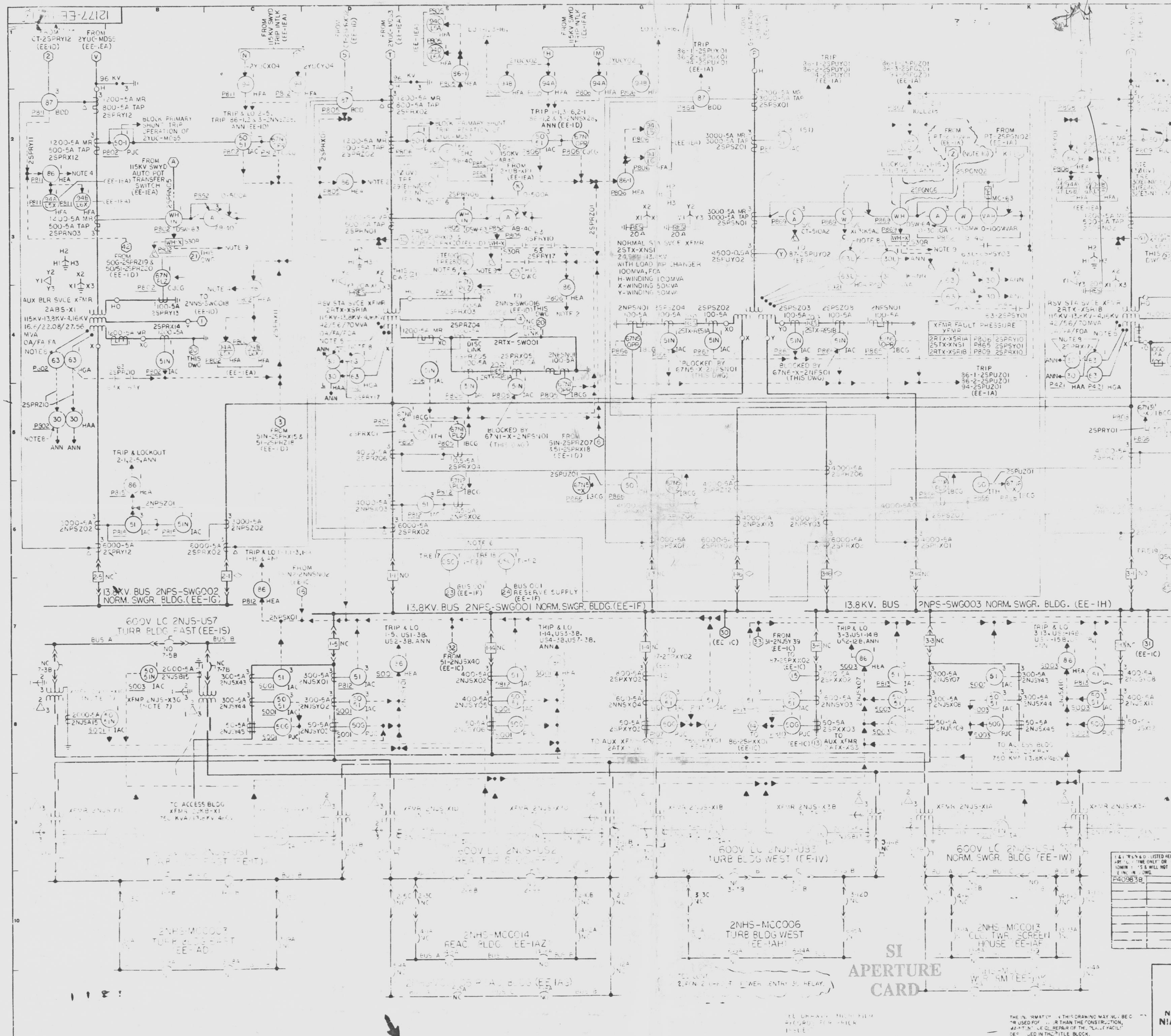

NOTES:

1. GENERAL NOTES, REFERENCES & ADDITIONAL SYMBOLS EE-1A. LOCATION SYMBOLS EE-1C.
2. TRIP & LOCKOUT 115KV CKT SWITCHER 2YUC-MDS3, 13.8KV ACB 1-1, 3-16, 2-1, 4.16KV ACB 16-2, XFMR 2RTX-XSR1A COOLING. TRIP 86-1,2 & 3-2NNSX26 VIA ... (EE-1D), ANN.
3. TRIP & LOCKOUT 115KV CKT SWITCHER 2YUC-MDS4, 13.8KV ACB 1-16, 3-1, 4.16KV ACB 17-2, XFMR 2RTX-XSR1B COOLING. TRIP 86-... (EE-1D), ANN.
4. TRIP & LOCKOUT 115KV CKT SWITCHER 2YUC-MDS5, 13.8KV ACB 2-5, 4.16KV ACB 18-2, XFMR 2ABS-X1 COOLING. TRIP 86-... ANN.
...
9. WHM SIGNAL OUTPUTS FROM 2STX-XNS1, 2RTX-XSR1A, 1B & 2ABS-X1 ARE PROVIDED FOR NMP2 STA REVENUE MTR PNL 2CES-PNL556, FURNISHED BY NMPC. REF: ESKS-8SPS01, 8SPR03, DWGS 12177-EE-2AV, 2AW & 2AX.

(NOTES CONT. ON EE-1C)

P40983B

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MAIN ONE LINE DIAGRAM RSV & NORM STA SVCE XFMR NORM 13.8KV & 600V SYSTEMS

NINE MILE POINT NUCLEAR STATION — UNIT 2

NIAGARA MOHAWK POWER CORPORATION

STONE & WEBSTER ENGINEERING CORPORATION BOSTON, MASS.

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