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AUTH. NAME AUTHOR AFFILIATION
MANGAN, C. V. Niagara Mohawk Power Corp.
RECIP. NAME RECIPIENT AFFILIATION
ADENSAM, E. G. BWR Project Directorate 3

SUBJECT: Forwards response to IE Bulletin 79-27 re electrical buses powering safety-related & nonsafety-related instrumentation & control circuitry. Info suppls util 851104 response. see RIS

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NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

January 17, 1986
(NMP2L 0588)

Ms. Elinor G. Adensam, Director
BWR Project Directorate No. 3
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Washington, DC 20555

Dear Ms. Adensam:

Re: Nine Mile Point Unit 2
Docket No. 50-410

Enclosed is the Nine Mile Point Unit 2 response to I.E. Bulletin 79-27 requested by your staff during the Instrument and Control Systems Branch Audit. This information supplements our previous response dated November 4, 1985. Ten copies are provided for your use and information.

Very truly yours,

C. V. Mangan
Senior Vice President

NLR:ja
Enclosure
1233G

xc: R. A. Gramm, NRC Resident Inspector
Project File (2)

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IEB 79-27 see NRC LB for attach.

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NIAGARA MOHAWK

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Senior Vice President

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xc: R. A. Gramm, NRC Resident Inspector
Project File (2)

8602100282

07-[illegible]-07

2VBB-UPS1C TEST SUMMARY

Purpose: To prove that the DC logic power for the Exide UPS is powered from the B-phase maintenance supply and that if a transient occurs on the maintenance supply it can effect the DC logic such that it will trip the unit. This test is done with the old internal logic batteries and then repeated with new ones. Each of the inverter trips will be tested to verify that each circuit is still intact except DCOV. An AC input transient to UPS will be simulated to verify that the unit can "ride out" a normal AC input transient without tripping. The K-5 relay pick up and drop out voltages and the DC trip-point of the DC logic will be recorded.

Results Summary:

1.) It was verified that the DC logic power supplies are fed from the B-phase maintenance supply.

2.) A rapid open and closing of the upstream normal AC input breaker to the UPS was done and the unit did not trip or go on battery. No noticeable effect was seen on the UPS output.

3.) Each inverter trip circuit except DCOV was tested and each functioned as designed.

4.) Fast transient tests:

With the old batteries still installed a voltage interruption of 100 - 150 msec duration was given to the AC input to the DC logic of UPS1C. The DC logic was initially at 19.86 VDC. The unit tripped 3 out of 4 times. This was done first with the loads on maintenance supply and then also with the loads on UPS power.

With the new batteries installed there was no trip when the fast transient test was performed 25 successive times. There were no trips but a repeated SCR short alarm occurred which is indicative of noise spikes within the unit.

5.) The K-5 relay drop out was recorded and was found to be below the trip point of the DC logic power.

6.) Normal transfers were done, UPS to maintenance and maintenance to UPS, with dead batteries and there were no trips of the UPS. The maintenance supply was opened with the UPS feeding the loads and no UPS trips occurred.

CONCLUSION

This test proves that the DC logic power is fed by the B phase maintenance power and that it is susceptible to voltage transients on the maintenance supply. It may be susceptible to other transients as well because it is directly tied to maintenance supply. The test DOES NOT prove the level of susceptibility, that is, it does not prove that the transient was of any set voltage or duration. The test implies that the batteries may have mitigated the trip but is not conclusive.

Each trip circuit was tested successfully so no failure to any of these occurred that caused the trip.

The fast open/close of the normal AC input breaker proves that the unit would withstand an AC input transient without failure or without going on battery power.

Numerical Results:

1.) Fast Transient Tests -

a.) <u>With existing batteries</u> -

1.) With loads on maintenance:
At 19.86 VDC (90.0 VAC) - <u>trip</u> (150 msec.)
At 19.86 VDC (120 VAC) - <u>trip</u> (150 msec.)

2.) With loads on UPS power:
2 Tries, 1 <u>trip</u> (200 msec.)

b.) <u>With new batteries</u> -

1.) Approx. 20.0 VDC - 25 times,
<u>no trip</u>. (100 msec.)

2.) The DC logic trips at < 16.9 VDC. (with 84.59 VAC on input).

3.) K-5 relay drop out - 45 VAC
K-5 relay pick up - ** not recorded

4.) The following trips tests were done:

a.) OV/UV
b.) ACUV
c.) ACOV
d.) DCUV
e.) Frequency fail
f.) Logic Failure
g.) Power supply failure
h.) Clock failure

5.) The internal battery voltage was measured:

Positive - +0.6
Negative - +0.04

5.) Individual cell voltages:

	Old Battery Voltage	New Battery Voltage
1.)	1.19	6.10
2.)	2.48	6.07
3.)	2.24	6.10
4.)	0.17	6.09
5.)	0.79	6.10
6.)	1.78	6.12

WORK REQUEST

DATE 8/14/91 W.R. NO. 190938

3. DEPARTMENT TO DO WORK
- [ ] [ ] ELECTRICAL MAINTENANCE
- [ ] [ ] MECHANICAL MAINTENANCE
- [x] [ ] INSTRUMENTATION & CONTROL
- [ ] [ ] COMPUTER [ ] [ ] HSI
- [ ] [ ] SECURITY I & C [ ] [ ] FIRE
- [ ] [ ] METER & TEST
- [ ] [ ] OTHER

4. PRIORITY OF WORK
- [ ] [1] EMERGENCY
- [ ] [2] ~~URGENT (<1 DAY)~~ 3/0/A
- [x] NECESSARY (<7 DAYS)
- [ ] [4] AS TIME PERMITS (>7 DAYS)
- [ ] [5] NEXT UNIT OUTAGE
- [ ] [6] NEXT REFUELING OUTAGE

5. UNIT: [ ] 1 [x] 2 [ ] SITE
6. SYSTEM CODE UBB
7. COMPONENT NUMBER UPS1C
8. BIP NUMBER 21.B07

18. SAFETY CLASS [ ] SR [ ] Q [x] NSR
19. EQ [ ] YES [x] NO
20. ASME COMPONENT [ ] YES [x] NO
21. CLEANNESS CLASS

9. EQUIPMENT TITLE: UPS 1C — SMITHONICS / UCWS

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE [ ] DESCRIPTION

TROUBLESHOOT UPS1C FOR SUPPORT OF SCRAM ASSESSMENT. - check AC output voltage + freq with Maintenance supply brk open and DC Bus voltage

12. ORIGINATOR [signature] (x4640) DATE 8/14/91
13. APPROVED [signature] McAndrew 2180 DATE 8/14/91
14. W.R. RECEIVED [signature] H. [signature] Therese Darling 2221 DATE 8/14/91
15. PROCEDURE NOS. APS.41.2 / / / / / NOT REQUIRED
16. [ ] QA NOTIFIED BY SUPV. DATE / / TIME QA NAME

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD. CAT	COST COMP	LOCATION	SUB ACCT.	PROJ. COST ACCT. NO.
706:50		0635	301288		200 ~~010~~	011a		0004

22. QA REVIEW QA [signature] DATE 8/14/91 23. INSPECTION REQUIRED [ ] YES [x] NO INIT
[signature] 8/14/91

STAGED BY J. BARTLETT DATE 8/14/91 [ ] PARTS [ ] PROCEDURE [ ] DRWG [ ] MARKUP [ ] RWP [ ] NA INIT
25. ASSIGNED TO Perry Hertel, Jon Blum, Jeff Vandell DATE 8/15/91
26. NOTIFICATIONS: QC DATE / / TIME [illegible] SSS DATE 8/15/91 TIME 0945
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE DESCRIPTION

A13A20 replaced w/ cal w/ 4; replaced by S. Fire F.S. replaced logic power supply battery, replaced A13A21 in 12; performed troubleshooting per attached sheets

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE DESCRIPTION

excessive cycling of once cycled circuit failures.

31. ATTACHMENTS [ ] MATERIAL ISSUES [ ] PROCEDURE CHECKLISTS [ ] INSPECTION REPORTS [ ] LAS [ ]
32. MARK UP NO'S / / RWP NO'S N/A / QCIR NO'S N/A NCR NO'S N/A
33. CORRECTIVE ACTION COMPLETED BY Perry Hertel, Jon Blum, Jeff Vandell DATE 8/25/91 INIT
34. SUPERVISOR REVIEW BY DATE / / INIT
35. WORK ACCEPTED BY QA [signature] [ ] NA DATE 8/14/91 INIT

36. PMT REVIEW BY [ ] ASSS/SSS [ ] SUPV. DATE / INIT
PMT PROCEDURE NO'S. / / / / / [ ] PMT TEST REPORT [ ] NOT REQUIRED
38. PMT COMPLETE VERIFIED BY [ ] NA DATE / / INIT
39. ACCEPTED BY [ ] SSS [ ] SUPV. DATE / / INIT

40. NPRDS [ ] NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

ATTACHMENT 1
TROUBLESHOOTING PLAN

TROUBLESHOOTING PLAN (AP-5.4.2, Form 1a, Rev 01)

• Section 1 •

System/Component to be inspected	Work Request Number
2VBB-UPS1C	WR # 190938

Will the system/component be "operable" per Technical Specifications during troubleshooting? ☒ Yes ☐ No

Brief description of troubleshooting work to be performed including precautions, limitations or boundary restrictions imposed.

1) USING AN OSCILLOSCOPE & FLUKE INSTRUMENT LOGIC CIRCUITS PER VENDOR DIRECTION.
2) OPEN CB-1 BREAKER ON 2VBB-XD 501 (MAINT. INPUT TO UPS1C
3) OPEN AC INPUT BREAKER - ~~2LAT-PNL300~~ 8/14/91 2LAT-PNL300, SUB-FEED BREAKER.
4) CLOSE & OPEN 2LAT-PNL300, SUB-FEED BREAKER. MONITOR LOGIC & ALARMS
5) RESTORE NORMAL AC & MAINT. SUPPLY
6) SIMULATE AN OUTPUT OV/UV. MONITOR LOGIC & ALARMS.
7) PLACE UPS1C ON MAINT. SUPPLY.
8) SIMULATE OTHER MODULE TRIP SIGNALS & VERIFY TRIPS, LOGIC & ALARMS.
9) PER TROUBLESHOOT PER ATTACHED p 5,6 [signature] 8/17/91
10) PER TROUBLESHOOT ATTACHED - p 7 & 8 [signature] 8/18/91
11) PER TROUBLESHOOT ATTACHED - p 8,10 [signature] 8/19/91
12) CONTINUE TROUBLESHOOTING PER p 11,12,13 [signature] 8/19/91

Troubleshooting Plan Originator Signature: [signature] RJ CRANDALL	Date: 8/14/91
Independent Verifier Signature (other than Originator): [signature]	Date: 8-15-91
Station Shift Supervisor Signature: [signature]	Date: 8/15/91

TROUBLESHOOTING PLAN (AP-5.4.2, Form 1b, Rev 01)

• Section 2 •

Record of Actions Taken (Before deviating from Planned Troubleshooting notify SSS.)

OPENED CB-1 ON 2VBB-XD501,
OPENED AC INPUT TO 2VBB-UPS1C UNIT RAN ON DC
(500 AMPS)
SIMULATED UV OUTPUT UV (OPENED CB-3 SWITCH)
- UNIT STARTED RUNNING - NO TRIP @ CB-3
OPENED.
RECLOSED AC INPUT TO 2VBB-UPS1C

NOTE SEE DETAILED DESCRIPTION ATTACHED. TJ Culy 8/15/91.

Problems Found/Results

☐ System or Component was left "As Found" ☐ System or Component deficiency was corrected under the Troubleshooting WR

Troubleshooter Signature	Date

On 8/15/91, troubleshooting was done on 2VBB-UPS1C as follows:

a.) With the unit on normal AC with DC and maintenance available an OV/UV signal was generated by opening the CB-3 toggle switch. The unit transferred to maintenance without generating a trip signal. This verifies that an output OV/UV will not cause a trip signal to be generated.

b.) With UPS1C on maintenance A27-S1 was opened with A27-CB1 closed. The logic power for the UPS went dead and it shouldn't have. This is evidence that the UPS internal batteries are dead.
When the UPS is down the internal logic is fed by ar internal power supply with internal battery backup. When the is UPS on line an auctioneering circuit should power the logic.
This auctioneering circuit was verified to be working by de-energizing the maintenance supply with the UPS running. When this was done the logic remained powered up. Although this is a deficiency it would not have contributed to the incident because the auctioneering circuit is working. (WR's are written to replace all UPS internal batteries).

c.) With all power sources available the maintenance supply feed was opened to verify the sync monitor circuit to the UPS. When the breaker was opened the voltage difference alarm came in and the unit sync indication went out. On reclosing the maintenance feed it took 10-15 seconds for the UPS to re-sync to the maintenance supply.

d.) With the load on UPS with the UPS running on normal AC and the DC breaker closed the maintenance supply feed was de-energized. The normal AC was feed was opened. The unit ran at full load off DC (500 amps) for 10-15 minutes with no alarms and no trips.

e.) Put unit on maintenance supply with UPS running off normal AC and CB-2 (DC) open. Opened the logic power and verified that CB-1 will trip.

f.) Put output on maintenance supply. With unit on normal AC and with DC breaker available, the AC output was lowered on the UPS. The AC undervoltage (ACUV) alarm signal was generated at 182 vac and after approximately 10 seconds the unit tripped.

g.) Restored unit to normal AC with DC available, load on maintenance. Raised output voltage to 220 vac and the AC overvoltage (ACOV) trip occurred.

h.) Unit was again restored with unit on normal AC and DC available, load on maintenance supply. Lowered the DC undervoltage (DCUV) caused a trip at 93 vdc.

i.) Due to the possibility of damage to the unit the DCOV (DC overvoltage was not verified. It was determined also that this condition was very unlikely to have occurred.

j.) The UPS was in its normal configuration on normal AC with DC and maintenance available. The upstream AC input breaker was opened and closed three times as rapidly as possible. This caused an audible "bump" to the input transformer on inrush current but the unit did not transfer to DC nor did it transfer to maintenance. This verifies that unit can maintain the load under input transients. This does not necessarily simulate the actual transient the unit had seen.

WR #190938, troubleshooting plan results, p 5

1.) UPS1C visually inspected.
2.) With the unit running on normal power the K-5 (logic power supply input) relay is energized.
3.) Opened the maintenance supply feed to UPS1C (CB-1, 2VBB-XD501). K-5 relay de-energized. This was verified by opening and closing CB-1 on 2VBB-XD501 while watching the K-5 relay. Read the output paramaters with UPS1C maintenance supply open:

Voltage:	Phase 1 to GND:	118.5 vac
	Phase 2 to GND:	119.5 vac
	Phase 3 to GND:	121.4 vac
Frequency:		59.91 cycles
DC Link Voltage:		140.08 vdc

4.) Reclosed the maintenance supply and the K-5 relay re-energized. This is verification that K-5 prefers to be powered from the maintenance supply feed any time that power source is available to the unit.
The SCR short light illuminated when the maintenance feed was restored to UPS1C.

5.) After a short duration with the unit running normally and no test evolutions being done the unit tripped (CB-1 trip, CB-2 trip, CB-3 opened) and the unit transferred to maintenance. The following alarms were indicated:
    1.) FREQUENCY FAIL (on A13A21)
    2.) MODULE TRIP
    3.) INVERTER OVERTEMP
    4.) INVERTER LOGIC
    5.) SCR SHORT

    NOTE: This trip, though, not purposely initiated at this time, is indication that a trip signal to the A13A21 card will initiate a logic trip and transfer the unit to maintenance successfully.

6.) Pushed the reset on the A13A21 card, SCR short cleared but no other alarms.
7.) Opened the P6 plug on CB-4
8.) Turned off A27-CB1 and A27-S1 killing logic power.
9.) Turned on A27-CB1 and A27-S1 (This was done to attempt to reset the logic.)
10.) The following alarms came back in:
    1.) FREQUENCY FAIL (A13A21)
    2.) MODULE TRIP
    3.) INVERTER OVERTEMP
    4.) INVERTER LOGIC

    NOTE: The fact that the alarms were reinitiated when the logic was re-energized is indication the trip stays latched in even if logic power is lost.
11.) Unlatched the motor operator off CB-$.
12.) Re-installed the P6 plug to CB-4. The operator did not

P 4 8/17/91

reposition itself.

13.) Reset the motor operator back on CB-4

THE ABOVE P. ~~3 of 4~~ 5 of 6 WAS PERFORMED ON 8/17/91. TRANSCRIBED FROM NOTES ON 8/16/91 [illegible] 8/12/91

Reprint of pages 7-13 of
Troubleshooting Plan - WR #190938

August 18, 1991

1. Open P6 Block.

2. Open logic power to UPS1C.

3. Reset overtemp switch. (NOTE: IT IS NOT DEFINITE THAT IT WAS TRIPPED.)

   Reset overtemp switch on LEG #4.

4. Put A13A20 on extender board.

5. Restore logic power and trace freq. fail signal through A13A20. Replace chips as required.

   When logic was restored - all lights were restored.

6. Restore card in slot.

7. Restore logic power.

   Attempted to restart unit - closed CB1, pushed module on and module tripped - freq. failed alarm, overtemp, module trip, Inverter logic alarms. No overtemp switches picked up (test each with fluke). See Step 4a (next page).

4a. Turn off logic.

4b. Put A13A20 on extender.

4c. Reset logic power

- module on light on

4d. PINS 16 and 46 on A13A20 okay 16 - low
46 - high

Stopped testing to repair A13A20 board.

Chips #1 and #4 (U1 and U4) Replaced on A13A20.

1. Open P6 block.

2. Open logic power to UPS1C.

3. Put A13A20 on extender board.

4. _____

5. Restore logic power.

   No alarm found
   A13A20 chips U1 and U4 cold to touch

6. If alarms reset, close CB1, verify no alarms.

   CB1 closed, no alarms found
   Module on pushed, no alarms with unit running
   CB2 closed - unit running normal
   Unit turned off, lock turned off
   Put A13A20 into slot - normal

7. Install variac on B-phase AC input to logic power supply.

   Install GND to input of A27 - F3 (term #1)
   Hot to input of A27 - F4 (term #1)
   Remove A27 - F4
   put VARIAC output on A27-F4 output (term #2)
   install oscilloscope AC input - Lead #243
   DC (+) Logic Power - #200

7a. Turn logic power on restart unit:

   Closed A27-S1 control batt. discharge, logic trip came on.
   Closed A27-CB1 alarms clear
   Closed CB1
   Pushed module on - unit running; no alarms
   Closed CB2

Steady State - 118.13 VAC to power supplies
19.86 VDC (+) DC logic
Lowered VAC to DC P.S. - at 96 VAC, DC volts starts to drop
- at 84.59 VAC, DC volts went to 16.9 VDC unit tripped.
Alarms - Power supply , failed inverter logic module trip (recorded (alarms) 2 hours later from memory)
At 84.59 VAC unit tripped
DC went to 16.9 VDC
Alarms - power supply fail, logic trip, module trip

11. _____

12. _____

13. _____

14. _____

13a. With unit tripped open A27-CB1 (Battery Breaker) lowered AC input to power supplies

At 45.0 AC, K-5 dropped - seen by logic (DC) power dropping - it dropped to approximately zero

(K-5 relay drops out at 45 VAC)

14. Reset logic (off) - A27-CB1 and A27-S1 open.

15. Reset variac to 120 vac.

16. Turned logic off.

17. Close CB1.

18. Turned unit on.

19. Closed CB2.

20. Unit running - no alarms (load on Maint.)

21. Open switch on variac with voltage at - 90.00 vac
    - opened and closed for 150 msec (Trace 7)

22. Unit tripped

    Alarms - power supply failed
    logic trip
    module trip
    SCR short

23. Reset logic and reset unit - CB1 closed
    CB2 closed
    Unit running

    Variac reset to 120 VAC.
    Open switch on variac for 100 msec. - open and closed
    Unit tripped, CB1 open (Trace 8)
    CB2 open
    Module trip
    Logic trip

24. Restarted unit CB1 closed
    CB2 closed
    logic reset - no alarms
    Put output on UPS Power
    Attempted to transfer to UPS power - P6 Block was open - would not transfer

25. Turn unit Off, reset logic, turn logic on
    Put CB-4 Operator (screw motor) to on
    Put P6 block back in

26. Open CB1 on 2VBB-XD501. No logic trip.

    1. Maintenance out of limits (clears)
    2. Voltage difference (locks)
    - K-5 relay swapped to UPS power

27. Turn Maint. back on. All alarm clear after time delay.

28. Open switch on variac - sustained. No trip, horn sounded, K-5 relay transfers.

29. Flipped switch on variac (off and on) AC voltage down to 58 VAC

    (found loose lead on fluke
    - not secure in plug)

    Turned switch off - unit tripped - no lights
    - fuse in Variac is still good

30. Restarted unit - leg fuse blown, alarm, impulse trip, Inverter fuse

    - leg #5 fuse bad

31. Logic off, CB1 opened
    CB2 opened

32. Replaced Leg #5, fuse unit restarted, transferred to UPS power, all alarms clear.

33. Open/Close variac switch - no trip SCR short alarm (200 msec)

    Open/Close variac switch - unit trip, power supply fail, logic (inverter) module trip - possibly 200 msec

    (- trace cannot be read)

34. Restore AC logic as follows:

    Remove lead from A27-F3 (team #1) - variac lead
    Remove lead from A27-F4 (team #1) - variac lead
    Remove lead from A27-F4 (team #2) - variac lead
    Re-install A27-F4 fuse

35. Unit left off, load on maintenance

1.) Measure each battery prior to installing in UPS1C:

1.) 6.10
2.) 6.07
3.) 6.10
4.) 6.09
5.) 6.10
6.) 6.12

2.) Using a leads lifted log replace the control batteries in UPS1C.

3.) Measure battery voltage on each battery removed from UPS1C:

1.) 1.19
2.) 2.48
3.) 2.24
4.) 0.17
5.) 0.79
6.) 1.78

4.) Install a variac on B-phase AC input to logic power supply as follows:

a.) Attach variac input ground lead to input side of A27-F3 (term #1).

b.) Attach variac input hot lead to input side of A27-F4 (term #1).

c.) Remove Fuse A27-F4.

d.) Attach variac output lead on the output side of A27-F4 (term #2).

5.) Install Oscilloscope leads as follows:

a.) one input to scope on A27, lead #243

b.) other input to scope on A27, lead #200 (+ of DC logic)

6.) Set variac for approximately 120 vac.

7.) Restart UPS1C and put load on UPS power, CB-3 closed.

8.) Slowly decrease AC voltage to the DC logic power supplies.

At 91.95 VAC, DC logic power dropped to 19.15 VDC
At approx. 42.94, DC logic recovery to 18.10 VDC
(K-5 transferred to UPS, No trip, Horn sounded)

9.) Verify K-5 relay transfers to UPS power.

At 42.94 DC dropped to approximately 17.8 or 17.9.
Turn VAC to 24.0 VAC (K-5 pulled in full) logic went to 19.76 VDC

10.) Restart UPS1C, as required, and put load on UPS power.

N/A
Put variac to 120 VAC - per oscilloscope K-5 energized
- power supply on maint.

11.) Flip switch on variac rapidly off then on.

12.) Perform the operation in step 11 multiple times and record whether trips of unit occur.

(See page 15a)

13.) Shutting down unit opened CB2
opened CB1

Alarms - power sync trip
UV/OV transfer
Inverter logic
No module trip

a.) Opened A27-S1 and A27-CB1
Closed A27-S1 and A27-CB1 - alarms still in
Opened A27-S1 and A27-CB1

SEQUENCE NO.	TIME	TRIP	REMARKS
1	150 - 200 msec	no	
2		no	SCR short came in
3		no	SCR short
4		no	SCR short
5		no	SCR short
6		no	SCR short AC Volt dip to 81 VAC
7		no	SCR
8		no	SCR
9		no	SCR
10		no	No Alarm
11		no	SCR short
12		no	SCR short
13		no	SCR
14		no	----
15		no	SCR
16		no	SCR
17		no	SCR
18		no	SCR
19		no	SCR
20		no	----
21		no	----
22		no	SCR
23		no	SCR
24		no	SCR
25		no	SCR

14.) Shutdown unit and remove variac and oscilliscope as follows:

a.) Remove variac input ground lead to input side of A27-F3 (term #1).

b.) Remove variac input hot lead to input side of A27-F4 (term #1).

c.) Remove variac output lead on the output side of A27-F4 (term #2).

d.) Remove Fuse A27-F4.

e.) Remove oscilliscope lead on A27, lead #243.

f.) Remove oscilliscope lead on A27, lead #200 (+ of DC logic).

g.) Install the A13A21 circuit card on the extender card.

NOTED: Fuse A27-F4 left out - reinstalled.

16.) _____

17.) _____

1.) Repair the A13A21 board in UPS1C.

2.) Reinstall A13A21 board in UPS1C on the extender board.

3.) Attach a recording device on the output of the UPS and the maintenance output and prepare to record transfer.

4.) Turn logic power on to UPS1C.

5.) Measure voltage on A27-F4, term. #1 referenced to phase A, B, and C of the maintenance supply:

A27-F4 to Phase A: 212 VAC

A27-F4 to Phase B: 0.2 VAC (This verifies DC power supplies fed by B-Phase)

A27-F4 to Phase C: 211 VAC

6.) Lift motor operator on CB-4.

6a.) Install P-6 block.

7.) Reset motor operator on CB-4.

8.) Restart UPS1C and put load on UPS power, CB-3 closed.

9.) Verify no alarms are present in UPS1C.

10.) Initiate each of the following trips and record the alarms found. Record at least one trip - transfer to maintenance.

a.) Frequency failure - not tested now - when A13A20 chip failed (earlier) fed frequency failure to A13A21 verifying logic

b.) Logic failure - took pin low - unit did not trip
- possible probe not on ground
- second time took pin 6 low
- unit tripped

Alarms - logic fail, fan fail, module trip, inverted logic alarm

Took board A13A21 off card cage extender - troubleshoot circuit. Alarm cleared by reinserting card. Unit restarting, load on UPS.

c.) Clock failed - took pin #32 low, unit tripped

Alarms - logic (inverter) alarm clock failed, module trip

16.) Restore A13A21 to the card cage slot.

17.) Restart unit and put loads on UPS power.

2VBB-UPS1D TEST SUMMARY

Purpose: To prove that the DC logic power for the Exide UPS is powered from the B-phase maintenance supply and that if a transient occurs on the maintenance supply it can effect the DC logic such that it will trip the unit. This test is done with the old internal logic batteries and then repeated with new ones. The K-5 pickup and drop out voltages and the DC trip-point of the DC logic will be recorded.

Results Summary:

1.) It was verified that the DC logic power supplies are fed from the B-phase maintenance supply.

2.) Fast transient tests:

With the old batteries still installed a voltage interruption of 100 - 150 msec duration was given to the AC input to the DC logic of UPS1D. The DC logic was at 20.9 VDC. The unit would not trip. The AC input voltage to the DC logic was then reduced such that the DC logic was at 20.0 volts. When the test was performed with the DC logic power at 20.0 VDC the unit tripped. This was done first with the loads on maintenance supply and then also with the loads on UPS power.

With the new batteries installed there was no trip when the fast transient test was performed though there was significant hits shown on the DC logic power bus as seen by the oscilloscope.

3.) The K-5 relay drop out and pick up voltages were recorded and they were found to be below the trip point of the DC logic power..

4.) Normal transfers were done, UPS to maintenance and maintenance to UPS, with dead batteries and there were no trips of the UPS. The maintenance supply was opened with the UPS feeding the loads and no UPS trips occurred.

CONCLUSION

This test proves that the DC logic power is fed by the B phase maintenance power and that it is susceptible to voltage transients on the maintenance supply. It may be susceptible to other transients as well because it is directly tied to maintenance supply. The test DOES NOT prove the level of susceptibility, that is, it does not prove that the transient was of any set voltage or duration. The test implies that the batteries may have mitigated the trip but that is not conclusive.

Numerical Results:

1.) Fast Transient Tests -

a.) <u>With existing batteries</u> -

1.) With loads on maintenance:
At 20.9 VDC - five tries, no trips.
At 20.7 VDC - one try, one <u>trip</u>. (150 msec.)

2.) With loads on UPS power:
At 20.06 VDC - one <u>trip</u>. (100 msec.)

b.) <u>With new batteries</u> -

1.) At 20.05 VDC - Five tries, <u>no trips</u>.
- noticeable DC hit on each transient.

2.) The DC logic trips at <17.3 VDC. (with 84.5 VAC on input).

3.) K-5 relay drop out - 42 VDC
K-5 relay pick up - 55 VDC

4.) The internal battery voltage was measured:

Positive - +0.6
Negative - +0.14 - (the negative battery set was actually slightly positive).

5.) Individual cell voltages:

	Old Battery Voltage	New Battery Voltage
1.)	.254	6.10
2.)	.570	6.06
3.)	1.03	6.10
4.)	.07	6.10
5.)	1.17	6.13

6.) 1.39 6.09

NIAGARA MOHAWK NINE MILE POINT **WORK REQUEST** 1. DATE 8/16/91 W.R. NO. 190945

3. DEPARTMENT TO DO WORK
- [1] [3] ELECTRICAL MAINTENANCE
- [1] [3] MECHANICAL MAINTENANCE
- [1] [3] INSTRUMENTATION & CONTROL
- [1] [3] COMPUTER [1] [3] I&I
- [1] [3] SECURITY I & C [1] [3] FIRE
- [1] [3] METER & TEST
- [1] [3] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY) 3/0/A
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [5] NEXT UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

5. UNIT: ☐1 ☒2 ☐SITE
6. SYSTEM CODE VBB
7. COMPONENT NUMBER VBS 1D
8. BIP NUMBER 71

18. SAFETY CLASS ☐SR ☐Q ☒NSR
19. EQ ☐YES ☒NO
20. ASME COMPONENT ☐YES ☒NO
21. CLEANNESS CLASS N/A

9. EQUIPMENT TITLE: 2VBB · VPS 1D

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE ☐ DESCRIPTION

with maintenance supply off - record UPS output voltage and frequency and DC Bus voltage - Perform TESTING ATTACHED

12. ORIGINATOR Perry H. Bertsch x7502 DATE 8/16/91
13. APPROVED Rene Murray R. Murray DATE 8/16/91
14. W.R. RECEIVED Therese H. Darling Therese Darling x2021 DATE 8/16/91
15. PROCEDURE NOS. / M15.3.1 / / / / / ☐ NOT REQUIRED
16. ☐ QA NOTIFIED BY SUPV. ____ DATE ___/___/___ TIME ____ QA NAME ____

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB. ACCT	PROJ. COST ACCT. NO.
706.50		0635	321258		200	0110		0004

22. QA REVIEW QA A.E. Lucas DATE 8/16/91 23. INSPECTION REQUIRED ☐ YES ☒ NO INIT
QA-ISI-8-16-91

TAGED BY Perry H Bertsch DATE 8/16/91 ☐PARTS ☐PROCEDURE ☐DRWG ☐MARKUP ☐RWP ☐NA INIT
ASSIGNED TO Perry H Bertsch, Jeff Vandell, Jon Blum DATE 8/20/91
26. NOTIFICATIONS: QC DATE ___/___/___ TIME ____ ☒NA QA INIT ____ SSS DATE 8/20/91 TIME 2253
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE AFH DESCRIPTION

performed testing per attached troubleshooting sheet; replaced battery.

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE AIG DESCRIPTION

dead Battery

31. ATTACHMENTS ☒MATERIAL ISSUES ☐PROCEDURE CHECKLISTS ☐INSPECTION REPORTS ☐LAS ☐
32. MARK UP NO'S Blue-2-91-50835 RWP NO'S / N/A / OCIR NO'S N/A NCR NO'S N/A
33. CORRECTIVE ACTION COMPLETED BY Perry H Bertsch, Jeff Vandell, Jon Blum DATE 8/25/91 INIT
34. SUPERVISOR REVIEW BY ____ DATE ___/___/___ INIT
35. WORK ACCEPTED BY QA A.E. Lucas ☒NA DATE 8/16/91 INIT

36. PMT REVIEW BY Therese H. Darling Therese H. Darling ☐ASSS/SSS ☒SUPV. DATE 8/16/91 INIT
PMT PROCEDURE NO'S. See WIP ___/___/___/___ ☐ PMT TEST REPORT ☐ NOT REQUIRED
38. PMT COMPLETE VERIFIED BY ____ ☐ NA DATE ___/___/___ INIT
39. ACCEPTED BY ____ ☐ SSS ☐ SUPV. DATE ___/___/___

40. NPRDS ☐ NA SYSTEM CODE ____ INIT. ____ 41. INDEXED BY DOC. CONT. INIT. ____ INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

ATTACHMENT 1
TROUBLESHOOTING PLAN

TROUBLESHOOTING PLAN (AP-5.4.2, Form 1a, Rev 01) Page 1 of 2

• Section 1 •

System/Component to be Inspected	Work Request Number
2UBB-UPS1D	190945

Will the system/component be "operable" per Technical Specifications during troubleshooting? ☒ Yes ☐ No

Brief description of troubleshooting work to be performed including precautions, limitations or boundary restrictions imposed.

PERFORM TROUBLESHOOTING PER ATTACHED SHEETS p. 3 THROUGH 8 [illegible] 8/20/91

PERFORM TROUBLESHOOTING PER ATTACHED SHEETS p 6 THROUGH 10 [illegible] 8/21/91

Perform troubleshooting per attached sheets 6 thru 10. [illegible]

Troubleshooting Plan Originator Signature [illegible]	Date 8/20/91
Independent Verifier Signature (other than Originator) Perry Hartsel	Date 8/21/91
Station Shift Supervisor Signature [illegible]	Date 8/21/91

TROUBLESHOOTING PLAN (AP-5.4.2 Form 1b, Rev 01)

• Section 2 •

Record of Actions Taken (Before deviating from Planned Troubleshooting notify SSS.)

PER ATTACHED SHEETS [illegible signature] 8/29/91

Problems Found/Results

CHANGED BATTERIES

☐ System or Component was left "As Found" ☒ System or Component deficiency was corrected under the Troubleshooting WR

Troubleshooter Signature [illegible signature] Date 8/30/91

1.) Place the loads off UPS1D on maintenance power.

When unit put to maintenance, CB-4 failed to close. Lifted operator - Bkr. closed (partial false signal to CB-4).

(Later found to be adjustment of CB-4 operator.)

2.) Open CB-2, CB-1, A27-S1.

3.) Measure and record DC logic power - (this is battery voltage)

(+20) = +.06V
(-20) = +.14V (* verified +.14 volts)

4.) Open A27-CB1.

5.) Measure voltage on A27-F4, term. #1 referenced to phase A,B and C of the maintenance supply:

A27-F4 to Phase A:	203.1 VAC
A27-F4 to Phase B:	0.0 VAC (Phase B to DC power supplies)
A27-F4 to Phase C:	202.4 VAC

6.) Install a variac on B-phase AC input to logic power supply as follows:

a.) Attach variac output ground lead to input side of A27-F3 (term #1).

b.) Attach variac input hot lead to input side of A27-F4 (term #1).

c.) Remove Fuse A27-F4.

d.) Attach variac output lead on the output side of A27-F4 (term #2).

7.) Install Oscilloscope leads as follows:

a.) one input to scope on A27, lead #243

b.) other input to scope on A27, lead #200 (+ of DC logic)

8.) Set variac for approximately 120 VAC.

9.) Lift motor operator on CB-4.

10.) Turn logic power on to UPS1D.

11.) Reset motor operator on CB-4.

12.) Restart UPS1D and put load on UPS power, CB-3 closed.

13.) Slowly decrease AC voltage to the DC logic power supplies.

Start 20.88 VDC at 98.13 VAC DC, power supply went down 20.59 VDC

14.) Record when DC voltage starts to drop -

98.13 VAC
20.59 VDC

15.) If unit trips, record voltage at trip point -

84.5 VAC	Unit tripped. CB-4 failed to close - got CB-4 "ON" flag.
17.3 VDC	Alarms - voltage difference, maint. out of limits module trip, inverter logic alarm. Power supply failed.

16.) If unit trips, lower AC input to K-5 relay until relay drops out.

At 56 VAC relay chattered, 8 VDC on logic
At 42 VAC relay swapped - dropped
Put reset back up - At 55 relay started to pickup
At 75 VAC pulled in

17.) Restart unit, as required, and put the load on UPS power.

18.) Set variac at 120 VAC.

19.) Open and close variac switch quickly. Record if trip occurs.

TRIED 8/21/91

~~Tripped~~ once - no trip, SCR short alarm - 150 msec (Trace #9)

20.) If trip does not occur attempt again.

2nd try - AC drops to 119.5 VAC, no trip (Trace #1)
3rd try - AC drops to 84.5 vac on fluke, no trip
(100 msec)
on oscilloscope - AC dropped 136 VAC, AC dropped 2.3 volts (from 20.9 VDC at start) (see 20a on next page)

20a.) 4th try - no trip
5th try - set variac to 95.0 VAC, VDC at 18.6 - unit tripped.
Power supply failed (Prior to switching variac)

Put unit on maintenance. Tried fast trip at 20.00 VDC - unit tripped.

21.) ----------
22.) ----------
23.) ----------
24.) ----------
25.) ----------
26.) ----------
27.) ----------

28.) Measure each new battery prior to installing in UPS1D.

1.) 6.10 VDC
2.) 6.06 VDC
3.) 6.10 VDC
4.) 6.10 VDC
5.) 6.13 VDC
6.) 6.09 VDC

29.) Shut logic power off.
Remove oscilloscope leads.
Remove variac leads.

30.) Install fuse F-4.

31.) Put loads on UPS power.

* ANNOUNCE LOSS OF LIGHTS

1.) Place the loads off UPS1D on maintenance power.

2.) Open the P-6 block block on CB-4.

3.) Open CB-2, CB-1, A27-S1, A27-CB1.

4.) Install a variac on B-phase AC input to logic power supply as follows:

   a.) Attach variac output ground lead to input side of A27-F3 (term #1).

   b.) Attach variac input hot lead to input side of A27-F4 (term #1).

   c.) Remove Fuse A27-F4.

   d.) Attach variac output lead on the output side of A27-F4 (term #2).

5.) Install Oscilloscope leads as follows:

   a.) one input to scope on A27, lead #243

   b.) other input to scope on A27, lead #200 (+ of DC logic)

6.) Set variac for approximately 120 vac.

7.) Lift motor operator on CB-4.

8.) Reinsert the P-6 block on CB-4.
9.) Turn logic power on to UPS1D.
10.) Reset motor operator on CB-4.
11.) Restart UPS1D leaving loads on maintenance supply.

12.) Open and close variac switch quickly.
Record if trip occurs.

Adjust variac such that DC logic power is at 20.00 VDC

AC at 91.28V Switch time - 150 msec
DC at 20.07V

At unit trip the following alarms observed: (TRACE #5)

1.	trip	3.	SCR short
2.	Inverter logic	4.	Power supply failed

21.) Restart unit, as required and put loads on UPS.

* Breaker CB-2 failed to reset.
Breaker replaced per WR #177123.

22.) Open CB-1 on 2VBB-XD600 and verify that unit does not trip.

Unit did not trip. The following alarms were observed:

1. Voltage Difference
2. Maintenance out of limits

22.) While on UPS power without maintenance available record the following:

UPS output voltage:	Phase A:	121.0 VAC
	Phase B:	120.0 VAC
	Phase C:	121.5 VAC

DC Link voltage: 140.7 VDC

UPS output Frequency: 59.93 HZ AC output

24.) Close CB-1 on 2VBB-XD600.

25.) Adjust motor operator on CB-4 as required.

Unable to adjust at this time.

Restart unit, put load on UPS power - Lower reostat (variac) volts until DC logic is 20.00 volts
VDC -20.06 VAC - 100.23
Flipped variac switch on and off, unit tripped (100 msec.)
Alarms - module trip
inverter logic
power supply failed

26.) Transfer loads to Maintenance.

26.) Shut down unit including logic power and P-6 block.

27.) Open Ac input breaker, 2NHS-MCC006, 8-A.

29.) Using a leads lifted log replace the control batteries in UPS1D.

Bench Battery Voltage Readings - prior to installation

1.)	6.097 VDC	4.)	6.101 VDC
2.)	6.063 VDC	5.)	6.125 VDC
3.)	6.107 VDC	6.)	6.090 VDC

30.) Measure battery voltage on each battery removed from UPS1D:

1.) .254 VDC
2.) .570 VDC
3.) 1.03 VDC
4.) .07 VDC
5.) 1.17 VDC
6.) 1.39 VDC

31.) Set variac for approximately 120 vac.

32.) Restore P-6 block on CB-4.

33.) Lift motor operator on CB-4.

34.) Turn logic power on to UPS1D.

35.) Reset motor operator on CB-4.

36.) Restart UPS1D and put load on UPS power, CB-3 closed.

Lower variac voltage to 99.03 VAC until DC logic voltage is approximately 20.05 VDC

37.) Flip switch on variac rapidly off then on.

38.) Perform the operation in step 11 multiple times and record whether trips of unit occur.

1.	No trip, 100 msec	No alarms	
2.	No trip	No alarms	
3.	No trip	SCR short alarm	
4.	No trip, 100 msec (noticeable DC hit)	No alarms	(Trace #3)
5.	No trip, 150 msec (noticeable DC hit)	SCR short alarm	(Trace #5)

39.) Shutdown unit and remove variac and oscilliscope as follows:

a.) Remove variac output ground lead to input side of A27-F3 (term #1).

b.) Remove variac input hot lead to input side of A27-F4 (term #1).

c.) Remove variac output lead on the output side of A27-F4 (term #2).

d.) REINSTALL Fuse A27-F4.

e.) Remove oscilliscope lead on A27, lead #243.

f.) Remove oscilliscope lead on A27, lead #200 (+ of DC logic).

39a.) Restart unit and put loads on UPS power.

40.) - Static swithc is operating as noted by observation of static switch light on control module during UPS to maint transfer.

41.) Measure B-phase AC input voltage to DC logic power supplies

118.34 VAC

Measure DC logic power with unit on line

(+20V)	20.78 VDC
(-20V)	-20.86 VDC

*42.) Adjust motor operator on UPS1D

Unable to adjust CB-4, Maintenance supply breaker. CB-4 requires replacement. Problem determined to be the breaker or the transfer motor operator. WR 177124 initiated to replace breaker CB-4.
(-Breaker replaced.)

43.) Perform transfer - UPS to maintenance

- Record transfer with visicorder

*NOTE: UPS output breaker CB-3 is sticking and requires replacement.

2VBB-UPS1A, 1B, 1G TEST SUMMARY

Purpose: To prove that the DC logic power for the Exide UPS is powered from the B-phase maintenance supply. The K-5 pickup and drop out voltages and the DC trip-point of the DC logic will be recorded for UPS1A, not for UPS1B and UPS1G. The internal batteries will be tested and replaced.

Results Summary:

1.) On UPS1A, UPS1B and UPS1G, it was verified that the DC logic power supplies are fed from the B-phase maintenance supply.

2.) The K-5 relay drop out and pick up voltages were recorded for UPS1A and they were found to be below the trip point of the DC logic power.

3.) On UPS1A, UPS1B, UPS1G, the maintenance supply was opened with the UPS feeding the loads and no UPS trips occurred.

4.) On UPS1A, UPS1B and UPS1G, the batteries were replaced.

CONCLUSION

This test proves that the DC logic power is fed by the B phase maintenance power. It proves that the internal batteries were effectively dead. For UPS1A it proves that on a slow transient that the DC logic power will drop out before the K-5 relay will transfer to UPS power.

Numerical Results:

1.) The UPS1A DC logic trips at <16.7 VDC. (with 75.6 VAC on input).

2.) UPS1A: K-5 relay drop out - 47 VDC
K-5 relay pick up - 52 VDC

4.) The internal battery voltage was measured:

UPS1A:	Positive -	0.7
	Negative -	1.1
UPS1B:	Positive -	0.54
	Negative -	6.2
UPS1G:	Positive -	18.3
	Negative -	0.69

1.) Place the loads off UPS1A on maintenance power.

2.) Pull the P-6 block to CB-4

3.) Open CB-2, CB-1, A27-S1.

4.) Measure and record DC logic power - (this is battery voltage)

+20 VDC Batt.	+0.70 VDC
-20 VDC Batt.	-1.15 VDC

5.) Open A27-CB1.

6.) Install a variac on B-phase AC input to logic power supply as follows:

a.) Attach variac output ground lead to input side of A27-F3 (term #1).

b.) Attach variac input hot lead to input side of A27-F4 (term #1).

c.) Remove Fuse A27-F4.

d.) Attach variac output lead on the output side of A27-F4 (term #2).

7.) Measure voltage on A27-F4, term. #1 referenced to phase A, B and C of the maintenance supply:

A27-F4 to Phase A:	206 VAC
A27-F4 to Phase B:	0 VAC
A27-F4 to Phase C:	208 VAC

8.) Set variac for approximately 120 vac.

9.) Turn logic power on to UPS1A.

10.) Slowly decrease AC voltage to the DC logic power supplies.

120 VAC = 21.08 VDC

11.) Record when DC voltage starts to drop -

92.42 VAC	Logic trip	75.60 VAC
21.05 VDC	Pwr Supply failed	16.70 VDC

12.) Lower AC input to K-5 relay until relay drops out and pickup.

47 VAC drop out

52 VAC pickup

<u>DO NOT PROCEED WITHOUT NRC APPROVAL</u> Received 13:15 8/23/91

13.) Shutdown unit and remove variac as follows:

a.) Remove variac output ground lead to input side of A27-F3 (term #1).

b.) Remove variac input hot lead to input side of A27-F4 (term #1).

c.) Remove variac output lead on the output side of A27-F4 (term #2).

d.) REINSTALL Fuse A27-F4.

14.) Repair UPS1A. ** CHARGER SUPPLY REPAIR ONLY **

Troubleshot UPS1A - no problem found. Suspect weak breaker in VBB-PNL301 (Bkr #1) trips at time - WR #195051 written to replace

15.) Restart unit, as required, and put the load on UPS power.

16.) Open CB-1 on 2VBB-XD500 and verify that unit does not trip.

Unit did not trop
Voltage difference alarm
Maint out of limit alarm

17.) While on UPS power without maintenance available record the following:

UPS output voltage:	Phase A:	118.8 VAC
	Phase B:	123.0 VAC
	Phase C:	120.2 VAC

DC Link voltage: (as found) 135 VDC
(as left) 140.0 VDC

NOTE: WR #154535 written on 5/10/91 previous problem

UPS output Frequency: 59.85 Hz

18.) Close CB-1 on 2VBB-XD600.

19.) Transfer loads to Maintenance.

20.) Open P-6 block on CB-4.

21.) Shut down unit including logic power.

22.) Open AC input breaker, 2VBS-PNL301, 1.

23.) Measure each new battery prior to installing in UPS1A.

1.) 6.08 VDC
2.) 6.09 VDC
3.) 6.10 VDC
4.) 6.12 VDC
5.) 6.13 VDC
6.) 6.14 VDC

24.) Using a leads lifted log replace the control batteries in UPS1A.

25.) Measure battery voltage on each battery removed from UPS1A:

1.) 6.31 VDC
2.) 5.29 VDC
3.) 4.92 VDC
4.) 2.64 VDC
5.) 6.46 VDC
6.) 5.54 VDC

26.) Lift motor operator on CB-4.

27.) Reistall P-6 block on CB-4.

28.) Turn logic power on to UPS1A.

29.) Reset motor operator on CB-4.

30.) Restart UPS1A and put load on UPS power, CB-3 closed.

Supply breaker did not trip.

NIAGARA MOHAWK NINE MILE POINT **WORK REQUEST** 8/16/91 **W.R. NO.** 190944

3. DEPARTMENT TO DO WORK
- [L] [S] ELECTRICAL MAINTENANCE
- [L] [S] MECHANICAL MAINTENANCE
- [L] [S] INSTRUMENTATION & CONTROL
- [L] [S] COMPUTER [L] [S] ISI
- [L] [S] SECURITY I & C [L] [S] FIRE
- [L] [S] METER & TEST
- [L] [S] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY) 3/0/A
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [5] NEXT UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

5. UNIT: ☐1 ☒2 ☐SITE
6. SYSTEM CODE 2VBB
7. COMPONENT NUMBER VPS 1B
8. BIP NUMBER 71

18. SAFETY CLASS ☐SR ☐Q ☒NSR
19. EQ ☐YES ☒NO
20. ASME COMPONENT ☐YES ☒NO
21. CLEANNESS CLASS N/A

9. EQUIPMENT TITLE: 2VBB - VPS 1B

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE ☐ DESCRIPTION

check trip setpoints of VPS 1B + record.

12. ORIGINATOR Perry H. Bertsch x7502 DATE 8/16/91
13. APPROVED Rene Murray R. Murray DATE 8/16/91
14. W.R. RECEIVED Sherman H. Theresa H. Darling x22221 DATE 8/16/91
15. PROCEDURE NOS. / MES.3.1 / / / / / ☐ NOT REQUIRED
16. ☐ QA NOTIFIED BY SUPV. DATE / / TIME QA NAME

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB. ACCT	PROJ COST ACCT NO.
706.50		0635	321258		200	0110		0004

22. QA REVIEW QA AE Zeen DATE 8/16/91 23. INSPECTION REQUIRED ☐ YES ☒ NO INIT
QA-ISI-8-16-91

STAGED BY Perry H. Bertsch DATE 8/16/91 ☐PARTS ☐PROCEDURE ☐DRWG ☐MARKUP ☐RWP ☐NA INIT
25. ASSIGNED TO Perry H. Bertsch, Jeff Vondell DATE 8/26/91
26. NOTIFICATIONS: QC DATE / / TIME ☒NA QA INIT SSS DATE KOC 8/26/91 TIME 1055
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE ☐☐ DESCRIPTION

performed troubleshooting per attached sheets, also replaced logic power supply battery

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE ☐☐ DESCRIPTION

bad battery

31. ATTACHMENTS ☒ MATERIAL ISSUES ☐ PROCEDURE CHECKLISTS ☐ INSPECTION REPORTS ☐ LAS ☐
32. MARK UP NO'S Blue 2-91-5086 RWP NO'S / N/A / QCIR NO'S N/A NCR NO'S N/A
33. CORRECTIVE ACTION COMPLETED BY Perry H. Bertsch, Jeff Vondell DATE 8/26/91
34. SUPERVISOR REVIEW BY DATE / / INIT
35. WORK ACCEPTED BY QA AE Zeen ☒NA DATE 8/16/91 INIT
36. PMT REVIEW BY Sherman H. Theresa Darling ☐ASSS/SSS ☐SUPV. DATE 8/16/91
PMT PROCEDURE NO'S. See WP / / / / ☒PMT TEST REPORT ☐ NOT REQUIRED INIT
38. PMT COMPLETE VERIFIED BY ☐ NA DATE / / INIT
39. ACCEPTED BY ☐ SSS ☐ SUPV. DATE / / INIT

40. NPRDS ☐ NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-188 SYMBOL NUMBER 55-32-053 R09-85

ATTACHMENT 1
TROUBLESHOOTING PLAN

• Section 1 •

System/Component to be Inspected	Work Request Number
2VBB-CPS1B	192944

Will the system/component be "operable" per Technical Specifications during troubleshooting? ☐ Yes ☒ No

Brief description of troubleshooting work to be performed including precautions, limitations or boundary restrictions imposed.

Per attached sheets 3, 4 and 5

Troubleshooting Plan Originator Signature	Date 8/26/91
Independent Verifier Signature (other than Originator)	Date 8/26/91
Station Shift Supervisor Signature	Date 8/26/91

TROUBLESHOOTING PLAN (AP-5.4.2, Form 1b, Rev 01)

• Section 2 •

Record of Actions Taken (Before deviating from Planned Troubleshooting notify SSS.)

Problems Found/Results

☐ System or Component was left "As Found" ☐ System or Component deficiency was corrected under the Troubleshooting WR

Troubleshooter Signature	Date

(8/26/91)

1.) Place the loads off UPS1B on maintenance power. PB 8/26/91
* Visually verify that the static switch operates.

2.) Pull the P-6 block to CB-4 PB 8/26/91

3.) Open CB-2, CB-1, A27-S1., (Use A27 CB-1 PB

4.) Measure and record DC logic power - (this is battery voltage) +20vdc Batt - +0.54
-20vdc Batt - -6.2

5.) Open A27-CB1.

6.) Measure voltage on A27-F4, term. #1 referenced to phase A, B and C of the maintenance supply:

A27-F4 to Phase A: 199.2 VAC B ϕ - N 119.9

A27-F4 to Phase B: 0.0 VAC

A27-F4 to Phase C: 199.6 VAC

7.) Open AC input breaker, 2VBS-PNL301, 2. PB

8.) Measure each new battery prior to installing in UPS1B. PB

1.) 6.098
2.) 6.128
3.) 6.084
4.) 6.095
5.) 6.096
6.) 6.105

9.) Using a leads lifted log replace the control batteries in UPS1B. PB

10.) Measure battery voltage on each battery removed from UPS1B:

1.) 6.2
2.) 6.2
3.) 5.4
4.) 4.8
5.) 5.5
6.) 1.2

11.) Lift motor operator on CB-4. P/B

12.) Reinstall P-6 block on CB-4. P/B

13.) Turn logic power on to UPS1B. P/B

14.) Reset motor operator on CB-4. P/B

15.) Restart UPS1B and put load on UPS power, CB-3 closed. P/B

JB 16.) With loads on UPS power, open A27-S1 and verify no CONTROL BATTERY DISCHARGE alarm occurs.

Control Battery Discharge alarm in alarm light in, Logic alarm in

JB 17.) Close A27-S1.

all alarms cleared

18.) With loads on UPS power open CB-1 on 2VBB-XD601.

maint out of limit light
voltage difference light

19.) With loads on UPS power without maintenance available record the following:

UPS output voltage: ØA 119.0 VAC, ØB 120.0 VAC, ØC 120.1 VAC

DC Link voltage: 140.5 vdc

UPS output Frequency: 59.88 Hz

20.) Close CB-1 on 2VBB-XD601.

maint supply - not supplying load.

ØA	118.6	VAC
ØB	116.4	VAC
ØC	119.0	VAC

S1- on Batt off Logic off +21.00 vdc

S1 on Batt on Logic on +21.07

* Supply Brk tripped during starting of unit - CB-1 closing on button best position

Logic on, Batt on, unit running +20.97 vdc

W-1 - pulse of DC Batt while K5 energizes

voltage drops ≈ 2.4 vdc

takes ≈ 1.64 sec to return to normal.

= 5 amps peak off of Batt.

W-2 voltage dropped fast to 18 vdc and held

W-3 peak load ≈ 5 amps steady state 3.1 amps from wire 200 from Batt.

after approx 2 min unit tripped but CB-1 did not trip - + voltage did not go below 18 vdc

PC ov lite, Pwr supply failed, cont Batt discharge, alarm, trip, Inverter logic lites all on.

after reset - all lites clear except cont Batt discharge + alarm + Inverter logic

after ≈10 min -20 vdc was -18.75 vdc on Batt.

NIAGARA MOHAWK NINE MILE POINT **WORK REQUEST** W.R. NO: 190946

3. DEPARTMENT TO DO WORK
- [L] [S] ELECTRICAL MAINTENANCE
- [L] [S] MECHANICAL MAINTENANCE
- [L] [S] INSTRUMENTATION & CONTROL
- [L] [S] COMPUTER [L] [S] ISI
- [L] [S] SECURITY I & C [L] [S] FIRE
- [L] [S] METER & TEST
- [L] [S] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY) 3/0/A
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [5] NEXT UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

5. UNIT: [1] [2] [SITE]
6. SYSTEM CODE VBB
7. COMPONENT NUMBER VPS 16
8. BIP NUMBER 71

18. SAFETY CLASS [SR] [Q] [NSR]
19. EQ [YES] [NO]
20. ASME COMPONENT [YES] [NO]
21. CLEANNESS CLASS N/A

9. EQUIPMENT TITLE: 2VBB- VPS 16

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE [ ] DESCRIPTION

with maintenance supply off - record VPS output voltage and frequency and DC Bus voltage.

12. ORIGINATOR Perry H. Bertsch x7502 DATE 8/16/91
13. APPROVED Rose Murray R. Murray DATE 8/16/91
14. W.R. RECEIVED Sheron H. Lee / Therese Darling 2261 DATE 8/16/91
15. PROCEDURE NOS. / M15.311 / / / / / / [NOT REQUIRED]
16. [QA NOTIFIED BY SUPV.] DATE / / TIME QA NAME

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB ACCT.	PROJ COST ACCT NO
706.50		0635	321258		200	0110		0004

22. QA REVIEW QA [signature] DATE 8/16/91 23. INSPECTION REQUIRED [YES] [NO] INIT
ISI-8-16-91

STAGED BY Perry H. Bertsch DATE 8/16/91 [PARTS] [PROCEDURE] [DRWG] [MARKUP] [RWP] [NA] INIT

25. ASSIGNED TO Perry H. Bertsch, Jeff Vandell DATE 8/24/91
26. NOTIFICATIONS: QC DATE / / TIME [illegible] SSS DATE 8/24/91 TIME 1452
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE DESCRIPTION

performed troubleshooting per [illegible] replaced logic power supply battery

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE DESCRIPTION

Bad battery

31. ATTACHMENTS [MATERIAL ISSUES] [PROCEDURE CHECKLISTS] [INSPECTION REPORTS] [LAS] [ ]
32. MARK UP NO'S Blue 2-91-50853 RWP NO'S / / / / QCIR NO'S N/A NCR NO'S N/A
33. CORRECTIVE ACTION COMPLETED BY Perry H. Bertsch, Jeff Vandell DATE 8/25/91 INIT
34. SUPERVISOR REVIEW BY DATE / / INIT
35. WORK ACCEPTED BY QA [NA] DATE 8/16/91 INIT

36. PMT REVIEW BY Sheron H. Lee Therese Darling [ASSS/ASSS SUPV.] DATE 8/16/91 INIT
PMT PROCEDURE NO'S. See UDIP / / / / [PMT TEST REPORT] [NOT REQUIRED]
38. PMT COMPLETE VERIFIED BY [NA] DATE / / INIT
39. ACCEPTED BY [SSS] [SUPV.] DATE / / INIT

40. NPRDS [NA] SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

1.) Place the loads off UPS1G on maintenance power.
*Visually verify that the static switch operates.

2.) Pull the P-6 block to CB-4

3.) Open CB-2, CB-1, A27-S1.

Logic on- power supply failed, DC OV, Maint. out of limits, voltage diff output OV/UV, Inverter logic trip.

4.) Measure and record DC logic power - (this is battery voltage)

-20 VDC Batt.	+0.69 VDC
+20 VDC Batt.	+18.3 VDC

5.) Open A27-CB1.

6.) Measure voltage on A27-F4, term. #1 referenced to phase A, B and C of the maintenance supply:

A27-F4 to Phase A:	206.7 VAC
A27-F4 to Phase B:	0.0 VAC
A27-F4 to Phase C:	213.3 VAC

7.) Open AC input breaker, 2VBS-PNL301, 7.

8.) Measure each new battery prior to installing in UPS1G.

1.)	6.086 VDC	4.)	6.167 VDC
2.)	6.096 VDC	5.)	6.100 VDC
3.)	6.115 VDC	6.)	6.098 VDC

9.) Using a leads lifted log replace the control batteries in UPS1G.

Lead 256 to +20 VDC power supply had burnt log - screw was loose; other screws were tight.

10.) Measure battery voltage on each battery removed from UPS1G:

1.) +6.414 VDC
2.) +6.370 VDC
3.) +3.067 VDC
4.) +6.392 VDC
5.) +2.464 VDC
6.) +5.518 VDC

11.) Lift motor operator on CB-4.

12.) Reistall P-6 block on CB-4.

13.) Turn logic power on to UPS1G.

14.) Reset motor operator on CB-4.

15.) Restart UPS1G and put load on UPS power, CB-3 closed.

16.) With loads on UPS power, open A27-S1 and very no CONTROL BATTERY DISCHARGE alarm occurs.

No alarms or lights.

17.) Close A27-S1.

18.) With loads on UPS power, open CB-1 on 2VBB-XD602.

Voltage difference, Maintenance out of limits alarms.

19.) With loads on UPS power without maintenance available record the following:

UPS output voltage:	Phase A:	119.2 VAC
	Phase B:	121.6 VAC
	Phase C:	121.4 VAC

DC Link voltage: 139.58 VDC

UPS output Frequency: 59.91 Hz

20.) Close CB-1 on 2VBB-XD602.

313-367 R01-90

NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

EDC NO.	2	E	1	0	4	6	4	REV

ENGINEERING DESIGN CHANGE NEL-350 1/90

DOCUMENTS CHANGED

C=TO BE INCORPORATED
N=NOT TO BE INCORPORATED
I=NOT TO BE INCORPORATED, NOT TO BE POSTED
T=TEMPORARY MODIFICATION
A=ALREADY INCORPORATED

	DISC	STATUS		DISC	STATUS
N2E35600IPWSUP001	2E	C			

DESCRIPTION OF CHANGE

CHANGE TYPE: [X] HARDWARE/INSTALLATION [ ] DOCUMENTATION ONLY

Change UPS Logic Power Supply

This EDC is to change the required power input for the UPS Logic Power and Relay Panel from the maintenance supply (alternate 120VAC power) to the UPS inverter output.

Technical Justification: The use of the inverter output will prohibit transients on the maintenance supply from affecting the Logic Power. This change is recommended by Exide Electronics.

MEL: ZVBB-UPS1B

INSTALLATION COPY

RECEIVED AUG 23 1991

ECL: 2-91-042

SOURCE OF CHANGE

CODE N12200

[ ] APPROVED MOD [ ] AS-BUILT UPDATE [ ] DESIGN IMPLEMENTATION PROBLEM [ ] FIELD NONCONFORMANCE/UNSAT [ ] LICENSING CONCERN [X] OTHER

REFERENCE DOCUMENTS			
MOD NO.	N/A	SC2-0273-91	
PR NO.	N/A		

RDO COMPANY/DISCIPLINE: Niagara Mohawk / Electrical

SYSTEM ID. VBB — SAFETY CLASS NSR

EQ: [ ] YES... [X] NA — EQAI# N/A — BY/DATE [illegible] 8-23-91

SQ: [ ] YES... [X] NA — EQAI# N/A — BY/DATE [illegible] 8-23-91

LICENS IMPACT: [ ] YES [X] NO — LIST D91-164

MEL: [X] YES... [ ] NO — SEE PAGE 1

ASME: [ ] YES... [X] NO — ANII N/A — DATE: — PE — DATE:

RDO	PREPARED	PHONE/DATE	CHECKED/	DATE	APPROVED/	DATE
	A.Freeland	x7223/8-20-91	Timothy Ahlin	8/22/91	K. Jurlina	8/23/91

NMPC				
INTERDISC. CONC.	N/A	INTERDISC. CONC.	N/A
ACCEPTED/DATE	N/A	QA CONCURRENCE/DATE	N/A
MOD HOLD FILE/DATE	N/A	RELEASED/DATE	DTE-2-91-043 [illegible] 8-23

IMPLEMENTATION PREREQUISITES: [X] NO [ ] YES..DO AFTER OR CONCURRENT WITH EDC#

SYMBOL NO. 55-32-385

113-369 R01-90

NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

ENC. NO. 2E10464 REV

ENGINEERING DESIGN CHANGE NEL-350 1/90

WORK INSTRUCTIONS:

NMPC INSTRUCTIONS:

STEPS 4,16,17 OF EXIDE INSTRUCTIONS TO BE PERFORMED AT THE DISCRETION OF THE FIELD.

EXIDE INSTRUCTIONS:

RE: NIAGARA MOHAWK CHANGE RECOMMENDATION TO A27 PANS

1) TRANSFER LOAD TO BYPASS
2) SECURE CB4
3) SHUT DOWN MODULE
4) REMOVE PAN A27
5) RELOCATE RV1 FROM RELAY K5 PIN(9)-(10) TO SWITCH S1 PIN (1)-(4)
6) DISCONNECT WIRE # 368 FROM K5(9)
7) DISCONNECT WIRE # 367 FROM K5(10)
8) DISCONNECT WIRE # 257 FROM K5(4)
9) DISCONNECT WIRE # 255 FROM K5(2)
10) RECONNECT WIRE # 368 TO K5(2)
11) RECONNECT WIRE # 367 TO K5(4)
12) RECONNECT WIRE # 257 TO K5(8)
13) RECONNECT WIRE # 255 TO K5(6)

WORK INSTRUCTIONS (CON'T).

14) RENAME JUMPER K5(8) TO K5(10) FROM 367 TO BE 257

15) RENAME JUMPER K5(6) TO K5(9) FROM 368 TO 255

16) REPLACE CONTROL BATTERY BANK WITH NEW ONES

17) REMOUNT A27

18) RESUME NORMAL UPS OPERATION.

ATTACHED:

S/D C 110 611 334

W/D D 110 615 235

8/21/91
1720 HRS

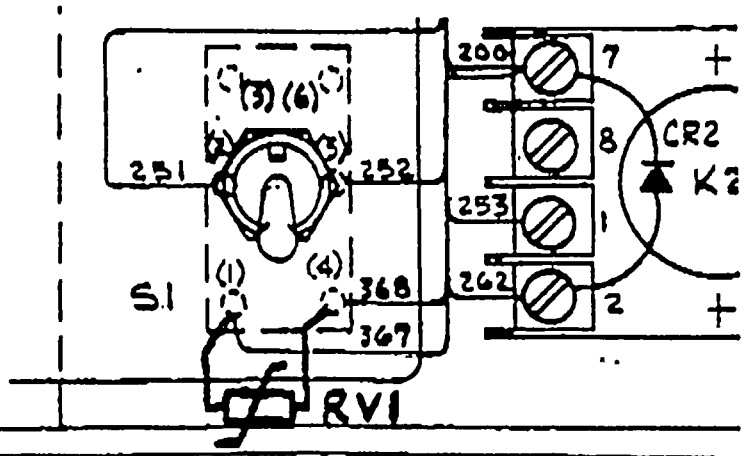
NEL-350 R01-90

NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

EDC NO. 2E10464 REV PAGE 4 OF 4

ENGINEERING DESIGN CHANGE NEL-350 1/90

PARTIAL OF EXIDE DRAWING.
D 110 615 235



WIRE #	SIZE	FROM	END ITEM	TO	END ITEM
253	18	K3-1	24	K1-1	24
253		K1-1	24	K2-1	
255		F2-2	23	K5-6	
256		PS1-(+)	24	CR5-A	
256		PS1-(+)	24	CB1-5B(AUX)	26
257		F1-2	23	K5-8	24
258		PS2-(-)	24	CR6-C	24
258		CR6-C	24	A1-E3	26
360		BT1(-)	26	BT2(+)	26
361		BT2(-)	26	BT3(+)	26
362		BT3(-)	26	CB1-1A	25
363		BT4(+)	26	CB1-1	25
364		BT4(-)	26	BT5(+)	26
365		BT5(-)	26	BT6(+)	26
366		CB1-3D (AUX)	26	A1-E4	26
367		S1-1	24	K5-4	24
257→		K5-10		K5-8	
368		S1-4		K5-2	
255→		K5-9		K5-6	

SYMBOL NO. 55-32-387

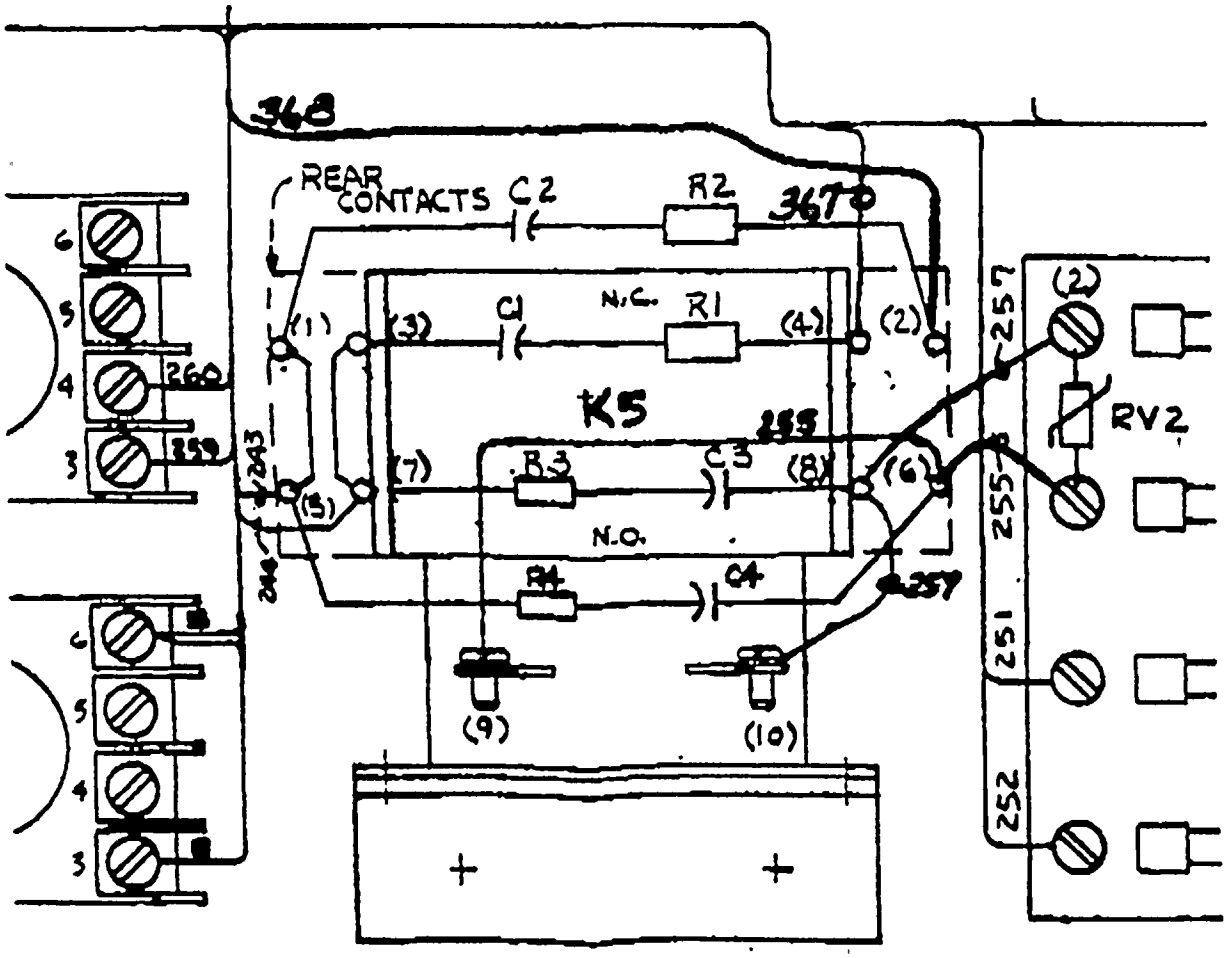
313-369 R01-90

NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

ETC NO. 2 E 1 0 4 6 4 REV PAGE 5 OF 9

ENGINEERING DESIGN CHANGE NEI-350 1/90

PARTIAL OF EXIDE DRAWING
D 110 615 235



113-369 R01-90

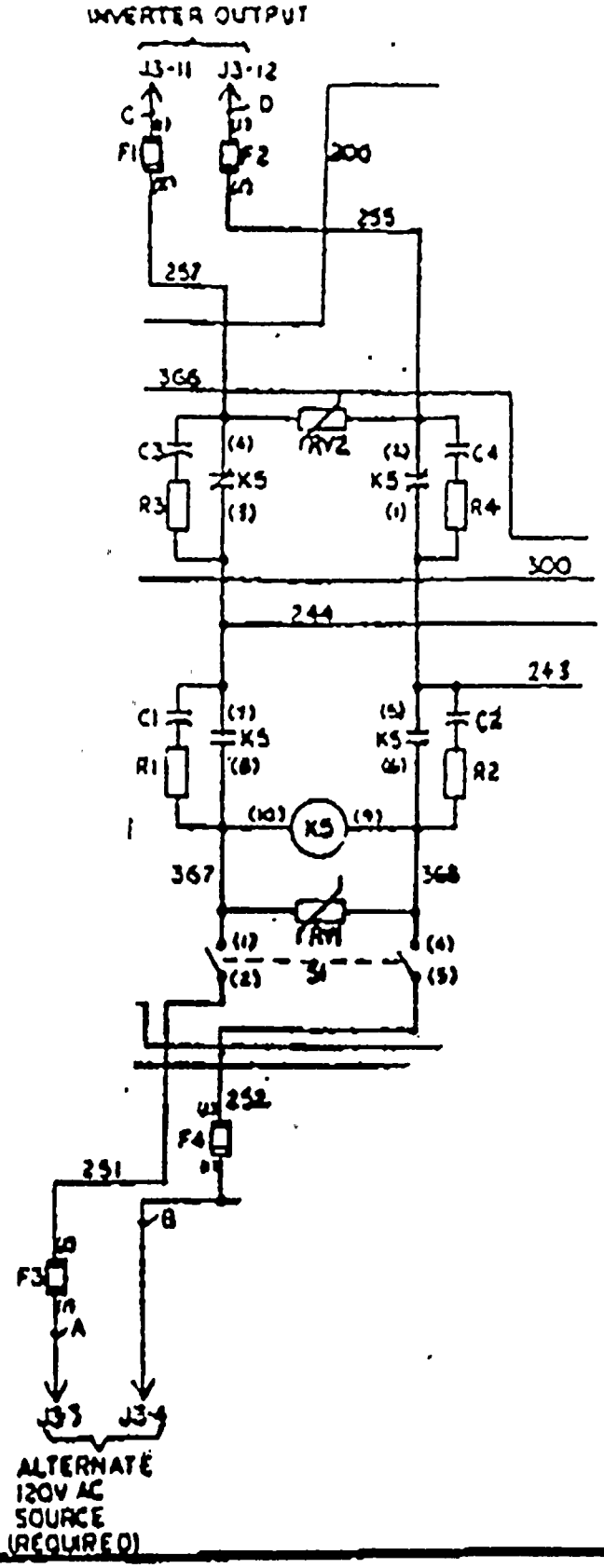
NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

EDC NO. 2E10464 REV

PAGE 6 OF 9

ENGINEERING DESIGN CHANGE NEJ-350 1/90

FROM: NMPC NO: N2E35600IPNSUP001
PG 6 11061 1939



SYMBOL NO. 55-32-387

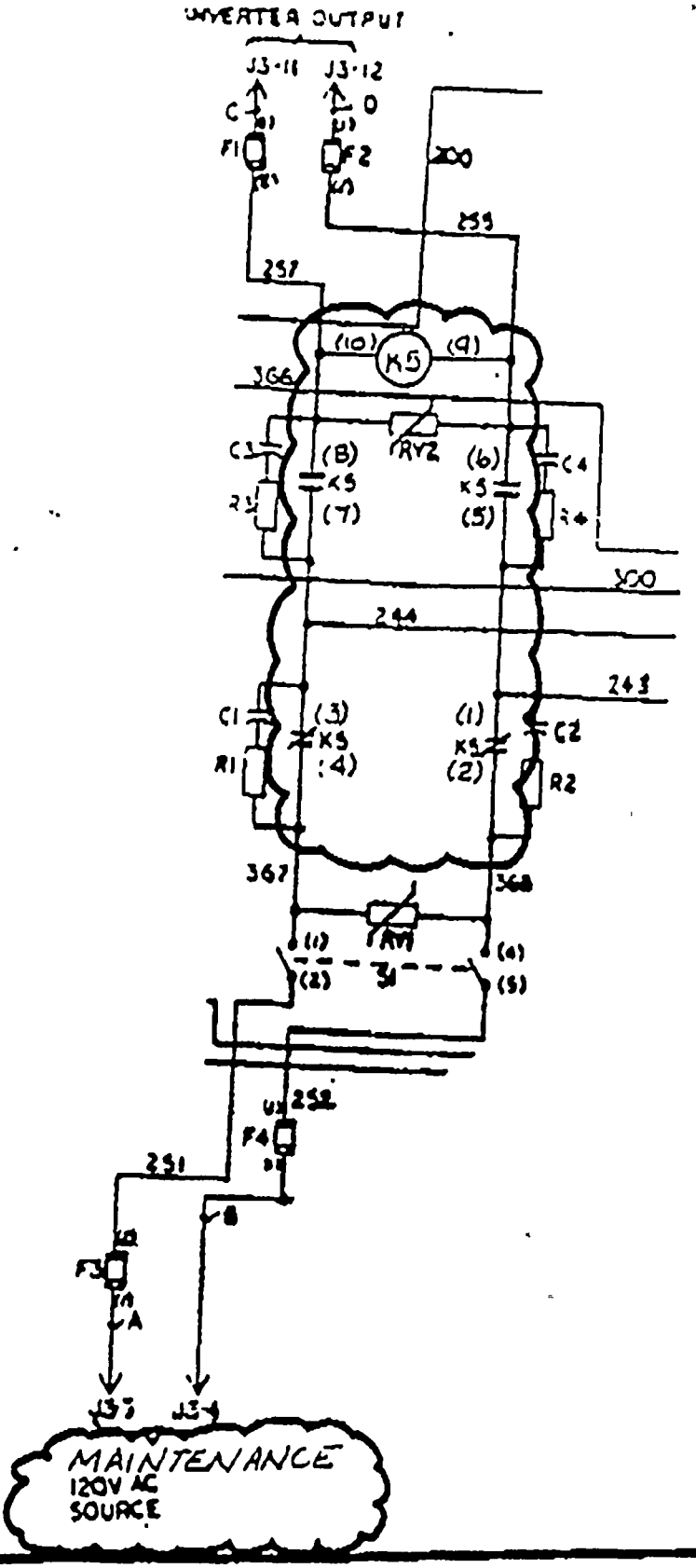
3-369 R01-90

NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

EDC NO. 2E10464 REV PAGE 7 OF 9

ENGINEERING DESIGN CHANGE NEL-350 1/90

TO: NMPC NO: N2E356001PW/SUP001
PG. C110 611534



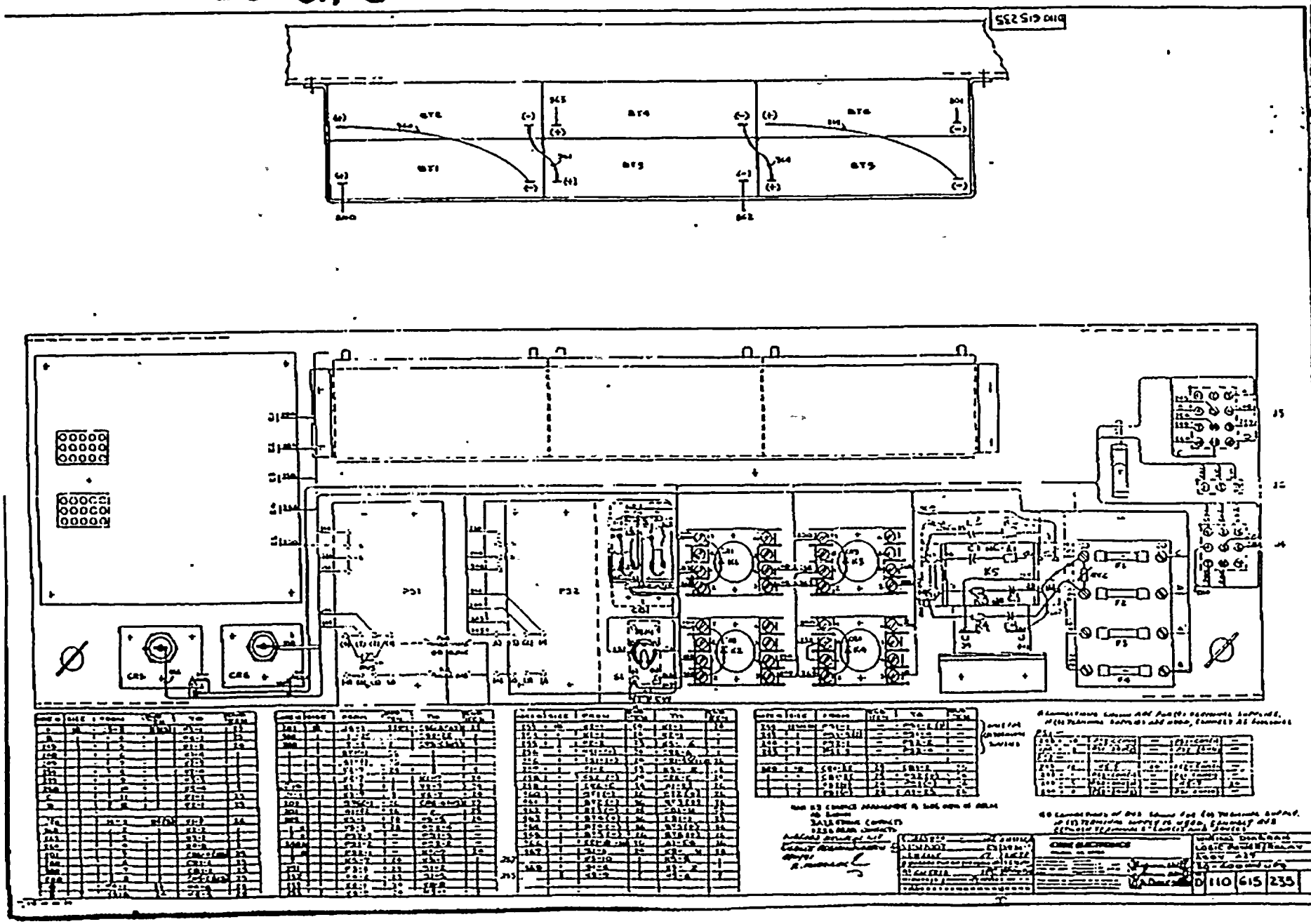
SYMBOL NO. 55-32-387

ADD TO NMPCNO:
N2E35600IPWSUP001
IN SECTION 3

ENGINEERING DESIGN CHANGE NEL-350 1/90

NIAGARA MOHAWK
NINE MILE POINT NUCLEAR STATION

EDC NO 2E11044 REV



PAGE 8 of 8

1-369 R01-90

NIAGARA MOHAWK NINE MILE POINT NUCLEAR STATION

EDC NO. 2E10464 REV

PAGE 9 OF 9

ENGINEERING DESIGN CHANGE NEL-350 1/90

ADD TO NMPCNO:
N2E35600IPWSUP001
IN LIST OF DRAWINGS PAGE 0-5

NUMBER	TITLE	LOCATED IN SECTION
D 110 615 235	WIRING DIAGRAM LOGIC POWER/RELAY, A27	3

REVISE NMPCNO:
N2E35600IPWSUP001
SECTION 2.3.7 ON PAGES 2-10 and 2-11
AS FOLLOWS:

2.3.7 Logic Power and Relay Panel, A27.

This panel contains positive and negative 20 VDC power supplies (PS1 and PS2). These power supplies are powered through relay A27K5, which selects inverter output or maintenance source. Positive and negative 18-V sealed batteries (A27BT1-BT6) are mounted on this panel and are kept charged by the power supplies. Circuit breaker A27CB1 disconnects the battery from

the logic power bus, and logic power supply switch A27S1 disconnects the power supply's 120 VAC input power (only from the maintenance power). The panel also contains card-mounted (A27A1) relays which interface the A13 controls with external items such as circuit breaker motor operators, shunt trip coils, and remote monitor panel functions. Control battery discharge sensing is located on the A27A1 card. (These batteries should be replaced at 4-year intervals.)

11.WA 1B SC

NIAGARA MOHAWK NINE MILE POINT

WORK REQUEST

1. DATE 8/23/91

2. W.R. NO. 195010

3. DEPARTMENT TO DO WORK
- [X] [S] ELECTRICAL MAINTENANCE
- [L] [S] MECHANICAL MAINTENANCE
- [L] [S] INSTRUMENTATION & CONTROL
- [L] [S] COMPUTER [L] [S] ISI
- [L] [S] SECURITY I & C [L] [S] FIRE
- [L] [S] METER & TEST
- [L] [S] OTHER

4. PRIORITY OF WORK 3/0/F
- [1] EMERGENCY
- [2] URGENT (<1 DAY)
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [5] ~~NEXT~~ THIS UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

5. UNIT: [1] [X] 2 [SITE]
6. SYSTEM CODE VBB
7. COMPONENT NUMBER 2VBB-UPS1A
8. BIP NUMBER 71.B09

18. SAFETY CLASS [SR] [Q] [X] NSR
19. EQ [YES] [X] NO
20. ASME COMPONENT [YES] [X] NO
21. CLEANNESS CLASS

9. EQUIPMENT TITLE: UPS-1A

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS SYMPTOM CODE [ ] DESCRIPTION

Perform SDC SC2-0273-91

12. ORIGINATOR Keero LAMPMAN x4799 KLL DATE 8/23/91

13. APPROVED RW Gayne DATE 8/23/91

14. W.R. RECEIVED Dan Ramey DATE 8/26/91

15. PROCEDURE NOS. 2E10463 / / / / / NOT REQUIRED

16. [ ] QA NOTIFIED BY SUPV. DATE / / TIME QA NAME

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB. ACCT.	PROJ. COST ACCT. NO.
706-46		9591	321257		200	0110		

22. QA REVIEW QA [signature] DATE 8/26/91 23. INSPECTION REQUIRED [YES] [X] NO INIT
QA-IST-8-26-91

STAGED BY DATE / / [PARTS] [X] PROCEDURE [DRWG] [MARKUP] [RWP] [NA] INIT

25. ASSIGNED TO B. WHITCOMB DATE 8/26/91

26. NOTIFICATIONS: QC DATE / / TIME [QA] QA INIT. [SSS] SSS DATE 8/26/91 TIME 1538

27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE [A] DESCRIPTION Re Calibrate / Adjust

Performed work as directed by EDC 2E10463

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE [ ] DESCRIPTION

As described in EDC 2E10463

31. ATTACHMENTS [ ] MATERIAL ISSUES [X] PROCEDURE CHECKLISTS [ ] INSPECTION REPORTS [ ] LAS [ ]

32. MARK UP NO'S 91-508162 RWP NO'S N/A QCIR NO'S N/A NCR NO'S

33. CORRECTIVE ACTION COMPLETED BY Whitcomb, Coe, Poor DATE 8/26/91 INIT

34. SUPERVISOR REVIEW BY [signature] DATE 8/27/91 INIT

35. WORK ACCEPTED BY QA [signature] [ ] NA DATE 8/27/91 INIT

36. PMT REVIEW BY [signature] [ ] ASSS/SSS [X] SUPV. DATE 8/27/91 INIT

PMT PROCEDURE NO'S / / / [ ] PMT TEST REPORT [ ] NOT REQUIRED

38. PMT COMPLETE VERIFIED BY [signature] [ ] NA DATE 8/27/91 INIT

39. ACCEPTED BY [ ] SSS [ ] SUPV. DATE / / INIT

40. NPRDS [ ] NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186

SYMBOL NUMBER 55-32-053 R09-85

NIAGARA MOHAWK

LIFTED LEAD AND JUMPER LOG

1 UNIT: II	2 ~~TEMP. MOD.~~ # EDC 2E10463 ☐ NA
3 WORK DOC: WO# 185010	4 PROC. # ☑ NA

2VBB-UPS 1A

#	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	APPLICATION PERF'D INIT.	APPLICATION VERF'D INIT.	RETURN TO NORMAL PERF'D INIT.	RETURN TO NORMAL VERF'D INIT.
1	2VBB-UPS1A	A27P3		PLUG		✓		A27 PAN				JPO	BC.	BC.	J.P.
2		A27P4				✓						JPO	BC.	BC.	J.P.
3		A27P6				✓						JPO	BC.	BC.	J.P.
4		A27P1				✓						JPO	BC.	BC.	J.P.
5		A27P2				✓						JPO	BC.	BC.	J.P.
6		RU1		~~Relay K5 EJH~~ Resistor	9	✓	✓	Relay K5	9	✓		EJH	JPO		
7					10	✓	✓		10	✓		EJH	JPO		
8				~~Relay K5 EJH~~				~~Relay EJH~~ Switch S1 Relant	1			EJH		EJH	JPO
9									4			EJH		EJH	JPO
10		#368		K5	9	✓						EJH	JPO		
11		#367			10	✓						EJH	JPO		
12		#257			4	✓						EJH	JPO		
13		#255			2	✓						EJH	JPO		
14		#268						K5 Relant to	2					EJH	JPO
15		#367							4					EJH	JPO
16		#257							8					EJH	JPO
17		#255							6					EJH	JPO

		5. APPLICATION SIGNATURE	INITIAL	DATE	TIME	6. RETURN TO NORMAL SIGNATURE	INITIAL	DATE	TIME
313-253 R11-86	PERFORMED BY:	Edward J. Adamo / James Cosma	EJH / JPO	8/26/91	PM	Edward J. Adamo	EJH	8 26 91	PM
SYMBOL NO. 55-32-211	VERIFIED BY:	Bernie Co	BC	8/26/91	PM	Jeffrey Fox / Hans Olsen	J.P. / JPO	"	"

Verify P-6 block open on CB-4

Verify logic power is off:

A27-CB1 open
A27-S1 open

NOTE. CALL CSC - ALARMS WILL CLEAR

* CAUTION: RIGHT SIDE BUS CONNECTIONS ARE HOT INSTALL RUBBER BLANKETS.

Unplug the following plugs on A27:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Remove A27 pan from unit

Modify A27-K5 relay wiring per EDC

Reinstall the A27 pan.

Reinstall following plugs:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Close A27-S1 (Leave A27-CB1 open).
Verify mimic lights come on on the front panel.
Alarm horn will come in. (Reset as necessary)

Push relay A27-K5 in AND HOLD. Verify that lights go out.

Release relay A27-K5 and verify lights come on.

CLOSE UPS TRIM AC & DC BREAKERS

CLOSE A27-CB1

Re-energize the UPS on AC power, CB-2 open, with loads on maintenance.

Visually verify that the A27-K5 relay is energized.

Open A27-CB1.

Open the A27-S1 switch while monitoring A27-K5 and verify that the A27-K5 relay does not drop out.

Reclose A27-S1 and A27-CB1.

Lift the CB-4 motor operator.

Insert the P-6 block.

Reinsert the motor operator.

Close CB-2.

Transfer loads to UPS power and verify mimic lights are still on.

Transfer loads to maintenance power and verify that mimic lights are still on.

Place the transfer control switch in the AUTO RESTART position. The unit will restart (after a time dealy) and retransfer to UPS power.

WORK IN PROGRESS DATA SHEET

PLANNER & TECHNICAL REVIEWER

☒ WR# 195010
☐ P#
☐ Other
☐ Not Applicable

DIV: ☐ I ☐ II ☐ III ☐ NA

2VBB-UPS1A
☒ Mark No.
☐ EPN
☐ Not Applicable

See attached
Procedure No. plan ☐ NA

Estimated Duration:
(Equipment Out of Service)

Permissible Reactor Mode:
☐ All ☐ Hot Shutdown
☐ Run ☐ Cold Shutdown
☐ Start-up ☐ Refuel

Mark-up Required ☒ Yes ☐ No

EQUIPMENT IMPACT (LIST OUT OF SERVICE EQUIPMENT)

unit on maintenance
supply

PLANT IMPACT (REQUIRES OPERATION'S INPUT)

No loss of loads
unit on maintenance supply
with P-6 Block pulled

REFERENCE DRAWINGS: (LIST BELOW)

E.E-1BH

COMMENTS

Prepared By R L Lay (LAMPMAN) Date: 8/26/91 Tech. Reviewer Stephen C Sack Date: 8/26/91

☐ This section N/A with No Plant Impact

Reviewed with Crew By: Supv/Chief Date: / /
Permission Requested to Start By: Date: 8/26/91 Time: 11:20
Permission Granted to Start By: SSS Date: 8/26/91 Time: 15:35 CSO Date: 8/27/91 Time:
Renotifications: ☐ / SSS / CSO ☐ / SSS / CSO ☐ / SSS / CSO

CONTINUED ON BACK

POST MAINTENENCE TESTS

PMT REQUIRED ☐YES ☒NO

PLANNER AND TECHNICAL REVIEWER

TEST REQUIREMENTS

PROCEDURES

☐ No.	Step No.'s	☐NA
☐ No.	Step No.'s	☐NA
☐ No.	Step No.'s	☐NA
☐ No.	Step No.'s	☐NA

TESTS

Test	Acceptance Criteria
☐ Test as per attached plan	☐
☐ Test	☐
☐ Test	☐
☐ Test	☐

Prepared by: K L Logan Date: 8/24/91

Technical Reviewer: Stephen C Slack Date: 8/26/91

Reviewed by: _____ ASSS/SSS Date: __/__/__

TEST RESULTS

Deferred	Sat	Performed By	Verified By
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☒No	☒ Sat	BC 8/27/91	RSW 8-26-91
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___

OPS ACCEPTANCE

☐ Shaded section not used with WR/Document on WR

Remarks: _____

N[illegible] below signature, when signed, do[illegible] the equipment operable at the date and time specified.

Accepted By: _____ SSS Date: __/__/__ Time: __:__

MOHAWK POINT **WORK REQUEST** 8/23/91 **W.R. NO.** 195011

3. DEPARTMENT TO DO WORK
- [X] [S] ELECTRICAL MAINTENANCE
- [ ] [S] MECHANICAL MAINTENANCE
- [ ] [S] INSTRUMENTATION & CONTROL
- [ ] [S] COMPUTER [ ] [S] IST
- [ ] [S] SECURITY I & C [ ] [S] FIRE
- [ ] [S] METER & TEST
- [ ] [S] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY)
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [5] ~~NEXT~~ UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

B/O/F

5. UNIT: [ ] 1 [X] 2 [ ] SITE
6. SYSTEM CODE VBB
7. COMPONENT NUMBER 2VBB-UPS1B
8. BIP NUMBER 71.1309

18. SAFETY CLASS [ ] SR [ ] Q [X] NSR
19. EQ [ ] YES [X] NO
20. ASME COMPONENT [ ] YES [X] NO
21. CLEANNESS CLASS

9. EQUIPMENT TITLE: UPS-1B

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE [ ] DESCRIPTION

Perform SDC SC2-0273-91

12. ORIGINATOR Keene LAMPMAN X4799 DATE 8/23/91
13. APPROVED RW Gayne X1255 DATE 8/23/91
14. W.R. RECEIVED Dan Lichfy DATE 8/26/91
15. PROCEDURE NOS. 2E10464 / / / / / [ ] NOT REQUIRED
16. [ ] QA NOTIFIED BY SUPV. DATE TIME QA NAME

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB. ACCT.	PROJ. COST ACCT. NO.
706140		9591	321257		200	OHC		

22. QA REVIEW, QA [signature] DATE 8/26/91 23. INSPECTION REQUIRED [ ] YES [X] NO INIT
QA-IST-8-26-91

24. STAGED BY DATE / / [ ] PARTS [ ] PROCEDURE [ ] DRWG [ ] MARKUP [ ] RWP [ ] NA INIT
25. ASSIGNED TO B WHITCOMB DATE 8/26/91
26. NOTIFICATIONS: QC DATE / / TIME [ ] NA QA INIT. SSS DATE 8/26/91 TIME 1535
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE DESCRIPTION Recalibrate/adjust

Performed work as directed by EDC 2E10463

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE DESCRIPTION

as described by EDC 2E10463

31. ATTACHMENTS [ ] MATERIAL ISSUES [ ] PROCEDURE CHECKLISTS [ ] INSPECTION REPORTS [ ] LAS [ ]
32. MARK UP NO'S 91-50863 RWP NO'S N/A QCIR NO'S. NCR NO'S.
33. CORRECTIVE ACTION COMPLETED BY Whitcomb, Poor, Coe DATE 8/26/91 INIT
34. SUPERVISOR REVIEW BY [signature] DATE 8/27/91 INIT
35. WORK ACCEPTED BY QA [signature] [ ] NA DATE 8/28/91 INIT

36. PMT REVIEW BY [signature] [ ] ASSS/SSS [X] SUPV. DATE 8/27/91 INIT
37. PMT PROCEDURE NO'S. WIP / / / [ ] PMT TEST REPORT [ ] NOT REQUIRED
PMT COMPLETE VERIFIED BY [signature] [ ] NA DATE 8/27/91 INIT
39. ACCEPTED BY [ ] SSS [ ] SUPV. DATE / / INIT

40. NPRDS [ ] NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

NIAGARA MOHAWK

LIFTED LEAD AND JUMPER LOG

2V BB- UPS 1A

1 UNIT: 2	2 TEMP. MOD. # EDC-2E10464 ☐ NA
3 WORK DOC: WR# 19501	4 PROC. # ☒ NA

#	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	APPLICATION PERF'D INIT.	APPLICATION VERF'D INIT.	RETURN TO NORMAL PERF'D INIT.	RETURN TO NORMAL VERF'D INIT.
1		A27 P3		Plug		✓						J.P	BC.	J.P	BC.
2		A27 P4		↓		✓						J.P	BC.	J.P	BC.
3		A27 P6		↓		✓						J.P	BC.	J.P	BC.
4		A27 P1		↓		✓						J.P	BC.	J.P	BC.
5		A27 P2		↓		✓						J.P	BC.	J.P	BC.
6				Relay K5	9	✓						J.P	BC.	J.P	BC.
7				" "	10	✓						J.P	BC.	J.P	BC.
8				Relocate above to S1	1	✓							BC.	J.P	BC.
9					4								BC.	J.P	BC.
10		#368			9	✓						J.P	BC.	J.P	
11		#367			10	✓						J.P	BC.	J.P	
12		#257			4	✓						J.P	BC.	J.P	
13		#255			2	✓						J.P	BC.	J.P	
14		#368		Re/				→ K5	2				BC.	J.P	BC.
15		#367		9d/				→	4					J.P	BC.
16		#257						→	8				BC.	J.P	BC.
17		#255		Xo				→	6					J.P	BC.

		5. APPLICATION SIGNATURE	INITIAL	DATE	TIME	6. RETURN TO NORMAL SIGNATURE	INITIAL	DATE	TIME
R11-86	PERFORMED BY:	Jeffrey Pop	JP	8-26-91	PM	Jeffrey Pop	JP	8-27-91	AM
32-211	VERIFIED BY:	Bonnie Coe	BC	8-26-91	PM	Bonnie Coe	BC.	8-27-91	AM

Verify P-6 block open on CB-4

Verify logic power is off:

A27-CB1 open
A27-S1 open

* CAUTION: RIGHT SIDE BUS CONNECTIONS ARE HOT INSTALL RUBBER BLANKETS.

Unplug the following plugs on A27:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Remove A27 pan from unit

Modify A27-K5 relay wiring per EDC

Reinstall the A27 pan.

Reinstall following plugs:
1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Close A27-S1 (Leave A27-CB1 open). PB
Verify mimic lights come on on the front panel.
Alarm horn will come in. (Reset as necessary)

Push relay A27-K5 in AND HOLD. Verify that lights go out. P/B

Release relay A27-K5 and verify lights come on. P/B

CLOSE UPSTREAM AC & DC BREAKERS

CLOSE A27-CB1

Re-energize the UPS on AC power, CB-2 open, with loads on maintenance. P/B

Visually verify that the A27-K5 relay is energized. P/B

Open A27-CB1. P/B

Open the A27-S1 switch while monitoring A27-K5 and verify that the A27-K5 relay does not drop out. P/B

Reclose A27-S1 and A27-CB1. P/B

Lift the CB-4 motor operator. P/B

Insert the P-6 block. P/B

Reinsert the motor operator. P/B

Close CB-2. P/B

Transfer loads to UPS power and verify mimic lights are still on.

P/B

Transfer loads to maintenance power and verify that mimic lights are still on. MB

Place the transfer control switch in the AUTO RESTART position. The unit will restart (after a time dealy) and retransfer to UPS power. MB

WORK IN PROGRESS DATA SHEET

PLANNER & TECHNICAL REVIEWER

☒ WR# 195011
☐ P#
☐ Other
☐ Not Applicable

DIV: ☐ I ☐ II ☐ III ☐ NA

2VBB-UPS1B
☒ Mark No.
☐ EPN
☐ Not Applicable

See attached
Procedure No. Plan ☐ NA

Estimated Duration:
(Equipment Out of Service)

Permissible Reactor Mode:
☐ All ☐ Hot Shutdown
☐ Run ☐ Cold Shutdown
☐ Start-up ☐ Refuel

Mark-up Required ☒ Yes ☐ No

EQUIPMENT IMPACT (LIST OUT OF SERVICE EQUIPMENT)

Unit on maintenance supply

PLANT IMPACT (REQUIRES OPERATION'S INPUT)

No loads lost
Unit on maintenance supply
with P-6 Block pulled

REFERENCE DRAWINGS: (LIST BELOW)

EE - 1BH

COMMENTS

Prepared By (LAMPMAN) Date: 8/24/91 Tech. Reviewer Stephen C. Beck Date: 8/26/91

☐ This section N/A with No Plant Impact

Reviewed with Crew By: Supv/Chief Date: 8/27/91

Permission Requested to Start By: Date: 8/26/91 Time: 11:40

Permission Granted to Start By: SSS Date: 8/26/91 Time: 15:36 CSO Date: 8/26/91 Time: 1510

Renotifications: ☐ / SSS / CSO ☐ / SSS / CSO ☐ / SSS / CSO

CONTINUED ON BACK

POST MAINTENENCE TESTS

PMT REQUIRED ☐YES ☒NO

PLANNER AND TECHNICAL REVIEWER

TEST REQUIREMENTS

PROCEDURES

☐ No. _____	Step No.'s _____	☐NA
☐ No. _____	Step No.'s _____	☐NA
☐ No. _____	Step No.'s _____	☐NA
☐ No. _____	Step No.'s _____	☐NA

TESTS

Test	Acceptance Criteria
☐ Test as per attached plan	☐
☐ Test	☐
☐ Test	☐
☐ Test	☐

Prepared by: (LAMPMAN) Date: 8/24/91

Technical Reviewer: Stephen C. Black Date: 8/26/91

Reviewed by: _____ ASSS/SSS Date: __/__/__

TEST RESULTS

Deferred	Sat	Performed By	Verified By
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☒No	☒ Sat	TM 18/27/91	Dtt Parker 18/27/91
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___

☐ Shaded section not used with WR/Document on WR

Remarks: _____

Note: The below signature, when signed, declares the equipment operable at the date and time specified.

Accepted By: _____ SSS Date: __/__/__ Time: __:__

OPS ACCEPTANCE

NIAGARA MOHAWK POINT **WORK REQUEST** 1. DATE 8/23/91 2. W.R. NO. 195012

3. DEPARTMENT TO DO WORK
- [X] [S] ELECTRICAL MAINTENANCE
- [ ] [S] MECHANICAL MAINTENANCE
- [ ] [S] INSTRUMENTATION & CONTROL
- [ ] [S] COMPUTER [ ] [S] ISI
- [ ] [S] SECURITY I & C [ ] [S] FIRE
- [ ] [S] METER & TEST
- [ ] [S] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY) 3/0/A
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [5] NEXT UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

5. UNIT: [ ] 1 [X] 2 [ ] SITE
6. SYSTEM CODE VBB
7. COMPONENT NUMBER 2VBB-UPS1C
8. BIP NUMBER 71509

18. SAFETY CLASS [ ] SR [ ] Q [X] NSR
19. EQ [ ] YES [X] NO
20. ASME COMPONENT [ ] YES [X] NO
21. CLEANNESS CLASS

9. EQUIPMENT TITLE: UPS-1C

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE [ ] DESCRIPTION

Perform SDC SC2-0273-91

12. ORIGINATOR Keeno LAMPMAN x4799 DATE 8/23/91
13. APPROVED Ron Murray DATE 8/24/91
14. W.R. RECEIVED DATE 8/24/91
15. PROCEDURE NOS. 2E10465 [ ] NOT REQUIRED
16. [ ] QA NOTIFIED BY SUPV. DATE TIME QA NAME

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD. CAT	COST COMP	LOCATION	SUB. ACCT.	PROJ. COST ACCT. NO.
706.50		9571	321258		200	0110		

22. QA REVIEW. QA DATE 8/25/91 23. INSPECTION REQUIRED [ ] YES [X] NO INIT
ISI REVIEW BY: S Chengappa 8/25/91

24. STAGED BY DATE / / [ ] PARTS [ ] PROCEDURE [ ] DRWG [ ] MARKUP [ ] RWP [ ] NA INIT
ASSIGNED TO D. PARKER DATE 8/26/91

26. NOTIFICATIONS: QC DATE / / TIME [ ] NA QA INIT. SSS DATE 8/25/91 TIME 2150

27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE AA DESCRIPTION ADJUST/CALIBRATE

PERFORMED SDC SC2-0273-91 TO EDC 2E10465
WIRING MODIFICATION

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE AM DESCRIPTION INSTALLATION STATUS

REQUIRED WIRING CHANGE TO PERFORM FUNCTION AS DESIRED

31. ATTACHMENTS [ ] MATERIAL ISSUES [X] PROCEDURE CHECKLISTS [ ] INSPECTION REPORTS [ ] LAS [X] EDC 2E10465
32. MARK UP NO'S 2-91-50859 RWP NO'S / / CCIR NO'S N/A NCR NO'S
33. CORRECTIVE ACTION COMPLETED BY PARKER/DEAN DATE 8/26/91 INIT
34. SUPERVISOR REVIEW BY DATE 8/26/91 INIT
35. WORK ACCEPTED BY QA [ ] NA DATE 8/27/91 INIT

36. PMT REVIEW BY [ ] ASSS/SSS [X] SUPV. DATE 8/26/91 INIT
37. PMT PROCEDURE NO'S. WIP / / / / [ ] PMT TEST REPORT [ ] NOT REQUIRED
PMT COMPLETE VERIFIED BY [ ] NA DATE 8/26/91 INIT
39. ACCEPTED BY [ ] SSS [ ] SUPV. DATE / / INIT

40. NPRDS [ ] NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

Verify P-6 block open on CB-4

Verify logic power is off:

A27-CB1 open
A27-S1 open

* CAUTION: RIGHT SIDE BUS CONNECTIONS ARE HOT INSTALL RUBBER BLANKETS.

Unplug the following plugs on A27:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Remove A27 pan from unit

Modify A27-K5 relay wiring per EDC

Reinstall following plugs:
1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Close A27-S1 (Leave A27-CB1 open).
Verify mimic lights come on on the front panel.
Alarm horn will come in. (Reset as necessary)

Push relay A27-K5 in AND HOLD. Verify that lights go out. DHP

Release relay A27-K5 and verify lights come on. DHP

JC 8/26/91 ~~Close A27-CB1.~~

Lift motor operator on CB-4 DHP

Plug P-6 block in on CB-4 DHP

Reattach motor operator on CB-4 DHP

PULL P-6 BLOCK DHP
LIFT LEAD NO. 3E2 AND 3E3 FROM BATTERIES.
CLOSE A27-CB1 2E0 2E1 JC 8/26/91

Re-energize the UPS ~~and put the loads on UPS power.~~ DHP

OPEN A27-CB1, RELAY WIRE 3E 200 & 201. RECLOSE A27-S1 AND A27-CB1 JC 8/26/91

- UNIT TRIPPED
MOVING TRIP
INVERTER ALARM
SCR STATUS
POWER SUPPLY FAILE

1/26/91 ~~CLOSE A27-CB1.~~ JC 8/26/91
RE-ENERGIZE THE UPS — NO TRIP.

Visually verify that the A27-K5 relay is energized.

OPEN A27-CB1

Open the A27-S1 switch while monitoring A27-K5 and verify the following:

a.) The A27-K5 relay does not drop out. ✓
~~b.) No control battery discharge alarm comes in.~~ JC 8/26/91

Reclose the A27-S1 switch. AND A27-CB1

LIFT CB-4 OPERATOR
INSERT P-6 BLOCK
RESET CB-4 OPERATOR ON BREAKER, CLOSE CB-2

With the UPS feeding the loads open A27-CB1. ✓

JC 8/26/91

Transfer loads to ~~maintenance~~ UPS power and verify mimic lights are still on. ✓

MAINT. y 8/26/91

Transfer loads to ~~UPS~~ power and verify that mimic lights are still on. – TRIP TO MAINT.

– UNIT WILL TRIP WITHOUT BATTERY yc 8/26/91

Place A27-CB1 on. ✓ yc 8/26/91

RESTORE UNIT TO NORMAL, LOADS ON UPS

WORK IN PROGRESS DATA SHEET

PLANNER & TECHNICAL REVIEWER

☒ WR# 195012
☐ P#
☐ Other
☐ Not Applicable

DIV: ☐ I ☐ II ☐ III ☐ NA

2VBB - UPSIC
☒ Mark No
☐ EPN
☐ Not Applicable

See attached plan
Procedure No. ☐ NA

Estimated Duration:

(Equipment Out of Service)

Permissible Reactor Mode
☐ All ☐ Hot Shutdown
☐ Run ☐ Cold Shutdown
☐ Start-up ☐ Refuel

Mark-up Required ☒ Yes ☐ No

EQUIPMENT IMPACT (LIST OUT OF SERVICE EQUIPMENT)

unit on maintenance supply

PLANT IMPACT (REQUIRES OPERATION'S INPUT)

No loss of loads
unit on maintenance supply
with P-6 block pulled

REFERENCE DRAWINGS: (LIST BELOW)

BE-1BH

COMMENTS

Prepared By (LAMPMAN) Date: 8/24/91 Tech. Reviewer Stephen C Lack Date: 8/25/91

☐ This section N/A with No Plant Impact

Reviewed with Crew By: Supv/Chief Date: 8/26/91

Permission Requested to Start By: Date: 8/24/91 Time: 17:10

Permission Granted to Start By: SSS Date: 8/27/91 Time: 20:50 CSO Date: 8/24/91 Time: 2:37

Renotifications: ☐ / SSS / CSO ☐ / SSS / CSO ☐ / SSS / CSO

CONTINUED ON BACK

POST MAINTENENCE TESTS — PMT REQUIRED ☒YES ☐NO

PLANNER AND TECHNICAL REVIEWER

TEST REQUIREMENTS

PROCEDURES

☐ No. _____ Step No.'s _____ ☐NA

☐ No. _____ Step No.'s _____ ☐NA

☐ No. _____ Step No.'s _____ ☐NA

☐ No. _____ Step No.'s _____ ☐NA

TESTS

Test	Acceptance Criteria
☐ Test see attached plan	☐
☐ Test	☐
☐ Test	☐
☐ Test	☐

Prepared by: K S Lo Date: 8/24/91

Technical Reviewer: Stephen C Sack Date: 8/25/91

Reviewed by: _____ ASSS/SSS Date: __/__/__

TEST RESULTS

Deferred	Sat	Performed By	Verified By
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	[illegible] 18 Sep 91	[illegible] 18 Sep 91
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___

☐ Shaded section not used with WR/Document on WR

Remarks: _____

Note: The below signature, when signed, declares the equipment operable at the date and time specified.

Accepted By: _____ SSS Date: __/__/__ Time: __:__

OPS ACCEPTANCE

NIAGARA MOHAWK NINE MILE POINT **WORK REQUEST**

1 DATE 8/23/91 | 2. W.R. NO. 195013

3. DEPARTMENT TO DO WORK
- [X] [S] ELECTRICAL MAINTENANCE
- [L] [S] MECHANICAL MAINTENANCE
- [L] [S] INSTRUMENTATION & CONTROL
- [L] [S] COMPUTER [L] [S] ISI
- [L] [S] SECURITY I & C [L] [S] FIRE
- [L] [S] METER & TEST
- [L] [S] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY)
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- ~~[5] NEXT~~ UNIT OUTAGE
- [6] NEXT REFUELING OUTAGE

3/0/F

5. UNIT: [1] [X] 2 [ ] SITE
6. SYSTEM CODE VBB
7. COMPONENT NUMBER 2VBB-APS1D
8. BIP NUMBER 71.509

18. SAFETY CLASS [ ] SR [ ] Q [X] NSR
19. EQ [ ] YES [X] NO
20. ASME COMPONENT [ ] YES [X] NO
21. CLEANNESS CLASS

9. EQUIPMENT TITLE: APS-1D

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE [ ] DESCRIPTION

Perform SDC SC2-0273-91
(Change logic PS do Inverter output)

12. ORIGINATOR Keene LAMPMAN X4799 KL DATE 8/23/91
13. APPROVED RW Gayne X1255 DATE 8/23/91
14. W.R. RECEIVED Dan LeMay DATE 8/26/91
15. PROCEDURE NOS. 2E10466 [ ] NOT REQUIRED
16. [ ] QA NOTIFIED BY SUPV. DATE TIME QA NAME

17. ACCOUNT	ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB. ACCT.	PROJ. COST ACCT. NO.
	706.40		9591	32257		200	0110		

22. QA REVIEW QA [signature] DATE 8/26/91 23. INSPECTION REQUIRED [ ] YES [X] NO INIT
[signature] - DSI - 8-26-91

24. TAGED BY DATE / / [ ] PARTS [ ] PROCEDURE [ ] DRWG [ ] MARKUP [ ] RWP [ ] NA INIT
25. ASSIGNED TO: D. PARKER DATE 8/26/91
26. NOTIFICATIONS: QC DATE / / TIME [X] NA QA INIT. [signature] SSS DATE KOC 8/26/91 TIME 1407
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE AA DESCRIPTION ADJUST/CALIBRATE

PERFORMED SDC/EDC: 2E10466 WIRING MODIFICATION

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE AM DESCRIPTION INSTALLATION STATUS

REQUIRED WIRING CHANGE TO PERFORM FUNCTION AS DESIRED

31. ATTACHMENTS [ ] MATERIAL ISSUES [ ] PROCEDURE CHECKLISTS [ ] INSPECTION REPORTS [ ] LAS ~~NPRDS~~ 2E10466
32. MARK UP NO'S 2-91-54864 RWP NO'S / / QCIR NO'S N/A NCR NO'S
33. CORRECTIVE ACTION COMPLETED BY PARKER / DEAN / ORLIS DATE 8/26/91 INIT
34. SUPERVISOR REVIEW BY [signature] DATE 8/26/91 INIT
35. WORK ACCEPTED BY QA [signature] [ ] NA DATE 8/27/91 INIT
36. PMT REVIEW BY [signature] [ ] ASSS/SSS [X] SUPV. DATE 8/26/91 INIT
37. PMT PROCEDURE NO'S. WIP / / / / [ ] PMT TEST REPORT [ ] NOT REQUIRED
38. PMT COMPLETE VERIFIED BY [signature] [ ] NA DATE 8/26/91 INIT
39. ACCEPTED BY [ ] SSS [ ] SUPV. DATE / / INIT

40. NPRDS [ ] NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

Verify P-6 block open on CB-4

Verify logic power is off:

A27-CB1 open
A27-S1 open

* CAUTION: RIGHT SIDE BUS CONNECTIONS ARE HOT INSTALL RUBBER BLANKETS.

Unplug the following plugs on A27:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Remove A27 pan from unit

Modify A27-K5 relay wiring per EDC

Reinstall the A27 pan.

Reinstall following plugs:
1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Close A27-S1 (Leave A27-CB1 open).
Verify mimic lights come on on the front panel.
Alarm horn will come in. (Reset as necessary)

Push relay A27-K5 in AND HOLD. Verify that lights go out. ✓

Release relay A27-K5 and verify lights come on. ✓

CLOSE UPSTREAM VC & DC BREAKERS ✓
CLOSE A27-CB1

Re-energize the UPS on AC power, CB-2 open, with loads on maintenance. ✓

Visually verify that the A27-K5 relay is energized. ✓

Open A27-CB1. ✓

Open the A27-S1 switch while monitoring A27-K5 and verify that the A27-K5 relay does not drop out. ✓

Reclose A27-S1 and A27-CB1. ✓

Lift the CB-4 motor operator. ✓

Insert the P-6 block. ✓

Reinsert the motor operator. ✓

Close CB-2. ✓

Transfer loads to UPS power and verify mimic lights are still on. ___

Transfer loads to maintenance power and verify that mimic lights are still on. ✓

Place the transfer control switch in the AUTO RESTART position. The unit will restart (after a time dealy) and retransfer to UPS power.

— NOT DONE ON UPS 1/7 — CB-3 BREAKER — STICKS

UPS ON NORMAL POWER IMMEDIATELY

POST MAINTENENCE TESTS — PMT REQUIRED ☐YES ☒NO

PLANNER AND TECHNICAL REVIEWER

TEST REQUIREMENTS

PROCEDURES

☐ No. _____	Step No.'s _____	☐NA
☐ No. _____	Step No.'s _____	☐NA
☐ No. _____	Step No.'s _____	☐NA
☐ No. _____	Step No.'s _____	☐NA

TESTS

Test	Acceptance Criteria
☐ Test as per attached plan	☐
☐ Test	☐
☐ Test	☐
☐ Test	☐

Prepared by: [signature] Date: 8/24/91

Technical Reviewer: Stephen C. Stack Date: 8/26/91

Reviewed by: _____ ASSS/SSS Date: __/__/__

TEST RESULTS

Deferred	Sat	Performed By	Verified By
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☒No	☒ Sat	[signature] 8/26/91	[signature] 8/26/91
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___
☐Yes ☐No	☐ Sat	___/___	___/___

☐ Shaded section not used with WR/Document on WR

Remarks: _____

Note: The below signature, when signed, declares the equipment operable at the date and time specified.

Accepted By: _____ SSS Date: __/__/__ Time: __:__

OPS ACCEPTANCE

WORK IN PROGRESS DATA SHEET

PLANNER & TECHNICAL REVIEWER

☒ WR# 195013
☐ P#
☐ Other
☐ Not Applicable

DIV: ☐ I ☐ II ☐ III ☐ NA

2VBB-UPS1D
☒ Mark No.
☐ EPN
☐ Not Applicable

See attached
Procedure No. plan ☐ NA

Estimated Duration:

(Equipment Out of Service)

Permissible Reactor Mode:
☐ All ☐ Hot Shutdown
☐ Run ☐ Cold Shutdown
☐ Start-up ☐ Refuel

Mark-up Required ☒ Yes ☐ No

EQUIPMENT IMPACT (LIST OUT OF SERVICE EQUIPMENT)

Unit on maintenance
Supply

PLANT IMPACT (REQUIRES OPERATION'S INPUT)

No loads lost
Unit on maintenance
with P-6 Block pulled

REFERENCE DRAWINGS: (LIST BELOW)

RE-1BH

COMMENTS

Prepared By (LAMPMAN) Date: 8/26/91 Tech. Reviewer Stephen C Stack Date: 8/26/91

☐ This section N/A with No Plant Impact

Reviewed with Crew By: Supv/Chief Date: 8/26/91

Permission Requested to Start By: Date: 8/26/91 Time: 1 20

Permission Granted to Start By: SSS Date: 8/26/91 Time: 16:07 CSO Date: 8/26/91 Time: 4:10

Renotifications: ☐ / SSS / CSO ☐ / SSS / CSO ☐ / SSS / CSO

CONTINUED ON BACK

NIAGARA MOHAWK NINE MILE POINT **WORK REQUEST**

1. DATE 8/23/91 2. W.R. NO. 195014

3. DEPARTMENT TO DO WORK
- [X] [S] ELECTRICAL MAINTENANCE
- [L] [S] MECHANICAL MAINTENANCE
- [L] [S] INSTRUMENTATION & CONTROL
- [L] [S] COMPUTER [L] [S] ISI
- [L] [S] SECURITY I & C [L] [S] FIRE
- [L] [S] METER & TEST
- [L] [S] OTHER

4. PRIORITY OF WORK
- [1] EMERGENCY
- [2] URGENT (<1 DAY)
- [3] NECESSARY (<7 DAYS)
- [4] AS TIME PERMITS (>7 DAYS)
- [X] NEXT UNIT OUTAGE
- [5] NEXT REFUELING OUTAGE

3/4/F

5. UNIT: [ ] 1 [X] 2 [ ] SITE
6. SYSTEM CODE VBB
7. COMPONENT NUMBER 2VBB-UPS1E
8. BIP NUMBER 71.B09

18. SAFETY CLASS [ ] SR [ ] Q [X] NSR
19. EQ [ ] YES [X] NO
20. ASME COMPONENT [ ] YES [X] NO
21. CLEANNESS CLASS

9. EQUIPMENT TITLE: UPS-1E

10. FAILURE DESCRIPTION AND LOCATION 11. NPRDS. SYMPTOM CODE [ ] DESCRIPTION

Perform SDC SC2-0273-91

12. ORIGINATOR Keena LAMPMAN X4799 DATE 8/23/91
13. APPROVED RW Gayne X/255 DATE 8/25/91
14. W.R. RECEIVED Alan LeMay DATE 8/26/91
15. PROCEDURE NOS. / 2E10467 / / / / /
16. [ ] QA NOTIFIED BY SUPV. DATE / / TIME QA NAME [ ] NOT REQUIRED

17. ACCOUNT

ACCOUNT	SUB LEDGER	ACTIVITY/ORDER	COST CENTER	BUD CAT	COST COMP	LOCATION	SUB ACCT.	PROJ. COST ACCT. NO.
706.40		9591	32257		200	0160		

22. QA REVIEW QA W Lemin DATE 8/26/91 23. INSPECTION REQUIRED [ ] YES [X] NO INIT
ISI-8-26-91

24. STAGED BY DATE / / [ ] PARTS [ ] PROCEDURE [ ] DRWG [ ] MARKUP [ ] RWP [ ] NA INIT
ASSIGNED TO B. WHITCOMB DATE 8/26/91
26. NOTIFICATIONS: QC. DATE / / TIME [X] NA QA INIT WL SSS DATE 8/26/91 TIME 1535
27. CORRECTIVE ACTION 28. NPRDS CORRECTIVE ACTION CODE AA DESCRIPTION Recalibrate/Adjust

Performed work as directed by EDC 2E10467

29. CAUSE OF FAILURE 30. NPRDS FAILURE CODE [ ] DESCRIPTION

As Described in EDC 2E10467

31. ATTACHMENTS [ ] MATERIAL ISSUES [ ] PROCEDURE CHECKLISTS [ ] INSPECTION REPORTS [ ] LAS [ ]
32. MARK UP NO'S / B91-50865 RWP NO'S / N/A QCIR NO'S. NCR NO'S.
33. CORRECTIVE ACTION COMPLETED BY Whitcomb, Poole, Coe DATE 8/27/91 INIT
34. SUPERVISOR REVIEW BY DATE 8/27/91 INIT
35. WORK ACCEPTED BY QA W Lemin [ ] NA DATE 8/28/91 INIT

36. PMT REVIEW BY [ ] ASSS/SSS [ ] SUPV. DATE 8/27/91 INIT
37. PMT PROCEDURE NO'S. WIP / / / / [ ] PMT TEST REPORT [ ] NOT REQUIRED
38. PMT COMPLETE VERIFIED BY [ ] NA DATE 8/27/91 INIT
39. ACCEPTED BY [ ] SSS [ ] SUPV. DATE / / INIT

40. NPRDS [ ] NA SYSTEM CODE INIT. 41. INDEXED BY DOC. CONT. INIT. INIT

313-186 SYMBOL NUMBER 55-32-053 R09-85

Verify P-6 block open on CB-4

Verify logic power is off:

A27-CB1 open
A27-S1 open

NOTE. CALL CSO - ALARMS WILL CLEAR

* CAUTION: RIGHT SIDE BUS CONNECTIONS ARE HOT INSTALL RUBBER BLANKETS.

Unplug the following plugs on A27:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

Remove A27 pan from unit

Modify A27-K5 relay wiring per EDC

Reinstall the A27 pan.

Reinstall following plugs:

1.) A27P3
2.) A27P4
3.) A27P6
4.) A27P1
5.) A27P2

START

Close A27-S1 (Leave A27-CB1 open).
Verify mimic lights come on on the front panel.
Alarm horn will come in. (Reset as necessary)

Push relay A27-K5 in AND HOLD. Verify that lights go out. PB

Release relay A27-K5 and verify lights come on. PB

CLOSE UPSTREAM AC & DC BREAKERS

CLOSE A27-CB1

Re-energize the UPS on AC power, CB-2 open, with loads on maintenance. PB

Visually verify that the A27-K5 relay is energized. PB

Open A27-CB1. PB

Open the A27-S1 switch while monitoring A27-K5 and verify that the A27-K5 relay does not drop out. PB

Reclose A27-S1 and A27-CB1. PB

Lift the CB-4 motor operator. PB

Insert the P-6 block. PB

Reinsert the motor operator. PB

Close CB-2. PB

Transfer loads to UPS power and verify mimic lights are still on. PB

Transfer loads to maintenance power and verify that mimic lights are still on.

Place the transfer control switch in the AUTO RESTART position. The unit will restart (after a time dealy) and retransfer to UPS power.

NIAGARA MOHAWK

LIFTED LEAD AND JUMPER LOG

2VBB-UPS 1G

1 UNIT: #2	2 TEMP. MOD. # EAX-CE 4641
3 WORK DOC: WR #195014	4 PROC. #

WIRING DATA

#	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	APPLICATION PERF'D INIT.	APPLICATION VERF'D INIT.	RETURN TO NORMAL PERF'D INIT.	RETURN TO NORMAL VERF'D INIT.
1		A 27 P3		PLUG		✓						JP	BC	JP	BC
2		A 27 P4		↓		✓						JP	BC	JP	BC
3		A 27 P6				✓						JP	BC	JP	BC
4		A 27 P1				✓						JP	BC	JP	BC
5		A 27 P2		↓		✓						JP	BC	JP	BC
6				→ RELAY K5	9	✓						JP	BC	JP	BC
7				↓ ↓	10	✓						JP	BC	JP	BC
8				RELOCATE AB.W	1	A								JP	BC
9				TO S1	4	D								JP	BC
10		# 368			9	✓						JP	BC		
11		# 367			10	✓						JP	BC		
12		# 257			4	✓						JP	BC		
13		# 255			2	✓						JP	BC		
14		# 368		RELAND				→ K5	2					JP	BC
15		# 367							4					JP	BC
16		# 257		TO →				→	8					JP	BC
17		# 255						→	6					JP	BC

		5. APPLICATION SIGNATURE	INITIAL	DATE	TIME	6. RETURN TO NORMAL SIGNATURE	INITIAL	DATE	TIME
313-253 R11-86	PERFORMED BY:	[illegible]	JP	8-27-91	AM	[illegible]	JP	[illegible]	[illegible]
SYMBOL NO. 55-32-211	VERIFIED BY:	[illegible]	BC	8-27-91	AM	[illegible]	BC	[illegible]	[illegible]

WORK IN PROGRESS DATA SHEET

PLANNER & TECHNICAL REVIEWER

☒ WR# 195014
☐ P#
☐ Other
☐ Not Applicable

DIV: ☐ I ☐ II ☐ III ☐ NA

2VBB-UPS1G
☒ Mark No.
☐ EPN
☐ Not Applicable

See attached Plan
Procedure No. ☐ NA

Estimated Duration:
(Equipment Out of Service)

Permissible Reactor Mode:
☐ All ☐ Hot Shutdown
☐ Run ☐ Cold Shutdown
☐ Start-up ☐ Refuel

Mark-up Required ☒ Yes ☐ No

EQUIPMENT IMPACT (LIST OUT OF SERVICE EQUIPMENT)

UNIT ON MAINTENANCE
~~LOGIC POWER OFF~~
~~(A27-CB1, A27-S1 OPEN)~~
RK 8/24/91

PLANT IMPACT (REQUIRES OPERATION'S INPUT)

No loss of loads
unit on maintenance supply
with P-6 Block Pulled.

REFERENCE DRAWINGS: (LIST BELOW)

RE-1B11

COMMENTS

Prepared By R L Fry (LANMAN) Date: 8/24/91 Tech. Reviewer Stephen C Sack Date: 8/26/91

☐ This section N/A with No Plant Impact

Reviewed with Crew By: D H Parker Supv/Chief Date: 8/26/91
Permission Requested to Start By: R L Fry Date: 8/26/91 Time: 11:20
Permission Granted to Start By: SSS [illegible] Date: 8/26/91 Time: 15:35 CSO [illegible] Date: 8/26/91 Time: [illegible]
Renotifications: ☐ ___/___ SSS ___/___ CSO ☐ ___/___ SSS ___/___ CSO ☐ ___/___ SSS ___/___ CSO

CONTINUED ON BACK

POST MAINTENENCE TESTS — PMT REQUIRED ☐YES ☒NO

PLANNER AND TECHNICAL REVIEWER

TEST REQUIREMENTS

PROCEDURES

☐ No.	Step No.'s	☐NA
☐ No.	Step No.'s	☐NA
☐ No.	Step No.'s	☐NA
☐ No.	Step No.'s	☐NA

TESTS

Test	Acceptance Criteria
☐ Test as per attached plan	☐
☐ Test	☐
☐ Test	☐
☐ Test	☐

TEST RESULTS

Deferred	Sat	Performed By	Verified By
☐Yes ☐No	☐ Sat	/	/
☐Yes ☐No	☐ Sat	/	/
☐Yes ☐No	☐ Sat	/	/
☐Yes ☐No	☐ Sat	/	/
☐Yes ☒No	☒ Sat	TM 18/27/91	[illegible] 8/27/91
☐Yes ☐No	☐ Sat	/	/
☐Yes ☐No	☐ Sat	/	/
☐Yes ☐No	☐ Sat	/	/

Prepared by: [illegible] Date: 8/24/91

Technical Reviewer: Stephen C Heck Date: 8/26/91

☐ Shaded section not used with WR/Document on WR

Remarks:

Note: The below signature, when signed, declares the equipment operable at the date and time specified.

Reviewed by: _____ ASSS/SSS Date: __/__/__

Accepted By: _____ SSS Date: __/__/__ Time: __:__

OPS ACCEPTANCE

UPS1A EFFICIENCY CALCULATIONS:

(8/91)

		Input:	Output:
Volts:	Phase A:	600	120
	Phase B:	600	124
	Phase C:	600	122
Amps:	Phase A:	40	100
	Phase B:	36	50
	Phase C:	36	90

$$KW_{IN} = \frac{I_{AVG} \times E \times 1.73 \times p.f.}{1000}$$ (p.f. $_{IN}$ = .8 @ full load)

$$KW_{OUT} = \frac{(I \times E)_A + (I \times E)_B + (I \times E)_C \times p.f.}{1000}$$ (p.f. $_{OUT}$ = approx 1.0)

$$EFF = \frac{KW_{OUT}}{KW_{IN}}$$

$$KW_{IN} = \frac{37.3 \times 600 \times 1.73 \times .8}{1000} = \mathbf{30.97\ KW}$$

$$KW_{OUT} = \frac{(100 \times 120) + (50 \times 124) + (90 \times 122) \times 1.0}{1000} = \mathbf{29.18\ KW}$$

$$EFF = \frac{29.18}{30.97} = \underline{\mathbf{94.2\ \%}}$$

Expected Eff: 82 % @ 1/2 load
84 % @ full load

UPS1B EFFICIENCY CALCULATIONS:

(8/91)

		Input:	Output:
Volts:	Phase A:	620	120.5
	Phase B:	610	122
	Phase C:	600	121
Amps:	Phase A:	48	95
	Phase B:	44	75
	Phase C:	46	90

$$KW_{IN} = \frac{I_{AVG} \times E \times 1.73 \times p.f.}{1000}$$ (p.f. $_{IN}$ = .8 @ full load)

$$KW_{OUT} = \frac{(I \times E)_A + (I \times E)_B + (I \times E)_C \times p.f.}{1000}$$ (p.f. $_{OUT}$ = approx 1.0)

$$EFF = \frac{KW_{OUT}}{KW_{IN}}$$

$$KW_{IN} = \frac{46 \times 610 \times 1.73 \times .8}{1000} = 38.84 \text{ KW}$$

$$KW_{OUT} = \frac{(95 \times 120.5) + (75 \times 122) + (90 \times 121) \times 1.0}{1000} = 31.49 \text{ KW}$$

$$EFF = \frac{31.49}{38.84} = \underline{81.11\ \%}$$

Expected Eff: 82 % @ 1/2 load
84 % @ full load

UPS1C EFFICIENCY CALCULATIONS:

(8/91)

		Input:	Output:
Volts:	Phase A:	605	119
	Phase B:	600	120
	Phase C:	600	122
Amps:	Phase A:	90	180
	Phase B:	84	160
	Phase C:	86	165

$$KW_{IN} = \frac{I_{AVG} \times E \times 1.73 \times p.f.}{1000}$$ (p.f. $_{IN}$ = .8 @ full load)

$$KW_{OUT} = \frac{(I \times E)_A + (I \times E)_B + (I \times E)_C \times p.f.}{1000}$$ (p.f. $_{OUT}$ = approx 1.0)

$$EFF = \frac{KW_{OUT}}{KW_{IN}}$$

$$KW_{IN} = \frac{86.6 \times 602 \times 1.73 \times .8}{1000} = 72.15 \text{ KW}$$

$$KW_{OUT} = \frac{(180 \times 119) + (160 \times 120) + (165 \times 122) \times 1.0}{1000} = 60.75 \text{ KW}$$

$$EFF = \frac{60.75}{72.15} = \underline{84.29\ \%}$$

Expected Eff: 82 % @ 1/2 load
84 % @ full load

UPS1D EFFICIENCY CALCULATIONS:

(8/91)

		Input:	Output:
Volts:	Phase A:	620	121
	Phase B:	610	119
	Phase C:	605	121
Amps:	Phase A:	74	135
	Phase B:	70	155
	Phase C:	70	140

$$KW_{IN} = \frac{I_{AVG} \times E \times 1.73 \times p.f.}{1000}$$ (p.f. $_{IN}$ = .8 @ full load)

$$KW_{OUT} = \frac{(I \times E)_A + (I \times E)_B + (I \times E)_C \times p.f.}{1000}$$ (p.f. $_{OUT}$ = approx 1.0)

$$EFF = \frac{KW_{OUT}}{KW_{IN}}$$

$$KW_{IN} = \frac{71.3 \times 612 \times 1.73 \times .8}{1000} = 60.39 \text{ KW}$$

$$KW_{OUT} = \frac{(135 \times 121) + (155 \times 119) + (140 \times 121) \times 1.0}{1000} = 51.73 \text{ KW}$$

$$EFF = \frac{51.73}{60.39} = \underline{85.66\ \%}$$

Expected Eff: 82 % @ 1/2 load
84 % @ full load