NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

07-188-91

02-LOT-001-262-2-01 Revision 7

TITLE: PLANT AC ELECTRICAL DISTRIBUTION SYSTEM

	SIGNATURE	DATE
PREPARER	Charles Ware	5/14/91
TRAINING AREA SUPERVISOR	[signature]	5/14/91
TRAINING SUPPORT SUPERVISOR	J. Lyst for J. LeClair	5-15-91
PLANT SUPERVISOR/ USER GROUP SUPERVISOR	[signature] FOR J B HILL	5/31/91

Summary of Pages

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I. TRAINING DESCRIPTION

A. Title of Lesson: Plant AC Electrical Distribution System

B. Lesson Description: This lesson contains information pertaining to the AC Electrical Distribution system. The scope of the training is defined by the learning objectives and in general covers the knowledge required of a Licensed Control Room Operator.

C. Estimate of the Duration of the Lesson: 4 hours

D. Method of Evaluation, Grade Format, and Standard of Evaluation: Written exam, passing grade of 80% or greater.

E. Method and Setting of Instruction: This lecture should be conducted in the classroom.

F. Prerequisites:

1. Instructor:
   a. Certified in accordance with NTP-16.
2. Trainee:
   a. Initial License Candidate - In accordance with the eligibility requirements of NTP-10.
   b. Licensed Operator Requal - In accordance with the requirements of NTP-11.

G. References:

1. Technical Specifications
   a. 3/4.8.1, AC Sources
   b. 3/4.8.2, DC Sources
   c. 3/4.8.3, On-Site Power Distribution
   d. 3/4.8.4, Electrical Equipment Protective Devices
2. Procedures
   a. N2-OP-70, Station Electrical Feed and 115 DV Switch Yard
   b. N2-OP-71, 13.8 KV/4160 V/600V AC Power Distribution
   c. N2-OP-75, Station Lighting System
3. NMP-2 FSAR
   Chapter 8 Electrical Power Section 8.3.1, AC Power System

II. REQUIREMENTS

A. AP-9, Administration of Training

B. NTP-10, Training of Licensed Operator Candidates

C. NTP-11, Licensed Operator Requalification Training

D. NTP-12, Unlicensed Operator Training

III. TRAINING MATERIALS

A. Instructor Materials:

1. Classroom
2. Lesson Plan
3. TR
4. Transparency package
5. Overhead projector
6. Applicable references
7. Trainee handouts

B. Trainee Materials:

1. Handouts (can include text, drawings, objectives, procedures, etc.)
2. Pens, pencils, paper
3. Course Evaluation Sheet

IV. EXAM AND MASTER ANSWER KEYS

A. Exams will be generated and administered as necessary.

B. Exams and Master Answer Keys will be on permanent file in the Records Room.

V. LEARNING OBJECTIVES

Upon satisfactory completion of this lesson the trainee will demonstrate the knowledge to:

A. Terminal Objectives:

TO-1.0 (SRO Only)	Authorize and direct de-energizing energizing of electrical busses.	3410460303
TO-2.0 (SRO Only)	Direct the actions required for a loss of electrical power.	3449150503
TO-3.0 (SRO Only)	Respond to a loss of off-site power with the unit online.	3449400503
TO-4.0	Line up the electrical distribution system (shift station power from normal to reserve).	2620010101
TO-5.0	Operate breakers and disconnects from the Control Room.	2620080201
TO-6.0	Backfeed the reserve station transformer from the switchyard.	2620090101
TO-7.0	Rack in/out a high voltage circuit breaker (13.8 and 4.16 Kv).	2620190101
TO-8.0	Manually operate disconnect switches.	2629060401
TO-9.0	Re-energize stub busses after a loss of off-site power.	2629060401
TO-10.0	Transfer emergency bus feed from reserve station transformer and return to normal source.	2629130101
TO-11.0	Place a UPS in service from a de-energized condition.	2629140101
TO-12.0	Energize the 600V busses.	2629250101
TO-13.0	Remove from service the #5 and #6 lines.	2629250101

B. Enabling Objectives:

EO-1.0 Explain the purpose and function of the AC Electrical Distribution system.

EO-2.0 Regarding the AC Electrical Distribution system, 1) locate the correct drawings and 2) use drawings to perform the following:

a. Identify electrical components
b. Trace the flowpath of electricity
c. Identify interlocks and setpoints
d. Describe system operation
e. Locate information about specific components
f. Identify system interrelations

EO-3.0 Regarding the AC Electrical Distribution system, determine and use the correct procedure to identify the actions and/or locate information related to the following:

a. Startup
b. Shutdown
c. Normal Operations
d. Off-Normal Operations
e. Annunciator Responses

EO-4.0 Given a specific set of plant conditions, determine how the AC Electrical Distribution system will respond.

EO-5.0 Given a specific set of plant conditions, describe the immediate operator actions required.

EO-6.0 Given the NMP2 Technical Specifications and a set of plant conditions, determine the appropriate bases, limiting conditions for operation, limiting safety system settings, and/or action statement as applicable.

EO-7.0 For the precautions and limitations listed in N2-OP-70, 71 and 75 explain the basis for each precaution and limitation.

LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES
INTRODUCTION		
A. Introduction		
1. Have students fill out TR.		
2. Explain purpose of Course Evaluation and how to use it.		
3. Explain method of evaluation.	Describe daily quizzes/weekly exams.	
4. Review Student Learning Objectives.		
B. System Purpose		
1. The electrical power system provides sources of power for the normal, auxiliary and service loads during normal operation of the plant, plant startup and shutdown.		EO-1.0
2. Provides electrical power for the Emergency Core Cooling Systems during normal, abnormal, and Design Basis Accident (DBA) conditions. The electric power system consists of the Off-Site Power System, the On-Site AC Power System, the DC Power System, a 345 KV Transmission facility, and the Normal Station Service Transformer.		
C. General Description		
1. NMP 2 has 2 115 KV Off-Site power sources from the Scriba substation.	Use Figures 2 & 3A to discuss normal and alternate system line-ups. Describe how the system designators can be used to identify whether the bus is an emergency bus or not and also the voltage supplied by the bus.	EO-2.0
a. On-Site Emergency Power Distribution is normally energized from Off-Site via the reserve station service transformers and the 4.16 KV busses.		

b. The reserve station service xfmrs provide backup power to the 13.8 KV Normal On-Site Power Distribution Busses.

2. The Plant Normal AC Power System includes all the equipment and systems required to power the plant's loads under all conditions of plant operation.

DETAILED DESCRIPTION

Show T.P. (Figure 2)

A. Off-Site AC Power System

Use Figure 2 to show sources and lineups. EO-2.0

1. 115 KV from the 345KV "A" bus
   a. 115 KV west bus connects to Reserve Station Service Transformer 2RTX-XSR1A.
2. 115 KV from the 345KV "B" bus .
   a. 115 KV East bus connects to Reserve Station Service Transformer 2RTX-XSR1B.
3. Center Bus
   a. Cross connects the east bus and the west bus.
   b. Connects to the Aux. Boiler Transformer 2ABS-X1.
4. Disconnect Switches - These disconnect the Off-Site power sources from the switchyard busses.

Point out switches on Figure 2.

a. 2YUL-MDS1
b. 2YUL-MDS2
c. 2YUC-MDS10
d. 2YUC-MDS20

5. Circuit Switchers - These are used to disconnect the Reserve Station Service and Auxiliary Boiler Transformers from their respective 115 KV power sources.
   a. 2YUC-MDS3
   b. 2YUC-MDS4
   c. 2YUC-MDS5
6. Reserve Station Service Transformers
   a. 2RTX-XSR1A
      1) Feeds Div. 1 (2NNS-SWG016) of the On-Site Emerg. AC Power System, 4.16 KV through a tertiary winding.
      2) Backup power source for plant Normal AC Power System, 13.8 KV. (2NPS-SWG001,002,003) EO-4.0
   b. 2RTX-XSR1B
      1) Feeds Div. II (2NNS-SWG017) of the On-Site Emerg. AC Power System, 4.16 KV through a tertiary winding.
      2) Backup power source for plant Normal On-Site AC Power System, 13.8 KV. (2NPS-SWG001,003). EO-4.0

c. 2RTX-XSR1A and - XSR1B are capable of carrying the plant at 100 percent power and during plant startup. Transformers are three phase, 60Hz, 115 KV primary, 13.8 KV resistance grounded secondary, with a 4.16 KV tertiary winding. Transformer 1A is capable of carrying the auxiliary boiler loads on the 13.8 KV winding. (Resistance ground is shorted through 2RTX-SW001 for this lineup.)

EO-2.0

1) Automatic load tap changing (LTC) mechanisms can be set to maintain 13.8 KV at the non-safety related switchgear busses under varying Off-Site voltage and transformer secondary loading conditions.
   a) 115 KV Off-Site system voltage may fluctuate between 120.75 KV to 109.25KV. (±5%)
   b) LTC's are operated in manual normally by procedure from P852 in the Control Room.
2) Secondary winding has a load tap changer which shall only be operated under de-energized conditions.

Show T.P. (Figure 2)
Use Figure 2 to show operation of 2RTX-SW001.

Q: When else would the LTC be used during operation?

EO-4.0

A: When paralleling, to adjust voltage.
Describe previous event involving operator and engineer during construction of NMP-2 who operated this tap changer under load and severly damaged the transformer and which could have caused personnel injury as well.

3) Each transformer is furnished with two (2) separately controlled banks of cooling equipment. Each bank contains seven (7) fans for forced air cooling through an oil to air heat exchanger and a pump for forced circulation of the insulating oil. One cooling bank is designed to provide 70% of the rated transformer cooling capacity. The fans and pumps for the cooling banks are started and stopped automatically by a winding temperature relay. Transfer switches permit the selection of either cooling bank to operate continuously or in the standby mode.

Show TP of Figure 4

Instructor should stress the normal operation of transformer fans and pumps since various WR's have been written by operators who misunderstood the normal operation of the transformer cooling system.

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d. Aux. Boiler Transformer, 2ABS-X1

1) Primary winding - 115 KV Wye
Secondary winding - 13.8 KV Wye
Tertiary Winding - 4.16 KV Delta.

2) Feeds Aux. Boiler and associated loads, 13.8 KV. (2NPS-SWG002)

3) Backup source for Div. I or II of the On-Site Emergency AC Power System, 4.16 KV. (2NNS-SWG018)

EO-4.0

4) Sized to supply two electric boilers at 13.8 KV and either Div. I or II of the emergency power system at 4.16 KV.

5) When the Aux. Boiler bus is fed from 2RTX-XSR1A it is solidly grounded neutral by 2RTX-SW001 to match 13.8 KV Aux. Boiler bus.
   a) Under this condition 2NPS-SWG001, - SWG003 cannot be connected to 2RTX-XSR1A, since normal 13.8KV system is resistance grounded.

6) The transformer is furnished with two (2) separately controlled banks of cooling equipment. One bank contains seven (7) fans for forced air cooling through an oil to air heat exchanger, the insulating oil flows by natural circulation. The other cooling bank contains four (4) fans for forced air cooling through an oil to air heat exchanger, the insulating oil flow by natural circulation. The fans for the cooling banks are started and stopped automatically by a winding

Explain need for Aux. Boiler (i.e., Rad Waste Steam, Air Ejectors) when shutdown.

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temperature relay. Transfer switches permit the selection of either cooling bank to operate in the lead mode with the other in standby mode or continuously.

7) Transformer has a no-load tap changing mechanism.

8) On loss of normal power, the 13.8 KV aux boiler bus can be energized from RSS XFMR 1A. (requires secondary grounding resistor to be bypassed by switch (2RTX-SW001) Under these conditions RSS XFMR can't be connected to normal 13.8 KV busses. (2NPS-SWG001 and 002)

EO-3.0

7. Generator Step-up Transformer

a. 2MTX-XM1A,1B,1C,1D steps up the generator voltage of 25 KV to 345 KV for interconnection to the NMPC grid at Scriba Substation. Three of these single phase units are connected to form a grounded three phase high voltage network. One is used as a spare.

Show T.P. (Figure 3A)
Use Figure 3A to show configuration of 2MTX-XM1A,B,C,D.

1) Each transformer is furnished with two (2) separately controlled banks of cooling equipment. Each bank contains five (5) fans for forced air cooling through an oil to air heat exchanger and a pump for forced circulation of the insulating oil. One cooling bank is designed to provide 70% of the rated transformer cooling capacity. The second cooling bank is started and stopped automatically by a winding temperature relay. Transfer switches permit the selection of either cooling bank to operate continuously or in the standby mode.

8. Normal Station Service Transformer

a. 2STX-XNS1 steps down the 25 KV generator output to 13.8 KV for the plant normal power distribution system. The secondary consists of two sets of windings (one for each bus) which are resistance grounded.

b. Sized to carry all plant non-safety related loads through 2NPS-SWG001,-SWG003.

EO-2.0

Use Figure 3A to show configuration of 2STX-XNS1.

c. The transformer is furnished with two (2) separately controlled banks of cooling equipment. Within each cooling bank there are two (2) separate paths for cooling flow Within each cooling path there are three (3) fans for forced air cooling through an oil to air heat exchanger and a pump for forced circulation of the insulating oil. One cooling bank is designed to provide 70% of the rated transformer cooling capacity. The second cooling bank is started and stopped automatically by winding temperature relay. Transfer switches permit the selection of either cooling bank to operate continuously or in the standby mode.

B. On-Site Normal AC Power System (2NPS-SWG001 through SWG005)

Show T.P. (Figure 3A)

Use Figure 3A to show distribution from 2NPS-SWG001-005 also use Figure 2 to show relationship between Figures 2 and 3A.

EO-2.0

EO-4.0

1. Purpose - The On-Site Normal or Nonsafety Related AC Power System feeds all non-safety related loads. It is normally energized from the unit generator. In case of loss of power from its normal source, the system is energized from Off-Site power sources. A 345KV Transmission facility connects the

Unit 2 generator to the Scriba Substation and the Niagara Mohawk grid. The Normal Station Service Transformer steps down the 25 KV output of the Unit generator to 13.8 KV for the plant Normal On-Site AC Power System.

2. Five non-safety related 13.8 kV busses
   a. 2NPS-SWG001,-SWG003 supply:
      1) All 13.8 KV non-safety related motors (>2500 hp)
      2) All non-safety related 4.16 KV busses
      3) 600V normal load centers
   b. 2NPS-SWG001 also feeds 2EPS*SWG001,*SWG002
   c. 2NPS-SWG003 also feeds 2EPS*SWG003,*SWG004
   d. 2NPS-SWG002 fed through the Aux. Boiler Transformer

Point out each bus on TP as it is discussed.

3. 4 safety related busses (2EPS*SWG001-0047
   a. 13.8KV 2EPS*SWG001, *SWG002 feed RRC pump 2RCS-PIA fast speed.
   b. 13.8KV 2EPS*SWG003, *SWG004 feed RRC pump 2RCS-PIB fast speed.
   c. The safety function is to downshift the recirculation pumps to slow speed when required.

EO-2.0

d. 2NPS-SWG004 and 2NPS-SWG005 supply 15Hz power to 2RCSP1A and 2RCSP1B respectively via the LFMG's.

4. Normal 4.16KV distribution 2NNS-SWG011 through 2NNS-SWG018 (Table 11)

Use Figure 3A to show distribution from 2NNS-SWG011-018.

a. 2NNS-SWG011,-SWG012, and -SWG013 supply 4.16KV non-class 1E motor loads. 2NNS-SWG011 and -SWG013 also feed the Reactor Recirculation LFMG motors.

b. Bus 2NNS-SWG012 normally connected to bus 2NNS-SWG011, but can also be supplied by bus 2NNS-SWG013.

c. 2NNS-SWG014 and -SWG015 known as <u>plant stub busses,</u> feed selected redundant normal 4.16 KV motor loads (250 to 2500 hp) and the 600V load center transformers for load centers 2NJS-US5 and -US6.

1) Can be manually connected to associated Emerg. Diesel Generator busses, 2ENS*SWG101 and *SWG103, upon loss of normal 13.8 KV power and no LOCA condition.

Use Figure 3A to show lineup.

EO-5.0

2) Physically separated and electrically isolated to prevent interference with the safety function of the emergency distribution system.

LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES
d. 2NNS-SWG016, -SWG017, -SWG018 1) Interconnect 4.16 KV tertiary windings of 2RTX-XSR1A and -XSR1B, and 2ABS-X1, to the 4.16 KV emerg. busses, 2ENS*SWG101, *SWG102 and *SWG103.		
5. Normal 600V Distribution System (Tables 1-9)	Show T.P. (Figure 3B) Use Figure 3B to show NJS distribution also show Figure 3A to show relationship between Figures 3A and 3B.	
a. 2NJS-US1 through 2NJS-US4 and 2NJS-US7 through 2NJS-US10 1) Feed non-safety related loads (50 to 200 HP) 2) Fed from the normal 13.8 KV switchgear busses. 3) Double ended, split bus design. 4) Associated MCC's carry loads 1/6 to 50 HP in size.	NOTE: US-7 only has an A and B bus). Use Figure 3B to show bus arrangement.	
b. 2NJS-US5 and 2NJS-US6 1) Feed selected plant loads such as the Uninterruptible Power Supply. 2) Fed from 4.16 KV stub busses. (US-5 from SWG-014, US-6 from SWG-015)	Show T.P. (Figure 3A) Use Figure 3A to show distribution to 2NJS-US5/6.	
6. Uninterruptible Power Supply (UPS) (Table 12) a. Provides normal and emergency power to all plant service loads, instrumentation, and control loads which require UPS.	Show T.P. (Typical UPS) Use Typical UPS figure. Explain UPS operation.	

b. Each UPS system has a normal AC source, alternate AC source from the 600V system, and a backup DC source from the 125V DC system.

c. Upon loss of normal AC, the DC source automatically feeds the UPS. EO-4.0

d. In case of any inverter fault the alternate AC source automatically feeds the UPS. This is done by a make-before break static switch so no interruption of power to the loads occur.

This is important to prevent a protective action because of a momentary loss of power.

e. Plant UPS system consists of:
   1) two 10KVA, 120V, 1-phase units (2VBB-UPS3A and 2VBB-UPS3B)
   2) five 75KVA, 120/208V, 3-phase units (2VBB-UPS1A, -UPS1B, -UPS1C, -UPS1D, -UPS1G)

f. 2VBB-UPS3A and -UPS3B feed all RPS logic trip channel loads and ISC logic. Non-safety related because the RPS and ISC are fail safe systems.

g. 2VBB-UPS1A and -UPS1B feed selected Non-safety related instrumentation and control loads.

h. 2VBB-UPS1C and -UPS1D feed selected lighting loads.

i. 2VBB-UPS1G feeds all plant computer loads.

7. Station Lighting (Four Subsystems) — EO-2.0
   a. Normal lighting subsystem (NLSS)
      1) Power originates from 600V load center
   b. Essential Lighting Subsystem (Ess LSS)
      1) Fed from two UPS units, (UPS-1C & 1D)
   c. Emergency Lighting Subsystem — EO-4.0
      1) In emergency modes of operation, Emergency lighting subsystem is fed from the emergency diesel generator sets.
   d. Egress Lighting Subsystem
      1) (Eg LSS), branch of the Ess LSS. Provides lighting to various plant exit doors, walkways and roadways.

III. INSTRUMENTATION, CONTROLS AND INTERLOCKS — EO-2.0

A. Instruments and Indications

If availability permits, use of Simulator to discuss instrumentation and control would be appropriate.

1. Current XFMRs, Potential XFMR's, and watt meters measure bus current flow, voltage, and electrical power.
2. Frequency and VAR indication also present on PNL-852.
3. Status Lights
   a. Red (closed)
   b. Green (tripped)

c. Blue indicates the load tap changer transfer switches are in local position for 2RTX-XSR1A, 2RTX-XSR1B, and 2STX-XNS1.

4. Controls

a. Located on electrical control panel 852

B. System Interlocks

1. 115 KV System

a. CKT Switches YUC-MDS3-5 can be operated as long as no electrical fault exists on the respective service transformer.

b. YUL-MDS1 & 2 can be operated if no other power source is supplying the bus and its respective RSS XFMR CKT switcher is not closed.

c. YUL-MDS10 and 20 can only be operated when no power exists on at least one side of the switch.

2. 13.8 KV System

a. 2NPS-SWG001 and 003 has protective relays for bus undervoltage and overcurrent.

b. ACB1-3 and 3-14 can be closed if sync permissive satisfied, supply XFMR has adequate voltage and no fault, and there are no bus electrical faults. ACB1-3 and 3-14 will trip on unit electrical fault, main generator fault, or bus electrical fault.

c. Alternate supply breaker (ACB1-1 and 3-1) can be closed when adequate voltage exists on alternate XFMR, sync permissive is satisfied, there are no electrical faults on the bus, reserve XFMR, or normal XFMR, and normal supply breakers (ACB1-3 and 3-14) are open.

d. ACB1-1 and 3-1 will trip from the control switch, on a bus or reserve XFMR fault, or if the neutral grounding switch is closed.

e. 2NPS-SWG002 has protective relays for overcurrent, the normal supply breaker ACB2-5 can be manually closed if alternate XFMR, or 115 KV XFMR trip. ACB2-5 will trip on a bus or XFMR fault.

3. 4.16 KV System

a. Busses have protective relays, breaker control interlocks, and lockouts for overcurrent and undervoltage.

b. Supply breakers for busses 2NNS SWG011-013 can be manually closed only if any one of the three other supply breakers are open with the remaining pair closed.

c. Supply breakers for busses 2NNS-SWG014 and 015 interlocked such that only one breaker may be closed at a time.

LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES
IV. SYSTEM OPERATION		EO-2.0
A. Normal Operation	Use Figure 1.2 and 3A as necessary to show lineups.	EO-3.0
1. Breaker line-up as follows: 2YUC-MDS1-closed 2YUC-MDS2-closed 2YUC-MDS3-closed 2YUC-MDS4-closed 2YUC-MDS5-closed 2YUC-MDS10-closed 2YUC-MDS20-open		
2. RSS XFMR 1A and Aux Boiler XFMR are normally powered from the west bus. RSS XFMR 1B normally supplied from east bus.		
a. RSS XFMR 1A can supply 2NPS-SWG001 or an alternate supply to 2NPS-SWG003, or it can supply 2NPS-SWG002 (only with switch 2RTX-SW001 in connected position). Also supplies power to 4.16 KV emergency busses 2ENS*SWG101 and 102 via 2NNS-SWG016.		
b. RSS XFMR 1B is in standby to supply 2NPS-SWG003 and an alternate supply to 2NPS-SWG001. 4.16 KV supplies emergency bus 2ENS*SWG103 via 2NNS-SWG017. It can also feed power to emergency bus 2ENS*SWG102 if required.		EO-4.0

c. Aux boiler XFMR supplies 13.8 KV to the two electrode boilers, and is the alternate 4.16 KV to emergency busses 2ENS*SWG101 or 103 via 2NNS-SWG018.

3. During normal operation with main generator on the line, 13.8 KV busses 2NPS-SWG001 and 003 are powered from the main generator through the NSS XFMR. 13.8 KV to 2NPS-SWG002 is still supplied from aux boiler XFMR.

EO-4.0

a. Normal load and motor control center 600V supply breakers are closed to energize normal load center busses A and B. Bus C energized by tie circuit breakers connecting busses A and C. (NOTE: US-7 only has A and B bus)

Show TP Figure 3B
Use Figure 3B to show lineup.

b. See Table 12 for available UPS power supplies.

B. Infrequent Operation

Following a generator trip, the supply breakers from the normal station service transformer to 2NPS-SWG001 and SWG003 automatically open and the supply breakers from the reserve station service transformers (1A and B) close simultaneously so that power is not interrupted to normal station loads. The auto fast transfer is attempted whenever a generator primary lockout or high speed protective relay is actuated. If the fast transfer is not completed within six cycles, fast transfer is blocked and slow transfer is attempted after all motor loads are shed.

Use Figure 2 to explain fast transfer.

EO-3.0
EO-4.0

1. Review LER 88-12 (Attachment 1).

Emphasize potential adverse effects of "slow" transfer.

TCO-02-LIC-90-001

2. Loss of NPS-SWG003/001

   a. If power is lost to NPS-SWG003 the following major loads will be lost:

      1) Recirc Pump and LFMG B/A — Could cause power oscillations
      2) Condensate and Cond. Booster Pump B/A and C — Potential Loss of Feed
      3) Reactor Feed Pumps B and C/A — Potential Loss of Feed
      4) Circulating Water Pumps B, D and F/A, C and E — Potential Loss of Condenser Vacuum

5)	RBCLCW Pump B and RBCLCW Booster Pumps A & B/RBCLCW Pumps A and C and Booster Pump C	Partial loss of cooling to RBCLCW components including Drywell Cooling. Potential increase in Drywell Pressure.
6)	TBCLCW Pump B/A and C	Partial loss of cooling to TBCLCW components
7)	RWCU Pump B/A	Potential system isolation due to low flow
8)	Instrument Air Compressor B/A	Potential loss of Instrument Air including scram due to low air header pressure
9)	Stator Water Cooling Pump B/A	Potential loss of stator water cooling and generator runback/trip.
10)	4th Point Heater Drain Pump B/AC	Potential partial loss of feedwater heating
11)	CRD Pump B/A	Potential overheating of CRDMS and loss of rod control

V. SYSTEM INTERRELATIONS

EO-2.0

A. Normal AC distribution interconnects with all systems receiving power to loads from associated switchgear.

B. DC power system provides power to protective relaying control.

C. Site transmission system interconnects NMP-2 with other utilities, and major load centers at 345 KV and 115 KV.

D. On-Site Emergency Power Distribution is normally energized from the Off-Site Power System via the RSS XFMR's.

VI. DETAILED SYSTEM REFERENCE REVIEW

Review each of the following referenced documents with the class.

A. Technical Specifications — EO-6.0

1. AC Sources L.C.O. 3.8.1, 4.8.1
2. DC Sources L.C.O. 3.8.2, 4.8.2
3. On-Site Power L.C.O. 3.8.3, 4.8.3 Dis. System
4. Elec Equipment L.C.O. 3.8.4, 4.8.4 Protective Devices

B. Procedures — EO-7.0

1. N2-OP-70 "Station electrical feed and 115 KV switchyard"
2. N2-OP-71, "13.8 KV/4160 V/600VAC Power Distribution"
3. N2-OP-75, "Station Lighting"
4. N2-OP-68, "Section H.6.0, Station Backfeed Procedure"

VII. RELATED PLANT EVENTS

A. Using the modified case study format, discuss the events described in SER 11-90, Main Transformer Damage and Fires Caused by Static Electrification. — SER 11-90 | 7

After reading the event description use a guided class discussion to determine:

1. Probable root cause
2. Recommended corrective actions (as if you were the licensee)
3. Relevance to NMP2 (i.e. Is the event described, a concern at NMP2?)

VIII. SYSTEM HISTORY

A. Refer Addendum "B" and review related modifications with class (if applicable).

IX. WRAP-UP

A. Review the Student Learning Objectives

4. Actions that can be taken to prevent this event from happening at NMP2. | 7

INSTRUCTOR NOTE

Use of OEA response to SER 11-90 may be useful for the discussion of items 3 and and 4 above.

File Code NMP74724