May 28, 1991

Docket Nos. 50-335
and 50-389

LICENSEE: Florida Power and Light Company (FPL)

FACILITY: St. Lucie Units 1 and 2

SUBJECT: SUMMARY OF THE MEETING TO DISCUSS IMPLEMENTATION OF THE STATION BLACKOUT RULE AT ST. LUCIE 1 AND 2

On May 21, 1991, the NRC staff met with Florida Power and Light Company (FPL) to discuss implementation of the Station Blackout Rule, 10 CFR 50.63 (SBO) at the St. Lucie Plant. Enclosure 1 lists the attendees. Enclosure 2 contains the slides FPL used during the presentation.

After the introduction, FPL reviewed the chronology of SBO at the St. Lucie Plant and outlined the electrical design of the station, including the proposed crosstie between the units. Then the operational and technical considerations of the required modifications were discussed. Finally, FPL presented a list of proposed revisions to the staff's draft SER issued on November 21, 1990. The staff agreed to review the proposed changes.

Originalssigned by

Jan A. Norris, Sr. Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures: As stated

cc w/enclosures:
See next page

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See next page

memo-4

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DF01

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Meeting Summary dated May 28, 1991

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ENCLOSURE 1

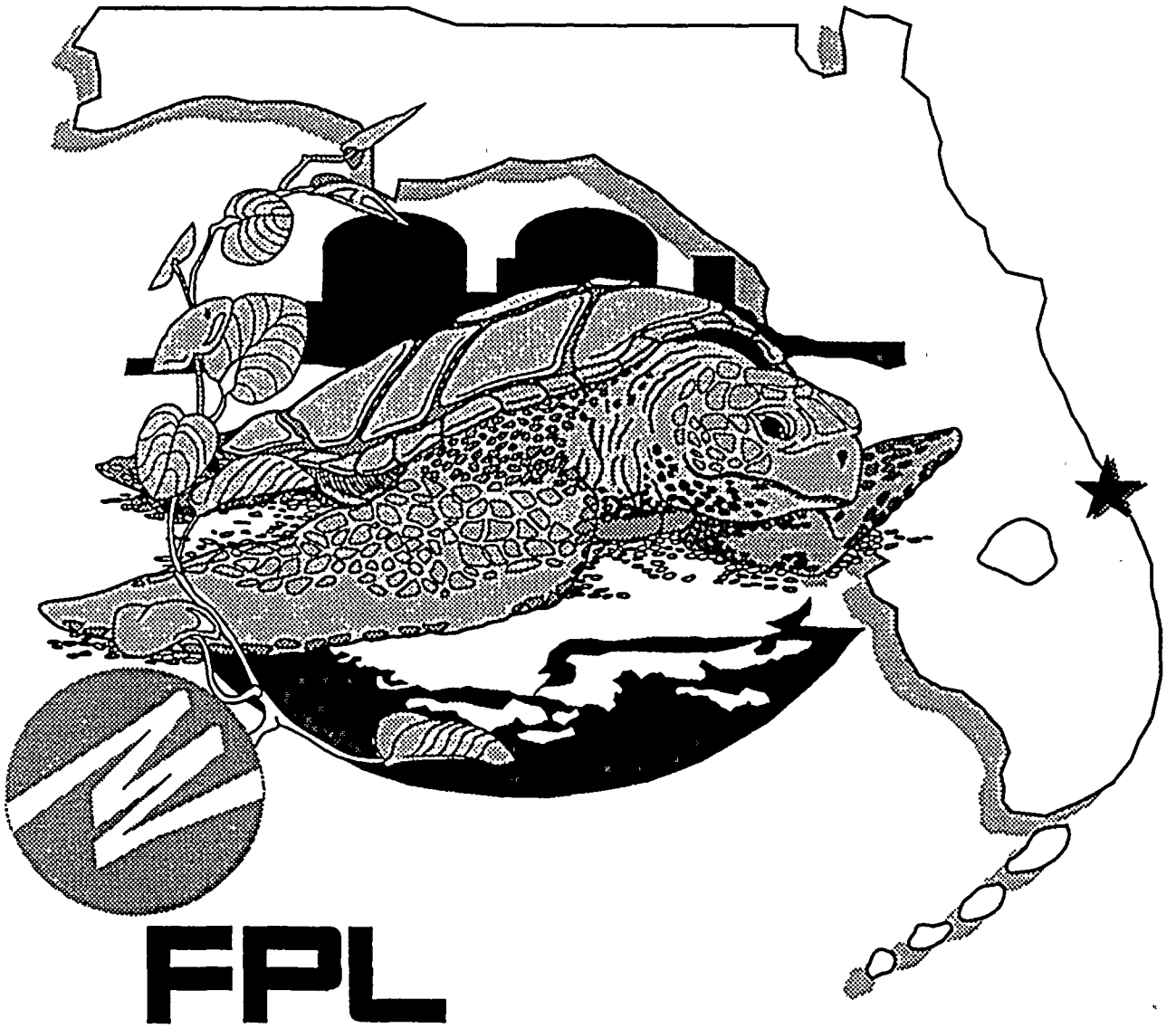
MEETING BETWEEN FLORIDA POWER AND LIGHT COMPANY
AND NRC STAFF - ST. LUCIE PLANT

ATTENDANCE RECORD

NAME	AFFILATION
Jan Norris	NRC/NRR/PDII-2
Herbert Berkow	NRC/NRR/PDII-2
Faust Rosa	NRC/NRR/SELB
Rajender Auluck	NRC/NRR/PDII-2
Jim Knight	NRC/NRR/DST/SELB
Bob Grazio	FPL/Dir. Nucl. Lic.
Tedd Dillard	FPL St. Lucie
Vittorio Pareto	Devonrute
Med El-Zeftawy	NRC/ACRS
Roger Kulavich	FPL St. Lucie Tech. Staff
Thierry Ross	NRC/NRR/PDII-4
Ron Pennenga	FPL/St. Lucie/Operations
J. Laduca	FPL/Nuclear Engineering
R. C. Munter	FPL/Nuclear Engineering
Dan Dorman	NRC/NRR/PDII-2
Mike Schoppman	FPL/Nucl. Licensing
David Shum	NRC/NRR/SPLB
Lamar McLaughlin	FPL/Plant Licensing
J. H. Raval	NRR/SPLB
Paul Gill	NRR/SELB
Gabe Salamon	FPL/Turkey Point Licensing
Thomas E. Roberts	FPL/Engr. Proj. Mgr.
Kahtan N. Jabbour	NRC/NRR (Hatch PM)
Stephen Elrod	NRR/Region II
Ronnie Lo	NRR/PDII-I
Chu-Yu Liang	NRR/DST/SRXB
Ashok Thadani	NRR/DST
Ed Weinkam	FPL
George Hubbard	NRR/SPLB

ENCLOSURE 2

St. Lucie Nuclear Plant



FPL

STATION BLACKOUT

MAY 21, 1991

910401.MAC

FPL/NRC MEETING
STATION BLACKOUT
ST. LUCIE NUCLEAR PLANT
MAY 21, 1991

AGENDA

INTRODUCTION/OBJECTIVES	McLAUGHLIN
LICENSING BACKGROUND	WEINKAM
ELECTRICAL DESIGN	MUNTER
OPERATIONAL CONSIDERATIONS	PENNENGA
TECHNICAL CONSIDERATIONS	MUNTER
SUMMARY	McLAUGHLIN

MEETING OBJECTIVES

- PRESENT FPL PLANS
- OBTAIN A CONSISTENT UNDERSTANDING BETWEEN FPL AND NRC OF SBO REQUIREMENTS
- CONFIRM FPL'S PLANS MEET 10CFR50.63 AND LICENSING BASIS REQUIREMENTS
- DOCUMENT CONCLUSIONS FROM MEETING
- WORK TOWARD CLOSURE OF STATION BLACKOUT FOR ST. LUCIE

CHRONOLOGY OF 10 CFR 50.63 AT ST. LUCIE PLANT

- JUNE 21, 1988

  NRC PUBLISHES SBO RULE IN FEDERAL REGISTER, EFFECTIVE JULY 22, 1988

- APRIL 17, 1989

  FPL RESPONDS TO SBO RULE FOR UNIT 1 AND UNIT 2 (L-89-145) FPL'S LICENSING ASSUMPTIONS FOR SBO MODIFICATION DESIGN BASES ARE:

  - 10 Minute clock defined

    1. Starts at identification of SBO
    2. Ends at powering of SBO unit bus

  - 4 Hour SBO Duration
  - 0.95 Emergency Diesel Generator (EDG) Reliability
  - Hot Standby For 4 Hours
  - FPL committed to complete the modifications by December 31, 1991

- OCTOBER 17-19, 1989

  NRC AND SAIC CONDUCT SBO AUDIT IN JUNO BEACH

- MARCH 7, 1990

  FPL PROVIDES RESPONSE TO NRC COMMENTS/QUESTIONS FROM SBO AUDIT (L-90-58)

- NOVEMBER 21, 1990

  NRC FORWARDS DRAFT SAFETY EVALUATION ON SBO AT UNIT 1; UNIT 2 EXEMPTED BY REGULATIONS

- DECEMBER 21, 1990

  FPL FORWARDS COMMENT TO NRC ON DRAFT SBO SAFETY EVALUATION (L-90-452)

STATION BLACKOUT CHRONOLOGY AT ST. LUCIE UNIT 2

- ON JULY 30, 1980, THE NRC'S ATOMIC SAFETY AND LICENSING APPEAL BOARD, IN ALAB 603:

  Determines that the design of the circuits connecting St. Lucie Unit 2 to the offsite grid is in compliance with NRC regulations

  Concludes that the probability of a complete loss of electric power (other than onsite battery power) at the facility should be designated a "design basis event"

  Directs FPL to include in its FSAR an analysis demonstrating the ability of St. Lucie Unit 2 to withstand such a total loss of power

- IN DECEMBER 1981, ST. LUCIE UNIT 2 OPERATING LICENSE REVIEW (NUREG-0843) SECTION 15.10.8 (SSER #1)

  Section 15.10.8 NRC Staff states that the event is a <u>licensing basis</u> event for St. Lucie Unit 2

  NRC Staff finds "...that the plant system response is acceptable for total station blackout"

- ON NOVEMBER 21, 1990 THE NRC STAFF SAFETY EVALUATION ACKNOWLEDGES THE ST. LUCIE UNIT 2 EXEMPTION FROM 10 CFR 50.63

ELECTRICAL SYSTEM DESIGN
ST. LUCIE PLANT

- ST. LUCIE IS A TWO UNIT SITE WITH TWO COMBUSTION ENGINEERING PRESSURIZED WATER REACTORS

- THE TWO MAIN GENERATORS ARE WESTINGHOUSE 1000 MVA GENERATORS THAT PRODUCE APPROXIMATELY 900 MWe AT 22 KV

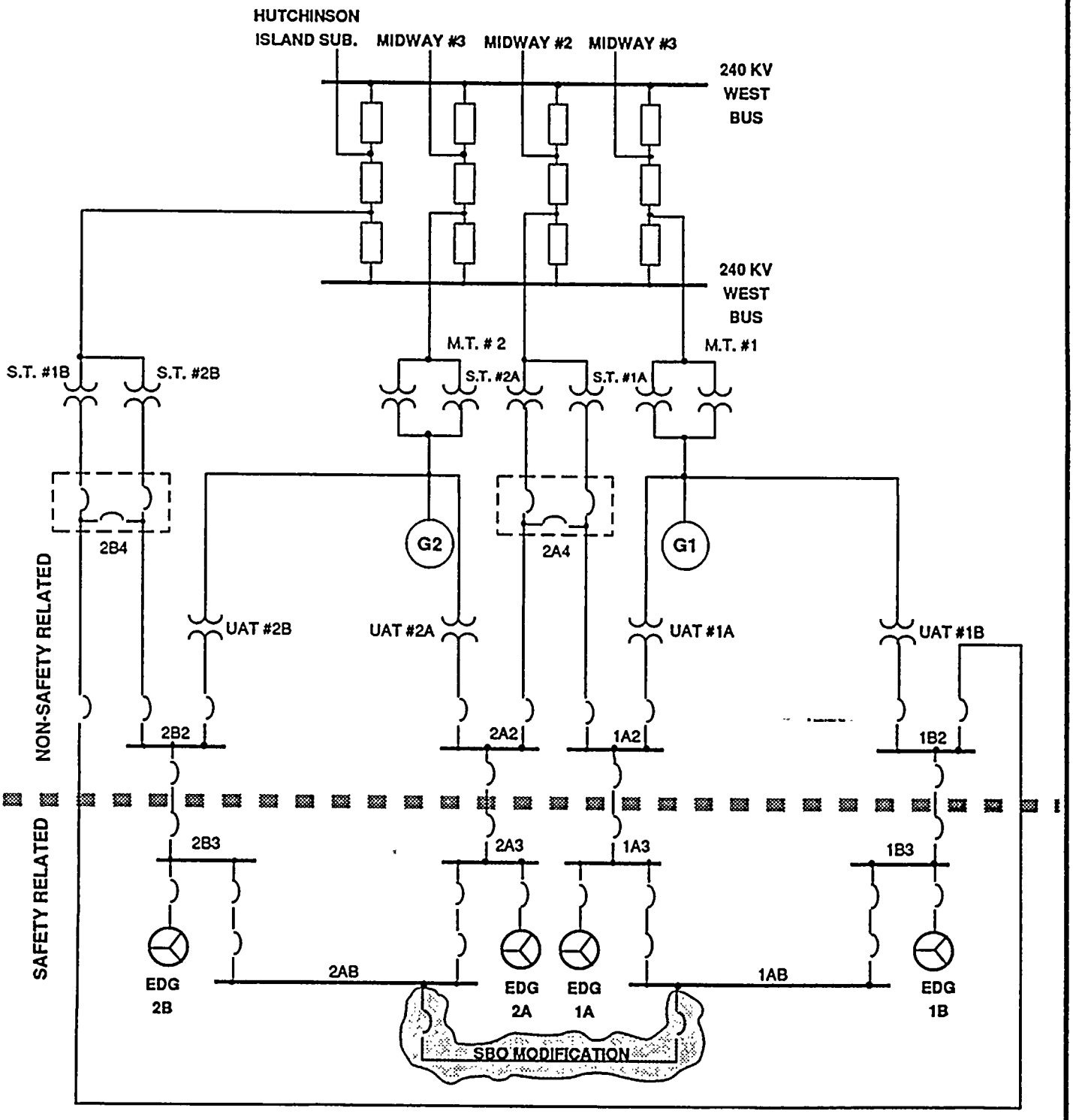
- THE FOUR BAY 240 KV SWITCHYARD PROVIDES SWITCHING CAPABILITY FOR EACH UNIT'S MAIN GENERATOR AND TWO STARTUP TRANSFORMERS AND THREE OUTGOING TRANSMISSION LINES

- THE ELECTRICAL SYSTEM FOR EACH UNIT IS AN A/B TRAIN DESIGN WITH A SAFETY RELATED SWING BUS (AB)

  THE SWING BUS CAN BE MANUALLY ALIGNED TO EITHER TRAIN

- EACH TRAIN HAS A SAFETY AND NON-SAFETY RELATED PORTION WITH EACH SAFETY RELATED TRAIN HAVING ITS OWN EMERGENCY DIESEL GENERATOR

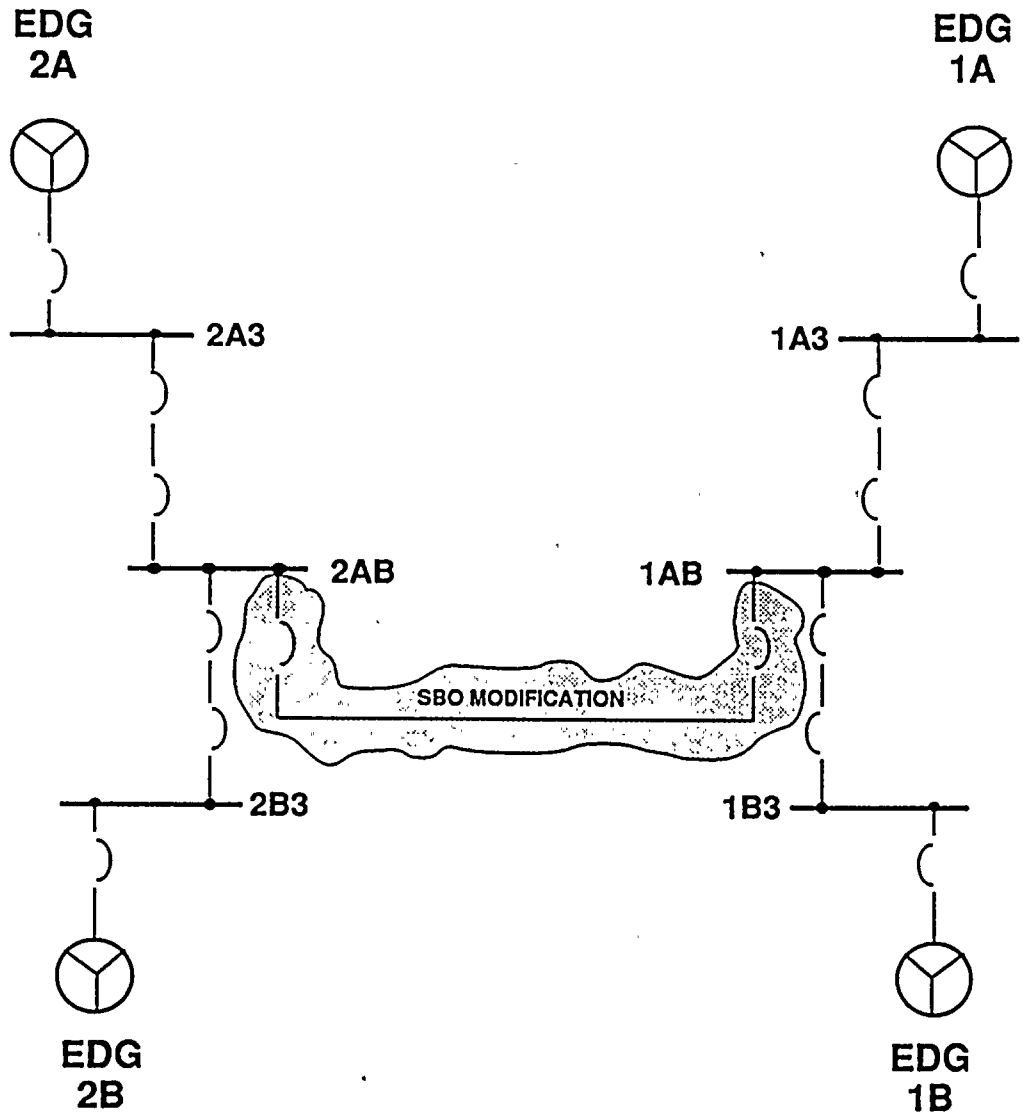
ST. LUCIE PLANT SIMPLIFIED ONE LINE DIAGRAM



10 CFR 50.63 MODIFICATION
ST. LUCIE UNITS 1 AND 2

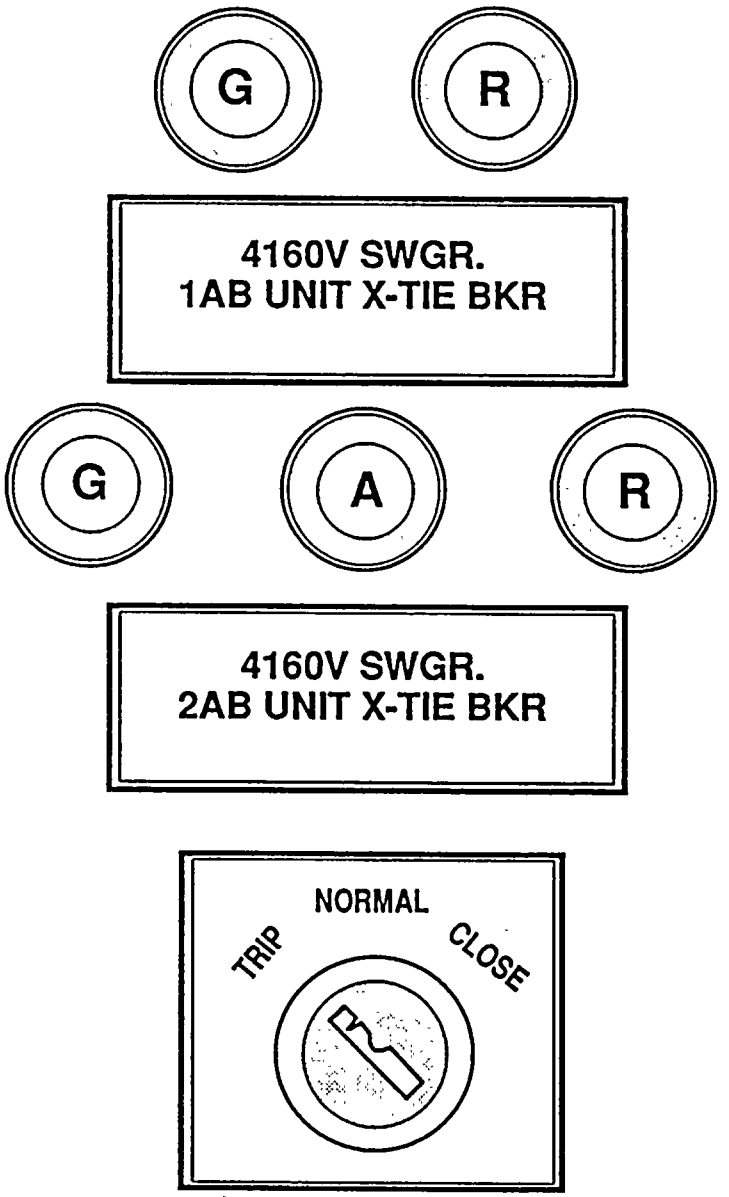
- INSTALL AN INTER-UNIT CABLE CROSS TIE CAPABLE OF TRANSFERRING POWER FROM ANY EDG TO ANY SAFETY-RELATED 4.16 KV SWITCHGEAR THROUGH THE SAFETY RELATED SWING BUS (6-1/c 350MCM POWER CABLES)
- THE STATION BLACKOUT CROSSTIE HAS BEEN DESIGNED TO CARRY MORE THAN TWICE THE ANTICIPATED STATION BLACKOUT LOADS
- ADD APPROPRIATE CONTROL AND INDICATION EQUIPMENT IN THE CONTROL ROOMS OF BOTH UNITS SUCH THAT THE CROSS-TIE CAN BE ACCOMPLISHED FROM THE CONTROL ROOMS
- THIS MODIFICATION SATISFIES THE OBJECTIVES TO:
  - Increase flexibility of the plant's electrical distribution to cope with emergency events
  - Increase the capability of the operators to accomplish this from inside the Control Room
  - Significantly decrease the amount of time and effort currently required to accomplish this task

10 CFR 50.63 MODIFICATION
ST. LUCIE UNITS 1 AND 2



NOTE: SIMPLIFIED ONE LINE DIAGRAM OF THE 4.16KV SAFETY RELATED SWITCHGEAR

10 CFR 50.63 MODIFICATION
CONTROL ROOM CONTROLS AND INDICATION
ST. LUCIE UNITS 1 AND 2

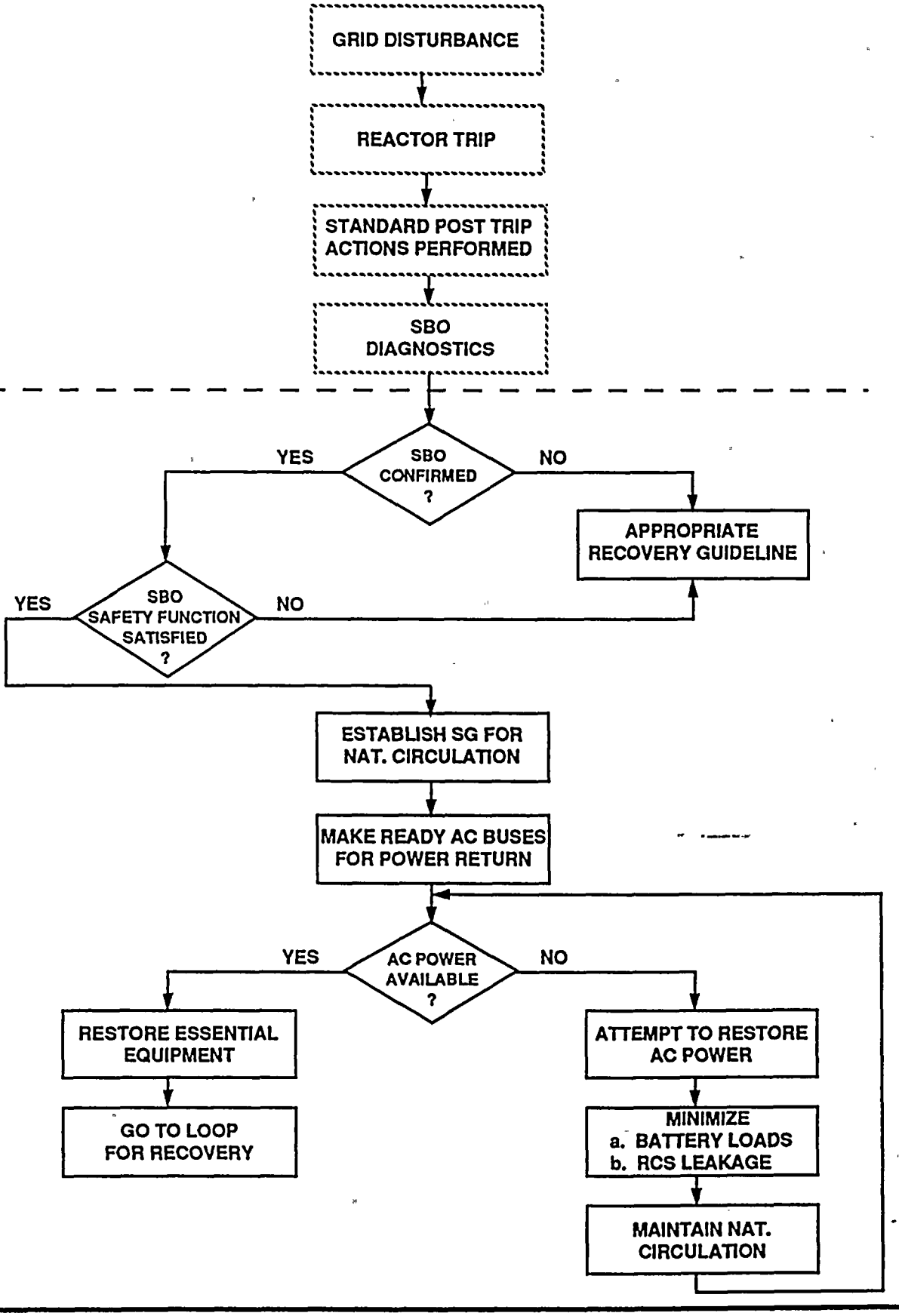


NOTE: UNIT 2 CONTROL ROOM MODIFICATIONS ARE SHOWN.
UNIT 1 MODIFICATIONS ARE SIMILAR.

OPERATIONS DEPARTMENT SBO GOALS

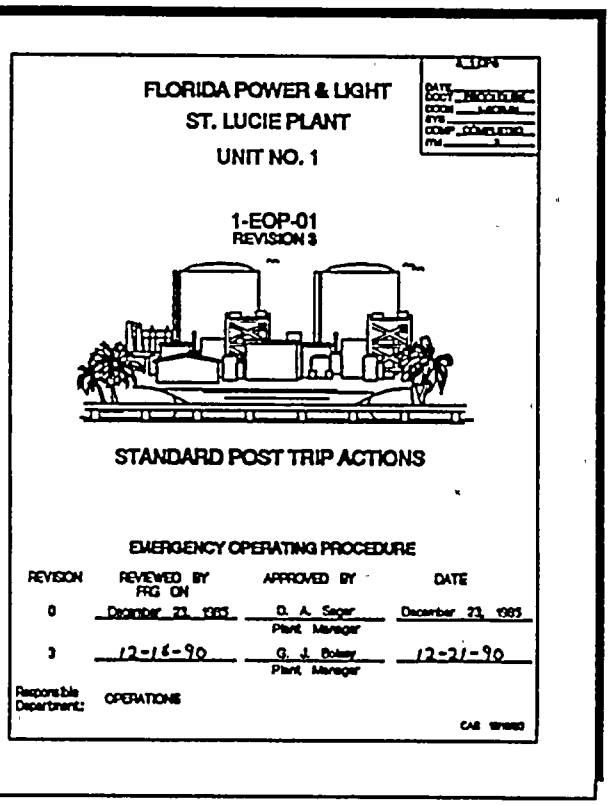
- MAINTAIN CONTROL OF ALL SAFETY FUNCTIONS ON BOTH UNITS
- MAINTAIN HOT STANDBY (MODE 3) CONDITIONS
  - Minimum amount of safety equipment requiring emergency AC Power
  - Core Heat Removal readily accomplished by Natural Circulation
  - Reduced stress compared to the actions required by performing an RCS cooldown
  - Reduced RCS make-up demand
- TO QUICKLY CROSS CONNECT TO THE OTHER UNIT'S AC POWER SUPPLY, PROVIDING POWER TO EQUIPMENT NECESSARY TO MAINTAIN HOT STANDBY WITH THE MINIMUM AMOUNT OF OPERATOR ACTION
- TO PROVIDE UNIFORM AND DETAILED PROCEDURAL GUIDANCE TO OPERATIONS STAFF FOR HANDLING SBO CONDITIONS
  - Provide directions and precautions
  - Reference point for both control rooms for event strategy
  - Uniform EOPs designed to enhance operator familiarity no matter which unit he is on

STATION BLACKOUT STRATEGY CHART



SAFETY FUNCTIONS (EOP-01)

- REACTIVITY CONTROL
- MAINTENANCE OF VITAL AUXILIARIES
- RCS INVENTORY CONTROL
- RCS PRESSURE CONTROL
- CORE HEAT REMOVAL
- RCS HEAT REMOVAL
- CONTAINMENT ISOLATION
- CONTAINMENT PRESSURE/COMBUSTIBLE GAS



FLORIDA POWER & LIGHT
ST. LUCIE PLANT
UNIT NO. 1

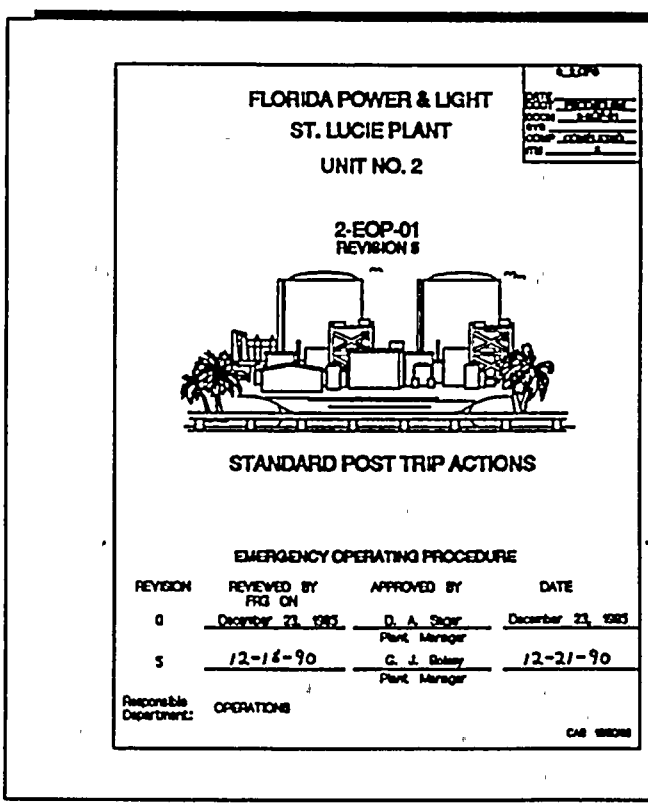
1-EOP-01
REVISION 3

STANDARD POST TRIP ACTIONS

EMERGENCY OPERATING PROCEDURE

REVISION	REVIEWED BY FRG ON	APPROVED BY	DATE
0	December 23, 1985	D. A. Sager, Plant Manager	December 23, 1985
3	12-16-90	G. J. Boissy, Plant Manager	12-21-90

Responsible Department: OPERATIONS



FLORIDA POWER & LIGHT
ST. LUCIE PLANT
UNIT NO. 2

2-EOP-01
REVISION 5

STANDARD POST TRIP ACTIONS

EMERGENCY OPERATING PROCEDURE

REVISION	REVIEWED BY FRG ON	APPROVED BY	DATE
0	December 23, 1985	D. A. Sager, Plant Manager	December 23, 1985
5	12-16-90	G. J. Boissy, Plant Manager	12-21-90

Responsible Department: OPERATIONS

OPERATOR MILESTONES ON SBO ST. LUCIE UNIT 1 WITH LOOP ST. LUCIE UNIT 2

- ENTER APPROPRIATE RECOVERY GUIDELINE
  - ST. LUCIE UNIT 1 will implement EOP 10
  - ST. LUCIE UNIT 2 will implement EOP 9
- ASSESS CORE AND RCS HEAT REMOVAL CAPABILITIES ON BOTH UNITS
  - Establish flow via C AFW pump
  - Verify natural circulation
- ESTABLISH COMMUNICATIONS
- SECURE NON-ESSENTIAL UNIT 2 LOADS
- STRIP UNIT 1 EMERGENCY BUSES
- CLOSE SBO CROSSTIES
- RESTORE UNIT 1 VITAL LOADS
- STABILIZE BOTH PLANTS
- RESTORE AC POWER
- EXIT EOPS, ENTER AN APPROPRIATE OPERATING PROCEDURE

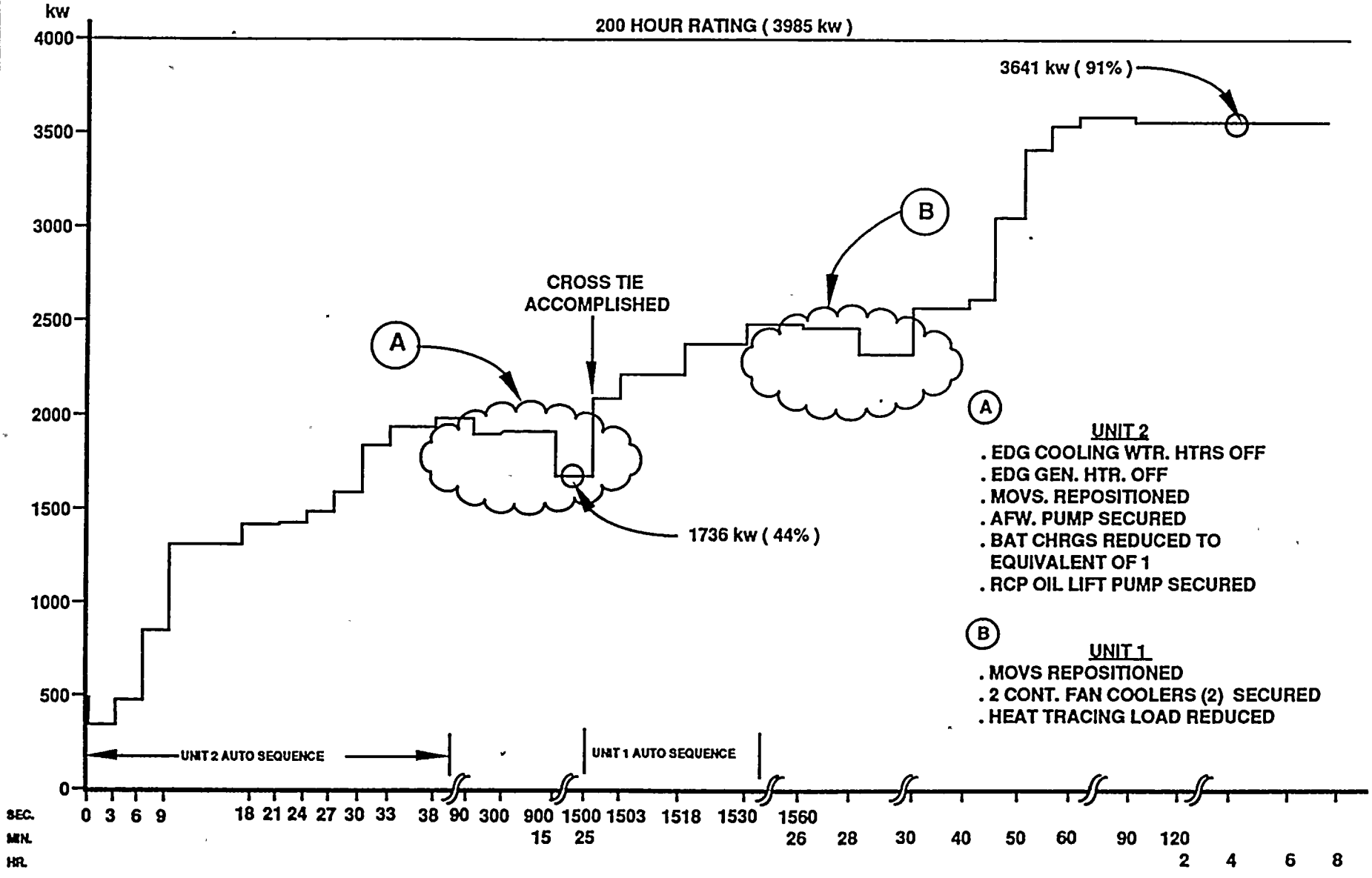
EMERGENCY DIESEL GENERATOR
ST. LUCIE UNIT 2

LOAD RATINGS*

CONTINUOUS	3685 KW
2000 HR	3935 KW
200 HR	3985 KW
4 HR	3985 KW
30 MIN	3985 KW

*NOTE:
1. The EDG ratings are based on a 104^{o}F air intake temperature.
2. The EDG's are rated for worst case operating conditions. An air intake temperature above 90^{o}F derates the engine capacity.

ST. LUCIE UNITS 1 AND 2
EDG LOAD PROFILE



NOTE: 1. THIS EDG LOAD PROFILE IS BASED ON UNIT 2 IN A LOOP AND UNIT 1 IN AN SBO EVENT.
2. THIS EDG LOAD PROFILE IS FOR TRAIN "A " OF BOTH UNITS (WORST CASE).

EDG LOAD PROFILE ASSUMPTIONS
ST. LUCIE UNITS 1 AND 2

- ELECTRICAL LOAD FOR PUMP MOTORS IS BASED ON THE BRAKE HORSEPOWER AT PUMP RUN OUT OR OPERATING CONDITIONS

- SHUTDOWN COOLING (LPSI) PUMPS ARE NOT INCLUDED IN THE UNIT 1 OR 2 LOADS
  - Both Units will maintain Hot Standby conditions
  - The LPSI pumps are not automatically started for a LOOP event

- STEAM DRIVEN AUXILIARY FEEDWATER PUMPS ARE USED ON BOTH UNITS 1 AND 2
  - Steam driven AFW pumps are available. Therefore, the motor driven AFW pumps are not required.

- 200 HOUR RATING OF THE EDGs WILL BE USED
  - Power will be restored within 8 hours
  - EDG tested every 18 months for 2 hours at 4 hour rating

REACTOR COOLANT SYSTEM INVENTORY
ST. LUCIE UNIT 1

- COMBUSTION ENGINEERING NSSS
- THERMAL CORE RATING OF 2700 MWt
- 2 STEAM GENERATORS WITH 4 REACTOR COOLANT PUMPS
- 3 CHARGING PUMPS RATED AT 44 gpm EACH
- TOTAL RCS INVENTORY (NORMAL OPERATION) OF 75,000 GALLONS
- PRESSURIZER LIQUID VOLUME (NORMAL OPERATION) OF 4500 TO 6000 GALLONS

REACTOR COOLANT SYSTEM INVENTORY
ST. LUCIE UNIT 1

- ASSUMPTIONS IN DRAFT SER FOR RCS LEAKAGE
  - Maximum allowable RCS leakage per plant Technical Specifications (12 gpm for identified and unidentified)
  - 25 gpm per pump losses through Reactor Coolant Pump seals (4 RCPs)
  - Therefore, a total of 112 gpm
- FPL ASSUMPTIONS FOR RCS LEAKAGE
  - Unit 2 SBO analysis is applicable to Unit 1
  - Maximum allowable RCS leakage per plant Technical Specifications (11 gpm for identified and unidentified)
  - Nominal RCP seal leakage of 1.25 gpm per pump (4 RCPs)
  - Therefore, a total of 16 gpm

REACTOR COOLANT SYSTEM INVENTORY
ST. LUCIE UNIT 1

- BASIS FOR RCP SEAL LEAKAGE ASSUMPTION
  - RCP seal maintains integrity after seal cooling is lost
  - A test by the pump manufacturer in August 1980
  - Greater than 36 hours at Hot Standby conditions without cooling
  - Maximum seal leakage was less than 0.3 gpm (16.1 gph)
  - Operational experience at St. Lucie Units 1 and 2 (approx. 23 reactor years)
  - 13 RCP seals subjected to loss of cooling
  - No significant increase in seal leakage

HVAC EVALUATION
ST. LUCIE UNIT 1

- AN ENGINEERING EVALUATION WAS PERFORMED FOR THE CONTROL ROOM, REACTOR CONTAINMENT BUILDING, AUXILIARY BUILDING AND ELECTRICAL EQUIPMENT ROOMS FOR THE SBO EVENT

- THE EVALUATION CONCLUDED THAT ROOM TEMPERATURES REMAIN BELOW PREVIOUSLY ANALYZED VALUES

SUMMARY

- OPERATOR ACTIONS REQUIRED FOR SBO AND NBO UNITS
- FPL LICENSING ASSUMPTIONS
- STATION BLACKOUT MODIFICATION
- REQUESTED REVISIONS TO SAFETY EVALUATION

REQUESTED REVISIONS TO NRC DRAFT SAFETY EVALUATION ON SBO

PROPOSED CHANGE	SE SECTION/ SE PAGE	REASON FOR CHANGE
Add St. Lucie Unit 2 docket number to the SE.	Cover letter and page 1 of SE	The Unit 2 licensing basis for SBO is being amended by the SE.
Delete the recommendation that FPL verify the NBO unit's auxiliary or startup transformer capacity sufficiency.	Section 2.1/ page 3	FPL concurs that St. Lucie Unit 1 should be classified as independence of offsite power group I 3.
Revise SBO and NBO units SBO/LOOP loads.	Section 2.2.2/ pages 5 and 6	The SBO and LOOP loads have been recalculated by FPL.
Clarify that the time to repower SBO bus is 10 minutes from identification.	Section 2.2.2/ page 6 Section 2.3.5/ page 7	FPL has committed to repower the SBO unit's bus with the AAC source within 10 minutes following confirmation that an SBO has occurred.
Delete requirement to power motor-driven AFW pump and LPSI pump on AAC source for the NBO unit.	Section 2.2.2/ page 6	FPL will provide decay heat removal for the NBO unit using the turbine-driven AFW pump. FPL will maintain the SBO and NBO units in Hot Standby; therefore there is no need to provide for forced cooling decay heat removal.
Revise the AAC source load limit rating to the 200 hour rating.	Section 2.2.2/ page 6	FPL tests the NBO EDGs for 2 hours at the 4 hour rating every 18 months. Event postulated to last no more than 8 hours.

REQUESTED REVISIONS TO NRC DRAFT SAFETY EVALUATION ON SBO

PROPOSED CHANGE	SE SECTION/ SE PAGE	REASON FOR CHANGE
Delete the reference to diesel-driven air compressors.	Section 2.3.3/ page 7	The instrument air compressors at St. Lucie Plant are not diesel driven; the air compressors can be powered from the EDGs.
Revise the hypothesized RCS inventory loss rate to 16 gpm from the 112 gpm presented in the SE.	Section 2.3.6/ page 7	FPL has tested the St. Lucie Units 1 and 2 RCP seals under operating conditions without cooling. The leak rate determined by this testing was significantly less than the postulated value in the draft SER.
Revise the SE Section discussing the proposed modifications implementation schedule to reflect the 10 CFR 50.63 (c) (3) rule requirement of implementation within 2 years of the completion of the NRC's regulatory assessment.	Section 2.5/ page 8	FPL requests that the NRC Staff reflect in the SBO rule-required Safety Evaluation the scheduler requirements for implementation of the SBO modifications as specified in 10 CFR 50.63.
Revise the SE discussion of AAC power sources to accommodate securing of non-essential LOOP loads (NBO Unit).	Section 2.2.1/ pages 4-5 Section 2.2.2/ page 6	Selective load reduction is a desirable element of LOOP recovery for a NBO Unit.

TABLE 5.2 A
UNIT 2 LOOP - UNIT 1 SBO
EOP 10 & APPENDIX X/XX
TRAIN "A" - BOTH UNITS

UNIT		TIME	KW	AUTO/MAN	KW LOAD BLOCK TOTAL	KW RUNNING TOTAL (LOAD BLOCKS)
2	Emerg. Lighting Pnls	0 sec	82.4	A		
2	HOVs: V-2553,2555,3614,3642,FCV-25-11 MV-09-09,21-03,21-4A	0 sec	6.4	A		
2	Power Pnls: PP-201,201A,211,220,246,250 262,263,268,203,233,234	0 sec	115.4	A		
2	RCP Oil Lift Pumps	0 sec	18.0	A		
2	Security Bld Computer A/C HVA-10A	0 sec	7.7	A		
2	Hydrogen Analyzer "SA"	0 sec	1.6	A		
2	D/G Cooling Water Htrs	0 sec	60.0	A		
2	D/G/ Turbo Lub Oil Pmps 2A1-1 and 2A2-1	0 sec	3.6	A		
2	D/G Soak Back Lub Oil Pmps 2A1-1 and 2A2-1	0 sec	1.8	A		
2	D/G Air Compressor	0 sec	6.7	A		
2	Fire/Security UPS	0 sec	30.0	A		
2	Vital (Non-IE) UPS	0 sec	20.0	A	353.6	353.6
2	Containment Fan Coolers 2 HVS-1A and 1B	3 sec	141.0	A		
2	Cntmt Fan Htrs PP-201	3 sec	-0.6	A		
2	D/G Fuel Oil Transfer Pmp 2A	3 sec	2.7	A	143.1	496.7
2	CCW P 2A	6 sec	368.9	A		
2	CCW P Htrs PP-201	6 sec	-1.1	A	367.8	864.5
2	ICW P 2A	9 sec	476.8	A		
2	ICW P Htrs PP-201	9 sec	-0.9	A	475.9	1340.4
2	EE Rm Fan 2 HVS-5A	18 sec	72.8	A		
2	EE Fan HVS-5A Htr PP-201	18 sec	-0.2	A		
2	Reactor Cavity Supply 2 HVS-2A	18 sec	13.7	A		
2	Reactor Support Cooling 2 HVE-3A	18 sec	21.8	A		
2	Support Cool Fan Htr PP-201	18 sec	-0.3	A	107.8	1448.2
2	EE Rm Exhaust Fan 2 RV-3	21 sec	4.5	A		
2	Battery Rm Exhaust Fan 2 RV-1	21 sec	0.7	A		
2	Intake Bld Exhaust Fan 2 HVE-41A	21 sec	6.7	A	11.9	1460.1
2	Control Rm A/C 2 HVA-3A and ACC-3A	24 sec	49.4	A		
2	CR HVA/ACC-3A Htrs PP-201	24 sec	-0.4	A	49.0	1509.1
2	CVCS Heat Trace	27 sec	3.5	A		
2	Battery Chargers 2A,2AA, and 2AB	27 sec	105.6	A	109.1	1618.2
2	AFW P 2A	30 sec	254.1	A		
2	AFW P Heater PP-201	30 sec	-1.1	A	253.0	1871.2
2	RAB Supply Fan 2 HVS-4A	33 sec	106.6	A		
2	RAB Fan HVS-4A Htr PP-206/201	33 sec	-0.3	A	106.3	1977.5
2	EE Rm Exhaust Fan 2 HVE-11	38 sec	39.4	A		
2	EE Rm Fan HVE-11 Htr PP-201	38 sec	-0.3	A	39.1	2016.6
2	D/G Cool Water Htrs	90 sec	-60.0	A		

TABLE 5.2 A
UNIT 2 LOOP - UNIT 1 SBO
EOP 10 & APPENDIX X/XX
TRAIN "A" - BOTH UNITS

UNIT		TIME	KW	AUTO/HAN	KW LOAD BLOCK TOTAL	KW RUNNING TOTAL (LOAD BLOCKS)
2	D/G Gen Htr PP-211	90 sec	-4.5	A		
2	MOVs	90 sec	-6.4	A	-70.9	1945.7
2	Charging Pmp 2A	300 sec	52.1	A/M		
2	Charging Pmp Htr PP-201	300 sec	-0.6	A		
2	Battery Chargers	300 sec	-52.0	A		
2	EE Rm A/C 2 HVA-ACC-4	300 sec	11.7	A		
2	CVCS Heat Trace (1/2)	300 sec	-1.7	A	9.5	1955.2
2	AFW P 2A	900 sec	-254.1	M		
2	AFW P Htr PP-201	900 sec	1.1	A		
2	RCP Oil Lift Pumps	900 sec	-18.0	M		
2	Charging Pmp 2C	900 sec	52.1	M		
2	Charging Pmp Htr PP-203	900 sec	-0.6	A		
1	RCP Oil Lift Pmp - Secured	900 sec	0.0	M	-219.5	1735.7
2	Close SBO 2AB/1AB Tie Bkrs	1500 sec	0.0	M		
1	Close 480V LC Bkr	1500 sec	0.0	M		
1	D/G Oil Pmp	1500 sec	1.8	A		
1	D/G Air Compressor	1500 sec	6.7	A		
1	D/G Fuel Oil Transfer Pump 1A	1500 sec	4.5	A		
1	Emerg. Lighting Pnls.	1500 sec	125.8	A		
1	MOVs: V-3481,3644,3651,3659	1500 sec	9.4	A		
1	Power Pnls PP-101,111,114,135,PP-103,134	1500 sec	122.3	A		
1	Boric Acid MU Pmp 1A or 1B	1500 sec	16.2	A		
1	BA MU Pmp Htr PP-101	1500 sec	-0.3	A		
1	Cable Spread Rm A/C	1500 sec	31.5	A		
1	Cable Spread Rm Fan	1500 sec	4.5	A		
1	Computer Rm A/C 1 ACC-10A	1500 sec	8.0	A		
1	Computer Rm Fan 1 HVA-10A	1500 sec	2.7	A		
1	Hydrogen Analyzer	1500 sec	1.6	A		
1	Charging Pmp 1A	1500 sec	70.5	A		
1	Charging Pmp Htr PP-101	1500 sec	-0.6	A	404.6	2140.3
1	Containment Fan Coolers 1 HVS-1A and 1B	1503 sec	123.0	A		
1	Cntmt Fan Htrs PP-101	1503 sec	-0.9	A	122.1	2262.4
1	Boric Acid Heat Trace	1518 sec	33.8	A		
1	Control Rm A/C 1 ACC-3A	1518 sec	29.3	A		
1	Control Fan 1 HVA-3A	1518 sec	6.7	A		
1	RAB Supply Fan 1 HVS-4A	1518 sec	41.7	A		
1	Reactor Cavity Supply Fan HVS-2A	1518 sec	15.5	A		
1	Reactor Support Fan HVE-3A	1518 sec	21.6	A		
1	CVCS Heat Trace	1518 sec	10.1	A		
1	Boric Acid Tank Heaters	1518 sec	13.5	A	172.2	2434.6
1	Battery Chargers 1A,1AA	1530 sec	104.0	A	104.0	2538.6
1	MOVs	1560 sec	-9.4	A		
1	Boric Acid Tank Heaters	1560 sec	-13.5	A	-22.9	2515.7

TABLE 5.2 A
UNIT 2 LOOP - UNIT 1 SBO
EOP 10 & APPENDIX X/XX
TRAIN "A" - BOTH UNITS

UNIT		TIME	KW	AUTO/MAN	KW LOAD BLOCK TOTAL	KW RUNNING TOTAL (LOAD BLOCKS)
1	Containment Fan Coolers	28 min	-122.1	M	-122.1	2393.6
1	Boric Acid Heat Trace (1/2)	30 min	-16.9	A		
1	CVCS Heat Trace (1/2)	30 min	-5.1	A		
2	Przr Htrs	30 min	200.0	M		
2	Inst. Air Compressor 2A	30 min	54.0	M		
2	Inst. Air Cool Fan	30 min	4.5	M		
2	Inst. Air Cool Pmp	30 min	6.8	M	243.3	2636.9
1	D/G Fuel Oil Transfer Pmp	35 min	-4.5	A	-4.5	2632.4
1	Inst. Air compressor 1A	40 min	32.8	M		
1	Inst. Air Comp Fan	40 min	6.7	M		
1	Inst. Air Cool Water Pmp	40 min	1.8	M	41.3	2673.7
1	ICW P 1A	45 min	451.0	M		
1	ICW P Htrs PP-101	45 min	-1.2	A	449.8	3123.5
1	CCW P 1A	50 min	368.9	M		
1	CCW P Htrs PP-101	50 min	-1.1	A	367.8	3491.3
1	PRZR Htr*	55 min	186.0	M		
1	Charging Pmp 1A*	55 min	-70.5	M		
1	Charging Pmp Htr* PP-101	55 min	0.6	A	116.1	3607.4
1	Containment Fan Cooler	60 min	61.1	M		
2	D/G Air Compressor	60 min	-6.7	A		
2	Battery Chargers	60 min	-5.0	A	49.4	3656.8
1	Battery Chargers	90 min	-52.0	A		
1	Fire/Security UPS	90 min	20.0	M		
1	Vital (non-IE) UPS	90 min	20.0	M	-12.0	3644.8
1	EE Rm Roof Fan 1 RV-3	120 min	1.3	M		
1	EE Rm Exhaust Fan 1 HVE-11	120 min	4.1	M		
1	EE Rm Supply Fan 1 HVS-5A	120 min	27.0	M		
1	Cable Spread Rm A/C	120 min	-31.5	M		
1	Cable Spread Rm Fan	120 min	-4.5	M	-3.6	3641.2
	DISCRETIONARY LOADS					
	I					
1	D/G Bld PP-111 Ckts 1, 7, 8, 11 & 12		-32.7			
1	D/G Air Compressor		-6.7			
1	EE Rm Supply Fan 1 HVS-5A		-27.0			
1	Balance of BA & CVCS Heat Trace		-21.9		-88.3	
	II					
1	Boric Acid MU Pump		-15.9		-15.9	

*NOTE: The Unit 1 Pressurizer Heaters and Charging Pump are alternately cycled.

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