

APPENDIX A. DISCUSSION OF NRC LICENSE RENEWAL NATIONAL ENVIRONMENTAL POLICY ACT ISSUES

Florida Power & Light Company (FPL) has prepared this *Environmental Report - Operating License Renewal Stage; St. Lucie Units 1 and 2* in accordance with the requirements of U.S. Nuclear Regulatory Commission (NRC) regulation 10 CFR 51.53. The NRC included in the regulation a list of National Environmental Policy Act (NEPA) issues for license renewal of nuclear power plants. Table A-1 lists these 92 issues with assigned categorization and identifies where FPL addressed each issue in the Environmental Report. A cross-reference to the section in the GEIS containing the NRC's generic analysis is also presented for the issues applicable to St. Lucie Units 1 & 2 license renewal. For expediency, FPL has assigned numbers to each issue and uses the issue numbers throughout the Environmental Report.

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

TABLE A-1
ST. LUCIE UNITS 1 & 2 ENVIRONMENTAL REPORT
DISCUSSION OF LICENSE RENEWAL NEPA ISSUES

Issue ^a	Category ^a	Section of this Environmental Report	GEIS Cross Reference ^b (Section/Page)
1. Impacts of refurbishment on surface water quality	1	NA ^c	
2. Impacts of refurbishment on surface water use	1	NA ^c	
3. Altered current patterns at intake and discharge structures	1	4.1	4.2.1.2.1/4-4
4. Altered salinity gradients	1	NA ^d	
5. Altered thermal stratification of lakes	1	NA ^d	
6. Temperature effects on sediment transport capacity	1	4.1	4.2.1.2.3/4-6
7. Scouring caused by discharged cooling water	1	4.1	4.2.1.2.3/4-6
8. Eutrophication	1	NA ^d	
9. Discharge of chlorine or other biocides	1	4.1	4.2.1.2.4/4-10
10. Discharge of sanitary wastes and minor chemical spills	1	4.1	4.2.1.2.4/4-10
11. Discharge of other metals in waste water	1	4.1	4.2.1.2.4/4-10
12. Water use conflicts (plants with once-through cooling systems)	1	4.1	4.2.1.3/4-13
13. Water use conflicts (plants with cooling ponds or cooling towers using makeup water from a small river with low flow)	2	NA ^f	
14. Refurbishment impacts to aquatic resources	1	NA ^c	
15. Accumulation of contaminants in sediments or biota	1	4.1	4.2.1.2.4/4-10
16. Entrainment of phytoplankton and zooplankton	1	4.1	4.2.2.1.1/4-15
17. Cold shock	1	4.1	4.2.2.1.5/4-18
18. Thermal plume barrier to migrating fish	1	4.1	4.2.2.1.4/4-17

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TABLE A-1 (continued)
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Issue ^a	Category ^a	Section of this Environmental Report	GEIS Cross Reference ^b (Section/Page)
19. Distribution of aquatic organisms	1	4.1	4.2.2.1.6/4-19
20. Premature emergence of aquatic insects	1	NA ^e	
21. Gas supersaturation (gas bubble disease)	1	4.1	4.2.2.1.8/4-21
22. Low dissolved oxygen in the discharge	1	4.1	4.2.2.1.9/4-23
23. Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	1	4.1	4.2.2.1.10/4-24
24. Stimulation of nuisance organisms (e.g., shipworms)	1	4.1	4.2.2.1.11/4-25
25. Entrainment of fish and shellfish in early life stages for plants with once-through and cooling pond heat dissipation systems	2	4.2	4.2.2.1.2/4-16
26. Impingement of fish and shellfish for plants with once-through and cooling pond heat dissipation systems	2	4.3	4.2.2.1.3/4-16
27. Heat shock for plants with once-through and cooling pond heat dissipation systems	2	4.4	4.2.2.1.4/4-17
28. Entrainment of fish and shellfish in early life stages for plants with cooling-tower-based heat dissipation systems	1	NA ^f	
29. Impingement of fish and shellfish for plants with cooling-tower-based heat dissipation systems	1	NA ^f	
30. Heat shock for plants with cooling-tower-based heat dissipation systems	1	NA ^f	
31. Impacts of refurbishment on groundwater use and quality	1	NA ^c	

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32. Groundwater use conflicts (potable and service water; plants that use < 100 gpm)	1	NA ^g	
33. Groundwater use conflicts (potable, service water, and dewatering; plants that use > 100 gpm)	2	NA ^g	
34. Groundwater use conflicts (plants using cooling towers withdrawing makeup water from a small river)	2	NA ^g	
35. Groundwater use conflicts (Ranney wells)	2	NA ^h	
36. Groundwater quality degradation (Ranney wells)	1	NA ^h	
37. Groundwater quality degradation (saltwater intrusion)	1	NA ^g	
38. Groundwater quality degradation (cooling ponds in salt marshes)	1	NA ^{f,g}	
39. Groundwater quality degradation (cooling ponds at inland sites)	2	NA ^{f,g}	
40. Refurbishment impacts to terrestrial resources	2	4.5	3.6/3-6
41. Cooling tower impacts on crops and ornamental vegetation	1	NA ^f	
42. Cooling tower impacts on native plants	1	NA ^f	
43. Bird collisions with cooling towers	1	NA ^f	
44. Cooling pond impacts on terrestrial resources	1	NA ^f	
45. Power line right-of-way management (cutting and herbicide application)	1	4.1	4.5.6.1/4-71
46. Bird collisions with power lines	1	4.1	4.5.6.2/4-74

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47. Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	1	4.1	4.5.6.3/4-77
48. Floodplains and wetlands on power line right-of-way	1	4.1	4.5.7/4-81
49. Threatened or endangered species	2	4.6	3.9/3-48, 4.1/4-1
50. Air quality during refurbishment (nonattainment and maintenance areas)	2	4.7	3.3/3-2
51. Air quality effects of transmission lines	1	4.1	4.5.2/4-62
52. Onsite land use	1	4.1	3.2/3-1
53. Power line right-of-way land-use impacts	1	4.1	4.5.3/4-62
54. Radiation exposures to the public during refurbishment	1	NA ^c	
55. Occupational radiation exposures during refurbishment	1	NA ^c	
56. Microbiological organisms (occupational health)	1	4.1	4.3.6/4-48
57. Microbiological organisms (public health)(plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	2	NA ^{d,f}	
58. Noise	1	4.1	4.3.7/4-49
59. Electromagnetic fields, acute effects (electric shock)	2	4.8	4.5.4.1/4-66
60. Electromagnetic fields, chronic effects	NA ⁱ	4.1.3	
61. Radiation exposures to public (license renewal term)	1	4.1	4.6.2/4-87
62. Occupational radiation exposures (license renewal term)	1	4.1	4.6.3/4-95
63. Housing impacts	2	4.9	3.7.2/3-10, 4.7.1/4-101

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64. Public services: public safety, social services, and tourism and recreation	1	4.1	3.7.4/3-14, 3.7.4.3/3-18, 3.7.4.4/3-19, 3.7.4.6/3-20, 4.7.3/4-104, 4.7.3.3/4-106, 4.7.3.4/4-107, 4.7.3.6/4-107
65. Public services: public utilities	2	4.10	3.7.4.5/3-19, 4.7.3.5/4-107
66. Public services, education (refurbishment)	2	4.11	3.7.4.1/3-15
67. Public services, education (license renewal term)	1	4.1	4.7.3.1/4-106
68. Offsite land use (refurbishment)	2	4.12.1	3.7.5/3-20
69. Offsite land use (license renewal term)	2	4.12.2	4.7.4/4-107
70. Public services, transportation	2	4.13	3.7.4.2/3-17, 4.7.3.2/4-106
71. Historic and archaeological resources	2	4.14	3.7.7/3-23, 4.7.7/4-114
72. Aesthetic impacts (refurbishment)	1	NA ^c	
73. Aesthetic impacts (license renewal term)	1	4.1	4.7.6/4-111
74. Aesthetic impacts of transmission lines (license renewal term)	1	4.1	4.5.8/4-83
75. Design basis accidents	1	4.1	5.3.2/5-11, 5.5.1/5-114
76. Severe accidents	2	4.15	5.3.3/5-12, 5.5.2/5-114
77. Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level radioactive waste)	1	4.1	6.2.4/6-27, 6.6/6-87
78. Offsite radiological impacts (collective effects)	1	4.1	6.2.4/6-27, 6.6/6-88
79. Offsite radiological impacts (spent fuel and high-level radioactive waste disposal)	1	4.1	6.2.4/6-28, 6.6/6-88
80. Nonradiological impacts of the uranium fuel cycle	1	4.1	6.2.2.6/6-20, 6.2.2.7/6-20, 6.2.2.8/6-21, 6.2.2.9/6-21, 6.6/6-90
81. Low-level radioactive waste storage and disposal	1	4.1	6.4.2/6-36, 6.4.3/6-37, 6.4.4/6-48, 6.6/6-90

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Issue ^a	Category ^a	Section of this Environmental Report	GEIS Cross Reference ^b (Section/Page)
82. Mixed waste storage and disposal	1	4.1	6.4.5/6-63, 6.6/6-91
83. Onsite spent fuel	1	4.1	6.4.6/6-70, 6.6/6-91
84. Nonradiological waste	1	4.1	6.5/6-86, 6.6/6-92
85. Transportation	1	4.1	Addendum 1 (Ref. A.0-2)
86. Radiation doses (decommissioning)	1	4.1	7.3.1/7-15, 7.4/7-25
87. Waste management (decommissioning)	1	4.1	7.3.2/7-19, 7.4/7-25
88. Air quality (decommissioning)	1	4.1	7.3.3/7-21, 7.4/7-25
89. Water quality (decommissioning)	1	4.1	7.3.4/7-21, 7.4/7-25
90. Ecological resources (decommissioning)	1	4.1	7.3.5/7-21, 7.4/7-25
91. Socioeconomic impacts (decommissioning)	1	4.1	7.3.7/7-24, 7.4/7-25
92. Environmental justice	NA ⁱ	4.16	Not in GEIS

NOTES:

- a. Source: 10 CFR 51, Subpart A, Appendix B, Table B-1 (Issue numbers added to facilitate discussion).
- b. Source: Ref. A.0-1.
- c. NRC findings are not applicable because FPL has no plans for major refurbishment.
- d. Not applicable because St. Lucie Units 1 & 2 discharge to an ocean rather than an estuary or lake.
- e. Not applicable because St. Lucie Units 1 & 2 discharge to saline waters that do not provide a viable environment for aquatic insects.
- f. Not applicable because St. Lucie Units 1 & 2 are not equipped with cooling ponds or cooling towers.
- g. Not applicable because St. Lucie Units 1 & 2 are not direct users of groundwater (no dewatering; potable and service water are from municipal supply).
- h. Not applicable because St. Lucie Units 1 & 2 do not use Ranney wells.
- i. Not applicable. Regulation does not categorize this issue.

FPL = Florida Power & Light Company

GEIS = *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*

NA = Not applicable

NEPA = National Environmental Policy Act

NRC = U.S. Nuclear Regulatory Commission

Ref. = Reference

A.1 REFERENCES

- A-1 U.S. Nuclear Regulatory Commission. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437. Office of Nuclear Regulatory Research. Washington, D.C. May 1996.
- A-2 U.S. Nuclear Regulatory Commission. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. Section 6.3, "Transportation," and Table 9.1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants." NUREG-1437, Vol. 1, Addendum 1. Office of Nuclear Reactor Regulation. Washington, D.C. August 1999.

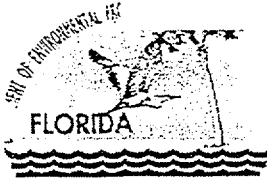
LICENSE RENEWAL APPLICATION
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APPENDIX B. CLEAN WATER ACT DOCUMENTATION

<u>Item</u>	<u>Page</u>
Notice of Permit, Drew, M. (DEP) to N. Whiting (FPL)	B-2
State of Florida Industrial Wastewater Facility Permit No. FL0002208	B-4

DEP = Department of Environmental Protection
FPL = Florida Power & Light Company

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Jeb Bush
Governor

Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFIED MAIL

In the Matter of an
Application for Permit by:
Florida Power & Light Company
6501 S. Ocean Drive
Jensen Beach, Florida 34957
Attention: Nick Whiting, Environmental Compliance Supervisor, St. Lucie Plant

DEP File # FL0002208-001-IW1S
St. Lucie County

NOTICE OF PERMIT

Enclosed is Permit Number FL0002208 to operate wastewater treatment and effluent disposal facilities for Units 1 and 2 of the St. Lucie Power Plant located in St. Lucie County, Florida issued under Section 403.0885, Florida Statutes and DEP rule 62-620, Florida Administrative Code.

Any party to this order (permit) has the right to seek judicial review of the permit under section 120.68 of the Florida Statutes, by the filing of a Notice of Appeal under rule 9.110 of the Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection, Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000 and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Mimi Drew
Division Director
Division of Water Resource Management

2600 Blair Stone Road
Tallahassee, FL 32399-2400
(850) 487-1855

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

FPL-St. Lucie Power Plant
Facility ID Number FL0002208

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CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed by certified mail before the close of business on 01-10-00 to the listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, under section 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

S. Shields 01-10-00

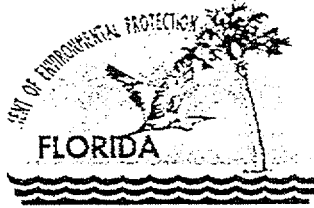
Clerk

Date

Copies furnished to:

Douglas Mundrick, P.E. - Chief EPA
Paula Lewis - Chairperson, Board of St. Lucie County Commissioners
Jennifer Fitzwater - DEP Tallahassee
Tim Powell - DEP Southeast District

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Jeb Bush
Governor

Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

STATE OF FLORIDA

INDUSTRIAL WASTEWATER FACILITY PERMIT

PERMITTEE:

Florida Power & Light Company
6501 S. Ocean Drive
Jensen Beach, Florida 34957

PERMIT NUMBER: FL0002208-Major
ISSUANCE DATE: January 10, 2000
EXPIRATION DATE: January 9, 2005

FACILITY:

St. Lucie Power Plant
Units 1 and 2
Hutchinson Island
St. Lucie County, Florida

Latitude: 27° 20' 54" Longitude: 80° 14' 44"

This permit is issued under the provisions of Chapter 403, Florida Statutes, and applicable rules of the Florida Administrative Code and constitutes authorization to discharge to waters of the state under the National Pollutant Discharge Elimination System. The above named permittee is hereby authorized to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

OPERATION: The facility consists of two nuclear powered steam electric generating units (Unit 1 and Unit 2) and each unit is nominally rated at 850 MW. The facility discharge consists of once-through cooling water, auxiliary equipment cooling water, wastewater plant makeup water, treatment system wastewater, steam generator blowdown, industrial and non-industrial stormwater, canal debris, equipment area floor drains and treated non-radioactive wastes/liquid radiation waste.

WASTEWATER TREATMENT: Consists of screening and chlorination of the once-through cooling water, neutralization, settling, ion exchange and micron filtration to the intake and discharge canal.

EFFLUENT DISPOSAL: An existing 1477 MGD annual average daily flow of treated effluent is discharged via outfall D-001 (Condenser once through cooling water and auxiliary equipment cooling water) to the site discharge canal to the point of discharge (POD) (latitude: 27° 21' 05" longitude: 80° 14' 26") thence to the Atlantic Ocean, a Class III marine water. This permit authorizes discharge from existing internal outfalls I-003 (Liquid radiation waste), I-005 (Steam generator blowdown), I-06B (Former oil storage area), I-06C (Non-industrial related storm water), I-007 (Intake screen wash water), and I-008 Evaporation percolation basin

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions set forth in Part I through Part VIII on pages 2 through 28 of this permit.

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2

PERMITTEE:
Florida Power & Light
St. Lucie Power Plant
Unit 1 & 2
6501 S. Ocean Drive
Jensen Beach, Florida 34957

PERMIT NUMBER: FL0002208
ISSUANCE DATE: January 10, 2000
EXPIRATION DATE: January 9, 2005

I. Effluent Limitations and Monitoring Requirements

A. Surface Water Discharges

1. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from outfalls D-001 [formerly (OSN) 001] - Condenser once through cooling water and auxiliary equipment cooling water from Units 1 & 2 to the discharge canal thence the Atlantic Ocean.

- a. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS	MONITORING REQUIREMENTS		
	Instantaneous Maximum	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	Report	Hourly	Pump Logs	INT-1
Discharge Temperature, °F	113 ^{1,2}	Hourly	Recorders	EFF-2
Temperature Rise, °F	30 ^{1,2}	Hourly	Recorders	
Total Residual Oxidants (TRO), mg/l	0.10 (See item A.1.b.)	Continuous	Recorders ³	EFF-2
Time of Condenser Chlorine Addition, minutes/day/unit	120	Daily	Log	EFF-2
Free Available Oxidants, mg/l	0.5 (See item A.1.b.)	1/2 months	Multiple Grabs ⁴	EFF-1
Toxicity (Acute)	(See section I.B.12)			EFF-2

- b. Free available oxidants (FAO) shall not exceed an average concentration of 0.2 mg/l and maximum instantaneous concentration of 0.5 mg/l at the outlet corresponding to an individual condenser during any chlorination period. Neither FAO nor total residual oxidants (TRO) may be discharged from either unit condensers for more than two hours in any one day and not more than one unit may discharge FAO or TRO from its condensers at any one time. Additionally, TRO shall not exceed a maximum instantaneous concentration of 0.10 mg/l at any one time as measured at the POD prior to discharge to the Atlantic Ocean. Auxiliary equipment cooling water may receive continuous low-level chlorination.

¹ At the point of discharge, the heated water temperature from the diffusers shall not exceed 113°F or 30°F above ambient at any time except that the maximum discharge temperature shall be limited to 117°F or 32°F above ambient during condenser and/or circulating water pump maintenance, throttling circulating water pumps to minimize use of chlorine, and/or fouling of circulating water system. This temperature may be measured at a point within the discharge canal. (In determining the temperature differential, the time of travel through the plant may be considered). In the event that discharge temperature exceeds 113°F the permittee shall notify the Department within 5 days.

² The ambient ocean surface temperature shall not exceed 97°F as an instantaneous maximum at any point.

³ During periods of monitor outage of more than 7 days, monitoring for TRO shall be conducted 1/week on not less than three grab samples during daylight hours. Additional grab samples shall be conducted during periods of TRO discharge from condensers.

⁴ Multiple grabs shall consist of grab samples collected at the approximate beginning of FAO/TRO discharge and once every 15 minutes thereafter until the end of FAO/TRO discharge.

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- c. Samples taken in compliance with the monitoring requirements specified in item 1.a. shall be taken at the following locations: Intake temperature and flow at plant intakes (INT-1), free available chlorine at the outlet corresponding to an individual condenser (EFF-1), and all other parameters at the POD prior to discharge to the Atlantic Ocean (EFF-2).

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St. Lucie Power Plant
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PERMIT NUMBER:

FL0002208

ISSUANCE DATE:

January 10, 2000

EXPIRATION DATE:

January 9, 2005

2. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from internal outfall I-003 [formerly (OSN) 003] - Liquid radiation waste discharge to the discharge canal to the Atlantic Ocean.

- a. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS		
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	Report	Report	1/Batch	Calculation	EFF-3
Oil and Grease, mg/l	15.0	20.0	Annually	Grab	EFF-3
Total Suspended Solids, mg/l	30.0	100.0	1/Batch	Grab	EFF-3

- b. This discharge is regulated by the U.S. Regulatory Commission (NRC) under the provisions of its operating license and is monitored and reported to the NRC. No additional monitoring of the radiological aspects of this discharge is required.
- c. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., Atlantic Ocean).
- d. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: discharge from the radiation waste system prior to mixing with any other waste stream (EFF-3).

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Florida Power & Light
St. Lucie Power Plant
Unit 1 & 2
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Jensen Beach, Florida 34957

PERMIT NUMBER: FL0002208
ISSUANCE DATE: January 10, 2000
EXPIRATION DATE: January 9, 2005

3. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from internal outfall I-005 [formerly (OSN) 005] - Steam generator blowdown to the discharge canal to the Atlantic Ocean.

a. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS		
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	Report	Report	¹	Calculation	EFF-5
Oil and Grease, mg/l	15.0	20.0	¹	Grab	EFF-5
Total Suspended Solids, mg/l	30.0	100.0	¹	Grab	EFF-5
Boron, mg/l	-----	4.0	1, 2	Calculation ³	EFF-2
Hydrazine, mg/l	-----	0.30	1, 2	Calculation ³	EFF-2
Dimethylamine, mg/l	-----	Report	1, 2	Calculation ³	EFF-2
Carbohydrazide, mg/l	-----	Report	1, 2	Calculation ³	EFF-2

b. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., discharge canal).

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the point of discharge prior to entering the discharge canal (EFF-5 or at EFF-2 (POD)).

¹ One per discharge event or one per week which ever is more frequent, unless there is no discharge for that week. Total volume of batch and period of discharge shall be reported.

² Boron and hydrazine or carbohydrazide shall be monitored once per batch by a grab sample, during wet lay-up discharges that result from the start-up of a unit following a refueling outage.

³ A grab sample shall be taken at the discharge of the steam generator to the discharge canal and the following calculations shall be used to determine the concentration from the discharge canal to the Atlantic Ocean (point of discharge (POD)):

$$\frac{\text{Steam Generator Blowdown Flow} \times \text{Blowdown Boron Concentration}}{\text{Once Through Cooling Water Flow}} = \text{Boron at the POD}$$

$$\frac{\text{Steam Generator Blowdown Flow} \times \text{Blowdown Hydrazine Concentration}}{\text{Once Through Cooling Water Flow}} = \text{Hydrazine at the POD}$$

$$\frac{\text{Steam Generator Blowdown Flow} \times \text{Blowdown Dimethylamine Concentration}}{\text{Once Through Cooling Water Flow}} = \text{Dimethylamine at the POD}$$

$$\frac{\text{Steam Generator Blowdown Flow} \times \text{Blowdown Carbohydrazide Concentration}}{\text{Once Through Cooling Water Flow}} = \text{Carbohydrazide at the POD}$$

**LICENSE RENEWAL APPLICATION
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4. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from internal outfall **I-06B** [formerly (OSN) 006B] – Former oil storage area - industrial related storm water to the intake canal.

- a. Such discharges shall be limited and monitored by the permittee as specified below and in Section I.B.:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS ¹		
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	Report	Report	Annually	Estimate	EFF-6
Total Suspended Solids, mg/l	Report	Report	Annually	Grab	EFF-6
Oil and Grease, mg/l	Report	Report	Annually	Grab	EFF-6

- b. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., discharge canal).
- c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: nearest accessible point after final treatment but prior to discharge to the receiving stream (EFF-6).

¹ Monitoring requirements apply once per year during the first 30 minutes of a rainfall event.

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5. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from internal outfall I-06C [formerly (OSN) 006C] - Non-industrial related storm water to the Mangrove Impoundment 8E.

- a. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS ¹		
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	Report	Report	1/Annually	Estimate	EFF-7
Oil and Grease, mg/l	Report		1/Annually	Grab	EFF-7

- b. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., discharge canal).
- c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: nearest accessible point after final treatment but prior to discharge to the receiving stream (EFF-7).

¹ Monitoring requirements apply annually during the first 30 minutes of a rainfall event.

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6. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from internal outfall I-007 [formerly (OSN) 007] - Intake screen wash water to the intake canal.
- a. Discharge of intake screen wash water is permitted without limitations or monitoring requirements.
 - b. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., discharge canal).

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7. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from internal outfall I-008 – Evaporation percolation basin - industrial related storm water to the intake canal.

- a. Such discharges shall be limited and monitored by the permittee as specified below and in Section I.B.:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS		
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Point
Flow, MGD	Report	Report	1/Week	Calculation	EFF-8
Total Suspended Solids, mg/l	30.0	100.0	1/Week	Composite	EFF-8
Oil and Grease, mg/l	15.0	20.0	1/Week	Grab	EFF-8

- b. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., discharge canal).
- c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: nearest accessible point after final treatment but prior to discharge to the receiving stream (EFF-8).
- d. Monitoring requirements are applicable only during discharge of the evaporation percolation basin.

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B. Other Limitations and Monitoring and Reporting Requirements

1. The Sampling and Testing Methods and Method of Detection Limits applicable to this permit shall be in accordance with Department established and published approved analytical methods and corresponding Department established MDLs (method detection limits) and PQLs (practical quantification limits). The approved list, which is titled "Florida Department of Environmental Protection Table Required By Rule 62-4.246(4) Testing Methods for Discharge to Surface Water" dated June 21, 1996, is available from the Department on request. Any method and corresponding MDL and PQL listed in the above described table may be used for reporting as long as it meets the following requirements:
 - a) The PQL for the specific parameter measured is less than or equal to the permit limit or the water quality criteria stated in the applicable section of 62-302 FAC. Parameters that are listed as "report only" in the permit shall use methods which provide a PQL which is equal to or less than the applicable water quality criteria stated in 62-302 FAC.
 - b) If the PQL's for all methods available in the approved list are above the stated permit limit or applicable water quality criteria for that parameter then the method with the lowest available PQL shall be used.

In general the MDLs and PQLs as described above shall constitute the minimum reporting levels and the Department shall not accept results for which the laboratory's MDLs or PQLs are greater than those described above. However, minimally higher MDL/PQLs may be used if those MDL/PQLs are included in an update of the Permittee's Department Approved Comprehensive Quality Assurance Plan (CompQAP) and the permittee has notified the Department's Industrial Wastewater Section. In Addition, certain other method MDL/PQLs may be acceptable if the PQL value for a particular method is less than the permit limit, the MDL/PQL is included in the Department approved CompQAP, and the permittee has notified the Department's Industrial Wastewater Section.

Unless otherwise specified, sample results shall be reported as indicated on the instructions included with the Discharge Monitoring Report:

2. Monitoring results obtained for each calendar month shall be summarized for that month and reported on a Discharge Monitoring Report (DMR), Form 62-620.910(10), postmarked no later than the 28th day of the month following the completed calendar month. For example, data for January shall be submitted by February 28. Signed copies of the DMR shall be submitted to the address specified below:

Florida Department of Environmental Protection
Mail Station 3551
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

If no discharge occurs during the reporting period, sampling requirements of this permit do not apply. The statement "No discharge" shall be written on the DMR form. If, during the term period of this permit, the facility ceases to discharge, the Department shall be notified immediately upon cessation of discharge. Such notification shall be in writing.

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3. Unless specified otherwise in this permit, all other reports and notifications required by this permit, including twenty-four hour notifications, shall be submitted to or reported to, as appropriate, the address specified below:

Florida Department of Environmental Protection
Southeast District Office
Industrial Wastewater Section
1801 SE Hillmoor Drive, Suite C-204
Port St. Lucie, Florida 34952
(561)871-7662

4. The permittee shall report all visible discharges of floating materials contributed by plant operations, such as ash or an oil sheen, when submitting DMR's.
5. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.
6. Discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act to any waste stream which ultimately may be released to waters of the State is prohibited unless specifically authorized elsewhere in this permit. This requirement is not applicable to products used for lawn and agricultural purposes or to the use of herbicides if used in accordance with labeled instructions and any applicable State permit. The company shall notify the Department in writing no later than six (6) months prior to instituting use of any biocide or chemical (except as authorized elsewhere in this permit) used in the cooling systems or any other portion of the treatment system which may be toxic to aquatic life. Such notification shall include:
- a. Name and general composition of biocide or chemical
 - b. Frequencies of use
 - c. Quantities to be used
 - d. Proposed effluent concentrations
 - e. Acute and/or chronic toxicity data (laboratory reports shall be prepared according to Section 12 of EPA document no. EPA/600/4-90/027 entitled, Methods for Measuring the Acute Toxicity of Effluents a Receiving Waters for Freshwater and Marine Organisms, or most current addition.)
 - f. Product data sheet
 - g. Product label

The Department shall review the above information to determine if a major or minor permit revision is necessary. Permit revisions shall be processed in accordance with the requirements of Chapter 62-620, F.A.C. Discharge associated with the use of such biocide or chemical is not authorized without prior approval by the Department.

7. The permittee shall provide safe access points for obtaining representative samples which are required by this permit.
8. The permittee shall ensure that all laboratory analytical data submitted to the department as required by this permit is from a laboratory which has a currently valid and Department-approved Comprehensive Quality Assurance Plan (ComQAP) [or a ComQAP pending approval] for all parameters being reported as required by Chapter 62-160, Florida Administrative Code.

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9. The discharge of any waste resulting from the combustion of chemical metal cleaning wastes, toxic wastes, or hazardous wastes to any waste stream which ultimately discharges to waters of the United States is prohibited, unless specifically authorized elsewhere in this permit.
10. No direct discharge from any solid waste storage area to waters of the United States is authorized by this permit without prior approval by the Department.

Additionally, except as specifically permitted, there shall be no point source discharge of the following categories of wastes to waters of the United States or to any waste stream which enters such waters:

a. Low Volume Wastes

Includes, but is not limited to, boiler blowdown, wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning wastes and blowdown from recirculating house service water systems.

b. Metal Cleaning Wastes

Any wastewater resulting from cleaning, with or without chemical cleaning compounds, any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning. Wastewater not classified as metal cleaning waste includes wastewater generated from hydrolasing (high pressure water jets) equipment to remove radioactive contaminants, including the reactor cavity, fuel transfer canal and various plant components such as valves, motor parts, and sections of pipe and stainless steel insulation.

11. The permittee is authorized to utilize the following chemical additives in accordance with the conditions of this permit pursuant to sections I.A.3.a.: Boron, Hydrazine, Dimethylamine, Carbohydrazide. Glutaraldehyde, Isothiazolin and Polyglycol are approved for use in the "closed-cooling water" system. If any discharges of these biocides occur to "waters of the US" in other than de minimus amounts where as the active ingredient is a detectable level, the facility shall immediately notify the Department.
12. The permittee shall initiate the series of tests described below, within the fourth year after permit issuance, to evaluate whole effluent toxicity of the discharge from outfall D-001 [formerly (OSN) 001]. All test species, procedures and quality assurance criteria used shall be in accordance with Methods for Measuring Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-90/027F, or the most current edition. The control water and dilution water used will be moderately hard water as described in EPA/600/4-90/027F, Table 6, or the most current edition. A standard reference toxicant quality assurance acute toxicity test shall be conducted concurrently or no greater than 30 days prior to the initiation of each bioassay test with each species used in the toxicity tests. Results of all toxicity tests shall be submitted with the discharge monitoring report (DMR). Any deviation of the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use.
- a.) 1. The permittee shall conduct 96-hour acute static renewal toxicity tests using the mysid shrimp, Mysidopsis bahia and the silverside minnow, Menidia beryllina. All tests will be conducted on four separate grab samples collected at evenly-spaced (6-hr) intervals over a 24-hour period and used in four separate tests in order to catch any peaks of toxicity and to account for daily variations in effluent quality.
2. If control mortality exceeds 10% for either species in any test, the test(s) for that species (including the control) shall be repeated. A test will be considered valid only if control mortality does not exceed 10% for either species. If, in any separate grab sample test, 100% mortality occurs prior to the end of the test, and control mortality is less than 10% at that time, that test (including the control) shall be terminated with the conclusion that the sample demonstrates unacceptable acute toxicity.
- b.) 1. The toxicity tests specified above shall be initiated during the fourth year after permit issuance during a condenser chlorination application.

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2. Results from "routine" tests shall be reported according to EPA/600/4-90/027F, Section 12, Report Preparation (or the most current edition), and shall be submitted to:

Florida Department of Environmental Protection
Industrial Wastewater Section
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

- c.) 1. Each grab sample shall be run as a separate test and shall be conducted using a control (0% effluent) and one test concentration of 100% final effluent.
2. Mortalities of equal to or greater than 50% in a 100% effluent sample or any $LC_{50} < 100\%$ identified in additional tests will constitute a violation of these permit conditions, and Rule 62-302.200(1), Rule 62-302.500(1)(d) and Rule 62-4.244(3)(a), F. A. C.
- d.) 1. If mortalities of greater than 20% are identified for either test species in any of the *four separate* grab sample tests within the specified time, the Department reserves the right to require additional toxicity testing to determine the source of the observed toxicity.
2. The first additional test shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5% and 6.25% effluent and a control (0% effluent). The dilution series may be modified in the second and third test to more accurately identify the toxicity, such that at least two dilutions above and two dilutions below the target toxicity and a control (0% effluent) are run.
3. For each additional test, the sample collection requirements and the test acceptability criteria specified in Section 1 above must be met for the test to be considered valid. The first test shall begin within two weeks of the end of the "routine" tests, and shall be conducted weekly thereafter until *six* additional, valid tests are completed. The additional tests will be used to determine if the toxicity found in the "routine" test is still present.
4. Results from additional tests, required due to unacceptable acute toxicity in the "routine" tests, shall be submitted in a single report prepared according to EPA/600/4-90/027F, Section 12, or the most current edition and submitted within 45 days of completion of the additional, valid test. If the additional test(s) demonstrate unacceptable acute toxicity, the permittee will meet with the Department within 30 days of the report submittal to identify corrective actions necessary to remedy the observed acute toxicity.
13. If any manatee are observed in the intake canal, DEP shall be contacted and actions shall be taken for the safe and expeditious removal of the manatee. Florida Fish & Wildlife Conservation Commission (FWC), Tequesta, Florida shall be contacted at (561) 575-5408.
14. Monitoring requirements specified in Section I.A.1 through I.A.7 of this permit shall begin on the first day of the month following the issuance of this permit.

C. Reopener Clause

1. The permit shall be modified, or alternatively, revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(23)(C) and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act (the Act), as amended, if the effluent standard or limitation so issued or approved:

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- a.) Contains different conditions or is otherwise more stringent than any condition in the permit/or;
- b.) Controls any pollutant not addressed in the permit.

The permit as modified or reissued under this paragraph shall contain any other requirements of the Act then applicable.

2. The permit may be reopened to adjust effluent limitations or monitoring requirements should future wasteload allocation determinations, water quality studies, DEP approved changes in water quality standards, or other information show a need for a different limitation or monitoring requirement.

D. Stormwater to Intake/Discharge Canal from Diked Petroleum Storage or Handling Area

Permittee is authorized to discharge stormwater from diked petroleum storage or handling areas, provided the following conditions are met:

Such discharges shall be limited and monitored by the permittee as specified below:

1. The facility shall have a valid SPCC Plan pursuant to 40 CFR 112.
2. In draining the diked area, a portable oil skimmer or similar device or absorbent material shall be used to remove oil and grease (as indicated by the presence of a sheen) immediately prior to draining.
3. Monitoring records shall be maintained in the form of a log and shall contain the following information, as a minimum:
 - a.) Date and time of discharge,
 - b.) Estimated volume of discharge,
 - c.) Initials of person making visual inspection and authorizing discharge, and
 - d.) Observed conditions of storm water discharged.
4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of a visible oil sheen at any time.

E. Combined Waste Streams

In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property attributable to each controlled waste source shall not exceed the specified limitation for that waste source (ref. 40 CFR Section 423.15(k);1974).

F. Definitions

1. **Calendar day** for the purposes of flow and temperature measurement is from midnight to midnight.
2. **Continuous measurement frequency** is defined as measurements taken at intervals of no greater than one hour each, except for TRO, which shall be taken at intervals of no greater than per 10 minutes.
3. **Daily Average Value** is defined as the average of all daily sampling results for a parameter during a reporting period (i.e. month).

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4. **Daily Maximum Concentration** is the maximum concentration of a pollutant discharged during any calendar day of a reporting period (i.e. month).
5. **Day of Discharge** shall be defined as a 24 hour period beginning 12 hours prior to commencement of discharge and hence ending 12 hours after completion of discharge.
6. **Multiple Grabs** shall consist of grab samples collected at the beginning of the period of chlorination discharge, and once every 15 minutes, thereafter. In addition, one grab sample shall be collected at the end of the period of chlorine discharge. The "period of chlorine discharge" refers to all chlorination sessions conducted during a 24-hour period.
7. **Three-hour rolling average** for temperature means the average of the most recent value with those collected over the previous 180 minutes.
8. **Total Residual Oxidants (TRO)** means the value obtained using the amperometric titration method for total residual chlorine. Testing for TRO shall be conducted according to either the amperometric titration method, the DPD colorimetric method, or electrode as specified in Section 4500-C1 E., 4500-C1 G., or 4500-C1 I, respectively, Standard Methods for the Examination of Water and Wastewater, 18th edition (or most current edition).
9. **Free Available Oxidants (FAO)** means the value obtained using the amperometric titration method for free available chlorine. Testing for FAO shall be conducted according to either the amperometric titration method, or DPD colorimetric method as specified in Section 4500-C1 E. or 4500-C1 G., respectively, Standard Methods for the Examination of Water Wastewater, 18th edition (or most current edition).
10. **Fully Operational** shall mean when on-site demineralizer regeneration is eliminated pursuant to the installation and operation of the proposed reverse osmosis system.

G. Condenser Maintenance Program

The permittee is authorized to use the Taprogge condenser tube cleaning system pursuant to the the plant's Best Management Practices for control of sponge ball loss to the environment.

H. Burning Toxic and Hazardous Wastes

Discharge of any waste resulting from the combustion of toxic, hazardous, or metal cleaning wastes to any waste stream which ultimately discharges to waters of the state is prohibited, unless specifically authorized elsewhere in this permit.

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II. Industrial Sludge Management Requirements

The disposal of sludge or other solids generated from the facility shall be reused, reclaimed, or otherwise disposed of in accordance with the requirement of Chapter 62-701, F.A.C.

III. Ground Water Monitoring Requirements

This section is not applicable to this facility.

IV. Other Land Application Requirements

This section is not applicable to this facility.

V. Operation and Maintenance Requirements

A. Operation of Treatment and Disposal Facilities

1. The permittee shall ensure that the operation of this facility is as described in the application and supporting documents.
2. The operation of the pollution control facilities described in this permit shall be under the supervision of a person who is qualified by formal training and/or practical experience in the field of water pollution control appropriate for those facilities.

B. Record keeping Requirements:

1. The permittee shall maintain the following records on the site of the permitted facility and make them available for inspection:
 - a. Records of all compliance monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, including, if applicable, a copy of the laboratory certification showing the certification number of the laboratory, for at least three years from the date the sample or measurement was taken;
 - b. Copies of all reports, other than those required in items a. and b. of this section, required by the permit for at least three years from the date the report was prepared, unless otherwise specified by Department rule;
 - c. Records of all data, including reports and documents used to complete the application for the permit for at least three years from the date the application was filed, unless otherwise specified by Department rule;
 - d. A copy of the current permit;
 - e. A copy of any required record drawings;
 - f. Copies of the logs and schedules showing plant operations and equipment maintenance for three years from the date on the logs or schedule

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VI. Compliance Schedules and Self-imposed Improvement Schedules

A. Schedule of Compliance

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:
 - a. Attainment of effluent limitations.....Permit issuance
 - b. Best Management Practices (BMP3) Plan (See Part VII, Subpart D)
 - (1) Update plan.....No later than 3 months from the effective date of the permit
 - (2) Implement plan.....On start of discharge
2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by an identified date, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

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VII. Other Specific Conditions

A. Specific Conditions Applicable to all permits

1. Drawings, plans, documents or specifications submitted by the permittee, not attached hereto, but retained on file with the Department, are made a part hereof.
2. If significant historical or archaeological artifacts are discovered at any time within the project site, the permittee shall immediately notify the office specified in Condition 5. and the Bureau of Historic Preservation, Division of Archives, History and Records Management, R.A. Gray Building, Tallahassee, Florida 32301.
3. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) Florida Statutes, applicable portions of reports to be submitted under this permit, shall be signed and sealed by the professional(s) who prepared them.
4. This permit satisfies industrial wastewater program permitting requirements only and does not authorize operation of this facility prior to obtaining any other permits required by local, state or federal agencies.

B. Duty to Reapply

1. The permittee shall submit an application to renew this permit at least 180 days before the expiration date of this permit.
2. The permittee shall apply on the appropriate form listed in Rule 62-620.910, F.A.C., and in the manner established in Rules 62-620.400 through 62-620.460, F.A.C., including submittal of the appropriate processing fee set forth in Rule 62-4.050, F.A.C.
3. An application filed in accordance with subsections 1. and 2. of this part shall be considered timely. When an application for renewal of a permit is timely and sufficient, the existing permit shall not expire until the Department has taken final action on the application for renewal or until the last day for seeking judicial review of the agency order or a later date fixed by order of the reviewing court.
4. The late submittal of a renewal application shall be considered timely and sufficient for the purpose of extending the effectiveness of the expiring permit only if it is submitted and made complete before the expiration date.

C. Specific Conditions Related to Best Management Practices Condition

1. Best Management Practices Plan:

In accordance with Rule 62-620.620(1)(n), the permittee shall develop and implement a Best Management Practices plan incorporating pollution prevention measures. References which may be used in developing the plan are "Criteria and Standards for Best Management Practices Authorized Under Section 304(e) of the Act", found at 40 CFR Section 122.44(k), the Storm Water Management Industrial Activities Guidance Manual, EPA/833-R92-002 and other EPA documents relating to Best Management Practice guidance.

2. Definitions:

- a. The term "pollutants" refers to conventional, non-conventional and toxic pollutants, as appropriate for the NPDES storm water program and toxic pollutants.

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- b. Conventional pollutants are: biochemical oxygen demand (BOD), suspended solids, pH, fecal coliform bacteria and oil & grease.
 - c. Non-conventional pollutants are those which are not defined as conventional or toxic, such as phosphorus, nitrogen or ammonia. (Ref: 40 CFR Part 122, Appendix D, Table IV)
 - d. For purposes of this part, Toxic pollutants include, but are not limited to: a) any toxic substance listed in Section 307(a)(1) of the CWA, any hazardous substance listed in Section 311 of the CWA, and b) any substance (that is not also a conventional or non-conventional pollutant) for which EPA has published an acute or chronic toxicity criterion, or that is a pesticide regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).
 - e. "Pollution prevention" refers to the first category of EPA's preferred hazardous waste management strategy - source reduction.
 - f. "Significant Materials" is defined as raw materials; fuels; materials such as solvents and detergents; hazardous substances designated under Section 101(14) of CERCLA; and any chemical the facility is required to report pursuant to EPCRA, Section 313; fertilizers; pesticides; and waste products such as ashes, slag and sludge.
 - g. "Source reduction" means any practice which: i) reduces the amount of any pollutant entering a waste stream prior to recycling, treatment or disposal; and ii) reduces the hazards to public health and the environment associated with the release of such pollutant. The term includes equipment or technology modifications, process or procedure modifications, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. It does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a pollutant through a process or activity which itself is not integral to, or previously considered necessary for, the production of a product or the providing of a service.
 - h. "BMP3" means a Best Management Plan incorporating the requirements of 40 CFR § 125, Subpart K, plus pollution prevention techniques, except where other existing programs are deemed equivalent by the permittee. The permittee shall certify the equivalency of the other referenced programs.
 - i. "Reportable Quantity (RQ) Discharge" A RQ release occurs when a quantity of a hazardous substance or oil is spilled or released within a 24-hour period of time and exceeds the RQ level assigned to that substance under CERCLA or the Clean Water Act. These levels or quantities are defined in terms of gallons or pounds. Regulations listing these quantities are contained at 40 CFR 302.4, 40 CFR 117.21 and 40 CFR 110.
 - j. The term "material" refers to chemicals or chemical products used in any plant operation (i.e., caustic soda, hydrazine, degreasing agents, paint solvents, etc.). It does not include lumber, boxes, packing materials, etc.
3. Best Management Practices/Pollution Prevention Plan:

The permittee shall develop and implement a BMP3 plan for the facility which is the source of wastewater and storm water discharges. The plan shall be directed toward reducing those pollutants of concern which discharge, or could discharge, to surface waters to and shall be prepared in accordance with good engineering

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ST. LUCIE UNITS 1 & 2**

PERMITTEE:

Florida Power & Light
St. Lucie Power Plant
Unit 1 & 2
6501 S. Ocean Drive
Jensen Beach, Florida 34957

PERMIT NUMBER:

FL0002208

ISSUANCE DATE:

January 10, 2000

EXPIRATION DATE:

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and good housekeeping practices. For the purposes of this permit, pollutants of concern shall be limited to toxic pollutants and significant materials, as defined above, known to the discharger. The plan shall address all activities which could or do contribute these pollutants to the surface water discharge, including storm water, water and waste treatment, and plant ancillary activities.

In addition, the BMP3 plan shall include procedures to be implemented by the facility to minimize and monitor losses that may occur during operation of the condenser tube cleaning system. At a minimum, the plan shall include provisions for:

- a) Cleaning device losses and recovery for each cleaning event.
- b) Replacement of worn cleaning devices.
- c) Cleaning device losses shall be reported to NMFS and DEP-BPSM on an annual basis.

The above documentation shall be kept on file at the facility for a minimum of at least three years from the date of preparation pursuant to Section V.B.1.

1. Signatory Authority & Management Responsibilities:

A copy of the BMP3 plan shall be retained at the facility and shall be made available to the permit issuing authority upon request.

The BMP3 plan shall contain a written statement from corporate or plant management indicating management's commitment to the goals of the BMP3 program. The BMP3 plan shall be signed and reviewed by the plant management.

5. BMP3 Plan Requirements:

The following requirements may be incorporated by reference from existing facility procedures:

- a. Name and description of facility
- b. A site map - At a minimum the site map must include information of the following: discharge points ("outfalls"); drainage patterns; identification of the types of pollutants likely to be discharged from each drainage area; direction of flow; surface water bodies, including any proximate stream, river, lake, or other waterbody receiving storm water discharge from the site; structural control measures (physically constructed features used to control storm water flows); locations of "significant materials" exposed to storm water; locations of industrial activities (such as fueling stations, loading and unloading areas, vehicle or equipment maintenance areas, waste disposal areas, storage areas).
- c. A materials inventory including the types of materials that are handled, stored, or processed onsite, particularly significant materials. To complete the materials inventory, the permittee must list materials that have been exposed to storm water in the past 3 years (focus on areas where materials are stored, processed, transported, or transferred and provide a narrative description of methods and location of storage and disposal areas, materials management practices, treatment practices, and any structural/nonstructural control measures.

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- d. A list of significant spills and leaks of toxic or hazardous materials that have occurred in the past 3 years. "Significant spills" includes releases in excess of reportable quantities.
- e. A summary of any existing storm water sampling data and a description of the sample collection procedures used.
- f. A site evaluation summary - The Site Evaluation Summary should provide a narrative description of activities with a high potential to contaminate storm water at the site, including those associated with materials loading and unloading, outdoor storage, outdoor manufacturing or processing, onsite disposal, and significant dust or particulate generating activities. The summary should also include a description of any pollutants of concern that may be associated with such activities.
- g. A narrative description of the following BMP's:
 - (i) - Good Housekeeping Practices
 - (ii) - Preventive Maintenance The permittee must develop a preventive maintenance program that involves inspections and maintenance of storm water management devices and routine inspections of facility operations to detect faulty equipment. Equipment (such as tanks, containers, and drums) should be checked regularly for signs of deterioration.
 - (iii) - Visual Inspections Regular inspections shall be performed by qualified, trained plant personnel. Reports shall note when inspections were done, the name of the person who conducted the inspection, which areas were inspected, what problems were found, and what steps were taken to correct any problems.
 - (iv) - Spill Prevention and Responses Areas where spills are likely to occur and their drainage points must be clearly identified in the BMP3 plan. Employees shall be made aware of response procedures, including material handling and storage requirements, and should have access to appropriate cleanup equipment.
 - (v) - Sediment and Erosion Control The BMP3 must identify activities that present a potential for significant soil erosion and measures taken to control such erosion.
 - (vi) - Management of Runoff The permittee must describe existing storm water controls found at the facility and any additional measures that can be implemented to improve the prevention and control of polluted storm water. Examples include: vegetative swales, reuse of collected storm water, infiltration trenches, and detention ponds.

6. Best Management Practices & Pollution Prevention Committee:

A Best Management Practices Committee (Committee) should be established to direct or assist in the implementation of the BMP3 plan. The Committee should be comprised of individuals within the plant organization who are responsible for developing, implementing, monitoring of success, and revision of the BMP3 plan. The activities and responsibilities of the Committee should address all aspects of the facility's BMP3 plan. The scope of responsibilities of the Committee should be described in the plan.

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7. Employee Training:

Employee training programs shall inform appropriate personnel of the components & goals of the BMP3 plan and shall describe employee responsibilities for implementing the plan. Training shall address topics such as good housekeeping, materials management, recordkeeping and reporting, spill prevention & response, as well as specific waste reduction practices to be employed. The plan shall identify periodic dates for such training.

8. Plan Development & Implementation:

The BMP3 plan shall be developed or updated 6 months prior to commercial operation and implemented upon commercial operation, unless any later dates are specified by the Department.

9. Plan Review & Modification:

If following review by the Permit Issuing Authority, or authorized representative, the BMP3 plan is determined insufficient, he/she may notify the permittee that the BMP3 plan does not meet one or more of the minimum requirements of this Part. Upon such notification from the Permit Issuing Authority, or authorized representative, the permittee shall amend the plan and shall submit to the Permit Issuing Authority a written certification that the requested changes have been made. Unless otherwise provided by the Permit Issuing Authority, the permittee shall have 30 days after such notification to make the changes necessary.

The permittee shall modify the BMP3 plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the State or if the plan proves to be ineffective in achieving the general objectives of reducing pollutants in wastewater or storm water discharges. Modifications to the plan may be reviewed by Permit Issuing Authority in the same manner as described above.

10. Annual Site Compliance Evaluation:

Qualified personnel must conduct site compliance evaluations at appropriate intervals, but at least once a year. Compliance evaluations shall include:

- inspection of storm water drainage areas for evidence of pollutants entering the drainage system;
- evaluation of the effectiveness of BMP's;
- observations of structural measures, sediment controls, and other storm water BMP's to ensure proper operation;
- revision of the plan as needed within 2 weeks of the inspection, and implementation of any necessary changes within 12 weeks of the inspection; and
- preparation of a report summarizing inspection results and follow-up actions, identifying the date of inspection and personnel who conducted the inspection.

The inspection report shall be signed by the plant environmental engineering staff and plant management and kept with the BMP3 plan.

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11. Recordkeeping and Internal Reporting:

For at least one year after the expiration of this permit, the permittee shall record and maintain records of spills, leaks, inspections, and maintenance activities. For spills and leaks, records should include information such as the date and time of the incident, weather conditions, cause, and resulting environmental problems.

D. Specific Conditions Related to Existing Manufacturing, Commercial, Mining, and Silviculture Wastewater Facilities or Activities

1. Existing manufacturing, commercial, mining, and silvicultural wastewater facilities or activities that discharge into surface waters shall notify the Department as soon as they know or have reason to believe:
[62-620.624(1)]

- (a) That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following levels
- (1) One hundred micrograms per liter,
 - (2) Two hundred micrograms per liter for acrolein and acrylonitrile; five hundred micrograms per liter for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter for antimony, or
 - (3) Five times the maximum concentration value reported for that pollutant in the permit application.
- (b) That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following levels
- (1) Five hundred micrograms per liter,
 - (2) One milligram per liter for antimony, or
 - (3) Ten times the maximum concentration value reported for that pollutant in the permit application.

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VIII. General Conditions

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision. [62-620.610(1)]
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviations from the approved drawings, exhibits, specifications or conditions of this permit constitutes grounds for revocation and enforcement action by the Department. [62-620.610(2)]
3. As provided in Subsection 403.087(6), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor authorize any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit or authorization that may be required for other aspects of the total project which are not addressed in this permit. [62-620.610(3)]
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. [62-620.610(4)]
5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. [62-620.610(5)]
6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit. [62-620.610(6)]
7. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control, and related appurtenances, that are installed and used by the permittee to achieve compliance with the conditions of this permit. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to maintain or achieve compliance with the conditions of the permit. [62-620.610(7)]
8. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [62-620.610(8)]

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9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to
 - a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;
 - b. Have access to and copy any records that shall be kept under the conditions of this permit;
 - c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and
 - d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.
[62-620.610(9)]
10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, Florida Administrative Code. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules.
[62-620.610(10)]
11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department. [62-620.610(11)]
12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard. [62-620.610(12)]
13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C. [62-620.610(13)]
14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department. [62-620.610(14)]
15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment. [62-620.610(15)]

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16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300, 62.420 or 62.620.450, F.A.C., as applicable, at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.300 for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C. [62-620.610(16)]
17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:
 - a. A description of the anticipated noncompliance;
 - b. The period of the anticipated noncompliance, including dates and times; and
 - c. Steps being taken to prevent future occurrence of the noncompliance.[62-620.610(17)]
18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapter 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.
 - a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10).
 - b. If the permittee monitors any contaminate more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
 - c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.
 - d. Any laboratory test required by this permit for domestic wastewater facilities shall be performed by a laboratory that has been certified by the Department of Health and Rehabilitative Services (DHRS) under Chapter 10D41, F.A.C., to perform the test. In domestic wastewater facilities, on-site tests for dissolved oxygen, pH, and total chlorine residual shall be performed by a laboratory certified to test for those parameters or under the direction of an operator certified under Chapter 61E12-41, F.A.C.
 - e. Under Chapter 62-160, F.A.C., sample collection shall be performed by following the protocols outlined in "DER Standard Operating Procedures for Laboratory Operations and Sample Collection Activities" (DER-QA-001/92). Alternatively, sample collection may be performed by an organization who has an approved Comprehensive Quality Assurance Plan (CompQAP) on file with the Department. The CompQAP shall be approved for collection of samples from the required matrices and for the required tests.[62-620.610(18)]
19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date. [62-620.610(19)]
20. The permittee shall report to the Department any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain: a description of the noncompliance and its cause; the period of noncompliance including exact dates and time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

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- a. The following shall be included as information which must be reported within 24 hours under this condition:
 - (1). Any unanticipated bypass which causes any reclaimed water or the effluent to exceed any permit limitation or results in an unpermitted discharge,
 - (2). Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,
 - (3). Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and
 - (4). Any unauthorized discharge to surface or ground waters.
 - b. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department shall waive the written report.
[62-620.610(20)]
21. The permittee shall report all instances of noncompliance not reported under Conditions VIII. 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Condition VIII. 20. of this permit. [62-620.610(21)]
22. Bypass Provisions.
- a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:
 - (1). Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and
 - (2). There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - (3). The permittee submitted notices as required under Condition VIII. 22. b. of this permit.
 - b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Condition VIII. 20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.
 - c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Condition VIII. 22. a. 1. through 3. of this permit.
 - d. A. permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Condition VIII. 22. a. through c. of this permit.
[62-620.610(22)]

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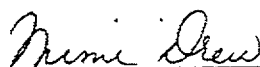
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23. Upset Provisions

- a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:
 - (1). An upset occurred and that the permittee can identify the cause(s) of the upset;
 - (2). The permitted facility was at the time being properly operated;
 - (3). The permittee submitted notice of the upset as required in Condition VIII. 20. of this permit; and
 - (4). The permittee complied with any remedial measures required under Condition VIII. 5. of this permit.
- b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.
- c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.
[62-620.610(23)]

Executed in Tallahassee, Florida.

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL PROTECTION



Mimi Drew
Director
Division of Water Resource Management

2600 Blair Stone Road
Tallahassee, FL 32399-2400
(850) 487-1855

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

AMENDMENT TO THE FACT SHEET FOR
PERMIT TO DISCHARGE TREATED WASTEWATER
TO WATERS OF THE STATE

Permit Number: FL0002208
Permit Writer: Wanda Parker-Garvin

Application Date: April 9, 1996

1. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

Florida Power & Light Company
6501 S. Ocean Drive
Jensen Beach, Florida 34957

For:

St. Lucie Power Plant
Units 1 and 2
Hutchinson Island
St. Lucie County, Florida

2. EPA Comments

None received.

3. Public Comments

None received.

4. Other Comments Received

Changes made to the draft permit after Notice of Draft Issuance:

- a) Section I.A.1.a., page 2: The parameter for biocide was deleted pursuant to supporting documentation provided by the facility which states that FPL no longer intends to discharge biocides other than chlorine. An additional requirement was included in specific condition I.B.11. if any discharges of these biocides occur to "waters of the US" in other than de minimus amounts where as the active ingredient is a detectable level.
- b) Section I.A.2., page 4 of the draft permit: Outfall 002 was deleted because the facility provided supporting documentation that FPL no longer intends to discharge low volume wastewater from the neutralization basin to the intake canal. Future discharges from the neutralization basin will be directed to the evaporation/percolation pond system.
- c) Section I.A.5., page 6: The sample type for Dimethylamine and Carbohydrazide was changed from grab to calculation. Additional calculations for the aforementioned were added as footnotes.
- d) Section I.A.8.d., page 9: A specific requirement was added referencing monitoring applicability for outfall I-008.

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FPL-St. Lucie Plant - FL0002208
Fact Sheet

- e) Section I.B.11., page 12: The language was changed to clarify the specific requirement and amend the changes made in item c) of this fact sheet.
- f) Section I.B.12., page 12: The measurement frequency was changed from "the third and fifth year" to the "fourth year".

Changes made to the fact sheet after Notice of Draft Issuance:

- a) Additional language was added to the fact sheet referencing the facility's 316(a) and (b) issues.

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FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

FACT SHEET FOR APPLICATION FOR
PERMIT TO DISCHARGE TREATED WASTEWATER
TO WATERS OF THE STATE

Permit Number: FL0002208
Permit Writer: Wanda Parker-Garvin

Application Date: April 9, 1996
Application No: FL0002208-001-IWIS
Additional Information: April 30, 1999/June 8, 1999
Designation: Major

1. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

Florida Power & Light Company
6501 S. Ocean Drive
Jensen Beach, Florida 34957

For:

St. Lucie Power Plant
Units 1 and 2
Hutchinson Island
St. Lucie County, Florida

B. Description of Applicant's Operation

The Standard Industrial Classification (SIC) code is 4911 which covers generation, transmission, and distribution of electricity. The St. Lucie plant is located on Hutchinson Island in St. Lucie County, approximately twelve miles north of Stuart, Florida. The plant covers 1,132 acres and is at about midpoint of Hutchinson Island. The plant is a two unit nuclear powered steam electric plant. Each unit is nominally rated at 850 MW. The commercial operation of Unit 1 began in March 1976 and Unit 2 began in May 1983.

C. Design Capacity of Facility

Number of Units - 2
Unit 1 Nameplate Rating - 850 MW
Unit 2 Nameplate Rating - 850 MW

D. Applicant's Receiving Waters: Atlantic Ocean @ D-001 (formerly OSN 001) POD
27° 21' 05" - Latitude 80° 14' 26" - Longitude
Classification: Class III Open Marine Waters
Use Designation: Suitable for Recreation, Propagation, and Maintenance of a Healthy,
Well-Balanced Population of Fish and Wildlife.
(For a sketch showing the location of the discharges see Attachment A)

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2

St. Lucie Power Plant – FL0002208
Fact Sheet

E. Description of Wastewater Treatment Facilities

Once-Through Cooling Water and Auxiliary Cooling Water - D-001 (formerly OSN 001)

The plant utilizes a total of eight circulating water pumps (four per unit) having a nominal total capacity of 968,000 gpm to supply once-through cooling water to Units 1 and 2. The once-through condenser and auxiliary cooling water systems discharge through pipelines into the Atlantic Ocean. Unit 1 discharge pipe utilizes a Y-port diffuser which discharges approximately 1500 feet from shore. Unit 2 utilizes a multi-port diffuser designed with 58 ports, each port being about 16 inches in diameter. The length of the multi-port diffuser is 1,416 feet beginning 1959 feet from shore. The discharge of heated water through the Y-port and multi-port diffusers ensures distribution over a wide area and enables a more rapid and efficient mixing with ambient waters.

Two additional minor effluent streams into the discharge canal are from the steam generators, with monitoring for boron at the point of discharge (POD) and the refueling water storage tank/non-aerated water hold-up tanks. The tanks are normally treated by the liquid radwaste system for further reduction of radioactivity. The refueling water storage tank, whose contents are used for safety injection and refueling water, contains 5000,000 gallons of water with a 2000 ppm boron content. There are four, forty thousand gallon non-aerated water hold-up tanks which hold reactor coolant bleed-off or drain down water. Both of which discharge very infrequently. The once-through cooling water system is presently chlorinated at a maximum of two hours per day per unit for micro- and acrobiofouling control.

As a replacement for the biocide treatment, FPL utilizes mechanical condenser tube cleaning systems on both units. These systems utilize sponge balls that are about 23 mm in diameter, which are forced through the condenser tubes. Approximately 1800 sponge balls are utilized at one time per condenser waterbox. There are four waterboxes per condenser on each unit. The sponge balls scrub the tubes as they pass through and downstream of the condensers, the sponge balls are captured by a ball strainer.

In addition to once-through cooling, up to 58,000 gpm of ocean cooling water is pumped using auxiliary cooling water pumps through the auxiliary equipment heat exchangers. The solution being cooled by these heat exchangers contain 200-500 ppm of sodium molybdate, 200-500 ppm of sodium nitrate and 10-30 ppm of polytriazole. Low-level chlorination of the auxiliary cooling water is utilized.

Liquid Radwaste System Batch Releases – I-003 (formerly OSN 003)

The flow from the radwaste treatment system is intermittent. The system has been modified to permit a maximum estimated flow of 259 gpm. The waste stream originates from various maintenance and operational activities which take place in the reactor auxiliary building (RAB) and is processed for radioactive reduction by ion exchange resins and low micron filtration systems.

Steam Generator Blowdown – I-005 (formerly OSN 005)

High purity make-up water is routed to the secondary system and steam generators as makeup for the water/steam cycle. Ammonium hydroxide is added for pH control and catalyzed hydrazine (Amerzine) is added for oxygen removal. The blowdown is either recovered or routed to the discharge canal. The concentration of hydrazine in these discharges during plant operation normally ranges from 25 ppb to 2 ppm.

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Intake Traveling Screen Wash Water – I-007 (formerly OSN 007)

Two 1060 gpm capacity traveling screen wash pumps located on both Units 1 and 2 at the intake structure withdraw ocean water for traveling screen cleaning. The traveling screens are used to prevent debris from reaching the condensers. One pump is normally in operation on each unit for two hours per day, at an average wash flow of 90 gpm per unit. The wash water is returned to the intake canal through a collection sump and drain system.

Non-equipment Area Storm Water Run-off – I-06B and I-06C (formerly OSN 006B and OSN 006C)

Two non-equipment area stormwater discharges are made to the cooling water intake canal or mangrove impoundments. These streams originate from areas of the plant including roadways, parking lots, and building storm drains.

Evaporation/Percolation Basin – I-008

This new discharge from the Southeast Evaporation/Percolation Basin to the plant intake canal is to be used when local rainfall amounts result in pond levels that impend plant operating equipment. The discharge is to be utilized via a staff gauge located in the basin and opened for discharge when necessary. Historical data indicates the discharge would occur approximately twice a year.

F. Description of Discharges (as reported by the applicant)

D-001 (formerly outfall 001) - Once-through cooling water for Unit 1 & 2

Maximum Daily flow, MGD	1477
pH range, SU	8.09-8.11
Daily Maximum Temp., °C(Winter)	35.6
Daily Maximum Temp., °C(Summer)	44.4

I-003 (formerly outfall 003) - Liquid radiation waste

Maximum Daily flow, MGD	0.040
pH range, SU	5.73 - 5.73
Daily Maximum Temp., °C (Winter)	21.0

I-005 (formerly outfall 005) - Steam generator blowdown

Maximum Daily flow, MGD	0.509
pH range, SU	7.59 - 10.05
Daily Maximum Temp., °C (Winter)	48.9

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2. PROPOSED EFFLUENT LIMITATIONS

- A. Outfall D-001 [formerly (OSN) 001] - Condenser once through cooling water and auxiliary equipment cooling water

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS
	Instantaneous Maximum
Flow, MGD	Report
Discharge Temperature, °F	113 ^{1, 2}
Temperature Rise, °F	30 ^{1, 2, 3}
Total Residual Oxidants (TRO), mg/l	0.10 (See item b.)
Time of Condenser Chlorine Addition, minutes/day/unit	120
Free Available Oxidants, mg/l	0.5 (See item b.)
Toxicity (Acute)	(See section I.B.12)

- b. Free available oxidants (FAO) shall not exceed an average concentration of 0.2 mg/l and maximum instantaneous concentration of 0.5 mg/l at the outlet corresponding to an individual condenser during any chlorination period. Neither FAO nor total residual oxidants (TRO) may be discharged from either unit condensers for more than two hours in any one day and not more than one unit may discharge FAO or TRO from its condensers at any one time. Additionally, TRO shall not exceed a maximum instantaneous concentration of 0.10 mg/l at any one time as measured at the POD prior to discharge to the Atlantic Ocean. Auxiliary equipment cooling water may receive continuous low-level chlorination.

¹ At the point of discharge, the heated water temperature from the diffusers shall not exceed 113°F or 30°F above ambient at any time except that the maximum discharge temperature shall be limited to 117°F or 32°F above ambient during condenser and/or circulating water pump maintenance, throttling circulating water pumps to minimize use of chlorine, and/or fouling of circulating water system. This temperature may be measured at a point within the discharge canal. (In determining the temperature differential, the time of travel through the plant may be considered). In the event that discharge temperature exceeds 113°F the permittee shall notify the Department within 5 days.

² The ambient ocean surface temperature shall not exceed 97°F as an instantaneous maximum at any point.

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B. Outfall I-003 [formerly (OSN) 003] - Liquid radiation waste

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS	
	Daily Average	Daily Maximum
Flow, MGD	Report	Report
Oil and Grease, mg/l	15.0	20.0
Total Suspended Solids, mg/l	30.0	100.0

D. Outfall I-005 [formerly (OSN) 005] - Steam generator blowdown

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS	
	Daily Average	Daily Maximum
Intake Flow, MGD	Report	Report
Oil and Grease, mg/l	15.0	20.0
Total Suspended Solids, mg/l	30.0	100.0
Boron, mg/l	-----	4.0
Hydrazine, mg/l	-----	0.30
Dimethylamine, mg/l	-----	Report
Carbohydrazide, mg/l	-----	Report

E. Outfall I-06B [formerly (OSN) 006B] – Former Oil storage area

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS	
	Daily Average	Daily Maximum
Flow, MGD	Report	Report
Total Suspended Solids, mg/l	Report	Report
Oil and Grease, mg/l	Report	Report

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- F. Outfall I-06C [formerly (OSN) 006C] - Non-industrial related storm water

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS	
	Daily Average	Daily Maximum
Flow, MGD	Report	Report
Oil and Grease, mg/l	Report	

- G. Outfall I-007 [formerly (OSN) 007] - Intake screen wash water

- a. Discharge of intake screen wash water is permitted without limitations or monitoring requirements.
- b. There shall be no discharge of floating or visible foam or oil sheen in such amounts as to create a nuisance, nor shall the effluent cause a visible sheen on the receiving waterbody (i.e., discharge canal).

- H. Outfall I-008 – Evapotranspiration Percolation Ponds - Industrial related storm water

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS	
	Daily Average	Daily Maximum
Flow, MGD	Report	Report
Total Suspended Solids, mg/l	30.0	100.0
Oil and Grease, mg/l	15.0	20.0

3. BASIS FOR EFFLUENT LIMITATIONS AND PERMIT CONDITIONS

The majority of the effluent limitations and conditions for permitting contained in Part I of the permit are continuations of those provisions in the previous NPDES permit. These conditions were made in accordance with the following regulations and determinations:

- A. Federal effluent guidelines for the steam electric power generating point source category (40 CFR Part 423, November 19, 1982, 47 FR ³ 52290), New Source Performance Standards (§ 423.15). A best professional judgment (BPJ) has been made that concentration limitations will be used in lieu of mass limitations in accordance with 40 CFR § 423.15(m). All measurement frequency and sample type requirements are based on BPJ. A limitation on pH range of 6.0 standard units minimum and 9.0 maximum has been proposed in accordance with 40 CFR § 423.15(a), except when limited for direct

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discharge. For direct discharge, the pH range is limited to 6.0 to 8.5 in accordance with FAC⁴ Section 62-302.560(21).

Where necessary, limitations and monitoring requirements have been established for internal waste streams (e.g., wastes which combine with other contaminated wastes or cooling water prior to discharge) in accordance with 40 CFR §122.45(h). Unless otherwise noted, the reason for designating internal waste streams is that the required pollutant concentration limitations cannot be monitored after combination, due to dilution.

- B. Florida Water Quality Standards: The receiving waters are classified as Surface Waters, Class III Waters Recreation, Propagation, and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife (FAC Chapters 62-301 and 62-302).

Requirements for toxic pollutants are provided in FAC Sections 62-302.200, 62-302.500, and 62-302.560. "All surface waters of the State shall at all places and at all times be free from domestic, industrial, agricultural, or other man-induced non-thermal components of discharges which, alone or in combination with other substances or in combination with other components of discharges (whether thermal or non-thermal) are acutely toxic [Section 62-302.500(1)(d)]." "Acute Toxicity" is defined in Section 62-302.200(1) as: "the presence of one or more substances or characteristics or components of substances in amounts which: (a) are greater than one-third (1/3) of the amount lethal to 50% of the test organisms in 96 hours (96 hr LC50) where the 96 hr LC50 is the lowest value which has been determined for a species significant to the indigenous aquatic community; or (b) may reasonably be expected, based upon evaluation by generally accepted scientific methods, to produce effects equal to those of the concentration of the substance specified in (a) above." Criteria for specific pollutants are contained in Section 62-302.530.

- C. Specific citations of the regulations and other rationale for the limitations and conditions for each outfall authorized by this permit are as follows:

1) Part I.A. Conditions:

D-001 [formerly (OSN) 001] - Condenser once through and auxiliary equipment cooling water

Flow

Monitoring and reporting requirements are based on BPJ, and are consistent with §308(a) of the CWA.

Discharge Temperature

Monitoring and reporting requirements are based on BPJ, supporting historical data and previous thermal studies conducted at the facility.

The thermal component of the discharge is subject to compliance with Florida Water Quality Standards. FAC Section 62-302.520 provides that heated water discharges "shall not increase the temperature of the RBW [receiving body of water] so as to cause substantial damage or harm to the aquatic life or vegetation therein or interfere with the beneficial uses assigned to the RBW."

Section 316(a) Clean Water Act allows the Regional Administrator to impose alternative and less stringent thermal limitations after demonstration that the water quality standards limitations are more stringent than

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necessary to assure the protection and propagation of a balanced, indigenous population of the shellfish fish and wildlife in an on the RBW. It was previously determined that the thermal component of this discharge meets Florida Water Quality Standards. (The temperature limitations included in this permit are supported by previous biological studies which can be found in the administrative record.) Therefore, Section 316(a) was determined not to be applicable. At the time of this writing, there have been no reported changes by the permittee, in the operation of the plant or changes in the biotic community of the RBW which would change the previous determinations.

Section 316(b) of the Clean Water Act requires that the location, design, construction, and capacity of a cooling water intake structure reflect the best technology available for minimizing environmental impacts. Through deliberations between FPL and several government agencies, it was determined that the intake structure met the requirements of Section 316 (b). (See the August 15, 1981 and January 29, 1982 Findings of Facts in the administrative file.)

Total Residual Oxidants

Based on FAC Section 62-302.560(19).

Toxicity

Monitoring and reporting requirements are based on toxicity tests and chemical data provided by the facility.

I-003 [formerly (OSN) 003] - Liquid radiation waste

Flow

Monitoring and reporting requirements are based on BPJ, and are consistent with §308(a) of the CWA.

Oil and Grease and Total Suspended Solids

Based on 40 CFR Section 423.12(b)(5) for low volume wastes.

pH

Based on 40 CFR Section 423.12(b)(1).

I-005 [formerly (OSN) 005] - Steam generator blowdown

Flow

Monitoring and reporting requirements are based on BPJ, and are consistent with §308(a) of the CWA.

Oil and Grease and Total Suspended Solids

Based on 40 CFR Section 423.12(b)(5) for low volume wastes.

Boron, Hydrazine, Dimethylamine, and Carbohydrazide

Monitoring and reporting requirements are based on BPJ and current/historical chemical data provided by the facility.

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I-06B [formerly (OSN) 006B] – Former Oil storage area

Flow

Monitoring and reporting requirements are based on BPJ, and are consistent with §308(a) of the CWA.

Oil and Grease and Total Suspended Solids

Based on 40 CFR Section 423.12(b)(5) for low volume wastes.

I-06C [formerly (OSN) 006C] - Non-industrial related storm water

Flow

Monitoring and reporting requirements are based on BPJ, and are consistent with §308(a) of the CWA.

Oil and Grease

Based on FAC Section 62-302.530(50)(b).

I-008 - industrial related storm water

Flow

Monitoring and reporting requirements are based on BPJ.

Oil and Grease and Total Suspended Solids

2) Part I.B. Conditions:

- a) Condition 1. The requirement is based on 62-160, F.A.C.
- b) Condition 2. and 3. Reporting requirements are standard for a major industrial discharger.
- c) Condition 5. PCB prohibition as required by 40 CFR 423.12(b)(2) and 40 CFR 423.13(a).
- d) Condition 6. FIFRA and Toxic Compound prohibitions are based on BPJ and the absence of a request for discharge in the application. These compounds may be highly toxic and any proposed discharge would require assessment and possible inclusion of an effluent limitation to insure that toxicity did not occur.

The remaining conditions are included per best professional judgment of the permit writer, consistency with requirements in the previous NPDES permit, and standard requirements for each NPDES permit.

4. REQUESTED VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS

The applicant did not make a request.

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5. EFFECTIVE DATE OF PROPOSED EFFLUENT LIMITATIONS AND COMPLIANCE SCHEDULE

- a. Attainment of effluent limitations.....Permit issuance
- b. Best Management Practices (BMP3) Plan (See Part VII, Subpart D)
 - (1) Update plan.....No later than 3 months from the effective date of the permit
 - (2) Implement plan.....On start of discharge

6. PRINCIPAL CHANGES FROM THE EXISTING PERMIT TO THE DRAFT PERMIT

The permit incorporates a request by the applicant of the following:

- a. Authorization for use of the following new and existing chemical additives at outfall D-001 and I-005: Boron, Hydrazine, Dimethylamine, Carbohydrazide, Glutaraldehyde, Isothiazolin and Polyglycol.
- b. Deletion of the limitations and monitoring requirements of copper and iron for outfall I-005 (formerly (OSN) 005). The parameters were deleted pursuant to historical monitoring data and supporting documentation provided by the facility which demonstrated compliance and no adverse affect to the environment.
- c. Authorization to add a discharge outfall (outfall I-008) from the Southeast Evaporation/Percolation Basin to the plant intake canal.

The permit incorporates changes made by the permit writer based on historical data provided by the facility and best professional judgment of the following:

- a. Deletion of the limitations and monitoring for boron at outfall D-001. The change was made because boron is monitored at the internal outfall I-005 for the same limitation.
- b. Deletion of the limitations and monitoring for copper, iron, and phosphorus at outfall I-003. The parameters were deleted pursuant to historical monitoring data and supporting documentation provided by the facility which demonstrated compliance and no adverse affect to the environment.
- c. Deletion of outfall 004 because the facility is currently connected to the municipal sewage treatment plant.
- d. Deletion of the limitations and monitoring requirements of biocides at outfall D-001. The parameters were deleted pursuant to supporting documentation provided by the facility which states that FPL no longer intends to discharge biocides other than chlorine. An additional requirement was included in specific condition I.B.11. if any discharges of these biocides occur to "waters of the US" in other than de minimus amounts where as the active ingredient is a detectable level.
- e. Deletion of outfall 002 because the facility provided supporting documentation that FPL no longer intends to discharge low volume wastewater from the neutralization basin to the intake canal. Future discharges from the neutralization basin will be directed to the evaporation/percolation pond system.

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7. FDEP CONTACT

Additional information concerning the permit may be obtained by Wanda Parker-Garvin at the address and during the hours noted in Item 8.

8. ADMINISTRATIVE RECORD

The administrative record including application, draft permit, fact sheet, public notice (after release), documents cited herein, comments received and responses thereto, and other documents contained in the supporting file for the permit, is available by writing FDEP or for review and copying at 2600 Blairstone Road, Tallahassee, Florida 32399-2400 between the hours of 8 A.M. and 5 P.M., Monday through Friday. Copies will be provided at a minimal charge per page.

9. PROPOSED SCHEDULE FOR PERMIT ISSUANCE

Draft Permit to Applicant and EPA.....July 17, 1999
Applicant to Publish Public Notice (no later than).....August 16, 1999
Public Comment Period.....Beginning:.....August 19, 1999
Ending:.....October 18, 1999
Final Department Action.....November 18, 1999

10. PROCEDURES FOR THE FORMULATION OF FINAL DETERMINATIONS

a. Comment Period

The Florida Department of Environmental Protection proposes to issue an NPDES permit to this applicant subject to the aforementioned effluent limitations and special conditions. These determinations are tentative and open to comment from the public.

Copies of the Draft Permit (including Public Notice and Fact Sheet) will be available for review at the address noted in Item 8 and at the Department's Southeast District office located at 400 North Congress Avenue, West Palm Beach, Florida 33401. Interested persons are invited to submit written comments regarding permit issuance on the proposed permit limitations and conditions to the following address:

Industrial Wastewater Section
Mail Station 3545
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

All comments received within thirty (30) days following the date of public notice will be considered in the formulation of final determinations with regard to proposed permit issuance.

b. Public Meeting

Interested persons may submit to the Department at the above address a request for a public meeting, stating the nature of the issues the person proposes be raised at such meeting. The Department shall hold a public meeting following public notice whenever a significant degree of public interest in this permit is expressed through public comments and requests for a public meeting. If a public meeting is held, any person may submit oral or written statements and data concerning this draft permit. Public notice of such a public meeting will be given at least 30 days before the meeting.

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c. Preparation of a Proposed Permit

Following receipt of any public comments in accordance with a. and b. above, the Department will consider all significant comments in revising the draft permit and making a final decision to issue a final permit. If the draft permit is revised based on public comment it will be submitted to the U.S. Environmental Protection Agency as a proposed permit for EPA's concurrence in the Department's decision. Following receipt of any comments or objections from USEPA, the Department will either issue the proposed permit, issue a modified proposed permit, or deny the permit in accordance with the EPA objections.

d. Issuance of a Final Permit

The Department will prepare and send a public notice of the final permit to the applicant for publication in a local newspaper published in the vicinity of the project. That notice will advise the applicant and all affected persons of their right to petition for an administrative hearing pursuant to Chapter 120, Florida Statutes. Substantially affected persons will have 14 days from receipt of public notice to request an administrative hearing. If no administrative hearing is held, the Department will issue a final permit to the applicant.

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME: Florida Power & Light
MAILING ADDRESS: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

FACILITY: St. Lucie Power Plant - Units 1 & 2
LOCATION: 6501 S. Ocean Drive
Jensen Beach, Florida 34957
COUNTY: St. Lucie

PERMIT NUMBER: 0002208
MONITORING PERIOD From: _____
LIMIT: Final
CLASS SIZE: Major
DISCHARGE POINT NUMBER: D-001
(formerly OSN 001)
PLANT SIZE/TREATMENT TYPE:
☐-check if no discharge for reporting period

To: _____
REPORT: Monthly
GROUP: Industrial
DMR Issued:

Please read instructions before completing this form

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Flow	Sample Measurement										
STORET No. 50050 1	Permit Requirement		Report Inst. Maximum	MGD						Hourly	Pump Logs
Mon. Site No. INT-1											
Discharge Temperature (Normal Operations)	Sample Measurement						113	°F		Hourly	Recorders
STORET No. 00011 1	Permit Requirement						Inst. Maximum				
Mon. Site No. EFF-2											
Temperature Rise (Normal Operations)	Sample Measurement						30	°F		Hourly	Recorders
STORET No. 61576 1	Permit Requirement						Inst. Maximum				
Mon. Site No. EFF-2											
Discharge Temperature (Maintenance Operations)	Sample Measurement						117	°F		Hourly	Recorders
STORET No. 00011 Q	Permit Requirement						Inst. Maximum				
Mon. Site No. EFF-2											
Temperature Rise (Maintenance Operations)	Sample Measurement						32	°F		Hourly	Recorders
STORET No. 61576 Q	Permit Requirement						Inst. Maximum				
Mon. Site No. EFF-2											

NOTE: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

Part A (Continued)

FACILITY NAME: St. Lucie – Units 1 & 2

PERMIT NUMBER: F10002208

DISCHARGE POINT NUMBER: D-001

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Total Residual Oxidants	Sample Measurement										
STORET No. 34044 1	Permit Requirement						0.10	mg/l		Continuous	Recorders
Mon. Site No. EFF-2							Inst. Maximum				
Time of Condenser Chlorine Addition (Unit 1)	Sample Measurement										
STORET No. 50068 R	Permit Requirement						120	minutes/day/unit		Daily	Log
Mon. Site No. EFF-2							Inst. Maximum				
Time of Condenser Chlorine Addition (Unit 2)	Sample Measurement										
STORET No. 50068 S	Permit Requirement						120	minutes/day/unit		Daily	Log
Mon. Site No. EFF-2							Inst. Maximum				
Free Available Oxidants (Unit 1)	Sample Measurement										
STORET No. 34045 R	Permit Requirement					0.2	0.5	mg/l		1 / 2 Months	Multiple Grabs
Mon. Site No. EFF-1						Average	Inst. Maximum				
Free Available Oxidants (Unit 2)	Sample Measurement										
STORET No. 34045 S	Permit Requirement					0.2	0.5	mg/l		1 / 2 Months	Multiple Grabs
Mon. Site No. EFF-1						Average	Inst. Maximum				

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. Area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME: Florida Power & Light
MAILING ADDRESS: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

FACILITY: St. Lucie Power Plant - Units 1 & 2
LOCATION: 6501 S. Ocean Drive
Jensen Beach, Florida 34957
COUNTY: St. Lucie

PERMIT NUMBER: 0002203
MONITORING PERIOD From: _____
LIMIT: Final
CLASS SIZE: Major
DISCHARGE POINT NUMBER: D-001
(formerly OSN 001)
PLANT SIZE/TREATMENT TYPE:
☐-check if no discharge for reporting period

To: _____
REPORT: Toxicity
GROUP: Industrial
DMR Issued:

Please read instructions before completing this form											
Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Mysidopsis Bahia 96-hour acute static	Sample Measurement										
STORET No. TAN3E P Mon. Site No. EFF-2	Permit Requirement				100 Daily Minimum			Percent		Annual	Multiple Grab
Mysidopsis Bahia, 96-hour acute static	Sample Measurement										
STORET No. TAN3E Q Mon. Site No. EFF-2	Permit Requirement				100 Daily Minimum			Percent		As Required	Multiple Grab
Menidia Beryllina 96-hour acute static	Sample Measurement										
STORET No. TAN6B P Mon. Site No. EFF-2	Permit Requirement				100 Daily Minimum			Percent		Annual	Multiple Grab
Menidia Beryllina 96-hour acute static	Sample Measurement										
STORET No. TAN6B Q Mon. Site No. EFF-2	Permit Requirement				100 Daily Minimum			Percent		As Required	Multiple Grab

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME: Florida Power & Light

MAILING ADDRESS: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

FACILITY: St. Lucie Power Plant - Units 1 & 2

LOCATION: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

COUNTY: St. Lucie

PERMIT NUMBER: 0002208

MONITORING PERIOD From: _____

LIMIT: Final

CLASS SIZE: Major

DISCHARGE POINT NUMBER: I-003
(formerly OSN 003)

PLANT SIZE/TREATMENT TYPE: _____

☐-check if no discharge for reporting period

To: _____

REPORT: Monthly

GROUP: Industrial

DMR Issued: _____

Please read instructions before completing this form											
Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Flow	Sample Measurement										
STORET No. 50050 1 Mon. Site No. EFF-3	Permit Requirement	Report Average	Report Maximum	MOD						1/Batch	Calculation
Oil and Grease	Sample Measurement										
STORET No. 00556 1 Mon. Site No. EFF-3	Permit Requirement					15.0 Average	20.0 Maximum	mg/l		Annually	Grab
Total Suspended Solids	Sample Measurement										
STORET No. 00530 1 Mon. Site No. EFF-3	Permit Requirement					30.0 Average	100.0 Maximum	mg/l		1/Batch	Grab

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME:	Florida Power & Light	PERMIT NUMBER:	0002208	To:	
MAILING ADDRESS:	6501 S. Ocean Drive	MONITORING PERIOD From:		REPORT:	Monthly
	Jensen Beach, Florida 34957	LIMIT:	Final	GROUP:	Industrial
		CLASS SIZE:	Major	DMR Issued:	
FACILITY:	St. Lucie Power Plant - Units 1 & 2	DISCHARGE POINT NUMBER:	I-005		
LOCATION:	6501 S. Ocean Drive	(formerly OSN 005)			
	Jensen Beach, Florida 34957	PLANT SIZE/TREATMENT TYPE:			
COUNTY:	St. Lucie	<input type="checkbox"/> -check if no discharge for reporting period			

Please read instructions before completing this form											
Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Flow	Sample Measurement										
STORET No. 50050 1 Mon. Site No. EFF-5	Permit Requirement	Report Average	Report Maximum	MGD						1/Discharge ¹	Calculation
Oil and Grease	Sample Measurement										
STORET No. 00556 1 Mon. Site No. EFF-5	Permit Requirement					15.0 Average	20.0 Maximum	mg/l		1/Discharge ¹	Grab
Total Suspended Solids	Sample Measurement										
STORET No. 00530 1 Mon. Site No. EFF-5	Permit Requirement					30.0 Average	100.0 Maximum	mg/l		1/Discharge ¹	Grab

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

¹ One per discharge event or one per week which ever is more frequent, unless there is no discharge for that week. Total volume of batch and period of discharge shall be reported.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Boron, Chemical Additive	Sample Measurement										
STORET No. 01020 1 Mon. Site No. EFF-2	Permit Requirement						4.0 Maximum	mg/l		1/Discharge ^{1,2}	Calculation ³
Hydrazine, Chemical Additive	Sample Measurement										
STORET No. 81313 1 Mon. Site No. EFF-2	Permit Requirement						0.30 Maximum	mg/l		1/Discharge ^{1,2}	Calculation ³
Dimethylamine, Chemical Additive	Sample Measurement										
STORET No. 77003 1 Mon. Site No. EFF-2	Permit Requirement						Report Maximum	mg/l		1/Discharge ^{1,2}	Calculation ³
Carbohydrazide, Chemical Additive	Sample Measurement										
STORET No. 61916 1 Mon. Site No. EFF-2	Permit Requirement						Report Maximum	mg/l		1/Discharge ^{1,2}	Calculation ³

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

- ¹ One per discharge event or one per week which ever is more frequent, unless there is no discharge for that week. Total volume of batch and period of discharge shall be reported.

² Boron and hydrazine or carbohydrazide shall be monitored once per batch by a grab sample, during wet lay-up discharges that result from the start-up of a unit following a refueling outage.

³ A grab sample shall be taken at the discharge of the steam generator to the discharge canal and the following calculations shall be used to determine the concentration from the discharge canal to the Atlantic Ocean (point of discharge (POD)):

Steam Generator Blowdown Flow x Blowdown Boron Concentration = Boron @ POD

Once Through Cooling Water Flow

Steam Generator Blowdown Flow x Blowdown Hydrazine Concentration = Hydrazine @ POD

Once Through Cooling Water Flow

Steam Generator Blowdown Flow x Blowdown Dimethylamine Concentration = Dimethylamine @ POD

Once Through Cooling Water Flow

Steam Generator Blowdown Flow x Blowdown Carbohydrazide Concentration = Carbohydrazide @ POD

Once Through Cooling Water Flow

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME: Florida Power & Light
MAILING ADDRESS: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

FACILITY: St. Lucie Power Plant - Units 1 & 2
LOCATION: 6501 S. Ocean Drive
Jensen Beach, Florida 34957
COUNTY: St. Lucie

PERMIT NUMBER: 0002208
MONITORING PERIOD From: _____
LIMIT: Final
CLASS SIZE: Major
DISCHARGE POINT NUMBER: I-06B
(formerly OSN 006B)
PLANT SIZE/TREATMENT TYPE:
☐-check if no discharge for reporting period

To: _____
REPORT: Annual
GROUP: Industrial
DMR Issued:

Please read instructions before completing this form											
Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Flow	Sample Measurement										
STORET No. 50050 1 Mon. Site No. EFF-6	Permit Requirement	Report Average	Report Maximum	MGD						Annually	Estimate
Oil and Grease	Sample Measurement										
STORET No. 00556 1 Mon. Site No. EFF-6	Permit Requirement					Report Average	Report Maximum	mg/l		Annually	Grab
Total Suspended Solids	Sample Measurement										
STORET No. 00530 1 Mon. Site No. EFF-6	Permit Requirement					Report Average	Report Maximum	mg/l		Annually	Grab

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME: Florida Power & Light
MAILING ADDRESS: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

FACILITY: St. Lucie Power Plant - Units 1 & 2
LOCATION: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

COUNTY: St. Lucie

PERMIT NUMBER: 0002208
MONITORING PERIOD From: _____
LIMIT: Final
CLASS SIZE: Major
DISCHARGE POINT NUMBER: I-06C
(formerly OSN 006C)
PLANT SIZE/TREATMENT TYPE:
☐-check if no discharge for reporting period

To: _____
REPORT: Annual
GROUP: Industrial
DMR Issued:

Please read instructions before completing this form											
Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Flow STORET No. 50050 1 Mon. Site No. EFF-7	Sample Measurement									Annually	Estimate
	Permit Requirement	Report Average	Report Maximum	MGD							
Oil and Grease STORET No 00556 1 Mon Site No EFF-7	Sample Measurement									Annually	Grab
	Permit Requirement					Report Average	Report Maximum	mg/l			

Note If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A
WHEN COMPLETED MAIL THIS REPORT TO: Department of Environmental Protection, 2600 Blair Stone Rd, Tallahassee FL 32399-2400

PERMITTEE NAME: Florida Power & Light
MAILING ADDRESS: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

FACILITY: St. Lucie Power Plant - Units 1 & 2
LOCATION: 6501 S. Ocean Drive
Jensen Beach, Florida 34957

COUNTY: St. Lucie

PERMIT NUMBER: 0002208
MONITORING PERIOD From: _____
LIMIT: Final
CLASS SIZE: Major
DISCHARGE POINT NUMBER: I-008

PLANT SIZE/TREATMENT TYPE:
☐-check if no discharge for reporting period

To: _____
REPORT: Annual
GROUP: Industrial
DMR Issued:

Please read instructions before completing this form											
Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Avg.	Max.	Units	Min.	Avg.	Max.	Units			
Flow	Sample Measurement										
STORET No. 50050 1 Mon. Site No. EFF-8	Permit Requirement	Report Average	Report Maximum	MGD						1/Week	Calculation
Oil and Grease	Sample Measurement										
STORET No. 00556 1 Mon. Site No. EFF-8	Permit Requirement					15.0 Average	20.0 Maximum	mg/l		1/Week	Grab
Total Suspended Solids	Sample Measurement										
STORET No. 00530 1 Mon. Site No. EFF-8	Permit Requirement					30.0 Average	100.0 Maximum	mg/l		1/Week	Composite

Note: If any line not required, enter "NODI = 9".

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principal Executive Officer or Authorized Agent (Type or Print)	Signature of Principal Executive officer Or Authorized Agent	Telephone No. (incl. area code)	Date (yy/mm/dd)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

**APPENDIX C. THREATENED AND ENDANGERED SPECIES
CORRESPONDENCE**

<u>Item</u>	<u>Page</u>
Letter, Kundalkar, R.S. (FPL) to J.J. Slack (FWS)	C-2
Letter, Kundalkar, R.S. (FPL) to R. Hoffman (NMFS)	C-6
Letter, Kundalkar, R.S. (FPL) to A. L. Egbert (FWCC)	C-10
Letter, Egbert, A.L. (FWCC) to R.S. Kundalkar (FPL)	C-14

FPL = Florida Power & Light Company
FWCC = Florida Fish and Wildlife Conservation Commission
FWS = U.S. Fish and Wildlife Service
NMFS = National Marine Fisheries Service

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0053

Mr. James J. Slack
Field Supervisor
US Fish and Wildlife Service
P. O. Box 2676
Vero Beach, FL 32961-2676

Subject: St. Lucie Plant
License Renewal Project
NRC Informal Consultation Preparation

Dear Mr. Slack:

Florida Power & Light Company (FPL) is preparing an application to renew the operating licenses for St. Lucie Units 1 and 2, and we intend the application to be consistent with your agency's interests and the priorities of our community. As part of the license renewal process, the Nuclear Regulatory Commission (NRC) requires that applicants identify adverse impacts to threatened and endangered species resulting from continued operation of the facility or refurbishment activities associated with license renewal.

FPL believes that continued operation of the St. Lucie Plant will have no adverse impact on any protected species. Environmental Protection Plans (EPPs) are included in the St. Lucie Units 1 and 2 Operating Licenses. Specifically, FPL's compliance with the EPPs ensures the continued protection of sea turtles. In addition, there are no planned operational or refurbishment activities for the period of extended operations that would invalidate this conclusion. The NRC may request an informal consultation from your agency on this matter.

To assist you in making your determination, two figures are enclosed which depict the St. Lucie Plant site and the associated vicinity.

It is our intent that, by contacting you at this point in the process, we can identify any concerns or data needed so that those areas identified can be addressed to ensure that the consultation process proceeds smoothly and efficiently.

an FPL Group company

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0053
Page 2 of 2

We would appreciate it if you would provide your comments and any additional information or actions that might be required from FPL to expedite the upcoming consultation process.

If you have any comments or questions, please contact T. V. Abbatiello at (561) 467-7316.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "R. S. Kundalkar".

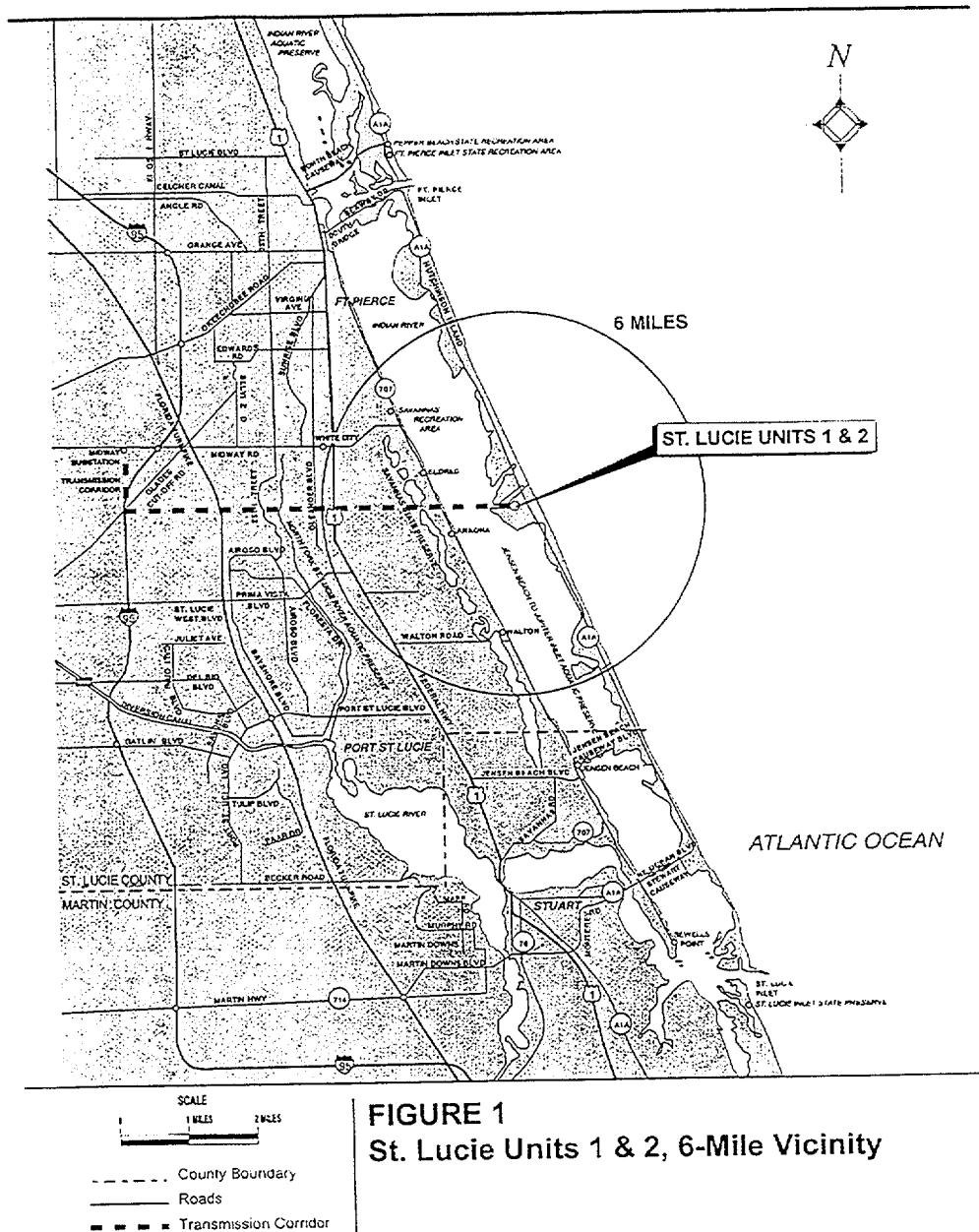
R. S. Kundalkar
Vice President
St. Lucie Plant

EAT/TVA/sap

Enclosures: Figure 1 - St. Lucie Units 1 & 2, 6-Mile Vicinity
Figure 2 - St. Lucie Site Boundary

an FPL Group company

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2



LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

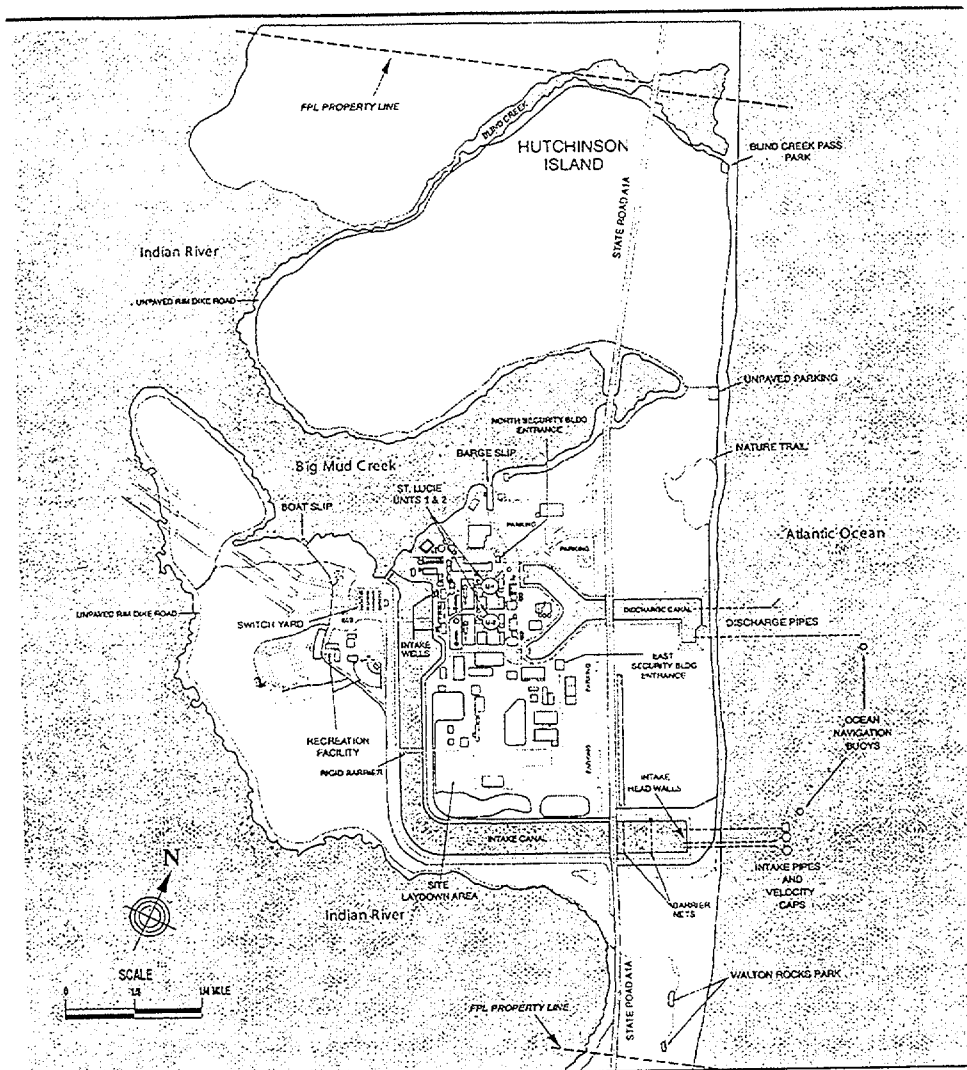


FIGURE 2
St. Lucie Site Boundary

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0054

Mr. Robert Hoffman
National Marine Fisheries Service
9721 Executive Center Drive, North
St. Petersburg, FL 33702

Subject: St. Lucie Plant
License Renewal Project
NRC Informal Consultation Preparation

Dear Mr. Hoffman:

Florida Power & Light Company (FPL) is preparing an application to renew the operating licenses for St. Lucie Units 1 and 2, and we intend the application to be consistent with your agency's interests and the priorities of our community. As part of the license renewal process, the Nuclear Regulatory Commission (NRC) requires that applicants identify adverse impacts to threatened and endangered species resulting from continued operation of the facility or refurbishment activities associated with license renewal.

FPL believes that continued operation of the St. Lucie Plant will have no adverse impact on any protected species. Environmental Protection Plans (EPPs) are included in the St. Lucie Units 1 and 2 Operating Licenses. Specifically, FPL's compliance with the EPPs ensures the continued protection of sea turtles. In addition, there are no planned operational or refurbishment activities for the period of extended operations that would invalidate this conclusion. The NRC may request an informal consultation from your agency on this matter.

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an FPL Group company

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0054
Page 2 of 2

We would appreciate it if you would provide your comments and any additional information or actions that might be required from FPL to expedite the upcoming consultation process.

If you have any comments or questions, please contact T. V. Abbatiello at (561) 467-7316.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'R. S. Kundalkar'.

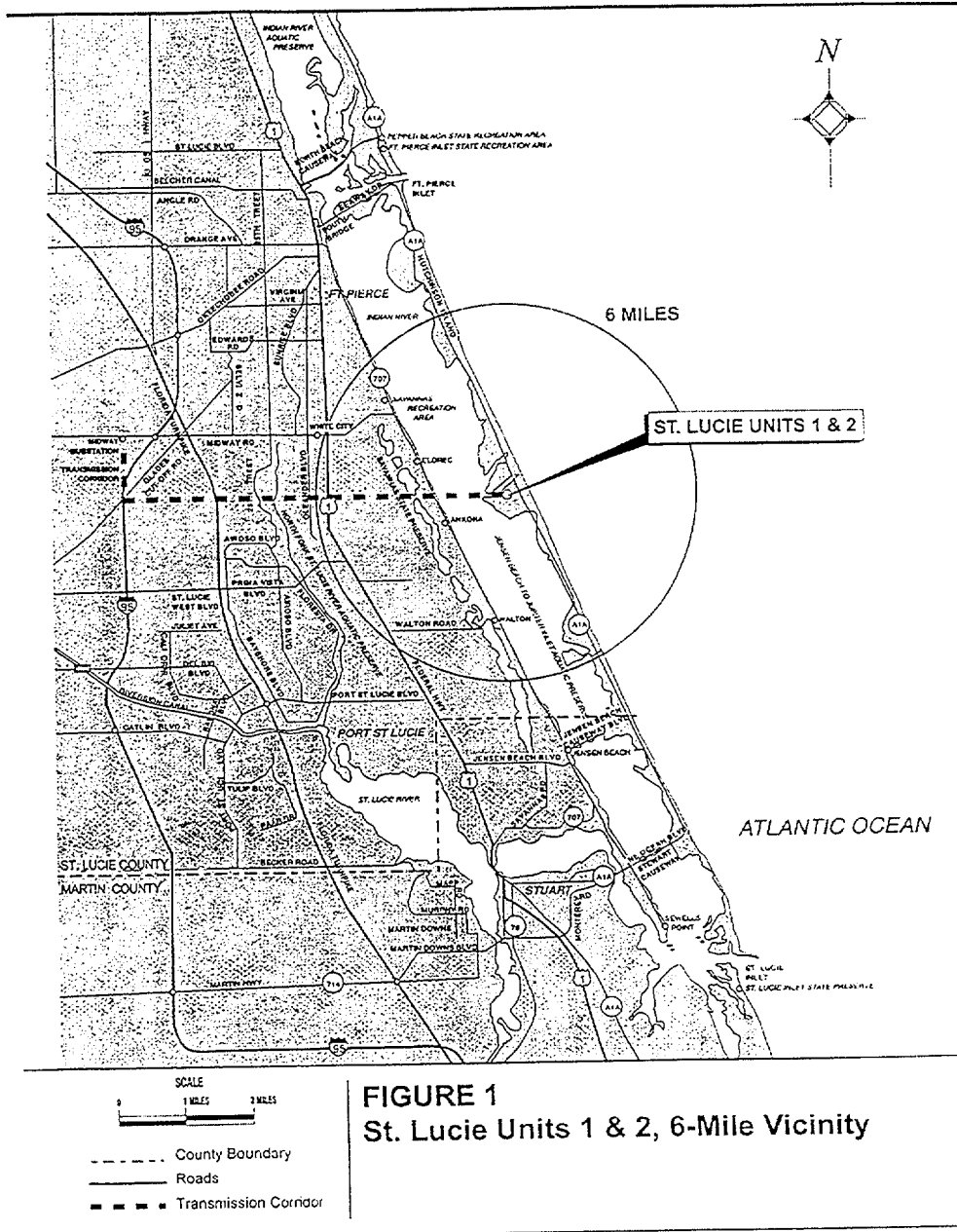
R. S. Kundalkar
Vice President
St. Lucie Plant

EAT/TVA/sap

Enclosures: Figure 1 - St. Lucie Units 1 & 2, 6-Mile Vicinity
Figure 2 - St. Lucie Site Boundary

an FPL Group company

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2



LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

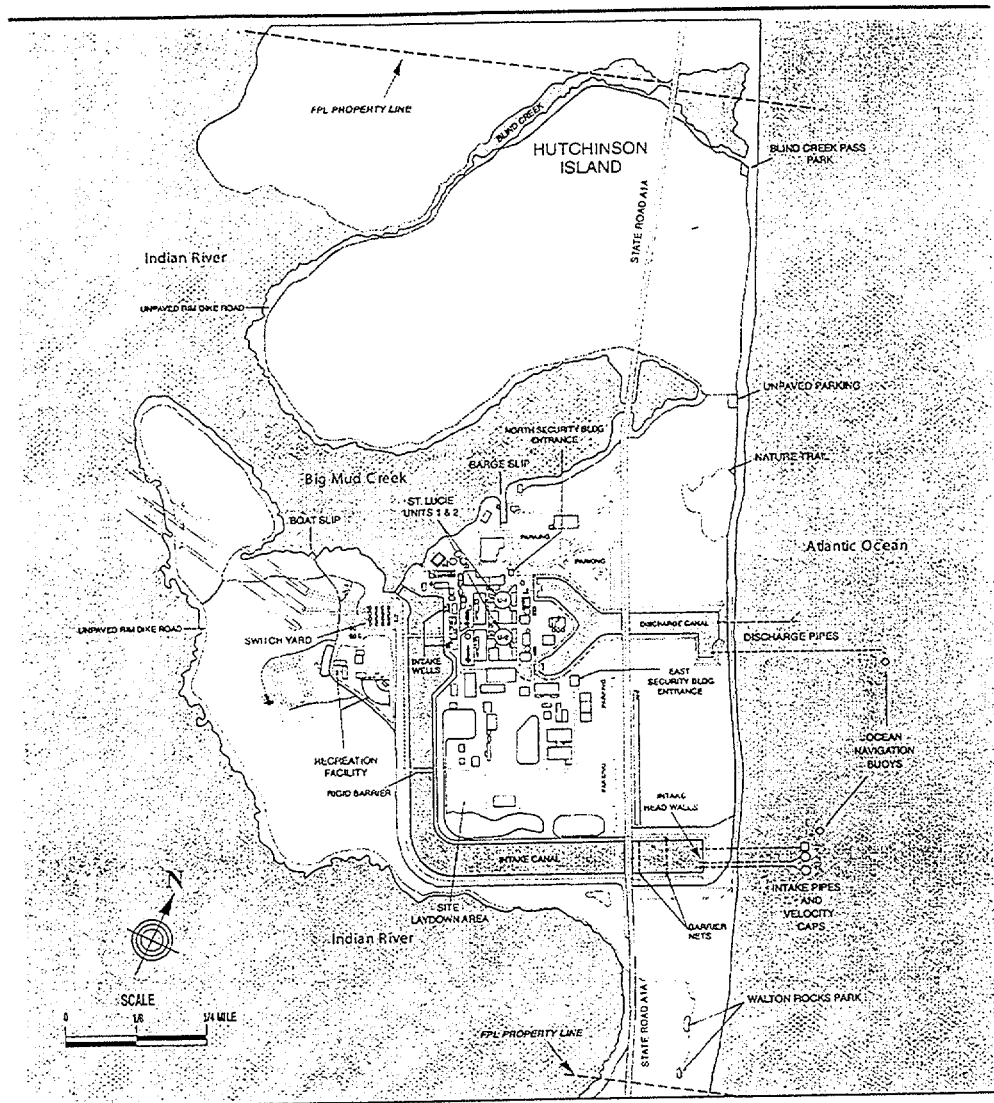


FIGURE 2
St. Lucie Site Boundary

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0052

Dr. Allan Egbert
Executive Director
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399

Subject: St. Lucie Plant
License Renewal Project
NRC Informal Consultation Preparation

Dear Dr. Egbert:

Florida Power & Light Company (FPL) is preparing an application to renew the operating licenses for St. Lucie Units 1 and 2, and we intend the application to be consistent with your agency's interests and the priorities of our community. As part of the license renewal process, the Nuclear Regulatory Commission (NRC) requires that applicants identify adverse impacts to threatened and endangered species resulting from continued operation of the facility or refurbishment activities associated with license renewal.

FPL believes that continued operation of the St. Lucie Plant will have no adverse impact on any protected species. Environmental Protection Plans (EPPs) are included in the St. Lucie Units 1 and 2 Operating Licenses. Specifically, FPL's compliance with the EPPs ensures the continued protection of sea turtles. In addition, there are no planned operational or refurbishment activities for the period of extended operations that would invalidate this conclusion. The NRC may request an informal consultation from your agency on this matter.

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It is our intent that, by contacting you at this point in the process, we can identify any concerns or data needed so that those areas identified can be addressed to ensure that the consultation process proceeds smoothly and efficiently.

an FPL Group company

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0052
Page 2 of 2

We would appreciate it if you would provide your comments and any additional information or actions that might be required from FPL to expedite the upcoming consultation process.

If you have any comments or questions, please contact T. V. Abbatiello at (561) 467-7316.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'R. S. Kundalkar', is written over a horizontal line.

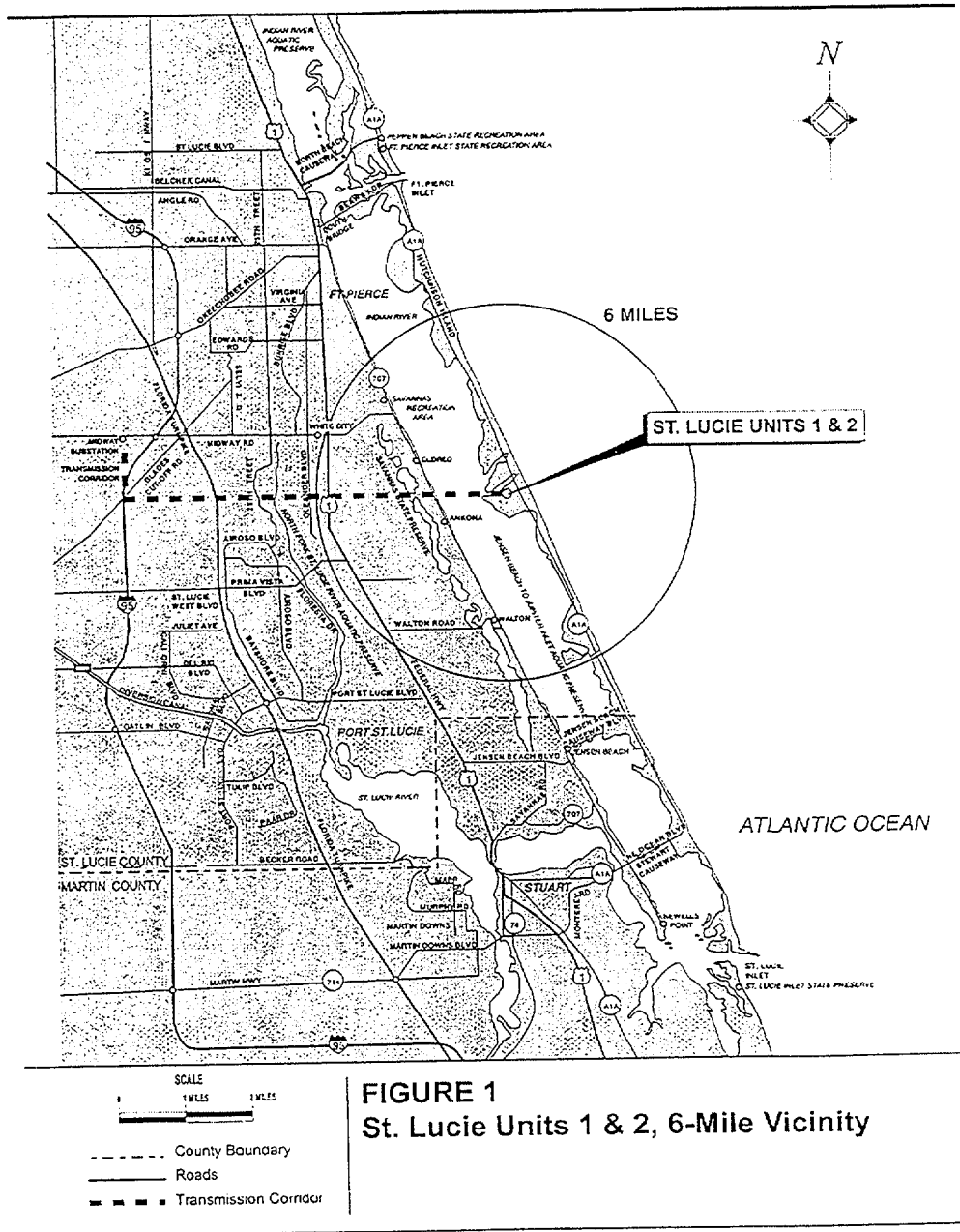
R. S. Kundalkar
Vice President
St. Lucie Plant

EAT/TVA/sap

Enclosures: Figure 1 - St. Lucie Units 1 & 2, 6-Mile Vicinity
Figure 2 - St. Lucie Site Boundary

an FPL Group company

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2



LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

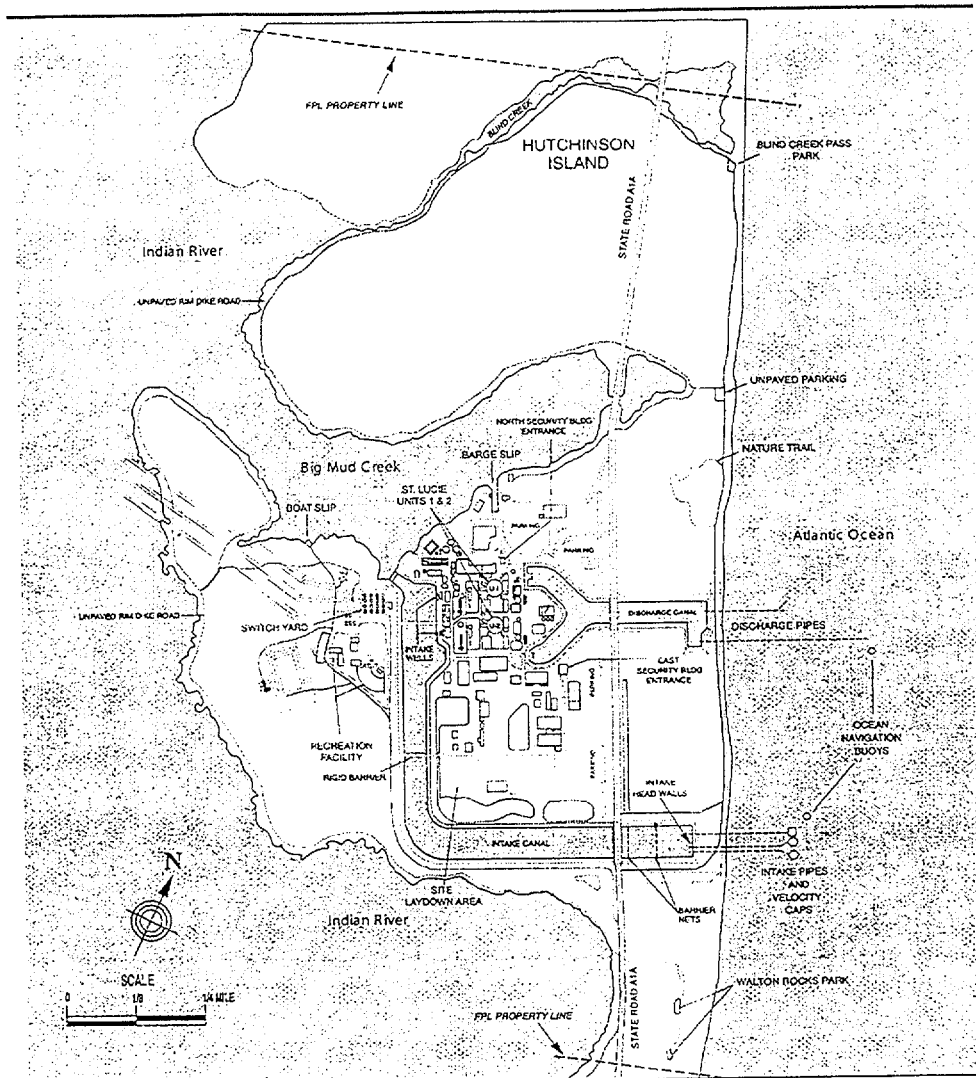


FIGURE 2
St. Lucie Site Boundary

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION



ALLAN L. EGBERT, Ph.D., Executive Director
VICTOR J. HELLER, Assistant Executive Director

BARBARA C. BARSH
Jacksonville

JULIE K. MORRIS
Sarasota

QUINTON L. HEDGEPEETH, DDS
Miami

TONY MOSS
Miami

H.A. "HERKY" HUFFMAN
Deltona

EDWIN P. ROBERTS, DC
Pensacola

DAVID K. MEEHAN
St. Petersburg

JOHN D. ROOD
Jacksonville

OFFICE OF THE EXECUTIVE DIRECTOR
(850)487-3796 TDD (850)483-4

June 22, 2001

Mr. R.S. Kundalkar, Vice President
Florida Power & Light Company
St. Lucie Plant
6501 South Ocean Drive
Jensen Beach, FL 34957

RE: St. Lucie Plant, License Renewal
NRC Informal Consultation
Preparation

Dear Mr. Kundalkar:

I have reviewed your recent request for early identification and resolution of protected species concerns relative to the operation of Florida Power & Light (FPL) Company's St. Lucie Plant. Our staff has worked closely with employees at the St. Lucie Plant to ensure that impacts to threatened and endangered species, particularly manatees and sea turtles, are minimized. We recognize the effort FPL has put into ensuring protection of these species during plant operation. While protected species issues may involve staff time and other costs for the plant, continuation and improvement of ongoing measures should be a major focus for this facility.

The St. Lucie Plant currently has active programs for stranding and salvage of sea turtles entrained in the intake canal, as well as nesting surveys and protection on adjacent beaches. Operation of the plant does cause take of sea turtles that become trapped in the intake canal. This incidental take has been authorized under the Federal Endangered Species Act, provided all Terms and Conditions in the Biological Opinion are met. Captured turtles should be marked using the most up-to-date technologies so that recapture events can be monitored. Currently, turtles are tagged with conventional metal tags on their front flippers. These tags can be lost or torn. More reliable internal tags, such as PIT-tags, should be used for marking turtles that are captured in the intake canal. Efforts should also be made to collect tissue samples from each captured animal for DNA work. This procedure, which requires relatively little

620 South Meridian Street • Tallahassee • FL • 32399-1600
www.state.fl.us/fwc/

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

Mr. R.S. Kundalkar
June 22, 2001
Page 2

time or supplies, would allow identification of origin for the different turtles captured and add substantially to our existing knowledge about Florida's sea turtles.

Currently, sea turtles in the intake canal are captured and either taken to a rehabilitation facility for treatment or released directly back into the ocean. Our staff believes it is crucial that the St. Lucie Plant maintains its current ability to respond to sea turtle entrapment and stranding events. Rehabilitation facilities in Florida often are overwhelmed with injured sea turtles. Ideally, the plant should investigate the creation and management of a small rehabilitation facility on-site to handle injured turtles that are rescued from plant property.

The St. Lucie Plant site also includes several miles of sea turtle nesting beaches along the Atlantic shoreline; threatened loggerhead, and endangered green and leatherback turtles nest here. Ongoing nesting surveys and nest inventories should continue, as well as efforts to reduce raccoon predation when needed. If possible, standardized surveys should start March 1 annually to ensure that all nests of the endangered leatherback turtle are documented and protected. This species can begin nesting as early as February on the Atlantic coast. Estimates of nest productivity are crucial for assessing the value of the plant's beaches for nesting, particularly if reproductive females are routinely entrained in the intake canal during nesting season. Any construction activities planned for plant facilities on or near the nesting beach should be scheduled to occur outside marine turtle nesting season, March 1 through October 31.

Any proposed new technologies for plant operation that could affect the marine or estuarine environment should be carefully assessed to determine potential impacts to sea turtles and manatees. Efforts to minimize loss of persistent plant-produced debris, such as sponge balls accidentally discharged into coastal ecosystems, should continue. If possible, alternate, less harmful technologies should be implemented if such impacts are identified.

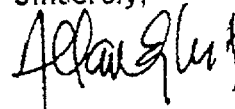
Operation of the St. Lucie Plant can also impact endangered manatees. Over the past twelve years, there have been five documented instances of manatees becoming trapped in the plant's intake canal. Several of these animals exhibited lacerations and signs of trauma, perhaps due to their entrapment. In such instances, prompt and appropriate responses can ensure the animal's survival and recovery.

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

Mr. R.S. Kundalkar
June 22, 2001
Page 3

Thank you for the opportunity to provide input on this important issue. We look forward to continuing to work with FPL, and their St. Lucie Plant staff, for the protection of Florida's threatened and endangered wildlife. Please contact Mr. Bradley Hartman at (850)488-6661 if you require additional information on this topic.

Sincerely,



Allan L. Egbert, Ph.D.
Executive Director

ALE/BJH/RT
ENV 7-3
A:\trkr437-kundalkar.doc
cc: Mr. T.V. Abbatiello

APPENDIX D. CULTURAL RESOURCES CORRESPONDENCE

<u>Item</u>	<u>Page</u>
Letter, Kundalkar, R.S. (FPL) to J. Matthews (SHPO)	D-2
Letter, Matthews, J. (SHPO) to R.S. Kundalkar (FPL)	D-6

FPL = Florida Power & Light Company

SHPO = State Historic Preservation Officer

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0055

Ms. Janet Snyder-Matthews
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, FL 32399-0250

Subject: St. Lucie Plant
License Renewal Project
NRC Informal Consultation Preparation

Dear Ms. Snyder-Matthews:

Florida Power and Light Company (FPL) is preparing an application to renew the operating licenses for St. Lucie Units 1 and 2, and we intend the application to be consistent with your agency's interests and the priorities of our community. As part of the license renewal process, the Nuclear Regulatory Commission (NRC) requires that applicants identify impacts to cultural resources resulting from the renewal of the licenses. The NRC will request an informal consultation with your agency. There are no land disturbing operational or refurbishment activities planned during the license renewal term. FPL, therefore, believes there will be no cultural impacts from license renewal activities.

To assist you in your determination, please find enclosed two figures that depict the St. Lucie Plant site and the associated vicinity.

It is our intent that, by contacting you at this point in the process, we can identify any concerns or data needed so that those areas identified can be addressed to ensure that the consultation process proceeds smoothly and efficiently.

After your review, we would greatly appreciate a letter confirming FPL's conclusion that there will be no impacts to cultural resources and therefore no need for mitigation.

an FPL Group company

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0055
Page 2 of 2

If you have any comments or questions, please contact T. V. Abbatiello at (561) 467-7316.

Sincerely yours,

A handwritten signature in cursive script, reading "R. S. Kundalkar".

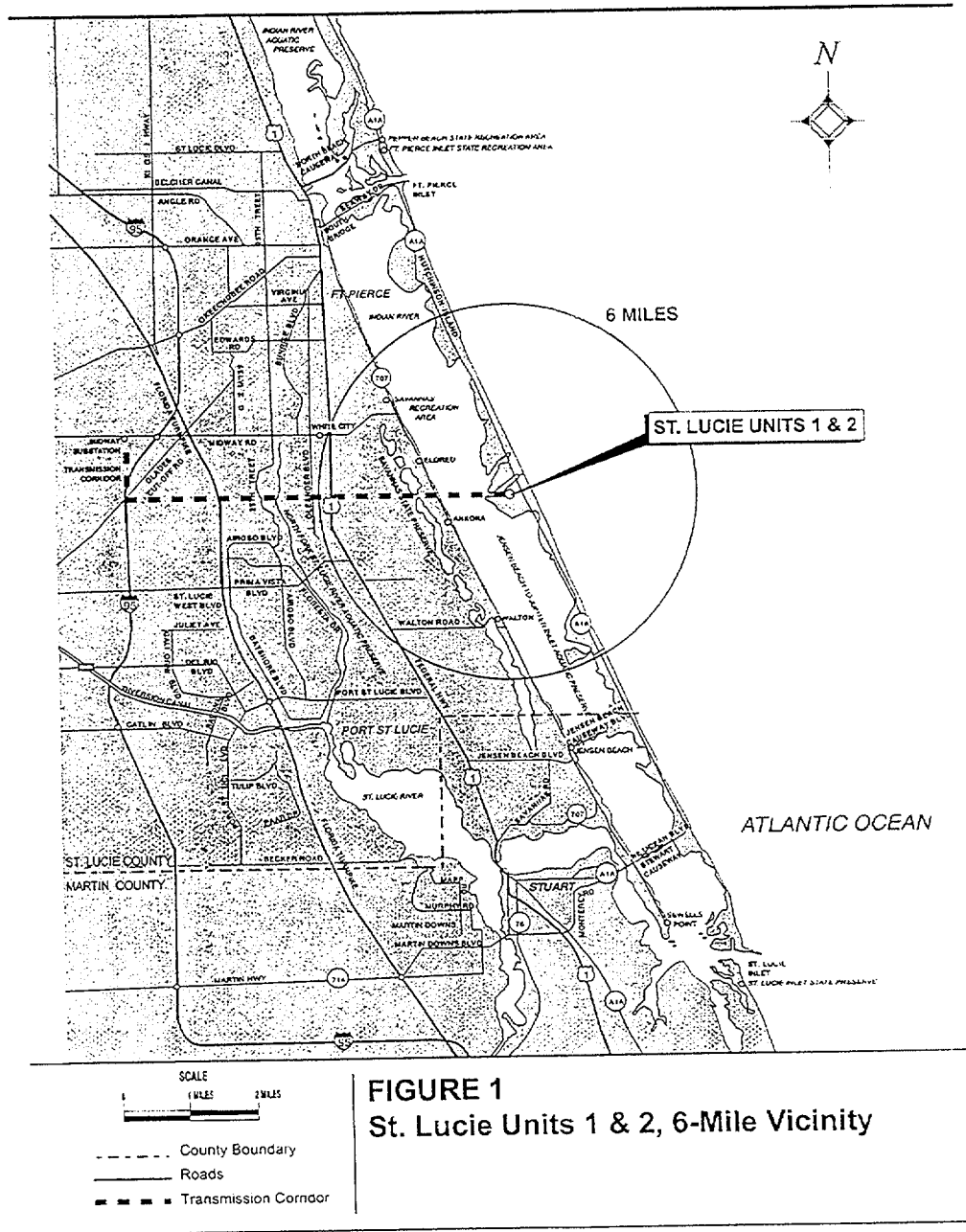
R. S. Kundalkar
Vice President
St. Lucie Plant

EAT/TVA/sap

Enclosures: Figure 1 - St. Lucie Units 1 & 2, 6-Mile Vicinity
Figure 2 - St. Lucie Site Boundary

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LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2



LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

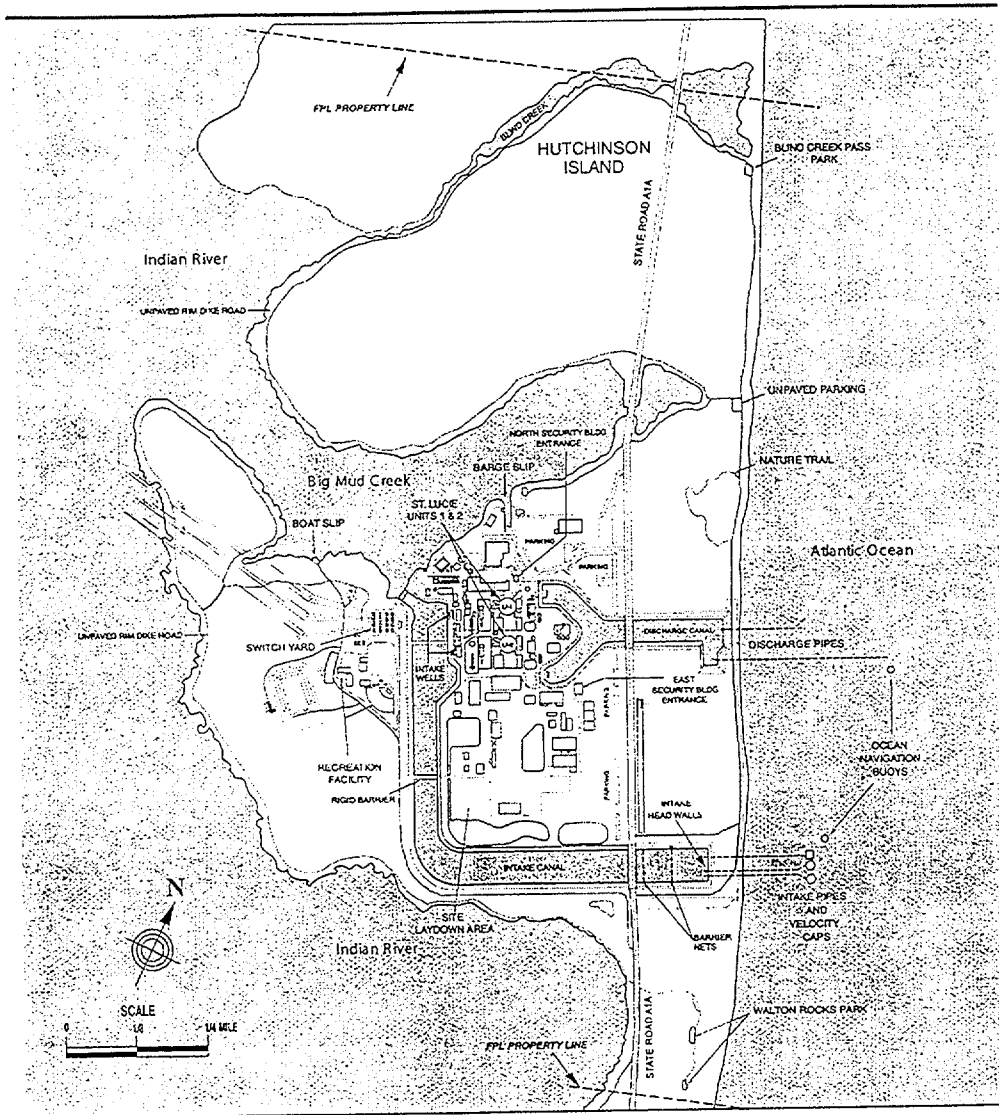


FIGURE 2
St. Lucie Site Boundary

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ST. LUCIE UNITS 1 & 2

DIVISIONS OF FLORIDA DEPARTMENT OF STATE

Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services



FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

MEMBER OF THE FLORIDA CABINET

State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

Mr. R.S. Kundalkar
Florida Power & Light Company
6501 South Ocean Drive
Jensen Beach, Florida 34957

May 22, 2001

RE: DHR Project File No. 2001-04066
Received by SHPO on April 25, 2001
Nuclear Regulatory Commission
St. Lucie Nuclear Plant License Renewal Project
St. Lucie County, Florida

Dear Mr. Kundalkar:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*. The State Historic Preservation Officer (SHPO) is to advise Federal agencies as they identify historic properties (listed or eligible for listing, in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

Based on the information provided, it is the opinion of this office that that because of the project nature (license renewal) no historic properties will be affected by this undertaking.

However, a review of the Florida Master Site File and our records indicated that there is one archaeological site (8SL33) recorded within the property and one archaeological site (8SL44) recorded within close proximity to the property (see map). Based upon comparison with environmentally similar areas of St. Lucie County, it is our opinion that there is a medium to high probability of encountering additional prehistoric archaeological site(s) within the property boundaries.

Therefore, since potentially significant archaeological and historic sites may be present, it is our recommendation that the Plant should incorporate this information into planning documents. Prior to initiating any future land clearing or ground disturbing activities within the undeveloped areas of plant property, the project area should be subjected to a systematic, professional archaeological and historical survey. The purpose of this survey will be to locate and assess the significance of any sites that are encountered. This office will provide guidance regarding any significant sites identified

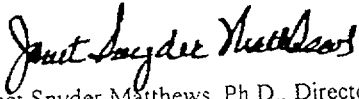
R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • <http://www.flheritage.com>
☐ Director's Office (850) 488-1480 • FAX: 488-3355 ☐ Archaeological Research (850) 487-2299 • FAX: 414-2207 ☒ Historic Preservation (850) 487-2333 • FAX: 922-0496 ☐ Historical Museums (850) 488-1484 • FAX: 921-2503
☐ Historic Pensacola Preservation Board (850) 595-5985 • FAX: 595-5989 ☐ Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476 ☐ St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044 ☐ Tampa Regional Office (813) 272-3843 • FAX: 272-2340

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

Mr. Kundalkar
May 18, 2001
Page 2

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservation Planner, by electronic mail sedwards@mail.dos.state.fl.us, or at 850-487-2333 or 800-847-7278.

Sincerely,



Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Ese

Enclosure

Map of the Big Muddy River Aquatic Preserve. The map shows the Big Muddy River flowing from the top left towards the bottom right. Herman Bay Pt 102 (C) is located on the left side. Big Mud Creek flows into the river. Herman Bay is located on the right side. Big Muddy Island is in the center. The map includes various numbered points (1-22) and labels for 'SL 26 (GV)', 'SL 44', 'SL 33P', 'SL 55 (GV)', and 'SL 1'. A dashed line indicates a boundary or path.

APPENDIX E. SEVERE ACCIDENT MITIGATION ALTERNATIVES ANALYSIS

Appendix E contains the following sections:

E.1 – St. Lucie Units 1 & 2 PSA Model	E.1-1
E.2 – Melcor Accident Consequence Code System Modeling.....	E.2-1
E.3 – Identification and Screening of Candidate SAMAs.....	E.3-1
E.4 – PSA Runs for Selected SAMA Evaluation Cases	E.4-1
E.5 – Acronyms Used in Appendix E	E.5-1

E.1 ST. LUCIE UNITS 1 & 2 PSA MODEL

E.1.1 LEVEL 1 AND 2 MODEL DESCRIPTION

The severe accident mitigation alternative (SAMA) evaluations utilize a separate baseline Level 1 and Level 2 probabilistic safety assessment (PSA) model for each Unit. St. Lucie Unit 1 plant damage state (PDS) and St. Lucie Unit 2 PDS models incorporate Level 1 and Level 2 internal event results. Level 2 results are calculated based upon the updated containment event tree used in the Individual Plant Examination (IPE) submittal (Ref. E.1-1). Level 1 and Level 2 results were obtained using two cases for 4.16kV (kilovolt) AB-bus alignment. Case 1 is when the AB-bus is aligned to the A-bus, and Case 2 is when the AB-bus is aligned to the B-bus. The SAMA evaluation utilized the conservative cases, which were Case 2 for Unit 1 and Case 1 for Unit 2. Hence, these became the baseline models for the SAMA evaluation purposes.

E.1.1.1 SUMMARY OF UPDATES

The PSA models have been updated since the time of IPE submittal to the U.S. Nuclear Regulatory Commission (NRC). The major changes include going to a "One-top" model rather than solving individual sequences, and updating software to allow use of a recovery rule file that allows thorough, automatic application of recovery rules consistently to every appropriate cutset. This also allows removal of recoveries from the model (called hardwired recoveries) in many cases, which simplifies modeling since determining if a recovery in the model is appropriate for every circumstance is extremely difficult at best. Common-cause failure modeling was refined by the use of a basic event for common causes only. The original model normally used an "A" train event with the common-cause factor. This practice overemphasized the importance of the "A" train components, as all common-cause failures were tied to "A" (and none to "B" train components). Test and Maintenance basic events were added for various components as further improvements to the model. Treatment of reactor coolant pump (RCP) seal failures depending on operator action or failure to act was improved per the latest Combustion Engineering Owners Group (CEOG) information (Ref. E.1-2). The initiating event frequencies for loss-of-coolant accidents (LOCAs) and Main Steam Line Breaks were updated per the latest CEOG methodologies (Ref. E.1-3; Ref. E.1-4). Although numerous other minor improvements were made, the only other significant one was the update of the interfacing system LOCA (ISLOCA) analysis for each Unit. Due to changes in operating performance, the number of shutdowns (and valve testing opportunities) for each Unit decreased over time leading to a calculated change (increase) in the ISLOCA frequency. Additionally, Unit 2 performed a design change that increased the calculated probability of ISLOCA while reducing the probability of pressure locking of the shutdown cooling isolation valves, which would prevent the use of shutdown cooling among other things. This change is considered to be risk neutral or positive overall. As noted for ISLOCA, plant design changes were incorporated in these updates as needed. By procedure, design changes are reviewed periodically to ensure that the models reflect the actual Unit designs. Significant operating procedures, particularly the Emergency Operating Procedures, are periodically reviewed and model changes are made if needed. Although this appears to be a long list of changes, it should be noted that the St. Lucie Units 1 & 2

core damage frequency (CDF) values have always been and remain in the range of $2E-5$ to $3E-5$ for both Units for internal events.

E.1.1.2 QUALITY CONTROL

Florida Power & Light Company (FPL) Quality Assurance Program procedures govern engineering performance for calculations and evaluations. In addition, the FPL Reliability and Risk Assessment Group (RRAG) has developed specific standards and procedures for PSA-related evaluations and model updates. They require periodic review of plant changes so that the model is consistent with the as-built configuration of the plant.

Each PSA model change and update is documented via calculation or evaluation, and is reviewed internally by two independent reviewers in accordance with FPL Quality Assurance Program and RRAG standards.

E.1.2 EXTERNAL EVENTS RISK

To evaluate potential risks from external events, the cost of implementation of SAMAs was compared with a benefit value that was twice that calculated. This was done to represent the comparison of the cost with the benefit of reducing both internal and external event risks and shows that the doubling of risk to account for external events is a conservative approach. The following discussions provide additional information related to risks associated with external events.

E.1.2.1 SEISMIC EVENTS

The St. Lucie Individual Plant Examination of External Events (IPEEE) submittal for seismic risk was based on the seismic analysis resolving Unresolved Safety Issue (USI) A-46. The St. Lucie IPEEE submittal demonstrated that the seismic risk for St. Lucie Units 1 & 2 is low.

The FPL A-46 Seismic Program implements the NUREG-1407 approach to seismic analysis. Briefly summarized, NUREG-1407 states that, "For sites where the seismic hazard is low, a reduced scope margins method emphasizing the walkdown is adequate." Table 3.1 of NUREG-1407 lists St. Lucie Units 1 & 2 as a reduced scope plant. This assignment recognizes a low level of seismic importance and a reduction of FPL's analysis requirements for the plant. Therefore, seismically induced failures, including fires and floods, beyond the Safe Shutdown Earthquake (SSE) were not considered credible and were not analyzed as part of the St. Lucie Units 1 & 2 IPEEE resolution program.

Therefore, pursuant to FPL's approach to A-46, the probabilities of seismically induced LOCAs and high-energy line breaks (HELBs) were judged to be low enough at the maximum postulated SSE at St. Lucie Units 1 & 2 that further consideration was not warranted. This analysis was also applied to systems, structures, and components for mitigating the effects of LOCAs and HELBs.

E.1.2.2 EXTERNAL FLOODS

The St. Lucie IPEEE (Ref. E.1-5) contains the following conclusions with respect to external flooding risks: "As stated in NUREG-1407 [2], plants designed to the criteria described in [Regulatory Guide] RG 1.59 and applicable [Standard Review Plan] SRP sections pose no significant threat of a severe accident. St. Lucie Units 1 & 2 designs meet the NRC Regulatory Guide 1.59 and SRP criteria, and thus pose no significant risk of a severe

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ST. LUCIE UNITS 1 & 2

accident as the result of external flooding." Note that RG 1.59 assigns a Probable Maximum Surge (PMS) of 16.7 feet above Mean Low Water (MLW), and the surge assumed by the St. Lucie Units 1 & 2 Final Safety Analysis Report (FSAR) analyses is 17.2 feet above MLW. Plant design features conservatively include flood protection to 19.5 feet above MLW.

E.1.2.3 HURRICANES

As stated in Section 3.3.1 for Unit 1 and Section 3.3.1.1 for Unit 2 of the respective St. Lucie Updated Final Safety Analysis Reports (UFSARs), the design hurricane wind speed is 194 miles per hour (mph). The design wind speed selected is greater than the Probable Maximum Hurricane (PMH) related to the St. Lucie Units 1 & 2 region. Wind loads were determined and applied to all seismic Category I structures based on the design hurricane wind speed. From a severe accident risk perspective, hurricanes are much less significant than other external events because hurricanes develop slowly and enable advance warning that allows both preparation and elimination of many accident sequences.

After the 1992 hurricane experience at the Turkey Point site, FPL made procedural improvements to further reduce flooding risks due to hurricanes. FPL established new and revised existing administrative and operations procedures to address hurricane and severe weather preparations. Actions to be taken, among others, include:

- Installing intake structure missile shielding if removed,
- Topping off the diesel oil storage tanks,
- Removing the stop logs from storage and preparing them for installation,
- Surveying the plant site, removing trash and debris, and securing loose equipment,
- Closing Reactor Auxiliary Building outside doors and roof hatches, and
- Placing station batteries on equalizing charge.

Additionally, St. Lucie Units 1 & 2 procedures were established with criteria to shut down both Units if a hurricane watch goes into effect. These criteria include:

- For storms projected to reach a Category 1 or 2, the Unit(s) shall be placed in HOT STANDBY (Mode 3) or below at least two (2) hours before the projected onset of sustained hurricane-force winds at the site and both Units shall remain off-line for the duration of the hurricane-force winds (or restoration of reliable offsite power).
- For storms projected to reach Category 3, 4, and 5 prior to landfall, the Units shall be shut down to an average temperature of less than 350 degrees Fahrenheit at least two (2) hours before the projected onset of sustained hurricane-force winds at the site and both Units shall remain off-line for the duration of the hurricane-force winds (or restoration of reliable offsite power).

E.1.2.4 TORNADOES AND HIGH WINDS

The St. Lucie Units 1 & 2 site area is affected by passage of high winds and tropical storms with various intensities. These activities are more likely to occur during the months of September and October. However, tornadoes and waterspouts have been observed throughout the year around the site.

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ST. LUCIE UNITS 1 & 2

FPL's IPEEE analysis concluded for High Winds/Tornadoes that the designs of St. Lucie Units 1 & 2 either conform to the SRP criteria (NUREG-0800 paragraphs 3.3.1 and 3.3.2) or have demonstrated that the tornado and high winds hazard frequency is acceptably low. Therefore, the risk significance of a severe accident due to tornadoes and high wind threats is extremely low.

E.1.2.5 FIRES

At the outset, it should be noted that the CDF estimates for fires in the 1994 St. Lucie IPEEE were extremely conservative and overestimated risk for screening purposes. On January 19, 2001, and April 26, 2001, respectively, the St. Lucie Units 1 & 2 operating licenses were amended to extend the allowable outage time (AOT) for the emergency diesel generators (EDGs). Preparatory work for these amendments refined and revised the fire risk estimates for the cable spreading rooms and the Control Rooms. Specific risk insights from refining the St. Lucie Units 1 & 2 fire risks for the cable spreading rooms and Control Rooms provide reasonable assurance that the fire risk for those areas is very low. The revised fire risk estimates for the cable spreading rooms and Control Rooms are about two orders of magnitude lower than that reported in the original St. Lucie IPEEE. Due to concerns about potential fires in the cable spreading rooms, FPL has committed to perform the following actions for each Unit if an EDG is to be removed from service for maintenance for extended AOT (i.e., greater than 72 hours) during Modes 1, 2, and 3:

- External fires: CONTACT the system load dispatcher to determine if there are existing fires that could impact offsite power to the St. Lucie plant. If there are existing fires that have a significant potential of affecting offsite power to St. Lucie Units 1 & 2, an EDG should only be removed from service for surveillance testing or corrective maintenance. The final decision to remove an EDG from service for an extended AOT should also consider whether there is a significant potential fire threat during the time the EDG will be out of service.
- CONDUCT a plant fire protection walkdown of the area that could impact EDG availability, offsite power availability, or the ability to use the station blackout cross-tie prior to entering the extended AOT, and
- PERFORM a thermographic examination of high-risk potential ignition sources in the cable spreading room and the Control Room prior to entering the extended AOT, and
- RESTRICT planned hot work in the cable spreading room and Control Room during the extended AOT, and
- ESTABLISH a continuous fire watch in the cable spreading room when in the extended AOT.

The St. Lucie IPEEE concluded that no St. Lucie Units 1 & 2 fire zones were found to be significant contributors that would result in failure to achieve a safe shutdown condition. Improvements continue to be made in St. Lucie Units 1 & 2 fire protection features as a result of on-going (10 CFR 50) Appendix R evaluations.

E.1.2.6 TRANSPORTATION AND OTHER EXTERNAL EVENTS

FPL's IPEEE demonstrated that there are no significant vulnerabilities to accidents at St. Lucie Units 1 & 2 related to nearby transportation routes, or nearby industrial or military facilities.

E.1.2.7 CONCLUSIONS

For St. Lucie Units 1 & 2, the severe accident risk contribution from external events is very small. The risk contribution from all external events in general is minimized as much as practical.

No specific SAMA was found to provide redundancy to plant safe shutdown capabilities in order to reduce the external event (i.e., fire, flood, etc.) contribution. Based on this review, no SAMAs were identified to be especially beneficial for reducing external event contributions.

Although the risk from the external events is not quantified with the same level of detail and accuracy as that for internal events, the risk for external events is expected to be lower than that for internal events. Therefore, it is reasonable, for SAMA evaluation purposes, to bound the risk of core damage due to all initiators at St. Lucie Units 1 & 2 by doubling the cost benefits evaluated for the internal events.

E.1.3 PLANT DAMAGE STATE TO CONTAINMENT RELEASE

For the evaluations performed in this analysis, the PDSs are considered to be parsed into containment release fractions. Given this, the baseline conditional containment event tree endstate probabilities for each of the 39 PDSs are provided in Table E.1-1. This table is presented in four parts to accommodate the 39 PDSs.

TABLE E.1-1
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 1

CET ES	Plant Damage States									
	IA	IB	ID	IE	IF	IH	IIA	IIB	IID	IIE
A1	1.27E-02	1.54E-02	1.69E-02	3.00E-02	3.01E-02	2.47E-02	1.54E-02	1.54E-02	1.69E-02	3.01E-02
A2	5.81E-03	3.10E-03	1.93E-02	2.29E-02	6.05E-03	2.82E-02	3.10E-03	3.10E-03	1.93E-02	6.05E-03
B1	7.52E-02	9.11E-02	5.20E-04	6.30E-04	9.12E-02	5.20E-04	9.11E-02	1.56E-01	8.67E-04	1.56E-01
B2-L	3.42E-02	1.83E-02	5.91E-04	4.81E-04	1.83E-02	5.91E-04	1.83E-02	3.12E-02	9.85E-04	3.12E-02
B2-R	8.56E-05	4.58E-05	1.48E-06	1.20E-06	4.58E-05	1.48E-06	4.58E-05	7.82E-05	2.47E-06	7.83E-05
B3-L	5.15E-02	6.24E-02	0.00E+00	0.00E+00	6.25E-02	0.00E+00	6.24E-02	1.07E-01	0.00E+00	1.07E-01
B3-R	1.29E-04	1.56E-04	0.00E+00	0.00E+00	1.57E-04	0.00E+00	1.56E-04	2.67E-04	0.00E+00	2.68E-04
B4-L	2.35E-02	1.25E-02	0.00E+00	0.00E+00	1.26E-02	0.00E+00	1.25E-02	2.14E-02	0.00E+00	2.15E-02
B4-R	5.88E-05	3.14E-05	0.00E+00	0.00E+00	3.15E-05	0.00E+00	3.14E-05	5.37E-05	0.00E+00	5.38E-05
B5-L	2.86E-05	3.54E-05	1.94E-07	2.40E-07	3.54E-05	1.94E-07	3.54E-05	4.19E-05	2.26E-07	4.19E-05
B5-R	7.16E-08	8.86E-08	4.87E-10	6.02E-10	8.87E-08	4.87E-10	8.86E-08	1.05E-07	5.66E-10	1.05E-07
B6-L	1.30E-05	7.10E-06	2.21E-07	1.84E-07	7.11E-06	2.21E-07	7.10E-06	8.41E-06	2.57E-07	8.42E-06
B6-R	3.27E-08	1.78E-08	5.55E-10	4.61E-10	1.78E-08	5.55E-10	1.78E-08	2.11E-08	6.45E-10	2.11E-08
BYP-SGTR1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-SGTR2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-ISLOCA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1-L	1.21E-01	1.47E-01	0.00E+00	1.78E-01	1.50E-01	0.00E+00	1.47E-01	9.27E-02	1.08E-01	9.57E-02
C1-R	3.04E-04	3.68E-04	0.00E+00	4.47E-04	3.77E-04	0.00E+00	3.68E-04	2.32E-04	2.71E-04	2.40E-04
C2-L	5.52E-02	2.95E-02	3.12E-01	1.36E-01	3.02E-02	3.15E-01	2.95E-02	1.86E-02	1.23E-01	1.92E-02
C2-R	1.38E-04	7.39E-05	7.82E-04	3.42E-04	7.57E-05	7.89E-04	7.39E-05	4.67E-05	3.08E-04	4.82E-05
C3-L	1.25E-01	1.51E-01	0.00E+00	1.45E-01	1.51E-01	0.00E+00	1.51E-01	1.07E-01	1.20E-01	1.07E-01
C3-R	3.12E-04	3.79E-04	0.00E+00	3.64E-04	3.79E-04	0.00E+00	3.79E-04	2.68E-04	3.01E-04	2.68E-04
C4-L	5.68E-02	3.04E-02	2.57E-01	1.11E-01	3.04E-02	2.57E-01	3.04E-02	2.15E-02	1.37E-01	2.15E-02
C4-R	1.42E-04	7.61E-05	6.43E-04	2.79E-04	7.61E-05	6.43E-04	7.61E-05	5.38E-05	3.42E-04	5.38E-05

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 1 (continued)

CET ES	Plant Damage States									
	IA	IB	ID	IE	IF	IH	IIA	IIB	IID	IIE
C5-L	3.78E-05	4.67E-05	0.00E+00	5.57E-05	4.67E-05	0.00E+00	4.67E-05	4.11E-05	4.50E-05	4.11E-05
C5-R	9.47E-08	1.17E-07	0.00E+00	1.39E-07	1.17E-07	0.00E+00	1.17E-07	1.03E-07	1.13E-07	1.03E-07
C6-L	1.72E-05	9.39E-06	9.62E-05	4.26E-05	9.39E-06	9.62E-05	9.39E-06	8.25E-06	5.12E-05	8.25E-06
C6-R	4.32E-08	2.35E-08	2.41E-07	1.07E-07	2.35E-08	2.41E-07	2.35E-08	2.07E-08	1.28E-07	2.07E-08
D1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D1-R	2.88E-05	3.50E-05	2.01E-07	2.44E-07	3.50E-05	2.01E-07	3.50E-05	5.98E-05	3.30E-07	5.98E-05
D2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D2-R	1.89E-05	1.28E-05	2.89E-07	2.46E-07	1.28E-05	2.89E-07	1.28E-05	2.19E-05	4.72E-07	2.19E-05
D3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D3-R	2.92E-07	1.28E-07	2.04E-09	8.92E-10	1.28E-07	2.04E-09	1.28E-07	1.61E-08	2.29E-09	1.61E-08
D4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D4-R	1.92E-07	4.69E-08	2.92E-09	8.98E-10	4.69E-08	2.92E-09	4.69E-08	5.89E-09	3.28E-09	5.89E-09
E1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E1-R	3.98E-04	3.98E-04	2.22E-04	4.45E-04	3.98E-04	2.22E-04	3.98E-04	3.64E-04	4.45E-04	3.64E-04
E2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E2-R	0.00E+00	0.00E+00	2.23E-04	0.00E+00	0.00E+00	2.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E3-R	3.09E-04	3.09E-04	1.54E-04	3.09E-04	3.09E-04	1.54E-04	3.09E-04	3.09E-04	3.09E-04	3.09E-04
E4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E4-R	0.00E+00	0.00E+00	1.55E-04	0.00E+00	0.00E+00	1.55E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E5-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E5-R	2.61E-06	9.44E-07	1.54E-06	1.12E-06	9.44E-07	1.54E-06	9.44E-07	9.80E-08	3.09E-06	9.80E-08
E6-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E6-R	0.00E+00	0.00E+00	1.55E-06	0.00E+00	0.00E+00	1.55E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 1 (continued)

CET ES	Plant Damage States									
	IA	IB	ID	IE	IF	IH	IIA	IIB	IID	IIE
NCF	8.45E-02	8.45E-02	5.68E-02	5.39E-02	8.03E-02	5.39E-02	8.45E-02	7.19E-02	1.37E-01	6.83E-02
NCFA	3.53E-01	3.53E-01	3.35E-01	3.18E-01	3.35E-01	3.18E-01	3.53E-01	3.53E-01	3.35E-01	3.35E-01
NCFB	1.85E-04	1.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-04	3.16E-04	0.00E+00	0.00E+00
NEG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.00E+00	1.00E+00	1.00E+00	9.98E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 2

CET ES	Plant Damage States									
	IIF	IIH	IIIA	IIIB	IIID	IIIE	IIIF	IIIH	IVA	IVB
A1	3.01E-02	2.47E-02	1.54E-02	1.54E-02	2.05E-02	3.01E-02	3.01E-02	3.00E-02	1.54E-02	1.54E-02
A2	6.05E-03	2.82E-02	3.10E-03	3.10E-03	1.57E-02	6.05E-03	6.05E-03	2.29E-02	3.10E-03	3.10E-03
B1	1.56E-01	8.67E-04	9.11E-02	1.56E-01	1.05E-03	1.56E-01	1.56E-01	1.05E-03	9.11E-02	1.56E-01
B2-L	3.12E-02	9.85E-04	1.83E-02	3.12E-02	8.01E-04	3.12E-02	3.12E-02	8.01E-04	1.83E-02	3.12E-02
B2-R	7.83E-05	2.47E-06	4.58E-05	7.82E-05	2.01E-06	7.83E-05	7.83E-05	2.01E-06	4.58E-05	7.82E-05
B3-L	1.07E-01	0.00E+00	6.24E-02	1.07E-01	0.00E+00	1.07E-01	1.07E-01	0.00E+00	6.24E-02	1.07E-01
B3-R	2.68E-04	0.00E+00	1.56E-04	2.67E-04	0.00E+00	2.68E-04	2.68E-04	0.00E+00	1.56E-04	2.67E-04
B4-L	2.15E-02	0.00E+00	1.25E-02	2.14E-02	0.00E+00	2.15E-02	2.15E-02	0.00E+00	1.25E-02	2.14E-02
B4-R	5.38E-05	0.00E+00	3.14E-05	5.37E-05	0.00E+00	5.38E-05	5.38E-05	0.00E+00	3.14E-05	5.37E-05
B5-L	4.19E-05	2.26E-07	4.23E-05	1.64E-05	1.11E-07	1.64E-05	1.64E-05	1.11E-07	3.54E-05	4.19E-05
B5-R	1.05E-07	5.66E-10	1.06E-07	4.11E-08	2.77E-10	4.11E-08	4.11E-08	2.77E-10	8.86E-08	1.05E-07
B6-L	8.42E-06	2.57E-07	8.50E-06	3.29E-06	8.45E-08	3.30E-06	3.30E-06	8.45E-08	7.10E-06	8.41E-06
B6-R	2.11E-08	6.45E-10	2.13E-08	8.25E-09	2.12E-10	8.26E-09	8.26E-09	2.12E-10	1.78E-08	2.11E-08
BYP-SGTR1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-SGTR2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-ISLOCA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1-L	9.57E-02	0.00E+00	1.47E-01	9.27E-02	1.31E-01	9.57E-02	9.57E-02	0.00E+00	1.47E-01	9.27E-02
C1-R	2.40E-04	0.00E+00	3.68E-04	2.32E-04	3.28E-04	2.40E-04	2.40E-04	0.00E+00	3.68E-04	2.32E-04
C2-L	1.92E-02	2.38E-01	2.95E-02	1.86E-02	1.00E-01	1.92E-02	1.92E-02	2.38E-01	2.95E-02	1.86E-02
C2-R	4.82E-05	5.96E-04	7.39E-05	4.67E-05	2.51E-04	4.82E-05	4.82E-05	5.96E-04	7.39E-05	4.67E-05
C3-L	1.07E-01	0.00E+00	1.51E-01	1.07E-01	1.45E-01	1.07E-01	1.07E-01	0.00E+00	1.51E-01	1.07E-01
C3-R	2.68E-04	0.00E+00	3.79E-04	2.68E-04	3.64E-04	2.68E-04	2.68E-04	0.00E+00	3.79E-04	2.68E-04
C4-L	2.15E-02	2.57E-01	3.04E-02	2.15E-02	1.11E-01	2.15E-02	2.15E-02	2.57E-01	3.04E-02	2.15E-02
C4-R	5.38E-05	6.43E-04	7.61E-05	5.38E-05	2.79E-04	5.38E-05	5.38E-05	6.43E-04	7.61E-05	5.38E-05

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 2 (continued)

CET ES	Plant Damage States									
	IIF	IIH	IIIA	IIIB	IIID	IIIE	IIIF	IIIH	IVA	IVB
C5-L	4.11E-05	0.00E+00	5.59E-05	1.61E-05	2.20E-05	1.61E-05	1.61E-05	0.00E+00	4.67E-05	4.11E-05
C5-R	1.03E-07	0.00E+00	1.40E-07	4.03E-08	5.51E-08	4.03E-08	4.03E-08	0.00E+00	1.17E-07	1.03E-07
C6-L	8.25E-06	9.62E-05	1.12E-05	3.23E-06	1.68E-05	3.23E-06	3.23E-06	3.88E-05	9.39E-06	8.25E-06
C6-R	2.07E-08	2.41E-07	2.81E-08	8.10E-09	4.21E-08	8.10E-09	8.10E-09	9.73E-08	2.35E-08	2.07E-08
D1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D1-R	5.98E-05	3.30E-07	3.50E-05	5.98E-05	4.00E-07	5.98E-05	5.98E-05	4.00E-07	3.50E-05	5.98E-05
D2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D2-R	2.19E-05	4.72E-07	1.28E-05	2.19E-05	4.02E-07	2.19E-05	2.19E-05	4.02E-07	1.28E-05	2.19E-05
D3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D3-R	1.61E-08	2.29E-09	1.53E-07	6.30E-09	4.21E-11	6.30E-09	6.30E-09	4.21E-11	1.28E-07	1.61E-08
D4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D4-R	5.89E-09	3.28E-09	5.61E-08	2.31E-09	4.24E-11	2.31E-09	2.31E-09	4.24E-11	4.69E-08	5.89E-09
E1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E1-R	3.64E-04	2.22E-04	3.98E-04	3.64E-04	4.45E-04	3.64E-04	3.64E-04	2.22E-04	3.98E-04	3.64E-04
E2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E2-R	0.00E+00	2.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.23E-04	0.00E+00	0.00E+00
E3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E3-R	3.09E-04	1.54E-04	3.09E-04	3.09E-04	3.09E-04	3.09E-04	3.09E-04	1.54E-04	3.09E-04	3.09E-04
E4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E4-R	0.00E+00	1.55E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-04	0.00E+00	0.00E+00
E5-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E5-R	9.80E-08	1.54E-06	1.13E-06	3.84E-08	4.69E-08	3.84E-08	3.84E-08	2.34E-08	9.44E-07	9.80E-08
E6-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E6-R	0.00E+00	1.55E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-08	0.00E+00	0.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 2 (continued)

CET ES	Plant Damage States									
	IIF	IIH	IIIA	IIIB	IIID	IIIE	IIIF	IIIH	IVA	IVB
NCF	6.83E-02	1.31E-01	8.45E-02	7.19E-02	1.37E-01	6.84E-02	6.84E-02	1.31E-01	8.45E-02	7.19E-02
NCFA	3.35E-01	3.18E-01	3.53E-01	3.53E-01	3.35E-01	3.35E-01	3.35E-01	3.18E-01	3.53E-01	3.53E-01
NCFB	0.00E+00	0.00E+00	1.85E-04	3.16E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-04	3.16E-04
NEG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.00E+00	1.00E+00	1.00E+00	1.00E+00	9.99E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 3

CET ES	Plant Damage States									
	IVD	IVE	IVF	IVH	VA	VB	VD	VE	VF	VH
A1	1.69E-02	3.01E-02	3.01E-02	2.47E-02	1.54E-02	1.54E-02	2.05E-02	3.01E-02	3.01E-02	3.00E-02
A2	1.93E-02	6.05E-03	6.05E-03	2.82E-02	3.10E-03	3.10E-03	1.57E-02	6.05E-03	6.05E-03	2.29E-02
B1	8.67E-04	1.56E-01	1.56E-01	8.67E-04	9.11E-02	1.56E-01	1.05E-03	1.56E-01	1.56E-01	1.05E-03
B2-L	9.85E-04	3.12E-02	3.12E-02	9.85E-04	1.83E-02	3.12E-02	8.01E-04	3.12E-02	3.12E-02	8.01E-04
B2-R	2.47E-06	7.83E-05	7.83E-05	2.47E-06	4.58E-05	7.82E-05	2.01E-06	7.83E-05	7.83E-05	2.01E-06
B3-L	0.00E+00	1.07E-01	1.07E-01	0.00E+00	6.24E-02	1.07E-01	0.00E+00	1.07E-01	1.07E-01	0.00E+00
B3-R	0.00E+00	2.68E-04	2.68E-04	0.00E+00	1.56E-04	2.67E-04	0.00E+00	2.68E-04	2.68E-04	0.00E+00
B4-L	0.00E+00	2.15E-02	2.15E-02	0.00E+00	1.25E-02	2.14E-02	0.00E+00	2.15E-02	2.15E-02	0.00E+00
B4-R	0.00E+00	5.38E-05	5.38E-05	0.00E+00	3.14E-05	5.37E-05	0.00E+00	5.38E-05	5.38E-05	0.00E+00
B5-L	2.26E-07	4.19E-05	4.19E-05	2.26E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.19E-05	0.00E+00
B5-R	5.66E-10	1.05E-07	1.05E-07	5.66E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-07	0.00E+00
B6-L	2.57E-07	8.42E-06	8.42E-06	2.57E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.42E-06	0.00E+00
B6-R	6.45E-10	2.11E-08	2.11E-08	6.45E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-08	0.00E+00
BYP-SGTR1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-SGTR2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-ISLOCA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1-L	1.08E-01	9.57E-02	9.57E-02	0.00E+00	7.34E-02	9.27E-02	0.00E+00	9.57E-02	9.57E-02	0.00E+00
C1-R	2.71E-04	2.40E-04	2.40E-04	0.00E+00	1.84E-04	2.32E-04	0.00E+00	2.40E-04	2.40E-04	0.00E+00
C2-L	1.23E-01	1.92E-02	1.92E-02	2.38E-01	1.03E-01	1.86E-02	2.31E-01	1.92E-02	1.92E-02	2.38E-01
C2-R	3.08E-04	4.82E-05	4.82E-05	5.96E-04	2.58E-04	4.67E-05	5.79E-04	4.82E-05	4.82E-05	5.96E-04
C3-L	1.20E-01	1.07E-01	1.07E-01	0.00E+00	7.56E-02	1.07E-01	0.00E+00	1.07E-01	1.07E-01	0.00E+00
C3-R	3.01E-04	2.68E-04	2.68E-04	0.00E+00	1.89E-04	2.68E-04	0.00E+00	2.68E-04	2.68E-04	0.00E+00
C4-L	1.37E-01	2.15E-02	2.15E-02	2.57E-01	1.06E-01	2.15E-02	2.57E-01	2.15E-02	2.15E-02	2.57E-01
C4-R	3.42E-04	5.38E-05	5.38E-05	6.43E-04	2.66E-04	5.38E-05	6.43E-04	5.38E-05	5.38E-05	6.43E-04

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 3 (continued)

CET ES	Plant Damage States									
	IVD	IVE	IVF	IVH	VA	VB	VD	VE	VF	VH
C5-L	4.50E-05	4.11E-05	4.11E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.11E-05	0.00E+00
C5-R	1.13E-07	1.03E-07	1.03E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-07	0.00E+00
C6-L	5.12E-05	8.25E-06	8.25E-06	9.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E-06	0.00E+00
C6-R	1.28E-07	2.07E-08	2.07E-08	2.41E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.07E-08	0.00E+00
D1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D1-R	3.30E-07	5.98E-05	5.98E-05	3.30E-07	3.50E-05	5.98E-05	4.00E-07	5.98E-05	5.98E-05	4.00E-07
D2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D2-R	4.72E-07	2.19E-05	2.19E-05	4.72E-07	1.28E-05	2.19E-05	4.02E-07	2.19E-05	2.19E-05	4.02E-07
D3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D3-R	2.29E-09	1.61E-08	1.61E-08	2.29E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-08	0.00E+00
D4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D4-R	3.28E-09	5.89E-09	5.89E-09	3.28E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.89E-09	0.00E+00
E1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E1-R	4.45E-04	3.64E-04	3.64E-04	2.22E-04	2.91E-04	3.64E-04	2.22E-04	3.64E-04	3.64E-04	2.22E-04
E2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E2-R	0.00E+00	0.00E+00	0.00E+00	2.23E-04	1.07E-04	0.00E+00	2.23E-04	0.00E+00	0.00E+00	2.23E-04
E3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E3-R	3.09E-04	3.09E-04	3.09E-04	1.54E-04	2.26E-04	3.09E-04	1.54E-04	3.09E-04	3.09E-04	1.54E-04
E4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E4-R	0.00E+00	0.00E+00	0.00E+00	1.55E-04	8.28E-05	0.00E+00	1.55E-04	0.00E+00	0.00E+00	1.55E-04
E5-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E5-R	3.09E-06	9.80E-08	9.80E-08	1.54E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.80E-08	0.00E+00
E6-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E6-R	0.00E+00	0.00E+00	0.00E+00	1.55E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 3 (continued)

CET ES	Plant Damage States									
	IVD	IVE	IVF	IVH	VA	VB	VD	VE	VF	VH
NCF	1.37E-01	6.83E-02	6.83E-02	1.31E-01	8.45E-02	7.20E-02	1.37E-01	6.84E-02	6.83E-02	1.31E-01
NCFA	3.35E-01	3.35E-01	3.35E-01	3.18E-01	3.53E-01	3.53E-01	3.35E-01	3.35E-01	3.35E-01	3.18E-01
NCFB	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-04	3.16E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NEG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 4

CET ES	Plant Damage States								
	VIA	VIB	VID	VIE	VIF	VIH	SGTR1	SGTR2	ISLOCA
A1	1.54E-02	1.54E-02	1.69E-02	3.01E-02	3.01E-02	2.47E-02	0.00E+00	0.00E+00	0.00E+00
A2	3.10E-03	3.10E-03	1.93E-02	6.05E-03	6.05E-03	2.82E-02	0.00E+00	0.00E+00	0.00E+00
B1	9.11E-02	1.56E-01	8.67E-04	1.56E-01	1.56E-01	8.67E-04	0.00E+00	0.00E+00	0.00E+00
B2-L	1.83E-02	3.12E-02	9.85E-04	3.12E-02	3.12E-02	9.85E-04	0.00E+00	0.00E+00	0.00E+00
B2-R	4.58E-05	7.82E-05	2.47E-06	7.83E-05	7.83E-05	2.47E-06	0.00E+00	0.00E+00	0.00E+00
B3-L	6.24E-02	1.07E-01	0.00E+00	1.07E-01	1.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3-R	1.56E-04	2.67E-04	0.00E+00	2.68E-04	2.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4-L	1.25E-02	2.14E-02	0.00E+00	2.15E-02	2.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4-R	3.14E-05	5.37E-05	0.00E+00	5.38E-05	5.38E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BYP-SGTR1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00
BYP-SGTR2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
BYP-ISLOCA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+00
C1-L	7.34E-02	9.27E-02	0.00E+00	9.57E-02	9.57E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1-R	1.84E-04	2.32E-04	0.00E+00	2.40E-04	2.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2-L	1.03E-01	1.86E-02	2.31E-01	1.92E-02	1.92E-02	2.38E-01	0.00E+00	0.00E+00	0.00E+00
C2-R	2.58E-04	4.67E-05	5.79E-04	4.82E-05	4.82E-05	5.96E-04	0.00E+00	0.00E+00	0.00E+00
C3-L	7.56E-02	1.07E-01	0.00E+00	1.07E-01	1.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3-R	1.89E-04	2.68E-04	0.00E+00	2.68E-04	2.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4-L	1.06E-01	2.15E-02	2.57E-01	2.15E-02	2.15E-02	2.57E-01	0.00E+00	0.00E+00	0.00E+00
C4-R	2.66E-04	5.38E-05	6.43E-04	5.38E-05	5.38E-05	6.43E-04	0.00E+00	0.00E+00	0.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 4 (continued)

CET ES	Plant Damage States							
	VIA	VIB	VID	VIE	VIF	VIH	SGTR1	SGTR2
C5-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C5-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C6-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C6-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D1-R	3.50E-05	5.98E-05	3.30E-07	5.98E-05	3.30E-07	0.00E+00	0.00E+00	0.00E+00
D2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D2-R	1.28E-05	2.19E-05	4.72E-07	2.19E-05	4.72E-07	0.00E+00	0.00E+00	0.00E+00
D3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D3-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
D4-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E1-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E1-R	2.91E-04	3.64E-04	2.22E-04	3.64E-04	2.22E-04	0.00E+00	0.00E+00	0.00E+00
E2-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E2-R	1.07E-04	0.00E+00	2.23E-04	0.00E+00	2.23E-04	0.00E+00	0.00E+00	0.00E+00
E3-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E3-R	2.26E-04	3.09E-04	1.54E-04	3.09E-04	1.54E-04	0.00E+00	0.00E+00	0.00E+00
E4-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E4-R	8.28E-05	0.00E+00	1.55E-04	0.00E+00	1.55E-04	0.00E+00	0.00E+00	0.00E+00
E5-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E5-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E6-L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
E6-R	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE E.1-1 (continued)
CONTAINMENT EVENT TREE ENDSTATE RELEASE FRACTIONS
(CONDITIONAL PROBABILITY) PART 4 (continued)

CET ES	Plant Damage States								
	VIA	VIB	VID	VIE	VIF	VIH	SGTR1	SGTR2	ISLOCA
NCF	8.45E-02	7.20E-02	1.37E-01	6.84E-02	6.84E-02	1.31E-01	0.00E+00	0.00E+00	0.00E+00
NCFA	3.53E-01	3.53E-01	3.35E-01	3.35E-01	3.35E-01	3.18E-01	0.00E+00	0.00E+00	0.00E+00
NCFB	1.85E-04	3.16E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NEG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00

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E.1.4 REFERENCES

- E.1-1 D.A. Sager (FPL) to Document Control Desk (NRC), "St. Lucie Units 1 & 2 Summary Report of Individual Plant Examination for Severe Accident Vulnerabilities – Generic Letter 88-20." (L-93-301) December 9, 1993.
- E.1-2 CEOG Report CE NPSD-755. "Reactor Coolant Pump Seal Failure Probability Given Loss of Seal Cooling." Rev. 01. May 1988.
- E.1-3 CEOG Technical Paper, "Evaluation of the Initiating Event Frequency for the Loss of Coolant Accident," CE Task 941. January 1997.
- E.1-4 CEOG Technical Paper, "Evaluation of the Initiating Event Frequency for Main Steam Line Breaks," CE Task 941. January 1997.
- E.1-5 Letter from D.A. Sager (FPL) to Document Control Desk (NRC), "Individual Plant Examination of External Events Submittal." (L-94-318, with Enclosure) December 15, 1994.

E.2 MELCOR ACCIDENT CONSEQUENCE CODE SYSTEM MODELING

E.2.1 INTRODUCTION

The following sections describe the assumptions made and the results of modeling performed to assess potential modifications to reduce the consequences of severe accidents [U.S. Nuclear Regulatory Commission (NRC) Class 9] at St. Lucie Units 1 & 2.

The Level 3 analysis was performed using the Melcor Accident Consequence Code System (MACCS) 2 code (Ref. E.2-1; Ref. E.2-2; Ref. E.2-3). MACCS2 simulates the impact of severe accidents at nuclear power plants on the surrounding environment. The principal phenomena considered in MACCS2 are atmospheric transport, mitigative actions based on dose projections, dose accumulation by a number of pathways including food and water ingestion, early and latent health effects, and economic costs. Input for the Level 3 analysis includes the reactor core radionuclide inventory, source terms from the Individual Plant Examination (IPE) [as applied to the probabilistic safety assessment (PSA) model], site meteorological data, projected population distribution (within a 50-mile radius) for the year 2025, emergency response evacuation modeling, and economic data. These inputs are described in the following section.

E.2.2 INPUT DATA

The input data required by MACCS2 are outlined below.

E.2.2.1 CORE INVENTORY

The MACCS2 code provides a default pressurized-water reactor (PWR) core inventory for a 3,412 megawatt (thermal) [MW(t)] output. The St. Lucie Units 1 & 2 licenses limit thermal power to 2,700 MW(t). Therefore, FPL used a power scaling factor of 0.791 (2,700/3,412) to adjust the default core inventory for the actual St. Lucie Units 1 & 2 power levels.

E.2.2.2 SOURCE TERMS

Table E.2-1 provides the source term release fractions for the MACCS2 element groups for 48 different release modes defined for St. Lucie Units 1 & 2. Forty-five release modes were identified in Table 4.0-7, "Fission Product Releases Associated with St. Lucie Release Modes," of the St. Lucie Units 1 & 2 IPE submittal document (Ref. E.2-4). Three additional containment bypass release modes have been added to complete the release set. These are two steam generator tube rupture (SGTR) cases and one interfacing system loss-of-coolant accident (ISLOCA) case based on Tables F-28, F-29, and F-30 of the St. Lucie Units 1 & 2 IPE submittal for scenarios SGTR01, SGTR02, and VSEQC0, respectively. These three represent the late SGTR, early SGTR, and ISLOCA release modes, respectively. For all modes the ruthenium (Ru), lanthanum (La), cerium (Ce), and barium (Ba) fractions are set to zero as no values are given in Table 4.7-4 of the St. Lucie Units 1 & 2 IPE submittal. Also, for consistency with the other releases, the quoted bypass releases for La have been omitted. The release modes listed in Table E.2-1 are further designated by the characterization of the time of release and size of containment failure. Late leaks and ruptures are both considered here as "Late," whereas the early ones are divided into "Leak" and "Rupture" subclasses. The early failures are expected to have consequences

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**TABLE E.2-1
RELEASE FRACTION BY NUCLIDE GROUP**

Release Mode ^a	Xenon/ Krypton	Iodine	Cesium	Tellurium	Strontium
A1	8.00E-01	2.98E-05	3.10E-05	6.70E-06	0.00E+00
A2	8.00E-01	9.04E-02	9.41E-02	2.03E-02	0.00E+00
B1	8.00E-01	5.07E-02	4.11E-04	6.70E-06	0.00E+00
B2-L	8.00E-01	1.47E-01	9.78E-02	2.03E-02	0.00E+00
B2-R	8.00E-01	1.40E-01	9.78E-02	5.08E-02	0.00E+00
B3-L	8.00E-01	5.07E-02	4.11E-04	6.70E-06	0.00E+00
B3-R	8.00E-01	5.07E-02	4.11E-04	1.68E-05	0.00E+00
B4-L	8.00E-01	1.47E-01	9.78E-02	2.03E-02	0.00E+00
B4-R	8.00E-01	1.47E-01	9.78E-02	5.08E-02	0.00E+00
B5-L	8.00E-01	5.37E-02	5.47E-03	3.39E-06	1.78E-09
B5-R	8.00E-01	5.37E-02	5.47E-03	8.47E-06	8.89E-09
B6-L	8.00E-01	1.38E-01	8.24E-02	1.03E-02	5.39E-06
B6-R	8.00E-01	1.38E-01	2.78E-02	2.57E-02	2.69E-05
C1-L	8.00E-01	5.07E-02	4.13E-04	3.23E-04	2.64E-05
C1-R	8.00E-01	5.07E-02	4.13E-04	8.07E-04	1.32E-04
C2-L	8.00E-01	1.47E-01	9.80E-02	3.83E-02	6.60E-04
C2-R	8.00E-01	1.47E-01	9.80E-02	9.57E-02	3.30E-03
C3-L	8.00E-01	5.07E-02	4.13E-04	3.23E-04	2.64E-05
C3-R	8.00E-01	5.07E-02	4.13E-04	8.07E-04	1.32E-04
C4-L	8.00E-01	1.47E-01	9.80E-02	3.83E-02	6.60E-04
C4-R	8.00E-01	1.47E-01	9.80E-02	9.57E-02	3.30E-03
C5-L	8.00E-01	5.37E-02	5.48E-03	3.19E-04	2.64E-05
C5-R	8.00E-01	5.37E-02	5.48E-03	7.98E-04	1.32E-04
C6-L	8.00E-01	1.38E-01	8.25E-02	2.82E-02	6.65E-04
C6-R	8.00E-01	1.38E-01	8.25E-02	7.05E-02	3.33E-03
D1-L	1.00E+00	7.48E-02	2.55E-02	5.42E-03	0.00E+00
D1-R	1.00E+00	7.48E-02	2.55E-02	1.35E-02	0.00E+00
D2-L	1.00E+00	3.11E-01	2.62E-01	5.42E-02	0.00E+00
D2-R	1.00E+00	3.11E-01	2.62E-01	1.35E-01	0.00E+00
D3-L	1.00E+00	1.89E-01	7.94E-02	1.11E-01	1.85E-02
D3-R	1.00E+00	1.89E-01	7.94E-02	2.77E-01	9.25E-02
D4-L	1.00E+00	5.71E-01	3.90E-01	1.66E-01	1.85E-02
D4-R	1.00E+00	5.71E-01	3.90E-01	4.16E-01	9.26E-02

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TABLE E.2-1 (continued)
RELEASE FRACTION BY NUCLIDE GROUP

Release Mode ^a	Xenon/ Krypton	Iodine	Cesium	Tellurium	Strontium
E1-L	1.00E+00	7.48E-02	2.55E-02	7.53E-03	2.31E-04
E1-R	1.00E+00	7.48E-02	2.55E-02	1.88E-02	1.16E-03
E2-L	1.00E+00	3.12E-01	2.64E-01	1.18E-01	7.00E-03
E2-R	1.00E+00	3.12E-01	2.64E-01	2.95E-01	3.50E-02
E3-L	1.00E+00	7.48E-02	2.55E-02	7.53E-03	2.31E-04
E3-R	1.00E+00	7.48E-02	2.55E-02	1.88E-02	1.16E-03
E4-L	1.00E+00	3.12E-01	2.64E-01	1.18E-01	7.00E-03
E4-R	1.00E+00	3.12E-01	2.64E-01	2.95E-01	3.50E-02
E5-L	1.00E+00	1.89E-01	7.94E-02	1.12E-01	1.86E-02
E5-R	1.00E+00	1.89E-01	7.94E-02	2.79E-01	9.30E-02
E6-L	1.00E+00	5.72E-01	3.90E-01	1.94E-01	2.17E-02
E6-R	1.00E+00	5.72E-01	3.90E-01	4.85E-01	1.08E-01
SGTR1	7.64E-01	2.03E-02	2.03E-02	0	1.08E-05
SGTR2	9.19E-01	5.56E-02	5.56E-02	0	2.53E-05
V	9.96E-01	8.69E-01	8.69E-01	3.79E-01	2.06E-02

NOTES:

^a Release Mode notations:

A, B, C designate late releases.

D, E designate early releases.

-L designates a containment leak.

-R designates a containment rupture.

SGTR1 designates the late SGTR bypass release mode.

SGTR2 designates the early SGTR bypass release mode.

V designates the ISLOCA (Event V) bypass release mode.

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significantly dependent on the time of release, with much less dependency on the duration of the release once started. For example, the Release Modes D1-L and D1-R are assigned the same timing data set, while maintaining their separate identities with regard to release fractions.

Other terms associated with the release are provided in Table E.2-2. They are assigned to each source term according to the "type." Each release plume is assumed to have only one segment. The early rupture and bypass releases are essentially puff releases, and the early leak and late failures are more continuous. The energy of releases is assigned by analogy with similar releases in the NUREG-1150 submittal for Surry Unit 1 (Ref. E.2-5).

E.2.2.3 METEOROLOGICAL DATA

St. Lucie Units 1 & 2 hourly meteorological data for calendar years 1998 and 1999 were placed in MACCS2 format. Where data blocks were missing in the source files, supplementary information was derived from meteorological data obtained from the National Climatic Data Center of the National Oceanographic and Atmospheric Administration (NOAA) for Vero Beach Airport, latitude 27° 37', longitude -80° 25'. In these cases, atmospheric stability classes were estimated based on the hour, the elevation of the sun, the wind speed, and the reported cloud cover.

E.2.2.4 POPULATION DISTRIBUTION

St. Lucie Units 1 & 2 is a coastal plant (barrier island) with an eastern boundary of the Atlantic Ocean and a western boundary of the Indian River Lagoon. The nearest population centers (greater than 25,000) are Fort Pierce (5-10 miles) and Port St. Lucie (3-13 miles). The projected year 2025 permanent population distribution is approximately 500 people within 2 miles of the plant, 30,000 within 5 miles, and 218,000 people between 5 and 10 miles from the plant.

The computer program SECPOP90 (Ref. E.2-6) was used to process block-level 1990 census data to prepare population estimates for the region surrounding the plant. County-specific years 1990 and 2015 population projections (Ref. E.2-7) were extrapolated to year 2025 using the ratio of the Bureau of the Census 2025 and 2015 Florida population projections (Ref. E.2-8) to form a county-specific set of population multiplier factors for the period 1990 to 2025. Year 2025 population projections were used for the MACCS2 analyses as these are the endmost data produced by the Bureau of the Census and because 2025 is about the midterm year of the proposed license extension period.

E.2.2.5 EVACUATION DATA

The model prepared for the St. Lucie Emergency Plan has been described by plant staff as very complex and extraction of MACCS2-type data from the Plan would be difficult. The emergency evacuation model has been modeled as a single evacuation zone extending out 10 miles from the plant. The evacuation speed and evacuation start time delay with no sheltering, 1.8 meters per second (m/s) and 7,200 seconds (s), respectively, are judgmentally chosen by examination of Surry Power Station emergency plan results. The Surry site is on a river with the bulk of the population located on the other side of the river

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**TABLE E.2-2
OTHER RELEASE MODE TERMS**

MACCS2 Variable	EARLY RUPTURE	EARLY LEAK	BYPASS-V	BYPASS- SGTR2 EARLY	BYPASS- SGTR1 LATE	LATE
(Data Source ¹)	NUREG-1150	NUREG-1150	Table F-11 & NUREG-1150	Table F-29 & NUREG-1150	Table F-28 & NUREG-1150	NUREG-1150
OALARM (s)	11,088	11,088	31,100	7,200	36,000	17,640
NUMREL	1	1	1	1	1	1
MAXRIS	1	1	1	1	1	1
REFTIM (s)	0	0.5	0.	0.5	0.	0.5
PLHEAT (w)	2.1E+6	1.8E+6	1.0E+6	1.5E+6	1.0E+6	9.2E+5
PLHITE (m)	30	30	0	30	30	30
PLDUR (s)	1,600	86,400	3,600	7,200	7,200	54,000
PDELAY (s)	17,640	17,640	34,700	9,500	40,000	86,400

NOTES:

¹ Values are from Tables 4.6-8A and 4.6-25, as appropriate, from NUREG-1150 (Ref. E.2-5).

The Bypass values are judgmentally extracted from the Modular Accident Analysis Program run data reported in the IPE submittal (Ref. E.2-4).

mostly in one quadrant and mostly beyond 5 miles. Other data such as sheltering factors are Surry values as recommended by the NRC (Ref. E.2-9). Complete evacuation is assumed as a base case.

Evacuation-related economic costs are the recommended values as given for the NUREG-1150 study (Ref. E.2-6). These data were updated using a recent Consumers Price Index (CPI) of 174.0 (M10/2000) from the Bureau of Labor (Ref. E.2-10). The referenced study uses a 1986 CPI of 113, referred to 100 in 1982. Therefore, the referenced study unit costs have been multiplied by a factor of 1.54 (174/113). The average non-farm property value and the average value of farm wealth were calculated as the population-weighted average for the largest counties within 50 miles of the plant.

E.2.2.6 LAND FRACTIONS

SECPOP90 calculates the land fraction for each rosette section, as explained in the manual for the code (Ref. E.2-6). The code contains a county-level database with the land fractions for each county obtained from the 1990 census data files. The calculated values are used directly in these analyses. Due to the way in which SECPOP90 allocates population from the census blocks, certain of the radial blocks near the plant are shown as all water. These segments have zero population so that the effect on the results is not significant.

E.2.2.7 WATERSHED INDEX

The sections were assigned to one of three watersheds. Each section that is over the ocean was assigned to a watershed that has zero contribution to the food chain in terms of uptake of deposited radionuclides. Those over Lake Okeechobee were assigned to a lake watershed, and the remainder to a river watershed.

E.2.2.8 CROP SEASON AND SHARE

Agricultural data including crop seasons were taken from data available in the 1997 Census of Agriculture (Ref. E.2-11) and were used to produce the land fraction used for each crop. It was not possible to enter values for some crops that are planted in the fall and harvested in the spring. The major crops are sugar cane for sugar, vegetables, and orchard fruits.

E.2.2.9 REGIONAL ECONOMIC DATA

The SECPOP90 code database includes county economic factors derived from the 1990 census and various other government sources dated 1992 to 1994. For the preparation of data for this St. Lucie Units 1 & 2 model the county data file was updated to circa 1999 for the nine Florida counties within 50 miles of the plant. By this means the site files prepared for St. Lucie contained updated values for each economic region and, hence, for each sector.

Agricultural data were taken from data available in the 1997 Census of Agriculture (Ref. E.2-11). The value of the non-farm assets (VNFRM) was calculated using the method and data given in Appendix D of the SECPOP90 manual and data from Ref. E.2-12 through Ref. E.2-15.

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Economic consequences were estimated by summing the following costs:

1. Costs of evacuation,
2. Costs for temporary relocation (food, lodging, lost income),
3. Costs of decontaminating land and buildings,
4. Lost return-on-investments from properties that are temporarily interdicted to allow contamination to be decreased by decay of nuclides,
5. Costs of repairing temporarily interdicted property,
6. Value of crops destroyed or not grown because they were contaminated by direct deposition or would be contaminated by root uptake, and
7. Value of farmland and of individual, public, and non-farm commercial property that is condemned.

Costs associated with damage to the reactor, the purchase of replacement power, medical care, life shortening, and litigation are not calculated by MACCS2.

E.2.3 RESULTS

Based on the preceding input data, MACCS2 was used to estimate the following:

- The downwind transport, dispersion, and deposition of the radioactive materials released to the atmosphere from the failed reactor containment.
- The short- and long-term radiation doses received by exposed populations via direct (cloudshine, plume inhalation, groundshine, and resuspension inhalation) and indirect (ingestion) pathways.
- The mitigation of those doses by protective actions (evacuation, sheltering, and post-accident relocation of people; disposal of milk, meat, and crops; and decontamination, temporary interdiction, or condemnation of land and buildings).
- The early fatalities and injuries expected to occur within 1 year of the accident (early health effects) and the delayed (latent) cancer fatalities and injuries expected to occur over the lifetimes of the exposed individuals.
- The offsite costs of short-term emergency response actions (evacuation, sheltering, and relocation), of crop and milk disposal, and of the decontamination, temporary interdiction, or condemnation of land and buildings.

The result of the Level 3 model is a matrix of offsite exposure and offsite property costs associated with a postulated severe accident in each containment event-tree endstate. This matrix is combined with the results of the Level 2 model to yield the probabilistic offsite dose and probabilistic offsite property losses resulting from the analyzed plant configuration. The base case offsite exposure for Unit 1 is 15.31 person-rem/year and 13.97 person-rem/year for Unit 2. Table E.2-3 provides the baseline exposure risk associated with each containment event-tree endstate. The offsite exposure risk for each endstate is calculated by multiplying the frequency of the release by the dose [Sieverts (Sv)] and then converting that value to person-rem by multiplying it by a factor of 100.

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**TABLE E.2-3
OFFSITE EXPOSURE RISK ASSOCIATED
WITH EACH CONTAINMENT ENDSTATE**

CET ES	Frequency Unit 1 Base Case	Sieverts Unit 1	person-rem Unit 1	Frequency Unit 2 Base Case	Sieverts Unit 2	person-rem Unit 2
A1	5.80E-07	8.28E+01	4.80E-03	4.48E-07	8.28E+01	3.71E-03
A2	2.08E-07	1.60E+04	3.33E-01	1.40E-07	1.60E+04	2.25E-01
B1	2.84E-06	1.49E+03	4.23E-01	2.15E-06	1.49E+03	3.20E-01
B2-L	5.71E-07	1.63E+04	9.31E-01	4.32E-07	1.63E+04	7.05E-01
B2-R	1.43E-09	1.66E+04	2.38E-03	1.08E-09	1.66E+04	1.80E-03
B3-L	1.94E-06	1.49E+03	2.89E-01	1.47E-06	1.49E+03	2.19E-01
B3-R	4.85E-09	1.49E+03	7.23E-04	3.68E-09	1.49E+03	5.49E-04
B4-L	3.89E-07	1.63E+04	6.34E-01	2.95E-07	1.63E+04	4.82E-01
B4-R	9.75E-10	1.66E+04	1.62E-03	7.40E-10	1.66E+04	1.23E-03
B5-L	5.98E-10	4.57E+03	2.73E-04	5.32E-10	4.57E+03	2.43E-04
B5-R	1.50E-12	4.57E+03	6.85E-07	1.33E-12	4.57E+03	6.09E-07
B6-L	1.21E-10	1.59E+04	1.92E-04	1.07E-10	1.59E+04	1.70E-04
B6-R	3.02E-13	1.11E+04	3.35E-07	2.68E-13	1.11E+04	2.98E-07
BYP-SGTR1	3.21E-07	4.85E+04	1.56E+00	3.73E-09	4.85E+04	1.81E-02
BYP-SGTR2	8.73E-07	5.83E+03	5.09E-01	2.53E-07	5.83E+03	1.47E-01
BYP-ISLOCA	2.90E-06	1.36E+04	3.94E+00	5.62E-06	1.36E+04	7.64E+00
C1-L	2.22E-06	1.50E+03	3.33E-01	1.71E-06	1.50E+03	2.56E-01
C1-R	5.55E-09	1.53E+03	8.50E-04	4.27E-09	1.53E+03	6.54E-04
C2-L	1.73E-06	1.65E+04	2.85E+00	1.06E-06	1.65E+04	1.75E+00
C2-R	4.33E-09	1.72E+04	7.45E-03	2.66E-09	1.72E+04	4.57E-03
C3-L	2.43E-06	1.50E+03	3.65E-01	1.86E-06	1.50E+03	2.79E-01
C3-R	6.10E-09	1.53E+03	9.33E-04	4.66E-09	1.53E+03	7.13E-04
C4-L	1.87E-06	1.65E+04	3.08E+00	1.14E-06	1.65E+04	1.88E+00
C4-R	4.67E-09	1.72E+04	8.03E-03	2.86E-09	1.72E+04	4.91E-03
C5-L	6.53E-10	4.59E+03	3.00E-04	5.73E-10	4.59E+03	2.63E-04
C5-R	1.64E-12	4.60E+03	7.53E-07	1.44E-12	4.60E+03	6.61E-07
C6-L	3.54E-10	1.61E+04	5.70E-04	2.38E-10	1.61E+04	3.84E-04
C6-R	8.87E-13	1.66E+04	1.47E-06	5.97E-13	1.66E+04	9.92E-07
D1-L	0.00E+00	1.05E+04	0.00E+00	0.00E+00	1.05E+04	0.00E+00
D1-R	1.09E-09	1.33E+04	1.45E-03	8.25E-10	1.33E+04	1.10E-03
D2-L	0.00E+00	2.25E+04	0.00E+00	0.00E+00	2.25E+04	0.00E+00
D2-R	4.00E-10	4.21E+04	1.68E-03	3.03E-10	4.21E+04	1.27E-03
D3-L	0.00E+00	1.84E+04	0.00E+00	0.00E+00	1.84E+04	0.00E+00
D3-R	8.52E-13	3.89E+04	3.31E-06	6.99E-13	3.89E+04	2.72E-06

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TABLE E.2-3 (continued)
OFFSITE EXPOSURE RISK ASSOCIATED
WITH EACH CONTAINMENT ENDSTATE

CET ES	Frequency Unit 1 Base Case	Sieverts Unit 1	person-rem Unit 1	Frequency Unit 2 Base Case	Sieverts Unit 2	person-rem Unit 2
D4-L	0.00E+00	2.88E+04	0.00E+00	0.00E+00	2.88E+04	0.00E+00
D4-R	3.13E-13	7.73E+04	2.42E-06	2.57E-13	7.73E+04	1.98E-06
E1-L	0.00E+00	1.05E+04	0.00E+00	0.00E+00	1.05E+04	0.00E+00
E1-R	8.83E-09	1.36E+04	1.20E-02	6.48E-09	1.36E+04	8.82E-03
E2-L	0.00E+00	2.33E+04	0.00E+00	0.00E+00	2.33E+04	0.00E+00
E2-R	1.19E-09	4.93E+04	5.86E-03	6.65E-10	4.93E+04	3.28E-03
E3-L	0.00E+00	1.05E+04	0.00E+00	0.00E+00	1.05E+04	0.00E+00
E3-R	7.15E-09	1.36E+04	9.72E-03	5.28E-09	1.36E+04	7.17E-03
E4-L	0.00E+00	2.33E+04	0.00E+00	0.00E+00	2.33E+04	0.00E+00
E4-R	8.26E-10	4.93E+04	4.07E-03	4.62E-10	4.93E+04	2.28E-03
E5-L	0.00E+00	1.84E+04	0.00E+00	0.00E+00	1.84E+04	0.00E+00
E5-R	6.65E-12	3.90E+04	2.60E-05	5.25E-12	3.90E+04	2.05E-05
E6-L	0.00E+00	2.90E+04	0.00E+00	0.00E+00	2.90E+04	0.00E+00
E6-R	5.24E-13	8.04E+04	4.21E-06	2.80E-13	8.04E+04	2.25E-06
NCF	2.21E-06			1.53E-06		
NCFA	8.79E-06			6.31E-06		
NCFB	3.43E-09			1.77E-09		
NEG	0.00E+00			0.00E+00		
Total	2.99E-05		15.31	2.45E-05		13.97

The base case offsite property risk is \$42,542 per year for Unit 1 and \$38,571 per year for Unit 2. Table E.2-4 provides the base case offsite property risk values associated with each containment event-tree endstate. The property risk for each endstate is calculated by multiplying the frequency by the offsite dollar factor.

The final result of a Level 3 evaluation of a severe accident mitigation alternative (SAMA) is a value of the cumulative dose expected to be received by offsite individuals and a value of the expected offsite property losses due to severe accidents given the plant configuration under evaluation.

E.2.4 SENSITIVITY ANALYSIS

Florida Power & Light Company (FPL) evaluated the sensitivity associated with five of the MACCS2 inputs. These include weather, percentage evacuation, evacuation speed, population, and source terms.

E.2.4.1 SENSITIVITY CASES

E.2.4.1.1 WEATHER

Two years of meteorological data were considered to determine whether the offsite risks are dependent on the yearly weather variations. Data for year 1999 were considered in the base case and were compared to year 1998 data. Both of these cases assumed 100 percent evacuation.

E.2.4.1.2 NON-EVACUATION

For this case, the percentage of evacuation was reduced to 95 percent evacuation of the population within a 10-mile radius of the plant versus the base case, which assumed 100 percent of the population within a 10-mile radius of the plant evacuates.

E.2.4.1.3 REDUCED EVACUATION SPEED

The evacuation speed was reduced to 0.3 m/s compared to the base case 0.45 m/s value.

E.2.4.1.4 POPULATION PROJECTION INCREASED BY 2.5 PERCENT

For this case, the population projections were uniformly increased by 2.5 percent. This factor is similar to the increased year 2000 population found in Census 2000, compared to the previous estimate for year 2000. This latter number was used in projecting the year 2025 data in the base MACCS2 St. Lucie Units 1 & 2 model.

E.2.4.1.5 POPULATION PROJECTION INCREASED BY 10 PERCENT

For this case, the population projections were uniformly increased by 10 percent to serve as a bounding projection for year 2025.

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TABLE E.2-4
OFFSITE PROPERTY RISK ASSOCIATED
WITH EACH CONTAINMENT ENDSTATE

CET ES	Frequency Unit 1 Base Case	Conversion Factor (\$)	Unit 1 Economic Risk (\$)	Frequency Unit 2 Base Case	Conversion Factor (\$)	Unit 2 Economic Risk (\$)
A1	5.80E-07	1.82E+07	11	4.48E-07	1.82E+07	8
A2	2.08E-07	5.34E+09	1,112	1.40E-07	5.34E+09	750
B1	2.84E-06	2.37E+08	672	2.15E-06	2.37E+08	510
B2-L	5.71E-07	5.46E+09	3,117	4.32E-07	5.46E+09	2,360
B2-R	1.43E-09	5.47E+09	8	1.08E-09	5.47E+09	6
B3-L	1.94E-06	2.37E+08	460	1.47E-06	2.37E+08	349
B3-R	4.85E-09	2.37E+08	1	3.68E-09	2.37E+08	1
B4-L	3.89E-07	5.46E+09	2,124	2.95E-07	5.46E+09	1,613
B4-R	9.75E-10	5.47E+09	5	7.40E-10	5.47E+09	4
B5-L	5.98E-10	8.09E+08	0	5.32E-10	8.09E+08	0
B5-R	1.50E-12	8.09E+08	0	1.33E-12	8.09E+08	0
B6-L	1.21E-10	4.85E+09	1	1.07E-10	4.85E+09	1
B6-R	3.02E-13	2.33E+09	0	2.68E-13	2.33E+09	0
BYP-SGTR1	3.21E-07	8.88E+08	2,846	3.73E-09	8.88E+08	33
BYP-SGTR2	8.73E-07	1.33E+09	1,161	2.53E-07	1.33E+09	336
BYP-ISLOCA	2.90E-06	3.49E+09	10,121	5.62E-06	3.49E+09	19,614
C1-L	2.22E-06	2.39E+08	530	1.71E-06	2.39E+08	408
C1-R	5.55E-09	2.41E+08	1	4.27E-09	2.41E+08	1
C2-L	1.73E-06	5.48E+09	9,473	1.06E-06	5.48E+09	5,817
C2-R	4.33E-09	5.49E+09	24	2.66E-09	5.49E+09	15
C3-L	2.43E-06	2.39E+08	581	1.86E-06	2.39E+08	444
C3-R	6.10E-09	2.41E+08	1	4.66E-09	2.41E+08	1
C4-L	1.87E-06	5.48E+09	10,221	1.14E-06	5.48E+09	6,253
C4-R	4.67E-09	5.49E+09	26	2.86E-09	5.49E+09	16
C5-L	6.53E-10	8.10E+08	1	5.73E-10	8.10E+08	0
C5-R	1.64E-12	8.10E+08	0	1.44E-12	8.10E+08	0
C6-L	3.54E-10	4.86E+09	2	2.38E-10	4.86E+09	1
C6-R	8.87E-13	4.90E+09	0	5.97E-13	4.90E+09	0
D1-L	0.00E+00	1.87E+09	0	0.00E+00	1.87E+09	0
D1-R	1.09E-09	1.64E+09	2	8.25E-10	1.64E+09	1
D2-L	0.00E+00	8.40E+09	0	0.00E+00	8.40E+09	0
D2-R	4.00E-10	5.77E+09	2	3.03E-10	5.77E+09	2
D3-L	0.00E+00	4.58E+09	0	0.00E+00	4.58E+09	0
D3-R	8.52E-13	3.80E+09	0	6.99E-13	3.80E+09	0

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TABLE E.2-4 (continued)
OFFSITE PROPERTY RISK ASSOCIATED
WITH EACH CONTAINMENT ENDSTATE

CET ES	Frequency Unit 1 Base Case	Conversion Factor (\$)	Unit 1 Economic Risk (\$)	Frequency Unit 2 Base Case	Conversion Factor (\$)	Unit 2 Economic Risk (\$)
D4-L	0.00E+00	9.67E+09	0	0.00E+00	9.67E+09	0
D4-R	3.13E-13	6.60E+09	0	2.57E-13	6.60E+09	0
E1-L	0.00E+00	1.87E+09	0	0.00E+00	1.87E+09	0
E1-R	8.83E-09	1.64E+09	14	6.48E-09	1.64E+09	11
E2-L	0.00E+00	8.43E+09	0	0.00E+00	8.43E+09	0
E2-R	1.19E-09	5.79E+09	7	6.65E-10	5.79E+09	4
E3-L	0.00E+00	1.87E+09	0	0.00E+00	1.87E+09	0
E3-R	7.15E-09	1.64E+09	12	5.28E-09	1.64E+09	9
E4-L	0.00E+00	8.43E+09	0	0.00E+00	8.43E+09	0
E4-R	8.26E-10	5.79E+09	5	4.62E-10	5.79E+09	3
E5-L	0.00E+00	4.58E+09	0	0.00E+00	4.58E+09	0
E5-R	6.65E-12	3.80E+09	0	5.25E-12	3.80E+09	0
E6-L	0.00E+00	9.68E+09	0	0.00E+00	9.68E+09	0
E6-R	5.24E-13	6.61E+09	0	2.80E-13	6.61E+09	0
NCF	2.21E-06			1.53E-06		
NCFA	8.79E-06			6.31E-06		
NCFB	3.43E-09			1.77E-09		
NEG	0.00E+00			0.00E+00		
Total	2.99E-05		42,542	2.45E-05		38,571

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E.2.4.1.6 AUGMENTED SOURCE TERMS

The St. Lucie Units 1 & 2 IPE Level 2 release fractions were used for the base case reported in Ref. E.2-4. These release fractions were assigned to the xenon/krypton, iodine, cesium, tellurium, and strontium MACCS2 release groups for each release mode in the base case. Other release groups were set to zero.

For this case, estimates for the ruthenium, lanthanum, cerium, and barium MACCS2 release groups were prepared and added to the release fractions RELFR in ATMOS.

NUREG-1465 (Ref. E.2-16) presents postulated representative severe accident fission product source terms released into the Containment. The summed (gap, in-vessel, and ex-vessel) releases for PWRs are:

Fission Product	Postulated Source Term
Barium (Ba)	(same as Strontium)
Noble metals (Ru)	0.005
Cerium group (Ce)	0.0055
Lanthanides (La)	0.0052

The barium release group was set equal to the St. Lucie-reported strontium release fraction for each of the 48 different release modes.

For the early release and bypass release modes (Dxx, Exx, V, and SGTRn) the Ru, Ce, and La release fractions were set equal to the NUREG-1465 values above. This assumes no containment release mitigation.

For the late release modes (Axx, Bxx, and Cxx) the Ru, Ce, and La release fractions were set equal to one tenth of the NUREG-1465 in-containment release values. This represents an estimate of a factor of 10 in the late containment release mitigation.

E.2.4.2 SENSITIVITY RESULTS

Table E.2-5 shows the results of the weather and non-evacuation cases described in Section E.2.4.1. The offsite risks are not significantly dependent on the yearly weather variations, as judged from the 1998 and 1999 weather data. Also, making the assumption that 5 percent of the population was not evacuated did not result in a significant difference when compared with the similar weather case with 100 percent evacuation.

**TABLE E.2-5
WEATHER AND NON-EVACUATION SENSITIVITY RESULTS**

Risk	1998 Weather	1999 Weather	5% Non-evac, 1999 Weather
Dose, Sv /yr	0.315	0.343	0.347
Economic costs, \$/yr	108,880	110,990	110,390

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The sensitivity results for the remaining cases are shown in Table E.2-6 in terms of total average annual risk for the base case and three sensitivity cases. The base case is the "99 Weather" case.

**TABLE E.2-6
EVACUATION SPEED, POPULATION, AND FISSION PRODUCT
SENSITIVITY ANALYSIS RESULTS**

RISK	Base Case	0.03 m/s evac spd	+2.5 % pop	+10% pop	+FissProd
Dose, Sv/yr	0.343	0.351	0.355	0.380	0.397
Economic costs, \$/yr	110,990	110,990	113,430	121,230	125,680

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E.2.5 REFERENCES

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- E.2-2 Oak Ridge National Laboratory. RSICC Computer Code Collection MACCS2 V.1.12. CCC-652 Code Package. Oak Ridge, Tennessee. 1997.
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- E.2-8 Paul Campbell, "Population Projections: States, 1995-2025." P25-1131. Bureau of the Census, U. S. Department of Commerce. May 1997.
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- E.2-11 U.S. Department of Agriculture, "1997 Census of Agriculture." AC97-A-51. National Agricultural Statistics Service/Florida Agricultural Statistics Service. Washington, D.C. March 1999.

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- E.2-12 U.S. Department of Commerce. *Statistical Abstract of the United States 1999*. CD-COMP-ABSTR99. March 2000.
- a) Table No. 774, "Net Stock of Fixed Reproducible Tangible Wealth: 1980 to 1997."
 - b) Table No.1114, "Farm Assets, Debt, and Income, by State:1996 and 1997."
 - c) Table No.1103, "Farms —Number, Acreage, and Value, by Type of Organization."
 - d) Table No. 395, "Land Cover/Use, by State."
 - e) Table No. 1224, "Net Stock of Residential Capital:1985 to 1997."
 - f) Table No. 2, "Population:1960 to 1998."
- E.2-13 U.S. Department of Commerce. "Fixed Assets and Consumer Durable Goods for 1925–99," *Survey of Current Business*. p.19. Table 1, "Current-Cost Net Stock of Fixed Assets and Consumer Durable Goods, 1925–99." Bureau of Economic Analysis. Washington, D.C. September 2000.
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E. 3 IDENTIFICATION AND SCREENING OF CANDIDATE SAMAs

This section describes the generation of the initial list of potential severe accident mitigation alternatives (SAMAs) for St. Lucie Units 1 & 2, the screening methods, and the screening results.

E.3.1 SAMA LIST COMPILATION

Florida Power & Light Company (FPL) has generated a list of candidate SAMAs by reviewing industry documents and considering plant-specific enhancements not addressed in published industry documents. Industry documents FPL reviewed include the following:

- St. Lucie Units 1 & 2 Individual Plant Examination (IPE) submittal (Ref. E.3-1)
- The Watts Bar Nuclear Plant Unit 1 IPE submittal (Ref. E.3-2)
- The Limerick Severe Accident Mitigation Design Alternatives (SAMDA) cost estimate report (Ref. E.3-3)
- NUREG-1437 description of Limerick SAMDAs (Ref. E.3-4)
- NUREG-1437 description of Comanche Peak SAMDAs (Ref. E.3-5)
- Watts Bar SAMDA submittal (Ref. E.3-6)
- Tennessee Valley Authority (TVA) response to the U.S. Nuclear Regulatory Commission's (NRC's) request for additional information (RAI) on the Watts Bar SAMDA submittal (Ref. E.3-7)
- Westinghouse AP600 SAMDA (Ref. E.3-8)
- Safety Assessment Consulting presentation by Wolfgang Werner at the NUREG-1560 conference (Ref. E.3-9)
- NRC IPE Workshop – NUREG-1560 NRC Presentation (Ref. E.3-10)
- NUREG-0498, Supplement 1, Section 7 (Ref. E.3-11)
- NUREG/CR-5567, [Pressurized-water reactor] *PWR Dry Containment Issue Characterization* (Ref. E.3-12)
- NUREG-1560, Volume 2, NRC Perspectives on the IPE Program (Ref. E.3-13)
- NUREG/CR-5630, *PWR Dry Containment Parametric Studies* (Ref. E.3-14)
- NUREG/CR-5575, *Quantitative Analysis of Potential Performance Improvements for the Dry PWR Containment* (Ref. E.3-15)
- Combustion Engineering, Inc. (CE), System 80+ Submittal (Ref. E.3-16)
- NUREG-1462, NRC Review of ABB CE System 80+ Submittal (Ref. E.3-17)
- An International Conference on Nuclear Engineering paper by C. W. Forsberg, et al., on a core-melt source reduction system (Ref. E.3-18)
- The Oconee SAMA analysis (Ref. E.3-19)
- The Turkey Point Units 3 & 4 SAMA analysis (Ref. E.3-20)
- The Calvert Cliffs Nuclear Power Plant Units 1 & 2 SAMA analysis (Ref. E.3-21)

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In addition, the top 100 cutsets of the Level 1 probabilistic safety assessment (PSA) update were examined to identify the important contributors to plant risk (both plant equipment and operator actions) and to ensure that the important contributors were addressed by one or more SAMA.

Although the Units are a CE design, each of the above documents has been reviewed for potential SAMAs even if it is not necessarily applicable to a CE plant. Those items found not applicable were subsequently screened from this list. The containment performance improvement programs for boiling water reactors and ice condenser plants were not reviewed (and the NUREG-1560 portion of the containment performance improvements for these improvement programs was not reviewed). FPL assumes that any issues from these documents have been included in the large, dry containment performance improvement program (NUREG/CR-5567). Conceptual enhancements for which no specific details are available (e.g., "improve diesel reliability" or "improve procedures for loss of support systems") were not included unless they were considered to be vulnerabilities in the plant's IPE.

FPL was able to eliminate most of the SAMAs identified in the Oconee SAMA analysis because they were already identified from the review of the industry documents listed above, the intent had already been met, or they are covered by the St. Lucie Units 1 & 2 Severe Accident Management Guidelines program. However, four items were added to the SAMA list as a result of this review.

E.3.2 QUALITATIVE SCREENING OF SAMAS

The initial list of potential SAMAs is presented in Table E.3-1. Table E.3-1 also presents a qualitative screening of the initial list. Items have been eliminated from further evaluation based on one of the following criteria:

- The SAMA is not applicable at St. Lucie Units 1 & 2, either because the enhancement is only for boiling water reactors or the Westinghouse AP600 design or PWR ice condenser containments, or because it is a plant-specific enhancement that does not apply (Screening Criterion "A"); or
- The SAMA is already implemented at St. Lucie Units 1 & 2 or the plant design meets the intent of the SAMA, as determined by plant staff review of each SAMA (Screening Criterion "B").

Based on preliminary screening, 29 improvements were eliminated as not applicable to St. Lucie Units 1 & 2 and 90 were already implemented or the intent was already met. This left 50 improvements subject to the final screening and evaluation process. The final screening and cost-benefit evaluation are presented in Section 4.15.

TABLE E.3-1
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
Improvements Related to RCP Seal LOCAs (loss of CCW or SW)					
1	Cap downstream piping of normally closed CCW drain and vent valves.	Reduces the frequency of loss of CCW initiating event, a large portion of which was derived from catastrophic failure of one of the many single isolation valves.	(13)	B	Vents and drains are ¾ inch or 1 inch, giving time to locate leaks should they occur. P&IDs indicate many are capped. Many inaccessible ones (e.g., containment fan coolers) are locked closed. Larger connections indicate blind flanges.
2	Enhance loss of CCW (or loss of SW) procedure to facilitate stopping RCPs.	Reduces potential for RCP seal damage due to pump bearing failure.	(2), (10), (13)	B	Site procedure [1(2)-EOP-02] is specific about stopping RCPs on loss of CCW, which is the only cooling at St. Lucie Units 1 & 2. This is emphasized in training.
3	Enhance loss of CCW procedure to present desirability of cooling down RCS prior to seal LOCA.	Potential reduction in the probability of RCP seal failure.	(2)	B	Site procedure [1(2)-EOP-02] is specific about stopping RCPs (and isolating controlled bleedoff) on loss of CCW. If done within the one hour allowable per CE (procedure requires 30 minutes), the probability of a seal LOCA is greatly reduced. This is emphasized in training.
4	Provide additional training on the loss of CCW.	Potential improvement in success rate of operator actions after a loss of CCW.	(2)	B	Procedures and training already cover loss of CCW, especially for RCP seal LOCAs.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
5	Provide hardware connections to allow another ERCW (SW) to cool charging pump seals.	Reduce effect of loss of CCW by providing a means to maintain the charging pump seal injection after a loss of CCW. Note, at Watts Bar, this capability was already in place for one charging pump at one unit, and the potential enhancement identified was to make it possible for all the charging pumps.	(2), (6), (11), (13)	B	Current seals are not designed for seal injection. Moreover, St. Lucie Units 1 & 2 seals do not require seal injection to maintain integrity after a loss of cooling water, assuming the operators stop the RCPs and isolate controlled bleedoff flow. If operators do not secure the RCPs, they would be unlikely to then initiate seal injection. Therefore, expanding the ability to support seal injection would have no impact on St. Lucie CDF.
6	On loss of ERCW, proceduralize shedding CCW loads to extend the CCW heatup time.	Increase time before the loss of CCW (and RCP seal failure) in the loss of ERCW sequences.	(2)	B	Procedure [1(2)-EOP-02] is specific about stopping RCPs (and isolating controlled bleedoff) on loss of CCW. If done within the one hour allowable per CE (procedure requires 30 minutes), the probability of a seal LOCA is greatly reduced. This is emphasized in training.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
7	Increase charging pump lube oil capacity.	Would lengthen time before charging pump failure due to lube oil overheating in loss of CCW sequences.	(2)	B	<p>Current seals are not designed for seal injection. Costs to modify seals, spares, revise procedures, and retrain operators would be high. This would be necessary before the charging pumps could even be used.</p> <p>St. Lucie Units 1 & 2 seals do not require seal injection to maintain integrity after a loss of cooling (assuming the operators stop the RCPs and isolate controlled bleedoff flow). Current seals are not designed for injection. Due to shaft cracking, seal injection would NOT be continuously operated at St. Lucie Units 1 & 2 and would have to be initiated on loss of CCW. (At one time procedures said, "secure RCPs and initiate seal injection.") If operators do not secure the RCPs, they are unlikely to then initiate seal injection. Therefore, expanding the ability to support seal injection would have no impact on St. Lucie Units 1 & 2 CDF and no benefits would arise from doing so.</p>

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
8	Eliminate RCP thermal barrier dependence on CCW, such that loss of CCW does not result directly in core damage.	Would prevent loss of RCP seal integrity after a loss of CCW. Watts Bar IPE said TVA could do this with ERCW connection to charging pump seals.	(2), (13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
9	Provide additional SW pump.	Providing another pump would decrease CDF due to a loss of SW.	(5)	B	St. Lucie Units 1 & 2 have two trains of ICW with a third pump, which can be aligned to either train. One pump is capable of supplying accident/shutdown loads for a Unit.
10	Create an independent RCP seal injection system, with dedicated diesel.	Would add redundancy to RCP seal cooling alternatives, reducing CDF from loss of CCW or SW, or from SBO.	(6), (11), (13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
11	Create an independent RCP seal injection system, without dedicated diesel.	Would add redundancy to RCP seal cooling alternatives, reducing CDF from loss of CCW or SW, or from SBO.	(11)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
12	Use existing hydro test pump for RCP seal injection.	Independent seal injection source, without cost of a new system.	(7)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
13	Replace ECCS pump motors with air-cooled motors.	Remove dependency on CCW.	(10), (13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
14	Install improved RCP seals.	RCP seal O-rings constructed of improved materials would reduce chances of an RCP seal LOCA.	(11), (13)	B	All of the St. Lucie Units 1 & 2 RCPs have been upgraded with the new N-9000 seal packages.
15	Add a third CCW pump.	Reduce chance of loss of CCW leading to an RCP seal LOCA.	(13)	B	St. Lucie Units 1 & 2 have two trains of CCW with a third pump, which can be aligned to either train. One pump is capable of supplying accident/shutdown loads for a Unit.
16	Prevent charging pump flow diversion from the relief valves.	If relief valve opening causes a flow diversion large enough to prevent RCP seal injection, then modification can reduce frequency of loss of RCP seal cooling.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
17	Change procedures to isolate RCP seal letdown flow on loss of CCW, and provide guidance on loss of injection during a seal LOCA.	Reduce CDF from loss of seal cooling.	(13)	B	Procedure [1(2)-EOP-02] is specific about stopping RCPs (and isolating controlled bleedoff) on loss of CCW. If done within the one hour allowable per CE (procedure requires 30 minutes), the probability of a seal LOCA is greatly reduced. This is emphasized in training.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
18	Create procedures to stagger HPSI pump use after a loss of SW.	Allow high-pressure injection to be extended after a loss of SW.	(13)	B	HPSI does not need CCW for injection. Loss of ICW/CCW with a LOCA would lead to many other problems, which would not be solved by gaining some time for HPSI injection.
19	Use fire water pumps as a backup for seal injection and high-pressure makeup.	Reduce RCP seal LOCA frequency and SBO CDF.	(13)	A	Fire water pumps cannot be used as backup for seal injection and high-pressure makeup since the fire water is at considerably lower pressure. St. Lucie Units 1 & 2 have two electric fire pumps with discharge pressures of 200 psi or less.
20	Provide procedural guidance for use of cross-tied CCW or SW pumps.	Can reduce the frequency of the loss of either of these.	(13)	B	St. Lucie Units 1 & 2 have a total of 2 CCW and 2 ICW trains, each with three pumps. One pump is an installed spare. The spare is used for either of the trains and is aligned electrically as well as mechanically per procedures and operator training.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
21	Create procedure and operator training enhancements in support-system failure sequences, with emphasis on anticipating problems and coping.	Potential improvement in success rate of operator actions after support-system failures.	(2), (13)	B	Support-system initiators dominated by loss of CCW, ICW, and DC bus. Reasonable procedures and training exist for these.
22	Improve ability to cool RHR heat exchangers.	Reduced chance of loss of DHR by 1) performing procedure and hardware modification to allow manual alignment of Fire Protection System to the CCW system, or 2) installing a CCW header cross-tie.	(12), (13)	B	Cost of procedure revision and training is a factor of 2 higher than the estimated \$16K benefit for eliminating ALL SDC failures (most of which are NOT CCW related). St. Lucie Units 1 & 2 CCW system is cross-connected, implementing part of the intent. CCW is well addressed in procedures and training.
Improvements Related to HVAC					
23	Stage backup fans in switchgear rooms.	Provides alternate ventilation in the event of a loss of switchgear ventilation.	(13)	B	Unit 1 has redundant 100% capacity (HVS-5A and -5B) cooling supply fans. Unit 2 has redundant 100% capacity (HVS-5A and -5B) cooling supply fans and redundant 100% exhaust fans (HVE-11 and -12). Both Units have redundant turbine building switchgear fans.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
24	Provide redundant train of ventilation to 480V board room.	Would improve reliability of 480V HVAC. At Watts Bar, only one train of HVAC cools the 480V board room that contains the unit vital inverters, and recovery actions are heavily relied on. Watts Bar IPE said their corrective action program is dealing with this.	(2), (13)	B	Unit 1 has redundant 100% capacity (HVS-5A and -5B) cooling supply fans. Unit 2 has redundant 100% capacity (HVS-5A and -5B) cooling supply fans and redundant 100% exhaust fans (HVE-11 and -12).
25	Create procedures for temporary HVAC.	Provides for improved credit to be taken for loss of HVAC sequences.	(11), (13)	B	Temporary ventilation is included in appropriate external event (fire) procedures. Use of temporary ventilation is also included in ventilation off-normal procedures [1(2)-ONP-25.02].
26	Add a switchgear room high temperature alarm.	Improve diagnosis of a loss of switchgear HVAC.	(13)	B	St. Lucie Units 1 & 2 do not have cooling other than fans (i.e., no air conditioning units) for switchgear rooms. There are alarms for loss of flow, which meet the intent of this SAMA.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
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 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
Improvements Related to Ex-vessel Accident Mitigation/Containment Phenomena					
27	Create ability to switch fan power supply to DC in SBO.	Allow continued operation in SBO (was created for a BWR RCIC room, Fitzpatrick; possible for turbine AFW if it has its own fan).	(13)	A	St. Lucie Units 1 & 2 AFW pump cooling is not required due to pump design and outdoor location of pumps and motors.
28	Delay containment spray actuation after large LOCA.	When ice remains in the ice condenser at such plants, containment sprays have little impact on containment performance, yet rapidly drain down the RWT. This improvement would lengthen time of RWT availability.	(2), (6)	A	St. Lucie Units 1 & 2 do not have an ice condenser.
29	Install containment spray throttle valves.	Can extend the time over which water remains in the RWT when full containment spray flow is not needed.	(11), (12), (13)	B	St. Lucie Units 1 & 2 Containment Spray Systems have valves that can be used for throttling if desired.
30	Install an independent method of suppression pool cooling.	Would decrease frequency of loss of containment heat removal.	(3), (4)	A	Not applicable to PWRs. St. Lucie Units 1 & 2 have 2 trains of spray plus containment coolers, thus yielding 3 trains of post-accident containment cooling with additional capability using LPSI pumps for spray.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
31	Develop an enhanced drywell spray system.	Would provide a redundant source of water to the Containment to control containment pressure when used in conjunction with containment heat removal.	(3), (4), (16), (17)	B	This is a BWR item since there is no drywell for PWRs. However, if we were to consider this as another containment cooling system, FPL assumes that 1 (of 2) spray pump or the 4 containment coolers at St. Lucie Units 1 & 2 are all individually adequate for containment cooling. This gives St. Lucie Units 1 & 2 three systems even though all 4 coolers are required as are trains of power for support. LPSI can be used in place of spray pumps.
32	Provide a dedicated existing drywell spray system.	Identical to the previous concept, except that one of the existing spray loops would be used instead of developing a new spray system.	(3), (4) [similar PWR containment spray option in (5), (6), (11)]	B	This is a BWR item since there is no drywell for PWRs. But if we were to consider this as another containment cooling system, FPL assumes that 1 (of 2) spray pump or the 4 containment coolers at St. Lucie Units 1 & 2 are all (each) adequate for containment cooling. This gives St. Lucie Units 1 & 2 three systems for containment cooling. Also, LPSI can be used in place of spray pumps.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
33	Install a containment vent large enough to remove ATWS decay heat.	Assuming injection is available, would provide alternative decay heat removal in an ATWS.	(3), (4)	B	The St. Lucie Units 1 & 2 design accommodates containment purge, which would provide an unfiltered vent that is probably large enough to do this. Impact on the environment would be similar to containment failure. Intent met since an unfiltered system is available.
34	Install a filtered containment vent to remove decay heat.	Assuming injection is available (non-ATWS sequences), would provide alternate decay heat removal with the released fission products being scrubbed.	(3), (4) [similar options in (5), (6), (8), (11), (12), (16), (17)]	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
35	Install an unfiltered, hardened containment vent.	Provides an alternate decay heat removal method (non-ATWS), which is not filtered.	(3), (4), (9), (14)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
36	Create/enhance hydrogen igniters with independent power supply.	Use a new, independent power supply, a non-safety grade portable generator, existing station batteries, or existing AC/DC independent power supplies such as the security system diesel. Would reduce hydrogen detonation at lower cost.	(3), (5), (6), (7), (9), (12), (13), (14), (15), (16), (17)	A	St. Lucie Units 1 & 2 have hydrogen recombiners requiring only electric power for operation. Neither hydrogen concentration buildup nor pockets were found to be a problem in the St. Lucie IPE, Section 4.4.3.
37	Create a passive hydrogen ignition system.	Reduce hydrogen detonation potential without requiring electric power.	(7), (11), (16), (17)	A	St. Lucie Units 1 & 2 have hydrogen recombiners requiring only electric power for operation. Neither hydrogen concentration buildup nor pockets were found to be a problem in the St. Lucie IPE, Section 4.4.3.
38	Create a giant concrete crucible with heat removal potential under the basemat to contain molten debris.	A molten core escaping from the vessel would be contained within the crucible. The water-cooling mechanism would cool the molten core, preventing a melt-through.	(3), (4), (16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
39	Create a water-cooled rubble bed on the pedestal.	This rubble bed would contain a molten core dropping onto the pedestal, and would allow the debris to be cooled.	(3), (4), (8), (16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
40	Provide modification for flooding of the drywell head.	Would help mitigate accidents that result in leakage through the drywell head seal.	(4), (9)	A	Item applicable to BWRs; therefore, not applicable to St. Lucie Units 1 & 2.
41	Enhance Fire Protection System and/or Standby Gas Treatment System hardware and procedures.	Improve fission product scrubbing in severe accidents.	(4)	A	Item applicable to BWRs; similar SAMA for PWRs presented by Item 47.
42	Enhance air return fans (ice condenser containment).	Provide an independent power supply for the air return fans, reducing containment failure in SBO sequences.	(6), (11)	A	Applicable to ice condenser plants only.
43	Create a reactor cavity flooding system.	Would enhance debris coolability, reduce core concrete interaction, and provide fission product scrubbing.	(5), (6), (9), (11), (12), (13), (15), (16), (17)	B	Intent of SAMA is to flood area around reactor vessel to prevent vessel breach and late containment failure. Wet cavity design at St. Lucie Units 1 & 2 will fill to over half of vessel height during severe accident to provide similar protection.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
43.1	Create other options for reactor cavity flooding (Part a).	Use water from dead-ended volumes, the condensed blowdown of the RCS, or secondary system by drilling pathways in the reactor vessel support structure to allow drainage from the steam generator compartments, refueling canal, sumps, etc., to the reactor cavity. Also (for ice condensers), allow drainage of water from melted ice into the reactor cavity.	(7), (9), (13)	B	Intent of SAMA is to flood area around reactor vessel to prevent vessel breach and late containment failure. Wet cavity design at St. Lucie Units 1 & 2 will fill to over half of vessel height during severe accident to provide similar protection.
43.2	Create other options for reactor cavity flooding (Part b).	Flood cavity via systems such as diesel-driven fire pumps.	(7), (9), (13)	B	Intent of SAMA is to flood area around reactor vessel to prevent vessel breach and late containment failure. Wet cavity design at St. Lucie Units 1 & 2 will fill to over half of vessel height during severe accident to provide similar protection.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
44	Provide a core debris control system.	Intended for ice condenser plants: Would prevent the direct core debris attack on the primary containment steel shell by erecting a barrier between the seal table and the containment shell.	(6), (11)	A	Applicable to ice condenser plants only.
45	Create a core melt source reduction system (COMSORS).	Place enough glass underneath the reactor vessel such that a molten core falling on the glass would melt and combine with the material. Subsequent spreading and heat removal from the vitrified compound would be facilitated, and concrete attack would not occur (such benefits are theorized in the reference).	(18)	B	Intent of SAMA is to flood area around reactor vessel to prevent vessel breach and late containment failure. Wet cavity design at St. Lucie Units 1 & 2 will fill to over half of vessel height during severe accident to provide similar protection.
46	Provide containment inerting capability.	Would prevent combustion of hydrogen and carbon monoxide gases.	(6), (9), (11), (14)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
47	Use fire water spray pump for containment spray.	Redundant containment spray method without high cost.	(7), (9), (10), (12)	B	For St. Lucie Units 1 & 2, one (of 2) spray pump or the group of 4 containment coolers is adequate for containment cooling. This gives St. Lucie Units 1 & 2 three systems for containment cooling. Also, LPSI can be used in place of spray pumps.
48	Install a passive Containment Spray System.	Containment spray benefits at a very high reliability, and without support systems.	(8)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
49	Provide secondary containment filtered ventilation.	For plants with a secondary containment, would filter fission products released from the primary containment.	(8)	B	St. Lucie Units 1 & 2 already have safety-grade secondary containment filtered ventilation systems.
50	Increase containment design pressure.	Reduce chance of containment overpressure.	(8)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
51	Increase the depth of the concrete basemat, or use an alternative concrete material to ensure melt-through does not occur.	Prevent basemat melt-through.	(16), (17)	A	Applicable to new design, not to existing Containments.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
52	Provide a reactor vessel exterior cooling system.	Potential to cool a molten core before it causes vessel failure, if the lower head can be submerged in water.	(16), (17)	B	Wet cavity design meets intent. This SAMA is based on a theoretical response, and there is no evidence that cooling the molten core in-vessel would actually prevent vessel failure. CCNPP cost estimate is \$4.7M.
53	Create another building, maintained at a vacuum, to be connected to the containment.	In an accident, connecting the new building to the containment would depressurize the containment and reduce any fission product release.	(17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
54	Add ribbing to the containment shell.	Would reduce the chance of buckling of the containment under reverse-pressure loading.	(17)	B	St. Lucie Units 1 & 2 vacuum relief systems to reduce the chance of buckling under reverse pressure. For an existing plant, design and installation of this SAMA is not considered feasible since it requires an extensive reconstruction of the containment.
Improvements Related to AC/DC Reliability/Availability					
55	Train operations crew for response to inadvertent actuation signals.	Improves chances of a successful response to the loss of two 120V AC buses, which causes inadvertent signals.	(13)	B	St. Lucie Units 1 & 2 operators are trained for these types of scenarios.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
56	Proceduralize alignment of spare diesel generator to shutdown board after LOP and failure of the non-emergency (i.e., normal) diesel generator.	Reduced SBO frequency.	(2)	B	St. Lucie Units 1 & 2 have no "spare" diesel. The plant does have the ability to cross-tie electrical power between Units such that 1 EDG can supply both Units for at least shutdown loads. This is proceduralized and operator training is performed.
57	Provide an additional diesel generator.	Would increase onsite emergency AC power reliability and availability (decrease SBO). The ANO-1 IPE reported that Entergy committed to install an AC power source capable of supplying the LOOP loads of any one of the four safety buses. This source would be available within 10 minutes after determination of SBO conditions.	(5), (6), (10), (13) (16), (17)	B	St. Lucie Units 1 & 2 have cross-tie capability to opposite Unit EDGs (and opposite Unit startup transformers), and these are included in procedures.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
58	Provide additional DC battery capability.	Would ensure longer battery capability during an SBO, reducing the frequency of long-term SBO sequences.	(5), (6), (13), (16), (17)	B	Battery depletion is a 4- to 8-hour event at St. Lucie Units 1 & 2. Each St. Lucie Unit has an installed battery that can be tied to the 'AB' bus to feed the "tied" vital battery. The 'AB' bus can be connected to only one battery at a time by physical interlocks and procedures. Offsite power recovery, use of cross-tie between Units, and realignment of the 'AB' DC bus can mitigate the effects of loss of the bus. Also, the non-safety class battery could be aligned to further support DC power needs in the event of loss of chargers for various reasons.
59	Use fuel cells instead of lead-acid batteries.	Extend DC power availability in an SBO.	(16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
60	Create procedure to cross-tie HPCS diesel.	(BWR 5/6)	(10)	A	Item applicable to BWRs. St. Lucie Units 1 & 2 do not have HPCS diesels.
61	Improve bus cross-tie ability.	Improved AC power reliability.	(10), (13)	B	Each Unit has two offsite power (startup) transformers. These can be cross-tied to the other Unit. Also, the SBO cross-tie can tie the vital buses together.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
62	Provide alternate battery charging capability.	Improved DC power reliability. Either cross-tie AC buses, or provide a portable diesel-driven battery charger.	(10), (11), (12), (13)	B	Both Units have 2 battery chargers for each of the 2 vital batteries. The non-vital battery charger can be tied through the 'AB' bus to either of the vital batteries on both Units. An AC cross-tie is also available.
63	Increase/improve DC bus load shedding.	Improved battery life in SBO.	(10), (11), (12), (13)	B	DC bus load shedding is already included in St. Lucie Units 1 & 2 EOPs. Battery depletion is a 4- to 8-hour event at St. Lucie. Offsite power recovery, use of cross-tie between Units, and realignment of the 'AB' DC bus can mitigate the effects of loss of the bus. Also, the non-safety class battery could be aligned to further support DC power needs in the event of loss of chargers for various reasons.
64	Replace batteries.	Improved reliability.	(10)	B	St. Lucie Units 1 & 2 have already replaced batteries with current technology batteries. Further replacements are scheduled.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
65	Create AC power cross-tie capability across units at a multi-unit site.	Improved AC power reliability.	(11), (12), (13)	B	Each Unit has two offsite power (startup) transformers. These can be cross-tied to the other Unit. Also, the SBO cross-tie can tie the vital buses together. This provides "double" cross-tie capability.
66	Create a cross-unit tie for diesel fuel oil.	For multi-unit sites, adds diesel fuel oil redundancy.	(13)	B	St. Lucie Units 1 & 2 have the ability to cross-connect diesel fuel oil between Units.
67	Develop procedures to repair or changeout failed 4kV breakers.	Offers a recovery path from a failure of breakers that transfer 4.16kV non-emergency buses from unit station service transformers to system station service transformers, leading to loss of emergency AC power (i.e., in conjunction with failures of the diesel generators).	(13)	B	Given the time constraints, repair/changeout would not be practical. When maintenance personnel are available after the ERFs are manned this is already a repair option available to response teams. It has been rehearsed during emergency drills usually by transferring a breaker from another location.
68	Emphasize steps in recovery of offsite power after an SBO.	Reduced HEP during offsite power recovery.	(13)	B	St. Lucie Units 1 & 2 training adequately reduces human error during SBO recovery. This is also an FPL system function, demonstrated in response to Hurricane Andrew and improved since then.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
69	Develop a severe weather conditions procedure.	For plants that do not already have one, reduces the likelihood of external events CDF.	(13)	B	St. Lucie Units 1 & 2 have severe weather procedures.
70	Provide procedures for replenishing diesel fuel oil.	Allow long-term diesel operation.	(13)	B	St. Lucie maintains a one-week supply of EDG fuel oil and procedures provide for replenishing diesel fuel oil and contracts with suppliers are in place.
71	Install gas turbine generators.	Improve onsite AC power reliability.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
72	Install tornado protection on gas turbine generator.	If the Unit has a gas turbine, the tornado-induced SBO frequency would be reduced.	(16), (17)	A	Not applicable since there is no gas turbine at St. Lucie Units 1 & 2 (EDGs are tornado protected).
73	Create a river water backup for diesel cooling.	Provides redundant source of diesel cooling.	(13)	B	St. Lucie Units 1 & 2 diesels are air cooled.
74	Use fire water as a backup for diesel cooling.	Redundancy in diesel support systems.	(13)	B	St. Lucie Units 1 & 2 diesels are air cooled.
75	Provide a connection to alternate offsite power source.	Increase offsite power redundancy.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
76	Implement underground offsite power lines.	Could improve offsite power reliability, particularly during severe weather.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
77	Replace anchor bolts on diesel generator oil cooler.	Millstone found a high seismic SBO risk due to failure of the diesel oil cooler anchor bolts. For plants with a similar problem, this would reduce seismic risk.	(13)	A	Unit 1 EDG unit was "shake-tested" satisfactorily and the Unit 2 EDG is essentially identical. Moreover, seismic risk is extremely low in Florida and bolts are very plant specific.
Improvements in Identifying/Coping with Containment Bypass					
78	Proceduralize use of pressurizer vent valves during SGTR sequences.	CCNPP procedures direct the use of pressurizer sprays to reduce RCS pressure after an SGTR. Use of the vent valves provides a backup method.	(13)	B	If SGTR is not controlled by EOP-4, EOP-15 will be entered. EOP-15 uses once-through cooling (PORVs to vent) to control RCS pressure and core heat removal if necessary.
79	Install a redundant spray system to depressurize the primary system during an SGTR.	Enhanced depresssurization ability during an SGTR.	(16), (17)	B	St. Lucie Units 1 & 2 have spray and alternate spray systems. If EOP-4 does not control plant, EOP-15 will be entered. EOP-15 causes once-through cooling (PORVs to vent) to control RCS pressure and heat removal, if necessary.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
80	Improve SGTR coping abilities.	Improved instrumentation to detect SGTR, or additional systems to scrub fission product releases.	(7), (9), (10), (13), (14), (16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
81	Add other SGTR coping features.	A highly reliable (closed loop) steam generator shell-side heat removal system that relies on natural circulation and stored water sources, A system that returns the discharge from the steam generator relief valve back to the primary containment, An increased pressure capability on the steam generator shell side with corresponding increases in the safety valve setpoints.	(7), (8), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
82	Increase secondary-side pressure capacity such that an SGTR would not cause the relief valves to lift.	SGTR sequences would not have a direct release pathway.	(8), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
83	Replace SGs with new design.	Lower the frequency of SGTR.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
84	Direct steam generator flooding after an SGTR, prior to core damage.	Would provide for improved scrubbing of SGTR releases.	(14), (15)	B	Procedures call for cooling isolated SG by feeding, but do not specify flooding SG. Procedures already call for isolating affected SG. If operators fail to cool and isolate the SG, then it is not prudent to assume they would flood the SG. Cooling and isolation will prevent releases.
85	Establish a maintenance practice that inspects 100% of the tubes in an SG.	Reduce chances of SGTR.	(16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
86	Revise EOPs to direct that a faulted steam generator be isolated.	For those plants where EOPs don't already direct this, SG isolation would reduce the consequences of SGTR.	(13)	B	St. Lucie Units 1 & 2 procedures direct isolation of faulted SG.
87	Locate RHR inside of containment.	Would prevent ISLOCA occurrences via the RHR pathway.	(8)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
88	Install self-actuating containment isolation valves.	For plants that don't have this, the valves would reduce the frequency of isolation failure.	(8)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
89	Install additional instrumentation for ISLOCA sequences.	Pressure or leak monitoring instruments installed between the first two pressure isolation valves on low-pressure injection lines, RHR suction lines, and high-pressure injection lines would decrease ISLOCA frequency.	(5), (6), (11), (13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
90	Increase frequency of valve leak testing.	Decrease ISLOCA frequency.	(12)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
91	Improve operator training on ISLOCA coping.	Decrease ISLOCA effects.	(12), (13)	B	Procedures already direct determination of break location and operators are well-trained on existing procedures.
92	Install relief valves in the Component Cooling Water System.	Would relieve pressure buildup from an RCP thermal barrier tube rupture, preventing an ISLOCA.	(13)	B	St. Lucie Units 1 & 2 CCW piping at the RCPs is rated at RCS pressure and has isolation valves that close automatically on high temperature (as from RCS coolant leaking into CCW).
93	Provide leak testing of valves in ISLOCA paths.	At Kewaunee, four MOVs isolating RHR from the RCS were not leak tested. Will help reduce ISLOCA frequency.	(13)	B	St. Lucie Units 1 & 2 currently perform leak testing of valves in ISLOCA flow paths. This can only be done at cold shutdown.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
94	Revise EOPs to improve ISLOCA identification.	Salem had a scenario in which an RHR ISLOCA could direct initial leakage back to the PRT, giving indication that the LOCA was inside containment. Procedure enhancement would ensure LOCA outside containment would be observed.	(13)	B	St. Lucie Units 1 & 2 LOCA EOPs direct comparison of RWT and sump levels to determine if leakage outside containment may exist.
95	Ensure all ISLOCA releases are scrubbed.	Would scrub ISLOCA releases. One suggestion was to plug drains in the break area so the break point would cover with water.	(14), (15)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
96	Add a redundant and diverse limit switch to each containment isolation valve.	Enhanced isolation valve position indication, which would reduce frequency of containment isolation failures and ISLOCAs.	(16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
Improvements in Reducing Internal Flooding Frequency					
97	Modify swing direction of doors separating Turbine Building basement from areas containing safeguards equipment.	For a plant where internal flooding from Turbine Building to safeguards areas is a concern, this modification can prevent flood propagation.	(13)	A	This SAMA is for a plant where Turbine Building flooding could reach/affect safeguards equipment. The St. Lucie Units 1 & 2 open Turbine Building design and the elevation of surrounding ground area make flooding of RAB or AFW areas from the Turbine Building not credible.
98	Improve inspection of rubber expansion joints on main condenser.	For a plant where internal flooding due to failure of a circulating water expansion joint is a concern, this can help reduce the frequency.	(13)	A	This SAMA is for a plant where Turbine Building flooding could reach/affect safeguards equipment. The St. Lucie Units 1 & 2 open Turbine Building design and the elevation of surrounding ground area make flooding of RAB or AFW areas from the Turbine Building not credible.
99	Install internal flood prevention and mitigation enhancements.	Use of submersible MOV operators. Back-flow prevention in drain lines.	(13)	B	Per the IPE internal flooding analysis, this has been done in selected areas as needed. For instance, submersible operators for the CCW area and back-flow check valves for the ECCS pump rooms have already been installed.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
100	Replicate internal flooding improvements used at Ft. Calhoun.	Prevention or mitigation of: A rupture in the RCP seal cooler of the CCW System, An ISLOCA in a shutdown cooling line, An AFW flood involving the need to possibly remove a watertight door. For a plant where any of these apply, would reduce flooding risk.	(13)	A	Specifically applicable to Ft. Calhoun. These items were not identified in the flooding analysis performed on St. Lucie Units 1 & 2.
Improvements Related to Feedwater/Feed & Bleed Reliability/Availability					
101	Install digital feedwater upgrade.	Reduces chance of loss of MFW following a plant trip.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
102	Perform surveillances on manual valves used for backup AFW pump suction.	Improves success probability for providing alternate water supply to AFW pumps.	(13)	B	Check valve from Unit 2 to Unit 1 CST is tested (1-OSP-12.01) and this also cycles the manual valves. Normal fill from the TWST is used routinely to adjust CST level.
103	Install manual isolation valves around AFW turbine-driven steam admission valves.	Reduces the dual turbine-driven pump maintenance unavailability.	(13)	B	At St. Lucie Units 1 & 2 the steam valves from each SG to the AFW pump on each Unit have manual inlet and outlet isolation valves.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
104	Install accumulators for turbine-driven AFW pump flow control valves.	Provides control air accumulators for the turbine-driven AFW flow control valves, the motor-driven AFW pressure control valves, and the SG PORVs. This would eliminate the need for local manual action to align nitrogen bottles for control air during an LOP.	(11)	B	St. Lucie Units 1 & 2 valves are MOVs and can be operated manually by a handwheel. IA has no impact on St. Lucie Units 1 & 2 AFW System.
105	Install a new CST (AFWST).	Either replace old tank with a larger one or install a backup tank.	(13), (16), (17)	B	St. Lucie Unit 2 CST is sized to supplement the smaller Unit 1 CST. The TWST can be used to fill either CST. Also, procedures are in place to fill Unit 1 CST from Unit 2 or to use the DWST to fill either CST.
106	Provide for cooling of steam-driven AFW pump in an SBO.	a) Use fire water to cool pump, or b) make the pump self-cooled. Would improve success chances in an SBO.	(13)	A	St. Lucie Units 1 & 2 AFW pumps do not require cooling due to pump design and outdoor location of pumps and motors; therefore, intent met.
107	Proceduralize local manual operation of AFW when control power is lost.	Lengthen AFW availability during SBO. Also provides a success path should AFW control power be lost during non-SBO sequences.	(13)	B	St. Lucie Units 1 & 2 EOPs provide for local manual operation of AFW valves and the steam-driven AFW pump.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
108	Provide portable generators to be hooked into the turbine-driven AFW after battery depletion.	Extend AFW availability in an SBO (assuming the turbine-driven AFW requires DC power).	(16), (17)	B	If power is lost, a cross-tie is available, 2 chargers per battery. St. Lucie Units 1 & 2 EOPs provide for local manual operation of AFW valves and the steam-driven AFW pump.
109	Add a motor train of AFW to the steam trains.	For PWRs that do not have any motor trains of AFW, this can increase reliability during non-SBO sequences.	(13)	B	St. Lucie Units 1 & 2 have both motor- and steam-driven 100% capacity AFW trains.
110	Create ability for emergency connections of existing or alternate water sources to feedwater/condensate.	Would be a backup water supply for the feedwater/condensate systems.	(12)	B	Use of TWST for CST fill is proceduralized.
111	Use fire water as a backup for steam generator inventory.	Would create a backup to the Main and Auxiliary Feedwater Systems for steam generator water supply.	(13)	B	St. Lucie Units 1 & 2 procedures first direct use of AFW, MFW, filling of CST (including Unit 1 fill from larger Unit 2 CST), or condensate (not fire pump). In order to be able to use fire water, the cost will be prohibitive due to the low pressure of the pump and other significant modifications needed.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
112	Procure a portable diesel pump for isolation condenser makeup.	Would provide backup to the city water supply and diesel fire water pump in providing isolation condenser makeup.	(13)	A	Applicable to isolation condenser plants only.
113	Install an independent diesel for the Condensate Storage Tank makeup pumps.	Would allow continued inventory in CST during an SBO.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
114	Change failure position of condenser makeup valve.	If the condenser makeup valve fails open on loss of air or power, this can prevent CST flow diversion to the condenser. Allows greater inventory for the AFW pumps.	(13)	B	Non-safety related connections have standpipes to ensure required volume is maintained. Valves fail closed on loss of air or power.
115	Create passive secondary-side coolers.	Provide a passive heat removal loop with a condenser and heat sink. Would reduce CDF from the loss of feedwater.	(17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
Improvements in Core Coding Systems					
116	Provide capability for diesel-driven, low-pressure vessel makeup.	Extra water source in sequences in which the reactor is depressurized and all other injection is unavailable (e.g., fire water).	(4), (5), (13)	A	Unborated water for SI implies applicability to BWRs, not PWRs.
117	Provide an additional HPSI pump with independent diesel.	Reduce frequency of core melt from small LOCA sequences and from SBO sequences.	(6), (16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
118	Install independent AC HPSI system.	Would allow makeup and feed-and-bleed capabilities during an SBO.	(11)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
119	Create the ability to manually align ECCS recirculation.	Provides a backup should automatic or remote operation fail.	(12)	B	Although St. Lucie Units 1 & 2 recirculation alignment is automatic, procedures require operator verification and manual operation of the MOVs to align if necessary. Depending on radiation levels, the containment sump valves could also be operated locally. RWT valves should not have a radiation level problem.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
120	Implement an RWT makeup procedure.	Decrease CDF from ISLOCA scenarios, some smaller break LOCA scenarios, and SGTR.	(12), (13)	B	LOCA EOPs 1[2]-EOP-03 direct RWT makeup as do the functional recovery EOPs, 1[2]-EOP-15. An SGTR, if not controlled, will also be mitigated by EOP-15.
121	Stop low-pressure injection pumps earlier in medium or large LOCAs.	Would give more time to perform recirculation swapover.	(13)	B	Recirculation swapover at St. Lucie Units 1 & 2 is automatic so extending time available (for operator action) is not beneficial. Also, 1[2]-EOP-03, "Loss of Coolant Accident," provides for stopping LPSI pumps if appropriate RCS conditions are met, indicating that the LOCA is "controlled."
122	Emphasize timely recirculation swapover in operator training.	Reduce HEP of recirculation failure.	(13)	B	At St. Lucie Units 1 & 2, swapover to recirculation is automatic. Procedures and training require verification of recirculation and taking action if it does not occur.
123	Upgrade CVCS to mitigate small-small LOCAs.	For a plant like the AP600 where CVCS can't mitigate a small-small LOCA, an upgrade would decrease CDF from small-small LOCAs.	(8)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
124	Install an active HPSI system.	For a plant like the AP600, where an active high-pressure injection system does not exist, would add redundancy in high-pressure injection.	(8)	B	St. Lucie Units 1 & 2 have an active HPSI System.
125	Change "in-containment" RWT suction from 4 check valves to 2 check and 2 air-operated valves.	Remove common-mode failure of all four injection paths.	(8)	A	SAMA refers to AP600 design with RWT inside containment. At St. Lucie Units 1 & 2 RWTs are outside containment. Suction line to HPSI/LPSI pumps contains two locked open MOVs and a series of locked open manual valves at the pump and no check valves. Since valves are not required to change state, no CCF applied.
126	Replace two of the four SI pumps with diesel pumps.	Intended for System 80+, which has four trains of SI. This would reduce common-cause failure probability.	(16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
127	Align LPCI or core spray to CST on loss of suppression pool cooling.	Low-pressure ECCS can be maintained in loss of suppression pool cooling scenarios.	(10), (13)	A	Item applicable to BWRs. PWRs do not have suppression pool cooling.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
128	Raise HPCI/RCIC backpressure trip setpoints.	Ensures HPCI/RCIC availability when high suppression pool temperatures exist.	(13)	A	Primarily a BWR item. At St. Lucie Units 1 & 2, the AFW pump turbine discharges to the atmosphere and has no need for backpressure trips.
129	Improve the reliability of the ADS.	Reduce frequency of high-pressure core damage sequences.	(4)	A	This is a BWR Automatic Depressurization System enhancement, not applicable to St. Lucie Units 1 & 2.
130	Disallow automatic vessel depressurization in non-ATWS scenarios.	Improve operator control of plant.	(13)	A	This is a BWR item that is not applicable to St. Lucie Units 1 & 2.
131	Create automatic swapover to recirculation on RWT depletion.	Would remove human error contribution from recirculation failure.	(5), (6), (11)	B	St. Lucie Units 1 & 2 have automatic switchover to recirculation, and station procedures require operators to verify this and make it happen if it does not occur.
Improvements Related to Instrument Air/Gas					
132	Modify EOPs for ability to align diesel power to more air compressors.	For plants that do not have diesel power to all normal and backup air compressors, this change allows increased reliability of instrument air after an LOP.	(13)	B	Two of the 4 Instrument Air compressors per Unit can be aligned to the EDGs and have self-contained cooling. Other compressors require cooling water pumps that are not intended to be diesel backed. Also, diesel compressors for maintenance use are generally available on site.

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
133	Replace old air compressors with more reliable ones.	Improve reliability and increase availability of instrument air compressors.	(13)	B	After a few years of operation, Unit 1 compressors were upgraded to match Unit 2's. Under the Maintenance Rule, extensive efforts have been spent on maintaining and improving IA compressor reliability.
Improvements in ATWS Coping					
134	Install nitrogen bottles as backup gas supply for SRVs.	Extend operation of safety relief valves during SBO and loss-of-air events (BWRs).	(13)	A	St. Lucie Units 1 & 2 PORVs are solenoid operated. Since they do not use air, nitrogen would not help. Also the SRVs are spring loaded and do not require any outside power or air, etc.
135	Install MG set trip breakers in Control Room.	Provides trip breakers for the motor generator sets in the Control Room. Currently, at Watts Bar, an ATWS would require an immediate action outside the Control Room to trip the MG sets. Would reduce ATWS CDF.	(11)	B	St. Lucie Units 1 & 2 have a backup automatic trip of the control rod drive MG sets that will deenergize the CEDMs and allow rods to drop (scram).

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TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
136	Add capability to remove power from the bus powering the control rods.	Decrease time to insert control rods if the reactor trip breakers fail (during a loss of feedwater ATWS, which has rapid pressure excursion).	(13)	B	St. Lucie Units 1 & 2 have the capability to trip the rod drive MG sets for backup scram using RCS pressure for initiating signal.
137	Create cross-connect ability for standby liquid control (SLC) trains.	Improved reliability for boron injection during ATWS.	(13)	B	St. Lucie Units 1 & 2 have redundant boric acid tanks, with redundant means/paths for supplying boric acid to charging pumps. Also, the RWT can readily be used to supply boric acid.
138	Create an alternate boron injection capability (backup to SLC).	Improved reliability for boron injection during ATWS.	(13)	B	St. Lucie Units 1 & 2 have redundant boric acid tanks, with redundant means/paths for supplying boric acid to charging pumps. Also, the RWT can readily be used to supply boric acid.
139	Remove or allow override of LPCI injection during ATWS.	On failure of HPCI and condensate, the Susquehanna Units direct reactor depressurization followed by 5 minutes of automatic LPCI. Would allow control of LPCI immediately.	(13)	A	This is applicable to BWRs and not applicable to St. Lucie Units 1 & 2.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
140	Install a system of relief valves that prevents any equipment damage from a pressure spike during an ATWS.	Would improve equipment availability after an ATWS.	(16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
141	Create a boron injection system to back up the mechanical control rods.	Provides a redundant means to shut down the reactor.	(16), (17)	B	St. Lucie Units 1 & 2 have capability for emergency boration.
142	Provide an additional I&C system such as AMSAC.	Improve I&C redundancy and reduce ATWS frequency.	(16), (17)	B	St. Lucie Units 1 & 2 already have the capability to remove power from control rods.
Other Improvements					
143	Provide capability for remote operation of secondary-side PORVs in SBO.	Manual operation of these valves is required in an SBO scenario. High area temperatures may be encountered in this case (no ventilation to main steam areas), and remote operation could improve success probability.	(2)	B	Valves can be operated manually. At St. Lucie Units 1 & 2, the main steam trestle area containing the secondary-side relief valves is outdoors, and with steel grating missile shields excessively high temperatures are implausible.

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INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
144	Create/enhance Reactor Coolant System depressurization ability.	Either with a new depressurization system or with existing PORVs, head vents, and secondary-side valve, RCS depressurization would allow low-pressure ECCS injection. Even if core damage occurs, low RCS pressure alleviates some concerns about high-pressure melt ejection.	(5), (6), (9), (11), (12), (13), (14), (15), (16), (17)	B	St. Lucie Units 1 & 2 have spray and alternate spray. Also, if SGTR is not controlled by EOP-4, EOP-15 will be entered, which uses once-through cooling (PORVs to vent) to control RCS pressure and core heat removal, if necessary.
145	Make procedural changes only for the RCS depressurization option.	Reduce RCS pressure without the cost of a new system.	(7), (9), (13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
146	Defeat 100% load rejection capability.	Eliminates the possibility of a stuck open PORV after an LOP, since PORV opening wouldn't be needed.	(13)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
147	Change CRD flow control valve failure position.	Change failure position to the 'fail-safest' position.	(13)	A	BWR item that is not applicable to St. Lucie Units 1 & 2.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
148	Install secondary-side guard pipes up to the MSIVs.	Would prevent secondary-side depressurization should a steam line break occur upstream of the MSIVs. Would also guard against or prevent consequential multiple SGTRs following a main steam line break event.	(16), (17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
149	Provide digital large break LOCA protection.	Upgrade plant instrumentation and logic to improve the capability to identify symptoms/precursors of a large break LOCA (a leak before break).	(17)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
150	Increase seismic capacity of the plant to a HCLPF of twice the SSE.	Reduced seismic CDF.	(17)	A	Florida has extremely low seismic risk. The IPEEE found no significant vulnerabilities.
151	Provide self-cooled ECCS seals.	ECCS pump seals are CCW cooled.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
152	Separate non-vital buses from vital buses.	Some non-vital loads mixed with vital loads on load centers causing load shedding difficulties.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

NOTES:

- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
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- c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
153	Make CCW trains separate.	Current cross-tie capability creates a potential common-mode failure mechanism for both trains (and both stations).	(20)	B	A & B trains are normally isolated from each other with redundant isolation valves. The probability of this specific common-mode failure of both trains is insignificant.
154	Make ICW trains separate.	Current cross-tie capability creates a potential common-mode failure mechanism for both trains (and both stations).	(20)	B	A & B trains are normally isolated from each other with redundant isolation valves. The probability of this specific common-mode failure of both trains is insignificant.
155	Provide a centrifugal charging pump.	Currently charging pumps are positive displacement pumps.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
156	Provide a motor-operated AFW pump.	Currently AFW pumps are both turbine driven.	(20)	B	St. Lucie Units 1 & 2 have two motor-driven and one steam-driven (each 100% capacity) AFW pumps for each Unit.
157	Provide containment isolation design per GDC and SRP.	Enhance containment isolation capability.	(20)	B	Unit 2 has GDC and SRP containment isolation. Unit 1 essentially meets the GDC.
158	Improve RHR sump reliability.	Common-mode failure of RHR due to debris in sump.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
159	Provide AB vent/seal structure.	Enhance ventilation in the AB.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening ^b Criterion	Disposition
160	Add charcoal filters on the AB exhaust.	Enhance fission product removal after an ISLOCA.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
161	Add penetration valve leakage control system.	Enhance capability to detect/control leakage from penetration valves.	(20)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
162	Enhance screen wash.	Potential for loss of ICW due to clogging of sea water screens.	(20)	B	St. Lucie Units 1 & 2 traveling screens and screen wash capability were improved in response to jellyfish problems in the early 1990s. Operators and maintenance have since repeatedly demonstrated the ability to keep screens clean enough to continue operation of main circulating water despite significant influxes of seaweed and other materials. Since ICW requires much less flow, the intent is met.
163	Enhance training for important operator actions.	Consider the operator actions in the top PSA cutsets for the Units.	(20)	B	Training is important but there is no clear way to translate improved training to improved performance by reducing HEPs. Since these are emphasized in operator and adequately addressed by PSA training, the intent is met.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
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 - N = Not Initially Screened. Considered in cost-benefit evaluation.
 - c. Acronyms and symbols are defined in Section E.5.

TABLE E.3-1 (continued)
INITIAL LIST OF CANDIDATE IMPROVEMENTS
FOR THE ST LUCIE UNITS 1 & 2 SAMA ANALYSIS

SAMA Number	Potential Improvement	Discussion	Source ^a	Screening Criterion ^b	Disposition
164	Prevent tornado damage to RWT and penetration rooms.	Penetration rooms are tornado protected. Tornado category F2 and higher can generate heavy enough missiles that they could impact and damage the RWT.	(19)	B	Penetration rooms are tornado protected. For tornadoes, makeup water for safe shutdown is provided by the SITs located inside the tornado-protected containment.
165	Man SSF continuously to align Coolant Makeup System for RCP seal cooling.	A dedicated operator for seals or for the highest value operator action could be considered.	(19)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.
166	Protect against tornado that causes failure of power and upper surge tanks.	Consider protection for tanks or switchgear in Turbine Building. Surge tanks are suction for emergency feedwater pumps.	(19)	B	The CCW surge tank is tornado protected since it is in the RAB, adjacent to the Control Room. Unit 2 CST is fully protected; Unit 1 CST has partial protection and can be filled from Unit 2 CST. Although the turbine switchgear is not fully protected, the emergency power system is protected.
167	Replace reactor vessel with stronger vessel.	Reduce core damage contribution due to vessel failure.	(19)	N	Considered in cost-benefit evaluation. See Table 4.15-2 of the main report.

- NOTES:
- a. Source identifiers correlate to entries on the reference list (see Section E.3.4): for example, (13) identifies Ref. E.3-13, i.e., NUREG-1560.
 - b. Screening criteria:
 - A = Not Applicable
 - B = Intent Met or Implemented
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 - c. Acronyms and symbols are defined in Section E.5.

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E.3.4 REFERENCES

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- E.3-3 Bechtel Power Corporation. *Cost Estimate for Severe Accident Mitigation Design Alternatives*, Limerick Generating Station for Philadelphia Electric Company. June 22, 1989.
- E.3-4 U.S. Nuclear Regulatory Commission. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. Vol. 1, Table 5.35, "Listing of SAMDAs Considered for the Limerick Generating Station." NUREG-1437. Office of Nuclear Regulatory Research. Washington, D.C. May 1996.
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E.4 PROBABILISTIC SAFETY ASSESSMENT (PSA) RUNS FOR SELECTED SAMA EVALUATION CASES

The severe accident mitigation alternative (SAMA) evaluation cases described in this document represent the plant risk given different plant configurations (as defined by the case). The case-specific plant configuration is defined as the plant in its baseline configuration [as modeled in the current probabilistic risk assessment (PRA)] with the model modified to represent the plant after the implementation of a particular SAMA. These model changes were performed in a manner expected to bound the change in risk that would actually be expected if the SAMA were implemented. This approach was taken because the actual designs for the SAMAs have not been developed.

For screening purposes, a single top event that included all plant damage states (PDSs) and containment bypass sequences (e.g., SGTR1, SGTR2, and ISLOCA), was developed from the Unit 1 and Unit 2 models. This gave a large but manageable number of cutsets and accounted for over 95 percent of the total baseline core damage frequency (CDF) calculated by using all sequences. This top model containing all PDS cutsets (for each Unit) could then be easily manipulated to give estimates of CDF reduction for a given circumstance. This technique was not used for estimation for such specific cases as steam generator tube ruptures (SGTRs) or interfacing system loss-of-coolant accidents (ISLOCAs). SGTRs and ISLOCAs and other cases were deemed important enough to warrant full risk-model cases.

The impacts of the improvement were estimated by modifying the system fault trees, the initiating events, the key PDS binning, or the containment release fractions. Once these changes were implemented, the process for calculating the containment release frequencies was identical to that used in calculating the baseline risk. The analysis of the Level 1 model resulted in the determination of PDS frequencies. These frequencies were combined with the conditional probabilities of each containment event-tree endstate, resulting in a frequency of release in each containment event-tree endstate. These containment event-tree endstate frequencies can be summed to yield CDF.

Since this is a screening evaluation, the exact modification option was not necessarily evaluated; the exact modifications are not defined by the plant design personnel and would only be defined in detail if the SAMAs were implemented. As a result, for some improvements multiple risk evaluations were done. This was, in general, a bounding-value quantification. The evaluations were based on very conservative approaches.

For many of the SAMAs, the CDF reduction was estimated from a baseline PDSTOP model. Although the baselines and cases were run with a large number of individual sequences, a PDS onetop run was also done for each. This file containing all PDS cutsets could then be used to estimate CDF reduction by setting the failure probability of the appropriate equipment to zero (as if the SAMA improvement were to make it perfectly reliable, which obviously is conservative). For St. Lucie Unit 1, the full baseline CDF from the sum of the sequences was 2.990E-05. The PDSTOP model CDF was 2.875E-05, which comprises over 96 percent of the entire CDF. For St. Lucie Unit 2, the full baseline CDF from the sum of the sequences was 2.445E-05. The PDSTOP model CDF was 2.425E-05, which comprises 99 percent of the entire CDF. Tables E.2-3 and E.2-4, presented in Section E.2 of this Appendix, show the full sum of the sequences and totals for each Unit. The reduced CDF was ratioed to the total benefit dollars available to give an estimate of the benefits of

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the SAMA. To verify conservatism, results based on the CDF model estimate were compared to Cases 2, 3, and 4, which were calculated with the Level 2 and Level 3 matrix. In all three cases for both Units, the estimated benefits from the CDF model estimates were higher than the calculated case. For the purpose of estimating benefits, the CDF cutset method is conservative as it gives higher benefits than those based on more detailed Level 2 and Level 3 calculations. Results of this comparison are shown in Table E.4-1.

**TABLE E.4-1
COMPARISON OF CUTSET ESTIMATE
TO CALCULATED CASE BENEFITS**

	Case 2 – Seal LOCA w/ Operator Failure	Case 3 – Small-Small LOCA	Case 4 – Seal LOCA w/o Operator Failure
Unit 1			
Case Benefits	\$129,652	\$225,316	\$44,343
Cutset Benefits	\$184,796	\$329,923	\$62,889
Unit 2			
Case Benefits	\$145,657	\$216,583	\$50,090
Cutset Benefits	\$224,062	\$330,641	\$76,340

E.4.1 SAMA EVALUATION CASE DESCRIPTIONS

Six SAMA evaluation cases are described in this section. Each evaluation case contains a description of the plant change that is represented by the case, and the specific SAMAs that are being evaluated by the case. Each case also includes a description of the changes that were made in the fault tree to represent the plant changes represented by the case. The PDS frequencies calculated as a result of the PSA model quantification for each considered SAMA evaluation case are presented in Table E.4-2. These PDS frequencies are used as input into the cost-benefit analysis.

E.4.1.1 CASE NO-ISLOCA

This case was used to determine the benefit to be obtained from improved ISLOCAs. For the purposes of the analysis, and for each Unit, a single bounding analysis was performed that assumed ISLOCA would be eliminated. This analysis case was used in the evaluation of SAMAs No. 89, 90, 95, 96, 159, and 160.

Evaluation method: The model was modified in order to evaluate the impact on the St. Lucie Units 1 & 2 risk profile if ISLOCA were eliminated. The PDSs that represent ISLOCA were set to zero to represent the impact of eliminating this event. The resulting frequency for each PDS is presented in Table E.4-2.

TABLE E.4-2
PDS RESULTS OBTAINED FROM ST. LUCIE UNITS 1 & 2
SAMA EVALUATION CASES

PDS	UNIT 1							UNIT 2						
	Baseline	NO-ISLOCA	NO-SGTR	Case 1	Case 2	Case 3	Case 4	Baseline	NO-ISLOCA	NO-SGTR	Case 1	Case 2	Case 3	Case 4
IA	5.25E-09	5.25E-09	5.25E-09	7.52E-08	5.25E-09	3.02E-09	5.25E-09	3.15E-09	3.15E-09	3.15E-09	7.01E-08	3.15E-09	1.82E-09	3.15E-09
IB	5.10E-06	5.10E-06	5.10E-06	5.13E-06	4.90E-06	1.12E-06	5.04E-06	4.02E-06	4.02E-06	4.02E-06	4.06E-06	3.84E-06	5.50E-07	3.97E-06
ID	1.13E-07	1.13E-07	1.13E-07	0.00E+00	1.07E-07	2.05E-08	1.11E-07	1.07E-07	1.07E-07	1.07E-07	0.00E+00	1.02E-07	1.69E-08	1.06E-07
IE	6.07E-09	6.07E-09	6.07E-09	1.80E-08	4.91E-09	3.72E-09	5.68E-09	3.91E-09	3.91E-09	3.91E-09	1.13E-08	2.53E-09	2.05E-09	3.52E-09
IF	1.10E-09	1.10E-09	1.10E-09	1.15E-09	1.10E-09	1.07E-09	1.10E-09	3.50E-10	3.50E-10	3.50E-10	3.50E-10	3.50E-10	3.50E-10	3.50E-10
IH	1.19E-08	1.19E-08	1.19E-08	0.00E+00	1.16E-08	9.52E-09	1.17E-08	7.35E-09	7.35E-09	7.35E-09	0.00E+00	7.04E-09	5.62E-09	7.04E-09
IIA	2.56E-07	2.56E-07	2.56E-07	2.56E-07	2.35E-07	3.43E-08	2.50E-07	2.08E-07	2.08E-07	2.08E-07	1.93E-07	1.99E-07	1.79E-08	2.06E-07
IIB	2.10E-07	2.10E-07	2.10E-07	2.10E-07	1.30E-07	8.66E-08	1.83E-07	2.83E-07	2.83E-07	2.83E-07	2.98E-07	2.82E-07	5.45E-09	2.83E-07
IID	2.79E-10	2.79E-10	2.79E-10	0.00E+00	2.79E-10	2.79E-10	2.79E-10	3.04E-11	3.04E-11	3.04E-11	0.00E+00	3.04E-11	3.04E-11	3.04E-11
IIE	6.32E-06	6.32E-06	6.32E-06	6.30E-06	2.58E-06	3.78E-06	5.03E-06	7.03E-06	7.03E-06	7.03E-06	7.02E-06	2.70E-06	4.39E-06	5.54E-06
IIF	1.27E-10	1.27E-10	1.27E-10	4.41E-11	1.27E-10	4.41E-11	1.27E-10	1.36E-08	1.36E-08	1.36E-08	1.36E-08	1.36E-08	4.79E-12	1.36E-08
IIH	6.51E-09	6.51E-09	6.51E-09	0.00E+00	4.49E-09	4.37E-09	5.93E-09	3.38E-09	3.38E-09	3.38E-09	0.00E+00	1.86E-09	1.94E-09	2.96E-09
IIIA	2.23E-08	2.23E-08	2.23E-08	5.80E-08	2.23E-08	2.23E-08	2.23E-08	1.26E-10	1.26E-10	1.26E-10	2.16E-08	1.26E-10	1.26E-10	1.26E-10
IIIB	5.57E-06	5.57E-06	5.57E-06	5.57E-06	5.57E-06	5.57E-06	5.57E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06
IIID	5.61E-08	5.61E-08	5.61E-08	0.00E+00	5.61E-08	5.61E-08	5.61E-08	2.45E-08	2.45E-08	2.45E-08	0.00E+00	2.45E-08	2.45E-08	2.45E-08
IIIE	7.93E-07	7.93E-07	7.93E-07	5.83E-06	7.93E-07	7.92E-07	7.93E-07	1.63E-07	1.63E-07	1.63E-07	2.98E-06	1.63E-07	1.62E-07	1.63E-07
IIIF	3.59E-09	3.59E-09	3.59E-09	3.59E-09	3.59E-09	3.59E-09	3.59E-09	2.71E-10	2.71E-10	2.71E-10	3.29E-11	3.29E-11	3.29E-11	3.29E-11
IIIH	5.05E-06	5.05E-06	5.05E-06	0.00E+00	5.05E-06	5.05E-06	5.05E-06	2.82E-06	2.82E-06	2.82E-06	0.00E+00	2.82E-06	2.82E-06	2.82E-06
IVA	3.41E-08	3.41E-08	3.41E-08	4.21E-08	3.41E-08	3.41E-08	3.41E-08	8.00E-08	8.00E-08	8.00E-08	2.57E-08	8.00E-08	8.00E-08	8.00E-08
IVB	5.56E-07	5.56E-07	5.56E-07	5.62E-07	5.56E-07	5.55E-07	5.56E-07	1.00E-07	1.00E-07	1.00E-07	1.55E-07	1.00E-07	1.00E-07	1.00E-07
IVD	1.52E-08	1.52E-08	1.52E-08	0.00E+00	1.52E-08	1.52E-08	1.52E-08	2.02E-11	2.02E-11	2.02E-11	0.00E+00	2.02E-11	2.02E-11	2.02E-11
IVE	1.08E-07	1.08E-07	1.08E-07	2.38E-07	1.08E-07	1.08E-07	1.08E-07	9.04E-07	9.04E-07	9.04E-07	9.04E-07	9.04E-07	9.04E-07	9.04E-07
IVF	7.44E-10	7.44E-10	7.44E-10	8.09E-10	7.44E-10	7.44E-10	7.44E-10	4.41E-11	4.41E-11	4.41E-11	3.63E-15	3.63E-15	3.63E-15	3.63E-15
IVH	1.30E-07	1.30E-07	1.30E-07	0.00E+00	1.30E-07	1.30E-07	1.30E-07	1.97E-08	1.97E-08	1.97E-08	0.00E+00	1.45E-08	1.45E-08	1.45E-08

TABLE E.4-2
PDS RESULTS OBTAINED FROM ST. LUCIE UNITS 1 & 2
SAMA EVALUATION CASES

PDS	UNIT 1							UNIT 2						
	Baseline	NO-ISLOCA	NO-SGTR	Case 1	Case 2	Case 3	Case 4	Baseline	NO-ISLOCA	NO-SGTR	Case 1	Case 2	Case 3	Case 4
VA	6.41E-10	6.41E-10	6.41E-10	2.51E-09	6.41E-10	6.41E-10	6.41E-10	6.64E-10	6.64E-10	6.64E-10	2.26E-09	6.64E-10	6.64E-10	6.64E-10
VB	6.03E-07	6.03E-07	6.03E-07	6.04E-07	6.03E-07	6.03E-07	6.03E-07	6.18E-07	6.18E-07	6.18E-07	6.18E-07	6.18E-07	6.18E-07	6.18E-07
VD	3.16E-09	3.16E-09	3.16E-09	0.00E+00	3.16E-09	3.16E-09	3.16E-09	2.99E-09	2.99E-09	2.99E-09	0.00E+00	2.99E-09	2.99E-09	2.99E-09
VE	2.98E-10	2.98E-10	2.98E-10	3.09E-10	2.98E-10	2.98E-10	2.98E-10	4.15E-10	4.15E-10	4.15E-10	4.75E-10	4.15E-10	4.15E-10	4.15E-10
VF	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11
VH	1.10E-11	1.10E-11	1.10E-11	0.00E+00	3.59E-11	3.59E-11	3.59E-11	6.00E-11	6.00E-11	6.00E-11	0.00E+00	6.00E-11	6.00E-11	6.00E-11
VIA	2.19E-08	2.19E-08	2.19E-08	2.31E-08	2.19E-08	2.19E-08	2.19E-08	4.26E-08	4.26E-08	4.26E-08	1.58E-08	4.26E-08	4.26E-08	4.26E-08
VIB	7.36E-07	7.36E-07	7.36E-07	7.36E-07	7.36E-07	7.36E-07	7.36E-07	4.14E-07	4.14E-07	4.14E-07	4.41E-07	4.14E-07	4.14E-07	4.14E-07
VID	3.03E-09	3.03E-09	3.03E-09	0.00E+00	3.03E-09	3.03E-09	3.03E-09	5.04E-10	5.04E-10	5.04E-10	0.00E+00	5.04E-10	5.04E-10	5.04E-10
VIE	6.68E-08	6.68E-08	6.68E-08	6.67E-08	6.68E-08	6.68E-08	6.68E-08	6.92E-08	6.92E-08	6.92E-08	6.91E-08	6.92E-08	6.92E-08	6.92E-08
VIF	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	2.84E-10	2.84E-10	2.84E-10	2.84E-10	2.84E-10	2.84E-10	2.84E-10
VIH	6.99E-11	6.99E-11	6.99E-11	0.00E+00	6.99E-11	6.99E-11	6.99E-11	5.70E-11	5.70E-11	5.70E-11	0.00E+00	5.70E-11	5.70E-11	5.70E-11
SGTR1	3.21E-07	3.21E-07	0.00E+00	3.21E-07	3.21E-07	3.21E-07	3.21E-07	3.73E-09	3.73E-09	0.00E+00	3.73E-09	3.73E-09	3.73E-09	3.73E-09
SGTR2	8.73E-07	8.73E-07	0.00E+00	8.73E-07	8.73E-07	8.73E-07	8.73E-07	2.53E-07	2.53E-07	0.00E+00	2.53E-07	2.53E-07	2.53E-07	2.53E-07
ISLOCA	2.90E-06	0.00E+00	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	5.62E-06	0.00E+00	5.62E-06	5.62E-06	5.62E-06	5.62E-06	5.62E-06
CDF	2.99E-05	2.70E-05	2.87E-05	2.98E-05	2.59E-05	2.29E-05	2.85E-05	2.44E-05	1.88E-05	2.42E-05	2.44E-05	1.99E-05	1.77E-05	2.29E-05

E.4.1.2 CASE NO-SGTR

This case was used to determine the benefit to be obtained from improved response to SGTRs. For the purposes of the analysis, and for each Unit, a single bounding analysis was performed that assumed SGTR would be eliminated. This analysis case was used in the evaluation of SAMAs No. 80-83, and 85.

Evaluation method: The model was modified in order to evaluate the impact on the St. Lucie Units 1 & 2 risk profile if SGTR events were eliminated. The PDSs that represents SGTR (i.e., SGTR1 and SGTR2) were set to zero. The resulting frequency for each PDS is presented in Table E.4-2.

E.4.1.3 CASE 1

This case was used to determine the benefit to be obtained from a redundant, highly reliable, independent Containment Spray System (CSS). For the purposes of the analysis, and for each Unit, a single bounding analysis was performed that assumed that the Containment Spray System would be perfectly reliable, thus eliminating those PDSs representing loss of sprays. This analysis case was used in the evaluation of SAMA No. 48.

Evaluation method: In order to evaluate the impact on the St. Lucie Units 1 & 2 risk profile if containment spray failures were eliminated, few logic changes were imposed. Instead of modifying the baseline results in the model in which safeguard bins that represent CSS failure (e.g., D, E, and H) are set to zero, the logic for CSS injection and recirculation was removed from the fault tree. To simulate the removal of CSS logic in each Unit's model, the following fault-tree logic was included in the corresponding master alignment flag:

Unit 1:

L1CSSINJ01	EQU .F
L1CSSREC04	EQU .F
L1CSSBOTH	EQU .F

Unit 2:

L2CSSINJ01	EQU .F
L2CSSREC04	EQU .F
L2CSSBOTH	EQU .F

The resulting frequency for each PDS is presented in Table E.4-2.

E.4.1.4 CASE 2

This case was used to determine the benefit to be obtained from elimination of reactor coolant pump (RCP) seal loss-of-coolant accident (LOCA) failure, including the operator action for securing the RCPs. For the purposes of the analysis, and for each Unit, a single bounding analysis was performed that assumed that RCP seal LOCA does not occur (and the operator does not fail to secure the RCPs). This analysis case was not used to evaluate SAMAs. See Case 4.

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Evaluation method: In order to evaluate the impact on the St. Lucie Units 1 & 2 risk profile if RCP seal cooling does not fail, few logic changes were imposed on the SAMA baseline models. To simulate the elimination of seal LOCA logic from the respective fault trees, the following logic was introduced in the corresponding master alignment flags:

Unit 1:

SEALLOCA1	EQU .F
SEALLOCA	EQU .F
RTOP1S1RCP	EQU .F

Unit 2:

SEALLOCA1	EQU .F
SEALLOCA	EQU .F
RTOP2S1RCP	EQU .F

The resulting frequency for each PDS is presented in Table E.4-2.

E.4.1.5 CASE 3

This case was used to determine the benefit to be obtained from elimination of Small Small LOCAs. For the purposes of the analysis, and for each Unit, a single bounding analysis was performed that assumed that Small-Small LOCA does not occur. This analysis case was used in the evaluation of SAMA No. 123.

Evaluation method: In order to evaluate the impact on the St. Lucie Units 1 & 2 risk profile if Small-Small LOCA does not occur, few logic changes were imposed on the SAMA baseline models. To simulate the elimination of Small-Small LOCA logic from the respective fault trees, the following logic was introduced in the corresponding master alignment flags:

Unit 1:

%ZZS1U1	EQU .F
---------	--------

Unit 2:

%ZZS1U2	EQU .F
---------	--------

The resulting frequency for each PDS is presented in Table E.4-2.

E.4.1.6 CASE 4

This case was used to determine the benefit to be obtained from elimination of RCP seal LOCA failure. For the purposes of the analysis, and for each Unit, a single bounding analysis was performed that assumed that RCP seal LOCA does not occur. This analysis case was used in the evaluation of SAMAs No. 8, 10, 11, 12, and 16.

Evaluation method: In order to evaluate the impact on the St. Lucie Units 1 & 2 risk profile if RCP seal cooling does not fail, few logic changes were imposed on the SAMA baseline

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models. To simulate the elimination of seal LOCA logic from the respective fault trees, the following logic was introduced in the corresponding master alignment flags:

Unit 1:

SEALLOCA1 EQU .F

SEALLOCA EQU .F

Unit 2:

SEALLOCA1 EQU .F

SEALLOCA EQU .F

The resulting frequency for each PDS is presented in Table E.4-2.

E.4.2 SAMA EVALUATION CASE AVERTED COSTS RESULTS

The modeling results of the six SAMA evaluation cases are provided in Tables E.4-3 and E.4-4, for Unit 1 and Unit 2, respectively. Each table presents the base case for comparison and the calculation for the averted costs (benefit). Also shown is the maximum attainable benefit (MAB) for eliminating all risk associated with the case-specific plant change (e.g., elimination of ISLOCA) represented by the bounding evaluation case. Although the total MAB for Unit 1 (\$1,382,099) is higher than for Unit 2 (\$1,202,105), some cases (and some CDF cutset estimates) are higher for Unit 2. The higher benefit of the two was used for screening and evaluation.

TABLE E.4-3
AVERTED COSTS (BENEFITS) FOR SAMA CASES – UNIT 1

Sama Evaluation Case							
	Base Case	NoISLOCA	NoSGTR	Case1-CS	Case2-seal	Case3-SSL	Case4–Seal
Offsite Annual Dose (rems)	15.3074	11.3634	13.2439	11.9466	14.3566	13.6433	14.9822
Offsite Annual Property Loss	\$42,542	\$32,421	\$38,535	\$30,771	\$39,870	\$37,834	\$41,628
Reduction in CDF	100%	9.69%	3.99%	0.24%	13.52%	23.34%	4.62%
Averted Onsite Dose	\$11,387	\$1,104	\$455	\$27	\$1,539	\$2,658	\$526
Averted Onsite Economic Cost	\$583,332	\$56,552	\$23,273	\$1,371	\$78,887	\$136,166	\$26,979
Averted Offsite Population Dose	\$329,505	\$84,898	\$44,419	\$72,345	\$20,468	\$35,822	\$7,001
Averted Offsite Economic Cost	\$457,875	\$108,931	\$43,131	\$126,695	\$28,758	\$50,670	\$9,837
Total Benefit	\$1,382,099	\$251,485	\$111,279	\$200,437	\$129,652	\$225,316	\$44,343

TABLE E.4-4
AVERTED COSTS (BENEFITS) FOR SAMA CASES – UNIT 2

	Base Case	NoISLOCA	NoSGTR	Case1-CS	Case2-Seal	Case3-SSL	Case4–Seal
Offsite Annual Dose (rems)	13.9718	6.3286	13.8063	12.0941	12.9021	12.3695	13.6026
Offsite Annual Property Loss	\$38,571	\$18,957	\$38,201	\$31,999	\$35,564	\$34,036	\$37,531
Reduction in CDF	100%	22.98%	1.05%	0.21%	18.56%	27.41%	6.37%
Averted Onsite Dose	\$9,309	\$2,139	\$97	\$20	\$1,729	\$2,552	\$593
Averted Onsite Economic Costs	\$476,909	\$109,594	\$5,005	\$984	\$88,537	\$130,736	\$30,363
Averted Offsite Population Dose	\$300,754	\$164,526	\$3,562	\$40,419	\$23,025	\$34,490	\$7,947
Averted Offsite Economic Cost	\$415,133	\$211,101	\$3,976	\$70,731	\$32,366	\$48,805	\$11,188
Total Benefit	\$1,202,105	\$487,361	\$12,640	\$112,154	\$145,657	\$216,583	\$50,090

E.5 ACRONYMS USED IN APPENDIX E

%	Percent
~	Approximately
<	Less than
>	Greater than
AB	Auxiliary Building
AC	Alternating Current
ADS	Automatic Depressurization System
ADV	Atmospheric Dump Valve
AFW	Auxiliary Feedwater
AFWST	Auxiliary Feedwater Storage Tank
AMSAC	ATWS Mitigating System Actuation Circuitry
ANO-1	Arkansas Nuclear One Unit 1
AOT	allowable outage time
AOV	Air-Operated Valve
ATWS	Anticipated Transient Without Scram
Ba	Barium
BGE	Baltimore Gas and Electric Company
BWR	Boiling Water Reactor
CCF	Common-Cause Failure
CCNPP	Calvert Cliffs Nuclear Power Plant
CCW	Component Cooling Water
CDF	Core Damage Frequency
Ce	Cerium
CE	Combustion Engineering, Inc.
CEDM	Control Element Drive Mechanism
CEOG	Combustion Engineering Owners Group
COMSORS	Core-Melt Source Reduction System
CPI	Consumers Price Index
CRD	Control Rod Drive
CSS	Containment Spray System
CST	Condensate Storage Tank

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CVCS	Chemical Volume Control System
DC	Direct Current
DHR	Decay Heat Removal
DWST	Demineralized Water Storage Tank
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EOP	Emergency Operating Procedure
ERCW	Emergency Raw Cooling Water
ERF	Emergency Response Facility
FPL	Florida Power & Light Company
FSAR	Final Safety Analysis Report
FW	Feedwater
GDC	General Design Criterion (Criteria)
HCLPF	High Confidence Low Probability of Failure
HELB	high-energy line break
HEP	Human Error Probability
HHSI	High-Head Safety Injection
HPCI	High-Pressure Coolant Injection
HPCS	High-Pressure Core Spray
HPSI	High-Pressure Safety Injection
HVAC	Heating, Ventilation, and Air Conditioning
I&C	Instrumentation and Controls
IA	Instrument Air
ICW	Intermediate Cooling Water
IEEE	Institute of Electrical and Electronic Engineers
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
ISLOCA	Interfacing System Loss-of-Coolant Accident
K	Thousand
kV	Kilovolt(s)
La	Lanthanum
LC	Load Center
LHSI	Low-Head Safety Injection

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LOCA	Loss-of-Coolant Accident
LOOP	Loss of Offsite Power
LOP	Loss of Power
LPCI	Low-Pressure Coolant Injection
LPSI	Low-Pressure Safety Injection
m/s	Meters Per Second
MAB	Maximum Attainable Benefit
MACCS	Melcor Accident Consequence Code System
MFW	Main Feedwater
MG	Motor Generator
MLW	Mean Low Water
MOV	Motor-Operated Valve
mph	miles per hour
MSIV	Main Steam Isolation Valve
MTC	Moderator Temperature Coefficient
MW(t)	Megawatt (Thermal)
NOAA	National Oceanographic and Atmospheric Administration
NRC	U.S. Nuclear Regulatory Commission
ONP	Off-Normal Procedure
P&ID	Piping and Instrumentation Diagram
PDS	Plant Damage State
PMH	Probable Maximum Hurricane
pmp	Probable Maximum Precipitation
PMS	Probable Maximum Hurricane
PORV	Power-Operated Relief Valve
PRA	Probabilistic Risk Assessment
PRT	Pressure Relief Tank
PSA	Probabilistic Safety Assessment
psi	Pounds Per Square Inch
PWR	Pressurized-Water Reactor
RAB	Reactor Auxiliaries Building
RAI	Request for Additional Information
RCIC	Reactor Core Isolation Cooling

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RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
rem	Roentgen Equivalent Man
RG	Regulatory Guide
RHR	Residual Heat Removal
RRAG	[FPL] Reliability and Risk Assessment Group
RRW	Risk Reduction Worth
Ru	Ruthenium
RWT	Refueling Water Tank
s	Second(s)
SAMA	Severe Accident Mitigation Alternative
SAMDA	Severe Accident Mitigation Design Alternative
SBO	Station Blackout
SDC	Shutdown Cooling
SG	Steam Generator
SGTR	Steam Generator Tube Rupture
SI	Safety Injection
SIT	Safety Injection Tank
SLC	Standby Liquid Control
SRP	Standard Review Plan
SRV	Safety Relief Valve
SSE	Safe Shutdown Earthquake
SSF	Safe Shutdown Facility
SSGFP	Standby Steam Generator Feed Pump
Sv	Sieverts
SW	Service Water
SWGR	Switchgear
TVA	Tennessee Valley Authority
TWST	Treated Water Storage Tank
UFSAR	Update Final Safety Analysis Report
USI	Unresolved Safety Issue
V	Volt(s)
VNFRM	Value of the Non-Farm Assets

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WBN	Watts Bar Nuclear Plant
yr	Year

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APPENDIX F. OTHER AGENCY CORRESPONDENCE

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Letter, Jernigan, D.E. (FPL) to C. Trainor (SCH)	F-1

FPL = Florida Power & Light Company
SCH = State Clearing House

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

PSL-LR-01-0111

Ms. Cherie Trainor
State Clearing House
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Subject: St. Lucie Nuclear Power Plant
License Renewal Project
Coastal Management Program Consistency Certification

Dear Ms. Trainor:

Florida Power & Light Company (FPL) is requesting concurrence with the enclosed Coastal Management Program Consistency Certification. This certification presents FPL's position that continued operation of St. Lucie Units 1 & 2 would be in compliance with the current Florida Coastal Management Program.

FPL is preparing an application to renew the U.S. Nuclear Regulatory Commission (NRC) Operating Licenses for St. Lucie Units 1 & 2 and has performed a review for consistency with the Florida Coastal Management Program. In conjunction with the application to NRC, FPL must submit a certification to the Federal licensing agency (NRC) and the State pursuant to the requirements of the Coastal Zone Management Act.

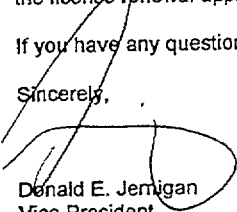
In accordance with NRC regulations for license renewal (10 CFR Part 54), FPL will include an Environmental Report with its license renewal application. This report will include a description of the proposed action and the affected environment, and an analysis of environmental consequences and mitigating actions. Also included in this report will be a complete list of licenses, permits, and other approvals from Federal, State, and local authorities for current St. Lucie Units 1 & 2 operations, as well as approvals and consultations that would be required for the approval of the license for the extended period of operation. A summary of this information is provided as part of the enclosed consistency certification.

The Environmental Report that FPL must submit as part of the St. Lucie Units 1 & 2 application will include a copy of this letter along with the Coastal Management Program Consistency Certification. When FPL submits its application to the NRC, you will also receive a copy of the Environmental Report.

After your review of the Environmental Report and Consistency Certification, I would appreciate a letter concurring with the attached Coastal Management Program Consistency Certification. A copy of your response will be made available to the NRC at the time of their site visit in connection with NRC's environmental review of the license renewal application.

If you have any questions or comments, please call T. V. Abbatiello at (561) 467-7316.

Sincerely,



Donald E. Jernigan
Vice President
St. Lucie Plant
EAT/TVA/sap

Enclosure: Coastal Management Program Consistency Certification

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2

COASTAL MANAGEMENT PROGRAM CONSISTENCY CERTIFICATION

Florida has an approved coastal zone management program documented by the U.S. Nuclear Regulatory Commission (NRC) (Ref. 1). Florida Power & Light Company (FPL) has determined that the proposed St. Lucie Units 1 & 2 license renewal complies with the Florida-approved coastal management program and will be conducted in a manner consistent with such program.

Proposed Activity

FPL operates St. Lucie Units 1 & 2 pursuant to NRC Operating Licenses DPR-67 and NPF-16, respectively. The Unit 1 license will expire March 1, 2016, and the Unit 2 license will expire April 6, 2023. FPL is applying to NRC for renewal of both licenses, which would permit FPL to operate each unit for an additional 20 years (i.e., until March 1, 2036 and April 6, 2043). License renewal would give FPL the option of relying on St. Lucie Units 1 & 2 to meet Florida's future needs for electricity generation.

St. Lucie Units 1 & 2 are located on Hutchinson Island in St. Lucie County, Florida, approximately 7 miles southeast of Fort Pierce and 8 miles north of Stuart (Figure 1 and 2). West Palm Beach, the largest city within 50 miles, is approximately 48 miles to the south. The site is bordered on the east by the Atlantic Ocean and on the west by the Indian River Lagoon. Two public beaches, Blind Creek Pass Park and Walton Rocks Park, lie within the property boundary of St. Lucie Units 1 & 2. The stretch of the Lagoon adjacent to the site is designated as the Jensen Beach to Jupiter Inlet Aquatic Preserve. The Savannas State Preserve, a freshwater lagoon, is located on the mainland approximately 2 miles west of the site. The North Fork of the St. Lucie River Aquatic Preserve is located on the north fork of the St. Lucie River as it parallels the coast approximately 5 miles west of the site.

St. Lucie Units 1 & 2 are shown in Figure 3. Each unit is a pressurized light-water reactor with two steam generators that produce steam that turns turbines to generate electricity. Each unit is capable of an output of 2,700 MW(t), with a corresponding gross electrical output of approximately 890 MW(e). Onsite electrical power usage amounts to less than 100 MW(e), leaving each unit with a reliable net summer rating of 839 MW(e).

St. Lucie Units 1 & 2 utilize a once-through heat dissipation system that withdraws cooling water from and discharges to the Atlantic Ocean. FPL uses small amounts of chlorine in the cooling water systems that discharge to offsite surface waters. There are seven outfalls permitted under the site's Industrial Wastewater Facility Permit. Five of these are internal outfalls, discharging to either the Intake or Discharge Canals and thus ultimately to the Atlantic Ocean. The sixth is an internal outfall where nonindustrial related storm water is discharged to Mangrove Impoundment 8E, located between the Intake and Discharge Canals, east of State Highway A1A. The seventh outfall is the

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ST. LUCIE UNITS 1 & 2

main outfall and is associated with the Once-Through and Intake Cooling Water Systems discharging through the Discharge Canal to the Atlantic Ocean.

St. Lucie Units 1 & 2 use once-through cooling water from the Atlantic Ocean to remove waste heat from the electricity generation process in a two-loop, three-stage heat-transfer design. The primary and secondary loops are closed systems utilizing demineralized water that has been treated to control chemistry and corrosion. The final stage of the heat transfer system involves the Circulating Water System, which is unconfined. Ocean water is withdrawn through three offshore intake structures into the Intake Canal. This water is then pumped from the Intake Canal through the main condensers to the Discharge Canal. The heated water is discharged back to the Atlantic Ocean through offshore diffusers. The three cooling water intake structures are located approximately 1,200 feet offshore where the water is approximately 23 feet deep. They consist of a large concrete base with a vertical cylindrical opening in the center and a concrete velocity cap supported by columns extending approximately 6 feet from the base. Water is conveyed from the structures through separate buried pipes beneath the beach and dune system to the Intake Canal. FPL has installed and maintains three barriers in the channel of the Intake Canal to reduce potential for losses of marine life, particularly sea turtles, and to facilitate return of turtles to the ocean that have entered the intake canal. The Discharge Canal transports the heated cooling water to two discharge pipes at its eastern end. The pipes transport the water beneath the beach dune system back to the Atlantic Ocean. One pipe extends approximately 1,500 feet offshore and ends in a two-port "Y" diffuser. The other pipe extends approximately 3,400 feet offshore and ends in a multiport diffuser. Discharge of heated water through the Y-port and multiport diffusers ensure distribution over a wide area and rapid and efficient mixing with ambient waters. Temperature of the discharged cooling water is limited by the Industrial Wastewater Facility Permit for St. Lucie Units 1 & 2.

The Intake Cooling Water System for St. Lucie Units 1 & 2 is also a once-through cooling system. Up to 58,000 gallons per minute of ocean water are pumped from the Intake Canal through heat exchangers for non-contact cooling for a wide variety of plant equipment. Discharge is to the Discharge Canal and low-level chlorination is used to control biofouling of the system.

St. Lucie Units 1 & 2 use approximately 4 million gallons of water per month (0.13 million gallons per day) from the city of Fort Pierce's water supply system. This municipal water is the source of supply for the plant's process (primarily demineralizer water makeup), potable, sanitary, and fire protection water systems. St. Lucie Units 1 & 2 discharge treated waste process water into the Intake and Discharge Canals. These discharges are regulated under the plant's Industrial Wastewater Facility Permit. Sanitary wastewater is not disposed on site, but is piped to the County's South Hutchinson Island Water Reclamation Facility for treatment and disposal.

FPL employs a permanent workforce of approximately 791 employees and 138 contractors at St. Lucie Units 1 & 2. Approximately 46 percent of the employees live in

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St. Lucie County, 37 percent live in Martin County, 8 percent live in Indian River County, and 6 percent live in Palm Beach County. The site workforce increases by as many as 575-870 workers for temporary (30 to 40 days) duty during refueling outages that occur about once a year. FPL does not anticipate the need for additional staff to support operations during extended operations.

In compliance with NRC regulations, FPL has analyzed the effects of plant aging and identified activities needed for St. Lucie Units 1 & 2 to operate for an additional 20 years. FPL conservatively assumes that renewal of the St. Lucie Units 1 & 2 operating licenses would require the addition of no more than 60 workers to perform the additional license renewal surveillance, monitoring, inspection, testing, trending, and reporting during the four 10-year in-service inspections. St. Lucie Units 1 & 2 license renewal would involve no major refurbishment activities.

St. Lucie transmission lines connect the plant through corridors to the state's electric grid at the Midway substation northwest of the plant (Figure 2). FPL maintains the Midway corridor using a combination of trimming, mowing, and herbicide application. Where required, FPL trims trees at the 14-foot level to maintain clearances. Typically, FPL only needs to do this at mid-span. In open, undeveloped areas, FPL mows approximately every five years. FPL uses spot and broadcast treatment with herbicides primarily to control tall exotic grasses and spot treatment for individual trees that may grow over 14 feet tall. These herbicides are applied under supervision by persons licensed by the State for herbicide application. These are the most common management practices for the Midway corridor.

St. Lucie Units 1 & 2 annually provide approximately 13.7 terawatt-hours of electricity to the grid that supplies electricity to all of FPL customers. In other words, the extended operation of St. Lucie Units 1 & 2 would meet the electrical needs of approximately one-half million households annually.

State Program

Florida's program is a networked coastal management program, which means that it is based on several different State and local authorities rather than a single law and set of regulations. The Program coordinates the actions of eight agencies and five water management districts under the authority of 23 statutes. The "Florida Coastal Program Guide" (Ref. 2) and its companion document, "The Florida Coastal Management Reference Book" (Ref. 3) document these authorities and how the State uses them to assure conformance with Coastal Zone Management Act (16 USC 1451 et seq.) requirements. Table 1 identifies the 23 chapters of the Florida Statutes included in the program as policies and notes the applicability of the key issues to the license renewal of St. Lucie Units 1 & 2. Tables 2 and 3 identify licenses, permits, consultations and other approvals necessary for St. Lucie Units 1 & 2 license renewal and continued operation, respectively.

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FPL consulted with Federal, State, and local regulatory agencies listed below to inform them of St. Lucie Units 1 & 2 plans to seek license renewal. FPL described for the agencies its license renewal efforts and requested input from agency representatives regarding issues of concern.

Federal

U.S. Fish and Wildlife Service
National Marine Fisheries Service

Regional/Local

South Florida Water Management District

State of Florida

Department of Community Affairs
Department of Environmental Protection
Department of Health
Division of Historical Resources
Department of Transportation
Fish and Wildlife Conservation Commission
Florida Coastal Management Program
Florida Department of Agriculture and
Conservation

Probable Effects

The NRC has prepared a generic environmental impact statement (GEIS) that analyzes the environmental impacts associated with the renewal of nuclear power plant operating licenses (Ref. 4 and 5). NRC has codified its findings by rulemaking (10 CFR Part 51, Subpart A, Appendix B, Table B-1). The codification identifies 92 potential environmental issues, 69 of which are generically identified as having small impacts and are called "Category 1" issues. Absent findings of new and significant information, NRC will rely on its codified findings, as amplified by supporting information in the GEIS, for its assessment of environmental impacts associated with license renewal. The codification and GEIS discuss the following types of Category 1 environmental issues:

- Surface water quality, hydrology, and use;
- Aquatic ecology;
- Groundwater use and quality;
- Terrestrial resources;
- Air quality;
- Land use;
- Human health;
- Socioeconomics;
- Uranium fuel cycle and waste management; and decommissioning.

For plants such as St. Lucie Units 1 & 2 that are located within the coastal zone, many of these issues involve potential impacts to the coastal zone. FPL has adopted by reference the GEIS analysis for all Category 1 issues.

LICENSE RENEWAL APPLICATION ST. LUCIE UNITS 1 & 2

The NRC review of environmental impacts arising out of license renewal identified 21 issues as "Category 2," for which license renewal applicants must submit additional, site-specific information.¹ There are 15 Category 2 issues that are applicable to St. Lucie Units 1 & 2.² The applicable issues and conclusions for these issues are as follows:

Aquatic ecology – FPL has conducted cooling water intake and discharge [Clean Water Act Section 316(a) and (b)] studies. It has been determined that the existing intake structures reflect the best technology available for minimizing entrainment and impingement impacts. Thermal plume studies indicated the thermal discharge from St. Lucie Units 1 & 2 complies with Florida Water Quality Standards without recourse to a Clean Water Act Section 316(a) variance. Consequently, the impacts of continued plant operation from entrainment, impingement, and heat shock would be small.

Terrestrial resources – FPL has no plans to perform major refurbishment activities; therefore, impacts due to refurbishment are not expected.

Threatened and endangered species – FPL has no plans to perform major refurbishment activities; therefore, impacts due to refurbishment are not expected and impacts to these species through license renewal would be small due to mitigative measures that are in place.

Air quality – FPL has no plans to perform major refurbishment activities; therefore, impacts due to refurbishment are not expected.

Human Health – St. Lucie Units 1 & 2 transmission lines meet the National Electric Safety Code recommendations for preventing electric shock from induced currents; therefore, the impact from electric shock would be small.

Socioeconomics – FPL has no plans for refurbishment activities; therefore, impacts to the local education system and transportation due to refurbishment are not expected. FPL's conservative bounding analysis of 60 additional license renewal personnel would not result in significant impacts to available housing or local water systems.

Offsite land use – FPL has no plans to perform major refurbishment activities; therefore, impacts due to refurbishment are not expected. The tax-related impacts of continued operations would be small.

¹ 10 CFR 51, Subpart A, Appendix B, Table B-1 also identifies 2 issues as "NA" for which NRC could not come to a conclusion regarding categorization. These issues, chronic effects of electromagnetic fields and environmental justice, do not affect the "coastal zone" as that phrase is defined by the Coastal Zone Management Act [16 USC 1453(1)]

² Some Category 2 issues are applicable to plants having features that are not present at St. Lucie Units 1 & 2 (e.g., cooling towers).

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Historic and archeological resources – FPL has no plans to perform major refurbishment activities; therefore, impacts due to refurbishment are not expected, and continued operations would have no impacts.

Severe accident mitigation alternatives – FPL identified no cost beneficial modifications that would reduce the impacts of a severe accident.

Findings

1. NRC has determined that the significance of Category 1 issue impacts is small. A small significance level is defined by NRC as follows:

For the issue, environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purpose of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's regulations are considered small as the term is used in this table. (10 CFR Part 51, Subpart A, Appendix B, Table B-1)

FPL has adopted by reference the NRC findings for Category 1 issues.

2. For applicable Category 2 issues, FPL has determined that the environmental impacts are small, as that term is defined by the NRC. Impact to the coastal zone, therefore, would also be small.
3. To the best of its knowledge, FPL is in compliance with Florida licenses, permits, approvals, and other requirements as they apply to St. Lucie Units 1 & 2 impacts on the Florida coastal zone (see Table 1).
4. St. Lucie Units 1 & 2 license renewal and continued operation of St. Lucie Units 1 & 2 facilities, and their effects, are all consistent with the Florida Coastal Management Program.

State Notification

FPL hereby certifies that St. Lucie Units 1 & 2 license renewal is consistent with the Florida Coastal Management Program. The regulation [15 CFR 930.63(a)] provides the State has six months from the receipt of this letter and accompanying information in which to concur or object to the FPL certification. However, the regulation [15 CFR 930.63(b)] also provides that if Florida has not issued a decision within three months following commencement of State agency review, it shall notify the contacts listed below of the status of the matter and the basis for further delay. The State's concurrence, objections, or notification of review status should be sent to the following contacts:

LICENSE RENEWAL APPLICATION
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Christopher I. Grimes, Branch Chief
License Renewal and Standardization Branch
Office of Nuclear Reactor Regulation
U.S Nuclear Regulatory Commission
One White Flint
11555 Rockville Pike
Rockville, Maryland 20555
(301) 415-1183

Donald E. Jernigan, Vice-President
St. Lucie Plant
Florida Power and Light Company
6351 S.Ocean Drive
Jensen Beach, FL 34957
(561) 467-7100

LICENSE RENEWAL APPLICATION
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References

- Ref. 1 U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation. "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." Revision 2, 1999.
- Ref. 2 State of Florida, 1998 Coastal Program Guide, A Guide to the Federally Approved Florida Coastal Management Program. Department of Community Affairs. Revised November 1, 2000. Accessed June 2001.
<http://www.dca.state.fl.us/ffcm/fcmp/pubs/progguide98.htm>.
- Ref. 3 State of Florida, Florida Coastal Management Program 1998 Reference Book. Department of Community Affairs.
<http://www.dca.state.fl.us/ffcm/fcmp/pubs/refguide98/outline.htm>.
Accessed June 2001.
- Ref. 4 U.S. Nuclear Regulatory Commission. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. NUREG-1437. Washington, D.C., May 1996.
- Ref. 5 U.S. Nuclear Regulatory Commission. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. Section 6.3, "Transportation" and Table 9-1, "Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants." NUREG-1437, Vol. 1, Addendum 1. Washington, D.C., August 1999.

TABLE 1
MATRIX OF FCMP ENABLING POLICIES AND LICENSE RENEWAL OF
ST. LUCIE UNITS 1 & 2

Florida Statute	Key Issue	Applicability and Response
Chapter 161	Beach and Shore Preservation	Not applicable; proposed action does not involve coastal construction. If a need for beach modification were to arise as a result of erosion from an extreme storm event, FPL would consult with DEP and pursue the appropriate permit.
Chapter 163, Part III	County and Municipal Planning and Land Development Regulation	Not applicable; proposed action involves an existing facility and no alterations.
Chapter 186	State and Regional Planning	Not applicable; proposed action involves an existing facility and continued operations do not require changes to water use, land use or transportation.
Chapter 252	Emergency Management	FPL has an approved emergency plan that it implements in coordination with the Division of Emergency Management.
Chapter 253	State Lands	Not applicable; proposed action is not associated with state lands.
Chapters 253, 259, 260, and 375	Land Acquisition	Not applicable; proposed action is not associated with state lands.

TABLE 1 (continued)
MATRIX OF FCMP ENABLING POLICIES AND LICENSE RENEWAL OF
ST. LUCIE UNITS 1 & 2

Florida Statute	Key Issue	Applicability and Response
Chapter 258	State Parks and Preserves	<p>Not applicable to State Parks; proposed action will not impact the two parks (Blind Creek Pass and Walton Rocks) in the vicinity or impair the public's ability to enjoy these resources. There are no proposed changes to either permitted air emissions or liquid effluent discharges. The visual impact of the plant will not change, since there are no modifications associated with the proposed action.</p> <p>Not applicable to Aquatic Preserves; proposed action does not involve dredging, spoiling, filling, erection and repair of structures and facilities, excavation of minerals drilling of oil and gas, or aquaculture that could potentially impact the Jensen Beach to Jupiter Inlet Aquatic Preserve. Discharges are controlled by the Industrial Wastewater Facility Permit (see Table 2)</p>
Chapter 267	Archives, History, and Records Management	<p>FPL has corresponded with the State Historic Preservation Officer and received concurrence that the proposed action will not impact historic resources.</p>
Chapter 288	Commercial Development and Capital Improvements	<p>Continued operation of St. Lucie Units 1 & 2 supports and enhances economic development.</p>
Chapters 334 and 339	Transportation Administration and Finance	<p>Not applicable; proposed action does not involve the transportation system.</p>
Chapter 370	Saltwater Fisheries	<p>FPL has corresponded with the National Marine Fisheries Service and the Florida Fish and Wildlife Conservation Commission (FWCC). Proposed action does not involve construction or changes in operation; therefore, no additional impacts are anticipated.</p>

TABLE 1 (continued)
MATRIX OF FCMP ENABLING POLICIES AND LICENSE RENEWAL OF
ST. LUCIE UNITS 1 & 2

Florida Statute	Key Issue	Applicability and Response
Chapter 372	Wildlife	FPL has corresponded with the US Fish and Wildlife Service and FWCC. Proposed action does not involve construction or changes in operations; therefore, no additional impacts are anticipated.
Chapter 373	Water Resources	Industrial Wastewater Facility Permit controls impacts to surface waters of the state.
Chapter 376	Pollutant Discharge Prevention and Removal	Not applicable; proposed action does not involve transfer, storage, or transportation of gasoline, pesticides, ammonia, or chlorine. Liquid sodium hypochlorite is stored onsite in aboveground storage tanks for use in biofouling control of some cooling water systems. Management of these tanks is covered in the site's Spill Prevention Plan.
Chapter 377	Energy Resources	Not applicable; proposed action does not involve exploration, drilling, or production of oil, gas or other petroleum products.
Chapter 380	Land and Water Management	Not applicable; proposed action involves an existing facility that is not located in an Area of Critical Concern. A resource planning and management committee was established for Hutchinson Island who put in place a completed and approved resource management plan in the mid 1980s. The Florida legislature chose not to designate Hutchinson Island as an Area of Critical Concern.
Chapter 381.001, .0011, .0012, .006, .0061, .0065 -.0067	Public Health, General Provisions	Not applicable; FPL does not have onsite sewage treatment and disposal.

TABLE 1 (continued)
MATRIX OF FCMP ENABLING POLICIES AND LICENSE RENEWAL OF
ST. LUCIE UNITS 1 & 2

Florida Statute	Key Issue	Applicability and Response
Chapter 388	Mosquito Control	Not applicable; proposed action does not involve arthropod control. FPL cooperates with St. Lucie County's mosquito control program in the Mangrove Impoundments in the vicinity of St. Lucie Units 1 & 2. The program involves withdrawals of small amounts of ocean water from the Intake Canal for annual seasonal flushing and renourishment of Mangrove Impoundment 8E and then pumping that water back to the Intake Canal. The county also controls water levels on the other Mangrove Impoundments surrounding St. Lucie Units 1 & 2. These impoundments are hydrologically connected by water control structures to the Indian River Lagoon. The proposed action would not involve changes to plant operations that would impact these mosquito control activities.
Chapter 403	Environmental Control	FPL has an air permit and an industrial wastewater facility permit (See Table 2).
Chapter 582	Soil and Water Conservation	Not applicable; proposed action does not involve activities associated with soil erosion.
DEP =	Department of Environmental Protection	
FPL =	Florida Power & Light Company	
FWCC =	Fish and Wildlife Conservation Commission	
NPDES =	National Pollutant Discharge Elimination System	
FCMP =	Florida Coastal Program Guide	

TABLE 2
ENVIRONMENTAL AUTHORIZATIONS FOR CURRENT
ST. LUCIE UNITS 1 & 2 OPERATIONS

Agency	Authority	Requirement	Number	Expiration Date	Activity Covered
U.S. Nuclear Regulatory Commission	Atomic Energy Act [42 USC 2011, et seq.], 10 CFR 50.10	License to operate	DPR-67 (Unit 1) NPF-16 (Unit 2)	3/1/2016 (Unit 1) 4/6/2023 (Unit 2)	Operation of St. Lucie Units 1 & 2
U.S. Fish and Wildlife Service	Migratory Bird Treaty Act [16 USC 703 – 712]	Special Purpose Salvage	PRT-697722	12/31/2000 (In renewal process)	Carcass salvage and injured bird transport. This is an FPL system-wide permit that may be applied as necessary and appropriate at St. Lucie Units 1 & 2
U.S. Army Corps of Engineers	Rivers and Harbors Act (33 USC 403) Clean Water Act (33 USC 1344)	Dredge Permit	199301803	12/21/2003	Maintenance dredging of Intake Canal

TABLE 2 (continued)
ENVIRONMENTAL AUTHORIZATIONS FOR CURRENT
ST. LUCIE UNITS 1 & 2 OPERATIONS

Agency	Authority	Requirement	Number	Expiration Date	Activity Covered
DEP	Florida Statutes § 403	Industrial Wastewater Facility Permit	FL0002208	1/9/2005	Wastewater treatment and effluent disposal. State implementation of National Pollutant Discharge Elimination System
DEP	Florida Statutes Chapter 376	Annual storage tank registration	Facility ID: 8630677 Placard No: 135878	6/30/2002	Operation of above- ground storage tanks. Five tanks for petroleum products (Tank Id Nos. 9, 10, 11, 12, and 13)
DEP Siting Coordination Office and Siting Board (Governor and Cabinet)	Florida Statutes § 403.501-518	Power Plant Siting Act Certification	Case No: PA74-02	Life of plant	Siting, construction, and operation of St. Lucie Unit 2 (The Power Plant Siting Act was not applicable to Unit 1)

TABLE 2 (continued)
ENVIRONMENTAL AUTHORIZATIONS FOR CURRENT
ST. LUCIE UNITS 1 & 2 OPERATIONS

Agency	Authority	Requirement	Number	Expiration Date	Activity Covered
DEP	Florida Statutes Chapter 403	Air permit	1110071-003-AO	6/26/2005	Emissions from six emergency diesel generators, miscellaneous diesel-driven equipment, and facility-wide fugitive emission from storage tanks, roadways, and paint/sandblasting
Florida Fish and Wildlife Conservation Commission (FWCC) ^a	Florida Administrative Code Chapter 39	Special purpose permit	01S-018	1/26/2002	Collection and possession of marine organisms for experimental purposes

TABLE 2 (continued)
ENVIRONMENTAL AUTHORIZATIONS FOR CURRENT
ST. LUCIE UNITS 1 & 2 OPERATIONS

Agency	Authority	Requirement	Number	Expiration Date	Activity Covered
FWCC	Florida Administrative Code Chapter 39	Marine turtle permit	TP#026	1/31/2002	Conduct turtle watches and maintain and display preserved specimens
FWCC	Florida Administrative Code Chapter 39	Marine turtle permit	TP#125	1/31/2002	Conduct turtle activities including net capture, tagging, nesting surveys, hand-capture, nest relocation, rescue and release of hatchlings, stranding and salvage activities

TABLE 2 (continued)
ENVIRONMENTAL AUTHORIZATIONS FOR CURRENT
ST. LUCIE UNITS 1 & 2 OPERATIONS

Agency	Authority	Requirement	Number	Expiration Date	Activity Covered
FWCC	Florida Administrative Code Chapter 39	Scientific Collecting permit	WS01374	6/25/2004	Carcass or wildlife salvaged and possessed for scientific or educational purposes. This is an FPL system-wide permit that may be applied as necessary and appropriate at St. Lucie Units 1 & 2
FWCC	Florida Administrative Code Chapter 39	Migratory Bird Nest permit	WN01373	6/25/2003	Authorization to destroy inactive nests of migratory birds other than ospreys (<i>Pandion haliaetus</i>) for routine facility maintenance. This is an FPL system-wide permit that may be applied as necessary and appropriate at St. Lucie Units 1 & 2

TABLE 2 (continued)
ENVIRONMENTAL AUTHORIZATIONS FOR CURRENT
ST. LUCIE UNITS 1 & 2 OPERATIONS

Agency	Authority	Requirement	Number	Expiration Date	Activity Covered
South Florida Water Management District (SFWMD)	Florida Administrative Code 40E-20.042	General water use permit	56-01238-W	7/13/2002	Aquifer remediation of surficial aquifer
SFWMD	Florida Administrative Code Chapter 65-25	Stormwater discharge permit	56-00848-S	Perpetual	Stormwater discharge from overflow parking lot
SFWMD	Florida Administrative Code Chapter 62-25	Stormwater discharge permit	85-142	Perpetual	Stormwater discharge from the Simulator Building

CFR = Code of Federal Regulations
DEP = Florida Department of Environmental Protection
FFWCC = Florida Fish and Wildlife Conservation Commission
SFWMD = South Florida Water Management District
a. Effective July 1, 1999, the Florida Fish and Wildlife Conservation Commission replaced the Florida Game and Fresh Water Fish Commission.

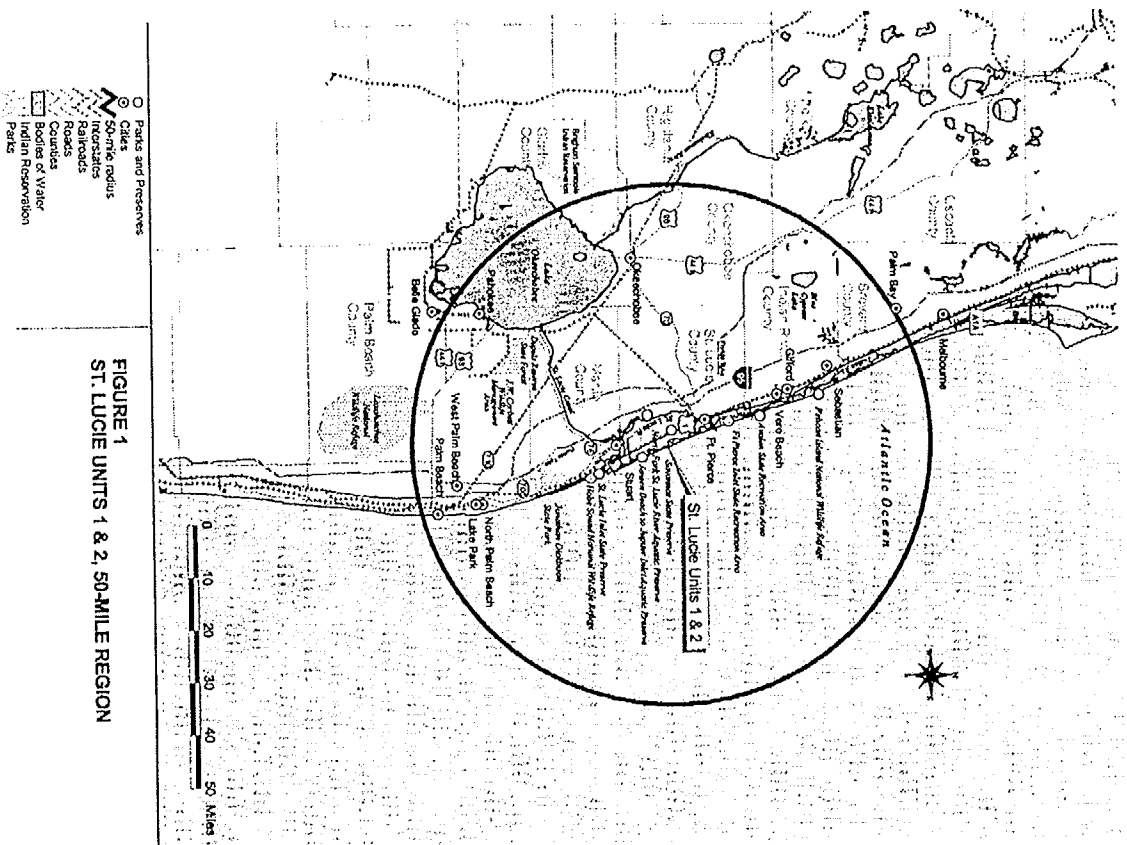
LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

TABLE 3
ENVIRONMENTAL AUTHORIZATIONS FOR ST. LUCIE
UNITS 1 & 2 LICENSE RENEWAL^a

Agency	Authority	Requirement	Remarks
U.S. Nuclear Regulatory Commission	Atomic Energy Act (42 USC 2011 et seq.)	License renewal	Environmental Report submitted in support of license renewal application.
FWS and NMFS	Endangered Species Act Section 7 (16 USC 1536)	Consultation	Requires Federal agency issuing a license to consult with FWS and NMFS.
Florida Department of Environmental Protection	Clean Water Act Section 401 (33 USC 1341) Florida Statutes Chapter 62-4.160(13)(c)	Certification	St. Lucie Units 1 & 2 Industrial Wastewater Facility Permit constitutes State Certification.
Florida Division of Historic Resources	National Historic Preservation Act Section 106 (16 USC 470f)	Consultation	Requires Federal agency issuing a license to consider cultural impacts and consult with State Historic Preservation Officer (SHPO).
Florida Department of Community Affairs	Federal Coastal Zone Management Act (16 USC 1451 et seq.)	Certification	Requires an applicant to provide certification to the Federal agency issuing the license that license renewal would be consistent with the Federally approved state coastal zone management program. Based on its review of the proposed activity, the State must concur with or object to the applicant's certification.

FPL = Florida Power & Light Company
 FWS = U.S. Fish and Wildlife Service
 NMFS = National Marine Fisheries Service
 a. No renewal-related requirements identified for local or other agencies.

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2



LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

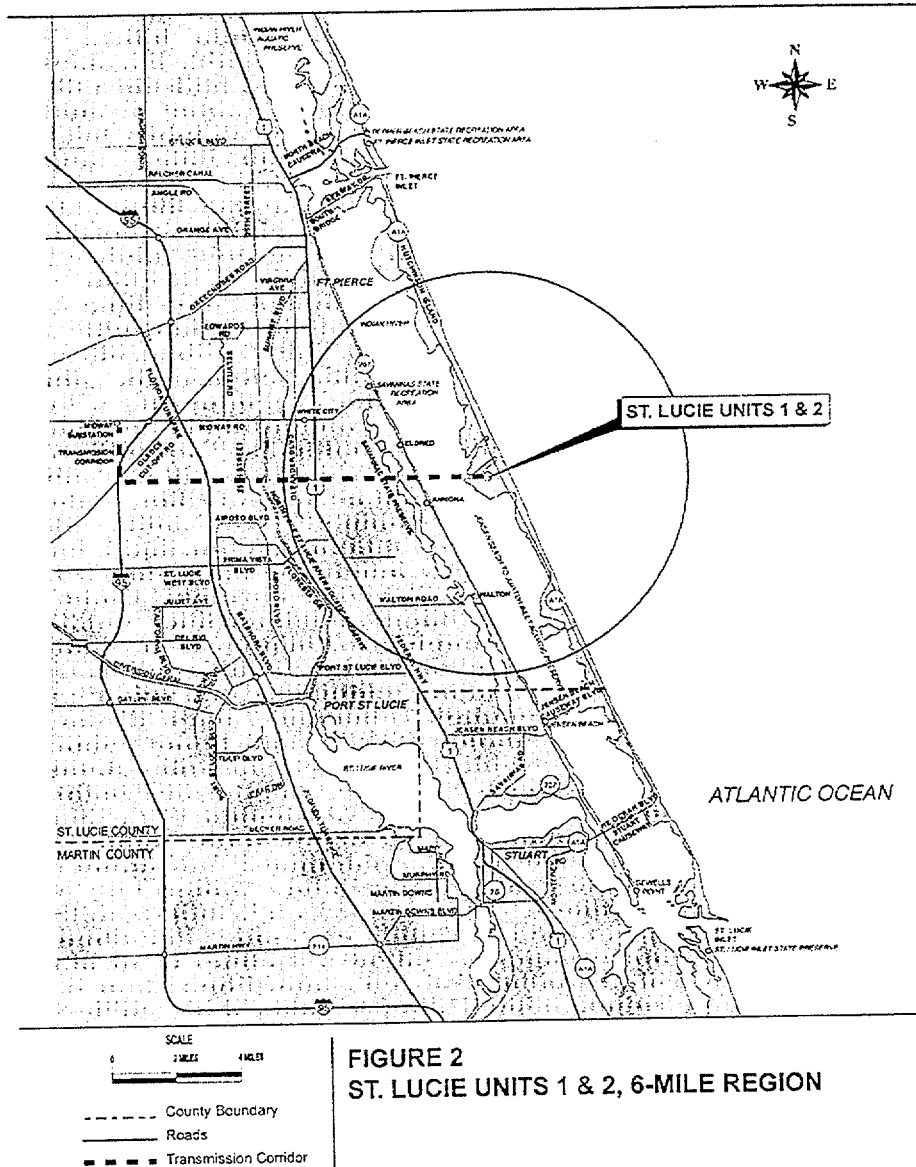


FIGURE 2
ST. LUCIE UNITS 1 & 2, 6-MILE REGION

LICENSE RENEWAL APPLICATION
ST. LUCIE UNITS 1 & 2

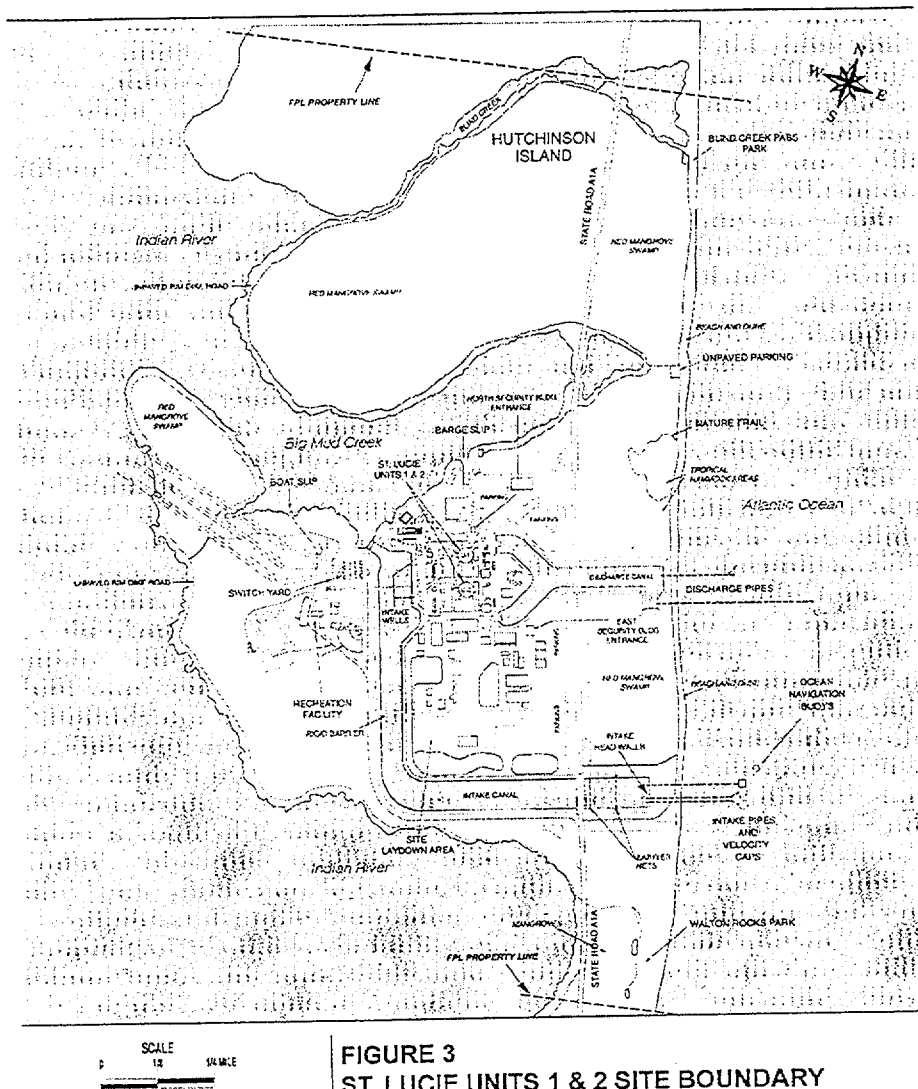


FIGURE 3
ST. LUCIE UNITS 1 & 2 SITE BOUNDARY