September 27, 2002

LICENSEE: Florida Power and Light Company

FACILITY: St. Lucie Nuclear Station, Units 1 and 2

SUBJECT: SUMMARY OF MEETINGS AND CONFERENCE CALLS BETWEEN THE NRC AND THE FLORIDA POWER AND LIGHT COMPANY TO DISCUSS DRAFT RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE ST. LUCIE LICENSE RENEWAL APPLICATION

The NRC staff and representatives of the Florida Power and Light Company (FPL) held meetings on August 15-16 and September 4-5, 2002, and conference calls on September 12 and 20, 2002, to discuss the applicant's draft responses to the staff's requests for additional information (RAIs). On the basis of these discussions, the applicant identified plans for making revisions to some of its responses. Lists of the participants in the meetings and conference calls are provided in Enclosures 1 and 2. The meeting summary, which identifies the RAI responses discussed and the applicant's planned actions, is provided in Enclosure 3. FPL has had an opportunity to review and comment on this summary. The FPL responses to the staff's RAIs are provided in Enclosures 4 to 9.

/***RA***/

Noel F. Dudley, Senior Project Manager
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos. 50-335 and 50-389

Enclosures:
1. Participants in Meetings
2. Participants in the Conference Calls
3. Meeting Summary
4. Draft RAI Responses Concerning the Scoping and Screening Methodology
5. Draft RAI Responses Concerning the Scoping and Screening Results
6. Draft RAI Responses Concerning Aging Management Reviews (AMRs)
7. Draft RAI Responses Concerning AMRs Related to Auxiliary Systems
8. Draft RAI Responses Concerning Time-Limited Aging Analyses
9. Draft RAI Responses Concerning AMPs

cc w/enclosures 1, 2, and 3: See next page

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RLEP RF
W. Dam
N. Dudley

E-MAIL:

PUBLIC
J. Johnson
W. Borchardt
D. Matthews
F. Gillespie
RidsNrrDe
R. Barrett
E. Imbro
G. Bagchi
K. Manoly
W. Bateman
J. Calvo
C. Holden
P. Shemanski
H. Nieh
G. Holahan
H. Walker
S. Black
B. Boger
D. Thatcher
G. Galletti
C. Li
J. Moore
R. Weisman
M. Mayfield
A. Murphy
W. McDowell
S. Smith (srs3)
T. Kobetz
C. Munson
RLEP Staff

B. Moroney
R. McIntyre
L. Wert (RII)
C. Julian (RII)

Mr. J. A. Stall
Florida Power and Light Company

ST. LUCIE PLANT

cc:

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Senior Resident Inspector
St. Lucie Plant
U.S. Nuclear Regulatory Commission
P.O. Box 6090
Jensen Beach, Florida 34957

Craig Fugate, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

M. S. Ross, Attorney
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Douglas Anderson
County Administrator
St. Lucie County
2300 Virginia Avenue
Fort Pierce, Florida 34982

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, Florida 32399-1741

Mr. Donald E. Jernigan, Site Vice President
St. Lucie Nuclear Plant
6501 South Ocean Drive
Jensen Beach, Florida 34957

Mr. R. E. Rose
Plant General Manager
St. Lucie Nuclear Plant
6501 South Ocean Drive
Jensen Beach, Florida 34957

Mr. J. T. Voorhees
Acting Licensing Manager
St. Lucie Nuclear Plant
6501 South Ocean Drive
Jensen Beach, Florida 34957

Mr. Don Mothena
Manager, Nuclear Plant Support Services
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Rajiv S. Kundalkar
Vice President - Nuclear Engineering
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. J. Kammel
Radiological Emergency
Planning Administrator
Department of Public Safety
6000 SE. Tower Drive
Stuart, Florida 34997

Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, Florida 32304

Mr. Steve Hale
St. Lucie Nuclear Plant
Florida Power and Light Company
6351 South Ocean Drive
Jensen Beach, Florida 34957-2000

Mr. Alan P. Nelson
Nuclear Energy Institute
1776 I Street, N.W., Suite 400
Washington, DC 20006-3708
APN@NEI.ORG

David Lewis
Shaw Pittman, LLP
2300 N Street, N.W.
Washington, D.C. 20037

ST. LUCIE LICENSE RENEWAL APPLICATION REVIEW
PARTICIPANTS IN MEETINGS
DRAFT RESPONSES

August 15, 2002, Meeting

NRC Staff Participants		Florida Power and Light Participants
Noel Dudley	Spyros Traiforos, ISL	Steve Hale
Bill Dam	Jin-Sien Guo	Tony Menocal
W. Chang-Yang Li	John Tsao	
Ron Young	Muhammad Razzaque	
Ben Gitnick, ISL	Ralph Caruso	
Greg Galletti	John Fair	
Sam Lee	James Medoff	
Janak Raval	Jai Rajan	
Naeem Iqbal	Diane Jackson	
H. Abelson	Hans Ashar	
David Shum	David Jeng	
Greg Hatchett		

August 16, 2002, Meeting

NRC Staff Participants		Florida Power and Light Participants
Noel Dudley	Ron Young	Steve Hale
Bill Dam	Daniel Frumkin	Tony Menocal
Ben Gitnick, ISL	Ken Dungan, via telephone	

September 4, 2002, Meeting

NRC Staff Participants		Florida Power and Light Participants
Noel Dudley	Mark Hartzman	Steve Hale
Bill Dam	Thomas McLellan	Tony Menocal
John Fair	John Tsao	Jack Hoffman
Jim Medoff	Jai Rajan	
Duc Nguyen		

Public Participant: Deann Raleigh, Scientech

September 5, 2002, Meeting

NRC Staff Participants		Florida Power and Light Participants
Noel Dudley	Jai Rajan	Steve Hale
Bill Dam	Ralph Caruso	Tony Menocal
Simon Sheng	Muhammad Razzaque	

ST. LUCIE LICENSE RENEWAL APPLICATION REVIEW
PARTICIPANTS IN CONFERENCE CALLS
DRAFT RESPONSES

People who participated in the September 12 and 20, 2002, conference calls concerning scoping and screening results and aging management reviews of auxiliary systems included:

September 12, 2002

NRC Staff Participants

Noel Dudley
Greg Galletti
John Knox
Ron Young
Renee Li
Ben Gitnick, ISL
Spyros Traiforos, ISL
Shi-Wing Tam, ANL
Vic Shaw, ANL

Florida Power and Light Company Participants

Steve Hale, via telephone
Tony Menocal, via telephone

September 19, 2002

NRC Staff Participants

Noel Dudley
Matthew Mitchell
Mark Hartzman

Florida Power and Light Company Participants

Steve Hale, via telephone
Tony Menocal, via telephone

MEETINGS WITH FLORIDA POWER AND LIGHT COMPANY
ST. LUCIE, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
DRAFT RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION

The Nuclear Regulatory Commission (NRC) staff (the staff) met with representatives of Florida Power and Light Company (FPL or the applicant) on August 15-16 and September 4-5, 2002, to discuss draft responses to the staff's requests for additional information (RAIs) associated with the application for renewed operating licenses for St. Lucie, Units 1 and 2. The staff and FPL representatives also discussed the draft responses during conference calls on September 12 and 20, 2002. Prior to the discussions, the applicant provided the staff with draft responses to the RAIs. The draft responses are provided in Enclosures 4 through 9 of this meeting summary package.

On the basis of the discussions, the staff was able to better understand the applicant's technical bases; however, no technical issues were resolved. In some cases, the applicant identified actions that would enhance its draft responses. The notation that the applicant's action is "None" does not imply the staff's approval or agreement with the technical information provided in the draft response.

The applicant is scheduled to summit its responses to the RAI by Octobe 11, 2002. The staff will review the applicant's responses when they are received. A summary of the RAIs discussed and the applicant's actions are presented below. The complete RAIs and draft responses are available in the identified enclosures.

RAI 2.1 - 1

Consistent with the staff position concerning evaluation of non-piping structures, systems, and components (SCCs) to determine which additional non-safety-related SSCs are with the scope of license renewal, please describe the scoping methodology that was used. As part of your response, please indicate the option(s) credited, list the SSCs included within scope as a result of your efforts, list those structures and components for which aging management reviews (AMRs) were conducted, and describe the aging management programs that will be credited for managing the identified aging effects.

Draft response: Enclosure 4, page 1

Applicant Action: The applicant plans to revise its response by:

- expanding the description of the methodology used to establish what additional non-safety-related piping should be included in the scope of license renewal,
- explaining the National Electrical Manufactures Association (NEMA) class rating of electrical equipment used in outdoor service,
- changing the nomenclature used in new tables to be consistent with the nomenclatures in table 2.2 - 1 in the license renewal application (LRA), and
- identifying, in a concluding statement for each of the systems, what license renewal boundaries had been expanded.

RAI 2.1 - 2

Draft Response: Enclosure 4, page 15

Applicant Action: None

RAI 2.1 - 3

Draft Response: Enclosure 4, page 27

Applicant Action: None

RAI 2.2 - 2

Draft Response: Enclosure 5, page 2

Applicant Action: None

RAI 2.3.1 - 1

The updated final safety analysis reports (UFSARs) for St. Lucie indicate that Units 1 and 2 are required to be in cold shutdown following some postulated fire events. However, the applicant states on page 3.1-11 of the LRA that the pressurizer spray heads do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and, therefore, are not within the scope of license renewal. The staff requests that the applicant explain whether the components, which spray water inside the pressurizer to condense steam (auxiliary spray), are relied upon to take the units to cold shutdown following the postulated fire events. Also consider postulated Station Blackout (SBO) events that require the units to be in cold shutdown.

Draft Response: Enclosure 5, page 3

Applicant Action: The applicant plans to revise its response to include a quantitative justification that, assuming the failure of the pressurizer spray nozzle head, the operators can adequately control the pressure in the pressurizer during natural circulation to cooldown the plant within 72 hours.

RAI 2.3.1 - 2

The applicant states on page 3.1-11 of the LRA that pressurizer thermal sleeves do not perform or support any license renewal system intended functions that satisfy the scoping criteria of 10 CFR 54.4 and, therefore, are not within the scope of license renewal. The applicant further states that the thermal sleeves are not part of the pressure boundary, but do provide thermal shielding to the surge and spray nozzles of the pressurizer to minimize fatigue for those nozzles, which might otherwise result from thermal cycles. Fatigue has been identified as an

aging effect requiring a time-limited aging analysis (TLAA), and is analytically addressed in Section 4.3.1 of the LRA. The staff concludes that, since the thermal sleeves were credited in the TLAA for the nozzles (pressure boundary), they should require an aging management program. Operable thermal sleeves are relied upon to allow the nozzles to perform their intended safety functions during the extended period of operation and, therefore, the thermal sleeves should be within the scope of license renewal, pursuant to 10 CFR 54.4(a)(2). Furthermore, the Westinghouse Owners Group has committed in topical report WCAP-14574-A, "License Renewal Evaluation: Aging Management Evaluation for Pressurizers," and the staff has concurred that the pressurizer surge nozzle and the spray nozzle thermal sleeves should require an AMR.

The staff requests that the applicant perform an AMR of the subject components, or justify why one is not required.

Draft Response: Enclosure 5, page 4

Applicant Action: The applicant plans to revise its response to indicate that the thermal sleeves are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2)

RAI 2.3.2 - 1

During the injection mode for a small break loss-of-coolant accident, a portion of the high pressure safety injection (HPSI) flow is returned to the refueling water tank (RWT) through the bypass line. A section of the bypass line (1-SI-02, location A7, and 2-SI-02, location B4) near the RWT is non-safety-related, and the LRA shows that it is not within the scope of license renewal. If this piping fails and flow is not returned to the RWT, the inventory of the tank could be prematurely exhausted. For both units, there are orifices in the bypass lines which restrict the maximum bypass flow. The Unit 1 bypass flow is 30 gpm per pump (per Table 6.3-2 of the Unit 1 UFSAR) for operation at rated HPSI flow. No specific bypass flow rate could be identified in the Unit 2 UFSAR. For breaks of sufficiently small size, the bypass flow can continue to leak out for a long period of time, potentially exhausting the supply of coolant from the RWT. The failure of the non-safety-related piping in the bypass line could prevent satisfactory accomplishment of the safety-related intended function of the HPSI system. Justify why the piping and valve body components in the bypass piping to the RWT are not within the scope of license renewal and subject to an AMR.

Draft Response: Enclosure 5, page 7

Applicant Action: The applicant plans to revise its response to include a quantitative justification for its position that failure of the non-safety-related bypass line will not prevent the safety injection system from meeting its design function.

RAI 2.3.3 - 1

Unit 1 license renewal boundary drawing 1-CCW-01 shows connections to temporary air conditioning chillers at four locations (D1, C1, C2, and C3). These chillers are shown as not

being within the scope of license renewal; however, two of them are connected to essential loop A and two are connected to essential loop B. These chillers and their intended functions are not described in Section 9.2.2 of the Unit 1 UFSAR, which discusses the component cooling water system. Therefore, the staff is unable to verify that these chillers do not have an intended function that would meet the requirements of 10 CFR 50.54(a). Justify why these components are considered to be outside the scope of license renewal or are not subject to an AMR.

Draft Response: Enclosure 5, page 13

Applicant Action: The applicant plans to clarify why the temporary chillers are not required during shutdown and provide the basis for classifying the chillers as quality group D.

RAI 2.3.3 - 2

Draft Response: Enclosure 5, page 14

Applicant Action: None

RAI 2.3.3 - 4

Draft Response: Enclosure 5, page 17

Applicant Action: None

RAI 2.3.3 - 8

The boundary of the portion of the instrument air system that is within the scope of license renewal ends at valves that are shown as normally open (see license renewal boundary drawing 1-IA-03 at locations C5, C7, D5, and H6; drawing 1-IA-05 at locations A2 and A5; and drawing 2-IA-04 at location C5). Failure of the downstream piping may affect the pressure boundary intended function. In Section 2.3.3.8 of the LRA, the applicant states that this approach is acceptable because sufficient time exists to close the open valves for the SBO and fire scenarios for which this system is needed.

Provide additional information to support the basis for this determination. For example, discuss the steps in the SBO and fire procedures for closing the valves, the amount of time required to complete these steps, and the availability of sufficient air inventory if the valves are not closed.

Draft Response: Enclosure 5, page 21

Applicant Action: The applicant plans to provide quantitative justifications for its assessment that there is sufficient time to close isolation valves, and substantial redundancy and capacity available.

RAI 2.3.3 - 9

Draft Response: Enclosure 5, page 22

Applicant Action: None

RAI 2.3.3 - 10

In LRA Section 2.4.2.10, “Intake Structures,” the applicant states that water enters each intake structure through four submerged openings and passes through the stationary and traveling screens before entering the rear of the intake structure where the pumps are located. It appears that these screens perform an intended function by preventing debris and organisms from reaching and causing the failure of the safety-related intake cooling water pumps and strainers. As such, these screens would be within the scope of license renewal and subject to an AMR. The staff was unable to locate these components either in LRA Table 3.3-9 for the intake cooling water system, or in Table 3.5-11 for the intake structure. Justify why the traveling screens are considered to be outside the scope of license renewal or are not subject to an AMR.

Draft Response: Enclosure 5, page 23

Applicant Action: The applicant plans to provide the flow velocities at the traveling screens associated with circulating water system pumps and intake cooling water system pumps.

RAI 2.3.3 - 13

Draft Response: Enclosure 5, page 26

Applicant Action: None

RAI 2.3.3 - 15

Draft Response: Enclosure 5, page 29

Applicant Action: None

RAI 2.3.3.15 - 1

The ventilation system license renewal boundary drawings show damper components for both Units 1 and 2; however, LRA Table 3.3-15 does not identify the housings for these dampers. It appears that these component housings are passive and long-lived and, as such, should be within the scope of license renewal and subject to an AMR. Justify why these components are considered to be outside the scope of license renewal or are not subject to an AMR.

Draft Response: Enclosure 5, page 32

Applicant Action: The applicant plans to provide appropriate cross-references to the components identifies in the RAI.

RAI 2.3.3.15 - 2

Draft Response: Enclosure 5, page 41

Applicant Action: None

RAI 2.3.3.15 - 3

Table 3.3-15 of the LRA does not list certain components, although the components are shown on the license renewal boundary drawings as being within the scope of license renewal. Justify why these components are excluded from Table 3.3-15.

Draft Response: Enclosure 5, page 42

Applicant Action: The applicant plans to revise its response to clarify which miscellaneous housings are addressed under the category of filter housings and to describe the intake screen to the Unit 2 hot shutdown panel ventilation system.

RAI 2.3.3.15 - 4

Many of the symbols used for HVAC system components in license renewal boundary drawings 1-HVAC-01, 2-HVAC-01, 1-HVAC-02, 2-HVAC-02, and 2-HVAC-03 are not defined on the "General Notes and Legend" drawings 1-NOTES-01 and 2-NOTES-01. Clarify the notes and legend drawing(s) that define ECCS ventilation exhaust system components and housings downstream of the exhaust fans, HVE-9A and HVE-9B, at locations D-5 and E-5 on drawing 1-HVAC-02

Draft Response: Enclosure 5, page 45

Applicant Action: The applicant plans to revise its response to explicitly identify which components do not preform an intended function.

RAI 2.3.3.15 - 5

Draft Response: Enclosure 5, page 46

Applicant Action: None

RAI 2.3.3.15 - 6

Draft Response: Enclosure 5, page 47

Applicant Action: None

RAI 2.3.3.15 - 7

License renewal boundary drawing 1-HVAC-02, Rev. 0, does not identify the components and/or housings, which are listed below, as being within the scope of license renewal, although these components and/or housings support the intended function of the control room ventilation system to comply with the requirements of GDC 19, as specified in Appendix A to 10 CFR Part 50. Justify why the following components and housings are considered to be outside the scope of license renewal and not subject to an AMR:

Draft Response: Enclosure 5, page 48

Applicant Action: The applicant plans to revise its response to include information concerning replacement of refrigeration cooling units.

RAI 2.3.3.15 - 8

Draft Response: Enclosure 5, page 49

Applicant Action: None

RAI 2.3.3.15 - 9

Draft Response: Enclosure 5, page 50

Applicant Action: None

RAI 2.3.3.4 - 1

Draft Response: Enclosure 5, page 51

Applicant Action: None

RAI 2.3.3.4 - 2

Draft Response: Enclosure 5, page 52

Applicant Action: None

RAI 2.3.3.4 - 3

Draft Response: Enclosure 5, page 53

Applicant Action: None

RAI 2.3.3.4 - 4

Draft Response: Enclosure 5, page 54

Applicant Action: None

RAI 2.4.1 - 5

In Section 2.4.1.3 of the LRA, the applicant states that the interior structures of each containment vessel and reactor containment shield building consist of concrete and steel components. However, thermal insulation is present on major reactor, pipe, and valve components; pipe and equipment component supports; and structural enclosures and panels used to shelter instruments and electrical equipment. No insulation material is shown as being within the scope of license renewal in Table 3.5-2 of the LRA. The temperature control intended function, provided by insulating materials, is important for environmental qualification, as piping and components with degraded insulation will experience additional heat loads and condensation. Justify why insulation is not included in the scope of license renewal and subject to an AMR.

Draft Response: Enclosure 5, page 59

Applicant Action: The applicant plans to provide additional information concerning what credit, if any, is given to thermal insulation in the environmental qualification (EQ) program for electrical circuits. The applicant also plans to describe what effect, if any, degradation of thermal insulation has on other systems or components, such as the containment spray system sump screens.

RAI 2.4.1 - 6

Non-safety-related structures and components of which a failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) should be included within the scope of the license renewal rule. The failure of the vent stack could potentially damage safety-related SSCs that have a spatial relationship with the vent stack, or could prevent the satisfactory function of the safety-related radiation monitors and the shield building ventilation system. Justify why these components are not within the scope of license renewal and subject to an AMR.

Draft Response: Enclosure 5, page 61

Applicant Action: The applicant plans to provide quantitative design information concerning the safety-related structures and components that may be affected by failure of the shield building vent stack.

RAI 2.4.2 - 3

In Section 9.1 of the Unit 1 and 2 UFSARs, the applicant states that the fuel storage racks are designed to maintain subcritical conditions in the fuel pool. However, Section 2.4.2.7 of the LRA does not list maintaining subcritical conditions as one of the attributes of the fuel handling building. In addition, none of the components or commodity groups listed in Table 3.5-9 of the LRA is credited with the intended function of maintaining subcritical conditions. Justify why maintaining subcritical conditions is not identified as an intended function.

Draft Response: Enclosure 5, page 64

Applicant Action: The applicant plans to expand intended function 3 in Table 3.5-1, "Structural Component Intended Functions," to include maintaining subcriticality.

RAI 2.4.2 - 4

It appears that the failure of the vent stack could potentially damage safety-related structures and components, which have a spatial relationship with the vent stack, and could allow external missiles to enter the fuel handling building. Justify why the fuel handing building stack structures are considered to be outside the scope of license renewal or are not subject to an AMR.

Draft Response: Enclosure 5, page 65

Applicant Action: The applicant plans to revise its response to include quantitative design information concerning safety related structures and components that may be affected by failure of the fuel handling building vent stack.

RAI 2.4.2 - 5

In Section 9.6.2 of the Unit 1 UFSAR, the applicant lists a fuel pool bulkhead monorail as an overhead load handling system. Clarify if this monorail is included in LRA Table 3.5-9 on page 3.5-67 as a component of the "trolley hoists and cranes" component group. If the fuel pool bulkhead monorail is not considered to be within the scope of license renewal and subject to an AMR, justify its exclusion.

Draft Response: Enclosure 5, page 66

Applicant Action: The applicant plans to identify the fuel handling buildings' trolley hoists and cranes passive components that were subjected to an AMR.

RAI 2.4.2 - 6

Draft Response: Enclosure 5, page 67

Applicant Action: None

RAI 2.5 - 1

Assuming the unavailability of offsite systems (e.g., offsite system protective relaying), describe how onsite safety systems are protected from voltage and frequency fluctuations that may result from offsite equipment failures or from natural phenomena such as lightning. Describe how the Class 1E system is designed to ensure that any offsite system malfunction or natural phenomena, such as lightning, will not prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(2).

Draft Response: Enclosure 5, page 68

Applicant Action: The applicant plans to revise its response to address the scoping of electrical fuse holders.

RAI 3.1 - 5

Discuss tube plugs installed in the Unit 1 and 2 steam generators, such as plug type and operating experience. Confirm that all tube plugs use thermally treated Alloy 690 material.

Draft Response: Enclosure 6, page 6

Applicant Action: The applicant plans to revise its response by describing the proposed inspections for confirming there are no Westinghouse tube plugs in the steam generators and for identifying the manufacturers of the installed tube plugs.

RAI 3.3 - 1

For carbon steel, stainless steel, bronze, brass, and copper bolting in the following systems and for the environments to which they are exposed, justify why the LRA excludes the aging effects that involve loss of material and cracking. Include the bounding humidity level for the outdoor, indoor-not air-conditioned, containment, and buried environments. The systems that should be considered are instrument air, component cooling water (CCW), diesel generator, intake cooling water, primary water makeup, service water system, turbine cooling water (Unit 1 only), ventilation, sampling, and steam and power conversion.

Provide a summary of the plant-specific operating experience associated with the degradation of bolting.

Draft Response: Enclosure 7, page 1

Applicant Action: The applicant plans to revise its response by expanding its description of industry operating experience related to similar materials in high humidity environments, explaining how the lubricant layer is maintained, and including a discussion of pitting corrosion.

RAI 3.3 - 3

In Table 3.3-5, "Emergency Cooling Canal," and Table 3.3-9, "Intake Cooling Water," please clarify the environment to which the concrete with embedded/encased carbon steel piping/fitting is exposed. In particular, state whether that environment is raw water-salt water, outdoor air, or some other(s).

The raw water-salt water environment contains chlorides. Similarly, the outdoor environment of St. Lucie is defined in the LRA as moist, salt-laden atmospheric air, with temperatures of 27 °F-93 °F, 73 percent average humidity, and exposure to weather, including precipitation and wind. Therefore, the outdoor environment also contains chlorides. These chlorides in the moist, salt-laden atmospheric air may reach the steel/concrete interface in the interior of the concrete through the process of permeation, infiltration, and condensation through the pores of the concrete. Accumulation of high enough levels of chlorides will result in attacks on and disruption of the protective film formed on the surfaces of the steel as a result of the originally high pH levels in the concrete environment. Once some particular region of the protective film is destroyed, localized corrosion of the steel will begin through an electrochemical process. However, Tables 3.3-5 and 3.3-9 of the LRA do not identify any aging effects for carbon steel components in the emergency cooling canal system and the intake cooling water system associated with external exposure to an embedded/encased environment.

Explain why the aging process as described is not applicable to St. Lucie, and discuss the operating history of the plant to support the conclusion regarding the absence of applicable aging effects with respect to cracking and loss of materials.

Draft Response: Enclosure 7, page 4

Applicant Action: The applicant plans to revise its response by expanding its discussion of industry operating experience related to corrosion of carbon steel embedded in concrete exposed to an outdoor environment.

RAI 3.3.2 - 1

In Appendix C, Section 4.1.1, "Treated Water," the applicant states that crevice corrosion is insignificant for an environment with extremely low oxygen content (less than 0.1 ppm). The applicant also states that oxygen is required for pitting corrosion. Oxygen can be a contributor, but is not needed for crevice and pitting corrosion of metal. The applicant is requested to provide references supporting its position.

Draft Response: Enclosure 7, page 10

Applicant Action: The applicant plans to revise its response by elaborating on what inspections are conducted during preventive and corrective maintenance activities. The applicant also plans to include a discussion of pitting corrosion.

RAI 3.3.2 - 4

Aging effects for CCW system components exposed to the air/gas environment depend, in part, on the type of air/gas environment, the operating temperature, and the water content. Provide the characteristic parameters of the air/gas environments applicable to the components found in the CCW system. Also provide the bases for excluding corrosion as an applicable aging effect for CCW components that are exposed to the air/gas environment.

Draft Response: Enclosure 7, page 13

Applicant Action: The applicant plans to revise its response by summarizing the calculations used to confirm that the existing corrosion allowance for the tank is adequate.

RAI 3.3.9 - 3

The applicant relies on detection of leakage for managing loss of material on the inside surface of several components that are exposed to raw water. The presence of leakage from a component, however, would indicate that the component could not perform its intended function as a pressure boundary. The applicant is requested to justify why the use of this program, alone, is adequate for managing loss of material from the inside surface of the components that are exposed to raw water.

Draft Response: Enclosure 7, page 27

Applicant Action: The applicant plans to revise its response by including a description of the daily plant tours that would identify leakage.

RAI 3.3.15 - 1

In Table 3.3.15, "Ventilation," the applicant identifies, for the control room air-conditioning subsystem, loss of material as an applicable aging effect for the carbon steel filter housing, which is internally exposed to an air/gas environment, but not for carbon steel component valves and piping/fittings that are exposed to the same environment. Please explain this discrepancy.

Draft Response: Enclosure 7, page 32

Applicant Action: The applicant plans to revise its response by providing a quantitative basis for excluding corrosion as an aging effect for butterfly valve bodies.

RAI 3.4 - 1

Draft Response: Enclosure 6, page 8

Applicant Action: None

RAI 3.4 - 2

In Tables 3.4-1 and 3.4-2 of the LRA, the applicant indicates that carbon steel bolts are not subject to any aging effects that require aging management. Explain why the effect of humidity in the external environment is not considered to cause aging that leads to a loss of preload.

Draft Response: Enclosure 6, page 9

Applicant Action: The applicant plans to clarify the statement that bolting associated with steam, feed, and condensate systems are typically in a dry environment. The applicant plans to expand its discussion of industry experience associated with general corrosion of bolting in steam, feed, and condensate systems.

RAI 3.4 - 3

Draft Response: Enclosure 6, page 10

Applicant Action: None

RAI 3.4 - 4

In Tables 3.4-1 and 3.4-2 of the LRA, the applicant identified the Boric Acid Wastage Surveillance Program to manage the aging effects in piping, valves, and fittings to ensure that boric acid corrosion does not lead to degradation of the pressure boundary. The Boric Acid Wastage Surveillance Program manages aging effects associated with aggressive chemical attack. Provide a discussion of how this program manages aging effects associated with elevated temperatures and stress levels to prevent loss of preload in mechanical bolting.

Draft Response: Enclosure 6, page 11

Applicant Action: The applicant plans to revise its response by expanding the discussion of why loss of preload is not an aging effect requiring mangement.

RAI 3.5 - 3

LRA Tables 3.5-2 through 3.5-16 do not identify any aging effects for the following components:

- silicone fuel transfer tube penetration flexible membranes (in annulus) (Table 3.5-2)
- lubrite sliding supports (Table 3.5-2)

- silicone mechanical penetrations (Table 3.5-8)
- carbon steel plate fire-sealed isolation joint (Table 3.5-8)

For the lubrite plates, provide their location(s), including the operating environment (temperature, humidity, and neutron flux) and loads (static and vibratory) to which they are subjected. Include occasional exposure to any degrading environments, such as borated water spills or leakage. Also, provide information related to the manufacturer-suggested life of the product under the expected operating conditions.

Draft Response: Enclosure 6, page 14

Applicant Action: The applicant plans to provide an additional discussion of St. Lucie, Unit 1, experience, industry experience, and the environmental temperature range associated with lubrite plates.

RAI 3.5 - 9

To demonstrate the potential for aging of concrete components below groundwater, provide the following information:

- average levels of contaminants (chloride and sulfates) and the pH level in the ground water soil surrounding below-grade concrete members

- grade elevations and the ground-water level fluctuations in the areas surrounding below-grade concrete members

- existing condition of concrete structural members exposed to groundwater

Draft Response: Enclosure 6, page 22

Applicant Action: The applicant plans to provide information concerning programs being developed to enhance the inspection of concrete components below groundwater.

RAI 3.6 - 1

Draft Response: Enclosure 6, page 27

Applicant Action: None

RAI 3.6 - 2

Exposure of electrical cables to localized environments caused by heat, radiation, or moisture can result in reduced insulation resistance (IR). Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation, since it may contribute to inaccuracies in the instrument loop. Visual

inspection may not be sufficient to detect aging degradation from heat, radiation, or moisture in the instrumentation circuits with sensitive, low-level signals. Because low-level signal instrumentation circuits may operate with signals that are normally in the pico-amp or less, they can be affected by extremely low levels of leakage current. These low levels of leakage current may affect instrument loop accuracy before the adverse localized changes are visually detectable. Routine calibration tests performed as part of the plant's surveillance test program can be used to identify the potential existence of this aging degradation. Provide a description of your aging management program that will be relied upon to detect this aging degradation in sensitive, low-level signal circuits.

Draft Response: Enclosure 6, page 30

Applicant Action: The applicant plans to revise its response concerning aging management of sensitive cables to be consistent with aging management programs previously approved by the staff.

RAI 4.1 - 1

Draft Response: Enclosure 8, page 1

Applicant Action: None

RAI 4.3 - 1

Draft Response: Enclosure 8, page 3

Applicant Action: None

RAI 4.3 - 2

Draft Response: Enclosure 8, page 10

Applicant Action: None

RAI 4.3 - 3

In Section 4.3.3 of the LRA, the applicant discusses its evaluation of the impact of the reactor water environment on the fatigue life of components. The discussion references the fatigue-sensitive component locations for an older vintage Combustion Engineering plant identified in NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components." The LRA indicates that these fatigue-sensitive component locations were evaluated for St. Lucie, Units 1 and 2. The LRA also indicates that the later environmental fatigue correlations contained in NUREG/CR-6583, "Effects of LWR Coolant Environments on Fatigue Design Curves of Carbon and Low-Alloy Steels," and NUREG/CR-5704, "Effects of LWR Coolant Environments on Fatigue Design Curves of

Austenitic Stainless Steels," were considered in the evaluation. Provide the results of the usage factor evaluation for each of the six component locations listed in NUREG/CR-6260.

Draft Response: Enclosure 8, page 11

Applicant Action: The applicant plans to revise its response to include a quantitative discussion concerning the environmental fatigue calculations for the Unit 1 safety injection nozzles.

RAI 4.5 - 2

Draft Response: Enclosure 8, page 16

Applicant Action: None

RAI 4.6.1 - 1

As a result of the V.C. Summer event, in which primary water stress corrosion cracking (PWSCC) was identified in an Inconel 82/182 main coolant loop-to-reactor pressure vessel weld, the NRC staff is concerned about the impact of PWSCC on licensees' leak-before-break (LBB) evaluations. NUREG-1061, Volume 3, which addresses the general methodology accepted by the NRC staff for demonstrating LBB behavior, stipulates that no active degradation mechanism (more specifically, none which would undermine the assumptions made elsewhere in the LBB analysis) may be present in a line that is under consideration for LBB approval. Draft Standard Review Plan Section 3.6.3, suggests that lines with potentially active degradation mechanisms may be considered for LBB approval provided that two mitigating actions or programs are in place to address the potential active degradation mechanism. Given this background:

- Identify the welds in the reactor coolant pressure boundary piping approved for LBB, which contain Inconel 82/182 material that is exposed to the reactor coolant system environment.

- Evaluate the impact of the V.C. Summer PWSCC issue on the St. Lucie LBB assessment for lines that contain welds manufactured from Inconel 82/182 material.

- Identify what actions will be taken during the period of extended operation to ensure that the potential for PWSCC in Inconel 82/182 lines does not undermine the assumptions of the St. Lucie LBB analyses.

Draft Response: Enclosure 8, page 18

Applicant Action: The applicant plans to revise its response by including a description of the corrective actions that would be taken if administrative limits in the Fatigue Monitoring Program are exceeded.

RAI 4.6.3 - 1

Draft Response: Enclosure 8, page 21

Applicant Action: None

RAI 4.6.3 - 2

Provide the source and basis for the data and information that was used to assess irradiation induced relaxation of the plug preload, which is expected to occur in the core support barrel expandable plugs at the end of 60 years of reactor operation.

Draft Response: Enclosure 8, page 22

Applicant Action: The applicant plans to provide the staff a copy of a proprietary report concerning the material properties of plugs used in the core barrel report and to delete extraneous information.

RAI 4.6.3 - 3

Provide a detailed description of the core barrel plug preload analysis based on irradiation induced stress relaxation, showing that the expandable plugs will continue to perform their function given the predicted fluence, operating temperature, operating hydraulic loads, and thermal deflections for the period of extended operation.

Draft Response: Enclosure 8, page 24

Applicant Action: The applicant plans to provide the staff a copy of a proprietary report concerning the material properties of plugs used in the core barrel report and to delete extraneous information.

RAI 4.6.4 - 1

Consistent with the staff's safety evaluation dated February 8, 2002, on Combustion Engineering Owners Group (CEOG) Topical Report No. CE NPSD-1198-P, Revision 00, perform a plant-specific general corrosion rate analysis calculation for the bounding half-nozzle repair implemented at St. Lucie, Units 1 and 2. Provide a discussion or evidence which demonstrates that the general corrosion rate analysis calculation provided in CEOG Topical Report No. CE NPSE-1198-P, Revision 00, is bounding relative to the plant-specific analysis.

Draft Response: Enclosure 8, page 25

Applicant Action: The applicant plans to submit a plant-specific report from Westinghouse.

RAI 4.6.4 - 2

Consistent with the staff's safety evaluation dated February 8, 2002, on CEOG Topical Report No. CE NPSD-1198-P, Revision 00, justify the conclusion in the topical report that existing flaws in ASME Class 1 nozzle Alloy 182 weldments will not grow into the adjacent ferritic pipes or vessels during the extended periods of operation. Review the reactor coolant system chemistry history over the last two operating cycles for St. Lucie, Units 1 and 2. Confirm that a sufficient hydrogen over-pressure for the reactor coolant system has been implemented at the facilities and that the ingress of dissolved elemental oxygen, halide, and sulfate into the reactor coolant over this period was adequately managed and controlled (i.e., minimized to acceptable levels).

Draft Response: Enclosure 8, page 26

Applicant Action: The applicant plans to submit a plant-specific report from Westinghouse.

RAI B.3.1.2 - 1

In Section 3.1.2, "Galvanic Corrosion Susceptibility Inspection Program," of Appendix B to the LRA, the applicant states that inspections will be conducted on a sampling basis. Locations selected for inspection will represent those with the greatest susceptibility to galvanic corrosion. However, there are insufficient details in the LRA concerning the program for the NRC staff to determine, with reasonable assurance, that the program is acceptable. Provide additional information concerning the existing program or the planned development of the program elements in the following areas:

- Explain how the greatest susceptibility locations will be determined, including whether these locations will be selected for each system or for all the systems.

- Explain what documents or information will be used to define the inspection interval, sample size, inspection criteria, and corrective actions.

- Explain how information concerning the inspections of the susceptible locations, the results of the inspections, and corrective actions will be managed, tracked, and evaluated.

Draft Response: Enclosure 9, page 1

Applicant Action: The applicant plans to revise its draft response by describing the selection methodology in more detail and by explaining how a location would be selected if the factors under consideration were contradictory.

RAI B.3.1.5 - 1

Draft Response: Enclosure 9, page 6

Applicant Action: None

RAI B.3.2.1 - 1

On March 18, 2002, the staff issued NRC Bulletin 2002-01, which requested information relevant to the type of degradation that was detected in the Davis-Besse reactor vessel head in March 2002. The applicant responded to NRC Bulletin 2002-01 in a letter dated April 2, 2002. The scoping program attribute in the LRA does not reference NRC Bulletin 2002-01 as part of the current licensing basis for the reactor vessel head penetration nozzles. The Detection of Aging Effects program attribute in the LRA implies that only one visual examination of the bare surfaces of each unit's upper reactor vessel head will be performed. If the results of the bare-surface visual examinations indicate the presence of flaw indications, additional bare-surface visual or volumetric examinations of the reactor vessel heads would be performed. As a result of the staff's review of the Operating Experience and Demonstration program attribute, the staff is under the impression that FPL completed the December 2001 visual examinations of the bare surfaces of the Unit 2 reactor vessel head. With respect to the Alloy 600 Inspection Program:

- Update the scoping program attribute to include your response to NRC Bulletin 2002-01 (dated April 2, 2002, in FPL letter L-2002-061).

- Summarize the scope and results of inservice inspections and augmented examinations that were performed on the Unit 1 and 2 reactor vessel heads. Describe the impact that the inspection results will have on the program attributes for the Alloy 600 Inspection Program.

Draft Response: Enclosure 9, page 7

Applicant Action: The applicant plans to revise its FSAR supplement to commit to an Alloy 600 Inspection Program that is consistent with the information contained in its response to NRC Bulletin 2002-1.

RAI B.3.2.5 - 1

In Section 3.2.5.1 of Appendix B to the LRA, the applicant states that no special one-time inspections are required to verify the effectiveness of the Water Chemistry Control Subprogram for St. Lucie, Units 1 and 2. The applicant also states that internal surfaces of components are visually inspected for loss of material and other aging effects during routine and corrective maintenance requiring equipment disassembly. Clarify that those locations inspected during routine and corrective maintenance include representative susceptible locations (such as low flow or stagnant areas). In addition, discuss past findings that demonstrate that routine and corrective maintenance verified the effectiveness of the Water Chemistry Control Subprogram.

Draft Response: Enclosure 9, page 12

Applicant Action: The applicant plans to revise its response by elaborating on what corrosion inspections are conducted during preventive and corrective maintenance activities.

RAI B.3.2.8 - 3

Discuss your program for internal inspections of fire protection piping as stated in Chapter XI.M27, “Fire Water Systems,” of the GALL report. Explain how the program will detect wall thinning due to internal corrosion. Opening the system results in introducing oxygen, which may contribute to the initiation of general corrosion. Explain why the use of non-intrusive means of measuring wall thickness, such as ultrasonic inspection, are not used to manage this aging effect.

Draft Response: Enclosure 9, page 14

Applicant Action: The applicant plans to provide justification for an alternative approach to volumetric inspection of fire water system piping.

RAI B.3.2.8 - 4

Draft Response: Enclosure 9, page 19

Applicant Action: None

RAI B.3.2.8 - 5

Draft Response: Enclosure 9, page 20

Applicant Action: None

RAI B.3.2.8 - 6

The 50-year service life of sprinkler heads does not necessarily equal the 50th year of operation in terms of licensing. The service life is defined from the time the sprinkler system is installed and functional. The staff interpretation, in accordance with National Fire Protection Agency (NFPA) 25, “Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,” is that testing should be performed prior to 50 years of sprinkler system service life, not at year 50 of plant operation. The staff position for this approach results in an applicant performing three such inspections over a 60-year period; the first before the end of the current operating term, the second after the 50-year sprinkler head testing, and the third after the first 10-year follow-up sprinkler head testing. Discuss your inspection plans for the sprinkler heads during the current operating term, as well as during the period of extended operation.

Draft Response: Enclosure 9, page 21

Applicant Action: The applicant plans to clarify when the first wet pipe sprinkler heads were installed.

RAI B.3.2.14 - 1

Draft Response: Enclosure 9, page 32

Applicant Action: None

RAI B.3.2.14 - 2

Draft Response: Enclosure 9, page 33

Applicant Action: None

RAI B.3.2.14 - 3

Draft Response: Enclosure 9, page 34

Applicant Action: None