ST. LUCIE POWER PLANT

FPL/NRC
License Renewal Application
Overview Meeting
January 16, 2002

Attachment 3

AGENDA

- Introduction
- Application Overview
- Discussion

APPLICATION OVERVIEW

- Application follows SRP Format
  - Chapter 1 - Administrative Information
  - Chapter 2 - SCs Subject to AMR (Scoping/Screening)
  - Chapter 3 - Aging Management Reviews (AMRs)
  - Chapter 4 - Time Limited Aging Analyses (TLAAs)

APPLICATION OVERVIEW

- Application follows SRP Format (continued)
  - Appendix A - UFSAR Supplement
  - Appendix B - Aging Management Programs (AMPs)
  - Appendix C - AMR Process for Non Class 1 Components
  - Appendix D - Technical Specification Changes
  - Environmental Report - Operating License Renewal Stage
- Incorporated results of NRC review of the Turkey Point license renewal application as appropriate and available

APPLICATION OVERVIEW

- Source Documents
  - UFSAR and Technical Specifications
  - Licensing Correspondence
  - Design Basis Documents
  - Component Database
  - Drawings
  - Other

APPLICATION OVERVIEW

- Scoping and Screening Methodology
  - Described in Section 2.1
  - Methodology used for St. Lucie the same as that used for Turkey Point
  - Follows the approach recommended in NEI 95-10
  - Implemented in accordance with FPL's Quality Assurance Program

APPLICATION OVERVIEW

- Scoping
  - Results presented in Section 2.2
    - 39 of 70 Systems in Scope
    - 16 of 46 Structures in Scope
    - Plant layout figures included for location of plant structures

APPLICATION OVERVIEW

- Screening
  - Mechanical Sections
    - RCS and Connected Systems
    - ESF Systems
    - Auxiliary Systems
    - Steam and Power Conversion
  - Justification for boundaries at open valves and components provided
  - Seismic interaction approach is consistent with that used for Turkey Point

APPLICATION OVERVIEW

- Screening (continued)
  - Structures and Structural Components Sections
    - Containments
    - Other structures (fire rated assemblies treated as a separate structure)
  - Table 3.5-1 provides structural component intended function key for 6 column tables
  - Structural components performing a pressure boundary function for ventilation or fire protection are identified

APPLICATION OVERVIEW

- Screening (continued)

  Component/commodity groups included with structures:

  - Structural steel framing and components
  - Reinforced concrete (reinforcing/embedded steel included with concrete)
  - Masonry walls
  - Safety related and non-safety related component, piping, tubing and HVAC duct supports
  - Pipe whip restraints
  - Piping segments between class break and anchor
  - Intake/exhaust hoods, louvers, and missile barriers
  - Electrical conduits, cable trays, instrument panels and enclosures, and associated supports
  - Passive components of cranes
  - Air tight and water tight doors and seals
  - Weatherproofing

APPLICATION OVERVIEW

- Screening (continued)
  - Electrical and I&C Section
    - Component Commodity Groups
  - Results in 6 column tables in Chapter 3
  - License Renewal Boundary Drawings and UFSAR references provided

APPLICATION OVERVIEW

- Aging Management Reviews
  - Application Chapter 3 and Appendix B
  - Same groupings as screening
  - Results presented in 6 column tables
  - Technical guidance/criteria for aging effects for non-class 1 components described in Appendix C
  - Electrical design features are the same as Turkey Point (lead sheathed cable, outdoor areas, etc.)

APPLICATION OVERVIEW

- Aging Management Reviews (continued)
  - GALL Report Comparisons
    - Differences between GALL component/commodity group listings and St. Lucie screening results identified and evaluated
    - Differences in materials and internal and external environments identified
    - GALL Report reference is provided in 6 column tables when the component/commodity group, material, and environment are the same
    - Aging management programs consistent with GALL identified

3.2 ENGINEERED SAFETY FEATURES SYSTEMS

The following systems .....

Subsection 2.3.2 provides .....

The aging management review .....

The Engineered Safety Features Systems scoping, screening, and aging management review results were compared to the GALL Report [Reference 3.2-1]. The following component/commodity groups identified in the GALL Report do not require an aging management review for St. Lucie Units 1 and 2 for the reasons noted.

- Containment Spray Heat Exchangers (V A.6) - The St. Lucie Units 1 and 2 design do not contain these components. The St. Lucie designs utilize the shutdown cooling heat exchangers to perform this function.
- Refueling Water Tank Circulation Pumps (V D1.3) - The St. Lucie Units 1 and 2 designs do not contain these components.
- Refueling Water Tank Heating Heat Exchangers (V D1.6) - The St. Lucie Units 1 and 2 designs do not contain these components.
- Primary Containment Heating and Ventilation System Filters (VII F3.4) - The St. Lucie Units 1 and 2 designs do not contain these components.

Additionally, the GALL Report does not address systems/subsystems included in Containment Post Accident Monitoring.

3.2.1 MATERIALS AND ENVIRONMENTS

The Engineered Safety Features Systems are exposed to internal environments of ..... For corresponding component/commodity groups included in the GALL Report, FPL identified the following additional environments at St. Lucie Units 1 and 2:

- Internal environment of treated water - other for Containment Spray valves, thermowells, orifices, and piping and fittings
- Internal environment of raw water - valves, piping, and fittings associated with the reactor cavity sumps (included as part of Containment Spray)
- Internal environment of air/gas for Containment Isolation valves, piping, and fittings
- Internal environment of air/gas for refueling water tanks and safety injection tanks

The tanks, pumps, heat exchangers, piping, tubing, and associated components and commodity groups for these systems are constructed of .... For corresponding component/commodity groups included in the GALL Report, FPL identified the following additional material applications at St. Lucie Units 1 and 2:

- Nickel alloy utilized for piping
- Aluminum and fiberglass reinforced vinyl ester utilized for the Unit 1 refueling water tank
- Brass utilized for valves
- Stainless steel utilized for spray nozzles, bolting, and safety injection tanks

TABLE 3.2-4
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment					
Safety injection tanks [V D1.7.3]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
			Air/gas	None	None required
Low pressure safety injection pumps [V D1.2.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
High pressure safety injection pumps [V D1.2.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material[1]	Chemistry Control Program
Shutdown cooling heat exchanger tubes [V D1.5.2]	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling Cracking	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Shutdown cooling heat exchanger tube sheets	Pressure boundary	Carbon steel clad with stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
			Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program

TABLE 3.2-4 (continued)
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
Internal Environment (continued)					
Shutdown cooling heat exchanger channel nozzles, channel facings, channel cover facings [V D1.5.1]	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking	Chemistry Control Program
Shutdown cooling heat exchanger shells, baffles, tube supports [V D1.5.3]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 1 low pressure safety injection pump cooler tubes [V D1.5.2]	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling Cracking	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program
Unit 1 low pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
High pressure safety injection pump cooler tubes [V D1.5.2]	Pressure boundary Heat transfer	Stainless steel	Treated water - borated (inside diameter)	Loss of material Fouling	Chemistry Control Program
			Treated water - other (outside diameter)	Loss of material Fouling	Chemistry Control Program

GALL COMPARISON EXAMPLES

Unit 1 high pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 2 high pressure safety injection pump cooler shells [V D1.5.3]	Pressure boundary	Carbon steel	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Unit 1 high pressure safety injection pump cooler tube shields	Pressure boundary	Brass	Treated water - other	Loss of material	Chemistry Control Program Galvanic Corrosion Susceptibility Inspection Program
Valves [V D1.4.1] Piping/fittings [V D1.1.1 - D1.1.5] Thermowells Tubing/fittings	Pressure boundary	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program
Valves Piping/fittings Tubing/fittings	Pressure boundary	Stainless steel	Air/gas	None	None required
Orifices [V D1.2.3]	Pressure boundary Throttling	Stainless steel	Treated water - borated	Loss of material Cracking[1]	Chemistry Control Program

GALL COMPARISON EXAMPLES

TABLE 3.2-4 (continued)
SAFETY INJECTION

Component / Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effect Requiring Management	Program/Activity
External Environment					
Safety injection tanks	Pressure boundary	Stainless steel	Containment air	None	None required
High pressure safety injection pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Low pressure safety injection pumps	Pressure boundary	Stainless steel	Indoor - not air conditioned	None	None required
Shutdown cooling heat exchanger shells [V D1.5.3]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Shutdown cooling heat exchanger channel heads and channel covers	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 1 low pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 1 high pressure safety injection pump cooler shells [V D1.5.4]	Pressure boundary	Cast iron	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program
Unit 2 high pressure safety injection pump cooler shells [V D1.5.3]	Pressure boundary	Carbon steel	Indoor - not air conditioned	Loss of material	Systems and Structures Monitoring Program
			Borated water leaks	Loss of material	Boric Acid Wastage Surveillance Program

3.2.1 CONCLUSION

The review of industry information, NRC generic communications, and St. Lucie Units 1 and 2 operating experience identified no additional aging effects beyond those discussed in Subsection 3.2.2. Tables 3.2-1 through 3.2-5 contain the results of the aging management review for the Engineered Safety Features Systems and summarize the aging effects requiring management.

The aging effects requiring management are adequately managed by the following programs:

St. Lucie programs consistent with the corresponding programs in the GALL Report:

- ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program
- Boric Acid Wastage Surveillance Program
- Chemistry Control Program

St. Lucie plant-specific programs:

- Galvanic Corrosion Susceptibility Inspection Program
- Periodic Surveillance and Preventive Maintenance Program
- Systems and Structures Monitoring Program

Based on the evaluations provided in Appendix B for the programs listed above, aging effects are adequately managed so that the intended functions of the Engineered Safety Features Systems components listed in Tables 3.2-1 through 3.2-5 are maintained consistent with the St. Lucie Units 1 and 2 CLBs for the period of extended operation.

APPLICATION OVERVIEW

- Time Limited Aging Analyses (TLAAs)
  - Reactor Vessel Embrittlement
  - Metal Fatigue (RCS and BOP)
    - 40 year design cycles determined to be conservative and bounding for the extended period of operation
    - The approach to EAF is consistent with that used for Turkey Point
  - EQ
    - Incorporated lessons learned from the Turkey Point review

      Wear cycle aging

      Classification of EQ TLAAs (ii vs. i)

      Temperature and radiation monitoring
  - Containment Penetration Fatigue

APPLICATION OVERVIEW

- TLAAs (continued)
  - RCS Piping Leak Before Break
  - Crane Fatigue
  - Unit 1 Core Support Barrel Repair
  - Alloy 600 Instrument Nozzle Repairs
- No time bound license exemptions identified

APPLICATION OVERVIEW

- Appendix A - UFSAR Supplements (A1 and A2 for St. Lucie Units 1 and 2, respectively)
  - Submitted markups with application
  - New Chapter 18 for each UFSAR
    - AMP descriptions
    - TLAA descriptions
  - Program commitment dates identified

APPLICATION OVERVIEW

- Aging Management Programs (AMPs)
  - For each aging effect requiring management, AMPs are identified
  - Descriptions and attribute evaluations provided in Appendix B
    - 10 attribute evaluations for plant-specific programs
    - "Operating Experience and Demonstration" attribute evaluations for GALL programs (other attributes are evaluated as appropriate)
  - Quality assurance requirements and corrective action program discussed in Section 2.0 of Appendix B

APPLICATION OVERVIEW

- AMPs (continued)
  - 3 categories of AMPs
    - 8 Existing (5 GALL, 3 plant-specific)
    - 8 Modified Existing (4 GALL, 4 plant-specific)
    - 6 New (1 GALL, 5 plant-specific)

APPLICATION OVERVIEW

- Existing AMPs consistent with GALL
  - ASME Section XI, Subsection IWE Inservice Inspection Program (GALL programs XI.S1 and XI.S4)
    - St. Lucie program includes Appendix J testing in IWE program
  - ASME Section XI, Subsection IWF Inservice Inspection Program (GALL program XI.S3)
  - Chemistry Control Program (includes 3 subprograms)
    - Water Chemistry Control Subprogram (GALL program XI.M2)
    - Closed-Cycle Cooling Water System Chemistry Subprogram (GALL program XI.M21)
    - Fuel Oil Chemistry Subprogram (plant-specific)

APPLICATION OVERVIEW

– Existing AMPs consistent with GALL (continued)

- Environmental Qualification Program (GALL program X.E1)
- Steam Generator Integrity Program (GALL program XI.M19)
  - St. Lucie program includes additional secondary side activities

APPLICATION OVERVIEW

- Modified existing AMPs consistent with GALL
  - ASME Section XI, Subsections IWB, IWC, and IWD Inservice Inspection Program (GALL program XI.M1)
    - Includes enhancements suggested by NRC for Turkey Point
  - Boraflex Surveillance Program (GALL program XI.M22)
    - Includes enhancement for areal density testing
  - Boric Acid Wastage Surveillance Program (GALL program XI.M10)
    - St. Lucie program includes more systems than GALL
  - Flow Accelerated Corrosion Program (GALL program XI.M17)
    - Includes enhancements for small bore steam trap and drain lines

APPLICATION OVERVIEW

- New AMP consistent with GALL
  - Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) Program (GALL program XI.M12)

APPLICATION OVERVIEW

- Appendix C - Non-Class 1 Component AMR Process
  - Not required by regulation
  - Includes technical discussions regarding SCC, bolting, high cycle fatigue, etc.
  - Addresses various RAIs associated with previous license renewal applications
  - Follows B&W/EPRI Tools Methodology adapted to St. Lucie
- Appendix D - Technical Specification Changes

APPLICATION OVERVIEW

- Environmental Report
  - Refurbishment
  - Water Sources
  - Evaluation against alternatives
    - License Renewal option is lowest impact option

DISCUSSION

- Discussion
- Questions
- Closing

LICENSE RENEWAL PROJECT

- St. Lucie License Renewal Project Team
  - Project Manager-Liz Abbott
  - Licensing/Design Basis -Steve Hale (primary contact)
  - Mechanical-Jack Hoffman
  - Civil/Structural-Bruce Beisler
  - Electrical/I&C-Fidel Prieto
  - Environmental Report-Tom Abbatiello

UNIT 1 AND 2 DIFFERENCES

– Scoping/Screening - Safety Related

- System design - Feedwater, Ventilation, and Post Accident Sampling
- Spent Fuel Cooling
- Radiological consequences of fuel handling accidents- Unit 2 fuel handling equipment is within the scope of license renewal
- External missile design - Unit 2 Component Cooling Water area, Condensate Storage Tank, and Emergency Diesel Generator Fuel Oil Storage Tanks are enclosed
- Unit 1 Turbine Building contains two safety related motor-operated valves and associated power cables

UNIT 1 AND 2 DIFFERENCES

- Scoping/Screening - Non-Safety Related which can Affect Safety Related
  - Condensate Storage Tank cross-connect piping for Unit 1
  - Non-safety related Demineralized Water piping in the Unit 2 Emergency Diesel Generator Buildings was designed Seismic Category I to prevent interaction with safety related equipment

UNIT 1 AND 2 DIFFERENCES

- Scoping/Screening - Regulated Events
  - Fire Protection
    - Fire pumps are common to both units but are powered from Unit 1
    - Unit 1 design includes Halon suppression for the Cable Spreading Room
    - Unit 2 design credits Primary Water for in-Containment hose station water supply
  - Station Blackout
    - Unit 1 design credits the Unit 2 Emergency Diesel Generators as alternate AC sources. Unit 2 is a DC coping plant
    - Unit 1 requires Instrument Air which utilizes a small portion of Turbine Cooling Water for cooling

UNIT 1 AND 2 DIFFERENCES

- Aging Management Reviews
  - Unit 1 Steam Generators replaced in 1997
  - Refueling Water Tank material
    - Unit 1 - Aluminum
    - Unit 2 - Stainless steel
  - Spent Fuel Storage Racks - Unit 2 does not contain Boraflex inserts
- TLAAs
  - Unit 1 Core Support Barrel