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Docket No.: 50-389

Dr. Robert E. Uhrig, Vice President
Advanced Systems & Technology
Florida Power & Light Company
P. O. Box 529100
Miami, Florida 33152

Dear Dr. Uhrig:

SUBJECT: ST. LUCIE PLANT, UNIT 2 FSAR -- REQUEST FOR ADDITIONAL INFORMATION

From the review of your application for an operating license by the Thermal Hydraulics Section of the Core Performance Branch, we find that we need a additional information regarding the St. Lucie Plant, Unit 2 FSAR. The specific information, (a draft copy of which was provided to Mr. Grozon on 7/8/81) required is listed in the Enclosure.

Responses to the enclosed request should be submitted by August 14, 1981. If you cannot meet this date, please inform us within seven days after receipt of this letter of the date you plan to submit your responses.

Please contact Mr. Nerses (301-492-7468), St. Lucie 2 Project Manager, if you desire any discussion or clarification of the enclosed report.

Sincerely,

Original signed by
Robert L. Tedesco

Robert L. Tedesco, Assistant Director
for Licensing
Division of Licensing

Enclosure:
As stated

cc: See next page.

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SURNAME	VNerses:jb	FJMiraglia	RLTedesco				
DATE	8/3/81	8/4/81	8/4/81				

ST. LUCIE

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492.0 THERMAL HYDRAULICS SECTION - CORE PERFORMANCE BRANCH

492.1 Standard Format and Content of Safety Analysis Reports (SAR), Regulatory Guide 1.70, states that in Chapter 4 of the SAR

"... the applicant should provide an evaluation and supporting information to establish the capability of the reactor to perform its safety functions throughout its design lifetime under all normal operation modes..."

Are the analyses presented in Section 4.4 representative of the initial core only or have future cycles been analyzed? Provide a discussion of how power distributions for future cycles are considered in the FSAR analyses. Is there any assurance that St. Lucie 2 can operate at the licensed power level without excessive DNB trips throughout future cycles? Will revisions to the design methodology be required in order to maintain sufficient thermal margin?

492.2 (4.4.1.1) There appears to be a discrepancy in the stated number of fuel assembly spacer grids. In Table 1.3-1, Plant Parameter Comparison, you state that the number of grids per assembly is ten for St. Lucie Unit 2. In Subsection 4.2.2.1 you state that the number of spacer grids is eleven. You also state that nine are made of Zircaloy and that one bottom spacer grid is made of Inconel. In Table 4.2-1, Mechanical Design Parameters, you indicate that there are nine spacer grids made of Zircaloy and one bottom spacer grid made of Inconel for each fuel assembly. Please confirm what the true number of spacer grids are and correct all references to accurately state the number of spacer grids per assembly.

492.3 (4.4.1) Figure 4.2-6, Fuel Assembly, shows a fuel assembly with overall dimensions. Provide a similar figure which locates the spacer grids and shows the dimensional spacing between grids. Also indicate if the grids are of standard design or the High Impact Design.

492.4 (4.4.1.1) Combustion Engineering has submitted a topical report (CENPD-225) on fuel and poison rod bowing which is being reviewed. The staff has developed interim criteria for evaluating the effect of rod bow on DNB for application to the Combustion Engineering 16x16 fuel assemblies. Use of the staff report "Revised Interim Safety Evaluation Report on the Effects of Fuel Rod Bowing on Thermal Margin Calculations for Light Water Reactors," dated February 16, 1977, presents an acceptably conservative treatment of rod bowing. Present a table of burnup (MWD/MTU) vs DNBR penalty (%). The calculation should be based on the maximum centerline to centerline distance of the grid span.

Credit can be given for thermal margin due to a multiplier of 1.05 on the hot channel enthalpy rise used to account for pitch reduction due to manufacturing tolerances.

The applicant should submit an acceptable method of accommodating the thermal margin reduction from the above calculation prior to issuance of an OL so that appropriate provisions may be incorporated in the Technical Specifications.

492.5 (4.4.1.1) CENPD-225 presents results of tests performed on the rod bundle of electrically heated rods and an unheated guide tube. Results were presented for rods in full contact and partially bowed rods. The data showed that plant rod bow penalties may be less than intended by the interim criteria described in question 492.4. Discuss how this data will affect St. Lucie 2 including the application and value of any anticipated penalties.

492.6 (4.4.2.6) With regard to hydraulic loads, you indicate that the effects of a six psi increase in P (should this be pressure drop?) are applied where appropriate. What are the appropriate applications and what are the assumptions used in arriving at a six psi increase due to crud buildup?

492.7 (4.4.3.1) Apparent inconsistencies are shown for coolant conditions. Please explain or make corrections. These inconsistencies are as follows:

1. Table 1.3-1 indicates that the total flow-rate in the reactor vessel is 139.4 x 10^6 lb/hr while Table 4.9-10 indicates that the value is 139.5 x 10^6 lb/hr;

2. Table 4.4-10 indicates that the reactor flow rate per loop (hot leg) and steam generator primary side (tube side) is 61 x 10^6 lb/hr. Table 1.3-1 also shows a value of 61 x 10^6 lb/hr as the flow rate through the steam generator (tube side). When this value is multiplied by two for the two flow loops, the total flow rate equals 122 x 10^6 lb/hr and, therefore, does not agree with the value of 139.5 x 10^6 lb/hr shown in Table 4.4-10 for the total flow through the reactor;

3. the coolant outlet temperature is listed as 597.6^{o}F in Table 4.4-10 but appears to be given as 596^{o}F (548^{o}F nominal inlet + 48^{o}F average rise) in Table 1.3-1;

4. the value given for the reactor coolant pump flow is 81,200 GPM (324,800 GPM for four pumps) in Table 4.4-10 and Table 1.3-1 for the rated capacity of the coolant pumps. This is less than the minimum flow value of 369,947 GPM shown in Table 4.4-1. Also, using the average inlet coolant density of 47.0 lb/ft^3 given in Table 4.4-10 the conversion to lb/hr flow is less than the value of 139.5 x 10^6 lb/hr given in Table 4.4-10 for the total four pump flow through the reactor.

492.8 (4.4.3.4) In Subsection 4.4.3.4, you state that operation at power with one, two, or three pumps operating or while in natural circulation is not allowed. The staff will require that Technical Specifications include appropriate provisions to ensure that these types of operation are prohibited.

492.9 (4.4.4) In Subsection 7.2.1.1.2.4, Analog Core Protection Calculators, you state that analog computers provide input to thermal margin/low pressure trip, the local power density trip, and the high power trip. You further state that a calculated low pressure limit related to departure from nucleate boiling ratio (DNBR) is determined using preset coefficients as a function of the measured cold leg temperature, axial offset, and the higher of the thermal power or neutron flux power. This calculated low pressure limit is an input to the thermal margin/low pressure trip. Provide the functional relationship of the low pressure trip setpoint and the above parameters; and describe how these functions are obtained.

Provide information to indicate the similarity of the Analog Core Protection Calculator used for St. Lucie Unit 2 to that used in St. Lucie 1. St. Lucie Unit 1 is currently under review for the next cycle reload since a statistical combination of uncertainties (SCU) is proposed in conjunction with calculations used in the Analog Core Protection Calculator. Is this same approach planned for St. Lucie Unit 2 currently or for future cycles?

492.10 (4.4.4) With regard to the Analog Core Protection Calculator, provide a listing of the algorithms used, discuss their verification and evaluation.

492.11 (4.4.4.1) In Subsection 4.4.4.1, Critical Heat Flux, you state that the CE-1 correlation was used with the TORC computer code to determine DNBR values. As shown in Table 1.3-1, Plant Parameter Comparison, the number of grids per fuel assembly for St. Lucie Unit 2 is different than for the three other plants for which comparisons are made; San Onofre Units 2 and 3, ANO-2 and St. Lucie Unit 1. Justify the CE-1 correlation for St. Lucie Unit 2 in consideration of the specific number of spacer grids and their spacing as compared to that from the test data.

492.12 (4.4.4.5.3) The staff is performing a generic study of the hydraulic stability of light water reactors, including the evaluation methods used for St. Lucie Unit 2. The results of the staff study will be applied to the acceptability of the stability methods now in use by reactor vendors. Provide a commitment to take any actions required by the results of the staff's study.

492.13 (4.4.6) Provide a description of the instrumentation available and the surveillance requirements and procedures which would alert the reactor operator to an abnormal core flow or core pressure drop during steady-state operation. We will require that the plant Technical Specifications include the requirements that the actual reactor coolant system total flowrate be greater than or equal to the value indicated by the core protection calculator system.

492.14 (4.4.6) With regard to the Vibration and Loose Parts Monitoring System to be provided for St. Lucie Unit 2, additional description should include a discussion of the capability of the components inside containment to remain operational following the seismic events up to and including the Operating Basis Earthquake. A discussion should also be provided of any analysis and/or tests to demonstrate that the system will be adequate for the normal operating radiation, vibration, temperature and humidity environment of the reactor system. The staff requires the Loose Parts Monitoring System be evaluated for conformance to the guidelines of Regulatory Guide 1.133 and that there are a minimum of two sensors at each natural collection region. Also provide the following information relative to the operation of the system:

1. a description of how alert levels will be determined;

2. a description of the diagnostic procedures to be used to confirm the presence of loose parts, and the ability to distinguish it from background noise;

3. a description of plans for a signature analysis during initial startup testing;

4. quantification of the online sensitivity of the system in terms of mass and kinetic energy; and

5. discussion of the training program for plant personnel.

492.15 (15.0) Provide justification for using the Macbeth correlation in the CHF correlation for Chapter 15 transients. Do the applicability ranges of the correlation cover all expected conditions?

492.16 Provide documentation to show compliance with the requirements of item II.F.2, "Instrumentation for Detection of Inadequate Core Cooling," of NUREG-0737," clarification of TMI Action Plan Requirements."