UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 8, 2010

Mr. Jon Franke, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing & Regulatory Programs
15760 W. Power Line Street
Crystal River, FL 34428-6708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT LICENSE RENEWAL APPLICATION (TAC NO. ME0274)

Dear Mr. Franke:

By letter dated December 16, 2009, Florida Power Corporation submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating license for Crystal River Unit 3 Nuclear Generating Plant, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Mr. Michael Heath, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-3733 or by e-mail at Robert.Kuntz@nrc.gov.

Sincerely,

Robert F. Kuntz, Sr. Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosure:
As stated

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REQUEST FOR ADDITIONAL INFORMATION
LICENSE RENEWAL APPLICATION FOR
CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT
DOCKET NO 50-302

Request for Additional Information (RAI) B.2.22-3

Background:

Given that there have been a number of recent industry events involving leakage from buried or underground piping, the staff required further information to evaluate the impact that these recent industry events might have on the applicant's Buried Piping and Tanks Inspection Program. By letter dated July 8, 2010, the staff issued RAI B.2.22-2 requesting that the applicant provide information regarding how Crystal River Unit 3 Nuclear Generating Plant (CR-3) will incorporate the recent industry operating experience into its aging management reviews and programs. The applicant responded on August 9, 2010. In reviewing the response, the staff determined that additional information is required.

Issue:

1. The staff requires further details on leaks that have occurred in the fire protection buried piping and corrosion at the ground to air interface to fully understand plant-specific operating experience at the station. The staff noted that in the first paragraph of the response to Request 1 of RAI B.2.22-2, the applicant separately discussed two instances of buried piping that was damaged during excavations. It is not clear to the staff whether these are two separate or a single instance of damage.

2. Beyond stating that a minimum of one inspection of buried fire protection piping will occur every ten years, the license renewal application (LRA) and supplemental material did not contain enough specifics on the planned inspections for the staff to determine if the inspections would be adequate to manage the aging effect for all material, safety/code class, and potential to contain hazardous material (i.e., material which, if released, could be detrimental to the environment such as diesel fuel and radioisotopes that exceed U.S. Environmental Protection Agency (EPA) drinking water standards) categories of in-scope buried pipes and tanks.

3. The staff does not have enough information to conclude if the condensate storage tank, emergency feedwater tanks, or the buried emergency feedwater or condensate piping contain tritium above the EPA drinking water limit. Given the degraded condition of the cathodic protection system for the emergency feedwater and condensate system, the staff believes that augmented inspections might be appropriate if the piping contains hazardous material.

4. The RAI response did not state the as-found condition of backfill observed during recent buried piping inspections.

5. The LRA and response to the RAI does not provide the staff enough information to determine:

a. If buried in-scope fuel oil piping is cathodically protected.

b. What amount of degradation could have occurred during the period beginning 2004 when cathodic protection for condensate system and emergency feedwater system was not maintained.

c. If the short length of piping from the Condensate Storage Tank to the Turbine Building is cathodically protected and if it has a safety-related function.

6. In relation to the nuclear services and decay heat sea water system which is either under water or buried 30 feet below grade:

   a. The staff believes that in instances where it is not possible to expose the program designated length of piping during each inspection, an alternative examination should be proposed. The staff is not aware of a method other than ultrasonic examination that would be effective at providing a reasonable assurance that the buried piping would meet its current licensing basis function(s).

   b. Based on the RAI response it does not appear that the steel piping portions of the nuclear services and decay heat sea water system is cathodically protected.

7. The RAI response to RAI B.2.22-2 states in the discussion on the emergency feedwater/condensate system that this system includes some stainless steel associated with the interfacing piping in these systems; however, the staff noted that there does not appear to be any stainless steel aging management review (AMR) line items in the condensate system and emergency feedwater system tables.

8. It is not clear to the staff (a) how often the buried fuel oil storage tanks are subjected to internal ultrasonic inspections, (b) how an internal visual inspection can be used to evaluate the external conditions of the tank material, (c) how an internal visual inspection can be used to evaluate the condition of the external coatings on the tank, and (d) how ultrasonic tests of the tank heads and lower shells provides sufficient information to evaluate the condition of all external surfaces of the tank.

9. The LRA does not contain details on the availability of the cathodic protection system, and what periodic testing is conducted on the cathodic protection system. The staff believes that cathodic protection is an important preventive measure for steel piping.

Request:

1. State the cause(s) of the buried fire protection piping leaks described in response to RAI B.2.22-2. State the material of the piping, coating condition and cause of the leak at the ground to air interface. State whether the two instances of buried piping that was damaged during excavations are two separate or a single instance of damage and the basis for why the evaluation concluded that this damage occurred during excavation.

2. For buried in-scope piping, respond to the following:

    a. State the minimum number of excavated direct visual inspections of buried in-scope piping which will be conducted during the 30-40, 40-50, and 50-60 year operating periods. When describing the minimum number of inspections, differentiate between material, code/safety-related piping, and potential to contain hazardous material category piping inspection quantities of buried in-scope piping.

    b. For the minimum number of planned inspections, state the length of piping that will be excavated and that will have a direct visual inspection conducted.

3. State whether the condensate storage tank, emergency feedwater tanks, or the buried emergency feedwater or condensate piping contain tritium above the EPA drinking water limit. If buried portions of the systems contain hazardous material, state what percent of total linear feet of buried in-scope piping will be inspected by excavation and direct inspection during each 10-year period starting 10 years prior to the period of extended operation. If there are no planned inspections for this piping, justify why it is acceptable to not inspect in-scope buried pipe containing hazardous materials.

4. State the as-found condition of backfill observed during recent buried pipe inspections. If the inspections detected the presence of rocks and sharp objects in the backfill around buried pipes justify why the minimum inspections are adequate to detect potential pipe degradation as a result of coating damage or holidays, or damage to the exterior surface of non-coated piping.

5. For buried in-scope piping, respond to the following:

    a. State whether the fuel oil piping is protected by cathodic protection. If this piping is not cathodically protected, (a) provide an analysis that demonstrates that this piping will continue to meet or exceed the minimum design wall thickness throughout the period of extended operation, assuming that no coatings are applied to the piping, or (b) justify why the number of the planned inspections of this piping is sufficient to reasonably assure that this piping will continue to meet or exceed the minimum design wall thickness throughout the period of extended operation.

    b. Given (a) that the cathodic protection system for the condensate and emergency feedwater system buried piping was not being regularly monitored and maintained since 2004, (b) troubleshooting is ongoing and the cathodic protection system is not yet fully restored, and (c) even though some inspections have been conducted, coating degradation or holidays can be randomly distributed, justify how the minimum design wall thickness will be maintained throughout the period of extended operation including the projected amount of degradation that could have occurred during this period.

c. State whether the short length of piping from the condensate storage tank to the Turbine Building is cathodically protected and if it has a safety-related function. If this piping is not cathodically protected, (a) provide an analysis that demonstrates that this piping will continue to meet or exceed the minimum design wall thickness throughout the period of extended operation, assuming that no coatings are applied to the piping, or (b) justify why the number of the planned inspections of this piping is sufficient to reasonably assure that this piping will continue to meet or exceed the minimum design wall thickness throughout the period of extended operation.

6. In relation to the nuclear services and decay heat sea water system buried piping which is either under water or buried 30 feet below grade, respond to the following:

   a. If alternative volumetric examination methods, beyond ultrasonic examinations, will be used for conducting an interior wall thickness measurement, justify why they will be effective at providing a reasonable assurance that the buried in-scope piping systems will meet their current licensing basis function and state what percentage of interior axial length of the pipe will be inspected during each inspection.

   b. If the buried steel portions of this system are not cathodically protected, (a) provide an analysis that demonstrates that this piping will continue to meet or exceed the minimum design wall thickness throughout the period of extended operation, assuming that no coatings are applied to the piping, or (b) justify why the number of the planned inspections of this piping is sufficient to reasonably assure that this piping will continue to meet or exceed the minimum design wall thickness throughout the period of extended operation.

7. Identify the AMR line item that includes the stainless steel, associated with the interfacing piping in the emergency feedwater/condensate system.

8. For the buried in-scope fuel oil storage tanks:

   a. State how often each of the buried fuel oil storage tanks are subjected to internal ultrasonic inspections.

   b. Justify how an internal visual inspection can be used to evaluate the external conditions of the tank material.

   c. Justify how an internal visual inspection can be used to evaluate the condition of the external coatings on the tank.

   d. Justify how ultrasonic tests of the tank heads and lower shells provide sufficient information to evaluate the condition of all external surfaces of the tank.

9. In relation to the cathodic protection system:

a. State the availability of the cathodic protection system, and if portions of the system are not available 90 percent of the time or will be allowed to be out of service for greater than 90 days in any given year, justify how the piping will meet or exceed the minimum design wall thickness throughout the period of extended operation.

b. State whether annual ground potential surveys of the cathodic protection system are conducted and what acceptance criteria is used, or if annual ground potential surveys are not conducted, justify how the piping will meet or exceed the minimum design wall thickness throughout the period of extended operation.

RAI B.2.25-5

Background:

The applicant is currently performing major repairs to the containment. Since October 8, 2009, a large number of prestressing tendons have been de-tensioned/removed. In addition, concrete has been removed in different areas. Vertical through-wall cracks have been identified in the containment concrete.

Issue:

There is a potential of corrosion in the containment liner plate exposed to humidity and moisture via the through-wall cracks present in the concrete containment. This condition may have introduced corrosion in the liner plate which can affect the containment liner's ability to act as a leak tight barrier during the period of extended operation.

Request:

Provide information related to monitoring the condition of the containment liner plate to capture any potential effects of long term exposure to humidity and moisture that may have occurred during the current long term shutdown.

RAI B.2.25-6

Background:

In response to RAI B2.25-3, provided in letter dated December 30, 2009, the applicant stated that during the 2009 refueling outage, an American Society of Mechanical Engineers (ASME) Section XI, Subsection IWE (IWE) program examination was performed on the accessible reactor building liner plate. In addition to the bulges of the liner plate previously identified in 2007, additional bulges were identified during the fall 2009 IWE examination. The applicant further stated that a Nuclear Condition Report has been initiated and will be evaluated by the applicant prior to acceptance of the liner plate for continued service. The applicant also stated that the acceptance of the liner plate for continued service shall be in accordance with IWE-3122 by examination, corrective measures or repair/replacement activity, or by engineering

evaluation. The details and basis of this engineering evaluation and/or corrective actions will be available for U.S. Nuclear Regulatory Commission review prior to return to operation of CR-3 from the fall 2009 refueling outage.

Issue:

Presence of bulges can potentially introduce corrosion on the concrete side of the liner plate which may affect its ability to perform its design function during the period of extended operation

Request:

Provide information regarding the corrective actions planned/performed for the bulges in the liner plate to demonstrate that the liner plate will be able to perform its intended function during the period of extended operation.

RAI B.2.26-5

Background:

The applicant is currently in the process of repairing a significant portion of the containment which includes new concrete, removal and re-installation of prestressing tendons, followed by a structural integrity test.

Issue:

LRA Section B.2.26 states that ASME Section XI, Subsection IWL Program is implemented in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55(a) and ASME Section XI, Subsection IWL, 2001 Edition, through the 2003 Addenda. ASME Section XI, IWL 2410 states, "Concrete shall be examined in accordance with IWL-2510 at 1, 3, and 5 years following the completion of the Containment Structural Integrity Test CC-6000 and every 5 years thereafter." LRA Section B.2.26 does not address the containment concrete surface examination frequency after the new structural integrity test.

Request:

Discuss the plans and frequency for performing the containment concrete surface examination after the new structural integrity test to establish a new baseline and trend in concrete degradation for the period of extended operation.

RAI B.2.26-7

Background:

The applicant has removed 64 (44 percent) of vertical tendons and 155 (54 percent) of the hoop tendons from the containment. These tendons will be reinstalled/replaced. In addition, the remaining vertical tendons will be re-tensioned.

Issue:

LRA Section B.2.26 states that the ASME Section XI, Subsection IWL Program is implemented in accordance with 10 CFR 50.55(a) and ASME Section XI, Subsection IWL, 2001 Edition, through the 2003 Addenda. ASME section XI, IWL-2420 states, "Unbonded post-tensioning systems shall be examined in accordance with IWL-2510 at 1, 3, and 5 years following the completion of the containment Structural Integrity Test and 5 years thereafter." LRA Section B.2.26 does not address the containment post tensioning system examination frequency following the removal, reinstallation, and replacement of 44 percent of vertical tendons and 54 percent of the hoop tendons.

Request:

Discuss the plans and frequency for performing the containment unbonded post-tensioning system examination following the completion of the new structural integrity test to establish a new baseline and trend for the loss of prestress in the hoop and vertical tendons during the period of extended operation.

RAI B.2.26-8

Background:

During the repair of the containment, vertical cracks of up to 5 mils in width have been recorded in the containment concrete exterior surface. These cracks appear to be through the 42 inch thick containment wall at numerous locations.

Issue:

LRA Section B.2.26 states that the ASME Section XI, Subsection IWL Program is an existing program consistent with NUREG-1801, Generic Aging Lessons Learned (GALL) Report, Section XI.S2. Element 6 of NUREG-1801, Section XI.S2, states that, "IWL-3000 provides acceptance criteria for concrete containments." IWL-3310 requires that an engineering evaluation report shall be prepared if there is evidence of damage or degradation sufficient to warrant further evaluation.

Request:

Discuss the effect of vertical through wall cracks on the containment structure during the period of extended operation. This discussion should include inspection and repairs (if necessary) of the containment required to demonstrate that the effects of these cracks on the containment will be adequately managed for the period of extended operation.

RAI B.2.28-4

Background:

The applicant is currently performing major repairs to the containment which will be followed by a structural integrity test and an integrated leak rate test (ILRT).

Issue:

LRA Section B.2.28 states that "the CR-3 10 CFR 50, Appendix J Program utilizes the performance-based approach of 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B, and includes appropriate guidance from Regulatory Guide 1.163, September 1995, "Performance-Based Containment Leak-Test Program," as modified by NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50 Appendix J.""

Section 9.2.3 of NEI 94-01, Revision 2, states that Type A testing shall be performed during a period of reactor shutdown at a frequency of at least once per 15 years based on acceptable performance history. Acceptable performance history is defined as successful completion of two consecutive periodic Type A tests where the calculated performance leakage rate was less than the maximum allowable leakage rate at the calculated peak accident pressure.

Considering the extent of containment repairs, the applicant may need to establish a new acceptable performance history to demonstrate that the containment will remain essentially leak tight during the period of extended operation.

Request:

Discuss how an acceptable performance history for the Type A test would be established after the new structural integrity test to ensure that the effects of the aging of the containment will be adequately managed during the period of extended operation.

RAI 4.5.1-1

Background:

The applicant is currently performing major repairs to the containment. This includes removal and reinstallation of 44 percent of vertical tendons and 54 percent of the hoop tendons. In addition the remaining vertical tendons will be re-tensioned to a higher level of prestresing.

Issue:

LRA Section 4.5.1 states that for the purposes of extending the plant operating license, regression analysis was used to extrapolate the tendon prestress forces to the end of the period of extended operation. This regression analysis will have to be revised since the majority of vertical and hoop tendons will be re-tensioned following concrete repairs.

Request:

Provide plans and schedules for performing a regression analysis to account for re-tensioned tendons, changes in tendon relaxation, and changes in the concrete creep of the old versus the new concrete to ensure that the effects of aging of the prestressing tendons will be adequately managed during the period of extended operation.

November 8, 2010

Mr. Jon Franke, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing & Regulatory Programs
15760 W. Power Line Street
Crystal River, FL 34428-6708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT LICENSE RENEWAL APPLICATION (TAC NO. ME0274)

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Sincerely,

/RA/

Robert F. Kuntz, Sr. Project Manager
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Docket No. 50-302

Enclosure:
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DATE	10/27/10	10/28/10	10/29/10	11/08/10

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Letter to Jon Franke from Robert F. Kuntz dated November 8, 2010

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT LICENSE RENEWAL APPLICATION (TAC NO. ME0274)

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