



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

October 14, 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 (CR-3), 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](mailto:robert.kuntz@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "R. Kuntz", written over a horizontal line.

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

cc w/encl: Distribution via Listserv

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

RAI 3.31.53-2

Background:

GALL Report Table 3, line items 53 and 54 recommend that steel or stainless steel piping, piping components, and piping elements exposed to condensation should be managed by GALL Report aging management program (AMP) XI.M24, "Compressed Air Monitoring." The applicant stated in the LRA that the GALL Report Table 3, line items 53 and 54 are not applicable to Crystal River Unit 3 thus they did not develop an aging management program to manage aging effects of steel or stainless steel compressed air system piping, piping components, or piping elements exposed to condensation.

By letter dated June 2, 2010, the staff issued request for additional information (RAI) 3.31.53-1 requesting that the applicant identify the Table 2 line items that are credited to manage loss of material for steel compressed air system piping exposed to internal condensation and describe how performance monitoring and air quality aspects of the GALL Report AMP XI.M24 are being considered.

Issue:

In its response, dated June 21, 2010, the applicant stated that components downstream of the compressed air system dryers were considered to be in a dry air environment and therefore not expected to exhibit aging effects. Historically, as discussed in the references included in GALL Report AMP XI.M24, aging effects such as a loss of material have been a contributor to compressed air system failures. Furthermore, the lack of air quality sampling and performance monitoring as described in GALL Report AMP XI.M24 leaves the quality of the dried air downstream of the system dryers in question. The staff believes that an appropriate AMP should be utilized to detect and manage the loss of material aging effect associated with compressed air system components within the scope of license renewal, whether upstream or downstream of compressed air system dryers.

Request:

For compressed air system related piping, piping components, and piping elements identified as being exposed to a "dried air (inside)" environment, describe the AMP to be applied to detect and manage the loss of material due to general, pitting and crevice corrosion aging effects.

ENCLOSURE

RAI 3.1.2.1-6.1

Background:

In its response dated December 30, 2009, to RAI 3.1.2.1-6 about the aging effect of reduction of heat transfer effectiveness due to fouling from the inside (primary) surfaces for nickel-alloy steam generator tubes and sleeves, the applicant explained that although there is no plant-specific operating experience (OE) related to reduction of heat transfer effectiveness due to fouling of heat transfer surfaces on either the primary or secondary sides of the steam generator tubes, its aging management review methodology assumes the aging effect is applicable in the absence of water chemistry control. The applicant stated that its aging management strategy will be updated to delete the reliance on the Steam Generator Tube Integrity Program and that the reduction of heat transfer effectiveness due to fouling of heat transfer surfaces of the primary and secondary sides of the tubes will be managed by the Water Chemistry Program only.

The applicant further stated that the GALL Report recommends the use of the Water Chemistry Program for managing corrosion on the primary side similarly for stainless steel and nickel base alloys and for managing reduction of heat transfer due to fouling of stainless steel heat exchanger tubes. Therefore, the applicant considers that the use of the Water Chemistry Program to manage nickel based alloy heat exchanger tubes for this aging effect is acceptable.

The staff noted that the GALL Report states that for stainless steel heat exchanger tubes exposed to treated water, control of water chemistry may have been inadequate, and recommends that the effectiveness of the chemistry control program should be verified to ensure that reduction of heat transfer due to fouling is not occurring.

Even though it has not been observed in applicant's SGs, the staff also noted that, there is well-known OE for the aging effect of reduction of heat transfer due to fouling of the SG tubes secondary surface, as identified in NRC Information Notice 2007-37.

Issue:

It is not clear to the staff why the applicant modified its application by selecting only the Water Chemistry Program, without any effectiveness verification program for managing this aging effect, and does not use the Steam Generator Tube Integrity Program. The Steam Generator Tube Integrity Program includes secondary activities related to fouling, consistent with industry guidelines, such as EPRI PWR Water Chemistry Guidelines and NEI 97-06, "Steam Generator Program Guidelines," as recommended in GALL AMPs XI.M2 and XI.M19. The staff considers that the Steam Generator Tube Integrity Program serves as a water chemistry effectiveness verification program, consistent with the recommendations of the GALL Report and SRP-LR.

Request:

Justify the elimination of the Steam Generator Tube Integrity Program for verifying the effectiveness of the Water Chemistry Program in managing the aging effect of reduction of heat transfer due to fouling on the SG tube external surfaces, or revise your application to include

this program, to verify the effectiveness of the Water Chemistry Program, consistent with the recommendations of the GALL Report.

RAI B.2.21-5

Background:

By letter dated July 8, 2010, the staff issued RAI B.2.21-4 requesting detailed information regarding the examination technique on Class 1 socket welds. In its response on August 9, 2010, the applicant stated that it will perform volumetric examinations of Class 1 socket welds using "fully qualified" volumetric technique, and that if such a fully qualified technique is not available prior to the end of 5<sup>th</sup> in-service inspection (ISI) interval, it will develop a plant-specific non-destructive examination (NDE) procedure for the inspection. The applicant committed in Commitment No. 16 to performing such inspection on ten percent of the Class 1 socket welds. It further stated that, "a destructive examination may be performed in lieu of the specified nondestructive examination."

Issue:

- 1) The staff is unclear of the basis for waiting until the end of the 5<sup>th</sup> ISI interval for "a fully qualified" technique. The staff noted that the first inspection should be completed prior to the period of extended operation in order to obtain additional information on the baseline conditions in Class 1 socket welds and to provide reasonable assurance that cracking is not occurring prior to entering the period of extended operation.
- 2) Regarding the statement that "a destructive examination may be performed in lieu of the specified nondestructive examination," it was not clear to the staff the number of welds that are included in Commitment No. 16 should the applicant choose to perform destructive examination.

Request:

- 1) Provide justification on how the proposed inspection schedule for socket welds, (i.e., commencing inspection of socket welds during, and potentially as late as the end of, the 5<sup>th</sup> ISI interval) will adequately manage the effects of aging in these components such that they will be able to perform their intended function during the period of extended operation.
- 2) Provide justification on how the potential option of a destructive examination of a socket weld will adequately manage the effects of aging in these components such that they will be able to perform their intended function during the period of extended operation. Include in the justification the number of welds that would be destructively examined if

that option were used and how that number compares to the number of examination that would be completed if the NDE option were used.

RAI B.2.33-1

Background:

NUREG-1801, Rev. 1, "Generic Aging Lessons Learned," (the GALL Report) addresses inaccessible medium voltage cables in Aging Management Program (AMP) XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The purpose of this program is to provide reasonable assurance that the intended functions of inaccessible medium voltage cables (2 kV to 35 kV), that are not subject to environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by moisture while energized, will be maintained consistent with the current licensing basis. The scope of the program applies to inaccessible (in conduits, cable trenches, cable troughs, duct banks, underground vaults or direct buried installations) medium-voltage cables within the scope of license renewal that are subject to significant moisture simultaneously with significant voltage.

The application of GALL AMP XI.E3 to medium voltage cables was based on the operating experience available at the time Revision 1 of the GALL Report was developed. However, recently identified industry operating experience indicates that the presence of water or moisture can be a contributing factor in inaccessible power cables failures at lower service voltages (480 V to 2 kV). Applicable operating experience (OE) was identified in licensee responses to Generic Letter (GL) 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," which included failures of power cable operating at service voltages of less than 2 kV where water was considered a contributing factor.

Recently identified industry operating, provided by NRC licensees in response to GL 2007-01 has shown that there is an increasing trend of cable failures with length in service beginning in the sixth through tenth years of operation and also that moisture intrusion is the predominant factor contributing to cable failure. The staff has determined, based on the review of the cable failure distribution, that annual inspection of manholes and cable testing frequency of at least every 6 years is a conservative approach to ensuring the operability of power cables and, therefore, should be considered.

In addition, recently identified industry operating experience has shown that some NRC licensees may experience events, such as flooding or heavy rain, that subject cables within the scope of program for GALL Report AMP XI.E3 to significant moisture. The staff has determined that event driven inspections, in addition to a 1 year periodic inspection frequency, is a conservative approach and, therefore, should be considered.

Issue:

The staff has concluded, based on recently identified industry operating experience concerning the failure of inaccessible low voltage power cables (480 V to 2 kV) in the presence of significant moisture, that these cables can potentially experience age related degradation. The staff noted that the applicant's Inaccessible Medium-Voltage Cables Program does not address inaccessible low voltage power cables (400 V (Nominally 480 V) to 2 kV inclusive). In addition, increased cable test and inspection frequencies (6 and 1 years respectively) should be evaluated to ensure that the Inaccessible Medium Voltage Program test and inspection frequencies reflect industry and plant-specific operating experience and that test and inspection frequencies may be increased based on future industry and plant-specific operating experience.

Request:

- 1) Provide a summary of your evaluation of recently identified industry operating experience and any plant-specific operating experience concerning inaccessible low voltage power cable failures within the scope of license renewal (not subject to 10 CFR 50.49 environmental qualification requirements), and how this operating experience applies to the need for additional aging management activities at your plant for such cables.
- 2) Provide a discussion of how CR-3 will manage the effects of aging on inaccessible low voltage power cables within the scope of license renewal and subject to aging management review; with consideration of recently identified industry operating experience and any plant-specific operating experience. The discussion should include assessment of your aging management program description, program elements (i.e., Scope of Program, Parameters Monitored/Inspected, Detection of Aging Effects, and Corrective Actions), and FSAR summary description to demonstrate reasonable assurance that the intended functions of inaccessible low voltage power cables subject to adverse localized environments will be maintained consistent with the current licensing basis through the period of extended operation.
- 3) Provide an evaluation showing that the Inaccessible Medium Voltage Program test and inspection frequencies, including event driven inspections, incorporate recent industry and plant-specific operating experience for both inaccessible low and medium voltage cable. Discuss how the Inaccessible Medium Voltage Program will ensure that future industry and plant-specific operating experience will be incorporated into the program such that inspection and test frequencies may be increased based on test and inspection results.

October 14, 2010

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Sincerely,  
*/RA/*  
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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Letter to Jon Franke from Robert F. Kuntz dated October 14, 2010.

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