UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

September 28, 2009

Mr. Jon A. Franke
Vice President, Crystal River Nuclear Plant
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, FL 34428-6708

SUBJECT: CRYSTAL RIVER NUCLEAR PLANT - NRC LICENSE RENEWAL INSPECTION REPORT 05000302/2009006

Dear Mr. Franke:

On August 14, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed a License Renewal Inspection at your Crystal River Unit 3 Nuclear Plant. The enclosed report documents the inspection results, which were discussed on August 14, 2009, with you and members of your staff in an exit meeting open for public observation at the Crystal River Nuclear Plant EOF/Training Center.

The purpose of this inspection was to examine activities that support the application for a renewed license for Crystal River Unit 3. The inspection addressed your scoping and screening of plant equipment for an aging management review, and the development and implementation of aging management programs (AMPs) to support a period of extended operation. As part of the inspection, the NRC examined procedures and records, interviewed personnel, and visually examined accessible portions of various systems, structures and components to verify license renewal boundaries and to observe any effects of equipment aging.

This inspection was conducted prior to your staff's response to NRC Requests for Additional Information (RAIs) that were associated with the NRC License Renewal Scoping Audit and the License Renewal AMP Audit. The inspectors determined that some AMPs would require further review, due to the nature and number of associated RAIs, before a specific determination could be made whether the program would maintain the function of the in-scope SSCs through the period of extended operation. A follow-up inspection will be performed to address these programs, which are identified in this report.

The inspection included a review of existing aging management programs and plans for new programs identified in the License Renewal Application. The inspectors determined that existing programs were generally functioning adequately and that, when all the programs are implemented as described in your License Renewal Application and associated RAIs are satisfactorily resolved, there was reasonable assurance that the intended functions of plant

systems, structures, and components will be maintained through the period of extended operation. The inspectors also determined that documentation supporting the application was generally in an auditable and retrievable form.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Kriss M. Kennedy, Director
Division of Reactor Safety

Docket No.: 50-302
License No.: DRP-72

Enclosures: 1. Inspection Report 05000302/2009006
w/Attachment: Supplemental Information
2. Aging Management Programs Selected for Review

cc w/encl.: (See page 3)

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Letter to Jon A. Franke from Kriss M. Kennedy dated September 28, 2009

SUBJECT: CRYSTAL RIVER GENERATING PLANT - NRC LICENSE RENEWAL INSPECTION REPORT 05000302/2009006

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SIGNATURE	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/	/RA email/
NAME	M. Franke	L. Lake	R, Carrion	E. Michel	J RIvera Ortiz	M. Sykes	C.Fletcer	EHuang
DATE	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	925/2009	9/24/2009
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-302
License No:	DRP 72
Report No:	05000302/2009006
Licensee:	Progress Energy Company
Facility:	Crystal River Unit 3
Location:	15760 West Power Line Street Crystal River, Florida
Dates:	July 27, 2009 through August 14, 2009
Inspectors:	L. Lake, Inspection Team Leader R. Carrion, Senior Reactor Inspector Eric Michel, Senior Reactor Inspector J. Rivera-Ortiz, Reactor Inspector Cecil Fletcher, Reactor Inspector Eugene Huang, Reactor Inspector
Approved by:	M. Franke, Chief Engineering Branch 3 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000302/2009006; July 27, 2009 - August 14, 2009; Crystal River Nuclear Plant, Unit 3; License Renewal Inspection.

This inspection of the applicant's license renewal scoping, screening, and aging management processes was performed by five regional office inspectors. The team used NRC Manual Chapter 2516 and NRC Inspection Procedure 71002 as guidance for performing this inspection. No findings as defined in NRC Manual Chapter 0612 were identified.

This inspection was conducted prior to your staff's response to NRC Requests for Additional Information (RAIs) that were associated with the NRC License Renewal Scoping Audit and the License Renewal Aging Management Program (AMP) Audit. The inspectors determined that some AMPs would require further review, due to the nature and number of associated RAIs, before a specific determination could be made whether the program would maintain the function of the in-scope SSCs through the period of extended operation. A follow-up inspection will be performed to address these programs.

The inspection concluded that for 23 of the 26 existing license renewal programs activities were generally conducted as described in your License Renewal Application and that these programs are generally accomplishing the intended functions. The inspection also concluded that 12 of the 14 new license renewal programs were generally as described in your License Renewal Application.

Specifically, the inspection was not complete on the existing Steam Generator AMP due to the nature and significant number of RAIs generated by a License Renewal Aging Management Audit, not completed for the existing Carborundum (B4C) Monitoring Program due to unavailability of personnel, was not completed on the existing Bolting Integrity Program due to insufficient information. Reviews on the new One Time Inspection Program and the new Internal Surfaces in Miscellaneous Piping and Ducting Components program were not completed due to insufficient information. See sections B.9, B.32, B.8, B.18 and B.23 respectively for additional information.

A follow-up inspection will be scheduled to complete the review of these AMPs upon completion of the licensee response(s) to the above referenced RAIs.

The applicant established auditable implementation plans that incorporated license renewal (LR) commitments into the plant tracking system to ensure they are completed. In addition to the enhancements identified in the licensee's LR application, inspectors identified instances where additional enhancements would be beneficial to aging management documents. These enhancements where incorporated into the licensee's corrective action program.

No significant issues were identified during system walkdowns. Because the reactor containment was inaccessible during plant operation at the time of the inspection, a containment walk down will be conducted during the refueling outage scheduled for this fall.

Enclosure 1 of this report lists the applicant personnel contacted and the documents reviewed. A list of acronyms used in this report is provided in the Attachment to Enclosure 1. The Aging Management Programs selected for review during this inspection are listed in Enclosure 2 to this report.

REPORT DETAILS

I. Inspection Scope

This inspection was conducted by NRC Region II inspectors to observe the material condition of the plant for aging effects, and to examine a sample of documentation which supports the license renewal application (LRA). This inspection also reviewed the implementation of the applicant's Aging Management Programs (AMPs) and interviewed applicant personnel. The inspectors reviewed supporting documentation to confirm the accuracy of the LRA conclusions including existing programs and the incorporation of both plant and industry operating experience (OPE). Implementation plans and associated activities were reviewed for audit ability and their incorporation into a system to track and assure their implementation. The inspectors performed visual examination of accessible portions of a sample of systems to observe any effects of equipment aging. Enclosure 1 of this report lists the applicant personnel contacted and the documents reviewed. A list of acronyms used in this report is provided in the Attachment to Enclosure 1. The Aging Management Programs selected for review during this inspection are listed in Enclosure 2 to this report.

II. Findings

A. Visual Observation of Plant Equipment

1. The inspectors performed walk-down inspections of portions of plant systems, structures, and components (SSCs) to determine their current condition and to observe any effects of equipment aging. During these walk-downs, the inspectors did not identify any significant issues with plant material condition that would adversely affect the license renewal process. The following SSCs were observed:

   Make-up/High Pressure Safety Injection System
   Decay Heat Removal System
   Diesel Generators and Building
   Spent Fuel Pool Pumps and Heat Exchangers
   Auxiliary Building locations with Containment Penetrations
   Borated Water Storage Tank
   Condensate Water Storage Tank
   Fire Service Water Storage Tanks
   Component Cooling Water System
   Residual Heat Removal System
   Various Cranes in the Scope of LR
   Fire Pumps
   Service Water structures
   Electrical Transformer Area
   Switchyard

2. The inspectors, with the applicant representatives, inspected cable manholes containing medium voltage cables that are identified to be within the scope of the LR

program. The inspectors observed that some contained varying amounts of water. The inspectors did not observe any water in contact with or covering the subject cables. A condition report was written with actions to pump the water out, evaluate the water's source, and revise the frequency of manhole inspections. See description of the Non-EQ Inaccessible Medium-Voltage Cables Program AMP in section C.35 for additional information.

3. Follow-up Inspection

In addition to the inspection walk down of the reactor containment during the refueling outage this fall, a follow-up inspection will be performed to complete the review of the Steam Generator AMP, the Carborundum (B4C) Monitoring Program AMP, the Bolting Integrity AMP, and the AMP on Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components. The follow-up inspection will be scheduled upon completion of the Crystal River response(s) to the previously referenced RAIs.

B. Review of Mechanical Aging Management Programs

1. ASME Section XI, Inservice Inspection, Subsections IWB, IWC and IWD Program

The ASME Section XI, Inservice Inspection (ISI) Program is an existing program with the objective to conduct periodic volumetric, surface, and/or visual examination; and leakage test of Class 1, 2, and 3 pressure retaining components and their integral attachments to detect degradation and determine appropriate corrective actions. The program is described in L08-0600, License Renewal Aging Management Program Description of the ASME Section XI Subsections IWB, IWC, and IWD, Revision 1. The implementation plans are described in AR 304745-33, Continued Use of ASME Inservice Inspection IWB, IWC, & IWD Program for License Renewal. The program implementation is governed by procedure AI-701, "Administration of the ASME Section XI and ASME OM Code Inservice Inspection, Examination, and Testing Program," which directs the development of ISI Program Plans and activities consistent with the requirements of 10 CFR 50.55a. The current ISI Program will meet the 2001 Edition with Addenda through 2003 of ASME Section XI and covers an interval from August 14, 2008 through August 13, 2018. The program will be updated in conformance with 10 CFR 50.55a for future inspection intervals. The applicant generated an action item to ensure continuous implementation of the ISI Program through the period of extended operation as established by the regulations and NRC approved alternatives.

The inspectors reviewed program documentation and license renewal calculations describing the scope, inspection attributes, corrective actions, operating experience reviews, and acceptance criteria of this program along with the proposed procedures to implement it in order to verify that the program was consistent with the elements described in the LRA. In particular, the inspectors reviewed the administrative procedures for the implementation of the ISI program, program self-assessments, inspection procedures, samples of inspection results, owner activity reports for previous operating cycles, and the ISI Plan for the fourth 10-year inspection interval. The inspectors also discussed the program implementation with responsible

applicant personnel to assess their knowledge and involvement in the license renewal effort.

The inspectors reviewed inspection procedure and data sheets for the performance of pressure tests on buried piping components in accordance with the applicable edition of ASME Code Section XI, IWA-5244. This subsection states that the system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components. The inspectors found that the procedure and data sheets for the pressure test of buried piping components lacked sufficient detail and instructions to document the test in accordance with the Code. The licensee initiated NCR 00350140 to address this issue in the Corrective Action Program and implement changes to the Pressure Test procedure.

The inspectors determined that the applicant provided adequate guidance to ensure aging effects will be appropriately managed and conducted adequate historic reviews of plant specific and industry experience to determine applicable aging effects. The inspectors concluded that the existing ISI Program was generally effective in identifying, monitoring, and correcting component degradation and includes the elements described in the LRA. The inspectors determined that there was reasonable assurance that this program will maintain the function of in-scope SSCs through the period of extended operation.

2. Water Chemistry Program

This is an existing program to mitigate the aging effects of the loss of material, cracking, and reduction in heat transfer in system components and structures through the control of water chemistry. This included control of detrimental chemical species and the addition of chemical agents. The station water chemistry control program is based on the latest version of the Electric Power Research Institute (EPRI) Pressurized Water Reactor (PWR) Primary Chemistry Guidelines: Volume 1 and 2, Revision 5; and PWR EPRI Secondary Water Chemistry Guidelines, Revision 6. The program included periodic monitoring, control of detrimental chemical contaminants, and the addition of chemical agents. The program is described in section B.2.2 of the application and L08-0601, “License Renewal Aging Management Program Description of the Water Chemistry Program,” Revision 1. The implementation plans are described in AR 304745-34, Water Chemistry Program Implementation Program. Additional implementation plans are described in Crystal River Unit 3 Optimized Primary Chemistry Program Strategic Water Chemistry Plan, and Crystal River-3 Optimized Secondary Water Chemistry Control Program. There were no enhancements identified for this program. The implementation plan provided a cross reference to station procedures implementing the program.

The inspectors reviewed the program documentation, discussed the program with the responsible station staff, and reviewed existing procedures which implemented the scope and actions of this program. The inspectors reviewed trending of critical chemistry parameters and reviewed the identification and resolution of identified conditions where parameter limits were exceeded. Additionally, the inspectors

reviewed applicant self assessments of the water chemistry program. The inspectors verified a one-time inspection of selected components where aging was managed by the Water Chemistry Aging Management Program.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience to determine aging effects. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

3. Reactor Vessel Closure Head (RVCH)Studs Program

This is an existing program with elements described and implemented in L08-0602, Reactor Head Closure Studs Age Management Program and AR 304745, Implementation Plans, respectively. The objective of this program is to manage loss of material and cracking in the reactor vessel closure head studs, nuts, and washers. The program is to be implemented through visual and volumetric examinations and leakage detection consistent with the Crystal River Inservice Inspection Program. The applicant will implement a RVCH Stud Program consistent with the 2001 Edition, through 2003 Addenda of the ASME Code, Section XI, Table IWB-2500-1, and will implement updates in conformance with 10 CFR 50.55(a) for future inspection intervals. Preventive measures are to include control of bolting materials and lubricants as described in NRC Regulatory Guide 1.65. The applicant has previously inspected the studs, nuts, and washers, and has appropriately schedule successive inspections. In addition, the applicant has implemented controls to assure the use of approved lubricants via program and maintenance procedures.

The inspectors reviewed program documentation describing the scope, inspection attributes, corrective actions, and acceptance criteria of this program along with the implementation procedures. Specifically, the inspectors reviewed the AMP and Implementation Plan (IMP) documents, Inservice Inspection plans, current lubricant specifications, Reactor Vessel disassembly procedures, VT-1 procedure, UT procedure for bolts and studs, Ultrasonic Examination (UT) exam reports, ISI program self-assessments, Corrective Action Program documents, Operating Experience Program documents, and Action Items to implement the program. The inspectors also interviewed applicant personnel responsible for the program implementation.

Molybdenum Disulfide was shown to be a factor in laboratory corrosion testing when conditions favored the liberation of hydrogen sulfide. As a result, the applicant has revised their procedures to prohibit the use of Molybdenum Disulfide on all bolting. Molybdenum Disulfide is currently the lubricant applied to the Reactor Head Closure Studs at Crystal River Unit 3. During the next outage, the applicant's plan is to change out the lubricant currently used on the Reactor Head Closure Studs. The new lubricant has been identified but is not listed in the LR AMP. Prior to the application of the new lubricant, the old lubricant is to be completely removed using an appropriate cleaner to prevent mixing of lubricants.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. When implemented as described, the inspectors determined there will be reasonable assurance that adequate inspections required by ASME will be performed through the extended period and that the intended function of the RVCH studs will be maintained during the period of extended operation.

4. Boric Acid Corrosion Program

The Boric Acid Corrosion Control Program (BACCP) is an existing program that was developed in response to NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants." The objective of this program is to visually inspect external surfaces that are potentially exposed to borated water leakage, identify leak paths and remove the boric acid residues, assess the damage caused by boric acid leakage, and conduct follow-up inspections to verify the adequacy of corrective actions. The program is described in L08-0603, License Renewal Aging Management Program Description of the Boric Acid Corrosion Program, Revision 1. The implementation plans are described in AR 304745-35, Continued Use of Boric Acid Corrosion Program for License Renewal. This program was governed by corporate procedure EGR-NGGC-0207, "Boric Acid Corrosion Control," which established the requirements for boric acid corrosion control by providing instructions for the inspection, reporting, evaluation, and corrective actions required when boric acid indications are identified on plant SSCs.

The inspectors reviewed program documents and license renewal calculations describing the scope, inspection attributes, acceptance criteria, operating experience reviews, and corrective actions in order to verify that the program was consistent with the elements described in the LRA and adequate to manage the aging effects associated with boric acid corrosion. The inspectors also reviewed results from previous boric acid inspections to assess the program's effectiveness in identifying, monitoring, trending, and correcting boric acid leaks from systems containing borated water. Specifically, the inspectors reviewed program procedures, outage walk-down plans, program health reports, benchmarking reports, self-assessments, post-outage reports, and tracking data base of boric acid indications. Additionally, the inspectors discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort. The inspectors conducted an independent walk-down of accessible systems containing borated water to assess the condition of plant SSCs and the effectiveness of the program to identify and correct boric acid leakage.

The inspectors determined that the applicant had provided adequate guidance to ensure aging effects will be appropriately managed and conducted adequate historic reviews of plant specific and industry experience to determine applicable aging effects. The inspectors concluded that the existing BACC program was generally effective and included the elements described in the LRA. The inspectors determined that there was reasonable assurance that this program will maintain the function of in-scope SSCs through the period of extended operation.

5. Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads (URVCH) of Pressurized Water Reactors Program

As described in the LRA, the Nickel Alloy Penetration Nozzles Welded to the URVCH Program was an existing program with the objective to implement visual, volumetric, and surface examinations of the URVCH penetrations in accordance with the requirements of the Revised NRC Order EA-03-009 issued on February 20, 2004. However, since the preparation of the applicant's LRA, the NRC amended the provisions of 10CFR 50.55a to withdraw the Order and incorporate by reference ASME Code Case N–729–1, ''Alternative Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds, Section XI, Division 1." All licensees of operating PWRs shall augment their ISI program with this Code Case by December 31, 2008, subject to the conditions specified in 10CFR 50.55a. Once a licensee implements this requirement, the First Revised NRC Order EA–03–009 no longer applies to that licensee and shall be deemed to be withdrawn.

The program is described in L08-0605, License Renewal Aging Management Program Description of the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program, Revision 0. The implementation plans are described in AR 304745-02, Nickel Alloy and Nickel-Clad Components Commitment Implementation Plan.

The applicant replaced the URVCH in the fall of 2003. The control rod drive mechanism (CRDM) penetrations and associated welds were built of nickel alloy material resistant to primary water stress corrosion cracking (PWSCC). The program is planned to be implemented through the ISI program as directed by procedure AI-701, Administration of the ASME Section XI Inservice Inspection and Inservice Testing Programs. The applicant has updated the ISI Plan to incorporate Code Case N-729-1 and planned to perform a bare metal visual examination every other outage and a volumetric examination of the CRDM penetrations not to exceed ten calendar years following the initial exam.

The inspectors reviewed program documentation and license renewal calculations describing the scope, inspection attributes, corrective actions, operating experience reviews, and acceptance criteria of this program in order to verify that the program was consistent with the elements described in the LRA. Specifically, the inspectors reviewed the ISI plan and results from previous examinations. The inspectors also discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort. The inspectors determined that the existing Nickel Alloy Penetration Nozzles Welded to the URVCH Program was generally effective in monitoring component degradation, and included the elements described in the LRA. The inspectors determined that there was reasonable assurance that this program will maintain the function of in-scope SSCs through the period of extended operation.

In addition, Enclosure 2 of the LRA letter contains two commitments associated with the aging management of Reactor Coolant System components. Item number 1 of the Enclosure consisted of a commitment to participate in the industry programs on

reactor internals, evaluate and implement the results of the industry programs, and submit an inspection plan for reactor internals to the NRC no less than 24 months before entering the period of extended operation. The inspectors reviewed the applicant's implementation plan for this commitment to verify these actions were included. The applicant planned to implement this commitment, in part, through procedure ADM-NGGC-0112, "Reactor Coolant System Material Integrity Management Program," which contained instructions to participate and implement industry programs. The inspectors also reviewed an inspection plan for reactor internals, which the licensee planned to submit to the NRC for review and approval. Item number 2 of the Enclosure consisted of a commitment to implement applicable Bulletins, Generic Letters, and NRC accepted industry guidelines for the aging management of nickel alloy and nickel clad components susceptible to PWSCC. The inspectors reviewed the applicant's implementation plan for this commitment to verify these actions were included. The applicant planned on implementing this commitment, in part, through procedure ADM-NGGC-0112 and a corporate Alloy 600 Strategic Plan. The inspectors also discussed the program implementation with responsible applicant personnel to assess the status of mitigation and inspection activities for Alloy 600 material in the RCS.

Based upon the review of available documents and discussions with plant personnel, the inspectors determined that there is reasonable assurance that these commitments will be implemented as described in the LRA and the function of the in-scope SSCs will be maintain through the period of extended operation.

6. Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program

This will be a new program to detect the effects of loss of fracture toughness due to thermal aging and neutron irradiation embrittlement of susceptible CASS components reactor vessel internals. The program augments the In-service Inspection Program. This aging management program will evaluate the susceptibility of CASS components to thermal aging and neutron irradiation embrittlement based on casting method, molybdenum content and percent ferrite. Based on screening consistent with NUREG-1801, Rev. 1, Section XI.M13, three component groups were identified at Crystal River Unit 3 for aging management under this program. These included the Control Rod Guide Tube Spacer Casting, Incore Guide Tube Spider Castings, and Vent Valve Body and Retaining Ring. Aging management will be accomplished by component-specific flaw tolerance evaluation, additional inspections, or a combination of these techniques.

The inspectors reviewed the description of the program in application section B.2.6 and L08-0607, "License Renewal Aging Management Program Description of the Thermal Aging and Neutron Embrittlement of Cast Austenitic Stainless Steel (CASS) Program," Revision 0, which stated the screening criteria for identification of components within the program scope.

Additionally the inspectors reviewed the program implementation plan documented in AR 304745-04, and discussed the program with the station staff. At the time of the

review, the implementation plan had not been developed to a degree that completely represents the associated license renewal calculation (L08-0607). The implementation plan addresses the intention to follow recently published MRP-227, "PWR Reactor Internals Investigation and Evaluation Guidelines," and the license renewal calculation will be revised to reflect this update. The program was scheduled to be implemented prior to the period of extended operation.

When implemented, there is reasonable assurance that the intended function of the SSCs within the scope of this program will be maintained throughout the period of extended operation.

7. Flow-Accelerated Corrosion Program

This is an existing program as described in L08-0610. The objective of this program is to manage loss of material (wall thinning) due to Flow Accelerated Corrosion (FAC) in susceptible plant piping and other components. The program will be implemented through analysis to determine FAC susceptible locations, predictive modeling techniques, baseline inspections of wall thickness, follow-up inspections, and repair or replacement of degraded components as necessary. Specifically, the program uses two predictive tools, FAC Manager and Checworks. FAC Manager is used to calculate the remaining life components that have been inspected. Checworks is used to calculate the remaining life of uninspected components. These two predictive tools are used to evaluate data and schedule periodic inspections to detect wall thinning and predict when and if minimum wall thickness will occur. Piping replacements are planned prior to wall thickness reaching minimum requirements. Inspection points and inspection frequency is periodically adjusted dependant on inspection data, plant operations history, and industry information. The program is based on the industry guidance provided in NSAC-202L-R2, "Recommendations for an Effective Flow-Accelerated Corrosion Program," including subsequent revisions of this guidance.

The inspectors reviewed the program documentation describing the scope, inspection attributes, corrective actions, and acceptance criteria of this program along with the proposed procedures to implement it. Specifically, the inspectors reviewed the AMP and Improvement Program documents, susceptibility analysis procedures for FAC on piping systems, data base of susceptible locations, FAC inspection reports, corrective action program documents, program self-assessments, operating experience, response to NRC communications, and action items to implement the program. The inspectors also interviewed applicant personnel responsible for the program implementation.

CR-3, Program Health Report, December 2007, identified a weakness in the FAC program. Specifically, it was noted that there were incorrect component replacement dates in FAC Manager and Checworks. Incorrect dates in these databases could potentially leave a component in-service past its predicted or actual lifetime. To correct the issue, CR-3 updated both databases with the correct replacement dates. Although the database was corrected, the inspectors identified that the issue was not resolved programmatically. There was no procedure or guidance in place to maintain the FAC Manager or Checworks databases and prevent the same problem

from recurring. As an enhancement, AR 00349553 was initiated to request a change to the FAC Program Monitoring Program procedure adding guidance on updating FAC Manager and Checworks databases.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. The FAC program was adequately functioning and there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

8. Bolting Integrity Program

The CR-3 License Renewal Application identifies this as an existing monitoring program with enhancements and is described in document L08-0633, Bolting Integrity Age Management Program. The objective of this program is to manage cracking, loss of material, and loss of preload in mechanical bolted closures. The scope of the program covers all safety-related and non-safety-related bolting for pressure-retaining components within the scope for license renewal, with the exception of the reactor vessel head studs which are addressed in a separate program. The program will be implemented through periodic inspections of bolted closures via a combination of existing procedures, Inservice Inspection program, and External Surfaces Monitoring Program. The program also includes preventive measures regarding the use of appropriate bolting and torque practices, including control of thread lubricants based on industry guidelines, NRC generic communications, vendor recommendations, and VEGP operating experience. Additional preventive measures include periodic replacement of steam generator manway and handhole bolting to manage cumulative fatigue damage for these fasteners. The AMP also identifies required enhancements to make the Bolting Integrity Program consistent with GALL, NUREG-1801, Section XI.M18, with no exceptions.

The inspectors reviewed the AMP, operating experience documents, corrective actions, the bolting and torque manual, and AR 304745, Bolting Integrity Program Implementation Program. The inspectors also discussed the program with the license renewal staff.

The inspectors identified that the Crystal River Program Owner had not been selected. Although this program is a compilation of other existing programs, there is no single point of contact or guidance to ensure that all the elements of the GALL are being met. Therefore, the inspectors concluded that without a program owner, the implementation and execution of the program is not auditable. The licensee generated AR 331803 to address this issue.

As a result of an Aging Management Program Audit, which was performed by NRC inspectors prior to this inspection, there were 3 Requests for Additional Information (RAI) still open with regards to the Bolting Integrity AMP. Two of those RAIs requested clarification on guidance that will be used to develop and implement the Bolting Integrity AMP enhancements listed in the AMP. In addition to the clarification requested by the aforementioned RAIs, the inspectors identified the following enhancements:

1. The Bolting Integrity Program states that as an enhancement, it will include periodic UT examinations of a representative sample of bolting identified as potentially having yield strength greater than or equal to 150 ksi for cracking. This procedure has not been developed, nor is there any specific guidance listed in the AMP on how the enhancement will meet GALL element 3-2.

2. The Bolting Integrity Program states that as an enhancement, it will include periodic In-Situ UT exams of a representative sample of High Yield Strength bolting for Stress Corrosion Cracking (SCC.) This procedure has not been developed, nor is there any specific guidance listed in the AMP on how the enhancement will meet GALL element 4-4.

Given the number of open RAIs, the insufficient supporting information with regards to enhancements, and no station program owner being identified, the inspectors were unable to conclude that the Bolting Integrity Program will provide reasonable assurance that the aging effects will be appropriately assessed and managed during the period of extended operation.

9. Steam Generator Tube Integrity Program

This is an existing condition monitoring program with elements and implementation described in L08-0634. This AMP is a subprogram of the CR-3 overall Steam Generator (SG) Integrity Program, which is an integrated program for managing the condition of the CR-3 steam generators. The objective of the AMP is to manage degradation of tubes, tube plugs, sleeves, tube supports, and secondary-side components whose failure could prevent the steam generator from fulfilling its intended safety function.

The program is implemented through tube examinations, tube repairs, and engineering assessments consistent with NEI 97-06, Steam Generator Tubing Integrity Program Guidelines, and CR3 Technical Specifications (TS). The examination consist of eddy current testing (ECT) of the SG tubes based on known and expected degradation mechanisms. Tube repairs are performed in accordance with the TS “Repair Criteria” and with qualified repair methods. Engineering assessments consist of Degradation Assessments (DA), Condition Monitoring (CM), and Operational Assessment (OA). The DA addresses the inspection plan and ECT techniques based on the existing and potential degradation mechanisms, which are obtained from plant historical data and industry operating experience. The CM documents a comparison of the as-found condition against the performance criteria for structural integrity to confirm that adequate steam generator integrity has been maintained during the previous operating period. The OA is a “forward-looking” evaluation of the SG tube condition to predict that the tube integrity performance criteria will be acceptable until the next scheduled inspection. Preventive measures include primary water chemistry control under a separate AMP: “CR3 Water Chemistry Control Program.” Detection of primary to secondary leakage is in accordance with the EPRI PWR Primary to Secondary Leak Guidelines.

CR-3’s current steam generator tubes are comprised of Stress Relieved, Alloy 600 material. In the fall of 2009, CR-3 will replace their steam generators and the new steam generators will have tubes comprised of Thermally Treated Alloy 600 material.

The inspectors reviewed the program documentation describing the scope, inspection attributes, corrective actions, and acceptance criteria of this program along with the procedures to implement it. Specifically, the inspectors reviewed the AMP and implementation documents, SG Program documents, SG Strategic Plan, Degradation Assessment reports, Condition Monitoring, and Operational Assessment reports. The inspectors also held discussions with the steam generator program coordinator to discuss the program and program activities.

As a result of an Aging Management Program Audit that was performed by NRC inspectors prior to this inspection, there were a number of Requests for Additional Information (RAI) that were still open. In addition, the majority of those RAIs had a number of subparts and additional request or points of clarification. Given the number and nature of RAIs that have not yet been answered, the inspectors are unable to conclude that the Steam Generator Tube Integrity Program will provide reasonable assurance of effectively managing the aging effects of the steam generator tubes during the period of extended operation.

10. Open-Cycle Cooling Water System Program

The CR-3 Open Cycle Cooling Water (OCCW) System Program relies on implementation of the recommendations in NRC Generic Letter 89-13, "Service Water Problems Affecting Safety-Related Equipment (Generic Letter 89-13, Supplement 1)," to ensure that the effects of aging associated with the Nuclear Services and Decay Heat Seawater System will be managed for the period of extended operation. The program includes surveillance and control techniques to manage aging effects caused by biofouling, corrosion, erosion, and silting in the Nuclear Services and Decay Heat Seawater System or structures and components serviced by the system.

The OCCW System Program is an existing program that, following the incorporation of the enhancements identified in the LR application, will be consistent with NUREG-1801, Section XI.M20. The enhancements include development of a program to inspect/rebuild/maintain the Nuclear Services and Decay Heat Seawater System Pumps, Discharge Conduits, and Expansion Joints prior to the period of extended operation.

The inspectors conducted a walk down of the system, reviewed the program documentation, interviewed the station program manager, and reviewed existing procedures which implemented the scope and activities of this program.

In March of 2006, a 100% baseline eddy current inspection was performed on all the SWHX tubes. During that inspection, any tube that was found to be greater than 70% through wall was replaced. That inspection is planned to be completed at 6 year intervals unless the next set of data shows that the frequency of inspection should be increased.

The applicant provided adequate guidance to ensure that aging effects will be appropriately assessed and managed through the continued implementation of the existing OCCW System Program. When implemented with enhancements, there is

reasonable assurance that the components in the scope of License Renewal will continue to perform their intended function(s) during the period of extended operation.

11. Closed-Cycle Cooling Water System Program

This is an existing program to manage the effects of aging from loss of material, cracking, and reduction in heat transfer in closed cooling water systems. Systems included in the scope of this program included Decay Heat Closed Cycle Cooling Water System, the Nuclear Services Closed Cycle Cooling Water System, the Secondary Services Closed-Cycle Cooling Water System, and the Industrial Cooling System. The program was based on the most recent version of the EPRI Closed Cooling Water Chemistry Guideline, TR-1007820. The program included chemistry control and corrosion monitoring activities. The inspectors identified program enhancements that included flagging implementing procedures to identify that they are part of the license renewal program in order to provide adequate administrative controls. The program was described in section B.2.11 of the application and L08-0614, "License Renewal Aging Management Program Description of the Closed-Cycle Cooling Water System Program," Revision 2. The activities to accomplish the program enhancements were documented in Action Request 304745-39, "Closed-Cycle Cooling Water System Program Implementation Plan for CR3."

The inspectors reviewed program documentation, discussed the program with responsible station personnel and reviewed existing procedures which implemented the scope and activities of the existing program**.** Additionally, the inspectors reviewed trend information which demonstrated that chemistry monitoring activities were accomplished and specified corrosion inhibitor levels were maintained.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. When implemented with enhancements, there was reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

12. Inspection of Overhead Heavy Load and Light Load Handling Systems Program

The Overhead Heavy Load and Light Load Handling Systems Program is an existing Aging Management Program at CR-3. Prior to the period of extended operation, the applicant planned to enhance the program to: revise administrative controls to include all cranes that are within the scope of License Renewal; require notifying the responsible engineer of unsatisfactory inspection results involving loss of material (including loss of material owing to wear of rails); clarify that crane rails are to be inspected for abnormal wear, and that members are to be inspected for cracking, including welds; and to specify the frequency of inspections for in-scope cranes to be every refueling outage for cranes inside the reactor building and every two years for cranes outside the reactor building.

The program is described in Section B.2.12 of the License Renewal Application, and Calculation L08-0628, Revision 1. The CR-3 Overhead Heavy Load and Light Load Handling Systems Program is primarily concerned with passive, long lived, carbon steel structural components that make up the bridge and trolley. The program is credited with managing loss of material for the steel crane rails and girders within the scope of license renewal. The regulatory basis for periodically inspecting Nuclear Safety-Related and Quality-Related cranes is found in NUREG-0612. The Overhead Heavy Load and Light Load Handling Systems Program had been evaluated for consistency with the guidance provided in NUREG -1801, Section XI.M23, by the applicant and was determined to be consistent by the inspectors.

The inspectors reviewed crane inspection records, procedures, self-assessments, and work orders. The inspectors also verified that issues pertaining to aging management were appropriately addressed, such as those identified during inspections of the cranes, and walked down the five cranes located outside of the reactor building. For license renewal, the following cranes were identified to be within the scope of program: the polar crane, the reactor vessel tool handling jib crane, the CRDM jib crane, the main fuel handling bridge crane, the fuel handling area crane, the spent fuel pit missile shield crane, the spent fuel pool handling bridge crane, the Emergency Feedwater (EFW) pump building crane, and the intake gantry crane.

The inspectors concluded that the applicant had provided adequate guidance to ensure that aging effects will be appropriately assessed and managed. As implemented, with enhancements, there is reasonable assurance that the intended function of the cranes listed in the Overhead Heavy Load and Light Load Handling Systems Program will be maintained through the period of extended operation.

13. Fire Protection Program

The Fire Protection Program is an existing program that provides aging management of the fire protection components using various plant procedures that includes: penetration seals; expansion joints; fire barrier walls, ceilings, and floors; fire rated doors; Diesel Fire Service Pump fuel oil supply lines; fire barrier assemblies such as fire wraps on trays, pipes, and conduits; and the Halon system used for the Control Complex cable spreading room. The testing and inspection procedures are based, in part, on the applicable National Fire Protection Association codes and standards.

The application states that the Fire Protection Program is consistent with the programs described in NUREG-1801, Section XI.M26, “Fire Protection”, with the following exceptions. Performance testing of the fixed Halon fire suppression system is performed at 18 month intervals rather than at least once every 6 months as specified by NUREG-1801, Section XI.M26, but the exception is based on the Halon system being located within the cable spreading room, which is a conditioned air environment within the CR-3 control complex. As noted in NUREG-1801, corrosion of external surfaces is not expected in controlled air environments. NUREG-1801 also recommends visual inspection of walls, ceilings, and floors be performed at least once every refueling outage. The CR-3 Fire Protection Program performs

visual inspection of walls, ceilings, and floors on a frequency commensurate with the safety significance of the structure and its condition but not to exceed 10 years. The exception is based on using an existing procedure for structural inspections and that CR-3 Operating Experience has not detected degradation of fire barrier walls, ceilings, and floors which has resulted in a loss of fire barrier function. The frequency of inspections would be increased depending on the as-found condition.

The application states that the following enhancements will be implemented prior to the period of extended operation. The Fire Protection Program will be enhanced to include a procedure for periodic inspections of fire barrier walls, ceilings, and floors. The procedure for periodic inspections of penetration seals will be enhanced to include inspections for seal separation from walls and components, separation of layers of material, rupture and puncture of seals which are directly caused by increased hardness, and shrinkage of seal material due to weathering. The Fire Protection Program procedure for the annual inspection of fire doors will be enhanced to include visual inspection for loss of material (corrosion) with an acceptance criterion of absence of signs of corrosion other than minor surface corrosion. The Fire Protection Program administrative controls for periodic inspections of penetration seals and fire doors will be enhanced to specify a minimum qualification requirement for personnel performing visual inspections. The Fire Protection Program procedures for periodic inspections of concrete fire barrier walls, ceilings, and floors will be enhanced to add a step to notify Fire Protection personnel of any deficiencies having the potential to adversely affect the fire barrier function of concrete walls, ceilings, and floors.

The inspectors reviewed records of a sample of past surveillance tests on the various components of the program. No significant issues were identified in this review.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. The program is functioning adequately and there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

14. Fire Water System Program

The Fire Water System Program is an existing program that includes system pressure monitoring, wall thickness evaluations, periodic flow and pressure testing in accordance with applicable National Fire Protection Association commitments and periodic visual inspection of overall system condition. Inspections of sprinkler heads are used to assure that corrosion products that could block flow of the sprinkler heads are not accumulating. The applicant states that the Fire Water System Program is consistent with the programs described in NUREG-1801, Section XI.M27, “Fire Water System”, with no exceptions.

The applicant states that the following enhancements will be implemented prior to the period of extended operation. These enhancements were incorporated into AR 304745 for tracking and assurance that they are implemented. The Fire Water System Program documents will be revised to incorporate a requirement to perform

one or a combination of the following two activities: implement periodic flow testing consistent with the intent of NFPA 25; and perform wall thickness evaluations to verify piping is not impaired by pipe scale, corrosion products, or other foreign material. For sprinkler systems, this may be done by flushing, internal inspection by removing one of more sprinkler heads, or by other obstruction investigation methods. These inspections will be performed before the end of the current operating term. The results from the initial inspections will be used to determine inspection intervals thereafter during the period of extended operation.

The applicant will also enhance the Fire Water System Program documents to incorporate a requirement to perform internal inspections of system piping at representative locations as required to verify that loss of material due to corrosion has not impaired system intended function. Alternately, non-intrusive inspections can be used to verify piping integrity. The Fire Water System Program will be enhanced to perform a visual inspection of yard fire hydrants annually consistent with the intent of NFPA 25 to ensure timely detection of signs of degradation, such as corrosion. The Program will also be enhanced consistent with the intent of NFPA 25, to either replace the sprinkler heads prior to reaching their 50-year service life or perform field service testing of representative samples from one or more sample areas by a recognized testing laboratory. Subsequent test intervals will be based on test results.

The inspectors walked down the fire water storage tanks, the fire pumps, and various fire water system components and reviewed documents containing results of inspections and tests performed on the Fire Water system. The inspectors discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort. The inspectors concluded that the fire protection equipment at Crystal River is functioning adequately.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. The program is functioning adequately and, with enhancements, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

15. Above-Ground Steel Tanks Program

The Above-Ground Steel Tank Program is a new aging management program with the objective to manage the aging effect of loss of material for the external surfaces and inaccessible locations of above ground carbon steel tanks within the scope of license renewal. The scope of this program consists of the following three above ground tanks: two Fire Service Water Storage Tanks (FST-1A and -1B) and one Condensate Storage Tank (CDT-1). The program will consist of existing procedures and preventive maintenance activities. Procedure AI-1701, “System Engineering Standards,” will address the implementation of periodic walk-down inspections, with focus on the condition of the external coating on the tank surface and the condition at the foundation to tank interface. Procedure EGR-NGGC-0351, “Condition Monitoring of Structures,” will contain the tank’s performance standards for corrosion

coating deficiencies, and foundation to tank interface. Periodic inspections of the in-scope tanks are also performed using the following planned preventive maintenance activities: a) PMID 27589, b) PMID 27836, and c) PMID 27837. The applicant generated an implementation plan with action items to revise the procedures identified above as part of the license renewal commitment to implement a new Above-Ground Steel Tank Inspection program. In addition, the applicant generated an action item to revise preventive maintenance activities to include the thickness measurement of inaccessible tank surfaces prior to the period of extended operation.

The inspectors reviewed program documents and license renewal calculations describing the scope, inspection attributes, acceptance criteria, operating experience reviews, and corrective actions and verified that the program was consistent with the elements described in the LRA and also adequate to manage the aging effects associated with above-ground carbon steel tanks. The inspectors also reviewed results from previous visual inspections on the in-scope tanks and conducted independent walkdowns of the in-scope tanks to assess the current material condition. The inspectors discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort.

The inspectors determined that the applicant had provided adequate guidance to ensure aging effects will be appropriately managed and conducted adequate historic reviews of plant specific and industry experience to determine applicable aging effects. The inspectors concluded that the proposed Above-Ground Steel Tank Inspection program, when implemented as described, will provide reasonable assurance that the program will maintain the function of the in-scope SCCs through the period of extended operation.

16. Fuel Oil Chemistry Program

This is an existing program to manage the aging effects of loss of material in the diesel fuel oil tanks through monitoring and maintenance of fuel oil quality. The program included the diesel fuel oil tanks for the emergency diesel generators (EDGs), the diesel-driven fire water pumps, and the diesel-driven emergency feed water pumps. The program includes the One Time Inspection for Diesel Fuel Oil Chemistry Verification aging management program. The program was described in section B.2.16 of the application and L08-0622, “License Renewal Aging Management Program Description of the Fuel Oil Chemistry Program,” Revision 1. The implementation plan for the program is documented in AR 304745-11, “Fuel Oil Chemistry Program Implementation Plan for CR3.” The program was implemented, with the following enhancements identified for completion prior to the period of extended operation: (1) adjust the inspection frequency for the Diesel-Driven Emergency Feedwater Pump Fuel Oil Storage Tank (DFT-4) to ensure an inspection is performed prior to the period of extended operation; (2) inspect the internal surfaces of the Diesel-Driven Fire Pump Fuel Oil Storage Tanks (FST-2A and FST-2B); and (3) develop a work activity to periodically inspect the internal surfaces of the Diesel-Driven Fire Fuel Oil Storage Tanks. The AMP provided a cross reference to all procedures which implement the program.

The inspectors reviewed the program documentation, discussed the program with responsible station personnel and reviewed existing procedures which implemented the scope and activities of this program. The inspectors reviewed results of previous inspections of fuel oil tanks and procedures and results for fuel oil tank sampling as well as corrective actions for identified parameter values that exceeded acceptance criteria.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented with the above described enhancements, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

17. Reactor Vessel Surveillance Program

The Reactor Vessel (RV) Surveillance Program is an existing program described in Nuclear Generation Group L08-0623, credited with managing the aging effects of the reactor beltline area in the CR-3 plant. The purpose of the surveillance program is to monitor for changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region which result from exposure to neutron irradiation and the thermal environment. CR-3 utilizes internal and external dosimetry and the Master Integrated Reactor Vessel Surveillance Program (MIRVP) to monitor and evaluate surveillance capsules. CR-3 and the MIRVP evaluates neutron embrittlement of the capsules through surveillance testing and the evaluation of the reactor vessel surveillance capsules (tensile specimens, charpy specimens, and alternative ex-vessel dosimetry), fluence calculations, benchmarking, and monitoring of effective full-power years (EFPYs).

The applicant stated the program is consistent with the GALL AMP XI.M31, with the following exception and enhancement. Unopened CR-3 capsules A and E have been disposed of in accordance with an NRC-approved plan and therefore cannot be reconstituted as required by GALL element 6-4. Therefore, CR-3 has a commitment/enhancement to formalize controls for the storage of archived specimens to ensure availability for future use, and maintain the identity, traceability, and recovery of the archived specimens throughout the storage. Two capsules being irradiated in the Davis-Besse reactor vessel are designated as standby capsules for CR-3 with no withdrawal planned. Three capsules remain in the CR-3 vessel, two of which are reserved for other data not relevant to CR-3, the other capsule has been confirmed to be stuck in its position, and currently there are no plans for its removal. CR-3 has identified adequate irradiated and un-irradiated material specimens within the MIRVP available for reconstitution to CR-3 if required.

The inspectors reviewed the program documents to verify the MIRVP was being followed and is consistent with the GALL. In addition, the inspectors interviewed personnel and reviewed the external neutron monitoring program.

The inspectors concluded that when implemented as described, there is reasonable assurance that the reactor vessel will be adequately maintained through the period of extended operation.

18. One-Time Inspection Program

This new program will use one-time inspections to provide objective evidence that an aging effect is not occurring, or that the aging effect is occurring slowly enough not to affect the SSCs' intended function during the period of extended operation, and will therefore not require additional aging management. The inspections will be performed prior to the period of extended operation. This program will verify the effectiveness of the aging management programs for water chemistry control, diesel fuel oil, and lube oil analysis. The program will include determination of a sample size, identification of inspection locations, determination of examination technique, and evaluation of the need for follow-up examinations.

The inspectors conducted interviews with appropriate plant personnel, and reviewed the description of the program in application section B.2.18 and L08-0624, "License Renewal Aging Management Program Description of the One Time Inspection Program," Revision 1. Additionally the inspectors reviewed the program implementation plan documented in AR 304745-13, "One Time Inspection Program Implementation Plan," and discussed the program with station license renewal staff.

At the time of this inspection the implementing procedures for this program were not complete. It was not fully apparent to the inspectors how the applicant would determine sample size, specific sample locations, or the acceptance criteria for inspections conducted. As such, there was not enough information to provide reasonable assurance that the effects of aging would be adequately managed and the intended function of in-scope SSCs would be maintained through the period of extended operation.

19. Selective Leaching of Materials Program

The Selective Leaching of Materials Program is a new program. It is a one-time inspection program designed to assess selective leaching of a sample population of components and/or commodities (such as piping, pump casings, valve bodies, and heat exchanger components) made of uninhibited copper alloys with zinc content greater than 15% or aluminum content greater than 8%, and gray cast iron exposed to a raw water, treated water, closed cycle cooling water, open cycle cooling water, fire water, steam, fuel oil, uncontrolled indoor air, or soil environment at CR-3 most likely to experience the selective leaching phenomenon. The Program will be implemented by the Work Management Process using a new inspection procedure which will define the examination methodology and acceptance criteria. Confirmation of selective leaching may be performed with a metallurgical evaluation or other testing methods and will result in expanded sampling, as appropriate, and engineering evaluation to determine whether the process will affect the ability of the components to perform their intended function(s) for the period of extended operation.

Initial examinations will be performed prior to the period of extended operation. The program was described in section B.2.19 of the application and Calculation L08-

0625, Revision 1. The inspectors reviewed the program description, the implementation package, and the draft procedure and discussed the program development and implementation with the license renewal staff to assess the consistency of scope and actions of this proposed program to NUREG 1801, Section XI.M33.

The inspectors concluded that the applicant provided adequate guidance to ensure that aging effects will be appropriately assessed and managed. When implemented, there is reasonable assurance that the intended function of the SSCs within the scope of this program will be maintained throughout the period of extended operation.

20. Buried Piping and Tanks Inspection Program

The Buried Piping and Tanks Inspection Program is a new aging management program with the objective to manage the aging effect of loss of material for the external surfaces of buried steel components in systems within the scope of license renewal. The scope of this program consists of buried steel piping and two buried tanks in the following systems: Emergency Feedwater, Condensate, Diesel Fuel Oil, Fire Service Water, and Nuclear Service and Decay Heat Sea Water. The program will be governed by corporate procedure EGR- NGGC-0513, which is currently implemented in other fleet sites to inspect buried piping within the scope of license renewal. The applicant generated action items to revise this procedure to add the buried SSCs within the scope of CR-3 license renewal. The program will be implemented through opportunistic inspections of buried piping segments and tanks within the aforementioned systems. The program also includes preventive measures to use protective coatings on buried steel piping applications.

The inspectors reviewed program documents and license renewal calculations describing the scope, inspection attributes, acceptance criteria, operating experience reviews, and corrective actions in order to verify that the program was consistent with the elements described in the LRA and adequate to manage the aging effects associated with buried piping. The inspectors also reviewed results from previous opportunistic inspections for Fire Service Water buried piping to assess its material condition. Specifically, the inspectors reviewed the results of excavations performed around components FSV-503 and FSV-507 and determined that no significant aging issues existed. Additionally, the inspectors reviewed operating experience and site specifications for buried piping to verify that preventative measures consisting of protective coatings were implemented as described in the LRA. The inspectors also discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort.

The inspectors determined that the applicant had provided adequate guidance to ensure aging effects will be appropriately managed and conducted adequate historic reviews of plant specific and industry experience to determine applicable aging effects. The inspectors concluded that the proposed Buried Piping and Tanks Inspection program, when implemented as described, will provide reasonable assurance that the program will maintain the function of the in-scope SCCs through the period of extended operation.

21. One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program

This new program is intended to provide objective evidence that the aging effect of cracking, due to thermal, mechanical and inter-granular stress corrosion, is not occurring, or is occurring slowly enough to not affect the intended function of in-scope small bore piping during the period of extended operation. Small bore piping is defined as less than a 4 inch nominal pipe size (NPS). To address cracking in small-bore piping, a one time volumetric examination of a sample of small bore butt welds will be performed. The examination locations will be selected from among the applicant's Risk Informed ISI Program locations, with a sample size appropriate to provide confidence the One-Time Inspection Program of ASME Code Class One Small-Bore Piping Program will adequately address aging effects. Additionally, the program is augmented by inspections conducted as recommended by the Babcock & Wilcox 177 Fuel Assembly Owner's Group Report (Document Number 77-1140611-00). These augmented inspections focus on the Normal Makeup, and High Pressure Injection nozzles. The program will be implemented by the applicant's ASME Section XI Program. Inspection of small bore piping socket welds will continue to be performed by VT-2 inspection in accordance with ASME Code Case N-578-1.

The program was described in section B.2.21 of the application, and L08-0627, "License Renewal Aging Management Program Description of the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program," Revision 1. The implementation plan was described in AR 304745-16, "One-Time Inspection of Code Class 1 Small Bore Piping Program Implementation Program Plan." The inspectors reviewed the program documentation and discussed the program with responsible applicant personnel.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. When implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

22. External Surfaces Monitoring Program

The CR-3 External Surfaces Monitoring Program is an existing Aging Management Program that implements inspections of external surfaces of mechanical system components for aging management in external air environments under the licensee's Maintenance Rule (10 CFR 50.65) implementation. The program is described in Section B.2.22 of the application and Calculation L08-0635, Revision 1. Surfaces constructed from materials susceptible to aging in these environments will be inspected at appropriate frequencies to assure that the effects of aging are managed such that system components remain functional to perform their intended function during the period of extended operation. The External Surfaces Monitoring Program is based on periodic visual system inspections of external surfaces via walkdowns of components such as piping, piping components, ducting, and other equipment within the scope of license renewal and subject to aging management review in order to manage aging effects. The inspectors noted that loss of material due to boric acid

corrosion is managed by the Boric Acid Corrosion Program. The program will be enhanced for license renewal to: ensure that the list of systems addressed encompasses all of the systems credited for aging management by the External Surfaces Monitoring Program; include inspection attributes that will be adequate to identify aging effects for the range of materials cited within the scope of the program; include measures to assure that aging effects are managed on surfaces that are inaccessible or not readily visible during both plant operations and refueling outages, such that reasonable assurance is provided that applicable components will perform their intended function during the period of extended operation; detect aging effects/mechanisms (including loss of material, hardening/loss of strength of elastomers, and reduction of heat transfer through fouling) and qualify degradations consistent with the demand of components crediting the External Surfaces Monitoring AMP for aging management; and include inspection attributes regarding the degradation of coatings.

The inspectors reviewed the program documentation, and discussed the program with responsible applicant personnel to assess the consistency of scope and actions of this proposed program with NUREG 1801, Section XI.M36.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

23. Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program

This new program is intended to inspect the internal surfaces of steel piping, piping components, ducting and other components that are not covered by other aging management programs. Examination techniques are primarily visual examination, but other non-visual NDE such as physical manipulation of elastomers will be included. The program will be implemented via existing and new preventative maintenance, surveillance testing, and periodic testing work orders.

The program was described in section B.2.22 of the application, and L08-0630, “License Renewal Aging Management Program Description of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program,” Revision 1. The implementation plan was described in AR 304745-18, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program Implementation Plan.” The inspectors reviewed the program documentation and discussed the program with responsible applicant personnel. The inspection scope of the program did not include a discussion of both component locations, the number of samples required to demonstrate adequate coverage to ensure the program will detect aging management issues. The applicant has identified examples of locations that are considered “leading indicators,” but not a methodology to show the number of samples will be sufficient. The applicant has also not yet identified acceptance criteria for new implementing procedures.

At the time of this inspection the implementing procedures for this program were not complete. It was not fully apparent to the inspectors how the applicant would determine sample size, or the acceptance criteria for new inspections. As such, there was not enough information to provide reasonable assurance that the effects of aging would be adequately managed and the intended function of in-scope SSCs would be maintained through the period of extended operation.

24. Lubricating Oil Analysis Program

This existing program ensured that lubricating oil and hydraulic fluid environments in the in-scope mechanical systems were maintained to the required quality and that contaminants (primarily water and particulates) for these systems were maintained within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking, or reduction of heat transfer. The One-Time Inspection program [B.2.18], described in Section18 above, includes inspections to verify the effectiveness of the oil analysis program.

The program was described in section B.2.24 of the application and L08-0631, "License Renewal Aging Management Program Description of the Lubricating Oil Analysis Program," Revision 1. The implementation plan is described in AR 304745-44, "Lubricating Oil Analysis Program Implementation Plan." The inspectors reviewed the program documentation, discussed the program with responsible station personnel and reviewed existing procedures which implemented the scope and activities of this program.

The inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

25. ASME Section XI, Subsection IWE Program

This is an existing program credited in the LRA for monitoring aging of the reactor containment which includes periodic visual examination and limited volumetric examinations utilizing ultrasonic thickness measurements of Class MC components of the containment structure. It includes the steel containment liner and integral attachments for the concrete containment, containment personnel airlock and equipment hatch, penetration sleeves, moisture barriers, and pressure-retaining bolting in accordance with the ASME Code, Section XI, Subsection IWE, 2001 Edition, through the 2003 Addenda, as modified by 10 CFR 50.55a. The frequency and scope of examinations specified in 10 CFR 50.55a and Subsection IWE ensure that aging effects would be detected before they would compromise the design basis requirements. The ASME Section XI, Subsection IWE Program is implemented and maintained in accordance with the general requirements for engineering programs. CR-3 will perform successive examinations in accordance with procedure EGR-NGGC-0015, Containment Inspection Program.

The program manages loss of material and cracking for the primary containment and its integral attachments by conducting visual examinations, either directly or remotely, and includes augmented examinations to measure wall thickness of the containment liner. 10 CFR 50a(b)(2)(ix) specifies additional requirements for inaccessible areas and states that the licensee is to evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas. CR-3 has identified general and pitting corrosion on the liner plate at the moisture barrier/concrete interface area and below and general corrosion was identified on several containment penetrations. The moisture barrier was cracked and brittle and had failed to perform its function. The coating on the liner plate had degraded in several spots, and there was visual evidence of localized rusting. As a result, the moisture barrier was completely removed and the deteriorated cork material below the moisture barrier was removed. Liner plate thickness measurements were determined by ultrasonic testing (UT) methods and were evaluated by Engineering and deemed to be acceptable. The liner plate was then prepared and re-coated, the cork was installed, and an alternate caulk from another supplier was installed as the moisture barrier. The structural integrity of the Reactor Building liner plate was not degraded beyond its design margin. Corrosion was identified on containment penetrations and the corrosion was evaluated as minor surface corrosion not impacting their structural integrity.

During the autumn 2009 refueling outage, a detailed visual examination of the moisture barrier is scheduled to be performed in accordance with Section XI, IWE requirements. A damaged (separated) moisture barrier which could allow moisture to reach the liner plate at and below the floor level is scheduled to be repaired during the outage. This detailed visual examination will document the condition of the moisture barrier for replacement during a subsequent refueling outage.

The inspectors reviewed the LR program description evaluation document, the program implementation package, reviewed the applicable plant procedures, reviewed recent inspection results, and held discussions with responsible applicant personnel. The inspectors concluded that the IWE Inspection Program was in place, had been properly implemented, and was consistent with the description in the LRA and NUREG 1801, Section XI.S1.

Industry and site operating experience demonstrates that the program is effective at detecting and managing aging effects and that continued implementation of the ASME Section XI, Subsection IWE Program will provide reasonable assurance that the aging effects of pressure-retaining Containment Structure Class MC components are adequately managed so that the intended functions of the applicable components will be maintained during the period of extended operation.

26. ASME Section XI, Subsection IWL Program

This program is an existing program credited in the LRA that manages the reinforced concrete and unbonded post-tensioning system of the CR-3 Class CC containment structure. 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. The program requires periodic visual inspection (VT-1, VT-1C, and VT-3C) of the reinforced concrete Reactor Building (RB), for degradation conditions such as corrosion, cracks, distortion, efflorescence, exposed reinforcing steel, popout, scaling, and spalling, and inspection and testing of a sample of the unbonded post-tensioning system as specified by ASME Section XI, Subsection IWL. The Program includes ASME Section XI, Subsection IWL, examination categories L-A, for concrete surfaces, and L-B, for the unbonded post-tensioning system. The frequency of inspection as specified in IWL-2400 at three and five years following the structural integrity test and at five-year intervals thereafter has been followed to date and will continue to be followed.

Previous tendon surveillance results have identified instances where tendons have been found with lift-off forces below 95 percent of the predicted base value. Small grease and oil leaks have also been identified on multiple tendon caps, located inside existing structures that adjoin the RB. In addition, instances of missing or broken wires have been identified. All of these conditions were evaluated against the acceptance criteria and determined to be acceptable. An evaluation of operating experience has concluded that the CR-3 containment structure is functioning as designed, that the reactor building structure meets code requirements and has experienced no abnormal degradation of the post-tensioning system. Industry and plant-specific operating experience demonstrates that the program is effective at detecting and managing aging affects so that the intended functions of the applicable components will be maintained during the period of extended operation.

The CR-3 ASME Section XI, Subsection IWL Program is implemented and maintained in accordance with the general requirements for engineering programs. Periodic program reviews are performed and the program is upgraded based on industry and plant-specific experience. In addition, plant operating experience is shared among program personnel at all four of Progress Energy nuclear plant sites.

The inspectors reviewed the licensing renewal program evaluation document, the program implementation package, reviewed the applicable plant procedures, reviewed recent inspection results, held discussions with responsible applicant personnel, and walked down areas of the reactor building and tendon galleries.

The inspectors concluded that the IWL Inspection Program was in place, had been properly implemented, and was consistent with the description in the LRA and NUREG 1801, Section XI.S2. Continued implementation of the program will provide reasonable assurance that the aging effects of the reactor building's pressure-retaining reinforced concrete and unbonded post-tensioning system are adequately managed so that the intended functions of the applicable components will be maintained during the period of extended operation.

27. ASME Section XI, Subsection IWF Program

This program is an existing program credited in the LRA that manages ASME Code Class 1, 2, and 3 components and their supports. The ASME Section XI, Subsection IWF Program is implemented in accordance with 10 CFR 50.55(a) and ASME

Section XI, Subsection IWF, 2001 Edition, through the 2003 Addenda, through the CR-3 ISI Components & Structures Examination Program Manual. The program requires periodic visual inspection (VT-3) of the components and their supports including: mechanical connections to pressure retaining components and building structure; weld connections to the building structure; weld and mechanical connections at intermediate joints in multi-connected supports; clearances of guides and stops, alignment of supports, and assembly of support items; hot and/or cold settings of spring supports and constant load supports; and accessible sliding surfaces. The controlling plant procedure for the CR-3 IWF ISI program is SP-208, Visual Examination of Component Supports, and the controlling plant procedure for the CR-3 hydraulic snubbers is SP-201, Hydraulic Snubbers Visual Inspection.

Evaluations of operating experience have concluded that the CR-3 ASME Section XI, Subsection IWF Program is functioning as designed and that the components and their supports meet code requirements. Industry and plant operating experience demonstrates that the program is effective at detecting and managing aging affects so that the intended functions of the applicable components will be maintained during the period of extended operation.

The CR-3 ASME Section XI, Subsection IWF Program is implemented and maintained in accordance with the general requirements for engineering programs. Periodic program reviews are performed and the program is upgraded based on industry and plant-specific experience; qualified personnel are assigned as program managers and are given authority and responsibility to implement the Program; and adequate resources are committed to Program activities. In addition, plant operating experience is shared among program personnel at all four of Progress Energy nuclear plant sites.

The inspectors reviewed the licensing renewal program evaluation document, the program implementation package, reviewed the applicable plant procedures, reviewed recent inspection results, held discussions with responsible applicant personnel, and walked down some of the accessible supports.

The inspectors concluded that the IWF Inspection Program was in place, had been properly implemented, and was consistent with the description in the LRA and NUREG 1801, Section XI.S3. Continued implementation of the program will provide reasonable assurance that the aging effects of the plant's ASME Code Class 1, 2, and 3 components and their supports are adequately managed so that the intended functions of the applicable components will be maintained during the period of extended operation.

28. 10 CFR Part 50, Appendix J Program

The 10 CFR50, Appendix J Program is an existing program with the objective to monitor leakage rates through the containment pressure boundary, including penetrations and access openings in accordance with the regulatory requirements of 10 CFR 50, Appendix J. Monitoring of leakage rates is performed by implementing the performance based approach on Appendix J (Option B) for Type A, B, and C leak

rate tests. In addition, the program includes guidance from Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," and NEI 94-01, “Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50 Appendix J.” The program implementation is governed by a series of procedures that individually address the testing of in-scope SSCs. The applicant implements the program with procedures for local leak rate testing of Reactor Building Purge Valves, Containment Leakage Test-Type “A” Including Liner Plate, Containment Leakage Test – Type “B” and “C”; and Containment Air Lock Test. In addition, the applicant conducts a visual inspection of the Reactor Building internal surfaces prior to a Containment Type-A test as part of the requirements of ASME Section XI, Subsection IWE, “Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Plants.” The applicant generated an action item to ensure continuous implementation of the Containment Leakage Testing Program through the period of extended operation as established by 10 CFR50 Appendix J.

The inspectors reviewed program documentation and license renewal calculations describing the scope, inspection attributes, corrective actions, operating experience reviews, and acceptance criteria of this program along with the proposed procedures to implement it in order to verify that the program was consistent with the elements described in the LRA. In particular, the inspectors reviewed the administrative procedures for the implementation of the Appendix J program, results of Containment Integrated Leak Tests, results of containment Type B and C tests, results of visual inspections prior to a Type A test, program health reports, Containment Leak Rate performance history, corrective action documents, and program self-assessments. The inspectors also discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort.

The inspectors determined that the applicant had provided adequate guidance to ensure aging effects will be appropriately managed and conducted adequate historic reviews of plant specific and industry experience to determine applicable aging effects. The inspectors concluded that the existing Appendix J program is generally effective in monitoring and correcting leakage through the containment pressure boundary, and includes the elements described in the LRA. The inspectors determined that there is reasonable assurance that this program will maintain the function of in-scope SSCs through the period of extended operation.

29. Masonry Wall Program

The CR-3 Masonry Wall Program is an existing program that manages aging of masonry walls and structural steel restraint systems of the masonry walls within the scope of license renewal. The program includes the concrete masonry units and restraint systems used for sealing and providing radiation shielding in the Auxiliary Building, Control Complex, Turbine Building, Fire Service Pump House and the Switchyard Relay Building under the licensee’s Maintenance Rule (10 CFR 50.65) implementation. The program is described in Section B.2.29 of the application and Calculation L08-0636, Revision 1. This program will be further enhanced to revise

the program administrative control procedure EGR-NGGC-0351 to identify the structures which have masonry walls in the scope of License Renewal prior to the period of extended operation.

The CR-3 Masonry Wall Program is implemented and maintained in accordance with the general requirements for engineering programs, thereby providing assurance that it is effectively implemented to meet regulatory, process, and procedure requirements. Periodic program reviews are performed and the program is upgraded based on industry and plant-specific experience; qualified personnel are assigned as program managers and are given authority and responsibility to implement the program; and adequate resources are committed to program activities. In addition, plant operating experience is shared among program personnel at all four of Progress Energy nuclear plant sites.

The CR-3 Masonry Wall Program is implemented on the schedule mandated by 10 CFR 50.65, the Maintenance Rule. A baseline inspection of masonry walls in the scope of Maintenance Rule was completed in 1997 and no unacceptable conditions were identified. A subsequent inspection of structures was completed in 2007, consistent with the program frequency of at least one inspection every ten years, and identified no degradation that impacted the intended functions of the walls.

The inspectors reviewed the licensing renewal program evaluation document, the program implementation package, reviewed the applicable plant procedures, reviewed recent inspection results, held discussions with responsible applicant personnel, and walked down some of the accessible masonry walls.

The inspectors concluded that the Masonry Wall Program was in place, had been properly implemented, was consistent with the description in the LRA and NUREG 1801, Section XI.S5, and that continued implementation of the program will provide reasonable assurance that the aging effects of the plant's masonry walls are adequately managed so that their intended functions will be maintained during the period of extended operation.

30. Structures Monitoring Program

The CR-3 Structures Monitoring Program is an existing program that manages aging effects of civil/structural components and commodities within the scope of license renewal and is implemented in accordance with the regulatory requirements and guidance of the Maintenance Rule (10 CFR 50.65). The program is described in Section B.2.30 of the application and Calculation L08-0608, Revision 1, and is designed to provide reasonable assurance that there is no loss of intended function of a structure or a structural component.

The inspectors reviewed the program description and the implementation package, and discussed the program development and implementation with the applicant's license renewal staff to assess the consistency of scope and actions of the program with NUREG 1801, Section XI.S6.

Prior to the period of extended operation, this program will be further enhanced to revise Program administrative control procedure EGR-NGGC-0351 to: (1) specifically include all License Renewal Structures and Systems that credit the Structures Monitoring Program for aging management; (2) require periodic inspections of the water-control structures (Circulating Water Intake Structure, the Circulating Water Discharge Structure, the Nuclear Service Sea Water Discharge Structure, and the Intake Canal) and the Raw Water Pits on a frequency not to exceed five years; (3) include inspection of the Circulating Water Intake Structure (including submerged portions) on a frequency not to exceed five years; and (4) include inspection of inaccessible surfaces of reinforced concrete pipe when exposed due to removal of backfill for any reason. Also, related procedures and maintenance activities will be enhanced to be worked in accordance with EGR-NGGC-0351. In addition, Procedure CP-113B will be revised to notify the Responsible Engineer when below-grade concrete, including concrete pipe, is exposed so that an inspection can be performed before backfilling. This requirement will also be satisfied by incorporating it into a new procedure to provide guidance for excavation and backfill of License Renewal components. The program will also be enhanced to provide for periodic groundwater chemistry monitoring, including consideration for potential seasonal variations.

The inspectors reviewed the licensing renewal program evaluation document, reviewed the program implementation package, reviewed applicable plant procedures, reviewed corrective action documents, reviewed recent inspection results. The inspectors held discussions with responsible applicant personnel, and walked down identified structures to verify that areas where signs of degradation, such as spalling, cracking, leakage through concrete walls, corrosion of steel members, deterioration of structural materials and other aging effects, had been identified and documented.

Based on the above observations and corrective actions, the inspectors concluded that the Structures Monitoring Program was in place, had been properly implemented, was consistent with the description in the LRA and NUREG 1801, Section XI.S6. Continued implementation of the program, with enhancements, will provide reasonable assurance that the aging effects of the plant's structures are adequately managed so that the intended functions of the applicable components will be maintained during the period of extended operation.

31. Metal Fatigue of Reactor Coolant Pressure Boundary

The Fatigue Monitoring Program is an existing program with the objective to monitor the number of transients and cycles on applicable systems and components in order to not exceed the limits imposed by Technical Specifications and the Final Safety Analysis Report. The program monitors and tracks thermal and pressure transients for limiting reactor coolant pressure boundary components against fatigue design limits. The systems within the scope of the program are: Core Flood, Decay Heat Removal, Control Rod Drive Control, Incore Monitoring, and Reactor Coolant. The program is implemented through procedure SP-296, "Documentation of Allowable Operating Cycles." This procedure provides instructions and acceptance criteria to track the cumulative number of transients and cycles through the life of the plant.

The applicant generated an action item to perform an evaluation of the effects of reactor water environment on fatigue (i.e., environmentally-assisted fatigue) and incorporate the results of this review in procedure SP-296.

The inspectors reviewed program documentation and license renewal calculations describing the scope, inspection attributes, corrective actions, operating experience reviews, and acceptance criteria of this program along with the proposed procedures to implement it in order to verify that the program was consistent with the elements described in the LRA.

The inspectors reviewed previous documentation of plant transients and cycles, self-assessments, and history of plant transients. The inspectors also discussed the program implementation with responsible applicant personnel to assess their knowledge and involvement in the license renewal effort. The inspectors concluded that the existing Fatigue Monitoring Program has been demonstrated to be generally effective in monitoring and tracking reactor coolant pressure boundary fatigue and there is reasonable assurance that the function of the in-scope SSCs will be maintained through the period of extended operation.

32. Carborundum (B4C) Program

The CR-3 Carborundum (B4C) Monitoring Program is an existing program that monitors the effects of aging on the Carborundum (B4C) panels that are located in the high density spent fuel storage racks in Spent Fuel Pool A. Carborundum (B4C) is a boron carbide shielding material utilized as a neutron absorber for the CR-3 spent fuel storage racks. Stability of the Carborundum (B4C) supports the fuel storage pool Technical Specification criticality analysis requirement that the effective neutron multiplication factor (Keff) of ≤ 0.95 must be maintained for all postulated events. The condition of the Carborundum (B4C) poison material in the high density spent fuel racks located in Pool A is an indication of the Keff of the fuel in the pool. The program periodically removes and examines Carborundum (B4C) poison samples from the pool to ensure that the Keff is maintained below 0.95.

The parameters monitored verify that: (1) Carborundum (B4C) sample coupons meet visual acceptance criteria and will be managed during the period of extended operation, and (2) Carborundum (B4C) sample weight loss shall be within acceptable criteria and will be managed during the period of extended operation. The inspections monitor Carborundum (B4C) samples that have been exposed to either, (1) gamma radiation dose plus borated water, or (2) borated water alone, to determine percentage weight loss of the sample. As a result of the low percentage weight loss of Carborundum (B4C) for sample inspections performed every five years, the inspection interval has been increased to nominally every 10 years.

Administrative controls for the Carborundum (B4C) Program will be enhanced to: (1) include provisions to monitor and trend data for incorporation in test procedures to ensure the projection meets the acceptance criteria; and (2) incorporate acceptance criteria tables for accumulated weight losses of monitored Carborundum samples.

The inspectors reviewed the licensing renewal program evaluation document, reviewed the program implementation package, reviewed applicable plant procedures, reviewed corrective action documents, and reviewed recent inspection results.

Due to unavailability of CR staff responsible for the program, personnel interviews could not be performed and no plant walk down was conducted. Therefore, the inspection of this program will completed during a follow-up inspection

C. Review of Electrical Aging Management Programs

33. Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

The Electrical Cables and Connections not subject to 10 CFR 50.49, Environmental Qualification Requirements Program, is a new inspection program that will be established to periodically inspect electrical cables that are routinely exposed to adverse localized environments caused by heat, radiation or moisture. The program includes electrical cables and connections which are not included in the environmental qualification requirements of 10 CFR 50.49, but are located in an adverse localized environment which is significantly more severe than the specified service conditions for the insulated cable or connection. The aging effect of concern is reduced insulation resistance caused by degradation of the insulating materials on electrical cables and connections that is visually observable, such as color changes or surface cracking. These visual indications will be used as indicators of degradation.

A representative sample of accessible insulated cables and connections within the scope of license renewal will be visually inspected for cable and connection jacket surface anomalies such as embrittlement, discoloration, and cracking. The technical basis for the sample selections of cables and connections to be inspected is to be provided by the applicant as part of implementing this program. The applicant has committed that the Electrical Cables and Connections, not subject to 10 CFR 50.49 Environmental Qualification Requirements Program, will be implemented and the first inspection completed prior to starting the period of extended operation. The application states that the program will be consistent with the program described in NUREG-1801, Section XI.E1, “Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.”

The inspectors reviewed the Electrical Cables and Connections not subject to 10 CFR 50.49 Environmental Qualification Requirements Program LR Evaluation Document and Implementation Plan, Calc. L08-0640, and found them to be of adequate quality and consistent with the application. The evaluation document states that the applicant investigated the Crystal River operating history for in-scope electrical components using condition report (CR) searches, internal correspondence, plant walkdowns and interviews with station staff. The inspectors reviewed the responsible engineer’s data base records of this work.

Based on the above observations, the inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended function of those in-scope electrical components will be maintained through the period of extended operation.

34. Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is a new program that will be used for aging management of radiation monitoring and nuclear instrumentation cables not included in the Crystal River EQ Program. Exposure of electrical cables to adverse localized environments caused by heat, radiation or moisture can result in reduced insulation resistance (IR). A reduction in IR is a concern for circuits with sensitive high voltage, low-level signals such as radiation monitoring and nuclear instrumentation circuits since it may contribute to signal inaccuracies. This review will be performed at least once every 10 years, with the first review to be completed before the end of the current license term. The application states that the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program will be consistent with the program described in NUREG-1801, Section XI.E2, “Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.”

For radiation monitoring circuits and the Gamma Metrics circuits, the review of calibration results or findings of surveillance testing will be used to identify the potential existence of cable system aging degradation. Power range cable systems used in the Excore Monitoring System will be tested at a frequency not to exceed 10 years based on engineering evaluation, with the first testing to be completed before the end of the current license term. Testing may include IR tests, time domain reflectometry (TDR) tests, current versus voltage (I/V) testing, or other testing judged to be effective in determining cable system insulation condition.

The inspectors reviewed the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program LR Evaluation Document and Implementation Plan, Calc. L08-0641, and found them to be of adequate quality and consistent with the application. The evaluation document states that the applicant investigated the Crystal River operating history for in-scope electrical components using condition report (CR) searches, internal correspondence, plant walkdowns and interviews with station staff. The inspectors reviewed the responsible engineer’s data base records of this work and found it adequate.

Based on the above observations, the inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended function of those in-scope electrical components will be maintained through the period of extended operation.

35. Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program credited for aging management of cables not included in the CR-3 EQ Program. In-scope, medium-voltage cables exposed to significant moisture and significant voltage are tested at least once every 10 years to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, polarization index, or other testing that is state-of-the-art at the time the test is performed. Inaccessible non-EQ medium-voltage (M-V) cables exposed to significant moisture and voltage are to be tested at least once every 10 years to provide an indication of the condition of the conductor insulation.

Manholes associated with inaccessible non-EQ medium-voltage cables will be inspected for water accumulation and drained, as needed. The manhole inspection intervals will be based on actual field data and shall not exceed two years. The first test and inspections for License Renewal will be completed before the period of extended operation.

This is a new program with no OE history. However, related plant-specific and industry-wide OE was reviewed. Going forward, OE will be captured through the CR-3 Corrective Action and Operating Experience Programs implemented in accordance with Progress Energy corporate procedures. The review of plant specific and industry-wide OE helps ensure that this program will be an effective aging management program for the period of extended operation.

The inspectors reviewed the licensing renewal program evaluation document, reviewed the program implementation package, reviewed corrective action documents, and reviewed recent inspection results. Inspectors performed a walk down of four manholes containing medium voltage electrical cables within the scope of the program and identified accumulation of water in two manholes. There was no evidence that water reached the level of the medium voltage cables. The licensee had identified this condition during inspections recently performed and entered this condition into their corrective action program.

Implementation of the Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will provide reasonable assurance that the intended functions of inaccessible non-EQ medium-voltage cables will be maintained consistent with the CLB through the period of extended operation.

36. Metal Enclosed Bus Program

The Metal Enclosed Bus Program is a new program that will inspect the aging management of all non-segregated 4.16 KV and 250/125 VDC Metal Enclosed Buses within the scope of License Renewal. The program involves various activities

conducted at least once every 10 years to identify the potential existence of aging degradation. In this aging management program, a sample of accessible bolted connections will be checked for loose connection by using thermography or by measuring connection resistance using a low range ohmmeter. In addition, the internal portions of the bus enclosure will be visually inspected for cracks, corrosion, foreign debris, excessive dust buildup, and evidence of moisture intrusion. The first test and inspections for license renewal will be completed before the period of extended operation. The application states that the Metal Enclosed Bus Program will be consistent with the program described in NUREG-1801, Section XI.E4, "Metal Enclosed Bus."

The program also requires that the bus insulation will be visually inspected for signs of embrittlement, cracking, melting, swelling, or discoloration, which may indicate overheating or aging degradation. The internal bus supports will be visually inspected for structural integrity and signs of cracks. As an alternative to thermography or measuring connection resistance of bolted connections, for the accessible bolted connections that are covered with heat shrink tape, sleeving, insulating boots, etc., visual inspection of the insulation material may be used to detect surface anomalies, such as discoloration, cracking, chipping or surface contamination. If this alternative visual inspection is used to check bolted connections, the first inspection will be completed before the period of extended operation and every five years thereafter.

The inspectors reviewed the Metal Enclosed Bus Program LR Evaluation Document and Implementation Plan, Calc. L08-0643, and found them to be of adequate quality and consistent with the application. The evaluation document states that the applicant investigated the Crystal River operating history for in-scope electrical components using condition report (CR) searches, internal correspondence, plant walkdowns and interviews with station staff. The inspectors reviewed the responsible engineer's data base records of this work and found them to be adequate.

The program provides adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended function of those in-scope metal enclosed boxes will be maintained through the period of extended operation.

37. Fuse Holder Program

The Fuse Holder Program is a new program that will inspect the aging management of fuse holders located outside of active devices that are susceptible to aging effects. Fuse holders inside an active device, such as switchgear, power supplies, power inverters, battery chargers, control panels and circuit boards are not within the scope of this program. The program focuses on the metallic clamp portion of the fuse holder. The parameters monitored include corrosion and oxidation. Identified fuse holders within the scope of License Renewal will be tested at least once every 10 years. Testing may include thermography, contact resistance testing, or other appropriate testing (to be determined prior to implementation). The first test for license renewal will be completed before the period of extended operation.

The application states that the Fuse Holder Program will be consistent with the program described in NUREG-1801, Section XI.E5, “Fuse Holders”, with exceptions. Loss of continuity due to corrosion and oxidation will be managed by the Fuse Holder Program. Fatigue due to ohmic heating, thermal cycling, electrical transients, frequent manipulation, vibration, and chemical contamination are not an applicable aging effects for Crystal River fuse holders located outside of active devices.

The inspectors reviewed the Fuse Holder Program LR Evaluation Document and Implementation Plan, Calc. L08-0644, and Calc. L07-0300. The inspectors identified that 2 fuse boxes (AH-23-TB and AH-24-TB) are not included the program. The licensee issued an action request to evaluate these two fuse boxes and determine if they may need to be included. The evaluation identifies that CR staff reviewed operating history for in-scope electrical components using condition report (CR) searches, reviewed internal correspondence, conducted plant walkdowns and interviews with station staff. The inspectors reviewed the responsible engineer’s data base records of this work and found them to be adequate.

Based on the above observations and enhancements, the inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended function of those in-scope fuse holders will be maintained through the period of extended operation.

38. Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Program

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements is a new one-time inspection program that will inspect aging management of cable connections not included in the Crystal River EQ Program. The program will be implemented as a one-time inspection on a representative sample of non-EQ cables connections within the scope of License Renewal prior to the period of extended operation to provide an indication of the integrity of the cable connections. The specific type of test performed will be determined prior to testing, and is to be a proven test for detecting loose connections, such as thermography, contact resistance testing, or other appropriate testing judged to be effective in determining cable connection integrity. This program does not include high-voltage (>35 kV) switchyard connections.

The aging effect of concern is the loosening of cable connections. The factors considered for sample selection are application (high, medium and low voltage), circuit loading (high loading), and location (high temperature, high humidity, vibration, etc.) in both indoor and outdoor environments. The technical basis for the sample selections of cable connections to be tested will be provided. The metallic parts of Metal Enclosed Bus connections are managed by the Metal Enclosed Bus Program as delineated in NUREG-1801, XI.E4, “Metal Enclosed Bus”, and therefore are not included within the scope of the program.

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program consistent with NUREG-1801, Section XI.E6, with exception. NUREG-1801, Rev. 1, AMP XI.E6 states that connections associated with cables in scope of license renewal are part of this program, regardless of their association with active or passive components. However, CR-3 has applied the clarification provided in proposed LR-ISG-2007-02 dated August 29, 2007, "Proposed License Renewal Interim Staff Guidance", that revises the scope to include only external cable connections terminating at an active device such as motor, motor control center, switchgear, or a passive device such as a fuse cabinet. Wiring connections internal to an active assembly installed by manufacturers are considered a part of the active assembly; and, therefore, are not within the scope of this program. NUREG-1801, Rev. 1, AMP XI.E6 also specifies periodic testing of connections using thermography, contact resistance testing, or other appropriate testing methods. However, consistent with the test frequency flexibility provided in proposed LR-ISG-2007-02, dated August 29, 2007, this element will be implemented as a one-time inspection on a representative sample of non-EQ cable connections within the scope of license renewal prior to the period of extended operation. Inspection methods may include thermography, contact resistance testing, or other appropriate testing methods. This one-time inspection verifies that the loosening of connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation is not an aging effect that requires a periodic aging management program.

The inspectors reviewed the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements One-Time Inspection Program LR Evaluation Document and Implementation Plan, Calc. L08-0646, and found it to be of adequate quality and consistent with the application. The evaluation document states that the applicant investigated the Crystal River operating history for in-scope electrical components using condition report (CR) searches, internal correspondence, plant walkdowns and interviews with station staff. The inspectors reviewed the responsible engineer's data base record of this work and found it adequate.

Based on the above observations, the inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended function of those in-scope electrical components will be maintained through the period of extended operation.

39. High Voltage Insulators in the 230 KV Switchyard Program

The High-Voltage Insulators in the 230KV Switchyard Program is a new and site-specific program consistent with the NUREG-1800, SRP-LR (Reference 5.5). This program will inspect the aging management of the high-voltage insulators used in the power path for the overhead transmission conductors that connect CR-3 230KV Switchyard to the Backup Engineered Safeguards Transformer (BEST). The program inspects the insulators for salt deposits or surface contamination and mechanical wear of the steel hardware connecting the insulators to one another. The high-voltage insulators within the scope of this program are to be inspected at

least once every four years. The first inspection for license renewal is to be completed prior to the period of extended operation.

The inspectors reviewed the High-Voltage Insulators in the 230KV Switchyard Program LR Evaluation Document and Implementation Plan, Calc. L08-0645, and found it to be of adequate quality and consistent with the application. The evaluation document states that the applicant investigated the Crystal River operating history for in-scope electrical components using condition report (CR) searches, internal correspondence, plant walkdowns and interviews with station staff. The inspectors reviewed the responsible engineer's data base record of this work and found it adequate.

Based on the above observations, the inspectors concluded that the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended function of those in-scope high-voltage insulators will be maintained through the period of extended operation.

40. Environmental Qualification Program

The Environmental Qualification (EQ) Program is an existing program that implements the requirements of 10 CFR 50.49. The EQ Program was established to demonstrate that certain electrical components located in potentially harsh plant environments are qualified and capable of performing their safety functions in those harsh environments. The EQ Program manages component thermal, radiation and cyclical aging, through the use of prototype testing and analytical aging evaluations. The program requires action be taken before individual components in the scope of the program exceed their qualified life. Actions taken may include replacement on a specified time interval of piece parts or complete components to maintain qualification, or analytical reanalysis to extend the qualified life of the component.

The reanalysis of an aging evaluation for the qualification of components under 10 CFR 50.49(e) is performed on a routine basis as part of the EQ Program. The reanalysis is normally performed to extend the qualification by reducing conservatisms incorporated in the prior evaluation. While a component life limiting condition may be due to thermal, radiation, or cyclical aging, the vast majority of component aging limits are based on thermal conditions. The analysis may have used conservative bounding conditions that can be refined to extend the qualification.

The program was described in B.3.2 of the application and L08-0647, "Environmental Qualification Program," Revision 1. The applicant's EQ Program Time Limited Aging Analysis (TLAA) adopts the requirement of 10 CFR 54.21(c)(1)(iii), which states that the effects of aging on the intended function(s) will be adequately managed for the period of extended operation. This requires the continual replacement or

reevaluation of component qualification as described above throughout the period of extended operation. The inspectors interviewed responsible plant personnel; reviewed program documentation used to implement the EQ program, CR-3 EQ Program Self- Assessments, and examples of calculations used to support equipment qualification.

Based on the above observations, the inspectors concluded that the Environmental Qualification Program is performing adequately and the applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is a reasonable assurance that the intended functions of SSCs will be maintained through the period of extended operation.

III Meetings, Including Exit

On August 14, 2009, the inspectors presented the inspection results to Mr. J. Franke and other members of the applicant staff in an exit meeting open for public observation at the Crystal River Nuclear Plant EOF/Training Center, 8200 West Venable Street, Crystal River, Florida.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Applicant Personnel

J. Franke, Vice President
Mike Heath, Supervisor License Renewal
Dennis Herrin, Licensing Contact
T. Hartman, System Engineer Electrical
M. Fletcher, License Renewal
T. Ploplis, License Renewal EQ
T. Reynolds, License Renewal, Mechanical
K. Williams, Fire Protection Program Owner
S. Gawolsky, System Engineer
T. Doruff, System Engineer
J. Lane, License Renewal ISI
C. Mallner, License Renewal Mechanical
R. Thompson, System Engineer
P. Cross, System Engineer
Louis Barbieri, Lead Engineer
Jeff Lane, Lead Engineer Mechanical
John Mueller, Lead Engineer
Joe Terrell, LR Reactor Vessel Surveillance Program Manager
Joe Lese, Senior Structural Design Engineer
Mike Brannin, Senior Engineering Technical Support Specialist
Rick Portmann, Program Manager IWE/IWL
Rafeal Figuero, System Engineer (Cranes)
Rick Pepin, Mechanical Superintendent
Greg Estep, CR3 Flow Accelerated Corrosion Program Manager
Wayne Bichlmeir, LR Flow Accelerated Corrosion Program Manager
Jim Lane, CR3 Open Cycle Cooling Water Program Manager
John Mueller, CR3 Reactor Vessel Surveillance Program Manager
Scot Stewart, CR3 SG Tube Integrity Program Manager

Members of the Public Attending Exit Meeting

Norman Hopkins	John H. Ring
Roger Foderingham	Ron Finnin
Mark P. Klutho	Chris Staubub
Ron Bright	Brad Myers

NRC personnel

Roger Hannah, Public Affairs Officer
Tom Morrissey, Senior Resident Inspector
Robert Kuntz, NRR Project Manager, License Renewal
Mark Franke, Branch Chief EB3

Attachment

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Program Descriptions:

L08-0600, License Renewal Aging Management Program Description of the ASME Section XI, Subsections IWB, IWC, and IWD, Inservice Inspection Program, Revision 1
L08-0601, License Renewal Aging Management Program Description of the Water Chemistry Program, Revision 1
L08-0602, Reactor Head Closure Studs Age Management Program
L08-0603, License Renewal Aging Management Program Description of the Boric Acid Corrosion Program, Revision 1
L08-0604, License Renewal Aging Management Program Description of the Reactor Coolant Pressure Boundary Fatigue Monitoring Program, Revision 1, 11/11/08
L08-0605, License Renewal Aging Management Program Description of the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program, Revision 0
L08-0607, License Renewal Aging Management Program Description of the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program, Revision 0
L08-0614, License Renewal Aging Management Program Description of the Closed-Cycle Cooling Water System Program, Revision 1
L08-0615, License Renewal Aging Management Program Description of the 10 CFR 50, Appendix J Program, Revision 1
L08-0621, License Renewal Aging Management Program Description of the Above Steel Tanks Program, Revision 0, 7/7/08
L08-0622, License Renewal Aging Management Program Description of the Fuel Oil Chemistry Program, Revision 1
L08-0624, License Renewal Aging Management Program Description of the One Time Inspection Program, Revision 1
L08-0626, License Renewal Aging Management Program Description of the Buried Piping and Tanks Inspection Program, Revision 1, 11/12/08
L08-0627, License Renewal Aging Management Program Description of the One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program, Revision 1
L08-0630, License Renewal Aging Management Program Description of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program, Revision 1
L08-0631, License Renewal Aging Management Program Description of the Lubricating Oil Analysis Program, Revision 1
L08-0633, Bolting Integrity Age Management Program
L08-0640, License Renewal Aging Management Program Description of the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program, 6/3/08
L08-0641, License Renewal Aging Management Program Description of the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program, 6/18/08

L08-0642, License Renewal Aging Management Program Description of the Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program, 6/3/08
L08-0643, License Renewal Aging Management Program Description of the Metal Enclosed Bus Program, 6/4/08
L08-0644, License Renewal Aging Management Program Description of the Fuse Holder Program, 6/3/08
L08-0645, License Renewal Aging Management Program Description of the High-Voltage Insulators in the 230KV Switchyard Program, 6/3/08
L08-0646, License Renewal Aging Management Program Description of the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program, 6/5/08
L08-0647, License Renewal Aging Management Program Description of the Environmental Qualification Program, Revision 1

Implementation Plans

AR 304745-01, Reactor Internals Aging Management Program Commitment Implementation Program Plan
AR 304745-02, Nickel Alloy and Nickel-Clad Components Commitment Implementation Plan
AR 304745-04, Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program Implementation Program
AR 304745-10, New AMP Aboveground Steel Tanks Program
AR 304745-11, Fuel Oil Chemistry Program Implementation Plan for CR3
AR 304745-13, Action Request for One Time Inspection Program Implementation Plan for CR 3
AR 304745-15, New AMP Buried Piping and Tanks Inspection Program
AR 304745-16, One-Time Inspection of Code Class 1 Small Bore Piping Program Implementation Plan
AR 304745-18, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program Implementation Plan for CR3
AR 304745-21, Non-EQ Cable Aging Management Program Implementation Plan
AR 304745-22, Non-EQ Instrument Cable Aging Management Program Implementation Plan
AR 304745-23, Inaccessible Medium-Voltage Cable Aging Management Program Implementation Plan
AR 304745-24, Metal Enclosed Bus Aging Management Program Implementation Plan
AR 304745-25, Fuse Holder Aging Management Program Implementation Plan
AR 304745-26, Non-EQ Cable Connections Aging Management Program Implementation Plan
AR 304745-28, H-V Insulators in the 230KV Switchyard Inspection Program Implementation Plan
AR 304745-33, Continued Use of ASME Inservice Inspection IWB, IWC, & IWD Program for License Renewal
AR 304745-34, Water Chemistry Program Implementation Program
AR 304745-35, Continued Use of Boric Acid Corrosion Program for License Renewal
AR 304745-36, Continued Use of RCPB Fatigue Monitoring Program for License Renewal
AR 304745-37, Nickel Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors Program Implementation Plan
AR 304745-39, Closed-Cycle Cooling Water System Program Implementation Plan for CR3
AR 304745-40, Continued Use of 10 CFR Part 50, Appendix J Program for License Renewal

Plant and Corporate Procedures

3F1207-04, Crystal River Unit 3, ASME Section XI / ASME OM Code Interval 4, ISI Components and Structures Examination Program, Revision 8
ADM-NGGC-0112, Reactor Coolant System Material Integrity Management Program, Revision 2
AI-1701, System Engineering Standards, Revision 9
AI-2205A, Pre Fire Plan – Control Complex, Revision 4
AI-513, Seasonal Weather Preparations, Revision 9
AI-701, Administration of the ASME Section XI and ASME OM Code Inservice Inspection, Examination, and Testing Program, Revision 17
AI-701, Administration of the ASME Section XI and ASME OM Code Inservice Inspection, Examination, and Testing Program, Revision 17
CH-400, Nuclear Chemistry Master Scheduling Program, Rev 46
CP-120, Review of Leak Rate Tests, Revision 9
CP-138, Secondary Water Chemistry Guidelines, Rev 27
CP-142, Primary Water Chemistry Program Guidelines, Rev 21
CP-160, Closed Cooling Water Systems Chemistry Program Guidelines, Rev 10
Crystal River Unit 3 Optimized Primary Chemistry Program Strategic Water Chemistry Plan
Crystal River Unit 3, ASME Section XI / ASME OM Code Interval 4, ISI Components and Structures Examination Program, Revision 8
Crystal River Unit 3, ASME Section XI Interval 4 Repair and Replacement Program Manual, Revision 13
Crystal River-3 Optimized Closed Cycle Cooling Water Chemistry Control Program, 2/15/2009
EGR- NGGC-0513, License Renewal Buried Piping and Tanks Inspection Program, Revision 1
EGR-NGGC-0156, Environmental Qualification of Electrical Equipment Important to Safety, Revision 14
EGR-NGGC-0207, Boric Acid Corrosion Control, Revision 3
EGR-NGGC-0209, Buried Piping Program, Revision 0
EGR-NGGC-0351, Condition Monitoring of Structures, Revision 14
Engineering Programs, Containment Leakage Rate Testing Program, Crystal River Unit 3, Revision 0, 10/20/97
ESG0100N, DRAFT - Buried Piping Program Manager, Revision 0
ISINDEPM-1, ISI Program Plan, Fourth Ten-Year Inspection Interval, Revision 0
MP-500, Emergency Fee Water Pump (EFP-3) Diesel Engine Maintenance, Revision 8
NEP-229, Guidance for Implementation and Use of ASME Section XI Repair/Replacement Program Documents, Revision 4
NEP-301, Control of ASME Section XI and ASME OM Code Inspection, Examination, and Testing Program Plans, Manuals, and Reports, Revision, Revision 2
NGG-PMB-BUS-02, NGG Equipment Reliability Template Non-Segregated Bus Duct, Revision 0
NGG-PMB-CBL-01, Medium Voltage Cable (2kV to 15 kV), Revision 1
Progress Energy, Crystal River Unit 3, ASME Section XI / ASME OM Code Interval 4, ISI Components and Structures Examination Program, Revision 8
Nuclear Generation Group Procedure, NDEP-0439, Straight Beam Ultrasonic Examination of Studs and Bolts (PDI)
Nuclear Generation Group Procedure, CHE-NGGC-0045, Chemical Control Program Procedure, Volume 99, Rev 14
Crystal River Unit 3 Procedure MP-256, Reactor Vessel Fluence Monitoring, Rev 3
Crystal River Unit 3 Procedure MP-700, Recommended Torque Values, Rev 11

Crystal River Unit 3 Procedure AI-701, Administration of the ASME Section XI and ASME OM Code
Crystal River Unit 3 Procedure FF-405, Reactor Vessel Closure Head Stud Removal and Cleaning
Crystal River Unit 3 Procedure FP-406, Reactor Vessel Closure Head Stud Installation
SP-177, Local Leak Rate Test of AHV-1A thru 1D, Revision 21
SP-178, Containment Leakage Test - Type "A" Including Liner Plate, Revision 30
SP-179A, Type “B” AND “C” Leakage Test Summary, Revision 14
SP-179B, Containment Leakage Test – Type “B,” Revision 15
SP-179C, Containment Leakage Test – Type “C,” Revision 28
SP-181, Containment Air Lock Test, Revision 30
SP-204, Class 1 System Leakage Test for Inservice Inspection, Revision 22
SP-206, System Inservice or Functional Pressure Test of Class 2 and 3 Systems, Revision 12
SP-206, System Leakage Test of Class 2 and 3 Systems, Revision 14
SP-2891, Field Fabrication and Erection of Piping, 06/1/71
SP-311, Diesel Fuel Transfer Pump Surveillance (DFP-1A, DFP-1B), Revision 31
SP-349C, EFP-3 and Valve Surveillance, Revision 18
SP-349C, EFP-3 and Valve Surveillance, Revision 21
SP-354A, Monthly Functional Test of the Emergency Diesel Generator EGDG-1A, Revision 85
SP-354B, Monthly Functional Test of the Emergency Diesel Generator EGDG-1A, Revision 79
SP-363, Fire Protection System Tests, Revision 39
SP-365A, Electric Fire Service Pump, FSP-1 Operability, Revision 17
SP-365B, Diesel Fire Service Pump, FSP-2A Operability, Revision 19
SP-365C, Diesel Fire Service Pump, FSP-2B Operability, Revision 20
SP-367, Fire Service Valve Alignment and Operability Check, Revision 35
SP-404, Fixed Water Spray and Sprinkler System Surveillance, Revision 22
SP-408, Fire System Flow Test, Revision 14
SP-430, Containment Air Locks Seal Leakage Test, Revision 31
SP-5206, CR-3 Piping Specification, Revision 9
SP-701J, RM-A6 Gas Channel Calibration, Revision 9
SP-701K, RM-A6 Particulate Calibration, Revision 11

Plant Drawings

PI-305-874, Sheet 1 of 2, Makeup System Isometric Drawing
CR3-P-SK-11, Sheet 1, ASME Section XI NDE Program, Revision 1
SC-421-173, Diesel Generator Building Walls – From Elev. 119’-0” to 143’-0” Plan & Elevations, Revision 12
Crystal River Buried Piping Program Basis Document, Attachment C, Electronic Mark Up of Plant Drawings
P-304-089, Emergency Feedwater Pump Suction Tank to Pump, Revision 8
P-304-281, Emergency Diesel Generator Fuel Oil Transfer Plans & Details, Revision 15
P-304-611, Nuclear Service & Decay Heat Sea Water Underground Piping Plan & Sections, Revision 13
P-304-642, Decay Heat Removal Plans Above EL 119’-0” – Auxiliary Building, Revision 21
P-304-808, Dedicated Emergency Feedwater Storage Tank Facility, Revision 6
P-304-821, DDEFW Suction and Discharge Piping-Yard Piping and Intermediate Building, Revision 1

Test and Inspection Results

3F020404, ASME, Section XI, NIS-1 Owner's Report of Inservice Inspections for the End of RFO 13
3F0206-09, ASME, Section XI, NIS-1 Owner's Report of Inservice Inspections for the End of RFO 14
3F0308-01, ASME, Section XI, NIS-1 Owner's Report of Inservice Inspections for the End of RFO 15
51-9065750-000, Visual Inspection Data Sheet 3R15-06, 11/20/07
Boric Acid Corrosion Control Program, August 2008 RCP Outage Mode 3 Walkdown Plan, 8/25/08
Boric Acid Corrosion Control Program, January 2009 Forced Outage Mode 3 Walkdown Plan, 1/27/09
Boric Acid Corrosion Control Program, March 2008 RCP Outage Mode 3 Walkdown Plan, 3/01/08
Containment Integrated Leak Test per SP-178, Containment Leakage Test -Type A Including Liner Plate, completed on December 2005
CR3 Collective Significance Review of Potential RCS Leakage Indicators, Period 8/29/08 to 3/10/09
CR3 Collective Significance Review of Potential RCS Leakage Indicators, Period 12/9/05 to 6/1/06
CR3 Collective Significance Review of Potential RCS Leakage Indicators, Period 12/1/06 to 6/1/07
CR3 Operating Cycle 14 Borated Water Leakage Review (90 day post-outage report)
CR3 Operating Cycle 15 Borated Water Leakage Review (90 day post-outage report)
Diesel Fuel Storage Tank DFT-1A – Modified API-653 Tank Inspection and Integrity Assessment, 11/15/07
Diesel Fuel Storage Tank DFT-1B – Modified API-653 Tank Inspection and Integrity Assessment, 11/17/07
EGR-NGGC-0513, Attachment 1, Buried Piping and Tanks Inspection Program Datasheet for FSV-503 and Associated Uncovered FS Piping, completed on 10/2/08
EGR-NGGC-0513, Attachment 1, Buried Piping and Tanks Inspection Program Datasheet for FSV-507 and Associated Uncovered FS Piping, completed on 10/2/08
NDE Report VT-07-026, Visual Examination for Leakage on EFP-3 Pressure Retaining Components, 9/25/07
SP-296, Documentation of Allowable operating Transient Cycles, Revision 21, Completed on 4/9/09
SP-296, Documentation of Allowable operating Transient Cycles, Revision 21, Completed on 1/5/09
Visual Examination of IWE Surfaces – Reports VT-05-020, VT-05-170, VT-05-209, VT-05-164, VT-05-201, VT-05-168, VT-05-161, VT-05-191, VT-05-163, VT-05-195, VT-05-199, VT-05-167, VT-05-194, VT-05-160, VT-05-196, VT-05-197, VT-05-169, VT-05-190, VT-05-166, VT-05-193, VT-05-200, VT-05-189, VT-05-162, VT-05-165, VT-05-192, VT-05-198, and VT-05-157

Audit, Inspections, and Self Assessments

C-EC-07-01, Environmental and Chemistry Assessment, Aug 9, 2007
Assessment 173609, Makeup Water Quality, May 19-30, 2008
AR 311292, CR3 EQ Program Self Assessment, 7/16/2009
AR 00144401, CR EQ Program Self Assessment, 11/23/2004

C-FP-09-01, Fire Protection Assessment, 5/6/2009
AR 00195313, Conduct a Benchmarking Trip to Appendix J Owners Group Meeting
AR0055995, Conduct Self Assessment of Fatigue Monitoring Program
Assessment Number 144400, Self-Assessment Report: CR3 Boric Acid Corrosion Control Program, 7/25 – 29/2005
Assessment Number: 153099, CR3 ILRT Outage Readiness, August 1-5, 2005
Benchmark Report 323077, CR3 Boric Acid Corrosion Control (BACC) Program, 4/6/09 – 4/8/09
Crystal River Unit 3, Program Health Report, Boric Acid Control, December 2008
NGG Program Health Report – Buried Piping Program, 07/24/09
NGG L07-0308, CR-3, License Renewal Integrated Plant Assessment of Raw Water Systems

Work Orders

WO 316488-01, FSP-2A Battery Replacement
WO 316507-01, FSP-2B Battery Replacement
WO 1151797-01, Replacement of Terminal strips within Terminal Box SW-5
WO 1151797-02, Replacement of Terminal strips within Terminal Box SW-5
WO 01101338-01, Inspection of MTBD-12A bus duct 316488-01
WO 1428393-01, Electric Fire Service Pump, FSP-1 Operability, 1/22/09
WO 1442480-01, Electric Fire Service Pump, FSP-1 Operability, 2/21/08
WO 1457023-01, Electric Fire Service Pump, FSP-1 Operability, 3/15/09
WO 1480385-31, Electric Fire System Pump, FSP-1 Operability, 4/29/9
WO 1495663-01, Diesel Fire Service Pump FSP-2B Operability
WO 1509846-01, Diesel Fire Service Pump FSP-2A Operability
WO 0240417-01, Fire Protection System Test
WO 0738080-01, Diesel Fire Service Pump, SP-365B
WO 0763012-01, Diesel Fire Service Pump, SP-365C
WO 0875805, Fire System Flow Test
WO 0964853, Mecatiss Fire Barrier Inspection
WO 1043974, FSP-2B, PM-185, Two Year Maintenance
WO 1151925, Fire Protection System Tests
WO 1305724, Annual Inspection Plant Fire Doors
WO 1413607, Surveillance of Plant Fire Doors
WO 1428723, Halon ASC Weight & Pressure Check
WO 1433928, Penetration 119 TB-IB Fire Seal
WO 1480385, Fire Detection System Upgrade
WO 00702983, Inspection and Verification as directed by SP-178, “Containment Leakage Test Type A,” 1/17/06
WO 00952469, Condition Monitoring of Structures, 5/31/07
WO 01303862, Condensate Storage Tank, 4/2/08
WO 01173092, Fire Service Water Storage Tank FST-1B, 1/22/09
WO 01301047, Fire Service Water Storage Tank FST-1A, 1/22/09

Corrective Action Documents

AR 349553*, Procedure EGR-NGGC-0202, Flow Accelerated Corrosion Monitoring Program, Rev 10, Revision Request
AR 52145, Steam leak below an elbow at the top of MSR-3A
AR 205882, Inconsistencies in Self Evaluation of Maintenance Group

AR 205883, Leak Management Weakness
AR 263589, Response to INPO OE Digest 2007-19 (Entrance Effect)
AR 299996, Discontinue Use of Molykote-G Lubricant
AR 304745, MOD Exist Open-Cycle Cooling Water System Program
AR 304745-38, Flow Accelerated Corrosion Program Implementation Plan
AR 00392157, RM-A6 Inspect Connections on Rad Monitoring Rate Meters, 7/29/09
AR 339267, Steam Generator Permeability Indications-ID Eddy Current Testing at Surry -OE
AR 00253517, Significant Corrosion Discovered on Term Box SW-5, 11/6/7
AR 00343175, RM-A6 Particulate Alarmed During RM-A12 Routine Calibration, 7/1/09
AR 00272265, FSP-2A Slow to Start, 3/27/08
AR 00267299, PAB00061 Fire Seal Breached, 2/22/08
AR 00233770, Fire Barrier Penetration Seals Failed SP-407, 5/21/07
AR 00174818, NGV-62 As-Found LLRT Exceeded Admin Limit
AR 00174922, CAV-2 As-Found LLRT Exceed Admin Limit
AR 00174925, CAV-430 As-Found LLRT Exceed Admin Limit
AR 00177673, AHV-1A/1B As-Left Leak Rate Failure
AR 00223014, NRC IN 2007-06 Common Cause Vulnerabilities in Essential Service Water Systems
AR 00228261, CIV-40 LLRT Exceeded Admin Limit
AR 00235101, INPO OE Digest Degradation of Buried Piping
AR 00317134, Rejected QC Inspection Point
AR 00343649, OE29126 Leaking Underground Condensate Return Line Pipe
AR 00318279, Actions Needed to Implement Buried Piping Program
AR 00033488, pH out of spec
AR 00035366, Condensate dissolved oxygen trending up

Condition Reports written as a result of this inspection

AR 349553, Procedure EGR-NGGC-0202, Flow Accelerated Corrosion Monitoring
AR 331803, Bolting Integrity Program Owner Identification
AR 00347973, RMA-6 Detector Cable, 7/30/09
AR 00392329, FSV-918 Packing Leak, 7/30/09
AR 00392330, FSV-238 Packing Leak, 7/30/09
AR 00349163, Fire Protection Flexible Insulation Cracking, 8/6/09
AR 00348101, Thermolag Damage CC-124', 7/31/09
AR 00349979, Fire Door D202 Found Breached, 8/12/09
AR 00342457, License Renewal Appendix J Program Revision
AR 00350140, License Renewal ISI Program Revision

Miscellaneous Documents

EPRI TR-105714, Pressurized Water Reactor Primary Water Chemistry Guidelines, Revision 5
EPRI TR-102134, Pressurized Water Reactor Secondary Water Chemistry Guidelines, Revision 6
L07-0304, License Renewal Integrated Plant Assessment of Reactor Vessel, Internals, and Reactor Coolant Systems, Revision 3
MRP-227, PWR Reactor Internals Investigation and Evaluation Guidelines
AI-701, Administration of the ASME Section XI Inservice Inspection and Inservice Testing Programs, Revision 16
Email, from Rocky H Thompson to Jeff Lane, Subj: NRC License Renewal Inspection: Closed cooling water corrosion coupon monitoring, 7/31/2009

EC (Engineering Change) 65825, Ultra Low Sulfur Diesel Evaluation and Diesel Fuel Oil Specification Update, Revision 4
Topical Report, Investigation and Repair of the Normal Makeup Line Safe End at Crystal River Unit 3, April, 1982
RFO-14 Inservice Inspection Report
RFO-15 Inservice Inspection Report
ENG-NGGC-0003, "AREVA Risk-Informed Inservice Inspection Consequence Evaluation of Class 1, Crystal River 3," Rev 2
Calculation M04-0015, "Structural Integrity Associates Calculation File No. ERPI-156-340," Risk Informed ISI Evaluations."
Calculation 07-0305, "License Renewal Integrated Plant Assessment of Emergency Core Cooling Systems," Rev 2
PdM Equipment Monitoring Basis, Revision 1
Progress Energy Oil Analysis Bid Specifications
EQ Vendor Qualification Package for VLV-L200-07
Progress Energy, Crystal River Unit 3, EQ Program Notebook, Rev3
Progress Energy, Crystal River Unit 3, "Environmental Qualification Plant Profile Document," Revision 15
Crystal River Unit 3, EQ Program Health Report, December 2008
Calculation L-07-0300, Revision 0
Calculation L06-0005, Revision 2
Penetration Seal Datasheet for Pent Seal #PAB0225, 10/16/08
FSAR Figure 8-1, 500KV & 230KV Distribution, Rev. 25
IE Bulletin No. 79-01B, 1980
EPRI TR-109619, Guideline for the Management of Adverse Localized Equipment Environments, 1999
IEEE 1205-2000, IEEE Guide for Assessing, Monitoring, and Mitigating Aging
Effects on Class 1E Equipment Used in Nuclear Power Generating Stations, 2000
License Response to Generic Letter 2007-01, 5/3/2007
SAND96-0344, Aging Management Guideline for Commercial Nuclear Power Plants – Electrical Cables and Terminations, 1996
EPRI TR0104213, Bolted Joint Maintenance & Applications Guide, 1995
Crystal River Unit 3 Fire Hazards Analysis, 12/2/2008
Crystal River Unit 3 Fire Protection Plan, Rev. 26
3F0108-10, Letter from Dale E. Young (Site Vice President) to NRC Document Control Desk, "Crystal River Unit 3 – Summary of Reactor Vessel Head Inspection per First Revised NRC Order (EA-03-009)," dated 01/28/08
51-9018595-000, Crystal River Unit 3 Alloy 600 Program Review – April 2006, 5/31/06
70-7329, Borated Water Tank, 4/14/71
C-FR-06-01, Results of the Ten-Year ISI Project Focus Review, 01/03/07
L07-0504, Design Basis Transient Summary for License Renewal, Revision 0
Letter from Stephen J. Cahill (Engineering Manager) to US NRC Document Control Desk, Crystal River Unit 3 – 90 Day Inservice Inspection (ISI) Summary Report, 03/04/2008
Nuclear Generation Group Alloy 600 Strategic Plan, Revision 1a, 2008
PEN01.G03, ISI Program Plan Fourth Ten-Year Inspection Interval, Revision 0, 09/26/07
RO-2961, Requirement Outline – Underground Oil Tanks, 02/11/70
WCAP-17113-NP, DRAFT – PWR Vessel Internals Program Plan for Aging Management of Reactor Internals at Crystal River Unit 3, Revision 0, August 2009
NUREG-1801, Rev 1, Section XI.M3, Reactor Head Closure Studs
NUREG-1801, Rev 1, Section XI.M17, Flow-Accelerated Corrosion
NUREG-1801, Rev 1, Section XI.M18, Bolting Integrity

NUREG-1801, Rev 1, Section XI.M19, Steam Generator Tube Integrity
NUREG-1801, Rev 1, Section XI.M20, Open Cycle Cooling Water System
NUREG-1801, Rev 1, Section XI.M31, Reactor Vessel Surveillance Crystal River Unit 3
Crystal River Unit 3 License Renewal Application, Appendix B, Age Management Program, B.2.3, Reactor Head Closure Studs Program
Crystal River Unit 3 License Renewal Application, Appendix B, Age Management Program, B.2.7, FAC Program
Crystal River Unit 3, License Renewal Application, Appendix B, Age Management Program, B.2.8, Bolting Integrity Program
Crystal River Unit 3, License Renewal Application, Appendix B, Age Management Program, B.2.9, Steam Generator Tube Integrity Program
Crystal River Unit 3, License Renewal Application, Appendix B, Age Management Program, B.2.10, OCCW Program
Crystal River Unit 3, License Renewal Application, Appendix B, Age Management Program, B.2.17, Reactor Vessel Surveillance Program
Crystal River Unit 3, Reactor Vessel Fluence Analysis Report for License Renewal. Areva Document#86-9048187-000
Crystal River Unit 3, Fluence Monitoring Strategic Plan Rev 0, 3/17/09
Crystal River Unit 3 Florida Power Corporation, Torque Values for Bolting of Pipe Flanges, June 18, 1962, Rev 1
Crystal River Unit 3 RFO 15, FAC Inspection Report, 1/14/08
Crystal River Unit 3 Plant Operating Manual, CP-138, Rev 25
Docket# 50-302/License # DPR-72, Enclosure 2, Crystal River Unit 3, List of Regulatory Commitments
FAC Induced Failures since May 2008
Assessment Number 178629, FAC Monitoring Program Round Robin Self-Assessment Report.
NRC Generic Letter 91-17, Bolting Degradation or Failure in Nuclear Power Plants
Final Safety Evaluation for PWROG Topical Report BAW-1543 (NP), Rev 4, Supplement 6, Supplement to The Master integrated Reactor Vessel Surveillance Program
NEI 97-06, Rev 2, Steam Generator Program Guidelines
Proposed License Renewal Interim Staff Guidance LR-ISG-02, Changes to Generic Aging Lessons Learned (Gall) Report Aging Management Program (AMP) XI.E6, Electrical Cable Connections Not Subject to 10CFR50.49 Environmental Qualification Program.

LIST OF ACRONYMS USED

AMP	Aging Management Program
API	American Petroleum Institute
AREVA	AREVA NP (formerly Framatome ANP) a supplier of nuclear services
ASME	American Society of Mechanical Engineers
BEST	Backup Engineered Safeguards Transformer
CAP	Corrective Action Program
CASS	Cast Austenitic Stainless Steel
CLB	Current Licensing Basis
CR-3	Crystal River Unit 3
CRDM	Control Rod Drive Mechanism
EDG	Emergency Diesel Generator
EFPY	Effective Full Power Years
EFW	Emergency Feedwater
EPRI	Electric Power Research Institute
EQ	Environmental Qualification
FAC	Flow Accelerated Corrosion
FO	Fuel Oil
FP	Fire Protection
FSAR	Final Safety Analysis Report
GALL	Generic Aging Lessons Learned (NUREG -1801)
IEEE	Institute Of Electrical And Electronic Engineers
IGSCC	Intergranular Stress Corrosion Cracking
ILRT	Integrated Leak Rate Test
IMP	Implementation Plan
INPO	Institute of Nuclear Power Operations
ISI	Inservice Inspection
LLRT	Local Leak Rate Test
LO	Lube Oil
LR	License Renewal
LRA	License Renewal Application
MIRVP	Master Integrated Reactor Vessel Material Surveillance Program
NCR	Nuclear Condition Report
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NUREG	Publications Prepared By The NRC Staff
OE	Operating Experience
PdM	Predictive Maintenance
PWR	Pressurized Water Reactor
PWSCC	Primary Water Stress Corrosion Cracking
RAI	Request For Additional Information
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RFO	Refueling Outage
RVCH	Reactor Vessel Closure Head
SCC	Stress Corrosion Cracking
SRP-LR	Standard Review Plan for License Renewal (NUREG-1800)
SSC	Systems Structures and Components
TLAA	Time Limited Aging Analysis
UT	Ultrasonic Examination
UVRCH	Upper Reactor Vessel Closure Head
WCAP	Westinghouse Commercial Atomic Power

AGING MANAGEMENT PROGRAMS SELECTED FOR REVIEW

- ASME Section XI Inservice Inspections IWB, IWC, and IWD Program
- Water Chemistry Program
- Reactor Vessel Closure Head Studs Program
- Boric Acid Corrosion Program
- Nickel Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Head of
- Pressurized Water Reactors Program
- Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel CASS Program
- Flow Accelerated Corrosion Program
- Bolting Integrity Program
- Steam Generator Tube Integrity Program
- Open Cycle Cooling Water System Program
- Closed Cycle Cooling Water System Program
- Inspection of Overhead heavy Load and Light Load Handling System Program
- Fire Protection Program
- Fire Water System Program
- Above Ground Steel Tanks Program
- Fuel Oil Chemistry Program
- Reactor Vessel Surveillance Program
- One Time Inspection Program
- Selective Leaching of Materials Program
- Buried Piping and Tank Inspection Program
- One Time Inspection of ASME Code Class 1 Small Bore Piping Program
- External Surfaces Monitoring Program
- Inspections of Internal Surfaces in Miscellaneous Piping and Ducting Components Program
- Lubricating Oil Analysis Program
- ASME Section XI Subsection IWE Program
- ASME Section XI Subsection IWF Program
- ASME Section XI Subsection IWL Program
- 10CFR50, Appendix J Program
- Masonry Walls Program
- Structures Monitoring Program
- Electrical cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements Program
- Electrical cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements used in Instrumentation Circuits Program
- Inaccessible Medium Voltage Cables Not Subject to 10CFR50.49 Environmental Qualification Requirements Program
- Metal Enclosed Bus Program
- Fuse Holders Program
- Electrical Cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements Program
- Reactor Coolant Pressure Boundary Fatigue Monitoring Program
- Environmental Qualification (EQ) Program
- Carborundum (B4C) Program
- High Voltage Insulators in 230 Volt Switchyard Program