NEXTera ENERGY
DUANE ARNOLD

May 28, 2010

NG-10-0309
10 CFR 54

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Duane Arnold Energy Center
Docket 50-331
License No. DPR-49

Supplemental Information and Response to Request for Additional Information Related to the Duane Arnold Energy Center License Renewal Application

References:

1. Letter, Richard L. Anderson (FPL Energy Duane Arnold, LLC) to Document Control Desk (USNRC), "Duane Arnold Energy Center Application for Renewed Operating License (TSCR-109)," dated September 30, 2008, NG-08-0713 (ML082980623)
2. Letter, Richard L. Anderson (FPL Energy Duane Arnold, LLC) to Document Control Desk (USNRC), "License Renewal Application, Supplement 1: Changes Resulting from Issues Raised in the Review Status of the License Renewal Application for the Duane Arnold Energy Center," dated January 23, 2009, NG-09-0059 (ML090280418)
3. Letter, Brian K. Harris (USNRC) to Christopher Costanzo (NextEra Energy Duane Arnold, LLC), "Request for Additional Information for the Review of the Duane Arnold Energy Center License Renewal Application – Buried Piping (TAC No. MD9769)," dated May 3, 2010 (ML101050235)

By Reference 1, FPL Energy Duane Arnold, LLC submitted an application for a renewed Operating License (LRA) for the Duane Arnold Energy Center (DAEC). Reference 2 provided Supplement 1 to the application. By Reference 3, the Staff requested additional information regarding the incorporation of recent industry operating experience regarding buried and underground piping into DAEC's aging management reviews and programs. Enclosure 1 contains the DAEC response to that request.

In a telephone conference on May 3, 2010, the NRC Staff expressed concern that the existing DAEC commitment related to inspection of socket welds remained too open ended. Specifically, if no qualified volumetric examination technique is developed for socket welds and no opportunity arises for a destructive examination, then the DAEC would not perform any inspections to detect cracking that could originate on the interior surface of socket welds in Class 1 piping. The NRC Staff indicated that while the configuration might preclude a fully qualified examination, volumetric examinations

could still yield meaningful information about many potential flaws. To aid in the resolution of the Staff concern, revisions to the DAEC ASME Code Class 1 Small-bore Piping Inspection Program are provided in Enclosure 2.

Enclosure 3 provides a revised LRA Appendix A, Section 18.4, Table A-1, Duane Arnold License Renewal Commitments, updated to reflect the license renewal commitment changes made in DAEC correspondence to date.

If you have any questions or require additional information, please contact Mr. Kenneth Putnam at (319) 851-7238.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 28, 2010.

Christopher R. Costanzo
Vice President, Duane Arnold Energy Center
NextEra Energy Duane Arnold, LLC

Enclosures:
1. DAEC Response to RAI B 3.7.1-X
2. ASME Code Class 1 Small-bore Piping Inspection Program
3. Duane Arnold Energy Center License Renewal Application Updated LRA Section 18.4, Table A-1, Duane Arnold License Renewal Commitments

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Senior Resident Inspector, DAEC, USNRC
License Renewal Project Manager, USNRC
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RAI B 3.7.1-X

Background

The license renewal application (LRA) states that aging management program (AMP) B.3.7, Buried Piping and Tanks Inspection Program, is a new program with one exception to the program elements in Generic Aging Lessons Learned (GALL) AMP XI.M34. This AMP addresses buried piping, i.e. piping in direct contact with soil. The description of the operating experience (OE) attribute for this AMP does not discuss specific OE at Duane Arnold Energy Center (DAEC) or from the industry. Instead, it states that "plant operating experience for this program will be gained as it is implemented during the period of extended operations, and will be factored into the program via the confirmation and corrective action elements of the DAEC 10 CFR 50 Appendix B quality assurance program."

The LRA also states that AMP B.3.21, External Surfaces Monitoring Program, is an existing program with enhancement. This AMP is also credited for managing the aging of the external surfaces of piping exposed to air.

Issue

There have been a number of recent industry events involving leakage from buried and underground piping, where the causes have included coating damage during backfill of piping, failure of fiberglass piping, failure of buried piping in and around piping penetrations, and failure of piping in trenches. In light of this recent industry OE, the staff is concerned about the susceptibility of buried and/or underground piping that are within the scope of 10 CFR 54.4 and subject to aging management for license renewal. In reviewing the AMPs cited above, along with the applicable aging management review items associated with them, the staff is not clear whether the components addressed by these AMPs would include both buried and underground piping (piping which is below grade and contained in a vault or other structure where it is exposed to air and where access is limited), and also if such programs would be sufficient and effective in managing the aging effects of buried and underground piping.

Request

Please provide information regarding how DAEC will incorporate the recent industry OE into its aging management reviews and programs in order to adequately and effectively manage the effects of aging, specifically for systems and components that are in scope for license renewal and include buried and underground piping.

DAEC Response to RAI B 3.7.1-X

Background information

In response to industry events involving buried piping, the Nuclear Energy Institute (NEI) issued an industry initiative on buried piping titled "Guideline for the Management of Buried Piping Integrity", NEI 09-14, in January 2010. DAEC supports the industry initiative and is implementing programs to ensure the integrity of buried and underground piping. Piping components included in these programs include piping subject to aging management review for license renewal as well as piping which could potentially contain radiologically contaminated fluids and piping important to plant operation. The key elements of the NEI initiative include:

- Establish program documents, procedures, and oversight to define roles and responsibilities.
- Perform risk ranking of buried piping segments including pipe function, location, and materials and design.
- Develop an inspection plan to provide reasonable assurance of the integrity of buried piping including inspection techniques and schedule.

DAEC specific information

DAEC LRAP-M034, Buried Piping and Tanks Program, Element 10, Operating Experience, was revised to include plant specific operating experience and now contains a summary of all buried piping leaks which have occurred at DAEC in the last ten years. All of the leaks identified involved buried well water piping. None of these leaks were in piping within the scope of License Renewal and none involved releases of radioactive material. Element 10 also includes recent industry OE as listed in SECY-09-0174 concerning piping leaks which resulted in releases of tritium.

DAEC does have underground piping in scope for License Renewal. This piping in underground "vaults" includes one manual valve and a short section of fire main piping for a crosstie with well water, short sections of PVC plastic sump pump discharge piping in electric manhole boxes, and below grade level piping and valves inside pit structures above the diesel oil storage tank. All other in-scope piping is either contained within buildings or buried (in direct contact with soil). A plant drawing review as well as site walk down was performed to verify this information. All of these "vaults" are accessible and are periodically opened for inspection, testing, or manipulation of components. The fire main and diesel fuel oil piping and valves will be inspected per the External Surfaces Monitoring Program. The PVC piping has no aging effects.

In order to ensure DAEC incorporates future industry operating experience into its aging management reviews and programs concerning buried and underground piping, implementing procedures state that the Operating Experience Coordinator is

responsible for "Providing information to the Cognizant Engineer on industry experience, including INPO documents, NRC documents, and other industry-wide information resources as it relates to buried piping corrosion."

The DAEC plant implementing document was developed in accordance with fleet procedures. The plant implementing document lists all buried piping sections at DAEC and provides a risk ranking for susceptibility as well as an assessment of whether any leakage would involve radiological consequences. The DAEC plant implementing document references EPRI document "Recommendations for an Effective Program to Control the Degradation of Buried Pipe", EPRI 1016456. This EPRI document provides recommendations for a risk informed approach for prioritizing inspections of buried pipes, evaluating inspection results, making repair decisions, selecting repair techniques, and taking preventative actions to reduce the probability or consequences of piping failures. The extent of cathodic protection was qualitatively considered as one input when risk ranking was performed on buried piping for future inspections. No historic formal trending of cathodic protection availability exists and therefore specific credit for historic performance of cathodic protection is limited. Periodic assessments of cathodic protection have been performed which look at conditions present at the time of the assessment. Recommendations for improvement in cathodic protection are entered into the site corrective action and maintenance work order programs where appropriate. Cathodic protection is not used as a basis for exclusion from inspection in any case. The risk ranking and any associated representative inspections are performed by piping segment, where a piping segment is limited to the piping within a system with similar characteristics resulting in a similar likelihood and consequence of failure. While overall linear feet of buried piping installed are noted, the length of pipe is not a key consideration in the risk ranking. This EPRI document is a living document which will be updated as more experience is gained and technology for examining piping is developed.

Torsional guided wave technology has been used to examine portions of River Water Supply, Emergency Service Water, and Residual Heat Removal Service Water buried piping, limited by piping configuration, as a screening tool to determine susceptible locations for further evaluation. These locations may be further assessed by visual, ultrasonic, electromagnetic, or radiography examinations. Additional torsional guided wave examinations of buried High Pressure Coolant Injection and Core Spray suction piping from Condensate Storage Tanks are scheduled for this summer.

Ultrasonic examination of 1T035, Diesel Oil Storage Tank, was last performed in 2001. The results indicated the tank was in excellent condition with no loss of material. This UT testing is scheduled to be performed again in 2012 per a scheduled work order and LRAP-M030, Fuel Oil Chemistry Program.

Opportunistic inspections were performed in 2008 on portions of the fire main that were uncovered to perform valve maintenance. The portions uncovered were not in scope for license renewal but the material and environment is the same as those portions of the fire main which are in scope for license renewal. The pipe is ductile iron with cement lining. The inspections concluded that pipe was in good condition with no sign of degradation on either the interior or exterior surfaces. Current plans are to excavate and inspect portions of the River Water Supply and RHR Service Water systems in the summer of 2010. When the piping is excavated for purposes of inspection, the entire circumference of the pipe will be inspected, data will be collected on the surrounding soil conditions, coatings will be inspected and corrosion measured by ultrasonic or other demonstrated means.

Revisions to DAEC LRA

To reflect the information discussed above, the LRA is revised as follows.

In LRA Section B.3.7.1, Program Description, the following paragraph is added on page B-21:

> The DAEC Buried Piping and Tanks Inspection Program uses risk ranking of buried components per the guidelines of EPRI 1016456, Recommendations for an Effective Program to Control the Degradation of Buried Piping. Torsional guided wave technology is used as a screening tool, where appropriate, to determine susceptible locations for further evaluation. Locations identified by the risk ranking and susceptible locations identified by the torsional guided wave exams will be considered for additional inspections beyond the minimum defined in NUREG-1801 XI.M34.

While preparing the DAEC response to the Staff's RAI, the need for additional revisions to the LRA were identified. A short section of ductile iron fire main pipe was determined to extend into the well water to fire main crosstie vault, and short sections of carbon steel pipe in the fire main extend underground. Also, modifications removed carbon steel pipe and copper alloy discharge check valves from the electric manhole sump pump discharge and replaced them with PVC pipe. Therefore, the following changes are made to the DAEC LRA:

- In LRA Table 3.3.2-9, Summary of Aging Management Review Results Electrical Manhole Sump Pump, on pages 3.3-121 and 3.3-122, the following items are deleted:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Line Item	Table 3.X-1 Item	Notes
Pipe, pipe fittings, hoses, tubes, rupture disk	Leakage boundary (spatial)	Carbon steel	Air-indoor uncontrolled (external)	Loss of material	External Surfaces Monitoring Program	VII.I-8 (A-77)	3.3.1-58	A
Pipe, pipe fittings, hoses, tubes, rupture disk	Leakage boundary (spatial)	Carbon steel	Raw water (internal)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-19 (A-38)	3.3.1-76	202, E
Valve, damper	Leakage boundary (spatial)	Brass	Air-indoor uncontrolled (external)	None	None	VIII.I-2	3.4.1-41	A
Valve, damper	Leakage boundary (spatial)	Brass	Raw water (internal)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	VII.C1-9 (A-44)	3.3.1-81	E

- In LRA Table 3.3.2-9, Summary of Aging Management Review Results Electrical Manhole Sump Pump, on page 3.3-121, the following item is added:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Line Item	Table 3.X-1 Item	Notes
Pipe, pipe fittings, hoses, tubes, rupture disk	Pressure boundary	PVC / plastic	Soil (external)	None	None			234, J

- In LRA Table 3.3.2-11, Summary of Aging Management Review Results Fire Protection System, on pages 3.3-137 and 3.3-138, the following items are added:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Line Item	Table 3.X-1 Item	Notes
Pipe, pipe fittings, hoses, tubes, rupture disk	Pressure boundary	Carbon steel	Soil (external)	Loss of material	Buried Piping and Tanks Inspection Program	VII.G-25 (A-01)	3.3.1-19	B
Pipe, pipe fittings, hoses, tubes, rupture disk	Pressure boundary	Ductile iron	Air-indoor uncontrolled (external)	Loss of material	External Surfaces Monitoring Program	VII.I-8 (A-77)	3.3.1-58	A

Enclosure 2 to NG-10-0309
ASME Code Class 1 Small-bore Piping Inspection Program

Issue

In a telephone conference on May 3, 2010, the NRC Staff expressed concern that the existing DAEC commitment related to inspection of socket welds remained too open ended. Specifically, if no qualified volumetric examination technique is developed for socket welds and no opportunity arises for a destructive examination, then the DAEC would not perform any inspections to detect cracking that could originate on the interior surface of socket welds in Class 1 piping. The NRC Staff indicated that while the configuration might preclude a fully qualified examination, volumetric examinations could still yield meaningful information about many potential flaws.

DAEC Response

The ASME Code Class 1 Small-bore Piping Inspection Program was provided by letter dated October 13, 2009 (NG-09-0764), and revised by letter dated April 28, 2010 (NG-10-0258).

In response to the Staff concerns noted above, revisions to the DAEC LRA regarding the ASME Code Class 1 Small-bore Piping Inspection Program are made below.

The second paragraph of B.3.40.1 Program Description is revised to read as follows:

> ASME Code Class 1 small-bore socket welds presently receive a VT-2 visual inspection during system leakage tests each refueling outage per the requirements of IWB-2500-1, Examination Category B-P. DAEC will continue to perform these inspections per the ASME Section XI requirements during the period of extended operation. In addition, DAEC will perform volumetric examination of a minimum of ten percent of the ASME Code Class 1 small-bore socket welds each inspection interval. (For socket welds, the first inspection interval may be expanded to include the 2012 refueling outage.) The sample will be based on susceptibility, inspectability, dose considerations, operating experience, and limiting locations of the total population of ASME Code Class 1 small-bore piping locations. The DAEC will use a volumetric technique for ASME Code Class 1 small-bore socket welds that is endorsed by the industry, when such a technique becomes available. If no such technique for ASME Code Class 1 small-bore socket welds is available at the time DAEC performs inspections of socket welded ASME Class 1 small-bore piping, then a plant procedure for volumetric examination of ASME Code Class 1 small-bore piping with socket welds will be used. A destructive examination may be performed on an opportunistic basis in lieu of the socket weld volumetric examinations. If the acceptable methodology is developed in the middle of an inspection interval, the number of socket welds to be inspected will be prorated. If volumetric examination of small-bore class 1 socket welds becomes a requirement of ASME Section XI, DAEC will perform examinations per the applicable code requirement.

The second paragraph of B.3.40.5 Scope of Program is revised to read as follows:

> ASME Code Class 1 small-bore socket welds presently receive a VT-2 visual inspection during system leakage tests each refueling outage per the requirements of IWB-2500-1, Examination Category B-P. DAEC will continue to perform these inspections per the ASME Section XI requirements during the period of extended operation. In addition, DAEC will perform volumetric examination of a minimum of ten percent of the ASME Code Class 1 small-bore socket welds each inspection interval. (For socket welds, the first inspection interval may be expanded to include the 2012 refueling outage.) The sample will be based on susceptibility, inspectability, dose considerations, operating experience, and limiting locations of the total population of ASME Code Class 1 small-bore piping locations. The DAEC will use a volumetric technique for ASME Code Class 1 small-bore socket welds that is endorsed by the industry, when such a technique becomes available. If no such technique for ASME Code Class 1 small-bore socket welds is available at the time DAEC performs inspections of socket welded ASME Class 1 small-bore piping, then a plant procedure for volumetric examination of ASME Code Class 1 small-bore piping with socket welds will be used. A destructive examination may be performed on an opportunistic basis in lieu of the socket weld volumetric examinations. If the acceptable methodology is developed in the middle of an inspection interval, the number of socket welds to be inspected will be prorated. If volumetric examination of small-bore class 1 socket welds becomes a requirement of ASME Section XI, DAEC will perform examinations per the applicable code requirement.

Section B.3.40.7, Parameters Monitored or Inspected, is revised in its entirety to read as follows:

> The DAEC ASME Code Class 1 Small-bore Inspection Program uses volumetric examinations to detect cracking in ASME Code Class 1 small-bore piping butt welds and small-bore socket welds. The program also uses VT-2 visual examinations during pressure tests to detect cracks in small-bore socket welds.

The second paragraph of B.3.40.8 Detection of Aging Effects is revised to read as follows:

> All ASME Code Class 1 small-bore socket welds presently receive a VT-2 visual inspection during system leakage tests each refueling outage per the requirements of IWB-2500-1, Examination Category B-P. DAEC will continue to perform these inspections per the ASME Section XI requirements during the period of extended operation. In addition, DAEC will perform volumetric examination of a minimum of ten percent of the ASME Code Class 1 small-bore socket welds each inspection interval. (For socket welds, the first inspection interval may be expanded to include the 2012 refueling outage.) The sample will be based on susceptibility, inspectability, dose considerations, operating experience, and limiting locations of the total population of ASME Code Class 1

small-bore piping locations. The DAEC will use a volumetric technique for ASME Code Class 1 small-bore socket welds that is endorsed by the industry, when such a technique becomes available. If no such technique for ASME Code Class 1 small-bore socket welds is available at the time DAEC performs inspections of socket welded ASME Class 1 small-bore piping, then a plant procedure for volumetric examination of ASME Code Class 1 small-bore piping with socket welds will be used. A destructive examination may be performed on an opportunistic basis in lieu of the socket weld volumetric examinations.

To reflect these changes to the ASME Code Class 1 Small-bore Piping Inspection Program, in LRA Appendix A, Section 18.1.40 is revised in its entirety to read as follows:

The ASME Code Class 1 Small-bore Piping Inspection Program is a plant-specific program that manages cracking of small-bore class 1 piping. Ten percent of Class 1 butt welds in piping of less than four inch NPS receive a volumetric examination each interval. Ten percent of Class 1 socket welds in piping of less than four inch NPS receive a volumetric examination each interval. A volumetric technique for ASME Code Class 1 small-bore socket welds that is endorsed by the industry is used, if available. If no such technique is available at the time the inspections are performed, then a plant procedure for volumetric examination of ASME Code Class 1 small-bore piping with socket welds will be used. Socket welds less than four inch NPS receive a VT-2 visual examination during pressure testing during each refueling outage.

In LRA Appendix A, Section 18.4, Table A-1 Duane Arnold License Renewal Commitments, Commitment 45 is revised to read as follows:

Item No.	System, Component or Program	Commitment	Section	Schedule
45.	ASME Class 1 Small-bore Piping Inspection Program	Implement an ASME Code Class 1 Small-bore Piping Inspection Program DAEC will perform volumetric examination of a minimum of ten percent of the ASME Code Class 1 small-bore socket welds each inspection interval. The ASME Code Class 1 Small-bore Piping inspection program will include provisions that a destructive examination may be performed on an opportunistic basis in lieu of the socket weld volumetric examinations.	18.1.40	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
1.	Buried Piping and Tanks Inspection Program	Implement Buried Piping and Tank Program [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.7	Prior to the period of extended operation
2.	BWR Vessel Internals Program	Perform an EVT-1 inspection of 5% of the top guide locations	18.1.14	Within six years of entering the period of extended operation
3.	BWR Vessel Internals Program	Perform an EVT-1 inspection of an additional 5% of the top guide locations	18.1.14	Within 12 years of entering the period of extended operation
4.	Electrical Cables and Connections Program	Implement an Electrical Cables and Connections Program and complete the first inspection prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.17	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
5.	Electrical Cables and Connections Used in Instrumentation Circuits Program	Implement an Electrical Cables and Connections Used in Instrumentation Circuits Program and complete the first inspection prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.18	Prior to the period of extended operation
6.	Electrical Connections Program	Implement an Electrical Connections Program and complete the one time inspection prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.19	Prior to the period of extended operation
7.	Electrical Penetration Assemblies Program	Implement an Electrical Penetration Assemblies Program. [Revised in DAEC letter NG-09-0764 in response to new Program Commitments RAI]	18.1.20	Prior to the period of extended operation
8.	External Surfaces Monitoring Program	Revise the inspection program to address inspector qualifications, types of components, degradation mechanisms, aging effects, acceptance criteria, inspection frequency, and periodic reviews to determine program effectiveness. The program will also specifically address inaccessible areas and include inspections of opportunity for possible corrosion under insulation. [Revised in DAEC letter NG-09-0764 in response to RAI B.3.21-2]	18.1.21	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
9.	Fire Protection Program	The DAEC Fire Barrier Penetration Seal Inspection surveillance procedure will be enhanced to include criteria for visual inspections of fire barrier wall, ceiling and floors to examine for any sign of degradation such as cracking, spalling and loss of material caused by freeze-thaw, chemical attack and reaction with aggregates by fire protection qualified inspectors. [Revised in DAEC letter NG-09-0764 in response to RAI B.3.22-1]	18.1.22	Prior to the period of extended operation
10.	Fire Protection Program	Enhance procedures to inspect the entire diesel driven fire pump fuel supply line for age related degradation.	18.1.22	Prior to the period of extended operation
11.	Fire Water System Program	Implement maintenance activities to perform volumetric examinations for pipe wall thinning of fire protection piping periodically during the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.23	Prior to the period of extended operation
12.	Fire Water System Program	Enhance procedures to include NFPA 25 criteria for sprinklers regarding replacing or testing	18.1.23	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
13.	Fire Water System Program	Enhance procedures to perform visual inspection of fire hydrants annually	18.1.23	Prior to the period of extended operation
14.	Fuel Oil Chemistry Program	Revise the program to require particulate testing of fuel oil samples from the diesel fire pump day tank	18.1.25	Prior to the period of extended operation
15.	Fuel Oil Chemistry Program	Enhance procedures to require sampling and testing of new fuel oil delivered to the diesel fire pump day tank; and to require that purchase orders and sampling procedures for diesel fuel delivered to and stored in the diesel fire pump day tank prohibit the delivery and use of biodiesel fuel. [Revised in letter NG-09-0764 in response to RAI B.3.25-1]	18.1.25	Prior to the period of extended operation
16.	Fuel Oil Chemistry Program	Enhance procedures to perform periodic (10 year) draining, cleaning and visual inspection of the diesel fuel oil day tanks, diesel fire pump day tank, and diesel driven air start air compressor fuel oil tanks. [Revised in letter NG-09-0764 in response to RAI B.3.25-4]	18.1.25	Prior to the period of extended operation
17.	Fuel Oil Chemistry Program	Implement procedures to require bottom thickness testing of the Standby Diesel Generator Day Tanks and the Diesel Fire Pump Day Tank. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.25	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
18.	Fuse Holders Program	Implement a Fuse Holders Program and complete the first test prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to RAI B.3.26-1 and New Program Commitments RAI]	18.1.26	Prior to the period of extended operation
19.	Inaccessible Medium Voltage Cable Program	Implement an Inaccessible Medium Voltage Cable Program and complete the first inspection or test prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.27	Prior to the period of extended operation
20.	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program	Implement an Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.28	Prior to the period of extended operation
21.	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program	Enhance procedures to monitor for corrosion and wear of the supporting steel and rails	18.1.29	Prior to the period of extended operation
22.	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems Program	Enhance procedures to record usage of the reactor building and turbine building cranes	18.1.29	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
23.	Lubricating Oil Analysis Program	Enhance procedures to include diesel fire pump	18.1.30	Prior to the period of extended operation
24.	Metal Enclosed Bus Program	Implement a Metal Enclosed Bus Program and complete the first inspection prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.31	Prior to the extended operation
25.	One-Time Inspection Program	Implement a One-Time Inspection Program and complete the one-time inspections prior to the period of extended operation. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.32	Prior to the period of extended operation
26.	Reactor Vessel Surveillance Program	Implement a procedure to evaluate the BWRVIP ISP data as it becomes available. [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.35	Prior to the period of extended operation
27.	Reactor Vessel Surveillance Program BWRVIP-74-A BWR PRV Inspection and Flaw Evaluation Guidelines for License Renewal	Revise the Reactor Vessel Surveillance Program to implement the recommendations of BWRVIP-116 BWR Vessel and Internals Project Integrated Surveillance Program Implementation for License Renewal.	18.1.35	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
28.	Reactor Vessel Surveillance Program	Implement BWRVIP-116 with the conditions documented in Sections 3 and 4 of the NRC Staff's SE dated March 1, 2006 for BWRVIP-116, including the following: • NRC approval will be obtained for any change in the withdrawal schedules of the DAEC Reactor Vessel surveillance capsules. • If a standby capsule is removed from the DAEC Reactor Vessel without the intent to test it, the capsule will be stored in a manner which maintains it in a condition which would permit its future use, including during the period of extended operation, if necessary. [Revised in DAEC letter NG-09-0663 in response to RAI B.3.35-1]	18.1.35	Prior to the period of extended operation
29.	Selective Leaching of Materials Program	Implement and complete a program to include one-time visual inspection and hardness measurement of selected components susceptible to selective leaching [Revised in DAEC letter NG-09-0764 in response to New Program Commitments RAI]	18.1.36	Prior to the period of extended operation
30.	Structures Monitoring Program	Enhance procedures to include structures and structural components not currently in Maintenance Rule Program	18.1.37	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
31.	Structures Monitoring Program	Enhance procedures to include periodic sampling of groundwater for pH, chloride and sulfate concentration on a 5 year periodicity. [Revised in letter NG-10-0043 in response to Follow-up RAI B.3.37-2]	18.1.37	Prior to the period of extended operation
32.	Structures Monitoring Program	Enhance procedures to include a elastomer inspection to prevent leakage through containment penetration.	18.1.37	Prior to the period of extended operation
33.	Structures Monitoring Program	Enhance procedures to include a requirement to contact the proper personnel to allow opportunistic inspection of the buried concrete foundation.	18.1.37	Prior to the period of extended operation
34.	Structures Monitoring Program	Enhance procedures to include opportunistic inspections of the buried concrete foundation on a 10 year periodicity.	18.1.37	Prior to the period of extended operation
35.	Metal Fatigue of Reactor Vessel Coolant Pressure Boundary Program	Enhance procedures to incorporate the requirements of NUREG/CR-6260 locations into the implementing procedures.	18.2.2	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
36.	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program	Implement a Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program. [Revised in DAEC letter NG-09-0764 in response to New Program Commitment RAI]	18.1.38	Prior to the period of extended operation
37.	Reactor Internals	DAEC will ensure that aging of core plate hold down bolts is appropriately addressed by completing one of the following actions: • Install core plate wedges to eliminate the function of core plate hold down bolts. • Perform analysis of the core plate rim hold down bolts that demonstrates adequacy to perform their intended function including loss of pre-load in the period of extended operation including the effects of projected neutron fluence. Inspection of core plate hold down bolts will be performed in accordance with BWRVIP-25, or a deviation disposition will be developed/submitted in accordance with BWRVIP-94. [Revised in DAEC letter NG-10-0091]	18.1.14 18.3.1.7	Prior to entering the period of extended operation
38.	Reactor Vessel Circumferential Weld TLAA	Submit a relief request to address the frequency requirements of the inservice inspection of the RPV circumferential welds. (BWRVIP-05).	18.3.1.4	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
39.	Quality Assurance Program (Corrective Action, Confirmation Process, Administrative Controls)	Expand the scope of its 10 CFR Part 50, Appendix B Quality Assurance program to include non-safety-related structures and components subject to an AMR for license renewal.	UFSAR 17.1.2	Prior to the period of extended operation
40.	Operating Experience	Perform an operating experience review of extended power uprate and its impact on aging management programs for systems, structures, and components (SSCs) before entering the period of extended operation.		Prior to the period of extended operation
41.	Bolting Integrity Program	Revise the implementing procedures for the ASME Section XI Inservice Inspection Subsections IWB, IWC, and IWD Program; ASME Section XI Inservice Inspection, Subsection IWF Program; External Surfaces Monitoring Program; Structural Monitoring Program; and Buried Piping and Tanks Program such that they specifically address the inspection of fasteners (bolting, washers, nuts, etc.) for signs of leakage, corrosion/loss of material, cracking, and loss of preload/loss of prestress, as applicable. [Added in letter NG-09-0764 in response to RAI B.3.6-02]	18.1.6	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
42.	BWR Penetrations Program	The implementing document for the BWR Penetrations Program will be revised to specify that guidance in BWRVIP-14, -59 and -60 will be used, as appropriate, depending on material, in the evaluation of crack growth in stainless steel, nickel alloys and low-alloy steels, respectively, when flaws are identified and evaluation required. [Added in letter NG-09-0764 in response to RAI B.3.10-5] [Revised in letter NG-10-0009]	18.1.10	Prior to the period of extended operation
43.	Fire Protection Program	The DAEC Fire Barrier Penetration Seal Inspection surveillance procedure will be enhanced to ensure a approximately 10% of each type of penetration seal is included in the 35 percent selection of fire penetration seals that are visually inspected at an 18 month interval. [Added in letter NG-09-0764 in response to RAI B.3.22-1]	18.1.22	Prior to the period of extended operation
44.	Fire Protection Program	The DAEC Surveillance Procedure for the CO2 Cardox System Operability Annual Test will be enhanced to include a step to perform an inspection for corrosion and mechanical damage to system components. [Added in letter NG-09-0764 in response to RAI B.3.22-1]	18.1.22	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
45.	ASME Class 1 Small-bore Piping Inspection Program	Implement an ASME Code Class 1 Small-bore Piping Inspection Program DAEC will perform volumetric examination of a minimum of ten percent of the ASME Code Class 1 small-bore socket welds each inspection interval. The ASME Code Class 1 Small-bore Piping inspection program will include provisions that a destructive examination may be performed on an opportunistic basis in lieu of the socket weld volumetric examinations. [Added in letter NG-09-0764 in response to RAI B.3.3-2] [Revised in letter NG-10-0258] [Revised in letter NG-10-0309]	18.1.40	Prior to the period of extended operation
46.	BWR Vessel Internals Program	The BWR Vessel Internals Program will incorporate the crack growth rate evaluations specified in the BWRVIP-100-A report. Plant-specific inspection intervals will be developed for DAEC core shroud welds that are exposed to a neutron fluence value equal to or greater than 1 X 10^{21} n/cm^2 (E > 1 MeV), as needed. [Added in letter NG-09-0663 in response to RAI B.3.14-5]	18.1.14	Prior to the period of extended operation
47.		Not Used [Withdrawn in letter NG-10-0091]		
48.	Boral Surveillance Program	Implement a Boral Surveillance Program and complete the first in-situ neutron attenuation test of the PaR spent fuel racks. [Added in letter NG-10-0009]	18.1.41	Prior to the period of extended operation

TABLE A-1
DUANE ARNOLD LICENSE RENEWAL COMMITMENTS[1]

Item No.	System, Component or Program	Commitment[2]	Section	Schedule
49.	Fire Protection Program	Enhance procedures to inspect the 1 hour fire rated gypsum board wall that separates the control room computer room area from the front panel area for aging due to cracking. [Added in letter NG-10-0043]	18.1.22	Prior to the period of extended operation
50.	ASME Section XI, Inservice Inspection, Subsection IWE Program	Perform recoating of suppression pool interior surfaces below the water line. [Added in letter NG-10-0091]	18.1.4	Complete recoating prior to startup from the first refuel outage during the period of extended operation
51.	Metal Fatigue of Reactor Vessel Coolant Pressure Boundary Program	Future revisions/updates to the environmental fatigue calculations for the Recirculation Inlet Nozzle Safe End, Feedwater Nozzle Safe End, and Core Spray Nozzle Safe End will use F_{en} data for Nickel Alloy from the methodology that is described in NUREG/CR-6909 in the determination of usage factors. [Added in letter NG-10-0258]	18.2.2	Upon calculation revision.

[1]Table is updated to reflect DAEC correspondence through 5/28/2010.
[2]In the table, the term “implement” means that the program is described in an approved procedure or other approved formal document; the test, inspection or monitoring procedure has been developed and approved; and the first test, inspection or monitoring activity has been scheduled.