NEXTera ENERGY
DUANE ARNOLD

October 16, 2009

NG-09-0774
10 CFR 50.54(f)

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

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

Subject: Response to Request for Additional Information Regarding NextEra Energy Duane Arnold's Nine Month Response to Generic Letter 2008-01.

References : 1) Letter, R. Anderson (FPL Energy Duane Arnold) to USNRC, "Nine- Month Response to NRC Generic Letter 2008-01, 'Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems'," NG-08-0777, dated October 13, 2008. (ADAMS Accession No. ML082970263)

2) Letter from K. Feintuch (USNRC) to C. Costanzo (NextEra Energy Duane Arnold), "Duane Arnold Energy Center - Request for Additional Information Regarding Your Nine Month Response to NRC Generic Letter 2008-01, 'Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems' (TAC NO. MD7824)," dated August 28, 2009. (ADAMS Accession No. ML092320116)

In Reference 1, NextEra Energy Duane Arnold, LLC, f/k/a FPL Energy Duane Arnold, LLC (hereafter, NextEra Energy Duane Arnold) provided its nine month response to Generic Letter 2008-01. The Staff, in Reference 2, has requested additional information regarding that nine month response. Subsequent to the Reference 2 letter, NextEra Energy Duane Arnold held another conference call with the Staff requesting further clarification to the Staff's request for additional information (RAI). In that call, held September 24, 2009, the Staff also granted NextEra Energy Duane Arnold's request for a 2 week extension to the original response date cited in Reference 2. The Enclosure to this letter contains NextEra Energy Duane Arnold's responses to the Staff's RAI.

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This letter contains no new commitments or any changes to existing commitments.

Please contact Steve Catron at (319) 851-7234 if you have further questions regarding this matter.

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

Executed on October 16, 2009.

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

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Duane Arnold Energy Center, USNRC
Resident Inspector, Duane Arnold Energy Center, USNRC

REQUEST FOR ADDITIONAL INFORMATION

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

Guidance on U.S. Nuclear Regulatory Commission (NRC) staff expectations is provided by Reference 1 which is generally consistent with Nuclear Energy Institute (NEI) guidance provided to industry in Reference 2 as clarified in later NEI communications. The NRC staff recommends that the licensee consult Reference 1 when responding to the following requests for additional information:

1. In page 4 of the submittal [Ref. 3], the licensee stated, "..... the DAEC licensing basis has no specific requirements regarding precluding gas accumulation (voiding) in piping systems (suction or discharge) for either the Containment Spray or Decay Heat Removal functions as a condition for Operability. This is principally because these are manually initiated systems, that are generally not vulnerable to water hammer concerns, and they have no specific timing requirements for initiation in response to any analyzed event in the DAEC UFSAR."

   The staff reiterates that the Generic Letter (GL) is intended for addressing all modes and all operating conditions, and it is not limited to events and accidents evaluated in the updated final safety analysis report. The staff believes that since the Containment Spray and Decay Heat Removal systems have been specifically identified as within the scope of the GL, it needs to be addressed. The staff, therefore, requests the licensee to clarify whether the Containment Spray or Decay Heat Removal systems are intended to be used for any other safety functions for any modes of operation, including shutdown mode; for example, to mitigate loss of shutdown cooling accidents. If needed, then justify whether the licensee would be able to or have sufficient time to vent the piping during such events.

DAEC Response:

The Containment Spray function (Drywell and Suppression Pool Spray modes of the Residual Heat Removal (RHR) system) was evaluated as part of the 9-month response (Reference 3). The conclusion was that these modes of RHR do not perform a safety function and have no time critical response to any analyzed event in the Duane Arnold Energy Center (DAEC) licensing basis. Although these modes of RHR do share piping sections with other modes of RHR, such as Low Pressure Coolant Injection (LPCI), that are maintained "filled with water[1]," this is not a requirement for Operability of the Drywell or Suppression Pool Spray modes of RHR.

[1] The terminology "full of water" or "filled with water" has been historically used to describe the state of piping systems as being absent of voids of sufficient size that could create unacceptable consequences, such as waterhammer. The Industry recognizes that this phrase is potentially confusing as to its original intent and is working on generic language to properly describe the desired state/condition for these piping systems. In the interim, the phrases "full of water" and "filled with water" will continue to be used with that understanding as to its original intent.

Suppression Pool Spray mode of the RHR system is only required to be Operable when the reactor is in Technical Specification (TS) MODES 1, 2 or 3, as specified in Limiting Condition for Operation (LCO) 3.6.2.4, when Primary Containment is required to be Operable by TS LCO 3.6.1.1. Similarly, Drywell Spray mode of the RHR system is only required to be functional in MODES 1, 2, or 3, per Technical Requirements Manual (TRM) LCO, TLCO 3.5.1. Neither Drywell nor Suppression Pool Spray modes of the RHR system have any other required modes of operation, including during plant shutdown or any other operating condition (such as Refueling).

Reiterating the information in the 9-month response, there are no credible scenarios that would require the Drywell or Suppression Pool Spray modes of the RHR system to be vented prior to placing them into operation in response to any identified events. The discharge piping terminates at spargers that are open to the containment atmosphere (i.e., completely voided by design) and the piping between the pump discharge valve and outboard containment isolation valves is maintained "filled with water" by the RHR Keep-fill pump. When properly filled and vented prior to return to service following maintenance that requires the piping to be drained, the common suction piping from the suppression pool to the pump suction for the Drywell and Suppression Pool Spray modes of the RHR system, which is also common to the Low Pressure Coolant Injection (LPCI) mode, has no identified mechanisms to accumulate gas voids. Consequently, the plant operating instructions for the RHR system do not contain any steps for venting the Drywell or Suppression Pool Spray piping prior to placing these modes into operation.

The Decay Heat Removal function, specifically the Shutdown Cooling (SDC) mode of the RHR system[2], is not a safety function in the DAEC licensing basis and a "loss of shutdown cooling" is not an analyzed event in the DAEC Update Final Safety Analysis Report (UFSAR). However, it is recognized that loss of shutdown cooling can be "risk significant" during plant shutdown conditions, i.e., TS MODES 3, 4, and 5. Consequently, TS LCO 3.4.7, 3.4.8, 3.9.7, and 3.9.8 require that the SDC mode of the RHR system be Operable in these MODES, per Criterion 4 of 10 CFR 50.36(c)(2)(ii). However, none of these TS LCOs has a Surveillance Requirement for being "filled with water" as a condition for Operability. The plant operating instructions for placing Shutdown Cooling into service has steps for backfilling, venting, and pre-warming the suction piping prior to initial operation of Shutdown Cooling after reactor shutdown. The discharge piping is common to the LPCI mode of RHR and maintained filled with water by the Keep Fill system which does not require any filling or venting prior to placing SDC into service. In addition to normal operation of the Shutdown Cooling mode, an Abnormal Operating Procedure (AOP) has been established for "Loss of Shutdown Cooling." The AOP directs the operator to follow the above plant operating instruction for RHR if Shutdown Cooling can be restored; if not, then the alternate decay heat removal methods are initiated. This AOP has no "Immediate Actions," which means that there are no time critical actions identified. Thus, the operator has sufficient time to vent this piping, if needed, in order to restore Shutdown Cooling.

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[2] The Suppression Pool Cooling and Low Pressure Coolant Injection (LPCI) modes of the RHR system can also be used to perform "decay heat removal" from the primary system using the RHR Heat Exchanger. However, these are long-term cooling functions, manually initiated in response to analyzed events in the UFSAR, which are assumed to occur at power and not during planned shutdown or refueling conditions.

2. Deleted -information not required at this time.

DAEC Response:

No response required.

3. In page 9 of the submittal [Ref. 3], the licensee stated, "The review of plant drawings confirmed that piping high points either had vent valves at those locations or were capable of being dynamically vented during system operation (e.g., inverted piping loops would be flushed during system operation, such as during post-maintenance testing prior to return to service.)" Confirm whether the pump test flow rates are adequate to remove voids. If not, would the maximum flow rate achieved during actual events move potential remaining voids? Did Duane Arnold Energy Center (DAEC) consider the difference? Provide Froude numbers associated with the test and maximum flow rates.

DAEC Response:

There is only one piping section of the GL subject systems/modes with a high point that does not have valves for venting - an inverted piping loop in the pump minimum flow line for the "B" RHR subsystem. This flow path is subjected to the same flows (~290 gpm through 3" schedule 40 piping) during each pump start, regardless of plant operating mode/condition. Thus, we have confidence that any potential voids in this pipe section would be removed (to the suppression pool) by the pump start during dynamic venting prior to return to service following maintenance.

4. Describe the method used to determine void volume when it is discovered.

DAEC Response:

When a void is detected using ultrasonic testing (UT), the void volume is determined analytically (i.e., using standard geometry) based on the UT measurement of the void profile (i.e., arc length measured at the maximum width and length along the axis). System pressure at the time the UT measurement of the void profile is performed is considered during evaluation of potential effects.

This is consistent with the guidance in Section 3.5.2 of Reference 1.

5. With respect to discharge side piping in the subject systems, in page 15 of the submittal [Ref. 3], the licensee stated, "These procedures require venting at high point locations in the respective systems and ensure adequate pressure is available to perform the venting. They were determined to have no other acceptance criteria than to ensure that a steady stream of water is observed when venting. This is consistent with meeting the specific requirement of the SRs to verify that the piping system is filled with water."

Justify how the current requirement of piping system "filled with water" assures that the

acceptance criteria of system operability is met; and ensures that all voids, including trapped voids, have sufficiently been vented.

DAEC Response:

As noted in the Reference 3 response, no new high points were identified as a result of the plant walkdowns. All piping sections were verified to be capable of being vented, either statically or dynamically. Procedures for filling and venting subject piping systems were upgraded to include positive verification of no voiding prior to return to service following maintenance that requires the piping to be drained; the general sequence is as follows:

- Systematically fill and vent (with a suitable makeup/pressure source available), starting at the lower elevations in the system and proceeding to higher elevations.
- Fill and vent instruments (specifically identified in procedure), as required.
- Run system pump (through full flow test line) at a flow rate greater than or equal to the pump flow rate assumed in the accident analyses.
- Vent at the highest point a second time.
- Perform UT exam at the high point to verify piping is "filled with water" prior to return to service.

Because we have identified no mechanisms for unidentified gas intrusion subsequent to confirmed fill and vent operations (for example, loss of adequate "keep fill" system pressure in the discharge piping is alarmed in the control room), the existing surveillance procedures are deemed adequate for periodically verifying Operability of these systems.

6. Until resolution of the TS issues related to GL 2008-01 is complete, identify supplementary actions, such as use of procedures and other processes, to address control of voids in the subject systems that are not covered by the current DAEC TS requirements.

DAEC Response:

As stated in our response to Question #5 above, plant procedures for fill and vent operations for the subject GL functions have been upgraded to give higher confidence that such piping systems are indeed "filled with water" upon return to service following maintenance. These procedural controls are deemed adequate for controlling voids in the GL subject piping.

7. Training was not identified in the GL but is considered to be a necessary part of applying procedures and other activities when addressing the issues identified in the GL. Training should be briefly discussed.

DAEC Response:

As noted in the question, the GL did not specifically cover training and thus, was not

included in our nine-month response. However, the associated Significant Event Report (SER) 2005-02, Rev. 1 from the Institute of Nuclear Power Operations (INPO) did have specific recommendations for initial and continuing training. This SER recommendation was evaluated by the operations, maintenance, and engineering training programs and appropriate training materials were developed and put into the respective lesson plans. In addition, the upgrades to the filling and venting procedures for the GL subject systems described in our response to Question #5 above were routed to the Operations and Operations Training departments for information as part of implementation.

REFERENCES

1. Ruland, William H., "Preliminary Assessment of Responses to Generic Letter 2008-01, 'Managing Gas Accumulation in emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems,' and Future NRC Staff Review Plans," NRC letter to James H. Riley, Nuclear Energy Institute, ML091390637, May 28, 2009.

2. Riley, James H., "Generic Letter (GL) 2008-01, 'Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Contain Spray Systems' Evaluation and 3 Month Response Template," Letter to Administrative Points of Contact from Director, Engineering , Nuclear Generation Division, Nuclear Energy Institute, Enclosure 2, "Generic Letter 2008-01 Response Guidance," March 20, 2008.

3. R. L. Anderson, "Nine-Month Response to NRC Generic Letter 2008-01 - Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," Vice President, Duane Arnold Energy Center, FPL Energy Duane Arnold, LLC, October 13, 2008.