August 24, 2009

Mr. Richard L. Anderson, Vice President
Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC
3277 DAEC Road
Palo, IA 52324

SUBJECT: CLARIFICATION OF RESPONSE TO THE REQUEST FOR ADDITIONAL INFORMATION REGARDING SEVERE ACCIDENT MITIGATION ALTERNATIVES ANALYSIS FOR LICENSE RENEWAL OF THE DUANE ARNOLD ENERGY CENTER (TAC NO. MD9770)

REFERENCE: Letter from Mr. Richard L. Anderson, Vice President, Duane Arnold Energy Center, titled "Response to Request for Additional Information Regarding Severe Accident Mitigation Alternatives for Duane Arnold Energy Center" (TAC NO. MD9770), dated July 9, 2009.

Dear Mr. Anderson:

On August 13, 2009, a teleconference was held between Mr. Charles Eccleston and Mr. Robert Palla of the U.S. Nuclear Regulatory Commission (NRC), Mr. Herb Giorgio and FPL Energy Duane Arnold, LLC, (FPL-DA) staff, and NRC and FPL-DA contractors hired to support preparation of the severe accident mitigation alternatives (SAMA) assessment for the license renewal of the Duane Arnold Energy Center (DAEC). This teleconference was held to discuss FPL-DA's response to an NRC request for additional information (RAI) on the SAMA assessment. The FPL-DA RAI response to the NRC was titled, "Response to Request for Additional Information Regarding Severe Accident Mitigation Alternatives for Duane Arnold Energy," dated July 9, 2009.

Specifically, this teleconference was held to obtain clarifications on the FPL-DA RAI response to the NRC. The requested clarifications are provided in the enclosure to this letter. As agreed to during the August 13, 2009 teleconference, DAEC will provide these clarifications. To maintain the environmental review schedule, we request that you provide these clarifications within 30 days of the date shown on this letter.

If you have any questions, please contact me by telephone at 301-415-8537 or by e-mail at Charles.Eccleston@nrc.gov.

Sincerely,

***/RA by Samuel Hernandez for/***

Charles H. Eccleston, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
As stated

cc w/encl: See next page

If you have any questions, please contact me by telephone at 301-415-8537 or by e-mail at Charles.Eccleston@nrc.gov.

Sincerely,

***/RA by Samuel Hernandez for/***

Charles H. Eccleston, Project Manager
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As stated

cc w/encl: See next page

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**Duane Arnold Energy Center (DAEC)**
**Clarification of Responses to the SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) Request for Additional Information (RAI)**

RAI 1.b - Station Blackout (SBO) is stated to contribute 34% of the core damage frequency (CDF) while Loss of Offsite Power (LOSP) is stated to contribute 37% of the CDF. Discuss the reasons for the large fraction of LOSP CDF events that involve SBO.

RAI 1.e.i - The response indicates that Probabilistic Risk Assessment (PRA) Rev. 3A was completed in March 1995 with a CDF of 3.3E-05 per year, and that PRA Rev. 3B was completed in January 1996 with a CDF of 1.5E-05 year. However, DAEC Individual Plant Examinaton (IPE) RAI responses (DAEC letter dated June 26, 1995 provide a CDF of 1.5E-05 per year for PSA Rev. 3 and indicate a date of December 1994. Clarify this inconsistency and indicate any necessary changes to the identification of major changes made to the DAEC PRA in response to RAI 1.e.ii.

RAI 1.l - The response describes a self-assessment of the DAEC PRA program conducted in 2004. Describe this self-assessment in more detail, including the depth to which the PRA itself was reviewed.

RAI 2.a - The response indicates that a peer review of the Level 2 PRA was conducted in 2007. Describe this review, including the scope, the reviewers, the findings, and the overall conclusions. Specifically address any review findings regarding the Level 2 sequence binning, release characterization, or need to update MAAP3.0B calculations.

RAI 2.b

- It is stated that source term category (STC) release timing (early <6 hours, intermediate 6-24 hours, and late >24 hours) is defined based on the time interval from accident initiation to general emergency declaration (which is given in Table 3.4.4-1.) The times given in this table for all of the intermediate STCs and one late STC (LL/L) do not agree with this definition. Address these discrepancies.

- The response indicates that the (Cesium Iodide) CsI release fraction decreases as the bins go from High (H) to very low (LL). As indicated in the RAI, this is not true for a number of the bins. Describe in more detail how sequences were assigned to release bins. Explain how sequences with high release fractions (>0.1) were assigned to the moderate bin, and how sequences with moderate release fractions (< 0.1, >0.01) are assigned to the low bin. Provide a description of the dominant sequences contributing to each release bin.

RAI 3.d – The listing of conservatisms in the DAEC fire PRA model includes the statement that the DAEC Individual Plant Examination of External Events (IPEEE) fire analyses do not credit fire suppression or fire brigades. Clarify if this remains true for the current model. If so, describe the basis for the reduction in the Divisions I and II 4kV essential switchgear rooms CDF from that given in the IPEEE to the current values quoted in response to RAI 3.f.

ENCLOSURE

RAI 3.e - Provide a description of the dominant seismic CDF sequences beyond those provided in the response, i.e., down to a CDF of 1 E-08 per year.

RAI 3.f - The failures listed in the Tables on pages 24 and 25 appear to be random failures that occur in the fire or seismic event. Identify and describe any of the listed failures that occur as a direct result of the initiating event. If none are included discuss why not.

RAI 4.a - Clarify how the population growth rates were determined from the data, i.e., least squares fit, exponential fit, linear fit.

RAI 4.c - Confirm that the DAEC core inventory provided in Table 3.4.3-1 was based on a DAEC-specific analysis rather than a generic analysis, and the source (computer code) of the information.

RAI 4.d

- It is noted on page F-25 of the original submittal that all releases were at ground level. Confirm that this is in error and that the statements in Sections 3.4.3 and 8.4 and the response to this RAI are correct.

- The response indicated that releases for STC M/I are from the stack via the wetwell vent. The release fractions for this STC given in Table 3.4.3-2 for Cs and I are 0.17. This seems high for releases from the wetwell vent which would be scrubbed by the suppression pool. Discuss this.

RAI 5.d

- Explain why failure of the turbine Lube Oil tank is not included in the list of important components nor in the important external event sequences provided in response to RAI 3.e and 3.f. Provide more information on this failure including: its modeling in the seismic analysis, the identified weakness in its support structure, and the potential for a cost-beneficial if uncertainties (increase of factor of 10 in seismic CDF) are considered.

- Review each of the dominant fire and seismic core damage sequences provided in the response to RAI 3.e to identify potential SAMAs that might address fire- or seismic-induced damage, such as adding/improving fire suppression systems, minor cable relocations, and minor structural modifications.

RAI 5.f.v - As described, SAMP 704 involves using a portable AC generator to supply existing battery chargers. This does not provide an additional battery charger or an additional source of DC power called for by SAMA 3. It would appear that SAMP 707, identified in response to RAI 5.f.vi, utilizes a portable DC power supply. Address this.

RAI 5.f.xiii – Clarify if the guidelines and their usage would effectively resulted in all elements of the two SAMAs being implemented.

RAI 6.a - The response dismisses SAMA 41 on the basis that the reactor water cleanup (RWCU) system is not capable of being an alternate means of injection, and doesn't address the concern that the benefit was potentially under-estimated. Note that the response to RAI 6.f for this SAMA indicates that the expert panel considered that RWCU could be used for injection. Address this discrepancy. Also provide an appropriate estimate of the benefit associated with this modification.

RAI 6.c - The response indicates that the evaluation of SAMA 117 (increasing boron concentration or enrichment) assumed elimination of mechanical failures but not the human error associated with standby liquid control (SLC) injection. This SAMA would do just the opposite; it would allow more time for the operator to manually inject SLC, thereby reducing the operator error contribution. Mechanical failures could still occur. Provide an appropriately revised evaluation for this SAMA.

RAI 6.d

- Describe the River Water System inlet valve control system in more detail including the portions in the normal base model, the backup controls added to the normal base model to create the revised base model to evaluate SAMA 164, and the function and modeling of the handswitches whose failures were eliminated to determine the SAMA benefit.

- The response to this RAI indicates that the normal base case has a CDF of 1.097E-05 per year. This is different from that given in the ER (1.08E-05 per year on p. F-10, and 1.09E-05 per year on p. F-14) and in response to the question during the May 27 conference call to discuss the RAIs (1.08E-05 per year.) Explain the various values quoted and confirm that consistent model quantifications were used when determining the benefit (due to reductions in population dose, offsite economic risk, and CDF) of each SAMA.

RAI 6.e - For those cost estimates that did not use the lower bound values, indicate what the expert panel estimates included, such as inflation, contingencies, and replacement power.