



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

March 28, 2011

LICENSEE: Energy Northwest
FACILITY: Columbia Generating Station
SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON
FEBRUARY 28, 2011, BETWEEN THE U.S. NUCLEAR REGULATORY
COMMISSION AND ENERGY NORTHWEST CONCERNING DRAFT
REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE
SEVERE ACCIDENT MITIGATION ALTERNATIVES REVIEW OF THE
COLUMBIA GENERATING STATION LICENSE RENEWAL APPLICATION

The U.S. Nuclear Regulatory Commission and representatives of Energy Northwest (the applicant) held a telephone conference call on February 28, 2011, to discuss draft requests for additional information concerning the Severe Accident Mitigation Alternatives review of the Columbia Generating Station license renewal application.

Enclosure 1 provides a list of the participants and Enclosure 2 contains a list of the draft requests for additional information including a brief description of the status of the items.

The applicant had an opportunity to comment on this summary.

A handwritten signature in black ink, appearing to read "Daniel I. Doyle".

Daniel I. Doyle, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosures:

1. List of Participants
2. List of Draft Requests for Additional Information

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LIST OF PARTICIPANTS
COLUMBIA GENERATING STATION
LICENSE RENEWAL APPLICATION
SEVERE ACCIDENT MITIGATION ALTERNATIVES REVIEW
TELEPHONE CONFERENCE CALL

FEBRUARY 28, 2011

PARTICIPANTS

AFFILIATIONS

Daniel Doyle	U.S. Nuclear Regulatory Commission (NRC)
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Steve Short	Pacific Northwest National Laboratory (PNNL)
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Jim Tansy	EN
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REQUESTS FOR ADDITIONAL INFORMATION
COLUMBIA GENERATING STATION
LICENSE RENEWAL APPLICATION
SEVERE ACCIDENT MITIGATION ALTERNATIVES REVIEW

FEBRUARY 28, 2011

Background:

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of the applicant, Energy Northwest (EN), held a telephone conference call on February 28, 2011, to discuss and clarify the following draft requests for additional information (RAIs) concerning the Severe Accident Mitigation Alternatives (SAMA) review of the Columbia Generating Station (CGS) license renewal application. The draft RAIs are follow-up questions based on the EN RAI response dated January 28, 2011 (ADAMS Accession Number ML110330395).

Draft Requests for Additional Information:

Draft RAI 1:

Table B-4 does not provide an analysis of SAMA CC-21, which was screened as Criterion C. If modeled similar to SAMA CP-01, SAMA CC-21 (procedure change) would be cost-beneficial. Clarify the disposition of this SAMA.

Discussion:

The Phase 1 screening criterion for SAMA candidate CC-21 was inadvertently listed as Criterion C – Considered for Further Evaluation in the Environmental Report (ER) Table E.10-1. The correct screening criterion is Criterion A – Not Applicable to CGS. A piping connection between condensate and residual heat removal (RHR) existed in CGS's earlier history but was blank flanged off due to secondary containment bypass issues. This connection is no longer used and is not allowed during operation. ER Table E.10-1 will be updated with the corrected information and supporting justification including any relevant NRC correspondence.

Draft RAI 2:

Tables A-10, A-12, and A-14 provide a large early release frequency (LERF) importance analysis for internal, fire, and seismic events, respectively, and associated SAMA assessment. Tables A-6 through A-7 show that release category M/I is generally a much more significant contributor to population dose/economic impact than the LERF (H/E) release category, with release category H/I also being a significant contributor. Clarify how release categories M/I and H/I are considered in the LERF importance analysis.

Discussion:

The M/I and H/I release categories were not considered in the LERF importance analysis (Tables A-10, A-12 and A-14). Level 2 Probabilistic Safety Assessment (PSA) basic events importance lists will be generated for the M/I and H/I release categories, and any basic events not already considered in the Level 1 PSA and LERF basic event tables will be dispositioned. A risk reduction worth (RRW) benefit value associated with M/I and H/I release categories will be developed for screening similar to that used in Tables A-10, A-12, and A-14.

Draft RAI 3:

The Level 1 and Level 2 seismic basic events importance lists (Tables A-13 and A-14) identify, in addition to the two initiating events, only a few basic events, and those identified appeared to be flag events, split fractions, or success terms. Neither seismically-induced failures nor random failures appear to be addressed in this importance analysis. Clarify how the seismic importance lists were developed. In the response, specifically discuss how the seismic PSA model treats both seismically-induced failures and random failures. If random failures are not included in the seismic analysis, explain how this model incompleteness impacts the SAMA evaluation.

Discussion:

Confirmation will be provided that random failures are included in the seismic PSA model but that these did not rise above the cutoff level (for RRW benefit) to be included in the tables.

Draft RAI 4:

Table A-1 presents a total fire core damage frequency (CDF) of 3.6E-6/yr on the Rev. 6.2 Model column header, but the contributing fire sequences under that column header sum to 3.92E-6/yr. ER Table E.3-1, on the other hand, presents a total fire CDF of 7.4E-6/yr and Table E.4-5 presents release categories that appear to support (i.e., frequencies when summed equals 7.4E-6/yr) that total. Clarify these discrepancies.

Discussion:

Table A-1 (Fire) is incorrect. The correct value for total fire CDF is 7.4E-6/yr. A corrected Table A-1 (Fire) will be provided.

Draft RAI 5:

The truncation limits for internal events, fire and seismic models used in the quantification of Revision 6.2 Level 1 and Level 2 CDFs range from 5×10^{-14} to 1×10^{-8} . In response to an NRC staff RAI (Sept. 17, 2010) EN explained that in general a four-order difference between the calculated total and truncation limit was maintained, except in a few cases where a lesser difference was appropriate. In a telephone clarification, EN further explained that the expression "appropriate" referred to cases in which the calculated CDF appeared to converge using a lower truncation limit. Clarify if the following statement is applicable for both the Revision 6.2 and 7.1 PSA models: "In general a four-order-of-magnitude difference between

the calculated total and truncation limit was maintained, except in a few cases where a lower truncation limit resulted in convergence between the calculated CDF and truncation limit.”

Discussion:

Confirmation will be provided of the following: for Revision 6.2 of the PSA, a four-order-of-magnitude difference between the calculated total and truncation limit was maintained, except in a few cases where a lower truncation limit resulted in convergence between the calculated CDF and truncation limit. For Revision 7.1 of the PSA, at least a four-order-of-magnitude difference between the calculated total and truncation limit was maintained.

Draft RAI 6:

The fire events listed in Table A-1 are almost entirely different from the fire events listed in Table E.3-7 of the ER. It appears that the Table A-1 fire events are identified by initiating event category rather than fire compartment (although the Table A-1 column header uses the term “Fire Compartment”). Clarify the difference between the fire events listed in the ER and Table A-1 of the RAI response.

Discussion:

The applicant clarified that different compartment labels were employed in ER Table E.3-7 (based on PSA Rev. 6.2) versus Table A-1 (based on PSA Rev. 7.1), although the compartments themselves were the same. A footnote will be provided to cross-reference the labels.

Draft RAI 7:

Additional Comment #2 discussed in the January 19, 2011 conference call (ADAMS Accession Number ML110400510) does not appear to have been addressed. The Phase I screening for SAMAs AC/DC-05, CB-02, CB-05, CC-13, and FR-02 needs to be re-evaluated based on the total risk reduction benefit and associated implementation cost.

Discussion:

The Phase 1 screening for the identified SAMA candidates will be re-evaluated based on the total risk reduction benefit and associated implementation cost.

Draft RAI 8:

Comment #2 discussed in the January 19, 2011 conference call (ADAMS Accession Number ML110400510) does not appear to have been entirely addressed. Explain the reason for the increase in fire population dose risk for SAMAs CW-02, CW-03, and CW-04 (Analysis Cases 18 and 19 in Table B-3) and the increase in internal events CDF and population dose-risk for SAMA AC/DC-30R (Analysis Case 45 in Table B-2).

Discussion:

The requested information will be provided. Revised benefit results for the identified SAMA candidates will be provided as appropriate.

Draft RAI 9:

The calculated total for the internal, fire, and seismic events listed for the release categories presented in Tables A-3, A-4, and A-5 ($5.61\text{E-}06/\text{yr}$, $1.02\text{E-}05/\text{yr}$, and $4.31\text{E-}06/\text{yr}$ respectively) are not the same as the total CDFs given for internal, fire, and seismic events in Table A-1 ($7.4\text{E-}6/\text{yr}$, $1.4\text{E-}6/\text{yr}$, and $4.9\text{E-}6/\text{yr}$ respectively). Explain these differences. Also, the percentage contributions presented in Tables A-3, A-4, and A-5 total to much less than 100% for each table (e.g., totals to 75% in the case of the internal events release categories).

Discussion:

Revised Tables A-3, A-4, and A-5 will be provided.

Draft RAI 10:

Table A-1 (seismic) shows that the CDF for a couple of the seismic damage states (i.e., S2P2, S20P2) was completely eliminated in PSA Rev. 7.1. Explain.

Discussion:

S2P2 and S20P2 are seismic station blackout (SBO) event trees with reactor core isolation cooling (RCIC) successful. The RCIC system success criteria in PSA Rev. 7.1 require success of the condensate storage tank, which is failed by the modeled seismic events. Therefore, all of the S2P2 and S20P2 accident sequence cutsets transfer to the seismic SBO event trees with RCIC unavailable, S2P3 and S20P3. A footnote will be added to Table A-1 (seismic) to provide this clarification.

Draft RAI 11:

Section 2.2 provides a sensitivity analysis of the assumed 0.3 hot short probability (if CPTs were known to be present for the circuits; otherwise, 0.6) for three selected SAMAs that address fire events. The basis for selecting the three SAMAs is the RRW significance of the hot shorts they address and that they address numerous important functions. Clarify Energy Northwest's basis for believing that the sensitivity analysis results for these three SAMAs bound the effect for other fire SAMAs. In the response, specifically address the potential for multiple hot shorts in series and whether the factor of two impact determined for SAMA FR-07b is bounding for the fire SAMAs. Alternatively, specifically assess the impact of using a 0.6 hot short probability (or 0.3 if these circuits are known to be protected by CPTs) on the analysis results for fire-related SAMAs FR-08, FR-09R, FR-12R, and FR-11R.

Also, the hot short probability assumption could result in an underestimate of the estimated risk reduction for SAMAs identified principally to address internal events if the SAMA addresses cutsets that contain hot shorts. Assess the impact of using a 0.6 hot short probability (or 0.3 if these circuits are known to be protected by CPTs) on the analysis results for non-fire-related SAMAs AC/DC-15, AC/DC-23, AC/DC-27, CC-02, CP-01, CW-02, CW-07, CC-24R, FW-05R, and OT-09R, which have significant fire risk reduction contribution to the total estimated benefit.

Discussion:

The above SAMA candidates will be included in the sensitivity evaluation and the results provided in the same format as Table 2-2 in the January 28, 2011, response. The applicant proposed to determine the delta-CDF factor increase resulting from a sensitivity analysis using the hot short probabilities consistent with NUREG/CR-6850, with a subsequent comparison against the 95th percentile uncertainty factor to determine if there is any change in cost-benefit, including increases in margins for candidates already deemed cost-beneficial. The NRC requested an e-mail with additional details on this proposed approach (ADAMS Accession No. ML110670526).

Draft RAI 12:

Table 2-3 notes that the "Late" time category (i.e., greater than 24 hours) is not used in PSA model Rev. 7.1. Clarify that all Level 2 sequences are mapped into "early" or "intermediate" release categories. If not, assess the impact of this incompleteness on the results of the sensitivity study.

Discussion:

The footnote to Table 2-3 will be clarified to state that all Level 2 PSA sequences, including those whose release time is listed as "Late," are mapped into either the early or intermediate release categories.

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/RA/

Daniel I. Doyle, Project Manager
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ADAMS Accession No.: ML110670496

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Memorandum to Energy Northwest from D. Doyle dated March 28, 2011

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