ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Tuesday, October 06, 2009 6:12 PM
To: 'usepr@areva.com'
Cc: Dehmel, Jean-Claude; Frye, Timothy; Jennings, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 301 (3802,3803), FSAR Ch. 11
Attachments: RAI_301_CHPB_3802_3803.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on September 24, 2009, and discussed with your staff on October 6, 2009. No changes were made to the draft RAI as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 859

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Created By: Getachew.Tesfaye@nrc.gov

Recipients:
"Dehmel, Jean-Claude" <Jean-Claude.Dehmel@nrc.gov>
Tracking Status: None
"Frye, Timothy" <Timothy.Frye@nrc.gov>
Tracking Status: None
"Jennings, Jason" <Jason.Jennings@nrc.gov>
Tracking Status: None
"Colaccino, Joseph" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
"ArevaEPRDCPEm Resource" <ArevaEPRDCPEm.Resource@nrc.gov>
Tracking Status: None
"'usepr@areva.com'" <usepr@areva.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

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Request for Additional Information No. 301 (3802), Revision 1

10/6/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 11.02 - Liquid Waste Management System
SRP Section: 11.03 - Gaseous Waste Management System

Application Sections: 11.2 and 11.3

QUESTIONS for Health Physics Branch (CHPB)

11.02-17

In its evaluation, the staff cannot duplicate the estimates of doses due to radioactive liquid effluent releases, as presented in FSAR Rev. 1, Tables 11.2-6 and 11.2-10. The evaluation identified a number of inconsistencies associated with assumptions and parameters used in the calculations described in FSAR Rev. 1, Sections 11.2.3.4 and 11.2.4.1. Without such clarifications and corrections, the staff cannot complete its evaluation and conclude, with reasonable assurance, that the design features and supporting analyses demonstrate compliance with Part 20.1301 and 20.1302, and design objectives of Appendix I to Part 50. The following observations should be reviewed by the applicant and corrected or justified in the next revision of the FSAR. Specifically, the observations include:

1. A review of Table 11.2-5 indicates that a number of parameters used in the LADTAP II code are not listed. While the FSAR references LADTAP II as a source of information, the applicant is responsible for documenting and justifying all input parameters in calculating doses. At a minimum, the applicant is requested to expand the tabulation to include the following parameters:

   a) ALARA analysis:

      (i) dilution factors for the following exposure pathways: aquatic food, boating, swimming, shoreline, and drinking water for the maximum individual.
      (ii) Transit times for drinking water, and “other pathways,” as a category.

   (b) Irrigated food pathways:

      (i) fraction of animal feed and water provided from non-contaminated irrigation water, as they relate to the meat and milk exposure pathways.
      (ii) water usage transit times for the leafy vegetables, vegetables, milk, and meat exposure pathways.

2. A review of Table 11.2-5 indicates that the results are based on a discharge flow rate of 100 ft^3/s. In demonstrating compliance with the effluent concentration limits of Appendix B to Part 20, FSAR Section 11.2.3.5 applies a dilution flow rate of 20 ft^3/s. In calculating population doses for the same effluents and discharge path, FSAR Table 11.2-9 uses a discharge flow rate of 39.3 ft^3/s. The applicant is requested to describe in the FSAR the underlying assumptions and justify the use of different values in estimating doses from the same effluent and discharge path.

3. A review of Table 11.2-6 indicates that dose results are presented only for the total body and thyroid, with only one reference identifying the infant as the critical age group for thyroid exposure. Also, the age group is not specified for the reported total body dose listed in the table. It is not possible from this information to compare doses among the four age groups of Regulatory Guide 1.109 and confirm that the infant is the limiting age group for the thyroid and that no other age group and organ are limiting. The applicant is requested to expand the presentation of the results in Table 11.2-6 to include all four age groups and eight organs of Regulatory Guide 1.109, and provide a summation of doses given that the LADTAP II code automatically provide all such results.

4. A review of Table 11.2-9 indicates that a number of parameters used in the LADTAP II code are presented without any supporting assumptions and justifications. For example, Table 11.2-9 list values for population distributions, time spent as recreational activities in surrounding locations impacted by liquid effluent releases, commercial and sport fishing production rates, and other supporting parametric values. While the FSAR references LADTAP II as a source of information, the applicant is responsible for documenting and justifying all input parameters in calculating doses. The applicant is requested to describe in the FSAR the underlying assumptions and justify the use of different values in estimating population doses. Note that the information on population doses is also needed by the staff in confirming the results of the cost-benefit analysis presented in FSAR Section 11.2.4. At a minimum, the applicant is requested to:

    a. provide justifications or appropriate references supporting the values listed in Table 11.2-9.

    b. explain the rationale for applying a “saltwater site” (see Table 11.2-9) in estimating population doses and using a “freshwater site” (see Table 11.2-5) in estimating doses for Part 50, Appendix I compliance. Provide a description of exposure pathways and usage or consumption parameters that would characterize a saltwater site.

    c. explain the basis for a single dilution value of 365, listed in Table 11.2-9, in estimating population doses. Confirm that a single dilution factor is adequate in characterizing exposures for the various listed activities, including shoreline, boating, swimming, commercial fishing (fish and invertebrate), and sport fishing (fish and invertebrate).

    d. provide the transit times for the listed activities, including shoreline, boating, swimming, commercial fishing (fish and invertebrate, if different), and sport fishing (fish and invertebrates, if different).

Note that the requested clarification on the basis of population doses is also needed by the staff in confirming the results of the cost-benefit analysis presented in FSAR Rev. 1, Section 11.2.4.

5. On an associated topic on liquid effluent releases and offsite impacts, a review of FSAR Rev. 1, Section 11.2.3.7 indicates that there is insufficient information for the staff to conduct an independent evaluation of the results presented in Table 11.2.8. At a minimum, the applicant is requested to describe the radioactive source term contained in the radwaste tank assumed to have failed; explain why other long-lived radionuclides (e.g., Cs-137, Sr-90, etc.) and environmentally mobile radionuclides (e.g., C-14, Tc-99, I-129, etc.) were not considered in the analysis; describe the application of design features, if any, used in mitigating such releases; and provide information describing the groundwater flow regime characterizing the movement, retardation, and dilution of the release from the selected plant building to the unrestricted area.

11.03-15

In its evaluation, the staff duplicated the estimates of yearly doses to the maximally exposed individual (MEI) due to radioactive airborne effluent releases, but could not duplicate the results for population doses. Also, the evaluation identified a number of inconsistencies in the presentation of the results and assumptions and parameters used in the calculations described in FSAR Rev. 1, Sections 11.3.3.4 and 11.3.4.1. Without such clarifications and corrections, the staff cannot complete its evaluation and conclude, with reasonable assurance, that the design features and supporting analyses demonstrate compliance with Part 20.1301 and 20.1302, and design objectives of Appendix I to Part 50. These observations should be reviewed by the applicant and corrected or justified in the next revision of the FSAR. Specifically, the observations include:

a. A review of Table 11.3-4 indicates that a number of parameters used in the GASPAR II code are presented without any supporting assumptions and justifications. For example, Table 11.3-4 list values for the atmospheric dispersion and deposition parameters, but does not specify as the basis for the parameters nor references FSAR Rev. 1, Section 2.3.5 on the development of long-term atmospheric dispersion estimates for routine airborne effluent releases. The scope of exposure locations should be expanded to include the nearest residence. The reference of Table 11.2-4 for the airborne source term is wrong since this table presents the source term for liquid effluents - the proper citation is Table 11.3-3. At a minimum, the applicant is requested to describe in the FSAR the underlying assumptions, provide all appropriate references or identify the source of the information within the FSAR for all parameters presented in Table 11.3-4, add the missing exposure location for the MEI, and provide the proper citation for the table listing the airborne effluent source term.

b. While the staff duplicated the dose results presented in Table 11.3-5, a review indicates that results for the MEI are presented only for the total body and thyroid, with only one reference identifying the infant as the critical age group for thyroid exposure. Also, the age group is not specified for the reported total body dose listed in the table. It is not possible from this information to compare doses among the four age groups of Regulatory Guide 1.109 and confirm that the infant is the limiting age group for the

thyroid and that no other age group and organ are limiting. The applicant is requested to expand the presentation of the results in Table 11.3-5 to include all four age groups and eight organs of Regulatory Guide 1.109, and provide a summation of doses given that the GASPAR II code automatically provide all such results.

c. A review of Table 11.3-7 indicates that a number of parameters used in the GASPAR II code are presented without any supporting assumptions and justifications. In addition, the table and FSAR Rev. 1, Section 11.3.4.1 do not include information for the staff to conduct an independent evaluation of population dose results. For example, Table 11.3-7 list values for a population within a 50-mile radius of the plant, an atmospheric dispersion parameter, and agricultural production data, but does not specify as the basis for the parameters nor references the applicable FSAR sections on the development of these parameters. In addition, the entries for the average humidity and temperature are inconsistent with the code input requirements, as the code requires that the relative humidity (%) be specified whenever a temperature value is inserted over the code default value. Finally, FSAR Section 11.3.4.1 and Table 11.3-7 do not provide any information as to how population data and agricultural production data were distributed against long-term atmospheric dispersion parameters by sectors in the 50-mile radius. At a minimum, the applicant is requested to describe in the FSAR the underlying assumptions, insert all appropriate references or identify the source of the information within the FSAR for all parameters presented in Table 11.3-7, provide the missing information for the staff to conduct its own analysis, revise the citation for the table referencing the basis of the airborne effluent source term, and change in Section 11.3.4.1 the table citation from 11.3-4 to 11.3-7 since Table 11.3-4 is for MEI doses and Table 11.3-7 is for population doses. Note that the requested clarification on the basis of population doses is also needed by the staff in confirming the results of the cost-benefit analysis presented in FSAR Rev. 1, Section 11.3.4.2.