

NRR-PMDAPEm Resource

From: Singal, Balwant
Sent: Wednesday, September 07, 2016 9:04 AM
To: 'Richardson, Michael'
Cc: Mazaika, Michael; Harvey, Brad; Bucholtz, Kristy; Pascarelli, Robert; Watford, Margaret
Subject: Request for Additional Information - License Amendment Request for Implementation of Alternative Source Term (CAC Nos. MF6399 and MF6400)
Attachments: MF6399-RAI-Sep7.docx

By a letter dated June 17, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15176A539), as supplemented by letters dated August 31, October 22, November 2, November 6, and December 17, 2015, and February 1, February 10, and April 21, 2016 (ADAMS Accession Nos. ML15243A363, ML15295A470, ML15321A235, ML15310A522, ML16004A363, ML16032A603, ML16041A533, and ML16120A026, respectively), Pacific Gas and Electric (PG&E, the licensee), submitted a license amendment request (LAR) to revise the licensing bases to adopt the alternative source term as allowed by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.67, "Accident source term," for Diablo Canyon Power Plant, Units 1 and 2.

Based on the documentation referenced above and technical issues discussed in an audit conducted on August 3-4, 2016, of the atmospheric dispersion modeling analyses performed in support of the LAR submittal, the U.S. Nuclear Regulatory Commission (NRC) staff requests the attached additional information to complete its review.

Please note that Draft Request for Additional Information (RAI) was sent to you via e-mail on August 29, 2016. A clarification call was held on September 6, 2016. Due to unavailability of the NRC technical staff related to RAI 1.b for ARCON96 Atmospheric Dispersion Model, it was decided to arrange another clarification call the week of September 12, 2016 to further discuss this RAI. Hence, RAI 1.b for ARCON96 Atmospheric Dispersion Model will be transmitted at a later date. Rest of the RAs are provided in the attachment to this e-mail. Please treat this e-mail as formal transmittal of RAIs.

You are requested to respond to this request within 30 days from the date of this e-mail.

Please let me know if you have any questions.

Thanks.

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DRAFT REQUEST FOR ADDITIONAL INFORMATION

DIABLO CANYON POWER PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST

REVISE LICENSING BASES TO ADOPT ALTERNATIVE SOURCE TERM

By a letter dated June 17, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15176A539), as supplemented by letters dated August 31, October 22, November 2, November 6, and December 17, 2015, and February 1, February 10, and April 21, 2016 (ADAMS Accession Nos. ML15243A363, ML15295A470, ML15321A235, ML15310A522, ML16004A363, ML16032A603, ML16041A533, and ML16120A026, respectively), Pacific Gas and Electric (PG&E, the licensee), submitted a license amendment request (LAR) to revise the licensing bases to adopt the alternative source term (AST) as allowed by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.67, "Accident source term," for Diablo Canyon Power Plant (DCPP), Units 1 and 2.

Based on the documentation referenced above and technical issues discussed in an audit conducted on August 3-4, 2016, of the atmospheric dispersion modeling analyses performed in support of the LAR submittal, the U.S. Nuclear Regulatory Commission (NRC) staff requests the following additional information to complete its review as discussed and agreed to by PG&E representatives at the audit exit.

Regulatory Basis

SRP Section 2.3.4, Revision 3 "Short-Term Atmospheric Dispersion Estimates for Accident Releases," ADAMS Accession No. ML070730398)

EN-113 Atmospheric Dispersion Model

The EN-113 Code is a proprietary code that the NRC staff does not have and therefore cannot run. As such, the NRC staff needs the additional information identified in the following Request for Additional Information (RAI) to understand the licensee's offsite dispersion modeling analysis and to evaluate the analysis for conformance to applicable regulatory guidance. If needed, the NRC staff may develop equivalent input data files for any appropriate confirmatory modeling runs using the NRC-accepted PAVAN dispersion model. This will assist the NRC staff in determining the acceptability of the offsite, accident-related dispersion modeling results presented in the LAR documentation which used the proprietary EN-113 Code.

(1) EN-113 Input Card 7

Please clarify the text in the fifth bulleted item under Section 5.1 (Paragraph 8) of the Technical Assessment as well as the parallel discussion in Subsection 2.3.5.2.1 of the Updated Final Safety Analysis Report (UFSAR) and elsewhere as appropriate to include the terrain adjustment factors (TAFs) applied to the U1/U2 (Low Population Zone (LPZ)) model run.

(2) EN-113 Input Card 8

Please clarify any related discussions in the UFSAR and Technical Assessment to explain how the building cross-sectional area was determined (including the domed-portion of the containment structure).

(3) EN-113 Input Card 10

- (a) Please clearly identify in the UFSAR and Technical Assessment the cross-sectional area of the containment buildings input to the dispersion modeling analyses in support of the submittal for offsite dispersion parameters (X/Q) calculations at the exclusion area boundary (EAB) and LPZ and for applicable onsite X/Q calculations at the air intakes and points of ingress/egress for the Control Room (CR) and Technical Support Center (TSC).
- (b) Please confirm whether the value of 2745 square meter (sq-m) rather than 1600 sq-m represents a change to the current licensing basis for offsite and onsite dispersion modeling analyses.

(4) EN-113 Input Card 11

Update the UFSAR and Technical Assessment with additional information that describes the basis and location of the offshore EAB receptors. These updates should also include a table or tables that list the modeled distances to the EAB from the nearest edge of the respective containment buildings for DCP, Units 1 and 2, and for all sixteen direction sectors consistent with the cited guidance in Regulatory Position C.1.2 of Regulatory Guide (RG) 1.145, Revision 1, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," (ADAMS Accession No. ML003740205).

(5) Other Potential EN-113 Modeling Analysis Issues

- (a) Please include the sector-specific X/Q values from the U1 (EAB) and U2 (EAB) model runs in the Technical Assessment table or tables that list the sector-specific distances to the EAB relative to both units (see the earlier Question 4 pertaining to EN-113 Input Card 11). Please provide a comparable table for the sector-specific 0.5% X/Q values based on the U1/U2 (LPZ) model run at the uniform LPZ receptor distance for all sectors.
- (b) Please update Section 2.1 of the UFSAR, where appropriate, with additional information that describes the location of the 2000-yard radius offshore Security Zone in relation to the EAB receptors, also located offshore in at least the south-southeast clockwise through the west-northwest direction sectors.
- (c) Please include the 5-percent overall site 0-2 hour X/Q values from the U1 (EAB), U2 (EAB), and U1/U2 (LPZ) model runs, the intermediate, short-term X/Q values (i.e., 2-8 hours, 8-24 hours, 1-4 days, and 4-30 days) from the U1/U2 (LPZ) model run, and the sixteen sector-dependent annual average X/Q values from the U1/U2 (LPZ) model run in the appropriate table or tables of the Technical Assessment that list the sector-specific distances to the EAB and LPZ relative to both units.

ARCON96 Atmospheric Dispersion Model

The intent of these RAI questions is to obtain sufficient information to understand the licensee's accident-related onsite dispersion modeling analyses at the various air intakes and ingress/egress locations to the CR and TSC. This will help NRC staff to evaluate those analyses for conformance to applicable regulatory guidance and requirements. If necessary, the NRC staff may develop equivalent input data files for any confirmatory modeling runs using the NRC-accepted ARCON96 dispersion model. This will facilitate the NRC staff's determination of the acceptability of the onsite dispersion modeling results presented in the LAR documentation and proposed revisions to the UFSAR.

- (1) X/Qs were previously unanalyzed at the TSC receptors for accident releases from the Main Steam Safety Valves (MSSVs), 10% Atmospheric Dump Valves (10% ADVs), and a Main Steam Line Break (MSLB). The proposed approach by PG&E for demonstrating that the LOCA still represents the worst-case accident scenario for onsite dose consequences includes:
 - assuming that the highest of the modeled X/Qs from among these three accident scenarios is conservatively representative of those scenarios because the release points are located so close together;
 - performing a simplified dose assessment by scaling previously estimated LPZ doses by the ratio of the highest X/Qs for each scenario at the TSC and the LPZ X/Qs which were input to the dose assessment at the LPZ; and
 - assuming that a TSC operator was located on the roof of the TSC at one of the air intakes and so any reductions due to emergency air filtering in the TSC were not taken into account.

A comparison was also made between the results from a MSLB scenario and a Control Rod Ejection Accident (CREA).

- (a) Please update the Technical Assessment and UFSAR, as appropriate, with a thorough explanation of the approach used, including X/Q modeling results at the TSC receptors for MSSV, 10% ADV, and MSLB release scenarios, determination of the ratios of these results to the X/Q values estimated at the LPZ, and a relative comparison of the estimated doses based on these ratios to the doses for the assumed controlling LOCA scenario. Also, please provide ARCON96 model input and output files for these additional model runs.
- (2) Please annotate any tables in the UFSAR and Technical Assessment to indicate the unit from which a bounding X/Q was obtained and used as input to a dose calculation for a given release scenario.
- (3) Please update any related discussions in the UFSAR and Technical Assessment to correct:
 - (a) the 95th-percentile 10-meter wind speed value to be consistent with the guidance in Note 13 at Paragraph 1 (Sentence 3) of Regulatory Position C.6 of RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," June 2003 (ADAMS Accession No. ML031530505);
 - (b) the ratios of the expected vertical velocity of MSSV and 10% ADV releases to corrected 95th percentile 10-meter (m) wind speed;
 - (c) the corrected 95th percentile 10-m wind speed as it appears to have been used in estimating enhancement to plume rise of the MSSV and 10% ADV releases (see Sentence 4 under the

heading “Energetic Releases” in Subsection 2.3.5.2.2 of the UFSAR mark-up provided by the letter dated December 17, 2015 and in Section 5.2 of the Technical Assessment), the ratio of the expected vertical velocity; and

- (d) Given the effects of wind shear and the stated elevations of the release points for the MSSVs and 10% ADVs, confirm the appropriateness of using unadjusted wind speed data from the 10-m level of the onsite Met tower to determine the 95th-percentile wind speed value or provide the technical basis for and propose adjustments to the resulting value or other alternative approach.
- (4) Please update the UFSAR and Technical Assessment by identifying the cross-sectional areas of the Containment Buildings, Refueling Water Storage Tanks, and Fuel Handling Buildings for DCP, Units 1 and 2, as input to the ARCON96 dispersion modeling analysis (and for the Containment Buildings in the case of the EN-113 modeling analysis). Also, update the Technical Assessment by explaining how the respective cross-sectional areas were determined (e.g., identification of the applicable structures or portions of structures considered, building dimensions (e.g., width, height, and, if applicable, the method of handling portions of irregularly-shaped structures), and cross-references to the applicable plant drawings on which the preceding information is based). This information represents part of (or change to) the licensing basis associated with dispersion analyses that support the LAR and needs to be clearly stated.
- (5) Subsection 2.3.5.2.2 (Paragraph 1) of the UFSAR mark-up provided by the letter dated December 17, 2015, indicates that input data to the ARCON96 dispersion model consists, in part, of “various receptor parameters (e.g., distance and direction from release to control room air intake...)”. Please correct the statement in the referenced UFSAR subsection (and Technical Assessment, if applicable) regarding the proper direction orientation between receptor locations and release points to be entered into the ARCON96 dispersion model input files (i.e., from the receptor to the release point).
- (6) The NRC staff notes a minor discrepancy from its review of the revised ARCON96 dispersion model input files. Specifically, a building area of 2744.5 sq-m is listed for Case 9 of the summary in the Technical Assessment titled “Unit 1 MSSVs / 10% ADVs / MSL Break Releases to CR Receptors”. The NRC staff believes that that entry should be “0.0” consistent with the entries for Cases 1 and 17 under that summary table and the entries for Cases 6, 14, and 22 under the comparable summary table for Unit 2. For consistency with the other cases identified above, please correct the typographical error in the Technical Assessment for the building area entered for case 9 by changing it to “0.0” from “2744.5” sq-m.