

## NRR-PMDAPEm Resource

---

**From:** Lingam, Siva  
**Sent:** Thursday, October 01, 2015 8:37 PM  
**To:** Soenen, Philippe R (PNS3@pge.com)  
**Cc:** Markley, Michael; Shoop, Undine; Cook, Christopher; Erwin, Kenneth; Mazaika, Michael; Bucholtz, Kristy; White, Jason; Schrader, Kenneth (KJSe@pge.com); 'mjrm@pge.com'  
**Subject:** Diablo Canyon 1 and 2 - Requests for Additional Information for License Amendment Request 15-03 to Adopt the Alternative Source Term per 10 CFR 50.67 (TAC Nos. MF6399 and MF6400)

By a letter dated June 17, 2015 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15176A539), as supplemented by letter dated August 31, 2015 (ADAMS Accession No. ML15243A363), 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. Please note the following official requests for additional information (RAIs) from our Radiation Protection and Consequence Branch [ARCB] for the AST LAR associated with meteorological data and atmospheric dispersion factors model input. Please provide your responses within 30 days from the date of this e-mail. We transmitted the draft RAIs to you on July 23, 2015, and we had a clarification call on September 29, 2015. Your timely responses will allow the U.S. Nuclear Regulatory Commission staff to complete its review on schedule.

### General

1. The licensee used the NRC-accepted ARCON96 dispersion model (based on NUREG/CR-6331, Rev. 1 as implemented by Regulatory Guide (RG) 1.194) to estimate onsite impacts to the Unit 1/Unit 2 Control Rooms (CRs) as well as the Technical Support Center (TSC). The licensee included the TSC pursuant to Supplement 1 to NUREG-0737 (Clarification of TMI Action Plan Requirements - dated January 1983) and RG 1.183. There are 58 source-receptor pairs evaluated for each unit.
2. The licensee used a (presumably) proprietary dispersion model referred to as EN-113 (Atmospheric Dispersion Factors), which is said to implement provisions in RG 1.145 for accident releases and from RG 1.111 for routine releases, to estimate short-term relative concentrations (X/Qs) and long-term (annual average) X/Qs at the Exclusion Area Boundary (EAB) and the outer boundary of the Low Population Zone (LPZ) similar to the NRC-accepted PAVAN and XOQDOQ dispersion models, respectively. Unlike PAVAN and XOQDOQ, however, the EN-113 code runs on hourly meteorological data and has, among other things, the ability to directly calculate X/Q values for the intermediate, short-term averaging intervals (i.e., 2-8 hours, 8-24 hours, 1-4 days, and 4-30 days). Because of conflicting discussions within the application package, it is not clear at this stage of the review how these provisions were implemented for this LAR. The licensee also cites other facilities where this code has been used and approved by the NRC staff. The licensee will need to provide justification for the use of the EN-113 code at the DCPP.
3. The licensee has updated the meteorological data set used to make its accident-related X/Q estimates (i.e., a more recent 5-year period of record (POR) consisting of data for calendar years 2007 through 2011). Data and summaries through Rev. 20 (November 2011) of the Updated Final Safety Analysis Report (UFSAR) - latest available on NRR's V:\ drive – are based on various 2- or 3-year PORs, which appear to be associated with the initial FSAR submittal for this facility. The purpose of some of those summaries appears to be related to the complicated meteorological conditions that characterize this coastal site, which includes complex terrain. It is not clear at this stage of the review how (or if) these previous studies, and the issues previously considered to be important as addressed by those studies, relate to the dispersion modeling analyses performed for this LAR.

### Meteorological (Met) Data – Offsite Impacts

1. Need Met data for calendar years 2007 thru 2011
  - a. Sequential hourly file(s) formatted in accordance with Appendix A to Revision 1 of RG 1.23 or equivalent with proper explanation;
  - b. Explanation of any data formatting differences between RG 1.23 (Appendix A) and as input to EN-113 dispersion model;
  - c. Whether Met data is input to the EN-113 dispersion model as a concatenated 5-year data set or run as individual years and if the latter how the modeling results are interpreted.
2. Joint frequency distributions (JFDs) of wind speed and wind direction by atmospheric stability class for indicated 5-year POR or, if EN-113 was run for individual years, JFDs for each year and for the composite 5-year POR;
3. Bases for determining hourly stability class and if different methods were used throughout the data set(s) (e.g., depending on wind speed as suggested by UFSAR Table 2.3-41) an accounting of such hours when implemented and an explanation for having done so;
4. Summary of data recoveries by year and for the 5-year POR for individual Met parameters and as composite recovery of concurrent wind speed, wind direction, and atmospheric stability class for the same periods;
5. Whether any data substitution was implemented to supplement data recovery over the indicated 5-year POR and, if so, an accounting of hours and parameters substituted, an explanation of why any substitutions were necessary, and the source of such data; and
6. Comparisons between the indicated 5-year POR and the PORs reflected in the current (or previous) UFSAR to establish the long-term representativeness of the 2007 through 2011 POR from an atmospheric dispersion standpoint.

#### **Met Data – Onsite Impacts (Control Room and Technical Support Center)**

1. Need Met data for calendar years 2007 thru 2011
  - a. Sequential hourly file(s) formatted in accordance with NUREG/CR-6331 (PNNL-10521) (Rev. 1).
  - b. Note that the cover sheet for Appendix A to Attachment 4 of the LAR submittal package (see Part 2 of 8, ML15176A528) states that “[t]he on-site meteorological data input to ARCON96 (January 1, 2007 through December 31, 2011), in the ARCON96 input data format, is embedded below”, followed by a list of the five individual calendar years. The phrase “is embedded below” suggests that this Met data may have already been provided with the LAR submittal package. If already in hand, copies of those files should be provided to my attention at NRO/DSEA/RHMB1/RMOT, and a separate request for that data is not necessary.
2. If different from the sequential hourly Met data sets input to the EN-113 dispersion model, bases for determining hourly stability class and if different methods were used throughout the data set(s) (e.g., depending on wind speed as suggested by UFSAR Table 2.3-41) an accounting of such hours when implemented and an explanation for having done so; and
3. Atmospheric stability class appears to have been based, at least in part, on the temperature difference between the 76- and 10-m measurement levels on the primary Met tower. Except for the Unit 1 and Unit 2 Plant Vent release scenarios (Release Height = 74.1 m), all other source release heights for estimating CR and TSC impacts are no greater than 32.0 m (and most are less than that height). Explain the basis for not having defined atmospheric stability based on the temperature difference between the 46- and 10-m measurement levels on the primary Met tower for those release scenarios with source-receptor pairs within that 46- to 10-m surface boundary layer. This comment also applies to the Met data input to the EN-113 dispersion modeling analyses to estimate impacts at the EAB and LPZ.

## **EN-113 (Atmospheric Dispersion Factors) Model Input Information**

1. Need input files for EN-113 model runs along with a key explaining file format and identification of model input parameters so that equivalent input data files can be developed for NRC staff confirmatory modeling runs using NRC-accepted PAVAN dispersion model.
2. Since this appears to be the first use of the EN-113 dispersion model at the DCPP and the licensee indicates that the code's provisions implement certain guidance from RG 1.145 and RG 1.111, provide documentation that demonstrates the equivalency of EN-113 results to the output from the NRC-accepted PAVAN and XOQDOQ dispersion models, which implement the guidance in RGs 1.145 and 1.111, respectively, with the understanding that EN-113 operates on sequential hourly Met data whereas the PAVAN and XOQDOQ dispersion models operate on JFDs of wind speed and wind direction by atmospheric stability class.
3. Confirm whether the X/Q values for the 0- to 2-hour averaging time and the other intermediate averaging intervals (i.e., 2-8 hours, 8-24 hours, 1-4 days, and 4-30 days) and annual average are determined as sliding averages or interpolated between the 0- to 2-hour and annual average X/Qs. The text in different parts of the application package appears to be inconsistent such that it is not clear which approach has been used and which discussions may only be intended to describe the capabilities of the EN-113 dispersion model.

## **ARCON96 Dispersion Model Input / Output Files**

1. Need input and output files for all ARCON96 model runs.
2. In addition to Figure A-1 in Appendix A to Attachment 4 of the LAR submittal package, need legible drawings of all structures used to determine building wake-related parameters as input to the ARCON96 model runs, as well as drawings that illustrate release and receptor heights. This comment also applies to the EN-113 dispersion modeling analyses if building wake has been accounted for as part of those analyses.

Siva P. Lingam  
U.S. Nuclear Regulatory Commission  
Project Manager (NRR/DORL/LPL4-1)  
Cooper Nuclear Station  
Diablo Canyon Nuclear Power Plant  
Location: O8-D5; Mail Stop: O8-B3  
Telephone: 301-415-1564; Fax: 301-415-1222  
E-mail address: [siva.lingam@nrc.gov](mailto:siva.lingam@nrc.gov)

**Hearing Identifier:** NRR\_PMDA  
**Email Number:** 2432

**Mail Envelope Properties** (3ed5b9c044114feda87f20429a53c9a6)

**Subject:** Diablo Canyon 1 and 2 - Requests for Additional Information for License Amendment Request 15-03 to Adopt the Alternative Source Term per 10 CFR 50.67 (TAC Nos. MF6399 and MF6400)  
**Sent Date:** 10/1/2015 8:36:42 PM  
**Received Date:** 10/1/2015 8:36:43 PM  
**From:** Lingam, Siva  
**Created By:** Siva.Lingam@nrc.gov

**Recipients:**

"Markley, Michael" <Michael.Markley@nrc.gov>  
Tracking Status: None  
"Shoop, Undine" <Undine.Shoop@nrc.gov>  
Tracking Status: None  
"Cook, Christopher" <Christopher.Cook@nrc.gov>  
Tracking Status: None  
"Erwin, Kenneth" <Kenneth.Erwin@nrc.gov>  
Tracking Status: None  
"Mazaika, Michael" <Michael.Mazaika@nrc.gov>  
Tracking Status: None  
"Bucholtz, Kristy" <Kristy.Bucholtz@nrc.gov>  
Tracking Status: None  
"White, Jason" <Jason.White@nrc.gov>  
Tracking Status: None  
"Schrader, Kenneth (KJSe@pge.com)" <KJSe@pge.com>  
Tracking Status: None  
"mjrm@pge.com" <mjrm@pge.com>  
Tracking Status: None  
"Soenen, Philippe R (PNS3@pge.com)" <PNS3@pge.com>  
Tracking Status: None

**Post Office:** HQPWMSMRS04.nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	9744	10/1/2015 8:36:43 PM

**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**