

PSEGSPeRAIPEm Resource

From: Chowdhury, Prosanta
Sent: Friday, April 15, 2011 9:55 AM
To: 'PSEGRAIResponses@pseg.com'
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Subject: PSEG Site ESPA FINAL RAI 21 (eRAI 5638) SRP-02.01.03 (RSAC)
Attachments: PSEG Site ESPA Final RAI 21 (eRAI 5638).pdf

Please find attached RAI 21 for the PSEG Site ESP Application. A draft of the RAI was provided to you on April 01, 2011. At your request, a clarification discussion on Question 02.01.03-1(c) (for DRAFT RAI 21) was held on April 15, 2011. As a result of the discussion, we understand that you have no further questions on this specific RAI, and therefore, we are issuing this RAI as final with no changes made to it.

The schedule we have established for review of your application assumes technically correct and complete responses within 30 calendar days of receipt of RAIs. For any RAIs that cannot be responded to within 30 calendar days, it is expected that a date for receipt of this information will be provided to the staff within the 30-calendar day period so that the staff can assess how this information will impact the published schedule.

If you have any questions, please contact me.

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Request for Additional Information No. 21

Application Revision 0

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4/15/2011

PSEG Site ESP
PSEG Power LLC, PSEG Nuclear LLC
Docket No. 52-043
SRP Section: 02.01.03 - Population Distribution
Application Section: 2.1.3

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

02.01.03-1

Pursuant to 10 CFR 52.17(a)(1)(viii) and based on the requirements in 10 CFR 100.21(h), NUREG-0800, SRP Section 2.1.3, Subsection III (Review Procedures), Item 5 (Population Density) establishes the need for an evaluation of the population density in the vicinity of the site to determine whether it exceeds the guidelines given in Regulatory Position C.4 of Regulatory Guide (RG) 4.7. This Regulatory Position specifies, among other things, a threshold population density criterion of 500 persons per square mile (per/sq-mi) averaged over any radial distance out to 20 miles.

Subsection 2.1.3.6 (Paragraph 2) of the Site Safety Analysis Report (SSAR) in the Early Site Permit Application for the PSEG Site includes a discussion of the plot in SSAR Figure 2.1-22 regarding estimated current (2010) and projected (2021) cumulative population totals as a function of distance from the proposed reactor(s) versus the population total equivalent to the 500 per/sq-mi threshold density. The Applicant considers data for the year 2021 to represent the period 5 years after the time of initial site approval. The Applicant states that the plot of population density for 2021 is well below 500 per/sq-mi out to 15 miles and approaches, but remains below, this threshold value between 15 and 20 miles reaching a population density of 497 per/sq-mi at 20 miles.

Given that the population density, as projected by the Applicant for 5 years after initial site approval, is within one percent of the 500 per/sq-mi threshold density, the Staff attempted to verify the Applicant's estimates based on the information available in SSAR Section 2.1.3. In the process, the Staff believes that the projected population densities within 20 miles of the site for 2021, and possibly for 2010, may be underestimated.

SSAR Subsection 2.1.3.6 is silent regarding whether and, if so, how any weighting was applied to the transient population component of the total population count as called for in Regulatory Position C.4 of RG 4.7. Therefore, presuming that no such weighting was taken into account, the Staff relied directly on the data available in SSAR Figures 2.1-4 and 2.1-5 which include distance- and direction-segment-specific combined resident and transient population counts between 0 and 10 miles from the proposed reactor(s) for the years 2010 and 2021, respectively. The Staff also relied on the data in SSAR Figures 2.1-13 and 2.1-14, recognizing that these values represent resident population counts

only between 10 and 50 miles, again for 2010 and 2021, respectively, in order to account for at least that portion of the total population between 10 and 20 miles from the proposed reactor(s).

Based on its initial evaluation, the Staff has identified a number of technical issues which the Applicant should address by updating the discussions under SSAR Section 2.1.3, including any associated current or new tables and figures, as appropriate:

- (a) Confirm whether the transient population component of the total population counts to be considered in determining the population density out to 20 miles was weighted consistent with Regulatory Position C.4 of RG 4.7. If so, explain the methodology for doing so. In either case, explain the technical basis for the approach used.
- (b) Explain the apparent discrepancy between the population density estimated by the Staff for the year 2021 (i.e., 508 per/sq-mi), which includes no transient population component between 10 and 20 miles from the proposed reactor(s), and the value reported by the Applicant in SSAR Subsection 2.1.3.6 (Paragraph 2) (i.e., 497 per/sq-mi) as reflected in the data plot in SSAR Figure 2.1-22. The latter value presumably accounts for the cumulative resident and transient populations out to 20 miles from the proposed reactor(s). Note, however, that the value estimated by the Staff exceeds the 500 per/sq-mi threshold population density criterion in SRP Section 2.1.3, Subsection III (Review Procedures), Item (5) and Regulatory Position C.4 in RG 4.7 without accounting for the transient population component between 10 and 20 miles.
- (c) The Staff estimates that the Delaware River takes up approximately 145 sq-mi of the total area encompassed by a 20-mile radius circle centered on the proposed reactor(s). Excluding this over-water area increases the population densities within 20 miles to 574 per/sq-mi for the year 2021 and to 531 per/sq-mi for the year 2010, both in excess of the 500 per/sq-mi threshold population density criterion in SRP Section 2.1.3, Subsection III (Review Procedures), Item (5), and Regulatory Position C.4 in RG 4.7.

In order to resolve this issue, the Applicant should update SSAR Subsection 2.1.3.6 by confirming whether this over-water area was included in or excluded from the determination of the population densities averaged over any radial distance out to 20 miles, and:

- if included, explain the technical rationale for doing so considering that there would be no resident population on the over-water area and only a negligible transient population present; or
 - if excluded, specifying the actual over-water area taken up by the Delaware River at various distances from the proposed reactor(s) out to 20 miles, the available area at those radial distances, and the corresponding population densities.
- (d) Given the preceding issues and the potential for exceeding the threshold population density criterion, the Applicant should either:

- justify having estimated the population density averaged over any radial distance out to 20 miles for the year 2010 rather than at the time of initial site approval as called for in SRP Section 2.1.3, Subsection III (Review Procedures), Item (5), and Regulatory Position C.4 in RG 4.7; or
 - identify the expected time of initial site approval and update the estimated population density (and associated discussion, tables and/or figures) accordingly.
- (e) Resolution of one or more of the preceding issues may result in the need to revise the population density analyses discussed in SSAR Subsection 2.1.3.6. If the results of any revised analysis exceed the applicable threshold population density criterion of 500 per/sq-mi averaged over any radial distance out to 20 miles, the Applicant should update SSAR Subsection 2.1.3.6 to address the evaluation of alternative sites with lower population densities as called for by SRP Section 2.1.3, Subsection II (Acceptance Criteria), SRP Acceptance Criterion (5) and Regulatory Position C.4 in RG 4.7.

02.01.03-2

Pursuant to 10 CFR 52.17(a)(1)(viii) and based on the requirements in 10 CFR 100.21(h), NUREG-0800, SRP Section 2.1.3, Subsection III (Review Procedures), Item 5 (Population Density) establishes the need for an evaluation of the population density out to a distance of 20 miles from a proposed site to determine whether the density exceeds the 500 persons per square mile (per/sq-mi) guideline given in Regulatory Position C.4 of Regulatory Guide (RG) 4.7.

In determining the population density, Regulatory Position C.4 calls for, among other things, the inclusion of the weighted transient population for those sites where a significant number of people work, reside part-time, or engage in recreational activities. The data presented in Tables 2.1-5 and 2.1-6 of the Site Safety Analysis Report (SSAR) in the Early Site Permit Application for the PSEG Site suggest that a significant number of people work and utilize recreational areas and facilities beyond 10 miles from the proposed site.

Further, SSAR Figure 2.1-22 illustrates cumulative, combined resident and transient population totals as a function of distance from the proposed reactor(s) versus the population total equivalent to the 500 per/sq-mi threshold density. However, neither the discussion in SSAR Subsection 2.1.3.6 nor the population data presented in the tables and figures associated with SSAR Section 2.1.3 allow for a straightforward determination of the transient population counts beyond 10 miles from the reactor(s).

In RAI 02.01.03-1, the Staff raised several fundamental issues regarding the Applicant's determination of the population density averaged over any radial distance out to 20 miles. The Staff has identified additional technical issues pertaining to the transient population component of the total population count to be considered in determining the population density in accordance with the referenced regulatory guidance and, in particular, within the distance range of 10 to 20 miles from the proposed reactor(s). Therefore, the Applicant should:

- provide additional information regarding the transient population in, at least, the 10- to 20-mile distance range where significant population variations are expected, consistent with Part III, Subsection C.I.2.1.3.3 of RG 1.206 (formerly Draft Guide-1145 as cited in SRP Section 2.1.3); and
 - address the following technical issues by updating the population density analysis within 20 miles of the proposed reactor(s) and revising, as appropriate, the discussions under SSAR Section 2.1.3, including any associated current or new tables and figures.
- (a) Employment statistics for several major economic centers between 10 and 50 miles from the proposed PSEG site are listed in SSAR Table 2.1-5. All or a portion of two of these centers lie within the 0- to 20-mile distance range to be considered in determining the population density for the site area. The Wilmington-Newark, DE economic center is located to the north-northwest within a distance range of 10 to 20 miles and is said to employ an estimated 350,700 persons. The Vineland-Millville-Bridgeton, NJ economic center is located to the east between 10 and 30 miles from the site and is said to employ an estimated 61,800 persons.

However, the combined resident populations for the cities of Wilmington and Newark, in New Castle County, Delaware, are more than a factor three less, totaling only about 102,300 persons based on 2010 U.S. Census Bureau (USCB) counts. This suggests a significant influx for the work-related component of the transient population between 10 and 20 miles, for this direction sector at least. Conversely, the combined resident populations for the cities of Vineland, Millville, and Bridgeton, in Cumberland County, New Jersey, total approximately 114,500 persons, again based on 2010 USCB data. This population count is much higher than the associated 2008 employment statistic reported by the Applicant for this economic center, with no clear indication of potential influx or outflow of this work-related component of the transient population.

The Applicant should update the discussions under SSAR Section 2.1.3, including any associated current or new tables or figures, by addressing the following issues for the work-related component of the total transient population, specifically within the 10- to 20-mile distance range:

- Confirm whether and, if so, to what extent employment in the Wilmington-Newark, DE and/or the Vineland-Millville-Bridgeton, NJ economic centers have been accounted for in determining the population density averaged over any radial distance out to 20 miles from the proposed reactor location(s).
- Reconcile the significant difference, as noted, between the combined resident population for Wilmington and Newark, DE versus the employment statistic for this economic center in terms of its relative contribution to the work-related component of the transient population between 10 and 20 miles.
- Reconcile the difference between the employment statistic for the Vineland-Millville-Bridgeton, NJ economic center versus the combined resident population for these cities in terms of its relative contribution to the work-

related component of the transient population, specifically between 10 and 20 miles.

- (b) There are three operating units currently adjacent to the proposed PSEG Site (i.e., two at the Salem Generating Station and one at the Hope Creek Generating Station). The proposed facility may incorporate two additional reactors depending on the design selected. The discussions under SSAR Section 2.1.3 do not appear to address work-related transient populations associated with plant outages and/or other construction activities for the existing or proposed unit(s) or whether such activities may overlap at some point in time such that a significant number of transient workers may be present at and in the immediate vicinity of the site.

Consequently, with regards to the determination of the population density averaged over any radial distance out to 20 miles from the proposed reactor location(s), the Applicant should either:

- explain the rationale for not including any of these activities as part of the work-related component of the transient population and update the discussions under SSAR Section 2.1.3 accordingly; or
- update SSAR Section 2.1.3, including any associated current or new tables or figures, to account for this potential work-related component of the transient population.

- (c) Statistics on visitors to major public recreation areas located between 10 and 50 miles from the proposed PSEG site are listed in SSAR Table 2.1-6. The Bombay Hook National Wildlife Refuge, located to the south-southeast within a distance range of 10 to 20 miles away, reported 270,860 visitors during 2006. The Applicant should update the applicable discussions under SSAR Section 2.1.3, including any associated current or new tables or figures, by addressing the following issues for the recreation-related component of the total transient population within the 10- to 20-mile distance range:

- Clarify what constitutes a “major” public recreation area.
- Confirm whether and explain how visitors to the Bombay Hook National Wildlife Refuge have been (will be) accounted for in determining the population density averaged over any radial distance out to 20 miles from the proposed reactor location(s). If not, justify the rationale for not doing so.
- Identify any other non-major public or private recreation areas between 10 and 20 miles from the proposed PSEG site and, if any, either explain how visitors to such areas will be accounted for in determining the population density averaged over any radial distance out to 20 miles from the proposed reactor location(s), or justify the rationale for not doing so.

- (d) Several other possible contributors to the total transient population do not appear to have been accounted for in the determination of the population density averaged over any radial distance out to 20 miles from the proposed reactor location(s). Based on SSAR Table 2.1-3, these components may include: lodging (e.g., commercial, prisons, or other law enforcement facilities); schools and daycare centers; and medical care facilities.

Consequently, with regards to the determination of the population density, the Applicant should update the applicable discussions under SSAR Section 2.1.3, including any associated current or new tables or figures, to either account for the transient population components related to lodging, schools and daycare centers, and/or medical care facilities, specifically within the 10- to 20-mile distance range, or justify the rationale for not doing so.

- (e) Resolution of one or more of the preceding issues may result in the exceedance of the applicable threshold population density criterion of 500 per/sq-mi averaged over any radial distance out to 20 miles. In such a case, the Applicant should update SSAR Subsection 2.1.3.6 to address the evaluation of alternative sites with lower population densities as called for by SRP Section 2.1.3, Subsection II (Acceptance Criteria), SRP Acceptance Criterion (5) and Regulatory Position C.4 in RG 4.7.