Nuclear Development
244 Chestnut Street, Salem, NJ 08079

PSEG
Power LLC

ND-2012-0043
August 9, 2012

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **PSEG Early Site Permit Application**
Docket No. 52-043
Submittal to Correct Typographical Errors in Responses to Requests for Additional Information and SSAR

References:
1) PSEG Power, LLC letter to USNRC, ND-2012-0031, Submittal of Revision 1 of the Early Site Permit Application for the PSEG Site, dated May 21, 2012

2) PSEG Power, LLC letter to USNRC, ND-2011-0067, PSEG Power, LLC, Response to Request for Additional Information, RAI No. 40, Aircraft Hazards, dated December 14, 2011

3) PSEG Power, LLC letter to USNRC, ND-2012-0027, PSEG Power, LLC, Response to Request for Additional Information, RAI No. 55, Evaluation of Potential Accidents, dated April 23, 2012

The purpose of this letter is to provide errata pages and markups of other editorial changes to the PSEG Site Early Site Permit Application, Revision 1 (Reference 1). The errata pages are provided to correct a typographical error in the value of the U.S. EPR Conditional Core Damage Probability (CCDP) provided in References 2 and 3.

Enclosure 1 contains an errata page to our response for RAI No. 40, Question No. 03.05.01.06-1.

Enclosure 2 contains an errata page to our response for RAI No. 55, Question No. 02.02.03-4.

D079
NRO

Enclosure 4 includes the new regulatory commitment established in this submittal.

If any additional information is needed, please contact David Robillard, PSEG Nuclear Development Licensing Engineer, at (856) 339-7914.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 9th day of August, 2012.

Sincerely,

James Mallon
Early Site Permit Manager
Nuclear Development
PSEG Power, LLC

Enclosure 1: Errata Page to PSEG Letter No. ND-2011-0067
Enclosure 2: Errata Page to PSEG Letter No. ND-2012-0027
Enclosure 3: Proposed Revisions, Part 2 – Site Safety Analysis Report (SSAR), Section 2.2 – Evaluation of Potential Accidents and Subsection 3.1.5.6 – Aircraft Hazards
Enclosure 4: Summary of Regulatory Commitments

cc: USNRC Project Manager, Division of New Reactor Licensing, PSEG Site (w/enclosures)
USNRC Environmental Project Manager, Division of New Reactor Licensing (w/enclosures)
USNRC Region I, Regional Administrator (w/enclosures)

PSEG Letter ND-2012-0043, dated August 9, 2012

ENCLOSURE 1

Errata Page to PSEG Letter No. ND-2011-0067

4. The conditional core damage probability (CCDP) as well as the associated core damage frequency (CDF) for small aircraft impact was formally obtained from each of the reactor technology vendors being considered for the PSEG site. Large aircraft CCDPs were not requested since the analysis of accident probability of occurrence for large aircraft resulted in values that were less than the NUREG-0800 acceptance criterion of 1E-07. The small aircraft impact CCDPs for each of the reactor technologies as well as their associated CDFs are shown in Table RAI-40-6-1. The responses from each of the reactor technology vendors regarding their calculated values of CCDP and CDF will be made available to the NRC for inspection. Note that the response provided by AREVA for the EPR reactor provided discrete CDF values for each aircraft type; small and large. A composite small aircraft impact CDF for the EPR technology was calculated for the PSEG site by summing each of the small aircraft CDFs. From this composite CDF, the EPR's CCDP was cal~~culated by divi~~ding the composite CDF by the value 1.17E-05 identified in SSAR ~~Table 3.6-6~~ which is the small aircraft crash probability per year for the EPR.

Replace with "Table 3.5-6"

Table RAI-40-6-1
Conditional Core Damage Probabilities and Core Damage Frequencies for Small Aircraft Impact

Reactor Technology	CCDP	CDF
AP1000	5.85E-08	2.77 E-13/yr
ABWR	3.18 E-03	2.33 E-08/yr
US-APWR	2.2 E-03	2.2 E-08/yr
U.S. EPR	~~8.80 E-08~~	1.03 E-08/yr

Associated PSEG Site ESP Application Revisions:

SSAR Subsections 2.2.2.7.2 and 3.5.1.6.2 will be updated as specified in Enclosure 2 of this document.

Replace with "8.80E-04"

PSEG Letter ND-2012-0043, dated August 9, 2012

ENCLOSURE 2

Errata Page to PSEG Letter No. ND-2012-0027

are presented in the response to RAI No. 40 (eRAI 6145) and in the table below. The highest reported CCDP is 0.318%. Using a CCDP of 0.318%, the total frequency of core damage due to all explosions near the PSEG site is 7.35 x 10^{-9} core damages per year. Even if the number of shipments of each of the chemicals listed in the table above were equal to the allowable number of trips, each chemical would have a hazard frequency of 1 x 10^{-6} hazards per year. The total hazard frequency of all the chemicals would be 1 x 10^{-5} hazards per year, which would result in a core damage frequency of 3.18 x 10^{-8} core damages per year. This demonstrates that there is a large amount of margin available when the CCDP is applied to the hazard frequency. The conditional release to the public following core damage has not been quantified, but it would further reduce the total frequency of an unacceptable condition.

Conditional core damage probability for each of the proposed reactor technologies for PSEG

Reactor Technology	CCDP
AP1000	5.85E-08
ABWR	3.18E-03
US-APWR	2.2E-03
U.S. EPR	~~8.8E-08~~

Replace with "8.80E-04"

In summary, this analysis is acceptable because the frequency of a radiological release is less than 10^{-6} releases per year and the analysis is conservative. A total core damage frequency due to explosions of 7.35 x 10^{-9} core damages per year is representative and is based on core damage frequency data for small aircraft hazards. This is well below the NUREG-0800 requirements that the frequency of releases to the public is less than 10^{-6} releases per year. In addition, as stated in SSAR Subsection 2.2.3.2.6, there are many conservatisms built into the analysis, including:

- The spill size for each case is the maximum in the range of spill sizes. For instance, a spill of 51,000 gal. is modeled as a spill of 322,000 gal. of chemical since the applicable range is 50,000 gal. to 322,000 gal. (SSAR Table 2.2-12).
- The estimated number of trips of each chemical is high since the estimated ship cargo sizes are biased low.
- Storage conditions for chemicals are selected in order to maximize the release rate, which would maximize the concentration at the PSEG Site. Many chemicals that would typically be stored or transported as liquids are modeled as gases (e.g., propane, methane).

PSEG Letter ND-2012-0043, dated August 9, 2012

ENCLOSURE 3

Proposed Revisions
Part 2 – Site Safety Analysis Report (SSAR)
Section 2.2 – Evaluation of Potential Accidents
and
Subsection 3.5.1.6 – Aircraft Hazards

Marked-up Pages
2.2-20
3.5-1

heat flux from the hydrogen jet fire is negligible (0.05 kW per m^2). The heat flux from a pool fire of the 1,000,000 gal. diesel tank is negligible (0.0497 kW per m^2), which leads to a temperature increase of 3.6°F.

The gasoline truck pool fire (using the current route, see Subsection 2.2.3.2.3 for discussion of changing the gasoline tank location and gasoline truck route) results in a heat load of 0.39 kW per m^2 at a standoff distance of 0.07 mi. The fire lasts a total of 5 minutes. The surface of a concrete wall of a building heats up by 8.2°F as a result of this fire. This is less than the 200°F allowable temperature rise and therefore, the fire is not a hazard to the new plant.
The BLEVE fireball of propane from a vessel on the Delaware River is modeled as being a complete fireball of 5000 tons of propane based on the largest explosion data detailed in Subsection 2.2.3.2.2. The fireball would last for 42 sec. and causes a peak heat load of 22.3 kW/m^2. The surface of a concrete wall of a building heats up by 174°F as a result of this fireball. This is less than the 200°F allowable, however, it is a very high temperature increase and very high heat load. Therefore, further evaluation of the likelihood of a propane vessel BLEVE is provided.

The full 5000 ton fireball analyzed above has a standoff distance of 1.9 mi. for a 5 kW/m^2 heat load. There is 4.2 mi. of vessel route within 1.9 mi. of the PSEG Site. In the MISLE database, there is only one reported instance of a release of more than 322,000 gal. of chemical. A fireball of 322,000 gal. of liquid propane would last 25 sec. and result in a heat load of 6.36 kW/m^2 on the power block. This fireball would increase the wall temperature only 37°F. The probability of a spill of any kind greater than 322,000 gal. is 1.82×10^{-10} spills per vessel mile (Table 2.2-12). The total frequency of a heat load greater than 6.36 kW/m is 7.644×10^{-10} hazards per trip. This is less than the hazard rate for a propane vapor cloud explosion; therefore the vapor cloud hazard is bounding over the BLEVE fireball.

Based on the frequency of BLEVEs in general a propane BLEVE is unlikely to occur. The largest spill in the MISLE database is the Bow Mariner. As detailed above, the mass of chemical that exploded in the Bow Mariner incident is estimated to be 116 tons. From the MISLE database, there have been no other explosions or fires within an order of magnitude of 5000 tons. Therefore, the frequency of a fireball on the order of 5000 tons of chemical is very low.

2.2.3.2.6 Conclusions

Revise to "10^{-6}"

Based on the analyses presented in Subsections 2.2.3.2.1 through 2.2.3.2.5, there are no chemical hazards that are design-basis events, provided:

- A review of the supporting calculations for these sections will be performed following technology selection.
- The HCGS 6000 gal. tank of gasoline and the delivery truck route to that tank, will be relocated.
- Chemicals identified for toxicity and control room habitability analysis will be performed for the COLA.

This conclusion is reached using the acceptance ~~criterion~~ for a probabilistic analysis. This analysis determines that the frequency is less than ~~10-6~~ hazards per year for each chemical. The total aggregated frequency of an explosion, ~~both due~~ to solid explosives and vapor cloud explosions, that adversely affects the PSEG Site is 2.31×10^{-6} hazards per year which is greater

CHAPTER 3

DESIGN OF STRUCTURES, COMPONENTS, EQUIPMENT, AND SYSTEMS

3.5.1.6 Aircraft Hazards

Airports and airways near the PSEG Site are discussed in Subsection 2.2.2 and shown in Figure 2.2-2. Aircraft hazards related to these airports and airways are evaluated in this section in accordance with NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plant: LWR Edition*, to show that the hazards do not meet the NUREG-0800 Section 3.5.1.6 criteria and are not incorporated into the plant design basis.

3.5.1.6.1 Airports

Plant-to-airport distance (D) is evaluated for each airport or helipad against its projected annual number of operations for distances between five and ten statute miles and distances greater than ten statute miles to determine whether the hazard probability requires further evaluation.

There are eight airports and helipads within five to ten miles of the new plant. Additionally, the Salem/Hope Creek helipad is located within five miles of the new plant and exists for corporate and emergency use. These facilities are listed in Table 2.2-11. The annual number of operations for each of these is described as sporadic. Due to the infrequent nature of these operations, these facilities do not present a safety hazard to the PSEG Site. There are no airports within five miles of the PSEG Site.

Table 2.2-11 lists six airports ten to thirty miles from the new plant along with the projected number of annual operations for the year 2025, where available. The hazard probability for these airports is considered acceptable if the projected annual number of operation is less than 1000 D^2. The screening limits are listed in Table 3.5-1. None of these airports require additional hazard probability evaluations, as the projected number of operations for each airport does not exceed the respective screening limit.

3.5.1.6.2 Military Airports and Routes

Replace with
"3.5.1.6.3"

New Castle County Airport is the closest facility with military operations (Air National Guard), and it is located 14.5 mi. northeast of the site. The closest dedicated military facility is Dover Air Force Base, located 23.8 miles from the site. The method of calculating hazard probabilities of these facilities are discussed in Subsection ~~3.5.1.6.1.~~

The closest military training routes (MTRs) are six slow speed low-altitude MTRs (SR800, SR805, SR844, SR845, SR846, and SR847). These MTRs are used by the Delaware Air National Guard (DANG). The nearest edge of these MTRs is located within approximately five statute miles of the PSEG Site (see Table 3.5-7). The annual traffic for these six MTRs is provided by the DANG and shown in Table 3.5-8. Military training route VR1709 is located 37 miles from the plant. The flight data for this route is not available from the Federal Aviation Administration (FAA) to verify that the number of flights does not exceed 1000 per year.

However, the distance from the PSEG Site to the nearest edge of any military base and MTR VR1709 significantly exceeds the five statute miles stated in the NUREG-0800, Section 3.5.1.6,

PSEG Letter ND-2012-0043, dated August 9, 2012

ENCLOSURE 4

Summary of Regulatory Commitments

ENCLOSURE 4

SUMMARY OF REGULATORY COMMITMENTS

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
PSEG will revise SSAR Subsections 2.2.3.2.6 and 3.5.1.6.2 to incorporate the changes in Enclosure 3.	This revision will be included in a future update of the PSEG ESP application.	Yes	No