Nuclear Development
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PSEG
Power LLC

ND-2012-0042
August 7, 2012

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

Subject: **PSEG Early Site Permit Application**
Docket No. 52-043
Response to Request for Additional Information, RAI No. 62, Gaseous Waste Management System

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

2) RAI No. 62, SRP Section: 11.03 – Gaseous Waste Management System, dated July 17, 2012 (eRAI 6533)

The purpose of this letter is to provide a response to the request for additional information (RAI) provided in Reference 2 above. This RAI addresses the Gaseous Waste Management System, as described in Subsection 11.3.3 of the Site Safety Analysis Report (SSAR), as submitted in Part 2 of the PSEG Site Early Site Permit Application, Revision 1.

Enclosure 1 provides our response for RAI No. 62, Question No. 11.03-9. Our response to RAI No. 62, Question No. 11.03-9 will result in a revision to the SSAR. Enclosure 2 contains the proposed revisions of the SSAR. Enclosure 3 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.

D079
NRO

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 7th day of August, 2012.

Sincerely,

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

Enclosure 1: Response to NRC Request for Additional Information, RAI No. 62, Question No. 11.03-9, SRP Section: 11.03 – Gaseous Waste Management System
Enclosure 2: Proposed Revisions Part 2 – Site Safety Analysis Report (SSAR), Chapter 11 – Radioactive Waste Management
Enclosure 3: 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-2012-0042, dated August 7, 2012

ENCLOSURE 1

Response to RAI No. 62

Question No. 11.03-9

Response to RAI No. 62, Question 11.03-9:

In Reference 2, the NRC staff asked PSEG for information regarding the Gaseous Waste Management System, as described in Subsection 11.3.3 of the Site Safety Analysis Report. The specific request was:

> *The staff cited the following requirements in RAI 11 (eRAI 5424) (ML110470363), and also in RAI 28 (eRAI 5692) (ML11136A221), which was a follow-up of RAI 11:*
>
> > *40 CFR 190 and 10 CFR 20.1301(e) require a summation of all liquid and gaseous effluent and direct doses from all fuel facilities on site to ensure compliance with the EPA total site dose requirements.*
>
> *In review of SSAR, Table 11.3-9, the staff has determined that direct doses are not included anywhere in this table to show compliance with 40 CFR 190 and 10 CFR 20.1301(e).*
>
> *The staff would like to know if the required information has been provided elsewhere in the SSAR, and if so, where. If not, the staff requests that the applicant include direct radiation doses in Table 11.3-9 as part of compliance with 40 CFR 190 and 10 CFR 20.1301(e), and provide a mark-up of the SSAR changes with the response, or justify why direct doses from all fuel facilities on site do not need to be considered.*

PSEG Response to NRC RAI:

The direct radiation dose to the public, for each reactor technology, is discussed in their associated Design Control Document (DCD). The direct doses for the AP1000 and US-APWR are negligible. The direct dose for the U.S. EPR (<1 mrem/year) is for a location at the exclusion area boundary of 0.5 miles. The direct dose for the ABWR (<2.5 mrem/year) is for a Maximally Exposed Individual (MEI) outside of the controlled area. The doses associated with these two locations are assumed to be applicable to the 40 CFR Part 190 MEI dose analysis at the PSEG Site. This assumption is acceptable because the 40 CFR Part 190 MEI at the PSEG Site is located at the nearest residence (2.8 miles from the site). The nearest residence is farther away from the site than the direct dose locations for the ABWR and U.S. EPR, and the specified direct dose values for these reactor technologies bound the associated direct dose values at the nearest residence.

The direct dose for the ABWR is greater than the direct doses for the other technologies and is therefore used as the bounding value for the PSEG Site. Note that a dual unit plant is also considered at the PSEG Site, but this scenario is limited to only using two AP1000 units. Since the direct dose for a single AP1000 unit is negligible, the direct dose for a single ABWR unit is greater than the direct dose for two AP1000 units and hence is a bounding value for all reactor technologies considered for the PSEG site.

Note that the direct dose for the ABWR, 2.5 mrem/year, is based on a limit with respect to minimal plant shielding design and is a highly conservative estimate for direct radiation at the PSEG Site. This conservative shielding assumption is why the assumed 2.5 mrem/year MEI value is much greater than the actual measured total dose due to operation of the existing Salem and Hope Creek units. Table RAI-062-1 provides a comparison of the direct, liquid and gaseous dose contributions assumed for the PSEG site to the 40 CFR 190 Criteria.

Table RAI-062-1: Comparison of Maximally Exposed Individual (MEI) Doses with 40 CFR 190 Criteria

Dose Type	New Unit(s)[g]				Existing Units[g]	Total[f]	Limit
	Gaseous Single Unit	Gaseous Dual Unit	Liquid Dual Unit[e]	Direct Radiation[h]			
Total Body (mrem/yr)	2.00E-01[a]	4.00E-01	3.14E-02	2.50E+00	5.36E-03	2.94E+00	25
Thyroid (mrem/yr)	2.13E+00[b]	4.26E+00	8.30E-02	2.50E+00	2.04E-02	6.86E+00	75
Other Organ – Bone (mrem/yr)	5.49E-01[c]	1.10E+00	3.54E-01	2.50E+00	2.04E-02[d]	3.97E+00	25

a) Gaseous MEI for this case is a child. Value is the sum of child total body doses from meat, milk, vegetable, and inhalation exposure plus the ground plane and plume exposure from SSAR Table 11.3-7.
b) Gaseous MEI for this case is an infant. Value is the sum of infant thyroid doses from milk and inhalation exposure plus the ground plane and plume exposure from SSAR Table 11.3-7.
c) Gaseous MEI for this case is a child. Value is the sum of child bone doses from meat, milk, vegetable, and inhalation exposure plus the ground plane and plume exposure from Table SSAR 11.3-7.
d) Doses to other organs are less than the dose to the thyroid, so the thyroid dose is used.
e) Liquid dose contributions are obtained from SSAR Table 11.2-7.
f) Total doses are the sum of the values from the direct radiation, gaseous dual unit, liquid dual unit, and existing units.
g) The doses from the new units are much higher than from the existing units because doses from the existing units are based on actual measurements, compared to the conservatively calculated, bounding PPE theoretical doses from the new unit(s).
h) The bounding direct radiation dose at the PSEG Site is for the plant that is based on a single ABWR unit. Note that a single ABWR unit plant bounds the dual AP1000 unit plant.

Associated PSEG Site ESP Application Revisions:

SSAR Table 11.3-9 will be updated as specified in Enclosure 2 of this document. In addition, associated text changes are made to SSAR Subsections 11.2.3.2, 11.3.3.2 and SSAR Table 11.2-7, as specified in Enclosure 2 of this document.

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ENCLOSURE 2

Proposed Revisions

Part 2 – Site Safety Analysis Report (SSAR)
Chapter 11 – Radioactive Waste Management

Marked-up Pages
11.2-2
11.2-13
11.3-2
11.3-16

well below the limits specified in 10 CFR 20, Appendix B, Table 2, Column 2, and the sum of the ECL fractions is less than one, as shown in Table 11.2-2. Note that the site concentrations given in Table 11.2-2 include releases from Salem Generating Station (SGS), Hope Creek Generating Station (HCGS), and a new dual unit plant.

11.2.3.2 Liquid Pathway Doses

Radiological impacts to individuals and collective population groups are examined in this section, and compared to federal limits. The LADTAP II code is used to calculate doses to the MEI for the liquid pathway. The results of the calculation are shown in Tables 11.2-5 and 11.2-9. These results are based on the inputs found in Tables 11.2-1, 11.2-3, and 11.2-4. The results in Table 11.2-5 are given in terms of total body dose, thyroid dose, and maximum organ dose for each age group. The results in Table 11.2-9 summarize doses for all organs and age groups from all pathways. Doses to infants are always zero because they are not directly exposed to the conventional pathways (i.e., fish and invertebrate ingestion), and other pathways such as ingestion of a mother's breast milk are not modeled in the LADTAP II computer code.

direct and

Compliance with 10 CFR 50, Appendix I is shown in Table 11.2-6 on a per unit basis. Comparison to 40 CFR 190 criteria requires that gaseous effluent doses also be considered. Liquid effluent dose contributions are listed in Table 11.2-7, while compliance with 40 CFR 190 (including both liquid and gaseous dose contributions) is shown in Table 11.3-9. Comparison to 40 CFR 190 is on a site-wide basis, including all SGS, HCGS, and all potential units at the new plant. Since 40 CFR 190 is more conservative than 10 CFR 20.1301, compliance with 40 CFR 190 demonstrates compliance with 10 CFR 20.1301. Collective doses from the new plant to the population within 50 miles (mi.) of the PSEG Site are shown in Table 11.2-8, on a per unit basis.

direct.

RAI No. 62, Question No. 11.03-9

RAI No. 62, Question No. 11.03-9

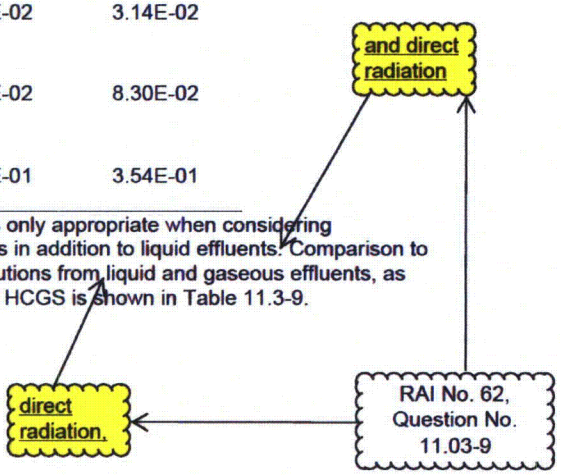
11.2.3.3 References

11.2.3-1 PSEG Nuclear LLC, "2008 Annual Radioactive Effluent Release Report for the Salem and Hope Creek Generating Stations," 2009.

Table 11.2-7
Liquid Contributions to Maximally Exposed Individual Doses with Regards to 40 CFR 190 Criteria[a]

	New Unit(s)	
Dose Type	**Single Unit**	**Dual Unit**
Total Body (mrem/yr)	1.57E-02	3.14E-02
Thyroid (mrem/yr)	4.15E-02	8.30E-02
Other Organ – GI-LLI (mrem/yr)	1.77E-01	3.54E-01

a) Comparison to 40 CFR 190 limits is only appropriate when considering contributions from gaseous effluents in addition to liquid effluents. Comparison to 40 CFR 190 limits including contributions from liquid and gaseous effluents, as well as contributions from SGS and HCGS is shown in Table 11.3-9.



account for the possibility of dual units. In order to determine if these releases meet ECLs of 10 CFR 20, Appendix B, Table 2, Column 1, they must be converted to concentrations. To do this, the release rates are multiplied by the maximum χ/Q value at the site boundary (as found in Table 11.3-1), and then converted to units of µCi/ml. The effluent concentrations are well below the limits specified in 10 CFR 20, Appendix B, Table 2, Column 1, as shown in Table 11.3-6. Furthermore, the sum of the concentration fractions of the ECLs is less than one. Site concentrations given in Table 11.3-6 include releases from SGS, HCGS, and a new dual unit plant.

11.3.3.2 Gaseous Pathway Doses

The GASPAR II code is used to calculate doses to the MEI for each pathway at various locations. The results of this calculation are shown in Table 11.3-7. These results are based on the inputs found in Tables 11.3-1 to 11.3-5. Compliance with 10 CFR 50, Appendix I is shown in Table 11.3-8 on a per unit basis. Gaseous effluent doses are calculated at the site-boundary assuming continuous occupancy for the duration of a year. Compliance with 40 CFR 190 (including both liquid and gaseous dose contributions) is shown in Table 11.3-9. Comparison to 40 CFR 190 is on a site-wide basis, including all SGS, HCGS, and all potential units at the new plant. Doses from inhalation, ground plane, and plume exposure are considered at the nearest residence. Since 40 CFR 190 is more conservative than 10 CFR 20.1301, compliance with 40 CFR 190 demonstrates compliance with 10 CFR 20.1301. The doses from the new units are much higher than from the existing units because doses from the existing units are based on actual measurements, compared to the conservatively calculated, bounding PPE theoretical doses from the new units. Collective doses from new units to the population within 50 mi. of the PSEG Site are shown in Table 11.3-10 and Table 11.3-11.

11.3.3.3 References

11.3.3-1 PSEG Nuclear LLC, "2008 Annual Radioactive Effluent Release Report for the Salem and Hope Creek Generating Stations," 2009.

direct radiation.

RAI No. 62, Question No. 11.03-9

Table 11.3-9
Comparison of Maximally Exposed Individual Doses with 40 CFR 190 Criteria

RAI No. 62, Question No. 11.03-9

Dose Type	New Unit(s)[g] Gaseous Single Unit	Gaseous Dual Unit	Liquid Dual Unit[e]	Existing Units[g]	Total[f]	Limit
Total Body (mrem/yr)	2.00E-01[a]	4.00E-01	3.14E-02	5.36E-03	~~4.36E-01~~ 2.94E+00	25
Thyroid (mrem/yr)	2.13E+00[b]	4.26E+00	8.30E-02	2.04E-02	~~4.36E+00~~ 6.86E+00	75
Other Organ – Bone (mrem/yr)	5.49E-01[c]	1.10E+00	3.54E-01	2.04E-02[d]	~~1.47E+00~~ 3.97E+00	25
Direct Radiation[h] 2.50E+00	2.50E+00	2.50E+00				

a) Gaseous MEI for this case is a child. Value is the sum of child total body doses from meat, milk, vegetable, and inhalation exposure plus the ground plane and plume exposure from Table 11.3-7.
b) Gaseous MEI for this case is an infant. Value is the sum of infant thyroid doses from milk and inhalation exposure plus the ground plane and plume exposure from Table 11.3-7.
c) Gaseous MEI for this case is a child. Value is the sum of child bone doses from meat, milk, vegetable, and inhalation exposure plus the ground plane and plume exposure from Table 11.3-7.
d) Doses to other organs are less than the dose to the thyroid, so the thyroid dose is used.
e) Liquid dose contributions are obtained from Table 11.2-7.
f) Total doses are the sum of the values from the gaseous dual unit, liquid dual unit, and existing units.
g) The doses from the new units are much higher than from the existing units because doses from the existing units are based on actual measurements, compared to the conservatively calculated, bounding PPE theoretical doses from the new unit(s). direct radiation.

h) The bounding direct radiation dose at the PSEG Site is for the plant that is based on a single ABWR unit. Note that a single ABWR unit plant bounds the dual AP1000 unit plant.

RAI No. 62, Question No. 11.03-9

Rev. 1

PSEG Letter ND-2012-0042, dated August 7, 2012

ENCLOSURE 3

Summary of Regulatory Commitments

ENCLOSURE 3

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 11.2.3.2, 11.3.3.2, and SSAR Tables 11.2-7 and 11.3-9 to incorporate the changes in Enclosure 2 in response to NRC RAI 62, Question 11.03-9.	This revision will be included in a future update of the PSEG ESP application.	Yes	No