



ND-2013-0012
May 13, 2013

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

Subject: **PSEG Early Site Permit Application**
Docket No. 52-043
Supplemental Response to Request for Additional Information, No. 18,
Gaseous Waste Management System

- References:
- 1) PSEG Power, LLC Letter No. ND-2013-0006 to USNRC, Submittal of Revision 2 of the Early Site Permit Application for the PSEG Site, dated March 27, 2013
 - 2) RAI No. 18, SRP Section: 11.03 - Gaseous Waste Management System, dated March 14, 2011 (eRAI 5466)
 - 3) PSEG Power, LLC Letter No. ND-2011-0018 to USNRC, Response to Request for Additional Information, No. 18, Gaseous Waste Management System, dated April 12, 2011
 - 4) PSEG Power, LLC letter to USNRC, ND-2012-0023, Response to Request for Additional Information, RAI No. 46, Gaseous Waste Management System, dated March 29, 2012
 - 5) PSEG Power, LLC letter to USNRC, ND-2012-0042, Response to Request for Additional Information, RAI No. 62, Gaseous Waste Management System, dated August 7, 2012
 - 6) PSEG Power, LLC letter to USNRC, ND-2013-0001, Supplemental Response to Request for Additional Information, RAI No. 46 and No. 62, Gaseous Waste Management System, dated January 11, 2013

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The purpose of this letter is to provide additional information associated with the request for additional information (RAI) identified in Reference 2 above. PSEG's response to RAI No. 18 (Reference 3) noted that revisions to sections and tables in the Environmental Report (ER) were required to update all applicable portions of the PSEG Site ESP Application. Mark-ups of the affected pages of the ER were not provided in the PSEG response to RAI No. 18 and the associated revisions to the ER were subsequently not included in the PSEG Site ESP Application provided in Reference 1.

Enclosure 1 provides the proposed revisions to ER Subsections 5.4.1, 5.4.3, and 7.2.3, and ER Tables 5.4-1, 5.4-8, 5.4-9, 5.4-10, 5.4-12, and 5.4-13 associated with RAI No. 18 and follow-up RAI Nos. 46 and 62 (References 4, 5 and 6). The affected ER sections and tables contain values regarding the gaseous effluent release source term and associated doses to members of the public and biota. The doses to biota are provided in ER Table 5.4-13 and are not reported in the SSAR.

Enclosure 2 provides a proposed revision to SSAR Table 11.3-5. During preparation of this supplemental response a rounding error was identified for three isotopes listed on the gaseous release source terms table. The error is typographical in nature and does not impact any associated calculations or output tables. ER Table 5.4-1 is similarly affected and the associated update is provided in Enclosure 1.

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 13th day of May, 2013.

Sincerely,



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

- Enclosure 1: Proposed revisions, Part 3 – Environmental Report, Subsections 5.4.1, 5.4.3, and 7.2.3
Enclosure 2: Proposed revisions, Part 2 – Site Safety Analysis Report, Subsection 11.3

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)
Oak Ridge National Laboratory (w/enclosures)

PSEG Letter ND-2013-0012, dated May 13, 2013

ENCLOSURE 1

Proposed Revisions, Part 3 – Environmental Report

Marked-up Pages

5.4-2

5.4-3

5.4-7

5.4-9

5.4-10

5.4-19 through 5.4-22

5.4-24

5.4-25

7.2-5

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Liquid effluent activity releases are given in Table 5.4-2. Values for average annual liquid effluent releases from a new unit are taken from SSAR Table 1.3-8, and multiplied by two to account for the possibility of dual units.

5.4.1.2 Gaseous Pathways

The new plant releases gaseous effluents to the atmosphere. The NRC endorsed GASPAR II computer code is used to calculate the doses to off-site receptors due to postulated gaseous effluents released from the new plant. This code uses radiological exposure models, as described in RG 1.109 and RG 1.111, to determine the doses resulting from radioactive releases in gaseous effluent. The gaseous exposure pathways modeled in GASPAR II are:

- External exposure to airborne activity in the plume
- External exposure to deposited activity on the ground
- Inhalation of airborne activity in the plume
- Ingestion of contaminated agricultural products

MEI locations and corresponding atmospheric dispersion factors (γ/Q values) and ground deposition factors (D/Q values) are listed in Table 5.4-5. Annual agricultural product consumption rates are listed in Table 5.4-6. Total agricultural production, as shown in Table 5.4-7, is assumed to be the maximum consumption for each agricultural product multiplied by the projected population within 50 mi. of the PSEG Site. This population projection is given in Table 2.5-7 for the year 2081, along with the population distribution by distance from the PSEG Site. Based on population projections, the population (and the accompanying maximum agricultural consumption estimate) for 2081 is bounding.

Gaseous release source terms are given in Table 5.4-1. Values for average annual gaseous effluent releases from a new unit are taken from SSAR Table 1.3-7, and multiplied by two to account for the possibility of dual units.

5.4.1.3 Direct Radiation from the New Plant

Doses from SGS and HCGS due to direct radiation are measured using TLDs located around the site. The measured values are comparable to the preoperational background radiation data (Reference 5.4-2). This data indicates that the sources of direct radiation from SGS and HCGS are shielded and do not contribute significantly to the radiation levels at the site boundary.

Per RAI 62, replace with:

"The contribution to MEI doses from direct radiation from a new unit are listed in Table 5.4-10. The values are taken from SSAR Table 11.3-9."

and are less than 1 mrem/year at the site boundary. Some plants [mostly boiling water reactors (BWRs)] do not have completely shielded secondary systems and may contribute some measurable off-site dose."

The NRC concludes that the direct radiation from normal operation results in "small contributions at site boundaries" (NUREG-1437). ~~Direct dose contribution from the new plant is~~

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Remove per RAI 62.

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negligible because the advanced reactor designs being considered provide shielding that is at least as effective as existing light water reactors.

5.4.2 RADIATION DOSES TO MEMBERS OF THE PUBLIC

5.4.2.1 Liquid Pathway Doses

The LADTAP II computer code is used to calculate doses to the MEI for the liquid pathway. The results of the calculation are shown in Table 5.4-4. These results are based on the inputs found in Tables 5.4-2 and 5.4-3. Note that the amount of near-field dilution between the radwaste system and the discharge point at the receiving water body (Delaware River) is based on the NUREG-0133, *Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants*, 1978, assumption that the blowdown rate (cfs) multiplied by the dilution factor is less than or equal to 1000 cfs. The minimum (most conservative) blowdown rate for the new plant is 45 cfs (20,000 gpm) and therefore the dilution is equal to 20.

5.4.2.2 Gaseous Pathway Doses

The GASPAR II computer code is used to calculate doses to the MEI for each pathway at various locations. The results of this calculation are shown in Table 5.4-8. These results are based on the inputs found in Table 5.4-1, Tables 5.4-5 to 5.4-7, and SSAR Figure 2.1-20.

5.4.3 IMPACTS TO MEMBERS OF

Per RAI 18, replace with:

Radiological impacts to individuals and subsection and compared to federal limits pathways are considered.

"Gaseous effluent doses are calculated at the site boundary assuming continuous occupancy for the duration of a year."

Compliance with the 10 CFR 50, Appendix I, dose limits is shown in Table 5.4-9. These dose limits are on a per unit basis. An occupancy factor of 0.228 is used, corresponding to an occupancy of 2000 hr/yr. Application of the occupancy factor is reasonable given the remoteness of the area outside the site boundary, the difficulty in reaching, and the limited activities that could be undertaken in the area (i.e., hunting and fishing).

Compliance with 40 CFR 190 is shown in Table 5.4-10. These dose limits are on a site-wide basis, and consider doses from SGS, HCGS, and the new plant. Dose values from SGS and HCGS are obtained from the 2008 RERR for SGS and HCGS (Reference 5.4-2). Releases from 2008 are considered to be representative because the releases do not vary significantly from 2006 and 2007 releases. In addition any small increase in power dependent radiation levels due to the implementation of Hope Creek's Extended Power Uprate is included in the 2008 data. Doses from inhalation, ground deposition, and plume exposure are considered at the nearest residence. As 40 CFR 190, *Environment Radiation Protection Standards for Nuclear Power Operations*, is more conservative than 10 CFR 20.1301, compliance with 40 CFR 190 demonstrates compliance with 10 CFR 20.1301.

Collective doses (per unit) from a new plant to the population within 50 mi. of the PSEG Site are shown in Table 5.4-11 and Table 5.4-12.

Per RAI 62, add "direct radiation, ".

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**Table 5.4-1 (Sheet 1 of 4)
Gaseous Release Source Terms**

Isotope ^(b,c)	New Unit(s)	
	Single Unit ^(a) (Ci/yr)	Dual Unit (Ci/yr)
Ag-110m	2.00E-06	4.00E-06
Ar-41	3.40E+01	6.80E+01
Ba-140	2.70E-02	5.41E-02
C-14	1.89E+01	3.78E+01
Ce-141	9.19E-03	1.84E-02
Ce-144	1.89E-05	3.78E-05
Co-57	8.20E-06	1.64E-05
Co-58	2.30E-02	4.60E-02
Co-60	1.30E-02	2.59E-02
Cr-51	3.51E-02	7.03E-02
Cs-134	6.22E-03	1.24E-02
Cs-136	5.95E-04	1.19E-03
Cs-137	9.46E-03	1.89E-02
Cs-138	1.70E-04	3.41E-04
Cu-64	1.00E-02	2.00E-02
Fe-55	6.49E-03	1.30E-02
Fe-59	8.11E-04	1.62E-03
H-3	3.5E+02	7.0E+02
I-131	2.60E-01	5.19E-01
I-132	2.19E+00	4.38E+00

Replace with "2.59E-01"
per RAI 18 (See SSAR
Table 1.3-7).

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**Table 5.4-1 (Sheet 3 of 4)
Gaseous Release Source Terms**

Isotope ^(b,c)	New Unit(s)	
	Single Unit ^(a)	Dual Unit
	(Ci/yr)	(Ci/yr)
Sb-124	1.81E-04	3.62E-04
Sb-125	6.10E-05	1.22E-04
Sr-89	5.68E-03	1.14E-02
Sr-90	1.20E-03	2.40E-03
Sr-91	1.00E-03	2.00E-03
Sr-92	7.84E-04	1.57E-03
Tc-99m	2.97E-04	5.95E-04
Te-129m	2.19E-04	4.38E-04
Te-131m	7.57E-05	1.51E-04
Te-132	1.89E-05	3.78E-05
W-187	1.89E-04	3.78E-04
Xe-131m	2.70E+03	5.40E+03
Xe-133	7.20E+03	1.44E+04
Xe-133m	1.70E+02	3.40E+02
Xe-135	1.20E+03	2.40E+03
Xe-135m	4.05E+02	8.11E+02
Xe-137	5.14E+02	1.03E+03
Xe-138	4.32E+02	8.65E+02
Y-90	4.60E-05	9.19E-05
Y-91	2.41E-04	4.81E-04
Y-92	6.22E-04	1.24E-03

Replace with "4.59E-05" per
RAI 18 (See SSAR Table
1.3-7).

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**Table 5.4-1 (Sheet 4 of 4)
Gaseous Release Source Terms**

	Isotope ^(b,c)	New Unit(s)	
		Single Unit ^(a) (Ci/yr)	Dual Unit (Ci/yr)
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;"> Replace with "1.59E-03" per RAI 18 (See SSAR Table 1.3-7). </div>	Y-93	1.11E-03	2.22E-03
	Zn-65	1.11E-02	2.22E-02
	Zr-95	<div style="border: 1px solid black; border-radius: 15px; padding: 2px; display: inline-block;">1.60E-03</div>	3.19E-03
	Total	1.78E+04	3.56E+04

- a) Single unit is the PPE value from SSAR Table 1.3-7, and is included for single unit analysis throughout the section.
- b) Radionuclides Kr-90 and Xe-139 are short lived and will decay prior to release to the environment and are therefore, not included in this table.
- c) The emissions from Rh-103m, Rh-106, and Ba-137m are attributed to their parent radionuclides and therefore, are not included in this table.

Replace with Insert
A-1 per RAI 18 (See
SSAR Table 11.3-7
Sheet 1 of 2).

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**Table 5.4-8 (Sheet 1 of 2)
Doses to MEIs from Gaseous Effluent Releases**

MEI Location	Pathway	MEI	Dose per Unit (mrem/yr)			
			T. Body	GI Tract	Bone	Liver
Nearest Meat Animal	Meat	Adult	2.63E-03	3.00E-03	1.12E-02	2.75E-03
		Teen	2.10E-03	2.86E-03	0.42E-03	2.25E-03
		Child	3.75E-03	4.07E-03	1.76E-02	3.05E-03
Nearest Milk-Producing animals (Goat)	Milk	Adult	7.45E-03	3.02E-03	1.68E-02	0.11E-03
		Teen	0.06E-03	6.40E-03	3.03E-02	1.56E-02
		Child	1.70E-02	1.34E-02	7.34E-02	2.06E-02
		Infant	3.08E-02	2.64E-02	1.37E-01	5.88E-02
Nearest Residence	Ground Plane		1.53E-02	1.53E-02	1.53E-02	1.53E-02
	Plume		1.00E-01	1.00E-01	1.00E-01	1.00E-01
	Inhalation	Adult	2.14E-03	2.35E-03	5.03E-04	2.44E-03
		Teen	2.20E-03	2.43E-03	6.52E-04	2.64E-03
		Child	2.00E-03	2.03E-03	8.35E-04	2.38E-03
		Infant	1.18E-03	1.15E-03	5.33E-04	1.58E-03
Nearest Vegetable Garden	Vegetable	Adult	0.37E-03	0.48E-03	4.23E-02	0.02E-03
		Teen	1.33E-02	1.35E-02	6.54E-02	1.50E-02
		Child	2.82E-02	2.71E-02	1.52E-01	3.16E-02
Nearest Site Boundary	Ground Plane		6.55E-01	6.55E-01	6.55E-01	6.55E-01
	Plume		4.18E+00	4.18E+00	4.18E+00	4.18E+00
	Inhalation	Adult	0.03E-02	1.01E-01	2.41E-02	1.04E-01
		Teen	0.31E-02	1.04E-01	3.11E-02	1.13E-01
		Child	8.44E-02	8.62E-02	3.07E-02	1.02E-01
		Infant	4.07E-02	4.85E-02	2.51E-02	6.83E-02

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Replace with Insert
A-2 per RAI 18 (See
SSAR Table 11.3-7
Sheet 2 of 2).

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**Table 5.4-8 (Sheet 2 of 2)
Doses to MEIs from Gaseous Effluent Releases**

MEI Location	Pathway	MEI	Dose per Unit (mrem/yr)			
			Kidney	Thyroid	Lung	Skin
Nearest Meat Animal	Meat	Adult	2.59E-03	9.50E-03	2.41E-03	2.38E-03
		Teen	2.12E-03	7.12E-03	1.99E-03	1.96E-03
		Child	3.78E-03	1.14E-02	3.62E-03	3.59E-03
Nearest Milk-Producing animals (Goat)	Milk	Adult	6.45E-03	2.50E-01	3.97E-03	3.44E-03
		Teen	1.10E-02	3.97E-01	6.82E-03	5.75E-03
		Child	2.16E-02	7.03E-01	1.46E-02	1.30E-02
		Infant	3.99E-02	1.02E+00	2.86E-02	2.57E-02
Nearest Residence	Ground Plane		1.53E-02	1.53E-02	1.53E-02	1.80E-02
			1.00E-01	1.00E-01	1.07E-01	6.10E-01
	Inhalation	Adult	2.68E-03	5.78E-02	3.08E-03	1.01E-03
		Teen	2.08E-03	7.51E-02	3.71E-03	1.03E-03
		Child	2.67E-03	9.23E-02	3.10E-03	1.70E-03
		Infant	1.69E-03	8.36E-02	2.10E-03	9.80E-04
Nearest Vegetable Garden	Vegetable	Adult	0.00E-03	1.71E-01	7.50E-03	7.30E-03
		Teen	1.35E-02	2.15E-01	1.16E-02	1.12E-02
		Child	2.91E-02	4.06E-01	2.60E-02	2.55E-02
Nearest Site Boundary	Ground Plane		6.55E-01	6.55E-01	6.55E-01	7.60E-01
			4.18E+00	4.18E+00	4.47E+00	2.54E+01
	Inhalation	Adult	1.15E-01	2.61E+00	1.38E-01	7.97E-02
		Teen	1.28E-01	3.40E+00	1.69E-01	8.04E-02
		Child	1.15E-01	4.18E+00	1.45E-01	7.10E-02
		Infant	6.93E-02	3.79E+00	9.68E-02	4.09E-02

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**Table 5.4-9
Comparison of Annual Maximally Exposed Individual Doses
with 10 CFR 50, Appendix I Criteria**

Remove columns per RAI 18 (See SSAR Table 11.3-8).

Add superscript (a) per RAI 18 (See SSAR Table 11.3-8).

Replace values per RAI 18 (See SSAR Table 11.3-8).

Type of Dose	Annual Dose		Single New Unit	Limit
	Continuous Occupancy ^(a)	Scaling Factor ^(a)		
Liquid Effluent				
Total Body (mrem)			0.02	3
Maximum Organ – GI-LLI (mrem)			0.18	10
Gaseous Effluent				
Gamma Air (mrad)	6.45	0.228	1.47 6.10	10
Beta Air (mrad)	30.2	0.228	6.89 11.0	20
Total Body (mrem)	4.84	0.228	1.10 4.62	5
Skin (mrem)	25.4	0.228	5.79 12.2	15
Iodines and Particulates (Gaseous Effluents)				
Maximum Organ – Thyroid (mrem)	7.18	0.228	1.64 7.22	15

GI-LLI = gastrointestinal-lining of lower intestine

a) Gaseous doses are scaled down to account for an occupancy factor of 0.228.

Per RAI 18 (See SSAR Table 11.3-8), replace with:

"Annual gaseous effluent doses are based on the member of the public that is situated on the nearest site boundary for the entire duration of a year."

Add Insert B (new column)
per RAI 62 (See SSAR
Table 11.3-9).

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Per RAI 18 (See SSAR
Table 11.3-9), replace with:
4.00E-01 2.93E+00

4.26E+00 6.84E+00

1.10E+00 3.95E+00

**Table 5.4-10
Comparison of Maximally Exposed Individual Doses with 40 CFR 19**

	Type of Dose	Liquid	Gaseous	Total	Limit
Dual New Units	Total Body (mrem/yr)	3.14E-02 ^(a)	3.32E-04 ^(d)	3.63E-04	-
	Thyroid (mrem/yr)	8.30E-02 ^(b)	4.24E+00 ^(e)	4.32E+00	-
	Other Organ (mrem/yr)	3.54E-01 ^(c)	7.18E-04 ^(f)	4.07E+00	-
Existing Units	Total Body (mrem/yr)	6.69E-05	5.29E-03	5.36E-03	Per RAI 18, replace with "4.05E-01". This value is the sum of 4.00E-01 and 5.29E-03.
	Thyroid (mrem/yr)	NA	NA	2.04E-02	
	Other Organ (mrem/yr)	NA	NA	2.04E-02	
Site Total	Total Body (mrem/yr)	3.15E-02	3.37E-04	3.69E-04	75
	Thyroid (mrem/yr)	NA	NA	4.34E+00	
	Other Organ (mrem/yr)	NA	NA	4.09E+00	

- a) Liquid MEI for total body dose is an adult. Value is obtained from Table 5.4-8 and multiplied by two to account for dual units.
- b) Liquid MEI for the thyroid dose is an adult. Value is obtained from Table 5.4-8 and multiplied by two to account for dual units.
- c) Liquid MEI for the limiting organ gastrointestinal-lining of lower intestine is an adult. Value is obtained from Table 5.4-4 and multiplied by two to account for dual units.
- d) Gaseous MEI for this case is a child. Value is the sum of child total body dose from meat, milk, vegetable, and inhalation exposure plus the ground plane and plume exposure, as given in Table 5.4-8.
- e) Gaseous MEI for this case is an infant. Value is the sum of infant thyroid dose from milk and inhalation exposure plus the ground plane and plume exposure, as given in Table 5.4-8.
- f) Gaseous MEI for this case is a child, and the limiting organ is the bone. Value is the sum of child bone dose from meat, milk, vegetable, and inhalation exposure plus the ground plane and plume exposure, as given in Table 5.4-8.
- g) NA – Not Available. The RERR provides total liquid and gaseous dose for SGS and HCGS but does not provide a breakdown into the separate liquid and gaseous dose component for organ and thyroid dose.

Per RAI 18 (See SSAR
Table 11.3-9), replace
with:

2.94E+00

6.86E+00

3.97E+00

Per RAI 62, add new footnote:

h) The bounding direct radiation dose at the PSEG Site is from a single unit ABWR configuration. The direct doses from the other reactor technology configurations presented in Subsection 1.2.3 are less than the ABWR.

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**Table 5.4-12
Collective Doses from a New Unit to Population within 50 Miles, Gaseous Pathway**

Pathway	Dose (person-rem/yr)			
	Total Body		Thyroid (Worst Case Organ)	
Meat	1.89E+00	3.61E+00	5.13E+00	6.86E+00
Milk (cow)	2.10E+00	3.62E+00	5.91E+01	6.06E+01
Ground Plane	1.04E+00		1.04E+00	
Plume	4.71E+00	3.89E+00	4.71E+00	3.89E+00
Inhalation	4.57E-01		1.04E+01	
Vegetable	4.30E+00	7.76E+00	4.67E+00	8.12E+00
Total	1.45E+01	2.04E+01	8.51E+01	9.10E+01

Replace values per
RAI 18 (See SSAR
Table 11.3-10).

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**Table 5.4-13
Doses to Biota from Liquid and Gaseous Effluents (per New Unit)**

Biota	Liquid Effluents (mrad/yr)		Gaseous Effluents (mrem/yr)		Total (mrem/yr)	40 CFR 190 Limit (mrem/yr)
	Internal Dose	External Dose	Internal Dose	External Dose		
Fish	6.17E-01	1.04E+00	0.00E+00	0.00E+00	1.66E+00	25
Invertebrate	3.80E+00	2.08E+00	0.00E+00	0.00E+00	5.88E+00	25
Algae	8.21E+00	6.05E-03	0.00E+00	0.00E+00	8.22E+00	25
Muskrat	1.20E+00	6.94E-01	9.31E-02	5.49E+00	7.48E+00	25
Raccoon	3.11E-01	5.19E-01	9.31E-02	5.49E+00	6.41E+00	25
Heron	1.33E+00	6.93E-01	9.31E-02	5.49E+00	7.61E+00	25
Duck	1.11E+00	1.04E+00	9.31E-02	5.49E+00	7.73E+00	25

Replace each value
with "5.28E+00" per
RAI 18.

Per RAI 18, replace with:

7.27E+00

6.20E+00

7.40E+00

7.52E+00

Per RAI 18, replace each with "5" (See ER Table 5.4-11).

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Per RAI 18 (See SSAR Table 11.3-10), replace with "2.04E+01 person-rem/year (2.04E-01 person-Sv/year)".

As discussed in Subsection 7.2.2.3, the risk of groundwater contamination from a US-APWR severe accident is negligible, and is smaller than the associated risk from the currently licensed reactors.

To gauge the relative magnitude of the severe accident dose risk, the bounding severe accident population dose risk is compared to the population dose risk associated with normal operation of the new plant. As reported in Section 5.4, the total collective doses for the bounding reactor technology at the PSEG Site from normal operation due to liquid and gaseous effluents are 4.56E+01 person-rem/year (4.56E-01 person-Sv/year) and 1.45E+01 person-rem/year (1.45E-01 person-Sv/year), respectively. The sum of these two components is the total collective dose and is equal to 6.00E+01 person-rem/year (6.00E-01 person-Sv/year). As previously described, dose risk is dose times frequency. Normal operation has a frequency of one. Therefore, the dose risk for normal operation is 6.00E+01 person-rem/reactor-year (6.00E-01 person-Sv/reactor-year). Comparing this value to the bounding severe accident dose risk of 1.15E+00 person-rem/reactor-year (1.15E-02 person-Sv/reactor-year) indicates that the bounding dose risk from severe accidents is 1.9 percent of dose risk from normal operation.

Per Table 7.2-3, the US-APWR severe accident product is 5.03E+03 dollars/reactor-year for the new plant. Similarly, the land requiring decontamination is for the US-APWR severe reactor accident and is calculated to be 7.34E-03 hectares/reactor-year. The probability-weighted risks of early and latent cancer fatalities from a US-APWR severe accident at the PSEG Site are indicated in Table 7.2-3 as 1.24E-09 persons/reactor-year and 7.36E-04 persons/reactor-year, respectively. Note that because no member of the public resides within a mile of the PSEG Site, the prompt fatality risk for this area is zero and complies with the guideline established in Reference 7.2-3.

Per RAI 18, replace with "1.7". This value is the ratio of 1.15E+00 person-rem/year to 6.59E+01 person-rem/year.

7.2.4 REFERENCES

- 7.2-1. 50 FR 32138, Severe Reactor Accidents Regarding Future Designs and Existing Plants, Nuclear Regulatory Commission, August 8, 1985.
- 7.2-2. Chanin, D. I. and M. L. Young. Code Manual for MACCS2: Volume 1, User's Guide, SAND97-0594, Sandia National Laboratories, Albuquerque, New Mexico, March 1997.
- 7.2-3. Nuclear Regulatory Commission (NRC), "Safety Goals for the Operations of Nuclear Power Plants; Policy Statement; Republication", 51 FR 30028, August 1986.

Per RAI 18, replace each with "6.59E+01 person-rem/year (6.59E-01 person-Sv/year)". This value is the sum of 2.04E+01 person-rem/year and 4.55E+01 person-rem/year.

Insert A-1 (See SSAR Table 11.3-7 Sheet 1 of 2) per RAI No. 18

MEI Location	Pathway	MEI	Dose per Unit (mrem/yr)			
			T. Body	GI-Tract	Bone	Liver
Nearest Meat Animal	Meat	Adult	4.90E-03	6.26E-03	2.26E-02	5.03E-03
		Teen	4.03E-03	4.78E-03	1.90E-02	4.17E-03
		Child	7.36E-03	7.69E-03	3.57E-02	7.56E-03
Nearest Milk- Producing animals (Goat)	Milk	Adult	9.93E-03	6.41E-03	2.92E-02	1.16E-02
		Teen	1.45E-02	1.10E-02	5.32E-02	2.02E-02
		Child	2.83E-02	2.47E-02	1.30E-01	4.08E-02
		Infant	5.44E-02	4.99E-02	2.47E-01	8.24E-02
Nearest Residence	Ground Plane		1.53E-02	1.53E-02	1.53E-02	1.53E-02
	Plume		9.52E-02	9.52E-02	9.52E-02	9.52E-02
	Inhalation	Adult	2.14E-03	2.35E-03	5.03E-04	2.44E-03
		Teen	2.20E-03	2.43E-03	6.52E-04	2.64E-03
		Child	2.00E-03	2.03E-03	8.35E-04	2.38E-03
		Infant	1.18E-03	1.15E-03	5.33E-04	1.58E-03
Nearest Vegetable Garden	Vegetable	Adult	1.55E-02	1.56E-02	7.30E-02	1.61E-02
		Teen	2.32E-02	2.35E-02	1.15E-01	2.50E-02
		Child	5.21E-02	5.11E-02	2.72E-01	5.56E-02
Nearest Site Boundary	Ground Plane		6.55E-01	6.55E-01	6.55E-01	6.55E-01
	Plume		3.97E+00	3.97E+00	3.97E+00	3.97E+00
	Inhalation	Adult	9.03E-02	1.01E-01	2.41E-02	1.04E-01
		Teen	9.31E-02	1.04E-01	3.11E-02	1.13E-01
		Child	8.44E-02	8.62E-02	3.97E-02	1.02E-01
		Infant	4.97E-02	4.85E-02	2.51E-02	6.83E-02

Insert A-2 (See SSAR Table 11.3-7 Sheet 2 of 2) per RAI No. 18

MEI Location	Pathway	MEI	Dose per Unit (mrem/yr)			
			Kidney	Thyroid	Lung	Skin
Nearest Meat Animal	Meat	Adult	4.87E-03	1.17E-02	4.69E-03	4.66E-03
		Teen	4.04E-03	9.04E-03	3.91E-03	3.88E-03
		Child	7.39E-03	1.50E-02	7.24E-03	7.20E-03
Nearest Milk-Producing animals (Goat)	Milk	Adult	8.93E-03	2.53E-01	6.45E-03	5.92E-03
		Teen	1.56E-02	4.02E-01	1.14E-02	1.03E-02
		Child	3.29E-02	8.05E-01	2.58E-02	2.42E-02
		Infant	6.35E-02	1.94E+00	5.21E-02	4.92E-02
Nearest Residence	Ground Plane		1.53E-02	1.53E-02	1.53E-02	1.80E-02
			9.52E-02	9.52E-02	9.79E-02	2.92E-01
	Inhalation	Adult	2.68E-03	5.78E-02	3.08E-03	1.91E-03
		Teen	2.98E-03	7.51E-02	3.71E-03	1.93E-03
		Child	2.67E-03	9.23E-02	3.19E-03	1.70E-03
		Infant	1.60E-03	8.36E-02	2.10E-03	9.80E-04
Nearest Vegetable Garden	Vegetable	Adult	1.51E-02	1.77E-01	1.37E-02	1.35E-02
		Teen	2.35E-02	2.25E-01	2.15E-02	2.11E-02
		Child	5.31E-02	4.29E-01	4.99E-02	4.94E-02
Nearest Site Boundary	Ground Plane		6.55E-01	6.55E-01	6.55E-01	7.69E-01
			3.97E+00	3.97E+00	4.08E+00	1.22E+01
	Inhalation	Adult	1.15E-01	2.61E+00	1.38E-01	7.97E-02
		Teen	1.28E-01	3.40E+00	1.69E-01	8.04E-02
		Child	1.15E-01	4.18E+00	1.45E-01	7.10E-02
		Infant	6.93E-02	3.79E+00	9.68E-02	4.09E-02

Insert B to be added as new column to ER Table 5.4-10 per RAI No. 62.

<u>Direct Radiation^(h)</u>
2.50E+00
2.50E+00
2.50E+00
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2.50E+00
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2.50E+00
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PSEG Letter ND-2013-0012, dated May 13, 2013

ENCLOSURE 2

Proposed Revisions, Part 2 – Site Safety Analysis Report

Marked-up Pages

11.3-7

11.3-9

**PSEG Site
ESP Application
Part 2, Site Safety Analysis Report**

**Table 11.3-5 (Sheet 1 of 3)
Gaseous Release Source Terms**

Isotope ^(c,d)	New Unit(s)			
	Single Unit ^(a) (Ci/yr)	Dual Unit (Ci/yr)	Existing Site ^(b) (Ci/yr)	Total (Ci/yr)
Ag-110m	2.00E-06	4.00E-06	-	4.00E-06
Ar-41	3.40E+01	6.80E+01	5.39E-01	6.85E+01
Ba-139	-	-	3.44E+00	3.44E+00
Ba-140	2.70E-02	5.41E-02	2.56E-03	5.66E-02
Br-82	-	-	5.27E-06	5.27E-06
C-14	1.89E+01	3.78E+01	-	3.78E+01
Ce-141	9.19E-03	1.84E-02	7.11E-05	1.84E-02
Ce-144	1.89E-05	3.78E-05	-	3.78E-05
Co-57	8.20E-06	1.64E-05	-	1.64E-05
Co-58	2.30E-02	4.60E-02	1.76E-04	4.62E-02
Co-60	1.30E-02	2.59E-02	8.30E-05	2.60E-02
Cr-51	3.51E-02	7.03E-02	-	7.03E-02
Cs-134	6.22E-03	1.24E-02	-	1.24E-02
Cs-136	5.95E-04	1.19E-03	-	1.19E-03
Cs-137	9.46E-03	1.89E-02	-	1.89E-02
Cs-138	1.70E-04	3.41E-04	-	3.41E-04
Cu-64	1.70E-04	3.41E-04	-	3.41E-04
Fe-55	6.49E-03	1.30E-02	-	1.30E-02
Fe-59	8.11E-04	1.62E-03	-	1.62E-03
H-3	9.5E+02	7.0E+02	2.79E+02	9.79E+02
I-131	2.60E-01	5.19E-01	7.26E-03	5.26E-01
I-132	2.19E+00	4.38E+00	-	4.38E+00
I-133	1.70E+00	3.41E+00	7.53E-02	3.48E+00
I-134	3.78E+00	7.57E+00	-	7.57E+00

1. Replace with "2.59E-01" per RAI 18 (See SSAR Table 1.3-7).

Rev. 2

11.3-7

**PSEG Site
ESP Application
Part 2, Site Safety Analysis Report**

**Table 11.3-5 (Sheet 3 of 3)
Gaseous Release Source Terms**

Isotope ^(c,d)	New Unit(s)			
	Single Unit ^(a) (Ci/yr)	Dual Unit (Ci/yr)	Existing Site ^(b) (Ci/yr)	Total (Ci/yr)
Sr-91	1.00E-03	2.00E-03	1.72E-02	1.92E-02
Sr-92	7.84E-04	1.57E-03	4.10E-02	4.26E-02
Tc-99m	2.97E-04	5.95E-04	1.09E-05	6.06E-04
Te-129m	2.19E-04	4.38E-04	-	4.38E-04
Te-131m	7.57E-05	1.51E-04	1.86E-05	1.70E-04
Te-132	1.89E-05	3.78E-05	-	3.78E-05
W-187	1.89E-04	3.78E-04	-	3.78E-04
Xe-131m	2.70E+03	5.40E+03	2.68E-04	5.40E+03
Xe-133	7.20E+03	1.44E+04	9.99E-01	1.44E+04
Xe-133m	1.70E+02	3.40E+02	1.19E-02	3.40E+02
Xe-135	1. Replace with "4.59E-05" per RAI 18 (See SSAR Table 1.3-7).			
Xe-135m	4. Replace with "4.59E-05" per RAI 18 (See SSAR Table 1.3-7).			
Xe-137	5.14E+02	1.03E+03	-	1.03E+03
Xe-138	4.32E+02	8.65E+02	-	8.65E+02
Y-90	4.60E-05	9.19E-05	-	9.19E-05
Y-91	2.41E-04	4.81E-04	-	4.81E-04
Y-91m	-	-	2.40E+00	2.40E+00
Y-92	6. Replace with "1.59E-03" per RAI 18 (See SSAR Table 1.3-7).			
Y-93	1. Replace with "1.59E-03" per RAI 18 (See SSAR Table 1.3-7).			
Zn-65	1.11E-02	2.22E-02	-	2.22E-02
Zr-95	4.60E-03	3.19E-03	-	3.19E-03
Total	1.78E+04	3.56E+04	2.87E+02	3.59E+04

- a) Single unit is the PPE value from SSAR Table 1.3-7, and is included for single unit analysis throughout the section.
- b) Existing site consists of one BWR (HCGS) and two PWRs (SGS).
- c) Radionuclides Kr-90 and Xe-139 are short lived and will decay prior to release to the environment and are therefore, not included in this table.
- d) The emissions from Rh-103m, Rh-106, and Ba-137m are attributed to their parent radionuclides and therefore, are not included in this table.

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11.3-9