



ND-2012-0023
March 29, 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. 46, Gaseous
Waste Management System

- References:
- 1) PSEG Power, LLC letter to USNRC, Application for Early Site Permit for the PSEG Site, dated May 25, 2010
 - 2) RAI No. 46, SRP Section: 11.03 – Gaseous Waste Management, dated January 06, 2012 (eRAI 6219)
 - 3) PSEG Power, LLC letter to USNRC, ND-2011-0018, PSEG Power, LLC, Response to Request for Additional Information, RAI No. 18, Gaseous Waste Management System, dated April 12, 2011
 - 4) PSEG Power, LLC letter to USNRC, ND-2012-0008, Response to Request for Additional Information, RAI No. 46, Gaseous Waste Management System, dated February 3, 2012

The purpose of this letter is to provide a revised response to the request for additional information (RAI) provided in Reference 4 above. This RAI addresses the Gaseous Waste Management System, as described in Subsection 11.3 of the Site Safety Analysis Report (SSAR), as submitted in Part 2 of the PSEG Site Early Site Permit Application, Revision 0.

Enclosure 1 provides our response for RAI No. 46, Question No. 11.03-8. Our response to RAI No. 46, Question No. 11.03-8 will result in a revision to the SSAR. Enclosure 3 includes the new regulatory commitment established in this submittal.

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MRO

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 29th day of March, 2012.

Sincerely,



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

- Enclosure 1: Revision 1 of Response to NRC Request for Additional Information, RAI No. 46, Question No. 11.03-8, SRP Section: 11.03 – Gaseous Waste Management System
- Enclosure 2: Proposed Revisions Part 2 – Site Safety Analysis Report (SSAR) Table 1.3-7
- Enclosure 3: Summary of Regulatory Commitments

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

PSEG Letter ND-2012-0023, dated March 29, 2012

ENCLOSURE 1

Revision 1 of Response to RAI No. 46

Question No. 11.03-8

Response to RAI No. 46, Question 11.03-8:

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

In the response to RAI 18 (eRAI 5466), Question 11.03-3, PSEG applied liquid and gaseous effluent source terms based on the Bell Bend Nuclear Power Plant's (BBNPP) Combined License Application (COLA), Final Safety Analysis Report (FSAR), Rev. 2, Section 11.3. A review of the BBNPP COLA FSAR effluent source terms indicates that the source terms are different than those described in the U.S. EPR Design Certification (DC) Application, Rev. 3. It should be noted that the BBNPP COLA has sought a departure from the U.S. EPR DC source terms, and that the BBNPP COLA application is not the reference COLA for this reactor design. In addition, the applicant should be aware that the staff has issued specific RAIs on BBNPP's approach and justification in developing liquid and gaseous alternate source terms. As a result, the applicant is requested to:

- 1. Confirm whether the applicant intends to apply the effluent source terms proposed in the BBNPP COLA application as opposed to using those of the U.S. EPR DC Application, Rev. 3. If not, the applicant should revise the ESP effluent and dose analyses using the source terms from the U.S. EPR Design Certification, Rev. 3, Sections 11.2 and 11.3. If the applicant intends to apply the effluent source terms from the BBNPP COLA application, provide clarification for using these source terms.*
- 2. Review and verify the other source terms being utilized in the ESP application and document what revisions are currently being used for each of the designs.*

PSEG Response to NRC RAI:

1. The gaseous effluent source term is based on the bounding release rates of the gaseous radionuclides for each of the four reactor technologies considered by PSEG in the ESP Application (ABWR, AP1000, US-APWR, and U.S. EPR). Since the issuance of the SSAR, an updated source term for the U.S. EPR has been established in the Bell Bend Nuclear Power Plant (BBNPP) Final Safety Analysis Report (FSAR), Rev. 2. This updated source term for the U.S. EPR is listed in Table 11.2-3 and Subsection 11.2.3.2 of the BBNPP FSAR, and is provided in the response to RAI No. 18 (PSEG Letter No. ND-2011-0018).

The BBNPP FSAR, Rev. 2, revised gaseous effluent radionuclide release rates for C-14, Kr-85, Xe-131m, Xe-133, and Xe-133m. The changes for all of the release rates, an increase for C-14 and a decrease for the other radionuclides, were small except for Kr-85. The release rate, in the U.S. EPR DCD, Rev. 1, for Kr-85, is 3.40E+04 Ci/yr. In the BBNPP FSAR, Rev. 2, the release rate for Kr-85 is 2.80E+03 Ci/yr. The release rate for Kr-85 in the BBNPP FSAR, Rev. 2, is similar to the release rate of Kr-85 from the other design certification applicant PWRs.

- AP1000 (single unit) 4.10E+03 Ci/yr
- US-APWR (single unit) 1.40E+03 Ci/yr

Therefore, the gaseous effluent source term in the BBNPP FSAR is used instead of the U.S. EPR source term.

The Early Site Permit (ESP) application for the PSEG Site uses a Plant Parameter Envelope (PPE) approach to postulate a set of parameters to bound the parameters of four reactor technologies that could potentially be deployed to the site. These parameters were developed from the following sources:

- The design certification documents (DCDs) of certified reactor technology designs or the DCDs of reactor technologies for which a design certification application has been submitted to the NRC.
- Information obtained directly from the reactor technology vendors.
- Site-specific design and analysis activities.

The plant parameter envelope approach was used by the first three ESPs and was developed in a series of meetings and correspondence between the NRC and industry representatives. A February 5, 2003, NRC letter from James E. Lyons (Director New Reactor Licensing Project Office) to Dr. Ronald L. Simard (NEI) on use of the PPE approach states:

“Given that PPE values do not reflect a specific design and will not be reviewed by the NRC staff for correctness, the granting of an ESP by the NRC does not indicate NRC approval of the site for any specific plant or type.”

In addition, the letter goes on to state:

“We agree that a combination of site characteristics and PPE values will comprise the ESP bases that will be the focus for comparison at COL with design of the actual plant proposed for the site.”

And

“COL applicants who reference an ESP bear the risk that the design ultimately selected for the approved site might fall outside the terms and conditions of the ESP.”

Thus, the PSEG Site ESP application provides the PPE and site characteristics that the ESP will be based on, and that will be the focus for comparison with the design of the actual plant proposed for the site when a COLA is submitted.

Moreover, the final permit issued by the NRC includes the parameters used by the NRC to reach the conclusion that the site is safe for construction of a nuclear power plant. When the permit holder proceeds to the COL phase they must confirm that the selected technology fits within the values assumed in the ESP, or provide additional information to allow the NRC to conclude the site is safe.

2. The source term information in SSAR Chapter 11, as amended by relevant RAI responses, was obtained from:

- Information in correspondence directly from the reactor technology vendors
- BBNPP FSAR, Rev. 2

The correspondence received from the reactor technology vendors will be made available for NRC staff review. SSAR Table 1.3-7 will be revised to add footnotes identifying the source of the information on the annual average normal gaseous release for each isotope. There is no intention to update the information in the PSEG Site ESP application if the reactor technology vendor's information on the annual average normal gaseous release for each isotope is revised. When PSEG selects a reactor technology and submits a Combined License (COL) application, the ESP PPE values will be the focus for comparison with the design of the actual plant proposed for the site.

Associated PSEG Site ESP Application Revisions:

SSAR Table 1.3-7 will be updated as specified in Enclosure 2 of this document.

PSEG Letter ND-2012-0023, dated March 29, 2012

ENCLOSURE 2

Proposed Revisions

**Part 2 – Site Safety Analysis Report (SSAR) Section 1.3
Plant Parameter Envelope**

Marked-up Pages

Table 1.3-7 (3 pages)

PSEG Site
ESP Application
Part 2, Site Safety Analysis Report

3

Footnotes
added in response
to RAI No. 46,
Question 11.03-8

Table 1.3-7 (Sheet 1 of 2)
Single Unit Composite Average Annual Normal Gaseous Release

Isotope	ABWR Release (a) (Ci/yr)	AP1000 Release (b) (Ci/yr)	U.S. EPR Release (c) (Ci/yr)	US-APWR Release (d) (Ci/yr)	Bounding Value Release (Ci/yr)
H-3	7.30E+01	3.50E+02	1.80E+02	1.80E+02	3.50E+02
C-14	9.19E+00	7.30E+00	7.30E+00	7.30E+00	9.19E+00
Na-24	4.05E-03				4.05E-03
P-32	9.19E-04				9.19E-04
Ar-41	6.76E+00	3.40E+01	3.40E+01	3.40E+01	1.89E+01
Cr-51	3.51E-02	6.10E-04	9.70E-05	6.10E-04	3.51E-03
Mn-54	5.41E-03	4.30E-04	5.70E-05	4.30E-04	5.41E-03
Fe-55	6.49E-03				6.49E-03
Mn-56	3.51E-03				3.51E-03
Co-57		8.20E-06	8.20E-06		8.20E-06
Co-58	2.41E-03	2.30E-02	4.80E-04	2.30E-02	2.30E-02
Fe-59	8.11E-04	7.90E-05	2.80E-05	7.90E-05	8.11E-04
Co-60	1.30E-02	8.70E-03	1.10E-04	8.80E-03	1.30E-02
Ni-63	6.49E-06				6.49E-06
Cu-64	1.00E-02		2.80E+03		4.10E+03
Zn-65	1.11E-02				1.11E-02
Kr-83m	8.38E-04				8.38E-04
Kr-85	5.68E+02	4.10E+03	3.40E+04	1.40E+03	3.40E+04
Kr-85m	2.11E+01	3.60E+01	1.50E+02	0.00E+00	1.50E+02
Kr-87	2.51E+01	1.50E+01	5.30E+01	0.00E+00	5.30E+01
Kr-88	3.78E+01	4.60E+01	1.80E+02	0.00E+00	1.80E+02
Kr-89	2.41E+02				2.41E+02
Rb-89	4.32E-05				4.32E-05
Sr-89	5.68E-03	3.00E-03	1.60E-04	3.00E-03	5.68E-03
Kr-90	3.24E-04				3.24E-04
Sr-90	7.03E-05	1.20E-03	6.30E-05	1.20E-03	1.20E-03
Y-90	4.59E-05				4.59E-05
Sr-91	1.00E-03				1.00E-03
Y-91	2.41E-04				2.41E-04
Sr-92	7.84E-04				7.84E-04
Y-92	6.22E-04				6.22E-04
Y-93	1.11E-03				1.11E-03
Nb-95	8.38E-03	2.50E-03	4.20E-05	2.50E-03	8.38E-03
Zr-95	1.59E-03	1.00E-03	1.00E-05	1.00E-03	1.59E-03
Mo-99	5.95E-02				5.95E-02
Tc-99m	2.97E-04				2.97E-04

RAI No. 18,
Question 11.03-3

(e)

Rev. 0

PSEG Site
ESP Application
Part 2, Site Safety Analysis Report

Footnotes
added in response
to RAI No. 46,
Question 11.03-8

Table 1.3-7 (Sheet 2 of 2)
Single Unit Composite Average Annual Normal Gaseous Release

Isotope	ABWR Release ^(a) (Ci/yr)	AP1000 Release ^(b) (Ci/yr)	U.S. EPR Release ^(c) (Ci/yr)	US-APWR Release ^(d) (Ci/yr)	Bounding Value Release (Ci/yr)
Ru-103	3.51E-03	8.00E-05	1.70E-05	8.00E-05	3.51E-03
Rh-103m	1.11E-04				1.11E-04
Rh-106	1.89E-05				1.89E-05
Ru-106	1.89E-05	7.80E-05	7.80E-07	7.80E-05	7.80E-05
Ag-110m	2.00E-06				2.00E-06
Sb-124	1.81E-04				1.81E-04
Sb-125		6.10E-05	6.10E-07		6.10E-05
Te-129m	2.19E-04			2.70E+03	2.19E-04
I-131	2.59E-01	1.20E-01	8.80E-03	4.20E-03	2.59E-01
Te-131m	7.57E-05				7.57E-05
Xe-131m	5.14E+01	1.80E+03	3.50E+03	2.60E+02	3.50E+03
I-132	2.19E+00	4.00E-01			2.19E+00
RAI No. 18, Question 11.03-3	1.89E-05				1.89E-05
Xe-133	2.41E+03	4.60E+03	3.20E-02	6.40E-02	1.70E+00
Xe-133m	8.65E-02	8.70E-01	8.60E+03	0.00E+00	8.60E+03
Cs-134	6.22E-03	2.30E-03	1.80E+02	2.00E+00	1.80E+02
I-134	3.78E+00		4.80E-05	2.30E-03	6.22E-03
I-135	2.41E+00				3.78E+00
Xe-135	4.59E+02	3.30E+02	1.20E+03	7.20E+03	2.41E+00
Xe-135m	4.05E+02	7.00E+00	1.40E+01	1.70E+02	1.20E+03
Cs-136	5.95E-04	8.50E-05	3.30E-05	8.50E-05	4.05E+02
Cs-137	9.46E-03	3.60E-03	9.00E-05	3.60E-03	9.46E-03
Xe-137	5.14E+02		0.00E+00	4.00E+00	5.14E+02
Ba-137m				3.60E-03	3.60E-03
Cs-138	1.70E-04				1.70E-04
Xe-138	4.32E+02	6.00E+00	1.20E+01	1.00E+00	4.32E+02
Xe-139	4.05E-04				4.05E-04
Ba-140	2.70E-02	4.20E-04	4.20E-06	4.20E-04	2.70E-02
La-140	1.81E-03				1.81E-03
Ce-141	9.19E-03	4.20E-05	1.45E+04	4.20E-05	1.84E+03
Ce-144	1.89E-05		1.47E+04		1.74E+04
Pr-144	1.89E-05				1.78E+04
W-187	1.89E-04				1.89E-05
Np-239	1.19E-02				1.89E-04
Total w/o H-3	5.19E+03	1.11E+04	4.79E+04	1.71E+03	1.19E-02
Total w/ H-3	5.26E+03	1.14E+04	4.84E+04	1.89E+03	4.95E+04

Rev. 0

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

**Table 1.3-7 (Sheet 3 of 3)
Single Unit Composite Average Annual Normal Gaseous Release**

- a) The annual average normal gaseous release from the ABWR for each isotope was provided by Toshiba America Nuclear Energy (TANE) Corporation in a letter dated June 11, 2009 and by GE Hitachi (GEH) in a letter dated March 4, 2009.
- b) The annual average normal gaseous release from the AP1000 for each isotope was provided by Westinghouse Electric Company (WEC) in letters dated March 9, 2009 and March 11, 2009.
- c) The annual average normal gaseous release from the U.S. EPR for each isotope was provided by AREVA NP, Inc in a letter dated March 9, 2009 except for specific isotopes identified by footnote e) below.
- d) The annual average normal gaseous release from the US-APWR for each isotope was provided by Mitsubishi Nuclear Energy Systems (MNES) in a letter dated March 9, 2009.
- e) The annual average normal gaseous release from the U.S. EPR for this isotope was obtained from the Bell Bend Nuclear Power Plant (BBNPP) Final Safety Analysis Report (FSAR), Revision 2.

RAI No. 46,
Question 11.03-8

PSEG Letter ND-2012-0023, dated March 29, 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 Table 1.3-7 to incorporate the changes in Enclosure 2 in response to NRC RAI 46, Question 11.03-8.	This revision will be included in the next update of the PSEG Site ESP application SSAR.	Yes	No