Exelon.
Generation

NP-12-0008
March 28, 2012

10 CFR 52, Subpart A

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

Subject: Exelon Nuclear Texas Holdings, LLC
Victoria County Station Early Site Permit Application
Response to Request for Additional Information Letter No. 16
NRC Docket No. 52-042

Attached is the response to the NRC staff question included in Request for Additional Information (RAI) Letter No. 16, dated February 27, 2012, related to Early Site Permit Application (ESPA), Part 2, Sections 02.03.01, 11.02, and 11.03. NRC RAI Letter No. 16 contained three (3) Questions. This submittal comprises a partial response to RAI Letter No. 16, and includes responses to the following two (2) Questions:

02.03.01-2
11.02-6

When a change to the ESPA is indicated by a Question response, the change will be incorporated into the next routine revision of the ESPA, planned for no later than March 31, 2013.

The response to RAI question 11.03-4 will be provided by April 27, 2012. This response time is consistent with the response time described in NRC RAI Letter No. 16, dated February 27, 2012.

Regulatory commitments established in this submittal are identified in Attachment 3.

If any additional information is needed, please contact David J. Distel at (610) 765-5517.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of March, 2012.

Respectfully,

Marilyn C. Kray

Marilyn C. Kray
Vice President, Nuclear Project Development

Attachments:
1. Question 02.03.01-2
2. Question 11.02-6
3. Summary of Regulatory Commitments

cc: USNRC, Director, Office of New Reactors/NRLPO (w/Attachments)
USNRC, Project Manager, VCS, Division of New Reactor Licensing (w/Attachments)
USNRC, Environmental Project Manager, Division of New Reactor Licensing, Victoria County Station (w/Attachments)
USNRC Region IV, Regional Administrator (w/Attachments)

RAI 02.03.01-2:

Question:

10 CFR 52.17(1)(vi), *Contents of applications; technical information,* states that site safety analysis reports should include "the meteorological characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated." In addition, 10 CFR 100.20(c)(2), *Factors to be considered when evaluating sites*, states that the "meteorological characteristics of the site that are necessary for safety analysis or that may have an impact upon plant design" must be identified and characterized. 10 CFR 100.21(d), *Non-seismic siting criteria*, states, in part, that the meteorological characteristics of the site "must be evaluated and site parameters established such that potential threats from such physical characteristics will pose no undue risk to the type of facility proposed to be located at the site."

Nuclear power plants must be designed so that they remain in a safe condition under extreme meteorological events, including events such as tornadoes and hurricanes that could result in the most extreme wind events that could reasonably be predicted to occur at the site. Initially, the NRC's predecessor, the U.S. Atomic Energy Commission considered tornadoes to be the bounding extreme wind events and issued RG 1.76, "Design-Basis Tornado for Nuclear Power Plants," in April 1974. The design-basis tornado wind speeds were chosen so that the probability that a tornado exceeding the design basis would occur was on the order of 10^{-7} per year per nuclear power plant.

In February 2007, the National Weather Service implemented the Enhanced Fujita Scale, which is a revised assessment relating tornado damage to wind speed. Relying on the Enhanced Fujita Scale, in March 2007, the NRC issued Revision 1 of RG 1.76, "Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants." In Revision 1 of RG 1.76, the NRC decreased the design-basis tornado wind speed criteria. Since design-basis tornado wind speeds were decreased as a result of the analysis performed to update RG 1.76, it was no longer clear that the revised tornado design basis wind speeds would bound design-basis hurricane wind speeds in all areas of the United States. This prompted an investigation into extreme wind gusts during hurricanes and their relation to design basis hurricane wind speeds. As a result, in October 2011, the NRC issued RG 1.221, "Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants." RG 1.221 provides the design-basis hurricane wind speeds that correspond to an exceedance frequency of 10^{-7} per year.

Based on the data in RG 1.221, it is possible that the potential winds associated with hurricanes may exceed the wind speeds associated with tornados at the VCS site. The staff is therefore requesting, in accordance with the requirements of 10 CFR Parts 52 and 100, and the guidance of RG 1.221, that the applicant update the site characteristic values in the VCS ESP SSAR to include a new site characteristic called "Hurricane Wind Speed." Alternatively, the applicant may provide a justification if the VCS ESP SSAR is not updated to include this new site characteristic.

Response:

The maximum wind speed for the VCS site has been re-evaluated, considering the guidance of RG 1.221, to include the 3-second wind gust that corresponds to the 10^7 year return period hurricane. Using the methodology specified in RG 1.221, the 3-second wind gust was determined by digitizing the contours from Figure 1 of RG 1.221 and overlaying the VCS site location. The 3-second wind gust was determined to be 190 mph. The VCS ESP SSAR and ER will be revised to include a new site characteristic called "Hurricane Wind Speed" following the guidance of RG 1.221. The following section, *Associated ESPA Revisions*, details the required changes to SSAR and ER text. Note that SSAR Table 1.9-2 has also been updated to document conformance with RG 1.221.

Additional text clarifications have also been incorporated into SSAR Subsection 2.3.1.3.1 and ER Subsection 2.7.3.2.

References:

U.S. NRC, *Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants*, Regulatory Guide 1.221, Revision 0, October 2011.

Associated ESPA Revisions:

SSAR Table 1.9-2 will be revised in a future revision as indicated on the following page:

Table 1.9-2 (Sheet 2 of 2)
Conformance with Regulatory Guides

Number	Regulatory Guide Title	Conformance	Affected SSAR Sections
1.208	A Performance-Based Approach to Define the Site-Specific Earthquake Ground Motion, Rev. 0, 03/07	Conforms Exception	2.5.1, 2.5.3 2.5.2: 1) The fractile hazard curves are presented as graphical format. The curves adequately show the hazard with sufficient detail. 2) The UHRS for annual exceedance frequency of 10-6 is not required for development of GMRS.
1.221	Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants, Rev. 0, 10/11	Conforms	2.0, 2.3.1.3.1
4.7	General Site Suitability Criteria for Nuclear Power Stations, Rev. 2, 04/98	Conforms	2.1.2, 2.1.3, 2.2.1, 2.2.3, 2.5.1, 2.5.2, 2.5.3, 13.6

SSAR Table 2.0-1 will be revised in a future revision as indicated on the following page. Note that the SSAR text changes indicated in the response to RAI 02.03.01-1 are changing as a result of this response:

Table 2.0-1 (Sheet 3 of 7)
Site Characteristics and Site-Related Design Parameters

Part 1 – Site Characteristics			
Item	**Site-Specific Value[a]**	**Description**	**References**
Basic Wind Speed	113 mph for a 3-second gust (98 mph fastest mile)	Wind velocity associated with a 50-year return period in the site area.	Refer to Subsection 2.3.1.3.1.
	121 mph for a 3-second gust (105 mph fastest mile)	Wind velocity associated with a 100-year return period in the site area.	Refer to Subsection 2.3.1.3.1.
~~Historical Maximum~~ Hurricane Wind Speed	~~160~~ {190} mph for a 3-second gust (~~142~~ {171}mph fastest mile)	Wind Velocity associated with ~~the most severe hurricane wind that has been historically observed in the site region.~~ a return period of 10^7 years (at 10 m / 33 ft above ground).	Refer to Subsection 2.3.1.3.1.
Site Characteristic Ambient Air Temperatures		Site characteristic wet bulb and dry bulb temperatures associated with the listed exceedance values and the 100 year return period.	Refer to Subsection 2.3.1.5.

SSAR Subsection 2.3.1.3.1 will be revised in a future revision as indicated below:

Estimating the wind loading on plant structures ~~for design and operating bases~~ considers the "basic" wind speed, which is the "3-second gust speed at 33 feet (10 meters) above the ground in Exposure Category C," as defined in Sections 6.2 and 6.3 of the ASCE SEI design standard, "*Minimum Design Loads for Buildings and Other Structures*" (Reference 2.3.1-12).

The "basic" windspeed is approximately 113 mph, as estimated by linear interpolation from the plot of basic wind speeds in Figure 6-1A of ASCE 7-05 (Reference 2.3.1-12) for that portion of the United States that includes the VCS site. The site is located in a hurricane-prone region as defined in Section 6.2 of the ASCE-SEI design standard. This value is associated with a mean recurrence interval of 50 years. Section C6.0 (Table C6-3) of the ASCE-SEI design standard provides conversion factors for estimating the 3 second gust wind speeds for other recurrence intervals (Reference 2.3.1-12). Based on this guidance, the 100-year return period value is determined by multiplying the 50-year return period value by a factor of 1.07, which yields a 100-year return period 3-second gust wind speed for the site of approximately 121 mph.

The National Oceanic and Atmospheric Administration's Coastal Services Center (NOAA-CSC) provides a comprehensive historical database of tropical cyclone tracks, extending from 1851, based on information compiled by the National Hurricane Center. This database indicates that a total of 62 tropical cyclone storm tracks have passed within a 100-nautical-mile radius of the VCS site during this historical period (Reference 2.3.1-14). The maximum wind speed observed in the site region was from an unnamed storm in 1886. The peak 1-minute wind speed for the storm is reported as 155 mph. This was converted, using the method detailed in Reference 2.3.1-38, to an equivalent peak 3-second gust of 160 mph for the VCS site. This wind speed accounts for the change in roughness as the hurricane makes landfall and is representative of the transition that all hurricanes undergo as they move inland. This is similar to peak winds observed inland during Hurricane Carla (September 1961) and Hurricane Celia (180 mph adjusted for increased surface roughness to 154 mph inland, August 1970) (References 2.3.1-14, 2.3.1-17, and 2.3.1-28).

{Using the methodology specified in RG 1.221 (Reference 2.3.1-39), it was determined that the nominal 3-second wind gust speed that can be expected to occur at the VCS site with a return period of 10^7 years is 190 mph (171 mph fastest mile) at 10 meters (33 feet) above ground level.}

The following reference will be added to SSAR Subsection 2.3.1.8:

2.3.1-39 U.S. NRC, *Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants*, Regulatory Guide 1.221, Revision 0, October 2011.

ER Subsection 2.7.3.2 will be revised in a future revision as follows:

Estimating the wind loading on plant structures ~~for design and operating bases~~ considers the "basic" wind speed, which is the "3-second gust speed at 33 feet (10 meters) above the ground in Exposure Category C," as defined in Sections 6.2 and 6.3 of the ASCE

SEI design standard, *Minimum Design Loads for Buildings and Other Structures* (ASCE 2005).

The "basic" windspeed is approximately 113 mph, as estimated by linear interpolation from the plot of basic wind speeds in Figure 6-1A of ASCE 7-05 for that portion of the United States that includes the VCS site. The site is located in a hurricane-prone region as defined in Section 6.2 of the ASCE-SEI design standard. This value is associated with a mean recurrence interval of 50 years. Section C6.0 (Table C6-3) of the ASCE-SEI design standard provides conversion factors for estimating the 3-second gust wind speeds for other recurrence intervals. Based on this guidance, the 100-year return period value is determined by multiplying the 50-year return period value by a factor of 1.07, which yields a 100-year return period 3-second gust wind speed for the site of approximately 121 mph.

The National Oceanic and Atmospheric Administration's Coastal Services Center (NOAA-CSC) provides a comprehensive historical database of tropical cyclone tracks, extending from 1851, based on information compiled by the National Hurricane Center. This database indicates that a total of 62 tropical cyclone storm tracks have passed within a 100-nautical-mile radius of the VCS site during this historical period (NOAA-CSC Sep 2009). The maximum wind speed observed in the site region was from an unnamed storm in 1886. The peak 1-minute wind speed for the storm is reported as 155 mph. This was converted, using the method detailed in Simiu, Vickery and Kareem (July 2007), to an equivalent peak 3- second gust of 160 mph for the VCS site. This wind speed accounts for the change in roughness as the hurricane makes landfall and is representative of the transition that all hurricanes undergo as they move inland. This is similar to peak winds observed inland during Hurricane Carla (September 1961) and Hurricane Celia (180 mph adjusted for increased surface roughness to 154 mph inland, August 1970) (NOAA-CSC Sep 2009, NCDC Jun 2004, U.S. Weather Bureau 1961).

{Using the methodology specified in RG 1.221 (U.S. NRC Oct 2011), it was determined that the nominal 3-second wind gust speed that can be expected to occur at the VCS site with a return period of 10^7 years is 190 mph (171 mph fastest mile) at 10 meters (33 feet) above ground level.}

The following reference will be added to ER Subsection 2.7.8:

U.S. NRC Oct 2011, U.S. Nuclear Regulatory Commission, *Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants*, Regulatory Guide 1.221, Revision 0, October 2011.

RAI 11.02-6:

Question:

The staff applies the current SRP review process of the LWMS system covering Part 50 Appendix I design objectives and ALARA provisions assuring compliance with Part 20 for workers and members of the public. In the review of SSAR Table 11.2.3-2, there are six different reactor design source terms provided to determine the PPE source term for the Victoria County ESP. However, these source terms are not referenced to an exact reactor design. In order to perform a validation and verification of each design source term that will be utilized in determination of a PPE source term, the staff requests the applicant to supply the DCD name, revision number and section table number(s) of each design source term; and, to provide the documentation for the source terms in other sections where applicable in the SSAR. In addition, please provide a SSAR mark up indicating the references used to provide the PPE source term tables as accordingly.

Response:

As indicated in SSAR Subsection 11.2.3.2, the liquid activity release source term for the proposed units is a conservative, bounding composite that was obtained by selecting the greatest activity for each radionuclide from the six reactor technologies identified in SSAR Section 1.10. Table 11.2.3-2 lists the liquid activity release source terms on a per-radionuclide basis for each of the six reactor technologies, highlights the greatest activity for each radionuclide from the source terms for the six reactor types, and provides the composite liquid activity release source term under the "Max" column. The values provided under the "Max" column comprise the source term used for calculating doses related to liquid effluents. Table 1 summarizes the reference documents from which the values for each of the reactor-technology-specific liquid activity release source term were taken.

Although not specifically the subject of this RAI, as indicated in SSAR Subsection 11.3.3.2, the process for obtaining the gaseous activity release source term is similar to that for the liquid activity release source term. Table 1 also summarizes the reference documents from which the values for each of the reactor-technology-specific gaseous activity release source term were taken.

For the analysis presented in SSAR 2.4.13, a liquid effluent release to groundwater is assumed from a generically-termed liquid radioactive waste management tank. The bounding source term, presented in Table 2.4.13-1, is assumed to consist of the highest concentration for each radionuclide of the reactor technologies considered. Table 1 summarizes the reference documents from which the values for each of the reactor-technology-specific accidental liquid radioactive release source terms were taken.

It is noted that information for the reference documents for the different SSAR Chapter 15 source terms was previously provided to the NRC in response to application acceptance review questions and has been incorporated into the VCS ESPA, Revision 1, submitted to the NRC on March 22, 2012.

RAI References:

1. Document APP-GW-GL-700, *AP1000 Design Control Document*, Tier 2, Westinghouse, Revision 17, 2008.

2. Document MUAP-DC001, *APWR Design Control Document for the US-APWR*, Tier 2, Mitsubishi Heavy Industries, Ltd., Revision 1, 2008.

3. *ABWR Design Control Document*, Tier 2, GE Nuclear Energy, Revision 4, 1997.

4. Document 26A6642, *ESBWR Design Control Document*, Tier 2 Material, GE-Hitachi Nuclear Energy, Revision 6, 2009.

5. Mitsubishi transmittal to Exelon dated September 11, 2009 for Accidental Liquid Release source term information.

6. GEH letter GEEX-VA0-2009-003 dated September 11, 2009, "Response to Request for Plant parameter Envelope Values."

7. GEH letter GEEX-VA0-2012-0001 dated March 20, 2012, "Victoria County Early Site Permit (ESP) ABWR Plant Parameter Envelope (PPE) table 8a basis."

8. Toshiba letter dated September 29, 2009, to Exelon "Plant Parameter Envelope Values."

9. B&W letter to Exelon BW-JAH-2009-203 dated September 11, 2009 (Attachment 1).

10. B&W letter to Exelon BW-JAH-2009-201 dated September 8, 2009 (Attachment 2).

Associated ESPA Revision:

No ESPA revision is required as a result of this response.

Table 1: Reference Documents Used for Activity Release Source Terms

Reactor Technology	Reference Document for Activity Release Source Term		
	Liquid Effluent	Gaseous Effluent	Accidental Liquid Release
AP1000	Reference 1, Table 11.2-7	Reference 1, Table 11.3-3	Reference 1, Table 11.1-8 for H-3 and Table 11.1-2 for all other radionuclides[a]
APWR	Reference 2, Table 11.2-10	Reference 2, Table 11.3-5 (Sheets 1 through 3)	Reference 5[f] for H-3 and Reference 2, Table 11.1-9[b] for other radionuclides
ABWR-GEH	Reference 6 & 7[d]	Reference 3, Table 12.2-20	Reference 3, Greater value of that provided in Table 12.2-13a and Table 12.2-13d on a per radionuclide basis
ABWR-Toshiba	Reference 3, Table 12.2-22	Reference 3, Table 12.2-20	Reference 8[e]
ESBWR	Reference 4, Table 12.2-19b	Reference 4, Table 12.2-17	Reference 4, Table 12.2-13a
mPower	Reference 9	Reference 9[c]	Reference 10

[a] The source term is defined as 101% reactor coolant activity as provided in Table 11.1-8 for H-3 and Table 11.1-2 for all other radionuclides. Radionuclides other than corrosion products have been multiplied by a factor of (0.12/0.25) to account for a realistic assumption for fuel defects (0.12%) versus the design basis assumption for fuel defects (0.25%) applied in Table 11.1-2.

[b] The source term is based on the greater activity between those in the holdup tank and the boric acid tank. Holdup tank and boric acid tank activities are based on the realistic reactor coolant activity provided in Table 11.1-9 and take into account the following: volume of the tank from Table 11.2-16, fraction of primary coolant activity from Table 11.2-16, tank factor from Table 11.2-16, decontamination factor from Table 11.2-7, and decay time from Table 11.2-9.

[c] As the source term for the mPower is still being developed, the ESPA used the C-14 gaseous release value provided in NUREG-0017 for a 3400 MWt PWR, using no scaling to adjust for the much lower thermal power of the mPower. However, multiplying this value by six to account for six mPower reactors (a total of 2550 MWt) would be overly conservative. As such, the next highest C-14 release (for the ESBWR), which is greater than that in NUREG-0017, is used to represent the six mPower reactors in the composite source term. If the mPower design is selected, the C-14 releases will be confirmed and used in the gaseous effluent dose calculation at the COL stage.

[d] GEH response referred to work developed for South Texas Project COLA Table 12.2-22, which is also applicable for the Victoria County ESP.
[e] Toshiba response referred to work completed for South Texas Project COLA Table 2.4S.13-1, which is also applicable for the Victoria County ESP.
[f] The value for H-3 for the APWR was originally provided to Exelon in Reference 5. This information is now contained in Table 11.2-17 of Revision 3 of the APWR DCD, MUAP-DC001, *APWR Design Control Document for the US-APWR*, Tier 2, Mitsubishi Heavy Industries, Ltd., dated 2011.

B&W babcock & wilcox nuclear power generation

Ms. Marilyn Kray
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Exelon Generation
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BW-JAH-2009-203

September 11, 2009

Subject: TODI Number 25352-000-GRI-GEX-00314

Dear Ms. Kray,

The Babcock & Wilcox Company has reviewed the subject TODI and prepared a response contained in the attached document number 93-00000223-000, Revision 0.

If you have any questions regarding this assessment, please feel free to contact myself or Mike Childerson at (434) 522-3846.

Thank you very much for the opportunity to participate in the ESP process for the Victoria Station.

Sincerely,

Jeff Halfinger
Program Director
Babcock & Wilcox Company

Attachment 1
Plant Parameters Envelope (PPE) Worksheet
Technology Supplier Input

Table 7e mPower One Unit Average Annual Normal Gaseous Release	
Isotope	Release 1 Unit Ci/yr
Kr-85m	4.5E+00
Kr-85	5.1E+02
Kr-87	1.9E+00
Kr-88	5.8E+00
Xe-131m	2.3E+02
Xe-133m	1.1E+01
Xe-133	5.8E+02
Xe-135m	8.8E-01
Xe-135	4.1E+01
Xe-138	7.5E-01
I-131	1.5E-02
I-133	5.0E-02
Cr-51	7.6E-05
Mn-54	5.4E-05
Co-57	1.0E-06
Co-58	2.9E-03
Co-60	1.1E-03
Fe-59	9.9E-06
Sr-89	3.8E-04
Sr-90	1.5E-04
Zr-95	1.3E-04
Nb-95	3.1E-04
Ru-103	1.0E-05
Ru-106	9.8E-06
Sb-125	7.6E-06
Cs-134	2.9E-04
Cs-136	1.1E-05
Cs-137	4.5E-04
Ba-140	5.3E-05
Ce-141	5.3E-06
H-3	4.4E+01
C-14	7.3E+00
Ar-41	3.4E+01

Exelon Early Site Permit Project

Table 8e mPower One Unit (B&W)) Average Annual Normal Liquid Radioactive Release			
Isotope	Release 1 Unit Ci/yr	Isotope	Release 1 Unit Ci/yr
Na-24	2.04E-04	Te-129m	1.50E-05
Cr-51	2.31E-04	Te-129	1.88E-05
Mn-54	1.63E-04	Te-131m	1.13E-05
Fe-55	1.25E-04	Te-131	3.75E-06
Fe-59	2.50E-05	I-131	1.77E-03
Co-58	4.20E-04	Te-132	3.00E-05
Co-60	5.50E-05	I-132	2.05E-04
Zn-65	5.13E-05	I-133	8.38E-04
W-187	1.63E-05	I-134	1.01E-04
Np-239	3.00E-05	Cs-134	1.24E-03
Br-84	2.50E-06	I-135	6.21E-04
Rb-88	3.38E-05	Cs-136	7.88E-05
Sr-89	1.25E-05	Cs-137	1.67E-03
Sr-90	1.25E-06	Ba-137m	1.56E-03
Sr-91	2.50E-06	Ba-140	6.90E-04
Y-91m	1.25E-06	La-140	9.29E-04
Y-93	1.13E-05	Ce-141	1.13E-05
Zr-95	2.88E-05	Ce-143	2.38E-05
Nb-95	2.63E-05	Pr-143	1.63E-05
Mo-99	7.13E-05	Ce-144	3.95E-04
Tc-99m	6.88E-05	Pr-144	3.95E-04
Ru-103	6.16E-04	H-3	1.26E+02
Rh-103m	6.16E-04		
Ru-106	9.19E-03		
Rh-106	9.19E-03		
Ag-110m	1.31E-04		
Ag-110	1.75E-05		

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BW-JAH-2009-201
September 8, 2009

Ms. Marilyn Kray
Vice President, Project Development
Exelon Generation
200 Exelon Way
Suite 340
Kennett Square, PA 19348

Subject: TODI Number 25352-000-GRI-GEX-00309

Dear Ms. Kray;

The Babcock & Wilcox Company has reviewed the subject TODI and prepared a response contained in the attached document number 93-00000221-000, Revision 0.

The attached describes the potential release from the refueling water storage tank which is one of the major potential sources of radioactive release. The design of the plant has not proceeded far enough however to quantify with certainty that this will be the largest source of release. The B&W mPower primary coolant purification system and associated radioactive waste systems are similar to other PWRs except that soluble boron is not used for normal reactivity control. Based on the methodology provided in ANSI/ANS-18.1-1999, the total curie content of the key radionuclides in the applicable coolant and waste streams is equal to or less than those calculated for large PWR designs per thermal megawatt of core power. Therefore the maximum inventories calculated for the other plants will envelop the B&W mPower design.

If you have any questions regarding this assessment, please feel free to contact myself or Mike Childerson at (434)522-3846.

Thank you very much for the opportunity to participate in the ESP process for the Victoria Station.

Sincerely,

Jeff Halfinger
Program Director
Babcock & Wilcox Company

Response to TODI 25352-000-GRI-GEX-00309

Table 1. Nuclide Activity Concentrations in RWST Following Each Refueling Cycle in [μCi/g]

Nuclide	After Fuel Cycle 1 [μCi/g]	After Fuel Cycle 2 [μCi/g]	After Fuel Cycle 3 [μCi/g]	After Fuel Cycle 4 [μCi/g]	After Fuel Cycle 5 [μCi/g]	After Fuel Cycle 6 [μCi/g]	After Fuel Cycle 7 [μCi/g]	After Fuel Cycle 8 [μCi/g]	After Fuel Cycle 9 [μCi/g]	After Fuel Cycle 10 [μCi/g]	After Fuel Cycle 11 [μCi/g]
Br-84	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06	2.1E-06
I-131	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07
I-132	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06
I-133	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06	1.8E-06
I-134	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05
I-135	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06	4.9E-06
Rb-88	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03	1.3E-03
Cs-134	6.1E-08	6.4E-08	6.5E-08	6.5E-08	6.5E-08	6.5E-08	6.5E-08	6.5E-08	6.5E-08	6.5E-08	6.5E-08
Cs-136	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06	1.5E-06
Cs-137, Ba-137m	8.7E-08	1.1E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07
H-3	2.4E-02	3.6E-02	4.2E-02	4.5E-02	4.6E-02	4.7E-02	4.7E-02	4.8E-02	4.8E-02	4.8E-02	4.8E-02
Na-24	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06	3.5E-06
Cr-51	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07
Mn-54	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08	8.9E-08
Fe-55	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08	6.7E-08
Fe-59	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08	1.7E-08
Co-58	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07	2.6E-07
Co-60	2.9E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08	3.0E-08
Zn-65	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08	2.8E-08
Sr-89	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09	7.8E-09
Sr-90	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10	6.7E-10
Sr-91	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08	7.8E-08
Y-91m	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08	5.8E-08
Y-91	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10
Y-93	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07	3.4E-07
Zr-95	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08	2.2E-08
Nb-95	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08
Mo-99	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07	3.9E-07
Tc-99m	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07

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Nuclide	After Fuel Cycle 1 [µCi/g]	After Fuel Cycle 2 [µCi/g]	After Fuel Cycle 3 [µCi/g]	After Fuel Cycle 4 [µCi/g]	After Fuel Cycle 5 [µCi/g]	After Fuel Cycle 6 [µCi/g]	After Fuel Cycle 7 [µCi/g]	After Fuel Cycle 8 [µCi/g]	After Fuel Cycle 9 [µCi/g]	After Fuel Cycle 10 [µCi/g]	After Fuel Cycle 11 [µCi/g]
Ru-103	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07	4.2E-07
Ru-106	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06	5.0E-06
Ag-110m	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08	7.2E-08
Te-129m	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08	1.1E-08
Te-129	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06	2.9E-06
Te-131m	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08	9.9E-08
Te-131	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06
Te-132	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07	1.0E-07
Ba-140	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07	7.4E-07
La-140	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06	1.6E-06
Ce-141	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09	8.4E-09
Ce-143	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07
Ce-144	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07	2.2E-07
W-187	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07	1.7E-07
Np-239	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07

ATTACHMENT 3

SUMMARY OF REGULATORY COMMITMENTS

(Exelon Letter to USNRC, NP-12-0008, dated March 28, 2012)

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)
Exelon will revise the VCS ESPA SSAR Subsections 1.9, 2.0, and 2.3.1, and ER Subsection 2.7 to incorporate the changes shown in the enclosed response to the following NRC RAI: 02.03.01-2 (Attachment 1)	Revision 2 of the ESPA SSAR and ER planned for no later than March 31, 2013	Yes	No