R. R. Sgarro
Director - Regulatory Affairs

PPL Bell Bend, LLC
Two North Ninth Street
Allentown, PA18101-1179
Tel. 610.774.7552 Fax 610.774.2618
rrsgarro@pplweb.com

October 11, 2013

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

BELL BEND NUCLEAR POWER PLANT
CHANGES TO COLA PART 3 FROM REVISED WIND DIRECTION INFORMATION
BNP-2013-132 Docket No. 52-039

Reference: BNP-2013-050, R. R. Sgarro (PPL Bell Bend, LLC) to U.S. NRC, "Submittal of Bell Bend COLA Revision 4" dated April 12, 2013.

This letter provides changes to Revision 4 of the Bell Bend Nuclear Power Plant (BBNPP) Combined License Application (COLA) submitted by PPL Bell Bend, LLC (PPL) with the referenced letter. A correction in the application of wind direction resulted in changes to the results of several airborne release calculations reflected in the BBNPP COLA Part 3, Environmental Report (ER). The changes are illustrated in the Enclosure to this letter.

Upon identification of misapplication of the wind direction, the condition was investigated, corrective actions taken, and extent of condition was identified. The changes to the ER are a result of the corrective actions.

The revised information will be included in the next Revision to the BBNPP COLA, and is the only regulatory commitment in this correspondence.

Should you have questions, please contact the undersigned at 610.774.7552.

Respectfully,

Rocco R. Sgarro

Rocco R. Sgarro

RRS/kw

Enclosure: Markup of Changes to BBNPP COLA Part 3

D102
NRO

cc: (w/ Enclosure)

Ms. Laura Quinn-Willingham
Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

(w/o Enclosure)

Mr. Michael Takacs
Project Manager
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mail Stop T6-E55M
Rockville, MD 20852

Mr. William Dean
Regional Administrator
U.S. Nuclear Regulatory Commission
Region I
2100 Renaissance Blvd., Suite 100
King of Prussia, PA 19406-2713

Enclosure

Markup of Changes to BBNPP COLA Part 3

- Containment combustible gas control system, including passive autocatalytic recombiners and gas mixing system
- Core stabilization system
- Passive cooling of molten core debris
- Active spray for environmental control of the containment atmosphere
- Active recirculation cooling of the molten core debris and containment atmosphere

The core damage frequency (CDF) is a measure of the impacts of potential accidents. CDF is estimated using PRA modeling which evaluates how changes to the reactor or auxiliary systems can change the severity of the accident. The CDF for the U.S. EPR is less than the CDFs for the current U.S. nuclear fleet.

7.2.2.1 Air Pathways

The potential severe accidents for the U.S. EPR were grouped into 23 release categories based on their similarity of characteristics. Each release category was assigned a set of characteristics representative of the elements of that class. Each release category was analyzed with MACCS2 to estimate population dose, number of early and latent fatalities, cost, and farm land requiring decontamination. The analysis assumed that 95 percent of the population was evacuated following declaration of a general emergency.

For each release category, risk was calculated by multiplying each consequence (population dose, fatalities, cost, and contaminated land) with its corresponding frequency. A summary of the results are provided in Table 7.2-3. The calculation considers other consequences, such as evacuation costs, value of crops contaminated and condemned, value of milk contaminated and condemned, cost of decontamination of property, and indirect costs resulting from loss of use of the property and incomes derived as a result of the accident.

1.22E-03

7.2.2.2 Surface Water Pathways

Population can be exposed to radiation when airborne radioactivity is deposited onto surface water. The exposure pathway can be from drinking the water, external radiation from submersion in the water, external radiation from activities near the shoreline, or ingestion of fish or shellfish. MACCS2 only calculates the dose from drinking water. The MACCS2 severe accident dose-risk to the 50-mile population from drinking water is ~~9.98E-04~~ person-rem per year for the U.S. EPR. This value is the sum of all 23 release categories.

Surface water pathways involving swimming, fishing, and boating are not modeled by MACCS2. Surface water bodies within the 50 mi (80 km) region of BBNPP include the Susquehanna River, Lehigh River, Beltzville Lake, and other smaller bodies of water. The NRC evaluated doses from the aquatic food pathway (fishing) for the current nuclear fleet discharging to various bodies of water in NUREG 1437, the Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NRC, 1996). The NRC evaluation concluded that with interdiction, the risk associated with the aquatic food pathway is found to be small relative to the atmospheric pathway for most sites and essentially the same as the atmospheric pathway for the few sites with large annual aquatic food harvests (which does not include BBNPP). Because the U.S. EPR atmospheric pathway doses are significantly lower that those of the current U.S. nuclear fleet, the doses from surface water sources would be consistently lower for the U.S. EPR as well.

7.2.2.3 Groundwater Pathways

Population can also receive a dose from groundwater pathways. Radioactivity released during an accident can enter groundwater that serves as a source of drinking water or irrigation, or can move through an aquifer that eventually discharges to surface water. The consequences of a radioactive spill not associated with an accident in COL application FSAR Section 2.4.13 have been evaluated and it has been determined that if radioactive liquids were released directly to groundwater, all isotopes would be below maximum permissible concentrations before they reached the local groundwater sources.

NUREG-1437 also evaluated the groundwater pathway dose, based on the analysis in NUREG 0440 (NRC, 1978), the Liquid Pathway Generic Study (LPGS). NUREG-0440 analyzed a core meltdown that contaminated groundwater that subsequently contaminated surface water. However, NUREG-0440 did not analyze direct drinking of groundwater because of the limited number of potable groundwater wells.

The LPGS results provide conservative, uninterdicted population dose estimates for six generic categories of plants. These dose estimates were one or more orders of magnitude less than those attributed to the atmospheric pathway. NUREG-1437 compared potential contamination at representative sites, including the existing Susquehanna Steam Electric Station (SSES). The conclusion for those sites is that the uninterdicted population doses are significantly less than the NUREG 0440 generic site. The proposed location for BBNPP has the same groundwater characteristics as the location of the existing SSES units and the CDF for the U.S. EPR is lower than that of the existing SSES units. Therefore, the doses from the BBNPP groundwater pathway would be smaller than from the existing SSES units.

7.2.3 Conclusions

The total calculated dose-risk to the 50 mi (80 km), year 2050 estimated population from airborne releases from a U.S. EPR reactor at BBNPP is expected to be approximately ~~0.22~~ 0.18 person-rem per year (Table 7.2-3). The fraction of core inventory assumed to be released in each of the release categories is also included in Table 7.2-2. The number of persons exposed to doses greater than 200 rem (2 Sv) and 25 rem (0.25 Sv) are ~~1.92E-05 and 2.55E-04,~~ 2.46E-05 3.49E-04 respectively. It must be noted that these populations exceeding a dose are only calculated by MACCS2 for the early phase of an accident, the long-term dose that could be accumulated is not included in this result. Long-term doses are mitigated by emergency response and remedial measures.

The U.S. EPR dose-risk at the BBNPP site is less than the population risk for current reactors that have undergone license renewal, and less than that for the five reactors analyzed in NUREG-1150 (NRC, 1990). As reported in NUREG-1811 (NRC, 2006), the lowest dose-risk reported for reactors currently undergoing license renewal is 0.55 person-rem per year.

The analysis indicates that risk from the water ingestion dose is small at ~~9.98E-04~~ 1.22E-03 person-rem per year. As discussed in Section 7.2.2, risks from aquatic food pathway is small compared with the atmospheric pathway of the current U.S. nuclear fleet. As discussed in Section 7.2.3, the risk of groundwater contamination from a BBNPP severe accident is one or more orders of magnitude less than the risk from the atmospheric pathway for currently licensed reactors. Additionally, interdiction could substantially reduce the groundwater pathway risks.

The probability-weighted number of cancer fatalities from a severe accident for the U.S. EPR at BBNPP is reported in Table 7.2-3 as ~~1.30 E-04~~ 1.18E-04 per year, at 50 miles from the plant. The lifetime probability of an individual dying from any cancer is 2.3 E-01 (NCHS, 2007).

Table 7.2-3— U.S. EPR Severe Accidents Analysis Impacts - 50-Mile Radius and 2050 Population

		~~Number of Fatalities (per year) at 50 mi (80km)~~		~~Environmental Risk (per year) at 50 mi (80km)~~			
~~Release Category~~	~~Release Category Frequency (per year)~~	~~Early Fatalities~~	~~Latent Cancers~~	~~Population Dose Risk (person-rem)~~	~~Water Ingestion Dose Risk (person-rem)~~	~~Cost (dollars)~~	~~Land Requiring Decontamination (acres)~~
~~RC101~~	~~3.43E-07~~	~~0.00E+00~~	~~4.36E-06~~	~~8.99E-03~~	~~9.50E-06~~	~~1.03E+00~~	~~1.58E-04~~
~~RC201~~	~~4.98E-10~~	~~8.67E-12~~	~~6.37E-07~~	~~1.40E-03~~	~~1.74E-05~~	~~1.78E+00~~	~~7.17E-05~~
~~RC202~~	~~3.97E-14~~	~~3.86E-17~~	~~4.84E-11~~	~~1.03E-07~~	~~2.53E-10~~	~~1.04E-04~~	~~6.75E-09~~
~~RC203~~	~~1.92E-12~~	~~3.19E-14~~	~~3.61E-09~~	~~7.35E-06~~	~~2.23E-08~~	~~7.89E-03~~	~~4.22E-07~~
~~RC204~~	~~2.78E-11~~	~~7.87E-14~~	~~3.67E-08~~	~~7.65E-05~~	~~1.85E-07~~	~~7.95E-02~~	~~4.98E-06~~
~~RC205~~	~~4.08E-10~~	~~3.61E-12~~	~~8.45E-07~~	~~1.67E-03~~	~~7.14E-06~~	~~1.94E+00~~	~~9.26E-05~~
~~RC206~~	~~1.65E-08~~	~~1.32E-09~~	~~1.31E-05~~	~~2.51E-02~~	~~9.24E-05~~	~~2.11E+01~~	~~1.50E-03~~
~~RC301~~	~~1.67E-12~~	~~1.62E-15~~	~~2.04E-09~~	~~4.34E-06~~	~~1.07E-08~~	~~4.36E-03~~	~~2.84E-07~~
~~RC302~~	~~2.18E-11~~	~~3.62E-13~~	~~4.10E-08~~	~~8.35E-05~~	~~2.53E-07~~	~~8.96E-02~~	~~4.80E-06~~
~~RC303~~	~~2.30E-09~~	~~6.51E-12~~	~~3.04E-06~~	~~6.33E-03~~	~~1.53E-05~~	~~6.58E+00~~	~~4.12E-04~~
~~RC304~~	~~1.75E-08~~	~~1.55E-10~~	~~3.62E-05~~	~~7.16E-02~~	~~3.06E-04~~	~~8.31E+01~~	~~3.97E-03~~
~~RC401~~	~~1.38E-11~~	~~0.00E+00~~	~~8.03E-09~~	~~1.74E-05~~	~~3.91E-08~~	~~1.25E-02~~	~~9.72E-07~~
~~RC402~~	~~2.75E-10~~	~~0.00E+00~~	~~3.05E-07~~	~~6.63E-04~~	~~1.87E-06~~	~~6.66E-01~~	~~4.46E-05~~
~~RC403~~	~~6.82E-10~~	~~0.00E+00~~	~~3.97E-07~~	~~8.59E-04~~	~~1.93E-06~~	~~6.20E-01~~	~~4.80E-05~~
~~RC404~~	~~1.34E-08~~	~~0.00E+00~~	~~1.49E-05~~	~~3.23E-02~~	~~9.11E-05~~	~~3.24E+01~~	~~2.17E-03~~
~~RC501~~	~~5.92E-13~~	~~0.00E+00~~	~~1.02E-10~~	~~2.24E-07~~	~~1.01E-10~~	~~3.10E-05~~	~~1.73E-08~~
~~RC502~~	~~2.87E-10~~	~~0.00E+00~~	~~4.94E-08~~	~~1.08E-04~~	~~4.91E-08~~	~~1.50E-02~~	~~8.38E-06~~
~~RC503~~	~~6.01E-10~~	~~0.00E+00~~	~~1.85E-08~~	~~4.12E-05~~	~~2.05E-08~~	~~1.34E-03~~	~~1.05E-06~~
~~RC504~~	~~1.19E-07~~	~~0.00E+00~~	~~3.67E-06~~	~~8.15E-03~~	~~4.06E-06~~	~~2.65E-01~~	~~2.07E-04~~
~~RC602~~	~~6.50E-10~~	~~0.00E+00~~	~~1.12E-07~~	~~2.46E-04~~	~~1.11E-07~~	~~3.40E-02~~	~~1.90E-05~~
~~RC701~~	~~1.02E-08~~	~~1.18E-13~~	~~8.06E-06~~	~~1.55E-02~~	~~3.07E-05~~	~~1.22E+01~~	~~8.57E-04~~
~~RC702~~	~~5.38E-09~~	~~1.85E-09~~	~~3.54E-05~~	~~4.14E-02~~	~~3.21E-04~~	~~3.49E+01~~	~~1.32E-03~~
~~RC802~~	~~2.64E-10~~	~~1.22E-09~~	~~8.58E-06~~	~~7.66E-03~~	~~9.87E-05~~	~~2.67E+00~~	~~5.97E-05~~
~~Total~~	~~5.31E-07~~	~~4.56E-09~~	~~1.30E-04~~	~~2.22E-01~~	~~9.98E-04~~	~~2.00E+02~~	~~1.10E-02~~

Insert 1

Insert 1

Release Category	Release Category Frequency (per year)	Number of Fatalities (per year) at 50 mi (80 km)		Environmental Risk (per year) at 50 mi (80 km)			
		Early Fatalities	Latent Cancers	Population Dose Risk (person-rem)	Water Ingestion Dose Risk (person-rem)	Cost (dollars)	Land Requiring Decontamination (acres)
RC101	3.43E-07	0.00E+00	6.62E-06	1.38E-02	1.21E-05	6.38E+00	2.71E-04
RC201	4.98E-10	1.73E-11	4.63E-07	9.61E-04	1.85E-05	1.19E+00	4.50E-05
RC202	3.97E-14	2.50E-17	3.28E-11	6.71E-08	2.98E-10	7.70E-05	5.24E-09
RC203	1.92E-12	3.28E-14	2.71E-09	5.16E-06	2.59E-08	5.01E-03	3.03E-07
RC204	2.78E-11	5.25E-14	2.61E-08	5.14E-05	2.15E-07	5.64E-02	3.81E-06
RC205	4.08E-10	4.03E-12	6.41E-07	1.17E-03	7.96E-06	1.22E+00	6.61E-05
RC206	1.65E-08	8.86E-10	1.42E-05	2.39E-02	1.09E-04	2.33E+01	1.27E-03
RC301	1.67E-12	1.05E-15	1.38E-09	2.82E-06	1.25E-08	3.24E-03	2.20E-07
RC302	2.18E-11	3.73E-13	3.07E-08	5.86E-05	2.94E-07	5.69E-02	3.44E-06
RC303	2.30E-09	4.35E-12	2.16E-06	4.26E-03	1.78E-05	4.67E+00	3.15E-04
RC304	1.75E-08	1.73E-10	2.75E-05	5.01E-02	3.41E-04	5.22E+01	2.84E-03
RC401	1.38E-11	0.00E+00	5.80E-09	1.20E-05	3.85E-08	1.01E-02	8.80E-07
RC402	2.75E-10	0.00E+00	2.09E-07	4.40E-04	1.91E-06	4.62E-01	3.49E-05
RC403	6.82E-10	0.00E+00	2.86E-07	5.95E-04	1.90E-06	5.01E-01	4.35E-05
RC404	1.34E-08	0.00E+00	1.02E-05	2.14E-02	9.30E-05	2.25E+01	1.70E-03
RC501	5.92E-13	0.00E+00	7.87E-11	1.73E-07	1.00E-10	3.26E-05	1.48E-08
RC502	2.87E-10	0.00E+00	3.82E-08	8.38E-05	4.85E-08	1.58E-02	7.18E-06
RC503	6.01E-10	0.00E+00	1.26E-08	2.82E-05	1.62E-08	2.10E-03	9.86E-07
RC504	1.19E-07	0.00E+00	2.50E-06	5.57E-03	3.20E-06	4.17E-01	1.95E-04
RC602	6.50E-10	0.00E+00	8.65E-08	1.90E-04	1.10E-07	3.58E-02	1.63E-05
RC701	1.02E-08	9.59E-14	7.36E-06	1.33E-02	4.38E-05	1.24E+01	7.92E-04
RC702	5.38E-09	5.36E-09	3.73E-05	3.85E-02	4.57E-04	2.54E+01	1.03E-03
RC802	2.64E-10	5.91E-09	8.42E-06	7.08E-03	1.08E-04	1.62E+00	4.20E-05
Total	5.31E-07	1.24E-08	1.18E-04	1.81E-01	1.22E-03	1.52E+02	8.67E-03

The screening categories were chosen based on guidance from NEI 05-01. The U.S. EPR DC ER contains a detailed description of each of the categories. The screening categories are applicable to BBNPP.

The SAMDA candidates categorized as "Not required for design certification" in the AREVA NP Environmental Report Standard Design Certification were re-evaluated for BBNPP. These SAMDA candidates were re-evaluated using the screening methdology in AREVA NP Environmental Report Standard Design Certification. An additional screening category called "Not a design alternative" was used to capture any SAMDA candidate not related to plant design. This category included SAMDA candidates related to procedure modifications, training, or surveillance. If a SAMDA candidate is related to any of these enhancements, it is not retained for this analysis.

After the screening process was completed, the SAMDA candidates that were placed in the Considered for Further Evaluation category would require a cost-benefit evaluation. The cost-benefit evaluation of each SAMDA candidate would determine the cost of implementing the specific SAMDA candidate with the maximum averted cost risk from the implementation of the specific SAMDA candidate. The maximum averted cost risk, typically referred to as the maximum benefit, equates to the cost obtained by the elimination of all severe accident risk.

7.3.2 Severe Accident Cost Impact and Maximum Benefit for BBNPP

The severe accident impact is determined by summing the occupational exposure cost, on-site cost, public exposure, and off-site property damage. The methodologies provided in NEI 05-01 (NEI, 2005) and NUREG/BR-0184 (NRC, 1997) were used as guidance. The principal inputs to the calculations were the CDF, 2,000 dollars per person-rem (NRC, 1997), licensing period of 60 years, 7% best estimate discount rate (NEI, 2005), and 3% upper bound discount rate (NEI, 2005). The maximum benefit calculation performed in the U.S. EPR DC ER used the whole body dose and economic impact from U.S. EPR Level 3 PRA analysis, which was based on population data from 2000. The maximum benefit calculation for BBNPP uses the economic impact and whole body dose for a 2050 population (Table 7.3-1). The point estimate and mean value CDF with 2008 replacement power costs severe accident impact cost for BBNPP is also shown in Table 7.3-1.

The total cost impact of a severe accident (maximum benefit) must account for the risk contribution from internal initiating events, internal flooding, fire, and seismic. The total core damage frequency (CDF) at power for the U.S. EPR design includes the contribution from internal initiating events (55%), internal flooding (12%), and fire (33%) (AREVA, 2007b). A seismic margin assessment instead of a seismic PRA was completed for the U.S. EPR design. The seismic margin analysis yields valuable information regarding the ruggedness of the seismic design with respect to the potential severe accident (AREVA, 2007b). However, it does not result in the estimation of seismic CDF which is used to determine the cost impact of a severe accident in the SAMDA analysis. In order to account for the seismic contribution, it was assumed that the seismic risk is equivalent to the fire risk since the fire risk in the U.S. EPR PRA analysis was evaluated to be the highest external event risk at 33% of the total CDF.

$69,955

Increasing the severe accident impact by 33 percent includes the contribution from seismic risk and is the maximum benefit for BBNPP. The maximum benefit for BBNPP based on the point estimate CDF with 2008 replacement power costs is ~~$72,388~~.Severe Accident Mitigation Design Alternati

$90,336

The percentage contributions of each hazards group are slightly different for the mean value CDF. Therefore, seismic risk based on the mean value CDF is assumed to be 28 percent of total mean value CDF. The resulting maximum benefit on the mean value CDF would be ~~$92,677~~.

7.3.3 Sensitivity Studies

Sensitivity cases were performed to investigate the sensitivity of certain parameters in the Bell Bend SAMDA analysis. A total of six sensitivity benefit calculations were performed for both the point estimate and mean value CDF with 2008 replacement power costs. Below is a brief description of the sensitivity cases.

- The first case investigated the sensitivity of the base case to the discount rate by assuming a lower discount rate of three percent. The method to calculate the present value of replacement power for a single event is discussed in U.S. EPR DC ER (AREVA 2009).
- The second case investigated the sensitivity of the base case to the discount rate by assuming a lower discount rate of five percent.
- The third case investigated the sensitivity of the base case to the on-site dose estimates. For the base case analysis, an immediate and long-term on-site dose to plant personnel following a severe accident is 3,300 rem and 20,000 rem, respectively. Therefore, this sensitivity case used the recommended high estimate dose values of 14,000 rem and 30,000 rem for immediate and long term dose on-site respectively, as suggested in (NRC, 1997).
- The fourth case investigated the sensitivity of the base case to the total on-site cleanup cost. For the base case analysis, the total on-site cleanup cost following a severe accident is taken to be $1,500,000. Therefore, this analysis assumed a high estimated on-site cleanup cost of $2,000,000 as suggested in (NRC, 1997).
- The fifth case also investigated the sensitivity of the increase in the replacement power cost for the U.S. EPR design. This sensitivity case projected that the cost of replacement power would double between 2008 and 2015. This would result in electricity cost of 24 cents/kw-h in 2015 based upon the assumption that the cost of electricity in 2008 is 12 cents/kw-h. The inflation rate for this sensitivity case was calculated using the the method outlined in (AREVA, 2009).
- The sixth case investigated the impact on the SAMDA analysis if the replacement power costs were based on the 95% capacity factor stated in Section 3.4.1.3.1 of the Bell Bend ER. Using a capacity factor of 95%, the maximum benefit for Bell Bend exceeded the value reported in Section 7.3.2 of the BBNPP ER by about $28,000 (point estimate core damage frequency, CDF) and by about $38,000 (mean value CDF). These increased values do not change the findings contained in Section 7.3.4, due to the design of the U.S. EPR with respect to prevention and mitigation of severe accidents.

Table 7.3-2 and Table 7.3-3 provide the calculated benefit for the point estimate and mean value CDF with 2008 replacement power cost sensitivity cases discussed above.

7.3.4 Results and Summary

A total of 167 SAMDA candidates developed from industry and U.S. EPR documents were evaluated in the U.S. EPR DC ER completed by AREVA NP. The basis for screening is provided in

Table 7.3-1— Severe Accident Cost Impact

	~~Point Estimate CDF (7% Discount Rate and 2008 Replacement Power Costs)~~	~~Mean Value CDF (7% Discount Rate and 2008 Replacement Power Costs)~~
~~Averted Occupational Exposure (AREVA, 2007a)~~	~~$264~~	~~$369~~
~~Averted Onsite Costs (AREVA, 2007a)~~	~~$45,102~~	~~$62,974~~
~~Averted Public Exposure~~	~~$6,247~~	~~$6,247~~
~~Averted Offsite Property Damage Costs~~	~~$2,814~~	~~$2,814~~
~~Severe Accident Cost Impact[a] Internal Events, Internal Flooding, Fire~~	~~$54,427~~	~~$72,404~~
~~Maximum Benefit[b] Internal Events, Internal Flooding, Fire, Seismic~~	~~$72,388~~	~~$92,677~~

Notes:
(a) Severe Accident Cost Impact is the sum of the Averted Occupational Exposure, Averted Onsite Cost, Averted Public Exposure and Averted Offsite Property Damage Cost.
(b) Maximum Benefit is calculated by increasing the Severe Accident Cost Impact by 33%.

Insert 2

Insert 2

Case	Point Estimate CDF (7% Discount Rate and 2008 Replacement Power Costs)	Mean Value CDF (7% Discount Rate and 2008 Replacement Power Costs)
Total Accident Related Occupational Exposure (AOE)	$264	$369
Averted Costs of On-site Property Damage (AOSC)	$45,102	$62,974
Averted Public Exposure (APE)	$5,093	$5,093
Averted Offsite Damage Savings (AOC)	$2,139	$2,139
Total Benefit (On-site + Offsite)	**$52,598**	**$70,575**
Total Benefit (On-site + Offsite + External Events)	**$69,955**	**$90,336**

Table 7.3-2— Maximum Benefit for Sensitivity Cases (Point Estimate CDF with 2008 Replacement Power Costs)

Insert 3

~~Case~~	~~Sensitivity Case 1: Discount Rate 3%~~	~~Sensitivity Case 2: Discount Rate - 5%~~	~~Sensitivity Case 3: High Estimated Dose (On-Site)~~	~~Sensitivity Case 4: High On-site Cleanup Costs~~	~~Sensitivity Case 5: Increase Replacement Power Cost via Inflation for 2015 Dollars~~	~~Sensitivity Case 6: Increase Replacement Power Costs for 95% Capacity Factor~~
~~Immediate Dose Savings (On-site)~~	~~$97~~	~~$66~~	~~$209~~	~~$49~~	~~$49~~	~~$49~~
~~Long Term Dose Savings (On-site)~~	~~$510~~	~~$317~~	~~$322~~	~~$215~~	~~$215~~	~~$215~~
~~Total Accident Related Occupational Exposure (AOE)~~	~~$607~~	~~$384~~	~~$531~~	~~$264~~	~~$264~~	~~$264~~
~~Cleanup/ Decontamination Savings (On-site)~~	~~$19,110~~	~~$13,053~~	~~$8,045~~	~~$10,727~~	~~$8,045~~	~~$8,045~~
~~Replacement Power Savings (On-site)~~	~~$129,243~~	~~$62,524~~	~~$36,835~~	~~$36,835~~	~~$73,675~~	~~$58,322~~
~~Averted Costs of On-site Property Damage (AOSC)~~	~~$148,353~~	~~$75,577~~	~~$44,880~~	~~$47,562~~	~~$81,720~~	~~$66,367~~
~~Total On-site Benefit~~	**~~$148,960~~**	**~~$75,960~~**	**~~$45,411~~**	**~~$47,826~~**	**~~$81,984~~**	**~~$66,631~~**
~~Averted Public Exposure (APE)~~	~~$12,354~~	~~$8,438~~	~~$6,248~~	~~$6,248~~	~~$6,248~~	~~$6,248~~
~~Averted Offsite Damage Savings (AOC)~~	~~$5,565~~	~~$3,801~~	~~$2,814~~	~~$2,814~~	~~$2,814~~	~~$2,814~~
~~Total Offsite Benefit~~	**~~$17,918~~**	**~~$12,239~~**	**~~$9,062~~**	**~~$9,062~~**	**~~$9,062~~**	**~~$9,062~~**
~~Total Benefit (On-site + Offsite)~~	**~~$166,878~~**	**~~$88,199~~**	**~~$54,473~~**	**~~$56,888~~**	**~~$91,046~~**	**~~$75,693~~**
~~Total Benefit (On-site + Offsite + External Events)~~	**~~$221,947~~**	**~~$117,305~~**	**~~$72,449~~**	**~~$75,611~~**	**~~$121,091~~**	**~~$100,672~~**

Insert 3

Case	Sensitivity Case 1: Discount Rate 3%	Sensitivity Case 2: Discount Rate - 5%	Sensitivity Case 3: High Estimated Dose (On-Site)	Sensitivity Case 4: High On-site Cleanup Costs	Sensitivity Case 5: Increase Replacement Power Cost via Inflation for 2015 Dollars	Sensitivity Case 6: Increase Replacement Power Costs for 95% Capacity Factor
Immediate Dose Savings (On-site)	$97	$66	$209	$49	$49	$49
Long Term Dose Savings (On-site)	$510	$317	$322	$215	$215	$215
Total Accident Related Occupational Exposure (AOE)	$607	$384	$531	$264	$264	$264
Cleanup/Decontamination Savings (On-site)	$19,110	$13,053	$8,045	$10,727	$8,045	$8,045
Replacement Power Savings (On-site)	$129,243	$62,524	$36,835	$36,835	$73,675	$58,322
Averted Costs of On-site Property Damage (AOSC)	$148,353	$75,577	$44,880	$47,562	$81,720	$66,367
Total On-site Benefit	**$148,960**	**$75,960**	**$45,411**	**$47,826**	**$81,984**	**$66,631**
Averted Public Exposure (APE)	$10,072	$6,880	$5,094	$5,094	$5,094	$5,094
Averted Offsite Damage Savings (AOC)	$4,229	$2,889	$2,139	$2,139	$2,139	$2,139
Total Offsite Benefit	**$14,301**	**$9,768**	**$7,233**	**$7,233**	**$7,233**	**$7,233**
Total Benefit (On-site + Offsite)	**$163,261**	**$85,729**	**$52,644**	**$55,058**	**$89,217**	**$73,864**
Total Benefit (On-site + Offsite + External Events)	**$217,137**	**$114,019**	**$70,016**	**$73,228**	**$118,658**	**$98,239**

Table 7.3-3— Maximum Benefit for Sensitivity Cases (Mean Value CDF with 2008 Replacement Power Costs)

~~Case~~	~~Sensitivity Case 1: Discount Rate 3%~~	~~Sensitivity Case 2: Discount Rate - 5%~~	~~Sensitivity Case 3: High Estimated Dose (On Site)~~	~~Sensitivity Case 4: High On-site Cleanup Costs~~	~~Sensitivity Case 5: Increase Replacement Power Cost via Inflation for 2015 Dollars~~	~~Sensitivity Case 6: Increase Replacement Power Costs for 95% Capacity Factor~~
~~Immediate Dose Savings (On-site)~~	~~$136~~	~~$93~~	~~$292~~	~~$69~~	~~$69~~	~~$69~~
~~Long Term Dose Savings (On-site)~~	~~$712~~	~~$443~~	~~$449~~	~~$300~~	~~$300~~	~~$300~~
~~Total Accident Related Occupational Exposure (AOE)~~	~~$847~~	~~$535~~	~~$741~~	~~$368~~	~~$368~~	~~$368~~
~~Cleanup/ Decontamination Savings (On-site)~~	~~$26,682~~	~~$18,225~~	~~$11,233~~	~~$14,977~~	~~$11,233~~	~~$11,233~~
~~Replacement Power Savings (On-site)~~	~~$180,452~~	~~$87,298~~	~~$51,430~~	~~$51,430~~	~~$102,867~~	~~$81,431~~
~~Averted Costs of On-site Property Damage (AOSC)~~	~~$207,134~~	~~$105,522~~	~~$62,663~~	~~$66,407~~	~~$114,100~~	~~$92,664~~
~~**Total On-site Benefit**~~	~~**$207,981**~~	~~**$106,058**~~	~~**$63,404**~~	~~**$66,775**~~	~~**$114,468**~~	~~**$93,032**~~
~~Averted Public Exposure (APE)~~	~~$12,354~~	~~$8,438~~	~~$6,248~~	~~$6,248~~	~~$6,248~~	~~$6,248~~
~~Averted Offsite Damage Savings (AOC)~~	~~$5,565~~	~~$3,801~~	~~$2,814~~	~~$2,814~~	~~$2,814~~	~~$2,814~~
~~**Total Offsite Benefit**~~	~~$17,918~~	~~$12,239~~	~~$9,062~~	~~$9,062~~	~~$9,062~~	~~$9,062~~
~~**Total Benefit (On-site + Offsite)**~~	~~**$225,900**~~	~~**$118,297**~~	~~**$72,466**~~	~~**$75,837**~~	~~**$123,530**~~	~~**$102,094**~~
~~**Total Benefit (On-site + Offsite + External Events)**~~	~~**$289,151**~~	~~**$151,420**~~	~~**$92,756**~~	~~**$97,072**~~	~~**$158,118**~~	~~**$130,680**~~

Insert 4

Insert 4

Case	Sensitivity Case 1: Discount Rate 3%	Sensitivity Case 2: Discount Rate - 5%	Sensitivity Case 3: High Estimated Dose (On-Site)	Sensitivity Case 4: High On-site Cleanup Costs	Sensitivity Case 5: Increase Replacement Power Cost via Inflation for 2015 Dollars	Sensitivity Case 6: Increase Replacement Power Costs for 95% Capacity Factor
Immediate Dose Savings (On-site)	$136	$93	$292	$69	$69	$69
Long Term Dose Savings (On-site)	$712	$443	$449	$300	$300	$300
Total Accident Related Occupational Exposure (AOE)	$847	$535	$741	$368	$368	$368
Cleanup/Decontamination Savings (On-site)	$26,682	$18,225	$11,233	$14,977	$11,233	$11,233
Replacement Power Savings (On-site)	$180,452	$87,298	$51,430	$51,430	$102,867	$81,431
Averted Costs of On-site Property Damage (AOSC)	$207,134	$105,522	$62,663	$66,407	$114,100	$92,664
Total On-site Benefit	**$207,981**	**$106,058**	**$63,404**	**$66,775**	**$114,468**	**$93,032**
Averted Public Exposure (APE)	$10,072	$6,880	$5,094	$5,094	$5,094	$5,094
Averted Offsite Damage Savings (AOC)	$4,229	$2,889	$2,139	$2,139	$2,139	$2,139
Total Offsite Benefit	**$14,301**	**$9,768**	**$7,233**	**$7,233**	**$7,233**	**$7,233**
Total Benefit (On-site + Offsite)	**$222,282**	**$115,826**	**$70,636**	**$74,008**	**$121,701**	**$100,265**
Total Benefit (On-site + Offsite + External Events)	**$284,522**	**$148,257**	**$90,415**	**$94,730**	**$155,777**	**$128,339**