BellBendCOLPEm Resource

From: Mazaika, Michael
Sent: Tuesday, June 16, 2009 12:19 PM
To: Galletta, Thomas
Cc: Canova, Michael; Harvey, Brad; Lauron, Carolyn; BellBendCOL Resource
Subject: RE: Scope of July Meteorology Audit at Bell Bend

Tom:

The TAC No. to use for this safety audit support of the Bell Bend meteorological monitoring program is RC6087.

Attached are some files documenting my earlier acceptance review of FSAR Section 2.3 as well as my comments on PNNL's (Jeremy Rischel's) ER Acceptance Report and Review Deficiencies. Some of the issues related to FSAR Section 2.3.3 are addressed there.

BBNPP SAR ceptance Review Re | Bell_Bend_Table_1 mazaika revi... | Bell_Bend_Table_2 mazaika revi...

Also attached is info obtained from PNNL's EARRTH web site regarding the recent environmental audit at the Bell Bend site at the end of April. This will give some perspective on what has already been covered. As I mentioned, Jeremy Rishel was the lead SME for the meteorology and accident modeling audit efforts. We had discussed several meteorology-related issues prior to the audit. The environmental- and safety-related audit issues for meteorology have many items in common although Jeremy's focus did not get into the level of detail that we might want to cover for the safety-related audit.

Records_Tracker_Rishel_site_au... | BB_Site_Audit_Trip_Report_JR.d... | BB Team Site Audit Trip Report... | Interfaces Group 1 hydro eco w... | Interfaces Group 4 met hdyro ...

Please let me know if you have any questions.

Thanks,

Mike

From: Galletta, Thomas
Sent: Tuesday, June 16, 2009 9:02 AM
To: Canova, Michael
Cc: Mazaika, Michael
Subject: RE: Scope of July Meteorology Audit at Bell Bend

Mike,
Need a TAC number to for Bell Bend activities.
Thanks,
Tom

-----Original Appointment-----
From: Canova, Michael
Sent: Monday, June 15, 2009 2:37 PM
To: Galletta, Thomas; Mazaika, Michael
Subject: Scope of July Meteorology Audit at Bell Bend
When: Friday, June 19, 2009 10:00 AM-10:30 AM (GMT-05:00) Eastern Time (US & Canada).
Where: T10-C01

Hearing Identifier: BellBend_COL_Public
Email Number: 155

Mail Envelope Properties (3DF2506A7257014AAC5857E5E852DEAC0756E6C37B)

Subject: RE: Scope of July Meteorology Audit at Bell Bend
Sent Date: 6/16/2009 12:18:42 PM
Received Date: 6/16/2009 12:18:50 PM
From: Mazaika, Michael

Created By: Michael.Mazaika@nrc.gov

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Files	**Size**	**Date & Time**
MESSAGE	1653	6/16/2009 12:18:50 PM
BBNPP SAR Acceptance Review Results Rev0 (112108).doc	325698	
Bell_Bend_Table_1 mazaika review rev1 (111708).doc	1737282	
Bell_Bend_Table_2 mazaika review rev0 (111708).doc	763970	
Records_Tracker_Rishel_site_audit.doc	134138	
BB_Site_Audit_Trip_Report_JR.doc	159298	
BB Team Site Audit Trip Report_AM_Accidents.doc	130042	
Interfaces Group 1 hydro eco waste met.doc	49658	
Interfaces Group 4 met hdyro land socio rad site.doc	59386	

Options
Priority: Standard
Return Notification: No
Reply Requested: Yes
Sensitivity: Normal
Expiration Date:
Recipients Received:

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
1.8 INTERFACES WITH STANDARD DESIGNS and EARLY SITE PERMITS			
Verification of Site Parameters	Demonstrate that site characteristics fall within DCD site parameters	Yes	• FSAR Table 2.0-201
COL Information Items and Permit Conditions	Identify specific FSAR sections where DCD COL information items are addressed	Yes	• FSAR Table 1.8-2
	Identify specific FSAR sections where ESP COL Action Items and Permit Conditions are addressed	N/A	• There is no ESP associated with this COL application
Generic Changes and Departures from the Referenced Certified Design	List the plant-specific departures from the referenced certified design. These departures should also be described and evaluated in Part 7 (Departures Report) of the COL application.	Yes	• See comments under Section 2.0 below (Site Characteristics and Site Parameters) for departures of 0-2 hour X/Q at EAB; 0-2 hour, 2-8 hour, and 8-24 hour post-accident periods at the LPZ; and annual average X/Qs at the site boundary.
Variances from the ESP and ESP SSAR	List the plant-specific exemptions from the referenced ESP. These exemptions should also be described and evaluated in Part 7 (Departures Report) of the COL application.	N/A	• There is no ESP associated with this COL application
1.8.1 COL INFORMATION ITEMS			
DCD COL Items	2.3-1: If site-specific meteorology values are outside the range of design parameters in Table 2-1, demonstrate the acceptability of the site-specific values in the appropriate sections of the Combined License application.	Yes	• Site parameters actually appear in Table 2.1-1 (U.S. EPR Site Design Envelope) of FSAR Section 2.0 in the DCD. Comparison between site parameters and site-specific climatological characteristics appears in Table 2.0-1 (U.S. EPR Site Design Envelope Comparison) of FSAR Section 2.0 in the COL Application.
	2.3-2: Provide site-specific characteristics for regional climatology	Yes	• Addressed in FSAR Section 2.3.1
	2.3-3: Provide site-specific characteristics for local meteorology	Yes	• Addressed in FSAR Section 2.3.2
	2.3-4: Provide the site-specific onsite meteorological measurement program	Yes	• Addressed in FSAR Section 2.3.3
	2.3-5: Provide a description of the atmospheric dispersion modeling used in evaluating potential design basis events to calculate concentrations of hazardous materials (e.g., flammable or toxic clouds) outside building structures resulting from the onsite and/or offsite airborne releases of such materials	Yes	• Addressed in FSAR Sections 2.3.4.2.4 and 2.2.3

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	2.3-6: Confirm that site-specific X/Q values, based on site-specific meteorological data, are bounded by those specified in Table 2-1 at the EAB and LPZ and by Table 2.3-1 at the control room. For site-specific X/Q values that exceed the bounding X/Q values, demonstrate that the radiological consequences associated with the controlling design basis accident continue to meet the dose reference values given in 10 CFR 50.34 and the control room operator dose limits given in GDC 19 using site-specific X/Q values.	Yes	• Addressed in FSAR Part 2, Sections 2.3.4.2.1 and 15.0.3; FSAR Part 7, Section 1.1.4
	2.3-7: Provide X/Q values for each cumulative frequency distribution which exceeds the median value (50 percent of the time) as part of the assessment of the postulated impact of an accident on the environment.	Yes	• Addressed in FSAR Section 2.3.4.2.2 and ER Section 2.7.6
	2.3-8: Provide the site-specific, long-term diffusion estimates for routine releases with consideration of the guidance provided in Regulatory Guides 1.23, 1.109, 1.111, and 1.112.	Yes	• Addressed in FSAR Section 2.3.5
	2.3-9: Provide estimates of annual average atmospheric dispersion (X/Q values) and deposition (D/Q values) for 16 radial sectors to a distance of 50 miles (80 km) from the plant as part of its environmental assessment.	Yes	• Addressed in FSAR Section 2.3.5
	2.3-10: Describe the means for providing UHS makeup sufficient to meet the evaporative and drift water loss after 72 hours through the remainder of the 30 day period consistent with RG 1.27	Yes	• Addressed in FSAR Section 2.3.1.2.2.13
ESP COL Action Items	None	N/A	• There is no ESP associated with this COL application
2.0 SITE CHARACTERISTICS AND SITE PARAMETERS			
Table 2.0-1 U.S. EPR Site Design Envelope Comparison	Precipitation: Snow (design: extreme live load, including 48-hour probable maximum winter precipitation)	Yes	• BBNPP site characteristic, 45 psf (as listed in Table 2.0-1), represents only the load contributed by PMWP component of extreme live winter precipitation loads (as estimated by applicant). 100-year return period ground snow load component is 42 psf (Section 2.3.1.2.2.12). Total for extreme live load would be 87 psf. Still bounded by DCD site parameter. However, values need to be evaluated against Proposed Interim Staff Guidance (ISG) on winter precipitation loads (DC/COL-ISG-07).

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Wind: Maximum Sustained Speed (based on 3-sec gust at 33 ft above ground level and factored for 50-year mean recurrence interval)	Yes	• BBNPP site characteristic, 90 mph (3-second gust speed as listed in Table 2.0-1) is bounded by DCD site parameter. However, Section 2.3.1.2.2.6 (High Winds) reports thunderstorm wind speed of 201 mph. Without qualification as to validity, what time interval that value is associated with, or its applicability in relation to 50- or 100-year return periods, value exceeds site parameter for wind.
	Wind: Importance Factor = 1.15 (Safety-related structures for 100-year mean recurrence interval)	Yes	
	Tornado: Maximum Pressure Drop; Maximum Rotational Speed; Maximum Translational Speed; Maximum Wind Speed; Radius of Maximum Rotational Speed	Yes	• BBNPP site characteristics are bounded by DCD site parameters
	Ambient Design Temperature: 1% exceedance values (maximum dry bulb and coincident and non-coincident wet bulb; minimum dry bulb)	Yes	• BBNPP site characteristic for maximum dry-bulb temperature, as listed in Table 2.0-1, appears to be bounded by the corresponding DCD site parameter. The coincident wet-bulb temperature is not shown in Table 2.0-1. The minimum dry-bulb temperature, as listed in Table 2.0-1 does not appear to be bounded by the corresponding site parameter.
	Ambient Design Temperature: 0% exceedance values (maximum dry bulb and coincident and non-coincident wet bulb; minimum dry bulb)	Yes	• BBNPP site characteristics, as listed in Table 2.0-1, appear to be bounded by the corresponding DCD site parameters
	Meteorological Dispersion: Exclusion Area Boundary (EAB) 0-2 hour X/Q value	Yes	• BBNPP site characteristic, 1.029E-03 (as listed in Table 2.0-1) appears to exceed corresponding DCD site parameter. However, discrepancy in use of math symbols between site parameter value as shown in Table 2.0-1 (i.e., < 1E-3) and Table 2.1.-1 (i.e., ≤ 1E-3), and precision of site parameter criterion versus reporting precision of modeling results may have an effect on interpretation of modeling results. • Nevertheless, FSAR Part 7, Section 1.1.4 discusses the departure and how the resulting 0-2 hour dose continues to meet the dose reference value provided in 10 CFR 50 Appendix I. See also FSAR Part 2, Section 15.0.3.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Meteorological Dispersion: Low Population Zone (LPZ) 0-2 hour, 2-8 hour, 8-24 hour, 1-4 day, and 4-30 day X/Q values	Yes	• BBNPP site characteristics, as listed in Table 2.0-1, for 0-2 hour, 2-8 hour, and 8-24 hour post-accident periods at the LPZ exceed the corresponding DCD site parameter values. X/Qs for the 1-4 day and 4-30 day periods are bounded by the corresponding DCD site parameter values. • Nevertheless, FSAR Part 7, Section 1.1.4 discusses the departure and how the resulting 0-2 hour, 2-8 hour, and 8-24 hour doses continue to meet the dose reference value provided in 10 CFR 50 Appendix I. See also FSAR Part 2, Section 15.0.3. • Discrepancy in use of math symbols between site parameter values as shown in Table 2.0-1 and Table 2.1.-1 for all time intervals, and precision of site parameter criterion versus reporting precision of modeling results (in particular for 8-24 hour value) may have an effect on interpretation of modeling results.
	Meteorological Dispersion: Main Control Room (MCR) and Technical Support Center (TSC) 0-2 hour, 2-8 hour, 8-24 hour, 1-4 day, and 4-30 day X/Q values for potential release points from: • Vent Stack • Main Steam Relief Train • Safeguard Building Roof Canopies • Open Equipment Hatch • Safeguard Building Depressurization Shaft	Yes	• BBNPP site characteristics, as listed in FSAR Tables 2.3-149 thru 2.3-153 of the COLA, are bounded by the corresponding site parameters in FSAR Table 2.3-1 (MCR and TSC Intake) and FSAR Table 2.3-2 (Unfiltered Inleakage) of the DCD.
	Long Term Dispersion Estimates: X/Q and D/Q values	Yes	• BBNPP site characteristic, 4.062E-05 (as listed in Table 2.0-1) does not appear in modeling results addressed in Section 2.3.5 or related tables. Nevertheless, several reported site boundary X/Qs, Table 2.3-156 (undecayed, undepleted) and Table 2.3-162 (decayed, depleted) exceed corresponding DCD site parameter value (N, NNW, and NW sectors). Highest reported X/Q is 9.672E-06 in N sector. • FSAR Part 7, Section 1.1.3 discusses departure and how resulting annual average doses continue to meet dose reference values provided in 10 CFR 50 Appendix I. However, discrepancies in X/Q values and number of sectors in which exceedances occur still need to be resolved. • Discrepancy between site parameter value as shown in Table 2.0-1 (i.e., < 4.973E-6) and Table 2.1.-1 (i.e., ≤ 4.973E-6). Appropriate symbol has an effect on interpretation of modeling results.
2.3.1 REGIONAL CLIMATOLOGY			
2.3.1.1 General Climate			
General Climate Description	Types of air masses	No	• Section 2.3.1.1 (Basis for Meteorological Parameters) - Not well developed. Can be handled via RAI.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Synoptic features (high- and low-pressure systems, frontal systems)	No	• Section 2.3.1.1 - Not well developed. Correlation (if any) of synoptic features with the monthly or seasonal occurrence of air stagnation conditions (Section 2.3.1.2.2.11) not addressed. Can be handled via RAI.
	General airflow patterns (wind direction and speed)	Yes	• Section 2.3.1.1 - Correlation (if any) of general air flow patterns with the monthly or seasonal occurrence of air stagnation conditions (Section 2.3.1.2.2.11) not addressed. Can be handled via RAI.
	Temperature and humidity	Yes	• Section 2.3.1.1 – Atmospheric moisture in relation to regional setting, types of air masses, and synoptic features not addressed. Can be handled via RAI.
	Precipitation (rain, snow, sleet, and freezing rain)	Yes	• Section 2.3.1.1 – No rationale given for relative comparison of annual rainfall totals in the site area to southeastern part of state, or how seasonal snowfall totals in site area compare to stated variations over Ridge and Valley Region. Can be handled via RAI.
	Potential influences from regional topography	Yes	• Section 2.3.1.1
	State climatic division identified	Yes	• Section 2.3.1.1 - BBNPP site close to two climate divisions (PA-01 and PA-02). No discussion of which characteristics are more representative of site.
	Relationships between synoptic-scale atmospheric processes and local (site) meteorological conditions	Yes	• Section 2.3.1.1 – No relationship or linkage is established between synoptic scale atmospheric processes in Section 2.3.1.1 and local (site) meteorological conditions in Section 2.3.2.1.1 (Wind Speed and Direction), atmospheric moisture in Section 2.3.2.1.2 (Temperature and Humidity), precipitation in Section 2.3.2.1.3 (Precipitation and Fog), or Section 2.3.2.1.4 (Atmospheric Stability).
2.3.1.2 Regional Meteorological Conditions for Design and Operating Bases			
Severe Weather	**Frequencies (Annual and, if available, Seasonal) for**:		
	Hurricanes	Yes	• Section 2.3.1.2.2.2 (Hurricanes and Tropical Storms) – Number of tropical cyclones (includes all classifications listed) appears to have been determined incorrectly due to double counting. Correlation between these events and record daily and/or monthly rainfall totals in the site area not well established. Can be handled via RAI.
	Tornadoes and Waterspouts	Yes	• Section 2.3.1.2.2.1 (Tornadoes and Waterspouts) - Seasonal frequency of tornadoes not addressed; only discrete occurrences based (presumably) on NCDC Storm Events database. No discussion of possible bias in Columbia County data due to lower population compared to Luzerne County. Can be handled via RAI. • Occurrence of waterspouts not relevant for this location. Nevertheless, stated period of record is inaccurate. NCDC Storm Events on-line database for waterspouts does not include records prior to 1993. Can be handled via RAI.
	Thunderstorms	Yes	• Section 2.3.1.2.2.3 (Thunderstorms)
	Severe Wind Events	No	• Section 2.3.1.2.2.6 (High Winds) – Reported thunderstorm wind speed of 201 mph. No linkage to Section 2.3.1.2.2.15 (100 Year Return Period 3 Second Wind Gust). Without qualification as to validity or applicability, exceeds corresponding site parameter for wind in DCD Table 2.1-1. Can be handled via RAI.
	Lightning	Yes	• Section 2.3.1.2.2.4 (Lightning)

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Hail (including probable maximum size)	Yes	• Section 2.3.1.2.2.7 (Hail) - Annual or seasonal frequency not addressed; only discrete occurrences based on NCDC Storm Events database. No discussion of possible bias in Columbia County data due to lower population compared to Luzerne County. Climate Atlas of the U.S. not utilized. Can be handled via RAI.
	High Air Pollution Potential		• Section 2.3.1.2.2.11 (High Air Pollution Potential) – Monthly variation of these conditions in site area not well established. Correlation (if any) of the occurrence of air stagnation conditions with synoptic features and general wind flow patterns in site region (Section 2.3.1.1), mixing heights in site region (Section 2.3.2.1.5), site-specific wind flow patterns (Section 2.3.2.1.1), and atmospheric stability (Section 2.3.2.1.4) not addressed. Can be handled via RAI.
Freezing Rain (Ice storms)	**Frequency (Annual)**: Probable maximum frequency of occurrence, amount, and time duration	Yes	• Section 2.3.1.2.2.9 (Ice Storms) – Annual or seasonal frequency not addressed; only discrete occurrences between 1999 and 2007 based on NCDC Storm Events database. Storm Events on-line database for snow and ice events does not include records prior to 1993. Period of record (POR) not climatologically significant. Climate Atlas of the U.S. not utilized. Can be handled via RAI.
Dust (Sand) Storms	**Frequency (Annual)**: Probable maximum frequency of occurrence and time duration	Yes	• Section 2.3.1.2.2.8 (Dust/Sand Storms) – Characteristic not significant for this location. Stated period of record is inaccurate. NCDC Storm Events on-line database for dust storms does not include records prior to 1993. Can be handled via RAI.
Air Quality	Identification of site's Interstate Air Quality Control Region and attainment status designations with respect to State and National Ambient Air Quality Standards	Yes	• Section 2.3.1.2.1 (Regional Air Quality) – Does not address whether BBNPP is a new major stationary source or major modification in the context of Class I Federal Areas. Can be handled via RAI. The material in this section is essentially redundant to the information in Section 2.3.2.1.6 (Air Quality) as are Tables 2.3.-1 and 2.3-143.
Snow and Ice	Weight of the 100-yr return period snowpack Weight of the 48-hour probable maximum winter precipitation	Yes	• Section 2.3.1.2.2.12 (Snow/Ice Load on Roofs of Safety Related Structures) – Methodology for extreme live winter precipitation loads assumes that 50% of PMWP combines with 100-year return period ground snow load. Approach referred to as conservative; not well substantiated. Rationale based on mean rainfall and temperatures from onsite monitoring program (6 and 5 years, respectively). PORs not climatologically significant. No linkage to Sections 2.4 and/or 3.8 regarding roof configurations, parapets, or scuppers which may limit depth of 48-hour PMWP that can accumulate on roofs. Can be handled via RAI. **Need to evaluate against Proposed Interim Staff Guidance (ISG) DC/COL-ISG-07** including snowfall and snow depth observations from other nearby cooperative observing stations rather than just first order NWS stations in site area. Can be handled via RAI.
Ultimate Heat Sink	Meteorological data for evaluating UHS performance (maximum evaporation and drift loss; minimum water cooling; potential for water freezing). Include period of record examined and bases/procedures for selecting critical meteorological data	Yes	• Section 2.3.1.2.2.13 (Condition for Maximum Evaporation and Potential Water Freezing in the Ultimate Heat Sink) – Need to evaluate whether persistence of below freezing temperatures has any effect that needs to be considered. Data for coop station in nearby Berwick indicates about 20 consecutive days of below freezing temperatures.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Tornado Parameters	Translational speed, rotational speed, maximum pressure differential with the associated time interval	Yes	• Section 2.3.1.2.2.14 (Tornado Parameters) – Site appears to be just within Tornado Intensity Region I which is basis for DBT parameters from Rev.1 of RG 1.76. BBNPP site proximity to Region II or plant-specific maximum tornado wind speed for SSES at 1E-07 probability based on NUREG/CR-4461 (Table 6-1) not addressed in relation to characteristics for those two regions. No discussion of transition to enhanced Fujita wind scale in the revised Reg. Guide or the NUREG. Can be handled via RAI.
Wind Speed	**Frequency**: 100-year return period "3-second gust"	No	• Section 2.3.1.2.2.15 (100 Year Return Period 3 Second Wind Gust) – Only discusses wind values from ASCE 7-05. No linkage with Section 2.3.1.2.2.6 (High Winds) which reports thunderstorm wind speed of 201 mph. Without qualification as to validity, what time interval that value is associated with, or its applicability in relation to 50- or 100-year return periods, exceeds corresponding site parameter for wind in DCD Table 2.1-1. Can be handled via RAI. • Also, need to resolve terminology discrepancy in DCD Table 2.1-1, BBNPP FSAR Table 2.0-1, and elsewhere regarding site parameter for wind speed which refers to parameter as “Maximum Sustained Speed” (which typically represents an average over one minute or longer) and reported values as “3-second gust”. Can be handled via RAI.
Dry- and Wet-bulb Temperatures	2% and 1% annual exceedance and 100-yr maximum dry bulb temperature and coincident wet bulb temperature; 2% and 1% annual exceedance and 100-yr maximum wet bulb temperature (non-coincident); 98% and 99% annual exceedance and 100-yr minimum dry bulb temperature	Yes	• Section 2.3.1.2.2.16 (Temperature and Humidity for Heating, Ventilation and Air Conditioning) – 10 CFR 52.79(a)(1)(iii) states in part that COL applications must identify 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. Temperatures based on a 100-year return period are considered by staff to provide this “sufficient margin” to account for situations where the historical data used to characterize a site may not adequately capture cyclical climatic events, as required by the regulation. This duration is consistent with the return intervals to be considered in the evaluation of extreme wind and snow loads on safety-related structures also addressed under SRP Section 2.3.1. 100-year return period values (rather than 0% exceedance values) should be evaluated against corresponding site parameters for maximum dry-bulb and coincident wet-bulb temperatures, maximum non-coincident wet-bulb temperatures, and minimum dry-bulb temperature. Appropriateness of 0% exceedance values in light of the regulation can be affected by length of period of record. Can be handled via RAI. 100-year return period minimum dry-bulb temperature should not be constrained to data from first-order NWS stations since only one variable is involved. Calculated 100-year return period value has been exceeded at several coop stations in vicinity of BBNPP site any may not be representative. Can be handled via RAI.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
All Other Meteorological and Air Quality Conditions	**Frequencies (Annual and, if available or applicable, Seasonal)**: for any other meteorological and air quality conditions that should be classified as climate site characteristics used to evaluate the design and operating bases of proposed facility		
		Yes	• Section 2.3.1.2.2.5 (Droughts) - Annual or seasonal frequency not addressed; only discrete occurrences based on NCDC Storm Events database. Stated POR is inaccurate. NCDC Storm Events on-line database for drought conditions does not include records prior to 1993. POR not climatologically significant. NCDC publication "Storm Data" not utilized. Can be handled via RAI.
		Yes	• Section 2.3.1.2.2.10 (Snow Storms) – Annual or seasonal frequency not addressed; only discrete occurrences between 1995 and 2007 based on NCDC Storm Events database. Storm Events on-line database for snow and ice events does not include records prior to 1993. POR not climatologically significant. Climate Atlas of the U.S. not utilized. Can be handled via RAI.
Climate Change	The applicability of data on severe weather phenomena to represent site conditions during the expected period of reactor operation should be substantiated. Current literature on possible changes in the weather in the site region should be reviewed to be confident that the methods used to predict weather extremes are reasonable.	No	• Not addressed. Can be handled via RAI
Organization			• All preceding topics and section numbering are subordinate to Section 2.3.1.2 (Meteorological Data for Evaluating the Ultimate Heat Sink). However, only Section 2.3.1.2.2.13 (Conditions for Maximum Evaporation and Potential Water Freezing in the Ultimate Heat Sink), and possibly Section 2.3.1.2.2.16 (Temperature and Humidity for Heating, Ventilation and Air Conditioning), are directly applicable. Poor organization of topical areas; should be re-structured.
2.3.2 LOCAL METEOROLOGY			
2.3.2.1 Normal and Extreme Values of Meteorological Parameters			
Wind Roses and Wind Direction Persistence	**Frequencies (Monthly and Annual Summaries):**		
	Wind roses using wind speed classes in accordance with RG 1.23	Yes	• Section 2.3.2.1.1 (Wind Speed and Direction)
	Wind direction persistence summaries at all heights at which wind characteristics data are applicable or have been measured	Yes	• Section 2.3.2.1.1 (Wind Speed and Direction)
Air Temperature	**Frequencies (Monthly and Annual Summaries):** Averages, Measured Extremes, and Diurnal Range	Yes	• Section 2.3.2.1.2 (Temperature and Humidity)

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Atmospheric Water Vapor (e.g., wet bulb temp, dew point temp, or relative humidity)	**Frequencies (Monthly and Annual Summaries):** Averages, Measured Extremes, and Diurnal Range	Yes	• Section 2.3.2.1.2 (Temperature and Humidity)
Precipitation	**Frequencies (Monthly and Annual Summaries):**		
	Averages and Measured Extremes	Yes	• Section 2.3.2.1.3 (Precipitation and Fog) – Discussion of long-term representativeness of site measurements with respect to data from other nearby stations not well developed. Only one other nearby coop station identified in addition to the three NWS stations used for other weather elements; however, there are other nearby coop stations (including Berwick, about 5 miles from BBNPP). Can be handled via RAI. No discussion of long-term daily and monthly rainfall totals from additional stations; important because rainfall is a point measurement and can vary significantly over very short distances. Relationship (if any) between maximum recorded rainfall events and thunderstorm activity (Section 2.3.1.2.2.3) or tropical cyclones (Section 2.3.1.2.2.2) not established. Can be handled via RAI.
	Number of Hours with Precipitation	Yes	• Section 2.3.2.1.3
	Rainfall Rate Distribution (i.e., maximum distributions for 1-hour intervals up to 24 hours)	Yes	• Section 2.3.2.1.3 - Relationship (if any) between maximum rainfall rates and thunderstorm activity (Section 2.3.1.2.2.3) or tropical cyclones (Section 2.3.1.2.2.2) not established. No linkage to Section 2.4 (Hydrologic Engineering) or limitations on use of data in Section 2.3.2.1.3 provided. Can be handled via RAI.
Precipitation Wind Roses	**Frequency (Monthly Summaries):** Wind roses with precipitation rate classes	Yes	• Section 2.3.2.1.3 (Precipitation and Fog) – Cannot readily distinguish wind speed classes associated with 0.1 to 0.2 inches/hr rainfall rate class in Figures 2.3-29 thru 2.3-62. No explanation of why this rainfall rate class was selected for plotting. Can be handled via RAI.
Fog (and smog)	**Frequencies (Monthly and Annual Summaries):** Including expected values and extremes of frequency and duration	Yes	• Section 2.3.2.1.3 (Precipitation and Fog) - Heavy fog data simply presented in tabular form for three nearby NWS stations. Monthly and/or seasonal variations of frequency of occurrence not addressed. Can be handled via RAI. Frequency for one station (i.e., Williamsport) markedly higher (more than 50% on an annual basis) than other two stations. Site appears to be fairly close to a transition area to a higher annual frequency of occurrence (Climate Atlas of the U.S.) and site is adjacent to a river in a valley. Climate Atlas of the U.S. not utilized. No discussion of which, if any, of the three stations is more representative of heavy fog conditions that might be expected at the site or of this transition area. Could have a bearing on interpretation of results for plant-induced fogging due to cooling towers. Can be handled via RAI.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Atmospheric Stability	**Frequencies (Monthly and Annual Summaries):** Stability defined by vertical temperature gradient or other well-documented parameters that have been substantiated by diffusion data	Yes	• Section 2.3.2.1.4 (Atmospheric Stability) – Confirm that stability classification is based on or equivalent to ^{o}C per 100 m. Requires sequential hourly meteorological data set. Can be handled by RAI. Percent probabilities in Tables 2.3-120 thru 2.3-125 and Tables 2.3-127 thru 2.3-132 (based on JFDs for 10- and 60-m wind measurement levels, respectively) appear to represent cumulative percent probabilities. Number of observations and percent probabilities in Tables 2.3-126 and 2.3-133 for composite 6-year POR (2001 - 2006) appear to be incorrect. Can be handled by RAI. No discussion of persistence duration by stability class or relationship to other concurrent meteorological conditions (e.g., wind speed), or monthly variation of stability class frequency based on Table 2.3-134), or related linkages to Section 2.3.1.2.2.11 (High Air Pollution Potential). Can be handled by RAI.
Mixing Height	**Frequency (Monthly Summaries):** Including frequency and duration (persistence) of inversion conditions	Yes	• Section 2.3.2.1.4 (Monthly Mixing Height Data and Inversion Summary) – Relationship between mixing heights presented in Section 2.3.2.1.4, those discussed in Section 2.3.1.2.2.11 (High Air Pollution Potential), and that used in dispersion modeling (Section 2.3.5.2) not established. All annual average values different. Technical rationale for selecting Buffalo, NY upper air station (other than it being closest to BBNPP) as being representative of conditions at site not addressed. Can be handled via RAI.
Wind Speed and Direction by Atmospheric Stability	**Frequency (Annual Summaries):** Joint frequency distributions of wind speed and wind direction by atmospheric stability for all measurement levels	Yes	• Section 2.3.2.1.1 (Wind Speed and Direction) - Monthly JFDs for 10-m level winds (Tables 2.3-40 thru 2.3-51) and 60-m level winds (Tables 2.3-52 thru 2.3-63), total of 192 pages each, may be excessive unless there is some need to discuss a dispersion- and/or wind-related characteristic that cannot be captured with seasonal JFDs (Tables 2.3-32 thru 2.3-35 and Tables 2.3-36 thru 2.3-39 for 10- and 60-m wind measurement levels, respectively). Annual and seasonal JFDs would be sufficient, with only monthly summary tables of stability class frequency and mean wind speed by stability class for each wind measurement level (e.g., Table 2.3-134). Can be handled by RAI. Not clear from discussion whether 2001-2007 JFD, as presented in Table 2.3-28, was directly input to AEOLUS3 dispersion modeling analyses in Sections 2.3.4 and 2.3.5 or if code operates on sequential hourly data set used to generate that JFD. If the latter, requires sequential hourly meteorological data set. Further, upper limit of several wind speed classes in that JFD do not match upper limits for wind speed classes indicated in Tables 2.3-146 (for Section 2.3.4 analysis) and Table 2.3-154 (for Section 2.3.5 analysis). Can be handled by RAI.
2.3.2.2 Potential Influence of the Plant and Its Facilities on Local Meteorology			

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Potential Modification of Meteorological Values	Influence of plant structures, terrain modifications, and cooling towers or water impoundment features	No	• BBNPP will use two natural draft cooling towers (NDCT) to dissipate waste heat during normal operation. Model used to evaluate ground-level fogging, icing, salt deposition, and increases in ground-level humidity resulting from operation of the NDCTs is not identified (SACTI, per ER Section 5.3.3.1); nor is model input data discussed (e.g., meteorological data). Model input data files do not appear to have been provided. Can be handled via RAI. Potential interaction between cooling tower plumes from BBNPP and existing SSES Units 1&2 not addressed. Can be handled via RAI. **Recommend 40 additional staff hours to evaluate and understand SACTI modeling analysis so that equivalent confirmatory modeling runs can be made.**
Topographic Features (as modified by the plant)	Within a 5-mile (8-km) radius of the plant	Yes	• Section 2.3.2.2 (Potential Influence of the Plant and its Facilities on Local Meteorology)
Topographic Map	Within a 50-mile (80-km) radius of the plant	Yes	• Section 2.3.2.2
	Plot of maximum elevation versus distance from the center of the plant in each of the sixteen 22.5-degree compass point sectors (centered on true north, north-northeast, northeast, etc.) to a distance of 50 miles (80 km) from the plant	Yes	• Section 2.3.2.2 – Not clear whether plot of maximum elevations versus distance in Figure 2.3-67 represents elevation differences above plant grade at containment and, if so, what plant grade elevation is at that location. Relationship to terrain elevations used in AEOLUS3 dispersion modeling in Section 2.3.5 (not clear to whether or if terrain heights were input to AEOLUS3 modeling in Section 2.3.4). Can be handled via RAI.
2.3.2.3 Local Meteorological Conditions for Design and Operating Bases			
Design- and Operating-basis Considerations	All local meteorological and air quality conditions used in design and operating bases	No	• See Comments/Notes above for Section 2.3.2.2 (Potential Modification of Meteorological Values) regarding deficiencies about SACTI plume impact modeling and need for additional staff hours. Can be handled via RAI. Salt deposition impacts from NDCTs on plant electrical equipment and corresponding acceptance criteria not addressed. Can be handled via RAI.
2.3.3 ONSITE METEOROLOGICAL MEASUREMENT PROGRAM			

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Site Description	Site map showing meteorological tower location with respect to manmade structures, topographic features, and other site features that may influence site measurements and indicating distance to nearby obstructions to flow in each downwind sector.	Yes	• Sections 2.3.3.1.1 and 2.3.3.2.1 (Tower Location) • Sections 2.3.3.1.6 and 2.3.3.2.6 (Nearby Obstructions to Air Flow) – Table 2.3-145 lists downwind sectors with obstructions to air flow and corresponding distances for those sectors with obstructions. However, table does not identify specific obstructions or their heights, and whether more than one obstruction of differing height exists within a given sector. Can be handled via RAI. Not clear whether distances in Table 2.3-145 are relative to SSES Units 1&2 tower (pre-operational phase) or BBNPP tower (operational phase). Both sections reference the same table. Can be handled via RAI. Discussions allude to a study that was performed to determine the effect of the SSES Units 1&2 cooling towers on the meteorological measurements at the primary SSES tower and concluding that effect on wind speed and direction measurements was minimal . No citation of the reference provided. Can be handled via RAI.
Onsite Monitoring Program Description (Pre-Operational)	Measurements made (locations and elevations)	Yes	• Section 2.3.3.1.1 (Tower Location) and Section 2.3.3.1.3 (Instrumentation)
	Exposure of instruments	No	• Section 2.3.3.1 (Pre-Application and Pre-operational Meteorological Measurement Program) – Following items not addressed: exposure of tower-mounted instruments relative to tower structure; boom length and orientation and rationale for doing so; presence or absence of wind shield for rain gauge; character of ground surface around base of tower; proximity (distance and direction) of paved or improved surfaces or other sources of heat and/or moisture that may affect measurements. Can be handled via RAI.
	Descriptions of instruments used	Yes	• Section 2.3.3.1.3 (Instrumentation) – Following items not addressed: dew point sensor shielding; presence or absence of icing protection for wind sensors; presence or absence of lightning protection. Discussion indicates that sigma-theta values calculated from wind direction data are used to compute horizontal dispersion coefficients. Not clear if this is meant only as a generic statement or if sigma-theta data used by AEOLUS3 dispersion model for that purpose. Can be handled via RAI. Discussion also states that sigma-theta values used as a back-up to temperature difference readings. Extent to which these data were used in 2001 to 2007 hourly data set not addressed. Can be handled via RAI.
	Instrument performance specifications	Yes	• Section 2.3.3.1.3 (Instrumentation) – Range specification for vertical temperature difference appears to be too narrow. Needs to be verified. Also, Table 2.3-144 implies that instrument specifications would apply to the 2001 to 2007 time period that provided onsite meteorological data for the application. No distinction made between pre-application and pre-operational phases in general or as it relates to these performance specifications. Can be handled via RAI.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Calibration and maintenance procedures	Yes	• Section 2.3.3.1.4 (Instrument Maintenance and Surveillance Schedules) – Discussion not well developed; broad references to RG 1.23 recommendations for calibration schedules. Vague reference to inspection and maintenance procedures unlike better description provided in Section 2.3.3.1.5 for data reduction and compilation. Can be handled via RAI.
	Data output and recording systems and locations	Yes	• Section 2.3.3.1.2 (Tower Design)
	Data processing, archiving, and analysis procedures	Yes	• Section 2.3.3.2.5 (Data Reduction and Compilation) – Not clear whether vertical temperature difference is calculated by subtracting the 10-m ambient temperature from the concurrent measurement at the 60-m level or if temperature difference is recorded from a dedicated delta-T circuit. If the former, could affect the accuracy specification and compliance with the accuracy requirement in Table 2.3-144. Can be handled via RAI. Annual and composite data recovery rates for all parameters individually, and for the joint recovery of wind speed and wind direction, and the joint recovery of wind speed, wind direction, and atmospheric stability not presented for the 2001 thru 2007 period of record of onsite data used in the COLA. Can be handled via RAI.
	Identify and justify and deviations from guidance in RG 1.23		• Section 2.3.3.1.7 (Deviations to Guidance from Regulatory Guide 1.23) – For the pre-application / pre-operational phase which was used as input to COLA, not clear why evaluation is made relative to Rev.1 of RG 1.23. Deviations noted; position on acceptability / unacceptability not addressed, especially in relation to data representativeness. Can be handled via RAI.
Onsite Monitoring Program Description (Operational)	Measurements made (locations and elevations)	Yes	• Section 2.3.3.2 (Operational Meteorological Monitoring Program) and Section 2.3.3.2.1 (Tower Location) – It is not clear whether tower referred to as "BBNPP meteorological tower" is already in service, although discussion and Table 2.3-144 appear to imply so. If so, no statement of when this occurred. If not, anticipated start date is not addressed. Can be handled via RAI.
	Exposure of instruments	No	• Section 2.3.3.2 (Operational Meteorological Measurement Program) – Following items not addressed: exposure of tower-mounted instruments relative to tower structure; boom length and orientation and rationale for doing so; presence or absence of wind shield for rain gauge; character of ground surface around base of tower; proximity (distance and direction) of paved or improved surfaces or other sources of heat and/or moisture that may affect measurements. Can be handled via RAI.
	Descriptions of instruments used	Yes	• Section 2.3.3.2.3 (Instrumentation) – Discussion parallels Section 2.3.3.1.2 (Tower Design) rather than its counterpart for the pre-operational phase in Section 2.3.3.1.3 (Instrumentation). See also previous comments for Section 2.3.3.1.3.
	Instrument performance specifications	Yes	• Section 2.3.3.2 (Operational Meteorological Measurement Program) and Section 2.3.3.2.3 (Instrumentation) – Section 2.3.3.2 references Table 2.3-144. See also preceding comment.
	Calibration and maintenance procedures	Yes	• Section 2.3.3.2.4 (Instrument Maintenance and Surveillance Schedules) - Discussion not well developed. See comments for parallel Section 2.3.3.1.4.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Data output and recording systems and locations	Yes	• Section 2.3.3.2.3 (Instrumentation)
	Data processing, archiving, and analysis procedures	Yes	• Section 2.3.3.2.5 (Data Reduction and Compilation) – Not clear whether vertical temperature difference is calculated by subtracting the 10-m ambient temperature from the concurrent measurement at the 60-m level or if temperature difference is recorded from a dedicated delta-T circuit. If the former, could affect the accuracy specification and compliance with the accuracy requirement in Table 2.3-144. Can be handled via RAI.
	Identify and justify and deviations from guidance in RG 1.23	Yes	• Section 2.3.3.2.7 (Deviations to Guidance from Regulatory Guide 1.23) – Instrument specifications for both pre-operational and operational phases both referenced to Table 2.3-144. Section 2.3.3.1.7 notes that resolution of existing sensors does not meet measurement resolution recommended in RG 1.23 (Rev.1). Not clear why same issue not identified for operational phase or why different specifications apply to both phases but have not been shown. Can be handled via RAI.
Additional Sources of Meteorological Data for Airflow Trajectories from the Site to a Distance of 50 Miles (80 km)	Measurements made	None	• Effects of nearby topography (in particular, undulating ridges and valleys within 50 miles of BBNPP site) on airflow trajectories especially in regards to long-range transport of potential short-term accidental and long-term routine release not addressed. Can be handled via RAI.
	Locations and elevations of instruments	None	
	Exposure of instruments	None	
	Descriptions of instruments used	None	
	Instrument performance specifications	None	
Onsite Meteorological Data (Supplemental Submittal – Electronic Copies)	Joint frequency distributions of wind speed and direction by atmospheric stability class based on appropriate meteorological measurement heights and data reporting periods in format described in RG 1.23	Yes	• Hardcopy version of annual JFDs for 10- and 60-m wind measurement levels, as might be used for dispersion modeling, provided in Tables 2.3-28 and 2.3-29, respectively. Not clear from discussion whether 2001-2007 JFD, as presented in Table 2.3-28, was directly input to AEOLUS3 dispersion modeling analyses in Sections 2.3.4 and 2.3.5 or if code operates on sequential hourly data set used to generate that JFD. If the latter, requires sequential hourly meteorological data set (see below). Electronic copies of JFDs not yet provided.
	Hour-by-hour listing of hourly-averaged onsite meteorological database in format shown in RG 1.23	No	• Sequential hourly meteorological database (2001-2007) in RG 1.23 format does not appear to have been provided. Electronic copies of sequential hourly data not yet provided.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Onsite Meteorological Data – Period of Record Submitted and Supplemental Submittal if Necessary	Provide at least two consecutive annual cycles (preferably three or more entire years) including most recent 1-year period at time of application submittal that is defendable, representative, and complete in accordance with RG 1.23, but not older than 10 years from date of application. If less than two years available at time of application submittal, provide at least one annual cycle of onsite meteorological data. Use one-year data set to calculate short-term atmospheric dispersion estimates for accident releases (Section 2.3.4) and long-term estimates for routine releases (Section 2.3.5). Continue to monitor data and submit complete two-year data set when collected. Supplemental submittal should also include re-analysis of Section 2.3.4 and 2.3.5 dispersion estimates based on complete two-year data set.	Yes	• Seven years of onsite data (2001-2007) from SSES Units 1&2 monitoring program used for dispersion modeling in Sections 2.3.4 and 2.3.5. • Six years of onsite data (2001-2006) from SSES monitoring program used for other onsite data characterizations in Sections 2.3.2 and 2.3.1.
Onsite Meteorological Data Representativeness	Evidence as to how well onsite data represent long-term conditions at the site	Yes	• Section 2.3.3.1.5 (Data Reduction and Compilation) and Section 2.3.2.1 (Normal and Extreme Values of Meteorological Parameters)
2.3.4 SHORT TERM ATMOSPHERIC DISPERSION ESTIMATES FOR ACCIDENT RELEASES			
2.3.4.2 Calculations			
Postulated Accidental Radioactive Releases - EAB & LPZ			
Dispersion Model	Provide detailed description of model input values. Identify and justify any deviations from guidance provided in RG 1.145.	Yes	• Section 2.3.4.2.1 (Conservative Short-Term (Accident Release) Atmospheric Dispersion Estimates for EAB and LPZ) – Proprietary code AEOLUS3 (Version 1) was used. Confirmatory runs by staff to be performed using PAVAN. Section 2.3.4.3 states that model implements guidance in RG 1.145 and that it was developed and validated by Entech Engineering. No documentation provided to substantiate that claim.
	Discuss the effects of topography and nearby bodies of water on short-term dispersion estimates	Yes	• Section 2.3.4.3 (Input Details for Computer Code AEOLUS3 (Version 1) – Terrain elevations assumed to be same (i.e., at ground level) for accident release points and receptors. Assumption is conservative. Effects of water bodies on dispersion not applicable.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Information provided should be sufficient to allow the staff to perform its own confirmatory calculations	No	• Section 2.3.4.3 (Input Details for Computer Code AEOLUS3 (Version 1) – Some discussion of modeling assumptions here and in Table 2.3-146. Development of the input data and assumptions need to be addressed in more detail, including, at least: (1) mixing height (whether and how it is used by model for ground-level releases); (2) whether recirculation correction factors (RCFs) were used and, if so, how they were developed; (3) the value of 900 m for the mixing height listed in Table 2.3-146 (also used in routine release analysis –see Section 2.3.5.2), is attributed to AP-101 (or Holzworth), as being a conservative value. Can be handled via RAI. Re this last item, this assumption of conservatism may be inappropriate from two perspectives: first, it appears to be a mean value based on stations over the entire U.S., and second, a mean value may not be representative of the conditions that produce the highest X/Q values (i.e., stable, night time conditions where there is essentially no mixed layer). The conditions under which AEOLUS3 code uses the mixing height should be addressed and discussed further as noted above. Can be handled via RAI. • **Recommend 30 additional staff hours to evaluate and understand AEOLUS3 modeling analysis so that equivalent confirmatory modeling runs with PAVAN can be made.**
X/Q Estimates	Should be based on most representative (preferably onsite) meteorological data and present evidence showing how well these dispersion estimates represent conditions that would be estimated from anticipated long-term conditions at the site	Yes	• Seven years (2001-2007) of onsite data from SSES Units 1&2 monitoring program used in AEOLUS3 modeling analysis. See earlier comments as to whether code ran on JFDs or sequential hourly input data sorted internally by model equivalent to joint frequency distribution wind speed class groupings. Also see earlier comment regarding different wind speed groupings between AEOLUS3 model runs used for short-term accident-related impacts (Section 2.3.4) and long-term routine release (Section 2.3.5). Electronic copies of JFDs and sequential hourly data not yet provided.
Offsite Dispersion Estimates – Exclusion Area Boundary (EAB) and Outer Boundary of Low Population Zone (LPZ)	Provide hourly cumulative frequency distributions of X/Q values using onsite data. Estimates should be made at appropriate distances from effluent release point(s), such as minimum site boundary distance (EAB). Report X/Q values from each of these distributions that are exceeded 5 percent of the time	Yes	• Section 2.3.4.2.1 – Results also listed in Table 2.3-147. X/Q is bounded by corresponding site parameter. See earlier comments under Section 2.0 above for more information.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	For LPZ, provide cumulative frequency of X/Q estimates for: (1) 8-hour time period from 0 to 8 hours (2) 16-hour period from 8 to 24 hours (3) 3-day period from 1 to 4 days (4) 26-day period from 4 to 30 days Report worst condition and 5-percent probability level conditions	Yes	• Section 2.3.4.2.1 – Results also listed in Table 2.3-147. Several X/Qs not bounded by corresponding site parameters. See earlier comments under Section 2.0 above for more information.
Postulated Accidental Radioactive Releases - Control Room			
Dispersion Model	Provide detailed description of the model input values. Identify and justify any deviations from guidance provided in RG 1.194.	Yes	• Section 2.3.4.2.3 (Short-Term (Accident Release) Atmospheric Dispersion Estimates for the Control Room) – ARCON96, May 9, 1997 version was used. Confirmatory runs to be performed by staff.
	Information provided should be sufficient to allow the staff to perform its own confirmatory calculations	Yes	• Section 2.3.4.2.3 – Input discussion not well developed. Stated that model implements guidance in RG 1.194. Some discussion of modeling assumptions here and in Table 2.3-146. Cross-referenced figures for locations of potential accident release pathways in relation to Control Room and general plant site and Control Room location not yet evaluated. • **Recommend 32 additional staff hours to evaluate and understand ARCON96 model input and make confirmatory modeling runs.**
	For purposes of control room radiological habitability analyses, provide a site plan showing true north and indicating locations of all potential accident release pathways and control room intake and unfiltered in-leakage pathways	Yes	• Section 2.3.4.2.3 – Cross-referenced figures for locations of potential accident release pathways in relation to Control Room (Figure 2.3-1 of U.S. EPR FSAR and general plant site and Control Room location (COL FSAR Figures 2.1.1-1 and 2.3.4-1). Figures not yet evaluated. Control Room and Technical Support Center indicated to be within same envelope.
X/Q Estimates	Should be based on most representative (preferably onsite) meteorological data and present evidence showing how well these dispersion estimates represent conditions that would be estimated from anticipated long-term conditions at the site	Yes	• Seven years (2001-2007) of onsite data from SSES Units 1&2 monitoring program used in ARCON96 modeling analysis. Electronic copy of sequential hourly data in ARCON96 format not yet provided.
	Provide X/Q values that are not exceeded more than 5 percent of the time for all potential accident release points	yes	• Section 2.3.4.2.3 - Results also listed in Table 2.3-149 thru Table 2.3-153. X/Qs are bounded by corresponding site parameters. See earlier comments under Section 2.0 above for more information.
Hazardous Material Releases			

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
Dispersion Model(s)	Describe atmospheric dispersion model(s) used in evaluating potential DBAs to calculate concentrations of hazardous materials (e.g., flammable or toxic clouds) outside building structures resulting from onsite and/or offsite airborne releases of such materials	Yes	• Section 2.3.4.2.4 (Atmospheric Dispersion Modeling for Hazardous Materials) – Cross-references Section 2.2.3 (Evaluation of Potential Accidents)
	Identify and justify any deviations from guidance provided in RG 1.78	Yes	• Section 2.3.4.2.4 – Cross-references Section 2.2.3 (Evaluation of Potential Accidents)
X/Q Estimates	Justify appropriateness of the use of the model(s) with regard to release characteristics, plant configuration, plume density, meteorological conditions, and site topography	Yes	• Section 2.3.4.2.4 – Cross-references Section 2.2.3 (Evaluation of Potential Accidents)
2.3.5 LONG-TERM ATMOSPHERIC DISPERSION ESTIMATES FOR ROUTINE RELEASES			
2.3.5.2 Calculations			
Dispersion Model	Provide detailed description of model used to calculate realistic annual average dispersion (X/Q) and deposition (D/Q) values. Identify and justify any deviations from guidance provided in RG 1.111.	Yes	• Section 2.3.5.2 (Calculations) – Proprietary code AEOLUS3 (version not stated but presumably same as used for short-term accident analyses) was used. Confirmatory runs by staff to be performed using XOQDOQ. States that model implements guidance in RG 1.111 and that it was developed and validated by Entech Engineering. No documentation provided to substantiate that claim.
	Discuss accuracy and validity of model, including suitability of input parameters, source configuration, and topography	Yes	• Section 2.3.5.2 – See preceding comments.
	Provide meteorological data (onsite and regional) used as input	Yes	• Section 2.3.5.2 - Seven years (2001-2007) of onsite data from SSES Units 1&2 monitoring program used in AEOLUS3 modeling analysis. See earlier comments as to whether code ran on JFDs or sequential hourly input data sorted internally by model equivalent to joint frequency distribution wind speed class groupings. Also see earlier comment regarding different wind speed groupings between AEOLUS3 model runs used for short-term accident-related impacts (Section 2.3.4) and long-term routine release (Section 2.3.5). Electronic copies of JFDs and sequential hourly data not yet provided. No other regional meteorological data used. Effects of nearby topography (in particular, undulating ridges and valleys within 50 miles of BBNPP site) on airflow trajectories especially in regards to long-range transport of long-term routine releases not addressed. Can be handled via RAI.

Area/Topic	Remarks	Complete & Technically Sufficient?	Comments/Notes
	Information provided should be sufficient to allow staff to perform its own confirmatory calculations	Yes	• Section 2.3.5.2 - Development of the input data and assumptions listed in Section 2.3.5.2 and/or Table 2.3-154 need to be discussed in more detail, including, at least: (1) mixing height (whether and how it is used by the model for ground-level releases and the elevated portion of mixed mode releases); (2) basis for gamma energy spectrum; (3) how recirculation correction factors (RCFs) were developed; (4) references for stack flow rate and basis for considering this to be a conservative value; (5) references for stack diameter, stack height, and reactor building height; (6) more detailed explanation of calculation of building cross-sectional area and other applicable references; (7) for both grid and special receptors whether terrain heights represent spot elevations or some maximum value and if the latter, (8) how maximum heights were determined; and (9) references for special receptor locations and if original distances and directions were relative to SSES Units 1&2 how the distances and directions relative to BBNPP were determined. Can be handled via RAI Re first item (mixing height), this assumption of conservatism may be inappropriate from two perspectives: first, it appears to be a mean value based on stations over the entire U.S., and second, a mean value may not be representative of the conditions that produce the highest X/Q values (i.e., stable, night time conditions where there is essentially no mixed layer). The conditions under which AEOLUS3 code uses the mixing height should be addressed and discussed further as noted above. Can be handled via RAI. • **Recommend 30 additional staff hours to evaluate and understand AEOLUS3 modeling analysis so that equivalent confirmatory modeling runs with XOQDOQ can be made.**
X/Q and D/Q Estimates - Routine Releases	For each venting location, provide annual average X/Q and D/Q values at appropriate locations (e.g., site boundary, nearest vegetable garden, nearest residence, nearest milk animal, and nearest meat cow in each 22.5-degree direction sector within a 5-mile radius of the site	Yes	• Section 2.3.5.2 (Calculations) and Section 2.3.5.3 (Site-Specific Evaluation of Maximum Annual Average X/Q) – Results also listed in Tables 2.3-155 thru 2.3-179. Several X/Qs not bounded by corresponding site parameters. See earlier comments under Section 2.0 above for more information. Discrepancies noted can be handled via RAI.
	Provided estimates of annual average X/Q and D/Q values for 16 radial sectors to a distance of 50 miles (80 km) from the plant using appropriate meteorological data	Yes	• Section 2.3.5.2 (Calculations) – Results also listed in Tables 2.3-155, 2.3-161, 2.3-167, 2.3-168, and 2.3-174. Tables 2.3-167 and 2.3-168 represent Pages 1 and 2 of 2 of the same table. Can be handled via RAI.
	Present evidence to show how well these estimates represent conditions that would be estimated from climatologically representative data	Yes	• Not evaluated during acceptance review.

Table 1. Environmental Report Acceptance Review
Bell Bend Combined License Application

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic (ESRP, Reg, or RG Section)	Review Area/Topic 1. Is the following material found in the Application?	2. As applicable, does the ER address the items required by regulation (e.g., 10 CFR 51.45, 51.49, 51.50, and 10 CFR Part 52) and by RG 4.2? (Completeness) **(Yes/No)**	3. Is the ER discussion technically sufficient for this area/topic? (Sufficiency) **(Yes/No)**	4. Can the technical deficiency be resolved through the RAI process or at the site audit? **(Yes/No)**	5. Remarks/Notes: If a "**No**" for either completeness or sufficiency has been entered in Column 2 or 3, identify deficiency(ies) and provide details. If a "Yes" for both completeness and sufficiency, provide the ER section where information was found and any other pertinent information.
	Accidents	Jeremy Rishel	1	7.1	Is the exclusion area boundary (EAB) definition consistent throughout the Environmental Report (ER) and Site Safety Analysis Report (SSAR) or Final Safety Analysis Report (FSAR)?	Yes	Yes		EAB is defined by a circle with a radius of 0.43 miles in ER and FSAR. See ER: Table 2.7-162, Section 3.1, Figure 3.1-1, Section 7.1 See FSAR: Figure 1.1-1, Section 1.8.2, Section 2.1.1.3, Section 2.3.4.3, Table 2.3-147, Section 15.0.3.1, Section 15.0.3.4, Table 15.0-1, Table 15.0-3

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.1	Is the low-population zone (LPZ) definition consistent throughout the ER and SSAR/FSAR?	Yes	Yes		LPZ is defined by a circle with a radius of 1.5 miles in ER and FSAR. See ER: Section 2.5.1.1, Section 2.5.1.1.4, Figure 2.5-3, Section 2.7.6.2, Table 2.7-163, Section 7.1, See FSAR: Table 2.0-1, Section 2.1.3.4, Section 2.3.4.3, Table 2.3-147, Section 15.0.3.1, Table 15.0-1, Table 15.0-3
	Accidents	Jeremy Rishel	1	7.1	Are the meteorological data used to calculate normalized concentrations (χ/Qs) for design basis accident (DBA) analyses the same as the data used to calculate χ/Q for routine releases?	Yes	Yes		Meteorological data used in calculations include 2001-2007. See ER: Section 2.7.6.1, Section 2.7.6.1.1, Section 2.7.6.1.2 See FSAR: Section 2.3.4.2.1 Section 2.3.4.2.2
	Accidents	Jeremy Rishel	1	7.1 RG 1.145	Are the χ/Q values used for DBA analyses for representative (50%) meteorological conditions? If so, were the procedures used to calculate the χ/Q values consistent with NRC guidance?	Yes	No	Yes	The AEOLUS3 model will need to be evaluated to determine if it is an acceptable method for calculating χ /Qs. A comparison run using an NRC-approved model will be required. See ER: Section 2.7.6.2, Table 2.7-161, Table 2.7-162, Table 2.7-163, Section 7.1 See FSAR: Section 2.3.4.2.2

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.1	Have the meteorological data on which the χ/Q values are based been provided to the NRC?	No	No	Yes	If not already received, meteorological data will need to be submitted to the NRC by the applicant
	Accidents	Jeremy Rishel	1	7.1	Does the ER list the name for any computer code used to calculate the χ/Qs used for DBAs?	Yes	Yes		AEOLUS3 Version 1 See ER: Section 2.7.6.1, Section 2.7.6.2
	Accidents	Jeremy Rishel	1	7.1	Does the ER contain a list of DBAs, and are they the same as the DBAs in the SSAR/FSAR?	Yes	Yes		ER contains a list of the DBAs; the FSAR provides a tabular result for the same DBAs. See ER: Section 7.1 Table 7.1-1 See FSAR: Section 15.0.3 Table 15.0-2
	Accidents	Jeremy Rishel	1	7.1	If the reactor design is certified or undergoing certification, are the DBAs the set of DBAs covered in the design control document (DCD) or FSAR? If the reactor design is not certified or undergoing certification, are the DBAs listed in Environmental Standard Review Plan (ESRP) 7.1 Appendix A included in the ER's DBA analysis?	Yes	No	Yes	DBAs are listed and covered in ER and FSAR. Review of reference DCD is required See ER: Section 7.1 Table 7.1-1 See FSAR: Section 15.0.3 Table 15.0-2
	Accidents	Jeremy Rishel	1	7.1 10 CFR 50 Appx K ESRP 15.6.5	Are the DBA doses calculated for the reactor design-power level plus a margin for uncertainty (e.g., design power + 2%).	Yes	No	Yes	A 0.48% uncertainty was used and will need to be justified. See ER: Section 7.1
	Accidents	Jeremy Rishel	1	7.1	Are isotopic source terms provided for each DBA?	Yes	Yes		Table 7.1-14 through Table 7.1-23
	Accidents	Jeremy Rishel		7.1 10 CFR 50.34(a)(1)(i) Regulatory Guide 1.183	Do the isotopic source terms include the source term for the worst 2-hour period?	Yes	Yes		Yes. See ER: Table 7.1-14 through Table 7.1-23

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.1 RGs 1.3, 1.4, 1.183	Do the DBA doses appropriately account for changes in breathing rates?	Yes	No	Yes	Time-varying breathing rates are not explicitly specified in ER Section 7.1; presumed to follow Reg Guide 1.183.
	Accidents	Jeremy Rishel	1	7.1	Does the ER appropriately reference a document that describes each DBA and underlying assumptions? If not, does the ER provide a description of each DBA?	Yes	Yes		ER lists DBAs in Table 7.1-1, referencing Section 7.1, Appendix A of NUREG-1555 (NRC, 1999) and DBAs applicable for the U.S. EPR. The DBAs are based on Chapter 15 of NUREG-0800 (NRC, 2007) and Regulatory Guide 1.183 (NRC, 2000). ER: Section 7.1 Table 7.1-1
	Accidents	Jeremy Rishel	1	7.1 10 CFR 50.34(a)(1)(i) RG 1.183	Are EAB doses calculated for the 2-hour period giving the highest dose? Is the 2-hour period identified?	Yes	No	Yes	ER Table 7.1-10 indicates loss-of-coolant accident (LOCA) worst 2-hour dose is between 1.5-3.5 hours; all other accidents maximum dose is between 0-2 hours. The rod control accident source term appears to have higher activity at 2-8 hours rather than 0-2 hours for several important nuclides. Values will need to be verified. ER: Section 7.1 Tables 7.1-6 through 7.1-12
	Accidents	Jeremy Rishel	1	7.1 10 CFR 50.34 SRP 15	Are EAB DBA doses less than dose limits and criteria set for safety reviews?	Yes	Yes		See ER: Table 7.1-13

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.1 RG 1.3, 1.4, 1.145, 1.183	Are DBA LPZ doses calculated for four time periods as indicated in ESRP 7.1, and Regulatory Guides 1.3, 1.4, 1.145, etc.	Yes	Yes		See ER: Table 7.1-6 through Table 7.1-12
	Accidents	Jeremy Rishel	1	7.1	Are the LPZ χ/Qs calculated consistently with NRC guidance?	Yes	No	Yes	The AEOLUS3 model will need to be evaluated to determine if it is an acceptable method for calculating χ /Qs. A comparison run using an NRC-approved model will be required. See ER: Section 2.7.6.2, Table 2.7-161, Table 2.7-163, Section 7.1
	Accidents	Jeremy Rishel	1	7.1 10 CFR 50.34 ESRP 15	Are LPZ DBA doses less than dose limits and criteria set for safety reviews?	Yes	Yes		See ER: Table 7.1-13
	Accidents	Jeremy Rishel	1	7.2	Does the ER contain a site-specific evaluation the potential impacts of severe accidents based results on a recognized tool such as the MACCS2 code?	Yes	Yes		See ER: Section 7.2
	Accidents	Jeremy Rishel	1	7.2	If not, what is the name, version, date, etc. for of the code used?	Yes	Yes		MACCS2, reference Sandia 1997. See ER: Section 7.2.1.1
	Accidents	Jeremy Rishel	1, 2	7.2	What meteorological data were used in the evaluation? (Check with meteorology reviewer.)	Yes	Yes		Year 2001 was used in MACCS2 runs (years 2001-2007 were evaluated in ER). See ER: Section 7.2.1.1
	Accidents	Jeremy Rishel	1, 2	7.2	What population data were used in the evaluation? Are the data consistent with that presented in the demographic discussion? Are population projections based on the most recent census and appropriate projection techniques? (Check with socioeconomic project reviewer.)	Yes	Yes		Population was generated using SECPOP2000 for the year 2000. The 2000 population data were escalated to 2050 by a growth rate factor of 1.0549 per decade. See ER: Section 7.2.1.2

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1, 2	7.2	What land-use data were used in the evaluation? Were they adjusted for potential changes in land use? (Check with land-use project reviewer.)	No	No	Yes	Source of land-use data used in MACCS2 are not provided in the ER.
	Accidents	Jeremy Rishel	1, 2	7.2	Does the ER contain a list of major surface water users within 50 miles of the site, including public water supplies and major industrial and agricultural users? (Check with hydrology project reviewer.)	Yes	Yes		See ER: Table 2.3-27 Table 2.3-29
	Accidents	Jeremy Rishel	1	7.2	Does the ER contain or refer to a list the postulated severe accidents, their descriptions, and their respective core damage frequencies (CDFs)? If so, is the list consistent with accidents considered in a DCD or FSAR for the reactor type?	Yes	No	Yes	Externally initiated events are not explicitly addressed. See ER: Table 7.2-1 Table 7.2-3
	Accidents	Jeremy Rishel	1	7.2	Has the applicant provided electronic copies of the input to and output from the computer code?	No	No	Yes	Input and output files will be necessary to perform confirmatory calculations.
	Accidents	Jeremy Rishel	1	7.2	Does the severe accident analysis in the ER consider the atmospheric, surface water, and groundwater pathways?	Yes	Yes		See ER: Section 7.2.2.1 Section 7.2.2.2 Section 7.2.2.3 Table 7.2-3
	Accidents	Jeremy Rishel	1	7.2	Does the severe accident analysis include output for socioeconomic, individual, and population health effects?	Yes	No	Yes	Average individual dose is needed for comparison to Commission's safety goals. See ER: Table 7.2-3
	Accidents	Jeremy Rishel	1	7.2	Are these effects adequately reflected in the ER in terms of risk?	Yes	No	Yes	CDFs do not identify whether they are for internally or externally events. Table 7.2-3
	Accidents	Jeremy Rishel	1	7.2	If the application references a reactor design other than a certified design, does the ER or FSAR list or refer to a list of the dominant severe accident sequences.	Yes	Yes		Design is undergoing certification. See ER: Table 7.2-1
	Accidents	Jeremy Rishel	1	7.3	Does the ER (or SSAR/FSAR or DCD) contain a list of leading contributors to (1) core damage frequency, (2) large release frequency, and (3) dose consequences with and without mitigation?	Yes	Yes		This is more detail than required for the ER; this detail should be in the DCD.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.3	Does the ER (or SSAR/FSAR) contain a description of the method, rationale, or process used to identify, screen, and select design alternatives and procedural modifications?	Yes	No	Yes	Procedural changes are not addressed. See ER: Section 7.3.1
	Accidents	Jeremy Rishel	1	7.3	Does the ER contain the estimated cost, risk reduction, and value impact ratios for the selected severe accident mitigation alternatives (SAMAs) along with the underlying assumptions?	Yes	Yes		See ER: Section 7.3.2 Table 7.3-1
	Accidents	Jeremy Rishel	1	7.3	Does the ER contain a list of SAMAs that have been or will be implemented to prevent or mitigate the impacts from severe accidents or to reduce the risk of a severe accident or other statement related to the implementation of SAMAs?	Yes	No	Yes	Procedural SAMAs are not evaluated; applicant states procedures will be addressed when the plant design is finalized and processes and procedures are being developed for the U.S. EPR (ER Section 7.3). Design alternatives are evaluated and summarized in the sections below. See ER: Section 7.3.2 Section 7.3.3
	Alternative Analysis	D Hostick	1	ESRP 9.1	Discussion of the no-action alternative.	Yes	Yes		
	Alternative Analysis	D Hostick	2	ESRP 9.2.1	A list of the facilities in the relevant service area scheduled for retirement during the period extending from the date of application through the sixth year of commercial operation of the proposed project, including existing nuclear power facilities within the relevant region that are near the end of their license and are candidates for license renewal. Power facilities available for reactivation should also be considered.	Yes	No	Yes	List of facilities in Ch 8 includes only recent deactivations of plants and does not extend beyond 2007.
	Alternative Analysis	D Hostick	2	ESRP 9.2.1	The potential for energy conservation within the relevant service area.	Yes	No	Yes	While the description of current programs is thorough, no estimate of the savings/benefits resulting from energy conservation is included (from either current or projected efforts)
	Alternative Analysis	D Hostick	1	ESRP 9.2.2	For alternatives that have not yet achieved commercial acceptance, U.S. Department of Energy (DOE) research, development, and demonstration/commercialization schedules and projected capability as a source of central station power.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternative Analysis	D Hostick	1	ESRP 9.2.2	For nonrenewable fuels (coal, natural gas, and petroleum fuels), the fuel quality, availability to the applicant, rate of consumption estimates, potential environmental restrictions and impacts, and emissions and definition of U.S. national policy (if any) with respect to new uses of these fuels.	Yes	No	Yes	Rate of consumption estimates are not included. Limited discussion of the Regional Greenhouse Gas Initiative (RGGI) should know whether RGGI will impact distribution of electricity through PJM to other states, because Bell Bend Nuclear Power Pant (BBNPP) will export power to RGGI participating states.
	Alternative Analysis	D Hostick	1	ESRP 9.2.2	For renewable fuels (e.g., wind, geothermal, hydroelectric, wood waste and municipal solid waste, energy crops, and solar), availability to the applicant, quantities needed, potential environmental restrictions, amount of land that would be occupied, amount of the fuel available, and U.S. national policy (if any) with respect to new uses of these fuels.	Yes	No	Yes	Amount of land needed for solar power appears to be based on dated sources (compared to Calvert Cliffs Draft EIS)
	Alternative Analysis	D Hostick	2	ESRP 9.2.3	When relevant, estimated decommissioning cost for the proposed project and for each competitive alternative.	Yes	Yes		Competitive alternatives are not identified.
	Alternative Analysis	D Hostick	1	ESRP 9.2.3	When competitive alternatives are identified, the fixed charge rate for the utility or consortium of utilities.	Yes	Yes		Competitive alternatives are not identified.
	Alternative Analysis	D Hostick	1	ESRP 9.2.3	When competitive alternatives are identified, fuel cost estimates at time of application for the proposed project and for other alternatives.	Yes	Yes		Competitive alternatives are not identified
	Alternative Analysis	D Hostick	1	ESRP 9.2.3	When competitive alternatives are identified, the operation and maintenance cost estimates (fixed component and variable component) at time of application for the proposed project and each competitive alternative.	Yes	Yes		Competitive alternatives are not identified.
	Alternative Analysis	D Hostick	1	ESRP 9.2.3	When competitive alternatives are identified, the escalation rates from date of application through facility lifetime (30-year life) for the components of operation and maintenance and fuel for the proposed project and each competitive alternative.	Yes	Yes		Competitive alternatives are not identified.
	Alternative Analysis	D Hostick	1	ESRP 9.2.3	When competitive alternatives are identified, the discount rate for the proposed project and each competitive alternative.	Yes	Yes		Competitive alternatives are not identified
	Alternative Analysis	D Hostick	1	ESRP 9.3	The objectives of the alternative site selection process.	Yes	Yes		"to verify that there are no 'obviously superior' sites"
	Alternative Analysis	D Hostick	1	ESRP 9.3	Siting constraints and limitations (e.g., rules, regulations, and laws).	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternative Analysis	D Hostick	1	ESRP 9.3	The selection procedures for the region of interest (ROI), candidate areas, potential sites, candidate sites, and proposed site.	Yes	Yes		Refers to special case in NUREG 1555, section 9.3, where plants proposed to be constructed on the site of an existing nuclear power plant (NPP) does not need to be selected as result of systematic review.
	Alternative Analysis	D Hostick	1	ESRP 9.3	The basis for establishing the geographical scope of the ROI.	Yes	Yes		
	Alternative Analysis	D Hostick	1	ESRP 9.3	The factors considered at each level of the selection process, parameters by which these factors were measured, and criteria used to define levels of quality (e.g., numerical limits or decision standards).	Yes	Yes		
	Alternative Analysis	D Hostick	1	ESRP 9.3	The criteria used to screen potential sites to arrive at candidate sites.	Yes	Yes		
	Alternative Analysis	D Hostick	1	ESRP 9.3	The methodologies used in the candidate site comparison process, including (when used) factors such as importance factors, preference functions, utility functions, weighing factors, ranking scales, scoring schemes, rating systems, and sensitivity analyses.	Yes	Yes		
	Alternative Analysis	D Hostick	1	ESRP 9.3	A description of the ROI selected by the applicant, including the following: • major centers of population • areas predicted to be deficient in power • waterbodies available for cooling • railroads, highways, and waterways (existing and planned) • topographic features • major land-use classifications (e.g., residential and agricultural) and areas reserved for specific uses • location and description of existing and planned primary electrical generating stations • existing and planned transmission network • transmission interconnections with other utilities • natural and man-made features (e.g., zones of seismic activity, unusual geologic features, military installations) constituting potential hazards to construction or operation of a nuclear power facility.	Yes	No	Yes	Transmission network and interconnections discussion needs additional detail.
	Alternative Analysis	D Hostick	1	ESRP 9.3	Descriptions of the following: • candidate areas • potential sites • candidate sites.	Yes	Yes		
	Alternative Analysis	D Hostick	1	ESRP 9.3	Descriptions of how the site-selection process was used to identify and select the ROI, candidate areas, potential sites, candidate sites, and the proposed site.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternative Analysis	D Hostick	1	ESRP 9.3	Data sources used in the site-selection process, including results of site-specific field investigations.	Yes	Yes		
	Alternative Analysis	D Hostick	1	9.4.3	For alternative transmission corridor routes: • maps or aerial photographs showing alternative transmission corridors from station site to inter-connecting points on the existing high-voltage system and identifying corridor characteristics (e.g., new lines/towers on existing corridors, widening of existing and new corridors) • maps or aerial photographs showing existing and known future generating stations and transmission networks for the service area or affected region. For existing transmission corridors not proposed as alternatives to the proposed system, reasons why they were not considered (e.g., system reliability) should be provided. • lengths and widths of corridors for each alternative segment or corridor • number and approximate location of known historic/archaeological sites within 2 km of the alternative corridor • maps or aerial photographs showing approximate locations of Federal, State, or private wildlife refuges or other areas dedicated to ecological preservation, management, or study within 1 km of alternative corridors • corridor proximity to airports, roads, railroads, or other transportation facilities • general land-use characteristics along the alternative corridors expressed as percentages of total corridor length and in terms of intensity of use (e.g., residential density) for the following classifications: – agricultural – forest, woodland – rangeland – recreational or ecologically sensitive areas such as parks, wildlife preserves/refuges or wildlife management areas, wetlands, wild and scenic rivers – urban or residential areas – commercial or industrial areas – other potentially significant classifications (e.g., Federally owned lands, Native American Tribal lands, ethnic enclaves, or areas of high minority population) – potential geologic hazards (e.g., active faults) that could affect transmission system reliability.	Yes	Yes		Plan to use existing corridors – no alternatives proposed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternative Analysis	D Hostick	1	9.4.3	For alternative system design, construction, and maintenance practices, the following information: • alternative voltage levels and transmission frequency that are compatible with the existing service area/regional transmission network • alternative tower designs for areas of potential visual impact • alternative tower heights and conductor-to-ground clearances • alternative conductor designs • underground placement in areas of potentially high impact • alternative construction practices, including vegetation clearing; erosion control; revegetation; access road design, location, and maintenance; tower placement, foundations, and installation; and conductor installation • alternative maintenance practices • alternative location of auxiliary transmission facilities (e.g., substations, microwave relay stations).	Yes	Yes		Plan to use existing corridors – no alternatives proposed.
	Alternative Analysis	D Hostick	1	9.4.3	For the alternative transmission selection process and cost data, the following information is required: • discussion of the selection process used to evaluate transmission line routes and the rationale and criteria used to select the proposed route • acquisition cost data for the proposed and alternative route corridors • construction and maintenance costs for the proposed system and for principal system alternatives • estimated transmission line losses for the proposed system and for principal alternatives.	Yes	Yes		Plan to use existing corridors – no alternatives proposed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	36 CFR 800	A description of surveys, consultation with the State Historic Preservation Office (SHPO), and mitigation measures prior to any ground disturbance activities associated with preconstruction or construction activities. NRC expects applicants to provide a plan to identify and protect historic resources during preconstruction activities and to follow that plan during preconstruction activities. NRC notes that Section 110(k) of the National Historic Preservation Act (NHPA; 16 USC § 470h-2(k)) prohibits applicants for federal licenses or permits from intentionally destroying historic properties that may be protected under the NHPA.	Yes	No	Yes	The ER describes the results of the Phase 1a and Ib cultural resources investigations, resulting in the identification of seven potentially National Register-eligible archaeological resources that are recommended for avoidance or mitigation and 10 architectural resources that are recommended as potentially National Register-eligible. SHPO concurrence with these findings as well as formal assessments of adverse effects and/or need for mitigation measures are still pending (i.e. Phase II and III investigations, if needed). Supplemental Phase 1B surveys are also in process. Details are described in Section 2.5.3, Tables 2.5.3-35-2.5.3-40 and 4.1.3, and in the Phase Ia and Ib cultural resources investigation reports, completed thus far. These additional studies when completed, and accompanying protection/avoidance plans should address these information needs. Completion of these analyses will provide the necessary information to complete this analysis. Applicant does indicate that these studies will be completed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of the cultural resources sensitivity within a 16-km (10-mi) radius of the proposed plant boundary.	Yes	No	Yes	This can be inferred from the information provided in Section 2.5.3 and the accompanying tables (Tables 2.5-41-2.5-48), but a specific statement on potential/cultural resources sensitivity in the vicinity of the plant is not explicitly stated. More details about cultural resources and associated sensitivity of the area are also provided in the Phase Ia and IIb studies.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of the cultural history of the region around the proposed plant.	No	No	Yes	These details and development of context can be inferred from preliminary conclusions made about the resources in Section 2.5.3 and 4.1.3 and 5.1.3, regarding National Register eligibility. More details should be provided in the Phase I reports, but a quick review does not readily provide a developed cultural and historical overview and/or context for the area.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of previous cultural investigations within a 16-km (10-mi) radius.	Yes	No	Yes	This information is not provided in Section 2.5.3 of the ER, but can be found in the Phase Iz and Ib cultural resource investigation reports.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	An appraisal of the cultural sensitivity of the project area based on models of prehistoric and historic occupation.	Yes	Yes		This is generally described in Section 2.5.3, but details regarding low, moderate, or high potential for archaeological resources can be found in the Phase Iz and Ib cultural resource investigation report.

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	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A summary of land use at the proposed plant location, beginning with the earliest recorded historic settlement.	No	No	Yes	These details are usually provided in the cultural resources investigation reports and provide background for Section 2.5.3. A quick review of the Phase Ia and Phase Ib reports indicates that this information can be inferred from the records and background search, the historic map, and from the resources located by the investigations.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	The identification of preconstruction and construction activities as defined by the Limited Work Authorization (LWA) Rule.	Yes	No	Yes	Separation and identification of preconstruction and construction activities are not described in Section 2.5.3. Section 2.5.3 describes cultural resources that may be impacted by both activities described as construction and preconstruction, as defined by LWA. Section 4.6 provides a table (4.6-2) that delineates impacts based on construction vs. preconstruction impacts with 95% of the impacts resulting from preconstruction activities. Clarification is needed to identify these activities and analyze their impacts separately as well as cumulatively.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	The Area of Potential Effect (APE) of proposed plant activities on cultural resources, including a visual APE for historic structures and for traditional cultural property (TCP), if appropriate.	Yes	Yes		The APEs are described in Section 2.5.3. Clarification is needed on the consultation with SHPO and Tribes on defining the APEs and any consultation letters with SHPO and Tribes. Clarification is needed on TCPs and APEs.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of past and recent surveys conducted in the APEs, including the basis for surveys and qualifications of surveyors.	Yes	Yes		These are described in Section 2.5.3, and in more detail in the Phase Ia and Ib cultural resources investigations. Still need pending studies to complete analysis or commitment that these studies will be done.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	The findings of the cultural resources surveys with any comments by the SHPO or others (e.g., Tribes and interested parties) related to preconstruction and construction activities.	Yes	No	Yes	This information is described in Section 2.5.3 and in more detail in the Phase Ia and Ib cultural resources investigations. Copies of consultation letters are necessary to confirm input from SHPO. Need pending studies to complete analysis or commitment that these studies will be done.
-	Cultural Resources	Ellen P. Kennedy	1	2.5.3	An identification of those resources within the area of potential effect determined to be important, that is, either determined eligible for listing in the National Register of Historic Places (NRHP) or considered important under the National Environmental Policy Act (NEPA).	Yes	No	Yes	Section 2.5.3 describes resources that are potentially eligible within the project APEs. Official NRHP evaluations, assessment of effects with SHPO input have not been completed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	If not all resource surveys have been completed, a description of the agreements and procedures/plans that the applicant has made with the State to ensure completion of surveys in the future.	Yes	No	Yes	In Section 2.5.3 there is an indication that Phase II and III activities will occur, but there are no formal procedures or agreements in place with the SHPO. Similarly, this type of statement is made in Sections 4.1.3 and 5.1.3.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of consultation efforts made with State and Federal agencies, Indian Tribes, and interested parties.	Yes	No	Yes	A description of efforts made to consult with SHPO and Tribes is outlined in Section 2.5.3.6. The details of the correspondence and responses are not included in the ER. Copies of this correspondence and replies, and any additional correspondence conducted since the publication of ER would clarify these details. Also, it is unclear if any efforts have been made to consult with interested parties.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	2	2.5.3	There are no technical deficiencies in support of cultural resources for the sections mentioned in Review Interfaces in ESRP 2.5.3.	Yes	Yes		Review interfaces include Sections 2.2.1, 2.2.2, 3.1 and 3.7, 4.1.3, and 5.1.3. Sections 2.2.1 and 2.2.2 describe land use at the BBNPP site. And transmission lines. These sections are covered in Section 2.5.3 of the ER. Section 3.1 describes the proposed activities related to construction of the plant and Section 3.7 describes the proposed transmission line upgrades/construction. Clarification is needed regarding the focus of cultural resources investigations in relation to the specific plant construction activities, to confirm that the cultural assessments cover relevant ground-disturbing activities associated with construction. Section 3.7 describes transmission lines that will use existing transmission line corridors, and proposed transmission line corridors used by PPL EU. New construction is contained to the BBNPP footprint. The extent of location of blowdown lines into the Susquehanna River should be confirmed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	A description of important cultural and historical resources that could be affected by proposed project construction activities.	Yes	No	Yes	Section 4.1.3 (p. 4-6) describes in more detail how specific construction activities might directly impact potentially NRHP-eligible cultural resources (three architectural resources and seven archaeological sites). Page 4-5 describes all of the potentially NRHP-eligible resources that have been located. Formal NRHP evaluations, findings of effect assessments, and possible avoidance/and mitigation plans have not been completed in consultation with the SHPO; however, the ER indicates that these will be completed. A procedure or some sort of agreement with SHPO regarding these studies and their timeline is needed. Otherwise, firm conclusions regarding impacts are necessary.

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	Cultural Resources	Ellen P. Kennedy	1	4.1.3	An assessment of the possible impacts on important cultural and historic resources from the proposed construction activities.	Yes	No	Yes	Section 4.1.3 (p. 4-6) describes in more detail how specific construction activities might directly impact potentially NRHP-eligible cultural resources (three architectural resources and seven archaeological sites). Page 4-5 describes all of the potentially NRHP-eligible resources that have been located. Formal NRHP evaluations, findings of effect assessments, and possible avoidance/and mitigation plans have not been completed in consultation with the SHPO; however, the ER indicates that these will be completed. A procedure or some sort of agreement with SHPO regarding these studies and their timeline is needed. Otherwise, firm conclusions regarding impacts are necessary.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	The SHPO's comments on the impact of the proposed project on important historic properties (from consultation with State agencies and Native American Tribal agencies).	Yes	No	Yes	Page 4-5 and 4-6 do not provide the results of the formal NRHP evaluations and assessments of impact. Need the results of these studies and correspondence from SHPO and Tribes. Need clarification onTCP analysis, because none was provided.

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	Cultural Resources	Ellen P. Kennedy	1	4.1.3	State laws and plans for historic preservation and human remains.	Yes	No	Yes	Specific reference to State laws regarding inadvertent discovery of human remains or archaeological material is not provided in Section 4.1.3. A brief reference to a procedure for discovery of archaeological material is described on page 5-6 in Section 5.1.3. Details of this procedure are needed.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	If located on Federal land, the applicant's procedures for identifying the potential for human remains to occur in the project and for complying with provisions of the Native American Graves Protection and Repatriation Act in the event of an inadvertent discovery.	Yes	Yes		BBNPP is not located on Federal lands. See response above regarding applicability of State law and need for a procedure.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	The proposed avoidance measures and procedures to avoid impacts on important cultural and historical resources during construction, or the proposed mitigation measures.	Yes	No	Yes	Formal NRHP evaluations, assessments of effect, or mitigation/avoidance plans have not been completed in consultation with SHPO. Section 4.1.3 indicates that these studies are pending. Section 5.1.3 (p. 5-6), indicates that a procedure will be developed for how construction activities will avoid/minimize impacts to archaeological resources. Details are not provided.
	Cultural Resources	Ellen P. Kennedy	2	4.1.3	There are no technical deficiencies in support of cultural resources for the sections mentioned in Review Interfaces in ESRP 4.1.3.	Yes	Yes		Details of avoidance plans/mitigation plans are pending. Once these are completed, these details can be added to Sections 9.3, 9.4. 4.6, 10.1 and 10.2. Integration of findings (i.e., commitment to avoidance plans) in Section 10.2 (p. 10-7) could be added into Sections 4.13 and 5.1.3.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	5.1.3	A description of important cultural and historic resources that could be affected during operations or the proposed mitigation measures.	Yes	No	Yes	Explicit analysis of how operations activities might directly or indirectly impact cultural resources is not provided with some indication that most of the impacts are construction related. Impact analysis/effect determinations are pending based on the results from additional studies already mentioned (NRHP eligibility, assessment of effects, and avoidance/mitigation/ minimization plans).
	Cultural Resources	Ellen P. Kennedy	1	5.1.3	An assessment of the possible impacts on important cultural and historic resources from the proposed operations	Yes	No	Yes	Explicit analysis of how operations activities might directly or indirectly impact cultural resources is not provided with some indication that most of the impacts are construction related. Impact analysis/effect determinations are pending based on results from additional studies already mentioned (NRHP eligibility, assessment of effects, and avoidance/mitigation/ minimization plans).

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	5.1.3	The proposed avoidance measures to avoid impact to important cultural and historical resources during construction.	Yes	No	Yes	Explicit analysis of how operations activities might directly or indirectly impact cultural resources is not provided with some indication that most of the impacts are construction related. Impact analysis/effect determinations are pending based on the results from additional studies already mentioned (NRHP eligibility, assessment of effects, and avoidance/mitigation/minimization plans). Section 5.10-1 details the type of operation impacts that could occur. No analysis of how these impacts could affect cultural resources is provided.
	Cultural Resources	Ellen P. Kennedy	2	5.1.3	There are no technical deficiencies in support of cultural resources for the sections mentioned in Review Interfaces in ESRP 5.1.3.	Yes	No	Yes	Section 5.10-1 details the type of operation impacts that could occur. No analysis of how these impacts could affect cultural resources is provided in Section 5.1.3. Findings from Table 5.10-1 are not integrated into Section 5.1.3 analysis. Details of avoidance plans/ mitigation plans are pending. Once these are completed, these details can be added to Sections 9.3, 9.4. 4.6, 10.1 and 10.2.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	9.0	Surveillance-level information is provided for all alternative sites.	Yes	Yes		Section 9.3 describes NRHP-eligible sites recorded in the county in which the alternative sites are located. No detailed analysis is provided, nor is it required.
	Cultural Resources	Ellen P. Kennedy	1	4.7	Cumulative effects have been addressed, including those associated with preconstruction LWA activities.	Yes	No	Yes	Cumulative impacts are provided in Section 10.5. Analysis does not include results of pending studies. It also does not include past, present, or future projects within region of influence. Preconstruction and construction activities are included in the analysis in Sections 4.1.3 and 5.1.3, but are not described in Section 10.5.
	Cultural Resources	Ellen P. Kennedy	1	10 CFR 51.45 (c)	A description the environmental impacts of preconstruction activities related to cultural resources at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	No	Yes	Cumulative impacts are provided in Section 10.5, but the analysis does not include results of pending studies. It also does not include past, present, or future projects within region of influence. Preconstruction and construction activities are included in analysis in Sections 4.1.3 and 5.1.3, but are not described in Section 10.5.
	Cultural Resources	Ellen P. Kennedy	1	Alternative Analysis (No ESRP Section)	Has the applicant provided reconnaissance data to characterize the cultural resource impacts at the alternative sites?	Yes	Yes		Section 9.3 describes NRHP-eligible sites recorded in the county in which the alternative sites are located. No detailed analysis is provided, nor is it required.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Decommissioning	T.P. Lynch	1	ESRP 5.9	As specified in 10 CFR 50.75(b)(I) and required by 10 CFR 50.33(k), a report containing a certification that financial assurance for radiological decommissioning will be provided.	Yes	Yes		Section 1.6 in Part 1 of the application contains an estimate of total decommissioning costs, funding methods to cover costs, and the financial assurance certification. Appendix A contains a copy of the certification with dollar amounts withheld as proprietary information.
	Decommissioning	T.P. Lynch	2	ESRP 5.9	Are there any technical deficiencies in support of decommissioning for the sections mentioned in Review Interfaces in ESRP 5.9?	Yes	Yes		
	Decommissioning	T.P. Lynch	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on decommissioning?	No	No	Yes	Section 10.5 discusses cumulative impacts but does not appear to address activities of other agencies in the region that could impact decommissioning.
	Decommissioning	T.P. Lynch	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified projects in the region that may contribute to a cumulative impact on decommissioning?	No	No	Yes	Section 10.5 discusses cumulative impacts but does not appear to address other projects in the region that could impact decommissioning.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Is the available site-specific data adequate, accurate, and complete?	Yes	Yes		See various sections identified below for specifics.

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	Ecology – Aquatic	Roy Kropp	1	2.4.2	Has the applicant included at least one year's worth of baseline aquatic monitoring data of the higher trophic level organisms to characterize adequately the aquatic environment and to identify important species? If the applicant is relying on historical data, is there adequate justification for why the data are appropriate?	Yes	Yes		Section 2.4.2.1. November 2007, July 2008 main sampling; April 2008. Macroinvertebrates and fish sampled in onsite ponds and streams. Applicant's Aquatic Field Study Report made available with application. Susquehanna River—used fish data from Ecology III for 2004–2007 and invertebrate data from 2007; historical record for invertebrates and fish back to 1970s. Included raw data in ER tables, not just summaries.

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	Ecology – Aquatic	Roy Kropp	1	2.4.2	Has the applicant identified any onsite waterbodies, streams, or wetland areas? Are sampling data available for these water features? Has the applicant determined if these waterbodies contain any "important" species?	Yes	No	Yes	Section 2.4.2.1.5 identifies important species in onsite ponds and streams; includes EPT taxa, but no fish. Susquehanna River—Section 2.4.2.2.6. Good list. Descriptions a bit brief. Sampling data are available—see above. Note: applicant also included data for offsite stream sections to be able to evaluate possible downstream indirect effects. Need to clarify absence of fish as important stream and pond species. Examples of potential important species include brown bullhead, green sunfish, bluegill, blacknose dace, creek chub, white sucker (pp.2-455, 456). Some discussed under River species (bluegill). May ask for more detail on river species. Should include American beaver as an ecologically important species.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Has the applicant identified the species and habitats that will be considered "important" ecological resources of the site, vicinity, transmission corridors, and offsite areas for evaluation of potential impacts on them?	Yes	Yes		Species—see above. Habitats—Section 2.4.2.1.7 for onsite ponds and stream; Section 2.4.2.2.9 for Susquehanna River. Latter a bit brief.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant include a map that identifies "important" aquatic habitats or bodies of water on and in the vicinity of the site?	Yes	Yes		Figures 2.4-3 to 2.4-6.

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	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant describe any "important" species and their spatial and temporal distributions on and in the vicinity of the site (discharge area and receiving waterbody), including (as appropriate) their relative abundance, critical habitat, and their life histories—critical life stages, spawning areas, nursery grounds, food habits, feeding areas, wintering areas, and migration areas?	Yes	Yes		Section 2.4.2.1.5 identifies important species in onsite ponds and streams; includes EPT taxa. Susquehanna River—Section 2.4.2.2.6. Discussion a bit brief. Gave qualitative assessment of occurrence near plant, but did not include relative abundance data in Susquehanna River near the NPP. Data are available in other subsections or tables in the ER.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Has the applicant consulted with local offices of the appropriate Federal, State, regional, local, and affected Native American Tribal agencies to determine the presence of endangered or threatened aquatic species? Determine when was the last time there was consultation with agencies.	Yes	Yes		Page 2-453. Consultation with U.S. Fish and Wildlife Service (USFWS) on December 21, 2007 via letter; letter received from USFWS on January 18, 2008 (cited in Section 5.6.2.6 references). Also with Pennsylvania Fish and Boat Commission for State species of concern; letter received April 14, 2008. Cited in Sections 2.4.3 and 5.6.2.6 references. Might have to ask for copies of documentation. Also see Section 5.6.2.5 transmission.

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	Ecology – Aquatic	Roy Kropp	1	2.4.2	Has the applicant identified the location and value of commercial, subsistence and/or recreational fisheries, and the historic and current seasonal harvest by species?	Yes	Yes		Section 2.4.2.2.3. No commercial fishing on the river near the NPP. Recreational fishing described. No recent creel data are available. Anecdotal information available.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant identify and describe the (a) species composition, (b) the spatial and temporal distribution, (c) abundance, and (d) other structural and functional attributes of biotic assemblages that could be impacted by the proposed action?	Yes	Yes		Onsite streams and ponds—Section 2.4.2.1.1 and 2.4.2.1.2. Offsite tributaries—Section 2.4.2.3. Susquehanna River—Section 2.4.2.2.1 (sampling), 2.4.2.2.2 (fish), 2.4.2.2.4 (macroinvertebrates), 2.4.2.2.5 (mussels)
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant identify and describe the location of wildlife sanctuaries and natural areas that might be impacted by the proposed action?	Yes	Yes		See Section 2.2.1.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Does the applicant provide information on key indicator organisms that are particularly vulnerable to impacts from plant construction or operation?	Yes	No	Yes	Section 2.4.2.2.7; see notes for important species above.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant list species that are of concern as disease vectors or pests?	No	No	Yes	Terrestrial only; no mention for aquatic. There may not be aquatic diseases or pests, but this should be mentioned.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant list any nuisance or invasive species of concern (e.g., *Corbicula* sp. or *Mytilus* sp.)? These species are capable of blocking or bio-fouling the cooling water intake system or causing other significant problems.	Yes	Yes		Onsite streams and ponds—Section 2.4.2.1.6. No nuisance species known. Susquehanna River—Section 2.4.2.2.8. Corbicula present; no zebra mussels yet.

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	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant describe the natural and anthropogenic effects (e.g., farming, logging, grazing, burning), preexisting environmental stresses (e.g., infestations, epidemics, catastrophes), and the current ecological conditions that are indicative of such stresses?	Yes	No	Yes	Section 2.4.2.1.8—onsite ponds and streams. None known, except agriculture mentioned. Section brief; may require more information. Section 2.4.2.2.10—Susquehanna River. Discussion very brief. Refer to Maryland stream stressors. Pennsylvania may not have such discussion. May include more general northeastern stream stresses. Additional river concerns information is available. Susquehanna River is on the list of American Rivers at Risk.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant describe the location of any ecological or biological studies of the site or its environs that are recent or currently in progress?	Yes	Yes		Section 2.4.2—introduction paragraphs.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant identify any wetlands on and in the vicinity of the site?	Yes	No	Yes	No real assessment in ER. Some brief discussion of wetland types in terrestrial section. Wetlands delineation report completed September 27, 2008. Copy included with application.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Has the applicant identified the construction activities that could impact "important" aquatic species and habitats of the site and vicinity, transmission corridors, and offsite areas?	Yes	Yes		Section 4.2.1.2
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is a map available that shows the areal extent and location of the construction activities, along with important aquatic features (e.g., wetlands, ponds, streams)? Does the map show an overlay of plant facilities for reference?	Yes	Yes		Figure 4.3-2 shows temporary and permanent impacts. Note: this is a color figure that may not reproduce well in black and white.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information on the proposed schedule of construction activities as well as timing and duration of the activities?	No	No	Yes	No schedule of specific activities is provided.

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	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information about the construction practices to control or minimize impacts from clearing activities, noise, siltation, and dust?	Yes	No	Yes	Sections 4.2.2.10, 4.3.2.1 and 4.6; Table 4.6-1. Much reference to best management practices (BMPs), various permits, and storm-water management plan without substantial detail. Some measures listed (bio-retention ditches, silt fences) without specifics.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for limiting impacts during construction (e.g., the maintenance of siltation ponds or catchment basins)?	Yes	No	Yes	Sections 4.2.2.10, 4.3.2.1 and 4.6; Table 4.6-1. Some details provided. Some measures to limit impacts also may contribute to impacts (e.g., use of cofferdams). These are mentioned in Section 4.3.2.1.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information available that can be used to determine how construction activities will impact "important" species and their habitats (e.g., those resulting from scouring and siltation, dredging and soil disposal, and interference with shoreline processes)? Is there information that can be used to estimate the magnitude and duration of such impacts? Consider potential disturbances of benthic areas by the following construction activities: • placement of intake and discharge structures • channel modifications for navigation or flow control • placement and removal of cofferdams • construction of bulkheads, piers, jetties, basins, and storm sewers • direct dredging, including the area that may be affected by resulting siltation and turbidity • percent (or the width and depth) of the waterbody cross section that might be obstructed by construction activity at any time • time and duration of such obstruction • potential changes to water quality caused by exposure of substrate to contaminants during construction (e.g., dredging for intake channels, cofferdam construction).	Yes	No	Yes	Major alterations to Walker Run and the ditch connecting Old Canal to Susquehanna River are described along with plans to recreate them. Some impacts are just listed without discussion; e.g, the installation of cofferdams is mentioned, without specifics about how it will be installed and the potential impacts from installation (e.g., noise, vessels). The materials used for the cofferdam are not described. Section 3.4. mentions that installation may partly be via a barge. The potential impacts of using vessels are not described. The intake system requires excavating

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									bedrock (p. 4-46) below the streambed elevation. The method by which this will be done is not discussed (i.e., is blasting required?). Note: this **conflicts** with a later statement (p. 4-47) that only the river overburden, not bedrock needs to be penetrated. Placement of riprap is mentioned in Chapter 3, but not in Chapter 4 as a potential habitat change. Details about type and extent of riprap are not provided. The potential for scour from the diffuser is mentioned only in the FSAR (Section 2.4.11), but not in ER Chapter 5. Time and duration of construction activities are not presented. The extent of construction activities into the Susquehanna River are given, but not in relation to the width of the river at the construction sites. Refurbishment of the shoreline unloading facility is listed as a potential activity in Table 4.6-1 (p. 4-124), but is not discussed in the text. Sections 4.2.1.2 (p. 4-12) and 5.2.1.3 (p. 5-11)

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
									mention that pilings will be driven to facilitate construction of new discharge system, but there is no discussion of the potential impacts from this activity.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information available that can be used to assess the potential for reversibility of impacts following completion of construction?	Yes	Yes		Permanently affected areas are discussed in the Section 4.3.2 Introduction and in Section 4.3.2.1.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for environmental improvement following construction?	Yes	Yes		Acreage not containing permanent structures would be reclaimed to the maximum extent possible (p. 4-1). Details are provided about the recreation of Walker Run (p. 4-43). Relocation of drainage ditch connecting Old Canal to Susquehanna River is discussed (p. 4-44).
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Have recognized BMPs been cited as means for limiting impacts from construction activities?	Yes	No	Yes	Section 4.6 mentions their use, but Table 4.6-1 provides no details.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for mitigation of a predicted impact using appropriate measures, which could include alternative placement of structures, alternative schedules, or alternative construction practices?	Yes	No	Yes	Sections 4.3.2 and 4.6 discuss some mitigation although alternative structures, schedules, or practices are not included. Details are provided about wetlands mitigation practices (pp. 4-39-40) that might be applicable to some aquatic resources impacts. No mitigation mentioned for the loss of the pond that will be filled.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Have any construction activities been evaluated that will result in adverse impacts that cannot be mitigated? Alternatives to mitigate adverse impacts could include using a fish hatchery or habitat restoration to increase natural fish production.	Yes	Yes		Section 4.3.2.1.

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	Ecology – Aquatic	Roy Kropp	1	4.3.2	If dredging is involved, are there plans for disposal of dredged material and placement of fill material?	Yes	No	Yes	Excavation (dredging per se is not mentioned in the text) will be required at the intake and discharge areas. No amount of material to be excavated is provided. No disposition of the material is provided.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for dewatering surface waters and/or wetlands?	Yes	No	Yes	Dewatering of the powerblock area is mentioned as being necessary (p. 4-25), but the amount and destination of the water are not described in detail.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	If a cooling pond or retention basin is at the site or being considered in future construction, is there information about the aquatic species expected to become established in the cooling ponds?	Yes	No	Yes	A large wastewater retention basin is included in the design. This basin at least partially serves to cool down discharge water. There is no mention of potential floral or faunal colonization.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	If the applicant wishes to accelerate the start of construction, then determine if the applicant has included an initial evaluation in the ER of environmental impacts based on an analysis of at least 6 months of field data related to the proposed facility and suitable projections of the remaining seasonal periods (if information has already been provided on the critical life stages and biologically significant activities [e.g., spawning, migration]) that increase the vulnerability of the potentially affected biota at the proposed site.	NA			No indication of desire to accelerate construction.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Is there a sufficiently detailed description in the text of the ER for the intake structure? Does the description include plans and cross-sectional schematics indicating size of facility, relation to waterbodies, and type of intake screen?	Yes	Yes		Section 3.4.1.1 Figures 3.4-3 through 3.4-5 show the location, plan view, and section view of the intake structure.

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	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant identified adverse impacts of cooling system intake operation to aquatic ecosystems?	Yes	No	Yes	Section 5.3.1.2. Note: no fish return system planned. Summarized recent impingement data from "nearby" power plants (Hunlock, Brunner Island Steam Electric Station) and described limitations. Also impingement data being collected at SSES (April 2008-2009). Older entrainment data from SSES summarized. Also entrainment data being collected at SSES (April 2008-2009). Request full recent SSES data sets, not just rely on summaries. ER states that the report of the completed Impingement and Entrainment study will be provided to the NRC as a supplement to this application.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Have measures or controls to limit adverse impacts been identified?	Yes	Yes		Section 5.3.1.2. Follow U.S. Environmental Protection Agency (EPA) guidance, e.g., low intake velocity, screens, etc.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant discussed how the intake system will be compliant with the National Pollutant Discharge Elimination System (NPDES) Permit under Sections 316(b), 401 and 402 of the Clean Water Act (CWA)?	Yes	Yes		Sections 5.2.3.1, 5.3.2, 5.5.1, 5.7.4 , 5.10; Table 5.10-1

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	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant identified the "important" aquatic organisms and their life stages susceptible to entrapment, impingement, or entrainment?	Yes	No	Yes	Section 5.3.1.2 lists some important species that might be affected, but doesn't list all important species. Obtain completed impingement and entrainment (I&E) report.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Is there information available to estimate the levels of susceptibility for fish or shellfish species to be entrapped or impinged by the cooling system, in either qualitative or quantitative terms?	Yes	Yes		Section 5.3.1.2.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Is there information about the design and proposed operation of any proposed systems (e.g., screen wash or fish return system) and how the potential for entrapment and impingement with that system?	Yes	Yes		No fish return system is planned—Section 5.2.2.1.2.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Is there information on the cooling system concerning the potential for altered hydrodynamic characteristics induced by intake system operation (e.g., altered circulation patterns) to affect attraction and entrapment of aquatic biota?	Yes	Yes		Section 5.3.1.1
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	What is the extent and seasonal variation of any altered hydrodynamic characteristics induced by intake system operation?	Yes	No	Yes	Seasonal variation is not discussed in Section 5.3.1.1. Considered water withdrawal as percentage of *annual* Susquehanna River flow. May not be major issue if minimal river flow is large enough. Plume models include seasonal variation for winter and summer.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Are there plans for recirculation of heated effluent from the facility discharge system, which has the potential for increased impacts of entrapment, entrainment, and impingement?	Yes	No	Yes	Potential I&E impacts associated with recirculating water are not discussed in Section 5.3.3.1
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant estimated the magnitude of the potential impingement and entrainment impacts on the species populations and the aquatic ecosystem?	Yes	Yes		See above notes on I&E.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant identified the economic value of "important" aquatic species for local or regional commercial and recreational fisheries?	NA			There is no commercial fishing in the Susquehanna River near the proposed BBNPP. No recent creel data are available on recreational fishery. See Section 2.4.2.2.3.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	For these "important" aquatic species, has the applicant provided information on habitat requirements (e.g., salinity, temperature, currents, dissolved oxygen water depth, substrate, etc.)?	Yes	Yes		Section 2.4.2.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	For these "important" species, has the applicant provided information on the transit time from the intake structure to the point of discharge to a receiving waterbody?	No	No	Yes	There is no such discussion in the ER. It will not apply to impingement because there is no return system (i.e., mortality is 100%). Could apply to entrainment.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Are impingement and entrainment effects data from nearby or co-located power stations presented and analyzed?	Yes	Yes		ER summarized recent impingement data from "nearby" power plants (Hunlock, Brunner Island Steam Electric Station) and described limitations.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Has the applicant identified adverse impacts of cooling system discharge operation on aquatic biota?	Yes	No	Yes	See notes below about chemical and physical effects.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Is there a sufficiently detailed description in the text of the ER for the discharge structure? Does the description include plans and cross-sectional schematics indicating size of facility, relation to waterbodies, and discharge design?	Yes	Yes		Sections 3.4.2.2 and 5.2.1.2.1, elsewhere Figure 3.4-6

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	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Have thermal, chemical, and physical alterations to the receiving waterbody been identified that may affect impacts?	Yes	No	Yes	Section 5.3.2.2. Note: Chemical effects are only discussed relative to NPDES permit requirements. Physical effects do not mention potential for scouring of bottom (probably not likely). However, Table 5.5-1 contains expected discharge concentrations of various chemicals and other parameters (alkalinity). Table 3.3-2 shows some chemicals used and amounts used during a year.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Will there be alterations in the discharge area (the mixing zone) or changes that will extend over a larger portion of the receiving waterbody that might affect biota that are transported, migrated, or attracted to the mixing zone?	Yes	Yes		Section 5.3.2.1.4 describes the size of the plume from proposed Unit 3 and combined plumes from Units 1, 2, and proposed Unit 3. Seasonal runs done (January, August). Figure 5.3-1 through Figure 5.3-4.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Have measures or controls to limit adverse impacts been identified?	Yes	No	Yes	Section 5.10; Table 5.10-1. Much of information consists of reference to permits and BMPs without specifics. Some effects stated as likely to not warrant mitigation (often by comparison to Units 1 and 2 effects).
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Has the applicant discussed how the intake system will be compliant with the NPDES Permit under Sections 316(a), 401 and 402 of the CWA?	Yes	Yes		Discussed in general terms, not specific conditions.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are there "important" aquatic species present in the vicinity of the discharge system?	Yes	Yes		Section 5.3.1.2
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are the types, life stages, and relative abundance of impacted "important" biota in the vicinity of the discharge system described?	Yes	Yes		Section 2.4.2
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Is there a description of potential impacts to the biota from operation of the proposed discharge system?	Yes	No	Yes	Discussion of chemical and some physical effects weak. See notes below.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are the aquatic species susceptible to thermal effects resulting from facility cooling-system discharges to the receiving waterbodies?	Yes	Yes		Sections 5.3.2.1.4 and 5.3.2.2.1
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Is there information to determine if thermal effects will be detectable or may destabilize or noticeably alter population levels?	Yes	Yes		Sections 5.3.2.1.4 and 5.3.2.2.1
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are the aquatic species susceptible to chemical effects resulting from facility cooling-system discharges to the receiving waterbodies?	Yes	Yes		Section 5.3.2.2. Note: Chemical effects only discussed relative to NPDES permit requirements. Table 5.5-1 contains expected discharge concentrations of various chemicals and other parameters (alkalinity).
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Is there information to determine if chemical effects will be detectable or may destabilize or noticeably alter population levels?	Yes	Yes		Section 5.3.2.2. Note: Chemical effects only discussed relative to NPDES permit requirements. Table 5.5-1 contains expected discharge concentrations of various chemicals and other parameters (alkalinity).
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are the aquatic species susceptible to physical effects resulting from facility cooling-system discharges to the receiving waterbodies?	Yes	No	Yes	Need discharge velocity at diffuser and height of diffuser off bottom. The potential for scour from the diffuser is mentioned in the FSAR (Section 2.4.11), but not in ER Chapter 5.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Is there information to determine if physical effects will be detectable or may destabilize or noticeably alter population levels?	Yes	Yes		
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Has the applicant considered the biological effects of thermal, chemical, and physical alterations to the receiving waterbody on the identified "important" aquatic species?	Yes	No	Yes	Not specifically to important species, but general effects of discharge are mentioned.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are there estimates of survival from discharge system impacts, and estimates of the relative or absolute losses of the impacted populations?	Yes	No	Yes	No quantitative estimates. ER states effects expected to be small.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are thermal, chemical, and physical effects data from nearby or co-located power stations presented and analyzed?	Yes	Yes		Plume modeling includes co-located Units 1 and 2. Documented effects of those units are considered.
	Ecology – Aquatic	Roy Kropp	1	5.5.1	Did the applicant provide data for aquatic resource impacts related to waste systems?	Yes	Yes		Table 5.5-1 contains expected discharge concentrations of various chemicals and other parameters (alkalinity).
	Ecology – Aquatic	Roy Kropp	1	5.6.2	Has the applicant provided a map of the proposed transmission facilities and included information about important aquatic species or habitats in the vicinity of these facilities?	Yes	Yes		General layout of transmission facilities on the site is shown (Figure 3.7-2), but not at a scale that shows small aquatic resources well. These are listed in the text. Onsite transmission effects are discussed in Section 5.6.2, which includes habitats, important species, and maintenance activities. Possible mitigation measures are noted.
	Ecology – Aquatic	Roy Kropp	1	5.6.2	Has the applicant identified operational and maintenance activities associated with transmission facilities that could adversely affect "important" aquatic species and habitats? The resources to be considered include marshlands, wetlands, impoundments, and other waterbodies.	Yes	Yes		Onsite transmission effects discussed in Section 5.6.2. Includes habitats, important species, and maintenance activities. Possible mitigation measures noted.
	Ecology – Aquatic	Roy Kropp	1	5.6.2	Have potential impacts on these resources been identified? These could include heating of waterbodies from removal of shade trees, siltation and turbidity resulting from increased runoff and erosion, runoff of defoliants and herbicides, recreational access by the public, and high-energy electrical fields associated with underwater transmission facilities.	Yes	Yes		Onsite transmission effects are discussed in Section 5.6.2, which includes habitats, important species, and maintenance activities. Possible mitigation measures are noted.
	Ecology – Aquatic	Roy Kropp	1	5.6.2	If adverse impacts of sufficient magnitude have been identified, has the applicant identified the potential mitigating actions or alternative practices to limit or avoid the impacts?	NA			ER states that the potential for adverse impacts is minor.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	6.5.2	Did the applicant complete any preapplication monitoring to examine the distribution and abundance of "important" species and habitats? Critical life history information should include parameters such as spawning areas, nursery grounds, food habits, feeding areas, wintering areas, and migration routes to the extent that the proposed project is expected to affect these parameters.	Yes	Yes		Summarized in Section 6.5.2.1; more details in Section 2.4.2; individual study reports included with application.
	Ecology – Aquatic	Roy Kropp	1	6.5.2	Is the applicant planning on completing preoperational/operational monitoring related to aquatic resources? If so, what will each program entail (both in schedule and scope)?	Yes	Yes		Thermal monitoring preapplication and operation—;Section 6.1. Preoperational monitoring Walker Run—Section 6.5.2.2. Operational monitoring may be necessary per NPDES permit (Section 6.5.2.3); also operational monitoring of Walker Run, Susquehanna River, and several unnamed tributaries. Potential scope and schedules outlined. No definitive plans for monitoring, but recognized that they may be needed.
	Ecology – Aquatic	Roy Kropp	1	6.5.2	Has the applicant supplied a basis for the decision to conduct/not conduct monitoring (preapplication/preoperational/operational)?	NA			
	Ecology – Aquatic	Roy Kropp	2	2.4	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 2.4.2.	Yes	No	Yes	See comments above regarding Section 2.4.2.
	Ecology – Aquatic	Roy Kropp	2	4.3	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 4.3.2.	Yes	No	Yes	See above comments suggesting that more details about construction are needed.
	Ecology – Aquatic	Roy Kropp	2	5.3	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 5.3	Yes	No	Yes	See above comments suggesting the need for more details about operations.
	Ecology – Aquatic	Roy Kropp	2	5.6	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 5.6.2	Yes	Yes		
	Ecology – Aquatic	Roy Kropp	2	6.5	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 6.5.2	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to aquatic ecology at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	Yes		Table 4.6-2 gives rough estimates of percentages of construction versus preconstruction for broad categories (e.g., impacts to impoundments and streams), not individual resources.
	Ecology – Aquatic	Roy Kropp	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified the activities of other agencies that have occurred, or will occur, in the potential impact area that may contribute to a cumulative impact on aquatic resources?	Yes	Yes		Section 10.5.2, Operations (page 10-53), mentions two projects in the ROI that may compete for resources.
	Ecology – Aquatic	Roy Kropp	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified projects in the region that may contribute to a cumulative impact on "important" species or habitat?	Yes	No	Yes	Other projects discussed in general terms, not relative to specific important species. Note that both additional projects are not near the proposed site, but are within the larger ROI.
	Ecology – Aquatic	Roy Kropp	1	9.3	Has the applicant provided reconnaissance data to characterize the aquatic resource and "important" aquatic species impacts at the alternative sites?	Yes	No	Yes	The alternative site discussions include a general discussion of what is needed and general impacts. No faunal data are provided for any of the sites. Aquatic resources are not characterized. Threatened and endangered (T&E) species are listed for each site. Reconnaissance-level data may not be available for each alternative site.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Has the applicant identified the species and habitats that will be considered "important" ecological resources (definition of "important" species and habitats is found in Table 2.4.1-1) of the site, vicinity, transmission corridors, and offsite areas for evaluation of potential impacts on them? Did the applicant include a map that identifies "important" terrestrial habitats on and in the vicinity of the site?	Yes	No	Yes	Figure 2.4-2 does not stand alone to identify the location of important terrestrial habitats on or in the vicinity of the BBNPP site. For example, the Susquehanna Riverlands Environmental Preserve (SREP) was identified in Table 2.4-1 as an important habitat that bounds the eastern end of the Owner Controlled Area (OCA) and the location for the intake/discharge structure, but does not appear on the figure. Information on impacts to important habitats/species at offsite areas is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant describe any "important" species and their spatial and temporal distributions on and in the vicinity of the site, including (as appropriate) their relative abundance, critical habitat, and their life histories: critical life stages, biologically significant activities, seasonal habitat requirements and population fluctuations, food chain, and other interspecific relationships?	Yes	Yes		Section 2.4.1
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Has the applicant consulted with local offices of the appropriate Federal, State, regional, local, and affected Native American Tribal agencies to determine the possible presence of "important" species?	Yes	Yes		Sections 2.4.1.8, 4.3.1.5, 5.6.1.6
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant identify and describe species' composition, spatial and temporal distribution, abundance, and other structural and functional attributes of biotic assemblages that could be impacted by the proposed action?	Yes	Yes		Section 2.4.1
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant identify and describe the location of wildlife sanctuaries and natural areas that might be impacted by the proposed action?	Yes	No	Yes	Detail relevant to the evaluation of possible impacts to the SREP at/near the proposed intake structure is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant list species that are of concern as disease vectors or pests?	Yes	Yes		Section 2.4.1.4

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	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant describe the natural and man-induced effects (e.g., farming, logging, grazing, and burning), preexisting environmental stresses (e.g., infestations, epidemics, and catastrophes), and the current ecological conditions that are indicative of such stresses?	Yes	Yes		Section 2.4.1
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant describe the location of any ecological or biological studies of the site or its environs that are recent or currently in progress?	Yes	Yes		Section 2.4.1
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant identify any important waterfowl in areas of proposed transmission lines, a list of descriptions of these areas, and data on the local abundance and distribution of waterfowl, their seasonal status, and local flight patterns?	Yes	No	Yes	Information regarding any important waterfowl in areas of proposed transmission lines is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Is the available site-specific data adequate, accurate, and complete?	Yes	Yes		Section 2.4.1
	Ecology – Terrestrial	RE Durham	2	ESRP 2.4.1	There are no technical deficiencies in support of terrestrial resources for the sections mentioned in Review Interfaces in ESRP 2.4.1.	Yes	Yes		No technical deficiencies
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided a map showing the site boundary and construction footprint, including locations of proposed structures, equipment storage, and construction material laydown areas, borrow areas, haul roads, and spoils and waste-disposal areas, and a map showing the locations of existing transmission corridors, corridor expansion areas, and any new corridors?	Yes	Yes		Figure 2.1-1
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided information on the location and areal extent of terrestrial habitats/plant communities on the site and along the transmission corridors and at any other offsite areas where construction would occur?	Yes	No	Yes	Transmission corridor detail is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided information on the locations of "important" terrestrial species and the location and areal extent of "important" habitats in the vicinity of the site, transmission corridors, and any other offsite areas which would be affected by construction?	Yes	No	Yes	Areal extents of important habitats and location of important species within the construction footprint are needed. Need a map that shows the areal extent of important butterflies and their host plants, or habitats that contain host plants. Need to know what specific steps will be taken to minimize potential impacts to important species and habitats.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Does the applicant have a proposed schedule of construction activities?	No	No	Yes	No schedules were provided.

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	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Did the applicant describe the clearing methods, temporary and permanent erosion, runoff, and siltation control methods, dust suppression methods, and other construction practices for control or suppression to be used on and in the vicinity of the site and along transmission corridors and at any other offsite areas?	Yes	Yes		Section 4.3.1
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Did the applicant provide an estimate of the potential for bird collisions with elevated construction equipment (e.g., cranes)?	Yes	Yes		Sections 4.3.1.2 and 5.3.3.2.4
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Did the applicant identify the total land area to be disturbed permanently on and in the vicinity of the site, such as for buildings, new ponds and reservoirs, and either any new or existing (expansion areas for) transmission corridors, etc.?	Yes	Yes		Table 4.3-1
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant identified the total land area to be disturbed temporarily during construction on and in the vicinity of the site and along transmission corridors and at any other offsite areas, such as equipment storage and construction material laydown areas, borrow areas, haul roads, spoils and waste disposal areas, etc.?	Yes	No	Yes	Areal extents of temporary and permanent disturbances are inconsistent within the ER: see Figures 4.3-1 and 4.3-2 and compare to Figure 4.1-1 near the proposed intake structure
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided the area of each habitat type/plant community (e.g., wetlands, deciduous forests, agricultural fields, etc.), including "important" habitats, to be cleared or otherwise disturbed (e.g., inundated, drained, etc.) permanently or temporarily on and in the vicinity of the site and along transmission corridors and at any other offsite areas, and how much area is being disturbed relative to the total amount present in the region?	Yes	No	Yes	Areal extents of important habitats and location of important species within the transmission corridors are needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided a list of any "important" species that could be affected by construction, particularly Federally and State-listed threatened or endangered species, on and in the vicinity of the site and along transmission corridors and at any other offsite areas, and information on the population size/stability of these species in the region?	Yes	Yes		4.3.1
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant considered mitigation (e.g., avoidance, minimization, restoration, and/or compensation) for habitat losses, including "important" habitats, or for disruption of the life processes of "important species," where appropriate?	Yes	Yes		Note: Pages 4-38 thru 41—Will need to know what specific steps will be taken to minimize potential impacts to "listed" species and habitats.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant identified the distance from the source beyond which construction noise levels would be expected to attenuate to below the 80- to 85-adjusted decibels threshold at which wildlife behavior is affected, and a comparison of that distance to that from the source of construction noise to locations of any Federally or State-listed threatened or endangered species?	Yes	Yes		Section 4.4.1.2 and Table 4.4-1

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	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided documentation of consultation with the appropriate Federal, State, regional, local, and affected Native American Tribal agencies, at a minimum the USFWS and/or National Marine Fisheries Service, and appropriate State resource agency(ies)?	Yes	Yes		Section 4.3.1.5
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant identified other projects within the region that affect or could potentially affect the same "important" terrestrial species and habitats, particularly Federally listed threatened or endangered species and/or designated or proposed critical habitat?	Yes	Yes		Section 4.3.1.4
	Ecology – Terrestrial	RE Durham	2	ESRP 4.3.1	There are no technical deficiencies in support of terrestrial resources for the sections mentioned in Review Interfaces in ESRP 4.3.1	Yes	Yes		No technical deficiencies
	Ecology – Terrestrial	RE Durham	1	ESRP 5.3.3.2	Has the applicant identified the concentration of chemicals in cooling tower basins or spray canals on a seasonal basis?	Yes	Yes		Section 3.6
	Ecology – Terrestrial	RE Durham	1	ESRP 5.3.3.2	Has the applicant considered the impacts of drift deposition on vegetation? Has the applicant identified isopleths of deposition at ground levels on a seasonal basis? Has the applicant described natural vegetation and agricultural crops onsite and offsite that occur in isopleths above 20 kg/ha/yr?	Yes	Yes		Section 5.3.3.2
	Ecology – Terrestrial	RE Durham	1	ESRP 5.3.3.2	Has the applicant provided a description "important" terrestrial species and habitats that may be affected by the heat dissipation system?	Yes	Yes		Section 5.3.3.2
	Ecology – Terrestrial	RE Durham	1	ESRP 5.3.3.2	Has the applicant considered the detrimental effects that increased fogging/icing could have on local vegetation?	Yes	Yes		Section 5.3.3.2
	Ecology – Terrestrial	RE Durham	1	ESRP 5.3.3.2	Has the applicant considered the impact to shoreline fauna, flora, and any wetland habitat during the drawdown of waterbodies used for plant cooling, particularly during drought periods?	Yes	Yes		Section 5.3.3.2
	Ecology – Terrestrial	RE Durham	1	ESRP 5.3.3.2	Has the applicant identified the adverse impacts of the cooling system heat dissipation on terrestrial ecosystems and considered any measures or controls to limit or otherwise mitigate adverse impacts?	Yes	Yes		Section 5.3.3.2
	Ecology-Terrestrial	RE Durham	2	ESRP 5.3.3.2	There are no technical deficiencies in support of terrestrial resources for the sections mentioned in Review Interfaces in ESRP 5.3.3.2.	Yes	Yes		No technical deficiencies
	Ecology-Terrestrial	RE Durham	1	ESRP 5.5.1	Terrestrial ecology at disposal sites other than licensed commercial sites.	Yes	Yes		No plans for using other than licensed commercial sites (ER pp. 5-89)
	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant described right-of-way maintenance practices, such as chemical and mechanical vegetation control methods, that are anticipated to affect terrestrial biota?	Yes	Yes		Section 5.6.1
	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant identified any special right-of-way maintenance practices to minimize adverse effects in "important" habitats (e.g., floodplains, wetlands, natural areas, etc.), including those that could result in beneficial effects on terrestrial biota?	Yes	Yes		Section 5.6.1

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	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Does the applicant participate in any wildlife management practices implemented within rights-of-way (e.g., forage plots)?	Yes	Yes		No ongoing formal wildlife management practices on the project site (ER pp. 5-98)
	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant identified the occurrences of "important" species and habitats, including Federally and State-listed threatened or endangered species and/or Federally designated or proposed critical habitat along the transmission corridors?	Yes	No	Yes	Areal extents of important habitats and location of important species within the transmission corridors are needed. Need a map that shows the areal extent of important butterflies and their host plants, or habitats that contain host plants.
	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant identified occurrences of invasive species (as defined in Executive Order [EO] 13112) along the existing transmission corridors? If so, has the applicant considered how the maintenance of expanded or new transmission corridors could affect the proliferation of such species?	Yes	Yes		Section 5.6.1
	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant identified and evaluated new and significant information on the impacts of transmission system operation and rights-of-way maintenance (cutting and herbicide application), i.e., bird collisions with power lines, the special case of rights-of-way maintenance impacts on floodplains and wetlands, and the effects of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, and livestock) since the publication of NUREG 1437? If so, has the applicant evaluated how this information applies to the proposed project?	Yes	Yes		Section5.6.1
	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant identified a list of the adverse impacts to habitats and species (particularly "important" habitats and species) from the operation and maintenance of transmission systems and considered measures or controls to limit or otherwise mitigate such impacts?	Yes	Yes		Section 5.6.1
	Ecology – Terrestrial	RE Durham	2	ESRP 5.6.1	There are no technical deficiencies in support of terrestrial resources for the sections mentioned in Review Interfaces in ESRP 5.6.1	Yes	Yes		No technical deficiencies
	Ecology – Terrestrial	RE Durham	1	ESRP 6.5.1	Did the applicant complete any preapplication monitoring to examine the distribution and abundance of "important" species and habitats? Critical life history information should include parameters such as feeding and wintering areas as well as migration routes to the extent that the proposed project is expected to affect these parameters.	Yes	Yes		Section 6.5.1
	Ecology – Terrestrial	RE Durham	1	ESRP 6.5.1	Does the applicant plan on completing preoperational/operational monitoring related to terrestrial resources? If so, what will each program entail, both in schedule and scope?	Yes	Yes		ER pp. 6-67

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	Ecology – Terrestrial	RE Durham	1	ESRP 6.5.1	Has the applicant supplied a basis for the decision to conduct/not conduct monitoring (preapplication/preoperational/operational)?	Yes	Yes		Sections 6.5.1.1, 6.5.1.2, 6.5.1.3
	Ecology – Terrestrial	RE Durham	2	ESRP 6.5.1	There are no technical deficiencies in support of terrestrial resources for the sections mentioned in Review Interfaces in ESRP 6.5.1	Yes	Yes		No technical deficiencies
	Ecology – Terrestrial	RE Durham	1	CFR 10 51.45 (c)	A description of the environmental impacts of preconstruction activities related to terrestrial ecology at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	Yes		Breakdown and/or apportionment of impacts is found in Table 4.6-2 between preconstruction and actual construction.
	Ecology – Terrestrial	RE Durham	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified the activities of other agencies or organizations that have occurred or will occur in the project area that may contribute to a cumulative impact on terrestrial resources?	Yes	Yes		Section 4.3.1.4
	Ecology – Terrestrial	RE Durham	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified projects in the region that may contribute to cumulative impacts on "important" terrestrial species or habitats?	Yes	Yes		Section 4.3.1.4
	Ecology - Terrestrial	RE Durham	1	Alternative Site (No ESRP Section	Has the applicant provided reconnaissance data to characterize the terrestrial resource and "important" terrestrial species impacts at the alternative sites?	Yes	Yes		Section 9.3
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRPs 2.3.1 and 2.3.2	Maps (including digital databases such as a Geographic Information System [GIS]) of sufficient detail to show the relationship of the site to major hydrological systems that could affect or be affected by plant construction or operation. These should include: • maps showing the relationship of the site to surface waterbodies that could affect or be affected by plant water use • maps (and cross sections where feasible) showing those portions of groundwater aquifer systems that could be affected by plant withdrawals and/or discharges	Yes Yes;	Yes Yes		Figures 2.3-34 to 2.3-39 Figures 2.3-1, 2.3-2, 2.3-3, 2.3-6, and 2.3-7 Maps of the site vicinity and site region are scattered throughout the ER. Figure numbers for the most relevant of these maps are noted. GIS files themselves are not provided, but clearly some of the maps are based on GIS spatial data processing.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.1	For surface waterbodies used as a heat sink, maximum, average maximum, average, average minimum, and minimum monthly temperature of the waterbody.	Yes	Yes		In ER Section 2.3.1. minimum, mean, and maximum monthly temperatures are available on the Susquehanna River upstream and downstream of the proposed intake structure. A limited period of daily data is also available.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.1	For surface waterbodies and wetlands, estimated erosion characteristics and sediment transport, including rate, bed, and suspended load fractions, and graduation analyses; a description of the floodplain and its relationship to the site; a description of wetlands and their relationship to the site; the design-basis flood (DBF) elevation; and, where applicable, the DBF discharge.	Yes	No	Yes	Federal Emergency Management Agency (FEMA) 100- and 500-yr floodplain maps are provided in Figures 2.3-12 – 2.3-15. Erosion and sediment transport information is missing.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.1 (freshwater streams only)	• a list of major streams, size of drainage areas, and gradient • maximum, average maximum, average, average minimum, and minimum monthly flow • flood frequency distributions, including levee failures • flood control measures (reservoirs, levees, flood forecasting) • historical drought stages and discharges by month and the 7-day once-in-10-years low flow • important short-duration flow fluctuations (e.g., diurnal release variations from peaking operation of upstream hydroelectric project) • within the influence of the intake and discharge structures, velocity distribution (horizontal and vertical), bathymetry at and near the intake structure, bathymetry at and downstream of the discharge structure, and stream cross-sections • other hydrographic modifications (e.g., diversion dams, channelization) • a list of wetlands and flood plains and their seasonal characteristics.	• Yes • -Yes – local Table 2.3-1. • Yes • No • No • 7Q10 in Section 5.2.2.1.1 • No • No • No Partial discussion	No	Yes	Local streams with area and slope in Table 2.3-1. Peak & monthly flow information provided for Wilkes-Barre and Danville Dam information provided in Table 2.3-12 7Q10 estimates in Section 5.2.2.1.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology		1	ESRP 2.3.1 (lakes and impoundments only)	• a description of lake or impoundment • where influenced by the intake or discharge structures (or vice-versa), size, location, and elevation of outlets • a summary description of reservoir operating rules • annual yield and dependability • variations in inflows, outflows, water surface elevations, and storage volumes and retention time • net loss, including evaporation and seepage • current patterns, including frequency distributions of current speed, direction, and persistence • temperature distribution (horizontal and vertical) and stratification and seasonal variations of density-induced currents • detailed bathymetry in vicinity of station intake and outfall.	N/A			
	Hydrology		1	ESRP 2.3.1 (estuaries and oceans only)	• shoreline and bottom descriptions, including seasonal variations because of sediment transport • tidal current patterns (velocities and phases), range, and excursion • nontidal circulation patterns, including frequency distributions of current speed, direction, and persistence • temperature and salinity distribution (horizontal and vertical), including temporal variations • detailed bathymetry in the vicinity of the station intake and outfall • for estuaries, maximum, average maximum, average, average minimum, and minimum monthly river discharge and flushing characteristics.	N/A			
	Hydrology	Michael Fayer	1	ESRP 2.3.1 (groundwater)	• the areal extent of aquifers, recharge and discharge areas, elevation and depth, and geologic formations • piezometric contour maps and hydraulic gradients (historical [if available] and current) • flow travel times • soil properties, including permeabilities or transmissivities, storage coefficients or specific yields, total and effective porosities, clay content, and bulk densities • interactions between site surface and groundwaters • historical and seasonal trends in groundwater elevation or piezometric levels; interactions between different aquifers • recharge rates, soil moisture characteristics, and moisture content in vadose zone • existence of any local aquifers designated or proposed to be designated as “sole source aquifers.”	Yes	Yes		Sections 2.3.1 and 2.3.2

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer	1	ESRP 2.3.2	Quantitative description of present and known future groundwater withdrawals on the site and for distances great enough to cover aquifers that may affect or be adversely affected by the plant. The following should be included for each withdrawal or discharge: • location and depth of well with respect to the site (from the ER, the site visit, peer-reviewed technical literature, and consultation with State and local agencies) • identification of aquifers (from the ER, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies) • the average monthly withdrawal rates by use category (from the ER, the site visit, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies)	Yes	No	Yes	Sections 2.3.1 and 2.3.2; identify locations of offsite wells relative to the potential extent of impacted groundwater.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Quantitative description of present and known future surface water uses (withdrawals, consumptions, and returns) that are within the hydrological system in which the site is located and that may affect or be affected by the plant. This should include a quantitative description of any water uses that provide potential liquid pathways for both radiological and nonradiological effluents. The following should be included for each withdrawal or discharge: • locations of diversions and returns with respect to the site and the waterbody (from the site visit, the general literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies) • identification of the waterbody (from the ER and the general literature) • the average monthly withdrawal and return rate for each diversion by use category.	Yes • Yes • Yes • No	No	Yes	Figures 2.3-66 and 2.3-67 provide locations and type of withdrawal Water use by organization and primary use provided in Table 2.3-27. Table 2.3-32 provides general use information by type of use. Water use is not provided on a monthly basis. Staff consultation with State and local agencies may be needed.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Quantitative and qualitative description of recreational, navigational, in-stream, and other nonconsumptive present and known future water uses. For a 10-km (6-mi) radius, this should include the following (from the ER, site visit, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies): • identification of waterbodies and locations with respect to the site (maps may be useful) • the kind and location of activity on the waterbody (maps may be useful) • the use rate with time variation.	No • Yes • Yes • No	No	Yes	General discussion of nonconsumptive water use. Staff consultation with State and local agencies may be needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Summary of statutory and other legal restrictions relating to water use or specific waterbody restrictions on water use imposed by Federal or State regulations.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Descriptions of pollutant sources with discharges to water that may interact with the plant, including locations relative to the site and the affected waterbodies, and the magnitude and nature of the pollutant discharges, including spatial and temporal variations.	Yes	No	Yes	Figures 2.3-68 and 2.3-69 show pollution control facilities. Table 2.3-31 lists owner information. Information on magnitude and nature of discharges is missing.
	Hydrology	Mark Wigmosta	1	ESRPs 2.3.2 and 3.3.1	A water-use diagram for the plant showing: • flow rates to and from the various water systems (e.g., circulating water system, sanitary system, radwaste and chemical waste systems, and service water systems) • points of consumption • source and discharge locations A water-use diagram of other station water uses (i.e., all facilities not associated with the proposed plant) showing: • flow rates to and from the facility • average water consumption • maximum water consumption Data and narrative description for: • various plant water systems, their interconnections, and their operational interdependence and coordination • maximum water consumption • water consumption during periods of minimum water availability • average operation by month and by plant operating status.	Yes, • Yes Partial • Yes • Yes • No No; Yes	No	Yes	Figure 3.3-1, Table 3.3.1, and a descrip-tion for plant water use. Anticipated water use for average and maximum flow conditions is provided Obtain data regarding water consumption during periods of minimum water availability and average use by month.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 2.3.3	The mean, range, and temporal and spatial variations of the surface-water and groundwater-quality characteristics. For surface waters: water temperature, suspended solids, total dissolved solids, hardness, turbidity, color, odor, conductivity, dissolved oxygen, biological oxygen demand (BOD), chemical oxygen demand (COD), phosphorus forms (total and orthophosphate), nitrogen forms (ammonia, nitrate, nitrite, organic), alkalinity, chlorides, sulfate, sodium, potassium, calcium, magnesium, heavy metals (e.g., Hg, Pb), pH, phytoplankton (chlorophyll *a*), and indicator micro-organisms (e.g., total coliform, fecal coliforms, fecal streptococci). For groundwaters: the above-surface water data, minus phytoplankton and with silica, iron, carbon dioxide, and bicarbonate added.	Yes Yes	Yes Yes		ER Tables 2.3-38, 2.3-41, 2.3-42, and 2.3-43. Section 2.3.3

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.3	Descriptions such as 303(d) lists of pre-existing aquatic environmental stresses and their effects on surface or groundwater quality for waters that interact with the plant (e.g., waterbodies at or near the site that do not meet established water-quality standards).	No	No	Yes	Staff consultation with State and local agencies may be needed.
	Geology	Michael Fayer	1	ESRP 2.6, RG 4.2	There are no data or information needs for an environmental review because the potential for geological environmental impact are assessed during staff's safety evaluation, which is described in the staff's Safety Evaluation Report (SER). Details of geologic description in the vicinity of the site is found in applicant's safety analysis report (SAR). Section 2.5 of the SAR should contain geological, seismological, and geotechnical data and descriptions sufficient to determine the potential for geological environmental impact.	Yes	Yes		Section 2.6; FSAR Section 2.5
	Hydrology	Mark Wigmosta		ESRP 3.3.1	A narrative description of the various plant water systems, their interconnections, and their operational interdependence and coordination.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.3.2	A description and purpose of the water treatment systems used in the plant, including: • identification, quantities, and points of addition of chemicals and additives to be used by each system • operating cycles for each water treatment system for normal modes of plant operation (e.g., full power operation, shutdown/refueling, and startup).	Yes • Yes • Yes	Yes		Table 3.3-2 provides information under normal conditions and normal shutdown/cool down conditions.
	Hydrology	Mark Wigmosta	1	ESRP 3.4.1	Descriptions of anticipated operational modes and the estimated periods of time that the system will operate in each mode including: • for each anticipated operational mode, quantities of heat generated, dissipated to the atmosphere, and released in liquid discharges • for each operational mode, water source and quantities of water withdrawn, consumed, and discharged.	Yes Partial No	No	Yes	Table 3.4-1 provides heat load and flow rates for different operating conditions.
	Hydrology	Mark Wigmosta		ESRP 3.4.1	Status of the NPDES permit and any 316(a/b) demonstrations.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 3.4.2	For INTAKE SYSTEMS, include: • a drawing of the intake structure that shows the relationship of the structure to the water surface, bottom geometry, and shoreline • a description of the cooling water pumping facility • a description of the trash racks, traveling screens, trash baskets, and fish-return devices • performance characteristics (e.g., flow rates, intake velocities) for the operational modes identified by the ESRP 3.4.1 reviewer • performance characteristics for specific intake-related functions, such as de-icing, trash-rack clearing, screen washing, trash basket removal, or fish-return system operation • the location and description of components for the addition of chemicals (e.g., corrosion inhibitors or antifouling agents) to the intake system.	• Yes • Yes • Yes • Yes • Partial • No	No	Yes	No details are provided on performance characteristics for de-icing, trash-rack clearing, screen washing, trash basket removal. No discussion exists on addition of chemicals to the intake system.
	Hydrology	Mark Wigmosta	1	ESRP 3.4.2	For DISCHARGE SYSTEMS, include: • drawings of the outfall structure, showing its location in the receiving waterbody, relationship to water surface, bottom geometry, and shoreline • a description of discharge canal or discharge lines • performance characteristics (e.g., discharge flow rates, discharge velocities, discharge temperatures, and temperature differentials) for the operational modes identified by the reviewer for ESRP 3.4.1 • descriptions of specific discharge-related components (e.g., diffusers and fish barriers).	• Partial • Yes • Partial • Yes	No	Yes	Figure 2.4-6 provides information on the diffuser pipe. Additional performance characteristics are provided in Section 5.3.2.
	Hydrology	Mark Wigmosta	1	ESRP 3.4.2	For HEAT-DISSIPATION SYSTEMS, include: • the location of heat dissipation system components relative to other site features • the design details of heat dissipation system components affecting system performance, including the cooling towers, cooling lakes and ponds, spray ponds or canals, and condensers (once-through systems; see ESRP Tables 3.4.2-1 and -2) • site-specific meteorological data (from ESRP 2.7) • site-specific water supply data (from ESRP 2.3.1) • heat-dissipation system performance analyses based on the manufacturer's design data and site-specific meteorological and hydrological data.	• Yes • Yes • Yes • Yes • Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	Descriptions of nonradioactive effluent treatment facilities.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	Average, maximum, and seasonal variations of principal constituents of intake and receiving waters and any minor or trace materials that may be of environmental relevance.	Yes	No	Yes	Estimated annual totals – no maximum or seasonal information.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	A list of chemicals processed through each system (e.g., corrosion inhibitors and antifouling agents) and total amounts used per year, frequency of use, and concentrations of these chemicals or their products in each waste stream.	Yes	No	Yes	Estimated annual totals – no maximum or seasonal information
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	The concentration factor on a seasonal basis for evaporative cooling systems.	No	No	Yes	No seasonal concentration factors given.
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	The average and maximum concentration of natural materials in effluent streams.	Yes	Yes		Tables 3.6-2, 3.6-4, 3.6-6, 3.6-8.
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	The operating cycles for each effluent treatment system for normal modes of facility operation (e.g., full power operation, shutdown/refueling, and startup).	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.2	A description of the systems (both temporary and permanent) to be provided.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.2	Anticipated quantity and characteristics of treated effluents.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.2	The ultimate disposal of treated effluents.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.2	Standards for the proposed sanitary system effluents.	Yes	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 3.6.2	The NPDES permit (if available).				
	Hydrology	Mark Wigmosta	2	ESRP 3.6.3	Information concerning nonradioactive wastes not considered in ESRPs 3.6.1 and 3.6.2, such as laboratory wastes, storm drainage, trash, hazardous wastes, and debris from bars or screens on the cooling water intake. The description should include estimates of the quantities of wastes, their pollutant concentrations at points of release as appropriate to the system, and other relevant data.(water-related aspects only)	Yes	Yes		Tables 3.6-6, 3.6-7, 3.6-8, 3.6-9, 3.6-10.
	Hydrology	Mark Wigmosta	2	ESRP 3.6.3	Procedures for any offsite disposal of wastes. (water-related aspects only)	Yes	No	Yes	General description, additional detail needed
	Hydrology	Mark Wigmosta	2	ESRP 3.6.3	Procedures by which all effluents will be treated, controlled, and discharged to meet State and EPA effluent limitation guidelines and new source performance standards (water-related aspects only).	Yes	No	Yes	General description, additional detail needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.1	The following list of data should be obtained: o descriptions of the physical characteristics of the surface-waterbodies and groundwater aquifers o identification and description of project related construction activities expected to result in hydrologic alterations at the site, transmission corridors, and offsite areas. Activities include construction of cofferdams and storm sewers; dredging operations; placement of fill material into the water; creation of shoreside facilities involving bulkheads, piers, jetties, basins, or other structures or activities with potential to alter existing shoreline processes; construction of intake and outfall structures; water channel modifications; construction of roads and bridges; operations affecting water levels (flooding); dewatering activities; and construction activities contributing to sediment runoff, e.g., road construction, clearing and grading, fill or spoil placement	Yes	Yes		Sections 2.3.1, 4.2, 5.2
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.1	The following list of data should be provided: o identification of water sources used during construction and the average and maximum use rates of these waters o identification of waterbodies receiving construction effluents and the expected average and maximum flow rates and physical characteristics (temperature, sediment load, velocities) of these effluents o identification of hydrologic alterations expected to result from the project related construction activities listed previously. o identification and location of groundwater and surface-water users and areas that could be affected by project related hydrologic alterations o descriptions of proposed practices and measures to limit or minimize expected hydrologic alterations o Federal, State, regional, local, and affected Native American Tribal agencies' best management practices and regulations o descriptions of proposed means to ensure construction activity compliance with applicable hydrological standards and regulations.	Yes • Partial • Partial • Yes	No	Yes	Section 4.2 Identify extent of offsite zone of impact to groundwater caused by construction and dewatering activities as well as re-routing of Walker Run; identify locations of offsite wells relative to the extent of impact. Yearly estimates of water use are in Table 4.2-1. General discussion on construction effluents; rates and characteristics are missing.

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	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.2	The following data should be provided: ○ identification and locations of groundwater and surface-water users and areas that could be impacted by project related construction activities affecting water use ○ predicted impacts on the water users identified in the previous item ○ descriptions of any proposed practices and measures to control construction related water use impacts. Factors to be considered include flooding, drainage, groundwater elevation, erosion, sedimentation, water quality, protection of natural drainage channels and waterbodies, protection of shorelines and beaches, restrictions on access to and use of surface water, protection against saltwater intrusion, and handling of fuels, lubricants, oily wastes, chemical wastes, sanitary wastes, herbicides, and pesticides ○ consultations with Federal, State, regional, local, and affected Native American Tribal regulators ○ descriptions of proposed means to ensure construction activity compliance with water-quality and water-use standards and regulations ○ water-quality requirements for key elements of aquatic ecosystem and domestic users	Yes • Yes • Partial • Yes • Partial • Partial • Partial	No	Yes	Section 4.2 Identify extent of offsite zone of impact to groundwater caused by construction and dewatering activities as well as re-routing of Walker Run; identify locations of offsite wells relative to extent of impact Limited discussion of impacts to water users in Luzerne County. General discussion of appropriate agencies/organizations; not clear to what level they have been consulted. Brief discussion of regulations, but no details on means to assure compliance. Some discussion of water quality requirements in Section 4.3

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.2	The following list of data should be provided: • descriptions of the site and vicinity waterbodies and aquifers (including sole-source aquifers) • descriptions of hydrologic alterations and their related construction activities • the physical effects of hydrologic alterations • comparisons of water quantity available to other water users with existing and known future water rights and allocations • identification of waterbodies receiving construction effluents (e.g., sanitary wastes, cleaning wastes, dust control, fuels and lubricants, chemical, herbicides, pesticides) and the expected average and maximum flow rates and composition of these effluents • baseline water-quality data for surface water and groundwater sources used during construction and impacted by construction activities • potential changes to surface water and groundwater quality (e.g., heavy metal contamination) resulting from substrate exposure during construction.	Yes • Yes • Yes • Partial • Partial • Partial • Yes	No	Yes	Sections 2.3.1, 4.2.2 Description of hydrologic alterations and general discussion of physical effects. Baseline water-quality data presented in other sections with general discussion of potential changes.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.1	The following list of data should be provided: • a quantitative description of present and known future groundwater withdrawals on the site and for distances great enough to cover aquifers that may affect plant water availability or be affected by plant water use. The following should be included for each use: (a) location, depth, and elevation of wells (total and cased) and water levels with respect to the plant; (b) identification of aquifers; and (c) average monthly withdrawal rates. • operational activities expected to result in hydrologic alterations within the site and vicinity, along transmission corridors, or at offsite areas. These activities can include dredging operations, operations affecting water levels, and dewatering activities. • identification and description of the hydrological alterations resulting from the identified operational activities. These can include changes in the flood handling capability of the floodplain, flow and circulation patterns, erosion subsidence, water availability, and sediment transport.	Yes	Yes		Sections 2.3.1, 5.2.1.2.2; Note – groundwater will not be used for operations

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.1	The following list of data should be provided: • descriptions of the physical characteristics of the surface waterbodies and groundwater aquifers • quantitative descriptions of proposed water sources, including groundwater sustained yield, 7-day once-in-10-years low flow, flows (including reverse and regulated) and yields during the drought of record, and low lake levels; estimates of frequency and duration of water-supply shortages • withdrawals and returns of surface water and groundwater used for plant operation, including rates and sources of water. This should include the different operational modes of the plant. The information should also include plant effluent quantity and physical characteristics as a function of the different operational modes • a quantitative description of present and known future surface-water uses (diversions, consumptions, and returns) that are within the hydrological system in which the plant is located and that may affect plant water availability or be affected by plant water use. The following should be included for each use: (a) locations of diversions and returns with respect to the plant intake system, (b) identification of waterbodies, and (c) average monthly withdrawal and consumption rate.	Yes • Yes • Partial (7Q19 in section 5.2.2.1.1) • Yes (also in ER Sections 3.3 and 3.4) • Partial	No	Yes	Section 5.2; Note: groundwater will not be used for operations. Figures 2.3-66 and 2.3-67 provide locations and type of withdrawal Water use by organization and primary use are provided in Table 2.3-27. Table 2.3-32 provides general use information by type of use. Water use is not provided on a monthly basis. Staff consultation with State and local agencies may be needed.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.1	The following list of data should be provided: • identification and locations of surface-water and groundwater users (including aquatic ecosystems) and water-use areas that could be affected by hydrologic alterations resulting from plant operation • a summary of statutory and other legal restrictions relating to plant water use and water consumption • descriptions of proposed means to ensure compliance with standards and regulations affecting plant water use and water consumption, and proposed practices and measures to limit or minimize operational hydrologic alterations.	Yes • Yes • No • No	No	Yes	Sections 2.3.1 and 5.2 This section does not contain information on regulatory requirements or means to ensure compliance

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.2	The following list of data should be provided: • descriptions of the site and vicinity waterbodies and groundwater aquifers • descriptions of hydrologic alterations and their related operational activities • the physical effects of hydrologic alterations • a quantitative description of present and known future surface-water uses, including any station water • uses not associated with the proposed project that are within the hydrological system in which the plant is located and that may be adversely affected by the plant. The following should be included for each use: (a) identification of the waterbody, (b) locations of diversions and returns with respect to the plant (diversions located between the plant discharge and the region of complete dilution should be further characterized by location with respect to the waterbody), and (c) average monthly withdrawal and consumption rate for each division by use category (e.g., domestic, municipal, agriculture).	Yes • Yes (ER Section 2.3.1) • Yes (ER Section 5.2.1) • Partial (from other sections) • Partial (from other sections)	No	Yes	Sections 2.3.1 and 5.2 This section limited to brief discussion of consumptive and nonconsumptive uses. More detailed information needed.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.2	The following list of data should be provided: • a quantitative description of present and known future groundwater withdrawals on the site and for distances great enough to cover aquifers that may be adversely affected by the plant. The following should be included for each use: (a) withdrawal location, (b) depth and elevation of wells (total and cased depth) and water levels, (c) identification of aquifers, and (d) average monthly withdrawal rates by use category • comparisons of water quantity available to other water users with existing and known future water rights and allocations • a quantitative and qualitative description of recreational, navigational, and other nonconsumptive known future water uses. For a 10-km (6-mi) radius, this should include the following: (a) identification of waterbodies and location with respect to the plant, (b) kind and location of activity on the waterbody, and (c) use rate with time variation • identification of waterbodies receiving plant effluents and the expected average and maximum flow rates and composition of these effluents • predicted impacts to water users or water-use categories described in the "Data and Information" section of this ESRP • baseline water-quality data for surface-water and groundwater sources used for and impacted by plant operation (from ESRP 2.3.3).	Yes Yes • Partial (Section 2.3.2) • Partial (Section 3.6) • Partial	No	Yes	Groundwater will not be used More detailed information may be needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.2	The following list of data should be provided: • baseline water-quality data for surface-water and groundwater sources used for and impacted by plant operation • descriptions of any proposed practices and measures to control or limit operational water-use impacts • summary of statutory and other legal restrictions relating to water use or specific water-body restrictions on water use imposed by Federal, State, regional, local, or affected Native American Tribal regulations • Federal, State, regional, local, and affected Native American Tribal standards and regulations applicable to water quality and water use (from consultation with Federal, State, regional, local, and affected Native American Tribal agencies) • descriptions of proposed means to ensure operational compliance with water quality and water-use standards and regulations.	Yes Yes (ER Sections 2.3, 5.2.1, 5.2.2, 5.2.3, 5.3.2)	No	Yes	Groundwater will not be used Additional detail may be required.
	Hydrology	Mark Wigmosta	1	ESRP 5.3.1.1	The following list of data should be provided: • bathymetry and sediment characteristics in the vicinity of the intake structure(s) • maps depicting station layout with respect to the waterbody, including locations of all intakes and discharges • intake flow rates and velocities as a function of plant operating conditions • detailed drawings of the intake structure(s), including the relationship of the structure to the water surface (normal and minimum levels) • ambient current patterns in the vicinity of the proposed intake structure(s) • descriptions of other intake system design and performance characteristics affecting hydrodynamics (e.g., horizontal and vertical approach velocities, geometry of intake canals, and submerged riprap) • descriptions of spatial and temporal alterations of the ambient flow field and of any other physical hydrologic effects induced by intake system operation.	• Partial (ER Section 3.4) • Yes (ER Section 2.3) Yes (also in ER Section 3.4) • Partial (Section 3.4) • No • Partial (ER 3.4) • Partial	No	Yes	No information on sediment or ambient currents

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 5.3.2.1	The following list of data should be obtained on the RECEIVING SURFACE waterbodies: • bathymetry of the waterbodies that may be affected by operation of the plant discharge system with detailed data in the vicinity of the discharge • maps depicting station layout with respect to waterbodies, including the locations of all intakes and discharges • maximum, average maximum, average, average minimum, and minimum monthly temperatures in the waterbodies • erosion characteristics and sediment transport (including rate, bed and suspended load fractions, and gradation analyses) • for freshwater streams: maximum, average maximum, average, average minimum, and minimum monthly flow rates; historical drought stages and flow rates by month, 7-day once-in-10-years low flow; important short duration fluctuations (e.g., diurnal release variations from peaking operation of upstream hydroelectric plant, diurnal temperature variations); velocity and temperature distributions (horizontal and vertical) near the discharge structure and downstream to the area of total mixing.	• Yes (ER 2.3) • Yes (ER 2.3) • Partial • (ER 2.3) • No • Partial	No	Yes	No erosion and sediment transport data CORMIX was used to model thermal plume configuration.
	Hydrology	Mark Wigmosta	1	ESRP 5.3.2.1	The following list of data should be obtained on the RECEIVING SURFACE waterbodies: • for lakes and impoundments: description of the lake or impoundment geometry; location and elevation of impoundment outlets; elevation area capacity curves; summary description of operating rules; maximum, average maximum, average, average minimum, and minimum monthly inflow and outflow rates; temperature distributions (horizontal and vertical); and seasonal variations of density induced currents • for estuaries and oceans: seasonal variations in the shoreline and bottom geometry due to sediment transport; tidal current patterns (velocities and phases), range, and excursion; nontidal circulation patterns, including frequency distributions of current speed, direction, and persistence; and temperature and salinity distribution (horizontal and vertical), including temporal variations. For estuaries: maximum, average maximum, average, average minimum, and minimum monthly river discharge and flushing characteristics.	N/A			
	Hydrology	Mark Wigmosta	1	ESRP 5.3.2.1	The following list of data should be obtained on the METEOROLOGY: • onsite meteorological data • National Oceanographic and Atmospheric Administration (NOAA) National Climatic Data Center meteorological data for the nearest National Weather Service (NWS) station • the elevation of instruments measuring wind speeds, wet bulb temperatures, and humidities.	Yes (ER Section 2.7)	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 5.3.2.1	The following list of data should be obtained on the DISCHARGE STRUCTURE: • detailed drawings of the discharge structure(s), including relationship of structure(s) to the water surface (normal and minimum) and waterbody bathymetry • water flow rates, velocities, and temperatures in the discharge stream(s) as a function of operating conditions.	Yes (also ER Section 3.4)	Yes		
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.3.2.1	The following list of information on the applicant's models, if used: • for numerical models: (a) theory, assumptions, and basis for applicability; (b) procedures used to estimate model parameters (e.g., diffusion coefficients); (c) model verification; and (d) the applicant's predicted temperature distributions, areas for isotherms, dilution rates, and time of passage through plume. • For physical models: (a) physical model facilities (e.g., dimensions of the plume and flow rates), (b) modeling techniques and scaling relationships, (c) data collection and analysis techniques (e.g., number and locations of temperature probes, infrared mapping), (d) prototype verification (if any), and (e) the applicant's flow fields and temperature distributions for critical and average hydrological conditions.	Yes Yes (CORMIX)	No	Yes	Groundwater will not be used for operations. CORMIX input files and/or a review of calculation package may be needed for staff's review.
	Hydrology	Mark Wigmosta	2	ESRP 5.5.1	Descriptions of nonradioactive waste systems, including quantities, composition, and frequency of waste discharges to water, land, and air. (water-related aspects only)	Yes (also in ER Section 3.6)	Yes		
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	For discharges to water, waste concentrations at the point of discharge, predicted dilution in the receiving waterbody, and estimates of concentrations at various distances from the discharge point.	Yes (ER Section 3.6)	No	Yes	Waste concentrations to Susquehanna River in Table 5.5-1. Predicted dilutions, and concentrations at various distances from the discharge point are needed.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Ambient concentrations in the receiving waterbody of the chemicals and other materials contained in the waste discharges.	Yes (ER Section 2.3)	No	Yes	Additional information may be required.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Receiving waterbody water-quality criteria for domestic, industrial, agricultural, and recreational uses.	Yes (ER Section 2.3.3)	No	Yes	Additional information may be required.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Water use for the receiving waterbodies.	Yes (ER Section 2.3.2)	No	Yes	Additional information may be required.

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	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.5.1	Soil data for disposal site (other than licensed commercial sites), and potential for transport of wastes to ground and surface waters.	Yes	Yes		Section 5.5 Disposal at licensed facilities.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Other site-specific waste-disposal activities (e.g., spoils from intermittent dredging activities).	No	No	Yes	Information regarding dredging activities and spoils disposal is needed.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Applicant's NPDES permit and water quality certification (or their status if not issued).				
	Hydrology	Mark Wigmosta	2	ESRP 5.5.2	Descriptions of systems that create mixed wastes, including quantities of waste produced. (water-related aspects only)	Yes	Yes		
	Hydrology	Mark Wigmosta	2	ESRP 5.5.2	Anticipated disposal plans for the mixed wastes (i.e., disposal at a mixed-waste disposal facility, shipment to a treatment facility, or storage onsite). (water-related aspects only).	Yes	Yes		
	Hydrology	Mark Wigmosta	2	ESRP 5.5.2	Estimated environmental impacts, including health effects resulting from exposure to the chemical constituents and those resulting from radiological exposures estimated to be received by workers as a result of mixed-waste testing and storage (water-related aspects only).	Yes	No	Yes	NRC staff need to independently estimate the impacts and more data regarding effluent streams, concentrations, and ambient conditions will be required for the staff's assessment.
	Hydrology	Mark Wigmosta	2	ESRP 5.5.2	A waste minimization plan that identifies process changes that can be made to reduce or eliminate mixed wastes (water-related aspects only).	Yes	No	Yes	Details of the waste minimization plan are needed. NRC staff will need more details to complete their independent impact assessment.
	Hydrology	Michael Fayer Mark Wigmosta	2	ESRP 5.10	Listing of potentially adverse impacts to surface and groundwaters, and measures and controls to limit adverse impacts of project operation.	Yes	No	Yes	Groundwater will not be used for operations Table 5.10-1 lists potential impacts and controls to limit adverse impacts; more detail may be needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 6.1	The following list of data describing the THERMAL MONITORING should be provided: • maps showing (a) features of the plant and site, including the boundaries and bathymetry of all waterbodies adjacent to the site both before and after construction activities; (b) the location of all thermal, hydrological, or aquatic biological monitoring stations; and (c) the predicted extent of the thermal plume • the type and frequency of temperature measurements taken at each location as well as the duration of each monitoring program • descriptions of the monitoring equipment used • descriptions of the data analysis procedures used.	• Yes (ER Section 2.3 and Figure 6.1.1) • Partial • Partial • No • No	No	Yes	Additional detail about preoperational and operational thermal monitoring, including new locations, type and frequency, durations, and descriptions of monitoring equipment and data analysis procedures are needed.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 6.3	The following list of data describing the HYDROLOGICAL MONITORING should be provided: • maps showing (a) features of the plant and site, including the boundaries and bathymetry of all surface waterbodies (including springs) adjacent to the site both before and after construction activities, (b) the locations of all hydrological (including groundwater monitoring wells), thermal, and aquatic biological monitoring stations, (c) locations of all wells potentially influenced by plant construction and operation, and (d) major geomorphic features (e.g., floodplains) and regional geology • site vicinity surface and groundwater average and extreme velocities and flow rates • sediment transport (suspended and bed load) characteristics and erodability of the site soil • the type and frequency of data collected at each location as well as the duration of each monitoring program • descriptions of the monitoring equipment used • descriptions of the data analysis procedures used • documentation of data quality objectives (if any).	Yes • (a) Yes (ER Section 2.3) • Partial (ER Section 2.3) • No velocity info • No • Yes • Partial • No • No	No	Yes	Sections 2.3.1 and 6.3 Identify locations of offsite wells that might be affected by construction and operation. Explain whether measurement frequency will be adjusted to capture influence of construction activities. Tables 6.3-1 and 6.6-1 provide information about locations, frequency, parameters, and types of samples. Descriptions of monitoring equipment, data analysis procedures, and data quality objectives are needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 6.6	The following list of data describing the CHEMICAL MONITORING should be provided: • systems to be sampled • location of sampling stations • type of sample (e.g., surface grab or depth composite), number of replicates, and method of collecting the sample • time of day, time period, and frequency of sampling • methods of preserving the samples analytical methods used • description of automated monitoring systems used • reference or calibration standards used to verify accuracy of methods statistical methods used to interpret results • quantitative data on chemical characteristics of surface water and/or groundwater in the site and vicinity, including seasonal ranges and averages and historical extremes • data quality objectives • quality assurance procedures.	Yes • Yes • Yes • Yes • Partial • No • No • No • Yes • Partial • No • No	No	Yes	No groundwater chemical monitoring. Some details of likely NPDES-required monitoring is needed
	Hydrology	Mark Wigmosta	2	10 CFR 51.45(c)	A description of the environmental impacts of preconstruction activities related to water-related aspects of the *waste systems* at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Partial	No	Yes	A clearly stated list of all preconstruction activities is needed.
	Hydrology	Mark Wigmosta	2	Cumulative Impacts 4.7 (proposed)	Has the applicant identified activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on water-related aspects of the waste systems?	No	No	Yes	Additional detail needed.
	Hydrology	Mark Wigmosta	2	Cumulative Impacts 4.7 (proposed)	Has the applicant identified projects in the region that may contribute to a cumulative impact on water-related aspects of the waste systems?	No	No	Yes	Additional detail needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	9.3	Has the applicant provided reconnaissance data to characterize the hydrological impacts at the alternative sites?	Yes	No	Yes	Section 9.3 Montour Site: Characterize the nearby GW and surface water users. Martins Creek Site: Identify any Delaware River temperature concerns in vicinity. Sandy B end Site: Confirm that Juanita River flow conditions can support proposed plant. Estimate impact of thermal discharge. Additional data may be required.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.1	The proposed heat-dissipation system for each potential alternative, as follows, is necessary: • land-use requirements • water-use requirements • operating and maintenance experience for similar units • capital, maintenance, and operating costs • effect on generating efficiency • predicted thermal and physical effects (e.g., thermal plume and scouring) • predicted atmospheric effects (e.g., fogging, icing, and drift) • predicted operating noise levels • predicted aesthetic effect (e.g., visual plumes) • predicted recreational benefits.	Yes • Yes • Yes • Yes • Yes • Yes • Partial • Partial • Yes • Yes • No	No	Yes	May need additional information about predicted thermal and physical effects.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	For intake systems, the following information is required: • sketches or preliminary designs and operational characteristics of alternative intake systems, showing the intake design and its relationship to water surface, bottom geometry, shoreline, and discharge structure • alternative pumping facilities, if proposed • alternative locations of the proposed intake system and pumping facility on the same waterbody • alternative procedures and schedules for intake defouling, including any use of defouling chemicals • descriptions and operational characteristics of any alternative trash racks, traveling screens, trash baskets, or fish-return systems • predicted physical impacts from hydrologic alternatives and impacts to aquatic ecosystems, including entrapment, impingement, and entrainment, for each alternative intake system • capital, maintenance, and operating costs for each alternative intake system and costs associated with system adaptation to the proposed site.	• No • No • Yes • No • No • No • No	No	Yes	Information needed: sketches of preliminary design of each alternative intake system, predicted physical and aquatic impacts for each alternative intake system, and maintenance and operating costs for each alternative intake system.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	For discharge systems, the following information is required: • sketches or preliminary designs and operational characteristics of alternative discharge systems showing the discharge design, its location with respect to the receiving waterbody, and its relationship to water surface, bottom geometry, intake structure, and shoreline • description of alternative discharge lines (or canals) from the heat-dissipation system to the receiving waterbody • description of alternative locations of the proposed discharge system on the same waterbody • estimated physical impacts from hydrologic alterations and impacts to aquatic biota for each alternative discharge system • capital, maintenance, and operating costs for each alternative discharge system and costs associated with system adaptation to the proposed site.	• No • No • No • No • No	No	Yes	Very little information provided. Additional detail needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternatives (Water-related issues only)	Michael Fayer Mark Wigmosta	2	ESRP 9.4.2	For the water supply, the following information: • description of potential alternative sources of water and their availability, including location of water-supply source with respect to the facility site • economic and environmental cost data for water delivered from each alternative source.	Yes • Yes • No	No	Yes	Section 9.4.2; Note: groundwater will not be used Applicant stated that site groundwater and municipal sources do not have sufficient capacity. Staff may need further information from the applicant and consultation with local and State agencies responsible for water-supply planning.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	For water treatment, the following information is required: • description and purpose of alternative water-treatment systems for the circulating water system and the facility (service) water system • chemicals and additives (or mechanical treatment) to be used in each alternative water-treatment system • operating cycles for each alternative water-treatment system • capital, maintenance, and operating costs for each alternative water treatment system.	• No • No • No • No	No	Yes	Very little information provided. Will need RAIs for detailed information
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	Capital, maintenance, and operating costs for the proposed intake system, discharge system, and water-treatment system, and water costs for the proposed water supply.	No	No	Yes	The missing information is needed for the staff's review.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Land areas devoted to major uses within the site boundary.	Yes	No	Yes	Table 2.2-1 and Figure 2.2-1 show the site; however, the ER states that site will be split up. A timeline for the division and revised site boundaries is not clearly provided; it is not clear from the figure which part will be PPL Susquehanna LLC and which will be PPL Bell Bend LLC.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to land use at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	No	No	Yes	
	Land Use/ Transmission Line	D Hostick	1	RG 4.2, sec. 2.1.1.2	Map of the site area.	Yes	Yes		Figure 2.1-1
	Land Use/ Transmission Line	D Hostick	1	RG 4.2, Ch. 12; 10 CFR 51.45(d)	Discussion of applicable zoning and land-use restrictions.	Yes	Yes		Figure 2.2-4 also illustrates these.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1; RG 4.2 sec. 2.1.3	Maps showing major land uses in the site vicinity with land uses classified consistently with standard Natural Resources Conservation Service (NRCS) categories.	Yes	Yes		Figures 2.2-1 and 2.2-2
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Egress limitations from the area surrounding the site.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Mineral resources (e.g., sand and gravel, coal, oil, natural gas, and ores) adjacent to or within the site boundary presently being exploited or of known commercial value.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Special land uses (e.g., recreation) other than major land uses in the site and vicinity that could be significantly affected by construction of the proposed project.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Ownership of mineral resources (i.e., whether the mineral resources are owned by the surface or another landowner).	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Identification of land-use plans that include the site and vicinity within their scope.	Yes	No	Yes	Mentions planning commission and others that BBNPP will need approval from, but does not discuss other plans that entities may have for the area.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/Transmission Line	D Hostick	2	ESRP 2.2.1	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.2.1	Yes	No	Yes	Need clarification of dates and revisions for planned site boundaries given that land will be split into two parcels. Does the ER use the BBNPP OCA, encompassing both, as the base, or should only the west parcel for PPL Bell Bend be considered the "site."?
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Proposed routes for corridors that will be used for construction of transmission lines from the station site to an interconnecting point(s) on the existing high-voltage transmission systems.	Yes	Yes		The plan is to use existing corridors, with modifications primarily confined to existing substations and switchyards.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Proposed routes of access corridors to serve the proposed facility.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Lengths and widths of any planned new transmission corridors.	Yes	Yes		No new planned corridors.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Land-use restrictions (if any) contained in any transmission line easements.	Yes	No	Yes	Restrictions are not explicitly mentioned.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Land use within existing and proposed transmission corridors using the categories defined by the NRCS. Land-use information should be subdivided into corridor segments having predominantly similar land-use types.	Yes	No	Yes	States that land is primarily agricultural or forest, but provides no numbers.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Identification of local and regional land-use plans of State, regional, and local agencies.	No	No	Yes	Local and regional land-use plans of other agencies are not specifically mentioned.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Special land-use classifications that would be impacted by the proposed facility (e.g., Native American or military reservations, wild and scenic rivers, State and national parks, national forests, designated coastal-zone areas, flood-plains, wildlife refuges, and wilderness areas).	Yes	Yes		Tables 2.2-10 through 2.2-14

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	2	ESRP 2.2.2	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.2.2.	Yes	No	Yes	New Susquehanna 500-kV Yard 2 is mentioned in Section 3.7, but not in Section 2.2.2; list used in Sections 4.1.2 and 5.1.2 is also slightly different from Section 3.7. Need clarification as to which actions are planned.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.3	Maps showing major land use within the region. Land-use categories should be consistent with those defined by the NRCS.	Yes	Yes		Figures 2.2-2 and 2.2-6
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.3	Land areas devoted to major uses within the region.	Yes	Yes		Tables 2.2-2, 2.2-5, 2.2-7 and 2.2-8
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.3	Principal agricultural products of the region.	Yes	No	Yes	Table 2.2-6 contains products and the value of products, but no yields of the products.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.3	Maps showing the major transportation and utility networks within the region.	Yes	Yes		As part of Figures 2.2-1, 2.2-2, and 2.2-5
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.3	Maps showing major public and trust land areas in the region.	Yes	Yes		Figure 2.2-7, other info (e.g., acreage) in Table 2.2-9; also Tables 2.2-3 and 2.2-4
	Land Use/Transmission Line	D Hostick	2	ESRP 2.2.3	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.2.3	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.8	Descriptions of Federal actions associated with acquisition and/or use of the proposed site and transmission corridors or of any other offsite property needed for the proposed project.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.8	Descriptions of planned Federal projects that will be required either to provide an adequate source of facility cooling water or to ensure an adequate supply of cooling water over the operating lifetime of the facility.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.8	Descriptions of any other planned Federal projects or activities that must be completed as a condition of facility construction or operation.	Yes	Yes		Discussion is light. Will want to follow up during the site audit.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.8	Federal agency plans or commitments that will result in significant new power purchases within the applicant's service area that have been used to justify a need for power.	Yes	No	Yes	States that the need for power was not justified based on Federal plans or commitments, but doesn't state whether there are federal plans or commitments for the area.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.8	Descriptions of planned Federal projects that are contingent on facility construction and operation.	Yes	Yes		Discussion is light. Will want to follow up during the site audit.
	Land Use/Transmission Line	D Hostick	2	ESRP 2.8	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.8.	Yes	No	Yes	Mentions two nonfederal projects that may have potential impacts, but does not provide details.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Basic electrical design parameters, including transmission design voltage or voltages, line capacity, conductor type and configuration, spacing between phases, minimum conductor clearances to ground, maximum predicted electric-field strength(s) at 1 m above ground, the predicted electric-field strength(s) at the edge of the corridor in kilovolts per meter (kV/m), and the design bases for these values.	Yes	No	Yes	Basics included, but design details have not begun, although ER states that all will comply with applicable regulations.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Predicted noise levels resulting from transmission-system operation.	Yes	No	Yes	Predicted levels at source, but not at project level boundaries or beyond.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Basic structural design parameters, including illustrations and descriptions of towers, conductors, and other structures, with dimensions, materials, color, and finish.	Yes	No	Yes	No illustrations; lacking detail.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	The applicant should provide siting data for all potential transmission line corridors identified by the applicant using topographic maps (as a rule, 7.5- or 15-minute scale) or aerial photographs showing the proposed corridor or corridors and all existing major high-voltage corridors in the region.	Yes	Yes		No new corridors are offsite (so they are not included).
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Lengths, widths, and area of transmission line corridors, including modification and/or use of existing corridors and other facilities for the proposed project.	Yes	No	Yes	Limited information on existing corridors; given that they will be using existing corridors only, more information is needed.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	General methods of transmission line construction (e.g., tower foundations, stringing, location of access roads, span length, and clearing of corridors).	Yes	No	Yes	General reference to PJM guidelines, but no details are provided.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	When available, tower and substation locations.	Yes	No	Yes	Substation locations are included, but tower locations are absent.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	2	ESRP 3.7	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 3.7.	Yes	No	Yes	Description of new/upgraded facilities and systems are inconsistent between Sections 3.7 and 2.2.2. Overall, not clear what is going to be built anyway, and what will be new just for BBNPP. Lacks detail for existing transmission corridors.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Has the applicant addressed transportation of construction materials to the site? For example, will rail service need to be established, restored, or otherwise reconditioned to accommodate the industrial loads expected during facility construction? If so, have these activities been characterized?	Yes	Yes		More complete discussion is included in Section 4.4.1.5.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Will the applicant be making use of currently abandoned rail lines?	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Will dredging of barge slips or other channels be required to facilitate construction? If so, where will the dredge spoils be deposited, and what volume of spoil is projected?	Yes	No	Yes	Transportation is indicated to be only by rail or highway; need clarification that none will be by barge.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Will borrow pits be constructed (or expanded)? If so, what volumes of borrow will be transported and used in construction?	Yes	No	Yes	Borrow pits are mentioned in text, but it is not clear if they are included in Table 4.1-1; no information on borrow volumes.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Has the applicant detailed the extent of the planned construction footprint in terms of amount of disturbed ground?	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Will local roads or highways need reconditioning to handle the expected loads?	Yes	Yes		Better discussion in Section 4.4.1.5
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	To what degree is the construction labor force expected to locate in the vicinity of the proposed facility? Will there be temporary housing communities during construction?	Yes	Yes		Discussed in Section 4.4.2.4
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Is the applicant seeking a Limited Work Authorization (LWA)? If so, the LWA would authorize ground-disturbing activities at the site to prepare for eventual reactor building construction. These activities should be clearly identified in the application as part of the Site Redress Plan, and the applicant should demonstrate that cooperation with relevant permitting agencies is underway or expected.	N/A			

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	2	ESRP 4.1.1	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 4.1.1.	Yes	No	Yes	Refers to other sections only for wetland habitat and population impacts; other disciplines may need more information.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	Highways, railroads, and utility corridors that will be crossed by transmission lines and access corridors.	Yes	Yes		No new offsite corridors, or widening of existing corridors is planned
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	A description of transmission line construction techniques and the associated impact on land use.	Yes	No	Yes	Discussion is brief, stating only that work will be conducted to avoid or minimize impact.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	Area and location of land within the transmission line corridors and offsite areas that will be disturbed by construction on either a long- or short-term basis.	Yes	Yes		No new offsite corridors, or widening of existing corridors is planned
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	Planned control actions during construction that will restrict land use in the transmission line corridors and offsite areas.	Yes	Yes		No new offsite corridors, or widening of existing corridors is planned
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	Do proposed transmission line corridors cross land zoned for residential or recreational uses?	Yes	Yes		No new offsite corridors, or widening of existing corridors is planned
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	Has the visual impact of constructing new corridors or widening existing corridors been addressed?	Yes	Yes		No new offsite corridors, or widening of existing corridors is planned
	Land Use/ Transmission Line	D Hostick	2	ESRP 4.1.2	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 4.1.2.	Yes	No	Yes	Limited discussion of the impacts of transmission line work on the site regarding impacts on existing wetlands and T&E species. No referral to those sections for further information.
	Land Use/ Transmission Line	D Hostick	1	ESRP 5.1.1	Depending on the site and the level of applicable demographic research, land-use impacts could be projected to result from demand for new housing of operations workers. Only in rare cases would it be expected that enough research would be available to predict the degree that new housing would have land-use impacts in the vicinity. The applicant should acknowledge the operations impact on housing and similar impacts that may occur from outage operations.	Yes	Yes		Further information is included in Section 5.8.
	Land Use/ Transmission Line	D Hostick	1	ESRP 5.1.1	Potential agreement or conflict with local land-use plans should be addressed by the applicant. The applicant needs to show how the operation of a new nuclear unit either complements or conflicts with existing land-use plans. Evidence of communication to this effect between the applicant and relevant agencies should be apparent.	Yes	No	Yes	Does not specifically address land-use plans; only mentions (in Section 2.2.1) what agencies will need to be consulted.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	1	ESRP 5.1.1	The land-use area also includes the impacts of salt drift from cooling tower steam plumes on crops and vegetation in the vicinity. The license renewal generic EIS provides clear metrics for determining impact significance in this area, and it should be referenced in this context by the applicant preparing the ER.	Yes	Yes		
	Land use/Transmission Line	D Hostick	2	ESRP 5.1.1	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 5.1.1	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 5.1.2	The applicant should provide a detailed characterization of typical transmission corridor maintenance activities.	Yes	Yes		
	Land Use/ Transmission Line	D Hostick	1	ESRP 5.1.2	Has the applicant addressed the question of impacts from seasonal access to transmission corridors that cross land in agricultural or other productive use?	Yes	Yes		No new corridors or changes to existing, so maintenance and access is expected not to change from current plant (SSES 1 and 2) operations
	Land Use/ Transmission Line	D Hostick		Alternative Site (No ESRP Section)	Has the applicant provided reconnaissance data to characterize the land-use and transmission-line impacts at the alternative sites?	Yes	Yes		
	Meteorology	Jeremy Rishel	2	ESRP 2.1	Is the plant description adequate for a meteorological analysis (see ESRP 2.1)?	Yes	Yes		See ER: Sections 2.1 and 2.7.5
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description of the general climate of the region with respect to the type of air masses, synoptic features, general air flow patterns, temperature and humidity characteristics, precipitation, and relationships between synoptic and mesoscale conditions, with an emphasis on conditions that would affect air quality and/or dispersion.	Yes	No	Yes	See ER: Section 2.7.1 Types of air masses, synoptic features, and relationships between synoptic and mesoscale conditions are not well developed or integrated. Relationships between those larger-scale conditions and local characteristics are not developed either. Discussions are largely a summary of data details presented later.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description of the regional air quality, including nonattainment or maintenance areas.	Yes	No	Yes	Clarification required for 8-hour ozone standard and the areas designated as maintenance areas. See ER: Section 2.7.2

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description of local severe weather phenomena and its frequency ~~and local conditions that would affect air quality and/or dispersion~~.	Yes	Yes		See ER: Section 2.7.3
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Monthly and annual air temperature and dewpoint temperature summaries, including averages, extremes, and diurnal range~~, and whether these extremes would affect air quality and/or dispersion~~.	Yes	No	Yes	Data are there; however, the daily average and extreme maximum and minimum ambient temperature and dew point temperature tables for SSES Units 1&2 (Tables 2.7-17 and 2.7-18), and for Williamsport, PA (Table 2.7-19) are excessive (148 pages total). Monthly/annual summaries would be sufficient. See ER: Section 2.7.4.1
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Monthly and annual summaries, including natural variability, occurrences of heavy fog, and appropriate summaries of other relevant parameters to support the description of impacts resulting from the operation of a closed-cycle heat-dissipation system.	Yes	Yes		See ER: Section 2.7.4.3 Table 2.7-56
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Estimated monthly mixing-height data, including frequency and duration (persistence) of inversion conditions and the methods used to provide the estimates, and an assessment of these values relative to their effect on air quality and/or dispersion.	Yes	No	Yes	Clarification is needed on how the mixing height calculation was performed and where and how the value is used elsewhere in ER calculations (e.g., is it used in AEOLUS3?). See ER: Section 2.7.4.4 For mixing heights, see ER: Table 2.7-164 Table 2.7-~~175~~165 Inversions, see ER: Sections 2.7.4.4 and 2.7.4.8; and Table 2.7-122 through Table 2.7-127

Comment [MDM1]: Consider adding another Review Area/Topic based on ESRP Section 2.7, Data and Info Needs, Sixth Bullet (Page 2.7-3) which reads: "Monthly and annual summaries of precipitation, including averages and measured extremes, number of hours with precipitation, hourly rainfall-rate distribution, and monthly precipitation wind roses with precipitation rate classes". If so, recommend that Col. 2 = Yes; Col. 3 = No; and Col. 4 = Yes. In Col. 5, would cross-reference ER §§ 2.7.4.3, Tables 2.7-49 thru 2.7-55, Figures 2.7-5 thru 2.7-30, and 2.7-31 thru 2.7-54. Other Remarks/Notes may include: only the data are presented in tabular form and graphically, there is no discussion of the long-term representativeness of the site data with respect to data from other nearby stations; there is one nearby cooperative station identified in addiiton to the three NWS stations that have been used for other elements, however, there are other nearby coop stations (including one close by in Berwick). A more rigorous discussion, includng data from additional stations, would be expected because rainfall can vary significantly over very short distances.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Monthly and annual summaries of atmospheric stability.	Yes	Yes		See ER: Section 2.7.4.5; Table 2.7-57 through Table 2.7-90.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description or reference to models and assumptions used to determine normalized concentration (χ/Q) and relative deposition (D/Q).	Yes	No	Yes	The AEOLUS3 Version 1.0 model will need to be reviewed for adequacy, because it is not a standard NRC model. A comparison run using an NRC-approved model will be required. See ER: Section 2.7.6.1 Table 2.7-128

Comment [MDM2]: Consider adding another Review Area/Topic based on ESRP Section 2.7, Data and Info Needs, Fourth Bullet (Page 2.7-4) which reads: "Topographic Data Presentation: (1) a map showing the detailed topographic features (as modified by the plant) on a large scale with an 8-km (5-mi) of the station; (2) a smaller-scale map showing topography within a 80-km (50-mi) radius of the station; and (3) a plot of maximum elevation versus distance from the center of the station in each of the sixteen 22.5-degree sectors radiating from the station to a distance of 80 km (50 mi). If so, recommend that Col. 2 = Yes; Col. 3 = No; and Col. 4 = Yes. In Col. 5, would cross-reference ER §§ 2.7.5, and Figures 2.7-92 thru 2.7-95. Other Remarks/Notes may include: explain how maximum terrain heights were determined (e.g., spot elevations, or some maximum value selected from within a distance- and/or compass-degree-band relative to adjacent sectors and downwind distances. A linkage between this information (if any) and the terrain heights input to the dispersion modelng for grid receptor and special recptor locations should be established and explained.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Short- and long-term diffusion estimates of χ/Q and/or D/Q and the period of onsite meteorological data used in the calculations.	Yes	No	Yes	Short- and long-term χ /Qs were estimated using the AEOLUS3 code. Code's implementation of Reg. Guides 1.111 and 1.145 needs to be verified. Onsite meteorological data used in modeling is from 2001-2007. A comparison run using an NRC-approved model will be required. Long-term: Estimates made assuming elevated release (when applicable during mixed mode release) at downwind distances defined in ESRP 2.7. See ER: Section 2.7.6.1 Short-term (DBAs): Method for calculating LPZ time averages needs clarification See ER: Section 2.7.6.2 Table 2.7-161 Table 2.7-162 Table 2.7-163
	Meteorology	Jeremy Rishel	2	ESRPs 3.4.1 and 3.4.2	Is the description of the cooling system (and relevant components) adequate for use in determining the potential impacts of heat dissipation on the atmosphere (this material is needed for ESRPs 3.4.1 and 3.4.2)?	Yes	Yes		See ER: Section 5.3.3.1 and Tables 5.3-7 through 5.3-9.
	Meteorology	Jeremy Rishel	2	ESRP 3.5	Are the release points for radioactive effluents (to be used in atmospheric transport and diffusion calculations) adequately described (this material is needed for ESRP 3.5)?	Yes	Yes		See ER: Section 2.7.6.1, Table 2.7-128
	Meteorology	Jeremy Rishel	2	ESRP 3.6.3	Are the release points for nonradiological emissions (to be used in atmospheric transport and diffusion calculations related to plant construction and operation, including vehicle emissions) adequately described (needed for ESRP 3.6.3)?	Yes	No	Yes	Potential sources of nonradiological air emissions are identified in Table 3.6-5. Vehicular emissions are not quantified in the ER.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRPs 4.4.1, 5.3.2.1, and 5.3.3.1	Is the meteorological information suitable to provide estimates of the impact of construction activity (needed for ESRP 4.4.1), plant operation (for ESRP 5.3.2.1), and heat-dissipation system effects (for ESRP 5.3.3.1) on the atmosphere and air quality?	Yes	No	Yes	Impact of construction and operation emissions on 8-hour ozone maintenance area, if any, needs to be described. Vehicle emissions need to be described and quantified. According to §§ 5.3.3.1.1, a composite of the onsite data set and concurrent data from the Wilkes-Barre NWS station was developed for use in the SACTI model. Wind speed and wind direction data were taken from the onsite monitoring program. Dry-bulb and dew point temperatures (from which relative humidity was calculated) and cloud cover were obtained from the Wilkes-Barre NWS station. However, §§ 6.4.1.5 indicates that dew point measurements are made at the SSES meteorological tower and that data recovery (at least for the 5-year period from 1999-2003) is greater than 95 percent. It is not clear why temperature and dew point data from the onsite monitoring program was not used for the SACTI modeling analysis. See ER: Section 1.3.2 Section 3.6.3.1 Section 5.3.3.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	2	ESRPs 5.4.1 and 5.4.2	Are the locations of the nearest receptors in each 22.5-degree sector for the transport and diffusion calculations clearly identified (for ESRPs 5.4.1 and 5.4.2)? Is enough information provided to allow staff to evaluate the concentrations and deposition values at these locations?	Yes	No	Yes	See ER: Table 2.7-128 For both grid and special receptors, it is not known whether terrain heights represent spot elevations or some maximum value and if the latter, how maximum heights were determined. References are not provided for special receptor locations and if original distances and directions were relative to SSES Units 1&2 it is not known how the distances and directions relative to BBNPP were determined.
	Meteorology	Jeremy Rishel	1	ESRP 6.2	Is the information sufficient to provide an assessment of the adequacy of air-sampling locations? Is a map provided showing the location of these stations (needed for ESRP 6.2)?	Yes	Yes		See ER: Table 6.2-3
	Meteorology	Jeremy Rishel	1	ESRP 6.4 and 6.7	Is the information provided adequate to assess the meteorological monitoring? For example, does it include a description of the onsite meteorological measurement program, including tower location and siting, location of any nearby obstructions or structures, and the local topography?	Yes	Yes		See ER: Section 6.4.1.1, 6.4.1.2, 6.4.1.6, Table 6.4-2, Figure 6.4-1, Figure 6.4-2.
	Meteorology	Jeremy Rishel	1	ESRP 6.4 and 6.7	Discussion of the meteorological measurements, including instrumentation used, instrument elevation above grade and siting on the tower, instrument accuracy, instrument performance specifications, and instrument calibration/maintenance procedures. Can the criteria of RG 1.23 be assessed?	Yes	Yes		See ER: For the pre-application and pre-operational phases, see Sections 6.4.1.3, 6.4.1.4, 6.4.1.6, and 6.4.1.7, Table 6.4-1 and Table 6.4-2 For the operational phase see Section 6.4.2, Tables 6.4-3, 6.4-4, and 6.4-5
	Meteorology	Jeremy Rishel	1	ESRPs 6.4 and 6.7	Discussion of meteorological data recording systems and analysis procedures, including data reduction (averaging) techniques and quality control.	Yes	Yes		See ER: Section 6.4.1.5 for the pre-application and pre-operational phases; and Section 6.4.2.5 for the operational phase.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	2	ESRPs 7.1 and 7.2	Is the meteorological data adequate to analyze and evaluate the effects of plant accidents involving radioactive material (needed for ESRPs 7.1 and 7.2)?	Yes	No	Yes	AEOLUS3 Version 1.0 model will need to be reviewed for adequacy, because it is not a standard NRC model. A comparison run using an NRC-approved model will be required. Note that the (POR) in Tables 2.7-57 thru 2.7-59 (i.e., 2001-2006), especially Table 2.7-57, is different from the POR presumably used in the dispersion modeling addressed in §§ 2.7.6 (i.e., 2001-2007). Note also that the wind speed classes in the JFDs, especially in Table 2.7-57 (i.e., the 10-m level JFD) does not correspond to the wind speed class breakdown called for by Revision 1 of Reg. Guide 1.23 and indicated in Tables 2.7-128 (for routine release modeling) and Table 2.7-161 (for accidental release modeling). These summaries would have to be provided to perform the confirmatory modeling by staff. See ER: Section 2.7.6.2, Table 2.7-161 through Table 2.7-163; Section 6.4.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	2	ESRP 9.4.1	Is the meteorological data adequate to evaluate the heat dissipation of alternative systems (for ESRP 9.4.1)?	Yes	No	Yes	See ER: Section 6.4.1, Section 9.4.1 According to §§ 5.3.3.1.1, a composite of the onsite data set and concurrent data from the Wilkes-Barre NWS station was developed for use in the SACTI model. Wind speed and wind direction data were taken from the onsite monitoring program. Dry-bulb and dew point temperatures (from which relative humidity was calculated) and cloud cover were obtained from the Wilkes-Barre NWS station. However, §§ 6.4.1.5 indicates that dew point measurements are made at the SSES meteorological tower and that data recovery (at least for the 5-year period from 1999-2003) is greater than 95 percent. It is not clear why temperature and dew point data from the onsite monitoring program was not used for the SACTI modeling analysis.
	Meteorology	Jeremy Rishel	1	10 CFR 51.45(c)	A description of the environmental impacts of preconstruction activities related to meteorology at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	No	No	Yes	Preconstruction activities impact on meteorology are not described in the ER.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	Alternative Site (No ESRP Section)	Has the applicant provided reconnaissance data to characterize the meteorological impacts at the alternative sites?	Yes	No	Yes	Air quality is described. Meteorology for the alternative sites could also be described. See ER: Section 9.3.2.2.2 Section 9.3.2.3.2 Section 9.3.2.4.2 Table 9.3-7
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.1 (Need for Power)	Description of the relevant service area(s), including (1) a map of the service area showing the location of the proposed facility relative to the service area; (2) how the output from the facility will be connected to the transmission and distribution grid system; (3) transmission and intertie, including capacity, constraints within the service area; and (4) new transmission capacity (if required).	Yes	No	Yes	Map of service area (Figure 8.0-1, not 8.2-1 as called out in text) does not include the location of BBNPP (although the location is included in Figure 9.3-5). Not clear if description throughout Ch 8 is referring to a specific portion of the PJM service area, or the entire PJM service area; along with all data presented. Need to clarify this. A map (or series of maps) containing the different regions referenced, along with definitions, would be helpful.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.1 (Need for Power)	Number and types of customers and major electrical load centers in the relevant service area.	Yes	No	Yes	Total customers are given, but not broken out by type.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.1 (Need for Power)	System factors that are unique to the power system (e.g., power pool agreements and reserve margin requirements), including status of retail deregulation, operating regional transmission organizations, and associated power markets.	Yes	Yes		Reserve margin information in Table 8.3-12; Section 8.3 contains more information on these topics.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Methodology, assumptions, and information sources used to develop the forecasts of electricity consumption, peak- and base-load demand, and forecasted load factor.	Yes	No	Yes	Peak-load demands only – no base-load forecasts

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Chart or table of historical and projected yearly electricity consumption, system peak-load demand, and load factor for the relevant service area(s), and principal reasons for the increase in consumption/demand and shifts in the load factor.	Yes	No	Yes	No discussion of load factor; projected consumption (Tables 8.1-3, 8.1-4, and 8.1-5) only project through 2012.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Results of any independent assessments of the forecasted electricity consumption and peak-load demand.	Yes	Yes		PJM forecast is used; no PPL-specific forecast available. Will want to follow up to see if any of the states in which PJM operates have ruled on the PJM forecast
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Comparison of forecasted electricity consumption and peak-load demand to other independent forecasts and reasons for significant differences.	Yes	No	Yes	Only includes PJM forecast.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Identification of expected customers (or firm power sales) for the power to be supplied by the proposed facility and any signed agreements for the purchase of the power; obtain estimate of forecasted power sales by the applicant in the relevant service area. (Note: This information is likely to be business sensitive and/or proprietary.)	Yes	No	Yes	Found some discussion in Section 8.3 on firm sales agreements and forecasts.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.2 (Need for Power)	Historical and projected economic, weather, price of electricity, energy mix (including energy-efficiency and fuel-switching effects), and demographic/population trends that are driving the growth in electricity demand.	Yes	No	Yes	Average electricity prices are provided for the region 2000-06, but no projected prices.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.2 (Need for Power)	Methodology and information sources used to develop the forecast of economic, weather, price of electricity, energy mix, and demographic/population trends.	Yes	No	Yes	Refers to PJM study, but ER does not contain the information, so indeterminate.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Description of the electricity supply mix in the relevant service area, historical and projected contribution of each to total annual electricity consumption and peak-load demand, and factors driving the change in electricity supply mix.	Yes	No	Yes	Only current supply mix; no projected contribution to total electrical consumption or peak load. Unclear as to whether data are for the relevant service area, or PJM total service area
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Description of the methodology, assumptions, and information sources used to develop the forecast of electricity supply mix.	Yes	No	Yes	Description of planned projects and retirements included, along with other factors, but no discussion on forecast of supply mix.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Need for Power and Benefit-Cost Balance	D Hostick		ESRP 8.3 (Need for Power)	Identification of existing power facilities that serve the relevant service area and their associated electricity generation capacity whose retirement has been announced or is anticipated within a few years before and after the start of operation of the applicant's proposed facility.	Yes	No	Yes	Generation deactivations and predominantly historical (up to 2007)
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Identification of firmly committed new facilities and proposed new facilities that will serve the relevant service area and their associated electricity generation capacity that are expected to start operation between a few years before and after start of operation of the applicant's proposed facility.	Yes	No	Yes	Section 8.3-6 only gives capacity additions in MW and generation source; no "go live" dates are presented.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Description of planned power purchases and sales (including the duration of contracts, distinguishing on-peak and off-peak sales) and whether any planned or proposed transmission construction could significantly impact these purchases and sales.	Yes	No	Yes	Section 8.3-8 includes long-term firm transmission service requests, but does not give the length of the contract. BBMPP will be a merchant plant. No discussion of planned power purchases. Does detail the various joint operating agreements between other markets.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Discussion of related policies and trends in distributed and/or self-generation in region of interest to the extent practicable.	No	No	Yes	Absent
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Estimate of forecasted electricity supply by the applicant in the relevant service area and source of the supply (e.g., existing facilities co-owned by the applicant, purchased power, and new capacity) area. (Note: This information is likely to be business sensitive and/or proprietary.)	Yes	No	Yes	General discussion of power and transmission needs for the area.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.4 (Need for Power)	Projected base-load demand from the present to 3 years after commercial operation of all proposed units.	Yes	No	Yes	Relies on demonstrating general need via reserve margins and predicted growth in the region.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.4 (Need for Power)	Historical and projected reserve margin for the relevant service area.	Yes	Yes		
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.4 (Need for Power)	Applicant's historical and projected reserve margin, and how this changes with the proposed new facility; identify any agreements with government/semi-government entities to maintain a minimum reserve margin and/or reserve margin range in the relevant service area.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Need for Power and Benefit-Cost Balance	Patrick Balducci	1	ESRP 10.4.1 (Benefit-Cost)	The annual average electrical-energy generation (kWh) and the annual production of any other beneficial or revenue-producing products (see ESRP 3.2).	Yes	Yes		
	Need for Power and Benefit-Cost Balance	Patrick Balducci	1	ESRP 10.4.1 (Benefit-Cost)	Data on other benefits, quantified and monetized to the extent possible (e.g., annual Federal, State, and local tax payments, number and type of jobs, and total annual wages paid) (see ESRPs 4.4.2 and 5.8.2).	Yes	No	Yes	No information was provided with respect to property tax generation. The applicant is withholding this information as proprietary. Staff needs some basis to support an estimate of the local economic benefits of the proposed action.
	Need for Power and Benefit-Cost Balance	Patrick Balducci	1	ESRP 10.4.1 (Benefit-Cost)	Description of other nonquantifiable or nonmonetary benefits (e.g., new recreational facilities) (see ESRPs 4.1.1 through 5.8.3).	Yes	No	Yes	Applicant notes that no enhancements to schools/recreational facilities are required; however, no data are supplied on capacity or percentage of use to verify this assumption.
	Need for Power and Benefit-Cost Balance	Patrick Balducci	1	ESRP 10.4.1 (Benefit-Cost)	Description of differences in benefits between alternatives and system configurations (if applicable; see ESRPs 9.4.1 and 9.4.2).	Yes	Yes		
	Need for Power and Benefit-Cost Balance	Patrick Balducci	1	ESRP 10.4.2 (Benefit-Cost)	Estimates of the capital, annual operating and maintenance, decommissioning, and any other internal costs of the proposed facility. Include alternative modifications when applicable (see ESRP 9.4.1 and 9.4.2).	Yes	Yes		
	Need for Power and Benefit-Cost Balance	Patrick Balducci	1	ESRP 10.4.2 (Benefit-Cost)	Comparison of estimated costs of the proposed facility with other independent or applicant-commissioned cost estimates and reasons for significant differences.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 3.5	Sources of radioactive liquid and gaseous waste within the facility.	Yes	Yes		Source-term summaries are provided in Tables 3.5.6 (liquid) and 3.5-8 (gas).
	Radiological Health	T.P. Lynch	1	ESRP 3.5	Description of liquid and gaseous radioactive waste management and effluent control systems.	Yes	Yes		Section 3.5.2 (liquid); 3.5.3 (gas)
	Radiological Health	T.P. Lynch	1	ESRP 3.5	Process flow diagrams for liquid and gaseous radioactive waste management and effluent control systems.	Yes	Yes		Figure 3.5.2-4 (liquid) Figure 3.5.5-3.5.7 (gas)

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	Radiological Health	T.P. Lynch	1	ESRP 3.5	Identification of principal release points for radioactive materials to the environment.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 3.5	Identification of direct radiation sources within or onsite out-of-plant as solid waste (e.g., independent fuel storage).	Yes	Yes		Section 3.5.4 and 5.4.1.3
	Radiological Health	T.P. Lynch	1	ESRP 3.5	Information relevant to estimating radioactive liquid and gaseous effluents.	Yes	Yes		Section 3.5.2.2 (liquid) and Section 3.5.3.2 (gas); PWR Gale code was used to generate source terms.
	Radiological Health	T.P. Lynch	1	ESRP 3.5	For early site permit (ESP) reviews, additional information from the applicant is needed to further define the radiological effluent information submitted pursuant to 10 CFR 52.17(a)(1)(iv).	N/A			
	Radiological Health	T.P. Lynch	2	ESRP 3.5	There are no technical deficiencies regarding waste systems for the sections mentioned in the Review Interfaces in ESRP 3.5.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 4.5	The physical layout of the site, including the location and orientation of onsite or adjacent nuclear fuel cycle facilities that are expected to be operating during construction of the proposed facility.	Yes	Yes	Yes	Cannot see the different colored zones on the black-and-white copy of maps. Will review this during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP4.5	The location and characteristics of external radiation sources and radioactive effluent emission sources at nearby facilities.	Yes	Yes		Sections 4.5.2 through 4.5.4
	Radiological Health	T.P. Lynch	1	ESRP 4.5	Measured or estimated radiation dose rates and airborne radioactivity concentrations at the construction site.	Yes	Yes		Data found in Section 4.5.4. Measured values from SSES radiological environmental monitoring program (REMP). Will review data during site audit.
	Radiological Health	T.P. Lynch	1	ESRP 4.5	The number and locations of construction workers who will be exposed to the radiation sources at the site and the amount of time per year that they will spend at those locations.	Yes	Yes		Can't distinguish zone locations on Figure 4.5-5. Will review during site audit.
	Radiological Health	T.P. Lynch	1	ESRP 4.5	The estimated annual collective dose to the construction work force, including models assumptions and input data used for the dose estimates.	Yes	Yes		The necessary data are in Section 4.5.6 of the ER. Need to review input, assumptions, and calculations using the models during the site audit.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	Distances from the proposed reactor to the following points or areas for each of the 22.5-degree radial sectors centered on the 16 cardinal compass directions: • nearest site boundary • to a distance of 8 km (5 mi), each receptor and its location for the nearest residence, milk cow, milk goat, meat animal, and vegetable garden larger than 50 m^2 • if the applicant proposes elevated releases of radioactive effluents as defined in RG 1.111, the location of all milk cows and goats, meat animals, residences, and vegetable gardens larger than 50 m^2 out to a distance of 5 km (3 mi).	Yes	Yes		Need to review Table 5.4-13, which has no data for many of the dose receptor locations, and review the mixed-mode release parameters from the stack discussed in Section 5.4.1.2. during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	For the applicable locations noted above, the grazing seasons and fraction of daily intake of cows, meat animals, and milk goats derived from pasture or fresh forage during the grazing season.	Yes	Yes		Table 5.4.7 contains the information.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	Fraction of the year that leafy vegetables are grown and the average absolute humidity in g/m^3 during the growing season.	Yes	Yes		Table 5.4.7 contains the information.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The nearest present and known future locations from which an individual can obtain aquatic food and/or drinking water.	Yes	No	Yes	Not clear that the future locations are addressed. The issue can be addressed during site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The nearest present and known future shoreline areas that an individual can use for recreational purposes.	Yes	No	Yes	Not clear that the future locations are addressed. The issue can be addressed during site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	For the two locations noted immediately above, the transit time of each facility discharge stream containing liquid radwaste discharge from the point at which the stream enters an unrestricted area to the identified location, and the estimated stream dilution at that location.	Yes	Yes		Transit times and dilutions are in Table 5.4-2.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	For each liquid radwaste discharge, the transit time from input to a facility discharge stream to the point at which the stream enters an unrestricted area, and the stream discharge in m^3/s.	Yes	No	Yes	The stream discharge rate is given in Section 5.1.1.1. Did not find the transit time information. Should be able to obtain it during the site audit.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The following distributional data for each of the 22.5-degree radial sectors centered on the 16 cardinal compass directions for radial distances of 2, 4, 6, 8, 10, 20, 40, 60, and 80 km (1.2, 2.5, 3.7, 5, 6.2, 12, 25, 27, and 50 mi) from the reactor: • projected population for five years from the time of the licensing action under consideration • present annual meat production (kg/yr)Table 5.4-10 • present annual milk production (L/yr) Table 5.4-9 • present annual vegetable production (kg/yr) Table 5.4-11 • estimate of direct radiation doses from sources within the site. Table 5.4.1.3	Yes	Yes		Data are given for a range of distances that includes those listed. Section 5.4.3.2 references population data in Section 2.5.1.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The present commercial fish and invertebrate catch (in kg/yr) from waters within 80 km (50 mi) downstream (or 80-km [50-mi] radius for lake or coastal sites) of the facility radwaste discharge; major catch locations, their distance from the facility radwaste discharge, and the amount caught within 80 km (50 mi) of the facility that is consumed; transit time from the point at which the discharge stream enters an unrestricted area to each major catch location, the estimated dilution at each location, and the basis for calculating transit time and dilution.	Yes	Yes		No commercial fishing in Susquehanna River. Recreational fishing is addressed.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	Present and known future drinking-water intake locations within 80 km (50 mi) of the facility radwaste discharge (downstream or radius), the transit time and estimated dilution at each major location, the basis for calculating transit time and dilution, and the populations served or the daily water consumption at each location.	Yes	Yes		Section 5.4.3.1 contains the information. Will review bases for transit time and dilution during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The irrigation rate ($L/m^2/mo$), crop yield (kg/m^2), annual production (kg/yr), and growing period (days) for irrigated land using water withdrawn within 80 km (50 mi) of the facility radwaste discharge (downstream or radius) when crop production has the potential for contributing 10% or more to individual or population doses because of liquid effluents; the crop type and its use (e.g., human consumption and meat animals), total crop production (by type) within the 80-km (50-mi) distance, and the amounts consumed within an 80-km (50-mi) radius of the facility; transit time from the point at which the discharge stream enters an unrestricted area to the points of withdrawal, estimated dilution at each withdrawal point, and the bases for calculating transit times and dilution factors.	Yes	Yes		Section 5.4.3.1 of the ER indicates less than 1% of farm land used Susquehanna River for irrigation. During the site audit, need to review basis for this assumption.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	Unusual animals, plants, agricultural practices, game harvests, or food processing operations having the potential to contribute 10% or more to either individual or population doses in areas affected by liquid effluents, and food-processing operations involving large quantities of water.	Yes	Yes		Section 5.4 on page 5-51 has statement that there are no unusual animals, plants, farming practices, game harvests, or food processing operations.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.2	Information related to exposure pathways, including • receptor locations (Table 5.4-13 for gas) • population distribution (Section 2.5.1 within 50 mi) • meteorological dispersion data (Section 2.7.5) • hydrological dilution data (Section 5.4.3.1).	Yes	Yes		Most pathway information appears to be in the ER. Will review model inputs and outputs, including liquid receptor locations and liquid dilution factors, during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.2	Gaseous and liquid effluent data.	Yes	Yes		Table 3.5.7 title labeled as SI units but table columns labeled as Ci and uCi.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.2	Exposure rates associated with onsite out-of-plant storage of solid waste. Section 5.4.1.3 based on 8760 hours, west fenceline maximum rate at 0.807 mrem/yr; north fence 2xE-10mrem/yr, south fence 0.0157 mrem/yr	Yes	Yes		During the site audit, will review models and assumptions used to calculate the exposure rates.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.2	Applicant calculated dose data.	Yes	Yes		Both population doses and maximum exposed individual doses are given for liquid and gas. Need to review models, inputs, and assumptions during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.2	Occupational radiation dose estimates.	Yes	Yes		Will review calculation method to arrive at the 50 person-rem per year collective dose estimate during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Data on water use to support the analysis of public dose from waterborne sources.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Estimated individual and collective doses.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Maximum site-specific doses to members of the public.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Dose consequences and health effects associated with normal operational effluents.	Yes	Yes		Effluent releases from normal operations are expected to meet requirements in 40 CFR 190.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Summary of the maximum individual and collective dose estimates.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Radiation dose data, including • maximum individual doses from liquid effluents • maximum individual doses from gaseous effluents • maximum individual doses from direct radiation sources • collective doses to the population within 80 km (50 mi) of the facility • occupational collective doses.	Yes	Yes		Will review inputs, assumptions, technical basis for the calculations during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.3	Natural radiation doses generally applicable to the site.	Yes	Yes		Section 5.4.3.3 uses the value of 300 mrem/yr (3 mSv/yr) from NCRP 94 (Tables 9.6 and 9.7).
	Radiological Health	T.P. Lynch	1	ESRP 5.4.4	A list of the biota to be considered in this evaluation.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 5.4.4	Site-specific pathways for radiation exposure to biota.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 5.4.4	Doses to the maximally exposed individual.	Yes	Yes		
	Radiological Health	T.P. Lynch	1	ESRP 6.2	A map or aerial photograph of the site vicinity with proposed monitoring and sampling locations identified and indicating the medium sampled at each location. The map or photograph should be suitable to show distance and direction of each location from the facility, particularly with regard to the effluent release points.	Yes	Yes		Figures 6.2-1 through 6.2-12 in the ER. Will talk with staff responsible for the Radiological Effluent and Environmental Monitoring Program to understand how locations were chosen and review the Offsite Dose Calculation Manual during the site audit.
	Radiological Health	T.P. Lynch	1	ESRP 6.2	A description of the proposed monitoring program, including: • number and location of sample collection points and measuring devices and the pathway sampled or measured (Table 6.2-5) • sample size, sample collection frequency, and sampling duration (Table 6.2-4) • type and frequency of analysis (Table 6.2-2) • general types of sample collection and measuring equipment (Table 6.2-4) • lower limit of detection for each analysis (Table 6.2-7) • the approximate date on which the proposed program will be effective (2 years prior to startup) • the quality-assurance program for radiological environmental monitoring programs (Section 6.2.6).	Yes	Yes		Section 6.2 contains the details—specifically Tables 6.2-2, 6.2-4, 6.2-5, 6.2-7, and 6.2-8. The monitoring program is scheduled to start 2 years prior to startup.

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	Radiological Health	T.P. Lynch	1	ESRP 6.2	A discussion justifying the choice of sample sites, analyses, sampling frequencies, sampling and measuring durations, sample sizes, and lower limits of detection.	Yes	Yes		Section 6.2 addresses the general justification. More specific information will be obtained during the site audit.
	Radiological Health	T.P. Lynch	2	ESRP 4.5	There are no technical deficiencies regarding radiological health for the sections mentioned in the Review Interfaces in ESRP 4.5.	Yes	Yes		No obvious deficiencies were identified. If further review identifies a need for more information, it will be addressed during that site audit.
	Radiological Health	T.P. Lynch	2	ESRP 5.4	There are no technical deficiencies regarding radiological health for the sections mentioned in the Review Interfaces in ESRP 5.4.	Yes	Yes		No obvious deficiencies were identified. If further review identifies a need for more information, it will be addressed during that site audit.
	Radiological Health	T.P. Lynch	2	ESRP 6.2	There are no technical deficiencies regarding radiological health for the sections mentioned in the Review Interfaces in ESRP 6.2.	Yes	Yes		No obvious deficiencies were identified. If further review identifies a need for more information, it will be addressed during that site audit and via an RAI.
	Radiological Health	T.P. Lynch	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to radiological health at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	N/A			Section 10.5 in the ER addresses the cumulative impacts. There do not appear to be any radiological health impacts during preconstruction activities that are different from those found for construction of a non-nuclear site. The impact from operation of SSES units on construction workers at BBNP is discussed in Section 4.5 of the ER.
	Radiological Health	T.P. Lynch	1	Cumulative Impacts (No ESRP Section)	Has the applicant considered activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on radiological health?	No	No	Yes	Can discuss whether activities of other agencies in region were considered for cumulative impact on radiological health during the site audit.

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	Radiological Health	T.P. Lynch	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified projects in the region that may contribute to a cumulative impact on radiological health?	Yes	Yes		Impacts from operation of SSES units are addressed in Section 4.5-2.
	Non-radiological Human Health	Lara Aston	1	ESRP 3.6.3	Estimates of gaseous effluents (e.g., from diesel engines, gas turbines, heating plants, and incinerators) released during facility operation, the location and elevation of release points, the frequency of their release and their treatment before release, and the total quantity of SO_x and NO_x hydrocarbons and suspended particulates to be discharged annually.	Yes	Yes		Section 3.6.3.1, pp.3-126 and 3-127; Table 3.6-5
	Non-radiological Human Health	Lara Aston	1	ESRP 3.6.3	Applicable Federal, State, and Tribal regional standards concerning atmospheric emissions from consultation with Federal, State, regional, local, and affected Native American Tribal agencies.	Yes	Yes		Section 3.6.3.1, p.3-126
	Non-radiological Human Health	Lara Aston	1	ESRP 3.6.3	Information concerning nonradioactive wastes not considered in ESRPs 3.6.1 and 3.6.2, such as laboratory wastes, storm drainage, trash, hazardous wastes, and debris from bars or screens on the cooling water intake. The description should include estimates of the quantities of wastes, their pollutant concentrations at points of release as appropriate to the system, and other relevant data. (Coordinate with the hydrology SME for water-related aspects)	Yes	Yes		Section 3.6.3.3 Tables 3.6-2, 3.6-6, 3.6-7, 3.6-8 3.6-9, 3.6-10, and 3.6-11. See Sections 5.5.1 and 5.5.2 also.
	Non-radiological Human Health	Lara Aston	1	ESRP 3.6.3	Procedures for any offsite disposal of wastes. (Coordinate with the hydrology SME on water-related aspects)	Yes	Yes		Section: 3.6.3.5, p.3-130
	Non-radiological Human Health	Lara Aston	1	ESRP 3.6.3	Procedures by which all effluents will be treated, controlled, and discharged to meet State and EPA effluent limitation guidelines and new source performance standards. (Coordinate with the hydrology SME on water-related aspects)	Yes	Yes		Sections 3.6.3.2, 3.6.3.5 (p.3-127, p.3-130). Tables 3.6-2, 3.6-8, 3.6-9
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant evaluated whether the potential exists for a detrimental impact from the thermal discharge on the concentration of etiological agents on the receiving waters?	No	No	Yes	Please provide information about whether the potential exists for a detrimental impact from the thermal discharge on the concentration of etiological agents in the receiving waters (Section 5.3.4.1, p.5-38).

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	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant consulted with the State's public health department to adequately characterize the state's level of concern?	No	No	Yes	Please provide information about consultation with the State's (or local) public health department to adequately characterize the State's level of concern for etiological agents in the receiving waters (Section 5.3.4.1).
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant discussed the proximity of recreational activities to the thermal discharge into the receiving waters? What is the likelihood of interaction by members of the public within the thermal influence of the operating facility?	No	No	Yes	Section 2.2.1, p.2-7; Table 2.2-1, 2.2-25.4-3; Figure 2.1-3, 2.2-3. Please provide a description of the proximity of recreational activities to the thermal discharge into the receiving waters and what the likelihood of interaction by members of the public within the thermal influence. (The topic of proximity of recreational activity is discussed in Chapter 2; however, it does not address it in the context of non-rad human health (NRHH) issues.
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant discussed the identification of etiological agents or diseases of concern for the plant proposed and the region where the plant is to be built? What is the incidence of infection in the region of influence?	Yes	No	Yes	Section 5.3.4.1, pp. 5-38 and 5-39. Please provide information about etiological agents or diseases of concern for the region where the plant is to be built and report the incidence of infection in the region of influence.
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant discussed procedures for protecting workers during activities with the cooling towers?	Yes	Yes		Sections 5.3.4.1 and 5.12.2

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	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant identified components of the plant's cooling system capable of contributing to offsite noise levels?	Yes	Yes		Section 5.3.4.2, pp.5-38 and 5-39
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant measured noise emission levels from to the plant's cooling system to the site boundary, and to the nearest offsite residence?	Yes	Yes		Section 5.3.4.2, pp.5-38 and 5-39
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant made a comparison of noise emission levels from the plant's cooling system to Federal and State standards for noise emissions?	Yes	Yes		Section 5.3.4.2
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.1	Descriptions of nonradioactive waste systems, including quantities, composition, and frequency of waste discharges to water, land, and air. (Coordinate with the hydrology SME on water-related aspects)	Yes	Yes		Section 5.5.1, pp.5-89 and 5-90
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.1	For discharges to land (other than at licensed commercial waste disposal sites), size and location of disposal sites, quantity and composition of wastes, and method of disposal (e.g., burial, combustion, and evaporation).	Yes	Yes		Section 5.5.1.2, p.5-90 Refers to Section 3.6,
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.1	Plans for ultimate treatment and/or restoration of retired disposal sites (other than licensed commercial sites).	No	No	Yes	Section 5.5.1 Please provide a description of any treatment and/or restoration plans for the retired disposal site or state why it won't be necessary.
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.1	Applicable Federal, State, regional, local, and affected Native American Tribal criteria or standards for air quality and for solid-waste disposal to land areas.	Yes	Yes		Sections 5.5.1.2 and 5.5.1.3
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.2	Descriptions of systems that create mixed wastes, including quantities of waste produced. (Coordinate with the hydrology SME for water-related aspects).	Yes	Yes		Section 5.5.2, p.5-91
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.2	Anticipated disposal plans for the mixed wastes (i.e., disposal at a mixed-waste disposal facility, shipment to a treatment facility, or storage onsite). (Coordinate with the hydrology SME for water-related aspects).	Yes	Yes		Section 5.5.2, pp.5-91 and 5-92

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	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.2	Estimated environmental impacts, including health effects resulting from exposure to the chemical constituents and those resulting from radiological exposures estimated to be received by workers as a result of mixed-waste testing and storage. (Coordinate with the hydrology SME for water-related aspects and the radiological SME for radiological results).	Yes	No	Yes	Sections 5.5.2 and 5.12.2 Please provide an estimate of the health effects resulting from exposure to the chemical constituents to be received by workers as a result of mixed-waste testing and storage.
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.2	A waste minimization plan that identifies process changes that can be made to reduce or eliminate mixed wastes. (Coordinate with the hydrology SME for water-related aspects).	Yes	Yes		Section 5.5.2, p.5-92
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant discussed predicted noise levels from the power-transmission system?	Yes	Yes		Section 5.6.3.10
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant made a comparison of noise emission levels from the power-transmission system to Federal and State standards for noise emissions?	Yes	Yes		Section 5.6.3.10
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant discussed the potential adverse impacts from electrostatic effects (electric shock), electromagnetic field effects, and corona discharges from the power-transmission system?	Yes	Yes		Section 5.6.3.9
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant discussed the potential visual impacts from the power-transmission system to members of the public?	Yes	Yes		Section 5.6.3.4
	Non-radiological Human Health	Lara Aston	1	5.6.3	Have design parameters been considered for the power-transmission system to reduce electric shock potentials to stationary vehicles (e.g., school buses and tractor trailers?	Yes	Yes		Section 5.6.3.8
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant discussed if there are ozone impacts from the power-transmission system?	Yes	No	Yes	Sections 5.6.3.1, 5.6.3.2, and 5.6.3.5 Please provide specific discussion of potential ozone from the power-transmission system.
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant discussed if the power-transmission system meets conformance with The National Electrical Safety Code (NESC) concerning steady-state currents?	Yes	Yes		Sections 5.6.3.1, 5.6.3.2, and 5.6.3.5
	Non-radiological Human Health	Lara Aston	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified other industrial activities that have occurred or will occur in the project area that may contribute to a cumulative impact with etiological agents?	Yes	Yes		Section 10.5.2, p.10-57

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Non-radiological Human Health	Lara Aston	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified other industrial activities that have occurred or will occur in the project area that may contribute to a cumulative impact associated with noise from plant operation?	Yes	Yes		Sections 10.5.1 and 10.5.2, pp.10-53 and 10-54
	Non-radiological Human Health	Lara Aston	2	5.3.4	There are no technical deficiencies in support of resources for evaluating nonradiological human health sections mentioned in Review Interfaces in ESRP 5.3.4.	Yes	Yes		ESRP interfaces: Sections 1.4, 3.4.1, 3.4.2, 5.3.2.1, and 5.10
	Non-radiological Human Health	Lara Aston	2	5.6.3	There are no technical deficiencies in support of resources for evaluating sections concerning impacts to members of the public from proposed transmission system mentioned in Review Interfaces in ESRP 5.6.3.	Yes	Yes		ESRP interfaces: Sections 2.2.2, 3.7, 5.10, 9.4.3, and 10.1
	Non-radiological Human Health	Lara Aston	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to nonradiological human health at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	Yes		Nonradiological human health is not usually discussed in preconstruction activities.
	Non-radiological Human Health	Lara Aston	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on nonradiological human health aspects of the waste systems?	Yes	Yes		
	Non-radiological Human Health	Lara Aston	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified projects in the region that may contribute to a cumulative impact on nonradiological human health aspects of the waste systems?	Yes	Yes		
	Site and Technical Overview	McDowell	1	ESRP 1.1	Full names of all organizations (e.g., utilities and municipalities) sharing ownership of the proposed project.	Yes	Yes		Section 1.2.1
	Site and Technical Overview	McDowell	1	ESRP 1.1	Name of the organization designated as the applicant. This organization is the contact with the NRC during the licensing process and will be responsible for construction and operation of the proposed project.	Yes	Yes		Section 1.2.1
	Site and Technical Overview	McDowell	2	ESRP 1.1	Site location with respect to nearby towns and natural features.	Yes	Yes		Section 1.2.2
	Site and Technical Overview	McDowell	1	ESRP 1.1	Number and type of proposed reactors, highest anticipated gross MW(t) output, and net electrical output.	Yes	Yes		Section 1.2.3
	Site and Technical Overview	McDowell	2	ESRP 1.1	Cooling system description (e.g., intake type, heat dissipation type, discharge type, and/or source of cooling water).	Yes	Yes		Section 1.2.4

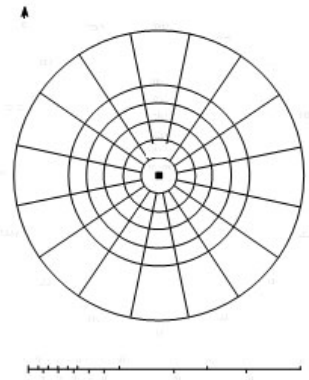
Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	McDowell	2	ESRP 1.1	Transmission system description (e.g., length of new corridors, new towers, or conductors on existing corridors).	Yes	Yes		Section 1.2.5
	Site and Technical Overview	McDowell	1	ESRP 1.1	The nature of the proposed action and the constraints placed on the review because of the type of action.	Yes	Yes		Section 1.2.6; also information on necessary approvals in Section 1.3
	Site and Technical Overview	McDowell	1	ESRP 1.1	Proposed dates for start and completion of major activities.	Yes	Yes		Section 1.2.7
	Site and Technical Overview	McDowell	1	ESRP 1.2	The name of each related authorization, including the responsible agency and the applicable law, ordinance, or regulation.	Yes	Yes		Section 1.3
	Site and Technical Overview	McDowell	1	ESRP 1.2	The date of application/initiation and scheduled date of issuance of each authorization.	Yes	Yes		Section 1.3
	Site and Technical Overview	McDowell	1	ESRP 1.2	The current status of each authorization.	Yes	Yes		Section 1.3
	Site and Technical Overview	McDowell	1	ESRP 1.2	The principal environmental factors to be covered by the authorization.	Yes	Yes		Section 1.3
	Site and Technical Overview	McDowell	2	ESRP 2.1	Site location: State and county.	Yes	Yes		Section 2.1
	Site and Technical Overview	McDowell	2	ESRP 2.1	Area of the proposed site.	Yes	Yes		Section 2.1
	Site and Technical Overview	McDowell	2	ESRP 2.1	Distance and direction from the nearest major city.	Yes	Yes		Section 2.1
	Site and Technical Overview	McDowell	2	ESRP 2.1	Distance and direction from several nearby towns and readily recognized landmarks, including major nearby highways, rivers, or other bodies of water, within 6 mi of the proposed facility.	Yes	Yes		Section 2.1
	Site and Technical Overview	McDowell	2	ESRP 2.1	For geographical orientation, simplified maps (based on an official source of information such as a State highway map) centered on the facility site: one general map with an approximate 50-mi radius and a second map with an approximate 6-mi radius of the facility (orient true north at the top of the map).	Yes	Yes		Figures 2.1-2 and 2.1-3
	Site and Technical Overview	McDowell	1	ESRP 2.1	High-oblique aerial view or perspective drawing of the site with an indication of the facility boundary (facility site should occupy about 10% of the view).	Yes	Yes		Figure 2.1-4

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	McDowell	2	ESRP 2.8	The ER or SSAR/FSAR should provide some indication of other nearby industrial facilities, other nuclear facilities in the region, or other Federal projects existing in the region or that might be required to construct and operate the proposed facility.	Yes	No	Yes	Section 2.8; needs a discussion of other nuclear plants.
	Site and Technical Overview	McDowell	2	ESRP 3.1	Topographic maps of the proposed site and vicinity (refer to ESRP 2.2) showing facility and station layout, the exclusion area, site boundary, liquid and gaseous release points (and their elevations), meteorological towers, the construction zone, land to be cleared, waste disposal areas, and other buildings and structures (both temporary and permanent) associated with the project.	Yes	No	Yes	Figure 3.1-1. Site Boundary and Owner Controlled Area is not clear. Land to be cleared is not identified. No waste disposal areas are identified, but this is consistent with the text.
	Site and Technical Overview	McDowell	1	ESRP 3.1	A description of the proposed site, including proposed plans to seclude and screen the facilities and to integrate the buildings and landscaping architecturally into the environs.	Yes	Yes		Section 3.1
	Site and Technical Overview	McDowell	1	ESRP 3.1	Aesthetic principles and concepts used in the facility design and layout.	Yes	Yes		Section 3.1
	Site and Technical Overview	McDowell	1	ESRP 3.1	Representative ground-level photographs of the site on which major station features are superimposed. These should be taken from among the following typical vantage points when a visual impact from that location can be expected: • residential • commercial • industrial • educational • transportation corridors (air, auto, rail, pedestrian) • cultural (recreational, historic, archaeological). •	No	No	Yes	Figures 3.1-3 to 3.1-6. It is not clear whether these vantage points are from locations listed in the checklist.
	Site and Technical Overview	McDowell	1	ESRP 3.1	Low, oblique aerial photograph of the site and vicinity on which major station features are superimposed.	Yes	Yes		Figure 3.1-2
	Site and Technical Overview	McDowell	1	ESRP 3.1	An architectural rendering of the proposed project to include landscaping and all major station features.	Yes	Yes		Figure 3.1-7

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Kim Leigh	1	ESRP 4.6	Data and information related to the applicant's commitments to measures and controls to limit potential impacts during construction should consist of the following four elements: (1) identification of the impact, (2) the planned control program (including monitoring), (3) the basis and need for an environmental protection plan, and (4) the control procedures for the following areas: • noise • erosion • dust • traffic • effluents and wastes • surface-water impacts • groundwater impacts • land-use protection/restoration • water-use protection/restoration • terrestrial ecosystem impacts • aquatic ecosystem impacts • socioeconomic impacts • radiation exposure to construction workers • other site-specific impacts.	Yes	No	Yes	Section 4.6, Table 4.6-1 and 4.6.2 of the ER; Part 10 ITAAC, Section 9 details a basis/need for an environmental protection plan. Monitoring programs for perched water/groundwater, construction effluent/storm water runoff, health and safety (noise and radiation protection) are mentioned in the ER, but not sure whether "comply with permit requirements" in other areas will include additional monitoring programs.
	Site and Technical Overview	Kim Leigh	1	ESRP 4.6	Proposed design or planned control program in each of the above areas.	Yes	No	Yes	Section 4.6, Tables 4.6-1 and 4.6-2. More detail regarding "comply with permit requirements" is needed.
	Site and Technical Overview	Kim Leigh	1	ESRP 4.7, 5.11	Identification of past, present and future Federal, non-federal, and private actions that could have meaningful cumulative impacts (both construction and operational impacts) with the proposed action.	Yes	Yes		Indirectly addressed in Sections 2.8.3, 2.8.5, 2.8.6, 4.1.1.1, and 4.2.2.11. Directly addressed on page 10-59.
	Site and Technical Overview	Kim Leigh	1	ESRP 4.7, 5.11	Identification of the geographic area to be considered in evaluating cumulative impacts.	No	No	Yes	Section 10.5 states that the "section summarizes the potential cumulative adverse environmental impacts to the BBNPP region," however the parameters of that region are not specifically called out in Section 10.5.
	Site and Technical Overview	Kim Leigh	1	ESRP 4.7, 5.11	Information on cumulative impacts (both construction and operational impacts) of relevant actions within the identified geographic area.	Yes	Yes		Section 10.5

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Kim Leigh	1	ESRP 5.10	Data and information related to the applicant's commitments to measures and controls to limit potential impacts during operation should consist of the following four elements: (1) identification of the impact, (2) the planned control program, including monitoring, (3) the basis and need for an environmental protection plan, and (4) the control procedures for the following areas: • noise • erosion • effluents and wastes • surface-water impacts • groundwater impacts • terrestrial ecosystem impacts • aquatic ecosystem impacts • socioeconomic impacts • cooling tower drift impacts • other site-specific impacts. •	Yes	No	Yes	Section 5.10 and Table 5.10-1; Part 10 ITAAC Section 9 details a basis/need for an environmental protection plan. A radiological monitoring program is mentioned in the ER, but it unclear whether "comply with permit requirements" in other areas will included additional monitoring programs.
	Site and Technical Overview	Kim Leigh	1	ESRP 5.10	Proposed design or planned control program in each of the above areas.	Yes	No	Yes	Section 5.10 and Table 5.10-1. More detail regarding "comply with permit requirements" is needed.
	Site and Technical Overview	Kim Leigh	1	ESRP 6.7	Site preparation and construction monitoring commitments.	Yes	No	Yes	Section 6.7 generally lists "construction and pre-operational monitoring." However, the site-preparation activities and monitoring commitments need to be specifically identified.
	Site and Technical Overview	Kim Leigh	1	ESRP 6.7	Preoperational monitoring commitments.	Yes	Yes		Construction and preoperational monitoring are combined in Section 6.7. Preoperational monitoring uses existing monitoring at the Susquehanna units.
	Site and Technical Overview	Kim Leigh	1	ESRP 6.7	Operational monitoring commitments.	Yes	Yes		Section 6.7.3 and Tables 6.7-1 through 6.7-7.
	Site and Technical Overview	Kim Leigh	1	ESRP 10.1	Did the applicant identify unavoidable adverse construction and operational impacts and mitigation actions related to the action. This is a summary of unavoidable adverse impacts identified by the reviewers of ESRP Chapters 4.0 and 5.0.	Yes	Yes		Section 10.1 and Tables 10.1-1 through 10.1-2.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Kim Leigh	1	ESRP 10.2	Did the applicant identify irreversible and irretrievable commitments of materials that will be used during project construction and operation. This is a summary of the descriptions of the irretrievable commitments of environmental resources identified by the reviewers for ESRP Chapters 4 and 5.	Yes	Yes		Section 10.2 and Tables 10.2-1 through 10.2-5.
	Site and Technical Overview	Kim Leigh	1	ESRP 10.3	Did the applicant describe the short-term and long-term use of the human environment related to the action (need to obtain data from ESRP 10.1 and 10.2)	Yes	Yes		Section 10.3
	Site and Technical Overview	Kim Leigh	1	RG 4.2, Rev 2: Page 5-1	Assess the proposed action for cumulative and projected long-term effects from the point of view that each generation is trustee of the environment for each succeeding generation.	Yes	No	Yes	Indirectly addressed in Section 10.5. Unclear if Section 10.5 meets the intent of "each generation is a trustee."
	Site and Technical Overview	Kim Leigh	1	RG 4.2, Rev 2: Page 5-3	Information concerning any cumulative buildup of radionuclides in the environment, such as in sediments.	Yes	No	Yes	Table 5.4-22 addresses cumulative air concentrations of radionuclides. Section 10.5 addresses cumulative impacts from construction and operation to public exposure and biota. However, the potential for cumulative buildup in the environment was not specifically addressed (sediments are not mentioned).
	Site and Technical Overview	Kim Leigh	1	10 CFR 51.45(c)	Does the ER contain a description the environmental impacts of preconstruction activities at the site, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	Yes		Table 4.6-2

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Kim Leigh	1	10 CFR 51.50(c)	Does the ER satisfy 10 CFR 51.50(c) by identifying procedures for reporting and keeping records of environmental data, and any conditions and monitoring requirements for protecting the non-aquatic environment, proposed for possible inclusion in the COL as environmental conditions in accordance with 10 CFR 50.36b? This information may be found in an Environmental Protection Plan.	Yes	No	Yes	Section 6 discusses monitoring and reporting for radiological, meteorological, and terrestrial ecology. A license condition is proposed in Section 9 of Part 10 ITAAC. Part 10 ITAAC, Section 9 also outlines an Environmental Protection Plan. However, not sure if the proposed environmental condition is in accordance with 10 CFR 50.36b. The Environmental Protection Plan does not identify monitoring issues.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.1	Sector chart superimposed on a map of the site vicinity extending to a 16-km (10-mi) radius: 	Yes	Yes		

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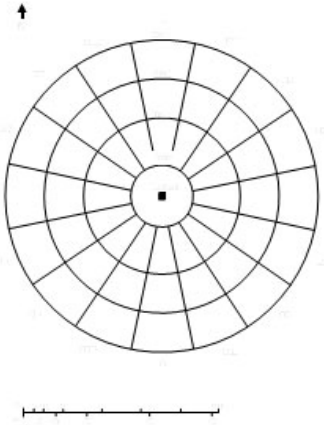
	Socioeconomics and Environmental Justice	Balducci	2	ESRP 2.5.1	Sector chart superimposed on a map of the site region extending to an 80-km (50-m) radius: 	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	2	ESRP 2.5.1	Table appropriately keyed to Figures 1 and 2 that provides the projected populations within each sector of the chart.	Yes	Yes		

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	Socioeconomics and Environmental Justice	Balducci	2	ESRP 2.5.1	Demographic characteristics of the 0-km to 80-km (0-mi to 50-mi) enclosed population. This should include specific reporting of population characteristics and projections for the emergency planning zone defined as the area within a 16-km (10-mi) radius of the facility. Demographic characteristics and projections should also be shown for the LPZ or exclusion area populations. Demographic characteristics should include age and sex distribution, transient or migrant population, racial and ethnic background, and income distribution (from the ER, latest decennial Census, other local/regional demographic sources such as planning commissions).	Yes	No	Yes	The ER does not include an analysis of migrant-transient populations within the 50-mile zone. Rather, it appears to extend out only 10 miles. The ER presents median income statistics within the affected zones but does not present income distribution information within each zone. No demographic information is presented for the LPZ (0-3 miles). Demographics are held constant in projections. More discussion is required to address potential trends in changing demographic composition.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information related to the area's economic base, including: • important regional industry by category, including employment • size and description of the heavy construction industry and construction labor force within the region • total regional labor force • regional unemployment levels and future economic outlook • characterization of incremental onsite labor, peak number of workers and duration of the peak, the number of workers expected to commute daily, the number of workers expected to require temporary and permanent housing, and the inventory of rental and of permanent housing within 80 km (50 mi) of the site.	Yes	No	Yes	Detailed information was used to construct an economic snapshot of the area's economic base; however, there is no discussion or data used to present a future economic outlook.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information related to the area's political structure, including • regional political jurisdictions and tax districts identifying those tax districts that will be directly • affected by facility construction or operation • local and regional planning and administrative organizations.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Social-structure information, including major community structures.	Yes	No	Yes	This section recites statistics but it doesn't identify or examine the trends that are driving the statistics. Further, it doesn't outline the factors that shape the local social structure (e.g., presence of local Amish populations).
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Housing information, including the sales and rental market in the region, number and types of units, turnover and vacancy rates, and trends in addition to housing stock, adequacy of structures, and location of existing and projected housing.	Yes	No	Yes	No housing projections are included in the report.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information about the local educational system (regional primary and secondary schools and higher education institutions), including capacity and present percentage of use.	Yes	No	Yes	No information is provided on current or projected capacity or percentage of use. The applicant does estimate the impact of construction- and operation-related activities on the school districts. These figures should be placed within the context of capacity/percentage of use statistics.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Public and private recreational facilities and opportunities, including present and projected capacity and percentage of use.	Yes	No	Yes	No information on current or projected capacity or percentage of use is included.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Regional tax structure and distribution of the present revenues to each jurisdiction and district.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Local plans concerning land use and zoning that are relevant to population growth, housing, and changes in land-use patterns.	Yes	Yes		

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	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Social services and public facilities, including: • present and projected water and sewer/sewage disposal facilities, including present capacity and projected percentage of use • present and projected police and fire capabilities, and emergency planning responsibilities • location of hospitals, number of medical doctors, and specialized health facilities, including present and projected capacity.	Yes	No	Yes	There is no mention of the projected percentage of use with respect to water and sewer/sewage disposal facilities or police and fire capabilities.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information on highways and transportation systems, for example: • regional and local highway systems, including carrying capacity and condition of roads and highways • availability and type of public transportation • modifications that might affect traffic flow to and from the station site.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information about distinctive communities, including characteristics of the State, Native American Tribes, and the local region, that may identify them as distinctive communities (e.g., historic districts, tourist attractions, cultural resources, and visual resources).	Yes	No	Yes	A section should be added near the end of Section 2.5.2 to document attempts to identify distinctive communities.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.4	Comments of any organizations contacted by the applicant that locate and assess uniquely vulnerable minority and low-income communities located on or near the proposed station site.	Yes	No	Yes	More documentation of county comments is necessary.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.4	General description (with maps) of the location of all minority and low-income populations within the environmental impact area of each alternative site, including offsite areas that can expect significant environmental impact as a result of the proposed project construction or operation.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.4	More specific description of any unique minority or low-income communities within each environmental impact area likely to be affected disproportionately by the proposed project construction or operation.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.4	Description of resources, customs and practices, circumstances, or preconditions of particular minority or low-income populations that may make them likely to experience disproportionate environmental impacts from proposed project.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Distribution of people, buildings, roads, and recreational facilities vulnerable to impact from construction-related activities.	Yes	No	Yes	No mention of construction impacts on recreational facilities or areas. If there are none that will be impacted, this should be mentioned.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Applicable standards for levels of noise, dust, and gaseous pollutants.	No	No	Yes	Noise, dust, and gaseous pollutant standards are not detailed in Section 4.4.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Predicted noise levels at sensitive areas identified in the first item listed above.	No	No	Yes	Noise levels are identified in Table 4.4-1 but there are no estimated noise levels at sensitive areas. Rather, the report estimates that the impact will be a small one.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Predicted air pollutant levels at sensitive areas identified in the first item listed above.	No	No	Yes	No estimates of pollution levels at sensitive areas.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.2	Annual expenditures within the region for materials and services during construction.	Yes	No	Yes	Sections 5.8.2.4.1 and 5.8.3.2.3 note that PPL Bell Bend, LLC will spend about $9 million annually on materials, equipment, and outside services. Annual expenditures during construction and operation should be differentiated.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.2	Plans to supplement public facilities and services to support construction and agencies responsible for facility expansion.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.2	Taxes by type and jurisdiction to be paid during construction.	Yes	No	Yes	No estimate of the property tax revenue during the construction phase.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.2	Annual construction labor force requirements (for each quarter year, if possible) over the construction period. Where necessary, requirements by major construction craft may be reported.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.3	Pathways where any environmental impact (including socioeconomic) during construction may interact with cultural or economic facts that may result in disproportionate environmental impacts on minority and low-income populations.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.3	Any assessment (qualitative or quantitative, as appropriate) of the degree to which each minority or low-income population would disproportionately experience adverse human health or environmental impacts (including socioeconomic) during construction compared to the entire geographic area. In addition, information should be obtained on any assessment comparing the impacts with the larger overall geographic area encompassing all of the alternative sites.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.3	Any assessment (qualitative or quantitative, as appropriate) of the significance or potential significance of such environmental impacts on each minority and low-income population.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.3	Any mitigative measures for which credit is being taken to reduce environmental justice concerns.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.1	Distribution of people, buildings, roads, and recreational facilities that are vulnerable to impact by facility operation (from the ER).	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.1	Predicted noise levels and nonradiological air pollutant levels at sensitive areas as identified above.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.1	Applicable standards for levels of noise and gaseous pollutants.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.1	Applicant's proposed methods to reduce visual impacts and impacts of noise and other pollutants.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.2	Expenditures within the region for materials and services during operation.	Yes	No	Yes	Sections 5.8.2.4.1 and 5.8.3.2.3 note that PPL Bell Bend, LLC will spend about $9 million annually on materials, equipment, and outside services. Annual expenditures during construction and operation should be differentiated.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.2	Plans to adjust public facilities and services during the transition period from the construction to the operation phase and agencies responsible for accomplishing this adjustment.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.2	Taxes by type and jurisdiction to be paid annually during operation.	Yes	No	Yes	No information was provided with respect to real estate (property) taxes, and the applicant is withholding this information as proprietary. Staff needs some basis to support an estimate of the local economic impacts of the proposed action.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.2	Annual operation labor force.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.3	Pathways where any environmental impact (including socioeconomic) during operations may interact with cultural or economic facts that may result in disproportionate environmental impacts on minority and low-income populations.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.3	Any assessment (qualitative or quantitative, as appropriate) of the degree to which each minority or low-income population would disproportionately experience adverse human health or environmental impacts (including socioeconomic) during operations compared to the entire geographic area. In addition, information should be obtained on any assessment comparing the impacts with the larger overall geographic area encompassing all of the alternative sites.	Yes	Yes		

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.3	Any assessment (qualitative or quantitative, as appropriate) of the significance or potential significance of such environmental impacts on each minority and low-income population.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.3	Any mitigative measures for which credit is being taken to reduce environmental justice concerns.	Yes	Yes		
	Socioeconomics and Environmental Justice	Balducci	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to socioeconomics at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/ reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	No	Yes	Further delineation between preconstruction and construction activities is required; cumulative impacts are discussed in Section 10.5.
	Socioeconomics and Environmental Justice	Balducci	1	Alternative Site (No ESRP Section)	Has the applicant provided reconnaissance data to characterize the socioeconomic and environmental justice impacts at the alternative sites?	Yes	Yes		
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant compare the proposed reactor's core thermal power level to the condition specified in 10 CFR 51.52(a)(1) (i.e., 3800 MW(t))?	Yes	Yes		Table 3.8-1
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant compare the fuel form and enrichment levels to the conditions specified in 10 CFR 51.52(a)(2) (i.e., the reactor fuel is in the form of sintered uranium dioxide pellets having a uranium-235 enrichment not exceeding 4% by weight and the pellets are encapsulated in zircalloy rods)?	Yes	Yes		Table 3.8-1
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant compare the average irradiation level of the fuel to the conditions specified in 10 CFR 51.52(a)(3) (i.e., average level of irradiation of the irradiated fuel from the reactor does not exceed 33,000 MW/MT and no irradiated fuel assembly is shipped until at least 90 days after it is discharged from the reactor)?	Yes	Yes		Table 3.8-1
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant state that all radioactive waste (with the exception of irradiated fuel) shipped from the reactor is packaged and in solid form (10 CFR 51.52(a)(4))?	Yes	Yes		Table 3.8-1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant state that the unirradiated fuel is shipped to the reactor by truck; irradiated fuel is shipped from the reactor by truck, rail, or barge; and radioactive waste other than irradiated fuel is shipped from the reactor by truck or rail (10 CFR 51.52(a)(5))?	Yes	Yes		Table 3.8-1
	Transport-ation	Steven Ross	1	ESRP 3.8	If the proposed reactor and fuel designs and operations do not meet all the conditions in 10 CFR 51.52(a)(1) through (a)(5), does the applicant provide an analysis of the environmental impacts of transportation of fuel and waste to and from the reactor with respect to normal conditions of transport and possible accidents (10 CFR 51.52(a)(6))?	Yes	Yes		Sections 5.11, 3.8, and 7.4
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant estimate the heat load in a spent fuel shipping cask and compare the result to 10 CFR 51.52 Table S-4 conditions (i.e., 250,000 Btu/hr (~73 kW)?	Yes	Yes		Section 5.11.2
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant evaluate the weights of shipments of fuel and waste and compare that to the shipment weights in 10 CFR 51.52, Table S-4 (i.e., governed by Federal or State restrictions; 73,000 lbs/truck, 100 tons/cask/rail car)?	Yes	Yes		Table 5.11-1
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant estimate traffic density for fuel and waste shipments and compare the result to the Table S-4 condition (i.e., one truck shipment/day or three rail shipments/month)?	Yes	Yes		Sections 5.11.3.1, 5.11.3.2, and 5.11.3.3
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant estimate the radiation dose to transport workers and compare the result to the Table S-4 condition (i.e., individual radiation doses in the range from 0.01 to 300 millirem (mrem)/reactor yr, population doses are 4 person-mrem/reactor yr)?	Yes	Yes		Table 5.11-1 and Table 5.11-5
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant calculate routine radiation doses to the general public-onlookers and compare the results to the Table S-4 conditions (i.e., routine radiation doses to onlookers; individual radiation doses in the range 0.003 to 1.3 mrem/reactor yr and population doses 3 person-mrem/reactor yr)?	Yes	Yes		Table 5.11-1 and Table 5.11-5
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant calculate routine radiation doses to the general public along the route and compare the results to Table S-4 conditions (i.e., individual radiation doses in the range 0.0001 to 0.06 mrem/reactor year and population doses 3 person-mrem/reactor year (includes doses to onlookers)?	Yes	Yes		Table 5.11-1 and Table 5.11-5
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant demonstrate that the radiological effects of accidents are SMALL as stated in Table S-4?	Yes	Yes		Section 7.4.3 and Table 7.4-11

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Transport-ation	Steven Ross	1	ESRP 3.8	Does the applicant estimate the nonradiological impacts of accidents and compare the results to Table S-4 conditions (i.e., nonradiological accidents result in one fatal injury per 100 reactor years, 1 non-fatal injury in 10 reactor years, and $475 in property damage per year)?	Yes	Yes		Section 7.4.3 and Table 7.4-12
	Transport-ation	Steven Ross	1	ESRP 7.4	Does the ER contain a statement about the comparison of the applicant's spent fuel characteristics with respect to the 10 CFR 51.52(a) conditions?	Yes	Yes		Section 3.8.6
	Transport-ation	Steven Ross	1	ESRP 7.4	Does the ER specify the estimated distance from the proposed reactor site to the spent fuel disposal facility?	Yes	Yes		Table 5.11-3
	Transport-ation	Steven Ross	1	ESRP 7.4	If the spent fuel is not in compliance with 10 CFR 51.52(a), does the ER contain an analysis of the environmental effects of transportation accidents that could occur?	Yes	Yes		Section 7.4
	Transport-ation	Steven Ross	2	ESRP 3.8	Are the review interfaces identified in ESRP 3.8 technically adequate; that is, no technical deficiencies are identified?	Yes	Yes		
	Transport-ation	Steven Ross	2	ESRP 7.4	Are the review interfaces identified in ESRP 7.4 technically adequate; that is, no technical deficiencies are identified?	Yes	Yes		
	Transport-ation	Steven Ross	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to transportation at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	Yes		Table 4.6-2
	Transport-ation	Steven Ross	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on transportation?	Yes	Yes		Section 10.5.2
	Transport-ation	Steven Ross	1	Cumulative Impacts (No ESRP Section)	Has the applicant identified projects in the region that may contribute to a cumulative impact on transportation?	Yes	Yes		Section 10.5.2

Table 2. Environmental Report Acceptance Review Deficiencies
Bell Bend Combined License Application

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic (ESRP, Reg, or RG Section)	Review Area/Topic 1. Is the following material found in the Application?	2. As applicable, does the ER address the items required by regulation (e.g., 10 CFR 51.45, 51.49, 51.50, and 10 CFR Part 52) and by RG 4.2? (Completeness) **(Yes/No)**	3. Is the ER discussion technically sufficient for this area/topic? (Sufficiency) **(Yes/No)**	4. Can the technical deficiency be resolved through the RAI process or at the site audit? **(Yes/No)**	5. Remarks/Notes: If a "**No**" for either completeness or sufficiency has been entered in Column 2 or 3, identify deficiency(ies) and provide details. If a "Yes" for both completeness and sufficiency, provide the ER section where information was found and any other pertinent information.
	Accidents	Jeremy Rishel	1	7.1 RG 1.145	Are the χ/Q values used for DBA analyses for representative (50%) meteorological conditions? If so, were the procedures used to calculate the χ/Q values consistent with NRC guidance?	Yes	No	Yes	The AEOLUS3 model will need to be evaluated to determine if it is an acceptable method for calculating χ /Qs. A comparison run using an NRC-approved model will be required. See ER: Section 2.7.6.2, Table 2.7-161, Table 2.7-162, Table 2.7-163, Section 7.1 See FSAR: Section 2.3.4.2.2
	Accidents	Jeremy Rishel	1	7.1	Have the meteorological data on which the χ/Q values are based been provided to the NRC?	No	No	Yes	If not already received, meteorological data will need to be submitted to the NRC by the applicant

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.1	If the reactor design is certified or undergoing certification, are the DBAs the set of DBAs covered in the design control document (DCD) or FSAR? If the reactor design is not certified or undergoing certification, are the DBAs listed in Environmental Standard Review Plan (ESRP) 7.1 Appendix A included in the ER's DBA analysis?	Yes	No	Yes	DBAs are listed and covered in ER and FSAR. Review of reference DCD is required See ER: Section 7.1 Table 7.1-1 See FSAR: Section 15.0.3 Table 15.0-2
	Accidents	Jeremy Rishel	1	7.1 10 CFR 50 Appx K ESRP 15.6.5	Are the DBA doses calculated for the reactor design-power level plus a margin for uncertainty (e.g., design power + 2%).	Yes	No	Yes	A 0.48% uncertainty was used and will need to be justified. See ER: Section 7.1
	Accidents	Jeremy Rishel	1	7.1 RGs 1.3, 1.4, 1.183	Do the DBA doses appropriately account for changes in breathing rates?	Yes	No	Yes	Time-varying breathing rates are not explicitly specified in ER Section 7.1; presumed to follow Reg Guide 1.183.
	Accidents	Jeremy Rishel	1	7.1 10 CFR 50.34(a)(1)(i) RG 1.183	Are EAB doses calculated for the 2-hour period giving the highest dose? Is the 2-hour period identified?	Yes	No	Yes	ER Table 7.1-10 indicates loss-of-coolant accident (LOCA) worst 2-hour dose is between 1.5-3.5 hours; all other accidents maximum dose is between 0-2 hours. The rod control accident source term appears to have higher activity at 2-8 hours rather than 0-2 hours for several important nuclides. Values will need to be verified. ER: Section 7.1 Tables 7.1-6 through 7.1-12

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.1	Are the LPZ χ/Qs calculated consistently with NRC guidance?	Yes	No	Yes	The AEOLUS3 model will need to be evaluated to determine if it is an acceptable method for calculating χ /Qs. A comparison run using an NRC-approved model will be required. See ER: Section 2.7.6.2, Table 2.7-161, Table 2.7-163, Section 7.1
	Accidents	Jeremy Rishel	1, 2	7.2	What land-use data were used in the evaluation? Were they adjusted for potential changes in land use? (Check with land-use project reviewer.)	No	No	Yes	Source of land-use data used in MACCS2 are not provided in the ER.
	Accidents	Jeremy Rishel	1	7.2	Does the ER contain or refer to a list the postulated severe accidents, their descriptions, and their respective core damage frequencies (CDFs)? If so, is the list consistent with accidents considered in a DCD or FSAR for the reactor type?	Yes	No	Yes	Externally initiated events are not explicitly addressed. See ER: Table 7.2-1 Table 7.2-3
	Accidents	Jeremy Rishel	1	7.2	Has the applicant provided electronic copies of the input to and output from the computer code?	No	No	Yes	Input and output files will be necessary to perform confirmatory calculations.
	Accidents	Jeremy Rishel	1	7.2	Does the severe accident analysis include output for socioeconomic, individual, and population health effects?	Yes	No	Yes	Average individual dose is needed for comparison to Commission's safety goals. See ER: Table 7.2-3
	Accidents	Jeremy Rishel	1	7.2	Are these effects adequately reflected in the ER in terms of risk?	Yes	No	Yes	CDFs do not identify whether they are for internally or externally events. Table 7.2-3
	Accidents	Jeremy Rishel	1	7.3	Does the ER (or SSAR/FSAR) contain a description of the method, rationale, or process used to identify, screen, and select design alternatives and procedural modifications?	Yes	No	Yes	Procedural changes are not addressed. See ER: Section 7.3.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Accidents	Jeremy Rishel	1	7.3	Does the ER contain a list of SAMAs that have been or will be implemented to prevent or mitigate the impacts from severe accidents or to reduce the risk of a severe accident or other statement related to the implementation of SAMAs?	Yes	No	Yes	Procedural SAMAs are not evaluated; applicant states procedures will be addressed when the plant design is finalized and processes and procedures are being developed for the U.S. EPR (ER Section 7.3). Design alternatives are evaluated and summarized in the sections below. See ER: Section 7.3.2 Section 7.3.3
	Alternative Analysis	D Hostick	2	ESRP 9.2.1	A list of the facilities in the relevant service area scheduled for retirement during the period extending from the date of application through the sixth year of commercial operation of the proposed project, including existing nuclear power facilities within the relevant region that are near the end of their license and are candidates for license renewal. Power facilities available for reactivation should also be considered.	Yes	No	Yes	List of facilities in Ch 8 includes only recent deactivations of plants and does not extend beyond 2007.
	Alternative Analysis	D Hostick	2	ESRP 9.2.1	The potential for energy conservation within the relevant service area.	Yes	No	Yes	While the description of current programs is thorough, no estimate of the savings/benefits resulting from energy conservation is included (from either current or projected efforts)
	Alternative Analysis	D Hostick	1	ESRP 9.2.2	For nonrenewable fuels (coal, natural gas, and petroleum fuels), the fuel quality, availability to the applicant, rate of consumption estimates, potential environmental restrictions and impacts, and emissions and definition of U.S. national policy (if any) with respect to new uses of these fuels.	Yes	No	Yes	Rate of consumption estimates are not included. Limited discussion of the Regional Greenhouse Gas Initiative (RGGI) should know whether RGGI will impact distribution of electricity through PJM to other states, because Bell Bend Nuclear Power Pant (BBNPP) will export power to RGGI participating states.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternative Analysis	D Hostick	1	ESRP 9.2.2	For renewable fuels (e.g., wind, geothermal, hydroelectric, wood waste and municipal solid waste, energy crops, and solar), availability to the applicant, quantities needed, potential environmental restrictions, amount of land that would be occupied, amount of the fuel available, and U.S. national policy (if any) with respect to new uses of these fuels.	Yes	No	Yes	Amount of land needed for solar power appears to be based on dated sources (compared to Calvert Cliffs Draft EIS)
	Alternative Analysis	D Hostick	1	ESRP 9.3	A description of the ROI selected by the applicant, including the following: • major centers of population • areas predicted to be deficient in power • waterbodies available for cooling • railroads, highways, and waterways (existing and planned) • topographic features • major land-use classifications (e.g., residential and agricultural) and areas reserved for specific uses • location and description of existing and planned primary electrical generating stations • existing and planned transmission network • transmission interconnections with other utilities • natural and man-made features (e.g., zones of seismic activity, unusual geologic features, military installations) constituting potential hazards to construction or operation of a nuclear power facility.	Yes	No	Yes	Transmission network and interconnections discussion needs additional detail.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	36 CFR 800	A description of surveys, consultation with the State Historic Preservation Office (SHPO), and mitigation measures prior to any ground disturbance activities associated with preconstruction or construction activities. NRC expects applicants to provide a plan to identify and protect historic resources during preconstruction activities and to follow that plan during preconstruction activities. NRC notes that Section 110(k) of the National Historic Preservation Act (NHPA; 16 USC § 470h-2(k)) prohibits applicants for federal licenses or permits from intentionally destroying historic properties that may be protected under the NHPA.	Yes	No	Yes	The ER describes the results of the Phase 1a and Ib cultural resources investigations, resulting in the identification of seven potentially National Register-eligible archaeological resources that are recommended for avoidance or mitigation and 10 architectural resources that are recommended as potentially National Register-eligible. SHPO concurrence with these findings as well as formal assessments of adverse effects and/or need for mitigation measures are still pending (i.e. Phase II and III investigations, if needed). Supplemental Phase 1B surveys are also in process. Details are described in Section 2.5.3, Tables 2.5.3-35-2.5.3-40 and 4.1.3, and in the Phase Ia and Ib cultural resources investigation reports, completed thus far. These additional studies when completed, and accompanying protection/avoidance plans should address these information needs. Completion of these analyses will provide the necessary information to complete this analysis. Applicant does indicate that these studies will be completed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of the cultural resources sensitivity within a 16-km (10-mi) radius of the proposed plant boundary.	Yes	No	Yes	This can be inferred from the information provided in Section 2.5.3 and the accompanying tables (Tables 2.5-41-2.5-48), but a specific statement on potential/cultural resources sensitivity in the vicinity of the plant is not explicitly stated. More details about cultural resources and associated sensitivity of the area are also provided in the Phase Ia and IIb studies.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of the cultural history of the region around the proposed plant.	No	No	Yes	These details and development of context can be inferred from preliminary conclusions made about the resources in Section 2.5.3 and 4.1.3 and 5.1.3, regarding National Register eligibility. More details should be provided in the Phase I reports, but a quick review does not readily provide a developed cultural and historical overview and/or context for the area.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of previous cultural investigations within a 16-km (10-mi) radius.	Yes	No	Yes	This information is not provided in Section 2.5.3 of the ER, but can be found in the Phase Iz and Ib cultural resource investigation reports.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A summary of land use at the proposed plant location, beginning with the earliest recorded historic settlement.	No	No	Yes	These details are usually provided in the cultural resources investigation reports and provide background for Section 2.5.3. A quick review of the Phase Ia and Phase Ib reports indicates that this information can be inferred from the records and background search, the historic map, and from the resources located by the investigations.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	The identification of preconstruction and construction activities as defined by the Limited Work Authorization (LWA) Rule.	Yes	No	Yes	Separation and identification of preconstruction and construction activities are not described in Section 2.5.3. Section 2.5.3 describes cultural resources that may be impacted by both activities described as construction and preconstruction, as defined by LWA. Section 4.6 provides a table (4.6-2) that delineates impacts based on construction vs. preconstruction impacts with 95% of the impacts resulting from preconstruction activities. Clarification is needed to identify these activities and analyze their impacts separately as well as cumulatively.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	The findings of the cultural resources surveys with any comments by the SHPO or others (e.g., Tribes and interested parties) related to preconstruction and construction activities.	Yes	No	Yes	This information is described in Section 2.5.3 and in more detail in the Phase Ia and Ib cultural resources investigations. Copies of consultation letters are necessary to confirm input from SHPO. Need pending studies to complete analysis or commitment that these studies will be done.
-	Cultural Resources	Ellen P. Kennedy	1	2.5.3	An identification of those resources within the area of potential effect determined to be important, that is, either determined eligible for listing in the National Register of Historic Places (NRHP) or considered important under the National Environmental Policy Act (NEPA).	Yes	No	Yes	Section 2.5.3 describes resources that are potentially eligible within the project APEs. Official NRHP evaluations, assessment of effects with SHPO input have not been completed.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	If not all resource surveys have been completed, a description of the agreements and procedures/plans that the applicant has made with the State to ensure completion of surveys in the future.	Yes	No	Yes	In Section 2.5.3 there is an indication that Phase II and III activities will occur, but there are no formal procedures or agreements in place with the SHPO. Similarly, this type of statement is made in Sections 4.1.3 and 5.1.3.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	2.5.3	A description of consultation efforts made with State and Federal agencies, Indian Tribes, and interested parties.	Yes	No	Yes	A description of efforts made to consult with SHPO and Tribes is outlined in Section 2.5.3.6. The details of the correspondence and responses are not included in the ER. Copies of this correspondence and replies, and any additional correspondence conducted since the publication of ER would clarify these details. Also, it is unclear if any efforts have been made to consult with interested parties.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	A description of important cultural and historical resources that could be affected by proposed project construction activities.	Yes	No	Yes	Section 4.1.3 (p. 4-6) describes in more detail how specific construction activities might directly impact potentially NRHP-eligible cultural resources (three architectural resources and seven archaeological sites). Page 4-5 describes all of the potentially NRHP-eligible resources that have been located. Formal NRHP evaluations, findings of effect assessments, and possible avoidance/and mitigation plans have not been completed in consultation with the SHPO; however, the ER indicates that these will be completed. A procedure or some sort of agreement with SHPO regarding these studies and their timeline is needed. Otherwise, firm conclusions regarding impacts are necessary.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	An assessment of the possible impacts on important cultural and historic resources from the proposed construction activities.	Yes	No	Yes	Section 4.1.3 (p. 4-6) describes in more detail how specific construction activities might directly impact potentially NRHP-eligible cultural resources (three architectural resources and seven archaeological sites). Page 4-5 describes all of the potentially NRHP-eligible resources that have been located. Formal NRHP evaluations, findings of effect assessments, and possible avoidance/and mitigation plans have not been completed in consultation with the SHPO; however, the ER indicates that these will be completed. A procedure or some sort of agreement with SHPO regarding these studies and their timeline is needed. Otherwise, firm conclusions regarding impacts are necessary.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	The SHPO's comments on the impact of the proposed project on important historic properties (from consultation with State agencies and Native American Tribal agencies).	Yes	No	Yes	Page 4-5 and 4-6 do not provide the results of the formal NRHP evaluations and assessments of impact. Need the results of these studies and correspondence from SHPO and Tribes. Need clarification onTCP analysis, because none was provided.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	State laws and plans for historic preservation and human remains.	Yes	No	Yes	Specific reference to State laws regarding inadvertent discovery of human remains or archaeological material is not provided in Section 4.1.3. A brief reference to a procedure for discovery of archaeological material is described on page 5-6 in Section 5.1.3. Details of this procedure are needed.
	Cultural Resources	Ellen P. Kennedy	1	4.1.3	The proposed avoidance measures and procedures to avoid impacts on important cultural and historical resources during construction, or the proposed mitigation measures.	Yes	No	Yes	Formal NRHP evaluations, assessments of effect, or mitigation/avoidance plans have not been completed in consultation with SHPO. Section 4.1.3 indicates that these studies are pending. Section 5.1.3 (p. 5-6), indicates that a procedure will be developed for how construction activities will avoid/minimize impacts to archaeological resources. Details are not provided.
	Cultural Resources	Ellen P. Kennedy	1	5.1.3	A description of important cultural and historic resources that could be affected during operations or the proposed mitigation measures.	Yes	No	Yes	Explicit analysis of how operations activities might directly or indirectly impact cultural resources is not provided with some indication that most of the impacts are construction related. Impact analysis/effect determinations are pending based on the results from additional studies already mentioned (NRHP eligibility, assessment of effects, and avoidance/mitigation/ minimization plans).

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	1	5.1.3	An assessment of the possible impacts on important cultural and historic resources from the proposed operations	Yes	No	Yes	Explicit analysis of how operations activities might directly or indirectly impact cultural resources is not provided with some indication that most of the impacts are construction related. Impact analysis/effect determinations are pending based on results from additional studies already mentioned (NRHP eligibility, assessment of effects, and avoidance/mitigation/ minimization plans).
	Cultural Resources	Ellen P. Kennedy	1	5.1.3	The proposed avoidance measures to avoid impact to important cultural and historical resources during construction.	Yes	No	Yes	Explicit analysis of how operations activities might directly or indirectly impact cultural resources is not provided with some indication that most of the impacts are construction related. Impact analysis/effect determinations are pending based on the results from additional studies already mentioned (NRHP eligibility, assessment of effects, and avoidance/mitigation/min imization plans). Section 5.10-1 details the type of operation impacts that could occur. No analysis of how these impacts could affect cultural resources is provided.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Cultural Resources	Ellen P. Kennedy	2	5.1.3	There are no technical deficiencies in support of cultural resources for the sections mentioned in Review Interfaces in ESRP 5.1.3.	Yes	No	Yes	Section 5.10-1 details the type of operation impacts that could occur. No analysis of how these impacts could affect cultural resources is provided in Section 5.1.3. Findings from Table 5.10-1 are not integrated into Section 5.1.3 analysis. Details of avoidance plans/ mitigation plans are pending. Once these are completed, these details can be added to Sections 9.3, 9.4. 4.6, 10.1 and 10.2.
	Cultural Resources	Ellen P. Kennedy	1	4.7	Cumulative effects have been addressed, including those associated with preconstruction LWA activities.	Yes	No	Yes	Cumulative impacts are provided in Section 10.5. Analysis does not include results of pending studies. It also does not include past, present, or future projects within region of influence. Preconstruction and construction activities are included in the analysis in Sections 4.1.3 and 5.1.3, but are not described in Section 10.5.
	Cultural Resources	Ellen P. Kennedy	1	10 CFR 51.45 (c)	A description the environmental impacts of preconstruction activities related to cultural resources at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	No	Yes	Cumulative impacts are provided in Section 10.5, but the analysis does not include results of pending studies. It also does not include past, present, or future projects within region of influence. Preconstruction and construction activities are included in analysis in Sections 4.1.3 and 5.1.3, but are not described in Section 10.5.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Decommissioning	T.P. Lynch	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on decommissioning?	No	No	Yes	Section 10.5 discusses cumulative impacts but does not appear to address activities of other agencies in the region that could impact decommissioning.
	Decommissioning	T.P. Lynch	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified projects in the region that may contribute to a cumulative impact on decommissioning?	No	No	Yes	Section 10.5 discusses cumulative impacts but does not appear to address other projects in the region that could impact decommissioning.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Has the applicant identified any onsite waterbodies, streams, or wetland areas? Are sampling data available for these water features? Has the applicant determined if these waterbodies contain any "important" species?	Yes	No	Yes	Section 2.4.2.1.5 identifies important species in onsite ponds and streams; includes EPT taxa, but no fish. Susquehanna River—Section 2.4.2.2.6. Good list. Descriptions a bit brief. Sampling data are available—see above. Note: applicant also included data for offsite stream sections to be able to evaluate possible downstream indirect effects. Need to clarify absence of fish as important stream and pond species. Examples of potential important species include brown bullhead, green sunfish, bluegill, blacknose dace, creek chub, white sucker (pp.2-455, 456). Some discussed under River species (bluegill). May ask for more detail on river species. Should include American beaver as an ecologically important species.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Does the applicant provide information on key indicator organisms that are particularly vulnerable to impacts from plant construction or operation?	Yes	No	Yes	Section 2.4.2.2.7; see notes for important species above.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant list species that are of concern as disease vectors or pests?	No	No	Yes	Terrestrial only; no mention for aquatic. There may not be aquatic diseases or pests, but this should be mentioned.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant describe the natural and anthropogenic effects (e.g., farming, logging, grazing, burning), preexisting environmental stresses (e.g., infestations, epidemics, catastrophes), and the current ecological conditions that are indicative of such stresses?	Yes	No	Yes	Section 2.4.2.1.8—onsite ponds and streams. None known, except agriculture mentioned. Section brief; may require more information. Section 2.4.2.2.10—Susquehanna River. Discussion very brief. Refer to Maryland stream stressors. Pennsylvania may not have such discussion. May include more general northeastern stream stresses. Additional river concerns information is available. Susquehanna River is on the list of American Rivers at Risk.
	Ecology – Aquatic	Roy Kropp	1	2.4.2	Did the applicant identify any wetlands on and in the vicinity of the site?	Yes	No	Yes	No real assessment in ER. Some brief discussion of wetland types in terrestrial section. Wetlands delineation report completed September 27, 2008. Copy included with application.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information on the proposed schedule of construction activities as well as timing and duration of the activities?	No	No	Yes	No schedule of specific activities is provided.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information about the construction practices to control or minimize impacts from clearing activities, noise, siltation, and dust?	Yes	No	Yes	Sections 4.2.2.10, 4.3.2.1 and 4.6; Table 4.6-1. Much reference to best management practices (BMPs), various permits, and storm-water management plan without substantial detail. Some measures listed (bio-retention ditches, silt fences) without specifics.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for limiting impacts during construction (e.g., the maintenance of siltation ponds or catchment basins)?	Yes	No	Yes	Sections 4.2.2.10, 4.3.2.1 and 4.6; Table 4.6-1. Some details provided. Some measures to limit impacts also may contribute to impacts (e.g., use of cofferdams). These are mentioned in Section 4.3.2.1.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Is there information available that can be used to determine how construction activities will impact "important" species and their habitats (e.g., those resulting from scouring and siltation, dredging and soil disposal, and interference with shoreline processes)? Is there information that can be used to estimate the magnitude and duration of such impacts? Consider potential disturbances of benthic areas by the following construction activities: • placement of intake and discharge structures • channel modifications for navigation or flow control • placement and removal of cofferdams • construction of bulkheads, piers, jetties, basins, and storm sewers • direct dredging, including the area that may be affected by resulting siltation and turbidity • percent (or the width and depth) of the waterbody cross section that might be obstructed by construction activity at any time • time and duration of such obstruction • potential changes to water quality caused by exposure of substrate to contaminants during construction (e.g., dredging for intake channels, cofferdam construction).	Yes	No	Yes	Major alterations to Walker Run and the ditch connecting Old Canal to Susquehanna River are described along with plans to recreate them. Some impacts are just listed without discussion; e.g, the installation of cofferdams is mentioned, without specifics about how it will be installed and the potential impacts from installation (e.g., noise, vessels). The materials used for the cofferdam are not described. Section 3.4. mentions that installation may partly be via a barge. The potential impacts of using vessels are not described. The intake system requires excavating bedrock (p. 4-46) below the streambed elevation. The method by which this will be done is not discussed (i.e., is blasting required?). Note: this **conflicts** with a later statement (p. 4-47) that only the river overburden, not bedrock needs to be penetrated.

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									Placement of riprap is mentioned in Chapter 3, but not in Chapter 4 as a potential habitat change. Details about type and extent of riprap are not provided. The potential for scour from the diffuser is mentioned only in the FSAR (Section 2.4.11), but not in ER Chapter 5. Time and duration of construction activities are not presented. The extent of construction activities into the Susquehanna River are given, but not in relation to the width of the river at the construction sites. Refurbishment of the shoreline unloading facility is listed as a potential activity in Table 4.6-1 (p. 4-124), but is not discussed in the text. Sections 4.2.1.2 (p. 4-12) and 5.2.1.3 (p. 5-11) mention that pilings will be driven to facilitate construction of new discharge system, but there is no discussion of the potential impacts from this activity.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Have recognized BMPs been cited as means for limiting impacts from construction activities?	Yes	No	Yes	Section 4.6 mentions their use, but Table 4.6-1 provides no details.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for mitigation of a predicted impact using appropriate measures, which could include alternative placement of structures, alternative schedules, or alternative construction practices?	Yes	No	Yes	Sections 4.3.2 and 4.6 discuss some mitigation although alternative structures, schedules, or practices are not included. Details are provided about wetlands mitigation practices (pp. 4-39-40) that might be applicable to some aquatic resources impacts. No mitigation mentioned for the loss of the pond that will be filled.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	If dredging is involved, are there plans for disposal of dredged material and placement of fill material?	Yes	No	Yes	Excavation (dredging per se is not mentioned in the text) will be required at the intake and discharge areas. No amount of material to be excavated is provided. No disposition of the material is provided.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	Are there plans for dewatering surface waters and/or wetlands?	Yes	No	Yes	Dewatering of the powerblock area is mentioned as being necessary (p. 4-25), but the amount and destination of the water are not described in detail.
	Ecology – Aquatic	Roy Kropp	1	4.3.2	If a cooling pond or retention basin is at the site or being considered in future construction, is there information about the aquatic species expected to become established in the cooling ponds?	Yes	No	Yes	A large wastewater retention basin is included in the design. This basin at least partially serves to cool down discharge water. There is no mention of potential floral or faunal colonization.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant identified adverse impacts of cooling system intake operation to aquatic ecosystems?	Yes	No	Yes	Section 5.3.1.2. Note: no fish return system planned. Summarized recent impingement data from "nearby" power plants (Hunlock, Brunner Island Steam Electric Station) and described limitations. Also impingement data being collected at SSES (April 2008-2009). Older entrainment data from SSES summarized. Also entrainment data being collected at SSES (April 2008-2009). Request full recent SSES data sets, not just rely on summaries. ER states that the report of the completed Impingement and Entrainment study will be provided to the NRC as a supplement to this application.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Has the applicant identified the "important" aquatic organisms and their life stages susceptible to entrapment, impingement, or entrainment?	Yes	No	Yes	Section 5.3.1.2 lists some important species that might be affected, but doesn't list all important species. Obtain completed impingement and entrainment (I&E) report.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	What is the extent and seasonal variation of any altered hydrodynamic characteristics induced by intake system operation?	Yes	No	Yes	Seasonal variation is not discussed in Section 5.3.1.1. Considered water withdrawal as percentage of *annual* Susquehanna River flow. May not be major issue if minimal river flow is large enough. Plume models include seasonal variation for winter and summer.
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	Are there plans for recirculation of heated effluent from the facility discharge system, which has the potential for increased impacts of entrapment, entrainment, and impingement?	Yes	No	Yes	Potential I&E impacts associated with recirculating water are not discussed in Section 5.3.3.1
	Ecology – Aquatic	Roy Kropp	1	5.3.1.2	For these "important" species, has the applicant provided information on the transit time from the intake structure to the point of discharge to a receiving waterbody?	No	No	Yes	There is no such discussion in the ER. It will not apply to impingement because there is no return system (i.e., mortality is 100%). Could apply to entrainment.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Has the applicant identified adverse impacts of cooling system discharge operation on aquatic biota?	Yes	No	Yes	See notes below about chemical and physical effects.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Have thermal, chemical, and physical alterations to the receiving waterbody been identified that may affect impacts?	Yes	No	Yes	Section 5.3.2.2. Note: Chemical effects are only discussed relative to NPDES permit requirements. Physical effects do not mention potential for scouring of bottom (probably not likely). However, Table 5.5-1 contains expected discharge concentrations of various chemicals and other parameters (alkalinity). Table 3.3-2 shows some chemicals used and amounts used during a year.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Have measures or controls to limit adverse impacts been identified?	Yes	No	Yes	Section 5.10; Table 5.10-1. Much of information consists of reference to permits and BMPs without specifics. Some effects stated as likely to not warrant mitigation (often by comparison to Units 1 and 2 effects).
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Is there a description of potential impacts to the biota from operation of the proposed discharge system?	Yes	No	Yes	Discussion of chemical and some physical effects weak. See notes below.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are the aquatic species susceptible to physical effects resulting from facility cooling-system discharges to the receiving waterbodies?	Yes	No	Yes	Need discharge velocity at diffuser and height of diffuser off bottom. The potential for scour from the diffuser is mentioned in the FSAR (Section 2.4.11), but not in ER Chapter 5.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Has the applicant considered the biological effects of thermal, chemical, and physical alterations to the receiving waterbody on the identified "important" aquatic species?	Yes	No	Yes	Not specifically to important species, but general effects of discharge are mentioned.
	Ecology – Aquatic	Roy Kropp	1	5.3.2.2	Are there estimates of survival from discharge system impacts, and estimates of the relative or absolute losses of the impacted populations?	Yes	No	Yes	No quantitative estimates. ER states effects expected to be small.
	Ecology – Aquatic	Roy Kropp	2	2.4	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 2.4.2.	Yes	No	Yes	See comments above regarding Section 2.4.2.
	Ecology – Aquatic	Roy Kropp	2	4.3	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 4.3.2.	Yes	No	Yes	See above comments suggesting that more details about construction are needed.
	Ecology – Aquatic	Roy Kropp	2	5.3	There are no technical deficiencies in support of aquatic resources for the sections mentioned in Review Interfaces in ESRP 5.3	Yes	No	Yes	See above comments suggesting the need for more details about operations.
	Ecology – Aquatic	Roy Kropp	1	Cumulative Impacts 4.7 (proposed)	Has the applicant identified projects in the region that may contribute to a cumulative impact on "important" species or habitat?	Yes	No	Yes	Other projects discussed in general terms, not relative to specific important species. Note that both additional projects are not near the proposed site, but are within the larger ROI.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Ecology – Aquatic	Roy Kropp	1	9.3	Has the applicant provided reconnaissance data to characterize the aquatic resource and "important" aquatic species impacts at the alternative sites?	Yes	No	Yes	The alternative site discussions include a general discussion of what is needed and general impacts. No faunal data are provided for any of the sites. Aquatic resources are not characterized. Threatened and endangered (T&E) species are listed for each site. Reconnaissance-level data may not be available for each alternative site.
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Has the applicant identified the species and habitats that will be considered "important" ecological resources (definition of "important" species and habitats is found in Table 2.4.1-1) of the site, vicinity, transmission corridors, and offsite areas for evaluation of potential impacts on them? Did the applicant include a map that identifies "important" terrestrial habitats on and in the vicinity of the site?	Yes	No	Yes	Figure 2.4-2 does not stand alone to identify the location of important terrestrial habitats on or in the vicinity of the BBNPP site. For example, the Susquehanna Riverlands Environmental Preserve (SREP) was identified in Table 2.4-1 as an important habitat that bounds the eastern end of the Owner Controlled Area (OCA) and the location for the intake/discharge structure, but does not appear on the figure. Information on impacts to important habitats/species at offsite areas is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant identify and describe the location of wildlife sanctuaries and natural areas that might be impacted by the proposed action?	Yes	No	Yes	Detail relevant to the evaluation of possible impacts to the SREP at/near the proposed intake structure is needed.

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	Ecology – Terrestrial	RE Durham	1	ESRP 2.4.1	Did the applicant identify any important waterfowl in areas of proposed transmission lines, a list of descriptions of these areas, and data on the local abundance and distribution of waterfowl, their seasonal status, and local flight patterns?	Yes	No	Yes	Information regarding any important waterfowl in areas of proposed transmission lines is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided information on the location and areal extent of terrestrial habitats/plant communities on the site and along the transmission corridors and at any other offsite areas where construction would occur?	Yes	No	Yes	Transmission corridor detail is needed.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided information on the locations of "important" terrestrial species and the location and areal extent of "important" habitats in the vicinity of the site, transmission corridors, and any other offsite areas which would be affected by construction?	Yes	No	Yes	Areal extents of important habitats and location of important species within the construction footprint are needed. Need a map that shows the areal extent of important butterflies and their host plants, or habitats that contain host plants. Need to know what specific steps will be taken to minimize potential impacts to important species and habitats.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Does the applicant have a proposed schedule of construction activities?	No	No	Yes	No schedules were provided.
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant identified the total land area to be disturbed temporarily during construction on and in the vicinity of the site and along transmission corridors and at any other offsite areas, such as equipment storage and construction material laydown areas, borrow areas, haul roads, spoils and waste disposal areas, etc.?	Yes	No	Yes	Areal extents of temporary and permanent disturbances are inconsistent within the ER: see Figures 4.3-1 and 4.3-2 and compare to Figure 4.1-1 near the proposed intake structure
	Ecology – Terrestrial	RE Durham	1	ESRP 4.3.1	Has the applicant provided the area of each habitat type/plant community (e.g., wetlands, deciduous forests, agricultural fields, etc.), including "important" habitats, to be cleared or otherwise disturbed (e.g., inundated, drained, etc.) permanently or temporarily on and in the vicinity of the site and along transmission corridors and at any other offsite areas, and how much area is being disturbed relative to the total amount present in the region?	Yes	No	Yes	Areal extents of important habitats and location of important species within the transmission corridors are needed.

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	Ecology – Terrestrial	RE Durham	1	ESRP 5.6.1	Has the applicant identified the occurrences of "important" species and habitats, including Federally and State-listed threatened or endangered species and/or Federally designated or proposed critical habitat along the transmission corridors?	Yes	No	Yes	Areal extents of important habitats and location of important species within the transmission corridors are needed. Need a map that shows the areal extent of important butterflies and their host plants, or habitats that contain host plants.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.1	For surface waterbodies and wetlands, estimated erosion characteristics and sediment transport, including rate, bed, and suspended load fractions, and graduation analyses; a description of the floodplain and its relationship to the site; a description of wetlands and their relationship to the site; the design-basis flood (DBF) elevation; and, where applicable, the DBF discharge.	Yes	No	Yes	Federal Emergency Management Agency (FEMA) 100- and 500-yr floodplain maps are provided in Figures 2.3-12 – 2.3-15. Erosion and sediment transport information is missing.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.1 (freshwater streams only)	• a list of major streams, size of drainage areas, and gradient • maximum, average maximum, average, average minimum, and minimum monthly flow • flood frequency distributions, including levee failures • flood control measures (reservoirs, levees, flood forecasting) • historical drought stages and discharges by month and the 7-day once-in-10-years low flow • important short-duration flow fluctuations (e.g., diurnal release variations from peaking operation of upstream hydroelectric project) • within the influence of the intake and discharge structures, velocity distribution (horizontal and vertical), bathymetry at and near the intake structure, bathymetry at and downstream of the discharge structure, and stream cross-sections • other hydrographic modifications (e.g., diversion dams, channelization) • a list of wetlands and flood plains and their seasonal characteristics.	• Yes • -Yes – local Table 2.3-1. • Yes • No • No • 7Q10 in Section 5.2.2.1.1 • No • No • No Partial discussion	No	Yes	Local streams with area and slope in Table 2.3-1. Peak & monthly flow information provided for Wilkes-Barre and Danville Dam information provided in Table 2.3-12 7Q10 estimates in Section 5.2.2.1.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer	1	ESRP 2.3.2	Quantitative description of present and known future groundwater withdrawals on the site and for distances great enough to cover aquifers that may affect or be adversely affected by the plant. The following should be included for each withdrawal or discharge: • location and depth of well with respect to the site (from the ER, the site visit, peer-reviewed technical literature, and consultation with State and local agencies) • identification of aquifers (from the ER, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies) • the average monthly withdrawal rates by use category (from the ER, the site visit, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies)	Yes	No	Yes	Sections 2.3.1 and 2.3.2; identify locations of offsite wells relative to the potential extent of impacted groundwater.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Quantitative description of present and known future surface water uses (withdrawals, consumptions, and returns) that are within the hydrological system in which the site is located and that may affect or be affected by the plant. This should include a quantitative description of any water uses that provide potential liquid pathways for both radiological and nonradiological effluents. The following should be included for each withdrawal or discharge: • locations of diversions and returns with respect to the site and the waterbody (from the site visit, the general literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies) • identification of the waterbody (from the ER and the general literature) • the average monthly withdrawal and return rate for each diversion by use category.	Yes • Yes • Yes • No	No	Yes	Figures 2.3-66 and 2.3-67 provide locations and type of withdrawal Water use by organization and primary use provided in Table 2.3-27. Table 2.3-32 provides general use information by type of use. Water use is not provided on a monthly basis. Staff consultation with State and local agencies may be needed.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Quantitative and qualitative description of recreational, navigational, in-stream, and other nonconsumptive present and known future water uses. For a 10-km (6-mi) radius, this should include the following (from the ER, site visit, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American Tribal agencies): • identification of waterbodies and locations with respect to the site (maps may be useful) • the kind and location of activity on the waterbody (maps may be useful) • the use rate with time variation.	No • Yes • Yes • No	No	Yes	General discussion of nonconsumptive water use. Staff consultation with State and local agencies may be needed.

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	Hydrology	Mark Wigmosta	1	ESRP 2.3.2	Descriptions of pollutant sources with discharges to water that may interact with the plant, including locations relative to the site and the affected waterbodies, and the magnitude and nature of the pollutant discharges, including spatial and temporal variations.	Yes	No	Yes	Figures 2.3-68 and 2.3-69 show pollution control facilities. Table 2.3-31 lists owner information. Information on magnitude and nature of discharges is missing.
	Hydrology	Mark Wigmosta	1	ESRPs 2.3.2 and 3.3.1	A water-use diagram for the plant showing: • flow rates to and from the various water systems (e.g., circulating water system, sanitary system, radwaste and chemical waste systems, and service water systems) • points of consumption • source and discharge locations A water-use diagram of other station water uses (i.e., all facilities not associated with the proposed plant) showing: • flow rates to and from the facility • average water consumption • maximum water consumption Data and narrative description for: • various plant water systems, their interconnections, and their operational interdependence and coordination • maximum water consumption • water consumption during periods of minimum water availability • average operation by month and by plant operating status.	Yes, • Yes Partial • Yes • Yes • No No; Yes	No	Yes	Figure 3.3-1, Table 3.3.1, and a descrip-tion for plant water use. Anticipated water use for average and maximum flow conditions is provided Obtain data regarding water consumption during periods of minimum water availability and average use by month.
	Hydrology	Mark Wigmosta	1	ESRP 2.3.3	Descriptions such as 303(d) lists of pre-existing aquatic environmental stresses and their effects on surface or groundwater quality for waters that interact with the plant (e.g., waterbodies at or near the site that do not meet established water-quality standards).	No	No	Yes	Staff consultation with State and local agencies may be needed.
	Hydrology	Mark Wigmosta	1	ESRP 3.4.1	Descriptions of anticipated operational modes and the estimated periods of time that the system will operate in each mode including: • for each anticipated operational mode, quantities of heat generated, dissipated to the atmosphere, and released in liquid discharges • for each operational mode, water source and quantities of water withdrawn, consumed, and discharged.	Yes Partial No	No	Yes	Table 3.4-1 provides heat load and flow rates for different operating conditions.

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	Hydrology	Mark Wigmosta	1	ESRP 3.4.2	For INTAKE SYSTEMS, include: • a drawing of the intake structure that shows the relationship of the structure to the water surface, bottom geometry, and shoreline • a description of the cooling water pumping facility • a description of the trash racks, traveling screens, trash baskets, and fish-return devices • performance characteristics (e.g., flow rates, intake velocities) for the operational modes identified by the ESRP 3.4.1 reviewer • performance characteristics for specific intake-related functions, such as de-icing, trash-rack clearing, screen washing, trash basket removal, or fish-return system operation • the location and description of components for the addition of chemicals (e.g., corrosion inhibitors or antifouling agents) to the intake system.	• Yes • Yes • Yes • Yes • Partial • No	No	Yes	No details are provided on performance characteristics for de-icing, trash-rack clearing, screen washing, trash basket removal. No discussion exists on addition of chemicals to the intake system.
	Hydrology	Mark Wigmosta	1	ESRP 3.4.2	For DISCHARGE SYSTEMS, include: • drawings of the outfall structure, showing its location in the receiving waterbody, relationship to water surface, bottom geometry, and shoreline • a description of discharge canal or discharge lines • performance characteristics (e.g., discharge flow rates, discharge velocities, discharge temperatures, and temperature differentials) for the operational modes identified by the reviewer for ESRP 3.4.1 • descriptions of specific discharge-related components (e.g., diffusers and fish barriers).	• Partial • Yes • Partial • Yes	No	Yes	Figure 2.4-6 provides information on the diffuser pipe. Additional performance characteristics are provided in Section 5.3.2.
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	Average, maximum, and seasonal variations of principal constituents of intake and receiving waters and any minor or trace materials that may be of environmental relevance.	Yes	No	Yes	Estimated annual totals – no maximum or seasonal information.
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	A list of chemicals processed through each system (e.g., corrosion inhibitors and antifouling agents) and total amounts used per year, frequency of use, and concentrations of these chemicals or their products in each waste stream.	Yes	No	Yes	Estimated annual totals – no maximum or seasonal information
	Hydrology	Mark Wigmosta	1	ESRP 3.6.1	The concentration factor on a seasonal basis for evaporative cooling systems.	No	No	Yes	No seasonal concentration factors given.
	Hydrology	Mark Wigmosta	2	ESRP 3.6.3	Procedures for any offsite disposal of wastes. (water-related aspects only)	Yes	No	Yes	General description, additional detail needed
	Hydrology	Mark Wigmosta	2	ESRP 3.6.3	Procedures by which all effluents will be treated, controlled, and discharged to meet State and EPA effluent limitation guidelines and new source performance standards (water-related aspects only).	Yes	No	Yes	General description, additional detail needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.1	The following list of data should be provided: ○ identification of water sources used during construction and the average and maximum use rates of these waters ○ identification of waterbodies receiving construction effluents and the expected average and maximum flow rates and physical characteristics (temperature, sediment load, velocities) of these effluents ○ identification of hydrologic alterations expected to result from the project related construction activities listed previously. ○ identification and location of groundwater and surface-water users and areas that could be affected by project related hydrologic alterations ○ descriptions of proposed practices and measures to limit or minimize expected hydrologic alterations ○ Federal, State, regional, local, and affected Native American Tribal agencies' best management practices and regulations ○ descriptions of proposed means to ensure construction activity compliance with applicable hydrological standards and regulations.	Yes • Partial • Partial • Yes	No	Yes	Section 4.2 Identify extent of offsite zone of impact to groundwater caused by construction and dewatering activities as well as re-routing of Walker Run; identify locations of offsite wells relative to the extent of impact. Yearly estimates of water use are in Table 4.2-1. General discussion on construction effluents; rates and characteristics are missing.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.2	The following data should be provided: ○ identification and locations of groundwater and surface-water users and areas that could be impacted by project related construction activities affecting water use ○ predicted impacts on the water users identified in the previous item ○ descriptions of any proposed practices and measures to control construction related water use impacts. Factors to be considered include flooding, drainage, groundwater elevation, erosion, sedimentation, water quality, protection of natural drainage channels and waterbodies, protection of shorelines and beaches, restrictions on access to and use of surface water, protection against saltwater intrusion, and handling of fuels, lubricants, oily wastes, chemical wastes, sanitary wastes, herbicides, and pesticides ○ consultations with Federal, State, regional, local, and affected Native American Tribal regulators ○ descriptions of proposed means to ensure construction activity compliance with water-quality and water-use standards and regulations ○ water-quality requirements for key elements of aquatic ecosystem and domestic users	Yes • Yes • Partial • Yes • Partial • Partial • Partial	No	Yes	Section 4.2 Identify extent of offsite zone of impact to groundwater caused by construction and dewatering activities as well as re-routing of Walker Run; identify locations of offsite wells relative to extent of impact Limited discussion of impacts to water users in Luzerne County. General discussion of appropriate agencies/organizations; not clear to what level they have been consulted. Brief discussion of regulations, but no details on means to assure compliance. Some discussion of water quality requirements in Section 4.3

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 4.2.2	The following list of data should be provided: • descriptions of the site and vicinity waterbodies and aquifers (including sole-source aquifers) • descriptions of hydrologic alterations and their related construction activities • the physical effects of hydrologic alterations • comparisons of water quantity available to other water users with existing and known future water rights and allocations • identification of waterbodies receiving construction effluents (e.g., sanitary wastes, cleaning wastes, dust control, fuels and lubricants, chemical, herbicides, pesticides) and the expected average and maximum flow rates and composition of these effluents • baseline water-quality data for surface water and groundwater sources used during construction and impacted by construction activities • potential changes to surface water and groundwater quality (e.g., heavy metal contamination) resulting from substrate exposure during construction.	Yes • Yes • Yes • Partial • Partial • Partial • Yes	No	Yes	Sections 2.3.1, 4.2.2 Description of hydrologic alterations and general discussion of physical effects. Baseline water-quality data presented in other sections with general discussion of potential changes.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.1	The following list of data should be provided: • descriptions of the physical characteristics of the surface waterbodies and groundwater aquifers • quantitative descriptions of proposed water sources, including groundwater sustained yield, 7-day once-in-10-years low flow, flows (including reverse and regulated) and yields during the drought of record, and low lake levels; estimates of frequency and duration of water-supply shortages • withdrawals and returns of surface water and groundwater used for plant operation, including rates and sources of water. This should include the different operational modes of the plant. The information should also include plant effluent quantity and physical characteristics as a function of the different operational modes • a quantitative description of present and known future surface-water uses (diversions, consumptions, and returns) that are within the hydrological system in which the plant is located and that may affect plant water availability or be affected by plant water use. The following should be included for each use: (a) locations of diversions and returns with respect to the plant intake system, (b) identification of waterbodies, and (c) average monthly withdrawal and consumption rate.	Yes • Yes • Partial (7Q19 in section 5.2.2.1.1) • Yes (also in ER Sections 3.3 and 3.4) • Partial	No	Yes	Section 5.2; Note: groundwater will not be used for operations. Figures 2.3-66 and 2.3-67 provide locations and type of withdrawal Water use by organization and primary use are provided in Table 2.3-27. Table 2.3-32 provides general use information by type of use. Water use is not provided on a monthly basis. Staff consultation with State and local agencies may be needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.1	The following list of data should be provided: • identification and locations of surface-water and groundwater users (including aquatic ecosystems) and water-use areas that could be affected by hydrologic alterations resulting from plant operation • a summary of statutory and other legal restrictions relating to plant water use and water consumption • descriptions of proposed means to ensure compliance with standards and regulations affecting plant water use and water consumption, and proposed practices and measures to limit or minimize operational hydrologic alterations.	Yes • Yes • No • No	No	Yes	Sections 2.3.1 and 5.2 This section does not contain information on regulatory requirements or means to ensure compliance
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.2	The following list of data should be provided: • descriptions of the site and vicinity waterbodies and groundwater aquifers • descriptions of hydrologic alterations and their related operational activities • the physical effects of hydrologic alterations • a quantitative description of present and known future surface-water uses, including any station water • uses not associated with the proposed project that are within the hydrological system in which the plant is located and that may be adversely affected by the plant. The following should be included for each use: (a) identification of the waterbody, (b) locations of diversions and returns with respect to the plant (diversions located between the plant discharge and the region of complete dilution should be further characterized by location with respect to the waterbody), and (c) average monthly withdrawal and consumption rate for each division by use category (e.g., domestic, municipal, agriculture).	Yes • Yes (ER Section 2.3.1) • Yes (ER Section 5.2.1) • Partial (from other sections) • Partial (from other sections)	No	Yes	Sections 2.3.1 and 5.2 This section limited to brief discussion of consumptive and nonconsumptive uses. More detailed information needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.2	The following list of data should be provided: • a quantitative description of present and known future groundwater withdrawals on the site and for distances great enough to cover aquifers that may be adversely affected by the plant. The following should be included for each use: (a) withdrawal location, (b) depth and elevation of wells (total and cased depth) and water levels, (c) identification of aquifers, and (d) average monthly withdrawal rates by use category • comparisons of water quantity available to other water users with existing and known future water rights and allocations • a quantitative and qualitative description of recreational, navigational, and other nonconsumptive known future water uses. For a 10-km (6-mi) radius, this should include the following: (a) identification of waterbodies and location with respect to the plant, (b) kind and location of activity on the waterbody, and (c) use rate with time variation • identification of waterbodies receiving plant effluents and the expected average and maximum flow rates and composition of these effluents • predicted impacts to water users or water-use categories described in the "Data and Information" section of this ESRP • baseline water-quality data for surface-water and groundwater sources used for and impacted by plant operation (from ESRP 2.3.3).	Yes Yes • Partial (Section 2.3.2) • Partial (Section 3.6) • Partial	No	Yes	Groundwater will not be used More detailed information may be needed.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.2.2	The following list of data should be provided: • baseline water-quality data for surface-water and groundwater sources used for and impacted by plant operation • descriptions of any proposed practices and measures to control or limit operational water-use impacts • summary of statutory and other legal restrictions relating to water use or specific water-body restrictions on water use imposed by Federal, State, regional, local, or affected Native American Tribal regulations • Federal, State, regional, local, and affected Native American Tribal standards and regulations applicable to water quality and water use (from consultation with Federal, State, regional, local, and affected Native American Tribal agencies) • descriptions of proposed means to ensure operational compliance with water quality and water-use standards and regulations.	Yes Yes (ER Sections 2.3, 5.2.1, 5.2.2, 5.2.3, 5.3.2)	No	Yes	Groundwater will not be used Additional detail may be required.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	1	ESRP 5.3.1.1	The following list of data should be provided: • bathymetry and sediment characteristics in the vicinity of the intake structure(s) • maps depicting station layout with respect to the waterbody, including locations of all intakes and discharges • intake flow rates and velocities as a function of plant operating conditions • detailed drawings of the intake structure(s), including the relationship of the structure to the water surface (normal and minimum levels) • ambient current patterns in the vicinity of the proposed intake structure(s) • descriptions of other intake system design and performance characteristics affecting hydrodynamics (e.g., horizontal and vertical approach velocities, geometry of intake canals, and submerged riprap) • descriptions of spatial and temporal alterations of the ambient flow field and of any other physical hydrologic effects induced by intake system operation.	• Partial (ER Section 3.4) • Yes (ER Section 2.3) Yes (also in ER Section 3.4) • Partial (Section 3.4) • No • Partial (ER 3.4) • Partial	No	Yes	No information on sediment or ambient currents
	Hydrology	Mark Wigmosta	1	ESRP 5.3.2.1	The following list of data should be obtained on the RECEIVING SURFACE waterbodies: • bathymetry of the waterbodies that may be affected by operation of the plant discharge system with detailed data in the vicinity of the discharge • maps depicting station layout with respect to waterbodies, including the locations of all intakes and discharges • maximum, average maximum, average, average minimum, and minimum monthly temperatures in the waterbodies • erosion characteristics and sediment transport (including rate, bed and suspended load fractions, and gradation analyses) • for freshwater streams: maximum, average maximum, average, average minimum, and minimum monthly flow rates; historical drought stages and flow rates by month, 7-day once-in-10-years low flow; important short duration fluctuations (e.g., diurnal release variations from peaking operation of upstream hydroelectric plant, diurnal temperature variations); velocity and temperature distributions (horizontal and vertical) near the discharge structure and downstream to the area of total mixing.	• Yes (ER 2.3) • Yes (ER 2.3) • Partial • (ER 2.3) • No • Partial	No	Yes	No erosion and sediment transport data CORMIX was used to model thermal plume configuration.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 5.3.2.1	The following list of information on the applicant's models, if used: • for numerical models: (a) theory, assumptions, and basis for applicability; (b) procedures used to estimate model parameters (e.g., diffusion coefficients); (c) model verification; and (d) the applicant's predicted temperature distributions, areas for isotherms, dilution rates, and time of passage through plume. • For physical models: (a) physical model facilities (e.g., dimensions of the plume and flow rates), (b) modeling techniques and scaling relationships, (c) data collection and analysis techniques (e.g., number and locations of temperature probes, infrared mapping), (d) prototype verification (if any), and (e) the applicant's flow fields and temperature distributions for critical and average hydrological conditions.	Yes Yes (CORMIX)	No	Yes	Groundwater will not be used for operations. CORMIX input files and/or a review of calculation package may be needed for staff's review.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	For discharges to water, waste concentrations at the point of discharge, predicted dilution in the receiving waterbody, and estimates of concentrations at various distances from the discharge point.	Yes (ER Section 3.6)	No	Yes	Waste concentrations to Susquehanna River in Table 5.5-1. Predicted dilutions, and concentrations at various distances from the discharge point are needed.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Ambient concentrations in the receiving waterbody of the chemicals and other materials contained in the waste discharges.	Yes (ER Section 2.3)	No	Yes	Additional information may be required.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Receiving waterbody water-quality criteria for domestic, industrial, agricultural, and recreational uses.	Yes (ER Section 2.3.3)	No	Yes	Additional information may be required.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Water use for the receiving waterbodies.	Yes (ER Section 2.3.2)	No	Yes	Additional information may be required.
	Hydrology	Mark Wigmosta	1	ESRP 5.5.1	Other site-specific waste-disposal activities (e.g., spoils from intermittent dredging activities).	No	No	Yes	Information regarding dredging activities and spoils disposal is needed.
	Hydrology	Mark Wigmosta	2	ESRP 5.5.2	Estimated environmental impacts, including health effects resulting from exposure to the chemical constituents and those resulting from radiological exposures estimated to be received by workers as a result of mixed-waste testing and storage (water-related aspects only).	Yes	No	Yes	NRC staff need to independently estimate the impacts and more data regarding effluent streams, concentrations, and ambient conditions will be required for the staff's assessment.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	2	ESRP 5.5.2	A waste minimization plan that identifies process changes that can be made to reduce or eliminate mixed wastes (water-related aspects only).	Yes	No	Yes	Details of the waste minimization plan are needed. NRC staff will need more details to complete their independent impact assessment.
	Hydrology	Michael Fayer Mark Wigmosta	2	ESRP 5.10	Listing of potentially adverse impacts to surface and groundwaters, and measures and controls to limit adverse impacts of project operation.	Yes	No	Yes	Groundwater will not be used for operations Table 5.10-1 lists potential impacts and controls to limit adverse impacts; more detail may be needed.
	Hydrology	Mark Wigmosta	1	ESRP 6.1	The following list of data describing the THERMAL MONITORING should be provided: • maps showing (a) features of the plant and site, including the boundaries and bathymetry of all waterbodies adjacent to the site both before and after construction activities; (b) the location of all thermal, hydrological, or aquatic biological monitoring stations; and (c) the predicted extent of the thermal plume • the type and frequency of temperature measurements taken at each location as well as the duration of each monitoring program • descriptions of the monitoring equipment used • descriptions of the data analysis procedures used.	• Yes (ER Section 2.3 and Figure 6.1.1) • Partial • Partial • No • No	No	Yes	Additional detail about preoperational and operational thermal monitoring, including new locations, type and frequency, durations, and descriptions of monitoring equipment and data analysis procedures are needed.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 6.3	The following list of data describing the HYDROLOGICAL MONITORING should be provided: • maps showing (a) features of the plant and site, including the boundaries and bathymetry of all surface waterbodies (including springs) adjacent to the site both before and after construction activities, (b) the locations of all hydrological (including groundwater monitoring wells), thermal, and aquatic biological monitoring stations, (c) locations of all wells potentially influenced by plant construction and operation, and (d) major geomorphic features (e.g., floodplains) and regional geology • site vicinity surface and groundwater average and extreme velocities and flow rates • sediment transport (suspended and bed load) characteristics and erodability of the site soil • the type and frequency of data collected at each location as well as the duration of each monitoring program • descriptions of the monitoring equipment used • descriptions of the data analysis procedures used • documentation of data quality objectives (if any).	Yes • (a) Yes (ER Section 2.3) • Partial (ER Section 2.3) • No velocity info • No • Yes • Partial • No • No	No	Yes	Sections 2.3.1 and 6.3 Identify locations of offsite wells that might be affected by construction and operation. Explain whether measurement frequency will be adjusted to capture influence of construction activities. Tables 6.3-1 and 6.6-1 provide information about locations, frequency, parameters, and types of samples. Descriptions of monitoring equipment, data analysis procedures, and data quality objectives are needed.
	Hydrology	Michael Fayer Mark Wigmosta	1	ESRP 6.6	The following list of data describing the CHEMICAL MONITORING should be provided: • systems to be sampled • location of sampling stations • type of sample (e.g., surface grab or depth composite), number of replicates, and method of collecting the sample • time of day, time period, and frequency of sampling • methods of preserving the samples analytical methods used • description of automated monitoring systems used • reference or calibration standards used to verify accuracy of methods statistical methods used to interpret results • quantitative data on chemical characteristics of surface water and/or groundwater in the site and vicinity, including seasonal ranges and averages and historical extremes • data quality objectives • quality assurance procedures.	Yes • Yes • Yes • Yes • Partial • No • No • No • Yes • Partial • No • No	No	Yes	No groundwater chemical monitoring. Some details of likely NPDES-required monitoring is needed

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Hydrology	Mark Wigmosta	2	10 CFR 51.45(c)	A description of the environmental impacts of preconstruction activities related to water-related aspects of the *waste systems* at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Partial	No	Yes	A clearly stated list of all preconstruction activities is needed.
	Hydrology	Mark Wigmosta	2	Cumulative Impacts 4.7 (proposed)	Has the applicant identified activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on water-related aspects of the waste systems?	No	No	Yes	Additional detail needed.
	Hydrology	Mark Wigmosta	2	Cumulative Impacts 4.7 (proposed)	Has the applicant identified projects in the region that may contribute to a cumulative impact on water-related aspects of the waste systems?	No	No	Yes	Additional detail needed.
	Hydrology	Michael Fayer Mark Wigmosta	1	9.3	Has the applicant provided reconnaissance data to characterize the hydrological impacts at the alternative sites?	Yes	No	Yes	Section 9.3 Montour Site: Characterize the nearby GW and surface water users. Martins Creek Site: Identify any Delaware River temperature concerns in vicinity. Sandy B end Site: Confirm that Juanita River flow conditions can support proposed plant. Estimate impact of thermal discharge. Additional data may be required.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.1	The proposed heat-dissipation system for each potential alternative, as follows, is necessary: • land-use requirements • water-use requirements • operating and maintenance experience for similar units • capital, maintenance, and operating costs • effect on generating efficiency • predicted thermal and physical effects (e.g., thermal plume and scouring) • predicted atmospheric effects (e.g., fogging, icing, and drift) • predicted operating noise levels • predicted aesthetic effect (e.g., visual plumes) • predicted recreational benefits.	Yes • Yes • Yes • Yes • Yes • Yes • Partial • Partial • Yes • Yes • No	No	Yes	May need additional information about predicted thermal and physical effects.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	For intake systems, the following information is required: • sketches or preliminary designs and operational characteristics of alternative intake systems, showing the intake design and its relationship to water surface, bottom geometry, shoreline, and discharge structure • alternative pumping facilities, if proposed • alternative locations of the proposed intake system and pumping facility on the same waterbody • alternative procedures and schedules for intake defouling, including any use of defouling chemicals • descriptions and operational characteristics of any alternative trash racks, traveling screens, trash baskets, or fish-return systems • predicted physical impacts from hydrologic alternatives and impacts to aquatic ecosystems, including entrapment, impingement, and entrainment, for each alternative intake system • capital, maintenance, and operating costs for each alternative intake system and costs associated with system adaptation to the proposed site.	• No • No • Yes • No • No • No • No	No	Yes	Information needed: sketches of preliminary design of each alternative intake system, predicted physical and aquatic impacts for each alternative intake system, and maintenance and operating costs for each alternative intake system.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	For discharge systems, the following information is required: • sketches or preliminary designs and operational characteristics of alternative discharge systems showing the discharge design, its location with respect to the receiving waterbody, and its relationship to water surface, bottom geometry, intake structure, and shoreline • description of alternative discharge lines (or canals) from the heat-dissipation system to the receiving waterbody • description of alternative locations of the proposed discharge system on the same waterbody • estimated physical impacts from hydrologic alterations and impacts to aquatic biota for each alternative discharge system • capital, maintenance, and operating costs for each alternative discharge system and costs associated with system adaptation to the proposed site.	• No • No • No • No • No	No	Yes	Very little information provided. Additional detail needed.
	Alternatives (Water-related issues only)	Michael Fayer Mark Wigmosta	2	ESRP 9.4.2	For the water supply, the following information: • description of potential alternative sources of water and their availability, including location of water-supply source with respect to the facility site • economic and environmental cost data for water delivered from each alternative source.	Yes • Yes • No	No	Yes	Section 9.4.2; Note: groundwater will not be used Applicant stated that site groundwater and municipal sources do not have sufficient capacity. Staff may need further information from the applicant and consultation with local and State agencies responsible for water-supply planning.
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	For water treatment, the following information is required: • description and purpose of alternative water-treatment systems for the circulating water system and the facility (service) water system • chemicals and additives (or mechanical treatment) to be used in each alternative water-treatment system • operating cycles for each alternative water-treatment system • capital, maintenance, and operating costs for each alternative water treatment system.	• No • No • No • No	No	Yes	Very little information provided. Will need RAIs for detailed information
	Alternatives (Water-related issues only)	Mark Wigmosta	2	ESRP 9.4.2	Capital, maintenance, and operating costs for the proposed intake system, discharge system, and water-treatment system, and water costs for the proposed water supply.	No	No	Yes	The missing information is needed for the staff's review.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Land areas devoted to major uses within the site boundary.	Yes	No	Yes	Table 2.2-1 and Figure 2.2-1 show the site; however, the ER states that site will be split up. A timeline for the division and revised site boundaries is not clearly provided; it is not clear from the figure which part will be PPL Susquehanna LLC and which will be PPL Bell Bend LLC.
	Land Use/ Transmission Line	D Hostick	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to land use at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	No	No	Yes	
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.1	Identification of land-use plans that include the site and vicinity within their scope.	Yes	No	Yes	Mentions planning commission and others that BBNPP will need approval from, but does not discuss other plans that entities may have for the area.
	Land Use/Transmission Line	D Hostick	2	ESRP 2.2.1	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.2.1	Yes	No	Yes	Need clarification of dates and revisions for planned site boundaries given that land will be split into two parcels. Does the ER use the BBNPP OCA, encompassing both, as the base, or should only the west parcel for PPL Bell Bend be considered the "site."?
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Land-use restrictions (if any) contained in any transmission line easements.	Yes	No	Yes	Restrictions are not explicitly mentioned.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Land use within existing and proposed transmission corridors using the categories defined by the NRCS. Land-use information should be subdivided into corridor segments having predominantly similar land-use types.	Yes	No	Yes	States that land is primarily agricultural or forest, but provides no numbers.

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	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.2	Identification of local and regional land-use plans of State, regional, and local agencies.	No	No	Yes	Local and regional land-use plans of other agencies are not specifically mentioned.
	Land Use/ Transmission Line	D Hostick	2	ESRP 2.2.2	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.2.2.	Yes	No	Yes	New Susquehanna 500-kV Yard 2 is mentioned in Section 3.7, but not in Section 2.2.2; list used in Sections 4.1.2 and 5.1.2 is also slightly different from Section 3.7. Need clarification as to which actions are planned.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.2.3	Principal agricultural products of the region.	Yes	No	Yes	Table 2.2-6 contains products and the value of products, but no yields of the products.
	Land Use/ Transmission Line	D Hostick	1	ESRP 2.8	Federal agency plans or commitments that will result in significant new power purchases within the applicant's service area that have been used to justify a need for power.	Yes	No	Yes	States that the need for power was not justified based on Federal plans or commitments, but doesn't state whether there are federal plans or commitments for the area.
	Land Use/Transmission Line	D Hostick	2	ESRP 2.8	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 2.8.	Yes	No	Yes	Mentions two nonfederal projects that may have potential impacts, but does not provide details.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Basic electrical design parameters, including transmission design voltage or voltages, line capacity, conductor type and configuration, spacing between phases, minimum conductor clearances to ground, maximum predicted electric-field strength(s) at 1 m above ground, the predicted electric-field strength(s) at the edge of the corridor in kilovolts per meter (kV/m), and the design bases for these values.	Yes	No	Yes	Basics included, but design details have not begun, although ER states that all will comply with applicable regulations.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Predicted noise levels resulting from transmission-system operation.	Yes	No	Yes	Predicted levels at source, but not at project level boundaries or beyond.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Basic structural design parameters, including illustrations and descriptions of towers, conductors, and other structures, with dimensions, materials, color, and finish.	Yes	No	Yes	No illustrations; lacking detail.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	Lengths, widths, and area of transmission line corridors, including modification and/or use of existing corridors and other facilities for the proposed project.	Yes	No	Yes	Limited information on existing corridors; given that they will be using existing corridors only, more information is needed.

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	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	General methods of transmission line construction (e.g., tower foundations, stringing, location of access roads, span length, and clearing of corridors).	Yes	No	Yes	General reference to PJM guidelines, but no details are provided.
	Land Use/ Transmission Line	D Hostick	1	ESRP 3.7	When available, tower and substation locations.	Yes	No	Yes	Substation locations are included, but tower locations are absent.
	Land Use/ Transmission Line	D Hostick	2	ESRP 3.7	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 3.7.	Yes	No	Yes	Description of new/upgraded facilities and systems are inconsistent between Sections 3.7 and 2.2.2. Overall, not clear what is going to be built anyway, and what will be new just for BBNPP. Lacks detail for existing transmission corridors.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Will dredging of barge slips or other channels be required to facilitate construction? If so, where will the dredge spoils be deposited, and what volume of spoil is projected?	Yes	No	Yes	Transportation is indicated to be only by rail or highway; need clarification that none will be by barge.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.1	Will borrow pits be constructed (or expanded)? If so, what volumes of borrow will be transported and used in construction?	Yes	No	Yes	Borrow pits are mentioned in text, but it is not clear if they are included in Table 4.1-1; no information on borrow volumes.
	Land Use/ Transmission Line	D Hostick	2	ESRP 4.1.1	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 4.1.1.	Yes	No	Yes	Refers to other sections only for wetland habitat and population impacts; other disciplines may need more information.
	Land Use/ Transmission Line	D Hostick	1	ESRP 4.1.2	A description of transmission line construction techniques and the associated impact on land use.	Yes	No	Yes	Discussion is brief, stating only that work will be conducted to avoid or minimize impact.
	Land Use/ Transmission Line	D Hostick	2	ESRP 4.1.2	There are no technical deficiencies in support of land use for the sections mentioned in Review Interfaces in ESRP 4.1.2.	Yes	No	Yes	Limited discussion of the impacts of transmission line work on the site regarding impacts on existing wetlands and T&E species. No referral to those sections for further information.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Land Use/ Transmission Line	D Hostick	1	ESRP 5.1.1	Potential agreement or conflict with local land-use plans should be addressed by the applicant. The applicant needs to show how the operation of a new nuclear unit either complements or conflicts with existing land-use plans. Evidence of communication to this effect between the applicant and relevant agencies should be apparent.	Yes	No	Yes	Does not specifically address land-use plans; only mentions (in Section 2.2.1) what agencies will need to be consulted.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description of the general climate of the region with respect to the type of air masses, synoptic features, general air flow patterns, temperature and humidity characteristics, precipitation, and relationships between synoptic and mesoscale conditions, with an emphasis on conditions that would affect air quality and/or dispersion.	Yes	No	Yes	See ER: Section 2.7.1 Types of air masses, synoptic features, and relationships between synoptic and mesoscale conditions are not well developed or integrated. Relationships between those larger-scale conditions and local characteristics are not developed either. Discussions are largely a summary of data details presented later.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description of the regional air quality, including nonattainment or maintenance areas.	Yes	No	Yes	Clarification required for 8-hour ozone standard and the areas designated as maintenance areas. See ER: Section 2.7.2
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Monthly and annual air temperature and dewpoint temperature summaries, including averages, extremes, and diurnal range~~, and whether these extremes would affect air quality and/or dispersion~~.	Yes	No	Yes	Data are there; however, the daily average and extreme maximum and minimum ambient temperature and dew point temperature tables for SSES Units 1&2 (Tables 2.7-17 and 2.7-18) and for Williamsport, PA (Table 2.7-19) are ~~is~~ excessive (148 pages total). Monthly/annual summaries would be sufficient. See ER: Section 2.7.4.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Estimated monthly mixing-height data, including frequency and duration (persistence) of inversion conditions and the methods used to provide the estimates, and an assessment of these values relative to their effect on air quality and/or dispersion.	Yes	No	Yes	Clarification is needed on how the mixing height calculation was performed and where and how the value is used elsewhere in ER calculations (e.g., is it used in AEOLUS3?). See ER: Section 2.7.4.4 For mixing heights, see ER: Table 2.7-164 Table 2.7-~~175~~165 Inversions, see ER: Sections 2.7.4.4 and 2.7.4.8; and Table 2.7-122 through Table 2.7-127
	Meteorology	Jeremy Rishel	1	ESRP 2.7	A description or reference to models and assumptions used to determine normalized concentration (χ/Q) and relative deposition (D/Q).	Yes	No	Yes	The AEOLUS3 Version 1.0 model will need to be reviewed for adequacy, because it is not a standard NRC model. A comparison run using an NRC-approved model will be required. See ER: Section 2.7.6.1 Table 2.7-128

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRP 2.7	Short- and long-term diffusion estimates of χ/Q and/or D/Q and the period of onsite meteorological data used in the calculations.	Yes	No	Yes	Short- and long-term χ /Qs were estimated using the AEOLUS3 code. Code's implementation of Reg. Guides 1.111 and 1.145 needs to be verified. Onsite meteorological data used in modeling is from 2001-2007. A comparison run using an NRC-approved model will be required. Long-term: Estimates made assuming elevated release (when applicable during mixed mode release) at downwind distances defined in ESRP 2.7. See ER: Section 2.7.6.1 Short-term (DBAs): Method for calculating LPZ time averages needs clarification See ER: Section 2.7.6.2 Table 2.7-161 Table 2.7-162 Table 2.7-163
	Meteorology	Jeremy Rishel	2	ESRP 3.6.3	Are the release points for nonradiological emissions (to be used in atmospheric transport and diffusion calculations related to plant construction and operation, including vehicle emissions) adequately described (needed for ESRP 3.6.3)?	Yes	No	Yes	Potential sources of nonradiological air emissions are identified in Table 3.6-5. Vehicular emissions are not quantified in the ER.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	ESRPs 4.4.1, 5.3.2.1, and 5.3.3.1	Is the meteorological information suitable to provide estimates of the impact of construction activity (needed for ESRP 4.4.1), plant operation (for ESRP 5.3.2.1), and heat-dissipation system effects (for ESRP 5.3.3.1) on the atmosphere and air quality?	Yes	No	Yes	Impact of construction and operation emissions on 8-hour ozone maintenance area, if any, needs to be described. Vehicle emissions need to be described and quantified. According to §§ 5.3.3.1.1, a composite of the onsite data set and concurrent data from the Wilkes-Barre NWS station was developed for use in the SACTI model. Wind speed and wind direction data were taken from the onsite monitoring program. Dry-bulb and dew point temperatures (from which relative humidity was calculated) and cloud cover were obtained from the Wilkes-Barre NWS station. However, §§ 6.4.1.5 indicates that dew point measurements are made at the SSES meteorological tower and that data recovery (at least for the 5-year period from 1999-2003) is greater than 95 percent. It is not clear why temperature and dew point data from the onsite monitoring program was not used for the SACTI modeling analysis. See ER: Section 1.3.2 Section 3.6.3.1 Section 5.3.3.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	2	ESRPs 5.4.1 and 5.4.2	Are the locations of the nearest receptors in each 22.5-degree sector for the transport and diffusion calculations clearly identified (for ESRPs 5.4.1 and 5.4.2)? Is enough information provided to allow staff to evaluate the concentrations and deposition values at these locations?	Yes	No	Yes	See ER: Table 2.7-128 For both grid and special receptors, it is not known whether terrain heights represent spot elevations or some maximum value and if the latter, how maximum heights were determined. References are not provided for special receptor locations and if original distances and directions were relative to SSES Units 1&2 it is not known how the distances and directions relative to BBNPP were determined.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	2	ESRPs 7.1 and 7.2	Is the meteorological data adequate to analyze and evaluate the effects of plant accidents involving radioactive material (needed for ESRPs 7.1 and 7.2)?	Yes	No	Yes	AEOLUS3 Version 1.0 model will need to be reviewed for adequacy, because it is not a standard NRC model. A comparison run using an NRC-approved model will be required. Note that the (POR) in Tables 2.7-57 thru 2.7-59 (i.e., 2001-2006), especially Table 2.7-57, is different from the POR presumably used in the dispersion modeling addressed in §§ 2.7.6 (i.e., 2001-2007). Note also that the wind speed classes in the JFDs, especially in Table 2.7-57 (i.e., the 10-m level JFD) does not correspond to the wind speed class breakdown called for by Revision 1 of Reg. Guide 1.23 and indicated in Tables 2.7-128 (for routine release modeling) and Table 2.7-161 (for accidental release modeling). These summaries would have to be provided to perform the confirmatory modeling by staff. See ER: Section 2.7.6.2, Table 2.7-161 through Table 2.7-163; Section 6.4.1

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	2	ESRP 9.4.1	Is the meteorological data adequate to evaluate the heat dissipation of alternative systems (for ESRP 9.4.1)?	Yes	No	Yes	See ER: Section 6.4.1, Section 9.4.1 According to §§ 5.3.3.1.1, a composite of the onsite data set and concurrent data from the Wilkes-Barre NWS station was developed for use in the SACTI model. Wind speed and wind direction data were taken from the onsite monitoring program. Dry-bulb and dew point temperatures (from which relative humidity was calculated) and cloud cover were obtained from the Wilkes-Barre NWS station. However, §§ 6.4.1.5 indicates that dew point measurements are made at the SSES meteorological tower and that data recovery (at least for the 5-year period from 1999-2003) is greater than 95 percent. It is not clear why temperature and dew point data from the onsite monitoring program was not used for the SACTI modeling analysis.
	Meteorology	Jeremy Rishel	1	10 CFR 51.45(c)	A description of the environmental impacts of preconstruction activities related to meteorology at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	No	No	Yes	Preconstruction activities impact on meteorology are not described in the ER.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Meteorology	Jeremy Rishel	1	Alternative Site (No ESRP Section)	Has the applicant provided reconnaissance data to characterize the meteorological impacts at the alternative sites?	Yes	No	Yes	Air quality is described. Meteorology for the alternative sites could also be described. See ER: Section 9.3.2.2.2 Section 9.3.2.3.2 Section 9.3.2.4.2 Table 9.3-7
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.1 (Need for Power)	Description of the relevant service area(s), including (1) a map of the service area showing the location of the proposed facility relative to the service area; (2) how the output from the facility will be connected to the transmission and distribution grid system; (3) transmission and intertie, including capacity, constraints within the service area; and (4) new transmission capacity (if required).	Yes	No	Yes	Map of service area (Figure 8.0-1, not 8.2-1 as called out in text) does not include the location of BBNPP (although the location is included in Figure 9.3-5). Not clear if description throughout Ch 8 is referring to a specific portion of the PJM service area, or the entire PJM service area; along with all data presented. Need to clarify this. A map (or series of maps) containing the different regions referenced, along with definitions, would be helpful.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.1 (Need for Power)	Number and types of customers and major electrical load centers in the relevant service area.	Yes	No	Yes	Total customers are given, but not broken out by type.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Methodology, assumptions, and information sources used to develop the forecasts of electricity consumption, peak- and base-load demand, and forecasted load factor.	Yes	No	Yes	Peak-load demands only – no base-load forecasts
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Chart or table of historical and projected yearly electricity consumption, system peak-load demand, and load factor for the relevant service area(s), and principal reasons for the increase in consumption/demand and shifts in the load factor.	Yes	No	Yes	No discussion of load factor; projected consumption (Tables 8.1-3, 8.1-4, and 8.1-5) only project through 2012.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Comparison of forecasted electricity consumption and peak-load demand to other independent forecasts and reasons for significant differences.	Yes	No	Yes	Only includes PJM forecast.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.1 (Need for Power)	Identification of expected customers (or firm power sales) for the power to be supplied by the proposed facility and any signed agreements for the purchase of the power; obtain estimate of forecasted power sales by the applicant in the relevant service area. (Note: This information is likely to be business sensitive and/or proprietary.)	Yes	No	Yes	Found some discussion in Section 8.3 on firm sales agreements and forecasts.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.2 (Need for Power)	Historical and projected economic, weather, price of electricity, energy mix (including energy-efficiency and fuel-switching effects), and demographic/population trends that are driving the growth in electricity demand.	Yes	No	Yes	Average electricity prices are provided for the region 2000-06, but no projected prices.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.2.2 (Need for Power)	Methodology and information sources used to develop the forecast of economic, weather, price of electricity, energy mix, and demographic/population trends.	Yes	No	Yes	Refers to PJM study, but ER does not contain the information, so indeterminate.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Description of the electricity supply mix in the relevant service area, historical and projected contribution of each to total annual electricity consumption and peak-load demand, and factors driving the change in electricity supply mix.	Yes	No	Yes	Only current supply mix; no projected contribution to total electrical consumption or peak load. Unclear as to whether data are for the relevant service area, or PJM total service area
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Description of the methodology, assumptions, and information sources used to develop the forecast of electricity supply mix.	Yes	No	Yes	Description of planned projects and retirements included, along with other factors, but no discussion on forecast of supply mix.
	Need for Power and Benefit-Cost Balance	D Hostick		ESRP 8.3 (Need for Power)	Identification of existing power facilities that serve the relevant service area and their associated electricity generation capacity whose retirement has been announced or is anticipated within a few years before and after the start of operation of the applicant's proposed facility.	Yes	No	Yes	Generation deactivations and predominantly historical (up to 2007)
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Identification of firmly committed new facilities and proposed new facilities that will serve the relevant service area and their associated electricity generation capacity that are expected to start operation between a few years before and after start of operation of the applicant's proposed facility.	Yes	No	Yes	Section 8.3-6 only gives capacity additions in MW and generation source; no "go live" dates are presented.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Description of planned power purchases and sales (including the duration of contracts, distinguishing on-peak and off-peak sales) and whether any planned or proposed transmission construction could significantly impact these purchases and sales.	Yes	No	Yes	Section 8.3-8 includes long-term firm transmission service requests, but does not give the length of the contract. BBMPP will be a merchant plant. No discussion of planned power purchases. Does detail the various joint operating agreements between other markets.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Discussion of related policies and trends in distributed and/or self-generation in region of interest to the extent practicable.	No	No	Yes	Absent
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.3 (Need for Power)	Estimate of forecasted electricity supply by the applicant in the relevant service area and source of the supply (e.g., existing facilities co-owned by the applicant, purchased power, and new capacity) area. (Note: This information is likely to be business sensitive and/or proprietary.)	Yes	No	Yes	General discussion of power and transmission needs for the area.
	Need for Power and Benefit-Cost Balance	D Hostick	1	ESRP 8.4 (Need for Power)	Projected base-load demand from the present to 3 years after commercial operation of all proposed units.	Yes	No	Yes	Relies on demonstrating general need via reserve margins and predicted growth in the region.
	Need for Power and Benefit-Cost Balance	Balducci	1	ESRP 10.4.1 (Benefit-Cost)	Data on other benefits, quantified and monetized to the extent possible (e.g., annual Federal, State, and local tax payments, number and type of jobs, and total annual wages paid) (see ESRPs 4.4.2 and 5.8.2).	Yes	No	Yes	No information was provided with respect to property tax generation. The applicant is withholding this information as proprietary. Staff needs some basis to support an estimate of the local economic benefits of the proposed action.
	Need for Power and Benefit-Cost Balance	Balducci	1	ESRP 10.4.1 (Benefit-Cost)	Description of other nonquantifiable or nonmonetary benefits (e.g., new recreational facilities) (see ESRPs 4.1.1 through 5.8.3).	Yes	No	Yes	Applicant notes that no enhancements to schools/recreational facilities are required; however, no data are supplied on capacity or percentage of use to verify this assumption.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The nearest present and known future locations from which an individual can obtain aquatic food and/or drinking water.	Yes	No	Yes	Not clear that the future locations are addressed. The issue can be addressed during site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	The nearest present and known future shoreline areas that an individual can use for recreational purposes.	Yes	No	Yes	Not clear that the future locations are addressed. The issue can be addressed during site audit.
	Radiological Health	T.P. Lynch	1	ESRP 5.4.1	For each liquid radwaste discharge, the transit time from input to a facility discharge stream to the point at which the stream enters an unrestricted area, and the stream discharge in m^3/s.	Yes	No	Yes	The stream discharge rate is given in Section 5.1.1.1. Did not find the transit time information. Should be able to obtain it during the site audit.
	Radiological Health	T.P. Lynch	1	Cumulative Impacts (No ESRP Section)	Has the applicant considered activities of other agencies that have occurred or will occur in the region that may contribute to a cumulative impact on radiological health?	No	No	Yes	Can discuss whether activities of other agencies in region were considered for cumulative impact on radiological health during the site audit.
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant evaluated whether the potential exists for a detrimental impact from the thermal discharge on the concentration of etiological agents on the receiving waters?	No	No	Yes	Please provide information about whether the potential exists for a detrimental impact from the thermal discharge on the concentration of etiological agents in the receiving waters (Section 5.3.4.1, p.5-38).
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant consulted with the State's public health department to adequately characterize the state's level of concern?	No	No	Yes	Please provide information about consultation with the State's (or local) public health department to adequately characterize the State's level of concern for etiological agents in the receiving waters (Section 5.3.4.1).

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant discussed the proximity of recreational activities to the thermal discharge into the receiving waters? What is the likelihood of interaction by members of the public within the thermal influence of the operating facility?	No	No	Yes	Section 2.2.1, p.2-7; Table 2.2-1, 2.2-25.4-3; Figure 2.1-3, 2.2-3. Please provide a description of the proximity of recreational activities to the thermal discharge into the receiving waters and what the likelihood of interaction by members of the public within the thermal influence. (The topic of proximity of recreational activity is discussed in Chapter 2; however, it does not address it in the context of non-rad human health (NRHH) issues.
	Non-radiological Human Health	Lara Aston	1	5.3.4	Has the applicant discussed the identification of etiological agents or diseases of concern for the plant proposed and the region where the plant is to be built? What is the incidence of infection in the region of influence?	Yes	No	Yes	Section 5.3.4.1, pp. 5-38 and 5-39. Please provide information about etiological agents or diseases of concern for the region where the plant is to be built and report the incidence of infection in the region of influence.
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.1	Plans for ultimate treatment and/or restoration of retired disposal sites (other than licensed commercial sites).	No	No	Yes	Section 5.5.1 Please provide a description of any treatment and/or restoration plans for the retired disposal site or state why it won't be necessary.
	Non-radiological Human Health	Lara Aston	1	ESRP 5.5.2	Estimated environmental impacts, including health effects resulting from exposure to the chemical constituents and those resulting from radiological exposures estimated to be received by workers as a result of mixed-waste testing and storage. (Coordinate with the hydrology SME for water-related aspects and the radiological SME for radiological results).	Yes	No	Yes	Sections 5.5.2 and 5.12.2 Please provide an estimate of the health effects resulting from exposure to the chemical constituents to be received by workers as a result of mixed-waste testing and storage.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Non-radiological Human Health	Lara Aston	1	5.6.3	Has the applicant discussed if there are ozone impacts from the power-transmission system?	Yes	No	Yes	Sections 5.6.3.1, 5.6.3.2, and 5.6.3.5 Please provide specific discussion of potential ozone from the power-transmission system.
	Site and Technical Overview	McDowell	2	ESRP 2.8	The ER or SSAR/FSAR should provide some indication of other nearby industrial facilities, other nuclear facilities in the region, or other Federal projects existing in the region or that might be required to construct and operate the proposed facility.	Yes	No	Yes	Section 2.8; needs a discussion of other nuclear plants.
	Site and Technical Overview	McDowell	2	ESRP 3.1	Topographic maps of the proposed site and vicinity (refer to ESRP 2.2) showing facility and station layout, the exclusion area, site boundary, liquid and gaseous release points (and their elevations), meteorological towers, the construction zone, land to be cleared, waste disposal areas, and other buildings and structures (both temporary and permanent) associated with the project.	Yes	No	Yes	Figure 3.1-1. Site Boundary and Owner Controlled Area is not clear. Land to be cleared is not identified. No waste disposal areas are identified, but this is consistent with the text.
	Site and Technical Overview	McDowell	1	ESRP 3.1	Representative ground-level photographs of the site on which major station features are superimposed. These should be taken from among the following typical vantage points when a visual impact from that location can be expected: • residential • commercial • industrial • educational • transportation corridors (air, auto, rail, pedestrian) • cultural (recreational, historic, archaeological). •	No	No	Yes	Figures 3.1-3 to 3.1-6. It is not clear whether these vantage points are from locations listed in the checklist.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Leigh	1	ESRP 4.6	Data and information related to the applicant's commitments to measures and controls to limit potential impacts during construction should consist of the following four elements: (1) identification of the impact, (2) the planned control program (including monitoring), (3) the basis and need for an environmental protection plan, and (4) the control procedures for the following areas: • noise • erosion • dust • traffic • effluents and wastes • surface-water impacts • groundwater impacts • land-use protection/restoration • water-use protection/restoration • terrestrial ecosystem impacts • aquatic ecosystem impacts • socioeconomic impacts • radiation exposure to construction workers • other site-specific impacts.	Yes	No	Yes	Section 4.6, Table 4.6-1 and 4.6.2 of the ER; Part 10 ITAAC, Section 9 details a basis/need for an environmental protection plan. Monitoring programs for perched water/groundwater, construction effluent/storm water runoff, health and safety (noise and radiation protection) are mentioned in the ER, but not sure whether "comply with permit requirements" in other areas will include additional monitoring programs.
	Site and Technical Overview	Leigh	1	ESRP 4.6	Proposed design or planned control program in each of the above areas.	Yes	No	Yes	Section 4.6, Tables 4.6-1 and 4.6-2. More detail regarding "comply with permit requirements" is needed.
	Site and Technical Overview	Leigh	1	ESRP 4.7, 5.11	Identification of the geographic area to be considered in evaluating cumulative impacts.	No	No	Yes	Section 10.5 states that the "section summarizes the potential cumulative adverse environmental impacts to the BBNPP region," however the parameters of that region are not specifically called out in Section 10.5.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Leigh	1	ESRP 5.10	Data and information related to the applicant's commitments to measures and controls to limit potential impacts during operation should consist of the following four elements: (1) identification of the impact, (2) the planned control program, including monitoring, (3) the basis and need for an environmental protection plan, and (4) the control procedures for the following areas: • noise • erosion • effluents and wastes • surface-water impacts • groundwater impacts • terrestrial ecosystem impacts • aquatic ecosystem impacts • socioeconomic impacts • cooling tower drift impacts • other site-specific impacts. •	Yes	No	Yes	Section 5.10 and Table 5.10-1; Part 10 ITAAC Section 9 details a basis/need for an environmental protection plan. A radiological monitoring program is mentioned in the ER, but it unclear whether "comply with permit requirements" in other areas will included additional monitoring programs.
	Site and Technical Overview	Leigh	1	ESRP 5.10	Proposed design or planned control program in each of the above areas.	Yes	No	Yes	Section 5.10 and Table 5.10-1. More detail regarding "comply with permit requirements" is needed.
	Site and Technical Overview	Leigh	1	ESRP 6.7	Site preparation and construction monitoring commitments.	Yes	No	Yes	Section 6.7 generally lists "construction and pre-operational monitoring." However, the site-preparation activities and monitoring commitments need to be specifically identified.
	Site and Technical Overview	Leigh	1	RG 4.2, Rev 2: Page 5-1	Assess the proposed action for cumulative and projected long-term effects from the point of view that each generation is trustee of the environment for each succeeding generation.	Yes	No	Yes	Indirectly addressed in Section 10.5. Unclear if Section 10.5 meets the intent of "each generation is a trustee."

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Site and Technical Overview	Leigh	1	RG 4.2, Rev 2: Page 5-3	Information concerning any cumulative buildup of radionuclides in the environment, such as in sediments.	Yes	No	Yes	Table 5.4-22 addresses cumulative air concentrations of radionuclides. Section 10.5 addresses cumulative impacts from construction and operation to public exposure and biota. However, the potential for cumulative buildup in the environment was not specifically addressed (sediments are not mentioned).
	Site and Technical Overview	Leigh	1	10 CFR 51.50(c)	Does the ER satisfy 10 CFR 51.50(c) by identifying procedures for reporting and keeping records of environmental data, and any conditions and monitoring requirements for protecting the non-aquatic environment, proposed for possible inclusion in the COL as environmental conditions in accordance with 10 CFR 50.36b? This information may be found in an Environmental Protection Plan.	Yes	No	Yes	Section 6 discusses monitoring and reporting for radiological, meteorological, and terrestrial ecology. A license condition is proposed in Section 9 of Part 10 ITAAC. Part 10 ITAAC, Section 9 also outlines an Environmental Protection Plan. However, not sure if the proposed environmental condition is in accordance with 10 CFR 50.36b. The Environmental Protection Plan does not identify monitoring issues.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	2	ESRP 2.5.1	Demographic characteristics of the 0-km to 80-km (0-mi to 50-mi) enclosed population. This should include specific reporting of population characteristics and projections for the emergency planning zone defined as the area within a 16-km (10-mi) radius of the facility. Demographic characteristics and projections should also be shown for the LPZ or exclusion area populations. Demographic characteristics should include age and sex distribution, transient or migrant population, racial and ethnic background, and income distribution (from the ER, latest decennial Census, other local/regional demographic sources such as planning commissions).	Yes	No	Yes	The ER does not include an analysis of migrant-transient populations within the 50-mile zone. Rather, it appears to extend out only 10 miles. The ER presents median income statistics within the affected zones but does not present income distribution information within each zone. No demographic information is presented for the LPZ (0-3 miles). Demographics are held constant in projections. More discussion is required to address potential trends in changing demographic composition.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information related to the area's economic base, including: • important regional industry by category, including employment • size and description of the heavy construction industry and construction labor force within the region • total regional labor force • regional unemployment levels and future economic outlook • characterization of incremental onsite labor, peak number of workers and duration of the peak, the number of workers expected to commute daily, the number of workers expected to require temporary and permanent housing, and the inventory of rental and of permanent housing within 80 km (50 mi) of the site.	Yes	No	Yes	Detailed information was used to construct an economic snapshot of the area's economic base; however, there is no discussion or data used to present a future economic outlook.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Social-structure information, including major community structures.	Yes	No	Yes	This section recites statistics but it doesn't identify or examine the trends that are driving the statistics. Further, it doesn't outline the factors that shape the local social structure (e.g., presence of local Amish populations).

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Housing information, including the sales and rental market in the region, number and types of units, turnover and vacancy rates, and trends in addition to housing stock, adequacy of structures, and location of existing and projected housing.	Yes	No	Yes	No housing projections are included in the report.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information about the local educational system (regional primary and secondary schools and higher education institutions), including capacity and present percentage of use.	Yes	No	Yes	No information is provided on current or projected capacity or percentage of use. The applicant does estimate the impact of construction- and operation-related activities on the school districts. These figures should be placed within the context of capacity/percentage of use statistics.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Public and private recreational facilities and opportunities, including present and projected capacity and percentage of use.	Yes	No	Yes	No information on current or projected capacity or percentage of use is included.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Social services and public facilities, including: • present and projected water and sewer/sewage disposal facilities, including present capacity and projected percentage of use • present and projected police and fire capabilities, and emergency planning responsibilities • location of hospitals, number of medical doctors, and specialized health facilities, including present and projected capacity.	Yes	No	Yes	There is no mention of the projected percentage of use with respect to water and sewer/sewage disposal facilities or police and fire capabilities.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.2	Information about distinctive communities, including characteristics of the State, Native American Tribes, and the local region, that may identify them as distinctive communities (e.g., historic districts, tourist attractions, cultural resources, and visual resources).	Yes	No	Yes	A section should be added near the end of Section 2.5.2 to document attempts to identify distinctive communities.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 2.5.4	Comments of any organizations contacted by the applicant that locate and assess uniquely vulnerable minority and low-income communities located on or near the proposed station site.	Yes	No	Yes	More documentation of county comments is necessary.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Distribution of people, buildings, roads, and recreational facilities vulnerable to impact from construction-related activities.	Yes	No	Yes	No mention of construction impacts on recreational facilities or areas. If there are none that will be impacted, this should be mentioned.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Applicable standards for levels of noise, dust, and gaseous pollutants.	No	No	Yes	Noise, dust, and gaseous pollutant standards are not detailed in Section 4.4.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Predicted noise levels at sensitive areas identified in the first item listed above.	No	No	Yes	Noise levels are identified in Table 4.4-1 but there are no estimated noise levels at sensitive areas. Rather, the report estimates that the impact will be a small one.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.1	Predicted air pollutant levels at sensitive areas identified in the first item listed above.	No	No	Yes	No estimates of pollution levels at sensitive areas.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.2	Annual expenditures within the region for materials and services during construction.	Yes	No	Yes	Sections 5.8.2.4.1 and 5.8.3.2.3 note that PPL Bell Bend, LLC will spend about $9 million annually on materials, equipment, and outside services. Annual expenditures during construction and operation should be differentiated.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 4.4.2	Taxes by type and jurisdiction to be paid during construction.	Yes	No	Yes	No estimate of the property tax revenue during the construction phase.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.2	Expenditures within the region for materials and services during operation.	Yes	No	Yes	Sections 5.8.2.4.1 and 5.8.3.2.3 note that PPL Bell Bend, LLC will spend about $9 million annually on materials, equipment, and outside services. Annual expenditures during construction and operation should be differentiated.

Row	Discipline	Subject Matter Expert	Priority	Issue Area/Topic	Review Area/Topic 1. Is the following material found in the Application?	2.	3.	4.	5.
	Socioeconomics and Environmental Justice	Balducci	1	ESRP 5.8.2	Taxes by type and jurisdiction to be paid annually during operation.	Yes	No	Yes	No information was provided with respect to real estate (property) taxes, and the applicant is withholding this information as proprietary. Staff needs some basis to support an estimate of the local economic impacts of the proposed action.
	Socioeconomics and Environmental Justice	Balducci	1	10 CFR 51.45(c)	A description the environmental impacts of preconstruction activities related to socioeconomics at the site and an analysis of the cumulative impacts of the activities to be authorized by the COL in light of the preconstruction impacts, as explained in COL/ESP-ISG-4. The Interim Staff Guidance (ISG) and the supplement are available at http://www.nrc.gov/ reading-rm/doc-collections/isg/col-app-design-cert.html on the NRC's public website.	Yes	No	Yes	Further delineation between preconstruction and construction activities is required; cumulative impacts are discussed in Section 10.5.

Record Management: Bell Bend EIS
Site and Technical Overview
Jeremy Rishel

Record Description and Steps				
Record Number	**Record Type**	**Timing**	**Record Description**	**Completion Date**
1	Checklist	Completion of Acceptance Review	Review ER and develop the Acceptance Review Checklist. Submit to NRC for approval and COL acceptance. PDF the Word file to freeze your work to date in time and save to EARRTH.	11/06/2008
2	Checklist	Submission of Information Needs Table	Review ER, ESRP and template requirements, and draft information needs table. Submit information needs table to NRC. Keep copies of both original submittal and final, OGC approved list if different. PDF the Word file to freeze your work to date in time and save to EARRTH.	4/20/2009 (Rishel's) 3/19/2009 (NRC)
3	Draft Sections and revised Checklist	One week prior to site audit	Review ER, ESRP and template requirements, and draft pre-audit sections. Identify completed and open areas with different colored fonts. Update information needs in the tracking checklist shown below if new issues are discovered. PDF the final pre-audit Word files and this Records Tracker prior to the Site Audit to freeze your work to date in time and save to EARRTH.	4/20/2009
4	Trip Report	Two weeks following the site audit	Following site audit, submit Site Audit Trip Report that addresses each of your information needs. Respond to each of the information needs in the status update boxes below to identify which ones were answered during the site audit and make brief notes about how it was answered. Attach this Records Tracker to the Site Audit Trip Report and PDF the Word file to freeze your work to date in time and save to EARRTH.	
5	RAI List	According to project schedule	Take any remaining, unanswered comments, review for continued relevancy and create the RAI list. This process should give you a one-to-one correspondence between the remaining information needs and the RAIs at this point in time. Delete highlighted information if it was answered during the site audit or in supplemental information provided by the applicant following the site audit. Additional RAIs may be added which were not part of the information needs as a result of discussions at the site audit or discovery of new information or issues; however, that is appropriate. PDF the Word file to freeze your work to date in time and save to EARRTH.	
6	Draft Sections	According to project schedule	Revise the sections with the information obtained during the site audit. Associate EVERY factoid in the DEIS with a reference (calculation sheet, publication, website, etc.) and ensure every 'factoid' on which you rely is relevant to the impact determination in the draft DEIS. Place all the references in the appropriate folders on the EARRTH site. Place draft DEIS sections in correct folder. PDF the Word file to freeze your work to date in time and	

			save to EARRTH.	
7	Draft Sections	Two weeks following RAI response	Obtain information from RAI responses and resolve any holes in the draft EIS sections. Respond to comments in margin as necessary to show how RAIs requests were handled. Compare sections between interfacing subject matter areas. Make electronic comments to show changes as appropriate in the margin. Add any new references to the appropriate folders on the EARRTH site. Submit final draft to Editors for compilation. PDF the Word file to freeze your work to date in time.	
8	Annoted ESRP	Two weeks following submittal of draft sections to the editor	Using an electronic copy of the ESRP, insert comments in areas where the ESRP was not followed and discuss the rationale for departures. PDF the Word file to freeze work to date in time and save to EARRTH.	
9	Draft Sections	Close of the DEIS Writing Session	Using the new electronic copy of the report, make changes prior to or during DEIS writing meeting (in Word document) using "track changes", and place comments about all changes in the margin as "comments". This process shows the changes that were made by or in conjunction with the NRC and the reason why these changes were made. Add any new references to the appropriate folders on the EARRTH site.	
10	Draft Section	Close of the FEIS Writing Session	Using the electronic copy of the published report, make changes prior to or during FEIS writing meeting (in Word document) using "track changes", and place comments about all changes in the margin as "comments". This process shows the changes that were made by or in conjunction with the NRC and the reason why these changes were made. Typically, changes would occur in response to comments received during the public notice period or made during the public meeting. Add any new references to the appropriate folders on the EARRTH site.	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
MET-1	2.7.4 General	Please provide the 2001- 2006 SSES meteorological data used to support the ER in NRC (Regulatory Guide 1.23 Rev 1) format.	Incomplete	Meteorological data (2001-2007) has been prepared and will be submitted. It will include both hourly Reg 1.23 Rev 1 formatted data as well as joint frequency data (JFD).	Yes	
MET-2	2.7.4 Page 2-735	Section 2.7.4 states that “An analysis of the differences between Regulatory Guide 1.23, Revision 0, and Regulatory Guide 1.23, Revision 1, concludes that the guidance provided in the two	Complete	Applicant noted that SSES tower mostly follows Reg 1.23 Rev 1 guidance. Departures from Rev 1 include: • Tower structure inspection (currently 3 years as opposed to yearly as	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		versions of the document are sufficiently similar, that there is no adverse impact from using the onsite meteorological data monitored for SSES Units 1 and 2 in analyses for BBNPP." What differences were identified and concluded to result in no adverse impact in using the data?		described in Rev 1) • Formalized obstruction heights in Rev 1 (10x obstruction heights) has prompted applicant to trim trees in the vicinity of the tower to meet guidance. A survey of tree stands around the tower was completed and trees will be trimmed at a later date (postponed due to ecological (bat) concerns). The applicant noted that the trees are currently not a major obstruction, as the data has been self-similar since the initial tower installation. • Cooling tower is within 10 obstruction heights. Applicant has prepared a study which shows the cooling towers are not a major obstruction to the met tower. This report will be cited in the ER and made available on the public docket. Table 6.4-1 of the ER provides a table that compares measurement capability to Reg 1.23 Rev 1 guidance; instrument accuracy is within Reg Guide specification.		
MET-3	2.7.1 Page 2-730	Section 2.7.1 should establish an overall context for evaluating the SSES data presented in Section 2.7.4, including a discussion of types of air masses and dominant synoptic/mesoscale weather features. Section 2.7.1 largely presents summary data for SSES and does not adequately establish a context in which to further evaluate the SSES data in 2.7.4. What are the dominant synoptic weather features for the region that would be reflected in the seasonal/annual averages presented in Section 2.7.4?	Complete	Applicant will consider updating Section 2.7.1 of ER to better explain the synoptic and mesoscale weather features that influence the site. Applicant stated that nearby stations, including Williamsport, Wilkes-Barre Scranton, and Allentown, were selected due to their proximity and similar hill-and-valley/river valley influence. Applicant acknowledged that temperature, dew point temperature, and precipitation are likely to be more consistent with BBNPP than wind speed and direction. The latter parameters are more likely to be influenced by local terrain features, as is evidenced by the windrose plots in the ER.	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		What are the dominant mesoscale weather features that might be reflected in hourly and daily averages presented in Section 2.7.4? What nearby weather stations (NWS or others) can be used to establish a context for evaluating the SSES data? What is the basis for selecting these stations? More organization is also needed in Section 2.7.1. For example, why are temperature data for Wilkes-Barre/Scranton discussed in Section 2.7.1.4, which is a section about regional precipitation? Wouldn't this summary be more appropriate in Section 2.7.1.3, which is about regional temperatures?				
MET-4	2.7.2.1-2.7.2.3 Page 2-731	Clarify air quality/permitting requirements for areas that are in attainment with the 1 hour ozone standard but were designated as maintenance areas relative to the 8-hour standard (e.g., Columbia County).	Incomplete	Applicant will discuss conformity requirements with the State (PADEP). Of concern are VOC and NOx construction emissions, which include worker vehicular emissions to-and-from the site as well as emissions from various construction equipment onsite. Note that the applicant will be removing 3 million + cubic yards of ground for the construction of the cooling towers. These construction emissions are not addressed in the ER.	Yes	
MET-5	2.7.4.1 Page 2-736	Daily average and extreme temperature and dew point temperature tables (Table 2.17 and Table 2.18, respectively) for SSES and daily average and extreme temperature tables for Williamsport (Table 2.19) are excessive and are not used meaningfully in the discussion presented in Section 2.7.4.1. What is the significance of presenting five years	Incomplete	Applicant will consider removing hourly temperature and dew point tables in ER and replace them with season and annual average values that more readily allow for the comparison to SSES. Applicant believes that, in general, Williamsport temperatures are more representative of SSES. This connection is important, particularly because the applicant used temperature and dew point temperature from Williamsport in the SACTI plume analysis.	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		of Williamsport's daily mean and extreme temperatures? Is Williamsport more representative than Wilkes-Barre Scranton? How do temperatures measured at SSES compare to the other stations? Are the SSES data showing similar trends as observed at the other sites? Why/why not?				
MET-6	2.7.4.1 Page 2-736	If humidity data are measured at SSES and are representative of the site, why are the data not used in the SACTI plume analysis in Section 5.3? Why are humidity data from Wilkes-Barre Scranton used in the SACTI analysis and are those data representative of SSES?	Incomplete	Applicant acknowledged that dew-point data measurements at SSES tended to not be reliable (i.e., the instrument would drift shortly after calibration). However, the applicant has not made instrumentation change because of the modification requirements that would be necessary for an operating plant (SSES). Applicant will consider updating ER to better explain why Williamsport dew point temperatures were used instead.	Yes	
MET-7	2.7.4.3 Page 2-737	What is the purpose of introducing the Shickshinny, PA, site for precipitation? Is it because it's only 6 miles away? What is the quality and period of record (POR) for the Shickshinny precipitation data? Why is the annual average precipitation at SSES approximately 8 inches less than the Shickshinny data? How does the SSES precipitation data compare to the other NWS sites?	Complete	Applicant acknowledged that precipitation may be underestimated at site, especially frozen (snow) precipitation. Applicant noted that this could be due, in part, because no wind shield surrounds the instrument. Applicant noted that SSES precipitation measurements do more closely agree with Williamsport and Wilkes-Barre/Scranton and so the Shickshinny data may actually be questionable.	No	
MET-8	2.7.4.3 Page 2-737	Other than mentioning Table 2.7-56, which is a monthly and annual observation summary of fog at nearby NWS sites, fog occurrence is not discussed in Section 2.7.4.3. Which station in 2.7-56 is expected to be similar to Bell Bend with regard to heavy fog observations? Why is there such a difference between the mean number of days per year at Wilkes-	Complete	Applicant stated that fog observations at Williamsport are likely to be representative of the BBNP site (as are temperature and dew point measurements). Applicant intends to update Section 2.7.4.3 to indicate this in a subsequent revision to the ER.	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		Barre Scranton (20.3 days) and Williamsport (36.4 days)?				
MET-9	2.7.4.4 Page 2-738 and Page 2-1304	How are mixing heights in Tables 2.7-164/165 computed? Would Pittsburgh be a more appropriate twice-daily station (as opposed to Buffalo) since it is not located near Lake Erie/Ontario? Where is the 900 m average annual mixing height discussed in Section 2.7.4.4 used? If used in MACCS2, wouldn't seasonal values be more appropriate?	Incomplete	Applicant acknowledges that both Albany and Buffalo are discussed in separate sections of the ER as being upper-air stations that are representative of the site. Albany data are used in the cooling tower plume analysis (SACTI), whereas Buffalo data are discussed in the section for normal radiological releases. Ultimately, the applicant uses a conservative estimate of mixing height (900m) from a climatological study (Holzworth) for normal radiological releases. The applicant will want to clarify why the various mixing heights are considered representative of the site.	Yes	
MET-10	2.7.4.5 Page 2-739 and Pages 2-1394 through 2-1396	What is the period of record (POR) for the data used to construct the windrose plots for in Figures 2.7-89, 2.7-90, and Figures 2.7-91, for the Wilkes-Barre Scranton, Allentown, and Williamsport stations? The text references sources AREVA 2008d, AREVA 2008e, and AREVA 2008f as the source for these plots, yet citations to these documents are not provided in the reference section. Have the data for the 2001-2006 period (which corresponds to the data period used in the ER) at these three NWS stations been compared to SSES? How do the NWS windrose plots compare to the annual 10- and 60-meter windrose plots for SSES in Figures 2.7-55 and 2.7-72, respectively? What is the explanation for the increased frequency of winds from the NNE and NE at SSES when compared to the NWS stations? What is the justification for using the SSES	Incomplete	Various periods of data are used to construct the windrose plots in Figures 2.7-89 through Figures 2.7-91, as the data were downloaded from the EPA's SCRAM website. The applicant believes that the windroses are representative of the site and can be generally compared to SSES. The applicant acknowledges that the ER is not clear what period the windroses represent and will provide clarification in a subsequent ER revision. Applicant will also provide references to the data source. The applicant noted that the winds are different at the various stations because of the valley/terrain features that are unique to each measurement location.	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		wind data in the routine release, design basis, and severe accident calculations?				
MET-22	2.7.6.1 general	Please provide a copy of the AEOLUS3 code, user-manual, validation documents, and input/output files associated with the Bell Bend ER for staff confirmatory analysis.	Incomplete	Applicant will make the AEOLUS3 documentation and input/output files for BBNPP available in their reading room.	Yes	
MET-11	2.7.6.1 Page 2-742	What is the purpose of using an additional year of meteorological data (2007) to the six years (2001-2006) described previously in the ER?	Complete	Reg Guide 1.206 directs the applicant to use the most recent year of meteorological data that is available, thus the reason for including year 2007 in the various codes (e.g., AEOLUS3).	No	
MET-12	2.7.6.1.1 Page 2-743	What are recirculation correction factors (RCFs), how are they implemented in the AEOLUS3 model, and how are they calculated in Table 2.7-128?	Incomplete	Applicant developed RCFs that are site-specific; these values are only used in X/Q estimates for normal operations. The RCFs were developed because default RCFs were overly conservative, resulting in unrealistic site X/Qs, especially for the NNW sector. Methodology for developing site-specific RCFs are documented in an internal report "Meteorological Recirculation Factors at Bell Bend Site". Report will be reviewed and notes will be taken at the site audit. In short, RCFs are determined using a puff (MESODIFF II) and plume (XOQDOQ) model to calculate X/Qs and then taking a ratio of their values. Onsite meteorological data for 2006 and site-specific building dimensions and EPR vent stack information (height, diameter, flow rate) were used in the analysis. The RCF's are input for every receptor location; the RCFs are used as a multiplier in AEOLUS3 to increase values of X/Q and D/Q. The RCFs will need to be evaluated and examined during the confirmatory stage of the ER calculations. If an issue is found with the RCFs, an RAI will need to be issued.	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
MET-13	2.7.6.1 Page 2-1271	How are the terrain heights for both grid and special receptors in Table 2.7-128 determined? Are they spot elevations or a maximum elevation between the release and receptor? Describe how were the distances and directions for special receptors (e.g., nearest garden) were determined.	Complete	Terrain heights are maximum values between the release and the receptor. Values are picked off of a USGS map.	No	
MET-14	2.7.6.1 Page 2-1271	How is mixing layer depth of 900 meters (Table 2.7-128) used in the AEOLUS3 code?	Complete	Mixing layer depth is used as in plume reflection in the AEOLUS3 code. A lower mixing depth results in a higher X/Q and D/Q at all downwind sectors.	No	
MET-23	5.3.3.1 General	Please provide the SACTI input/output files for staff confirmatory analysis.	Incomplete	Applicant will provide input/output files for SACTI cooling analysis for docketing.	Yes	
MET - 15	5.3.3.1.1 Page 5-29	Section 5.3.3.1 states that temperature, dewpoint, and cloud cover data were merged with SSES wind data to create the meteorological dataset used in the SACTI cooling tower plume analysis. If temperature and dewpoint are measure at SSES, why aren't these data used? Why are twice daily soundings from Albany used in the SACTI analysis, but Buffalo soundings are used in Section 2.7.4.4? Both upper-air stations are stated as being "closest" to BBNPP in the ER section writeups.	Incomplete	Applicant needs to provide justification as to why Williamsport dew point and temperature data were used in the SACTI analysis and are representative of BBNPP. Applicant needs to justify departure from Reg Guide 1.23 Rev 1 for dew point measurements (i.e., it's not at the highest measurement level on the onsite tower).	Yes	
MET-16	5.3.3.1.1 Page 5-29	In Section 5.3.1.1, the four Essential Service Water Supply System (ESWS) mechanical draft cooling tower plume impacts are considered much less when compared to the primary circulating water system (CWS). Provide a description of the ESWS (e.g., location relative to nearby structures and roads, height of towers above ground level, etc). Could the	Incomplete	Applicant does not provide a quantitative assessment of the ESWS impacts. Applicant will quantify ESWS impacts, particularly to onsite (safety) structures.	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		lower ESWS cooling tower heights allow for released plumes contribute meaningfully to ground-level fogging and icing since the plume would be physically closer to the ground?				
MET-25	5.3.3.2.1 Page 5-33 and Page 5-42	In Section 5.3.3.2.1, provides a maximum deposition of 0.0062 lb/ac per month. Yet Table 5.3-9 lists the maximum deposition rate at 0.0045 lb/ac per month. Resolve this inconsistency. At what downwind distance and direction does the maximum deposition value occur?	Incomplete	Applicant will fix either the ER Section text or table, depending which is in error. ER needs to address cumulative impact for all cooling towers.	Yes	
MET-24	6.4.1 general	Please provide (for review) documentation related to instrument specifications, calibration, and maintenance logs. How are data substitutions performed to achieve the better than 90% data completeness criteria.	Complete	Applicant will make instrument documentation available in the reading room and at the safety audit for meteorology. Table 6.4.1 list instrument specifications and accuracy for the SSES meteorological tower. Data substitution at SSES during instrumentation downtime (e.g., during times of calibration) are done using both the backup tower (winds) and the down-river tower (temperature and dew point temperature). The applicant provided a table of data recovery and substitution for each variable for the 2001-2007 period. In general, all instrumentation (and combination of instrumentation (e.g., 10 meter wind speed, wind direction, and delta-T) exceed 95%. Only dew point temperature was poorly measured, with an average data recovery of 60.24% for the 7-year period. Recovery for dew point temperature ranged from 23.87% (2007) to 99.36% (2005).	No	
MET-17	6.4.1 Page 6-57	Reference is made to three meteorological monitoring locations at SSES: the primary tower, a backup	Complete	Applicant notes that measurements (especially wind) made at the down-river tower are different and not likely to be representative of the general	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		tower, and a supplemental (down-river tower). The section indicates that the down-river tower will be described in subsequent sections; however, it never is discussed. Have the backup and down-river tower measurements been compared with the primary SSES data? Why are they not used as supplemental data to the ER in describing meteorological characteristics for the site?		site. Predominant wind direction at the down-river tower is from the west-southwest whereas it's from the east-northeast at SSES. The applicant notes that measured winds from the down river tower would only be used in a post-accident analysis/reconstruction. The applicant notes that the tower instrumentation is out of date, although the tower is maintained. The applicant will consider rewording the ER to either remove mention of the down river tower or explain why its data are not used substantially in the ER, except for limited data substitution at SSES. The applicant intends to make the discussion parallel what is described in the FSAR.		
MET-18	6.4.1.5 Page 6-58	How are wind speed/direction averages computed at SSES (i.e., scalar or vector average, Section 6.4.1.5)?	Complete	Scalar wind speed averages are used at all levels and tower locations.	No	
MET-19	6.4.1.6 Page 6-65 and Page 6-67	Tables 6.4-2 and Tables 6.4-5 provide approximate distance to the SSES (pre-application pre-operational) and BBNPP (operational) meteorological towers, respectively, to nearby obstructions. Please indicate the obstruction and its approximate height relative to the towers.	Complete	The applicant indicated that the tables reference tree stands that could be potential obstructions. However, these tree stands tend to be at a much lower base elevation than the met tower and so the actual height (from the perspective of the met tower) is considerably less than the tree height. The applicant will indicate that the obstructions refer to trees in the ER text and table descriptions.	No	
MET-20	6.4.1.6 Page 6-59	The existing meteorological tower is within five obstruction heights of the existing SSES cooling towers. In the ER, a study is mentioned that concludes the cooling towers on wind speed measurements are minimal. Please provide the details of the study and how the conclusion "the impact of the cooling towers on wind speed measurements is minimal and the effect	Incomplete	Applicant acknowledges that cooling towers are well within the 10x obstruction heights. However, a study was completed by the applicant (Effect of Plant Structures on the Wind Speed and Direction at the Meteorological Tower at the Susquehanna Steam Electric Plant) which shows that the cooling towers do not appreciably affect wind speed measurements made at the tower. It is preferred that the applicant would reference this	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post to Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy a Disposition
		on wind direction measurements is nearly non-existent".		study in the ER and docket the report. Applicant also noted that cooling towers are not in the predominant wind direction for the site, further minimizing their influence.		
MET-21		Provide a knowledgeable expert who can provide information on the downwind effects of the SSES cooling tower on agriculture.	Incomplete	Applicant notes that salt deposition impacts are negligible, as noted in the ER. Applicant notes a study (Ecology III, 1995. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 1994 Annual Report. Prepared for PPL Susquehanna, LLC. June 1995) that concludes no impact on surveyed areas which included locations on both sides of the Susquehanna River. Beyond the SACTI analysis provided in the ER and discussions in NUREG 1437, no additional information is available on plume shadowing impacts on agriculture. PNNL will likely perform additional analysis to better quantify impacts of the cooling tower plume.	Possible	

Bell Bend Site Audit Trip Report

Tables 1 – 4 are to be completed by the discipline specialist (project reviewer) and provided to the task lead as soon as possible after completion of a site visit. A separate report should be developed for each site visited. Some examples as to the type of information to collect or observe are shown in the tables that follow.

Project Reviewer Member Name: Jeremy Rishel
Technical Discipline(s): Meteorology, Accidents (Mentor)
COL Applicant: UniStar
Name of Site Visited: BBNPP
Date of Visit: April 27-May 1, 2009
Project Number: _____

Table 1. Site Specific Factors Needing Observation/Information Collection (Trip Objectives-information needs)

Trip Objective	Information to collect or observe	Objective achieved*
Objective (from info needs)	Staff identify specific information to be collected or observed	Yes/No/ Partial
View meteorological tower and data acquisition system/procedures used in data collection to support analyses in the ER.	Verify meteorological measurements are representative of the site, including tower siting, instrument placement, routine maintenance, and calibration procedures.	Yes
Get applicant responses to information needs (see Appendix A for information needs and summary/resolution). Information needs were developed upon reviewing Sections 2.7, 5.3.3.1, and 6.4 of the applicant's ER.	Request clarification of information in the ER and additional information.	Partial—some information needs will require RAIs (see Appendix A).

* If no or partial objective achieved, identify reasons.

Table 2. Activities (Provide a chronological summary of relevant activities – excluding consultations – during the visit to this site)

Date/Time	People	Event Description/Log
April 27, 2009		Travel Day
April 28, 2009 (8:00 am – 9:30 am)	All	Application/site overview and presentations.
April 28, 2009 (9:30 am – 11:30 am)	Jeremy Rishel (PNNL) Ted Messier (Areva) Theresa Clark (NRC) Adrian Miron (Numark) Vernon Hull (UniStar) Jack Cushing (NRC) Frank Hickey (PPL) Joshua Reinert (Areva) Mark Abrams (ABS) Larry Winker (PA DEP) Pedro Perez (AREVA)	Began discussion of meteorology information needs, initially addressing topics specific to Mark Abrams (i.e., the applicant's data reviewer), who was only available during this time period. NOTE: Accidents and meteorology break-out sessions were combined on this site audit because of discipline overlap and mentorship.
April 28, 2009 (12:30 pm – 5:00 pm)	Jeremy Rishel (PNL) Tedd Messier (Areva) Theresa Clark (NRC) Adrian Miron (Numark) Vernon Hull (Unistar) Joshua Reinert (Areva) Pedro Pereze (Areva) Stanley Levinson (Areva)	The afternoon session was devoted to reviewing design basis (DBA) and severe accidents, as discussed in Section 7 of the ER. Adrian Miron led the discussion as author of the information needs and EIS sections for the topics; I acted in a mentoring role to Adrian, where necessary. Please see Adrian's trip report for details on discussion's with the applicant that took place during this time period. (NOTE: We opted to postpone our participation in the general site tour, since Pedro Perez, who is the Areva representative primarily responsible for the DBA calculations, was only available (onsite) during this day/time.)
April 29, 2009 (8:00 am – 11:30 am)	Jeremy Rishel Tedd Messier (Areva) Theresa Clark (NRC) Jack Cushing (NRC) Adrian Miron (Numark) Vernon Hull (Unistar) Joshua Reinert (Areva) Larry Winker (PA DEP)	The morning session was devoted to completing the rest of the meteorology information needs. In addition, a presentation was given by Ted Messier (Areva) on the capabilities of the AEOLUS3 code as well as how the code was utilized in the BBNPP analyses (normal effluent and design basis accidents). SMEs from accidents, health physics, and meteorology participated in the presentation/discussion

		provided by Ted. Notes were taken on model inputs so confirmatory calculations can be preformed using standard NRC codes (i.e., PAVAN, XOQDOQ) at a later date. The applicant intends to make the AEOLUS3 supporting documentation (e.g., user manuals) available in the reading room. Input/output files for AEOLUS3 will be docketed.
April 29, 2009 (1:00 pm – 5:00 pm)	Jeremy Rishel Theresa Clark (NRC) Jack Cushing (NRC) Ted Messier (Areva) Joshua Reinert (Areva) Vernon Hull (UniStar) Frank Hickey (PPL) Adrian Miron (Newmark) Mike Detamore (PPL)	During the afternoon, we participated on a general site tour and meteorological tower tour. The SSES met tower is located to the east-south east of the SSES cooling towers and within 2000' of these obstructions. Instrumentation is at the 10 and 60 meter levels; the tower is an open-lattice structure with instrument elevators to enable easy servicing. Dew point is measured at 10 meters and precipitation is measured nearby the tower using a tipping-bucket rain gauge. There is no wind shield around the rain gauge. Terrain east of the met tower drops off quickly to the Susquehanna River. As a result, trees to the east are at varying (lower) base elevations when compared to the tower base elevation. A salt dome-like structure exists a few hundred feet west of the met tower, but the SSES cooling towers appear to be the major obstruction (in the westward direction). A wooden deck structure surrounds the base of the met tower; native grasses and vegetation as well as some gravel surround the wooden deck structure. The proposed BBNPP site was also toured, including the location for the meteorological tower. This tower will be approximately 20' higher in base elevation (670') than the existing SSES tower (650') and 4' lower than the proposed BBNPP reactor building. Terrain immediately surrounding the proposed met tower site is generally flat. Current vegetation is

		corn fields, but this will change once the site is built. The BBNPP met tower will also be within 10 obstruction heights of the SSES and BBNPP cooling towers. The applicant stated that the towers will operate independently, but it is possible that the towers could also serve in a "backup" role for the other plant.
April 30, 2009 (8:00 a.m. 10:00 a.m.)	Jeremy Rishel (PNNL) Ted Messier (Areva) Theresa Clark (NRC) Adrian Miron (Numark) Vernon Hull (UniStar) Jack Cushing (NRC) Joshua Reinert (Areva) Larry Winker (PA DEP)	Reviewed and clarified information needs table with applicant, identifying needs that are closed and those that will likely require RAIs (see Appendix A).
April 30, 2009 (10:00 a.m. – 11:00 a.m.)	Jeremy Rishel PNNL, NRC, UniStar Project Managers	Reviewed PPL information and documentation related to local farmer claims that plumes from SSES are shadowing nearby fields and adversely affecting crop yield. Farmers are concerned that the additional cooling towers associated with BBNPP will compound the problem. Farms identified include the Hess Farm (41º 5' 56.78"N, 76 º 5' 42.91W) and John Zaginaylo's Farm (41 º 4' 38.33"N 76 º 16' 4.55"W. Additional examination of local winds and SACTI plume analysis will be performed.
April 30, 2009 (1:00 p.m. – 3:00 p.m.)	Jeremy Rishel PNNL, NRC, UniStar Project Managers	Final close out on meteorology and accident information needs tables (see Appendix).
May 1, 2009		Travel Day

Table 3. Consultation Summary (Provide a summary of any offsite meetings held during the visit to this site)

Date/ Time	Consultation Meeting	Attendees and their contact information	Meeting Summary
	No off-site meetings		

Table 4. Summary of Issues/Concerns/Pertinent Information (Highlight sensitive issues discovered or confirmed on this trip for the site/vicinity/region in relation to facility siting)

Issue	Issue Summary (if appropriate, suggest a resolution or follow-up action)
Applicant needs to quantify air emissions from plant construction for conformity determination.	Issue: Luzerne County is classified as a maintenance area with regard to the National Ambient Air Quality Standard (NAAQS) 8-hour ozone standard. 40 CFR 93, Subpart B requires a conformity determination if the total of the direct and indirect emissions in a nonattainment or maintenance area caused by a Federal action would exceed certain thresholds as specified in 40 CFR 93. For ozone, the thresholds apply to ozone precursors—NOx and VOCs—and are 100 tons/year. If the maintenance area is inside an ozone transport region, then VOC threshold is further reduced to 50 tons/year. Resolution: The Applicant will discuss conformity requirements with the State (PADEP), as Luzerne County is a maintenance area with respect to the 8-hour ozone standard. Additionally, the NRC will evaluate whether 40 CFR 93 Subpart B is applicable to this COL. If 40 CFR 93 is applicable, then the applicant will need to quantify all VOC and NOx emissions (direct and indirect) to allow for a conformity determination. Emissions not addressed in the ER (but are of concern) include construction emissions, which include worker vehicular emissions to-and-from the site as well as emissions from various construction equipment. Note that the applicant will be moving 3 million + cubic yards of ground for the construction of the cooling towers. As a result, VOC and NOx emissions are likely to be higher for this site, especially when compared to other sites that are generally flat and require less site preparation.

Applicant needs to demonstrate that Williamsport temperature and dew point temperature measurements are representative of the BBNPP site and can therefore be used in analyses in the ER, including the SACTI cooling tower plume analysis.	Issue: Although the applicant measures dew point temperature onsite, it was noted that the measurements are often in error and are unreliable. As a result, the applicant chose to use dew point measurements from Williamsport, a nearby first-order National Weather Service (NWS) station, in certain ER analyses, including SACTI. Additionally, the applicant chose to use Williamsport's temperature measurements for consistency. Resolution: The applicant needs to demonstrate that Williamsport's dew point temperature and temperature measurements are representative of the BBNPP site. In addition, the applicant needs to indicate if measurements made at Williamsport follow regulatory guidance (Regulatory Guide 1.23 Revision 1) and justify the use of the data if any departures from guidance..
Local farmers believe that current SSES cooling tower plumes are adversely affecting crops. There is concern that additional cooling towers would compound the problem.	Issue: Two local farmers (Hess and Zaginaylo) raised concern during public comment that the existing SSES cooling tower plumes are adversely affecting their crops. They have concern that the addition of two new cooling towers would worsen the problem. Resolution: Upon receiving the applicant's hourly meteorological data, staff will review UniStar's SACTI cooling tower analysis to confirm the applicant's estimates for cooling tower plume length and frequency. Staff will follow ESRP 5.3.3.1 to determine if the analysis is appropriate and will issue subsequent RAIs to the applicant, if necessary.

<u>Site visit photos</u>:
Any relevant photos taken by the staff should be uploaded to the Environmental Assessment Reactor Review Team Home sharepoint site as soon as possible after completing the visit. Please take the time to annotate each photo to be of as much use to others as possible. Do not digitally process your pictures before uploading, as the native files from the camera contain specific details about each shot that should be preserved.

Appendix A: Meteorology Information Needs Table

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
MET-1	2.7.4 General	Please provide the 2001- 2006 SSES meteorological data used to support the ER in NRC (Regulatory Guide 1.23 Rev 1) format.	Incomplete	Meteorological data (2001-2007) has been prepared and will be submitted. It will include both hourly Reg 1.23 Rev 1 formatted data as well as joint frequency data (JFD).	Yes	
MET-2	2.7.4 Page 2-735	Section 2.7.4 states that "An analysis of the differences between Regulatory Guide 1.23, Revision 0, and Regulatory Guide 1.23, Revision 1, concludes that the guidance provided in the two versions of the document are sufficiently similar, that there is no adverse impact from using the onsite meteorological data monitored for SSES Units 1 and 2 in analyses for BBNPP." What differences were identified and concluded to result in no adverse impact in using the data?	Complete	Applicant noted that SSES tower mostly follows Reg 1.23 Rev 1 guidance. Departures from Rev 1 include: • Tower structure inspection (currently 3 years as opposed to yearly as described in Rev 1) • Formalized obstruction heights in Rev 1 (10x obstruction heights) has prompted applicant to trim trees in the vicinity of the tower to meet guidance. A survey of tree stands around the tower was completed and trees will be trimmed at a later date (postponed due to ecological (bat) concerns). The applicant noted that the trees are currently not a major obstruction, as the data has been self-similar since the initial tower installation. • Cooling tower is within 10 obstruction heights. Applicant has prepared a study which shows the cooling towers are not a major obstruction to the met tower. This report will be cited in the ER and made available on the public docket. Table 6.4-1 of the ER provides a table that compares measurement capability to Reg 1.23 Rev 1 guidance; instrument accuracy is within Reg Guide specification.	No	
MET-3	2.7.1 Page 2-730	Section 2.7.1 should establish an overall context for evaluating the SSES data presented in Section 2.7.4, including a discussion of types of air masses and dominant	Complete	Applicant will consider updating Section 2.7.1 of ER to better explain the synoptic and mesoscale weather features that influence the site. Applicant stated that nearby stations, including Williamsport, Wilkes-Barre Scranton,	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
		synoptic/mesoscale weather features. Section 2.7.1 largely presents summary data for SSES and does not adequately establish a context in which to further evaluate the SSES data in 2.7.4. What are the dominant synoptic weather features for the region that would be reflected in the seasonal/annual averages presented in Section 2.7.4? What are the dominant mesoscale weather features that might be reflected in hourly and daily averages presented in Section 2.7.4? What nearby weather stations (NWS or others) can be used to establish a context for evaluating the SSES data? What is the basis for selecting these stations? More organization is also needed in Section 2.7.1. For example, why are temperature data for Wilkes-Barre/Scranton discussed in Section 2.7.1.4, which is a section about regional precipitation? Wouldn't this summary be more appropriate in Section 2.7.1.3, which is about regional temperatures?		and Allentown, were selected due to their proximity and similar hill-and-valley/river valley influence. Applicant acknowledged that temperature, dew point temperature, and precipitation are likely to be more consistent with BBNPP than wind speed and direction. The latter parameters are more likely to be influenced by local terrain features, as is evidenced by the windrose plots in the ER.		
MET-4	2.7.2.1-2.7.2.3 Page 2-731	Clarify air quality/permitting requirements for areas that are in attainment with the 1 hour ozone standard but were designated as maintenance areas relative to the 8-hour standard (e.g., Columbia County).	Incomplete	Applicant will discuss conformity requirements with the State (PADEP). Of concern are VOC and NOx construction emissions, which include worker vehicular emissions to-and-from the site as well as emissions from various construction equipment onsite. Note that the applicant will be removing 3 million + cubic yards of ground for the construction of the cooling towers. These construction emissions are not addressed in the ER.	Yes	
MET-5	2.7.4.1 Page 2-736	Daily average and extreme temperature and dew point temperature tables (Table 2.17 and Table 2.18, respectively) for SSES and daily average and extreme temperature tables for Williamsport (Table 2.19) are excessive and are not used	Incomplete	Applicant will consider removing hourly temperature and dew point tables in ER and replace them with season and annual average values that more readily allow for the comparison to SSES. Applicant believes that, in general, Williamsport temperatures are more representative of SSES. This connection is	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
		meaningfully in the discussion presented in Section 2.7.4.1. What is the significance of presenting five years of Williamsport's daily mean and extreme temperatures? Is Williamsport more representative than Wilkes-Barre Scranton? How do temperatures measured at SSES compare to the other stations? Are the SSES data showing similar trends as observed at the other sites? Why/why not?		important, particularly because the applicant used temperature and dew point temperature from Williamsport in the SACTI plume analysis.		
MET-6	2.7.4.1 Page 2-736	If humidity data are measured at SSES and are representative of the site, why are the data not used in the SACTI plume analysis in Section 5.3? Why are humidity data from Wilkes-Barre Scranton used in the SACTI analysis and are those data representative of SSES?	Incomplete	Applicant acknowledged that dew-point data measurements at SSES tended to not be reliable (i.e., the instrument would drift shortly after calibration). However, the applicant has not made instrumentation change because of the modification requirements that would be necessary for an operating plant (SSES). Applicant will consider updating ER to better explain why Williamsport dew point temperatures were used instead.	Yes	
MET-7	2.7.4.3 Page 2-737	What is the purpose of introducing the Shickshinny, PA, site for precipitation? Is it because it's only 6 miles away? What is the quality and period of record (POR) for the Shickshinny precipitation data? Why is the annual average precipitation at SSES approximately 8 inches less than the Shickshinny data? How does the SSES precipitation data compare to the other NWS sites?	Complete	Applicant acknowledged that precipitation may be underestimated at site, especially frozen (snow) precipitation. Applicant noted that this could be due, in part, because no wind shield surrounds the instrument. Applicant noted that SSES precipitation measurements do more closely agree with Williamsport and Wilkes-Barre/Scranton and so the Shickshinny data may actually be questionable.	No	
MET-8	2.7.4.3 Page 2-737	Other than mentioning Table 2.7-56, which is a monthly and annual observation summary of fog at nearby NWS sites, fog occurrence is not discussed in Section 2.7.4.3. Which station in 2.7-56 is expected to be similar to Bell Bend with regard to heavy fog observations? Why is there such a difference between the mean number of days per year at Wilkes-Barre Scranton (20.3 days) and Williamsport (36.4 days)?	Complete	Applicant stated that fog observations at Williamsport are likely to be representative of the BBNP site (as are temperature and dew point measurements). Applicant intends to update Section 2.7.4.3 to indicate this in a subsequent revision to the ER.	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
MET-9	2.7.4.4 Page 2-738 and Page 2-1304	How are mixing heights in Tables 2.7-164/165 computed? Would Pittsburgh be a more appropriate twice-daily station (as opposed to Buffalo) since it is not located near Lake Erie/Ontario? Where is the 900 m average annual mixing height discussed in Section 2.7.4.4 used? If used in MACCS2, wouldn't seasonal values be more appropriate?	Incomplete	Applicant acknowledges that both Albany and Buffalo are discussed in separate sections of the ER as being upper-air stations that are representative of the site. Albany data are used in the cooling tower plume analysis (SACTI), whereas Buffalo data are discussed in the section for normal radiological releases. Ultimately, the applicant uses a conservative estimate of mixing height (900m) from a climatological study (Holzworth) for normal radiological releases. The applicant will want to clarify why the various mixing heights are considered representative of the site.	Yes	
MET-10	2.7.4.5 Page 2-739 and Pages 2-1394 through 2-1396	What is the period of record (POR) for the data used to construct the windrose plots for in Figures 2.7-89, 2.7-90, and Figures 2.7-91, for the Wilkes-Barre Scranton, Allentown, and Williamsport stations? The text references sources AREVA 2008d, AREVA 2008e, and AREVA 2008f as the source for these plots, yet citations to these documents are not provided in the reference section. Have the data for the 2001-2006 period (which corresponds to the data period used in the ER) at these three NWS stations been compared to SSES? How do the NWS windrose plots compare to the annual 10- and 60-meter windrose plots for SSES in Figures 2.7-55 and 2.7-72, respectively? What is the explanation for the increased frequency of winds from the NNE and NE at SSES when compared to the NWS stations? What is the justification for using the SSES wind data in the routine release, design basis, and severe accident calculations?	Incomplete	Various periods of data are used to construct the windrose plots in Figures 2.7-89 through Figures 2.7-91, as the data were downloaded from the EPA's SCRAM website. The applicant believes that the windroses are representative of the site and can be generally compared to SSES. The applicant acknowledges that the ER is not clear what period the windroses represent and will provide clarification in a subsequent ER revision. Applicant will also provide references to the data source. The applicant noted that the winds are different at the various stations because of the valley/terrain features that are unique to each measurement location.	Yes	
MET-22	2.7.6.1 general	Please provide a copy of the AEOLUS3 code, user-manual, validation documents, and input/output files associated with the Bell Bend ER for staff confirmatory analysis.	Incomplete	Applicant will make the AEOLUS3 documentation and input/output files for BBNPP available in their reading room.	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
MET-11	2.7.6.1 Page 2-742	What is the purpose of using an additional year of meteorological data (2007) to the six years (2001-2006) described previously in the ER?	Complete	Reg Guide 1.206 directs the applicant to use the most recent year of meteorological data that is available, thus the reason for including year 2007 in the various codes (e.g., AEOLUS3).	No	
MET-12	2.7.6.1.1 Page 2-743	What are recirculation correction factors (RCFs), how are they implemented in the AEOLUS3 model, and how are they calculated in Table 2.7-128?	Incomplete	Applicant developed RCFs that are site-specific; these values are only used in X/Q estimates for normal operations. The RCFs were developed because default RCFs were overly conservative, resulting in unrealistic site X/Qs, especially for the NNW sector. Methodology for developing site-specific RCFs are documented in an internal report "Meteorological Recirculation Factors at Bell Bend Site". Report will be reviewed and notes will be taken at the site audit. In short, RCFs are determined using a puff (MESODIFF II) and plume (XOQDOQ) model to calculate X/Qs and then taking a ratio of their values. Onsite meteorological data for 2006 and site-specific building dimensions and EPR vent stack information (height, diameter, flow rate) were used in the analysis. The RCF's are input for every receptor location; the RCFs are used as a multiplier in AEOLUS3 to increase values of X/Q and D/Q. The RCFs will need to be evaluated and examined during the confirmatory stage of the ER calculations. If an issue is found with the RCFs, an RAI will need to be issued.	Yes	
MET-13	2.7.6.1 Page 2-1271	How are the terrain heights for both grid and special receptors in Table 2.7-128 determined? Are they spot elevations or a maximum elevation between the release and receptor? Describe how were the distances and directions for special receptors (e.g., nearest garden) were determined.	Complete	Terrain heights are maximum values between the release and the receptor. Values are picked off of a USGS map.	No	
MET-14	2.7.6.1 Page 2-1271	How is mixing layer depth of 900 meters (Table 2.7-128) used in the AEOLUS3 code?	Complete	Mixing layer depth is used as in plume reflection in the AEOLUS3 code. A lower mixing depth results in a higher X/Q and D/Q at all downwind sectors.	No	
MET-	5.3.3.1	Please provide the SACTI input/output	Incomplete	Applicant will provide input/output files for	Yes	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
23	General	files for staff confirmatory analysis.		SACTI cooling analysis for docketing.		
MET - 15	5.3.3.1.1 Page 5-29	Section 5.3.3.1 states that temperature, dewpoint, and cloud cover data were merged with SSES wind data to create the meteorological dataset used in the SACTI cooling tower plume analysis. If temperature and dewpoint are measure at SSES, why aren't these data used? Why are twice daily soundings from Albany used in the SACTI analysis, but Buffalo soundings are used in Section 2.7.4.4? Both upper-air stations are stated as being "closest" to BBNPP in the ER section writeups.	Incomplete	Applicant needs to provide justification as to why Williamsport dew point and temperature data were used in the SACTI analysis and are representative of BBNPP. Applicant needs to justify departure from Reg Guide 1.23 Rev 1 for dew point measurements (i.e., it's not at the highest measurement level on the onsite tower).	Yes	
MET-16	5.3.3.1.1 Page 5-29	In Section 5.3.1.1, the four Essential Service Water Supply System (ESWS) mechanical draft cooling tower plume impacts are considered much less when compared to the primary circulating water system (CWS). Provide a description of the ESWS (e.g., location relative to nearby structures and roads, height of towers above ground level, etc). Could the lower ESWS cooling tower heights allow for released plumes contribute meaningfully to ground-level fogging and icing since the plume would be physically closer to the ground?	Incomplete	Applicant does not provide a quantitative assessment of the ESWS impacts. Applicant will quantify ESWS impacts, particularly to onsite (safety) structures.	Yes	
MET-25	5.3.3.2.1 Page 5-33 and Page 5-42	In Section 5.3.3.2.1, provides a maximum deposition of 0.0062 lb/ac per month. Yet Table 5.3-9 lists the maximum deposition rate at 0.0045 lb/ac per month. Resolve this inconsistency. At what downwind distance and direction does the maximum deposition value occur?	Incomplete	Applicant will fix either the ER Section text or table, depending which is in error. ER needs to address cumulative impact for all cooling towers.	Yes	
MET-24	6.4.1 general	Please provide (for review) documentation related to instrument specifications, calibration, and maintenance logs. How are data substitutions performed to achieve the better than 90% data completeness	Complete	Applicant will make instrument documentation available in the reading room and at the safety audit for meteorology. Table 6.4.1 list instrument specifications and accuracy for the SSES meteorological tower.	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
		criteria.		Data substitution at SSES during instrumentation downtime (e.g., during times of calibration) are done using both the backup tower (winds) and the down-river tower (temperature and dew point temperature). The applicant provided a table of data recovery and substitution for each variable for the 2001-2007 period. In general, all instrumentation (and combination of instrumentation (e.g., 10 meter wind speed, wind direction, and delta-T) exceed 95%. Only dew point temperature was poorly measured, with an average data recovery of 60.24% for the 7-year period. Recovery for dew point temperature ranged from 23.87% (2007) to 99.36% (2005).		
MET-17	6.4.1 Page 6-57	Reference is made to three meteorological monitoring locations at SSES: the primary tower, a backup tower, and a supplemental (down-river tower). The section indicates that the down-river tower will be described in subsequent sections; however, it never is discussed. Have the backup and down-river tower measurements been compared with the primary SSES data? Why are they not used as supplemental data to the ER in describing meteorological characteristics for the site?	Complete	Applicant notes that measurements (especially wind) made at the down-river tower are different and not likely to be representative of the general site. Predominant wind direction at the down-river tower is from the west-southwest whereas it's from the east-northeast at SSES. The applicant notes that measured winds from the down river tower would only be used in a post-accident analysis/reconstruction. The applicant notes that the tower instrumentation is out of date, although the tower is maintained. The applicant will consider rewording the ER to either remove mention of the down river tower or explain why its data are not used substantially in the ER, except for limited data substitution at SSES. The applicant intends to make the discussion parallel what is described in the FSAR.	No	
MET-18	6.4.1.5 Page 6-58	How are wind speed/direction averages computed at SSES (i.e., scalar or vector average, Section 6.4.1.5)?	Complete	Scalar wind speed averages are used at all levels and tower locations.	No	
MET-19	6.4.1.6 Page 6-65 and Page 6-67	Tables 6.4-2 and Tables 6.4-5 provide approximate distance to the SSES (pre-application pre-operational) and BBNPP (operational) meteorological towers, respectively, to nearby obstructions. Please indicate the obstruction and its approximate height	Complete	The applicant indicated that the tables reference tree stands that could be potential obstructions. However, these tree stands tend to be at a much lower base elevation than the met tower and so the actual height (from the perspective of the met tower) is considerably less than the tree height. The applicant will indicate that the	No	

Item	ER Rev 1 Section	Information Needed (including literature citation and data analysis summary)	Status post Site Audit	Post-Audit Status Updates	RAI Requested (Why or why not?)	RAI Response Adequacy and Disposition
		relative to the towers.		obstructions refer to trees in the ER text and table descriptions.		
MET-20	6.4.1.6 Page 6-59	The existing meteorological tower is within five obstruction heights of the existing SSES cooling towers. In the ER, a study is mentioned that concludes the cooling towers on wind speed measurements are minimal. Please provide the details of the study and how the conclusion "the impact of the cooling towers on wind speed measurements is minimal and the effect on wind direction measurements is nearly non-existent".	Incomplete	Applicant acknowledges that cooling towers are well within the 10x obstruction heights. However, a study was completed by the applicant (Effect of Plant Structures on the Wind Speed and Direction at the Meteorological Tower at the Susquehanna Steam Electric Plant) which shows that the cooling towers do not appreciably affect wind speed measurements made at the tower. It is preferred that the applicant would reference this study in the ER and docket the report. Applicant also noted that cooling towers are not in the predominant wind direction for the site, further minimizing their influence.	Yes	
MET-21		Provide a knowledgeable expert who can provide information on the downwind effects of the SSES cooling tower on agriculture.	Incomplete	Applicant notes that salt deposition impacts are negligible, as noted in the ER. Applicant notes a study (Ecology III, 1995. Environmental Studies in the vicinity of the Susquehanna Steam Electric Station, 1994 Annual Report. Prepared for PPL Susquehanna, LLC. June 1995) that concludes no impact on surveyed areas which included locations on both sides of the Susquehanna River. Beyond the SACTI analysis provided in the ER and discussions in NUREG 1437, no additional information is available on plume shadowing impacts on agriculture. PNNL will likely perform additional analysis to better quantify impacts of the cooling tower plume.	Possible	

Bell Bend Site Audit Trip Report – Accidents

Project Reviewer Member Name: Adrian Miron
Technical Discipline(s): Accidents
ESP/COL Application: Bell Bend
Name of Site Visited: Bell Bend
Date of Visit: April 27 – May 1, 2009
Project Number:

Table 1. Site Specific Factors Needing Observation/Information Collection

Trip Objective	Information to collect or observe	Objective achieved*
Information Needs	Discuss Design Basis Accidents (DBA), Severe Accident (SA) and Severe Accidents Mitigation Alternatives (SAMA) information needs with BB COL applicant	Partially/RAIs needed Applicant provided many useful answers that clarified most needs. Reports, and in some cases additional analyses will be requested. See below and in Attachment 1 for details on what RAIs will be requested.
Tour proposed BB site location	Observe areas and location for the proposed BB site. In addition, observe the location of Susquehanna NPS and its meteorological tower vis-à-vis the BB proposed site.	Yes

* If no or partial objective achieved, identify reasons.

Table 2. Activities

Date/Time	Event Description/Log
Site Tour, Wednesday April 29, 1 pm	Applicant provided a van tour of the BB site including stops at points on the expected construction footprint, wetlands likely to be impacted, river intake area, cooling tower footprint, and the met tower. In addition, the tour included a visit to the Susquehanna NPS and its meteorological tower.

Table 3. Consultation Summary

Date/ Time	Consultation Meeting	Attendees and their contact information	Meeting Summary
April 28, 8 – 9 am	BB COLA	All participants	Applicant presented the BB COLA status.
April 28, 9 – 11:30 am	Meteorology	Adrian Miron, NUMARK; Jeremy Rishel, PNNL; Theresa Clark, Jack Cushing, NRC; Joshua Reinert, Ted Messier, AREVA; Vernon Hull, Unistar; Frank Hickey, PPL; Mark Abrams, ABS; Larry Winker, PA Dep	Discuss BB meteorology related issues and information needs.
April 28, 1 – 4:30 pm	DBA, SA and SAMA	Adrian Miron, NUMARK; Jeremy Rishel, PNNL; Theresa Clark, NRC; Ted Messier, Pedro Perez (DBA), Joshua Reinert (SA and SAMA), Stanley Levinson (SA, over the phone, Issues 5 and 11), AREVA; Vernon Hull, Unistar	Discuss DBA, SA and SAMA information needs with the BB COL applicant. Applicant provided many useful answers that clarified most information needs. Reports, and in some cases additional analyses will be requested. See below and in Attachment 1 for details on information needs discussion and RAIs that will be requested.
April 28, 4:30 – 6 pm	Daily Close Out	NRC-PNNL-NUMARK Team	Each technical reviewer summarized accomplishments, identified issues, and briefly discussed plans in order to coordinate data, documents and other needs for the next days.
April 29, 8 – 10 am	AEOLUS3 Code Presentation	Adrian Miron, NUMARK; Jeremy Rishel, PNNL; Theresa Clark, Jack Cushing, NRC; Joshua Reinert, Ted Messier, AREVA; Vernon Hull, Unistar; Frank Hickey, PPL;	Applicant presented the AEOLUS3 code used to obtain X/Q values for the DBA and SA analysis. The code was also reviewed by the NRC. Comparison with other codes and methods approved by NRC were also discussed.

April 29, 4:30 – 5:30 pm	Daily Close Out	NRC-PNNL-NUMARK Team	Each technical reviewer summarized accomplishments, identified issues, and briefly discussed plans in order to coordinate data, documents and other needs for the next days.
April 30, 8 – 11:30 am	Meteorology and Accidents closing I	Adrian Miron, NUMARK; Jeremy Rishel, PNNL; Theresa Clark, Jack Cushing, NRC; Joshua Reinert, Ted Messier, AREVA; Vernon Hull, Unistar; Frank Hickey, PPL;	All meteorology and accident-related information needs discussed so far were reviewed and clarified with the applicant.
April 30, 2 - 3 pm	Meteorology and Accidents closing II	Adrian Miron, NUMARK; Jeremy Rishel, Bruce McDowell, Kim Leigh PNNL; Theresa Clark, Jack Cushing, Stacey Imboden NRC; Dmitry and ?	All meteorology and accident-related information needs discussed so far were reviewed and clarified once more. Following RAIs were discussed.

Table 4. Summary of Issues/Concerns/Pertinent Information

Issue	**Issue Summary (if appropriate, suggest a resolution or follow-up action)**
Un-interdicted aquatic food pathway dose	A RAI will follow if the applicant does not include in subsequent ER revisions a qualitative discussion on the BB un-interdicted aquatic food pathway and on how the Susquehanna NPS dose bounds the BB dose for this pathway.
Groundwater pathway dose	A RAI will follow if the applicant does not include in subsequent ER revisions a qualitative discussion on the BB groundwater pathway for a basemat core melthrough accident and on how the NRC's Liquid Pathway Generic Study applies to the BB site for this pathway.
Inhalation dose component for early phase dose	A RAI will follow if the confirmatory calculations would not verify that the doses for the early phase of the accident referred in ER section 7.2 include an inhalation dose component.
Earthquake risk	A RAI will follow if the applicant does not include in subsequent ER revisions a qualitative discussion on why the fire risk bounds an earthquake risk.
DBA source term	A RAI will follow if the applicant does not change in subsequent ER revisions the source term for three DBA (steam system piping failures, locked rotor and rod ejection)
MACCS2 I/O files	A RAI will follow if the applicant does not docket all I/O files for the SA and SAMA analysis.

Confirmatory calculations	A RAI will follow if the confirmatory calculations for DBA, SA and SAMA do not reach similar conclusions.
Large release frequencies (LRF) and Code Damage Frequency (CDF) cutsets	The applicant provided several arguments to justify the evaluation of only top 50% contributing cutsets of LRF and CDF. Possible RAI following discussions with NRC reviewer of design certification ER (Ed Fuller). Question may be asked of design certification applicant and not necessary for COLAs.
Average early and latent cancer fatalities	A RAI will follow if the applicant does not provide the average early and latent cancer fatalities.
Normal operation risk	A RAI will follow if the applicant does not provide reference and justification for the 5.7 person-rem/yr value for normal operation used in ER.

Site visit photos: No photos were taken during this trip.

Attachment 1
Discussion Summary
ER Sections 7.1 through 7.3
April 28, 2009
East Mountain Business Center
Conference Room 3

Participants:

Adrian Miron, NUMARK
Jeremy Rishel, PNNL
Theresa Clark, NRC
Pedro Perez, AREVA (Section 7.1)
Joshua Reinert, AREVA (Sections 7.2 and 7.3)
Stanley Levinson, AREVA (over the phone, Issues 5 and 11)
Ted Messier, AREVA
Vernon Hull, Unistar

Issue ACC-1 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss a quantitative estimate of the risk associated with the un-interdicted aquatic food pathway, including the relative magnitudes of the source terms, the large release core damage frequencies, and any changes in aquatic food harvest.

Status: RAI (for documentation), similar to Calvert Cliffs RAI 171

Discussion:

Joshua mentioned NUREG 1437 as reference for qualitative analysis for the un-interdicted aquatic food pathway. No quantitative, site-specific study was performed for this pathway.

NUREG 1437 analyses water pathways, including un-interdicted aquatic food pathway, for many NPPs, including Susquehanna NPS (SNPS), which is classified as a plant located on a small river. When asked how is this study pertinent to an US EPR at the BB site, Joshua admitted that even if doses, when compared with SNPS, may be in excess of 60 % for this pathway, from a direct correspondence with the power output, due to the fact that the CDF for an US EPR at the BB site is almost 1 order of magnitude smaller than the CDF for SNPS, the risk for this pathway should be smaller or comparable with SNPS covered in the NRC study.

Theresa proposed that this remains an RAI for documentation purpose.

The applicant will consider including in the subsequent ER revisions discussion on the link between SNPS, covered by NUREG 1437, and an US EPR at the BB site.

Issue ACC-2 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss water and groundwater pathway doses by release category, and to discuss water and groundwater pathways out of the containment (i.e., atmospheric versus basemat melthrough).

Status: Closed (single RAI under ACC-3 instead)

Discussion:

Joshua admitted that no quantitative study was performed for the radionuclide transport to the groundwater. He mentioned two related studies for water pathways (NUREGs 1437 and 0440). However, it is not clear how these studies are applicable to an US EPR at the BB site.

Theresa discussed that a similar RAI was issued by the CC RAI (# 176 or 173) and suggested an RAI for the purpose of documenting this issue. This RAI will be combined with ACC-3 and tracked there rather than as two separate RAIs.

The applicant will consider including in the subsequent ER revisions discussion on how the NRC studies are bounding for the US EPR at the BB site for the groundwater pathway.

Issue ACC-3 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss how the Liquid Pathway Generic Study (LPGS) applies to the BBNPP site and to discuss why groundwater doses are 'orders of magnitude less than atmospheric doses'.

Status: RAI (for documentation—applicability of the LPGS to both the site and the design)

Discussion:

Joshua admitted that no quantitative study was performed for the radionuclide transport to the groundwater. He mentioned two related studies for water pathways (NUREG 1437 and 0440). However, it is not clear how these studies are applicable to an US EPR at the BB site.

The applicant will consider including in the subsequent ER revisions discussion on why the groundwater doses are 'orders of magnitude less than atmospheric doses', conclusion reached

by NUREG 0440. The discussion should include arguments on why the NUREG 0440 study is applicable to an US EPR at the BB site.

Issue ACC-4 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the person-rem/yr values used in this section.

Status: Closed

Discussion:

The issue actually refers to the reason of having a value of 0.31 person-rem/yr in the first paragraph of ER Section 7.2.3 and another value of 0.61 person-rem/yr in the fourth paragraph of the same section.

Theresa noticed that the first value refers to a population dose estimated for a 2050 projected population whereas the second value refers to a 2080 projected population.

The issue was closed.

Issue ACC-5 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss population exposures to doses greater than 200 rem (2 Sv) and 25 rem (0.25 Sv).

Status: Closed for purposes of site audit. ER revision may be performed to clarify that only long-term inhalation doses were included; review of input files will also clarify.

Discussion:

Adrian asked about the reason this sentence was included in the ER and what its significance was. Stanley replied over the phone that it was added following a RAI from CC COLA review. It remains to be determined what the significance of this data is.

The applicant will consider replacing of the term “long-term doses” by “ingestion doses” in the next sentence in subsequent ER revisions. It remains to be checked during confirmatory calculations if the doses referred in this section include an inhalation dose component.

Issue ACC-6 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss fire risk versus seismic risk.

Status: RAI (for documentation), similar to Calvert Cliffs RAI 181

Discussion:

Joshua admitted there are no quantitative studies for the earthquake risk. Adrian suggested including in the ER a discussion on why the fire risk bounds an earthquake risk.

Theresa mentioned that this was also an RAI in the CC COLA review and suggested to leave the issue as a RAI for documentation as well.

Joshua also mentioned that there is incipient work on trying to assign a bounding number for the earthquake risk based on a uniform hazard spectra analysis, which shows a much lower value for the earthquake than for the fire risk. This number will be used in subsequent ER revisions.

Issue ACC-7 (in the NRC list submitted to the applicant) and Issue 48 (in AM tracker)

Provide a knowledgeable expert to discuss if the numbers for Averted Public Exposure, Averted Offsite Property Damage Costs, Severe Accident Cost Impact and Maximum Benefit in ER Table 7.3-1 differ from those in Table 4-1, ANP-10290, US EPR Design certification, due only to different population data (2000 vs. 2050).

Status: Closed

Discussion:

Joshua confirmed that different population data contributed to different values for parameters listed above. In addition, specific BB site dose calculation will also yield values that are different from the generic analysis.

In the current EIS template from CC COLA, two values are listed for the AOSC costs (onsite and replacement power costs) in Annex M. Since all these values will be added together there is no need for the applicant to provide separate values and the AOSC totals, as listed in the ER and the DCD for the generic study, are acceptable. Therefore, the values in Tables M2 and M3 in BB DEIS will show only totals for the AOSC costs.

Unless NRC has no other comments on above discussion, this issue is closed.

Issue ACC-8 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss DBA doses.

Status: Closed. Possible ER revision to clarify the adjustment of X/Q values for site-specific considerations.

Discussion:

Pedro described that the doses were calculated by running RADTRAD and ELISA codes for the generic plant in the DCD. The BB DBA doses were obtained by adjusting the X/Q factors that are BB site specific. The X/Q factors were obtained from the AELOUS3 code, which was reviewed by the NRC. Breathing rates were adjusted per the NRC methodology.

Jeremy offered to provide a spreadsheet to run confirmatory calculations for the DBA. If everything checks out, this issue is closed.

The applicant will consider including in the subsequent ER revisions clarification on how these doses were calculated, per the discussion above.

Issue ACC-9 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the EAB doses calculated for the 2-hour period.

Status: Closed. Possible ER revision to better clarify the different timeframes.

Discussion:

Table 7.1-5 in ER gives 50 percentile values for the two hour period that result in the highest dose. For LOCA accidents, this occurs between 1.5 to 3.5 hours and for the rest of the DBAs this corresponds to 0 to 2 hours. This was not clearly explained in the ER.

Vernon agreed to expand the note in Table 7.1-5 in subsequent ER revisions to better describe this issue. Provided that DBA confirmatory calculations reach the same conclusions, this issue is closed.

Issue ACC-10 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the design basis accident source term assumptions of the ER and the assumptions made in the design control document for corresponding accidents (specifically, steam system piping failures, locked rotor accidents, and rod ejection accidents).

Status: Closed. An ER revision for all COLAs related to the failed fuel assumption is forthcoming.

Discussion:

For the three accidents listed above, the radionuclide release fractions and failed fuel fractions do not correspond with the corresponding values in the DCD. Pedro explained that this goes back to the time when the original design documentation was first prepared; at that time, the failed fuel fractions were maximized to correspond to the 90 % of the acceptable limits for the site. Later on, more realistic calculation was performed and their results are reflected in the BB ER. The values will be changed to match the DCD values in the subsequent ER revisions.

The issue was closed.

Issue ACC-11 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss land-use data used in the evaluation.

Status: Closed. Input files will be reviewed at site audit and in reading room. Those were not available in the reading room. The level 3 PRA analysis was reviewed instead.

Discussion:

Stanley assured over the phone that all land-use data used by the MACCS2 code were BB site specific. Provided that I/O files are docketed by the applicant (see issue 12) and their review, as well as confirmatory calculations, matches the values in ER, this issue is closed.

Issue ACC-12 (in the NRC list submitted to the applicant)

Please make available electronic input and output files for all DBA and SA calculations.

Status: Possible RAI if MACCS2 input/output files are not docketed before initial round of RAIs is due.

Discussion:

As indicated above the following codes were used for the results in Sections 7.1 through 7.3: AEOLUS3 (for X/Q values); ELISA and RADTRAD for the DBA and MACCS2 for SA and some SAMA analysis. AEOLUS3 and ELISA are proprietary codes and their I/O will not allow us to perform confirmatory calculations since the codes will not be available. RADTRAD was used for the generic DBA. Since Jeremy has available a spreadsheet for confirmatory calculation, we only need to compare the final results from that analysis and see if the values in ER are bounding.

Provided that I/Os for MACCS2 are docketed, as the applicant agreed, this issue is closed for the site audit.

Issue ACC-13 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the DBA analysis (and ER Table 7.1-1) as compared with the DBAs that are listed in NUREG-1555.

Status: Closed

Discussion:

The issue was to make sure that all potential DBAs for the US EPR design were considered in addition to the ones listed in NUREG 1555, which does not include this design. Pedro stated that this issue was considered during the preparation of the design documentation and the main steam line break DBA was added and discussed in the DCD. There were also other DBAs in NUREG 1555 that are bounding or not applicable to the US EPR, as shown in Table 7.1-1.

Unless the NRC has further comments, this issue is closed.

Issue ACC-14 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss Notes a) and b) in ER Table 7.1-4.

Status: Closed

Discussion:

Notes a) and b) in Table 7.1-4 were the same. Vernon admitted that it is a typo and note a) should be different from note b). This issue will be corrected in subsequent ER revisions.

The issue is closed.

Issue ACC-15 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss inventory estimates in ER Tables 7.1-2 through 7.1-4.

Status: Closed

Discussion:

Pedro stated that these inventories were detailed in Section 15.0.3.3 in DCD. The issue is closed.

Issue ACC-16 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss if the X/Q values given by AREVA NP computer code AEOLUS3 are consistent with approved NRC methodology.

Status: Closed.

Discussion:

Pedro stated that AEOLUS3 code was reviewed by the NRC (ADAMS accession ML043650064 on 12/06/04, Proposed amendment to the technical specs, AREVA doc 32-5052821-01, "Determination of Atmospheric Dispersion Factors for Accident Analyses using Reg Guide 1.145 & 1.194" as well as in ADAMS accession ML032190646, "Vermont Yankee TS Proposed Change No 262, Alternative Source Term", Table 2-1). Unless NRC has any further comments, this issue is closed.

Issue ACC-17 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss why the first χ/Q value in ER Table 7.1-5 differs for LOCA and other accidents.

Status: Closed

Discussion:

See issue ACC-9 above. This issue is closed.

Issue ACC-18 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the selection of X/Q values for each of the time intervals in ER Table 7.1-5 and text.

Status: Closed

Discussion:

The X/Q values listed in Table 7.1-5 listed X/Q values for 0 to 2 hrs, and 1.5 to 3.5 hrs, depending on the DBA type, as explained in the ACC-9 above, and 2 to 8 hrs, whereas the EIS template requires values for worst two hours and 0-8 hrs. All other time intervals are in

accordance with the EIS template. It was collectively agreed that the time intervals values listed in the BB ER would be included in the EIS as it was in the CC DEIS. Unless NRC has any further comments, this issue is closed.

Issue ACC-19 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the code used to calculate the TEDE for DBA and if the code is consistent with NRC guidance.

Status: Closed

Discussion:

See ACC-8 issue above. This issue is closed.

Issue ACC-20 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the 2 EAB distances and release points for all DBAs and SAs.

Status: Closed

Discussion:

Pedro stated that the EAB distance of 0.43 mi is measured from the centerline of the containment building. The other 0.379 mi distance is used to adjust to various other release locations that are not occurring from the containment building.

This issue is closed.

Issue ACC-21 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss inconsistencies in ER Table 7.1-13.

Status: Closed

Discussion:

See issue ACC-10 above. This issue is closed.

Issue ACC-22 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss the 0.48% calorimetric uncertainty in reactor power mentioned in the ER.

Status: Closed

Discussion:

The NRC recommends a 2 % value for the calorimetric uncertainty. Pedro stated that the 0.48 % value comes from ultrasonic flow meter measurements. This difference is similar to the measurement uncertainty recapture power uprates performed for operating plants, in which lower uncertainty values were postulated to justify the uprate. This issue is closed.

Issue ACC-23 (in the NRC list submitted to the applicant)

Provide a knowledgeable expert to discuss why the large release frequencies (LRF) cutsets were not evaluated in addition to the CDF cutsets.

Status: Possible RAI following discussions with NRC reviewer of design certification ER (Ed Fuller). Question may be asked of design certification applicant and not necessary for COLAs.

Discussion:

Joshua provided several arguments for not evaluating LRF cutsets. Essentially, containment improvements were already included in the generic list of SAMAs. In addition, general insights from the Level 2 PRA (which came from examining cutsets initially) were also evaluated. Finally, lower levels of detail are allowed by NUREG-1555 depending on the significance of the area of review. The NRC may ask a question of the DC applicant to document this rationale, because it applies to the generic SAMDA work performed for the design certification.

Other Discussion and Additional Potential RAIs:

1. Issue ACC-24 in AM info needs table, version 6. Justify evaluation of only cutsets contributing top 50% of CDF (similar to Calvert Cliffs RAI 178).

2. Clarify commitment to perform SAMA analysis for areas not possible now (e.g., procedures and training) per ESRP. This commitment should be uniform for all COLAs and is being considered by the staff. Should follow whatever is being done for AP1000 COLAs.

3. Issue 36 in AM tracker. Provide average early and latent cancer fatalities (similar to Calvert Cliffs RAI 169). Closed for the site audit. The applicant agreed with this request.

4. GENERIC: Review all RAIs on Chapter 7 sent to Calvert Cliffs (and Callaway) and confirm that all were either sent to BBNPP or not needed.

5. Issue 39 in AM tracker. Provide location in the ER for the 5.7 person-rem/yr value for normal operation, referenced in Section 7.2. Closed for the site audit. This value was not found in the ER Section 5.4. Vernon agreed to look for it.

6. Issues 28 and 32 in AM tracker. Closed. Covered by ACC-2 and 3 above.

7. Issues 29 through 31 in AM tracker. Closed. The applicant will consider better ways to describe the issues in subsequent ER revisions.

Interfaces Taken from the Hydro, Ecology, Waste and Met Appendices of the Site Audit Guidance, Section 2.

https://earrth.pnl.gov/Tool%20Kits/Site%20Audit%20Tools

Hydrology

Cooling systems and auxiliary water systems

Non-radioactive waste systems

Water use - ground water

Water use - surface water

National Pollutant Discharge Elimination System (NPDES) permit information

Reference point distances such as the distance to the river shore, lake shore, dam, nearest town(s), recreation sites, other special uses, and river mile

Reference elevations such as the normal lake elevation, elevation range of the vicinity, and plant elevation at grade level

Canal dimensions for intake and outfall canals

Identification of liquid effluent points

Related water body surface area dimensions (cooling lakes, cooling ponds, etc.)

Use of local naming conventions such as forks and arms of rivers, creeks, and lakes, and other regional naming issues

Dam dimensions (spillway elevation, dam length, etc.)

Levee dimensions.

Construction-related measures such as dredging.

Meteorology

Location of the meteorological tower relative to existing and proposed structures

Distance from proposed reactor buildings to the exclusion area boundary, low population zone, nearest residence, and nearest garden, for example

Distance from major noise sources to the closest points of the exclusion area boundary and nearest residence

Distance and direction from cooling towers to roads/highways, other facility structures, nearest residence, recreational facilities

Air quality control district, if any, closest air quality monitoring site, regional air quality attainment status, location of nearby Class I areas

Meteorological data to be used in dose calculations (e.g., years)

Estimates of renewable energy resources (e.g., wind power and solar power).

Ecology

Salt plume information from the cooling tower

2- and 10-mile radii

Exact acreage of the proposed site

Exact acreage of the site proposed to be affected by construction activities (construction footprint)

In the case of existing sites, the land area not previously impacted by the original construction expected to be impacted should be distinguished from land previously disturbed by the original construction.

Reference point distances such as the distance to the river shore, lake shore, dam, nearest town(s), recreation sites, other special uses, and river mile.

Reference elevations such as the normal lake elevation, elevation range of the vicinity, and plant elevation at grade level.

Transmission corridor dimensions including corridor length, width, acreage, line voltage rating, and elevation range.

Lengths of and distances to site-related infrastructure such as roads, railways, waterways, gas lines, and industrial facilities.

Canal dimensions for intake and outfall canals.

Related water body surface area dimensions (cooling lakes, cooling ponds, etc.).

Use of local naming conventions such as forks and arms of rivers, creeks, and lakes, and other regional naming issues.

Dam dimensions (spillway elevation, dam length, etc.).

Levee dimensions.

Construction-related measures such as volume of borrow, dredged material, and other fill expected to be used or disposed of at the site.

Parameters for evaluating thermal plume.

Regulatory compliance with water permits.

Commercial/recreational fishing/hunting information.
Descriptions of nonradioactive effluent treatment facilities

Waste- Tim and Lara

Average, maximum, and seasonal variations of principal constituents of intake and receiving waters and any minor or trace materials that may be of environmental relevance

A list of chemicals processed through each system (e.g., corrosion inhibitors and antifouling agents) and total amounts used per year, frequency of use, and concentrations of these chemicals or their products in each waste stream

The concentration factor on a seasonal basis for evaporative cooling systems

The average and maximum concentration of natural materials in effluent streams

The operating cycles for each effluent treatment system for normal modes of facility operation (e.g., full power operation, shutdown/refueling, and startup).

A description of the systems (both temporary and permanent) to be provided during construction and operation

Anticipated quantity and characteristics of treated effluents

The ultimate disposal of treated effluents

Standards for the proposed sanitary system effluents

The National Pollutant Discharge Elimination System (NPDES) permit.

Estimates of gaseous effluents (e.g., from diesel engines, gas turbines, heating plants, and incinerators) released during facility operation, the location and elevation of release points, the frequency of their release and their treatment before release, and the total quantity of SO_x, NO_x, hydrocarbons, and suspended particulates to be discharged annually.

Applicable Federal, State, and tribal regional standards concerning atmospheric emissions from regulations established by Federal, State, regional, local, and affected Native American tribal agencies.

Information concerning nonradioactive wastes not considered in ESRPs 3.6.1 and 3.6.2, such as laboratory wastes, storm drainage, trash, hazardous wastes, and debris from bars or screens on the cooling water intake. The description should include estimates of the quantities of wastes, their pollutant concentrations at points of release as appropriate to the system, and other relevant data.

Procedures for any offsite disposal of wastes.

Procedures by which all effluents will be treated, controlled, and discharged to meet State and U.S. Environmental Protection Agency effluent limitation guidelines and new source performance standards.

Descriptions of nonradioactive waste systems, including quantities, composition, and frequency of waste discharges to water, land, and air

For discharges to water, waste concentrations at the point of discharge, predicted dilution in the receiving water body, and estimates of concentrations at various distances from the discharge point

Ambient concentrations in the receiving water body of the chemicals and other materials contained in the waste discharges

Receiving water body water-quality criteria for domestic, industrial, agricultural, and recreational uses

Water use for the receiving water bodies

Aquatic ecology for the receiving water bodies

For discharges to land (other than at licensed commercial waste disposal sites), size and location of disposal sites, quantity and composition of wastes, and method of disposal (e.g., burial, combustion, and evaporation)

Terrestrial ecology at disposal sites other than licensed commercial sites

Soil data for disposal site (other than licensed commercial sites), and potential for transport of wastes to ground and surface waters

Plans for ultimate treatment and/or restoration of retired disposal sites (other than licensed commercial sites)

Applicable Federal, State, regional, local, and affected Native American tribal criteria or standards for air quality and for solid-waste disposal to land areas

Other site-specific waste-disposal activities (e.g., spoils from intermittent dredging activities)

Applicant's NPDES permit and water quality certification or their status if not issued.

Descriptions of systems that create mixed wastes, including quantities of waste produced

Anticipated disposal plans for mixed wastes (i.e., disposal at a mixed-waste disposal facility, shipment to a treatment facility, or storage onsite)

Estimated environmental impacts, including health effects resulting from exposure to the

chemical constituents and those resulting from radiological exposures that are estimated to be received by workers as a result of mixed-waste testing and storage

A waste minimization plan that identifies process changes that can be made to reduce or eliminate mixed wastes.

Interfaces Taken from the Accidents, Met, Hydro, Land Use, Socio, and Rad Appendices of the Site Audit Guidance, Section 2.

https://earrth.pnl.gov/Tool%20Kits/Site%20Audit%20Tools

Accidents

Meteorological data to be used for atmospheric dispersion parameters, severe accident analysis

Demographic information to be used for population dose estimates

Surface water use within 50 miles of the facility for severe accident analysis

Land-use characterization for severe accident analysis

Exclusion Area Boundary and Low Population Zone for design basis accidents (DBAs).

Exact centerpoint coordinates of the proposed plant

Exact acreage of the proposed site

Exact acreage of the site proposed to be affected by construction activities (construction footprint)

In the case of existing sites, the land area not previously impacted by the original construction expected to be impacted should be distinguished from land previously disturbed by the original construction

Reference point distances such as the distance to the river shore, lake shore, dam, nearest town(s), recreation sites, other special uses, and river mile

Reference elevations such as the normal lake elevation, elevation range of the vicinity, and plant elevation at grade level

Transmission corridor dimensions including corridor length, width, acreage, line voltage rating, and elevation range

Meteorology

Location of the meteorological tower relative to existing and proposed structures

Distance from proposed reactor buildings to the exclusion area boundary, low population zone, nearest residence, and nearest garden, for example

Distance from major noise sources to the closest points of the exclusion area boundary and nearest residence

Distance and direction from cooling towers to roads/highways, other facility structures, nearest residence, recreational facilities

Air quality control district, if any, closest air quality monitoring site, regional air quality attainment status, location of nearby Class I areas

Meteorological data to be used in dose calculations (e.g., years)

Estimates of renewable energy resources (e.g., wind power and solar power).

Radiological Health

Coordinates of the proposed facility and effluent release locations

The physical layout of the site, including the location and orientation of onsite or adjacent nuclear fuel cycle facilities that are expected to be operating during construction of the proposed facility

The location and characteristics of external radiation sources and radioactive effluent emission sources at nearby facilities

Measured or estimated radiation dose rates and airborne radioactivity concentrations at the construction site

The number and locations of construction workers who will be exposed to the radiation sources at the site and the amount of time per year that they will spend at those locations

The estimated annual collective dose to the construction work force, including models assumptions, and input data used for the dose estimates

Distances from the proposed reactor to the following points or areas for each of the 22½-41 degree radial sectors centered on the 16 cardinal compass directions:

- Nearest site boundary
- To a distance of 8 km (5 mi), each receptor and its location for the nearest residence, milk cow, milk goat, meat animal, and vegetable garden larger than 50 m^2
- If the applicant proposes elevated releases of radioactive effluents as defined in Regulatory Guide 1.111, the location of all milk cows, milk goats, meat animals, residences, and vegetable gardens larger than 50 m^2 out to a distance of 5 km (3 mi).

For the applicable locations noted above, the grazing seasons and fraction of daily intake of cows, meat animals, and milk goats derived from pasture or fresh forage during the grazing season

Fraction of the year that leafy vegetables are grown

Average absolute humidity in grams per cubic meter during the growing season

The nearest present and known future locations from which an individual can obtain aquatic food and/or drinking water

The nearest present and known future shoreline areas that an individual can use for recreational purposes

For the two locations noted immediately above, the transit time of each facility discharge stream containing liquid radwaste discharge from the point at which the stream enters an unrestricted area to the identified location, and the estimated stream dilution at that location.

For each liquid radwaste discharge, the transit time from input to a facility discharge stream to the point at which the stream enters an unrestricted area, and the stream discharge in cubic meters per second

The following distributional data for each of the 22½-degree radial sectors centered on the 16 cardinal compass directions for radial distances of 2, 4, 6, 8, 10, 20, 40, 60, and 80 km (1.2, 2.5, 3.7, 5, 6.2, 12, 25, 27, and 50 mi) from the reactor:

Projected population for five years from the time of the licensing action under consideration

Present annual meat production (kg/yr)

Present annual milk production (liter/yr)

Present annual vegetable production (kg/yr)

Estimate of direct radiation doses from sources within the site.

The present commercial fish and invertebrate catch (in kg/yr) from waters within 80 km (50 mi) downstream (or 80-km [50-mi] radius for lake or coastal sites) of the facility radwaste discharge; major catch locations, their distance from the facility radwaste discharge, and the amount caught within 80 km (50 mi) of the facility that is consumed; transit time from the point at which the discharge stream enters an unrestricted area to each major catch location, the estimated dilution at each location, and the basis for calculating transit time and dilution

Present and known future drinking water intake locations within 80 km (50 mi) of the facility radwaste discharge (downstream or radius); the transit time and estimated dilution at each major location, the basis for calculating transit time and dilution, and the populations served or the daily water consumption at each location

The irrigation rate (liter/m^2/month), crop yield (kg/m^2), annual production (kg/yr), and growing period (days) for irrigated land using water withdrawn within 80 km (50 mi) of the facility radwaste discharge (downstream or radius) when crop production has the potential for contributing 10 percent or more to individual or population doses because of liquid effluents; the crop type and its use (e.g., human consumption and meat animals), total crop production (by type) within the 80-km (50-mi) distance, and the amounts consumed within an 80-km (50-mi) radius of the facility; transit time from the point at which the discharge stream enters an unrestricted area to the points of withdrawal, estimated dilution at each withdrawal point, and the bases for calculating transit times and dilution factors

Unusual animals, plants, agricultural practices, game harvests, or food processing operations having the potential to contribute 10 percent or more to either individual or population doses in areas affected by liquid effluents, and food-processing operations involving large quantities of water

Gaseous and liquid effluent data

Exposure rates associated with onsite out-of-plant storage of solid waste

Applicant calculated dose data

Occupational radiation dose estimates

Data on water use to support the analysis of public dose from waterborne sources

Estimated individual and collective doses

Maximum site-specific doses to members of the public

Dose consequences and health effects associated with normal operational effluents

Summary of the maximum individual and collective dose estimates

Radiation dose data including:

- Maximum individual doses from liquid effluents
- Maximum individual doses from gaseous effluents
- Maximum individual doses from direct radiation sources
- Collective doses to the population within 80 km (50 mi) of the facility
- Occupational collective doses.

Background radiation doses that are generally applicable to the site

A list of non-human biota to be considered in the radiological evaluation

Site-specific pathways for radiation exposure to non-human biota

Doses to the maximally exposed individual non-human biota

A map or aerial photograph of the site vicinity with proposed monitoring and sampling locations identified and indicating the medium sampled at each location

A description of the proposed radiological environmental monitoring program including:

- Number and location of sample collection points and measuring devices and the pathway sampled or measured

- Sample size, sample collection frequency, and sampling duration

- Type and frequency of analysis

- General types of sample collection and measuring equipment

- Lower limit of detection for each analysis

- The approximate date on which the proposed program will be effective

- The quality-assurance program for radiological environmental monitoring programs.

A discussion justifying the choice of radiological monitoring sample sites, analyses, sampling frequencies, sampling and measuring durations, sample sizes, and lower limits of detection.

Hydrology

Cooling systems and auxiliary water systems

Non-radioactive waste systems

Water use - ground water

Water use - surface water

National Pollutant Discharge Elimination System (NPDES) permit information

Reference point distances such as the distance to the river shore, lake shore, dam, nearest town(s), recreation sites, other special uses, and river mile

Reference elevations such as the normal lake elevation, elevation range of the vicinity, and plant elevation at grade level

Canal dimensions for intake and outfall canals

Identification of liquid effluent points

Related water body surface area dimensions (cooling lakes, cooling ponds, etc.)

Use of local naming conventions such as forks and arms of rivers, creeks, and lakes, and other regional naming issues

Dam dimensions (spillway elevation, dam length, etc.)

Levee dimensions.

Construction-related measures such as dredging.

Land Use and Socio

Exact centerpoint coordinates of the proposed plant.

Exact acreage of the proposed site.

Exact acreage of the site proposed to be affected by construction activities (construction footprint).

In the case of existing sites, the land area not previously impacted by the original construction expected to be impacted should be distinguished from land previously disturbed by the original construction.

Reference point distances such as the distance to the river shore, lake shore, dam, nearest town(s), recreation sites, other special uses, and river mile.

Reference elevations such as the normal lake elevation, elevation range of the vicinity, and plant elevation at grade level.

Lengths of and distances to site-related infrastructure such as roads, railways, waterways, gas lines, and industrial facilities.

Related water body surface area dimensions (e.g., cooling lakes, cooling ponds)

Use of local naming conventions such as forks and arms of rivers, creeks, and lakes and other regional naming issues.

Dam dimensions (e.g., spillway elevation, dam length).

Site and Tech

Ownership structure, site owner, power station owner, transmission owner

Commonly used or referenced site/plant parameters such as generation capacity, transmission resource dimensions, plant cooling technology, intake water source, outfall water destination, and waste storage design parameters.

Similar information about the alternative sites

Understanding of required permitting actions and applicable legal constraints under which the applicant will need to operate
General information about the immediate communities and wider region of the site.