

Combined License Application

Part 3: Environmental Report

This COLA Part is completely site-specific and brackets {} are not used.

COPYRIGHT © 2011

©UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets.

All rights reserved.
COPYRIGHT PROTECTED

For additional Copyright information contact:

Mr. Mark T. Finley
Senior Vice President, Regulatory Affairs
UniStar Nuclear Services, LLC
750 E. Pratt Street
Baltimore, Maryland 21202

Table of Contents

1.0	Introduction	1-1
1.1	Proposed Action	1-2
1.2	Project Description	1-3
1.2.1	Ownership and Applicant	1-3
1.2.2	Site Location	1-3
1.2.3	Reactor Information	1-3
1.2.4	Cooling System Information	1-3
1.2.5	Transmission System Information	1-5
1.2.6	Proposed Action and Constraints	1-5
1.2.7	Major Activity Start and Completion Dates	1-6
1.3	Status Of Reviews, Approvals and Consultations	1-12
1.3.1	Federal Agencies	1-12
1.3.2	State Agencies	1-16
1.3.3	Local Agencies	1-20
1.4	References	1-31
2.0	Environmental Description	2-1
2.1	Station Location	2-2
2.2	Land	2-8
2.2.1	The Site and Vicinity	2-8
2.2.2	Transmission Corridors and Offsite Areas	2-10
2.2.3	The Region	2-11
2.2.4	References	2-13
2.3	Water	2-36
2.3.1	Hydrology	2-36
2.3.2	Water Use	2-63
2.3.3	Water Quality	2-82
2.4	Ecology	2-531
2.4.1	Terrestrial Ecology	2-531
2.4.2	Aquatic Ecology	2-550
2.4.3	References	2-565
2.5	Socioeconomics	2-634
2.5.1	Demography	2-634
2.5.2	Community Characteristics	2-643
2.5.3	Historical Properties	2-680
2.5.4	Environmental Justice	2-696
2.6	Geology	2-871
2.6.1	Geologic Setting	2-871
2.6.2	Stratigraphy	2-871
2.6.3	Geologic Hazard Evaluation	2-876
2.6.4	Geologic Impact Evaluation	2-878
2.6.5	References	2-878
2.7	Meteorology and Air Quality	2-884
2.7.1	General Climate	2-884
2.7.2	Regional Air Quality	2-886

2.7.3	Severe Weather Phenomena	2-887
2.7.4	Local Meteorology	2-890
2.7.5	Maximum Terrain Heights and Topographic Maps	2-896
2.7.6	Atmospheric Dispersion Factors	2-897
2.7.7	Noise	2-900
2.7.8	References	2-902
2.8	Related Federal Project Activities	2-1601
2.8.1	Land Acquisition and Use of Electrical Transmission corridors	2-1601
2.8.2	Cooling Water source and Supply	2-1602
2.8.3	Other Federal Actions Affecting Construction or Operation	2-1602
2.8.4	Federal Agency Plans Used to Justify the Need for Power	2-1602
2.8.5	Planned Federal Projects Contingent on Plant Construction or Operation	2-1602
2.8.6	Non-Federal Potential Impacts	2-1602
2.8.7	References	2-1602
3.0	Plant Description	3-1
3.1	External Appearance and Plant Layout	3-2
3.1.1	References	3-4
3.2	Reactor Power Conversion System	3-12
3.2.1	General	3-12
3.3	Plant Water Use	3-16
3.3.1	Water Consumption	3-16
3.3.2	Water Treatment	3-18
3.3.3	References	3-20
3.4	Cooling System	3-26
3.4.1	Description and Operational Modes	3-26
3.4.2	Component Description	3-29
3.4.3	References	3-33
3.5	Radwaste Systems and Source Terms	3-49
3.5.1	Source Terms	3-49
3.5.2	Radioactive Liquid Processing System	3-52
3.5.3	Radioactive Gaseous Treatment Systems	3-59
3.5.4	Solid Radioactive Waste System	3-65
3.5.5	Process and Effluent Monitoring	3-69
3.5.6	References	3-73
3.6	Non-Radioactive Waste Systems	3-136
3.6.1	Effluents Containing Chemicals or Biocides	3-136
3.6.2	Sanitary System Effluents	3-136
3.6.3	Other Effluents	3-137
3.6.4	References	3-142
3.7	Power Transmission System	3-157
3.7.1	Substation and Connecting Circuits	3-158
3.7.2	Electrical Design Parameters	3-160
3.7.3	Noise Levels	3-160
3.7.4	Structural Design	3-161
3.7.5	Inspection and Maintenance	3-161
3.7.6	Compliance and Siting	3-161
3.7.7	References	3-162

3.8	Transportation of Radioactive Materials	3-165
3.8.1	Reactor Data	3-165
3.8.2	Onsite Storage Facilities for Irradiated Fuel	3-165
3.8.3	Treatment and Packaging of Radioactive Materials other than Irradiated Fuel	3-165
3.8.4	Transportation System for Fuel and Other Radioactive Waste	3-166
3.8.5	Transportation Distance from the Plant to the Storage Facility	3-166
3.8.6	Conclusions	3-166
3.8.7	References	3-166
4.0	Environmental Impacts of Construction	4-1
4.1	Land Use Impacts	4-2
4.1.1	The Site and Vicinity	4-2
4.1.2	Transmission Corridors and Offsite Areas	4-5
4.1.3	Historic properties	4-6
4.1.4	References	4-13
4.2	Water-Related Impacts	4-21
4.2.1	Hydrologic Alterations	4-21
4.2.2	Water Use Impacts	4-31
4.3	Ecological Impact	4-44
4.3.1	Terrestrial Ecosystems	4-44
4.3.2	Aquatic Ecosystems	4-60
4.3.3	References	4-68
4.4	Socioeconomic Impacts	4-80
4.4.1	Physical Impacts	4-80
4.4.2	Social and Economic Impacts	4-84
4.4.3	Environmental Justice Impacts	4-102
4.5	Radiation Exposure to Construction Workers	4-120
4.5.1	Site Layout	4-120
4.5.2	Radiation sources at BBNPP	4-120
4.5.3	Historical Dose Rates	4-121
4.5.4	Projected Dose Rates at BBNPP	4-121
4.5.5	Compliance with Dose Rate Regulations	4-126
4.5.6	Collective Doses to BBNPP Workers	4-127
4.5.7	Radiation Protection and ALARA Program	4-128
4.5.8	References	4-129
4.6	Measures and Controls to Limit Adverse Impacts during Construction	4-163
4.7	Nonradiological Health Impacts	4-185
4.7.1	Public Health	4-185
4.7.2	Occupational Health	4-185
4.7.3	References	4-186
5.0	Environmental impacts of station operation	5-1
5.1	Land Use Impacts	5-2
5.1.1	The Site and Vicinity	5-2
5.1.2	Transmission Corridors and Outside Areas	5-3
5.1.3	Historic Properties and Cultural Resources	5-5
5.1.4	References	5-12
5.2	Water Related Impacts	5-14
5.2.1	Hydrologic Alterations and Plant Water Supply	5-14
5.2.2	Water Use Impacts	5-17

5.2.3	Water Quality Impacts	5-18
5.2.4	References	5-21
5.3	Cooling System Impacts	5-25
5.3.1	Intake System	5-25
5.3.2	Discharge System	5-30
5.3.3	Heat Discharge System	5-37
5.3.4	Impacts to Members of the Public	5-45
5.4	Radiological Impacts of Normal Operations	5-66
5.4.1	Exposure Pathways	5-66
5.4.2	Radiation Doses to Members of the public	5-69
5.4.3	Impacts to Members of the Public	5-71
5.4.4	Impacts to Biota other than Members of the Public	5-73
5.5	Environmental Impact of Waste	5-113
5.5.1	Nonradioactive Waste System Impacts	5-113
5.5.2	Mixed Waste Impacts	5-115
5.6	Transmission System Impacts	5-118
5.6.1	Terrestrial Ecosystems	5-118
5.6.2	Aquatic Ecosystems	5-123
5.6.3	Impacts to Members of the Public	5-127
5.7	Uranium Fuel Cycle Impacts	5-132
5.7.1	Land Use	5-135
5.7.2	Water Use	5-135
5.7.3	Fossil Fuel Impacts	5-136
5.7.4	Chemical Effluents	5-136
5.7.5	Radioactive Effluents	5-137
5.7.6	Radioactive Wastes	5-138
5.7.7	Occupational Dose	5-138
5.7.8	Transportation	5-139
5.7.9	Fuel Cycle	5-139
5.7.10	References	5-139
5.8	Socioeconomic Impacts	5-145
5.8.1	Physical Impacts of Station Operation	5-145
5.8.2	Social and Economic	5-149
5.8.3	Environmental Justice Impacts	5-159
5.9	Decommissioning	5-168
5.9.1	NRC Generic Environmental Impact Statement Regarding Decommissioning	5-168
5.9.2	Decommissioning Cost Analysis Summary	5-168
5.9.3	References	5-169
5.10	Measures and Controls to Limit Adverse Impacts during Operation	5-170
5.10.1	Impacts during Operation	5-170
5.10.2	References	5-171
5.11	Transportation of Radioactive Materials	5-187
5.11.1	Fuel Cladding Environmental Impact	5-188
5.11.2	Heat (Irradiated Fuel Cask in Transit) Environmental Impact	5-188
5.11.3	Incident-Free Dose and Traffic Density Impact Analysis	5-189
5.11.4	Summary and Conclusion	5-194
5.11.5	References	5-194

5.12	Nonradiological Health Impacts	5-202
5.12.1	Public Health	5-202
5.12.2	Occupational Health	5-202
5.12.3	References	5-203
6.0	Environmental Measurements and Monitoring Programs	6-1
6.1	Thermal Monitoring	6-2
6.1.1	Preapplication Monitoring	6-2
6.1.2	Preoperational Monitoring	6-3
6.1.3	Operational Monitoring	6-3
6.1.4	References	6-4
6.2	Radiological Monitoring	6-7
6.2.1	Pathways Monitored	6-8
6.2.2	Land Use Census	6-9
6.2.3	Environmental Monitoring Program Sample Types	6-9
6.2.4	Sample Size	6-10
6.2.5	Radiological Environmental Monitoring Program Reports	6-10
6.2.6	Quality Assurance program	6-11
6.2.7	REMP Modifications for BBNPP	6-11
6.2.8	Ground Water Protection Program	6-12
6.2.9	Preoperational (Units 1 & 2) Site Area Background Radiation	6-13
6.2.10	References	6-14
6.3	Hydrological Monitoring	6-51
6.3.1	Preapplication Monitoring	6-51
6.3.2	Construction and pre-Operational Monitoring	6-52
6.3.3	Operational Monitoring	6-53
6.3.4	References	6-54
6.4	Meteorological Monitoring	6-56
6.4.1	Pre-Application and pre-Operational Meteorological Measurement program	6-56
6.4.2	Operational Meteorological Measurement program	6-59
6.4.3	References	6-62
6.5	Ecological Monitoring	6-74
6.5.1	Terrestrial Ecology and Land Use	6-74
6.5.2	Aquatic Ecology	6-76
6.5.3	References	6-80
6.6	Chemical Monitoring	6-81
6.6.1	Preapplication Monitoring	6-81
6.6.2	Construction and Preoperational Monitoring	6-84
6.6.3	Operational Monitoring	6-85
6.6.4	References	6-87
6.7	Summary of Monitoring Programs	6-90
6.7.1	Preapplication Monitoring	6-90
6.7.2	Construction and Preoperational Monitoring	6-90
6.7.3	Operational Monitoring	6-90
6.7.4	References	6-90
7.0	Environmental Impacts of Postulated Accidents Involving Radioactive Materials	7-1
7.1	Design Basis Accidents	7-2
7.1.1	References	7-3

7.2	Severe Accidents	7-45
7.2.1	Methodology	7-45
7.2.2	Consequences to Population Groups	7-47
7.2.3	Conclusions	7-49
7.2.4	References	7-50
7.3	Severe Accident Mitigation Design Alternatives	7-54
7.3.1	SAMDA Analysis Methodology	7-54
7.3.2	Severe Accident Cost Impact and Maximum Benefit for BBNPP	7-56
7.3.3	Sensitivity Studies	7-57
7.3.4	Results and Summary	7-57
7.3.5	References	7-58
7.4	Transportation Accidents	7-64
7.4.1	Radiological Impacts	7-65
7.4.2	Non-Radiological Impacts	7-67
7.4.3	Summary and Conclusion	7-69
7.4.4	References	7-69
8.0	Need For Power	8-1
8.0.1	References	8-6
8.1	Description of Power System	8-8
8.1.1	Systematic Process	8-12
8.1.2	Comprehensive Process	8-13
8.1.3	Confirmation Process	8-13
8.1.4	Consideration of Uncertainty	8-13
8.1.5	Conclusion	8-14
8.1.6	References	8-14
8.2	Power Demand	8-21
8.2.1	Power and Energy Requirements	8-21
8.2.2	Factors Affecting Power Growth and Demand	8-23
8.2.3	References	8-29
8.3	Power Supply	8-41
8.3.1	References	8-50
8.4	Assessment of Need for Power	8-69
8.4.1	Assessment of the Need for New Capacity	8-69
8.4.2	Other Benefits of New Nuclear Capacity	8-71
8.4.3	Summary of Need for Power	8-72
8.4.4	References	8-73
9.0	Alternatives To The Proposed Action	9-1
9.1	No-Action Alternative	9-2
9.1.1	References	9-4
9.2	Energy Alternatives	9-6
9.2.1	Alternatives Not Requiring New Generating Capacity	9-6
9.2.2	Alternatives that Require New Generating Capacity	9-12
9.2.3	Assessment of Reasonable Alternative Energy Sources and Systems	9-26
9.2.4	References	9-36
9.3	Alternative Sites	9-50
9.3.1	Site Selection Process	9-51
9.3.2	Proposed and Alternative Site Evaluation	9-60

9.3.3	Summary and Conclusions	9-220
9.3.4	References	9-221
9.4	Alternative Plant and Transmission Systems	9-520
9.4.1	Heat Dissipation Systems	9-520
9.4.2	Circulating Water Systems	9-528
9.4.3	Transmission systems	9-535
9.4.4	References	9-535
10.0	Environmental Consequences of the Proposed Action	10-1
10.1	Unavoidable Adverse Environmental Impacts	10-2
10.1.1	Unavoidable Adverse Environmental Impacts of Construction	10-2
10.1.2	Unavoidable Adverse Environmental Impacts of Operations	10-2
10.1.3	Summary of Unavoidable Adverse Environmental Impacts from Construction and Operations	10-2
10.1.4	References	10-5
10.2	Irreversible and Irretrievable Commitments of Resources	10-14
10.2.1	Irreversible Environmental Commitments	10-14
10.2.2	Irretrievable Commitments of Resources	10-15
10.2.3	References	10-16
10.3	Relationship Between Short-term Uses and Long-term Productivity of the Human Environment	10-23
10.3.1	Construction and Long-Term Productivity	10-23
10.3.2	Operation and Long-Term Productivity	10-24
10.3.3	Summary of Relationship between Short-Term and Long-Term Productivity	10-25
10.3.4	References	10-25
10.4	Benefit-Cost Balance	10-26
10.4.1	Benefits	10-26
10.4.2	Costs	10-29
10.4.3	Summary	10-32
10.4.4	References	10-32
10.5	Cumulative Impacts	10-58
10.5.1	Cumulative Impacts from Construction	10-58
10.5.2	Cumulative Impacts of Operations	10-62
10.5.3	Cumulative Impacts Summary	10-67
10.5.4	References	10-67

List of Tables

Table 1.3-1— Federal, State and Local Authorizations	1-21
Table 2.2-1— Land Use Categories within BBNPP Project Boundary: Pre- and Post-Construction	2-15
Table 2.2-2— Land Use Categories within 6 mi (10 km) Vicinity	2-16
Table 2.2-3— State Controlled Lands within 6 mi (10 km) Vicinity	2-17
Table 2.2-4— Trust Land within 6 mi (10 km) Vicinity	2-18
Table 2.2-5— Land Use Categories within 50 mi (80 km) Region	2-19
Table 2.2-6— Land Use Categories within 50 mi (80 km) Region	2-20
Table 2.2-7— Land Use Categories within Luzerne County	2-21
Table 2.2-8— Land Use Categories within Columbia County	2-22
Table 2.2-9— Trust Lands within 50 mi (80 km) Region	2-23
Table 2.2-10— County and Local Parks within 50 mi (80 km) Region	2-24
Table 2.2-11— State Park Lands within 50 mi (80 km) Region	2-25
Table 2.2-12— State Game Lands within 50 mi (80 km) Region	2-26
Table 2.2-13— State Forest Lands within 50 mi (80 km) Region	2-27
Table 2.2-14— Wild and Natural Areas within 50 mi (80 km) Region	2-28
Table 2.3-1— Sub-basin Flow Path Length and Slope	2-97
Table 2.3-2— Annual Peak Streamflow for Wilkes-Barre, PA USGS Station No. 01536500, (1787 through 2006)	2-98
Table 2.3-3— Monthly Streamflow for Danville, PA USGS Station No. 01540500, (1905 through 2006)	2-101
Table 2.3-4— Mean Daily Streamflow for Wilkes-Barre, PA USGS Station No. 01536500, (1899 through 2006)	2-105
Table 2.3-5— Maximum Daily Streamflow for Wilkes-Barre, PA USGS Station No. 01536500, (1899 through 2006)	2-106
Table 2.3-6— Minimum Daily Streamflow for Wilkes-Barre, PA USGS Station No. 01536500, (1899 through 2006)	2-107
Table 2.3-7— Annual Peak Streamflow for Danville, PA USGS Station No. 01540500, (1905 through 2006)	2-108
Table 2.3-8— Monthly Streamflow for Wilkes-Barre, PA USGS Station No. 01536500, (1899 through 2006)	2-111
Table 2.3-9— Mean Daily Streamflow for Danville, PA USGS Station No. 01540500, (1905 through 2006)	2-115
Table 2.3-10— Maximum Daily Streamflow for Danville, PA USGS Station No. 01540500, (1905 through 2006)	2-116
Table 2.3-11— Minimum Daily Streamflow for Danville, PA USGS Station No. 01540500, (1905 through 2006)	2-117
Table 2.3-12— {Susquehanna River Basin Upstream Dam Information}	2-118
Table 2.3-13— Physical Characteristics of Groundwater Wells in the North Branch Susquehanna River Basin, Pennsylvania	2-126
Table 2.3-14— Yields and Specific Capacities of Wells in the North Branch Susquehanna River Basin, Pennsylvania	2-127
Table 2.3-15— Specific Capacities of Wells in the Berwick-Bloomsburg-Danville Area, Pennsylvania	2-128
Table 2.3-16— Effect of Lithology on Well Yields, Berwick-Bloomsburg - Danville Area, Pennsylvania	2-129
Table 2.3-17— Computed Water Budget Components for Selected Drainage Basins in the North Branch Susquehanna River Basin, Pennsylvania	2-130
Table 2.3-18— BBNPP Monitoring Wells and Construction Details	2-131
Table 2.3-19— Monthly Groundwater Elevation Measurements, 2007-2008, BBNPP	2-134
Table 2.3-20— Monthly Groundwater Elevation Measurements, BBNPP, 2010-2011	2-138

Table 2.3-21— Monthly Surface Water Elevation Measurements, 2007-2008, BBNPP	2-142
Table 2.3-22— Monthly Surface Water Elevation Measurements 2010-2011, BBNPP	2-144
Table 2.3-23— Horizontal Hydraulic Gradients, 2007-2008	2-146
Table 2.3-24— - Horizontal Hydraulic Gradients, 2010-2011	2-149
Table 2.3-25— 2007-2008 Vertical Hydraulic Gradients and Flow Directions	2-151
Table 2.3-26— Vertical Hydraulic Gradients and Flow Directions	2-153
Table 2.3-27— Hydraulic Conductivity Values Based on Slug Tests	2-158
Table 2.3-28— - Hydraulic Properties Based on Pumping Tests	2-160
Table 2.3-29— Hydraulic Conductivity Values of Bedrock (Mahantango Shale) Based on Packer Tests	2-161
Table 2.3-30— Summary of Hydraulic Property Testing at the SSES	2-164
Table 2.3-31— SSES Unit 1 & 2 Monthly Consumptive Water Use	2-166
Table 2.3-32— Major Public Water Suppliers within Luzerne and Columbia Counties	2-167
Table 2.3-33— SSES Cooling Tower Blowdown Discharge Rate Permit No. PA0047325	2-168
Table 2.3-34— Water Pollution Control Facilities in Luzerne County	2-169
Table 2.3-35— Water Use in the Upper Susquehanna River Basin, Pennsylvania, in 1970	2-173
Table 2.3-36— Groundwater Wells Located within a 25 Mile (40-km) Radius of BBNPP (Listed in Pennsylvania Groundwater Information System)	2-174
Table 2.3-37— {Groundwater Wells Located Within a 5-Mile (8 km) Radius of BBNPP}	2-339
Table 2.3-38— {Groundwater Withdrawals Located Within a 25-Mile (40-km) Radius of BBNPP}	2-362
Table 2.3-39— {Groundwater Withdrawals Located Within a 5-Mile (8-km) Radius of BBNPP}	2-371
Table 2.3-40— {Drinking Water Wells Used for Public Water Supplies, Luzerne and Columbia Counties}	2-372
Table 2.3-41— Summary of BBNPP Surface Water Data for 2008	2-400
Table 2.3-42— Summary of BBNPP Groundwater Data for 2008	2-404
Table 2.3-43— Organic Chemical and Radiological Parameters ⁽¹⁾ Analyzed in Groundwater Samples from BBNPP Site, February 2008 ⁽²⁾	2-407
Table 2.3-44— Summary of Water Quality Data For The Susquehanna River, 1968-1977	2-408
Table 2.3-45— Water Quality in the Susquehanna River Between 2002 and 2006 (yearly averages of SSES quarterly data)	2-410
Table 2.3-46— BBNPP Surface Water Quality Data, 2007-2008 Field Measurements	2-412
Table 2.3-47— BBNPP Groundwater Quality Data, 2007-2008 Field Measurements	2-416
Table 2.3-48— BBNPP Surface Water Quality Data, 2010 Field Measurements	2-422
Table 2.3-49— Summary of BBNPP Surface Water Data for 2010	2-424
Table 2.3-50— BBNPP Groundwater Quality Data, 2010 Field Measurements	2-428
Table 2.3-51— Summary of BBNPP Groundwater Data for 2010	2-429
Table 2.4-1— Important Terrestrial Species and Habitats at the BBNPP Site	2-571
Table 2.4-2— Pennsylvania Mammals Observed or that are likely to Occur in the Vicinity of BBNPP Site	2-574
Table 2.4-3— Birds Observed or Likely to Occur in the Vicinity of BBNPP Site	2-578
Table 2.4-4— Pennsylvania Reptiles and Amphibians Observed or Likely to Occur in the Vicinity of BBNPP Site. Modified After Pennsylvania Fish and Boat Commission List of Native, Extant, Reptiles and Amphibians (PFBC 2008a)	2-587
Table 2.4-5— Number and Percent Composition of Fish Collected from Three Ponds Located within the BBNPP Site, November 8, 2007	2-591
Table 2.4-6— Number and Percent Composition of Fish Collected from Three Ponds Located within the Proposed BBNPP Site, July 2008	2-592
Table 2.4-7— Number and Percent Composition of Fish Collected from Three Stations in the Walker Run Watershed Located within the Proposed BBNPP Site, November 8, 2007 ...	2-593

Table 2.4-8— Number and Percent Composition of Fish Collected from Five Stations in the Walker Run Watershed Located within and Downstream of the Proposed BBNPP Site, April 7 and 8, 2008	2-594
Table 2.4-9— Number and Percent Composition of Fish Collected from Five Stations in the Walker Run Watershed Located within and Downstream of the Proposed BBNPP Site, July 2008	2-595
Table 2.4-10— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 1 in Walker Run, November 8, 2007	2-596
Table 2.4-11— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 2 in Walker Run, November 8, 2007	2-598
Table 2.4-12— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 1 in Walker Run, April 7, 2008	2-600
Table 2.4-13— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 2 in Walker Run, April 7, 2008	2-602
Table 2.4-14— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 4 in Walker Run, April 8, 2008	2-604
Table 2.4-15— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 5 in Walker Run, April 8, 2008	2-605
Table 2.4-16— Number and Percent Composition of Fish Collected by Seining at SSES on the Susquehanna River, 2004-2007	2-606
Table 2.4-17— Number and Percent Composition of Fish Collected by Seining at Bell Bend on the Susquehanna River, 2004-2007	2-607
Table 2.4-18— Number and Percent Composition of Fish Collected by Electrofishing at SSES on the Susquehanna River, 2004-2007	2-608
Table 2.4-19— Number and Percent Composition of Fish Collected by Electrofishing at Bell Bend on the Susquehanna River, 2004-2007	2-609
Table 2.4-20— Number and Percent Total of Benthic Macroinvertebrates Collected with a Dome Sampler at SSES (replicate 1) in the Susquehanna River, August 15, 2007	2-611
Table 2.4-21— Number and Percent Total of Benthic Macroinvertebrates Collected with a Dome Sampler at SSES (replicate 2) in the Susquehanna River, August 15, 2007	2-612
Table 2.4-22— Number and Percent Total of Benthic Macroinvertebrates Collected with a Dome Sampler at Bell Bend (replicate 1) in the Susquehanna River, August 15, 2007	2-613
Table 2.4-23— Number and Percent Total of Benthic Macroinvertebrates Collected with a Dome Sampler at Bell Bend (replicate 2) in the Susquehanna River, August 15, 2007	2-614
Table 2.4-24— Species of Mussels Observed During Survey of Susquehanna River Completed Near the Proposed BBNPP Site, October 2007	2-615
Table 2.4-25— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 1 in Walker Run on July 14, 2008	2-616
Table 2.4-26— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 2 in Walker Run on July 15, 2008	2-617
Table 2.4-27— Number and Percent Composition of Benthic Macroinvertebrates collected with a Kick Net at Station 4 in Walker Run on July 14, 2008	2-618
Table 2.4-28— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 5 in Walker Run on July 14, 2008	2-619
Table 2.4-29— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net at Station 6 in Walker Run on July 15, 2008	2-620

Table 2.4-30— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net in Unnamed Tributary 5 on July 16, 2008	2-621
Table 2.4-31— Number and Percent Composition of Benthic Macroinvertebrates Collected with a Kick Net in Unnamed Tributary No. 4 on July 16, 2008	2-622
Table 2.4-32— Occurrence of Butterfly Species of Concern Host Plants at BBNPP	2-623
Table 2.4-33— List of Fish Species Collected with Seine or Electrofishing Boat in the Susquehanna River at SSES and Bell Bend, 2004 to 2007	2-625
Table 2.4-34— Number and Percent Composition of Fish Collected from the North Branch Canal and adjacent areas within the Proposed BBNPP Site, April 28-30, 2010.	2-626
Table 2.5-1— The Counties of Residence for Existing SSES Units 1 and 2 Operational Employees	2-709
Table 2.5-2— Select Demographic and Economic Characteristics of Residential Population By Distance from the BBNPP Site, 2000	2-710
Table 2.5-3— Historical and Projected Population in Columbia and Luzerne Counties and Pennsylvania from 1970 to 2080	2-711
Table 2.5-4— Select Demographic and Economic Characteristics of Persons in Columbia Luzerne Counties, the Commonwealth of Pennsylvania, and the U.S. 2000 to 2006	2-712
Table 2.5-5— Demographic and Economic Characteristics of Residential Populations in Select Cities and Communities within Luzerne County and Columbia County, 2000	2-713
Table 2.5-6— Resident and Transient Populations, by Sector and Distance from BBNPP Site, 2000	2-714
Table 2.5-7— Commuting Patterns to and from the Region of Interest (Columbia and Luzerne Counties	2-716
Table 2.5-8— Current Population and Population Projections (Resident and Transient) For the 3 mi (4.8 km) Low Population Zone	2-718
Table 2.5-9— Total Population Projections (Resident and Transient) from 2000 to 2080 Within 50 mi (80 km) of the BBNPP Site	2-719
Table 2.5-10— Total Population Projections (Resident and Transient) by Sector and Distance from the BBNPP Site from 2000 to 2080	2-720
Table 2.5-11— Civilian Labor Force Data for Luzerne County, Columbia County, Scranton-Wilkes-Barre-Hazleton Metropolitan Statistical Area, Pennsylvania, and the U.S., 2000 and 2006	2-732
Table 2.5-12— County Employment for the 50-mile Area by Economic Sector, Sub-Sector, Industry Group, and Industry: Construction, 2006	2-734
Table 2.5-13— Employment by Industry Sectors and Class of Workers in Luzerne County, Columbia County, and the ROI, 2000 and 2006	2-737
Table 2.5-14— Top 10 Employers in Luzerne County and Columbia County, Second Quarter 2006	2-738
Table 2.5-15— Income Characteristics in Luzerne County, Columbia County, Scranton-Wilkes-Barre-Hazleton Metropolitan Statistical Area, Pennsylvania, and the U.S., 2000 and 2006	2-739
Table 2.5-16— Mean Earnings in Luzerne County, Columbia County, Scranton-Wilkes-Barre-Hazleton Metropolitan Statistical Area, Pennsylvania, and the U.S., 2000 and 2006	2-740
Table 2.5-17— Occupied Housing Units and Vacant (available) Housing Units in Luzerne County, Columbia County, and the ROI, 2000 and 2006	2-741
Table 2.5-18— New Housing Units (both Single-family and Multi-family) Authorized for Construction, Luzerne County, Columbia County, and the Region of Interest, 2000 to 2006	2-742
Table 2.5-19— Apartment and Townhouse Complexes within about 30 Mi (48 km) of Berwick, Pennsylvania	2-743
Table 2.5-20— Hotels, Motels, and Bed & Breakfasts within about 30 Mi (48 km) of Berwick, Pennsylvania	2-745
Table 2.5-21— Public Schools Located in Luzerne County and Columbia County	2-749
Table 2.5-22— Private Schools Located in Luzerne County and Columbia County	2-753

Table 2.5-23— Boat Launches in Luzerne County and Columbia County, Listed Alphabetically by City	2-755
Table 2.5-24— Charter Boats/Fishing Guides Services in Luzerne County and Columbia County, Listed Alphabetically by City	2-756
Table 2.5-25— The Campgrounds and RV Parks within about 30 Mi (48 km) of Berwick, Pennsylvania	2-757
Table 2.5-26— The Property and Income Tax Rates in Luzerne County and Columbia County, 2008 ...	2-758
Table 2.5-27— The Fiscal Year 2007 Actual County Revenues and Expenditures in Luzerne County ...	2-759
Table 2.5-28— The Fiscal Year 2006 Actual County Revenues and Expenditures in Columbia County	2-760
Table 2.5-29— Major Public Water Suppliers in Luzerne County and Columbia County	2-761
Table 2.5-30— Environmental Protection Agency Safe Drinking Water Information System, Luzerne County and Columbia County	2-762
Table 2.5-31— Sewer Districts/Systems in Luzerne County and Columbia County	2-764
Table 2.5-32— Fire/EMS Departments in Luzerne County and Columbia County	2-765
Table 2.5-33— Assessment of Archeological Potential for BBNPP Phase Ia Project APE	2-769
Table 2.5-34— Summary of Previously Surveyed Archeological Sites Identified in the Project APE Along the West Bank of the Susquehanna River	2-770
Table 2.5-35— Previously Recorded Architectural Resources within the 0.5 mi (0.8 km) Radius of the Proposed Project	2-771
Table 2.5-36— The Summary of Surveyed Architectural and Historic Resources in Project Viewshed ...	2-772
Table 2.5-37— Summary of Surveyed Architectural and Historical Resources in Phase Ia Project Footprint, West of Susquehanna River	2-775
Table 2.5-38— Summary of Identified Archeological Sites in Phase Ib Project APE	2-776
Table 2.5-39— Summary of Identified Isolated Finds in Initial Phase Ib Project APE	2-777
Table 2.5-40— Summary of Potentially NRHP-Eligible Archeological Sites in Phase Ib Project APE	2-778
Table 2.5-41— Phase II National Register Site Evaluations: Summary and Recommendations	2-779
Table 2.5-42— Second Supplemental Phase Ib Investigation and Third Supplemental Phase I Investigation: Summary and Recommendations of Identified Sites and Isolated Finds	2-780
Table 2.5-43— Summary of Architectural and Historical Resources in Project Viewshed Recommended Eligible for NRHP Listing	2-781
Table 2.5-44— Summary of Architectural and Historical Resources in Phase Ib Project Footprint Recommended Eligible for NRHP Listing	2-782
Table 2.5-45— Columbia County Historic Landmarks Listed on the National Register of Historic Places	2-783
Table 2.5-46— Luzerne County Historic Landmarks Listed on the National Register of Historic Places	2-784
Table 2.5-47— Summary of Identified Cultural Resources by NRHP Eligibility Status	2-785
Table 2.5-48— NRHP-Listed Cultural Resources Within 10 mi (16 km) of the Bell Bend Project (7 Records)	2-786
Table 2.5-49— NRHP-Eligible Cultural Resources Within 10 mi (16 km) of the Bell Bend Project (51 Records)	2-787
Table 2.5-50— NRHP-Ineligible Cultural Resources Within 10 mi (16 km) of the Bell Bend Project (126 Records)	2-791
Table 2.5-51— NRHP-Undetermined Cultural Resources Within 10 mi (16 km) of the Bell Bend Project (494 Records)	2-799
Table 2.5-52— Unmapped Cultural Resources Within 10 mi (16 km) of the Bell Bend Project (45 Records)	2-843
Table 2.5-53— Census Block Groups within 50 mi (80 km) of BBNPP with Minority and Low-Income Populations, 2000	2-847

Table 2.5-54— Census Block Groups and Percentages of Minority People within 50 mi (80 km) of the BBNPP Site, 2000	2-849
Table 2.5-55— Minority Populations in Luzerne County, Columbia County, the Scranton-Wilkes-Barre-Hazleton MSA, and Commonwealth of Pennsylvania, 2000 and 2006	2-850
Table 2.5-56— Census Block Groups and Percentages of Households within 50 mi (80 km) of BBNPP with Low-Income Populations, 2000	2-851
Table 2.5-57— Low-Income Populations in Luzerne County, Columbia County, the Scranton-Wilkes-Barre-Hazleton MSA, and Commonwealth of Pennsylvania, 2000 and 2006	2-852
Table 2.5-58— Deer Harvests in Wildlife Management Units	2-853
Table 2.5-59— Deer Harvests in Luzerne County, Columbia County, and the ROI	2-854
Table 2.5-60— Spring and Fall Turkey Harvests by Management Area	2-855
Table 2.5-61— Black Bear Harvests in Luzerne County, Columbia County, and the ROI	2-856
Table 2.5-62— Beaver Harvests in Luzerne County, Columbia County, and the ROI	2-857
Table 2.6-1— Site Specific Stratigraphic Column	2-881
Table 2.7-1— National Ambient Air Quality Standards	2-905
Table 2.7-2— Tornadoes Reported in Luzerne County, Pennsylvania	2-906
Table 2.7-3— Tornadoes Reported in Columbia County, Pennsylvania	2-907
Table 2.7-4— Total and Average Numbers of Tropical Storms and Hurricanes	2-908
Table 2.7-5— Tropical Storms and Hurricanes Passing Within 100 Miles (161' km) of Berwick, Pennsylvania	2-909
Table 2.7-6— Monthly Mean Number of Days with Thunderstorms	2-911
Table 2.7-7— Drought Events Reported in Luzerne County, Pennsylvania	2-912
Table 2.7-8— Drought Events Reported in Columbia County, Pennsylvania	2-914
Table 2.7-9— Fifty Knots or Greater High Wind Events in Luzerne County, Pennsylvania	2-916
Table 2.7-10— Fifty Knots or Greater High Wind Events in Columbia County, Pennsylvania	2-918
Table 2.7-11— Hail Events in Luzerne County, Pennsylvania	2-920
Table 2.7-12— Hail Events in Columbia County, Pennsylvania	2-922
Table 2.7-13— Ice Storm Events in Luzerne County, Pennsylvania	2-924
Table 2.7-14— Ice Storm Events in Columbia County, Pennsylvania	2-925
Table 2.7-15— Snow Storm Events in Luzerne County, Pennsylvania	2-927
Table 2.7-16— Probable Maximum Winter Precipitation (PMWP) Values	2-929
Table 2.7-17— Snow Storm Events in Columbia County, Pennsylvania	2-930
Table 2.7-18— SSES Daily Average and Extreme Temperatures (2001-2006)	2-932
Table 2.7-19— SSES Daily Average and Extreme Dew Point Temperatures (2001-2006)	2-978
Table 2.7-20— Williamsport, PA, Daily Average and Extreme Temperature and Dew Point Temperature Values (2000-2005)	2-1025
Table 2.7-21— SSES Monthly Mean Temperatures (2001-2006)	2-1074
Table 2.7-22— SSES Monthly Mean Extreme Maximum Temperatures (2001-2006)	2-1075
Table 2.7-23— SSES Monthly Mean Extreme Minimum Temperatures (2001-2006)	2-1076
Table 2.7-24— SSES Monthly Mean Daily Maximum Temperatures (2001-2006)	2-1077
Table 2.7-25— SSES Monthly Mean Daily Minimum Temperatures (2001-2006)	2-1078
Table 2.7-26— SSES Maximum Hourly Temperatures (2001-2006)	2-1079
Table 2.7-27— SSES Minimum Hourly Temperatures (2001-2006)	2-1080
Table 2.7-28— SSES Monthly Mean Dew Point Temperatures (2001-2006)	2-1081
Table 2.7-29— Number of SSES Hourly Temperature Values Greater Than or Less Than Indicated Value and Percent Frequency of Occurrence (2001-2006)	2-1082
Table 2.7-30— SSES Monthly Mean Relative Humidity (2001-2006)	2-1083
Table 2.7-31— Monthly Mean Temperatures (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1084
Table 2.7-32— Monthly Mean Daily Maximum Temperatures (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1085

Table 2.7-33— Monthly Mean Daily Minimum Temperatures (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1086
Table 2.7-34— Monthly Mean Wet Bulb Temperatures (1978-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1087
Table 2.7-35— Monthly Mean Dew Point Temperatures (1978-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1088
Table 2.7-36— Monthly Mean Relative Humidity (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1089
Table 2.7-37— Daily Variation of Monthly Mean Relative Humidity (%) (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1090
Table 2.7-38— Mean Number of Days with Maximum Hourly Temperature Value Greater than or Equal to 90°F (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1091
Table 2.7-39— Mean Number of Days with Maximum Hourly Temperature Value Less than or Equal to 32°F (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1092
Table 2.7-40— Mean Number of Days with Minimum Hourly Temperature Value Less than or Equal to 32°F (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1093
Table 2.7-41— Mean Number of Days with Minimum Hourly Temperature Value Less than or Equal to 0°F (1971-2000) for Sites Around Bell Bend Nuclear Power Plant	2-1094
Table 2.7-42— Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperature Values for Wilkes-Barre/Scranton, PA (1972-2001)	2-1095
Table 2.7-43— Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperature Values for Wilkes-Barre/Scranton, PA (1972-2001)	2-1096
Table 2.7-44— Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperature Values for Allentown, PA (1972-2001)	2-1097
Table 2.7-45— Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperature Values for Allentown, PA (1972-2001)	2-1098
Table 2.7-46— The Extreme Annual Dry Bulb Temperature Values for Wilkes-Barre/Scranton, PA(1972 - 2001)	2-1099
Table 2.7-47— The Extreme Annual Dry Bulb Temperature Values for Allentown, PA (1972 - 2001)	2-1100
Table 2.7-48— Heating Degree Days for Sites Around Bell Bend Nuclear Power Plant (1971-2000) for Base Temperature of 32°F	2-1101
Table 2.7-49— Cooling Degree Days for Sites Around Bell Bend Nuclear Power Plant (1971-2000) for Base Temperature of 65°F	2-1102
Table 2.7-50— SSES Monthly and Annual Precipitation (2001-2006)	2-1103
Table 2.7-51— SSES Monthly and Annual Percent Frequency (%) of Precipitation Occurrence (2001-2006)	2-1104
Table 2.7-52— SSES Hourly Rainfall Rate Distribution (2001-2006)	2-1105
Table 2.7-53— SSES Measured Extreme Precipitation Hourly Values (2001-2006)	2-1106
Table 2.7-54— Mean Monthly and Annual Precipitation for Sites Around Bell Bend Nuclear Power Plant (1971-2000)	2-1107
Table 2.7-55— Mean Monthly and Annual Snowfall for Sites Around Bell Bend Nuclear Power Plant (1971-2000)	2-1108
Table 2.7-56— Monthly Mean Number of Days with Precipitation for Sites Around Bell Bend Nuclear Power Plant (1971-2000)	2-1109
Table 2.7-57— Monthly Mean Number of Days with Heavy Fog for Sites Around Bell Bend Nuclear Power Plant (1964-2006)	2-1110
Table 2.7-58— SSES 33' (10m) 2001-2006 Annual JFD	2-1111
Table 2.7-59— SSES 33' (10m) 2001-2006 Winter JFD	2-1119
Table 2.7-60— SSES 33' (10m) 2001-2006 Spring JFD	2-1127
Table 2.7-61— SSES 33' (10m) 2001-2006 Summer JFD	2-1135

Table 2.7-62— SSES 33' (10m) 2001-2006 Autumn JFD	2-1143
Table 2.7-63— SSES 33' (10m) 2001-2006 January JFD	2-1151
Table 2.7-64— SSES 33' (10m) 2001-2006 February JFD	2-1159
Table 2.7-65— SSES 33' (10m) 2001-2006 March JFD	2-1167
Table 2.7-66— SSES 33' (10m) 2001-2006 April JFD	2-1175
Table 2.7-67— SSES 33' (10m) 2001-2006 May JFD	2-1183
Table 2.7-68— SSES 33' (10m) 2001-2006 June JFD	2-1191
Table 2.7-69— SSES 33' (10m) 2001-2006 July JFD	2-1199
Table 2.7-70— SSES 33' (10m) 2001-2006 August JFD	2-1207
Table 2.7-71— SSES 33' (10m) 2001-2006 September JFD	2-1215
Table 2.7-72— SSES 33' (10m) 2001-2006 October JFD	2-1223
Table 2.7-73— SSES 33' (10m) 2001-2006 November JFD	2-1231
Table 2.7-74— SSES 33' (10m) 2001-2006 December JFD	2-1239
Table 2.7-75— SSES 197' (60m) 2001-2006 Annual JFD	2-1247
Table 2.7-76— SSES 197' (60m) 2001-2006 Winter JFD	2-1255
Table 2.7-77— SSES 197' (60m) 2001-2006 Spring JFD	2-1263
Table 2.7-78— SSES 197' (60m) 2001-2006 Summer JFD	2-1271
Table 2.7-79— SSES 197' (60m) 2001-2006 Autumn JFD	2-1279
Table 2.7-80— SSES 197' (60m) 2001-2006 January JFD	2-1287
Table 2.7-81— SSES 197' (60m) 2001-2006 February JFD	2-1295
Table 2.7-82— SSES 197' (60m) 2001-2006 March JFD	2-1303
Table 2.7-83— SSES 197' (60m) 2001-2006 April JFD	2-1311
Table 2.7-84— SSES 197' (60m) 2001-2006 May JFD	2-1319
Table 2.7-85— SSES 197' (60m) 2001-2006 June JFD	2-1327
Table 2.7-86— SSES 197' (60m) 2001-2006 July JFD	2-1335
Table 2.7-87— SSES 197' (60m) 2001-2006 August JFD	2-1343
Table 2.7-88— SSES 197' (60m) 2001-2006 September JFD	2-1351
Table 2.7-89— SSES 197' (60m) 2001-2006 October JFD	2-1359
Table 2.7-90— SSES 197' (60m) 2001-2006 November JFD	2-1367
Table 2.7-91— SSES 197' (60m) 2001-2006 December JFD	2-1375
Table 2.7-92— Monthly Mean Wind Speed and Prevailing Wind Direction (tens of degrees) for Sites Around Bell Bend Nuclear Power Plant	2-1383
Table 2.7-93— Monthly Maximum Two-Minute Wind Speed and Direction (tens of degrees) for Sites Around Bell Bend Nuclear Power Plant	2-1384
Table 2.7-94— Monthly Maximum Five-Second Wind Speed and Direction (tens of degrees) for Sites Around Bell Bend Nuclear Power Plant	2-1385
Table 2.7-95— SSES 33' (10m) Wind Direction Persistence Summary for 2001	2-1386
Table 2.7-96— SSES 33' (10m) Wind Direction Persistence Summary for 2002	2-1388
Table 2.7-97— SSES 33' (10m) Wind Direction Persistence Summary for 2003	2-1390
Table 2.7-98— SSES 33' (10m) Wind Direction Persistence Summary for 2004	2-1392
Table 2.7-99— SSES 33' (10m) Wind Direction Persistence Summary for 2005	2-1394
Table 2.7-100— SSES 33' (10m) Wind Direction Persistence Summary for 2006	2-1396
Table 2.7-101— SSES 33' (10m) Average Wind Direction Persistence Summary for Years 2001-2006 ...	2-1398
Table 2.7-102— SSES 197' (60m) Wind Direction Persistence Summary for 2001	2-1400
Table 2.7-103— SSES 197' (60m) Wind Direction Persistence Summary for 2002	2-1402
Table 2.7-104— SSES 197' (60m) Wind Direction Persistence Summary for 2003	2-1404
Table 2.7-105— SSES 197' (60m) Wind Direction Persistence Summary for 2004	2-1407
Table 2.7-106— SSES 197' (60m) Wind Direction Persistence Summary for 2005	2-1409
Table 2.7-107— SSES 197' (60m) Wind Direction Persistence Summary for 2006	2-1411
Table 2.7-108— SSES 197' (60m) Average Wind Direction Persistence Summary for Years 2001-2006	2-1414

Table 2.7-109— SSES 33' (10m) Annual Stability Persistence Summary for Year 2001	2-1416
Table 2.7-110— SSES 33' (10m) Annual Stability Persistence Summary for Year 2002	2-1418
Table 2.7-111— SSES 33' (10m) Annual Stability Persistence Summary for Year 2003	2-1420
Table 2.7-112— SSES 33' (10m) Annual Stability Persistence Summary for Year 2004	2-1422
Table 2.7-113— SSES 33' (10m) Annual Stability Persistence Summary for Year 2005	2-1424
Table 2.7-114— SSES 33' (10m) Annual Stability Persistence Summary for Year 2006	2-1427
Table 2.7-115— SSES 33' (10m) Annual Stability Persistence Summary for the Years 2001 - 2006	2-1429
Table 2.7-116— SSES 197' (60m) Annual Stability Persistence Summary for Year 2001	2-1430
Table 2.7-117— SSES 197' (60m) Annual Stability Persistence Summary for Year 2002	2-1432
Table 2.7-118— SSES 197' (60m) Annual Stability Persistence Summary for Year 2003	2-1434
Table 2.7-119— SSES 197' (60m) Annual Stability Persistence Summary for Year 2004	2-1436
Table 2.7-120— SSES 197' (60m) Annual Stability Persistence Summary for Year 2005	2-1438
Table 2.7-121— SSES 197' (60m) Annual Stability Persistence Summary for Year 2006	2-1441
Table 2.7-122— SSES 197' (60m) Annual Stability Persistence Summary for the Years 2001 - 2006 ...	2-1444
Table 2.7-123— Temperature Inversion Frequency and Persistence, Year 2001	2-1445
Table 2.7-124— Temperature Inversion Frequency and Persistence, Year 2002	2-1446
Table 2.7-125— Temperature Inversion Frequency and Persistence, Year 2003	2-1447
Table 2.7-126— Temperature Inversion Frequency and Persistence, Year 2004	2-1448
Table 2.7-127— Temperature Inversion Frequency and Persistence, Year 2005	2-1449
Table 2.7-128— Temperature Inversion Frequency and Persistence, Year 2006	2-1450
Table 2.7-129— Design Input for AEOLUS3 Normal Effluent χ/Q Runs	2-1451
Table 2.7-130— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for a Mixed Mode Release With Building Wake from 0.5 to 5 Miles	2-1459
Table 2.7-131— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for a Mixed Mode Release With Building Wake from 7.5 to 50 Miles	2-1460
Table 2.7-132— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Site Boundary Receptors	2-1461
Table 2.7-133— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for a Mixed Mode Release With Building Wake for Nearest Residents	2-1462
Table 2.7-134— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Gardens	2-1463
Table 2.7-135— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Milk Animals	2-1464
Table 2.7-136— Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Hypothetical Meat Animals ...	2-1465
Table 2.7-137— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake from 0.5 to 5 Miles	2-1466
Table 2.7-138— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake from 7.5 to 50 Miles	2-1467
Table 2.7-139— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Site Boundary Receptors	2-1468
Table 2.7-140— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Residents	2-1469
Table 2.7-141— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Gardens	2-1470
Table 2.7-142— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Milk Animals	2-1471
Table 2.7-143— Normal Effluent Annual Average, Decayed, Depleted χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Hypothetical Meat Animals	2-1472
Table 2.7-144— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake from 0.5 to 5 Miles	2-1473

Table 2.7-145— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for a Mixed Mode Release With Building Wake from 7.5 to 50 Miles ...	2-1474
Table 2.7-146— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Site Boundary Receptors	2-1475
Table 2.7-147— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Residents	2-1476
Table 2.7-148— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Gardens ...	2-1477
Table 2.7-149— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Milk Animals	2-1478
Table 2.7-150— Normal Effluent Annual Average, Undecayed, Undepleted Gamma χ/Q Values (sec/m^3) for Mixed Mode Release With Building Wake for Nearest Hypothetical Meat Animals	2-1479
Table 2.7-151— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake from 0.5 to 5 Miles	2-1480
Table 2.7-152— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake from 7.5 to 50 Miles	2-1481
Table 2.7-153— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake for Site Boundary Receptors	2-1482
Table 2.7-154— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake for Nearest Residents	2-1483
Table 2.7-155— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake for Nearest Gardens	2-1484
Table 2.7-156— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake for Nearest Milk Animals	2-1485
Table 2.7-157— Normal Effluent Annual Average D/Q Values ($1/\text{m}^2$) for Mixed Mode Release With Building Wake for Nearest Hypothetical Meat Animals	2-1486
Table 2.7-158— Ground Level, Normal Effluent, Sector Average, Undepleted, Undecayed, Atmospheric Dispersion Factors (sec/m^3)	2-1487
Table 2.7-159— Ground Level, Normal Effluent, Sector Average, Depleted, Decayed, Atmospheric Dispersion Factors (sec/m^3)	2-1489
Table 2.7-160— Ground Level, Normal Effluent, Sector Average, Undepleted, Undecayed, Atmospheric Deposition Factors (sec/m^3)	2-1491
Table 2.7-161— Ground Level, Normal Effluent, Sector Average, Depleted, Decayed, Atmospheric Deposition Factors ($1/\text{m}^2$)	2-1493
Table 2.7-162— The Design Input for a 50% Percentile Atmospheric Dispersion Factor Computer Run	2-1495
Table 2.7-163— 0-2 Hour 50 th Percentile Accident Atmospheric Dispersion Factors for the EAB (0.43 miles)	2-1496
Table 2.7-164— The 50th Percentile Accident Atmospheric Dispersion Factors for the LPZ (1.5 miles)	2-1497
Table 2.7-165— Monthly and Annual Average Mixing Height Values (m)	2-1498
Table 2.7-166— Monthly and Annual Average Mixing Height Values (ft)	2-1499
Table 2.7-167— Summary of Ambient Environmental (dBA) for Commonly Used Metrics to Assess Noise Impacts	2-1500
Table 2.7-168— 24-Hour Day/Night Sound Levels for a 13 Day Sampling Period during Leaf-off Seasonal Conditions at the BBNPP Site	2-1501
Table 2.7-169— Summary of Ambient Environmental Sound Levels (dBA) for Commonly Used Metrics to Assess Noise Impacts	2-1502
Table 3.3-1— Anticipated Water Use	3-21

Table 3.3-2— Water Treatment Systems	3-23
Table 3.4-1— Minimal and Nominal Essential Service Water System Flows and Heat Loads at Different Operation Modes Per Train	3-34
Table 3.4-2— Circulating Water System Cooling Tower Design Specifications	3-35
Table 3.4-3— Essential Service Water System Cooling Tower Design Specifications	3-36
Table 3.5-1— Parameters Used in the Calculation of Fission Product Activity in Reactor (Design Basis)	3-75
Table 3.5-2— Reactor Coolant Radionuclide Concentrations	3-76
Table 3.5-3— Secondary Coolant Radionuclide Concentrations	3-79
Table 3.5-4— Principal Parameters Used In Estimating Realistic Releases of Radioactive Materials in Effluents (GALE Code Input Parameters)	3-82
Table 3.5-5— Average Radioactivity Concentrations in the Spent Fuel Pool (SFP) Area	3-86
Table 3.5-6— Liquid Waste Release Source Term Inputs	3-88
Table 3.5-7— Annual Liquid Effluent Releases (English Units)	3-89
Table 3.5-8— Annual Gaseous Effluent Releases (English Units)	3-93
Table 3.5-9— Gaseous Waste Release Source Term Inputs	3-97
Table 3.5-10— Annual Solid Waste Generation Volumes	3-99
Table 3.5-11— Liquid Waste Management System Tank Capacity	3-101
Table 3.5-12— Liquid Waste Management System Process Parameters	3-102
Table 3.5-13— Radioactivity Input to the Liquid Waste System	3-103
Table 3.5-14— Radioactivity Input to the Liquid Waste System	3-104
Table 3.5-15— Radioactive Liquid Releases Due to Anticipated Operational Occurrences	3-106
Table 3.5-16— Summary of Radioactive Liquid Releases Including Anticipated Operational Occurrences	3-108
Table 3.5-17— Obtainable Dose Benefits for Liquid Waste System Augment	3-110
Table 3.5-18— Liquid Waste System Augment Total-Body Dose Cost-Benefit Analysis	3-111
Table 3.5-19— Liquid Waste System Augment Thyroid Dose Cost-Benefit Analysis	3-112
Table 3.5-20— Annual Radioactive Gaseous Releases Due to Anticipated Operational Occurrences	3-113
Table 3.5-21— Obtainable Dose Benefits for Gaseous Waste System Augment	3-115
Table 3.5-22— Gaseous Waste System Augment Total-Body / Thyroid Dose Cost Benefit Analysis	3-116
Table 3.5-23— Radiation Monitors	3-117
Table 3.6-1— Chemicals Used in Water Treatment Systems	3-143
Table 3.6-2— Estimated Concentrations of Chemical Additives and Byproducts in Water Treatment System Discharges	3-145
Table 3.6-3— Intake Source Water Quality ^{a,b}	3-147
Table 3.6-4— Sanitary Sewer Discharge Limits	3-148
Table 3.6-5— Non-Radioactive Gaseous Effluents	3-149
Table 3.6-6— Anticipated CWS Blowdown Concentrations	3-150
Table 3.6-7— Anticipated ESWS Blowdown Concentrations	3-151
Table 3.6-8— Anticipated Reverse Osmosis Reject Concentrations	3-152
Table 3.6-9— Anticipated Effluent Water Chemical Concentrations	3-153
Table 3.6-10— Hazardous Waste Generation Rates at SSES	3-155
Table 3.6-11— Residual Waste Generation Rates at SSES	3-156
Table 3.8-1— Annual Solid Radioactive Wastes	3-167
Table 3.8-2— Transportation Environmental Impact Comparison	3-168
Table 4.1-1— Construction Areas Acreage and Operations Area Acreage, Land Use and Zoning	4-16
Table 4.2-1— Estimated Fresh Water Demand During BBNPP Construction	4-42
Table 4.3-1— Impacts to Plant Communities and Other Habitats in Acres (Hectares) for Construction of BBNPP	4-71
Table 4.3-2— Pre- and Post-Construction Land Cover within the BBNPP Project Boundary	4-72

Table 4.3-3— Construction Impacts to Plant Communities and Other Habitats within the Susquehanna Riverlands Environmental Preserve	4-73
Table 4.3-4— Pre- and Post-Construction Land Cover within the Susquehanna Riverlands Environmental Preserve	4-74
Table 4.3-5— Construction Impacts to Plant Communities and Other Habitats within the Susquehanna Riverlands IBA # 50	4-75
Table 4.3-6— Pre- and Post-Construction Land Cover within the Susquehanna Riverlands IBA # 50	4-76
Table 4.4-1— Typical Noise Levels of Construction Equipment	4-106
Table 4.4-2— Projected Level of Service at Key Intersections With and Without Construction of BBNPP	4-107
Table 4.4-3— Estimated Average FTE Construction Workers, by Construction Year/Quarter at the BBNPP	4-109
Table 4.4-4— Total Peak Onsite Nuclear Plant Construction Labor Force Requirements (based on an average of single power plants)	4-110
Table 4.4-5— Peak Onsite Nuclear Power Plant Construction Craft Force Requirements (based on an average of single power plants)	4-111
Table 4.4-6— Nuclear Power Plant Craft Labor Force Composition by Phases of Construction (in percent)	4-112
Table 4.4-7— Estimates of In-Migrating Construction Workforces in Luzerne County and Columbia County, 20% In-Migration Scenario, from 2012-2017	4-113
Table 4.4-8— Estimates of In-Migrating Construction Workforces in Luzerne County and Columbia County, 35% In-Migration Scenario, from 2012-2017	4-114
Table 4.4-9— Total Work Force Potential During BBNPP Construction, SSES Units 1 and 2 Operations, and SSES Outage Periods	4-115
Table 4.4-10— Summary of Level of Service (LOS) at Selected Intersections Following Mitigation	4-116
Table 4.5-1— Radiation Sources at SSES Units 1 and 2	4-131
Table 4.5-2— Historical All-Source Compliance for Offsite General Public	4-133
Table 4.5-3— FTE for BBNPP Construction Workers	4-134
Table 4.5-4— Gaseous Dose Rate Type and Coefficients	4-135
Table 4.5-5— Historic Gaseous Releases For 2001 Through 2006	4-136
Table 4.5-6— Historical Liquid Releases for Input to LADTAPII	4-137
Table 4.5-7— Historical Dilutions for Input to LADTAPII	4-138
Table 4.5-8— Historical Shoreline Dose	4-139
Table 4.5-9— Historic and Projected Loading of SSES ISFSI	4-140
Table 4.5-10— Condensate Storage Tank Source Terms	4-141
Table 4.5-11— LLRWHF Source Term	4-143
Table 4.5-12— SEALAND Container Source Term	4-144
Table 4.5-13— Maximum Dose by Zone for 2200 Hours	4-145
Table 4.5-14— Effluent Dose Rates by Zone	4-146
Table 4.5-15— Projected Construction Worker Census 2012 to 2017	4-147
Table 4.5-16— Occupancy by Construction Zone	4-148
Table 4.5-17— Collective Dose to BBNPP Construction Workers	4-149
Table 4.6-1— A Summary of Measures and Controls to Limit Adverse Impacts During Construction	4-165
Table 4.6-2— Summary of Construction and Preconstruction Related Impacts	4-177
Table 5.2-1— RWSS Demand for Normal Operations	5-22
Table 5.2-2— Estimated Fresh Water Demand During BBNPP Construction	5-23
Table 5.2-3— Calculated 7Q10 at Wilkes-Barre Gaging Station	5-24
Table 5.3-1— Parameter Values for the Simulations	5-48
Table 5.3-2— Protected Use Receiving Water Body Temperatures °F (°C)	5-49
Table 5.3-3— Simulation Summary with Scenario Descriptions	5-50

Table 5.3-4— Near-Field Plume Area (ft^2) and Volume (ft^3)	5-51
Table 5.3-5— Near-Field Plume Area (m^2) and Volume (m^3)	5-52
Table 5.3-6— Extreme Period Analysis of Plume Size	5-53
Table 5.3-7— CWS Cooling Tower Design Parameters	5-54
Table 5.3-8— Modeled Plume Parameters	5-55
Table 5.3-9— Maximum Salt Deposition Rate	5-56
Table 5.3-10— Total number and percent composition of fish and crayfish collected in impingement samples at the SSES River Intake Structure from April 22 , 2008 to April 20, 2009.	5-57
Table 5.3-11— Total number and percent composition of each life stage of fish collected in entrainment samples from SSES River Intake Structure from April 22 to August 13, 2008.	5-58
Table 5.4-1— Near Field Environmental Dilution Values (50 feet from the discharge) for BBNPP Discharges to the Susquehanna River	5-78
Table 5.4-2— Surface Far Field Dilution Values for BBNPP Discharges to the Susquehanna River	5-79
Table 5.4-3— Present Average Susquehanna River Recreational Fishing Harvest	5-80
Table 5.4-4— Liquid Pathway Parameters	5-81
Table 5.4-5— Recreational Liquid Pathway Usage Parameters for MEI	5-82
Table 5.4-6— Irrigated Food Crops Production Rates	5-83
Table 5.4-7— Gaseous Pathway Parameters	5-84
Table 5.4-8— Gaseous Pathway Consumption Factors for the MEI	5-85
Table 5.4-9— Milk Production gal/yr (l/yr)	5-86
Table 5.4-10— Meat Production lb/yr (kg/yr)	5-88
Table 5.4-11— Vegetable Production lb/yr (kg/yr)	5-90
Table 5.4-12— Leafy Vegetable Production lb/yr (kg/yr)	5-92
Table 5.4-13— Distance to Nearest Gaseous Dose Receptors	5-94
Table 5.4-14— Receptor Locations for Gaseous Effluent Maximum Dose Evaluations	5-95
Table 5.4-15— 50 Mi (80 km) Population Doses from Gaseous Effluents	5-96
Table 5.4-16— Whole Body Dose from Liquid Effluent to MEI	5-97
Table 5.4-17— Limiting Organ Dose from Liquid Effluent to MEI	5-98
Table 5.4-18— Summary Liquid Effluent Annual Dose to MEI	5-99
Table 5.4-19— General Population Doses from Liquid Effluents	5-100
Table 5.4-20— Gaseous Pathway Doses for Maximally Exposed Individuals (MEI)	5-101
Table 5.4-21— BBNPP Gaseous Effluent MEI Dose Summary	5-102
Table 5.4-22— Owner Controlled Area Boundary Air Concentration by Nuclide	5-103
Table 5.4-23— Annual Historical Dose Compliance with 40 CFR 190 for SSES Units 1 & 2	5-105
Table 5.4-24— 40 CFR 190 Annual Site Dose Compliance	5-106
Table 5.4-25— Important Biota Species and Analytical Surrogates	5-107
Table 5.4-26— Biota Exposure Pathways	5-108
Table 5.4-27— Terrestrial Biota Parameters	5-109
Table 5.4-28— Biota Residence Time	5-110
Table 5.4-29— Dose to Biota from all Sources	5-111
Table 5.4-30— Biota Doses Compared to the 40 CFR 190 Whole Body Dose Criterion (25 mrem/yr) ...	5-112
Table 5.5-1— Anticipated Water Chemical Concentrations in the Susquehanna River Downstream of BBNPP Discharge	5-117
Table 5.7-1— NRC Table S-3 of Uranium Fuel Cycle Environmental Data ^a Compared to the U.S. EPR Configuration (Normalized to Model LWR Annual Fuel Requirement (WASH-1248) or Reference Reactor Year (NUREG-0116))	5-141
Table 5.7-2— Average Nominal Annual Fuel Cycle Requirements (U.S. EPR Scaled to the 1,000 MWe Reference LWR)	5-144
Table 5.8-1— Estimated CWS Cooling Tower vs. Existing Ambient Sound in A-weighted Levels at Seven Community Receptors	5-163

Table 5.8-2— Estimates of In-Migrating Operational Workforces in Luzerne County and Columbia County, from 2018 to 2058	5-164
Table 5.8-3— Intersection LOS: Future Build Conditions	5-165
Table 5.10-1— The Summary of Measures and Controls to Limit Adverse Impacts During Operation	5-172
 Table 5.11-1— Summary of Environmental Impacts of Transportation of Fuel and Waste to and from One Light Water Reactor, taken from 10 CFR 51.52 Table S-4	5-196
Table 5.11-2— Decay Heat for EPR Irradiated Fuel Assembly	5-197
Table 5.11-3— RADTRAN & TRAGIS Model Input Parameters	5-198
Table 5.11-4— Annual EPR Solid Radioactive Waste	5-199
Table 5.11-5— Summary of Annual Transportation Radiological Dose Impact for the EPR	5-200
Table 5.11-6— ORIGEN2.1 Decay Heat Input Parameters for EPR Irradiated Fuel	5-201
Table 6.2-1— Effluent Exposure Pathways and Environmental Sampling Media	6-16
Table 6.2-2— The Existing Radiological Environmental Monitoring Program for SSES Units 1 and 2	6-17
Table 6.2-3— Existing Environmental Monitoring Sites for SSES Units 1 and 2	6-20
Table 6.2-4— BBNPP Radiological Environmental Monitoring Program	6-25
Table 6.2-5— Operational BBNPP Radiological Environmental Monitoring Program Locations ^(d)	6-28
Table 6.2-6— The Reporting Levels for Radioactivity Concentrations in Environmental Samples ^(a)	6-32
Table 6.2-7— Lower Limits of Detection (LLD) for Environmental Media	6-33
Table 6.2-8— Typical Sample Sizes for Environmental Media	6-34
Table 6.2-9— Background Radiation and Radioactivity Concentrations Measured Pre-Operationally* at SSES	6-35
Table 6.3-1— SSES Units 1 and 2 NPDES Hydrological Monitoring Program	6-55
Table 6.4-1— SSES Meteorological Tower Instrument Types, Specifications and Accuracies for Pre-Application and Pre-Operational Programs	6-64
Table 6.4-2— BBNPP Meteorological Tower Instrument Types, Specifications and Accuracies for Operation Program	6-65
Table 6.4-3— Potential Man-Made Obstructions to Air Flow for the BBNPP Meteorological Tower	6-66
Table 6.4-4— Distances from BBNPP Met Tower to Nearby Obstructions to Air Flow	6-68
Table 6.4-5— {Existing Man-Made Potential Obstructions to Air Flow for the SSES Meteorological Tower}	6-69
Table 6.4-6— Potential Man-Made Obstructions to Air Flow for the SSES Meteorological Tower	6-70
Table 6.6-1— Required Water Sampling Protocol	6-88
Table 6.7-1— Thermal Monitoring	6-91
Table 6.7-2— Radiological Monitoring	6-92
Table 6.7-3— Hydrological Monitoring	6-93
Table 6.7-4— Meteorological Monitoring	6-95
Table 6.7-5— Terrestrial Ecology Monitoring	6-96
Table 6.7-6— Aquatic Ecology Monitoring	6-97
Table 6.7-7— Chemical Monitoring	6-98
Table 7.1-1— Design Basis Accidents	7-4
Table 7.1-2— U.S. EPR Design Basis Primary Coolant Activity	7-6
Table 7.1-3— U.S. EPR Design Basis Secondary Coolant Activity	7-9
Table 7.1-4— U.S. EPR Core Inventory ^{1,2,3}	7-12
Table 7.1-5— 50th Percentile BBNPP Site Atmospheric Dispersion Factors	7-15
Table 7.1-6— Steam System Piping Failure	7-16
Table 7.1-7— Reactor Coolant Pump Locked Rotor Accident / Broken Shaft with 8% Fuel Rod Clad Failure	7-17
Table 7.1-8— Failure of Small Lines Carrying Primary Coolant Outside Containment ¹	7-18
Table 7.1-9— Steam Generator Tube Rupture	7-19
Table 7.1-10— Loss of Coolant Accident	7-20

Table 7.1-11— Fuel Handling Accident	7-21
Table 7.1-12— Rod Ejection Accident	7-22
Table 7.1-13— Summary of the DBA Radiological Consequences at Offsite Receptors from BBNPP	7-23
Table 7.1-14— Radionuclide Releases to Atmosphere for SteamSystem Piping Failure with Pre-Accident Iodine Spike	7-24
Table 7.1-15— Radionuclide Releases to Atmosphere for Steam System Piping Failure with Accident-Induced (Coincident) Iodine Spike	7-26
Table 7.1-16— Radionuclide Releases to Atmosphere for Steam System Piping Failure with Accident-Induced 3.3% Clad Failure	7-28
Table 7.1-17— Radionuclide Releases to Atmosphere for Steam System Piping Failure with Accident-Induced 0.58% Fuel Overheat	7-30
Table 7.1-18— Radionuclide Releases to Atmosphere for Steam System Piping Failure with Accident-Induced 1.24% Clad Failure	7-32
Table 7.1-19— Radionuclide Releases to Atmosphere for Pump Locked Rotor Accident (LRA) with Accident-Induced 8.0% Clad Failure	7-34
Table 7.1-20— Radionuclide Releases to Atmosphere for Design-Basis Small Line Break	7-35
Table 7.1-21— Radionuclide Releases to Atmosphere for SGTR with a Pre-Accident Iodine Spike	7-36
Table 7.1-22— Radionuclide Releases to Atmosphere for SGTR with Accident Induced (Coincident) Iodine Spike	7-38
Table 7.1-23— Radionuclide Releases to Atmosphere for Design Basis LOCA	7-40
Table 7.1-24— Radionuclide Releases to Atmosphere for Fuel Handling Accident	7-43
Table 7.1-25— Radionuclide Releases to Atmosphere for Rod Ejection Accident (REA) with Accident-Induced 26% Clad Failure	7-44
Table 7.2-1— Release Category Descriptions	7-51
Table 7.2-2— Source Term Input to MACCS2	7-52
Table 7.2-3— U.S. EPR Severe Accidents Analysis Impacts - 50-Mile Radius and 2050 Population	7-53
Table 7.3-1— Severe Accident Cost Impact	7-59
Table 7.3-2— Maximum Benefit for Sensitivity Cases (Point Estimate CDF with 2008 Replacement Power Costs)	7-60
Table 7.3-3— Maximum Benefit for Sensitivity Cases (Mean Value CDF with 2008 Replacement Power Costs)	7-61
Table 7.3-4— SAMDA Candidates - Already Implemented	7-62
Table 7.4-1— 10 CFR 51.52 Summary Table S-4 Excerpt Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor Accidents in Transport	7-70
Table 7.4-2— RADTRAN/TRAGIS Model Irradiated Fuel Input Parameters	7-71
Table 7.4-3— Irradiated Fuel Source Term	7-72
Table 7.4-4— Irradiated Fuel BBNPP Model Accident, Fatality & Injury Rates	7-73
Table 7.4-5— Irradiated Fuel and Radwaste Models Severity & Release Fractions	7-74
Table 7.4-6— New Fuel BBNPP Transportation Fatality and Injury Rates	7-75
Table 7.4-7— EPR Radwaste Annual Generation	7-76
Table 7.4-8— RADTRAN/TRAGIS Model Radwaste Input Parameters	7-77
Table 7.4-9— Radwaste Annual Source Term	7-78
Table 7.4-10— Radwaste BBNPP Transportation Accident, Fatality and Injury Rates	7-79
Table 7.4-11— Population Dose from Transportation Accidents	7-80
Table 7.4-12— EPR Summary of Annual Transportation Accident Non-Radiological Impact	7-81
Table 8.1-1— PPL EU Historic and Future Energy Demand	8-16
Table 8.1-2— PPL EU Actual and Projected Peak Load (MW)	8-17
Table 8.1-3— PPL EU Actual and Projected Residential Energy Demand (GWh)	8-18
Table 8.1-4— PPL EU Actual and Projected Commercial Energy Demand (GWh)	8-19
Table 8.1-5— PPL EU Actual and Projected Industrial Energy Demand (GWh)	8-20

Table 8.2-1— PJM RTO Historic Unrestricted Peak (MW)	8-30
Table 8.2-2— PJM Mid-Atlantic Summer Unrestricted Peak Forecast (MW)	8-31
Table 8.2-3— PJM Mid-Atlantic Winter Unrestricted Peak Forecast (MW)	8-32
Table 8.2-4— PJM Mid-Atlantic Historical Summer Peaks (MW)	8-33
Table 8.2-5— PJM Mid-Atlantic Historical Winter Peaks (MW)	8-34
Table 8.3-1— PJM Installed Capacity by Fuel Type in 2007	8-51
Table 8.3-2— PJM Generation Fuel Mix for 2007	8-52
Table 8.3-3— PJM Capacity Additions	8-53
Table 8.3-4— PJM Queued Capacity by Fuel Type in Pennsylvania	8-54
Table 8.3-5— PJM Queued Generation Interconnection Requests in the ROI/Primary Market Area	8-55
Table 8.3-6— Capacity Additions (MW) in Active or Under-Construction Queues by Control Zone	8-59
Table 8.3-7— Existing PJM Capacity (MW): 2007	8-60
Table 8.3-8— PJM Queued LTFTS Requests (12/31/2007)	8-61
Table 8.3-9— PJM Queued ARR Requests (12/31/2007)	8-62
Table 8.3-10— Generator Deactivations	8-63
Table 8.3-11— Distribution of PJM Energy Resources	8-67
Table 8.3-12— Historical Reserve Requirement Study (RRS) Parameters	8-68
Table 8.4-1— Demand, Capability, and Margins 2007 – 2016 (Summer)	8-75
Table 9.2-1— Impacts Comparison Table	9-42
Table 9.2-2— Air Emissions from Alternative Power Generation Facilities	9-49
Table 9.3-1— State and Federal Threatened and Endangered Species in Montour County, Pennsylvania	9-259
Table 9.3-2— Census Block Groups within 50 mi (80 km) of the Montour Site with Minority and Low Income Populations	9-260
Table 9.3-3— State and Federal Threatened and Endangered Species in Luzerne County, Pennsylvania	9-262
Table 9.3-4— Census Block Groups within 50 mi (80 km) of the Humboldt Industrial Park with Minority and Low Income Populations	9-265
Table 9.3-5— State and Federal Threatened and Endangered Species in Northumberland County, Pennsylvania	9-267
Table 9.3-6— Census Block Groups within 50 mi (80 km) of the Seedco Industrial Park with Minority and Low Income Populations	9-269
Table 9.3-7— Summary Comparison of Alternative Sites	9-271
Table 9.3-8— Site Ranking Criteria	9-272
Table 9.3-9— Site Ranking Rationale	9-284
Table 9.3-10— Weighted Scoring of Candidate Sites	9-291
Table 9.3-11— Ecologically Important Species in Pennsylvania	9-292
Table 9.3-12— Comparison of Wetland and Waterway Impacts: BBNPP vs. Alternative Sites	9-298
Table 9.3-13— Summary of Potential Onsite and Offsite Wetland Impacts, BBNPP and Alternative Sites	9-300
Table 9.3-14— Summary of Potential Onsite and Offsite Waterway Impacts, BBNPP and Alternative Sites	9-302
Table 9.3-15— State and Federal Threatened and Endangered Species in Columbia County, Pennsylvania	9-305
Table 9.3-16— Potential Occurrence of State and Federal Threatened and Endangered Species and Other Ecologically Important Species in Montour County, Pennsylvania	9-306
Table 9.3-17— Potential Occurrence of State and Federal Threatened and Endangered Species and Other Ecologically Important Species in Columbia County, Pennsylvania	9-312
Table 9.3-18— Potential Occurrence of State and Federal Threatened and Endangered Species and Other Ecologically Important Species in Northumberland County, Pennsylvania	9-316

Table 9.3-19— Potential Occurrence of State and Federal Threatened and Endangered Species and Other Ecologically Important Species in Luzerne County, Pennsylvania	9-326
Table 9.3-20— Potential Occurrence of State and Federal Threatened and Endangered Species and Other Ecologically Important Species in Warren County, New Jersey ^{a, b}	9-359
Table 9.3-21— Potential Occurrence of State and Federal Threatened and Endangered Species in Morris County New Jersey ^{a, b}	9-432
Table 9.3-22— Potential Occurrence of State and Federal Threatened and Endangered Species that May Forage or live in the Delaware River in Northampton County, Pennsylvania ^a	9-446
Table 9.3-23— Past, Present, and Reasonably Foreseeable Projects and Other Actions Considered in the Cumulative Impact Analysis for the BBNPP Alternate Sites	9-447
Table 9.3-24— Census Block Groups within 50 mi (80 km) of the Martins Creek Site with Minority and Low-Income Populations	9-473
Table 9.4-1— Comparison of Cooling Tower Evaluation Criteria	9-537
Table 9.4-2— Environmental Impacts of Alternative Cooling Tower Systems	9-538
Table 9.4-3— Alternate Intake Systems	9-539
Table 10.1-1— Construction-Related Unavoidable Adverse Environmental Impacts	10-6
Table 10.1-2— Operations-Related Unavoidable Adverse Environmental Impacts	10-11
Table 10.2-1— Summary of Historical Data - Materials Consumed by Nuclear Power Plant Construction in the United States During the 1970's	10-18
Table 10.2-2— U.S. EPR Estimated Construction Materials (Tons)	10-19
Table 10.2-3— Estimated Inventories of Construction Supplies Based on U.S. Merchant Wholesalers Data 2000, 2005 and 2006	10-20
Table 10.2-4— U.S. Mineral Production in 2000, 2005 and Estimated for 2006	10-21
Table 10.2-5— Percent Capacity Utilization Rates by Industry	10-22
Table 10.4-1— Benefits and Costs of the Proposed Project Summarized	10-34

List of Figures

Figure 1.2-1— BBNPP Site 50 Mi (80 km) Region	1-7
Figure 1.2-2— BBNPP Site 10 mi (16 km) Region	1-8
Figure 1.2-3— General Cooling System Flow Diagram for BBNPP	1-9
Figure 1.2-4— Aerial View of SSES Units 1 and 2 with BBNPP Superimposed	1-10
Figure 1.2-5— BBNPP Site 500 kV and 230 kV Regional Circuit Corridors	1-11
Figure 2.1-1— BBNPP Site and Proposed New Plant Layout	2-3
Figure 2.1-2— BBNPP Site 50 Mile (80 km) Region	2-4
Figure 2.1-3— BBNPP Site 6 mi (10 km) Region	2-5
Figure 2.1-4— Oblique Aerial Photo Showing BBNPP Project Area	2-6
Figure 2.1-5— Area Uses During Construction	2-7
Figure 2.2-1— Land Use within the BBNPP Project Boundary	2-29
Figure 2.2-2— BBNPP 6 mi (10 km) Land Use	2-30
Figure 2.2-3— BBNPP Site Topographic Map	2-31
Figure 2.2-4— BBNPP Site Zoning Map	2-32
Figure 2.2-5— BBNPP Site 500 kV and 230 kV Regional Circuit Corridors	2-33
Figure 2.2-6— BBNPP Land Use within a 50 mi (80 km) Radius	2-34
Figure 2.2-7— BBNPP Major Public and Trust Land in 50 mile (80 km) Region	2-35
Figure 2.3-1— Susquehanna River Basin and Sub-basins	2-432
Figure 2.3-2— Site Area Topographic Map 5 Mile (8 km) Radius	2-433
Figure 2.3-3— Walker Run Watershed	2-434
Figure 2.3-4— Site Utilization Layout	2-435
Figure 2.3-5— Site Drainage Flow Pattern	2-436
Figure 2.3-6— Elevation Profile of the NBSR in PA	2-437
Figure 2.3-7— USGS Stream Gages within a 50-Mile (80-km) Radius	2-438
Figure 2.3-8— Mean, Maximum and Minimum Streamflows for the Wilkes-Barre, PA USGS 01536500, 1900 through 2006	2-439
Figure 2.3-9— Mean, Maximum and Minimum Streamflows for the Danville, PA USGS 01540500, 1905 through 2006	2-440
Figure 2.3-10— Temperature for the Danville USGS 01540500, 1946 through 1976	2-441
Figure 2.3-11— Susquehanna River Bathymetry Near Intake and Blowdown Structures	2-442
Figure 2.3-12— Flood Insurance Map, Panel 1 of 4	2-443
Figure 2.3-13— Flood Insurance Map, Panel 2 of 4	2-444
Figure 2.3-14— Flood Insurance Map, Panel 3 of 4	2-445
Figure 2.3-15— Flood Insurance Map, Panel 4 of 4	2-446
Figure 2.3-16— Dams within the Susquehanna River Basin	2-447
Figure 2.3-17— Physiographic Provinces of Pennsylvania	2-448
Figure 2.3-18— Glacial Deposits of Pennsylvania	2-449
Figure 2.3-19— Geologic Map of the BBNPP Site and Vicinity	2-450
Figure 2.3-20— Stratigraphy and Geologic Cross Section of the Berwick Anticlinorium	2-451
Figure 2.3-21— Surficial Deposits at BBNPP Site and Vicinity	2-452
Figure 2.3-22— Legend of Surficial Deposits	2-453
Figure 2.3-23— Frequency Distribution of Nondomestic Well Yields Grouped According to Dominant Rock Type	2-454
Figure 2.3-24— Frequency Distribution of Nondomestic Well Yields Grouped According to Topographic Setting	2-455
Figure 2.3-25— Distribution of Water-Bearing Zones With Depth	2-456
Figure 2.3-26— Average Annual Precipitation in the North Branch of the Susquehanna River Basin in Pennsylvania, 1941 - 1970	2-457

Figure 2.3-27— Percent Frequency Distribution of Annual Precipitation in the Southern Part of the North Branch Susquehanna River Basin, 1931 - 1980	2-458
Figure 2.3-28— Locations of Drainage Basins Where Long-Term Water Budget Analyses Have Been Performed	2-459
Figure 2.3-29— Hydrographs of Two USGS Monitoring Wells in Luzerne County Screened in Glacial Outwash	2-460
Figure 2.3-30— Hydrographs of Two USGS Monitoring Wells in Luzerne County Screened in the Catskill Formation	2-461
Figure 2.3-31— Locations of Groundwater Monitoring Wells	2-462
Figure 2.3-32— Locations of BBNPP Surface Water Monitoring Stations	2-463
Figure 2.3-33— Locations of Hydrogeological Cross Sections	2-464
Figure 2.3-34— Hydrogeological Cross Section A-A'	2-465
Figure 2.3-35— Hydrogeological Cross Section B-B'	2-466
Figure 2.3-36— Thickness Map of the Glacial Overburden Aquifer	2-467
Figure 2.3-37— Topography of Bedrock Surface	2-468
Figure 2.3-38— Topography of Bedrock Surface in the Power Block Area	2-469
Figure 2.3-39— Groundwater Elevation versus Time, Glacial Outwash Aquifer	2-470
Figure 2.3-40— Groundwater Elevation versus Time, Shallow Bedrock Aquifer	2-471
Figure 2.3-41— Groundwater Elevation versus Time, Deep Bedrock Aquifer	2-472
Figure 2.3-42— Groundwater Elevation versus Time, Well Cluster MW301	2-473
Figure 2.3-43— Groundwater Elevation versus Time, Well Cluster MW302	2-474
Figure 2.3-44— Groundwater Elevation versus Time, Well Cluster MW303	2-475
Figure 2.3-45— Groundwater Elevation versus Time, Well Cluster MW304	2-476
Figure 2.3-46— Groundwater Elevation versus Time, Well Cluster MW305	2-477
Figure 2.3-47— Groundwater Elevation versus Time, Well Cluster MW306	2-478
Figure 2.3-48— Groundwater Elevation versus Time, Well Cluster MW307	2-479
Figure 2.3-49— Groundwater Elevation versus Time, Well Cluster MW308	2-480
Figure 2.3-50— Groundwater Elevation versus Time, Well Cluster MW309	2-481
Figure 2.3-51— Groundwater Elevation versus Time, Well Cluster MW310	2-482
Figure 2.3-52— Surface Water Elevation versus Time	2-483
Figure 2.3-53— Water Level Fluctuations In MW301 Cluster Area Based on Pressure Transducer Data	2-484
Figure 2.3-54— Water Level Fluctuations In MW302 Cluster Area Based on Pressure Transducer Data	2-485
Figure 2.3-55— Potentiometric Surface Map of Glacial Outwash Aquifer, November 2007	2-487
Figure 2.3-56— Potentiometric Surface Map of Glacial Outwash Aquifer, January 2008	2-488
Figure 2.3-57— Potentiometric Surface Map of Glacial Outwash Aquifer, March 2008	2-489
Figure 2.3-58— Potentiometric Surface Map of Glacial OverburdenOutwash Aquifer, July 2008	2-490
Figure 2.3-59— Potentiometric Surface Map of Glacial Outwash Aquifer, June 2010	2-491
Figure 2.3-60— Potentiometric Surface Map of Glacial Outwash Aquifer, September 2010	2-492
Figure 2.3-61— Potentiometric Surface Map of Glacial Outwash Aquifer, December 2010	2-493
Figure 2.3-62— Potentiometric Surface Map of Glacial Outwash Aquifer, April 2011	2-494
Figure 2.3-63— Potentiometric Surface Map of Shallow Bedrock Aquifer, November 2007	2-495
Figure 2.3-64— Potentiometric Surface Map of Shallow Bedrock Aquifer, January 2008	2-496
Figure 2.3-65— Potentiometric Surface Map of Shallow Bedrock Aquifer, March 2008	2-497
Figure 2.3-66— Potentiometric Surface Map of Shallow Bedrock Aquifer, July 2008	2-498
Figure 2.3-67— Potentiometric Surface Map of Shallow Bedrock Aquifer, June 2010	2-499
Figure 2.3-68— Potentiometric Surface Map of Shallow Bedrock Aquifer, September 2010	2-500
Figure 2.3-69— Potentiometric Surface Map of Shallow Bedrock Aquifer, December 2010	2-501
Figure 2.3-70— Potentiometric Surface Map of Shallow Bedrock Aquifer, April 2011	2-502
Figure 2.3-71— Potentiometric Surface Map of Deep Bedrock Aquifer, November 2007	2-503

Figure 2.3-72— Potentiometric Surface Map of Deep Bedrock Aquifer, January 2008	2-504
Figure 2.3-73— Potentiometric Surface Map of Deep Bedrock Aquifer, March 2008	2-505
Figure 2.3-74— Potentiometric Surface Map of Deep Bedrock Aquifer, July 2008	2-506
Figure 2.3-75— Potentiometric Surface Map of Deep Bedrock Aquifer, June 2010	2-507
Figure 2.3-76— Potentiometric Surface Map of Deep Bedrock Aquifer, September 2010	2-508
Figure 2.3-77— Potentiometric Surface Map of Deep Bedrock Aquifer, December 2010	2-509
Figure 2.3-78— Potentiometric Surface Map of Deep Bedrock Aquifer, April 2011	2-510
Figure 2.3-79— Areas Known or Suspected of Having Upward-Flowing Groundwater from Bedrock	2-511
Figure 2.3-80— Vertical Distribution of Fractures in MW301C Between 45 and 345 Feet Below Ground Surface	2-512
Figure 2.3-81— Distribution of Fracture Dip Directions in Monitoring Well MW301C	2-513
Figure 2.3-82— Distribution of Fracture Dip Angles in Monitoring Well MW301C	2-514
Figure 2.3-83— Vertical Distribution of Fractures in MW310C Between 24 and 200 Feet Below Ground Surface	2-515
Figure 2.3-84— Distribution of Fracture Dip Directions in Monitoring Well MW310C	2-516
Figure 2.3-85— Distribution of Fracture Dip Angles in Monitoring Well MW310C	2-517
Figure 2.3-86— Surface Water Withdrawal Within Luzerne County	2-518
Figure 2.3-87— Surface Water Withdrawal Within 5 Mile (8 km) Radius	2-519
Figure 2.3-88— Water Pollution Control Facility Locations Within a 5 Mile (8 km) Radius	2-520
Figure 2.3-89— Water Pollution Control Facility Locations Within Luzerne County	2-521
Figure 2.3-90— Sole Source Aquifers Located in USEPA Region 3	2-522
Figure 2.3-91— Groundwater Use in the Susquehanna River Basin in 1995	2-523
Figure 2.3-92— Groundwater Well Locations Within a 25-Mile (40-km) Radius	2-524
Figure 2.3-93— Groundwater Well Locations within a 5-Mile (8-km) Radius	2-525
Figure 2.3-94— Groundwater Withdrawal within a 25-Mile (40-km) Radius	2-526
Figure 2.3-95— Groundwater Withdrawal within a 5-Mile (8-km) Radius	2-527
Figure 2.3-96— Groundwater Production Wells at SSES	2-528
Figure 2.3-97— Potentially Stressed Areas and Water Challenged Areas in the Susquehanna River Basin	2-529
Figure 2.3-98— Relationship Between Total Mineral Solids and Flow Rates in the Susquehanna River	2-530
Figure 2.4-1— Topographic Map of the BBNPP Site	2-627
Figure 2.4-2— Plant Community Map	2-628
Figure 2.4-3— Location of Aquatic Biota Collection Stations	2-629
Figure 2.4-4— Location of Electrofishing (EF) and Seining (SN) Stations in the Susquehanna River	2-630
Figure 2.4-5— Location of Benthic Macroinvertebrate Collection Stations in the Susquehanna River	2-631
Figure 2.4-6— Location of Mussel Survey Stations in the Susquehanna River	2-632
Figure 2.4-7— Important Terrestrial Habitats in the Vicinity of BBNPP	2-633
Figure 2.5-1— BBNPP 50 Mile (80 km) Radius Map	2-858
Figure 2.5-2— BBNPP 10 Mile (16km) Radius Map	2-859
Figure 2.5-3— BBNPP Low Population Zone	2-860
Figure 2.5-4— Locations Surveyed as Part of the Phase 1A Reconnaissance	2-861
Figure 2.5-5— Phase 1b Project Location	2-862
Figure 2.5-6— Previously Recorded Cultural Resources within 1 mi (1.6 km) of the Phase 1a Project Area	2-863
Figure 2.5-7— Surveyed Architectural and Historic Resources in the Project Viewshed	2-864
Figure 2.5-8— Phase 1b Project APE Showing Testing Locations and Identified Archeological Sites	2-865
Figure 2.5-9— Black or African-American Minority Population	2-866

Figure 2.5-10— Other Minority Population	2-867
Figure 2.5-11— Aggregate Minority Population	2-868
Figure 2.5-12— Hispanic or Latin American Minority Population	2-869
Figure 2.5-13— Low Income Population	2-870
Figure 2.6-1— Physiographic Provinces Within the Site Region 200 Mile (322 km) Radius	2-882
Figure 2.6-2— Site Area Topographic Map 5 Mile (8 km) Radius	2-883
Figure 2.7-1— Annual Average Number of Tornadoes, 1950-1995	2-1503
Figure 2.7-2— Annual Average Number of Strong-Violent (F2-F5) Tornadoes, 1950-1995	2-1504
Figure 2.7-3— Annual Thunderstorm Frequency	2-1505
Figure 2.7-4— Five-Year Lightning Flash Density Map	2-1506
Figure 2.7-5— SSES 10 m January Precipitation Wind Rose	2-1507
Figure 2.7-6— SSES 10 m February Precipitation Wind Rose	2-1508
Figure 2.7-7— SSES 10 m March Precipitation Wind Rose	2-1509
Figure 2.7-8— SSES 10 m April Precipitation Wind Rose	2-1510
Figure 2.7-9— SSES 10 m May Precipitation Wind Rose	2-1511
Figure 2.7-10— SSES 10 m June Precipitation Wind Rose	2-1512
Figure 2.7-11— SSES 10 m July Precipitation Wind Rose	2-1513
Figure 2.7-12— SSES 10 m August Precipitation Wind Rose	2-1514
Figure 2.7-13— SSES 10 m September Precipitation Wind Rose	2-1515
Figure 2.7-14— SSES 10 m October Precipitation Wind Rose	2-1516
Figure 2.7-15— SSES 10 m November Precipitation Wind Rose	2-1517
Figure 2.7-16— SSES 10 m December Precipitation Wind Rose	2-1518
Figure 2.7-17— SSES 10 m Annual Precipitation Wind Rose	2-1519
Figure 2.7-18— SSES 60 m January Precipitation Wind Rose	2-1520
Figure 2.7-19— SSES 60 m February Precipitation Wind Rose	2-1521
Figure 2.7-20— SSES 60 m March Precipitation Wind Rose	2-1522
Figure 2.7-21— SSES 60 m April Precipitation Wind Rose	2-1523
Figure 2.7-22— SSES 60 m May Precipitation Wind Rose	2-1524
Figure 2.7-23— SSES 60 m June Precipitation Wind Rose	2-1525
Figure 2.7-24— SSES 60 m July Precipitation Wind Rose	2-1526
Figure 2.7-25— SSES 60 m August Precipitation Wind Rose	2-1527
Figure 2.7-26— SSES 60 m September Precipitation Wind Rose	2-1528
Figure 2.7-27— SSES 60 m October Precipitation Wind Rose	2-1529
Figure 2.7-28— SSES 60 m November Precipitation Wind Rose	2-1530
Figure 2.7-29— SSES 60 m December Precipitation Wind Rose	2-1531
Figure 2.7-30— SSES 60 m Annual Precipitation Wind Rose	2-1532
Figure 2.7-31— SSES 10 m January Precipitation Rate Wind Rose	2-1533
Figure 2.7-32— SSES 10 m February Precipitation Rate Wind Rose	2-1534
Figure 2.7-33— SSES 10 m March Precipitation Rate Wind Rose	2-1535
Figure 2.7-34— SSES 10 m April Precipitation Rate Wind Rose	2-1536
Figure 2.7-35— SSES 10 m May Precipitation Rate Wind Rose	2-1537
Figure 2.7-36— SSES 10 m June Precipitation Rate Wind Rose	2-1538
Figure 2.7-37— SSES 10 m July Precipitation Rate Wind Rose	2-1539
Figure 2.7-38— SSES 10 m August Precipitation Rate Wind Rose	2-1540
Figure 2.7-39— SSES 10 m September Precipitation Rate Wind Rose	2-1541
Figure 2.7-40— SSES 10 m October Precipitation Rate Wind Rose	2-1542
Figure 2.7-41— SSES 10 m November Precipitation Rate Wind Rose	2-1543
Figure 2.7-42— SSES 10 m December Precipitation Rate Wind Rose	2-1544
Figure 2.7-43— SSES 60 m January Precipitation Rate Wind Rose	2-1545
Figure 2.7-44— SSES 60 m February Precipitation Rate Wind Rose	2-1546
Figure 2.7-45— SSES 60 m March Precipitation Rate Wind Rose	2-1547

Figure 2.7-46— SSES 60 m April Precipitation Rate Wind Rose	2-1548
Figure 2.7-47— SSES 60 m May Precipitation Rate Wind Rose	2-1549
Figure 2.7-48— SSES 60 m June Precipitation Rate Wind Rose	2-1550
Figure 2.7-49— SSES 60 m July Precipitation Rate Wind Rose	2-1551
Figure 2.7-50— SSES 60 m August Precipitation Rate Wind Rose	2-1552
Figure 2.7-51— SSES 60 m September Precipitation Rate Wind Rose	2-1553
Figure 2.7-52— SSES 60 m October Precipitation Rate Wind Rose	2-1554
Figure 2.7-53— SSES 60 m November Precipitation Rate Wind Rose	2-1555
Figure 2.7-54— SSES 60 m December Precipitation Rate Wind Rose	2-1556
Figure 2.7-55— SSES 10m Annual Wind Rose	2-1557
Figure 2.7-56— SSES 10m Winter Wind Rose	2-1558
Figure 2.7-57— SSES 10m Spring Wind Rose	2-1559
Figure 2.7-58— SSES 10m Summer Wind Rose	2-1560
Figure 2.7-59— SSES 10m Fall Wind Rose	2-1561
Figure 2.7-60— SSES 10m January Wind Rose	2-1562
Figure 2.7-61— SSES 10m February Wind Rose	2-1563
Figure 2.7-62— SSES 10m March Wind Rose	2-1564
Figure 2.7-63— SSES 10m April Wind Rose	2-1565
Figure 2.7-64— SSES 10m May Wind Rose	2-1566
Figure 2.7-65— SSES 10m June Wind Rose	2-1567
Figure 2.7-66— SSES 10m July Wind Rose	2-1568
Figure 2.7-67— SSES 10m August Wind Rose	2-1569
Figure 2.7-68— SSES 10m September Wind Rose	2-1570
Figure 2.7-69— SSES 10m October Wind Rose	2-1571
Figure 2.7-70— SSES 10m November Wind Rose	2-1572
Figure 2.7-71— SSES 10m December Wind Rose	2-1573
Figure 2.7-72— SSES 60m Annual Wind Rose	2-1574
Figure 2.7-73— SSES 60m Winter Wind Rose	2-1575
Figure 2.7-74— SSES 60m Spring Wind Rose	2-1576
Figure 2.7-75— SSES 60m Summer Wind Rose	2-1577
Figure 2.7-76— SSES 60m Fall Wind Rose	2-1578
Figure 2.7-77— SSES 60m January Wind Rose	2-1579
Figure 2.7-78— SSES 60m February Wind Rose	2-1580
Figure 2.7-79— SSES 60m March Wind Rose	2-1581
Figure 2.7-80— SSES 60m April Wind Rose	2-1582
Figure 2.7-81— SSES 60m May Wind Rose	2-1583
Figure 2.7-82— SSES 60m June Wind Rose	2-1584
Figure 2.7-83— SSES 60m July Wind Rose	2-1585
Figure 2.7-84— SSES 60m August Wind Rose	2-1586
Figure 2.7-85— SSES 60m September Wind Rose	2-1587
Figure 2.7-86— SSES 60m October Wind Rose	2-1588
Figure 2.7-87— SSES 60m November Wind Rose	2-1589
Figure 2.7-88— SSES 60m December Wind Rose	2-1590
Figure 2.7-89— Wilkes-Barre/Scranton, PA, Wind Rose	2-1591
Figure 2.7-90— Allentown, PA, Wind Rose	2-1592
Figure 2.7-91— Williamsport, PA, Wind Rose	2-1593
Figure 2.7-92— Maximum Terrain Heights, With Respect to Finished Floor Grade, 0-5 Miles Downwind of Bell Bend by Compass Sector	2-1594
Figure 2.7-93— Maximum Terrain Heights, With Respect to Finished Floor Grade, 0-50 Miles Downwind of Bell Bend by Compass Sector	2-1595
Figure 2.7-94— Topographical Features Within 5 Miles (8 Kilometers) of Bell Bend	2-1596

Figure 2.7-95— Topographical Features Within 50 Miles (80 Kilometers) of Bell Bend	2-1597
Figure 2.7-96— Monthly Average Mixing Heights	2-1598
Figure 2.7-97— Baseline BBNPP Leaf-Off Sound Survey Measurement Locations	2-1599
Figure 2.7-98— Measured Hourly Residual (L90) Sound Levels at Survey	2-1600
Figure 3.1-1— Site Area Topographical Map	3-5
Figure 3.1-2— Aerial View of Susquehanna Steam Electric Station Units 1 and 2 with Bell Bend NPP Superimposed	3-6
Figure 3.1-3— Ground Level View Looking Southwest with the Bell Bend Structures Superimposed	3-7
Figure 3.1-4— Ground Level View Looking Northeast with the Bell Bend Structures Superimposed	3-8
Figure 3.1-5— Ground Level View Looking East with Bell Bend Structures Superimposed	3-9
Figure 3.1-6— Ground Level View Looking Northwest with the Bell Bend Structures Superimposed	3-10
Figure 3.1-7— Architectural Rendering of Bell Bend NPP Looking Northeast	3-11
Figure 3.2-1— Reactor Power Conversion System	3-15
Figure 3.3-1— Anticipated Water Use Diagram	3-25
Figure 3.4-1— General Cooling System Flow Diagram for BBNPP	3-37
Figure 3.4-2— View of Combined Waste Water Retention Pond for BBNPP	3-38
Figure 3.4-3— Circulating Water System Intake/Discharge Structure Location Plan	3-39
Figure 3.4-4— Plan View of BBNPP Intake Structure	3-40
Figure 3.4-5— Section View of BBNPP Intake Structure	3-41
Figure 3.4-6— View of Discharge Outfall for Discharge System for BBNPP	3-42
Figure 3.4-7— CWS Cooling Tower Elevation View	3-43
Figure 3.4-8— Plan View of ESWEMS Pumphouse	3-44
Figure 3.4-9— Section View of ESWEMS Pumphouse	3-45
Figure 3.4-10— ESWEMS Retention Pond	3-46
Figure 3.4-11— BBNPP Intake Structure Construction Cofferdam	3-47
Figure 3.4-12— End of Blowdown Line	3-48
Figure 3.5-1— Radwaste Effluent Flow Path	3-128
Figure 3.5-2— Liquid Radwaste Storage System	3-129
Figure 3.5-3— Liquid Waste Processing Evaporator and Centrifuge	3-130
Figure 3.5-4— Liquid Radwaste Processing Demineralizer System	3-131
Figure 3.5-5— Gaseous Waste Processing and Sources	3-132
Figure 3.5-6— Gaseous Waste Processing System	3-133
Figure 3.5-7— Controlled Area Ventilation Flow Diagram	3-134
Figure 3.5-8— Solid Waste System Flow Diagram	3-135
Figure 3.7-1— BBNPP Site 500 kV and 230 kV Regional Circuit Corridors	3-163
Figure 3.7-2— Site Topography and Generalized Transmission Line Corridor	3-164
Figure 4.1-1— BBNPP Site Zoning and Grading Layout	4-18
Figure 4.1-2— Construction Impacts to Prime Farmland within the BBNPP Project Boundary	4-19
Figure 4.1-3— Construction Impacts to Floodplains within the BBNPP Project Boundary	4-20
Figure 4.2-1— BBNPP Site Grading Plan	4-43
Figure 4.3-1— BBNPP Project Boundary and Limit of Disturbance	4-77
Figure 4.3-2— Vegetation Impacts	4-78
Figure 4.3-3— Wetland Impacts	4-79
Figure 4.4-1— BBNPP Traffic Impact Assessment Study Area	4-118
Figure 4.4-2— Cumulative Overlapping 50 mi (80 km) Zones for Nuclear Power Plants Surrounding BBNPP	4-119
Figure 4.5-1— Site Layout	4-150
Figure 4.5-2— CST and RWST Locations on Plant Grid	4-151
Figure 4.5-3— Source Locations	4-152

Figure 4.5-4— Annual Dose Rate in 2017 in Units of mrem 8760 hours	4-153
Figure 4.5-5— ISFSI Distance Equation	4-154
Figure 4.5-6— ISFSI Satellite Image	4-155
Figure 4.5-7— SSES ISFSI (blue border) with TLDs and Grid	4-156
Figure 4.5-8— TLD (ID 13S2) Data Verifying Time Correlation Function	4-157
Figure 4.5-9— Dose vs Distance for CSTs	4-158
Figure 4.5-10— Dose vs Distance for LLRWHF	4-159
Figure 4.5-11— Dose vs Distance for SEALAND Containers	4-160
Figure 4.5-12— Dose vs Distance for Steam Dryer Storage Vault	4-161
Figure 4.5-13— Dose vs Distance for Turbine Building	4-162
Figure 5.3-1— Temperature Rise Above Ambient at the Surface for the Combined BBNPP and SSES Blowdown Discharges for August	5-60
Figure 5.3-2— Temperature Rise Above Ambient at the Surface for the BBNPP Blowdown Discharge for August	5-61
Figure 5.3-3— Temperature Rise Above Ambient at the Surface for the Combined BBNPP and SSES Blowdown Discharges for January	5-62
Figure 5.3-4— Temperature Rise Above Ambient at the Surface for the BBNPP Blowdown Discharge for January	5-63
Figure 5.3-5— Total Number of Fish and Crayfish Collected in Impingement Samples at the SSES CWS, April 22, 2008 to August 12, 2008	5-64
Figure 5.3-6— Total Number of Fish Collected in Entrainment Samples at the SSES River Intake Structure, April 22, 2008 to June 4, 2008	5-65
Figure 5.8-1— Predicted Sound Contours (dBA) of the Cooling Towers During BBNPP Operation	5-167
Figure 6.1-1— SSES and BBNPP Discharge and Temperature Monitoring Stations	6-6
Figure 6.2-1— Existing SSES TLD Monitoring Locations within One Mile of Plant	6-38
Figure 6.2-2— Existing SSES TLD Monitoring Locations that are One to Five Miles from the Plant	6-39
Figure 6.2-3— Existing SSES TLD Monitoring Locations that are Greater than Five Miles from the Plant	6-40
Figure 6.2-4— Existing SSES Environmental Sampling Locations that are within One Mile of the Plant	6-41
Figure 6.2-5— Existing SSES Environmental Sampling Locations from One to Five Miles of the Plant	6-42
Figure 6.2-6— Existing SSES Environmental Sampling Locations Greater than Five Miles	6-43
Figure 6.2-7— BBNPP TLD Monitoring Locations Within One Mile of Plant	6-44
Figure 6.2-8— BBNPP TLD Monitoring Locations from One to Five Miles from Plant	6-45
Figure 6.2-9— BBNPP TLD Monitoring Locations Greater than 5 miles from Plant	6-46
Figure 6.2-10— BBNPP Environmental Sampling Locations Within One Mile of Plant	6-47
Figure 6.2-11— BBNPP Environmental Sampling Locations from One to Five from Plant	6-48
Figure 6.2-12— BBNPP Environmental Sampling Locations that are Greater than 5 Miles from the Plant	6-49
Figure 6.2-13— BBNPP Ground Water Sampling Locations that are within the Protected Area Boundary	6-50
Figure 6.4-1— Topography within a 1-Mile (1.6 km) Radius of the Site	6-72
Figure 6.4-2— Topography within a 5-Mile (8 km) Radius of the Site	6-73
Figure 8.0.1-1— Primary Market Area - Region of Interest	8-7
Figure 8.2-1— PJM Real - Time Load Duration Curve 2003-2007	8-35
Figure 8.2-2— 1990-2006 Average Electric Price in Pennsylvania	8-36
Figure 8.2-3— 1990-2006 Average Electric Price in New Jersey	8-37
Figure 8.2-4— 1990-2006 Average Electric Price in Delaware	8-38
Figure 8.2-5— 1990-2006 Average Electric Price in Maryland	8-39
Figure 8.2-6— 1990-2006 Average Electric Price in Virginia	8-40

Figure 9.3-1— Region of Interest	9-475
Figure 9.3-2— Candidate Area Exclusionary Criteria	9-476
Figure 9.3-3— Candidate Areas	9-477
Figure 9.3-4— Candidate Sites	9-478
Figure 9.3-5— BBNPP Location Map	9-479
Figure 9.3-6— Montour Site Location Map	9-480
Figure 9.3-7— Humboldt Industrial Park Location Map	9-481
Figure 9.3-8— Seedco Industrial Park Location Map	9-482
Figure 9.3-9— Alternative Site Evaluation Process Overview	9-483
Figure 9.3-10— Candidate Area Exclusionary Criteria – Population	9-484
Figure 9.3-11— Candidate Area Exclusionary Criteria – Transmission	9-485
Figure 9.3-12— Candidate Area Exclusionary Criteria – Dedicated Lands	9-486
Figure 9.3-13— Candidate Area Exclusionary Criteria – Waterway	9-487
Figure 9.3-14— Locations of Sites within Candidate Areas	9-488
Figure 9.3-15— Alternative Sites and Proposed Site	9-489
Figure 9.3-16— BBNPP Vicinity Map	9-490
Figure 9.3-17— Montour Site Vicinity Map	9-491
Figure 9.3-18— Black Minority Block Groups within 50-Mile Radius of Montour Site	9-492
Figure 9.3-19— American Indian Minority Block Groups within 50-Mile Radius of Montour Site	9-493
Figure 9.3-20— Aggregate Minority Block Groups within 50-Mile Radius of Montour Site	9-494
Figure 9.3-21— Low Income Block Groups within 50-Mile Radius of Montour Site	9-495
Figure 9.3-22— Humboldt Industrial Park Vicinity Map	9-496
Figure 9.3-23— Black Minority Block Groups within 50-Mile Radius of Humboldt Industrial Park	9-497
Figure 9.3-24— Asian Minority Block Groups within 50-Mile Radius of Humboldt Industrial Park	9-498
Figure 9.3-25— Other Race Minority Block Groups within 50-Mile Radius of Humboldt Industrial Park	9-499
Figure 9.3-26— Aggregate Minority Block Groups within 50-Mile Radius of Humboldt Industrial Park	9-500
Figure 9.3-27— Hispanic Minority Block Groups within 50-Mile Radius of Humboldt Industrial Park	9-501
Figure 9.3-28— Low Income Block Groups within 50-Mile Radius of Humboldt Industrial Park	9-502
Figure 9.3-29— Seedco Industrial Park Vicinity Map	9-503
Figure 9.3-30— Black Minority Block Groups Within 50 Mile Radius of Seedco Industrial Park	9-504
Figure 9.3-31— Other Race Minority Block Groups within 50-Mile Radius of Seedco Industrial Park	9-505
Figure 9.3-32— Aggregate Minority Block Groups within 50-Mile Radius of Seedco Industrial Park	9-506
Figure 9.3-33— Hispanic Minority Block Groups within 50-Mile Radius of Seedco Industrial Park	9-507
Figure 9.3-34— Low Income Block Groups within 50-Mile Radius of Seedco Industrial Park	9-508
Figure 9.3-35— Past, Present, and Reasonably Foreseeable Projects and Other Actions Considered in the Cumulative Impact Analysis for the BBNPP Alternative Sites	9-509
Figure 9.3-36— Martins Creek Site Location Map	9-510
Figure 9.3-37— Martins Creek Site Vicinity Map	9-511
Figure 9.3-38— Black Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-512
Figure 9.3-39— Native American Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-513
Figure 9.3-40— Asian Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-514
Figure 9.3-41— Other Race Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-515
Figure 9.3-42— Multi-Race Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-516
Figure 9.3-43— Aggregate Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-517
Figure 9.3-44— Hispanic Minority Block Groups within 50-Mile Radius of Martins Creek Site	9-518

Figure 9.3-45— Low Income Block Groups within 50-Mile Radius of Martins Creek Site 9-519