Rev. 7

Wetlands Delineation and Exceptional Value Wetlands Analysis Report for the Proposed Bell Bend Nuclear Power Plant Site, Luzerne County, Pennsylvania

Submitted to:
AREVA NP, Inc.
Marlborough, MA

September 2011

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

Bell Bend Nuclear Power Plant

Salem Township
Luzerne County, Pennsylvania

Revision 7

WETLANDS DELINEATION AND EXCEPTIONAL VALUE WETLANDS ANALYSIS REPORT

To satisfy:

Pennsylvania Department of Environmental Protection
Chapter 105 Dam Safety and Waterway Management Rules and Regulations

and

U.S. Army Corps of Engineers
Regulatory Programs
33 CFR 320-330

Prepared for:

UNISTAR NUCLEAR DEVELOPMENT, LLC

September 2011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

RECORD OF REVISIONS

Revision	Date	Pages/Sections Changed	Brief Description
000	October 2008	All	Initial release
001	February 2009	Title page	Title
001		Page 2	Update definition
001		Pages 8-12	5.0: text revisions
001		Pages 14 and 15	6.0: references added
001		Figure 5	Added new properties delineated wetland boundaries
001		Figure 6	New properties wetland boundaries and documentation
001		Appendix A	Added photographs 1a-1f, 29c, 43a-43d, 51c-51l
001		Appendix B	Added datasheets BBB1-4, CCC1,DDD1, FFF1-4, NNN1-2, PPP1, RRR1-2, SSS1-2, T1, TTT1-2, UUU1-2, VVV1
002	August 2009	Title page	Title
002		Table 2	Text revision
003	July 2010	Title page	Title
003		TOC	Page numbers
003		Pages 3-4	Section 1.0: updated to reflect Plot Plan Change and additional 2010 field surveys
003		Pages 5-8	Section 2.0: updated to reflect Plot Plan Change and additional 2010 field surveys
003		Page 9	Section 3.0: updated to reflect Plot Plan Change and additional 2010 field surveys
003		Page 14-19	Section 5.0: updated to reflect Plot Plan Change and additional 2010 field surveys
003		Pages 15-17	Section 6.0: references updated
003		Figure 1	Revised site boundary, added potential areas of disturbance, and moved location of BBNPP to reflect Plot Plan Change
003		Figure 2	Revised site boundary, added wetland survey area, and moved location of BBNPP to reflect Plot Plan Change
003		Figure 3	Revised site boundary, updated NWI within survey area, and moved location of BBNPP to reflect Plot Plan Change
003		Figure 4	Revised map with new soils within updated site boundary and moved location of BBNPP to reflect Plot Plan Change
003		Figure 5	Revised site boundary, added delineated wetlands within survey area, and moved location of BBNPP to

Revision	Date	Pages/Sections Changed	Brief Description
			reflect Plot Plan Change
003		Figure 6	Revised site boundary, added delineated wetlands within survey area, and moved location of BBNPP to reflect Plot Plan Change
003		Table 1	Added new soil series
003		Table 2	Added new species to plant list and footnote
003		Appendix A	Added photographs 75-85, deleted 51c
003		Appendix B	Added datasheets AM1, AN1, AO1, AO2, AP1, AP2, AQ1, AQ2, AS1, AS2, AV1, AV2, AW1, AW2, AX1, and AX2 Deleted datasheets DPM2 and DPCCC1
003		Appendix C	Added new soil series descriptions
003		Record of Revision	Modified columns and formatting to match other source documents
004	October 2010	Figures	All Figures were revised to include the modified BBNPP Project Boundary and Figures 5 and 6 were revised to include changes to wetland boundaries associated with the preliminary jurisdictional determination walk-through during September 2010
004		References	AREVA reference 2010a, 2010b, and 2010c were updated to include the latest revision of each document
005	November 2010	Figures 5 and 6	Revised wetland boundaries to reflect the wetlands boundaries that had been determined prior to the 2nd JD walk-through
005		Page 3	Revised text to reflect the BBNPP Project Boundary name change
005		Table 1 and 2, Figure 2	Titles were revised to reflect the BBNPP Project Boundary name change
005		References	AREVA 2010 a, b, and c references were revised to reflect most recent revision of each source
006	April 2011	Figure 2	Revised wetlands survey area
006		Figures 5 and 6	Revised wetlands boundaries to reflect the wetlands boundaries that had been determined after the 2nd JD walk-through
007	September 2011	Title page	Title
007		TOC	Page numbers
007		Pages 4-5	Section 1.0: updated to reflect additional 2011 field surveys, minor editorial changes to text, and net relief value changed to 500 ft to reflect value in ER
007		Page 17	Section 5.0: revised description of northern cricket frog observations to indicate that it was heard but

Revision	Date	Pages/Sections Changed	Brief Description
			never visually observed.
007		Pages 15-17, 19	Section 5.0: updated and revised to include additional agency responses, changed DCNR to PDNCR
007		Pages 16, 18-19	Section 5.0: added summary of results from Indiana Bat Roost Tree Survey
		Page 19	Section 5.0: minor text revision to summary discussion
007		Page 21	Section 6.0: added Indiana Bat Roost Tree Survey as reference (AREVA 2011d)
007		Table 2	Added new species to plant list with new footnote
007		Figure 1	Revised site boundary and potential areas of disturbance to reflect changes associated with disposal of excess cut material
007		Figure 2	Revised site boundary and wetland survey area to reflect changes associated with disposal of excess cut material
007		Figure 3	Revised site boundary and updated NWI within survey area per changes associated with disposal of excess cut material
007		Figure 4	Revised map and added soils within updated site boundary per changes associated with disposal of excess cut material
007		Figure 5	Revised site boundary and added delineated wetlands within survey area per changes associated with disposal of excess cut material
007		Figure 6	Revised site boundary and added delineated wetlands within survey area per changes associated with disposal of excess cut material
007		Appendix A	Added photographs 86- 89
007		Appendix B	Added datasheets DPBG-1, DPBG-2 and DPBG-3
007		Appendix D	Added PFBC letter of March 2011
007		References	Updated AREVA references to reflect 2011 revisions to source reports and updated corresponding text citations, updated to include recent agency correspondence letters

1.0 INTRODUCTION

1.1 Study Objectives

Bell Bend Nuclear Power Plant (BBNPP) is proposed to be sited adjacent to the Susquehanna Steam Electric Station (SSES) in Salem Township, Luzerne County, Pennsylvania. The proposed BBNPP Project Boundary, herein referred to as the site, is presented in Figure 1. Normandeau Associates, Inc. (Normandeau) was contracted by AREVA NP, Inc. to delineate the jurisdictional boundaries of wetlands and other waters within and adjacent to potential areas of disturbance onsite that are regulated by the Pennsylvania Department of Environmental Protection (PADEP) and U.S. Army Corps of Engineers (USACE). Potential areas of disturbance are illustrated in Figure 1. The actual wetland survey area that bounds the potential areas of disturbance is displayed in Figure 2.

PADEP regulates nearly all development activities within "Regulated Waters of this Commonwealth", including all wetlands, rivers, streams and other waterbodies, under the Title 25 PA Code Chapter 105 Dam Safety and Waterway Management Regulations. PADEP Chapter 105 jurisdiction also extends to the floodways surrounding these areas. USACE regulates development activities in "Waters of the U.S.", including wetlands, under Section 404 of the Clean Water Act and activities in "Navigable Waters" under Section 10 of the River and Harbors Act . Regulatory approvals are usually required from these agencies for development activities involving wetlands and other waters under their jurisdiction. This report presents the findings of the delineation study and is intended to demonstrate that boundaries for wetlands and other waters were established in accordance with PADEP and USACE regulatory requirements.

To minimize encroachment on wetlands, PPL Bell Bend LLC and Unistar Nuclear Energy have determined that the BBNPP power block needed to be relocated approximately 1,000 ft to the north of its previous location. This alteration required expansion of the site to include several new parcels of property, alteration of the limit of disturbance (LOD), and relocation of certain other plant features. Consequently, field studies of the new parcels were performed to supplement the wetland survey data previously obtained and reported in the prior revision of this report. This revision includes the new data as well as previously reported information.

1.2 Personnel

This wetlands delineation report for the BBNPP site is the product of efforts from many well-trained personnel. The overall effort was coordinated by Project Manager Paul Harmon and Principal Ecologist Robert Blye. Field work was coordinated by Keith Maurice and was conducted during the period of July 2007 through July 2011 by Normandeau biologists Elizabeth Garlo, Jayme Schaeffer, and Christopher Roche. Dr. James Montgomery of Ecology III, Inc. also participated in the field work and provided technical assistance. Keith Maurice prepared the report, Shelly Sherman prepared report maps and figures, and Melonie Ettinger and Brenda Strouse provided secretarial support.

1.3 Description of the Site

Potential areas of disturbance associated with BBNPP extend across 687 acres (1.1 mile^2) of property adjacent to SSES (Figure 1) and are located within a larger 2,055-acre site. The terrain is variable and ranges from steeply sloping hills in the west to the relatively level floodplain of the Susquehanna Riverlands in the east. Net relief is approximately 500 feet.

Land uses consist largely of cropland, fallow farmland including an abandoned orchard and deciduous forest. Prominent hydrologic features include the Susquehanna River, Walker Run, the North Branch Canal, several former farm ponds and a beaver pond. Man-made features consist of two active gravel quarries, several outlying SSES facilities and electric transmission line corridors, and two large soil stockpiles resulting from SSES construction in the 1970s. An aerial view of the site layout is presented in Figure 2.

2.0 DELINEATION METHODOLOGY

2.1 USACE 1987 Wetlands Delineation Manual

Prior to October 2009, jurisdictional areas within the site were identified and delineated in the field solely in accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual, January 1987 (USACE Manual), which involves the use of vegetation, soils, and hydrologic conditions to define wetlands boundaries. PADEP and USACE require the use of this methodology for establishing their jurisdictional boundaries and, in most cases, the same boundary represents the jurisdictional limits of both agencies. Recent U.S. Supreme Court rulings have limited USACE regulatory jurisdiction over certain categories of streams and wetlands. However, these rulings have had no affect on PADEP's regulatory program, which maintains jurisdiction over these areas.

The USACE Manual describes three diagnostic environmental features that characterize all wetlands and which govern the delineation of wetlands boundaries:

1. Hydrophytic Vegetation: The sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to create anaerobic (oxygen deficient) conditions in the upper part, which then exerts a controlling influence on the plant species present. Hydrophytic vegetation is present when the dominant plant species in a plant community are typically adapted for life in anaerobic soil conditions.

2. Hydric Soils: Soils that have formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part (NRCS, 2010a).

3. Wetlands Hydrology: Encompasses all hydrologic characteristics of areas that are periodically inundated (< 6.6 feet mean depth) or have soils saturated to the surface for sufficient duration during the growing season to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic soil conditions.

The manual provides specific field indicators that can be used to determine if the mandatory technical criteria are met for each parameter. In order for an area to be considered a wetland, at least one field indicator must be present for each parameter. Application of this methodology to the site is discussed in Section 2.3.

2.2 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region

Effective October 2009, jurisdictional areas within the site were identified and delineated in the field in accordance with the USACE Manual and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Regional Supplement). Although identification and delineation of wetlands is still based on the USACE Manual's three-factor approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology; the Regional Supplement presents wetland indicators, delineation guidance,

and other information that is specific to the Northcentral and Northeast Region. This Regional Supplement is designed for use with the current version of the USACE Manual. Where differences occur, the Regional Supplement takes precedence over the USACE Manual for applications in the Northcentral and Northeast Region. A summary of the specific sections of the USACE Manual replaced by the Regional Supplement are as follows:

1. Hydrophytic Vegetation Indicators: Chapter 2 of the Regional Supplement replaces Paragraph 35, all subparts, and all references to specific indicators in Part IV of the USACE Manual.

2. Hydric Soil Indicators: Chapter 3 of the Regional Supplement replaces Paragraphs 44 and 45, all subparts, and all references to specific indicators in Part IV of the USACE Manual.

3. Wetlands Hydrology Indicators: Chapter 4 of the Regional Supplement replaces Paragraph 49(b), all subparts, and all references to specific indicators in Part IV of the USACE Manual.

4. Growing Season Definition: The definition of the Growing Season in Chapter 4 and the Glossary of the Regional Supplement replaces the definition of the Growing Season in the Glossary of the USACE Manual.

5. Hydrology Standard for Highly Disturbed or Problematic Wetland Situations: Chapter 5, Wetlands that Periodically Lack Indicators of Wetland Hydrology, Procedure item 3(g) of the Regional Supplement replaces Paragraph 48, including Table 5 and the accompanying User Note in the online version of the USACE Manual.

Application of this methodology to the site is discussed in Section 2.3.

2.3 Delineation of the Bell Bend Nuclear Power Plant Site

Prior to October 2009, wetlands were delineated solely following the methodology specified in the USACE Manual, Routine Wetlands Determination Subsection 2: On-site Inspection Necessary. This technique was the most appropriate for the size and environmental characteristics of the site. Effective October 2009, all wetlands were delineated following the methodology specified in the USACE Manual except where replaced by the Regional Supplement methodology. The delineation process was initiated by researching available reference materials in order to anticipate site conditions. References consulted included the Natural Resources Conservation Service (NRCS) Luzerne County Soil Survey, National Wetlands Inventory (NWI) mapping, aerial photography and other natural resources information. Examination of these references revealed which portions of the survey area would most likely be included within USACE and PADEP jurisdictions so that special attention could be focused on these areas.

The survey area was then systematically searched for wetlands and other regulated waters. During this process all plant communities within the survey area (Figure 2) were mapped and documented. Data collected for each community included dominant vegetation, hydrology, soil

conditions and evidence of disturbance. This information was recorded on the appropriate USACE data form (Appendix B).

Prior to October 2009, vegetation data was evaluated using the U.S. Fish and Wildlife Service's (USFWS) 1988 National List of Plant Species that Occur in Wetlands Northeast (Region 1) and 1995 supplement to the list, augmented by information from various vegetation identification keys for species not found on either list. The plant lists categorizes species according to the following system of indicators:

Obligate (OBL): Always found in wetlands under natural (not planted) conditions (> 99% frequency), but may persist in nonwetlands if planted there by man or in wetlands that have been drained, filled, or otherwise transformed into nonwetlands.

Facultative Wetlands (FACW): Usually found in wetlands (67%-99% frequency), but occasionally found in nonwetlands.

Facultative (FAC): Sometimes found in wetlands (34%-66% frequency), but also occurs in nonwetlands.

Facultative Uplands (FACU): Seldom found in wetlands (1%-33% frequency) and usually occurs in nonwetlands.

Nonwetlands (UPL): Occurs in wetlands in another region, but not found (<1% frequency) in wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the list.

Beginning October 2009, vegetation data was identified and characterized similarly except that the Regional Supplement (Chapter 2, Hydrophytic Vegetation Indicators) dropped all (+) and (-) modifiers from the indicator status (e.g., FACW+ is now considered FACW). In addition, the Regional Supplement requires that absolute percent cover for each plant and total percent cover per stratum be recorded. Vegetation data is then evaluated beginning with a rapid field test for hydrophytic vegetation (Indicator 1) to determine if there is a need to collect more detailed vegetation information. If the first indicator is not met, then a standard dominant test (Indicator 2) is performed. If this test fails, then vegetation is re-evaluated using the prevalence index (Indicator 3) or by observing plant morphological adaptations for life in wetlands (Indicator 4).

Prior to October 2009, soils were evaluated based on a detailed examination of color, mottling, consistence and other characteristics as specified in the USACE Manual (Routine Determination Method Subsection 2: On-site Inspection Necessary - Step 14). Additional guidance for interpreting soil conditions was provided by "*Field Indicators of Hydric Soils in the United States*." Munsell color charts were used to determine soil color. Typically, presence or absence of hydric soil conditions is determined within a diagnostic horizon extending from immediately below the A horizon (topsoil) to a depth of 10-inches, whichever is shallower. In plowed soils (>10-inches), hydric conditions must be present immediately below the Ap horizon (plow horizon). Beginning October 2009, soils were evaluated based on a detailed examination of color, redoximorphic features and other characteristics as specified in the Regional Supplement (Chapter 3, Hydric Soil Indicators). The soil indicators in the Regional Supplement are designed

to help identify hydric soils in the Northcentral and Northeast Region and are a regional subset of those indicators provided by "*Field Indicators of Hydric Soils in the United States*."

Prior to October 2009, hydrology was evaluated based on topographic position and the list of indicators from the USACE Manual (Routine Determination Method Subsection 2: On-site Inspection Necessary - Step 10). Evidence of wetlands hydrology includes inundation, saturated soils, watermarks and/or sediment deposits on vegetation and drainage patterns characteristic of wetlands. Beginning October 2009, hydrology was evaluated based on topographic position and the list of Northcentral and Northeast Region-specific indicators from the Regional Supplement (Chapter 4, Wetland Hydrology Indicators).

The results of the data collection effort were used to identify wetlands and upland plant communities, and to determine the site-specific indicators of transition between these communities. The wetlands-uplands transition point corresponds to the wetlands jurisdictional boundary and a single boundary was determined that is intended to satisfy both the USACE and PADEP regulatory requirements. The wetlands boundaries were marked in the field with numbered surveyors' flags.

Prior to January 2010, wetland boundaries were located by a registered professional surveyor and, thereafter, by Normandeau personnel using a Trimble sub-meter GPS unit. The USACE Baltimore District has approved the use of sub-meter GPS units for mapping wetland boundaries. The wetland boundaries were plotted on the site topographic map and verified by Normandeau to ensure accuracy. A copy of the wetlands boundary map is enclosed (Figure 6).

3.0 REVIEW OF EXISTING RESOURCE INFORMATION

3.1 Wetlands

U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping (dated 1976) shows palustrine emergent (herbaceous), scrub/shrub and forested wetlands in the western section of the site. Hydrologic regimes for the wetlands were designated as temporarily flooded, seasonally flooded/saturated and semi-permanently flooded. In addition, several farm ponds in the western end of the site were classified as palustrine waterbodies (Figure 3). Most of the wetlands and waterbodies are associated with the main stem and eastern branch of Walker Run.

NWI mapping is useful for screening sites for larger wetlands but does not necessarily detect all wetlands, or show the full extent of mapped wetlands. Map resolution varies from 1 to 5 acres depending on the scale of the source aerial photography and vegetation cover of the mapped area. Typically, wetlands boundaries are generalized and are not as accurate as ground-based delineations. In addition, most of this mapping is based on aerial photography from the 1980's or earlier and, therefore, may not always reflect current site conditions (NWI 1998).

3.2 Soils

The Natural Resources Conservation Service (NRCS) mapped the majority of the site as upland soils encompassing Chenango gravelly loam, Arnot-Rock outcrop complex, Braceville gravelly loam, Morris very stony silt loam, Oquaga and Lordstown loams, Pope soils, Wayland silt loam, Weikert and Klinesville channery silt loam, Wellsboro very stony silt loam and Wyoming gravelly loam (Figure 4). These soils are classified as somewhat poorly drained to excessively drained and have seasonal high water tables ranging from 6 inches in depth to greater than 72 inches in depth (Table 1). NRCS information indicates that Chenango and Wyoming soils are unlikely to have inclusions of hydric soil. However, the other six upland soils may potentially have inclusions of hydric soil in areas such as depressions, drainageways and bottomlands (NRCS, undated; 1981; 2010b).

Hydric soils mapped onsite consist of Atherton silt loam, Holly silt loam, Rexford loam and Wayland silt loam which are classified as somewhat poorly drained to very poorly drained. Consequently, the range for seasonal high water tables in these soils extends from the soil surface to a depth of 18-inches. Atherton and Rexford soils were largely mapped in association with Walker Run and its network of small tributaries in the western section of the site. Rexford soil is also mapped in association with a small stream in the eastern section of the site and in headwaters areas in the southern end of the site. Holly and Wayland soil is mapped exclusively in the Riverlands along the Susquehanna River floodplain (NRCS, 1981; 2010b). NRCS soil series descriptions are provided in Appendix C.

3.3 Hydrology

NWI and NRCS mapping indicates that wetlands, waterbodies and poorly drained soils are largely associated with headwaters areas and small streams that drain the site. West of Confers Lane, the site drains to the Susquehanna River via Walker Run. East of Confers Lane, the site drains through two small-unnamed streams. One stream flows into the southern end of Lake Took-A-While and the other flows into the northern end of the reconstructed North Branch Canal.

Lake Took-A-While also drains into the North Branch Canal, which then drains through an outlet channel into the Susquehanna River.

PADEP's Chapter 93 Water Quality Standards (Chapter 93) designates Walker Run as having the protected water use of Cold Water Fishes (CWF). A CWF classification is intended to provide for the maintenance and propagation of fish species including the family Salmonidae and additional flora and fauna indigenous to cold water habitats. Chapter 93 designates the Susquehanna River in the vicinity of the site as having the protected use of Warm Water Fishes (WWF). A WWF classification is intended to provide for the maintenance and propagation of fish species and additional flora and fauna indigenous to warm water habitats (PADEP, 2006a).

4.0 RESULTS OF THE FIELD INVESTIGATION

The wetlands delineation determined that the survey area was primarily upland habitat composed of cropland, and old-field, shrub and deciduous forest communities. Wetlands consisted of palustrine emergent (herbaceous), scrub/shrub and forest communities (Figure 5). Many wetlands were composed of multiple vegetation communities and several contained large areas of open water. Wetlands distribution was generally consistent with NWI wetlands and NRCS soils mapping. The vegetation, soils and hydrologic conditions of uplands and wetlands habitats observed during the field delineation are summarized in the following sections.

4.1 UPLAND PLANT COMMUNITIES

Old-Field

Old-field vegetation cover was composed of a largely upland-preferring assemblage of grasses and herbaceous plants. During 2007, old-field vegetation extended over much of the fallow farmland in the western section of the site. However, during 2008 some of this habitat was returned to agricultural use for the production of corn. Dominant species included daisy fleabane (*Erigeron annuus,* FACU), Canada thistle *(Cirsium arvense*, FACU), wrinkled goldenrod (*Solidago rugosa*, FAC), flat-top fragrant goldenrod (*Euthamia graminifolia,* FAC), Canada goldenrod (*Solidago canadensis*, FACU), giant foxtail grass (*Setaria faberi,*UPL), white heath aster (*Aster pilosus,* UPL), lamb's quarters (*Chenopodium album,* FACU+), red clover *(Trifolium pretense*, FACU-) and common ragweed *(Ambrosia artemisiifolia,* FACU). A list of common plant species observed onsite is presented in Table 2.

Upland Scrub/Shrub

Upland shrub habitat was found mostly along transmission line corridors and in several abandoned farm fields located around the site that were undergoing secondary succession. This community consisted primarily of bush honeysuckle (*Lonicera tatarica*, FACU), multiflora rose (*Rosa multiflora*, FACU), Allegheny blackberry (*Rubus allegheniensis*, FACU-), and Russian olive (*Elaeagnus angustifolia*, FACU).

Upland Deciduous Forest

Upland deciduous forest covered a large portion of the site to the west of Route 11. Common overstory species included northern red oak (*Quercus rubra,* FACU-), white oak (*Quercus alba*, FACU-), black cherry (*Prunus serotina,* FACU), white ash (*Fraxinus americana*, FACU), shagbark hickory (*Carya ovata*, FACU-), bitternut hickory (*Carya cordiformis*, FACU+), sweet birch (*Betula lenta*, FACU), black walnut (*Juglans nigra*, FACU), black locust (*Robinia pseudoacacia*, FACU-), yellow poplar *(Liriodendron tulipifera,* FACU) and red maple (*Acer rubrum*, FAC).

Upland forest understories were composed predominantly of spicebush (*Lindera benzoin*, FACW), round-leaved greenbrier (*Smilax rotundifolia*, FAC), Virginia creeper (*Parthenocissus quinquefolia*, FACU) and saplings of overstory species. The groundcover included may-apple (*Podophyllum peltatum*, FACU), garlic mustard (*Allaria petiolata*, FACU), hayscented fern (*Dennsteadtia punctilobula*, UPL), tree clubmoss (*Lycopodium obscurum*, FACU), partridge berry (*Mitchella repens*, FACU), ground cedar (*Lycopodium tristachyum*, UPL) and stilt grass (*Eulalia viminea*, FAC).

Hydrology and Soils

Numerous borings were taken in upland soils during the delineation fieldwork and to formally document soil conditions at upland data points. Typical soil matrix colors at the diagnostic horizon ranged from brown (10YR 4/3) to light yellowish brown (10YR 6/4), indicating an absence of hydric conditions. In addition, mottling was usually absent indicating that the soils were reasonably well drained. Saturated soils and high water tables were observed in some upland areas during wetter parts of the year. However, high soil matrix chromas and a general absence of soil mottling indicated that these observations reflected hydrologic conditions that were short-term in nature.

4.2 WETLANDS PLANT COMMUNITIES

Palustrine Emergent

Palustrine emergent wetlands were located throughout the site. A diverse group of herbaceous hydrophytic plants was present including soft rush (*Juncus effusus*, FACW+), sedges (*Carex spp*., FAC – OBL), arrow-leaf tearthumb (*Polygonum sagittatum*, OBL), common boneset (*Eupatorium perfoliatum*, FACW+), giant goldenrod (*Solidago gigantea*, FACW), seedbox (*Ludwigia alternifolia*, FACW+), nutsedges (*Cyperus spp*., FAC-OBL), blue vervain (*Verbena hasta*, FACW+), New York ironweed (*Vernonia noveboracensis*, FACW+), swamp aster (*Aster puniceus*, OBL), cut-leaf coneflower (*Rudbeckia laciniata*, FACW), broad-leaved cattail (*Typha latifolia*, OBL), reed canary grass (*Phalaris arundinacea*, FACW+) and purple loosestrife (*Lythrum salicaria*, FACW+).

Palustrine Scrub/Shrub

Several large palustrine scrub/shrub wetlands were located in the western part of the site. In addition, hydrophytic shrubs were a component of many wetlands across the site. Spicebush was overwhelmingly the most abundant wetlands-preferring shrub onsite. Other frequently occurring

wetlands shrubs were highbush blueberry (*Vaccinium corymbosum*, FACW-), meadowsweet (*Spirea latifolia*, FAC+), alders (*Alnus spp*., FAC-OBL), silky dogwood (*Cornus ammomum*, FACW), arrow-wood (*Viburnum dentatum*, FAC) and grey dogwood (*Cornus racemosa*, FAC).

Palustrine Forested

Palustrine forested wetlands were the principal wetlands type onsite and large contiguous blocks of this habitat extended across the western section. Trees commonly found in forested wetlands habitat included red maple, silver maple (*Acer saccharinum*, FACW) black gum (*Nyssa sylvatica*, FAC), pin oak (Q*uercus palustris*, FACW) and river birch (*Betula nigra*, FACW+). In addition, upland-preferring species such as white ash and yellow poplar were present on upland microsites scattered throughout some forested wetlands.

Understories of forested wetlands were comprised largely of spicebush, highbush blueberry, arrow-wood and winterberry (*Ilex verticellata*, FACW+). Skunk cabbage (*Symplocarpus foetidus*, OBL) predominated in the groundcover along with sedges, jewelweed (*Impatiens capensis*, FACW), sensitive fern (*Onoclea sensibilis*, FACW), clearweed (*Pilea pumila*, FACW), cinnamon fern (*Osmunda cinnamomea*, FACW), stout woodreed grass (*Cinna arundinacea*, FACW+), and swamp dewberry (*Rubus hispidus*, FACW).

Hydrology and Soils

Wetlands habitat typically occurred in low-lying poorly drained lands adjacent to Walker Run and its tributaries, in headwaters areas, and along the other small streams that drain the site. A few isolated wetlands were also present. Indicators of wetlands hydrology observed during the delineation field work included prolonged inundation, saturated soils, sediment deposits on vegetation, water-stained leaves and oxidized rhizospheres associated with living roots within 12-inches of the soil surface. In addition, many wetlands were associated with multiple actively flowing groundwater seeps and exhibited a characteristic braided drainage pattern. Trees with buttressed trunks and surface roots were also common in forested wetlands.

Numerous borings were taken in wetlands soils during the delineation fieldwork and to formally document soil conditions at wetlands data points. Coal overwash was detected in some of the soils examined in the Susquehanna Riverlands. Typical soil matrix colors at the diagnostic horizon ranged from gray (6/N) to very dark grayish brown (10YR 3/2) with mottling, indicating hydric conditions.

4.3 WETLANDS BOUNDARIES

Wetlands boundaries were usually associated with gradual to steep increases in slope and a distinct change from low chroma hydric soil matrix colors to the much brighter matrix colors of upland soils. In addition, wetlands were distinguished by the generally strong evidence of requisite hydrology, particularly the abundance of groundwater seeps.

Vegetation indicators were not always as definitive as soil and hydrology indicators. There was considerable vegetation overlap between wetlands and uplands, particularly in forest understories and overstories. As a rule, red maple and spicebush were abundant in both forested wetlands and upland deciduous forests. However, in upland forests spicebush tended to be less common in the

understory, and upland preferring species as well as red maple predominated in the overstory. Boundaries between palustrine emergent wetlands and old field habitat were typically more distinct and characterized by a transition from hydrophytic cover to largely upland-preferring herbaceous plant communities dominated by Canada goldenrod, daisy fleabane and/or Canada thistle.

Many wetlands were bounded in part by manmade structures, especially in the Susquehanna Riverlands to the east of Route 11. These structures included roads, trails, SSES facilities and soil stockpiles created during SSES construction. Also, some farmlands in the western part of the site were tilled up to or within a few feet of wetlands.

Wetlands boundaries were documented by photographs (Appendix A) and data sheets (Appendix B). Wetlands boundaries, data points, and photograph locations are shown in Figure 6.

5.0 EXCEPTIONAL VALUE WETLANDS ANALYSIS

This section evaluates wetlands onsite against the PADEP Chapter 105 Dam Safety and Waterway Management Regulations criteria defining Exceptional Value Wetlands. According to Title 25 Pa. Code 105.17, Exceptional Value Wetlands are wetlands that exhibit one or more of the following characteristics:

1. ***Wetlands which serve as habitat for fauna or flora listed as "threatened" or "endangered" under the Endangered Species Act of 1973, the Wild Resource Conservation Act, 30 Pa. C.S. (relating to the Fish and Boat Code), or 34 Pa. C.S. (relating to the Game and Wildlife Code).***

Information concerning the presence of species of special concern within a 0.5-mile radius of an area encompassing the site, PPL-owned lands to the north and the Susquehanna Riverlands was requested via correspondence submitted December 21, 2007 and September 20, 2010 to the U. S. Fish and Wildlife Service (USFWS), Pennsylvania Department of Conservation and Natural Resources (PDCNR), Pennsylvania Game Commission (PGC) and Pennsylvania Fish and Boat Commission (PFBC). These requests were intended to cover all categories of Federal and state tracked species of flora and fauna, as well as other ecological resources of special concern. Responses from the agencies to the letters are presented in Appendix D and the findings of studies conducted to address their concerns are summarized in the following sections. Responses to the 2010 correspondence were received from the three state agencies but not from USFWS. The USFWS response will be incorporated into Appendix D upon receipt. Please note that classification systems for species of special concern vary by jurisdictional agency. The more important species rankings are defined at the Pennsylvania Natural Heritage Program Internet site (PNHP, 2010).

U. S. Fish and Wildlife Service

USFWS has jurisdiction over species of flora and fauna designated as listed, proposed or candidate under the Federal Endangered Species Act. The agency's reply indicated that the site was within the range of the federally endangered Indiana bat (*Myotis sodalis*). Furthermore, based on life history information cited in the response letter, the site contains suitable habitat for foraging and roosting by Indiana bats during the spring through fall. No other Federal threatened, endangered or other species of special concern were indicated as potentially occurring within the study area.

Comprehensive field studies were undertaken during the period of July 2007 through June 2010 to document the occurrence and distribution of terrestrial and aquatic fauna onsite. Taxonomic groups covered by these surveys encompassed mammals, birds, fish, reptiles, amphibians and freshwater mussels. No Federal proposed, candidate, or listed threatened or endangered species were detected (AREVA, 2011c).

At the request of the USFWS, the terrestrial fauna studies included a survey for Indiana bats. This investigation was conducted by Dr. Karen Campbell, an USFWS-approved Indiana bat surveyor, between June 7 and July 11, 2008 following the USFWS Bat Mist Netting Guidelines. Study techniques included mist net sampling, acoustic (echolocation) monitoring using hand-held AnaBat ultrasonic detectors, and a survey for cave and mine openings that could indicate the

potential presence of hibernacula onsite. No Indiana bats were collected by the mist net surveys and none were detected by acoustic monitoring. In addition, no potential hibernacula were identified. However, forested areas throughout much of the site provide potential roosting and maternity den sites for Indiana bats in the form of large trees with shaggy, platy or exfoliating bark, crevices and/or cavities (AREVA, 2011c). In October 2010 and July 2011, Indiana bat roost tree surveys were conducted in the forested areas proposed to be cleared during construction activities. Some of the surveyed interior forest and many of the forest edges provided densities of potential roost trees (PRTs) suitable for Indiana bat roosting habitat with forested wetlands providing higher quality roosting habitat than forested uplands on the site (AREVA, 2011d).

USFWS recommended the implementation of tree-cutting guidelines to protect Indiana bats potentially using forests onsite for roosting and maternity dens. The agency advised that any necessary tree-cutting take place during November 16 to March 31, when the bats are hibernating. Furthermore, cutting or physical disturbance of suitable trees (live or dead) between April 1 and November 15, if necessary, should be limited to those with a diameter at breast height (dbh) of less than 5 inches (AREVA, 2011c). The Project team has initiated consultation with USFWS with respect to the project's impacts to Indiana bat.

Pennsylvania Game Commission

PGC has jurisdiction over birds and mammals designated as special concern in Pennsylvania. The agency's 2008 response letter indicated that the site is located in the vicinity of known bat hibernacula and is concerned with potential impacts to five bat species encompassing the eastern small-footed myotis (*Myotis leibii*), northern myotis, also known as the northern long-eared myotis, (*Myotis septentrionalis*), little brown (*Myotis lucifugas*), big brown (*Eptesicus fucsus*) and the pipistrelle (*Pipistrellus subflavus*). The eastern small-footed myotis is listed as threatened in Pennsylvania and the northern myotis is classified as Pennsylvania candidate rare. However, the little brown and big brown are classified as common in Pennsylvania, while the pipistrelle was previously listed as a species of concern but is now considered secure (PBS, 2010). The agency's 2010 response letter indicated that Indiana bat, a state and federally endangered species, may potentially be impacted by the project. No other species were listed in this letter as potentially being impacted by the project.

Although no Indiana bats were collected during the mist net survey described above, 4 northern myotis, 8 little brown bats, and 4 big brown bats were captured, tagged and released. Results of acoustic monitoring were consistent with the echolocation signatures for big brown bats and the *Myotis* species captured during mist netting. Small-footed myotis and pipistrelle were not detected by either survey method (AREVA, 2011c).

The little brown and big brown specimens included reproductively active females, and adult or juvenile males, while the northern myotis specimens were all adult males. These findings suggest that northern myotis use of the site may be limited to roosting only, while the other two bat species utilize the site for both roosting and maternity dens (AREVA, 2011c). USFWS tree-cutting guidelines for Indiana bats, noted above, would provide similar protection to these other three bat species when utilizing forests onsite for roosting and maternity dens.

As noted above, the bat mist net study was a component of the terrestrial fauna studies conducted onsite July 2007 through June 2010. No other state level birds or mammals of special concern