



Appendix F

Mitigation Measures

**APPENDIX F:
MITIGATION MEASURES**

TABLE OF CONTENTS

APPENDIX F-1: MITIGATION MEASURES	F-5
APPENDIX F-2: AVIAN PROTECTION PLAN	F-22

APPENDIX F-1: MITIGATION MEASURES

While some alternatives may require specific mitigation measures, some best management practices (BMPs) are common to all action alternatives (alternatives 2-5). Correspondence regarding mitigation between the applicant and the National Park Service (NPS) can be found at the end of this appendix. The NPS would require the applicant to follow certain BMPs/mitigation measures for all action alternatives.

GEOLOGY

- Submit a detailed drilling plan for NPS review and approval for all drilling activities prior to drilling and construction activities.
- Complete geotechnical boring before construction to determine the appropriate depth needed to remove soils and weathered bedrock before reaching sound material where substantial excavation would occur. This would reduce the impacts of drilling in unstable material.
- Haul all tailings from geotechnical borings and drillings offsite, unless the NPS determines that there is a park need for the tailings.
- Use excavated rock as substrate for the access roads.
- Complete a preconstruction surface assessment prior to disturbance. If any paleontological resources are found, they would be avoided. If the resources are unavoidable, they would be collected and properly cared for before the start of construction.
- Monitor areas with potential paleontological resources during construction activities.
- Develop a buffer zone around areas of sensitive geologic resources. This buffer zone would protect these areas from drilling and excavation activities, limiting impacts.

Water and Soil Resources

- Prepare a spill prevention and response plan (SPRP) to reduce impacts on surface water, ground water, and aquatic species if equipment leaks or hazardous spills occur. The goal of the plan is to minimize the potential for a spill, contain any spillage to the smallest area possible, and to protect environmentally sensitive areas, including streams, rivers, and wetlands. The SPRP would include the following:
 - Procedures for fuel storage location, fueling activities, and construction equipment maintenance.
 - Lines of communication to facilitate the prevention, response, containment, and cleanup of spills during construction activities.
- Construct access roads with a gravel surface that is semipermeable to reduce the amount of stormwater runoff. A reduction in sheet flow would decrease the amount of sedimentation, total suspended soils, contaminants, nutrients, and turbidity in surface waters and impacts on aquatic species.
- Construct spur roads using geotextile fabric and stone, which would be removed at the conclusion of construction and revegetated.
- Construct road grades and alignments to follow the contour of the land with smooth, gradual curves; this would reduce the runoff potential of soils along the access roads outside the right-of-way (ROW).

- Inspect potential erosion areas weekly. Additionally inspect potential erosion areas immediately after storm events. The applicant would smooth out ruts and spread gravel to stabilize the roadway and prevent erosion.
- Develop and implement soil and erosion control plans as mandated in state permits for Pennsylvania Department of Environmental Protection (PADEP) and New Jersey Department of Environmental Protection (NJDEP).
- Implement erosion control methods, such as silt fences and straw bales, during and after construction to reduce impacts of increased soil runoff on water resources. By retaining soil on-site, sediment and attached nutrients are prevented from leaving disturbed areas and polluting streams. The use of BMPs is estimated to reduce total suspended solids (TSS) by 40 percent, total nitrogen by 25 percent, and total phosphorus by 40 percent (Baldwin n.d., 1).
- Use only those herbicides approved by the NPS for aquatic environments for removal of vegetation.
- Establish a 50-foot buffer near intermittent streams and a 100-foot buffer near perennial streams to reduce impacts on water quality and aquatic species (PPL and PSE&G 2008, 7).
- Drill during winter months (when not in areas with known snake dens) to reduce impacts of drilling on aquatic communities. Winter is when the least number of aquatic species and individuals are present in nearby water bodies.

FLOODPLAINS

- Avoid construction or clearing vegetation within floodplains and floodplain buffers.
- Construct dikes or conveyance ditches to divert or carry flood flows away from the site.
- Modify structures to provide sufficient elevation above the flood crest (e.g., place structures on columns, walls, piles, or piers).
- Restore watershed conditions to eliminate accelerated runoff caused by soil compaction, poor vegetation cover, or the unnatural conveyance of water by roads, ditches, or trails.
- Compensate lost natural floodplain values.
- Revegetate certain areas as directed in an NPS-approved, NPS-specific vegetation plan to reduce erosion into streams, wetlands, and floodplains.

WETLANDS

- Design access roads to avoid wetlands, including 50-foot buffers surrounding wetland areas where construction and full vegetation clearing would not occur.
- Use timber mats in areas outside the access roads during construction to minimize soil compaction.
- Except for those roads and towers identified in the final environmental impact statement (FEIS) and statement of findings (SOF), locate staging, tower, and pulling and splicing locations to avoid wetlands and rare and unique communities inside and outside the study area. During planning, design engineers would work closely with park staff to avoid these areas within park boundaries.
- Span wetlands with towers.

- Limit construction to winter months when soil and water are more likely to be frozen and vegetation is dormant.
- Use mats and wide-track vehicles when crossing wetlands because some wetlands never freeze.
- Carefully clean construction equipment after working in areas infested with known invasive and/or exotic plant species.
- Develop compensatory mitigation where clearing in a wetland would occur, as clearing is considered a loss. Director's Order 77-1 states that for new actions where impacts on wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restores wetlands on NPS lands, where possible, at a minimum acreage ratio of 1:1.
- Establish a groundwater monitoring system, and conduct pre- and post-construction monitoring at Arnott Fen / Community Drive wetlands to assess the effects of drilling and excavation on groundwater dynamics and supply.
- Disinfect machinery, equipment, boots, and other gear when working or monitoring project activities in or near wetlands, following NPS-approved disinfection protocols to avoid spreading disease from wetland to wetland.
- Submit wetland delineations to the NPS for approval. The wetland delineations must be approved before any activity can take place.

VEGETATION

- Develop and implement an NPS approved, long-term, park-specific vegetation management plan for the operation and maintenance of the line. Separate vegetation management plans are needed from Public Service Electric and Gas Company (PSE&G) and Pennsylvania Power and Light Electric Utilities Corporation (PPL). These plans would focus on retaining habitat within the constraints of the North American Electric Reliability Corporation (NERC) guidelines, and the control of invasive species. These plans would address invasive species management, including early detection, monitoring, and treatment for target invasive species using an integrated pest management approach. Additionally, an invasive species management plan would address the possible spread of invasive species via wooden spools used to supply wire. Other topics in the vegetation management plan would include vegetation restoration (native seeding and plantings, with annual monitoring and re-treatment as needed to achieve minimum acceptable outcomes, including an increase in biodiversity); management of sensitive species and sensitive habitats during routine maintenance; management of the ROW vegetation that would increase habitat for scrub shrub species; the use of best management practices to include restrictions on use of machinery and equipment time-of-year restrictions on vegetation in sensitive areas; pre-approval by NPS on pesticide and herbicide use; and off-site compensation. The vegetation management plan would also include an equipment cleaning plan that would address techniques for removal of any invasive seed sources prior to entering the parks.
- Clearly delineate the area to be cleared to minimize the amount of vegetation removed; the NPS would approve delineations prior to any action taking place.
- Clearly delineate wetlands prior to clearing activities and avoid these areas during these activities; however, wooded wetlands would be subject to tree clearing if non-compatible species are present.
- Use existing roads with minimal development of new access roads.

- Promptly seed areas disturbed during construction of the transmission line with a conservation mix approved by NPS, and monitor these areas for the spread of invasive plant species.
- Require that maintenance crews enter the ROW on foot and use handheld equipment for vegetation maintenance in sensitive areas.
- Minimize disturbance to native plant species to the greatest extent possible during construction and maintenance to prevent the spread of non-native species.
- Clean equipment after leaving areas where invasive species are known to occur and before entering sensitive areas.
- Use construction materials (e.g., gravel) from sources that had been inspected and found to be free of invasive species.
- Refrain from using mulched or chipped vegetation in areas of the parks outside the area in which the vegetation was removed to decrease the potential for spreading invasive species.
- Use timber mats during construction in areas outside the access roads to minimize soil compaction.
- Complete measures for the annual suppression of invasive plants within the ROW for the life of the project. Additionally, the applicant would be required to complete this same suppression in the decommissioned ROW for the applicable alternatives (3-5).

LANDSCAPE CONNECTIVITY, WILDLIFE HABITAT, AND WILDLIFE

- Impose a seasonal restriction on maintenance activities from March 15 through July 31 to prevent unauthorized take of nests and unfledged chicks protected under the Migratory Bird Treaty Act (MBTA). An avian protection plan (APP) would be developed and would be a condition of the applicant's permit. A summary of an example APP is included in appendix F-2.
- Impose a seasonal restriction on maintenance activities in March and April in areas of known amphibian migration to prevent direct mortality of spring peepers, wood frogs, spotted salamanders, red spotted newts, and Jefferson salamanders.
- Leave brush piles alongside the ROW to provide habitat for a variety of wildlife species following the clearing of vegetation.
- Remove spur roads following construction and maintain the ROW to provide bird habitat.
- Employ the following bird-safe standards and design components to minimize bird electrocution (PSE&G 2010, 23):
 - Use Avian Power Line Interaction Committee (APLIC) recommended eagle-safe standards in areas that contain known eagle nests or foraging habitats; these standards require at least 60 inches of horizontal and 48 inches of vertical separation of energized and grounded parts of electrical equipment.
 - Use an alternative raptor-safe design standard in areas where eagles are unlikely to occur but that contain nests or habitats for raptor species; this design standard includes a clearance of 48 inches to minimize electrocution potential based on the wing length (and wrist-to-wrist distance) of certain raptors.
 - Use APLIC-recommended bird-safe standards for areas with concentrations of tall birds (wading birds, including herons and egrets); these standards require at least 60 inches of

horizontal and 60 inches of vertical separation of energized and grounded parts of electrical equipment.

- Employ the following design components to minimize bird collisions with the lines (PSE&G 2010, 23):
 - Use flight diverters or transmission line markers where technically feasible for the static wires to reduce collision hazards in areas known to support species of birds that are at higher risk of collision and areas with topographic features and habitats that could attract concentrations of breeding or migrating birds.
 - Use optical ground wire for the transmission line, which is larger in profile than typical stand-alone ground wire and would be roughly 0.2 inch thicker than the existing wires on the S-R Line and should be more visible to birds.
 - Use bundled conductors to make the transmission lines more visible to birds than a nonbundled configuration; each bundled conductor would consist of three wires grouped together with spacers separating the wires.

SPECIAL STATUS SPECIES

- Conduct preconstruction surveys for presence of special-status species, habitat, nests, dens, and new hibernacula. This is particularly important because construction would not occur for some time following the completion of the NEPA process and special-status species could begin using habitat between site surveys and construction activity. If special-status species, nests, dens, or habitats are found, then consultation measures would be developed and implemented in consultation with state and federal regulatory agencies.
- Develop and implement an NPS-approved, long-term, park-specific vegetation management plans for the operation and maintenance of the line. Separate vegetation management plans are needed for both from PSE&G and PPL. This plan would help reduce impacts to the bog turtle and potential bog turtle habitat.
- Modify the placement of towers, access roads, laydown areas, and other ground-disturbing activities in order to avoid areas that support special-status species.
- Obtain a qualified biologist to conduct pre-construction surveys for special status species and determine if relocation would be an appropriate mitigation measure for any species found; these surveys would occur prior to any ground-disturbing or vegetation clearing activities. It is possible that some species such as reptiles, amphibians, and mussels identified during the preconstruction surveys could be collected and relocated prior to or during construction activities, if this were found to be beneficial or appropriate for the species present at the site. If relocation were to be undertaken, a plan for the relocation of the special status species would be designed in accordance with the appropriate federal and state agencies and a qualified and permitted biologist would collect and relocate individuals to nearby suitable habitat.
- Consult with appropriate federal and state agencies if special-status plant populations cannot be avoided, depending on the listing status of the species present. These consultations would determine appropriate mitigation measures for any populations affected by the proposed project. Appropriate measures could include the creation of offsite populations through seed collection or transplanting, preservation, and enhancement of existing populations, or restoration or creation of suitable habitat in sufficient quantities to compensate for the impact.
 - Translocation includes digging up plants and moving them to appropriate portions of the corridor that would not be affected by the proposed construction activities.

- Seeds can also be collected from plants that would be removed and either planted directly or germinated in a nursery and then planted in appropriate locations.
- Develop and implement (by recognized and qualified zoologists including individuals certified by the U.S. Fish and Wildlife Service or state conservation agencies) species-specific Conservation and Mitigation plans if special-status wildlife species or occupied habitat cannot be avoided. These individuals would complete on-site monitoring. The plans would include:
 - Conservation measures, such as time-of-year restrictions.
 - Pre-construction surveys.
 - Construction monitoring.
 - Habitat preservation habitat restoration components.
 - Post-construction monitoring as needed.
- Ensure that park staff or representatives from appropriate state or federal agencies who were experienced in managing or monitoring special status species are on site to monitor for special-status species during the construction activities to verify that special-status species are not in the active construction area.
- Complete an APP in accordance with the Bald Eagle Guidelines (USFWS 2007) and APLIC standards. Some of the proposed alternatives are not consistent with the Bald Eagle Guidelines, as discussed in the FEIS.
 - The APP would include elements that provide for training for all utility and contractor personnel on compliance with applicable regulations, procedures to be implemented for avoidance and minimization of disturbance, reporting bird mortality, required permits, accepted construction standards for reducing bird impacts, methodology for evaluation of risks to migratory birds, opportunities for enhancement of bird populations or habitat, public awareness and education, and identification of key resources.
 - The standards described in APLIC (1994) would be followed and would also comply with the *APLIC Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).
 - Proposed construction and maintenance activities would follow and adhere to the Bald Eagle Guidelines (USFWS 2007), which would minimize the potential for “take” on the bald eagle.
 - To reduce impacts on birds from collisions with the transmission line, the APP (PSE&G 2010) would be written in compliance with APLIC standards and would use the current best available technologies.
- Continue to identify and control invasive plant species through the applicant’s invasive plant management plans. In addition, an aggressive invasive plant management plan developed and implemented by the applicant would include ongoing monitoring and treatment.
- Close access roads to the public to reduce the impacts of illegal collection. It has been demonstrated by Garber and Burger (1995, 1152 and 1158) that when formerly intact, undisturbed, forested areas are opened to human recreation, the extinction of special-status species can occur in that particular area. Rare species, especially plants and small reptiles and amphibians, are vulnerable to illegal collecting, and even small numbers collected annually for a number of years could jeopardize the local population.
- Law enforcement would monitor visitor activities in these areas, including the use of remote surveillance to assess the need for and effectiveness of area closures. There would be an increase in

patrols along the access roads and any new ROW. Existing and proposed new access roads, especially access roads, could act as an attractive nuisance and/or recreation opportunity, by inviting visitors to areas inhabited by rare species and increasing visitor encounters with these species.

- Law enforcement and resource staff would monitor closed areas for invasive species, vegetation, wildlife, and erosion, and the presence of park staff may dissuade visitors from entering these illegal areas.
- Implement road closures and/or patrols prior to and during construction activities at locations where it was deemed effective.
- Install barrier fencing along streams to keep wood turtles from entering construction sites.
- Implement seasonal restrictions to reduce impacts on special-status species. Seasonal restrictions would be site-specific, based on species present and their use of the site and include the following:
 - Seasonal restrictions on vegetation clearing from March 15 through July 31 would prevent the unauthorized take of nests and unfledged chicks of birds protected by the MBTA (USFWS 2010). This seasonal restriction would protect the majority of the special-status bird fledglings that may occur in the study areas for each alternative. Therefore, the permanent and seasonal resident nesting special-status bird species would not be forced to abandon nests or young, because vegetation clearing would not occur during the nesting season; no direct mortality of eggs, young, or adults would occur as a result.
 - Seasonal restrictions for disturbance of bald eagles would include a restriction within 1,000 feet of bald eagle nests between December 15 and August 31, the bald eagle nesting period. This restriction is recommended in the Bald Eagle Guidelines (USFWS 2007).
 - Seasonal restrictions for tree clearing and construction would be implemented from December 15 to March 31 in the vicinity of bald eagle roosts.
 - To prevent cutting of potential roost trees for the Indiana bat, a season restriction from April 1 through September 30, which includes the restriction of cutting trees with a DBH greater than 8.7 inches would be implemented.
 - A seasonal restriction from April 1 through October 31 preventing the cutting of all trees or snags with a DBH greater than 5 inches would be implemented to avoid potential impacts on northern myotis and other tree-roosting bats.
 - Seasonal restrictions on project activities would be implemented in venomous snake basking, birthing, and foraging habitat during the active season. Safe dates for project activities span from November 1 through March 31. Further timing restrictions for drilling and excavation activities would be required in the vicinity of overwintering dens.
 - Seasonal restrictions for Neotropical birds and bats would also benefit nesting and birthing reptile species in the spring and summer.
 - Seasonal restrictions would be implemented on project activities in wood turtle foraging habitat during the active season. Safe dates for project activities are November 15 through March 31.
 - Seasonal restrictions on project activities in bog turtle wetlands and 300-foot buffer during active season would be implemented. Safe dates for project activities are November 1 through March 31.

Various measures to specifically protect bog turtles would be undertaken in accordance with the *Bog Turtle (Clemmys muhlenbergii) Northern Population Recovery Plan* (USFWS 2001), and the bog turtle conservation zones presented in the “Special-status Species” section of chapter 3 of the FEIS. These actions would be undertaken where appropriate as mitigation measures. Future coordination with appropriate federal and state agencies would clarify the extent to which adverse effects to the bog turtle would be likely to occur and would determine whether a biological assessment (BA) would be required. The FEIS and the BA for this project would include more details concerning impacts and mitigation measures to the bog turtle as appropriate. Other conservation and/or mitigation measures to protect the bog turtle suggested by the Recovery Plan include the restoration of disrupted wetland hydrology, the control of invasive species, reconnection of fragmented habitat, population monitoring, and protection of nests from collection and predation (USFWS 2001).

CULTURAL RESOURCES

Mitigation measures will be identified through consultation with Section 106 consulting parties prior to signature of the Record of Decision, and finalized in the ROW permit to the applicant, but will include a combination of efforts and practices as described in the three resource categories below.

ARCHEOLOGY

Avoidance of effects to archeological sites will be the preferred method of mitigation. The applicant would be required to cordon off site areas and deliberately avoid them by construction activities, thereby preserving the sites’ integrity and potential for scientific knowledge.

If avoidance is infeasible, the applicant would be required to undertake data recovery of the affected portion of the site, according to state and federal standards. In most situations, this would involve substantial excavation for the purpose of recovering a sample of the significant data contained in the site, as well as detailed analyses of the recovered data. However, DEWA maintains a 100% standard for data recovery, which exceeds both state and federal standards. Thus, in the event that data recovery excavations are required within NPS boundaries, the affected portion of the site would be fully excavated. The applicant must prepare excavation plans and submit to the DEWA cultural resources manager for approval before implementation. The applicant will be required to treat all artifacts excavated on NPS lands according to 36 CFR Part 79 standards.

Alternative mitigation measures may also be required such as the development of exhibits and other kinds of interpretive materials. While such measures are not an alternative to DEWA’s excavation standard, alternative mitigation measures can be valuable, and would include input from all consulting parties in the project. Examples of alternative mitigation include interpretive materials for the public, such as building a display or exhibit (permanent or portable) showing artifacts, graphics, and text; or a public document, such as a book, booklet, or pamphlet about the site that can be made available to the public.

HISTORIC STRUCTURES

Effects are expected to be primarily adverse visual impacts. Avoidance and minimization efforts will be the first priority. These efforts may include strategic placement by the applicant of transmission towers to be as visually unobtrusive as possible, as well as selection of color and finish that blend in with the vegetation of the area. “Artificial-tree” designs, as used by some cell phone towers, are not suitable.

Some of the adverse visual impacts may be mitigated through placement of trees and other vegetation between the historic architectural resource and the transmission line. These measures are most effective in situations where the transmission line is sufficiently far removed from the historic structure so as to be

mostly or totally hidden from view by vegetative screening. In these cases, however, towers, lines, and ROW may still be visible five months of the year (November – March) when leaves are off the trees. Coniferous vegetation could also be used to increase screening potential where appropriate. Sites for which these method is appropriate will be identified on a case-by-case basis, and measures proposed by the applicant approved by the parks.

Mitigation measures identified in the permit may also require the applicant to prepare materials that interpret the history and architecture of the study area to the public at large. Possible work products include published histories, National Register nominations, websites, brochures, exhibits, wayside panels, and driving/walking tours. The parks will review and approve all applicant-prepared products before distribution.

Mitigation can also include requiring the applicant to fund or complete improvements to the physical condition of the adversely-impacted structures, or other structures agreed upon by the parks and Section 106 consulting parties.

The parks may also prepare planning documents for historic property management, such as preservation plans, leasing viability studies, etc.

CULTURAL LANDSCAPES

Similar to historic structures, design modifications will be considered first; these could include both strategic placement of the transmission towers to be as visually unobtrusive as possible and selections of color and finish of the towers that might blend them more into the surrounding landscape.

- When feasible, alignments should be at lower elevations or behind higher elevations to mitigate visual impacts of the corridor. Any design changes to the towers should be discussed and reviewed by the parks and Section 106 consulting parties before action is taken.
- Some of the current efforts to conceal cell towers by giving them the appearance of an artificial tree only call more attention to the tower, failing to mitigate the visual impact. Colors and finish that blend more with the landscape might be more desirable.

Some of the adverse visual impacts may be mitigated through placement of trees and other vegetation between the cultural landscape resources and the transmission line corridor. These measures are most effective in situations where the transmission line is sufficiently far removed from the resource so as to be mostly or totally hidden from view by vegetative screening. Sites for which this method is appropriate will be identified on a case-by-case basis, and measures proposed by the applicant approved by the parks.

Some of these adverse visual impacts may be mitigated through requiring the applicant to prepare materials that interpret the overall cultural landscapes of the study area as well as individual cultural landscapes in the study area to the public. Interpretation should explore cultural landscapes as evolving entities, responsive to the needs of their occupants. Possible work products include published histories, National Register nominations, websites, brochures, exhibits, wayside panels and driving/walking tours. The parks will review and approve all applicant-prepared products before distribution.

Mitigation can also include improving the physical condition of the adversely-impacted landscapes, or other cultural landscapes agreed upon by the parks and Section 106 consulting parties.

Planting plans for landscapes in and around the corridor alignment, and implementation of such plans, are potential mitigation measures for cultural landscapes. The parks may also prepare planning documents for historic property management, such as preservation plans, leasing viability studies, etc.

INFRASTRUCTURE, ACCESS AND CIRCULATION

Prior to construction activities

- Develop a construction staging plan with the NPS and other parklands.
- Develop a traffic control plan in conjunction with NPS, other parklands, and local jurisdictions.
- Work with NPS and affected agencies to develop a cooperative agreement for the control of unauthorized public access and use on NPS and other federal and state lands that could result from the proposed project. The agreement would address various provisions related to unauthorized access, such as the following:
 - Additional measures to be taken to discourage unauthorized use of the project corridor and associated access roads.
 - Periodic inspection for unauthorized access and any resulting damage.
 - Repair of any damage from unauthorized access.
- Develop a media strategy/notification plan as a means to notify local residents, businesses, and officials of closures and changes in traffic patterns.

During construction activities

- Design and construct new access roads to minimize runoff and soil erosion.
- Install gates at the entrances to access roads to reduce unauthorized use; coordinate gate locks with landowners.
- Restore public roadways to their pre-construction conditions or better upon completion of project construction activities.
- Reclaim any road-related disturbance areas after construction is completed.

VISUAL RESOURCES

During Project Design several mitigation measures would be undertaken. Measures under APLIC to decrease bird collisions and electrocutions would supersede visual resource mitigation measures that directly contradict those found under the APLIC guidelines in areas where both sets of mitigation measures would be applicable:

- Locate new access roads within previously disturbed areas.
- Route the alignment of new access roads to follow landform contours where practicable, providing that such alignment does not impact additional resource values, to minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape.
- Place structures in designated areas so as to avoid sensitive features such as, but not limited to, riparian areas, water courses, and cultural sites, and/or to allow conductors to clearly span the

features, within limits of standard tower design. If the sensitive features cannot be completely avoided, towers would be placed so as to minimize the disturbance.

- Place tower structures at the maximum feasible distance from roadway and trail crossings, and where preservation of existing vista(s) is particularly important. Distances would be within the limits of standard tower structure design.
- Use non-reflective neutral colored paints and coatings approved by the NPS to reduce reflection, glare, and/or contrast on structures.
- Use non-reflective insulators (i.e., non-ceramic or porcelain).
- Use non-specular conductors to reduce reflectivity.
- Locate construction staging areas away from visually sensitive locations.
- Conceptual landscaping in the form of vegetation planted outside but along the utility ROW.

During construction and maintenance activities

- Restrict construction vehicle movement outside the ROW to NPS-approved routes. Should additional road access be required, permission would be granted by the NPS prior to disturbance, and appropriate remuneration fees would be assessed.
- Keep areas around the towers clean and free of debris.
- Maintain a clean construction site and remove all related equipment, materials, and litter following construction.
- Preserve vegetation within the 150-foot-wide right-of-way that would not interfere with maintenance access needs.
- Revegetate disturbed areas with approved species.
- Provide regular maintenance of access roads and fences within and leading to the corridor.
- Cut stumps close to ground.
- Implement “low-impact tree clearing” which involves directional tree-felling, both mechanically and by hand.
- Rehabilitate and/or restore disturbed areas.

SOUNDSCAPES

- Comply with county and city noise ordinances.
- Provide advanced notice of construction to affected residences, businesses, and public facilities.
- Install sound-control devices on all construction equipment.
- Install muffled exhaust on all construction equipment and vehicles except helicopters, if used.
- Limit construction activities to daytime hours.

VISITOR USE

- Develop an off-highway vehicle / all-terrain vehicle (OHV/ATV) deterrent plan prior to construction activities.
- Coordinate construction schedules with NPS and other managers of affected recreation areas to avoid peak visitor use periods and notify visitors of construction.
- Permanently close and revegetate spur roads to discourage OHV/ATV use. For roads still in use, restrict access by unauthorized users as identified in the OHV/ATV deterrent plan. (See Infrastructure, Access, and Circulation for similar mitigation measures).
- Prior to construction develop a media strategy/notification plan as a means to notify local residents and visitors of closures.

HEALTH AND SAFETY

- Develop safety and emergency plans for the project prior to construction activities.
- Fully train operators of the construction equipment and vehicles to reduce the chance of accidents.
- Inspect construction equipment for malfunctions or faulty parts to reduce the risk of leaking fluids that could harm the environment or humans from contact.
- Put in place safety devices such as traveling grounds, guard structures, and radio equipped public safety roving vehicles and lineman prior to the initiation of wire stringing activities.
- Install guard poles or guard structures at all transportation, flood control, and utility crossings, and may be installed at parks or near residences. Guard poles are temporary facilities designed to stop the travel of the conductor should it momentarily drop below a conventional stringing height.
- Restrict use of the immediate area in which construction would occur for safety reasons (PPL and PSE&G 2008, A10-6) to minimize impacts on park visitors during construction of the line within the parks.
- Fence off construction areas in areas outside of the park, but inside the study area, where the public could access the construction site.
- Station a safety representative at APPA crossings during any and all construction to maintain public safety.
- Station a safety watchman on the river during stringing operations to stop any boat traffic if an incident does occur or if conditions otherwise warrant (PPL and PSE&G 2008, 6).
- Implement road closures and traffic control to minimize the risk of accidents from occurring during the construction period.
- Regularly maintain and inspect helicopters and employ operators certified/licensed in helicopter aviation.
- Operators conducting aerial work in support of the utility may encounter hazards from the various types of flight profiles, terrain, infrastructure, weather, and operation at low levels and speeds.
 - To reduce the potential risk of a collision, the crew would identify potential collision hazards and make corrective actions prior to taking flight.

- While in flight, the crew would exercise concentration, maintain situational awareness, be knowledgeable of their area of operations, maintain effective communications, and establish clear roles and responsibilities.

REFERENCES

Avian Power Line Interaction Committee (APLIC)

- 1994 *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994.*
- 2006 *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Edison Electric Institute, Avian Power Line Interaction Committee and the California Energy Commission. Washington, DC, and Sacramento, California.

Baldwin, A.H.

- n.d. “Urban Erosion and Sediment Control Best Management Practice Definition and Nutrient and Sediment Reduction Efficiencies for Use in Calibration of the Chesapeake Bay Program’s Phase 5.0 Watershed Model.” University of Maryland.

Garber, S.D., and J. Burger

- 1995 “A 20-year Study Documenting the Relationship between Turtle Decline and Human Recreation.” *Ecological Applications* 5(4):1151–1162. The Ecological Society of America.

PPL Electric Utilities Corporation and Public Service Electric and Gas Company (PPL and PSE&G)

- 2008 Susquehanna to Roseland 500 kV transmission line Delaware Water Gap National Recreation Area proposed project plan and standard form 299 information. November.

Public Service Electric and Gas Company (PSE&G)

- 2010 *Avian Protection Plan for PSE&G’s Susquehanna-Roseland 500 kV Transmission Line.* Draft Review Document.

U.S. Fish and Wildlife Service (USFWS)

- 2001 *Bog Turtle (Clemmys muhlenbergii) Northern Population Recovery Plan.* Available [online]: http://ecos.fws.gov/docs/recovery_plan/010515.pdf. Accessed July 2, 2010.
- 2007 National Bald Eagle Management Guidelines. May.
- 2010 Letter from the USFWS New Jersey Field Office to NPS in response to Section 7 Consultation. Dated 21 October.



Gregory J. Smith
Manager-Transmission Expansion

PPL Electric Utilities
Two North Ninth Street, GENN5
Allentown, PA 18101-1179



June 1, 2011

Mr. John Donahue
Delaware Water Gap National Recreation Area
One River Road
Bushkill, PA 18324

Ms. Pamela Underhill
Appalachian National Scenic Trail
252 McDowell Street
Harper's Ferry, WV 25425

Re: Susquehanna Roseland Mitigation Concept

Dear John and Pam:

I have enclosed a draft of PPL's and PSEG's (collectively, the "Applicants") Mitigation Conceptual Plan. Although the mitigation planning is in its early stages, the Applicants want to clearly confirm to the National Park Service that the Applicants are committed to mitigation for any unavoidable impacts that result from the construction of the Applicant's planned Susquehanna to Roseland 500 kV transmission line. The Applicants are providing this to you as information that can be used as the NPS prepares the draft Environmental Impact Statement.

Additionally, when we last spoke, you mentioned that the Park Service would provide the Applicants with an acreage range that will likely be needed for mitigation based upon GIS modeling that the Park Service has had performed on the potential visual impacts. We would greatly appreciate your sharing that acreage range with us as to enable us to better understand the scope of the mitigation that might be necessary.

Please call me if you have any questions about this Mitigation Conceptual Plan.

Sincerely,

Gregory J. Smith

cc: Ron Reybitz
John Valeri
Andrew Tittler
Rob Pollock

31488301.1

May 31, 2011

**Applicants' Mitigation Concept for
the Susquehanna – Roseland 500 kV
Transmission Line Project**

Public Service Electric and Gas Company (PSE&G) and PPL Electric Utilities Corporation (PPL), collectively known as the Applicants, would like to reiterate their intent, as initially set forth in their National Park Service (NPS) application, to properly mitigate for impacts to NPS lands from the Applicants' proposal to construct the Susquehanna – Roseland 500 kV Transmission Line Project (the "Project"). This statement outlines Applicants' conceptual plan to address potential adverse impacts. This conceptual plan was developed based upon impacts to NPS lands and is thus only applicable to NPS Alternatives 2 and 8. The NPS resources are the Delaware Water Gap National Recreation Area (DEWA), the Middle Delaware National Scenic River (Scenic River), and the Appalachian National Scenic Trail (APPA).

The Applicants have looked extensively at various possible routing alternatives to construct the line between Susquehanna and Roseland. The most suitable route was defined as the route minimizing the effect of the transmission line on all factors of the natural and human environment, while avoiding unreasonable routes, extreme costs, and non-standard design requirements to the extent possible.

The Applicants and their routing consultant teams, along with public outreach and other specialty consultants, undertook a 6-month program of identifying potential routes in their respective states. This program involved intensive analysis through reviewing maps, Geographic Information Systems (GIS) data sets, and aerial photography; conducting field analysis; and subsequently identifying three Alternative Routes for further evaluation.

Once the Alternative Routes were identified, the Applicants and their routing teams held public workshops throughout the project study area; consulted with various federal, state, and local regulatory and resource agencies and other stakeholders; and conducted additional analysis of the three routes comparing land use, rights-of-way, environmental, cost, public input, and other factors, in order to identify a preferred route.

As a result of the intensive routing study, the Applicants have determined that the best route for the new line resulting in the least overall impact on the natural and human environments is a route that traverses through approximately 4.18 miles of land held by the NPS in Pennsylvania and New Jersey along the path of an existing 230 kV transmission line owned and operated by the Applicants. The preferred route makes use of existing transmission line rights-of-way for the overwhelming majority of the route in both states (100 percent in New Jersey and more than 90 percent in Pennsylvania). The preferred route was submitted to, and subsequently approved by, the public utility regulatory agencies in both states. The preferred route is the same route being evaluated by the NPS in Alternatives 2 and 8 by the NPS as part of its Environmental Impact Statement.

The Applicants have put forth a proposal to either avoid or minimize impacts of the Project by using Best Management Practices that will become part of the NPS Special Use and Construction Permits for the construction of the Project. However, the Applicants recognize that there may be instances where impacts cannot be avoided or minimized. In such instances, the Applicants are prepared to mitigate unavoidable impacts by providing land preservation based, primarily, on the impact of the Project on viewsheds. The Applicants will work with the NPS to arrive at a reasonable methodology to determine the appropriate mitigation, including developing formulae or methodologies to determine the amount of land preservation and the types of property interests necessary to achieve the mitigation objectives. The land preservation can then be accomplished by direct property interest acquisitions or by working with (and funding) one or more third party conservation organizations that identify and acquire land as part of their organizational mission.



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
 Delaware Water Gap National Recreation Area
 Bushkill, Pennsylvania 18324

D5015

JUN 27 2011

Mr. Gregory Smith
 Manager, Transmission Expansion
 PPL Electric Utilities
 Two North Street, GENPL3.
 Allentown, Pennsylvania 18101-1179

Dear Mr. Smith:

Thank you for your correspondence of June 1, 2011, including your most recent iteration of the applicant's mitigation concept. We will make every effort to ensure that the EIS reflects your efforts to propose mitigation for the impacts caused by alternatives number two (#2) and number eight (#8) as you have requested. However, the mitigation is non-specific and has become less substantive with each new iteration.

Regarding your second request, we cannot agree that we reached an understanding that the National Park Service (NPS) would propose mitigation measures for the applicant. We were at an impasse on that issue in our meeting. It was suggested that the applicant propose their mitigation strategy and you, as the applicant's representative, requested that the NPS should define how impacts would be ameliorated in a quantitative fashion.

The EIS process will define the impacts; this activity is still in process. Any efforts to offset impacts proposed by the applicant will be included in the document such as your concept included in the June 1, 2011, correspondence. It is not the role of the NPS to negotiate mitigation at this stage of the process, before any decision is made. We remain open to including any commitments made by the applicant in the document so that the public has a complete understanding of the potential benefits along with the impacts from the proposal.

We look forward to continuing a fruitful dialogue on all aspects of the project.

Sincerely,

John J. Donahue
 Superintendent
 Delaware Water Gap National Recreation Area &
 Middle Delaware National Scenic and
 Recreational River
 (570) 426-2418

Pamela Underhill
 Superintendent
 Appalachian National Scenic Trail
 (304) 535-6279

APPENDIX F-2: AVIAN PROTECTION PLAN

As part of mitigation for the proposed plan, an APP would be developed and would be a condition of the applicant's permit. This example of an APP is a plan developed by PSE&G for the New Jersey Highlands Council. While this APP provides an example of what an APP might be similar to for the proposed S-R Line, the below plan has not been reviewed by NPS, and NPS was not a participant in the development of this plan. An APP for the proposed S-R Line would be developed and reviewed by NPS.

This APP was developed for the New Jersey Highland section of the proposed S-R Line, outside of NPS land. PSE&G has developed an APP (PSE&G 2010) in accordance with the *Avian Protection Plan Guidelines* (APP Guidelines), a joint guidance document prepared by APLIC and USFWS (2005). The APP Guidelines, along with related guidance documents, are considered the most current and comprehensive guidance tools to reduce the risks that result from bird interactions with electrical utility facilities, including electrocution by and collision with the proposed transmission line. Related documents that were used to develop the APP included *Suggested Practices for Raptor Protection on Power Lines* (Miller et al. 1975), *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC 1994). The APP is also closely integrated with the CMP for the S-R Line through the New Jersey Highlands (PSE&G 2009), which has several components that relate to bird habitats, including the Transmission ROW Management Plan, Wetland and Transition Area Mitigation Plan, Stream and Riparian Habitat Restoration Plan, Critical Wildlife Habitat Endangered Species Mitigation Plan, and the Forest Management Plan. The APP describes the bird resources and issues in the project area, defines the methods that PSE&G would employ to avoid and minimize the direct and indirect impacts of the project on bird resources, and identifies bird enhancement opportunities that PSE&G would implement during operation of the project. This section summarizes some of the best available technologies incorporated in the APP to reduce potential bird collisions and electrocutions associated with the proposed transmission line.

Transmission lines are known to pose collision risks to birds. Collisions occur when birds fail to avoid the lines, either because they cannot detect the lines or cannot maneuver to avoid them once they have detected the lines (PSE&G 2010, 8). Bird collisions with power lines often occur when a transmission line runs perpendicular to a flight path used by birds that move back and forth from feeding and roosting sites on a daily basis or when migrant birds are traveling at reduced altitudes (usually in inclement weather) and encounter the structures. Therefore, the most successful strategies for mitigating collision-induced bird injury and mortality to date have focused on improving visibility of transmission lines, particularly the static wire (PSE&G 2010, 8). Additionally, transmission towers can pose an electrocution risk to birds because towers provide perching, loafing, and sometimes nesting opportunities for birds close to energized and/or grounded hardware (PSE&G 2010, 7). Electrocution can occur when a bird simultaneously contacts electrical equipment either phase to phase or phase to ground (APLIC 2006, ix). This normally occurs when a bird attempts to perch on a transmission tower/pole with insufficient clearance between these elements; other birds, such as raptors, may also use the poles for nesting and could be electrocuted while landing. Bird electrocutions typically occur on power lines with voltages less than 60 kV because there is inadequate separation between energized conductors and hardware or ground conductors and hardware (APLIC 2006, ix, 106). Therefore, transmission line structures that are considered safe for birds are lines that provide a minimum horizontal and vertical separation to accommodate both the wrist-to-wrist wing span and the height of a particular bird or group of birds (PSE&G 2010, 8), because the body size of birds is one of the most important characteristics that make certain species susceptible to electrocution (APLIC 2006, 24).

REFERENCES

Avian Power Line Interaction Committee (APLIC)

- 1994 *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994.*
- 2006 *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Edison Electric Institute, Avian Power Line Interaction Committee and the California Energy Commission. Washington, DC, and Sacramento, California.

Avian Power Line Interaction Committee and U.S. Department of Fish and Wildlife (APLIC and USFWS)

- 2005 *Avian Protection Plan Guidelines.* April. Available [online]: <http://www.aplic.org/documents.php>.

Miller, D., E. L. Boeker, R. S. Thorsell, and R. R. Olendorff

- 1975 *Suggested practices for raptor protection on powerlines.* Raptor Research Foundation, Provo, Utah, USA. As cited in PSE&G 2010.

Public Service Electric and Gas Company (PSE&G)

- 2009 Amended Highlands Applicability Determination Highlands Preservation and Planning Area, Roseland to Susquehanna Overhead Electric Transmission Project. Submitted to: New Jersey Department of Environmental Protection Division of Watershed Management. May.
- 2010 Avian Protection Plan for PSE&G's Susquehanna-Roseland 500 kV Transmission Line. Draft Review Document.

