

Appendix N

Applicant Materials Received
Subsequent to the DEIS*

*Provided for informational purposes
only; not analyzed or otherwise included
in the FEIS

**APPENDIX N:
APPLICANT MATERIALS RECEIVED SUBSEQUENT TO THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT**

Provided for informational purposes only; not analyzed or otherwise included in the final environmental impact statement.

Transmission Rights-of-Way Vegetation Management**PART 1 - NEW CONSTRUCTION****1. General**

1.1. THE PRIMARY PURPOSE OF THIS WORK IS TO PROVIDE ADEQUATE CLEARANCE OF THE ELECTRICAL CONDUCTORS AND STRUCTURES FROM TREES AND OTHER VEGETATION GROWING ON THE RIGHTS - OF - WAY TO ENSURE THE SAFETY OF PUBLIC SERVICE ELECTRIC AND GAS ("PSE&G" OR THE "COMPANY") EMPLOYEES, CONTRACTORS AND THE GENERAL PUBLIC AND TO PROMOTE TRANSMISSION SYSTEM RELIABILITY AND SECURITY. SINCE THE COMPANY RECOGNIZES THE NEED FOR THE PRESERVATION OF NATURAL RESOURCES AND THE ENVIRONMENT, THE COMPANY EMPLOYS SEVERAL DIFFERENT METHODS OF VEGETATION MAINTENANCE. THE FOLLOWING OBJECTIVES SHOULD BE KEPT IN MIND IN CARRYING OUT ALL VEGETATION MAINTENANCE WORK:

1.1.1. THE SAFETY OF PSE&G EMPLOYEES, CONTRACTORS AND THE GENERAL PUBLIC IS THE COMPANY'S HIGHEST PRIORITY THEREFORE, ALL VEGETATION IN THE STRUCTURE AREAS, ALONG THE ACCESS ROADWAYS AND IN THE SPAN LENGTHS AND WIDTHS, WHEN NOT LIMITED BY EASEMENT AND/OR ENVIRONMENTAL RESTRICTIONS, SHALL BE REMOVED.

1.1.2. IN ENVIRONMENTALLY SENSITIVE AREAS (SUCH AS WETLANDS, WETLAND BUFFERS, RIPARIAN BUFFERS AND/OR THREATENED AND ENDANGERED HABITATS) DISCRIMINATORY TYPE TREE REMOVAL METHODS WILL BE EMPLOYED TO PRESERVE SELECTED VEGETATION, PARTICULARLY THE LOW-GROWING TREE VARIETIES, SHRUBS AND/OR OTHER GROUND COVER.

1.1.3. VEGETATION REMOVAL EFFORTS WILL ENCOURAGE FUTURE GROWTH OF LOW-GROWING MORE DESIRABLE SPECIES THAT WERE PREVIOUSLY SHADED OR COVERED BY LARGER NATURAL FOREST TREES.

2. Types of Vegetation Management

2.1. SELECTIVE TREE REMOVAL SHALL BE INTERPRETED TO MEAN THAT ALL TREES RECOGNIZED AS BEING FAST-GROWING SPECIES SHALL BE CUT TO GROUND LEVEL. ALL OTHER VEGETATION SHALL BE TRIMMED ACCORDING TO THE REMOVAL DIAGRAMS ON PAGES B-811, 9, 10, 11, AND 12 AND INSTRUCTIONS CONTAINED IN PART 1, PARAGRAPH 5.4 HEREIN. SELECTIVE OR CONTROLLED TYPE TREE REMOVAL SHALL BE EMPLOYED IN THOSE AREAS IDENTIFIED AS "RESTRICTED" IN LAND USE EASEMENTS.

2.2. GROUND LINE MAINTENANCE SHALL BE INTERPRETED TO MEAN THAT ALL TREES AND SHRUBS SHALL BE CUT TO THE GROUND LEVEL (1 INCH ABOVE THE SOIL) IF POSSIBLE, BUT NO MORE THAN 3 INCHES (3") ABOVE SOIL LINE, EXCEPT WITHIN ENVIRONMENTALLY SENSITIVE AREAS. IN WETLAND AREAS MOWER HEADS WILL BE SET AT 6 INCHES ABOVE THE SOIL LINE. IN AREAS DETERMINED TO SUPPORT NEW JERSEY THREATENED OR ENDANGERED PLANT SPECIES, MOWERS WILL BE SET AT 3 INCHES OR GREATER (3 INCHES IN UPLAND HABITAT, 6 INCHES IN WETLAND HABITAT). GROUND LINE-TYPE TREE REMOVAL METHODS SHALL BE EMPLOYED ALONG ALL ACCESS ROADWAYS, ALL STRUCTURE SITES AND IN ALL SPANS WITH NO EASEMENT OR ENVIRONMENTAL RESTRICTIONS. IF AN AREA HAS BEEN CLEARED, THE AREA WILL BE MAINTAINED IN SAME MANNER.

3. Center Line Marking

3.1. CENTER LINE MARKING OF THE RIGHTS - OF - WAY WILL BE THE ONLY FIXED INDICATIONS PROVIDED BY THE COMPANY FOR TREE MARKING AND CUTTING.

4. Tree Marking

4.1. IF REQUESTED BY PROPERTY OWNERS OR REGULATORY OFFICIALS, TREES SHALL BE MARKED.

Transmission Rights-of-Way Vegetation Management**5. Vegetation Management Practices****5.1. Access Roads**

- 5.1.1. ROADWAYS SHALL BE COMPLETELY CLEARED OF ALL GROWTH. NORMAL WIDTH OF CLEARING FOR ROADWAYS SHALL BE FIFTEEN FEET (15') UNLESS OTHERWISE DESIGNATED. ALL STUMPS AND OTHER GROWTH SHALL BE CUT TO GROUND LEVEL.

5.2. Structure Sites

STRUCTURE SITES SHALL BE COMPLETELY REMOVED OF GROWTH FOR AN AREA OF FIFTY FEET (50') BEYOND THE STRUCTURE FOUNDATION PERIMETER, UNLESS OTHERWISE DESIGNATED. THIS REQUIRES ALL GROWTH TO BE CUT AT GROUND LEVEL AND ALL STUMPS TO BE REMOVED. THIS CLEARED AREA IS TO PROVIDE A SAFE WORK ZONE AROUND EACH TOWER.

5.2.1. Minimum Clearance

- 5.2.2. EVERY PRECAUTION SHALL BE TAKEN BY THE TREE CONTRACTOR TO PROVIDE SUFFICIENT AND CONSISTENT CLEARANCE BETWEEN CONDUCTORS AND TREES IN AREAS WHERE EASEMENT RESTRICTIONS LIMIT TREE REMOVAL. MINIMUM ALLOWABLE CLEARANCE SHALL BE NOT LESS THAN THIRTY FEET (30') VERTICALLY BETWEEN THE CONDUCTOR AT ITS MAXIMUM ALLOWABLE OPERATING TEMPERATURE AND THE NEAREST PORTION OF ANY TREE. THIS DISTANCE IS NOT TO BE CONSIDERED FROM THE COLD CONDUCTOR AS USUALLY SEEN IN THE FIELD. THE DISTANCE REQUIRED FROM THE COLD CONDUCTOR MAY BE FIFTY FEET (50') OR MORE. THE PROPER CLEARANCE WILL BE OBTAINED WHEN THE TREES ARE REMOVED OR TRIMMED SO THAT NO GROWTH EXTENDS ABOVE THE CUTTING LINE INDICATED ON THE PLAN AND PROFILE. THE REQUIRED VERTICAL CLEARANCE IS SHOWN IN THE DIAGRAMS ON PAGES B811, 10, 11, 12 AND 13. MINIMUM ALLOWABLE CLEARANCE IS BASED ON OSHA REGULATION 1910.333 ENTITLED "MINIMUM APPROACH DISTANCE TO ENERGIZED CONDUCTORS FOR UNQUALIFIED PERSONNEL".

5.3. Incompatible Vegetation

- 5.3.1. RAPID GROWING TREES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: ASH, ASPEN, TULIP, BIRCH, WILD CHERRY, GUM, POPLAR, SYCAMORE, SILVER MAPLE, WILLOW, LOCUST AND WHITE PINE. WHENEVER POSSIBLE EVERY EFFORT SHOULD BE MADE TO REMOVE THESE SPECIES OF TREES FROM THE RIGHTS - OF - WAY.
- 5.3.2. REGARDLESS OF SPECIES OR SIZE, ALL TREES ON THE RIGHTS - OF - WAY DETERMINED, BY AN AUTHORIZED AND TRAINED COMPANY EMPLOYEE OR REPRESENTATIVE, TO BE DEAD, DECAYED OR DYING SHALL BE REMOVED TO GROUND LEVEL.

5.4. Special Trimming

- 5.4.1. TRIMMING OF ORNAMENTAL TREES OFTEN REQUIRES SPECIAL TRIMMING PROCEDURES. WHEN SUCH TRIMMING IS REQUIRED, A COMPANY ARBORIST SHALL BE CONSULTED.

6. Notification

- 6.1. PROPERTY OWNERS OF RIGHTS - OF - WAY LEASED BY PSE&G SHALL BE NOTIFIED AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF MAINTENANCE. THE PROPERTY OWNER MUST RECEIVE NOTICE BY CERTIFIED LETTER.

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- 6.2. PROPERTY OWNERS ADJACENT TO PSE&G OWNED RIGHTS - OF - WAY SHOULD BE NOTIFIED AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF MAINTENANCE. REASONABLE EFFORT SHALL BE MADE TO NOTIFY THE PROPERTY OWNERS IN PERSON. IF PERSONAL CONTACT IS NOT POSSIBLE, THE ADJACENT PROPERTY OWNERS MAY BE NOTIFIED BY REGULAR MAIL.
- 6.3. IN THE EVENT OF AN EMERGENCY, PSE&G MAY ENTER LEASED RIGHTS - OF - WAY WITHOUT NOTICE TO THE PROPERTY OWNER PRIOR TO COMMENCEMENT OF WORK. FOLLOWING RESOLUTION OF THE EMERGENCY, PSE&G WILL MAKE REASONABLE EFFORTS TO CONTACT THE PROPERTY OWNER WITH AN ACCOUNT OF THE EVENT.
- 6.4. THE CORRESPONDING TOWNSHIPS SHALL BE NOTIFIED PRIOR TO PROPERTY OWNER NOTIFICATION. TOWNSHIP NOTIFICATION SHALL BE MADE TO AN APPROPRIATE TOWNSHIP REPRESENTATIVE.

PART 2 - VEGETATION MANAGEMENT IN UPLANDS AREAS**1. General**

- 1.1. THE TERM "RIGHTS - OF - WAY MAINTENANCE" REFERS TO ANY EFFORTS DIRECTED TOWARD MAINTAINING EXISTING TRANSMISSION AND DISTRIBUTION RIGHTS - OF - WAY FOR THE FOLLOWING PURPOSES:
 - 1.1.1. TO CONFORM WITH COMPANY OPERATING, SAFETY AND SECURITY REQUIREMENTS.
 - 1.1.2. TO PERMIT ACCESS TO TOWERS, POLES, CONDUCTORS AND EQUIPMENT FOR CONSTRUCTION AND MAINTENANCE AND TO PROVIDE LINE OF SIGHT VISIBILITY FOR INSPECTION AND SECURITY PURPOSES.
 - 1.1.3. TO COMPLY WITH APPLICABLE LAWS AND ORDINANCES.
 - 1.1.4. TO PROMOTE GOOD PUBLIC RELATIONS.
 - 1.1.5. TO FOSTER THE NATURAL ENVIRONMENT AND WILDLIFE.
- 1.2. ALL VEGETATION MANAGEMENT WILL BE PERFORMED IN ACCORDANCE WITH THE STATE OF NEW JERSEY BOARD OF PUBLIC UTILITIES (BPU), THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION (NERC) AND EASEMENT RIGHTS/RESTRICTIONS.
- 1.3. UPON COMPLETION OF THE INITIAL CUTTING AND CONSTRUCTION, AN ANNUAL FOLLOW-UP INSPECTION SHALL BE ESTABLISHED TO DETERMINE THE NEED FOR MAINTENANCE. AUTHORIZED PERSONNEL THOROUGHLY INSTRUCTED IN THE VEGETATION MANAGEMENT PROGRAM SHALL CONDUCT THE INSPECTIONS.
- 1.4. UPLAND AREAS IDENTIFIED AS REQUIRING MAINTENANCE WILL BE MAINTAINED UTILIZING THE GROUND LINE MAINTENANCE METHOD DESCRIBED IN PART 1, UNLESS RESTRICTED OR IDENTIFIED AS ENVIRONMENTALLY SENSITIVE AREAS. ALL MAINTENANCE ACTIVITIES WILL CONFORM WITH THE PSE&G OVERHEAD TRANSMISSION ENVIRONMENTAL COMPLIANCE MATRIX.
- 1.5. CERTAIN EASEMENTS ON TRANSMISSION RIGHTS - OF - WAY PROVIDE DEFINITE RESTRICTIONS REGARDING THE CUTTING OF TREES. THESE RESTRICTIONS SHALL HAVE PRECEDENCE OVER NORMAL TREE MAINTENANCE PRACTICES. RESTRICTED AREAS WILL BE MAINTAINED, AS STIPULATED BY THE EASEMENT, UTILIZING THE SELECTIVE REMOVAL METHODS AS DESCRIBED IN PART 1. REGARDLESS OF METHOD UTILIZED, THIRTY FEET (30') OF CLEARANCE BETWEEN THE TREE LINE AND THE CONDUCTOR AT ITS MAXIMUM OPERATING TEMPERATURE MUST BE MAINTAINED.

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- 1.6. EXISTING RIGHTS – OF – WAY, WHICH WERE ORIGINALLY CLEARED TO GROUND LINE, SHALL BE ALLOWED TO SUSTAIN NATURAL REGROWTH OF LOW GROWING SHRUBS, HERBACEOUS PLANTS AND GRASSES. LOW GROWING VEGETATION WILL LIMIT THE GROWTH OF LESS DESIRABLE TREE SPECIES.
- 1.7. RIGHTS – OF – WAY THAT HAVE BEEN MAINTAINED BY MOWING SHALL CONTINUE TO BE MOWED.
- 1.8. Chemical Treatment (Herbicide Application)
 - 1.8.1. TRANSMISSION RIGHTS – OF – WAY WILL BE CHEMICALLY TREATED AS A GENERAL PRACTICE. CHEMICAL TREATMENT SHALL BE SELECTIVELY SPRAYED ON WOODY STEMMED VEGETATION. CONTRACTOR MUST ABIDE BY ALL GOVERNING REGULATIONS REGARDING THE PROPER APPLICATION, LICENSING, TRANSPORTATION AND STORAGE OF THE CHEMICAL TREATMENT. CHEMICAL TREATMENT WILL PROMOTE GROWTH OF LOW GROWING VEGETATION AND IN TURN LIMIT GROWTH OF LESS DESIRABLE TREE SPECIES.
 - 1.8.2. PROPERTY OWNERS OF LEASED PROPERTY HAVE FIRST RIGHT OF REFUSAL OF CHEMICAL APPLICATION.
 - 1.8.3. APPLICATION OF HERBICIDES WITHIN ENVIRONMENTALLY SENSITIVE AREAS IS PROHIBITED UNLESS SPECIFICALLY PERMITTED. EXCEPTIONS MAY BE GRANTED ON A CASE BY CASE BASIS. THERE WILL BE LIMITED APPLICATION OF HERBICIDES WITHIN WETLANDS OR THE RIPARIAN ZONES OF STREAM, USING HERBICIDES APPROVED FOR USE IN AQUATIC ENVIRONMENTS, .IN ADDITION, NO HERBICIDES ARE UTILIZED IN AREAS IDENTIFIED AS CONTAINING THREATENED OR ENDANGERED PLANTS.

2. Notification

- 2.1. PROPERTY OWNERS OF RIGHTS – OF – WAY LEASED BY PSE&G SHALL BE NOTIFIED AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF MAINTENANCE. THE PROPERTY MUST RECEIVE NOTICE BY CERTIFIED LETTER.
- 2.2. PROPERTY OWNERS ADJACENT TO PSE&G OWNED RIGHTS – OF – WAY SHOULD BE NOTIFIED AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF MAINTENANCE. REASONABLE EFFORT SHALL BE MADE TO NOTIFY THE PROPERTY OWNERS IN PERSON. IF PERSONAL CONTACT IS NOT POSSIBLE, THE ADJACENT PROPERTY OWNERS MAY BE NOTIFIED BY REGULAR MAIL.
- 2.3. IN THE EVENT OF AN EMERGENCY, PSE&G MAY ENTER LEASED RIGHTS – OF – WAY WITHOUT NOTICE TO THE PROPERTY OWNER PRIOR TO COMMENCEMENT OF WORK. FOLLOWING RESOLUTION OF THE EMERGENCY, PSE&G WILL MAKE REASONABLE EFFORTS TO CONTACT THE PROPERTY OWNER WITH AN ACCOUNT OF THE EVENT.
- 2.4. THE CORRESPONDING TOWNSHIPS SHALL BE NOTIFIED PRIOR TO PROPERTY OWNER NOTIFICATION. TOWNSHIP NOTIFICATION SHALL BE MADE TO AN APPROPRIATE TOWNSHIP REPRESENTATIVE.
- 2.5. IN ADDITION TO THE PROPERTY OWNER NOTIFICATION, NOTIFICATION OF HERBICIDE APPLICATION MAINTENANCE MUST BE MADE TO AT LEAST TWO NEWSPAPERS HAVING THE GREATEST LIKELIHOOD OF INFORMING THE PUBLIC WITHIN THE AREA OF APPLICATION. THE NOTIFICATION MUST BE GIVEN A MAXIMUM OF 30 DAYS AND A MINIMUM OF 7 DAYS PRIOR TO THE PROPOSED APPLICATION DATE. THE NOTIFICATION SHOULD CONTAIN AT LEAST; THE PROPOSED DATE AND LOCATION OF APPLICATION, APPLICATOR'S NAME, ADDRESS AND REGISTRATION NUMBER, AND THE BRAND NAME AND ACTIVE INGREDIENTS OF THE HERBICIDE. ALL NOTIFICATIONS AND APPLICATION PROCEDURES SHALL BE DONE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NJDEP.

Transmission Rights-of-Way Vegetation Management**PART 3 – VEGETATION MANAGEMENT IN WETLANDS, WETLAND BUFFERS AND RIPARIAN BUFFER AREAS****1. General**

- 1.1. THE TERM "RIGHTS – OF – WAY MAINTENANCE" REFERS TO ANY EFFORTS DIRECTED TOWARD MAINTAINING EXISTING TRANSMISSION RIGHTS – OF – WAY FOR THE FOLLOWING PURPOSES:
 - 1.1.1. TO CONFORM WITH COMPANY OPERATING, SAFETY AND SECURITY REQUIREMENTS.
 - 1.1.2. TO PERMIT ACCESS TO TOWERS, POLES, CONDUCTORS AND EQUIPMENT FOR CONSTRUCTION AND MAINTENANCE AND TO PROVIDE LINE OF SIGHT VISIBILITY FOR INSPECTION AND SECURITY PURPOSES.
 - 1.1.3. TO COMPLY WITH APPLICABLE LAWS AND ORDINANCES.
 - 1.1.4. TO PROMOTE GOOD PUBLIC RELATIONS.
 - 1.1.5. TO FOSTER THE NATURAL ENVIRONMENT AND WILDLIFE.
- 1.2. UPON COMPLETION OF THE INITIAL CUTTING AND CONSTRUCTION, AN ANNUAL FOLLOW-UP INSPECTION SHALL BE ESTABLISHED TO DETERMINE THE NEED FOR MAINTENANCE. PERSONNEL THOROUGHLY INSTRUCTED IN THE VEGETATION MANAGEMENT PROGRAM WILL CONDUCT THE INSPECTION.
- 1.3. ALL CHIPS AND DEBRIS FROM CUTTING OF TREES WILL BE REMOVED FROM THE WETLANDS, WETLANDS BUFFERS OR WATERBODY RIPARIAN BUFFER AREAS AND STORED IN UPLAND AREAS UNTIL THEY CAN BE REMOVED FROM THE SITE.
- 1.4. CERTAIN EASEMENTS ON TRANSMISSION RIGHTS – OF – WAY PROVIDE DEFINITE RESTRICTIONS REGARDING THE CUTTING OF TREES. THESE RESTRICTIONS SHALL HAVE PRECEDENCE OVER NORMAL TREE REMOVAL PRACTICES. RESTRICTED AREAS WILL BE MAINTAINED, AS STIPULATED BY THE EASEMENT, UTILIZING THE SELECTIVE METHODS AS DESCRIBED IN PART 1. REGARDLESS OF METHOD UTILIZED, THIRTY FEET (30') OF CLEARANCE BETWEEN THE TREE LINE AND THE CONDUCTOR AT ITS MAXIMUM OPERATING TEMPERATURE MUST BE MAINTAINED.
- 1.5. FIFTY PERCENT (50%) OF THE INCOMPATIBLE AND/OR INVASIVE TREE SPECIES MAY BE REMOVED IN WETLAND, WETLAND BUFFERS OR RIPARIAN BUFFERS AREAS, IF CONSISTENT WITH STANDARDS PROVIDED IN PART 4 BELOW. TO THE GREATEST EXTENT FEASIBLE, REMOVED TREES SHOULD BE REPLACED WITH WOODY SPECIES SELECTED FROM THE DESIREABLE VEGETATION LIST (SEE PAGE 14).
- 1.6. EXISTING RIGHTS – OF – WAY, WHICH WERE ORIGINALLY CLEARED TO GROUND LINE, SHALL BE ALLOWED TO SUSTAIN NATURAL REGROWTH OF LOW GROWING SHRUBS, HERBACEOUS PLANTS AND GRASSES. LOW GROWING VEGETATION WILL LIMIT THE GROWTH OF LESS DESIRABLE TREE SPECIES.
- 1.7. RIGHTS – OF – WAY THAT HAVE BEEN MAINTAINED BY MOWING SHALL CONTINUE TO BE MOWED. ADJACENT TO STREAMS, PSE&G WILL MAINTAIN A 25 FOOT RIPARIAN BUFFER WHICH WILL NOT BE MOWED. TREES IN THESE AREAS WILL BE HAND CUT. SHRUBS AND HERBACEOUS VEGETATION WILL BE MAINTAINED ADJACENT TO THE STREAM TO PROVIDE SHADING FOR THE STREAM.
- 1.8. MOWER HEIGHTS WILL BE SET AT A MINIMUM OF 6 INCHES WITHIN ALL WETLANDS, AND ESTABLISHED RIPARIAN BUFFERS
- 1.9. TO INSURE STREAM BANK STABILITY, WOODY VEGETATION WITHIN 25 FEET OF TOP OF BANK SHALL BE MANAGED TO ENSURE A "NO-NET LOSS" OF ROOT MAT.

Transmission Rights-of-Way Vegetation Management**1.10. Chemical Treatment (Herbicide Application)**

1.10.1. TRANSMISSION RIGHTS – OF – WAY WILL BE CHEMICALLY TREATED AS A GENERAL PRACTICE. CHEMICAL TREATMENT WILL PROMOTE GROWTH OF LOW GROWING VEGETATION AND IN TURN LIMIT GROWTH OF LESS DESIRABLE TREE SPECIES. PSE&G WILL UTILIZE AN HERBICIDE ACCEPTABLE IN AQUATIC AREAS. CHEMICAL TREATMENT SHALL BE SELECTIVELY SPRAYED ON WOODY STEMMED VEGETATION. CONTRACTOR MUST ABIDE BY ALL GOVERNING REGULATIONS REGARDING THE PROPER APPLICATION, LICENSING, TRANSPORTATION AND STORAGE OF THE CHEMICAL TREATMENT. ALL NOTIFICATION AND APPLICATION PROCEDURES SHALL BE DONE IN ACCORDANCE WITH RULES AND REGULATIONS OF THE NJDEP.

1.10.2. PROPERTY OWNERS OF LEASED PROPERTY HAVE FIRST RIGHT OF REFUSAL OF CHEMICAL APPLICATION.

2. Notification

2.1. PROPERTY OWNERS OF RIGHTS – OF – WAY LEASED BY PSE&G SHALL BE NOTIFIED AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF MAINTENANCE. THE PROPERTY MUST RECEIVE NOTICE BY CERTIFIED LETTER.

2.2. PROPERTY OWNERS ADJACENT TO PSE&G OWNED RIGHTS – OF – WAY SHOULD BE NOTIFIED AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF MAINTENANCE. REASONABLE EFFORT SHALL BE MADE TO NOTIFY THE PROPERTY OWNERS IN PERSON. IF PERSONAL CONTACT IS NOT POSSIBLE, THE ADJACENT PROPERTY OWNERS MAY BE NOTIFIED BY REGULAR MAIL.

2.3. IN THE EVENT OF AN EMERGENCY, PSE&G MAY ENTER LEASED RIGHTS - OF - WAY WITHOUT NOTICE TO THE PROPERTY OWNER PRIOR TO COMMENCEMENT OF WORK. FOLLOWING RESOLUTION OF THE EMERGENCY, PSE&G WILL MAKE REASONABLE EFFORTS TO CONTACT THE PROPERTY OWNER WITH AN ACCOUNT OF THE EVENT.

2.4. THE CORRESPONDING TOWNSHIPS SHALL BE NOTIFIED PRIOR TO PROPERTY OWNER NOTIFICATION. TOWNSHIP NOTIFICATION SHALL BE MADE TO AN APPROPRIATE REPRESENTATIVE.

2.5. IN ADDITION TO THE PROPERTY OWNER NOTIFICATION, NOTIFICATION OF HERBICIDE APPLICATION MAINTENANCE MUST BE MADE TO AT LEAST TWO (2) NEWSPAPERS HAVING THE GREATEST LIKELIHOOD OF INFORMING THE PUBLIC WITHIN THE AREA OF APPLICATION. THE NOTIFICATION MUST BE GIVEN A MAXIMUM OF THIRTY (30) DAYS AND A MINIMUM OF SEVEN (7) DAYS PRIOR TO THE PROPOSED APPLICATION DATE. THE NOTIFICATION SHOULD CONTAIN AT LEAST; THE PROPOSED DATE AND LOCATION OF APPLICATION, APPLICATOR'S NAME, ADDRESS AND REGISTRATION NUMBER, AND THE BRAND NAME AND ACTIVE INGREDIENTS OF THE HERBICIDE. ALL NOTIFICATIONS AND APPLICATION PROCEDURES SHALL BE DONE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NJDEP.

PART 4- MAINTENANCE IN HABITAT FOR STATE OR FEDERALLY LISTED FLORA OR FAUNA**1. Maintenance Mowing and Herbicide Use**

1.1 PSE&G WILL NOT EMPLOY BROADCAST SPRAYING OF HERBICIDES. SUBSEQUENT TO THE INITIAL CLEARING OF LARGE WOODY VEGETATION AND SUBSEQUENT SELECTIVE CUTTING AND MOWING OPERATIONS, SELECTED HERBICIDES WHICH CONTROL WOODY AND BROAD-LEAFED VEGETATION WILL BE APPLIED. THIS WILL BE ACCOMPLISHED THROUGH THE USE AN ULTRA LOW VOLUME EMULSIFIED HERBICIDE APPLIED BY AN INVERTED LOW-LEVEL DIRECTIONAL SPRAY CONTAINED ON THE REAR OF A MODIFIED TRACK-MOUNTED ATV. THE SELECTED VERTICAL DIRECTIONAL APPLICATION OF EMULSIFIED HERBICIDES APPLIES THE EMULSIFICATION DIRECTLY ONTO THE VEGETATION AND SOILS IN A UNIFORM PATTERN OF DROPLETS, WHICH ALLOWS FOR CONTROL AND MAINTENANCE OF THE UNDESIRABLE VEGETATION DURING THE GROWING SEASON. THE SELECTED EMULSIFIED HERBICIDE MIXTURE FALLS DIRECTLY ONTO THE PLANTS/SOILS AND DOES NOT BECOME AIRBORNE AS THE HERBICIDE MIXTURE IS NOT IN AN AEROSOL STATE.

Transmission Rights-of-Way Vegetation Management

1.2 MAINTENANCE MOWING AND HERBICIDE USE WITHIN AREAS IDENTIFIED AS STATE ENDANGERED OR THREATENED FAUNAL SPECIES HABITAT SHALL FOLLOW THE GUIDANCE PROVIDED IN NO-HARM/BEST MANAGEMENT PRACTICES FOR WILDLIFE HABITAT ALONG UTILITY-LINE RIGHT OF WAYS, UPDATED DECEMBER 12, 2007 BY THE NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF FISH AND WILDLIFE, ENDANGERED AND NONGAME SPECIES PROGRAM, AND PSE&G'S OCTOBER 28, 2009 CORRISPONDANCE WITH THE NJDEP CONCERNING ENGANGERED SPECIES COMPLIANCE FOR VEGETATION MAINTENANCE.

1.3 MAINTENANCE MOWING AND HERBICIDE USE WITHIN AREAS IDENTIFIED A FEDERAL ENDANGERED OR THREATENED SPECIES HABITAT SHALL FOLLOW THE GUIDANCE PROVIDED IN PSEG'S OCTOBER 23, 2009 CORRESPONDENCE TO THE U.S. FISH AND WILDLIFE SERVICE ESTABLISHING A SET OF CONSERVATION MEASURES PSEG WILL IMPLEMENT AS PART OF THEIR RIGHT-OF-WAY MANAGEMENT TECHNIQUES AND PRACTICES.

1.4 MAINTENANCE MOWING AND HERBICIDE USE WITHIN AREAS IDENTIFIED AS STATE ENDANGERED OR RARE FLORA SPECIES HABITAT SHALL FOLLOW THE GUIDANCE PROVIDED BY THE NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF NATURAL LANDS MANAGEMENT, NATURAL HERITAGE PROGRAM IN THEIR SEPTEMBER 29, 2009 CORRESPONDENCE TO PSEG. IN ADDITION, MOWING IN STATE ENDANGERED OR RARE FLORA HABITAT WILL BE CONDUCTED USING SMALL MACHINERY OR BY HAND AND MUST BE MAINTAINED AT A HEIGHT OF A MINIMUM OF 3 INCHES. 1.4 HERBICIDE APPLICATION WITHIN RIPARIAN BUFFERs WILL BE PAINTED OR SNIP & DRIPPED DIRECTLY ONTO THE STUMP OR CUT END OF THE SPECIES REQUIRING REMOVAL.

PART 5 – MAINTENANCE IN THE PINELANDS**1. Removal**

1.1. PRIOR TO ANY WORK BEING CONDUCTED ON RIGHTS – OF – WAY WITHIN THE PINELANDS ALL ENVIRONMENTAL AND EASEMENT RESTRICTIONS MUST BE IDENTIFIED. THE PINELANDS COMMISSION MUST THEN BE CONTACTED IN ORDER TO ASCERTAIN THE NEED FOR A CERTIFICATE OF FILING.

2. Maintenance PRESCRIPTION

2.1. ALL MAINTENANCE ACTIVITIES WITHIN THE PINELANDS WILL FOLLOW THE PINELANDS PRESCRIPTION.

PART 6 – VEGETATION MANAGEMENT - GENERAL**1. Roadways, Pathways and Boardwalks**

1.1. WHERE REQUIRED AND AS PERMITTED BY TERRAIN, ROADWAYS SHALL BE ESTABLISHED WITHIN RIGHTS – OF – WAY TO FACILITATE PASSAGE OF AUTHORIZED VEHICLES AND EQUIPMENT, INCLUDING TREE AND BRUSH CUTTING EQUIPMENT. SUCH ROADWAYS MUST REMAIN ACCESSIBLE.

1.2. IN MOUNTAINOUS OR WOODED TERRAIN, AUTHORIZED PERSONNEL SHALL ESTABLISH PATHWAYS TO FACILITATE TRANSVERSING THE RIGHTS – OF – WAY. THE PATH SHALL BE A MINIMUM OF FOUR FEET WIDE AND FREE OF PLANT GROWTH. STEPS SHALL BE CONSTRUCTED WHERE REQUIRED TO IMPROVE FOOTING ON STEEP BANKS AND SLOPES. FIELD STONES OR CROSS ARMS MAY BE CUT AND USED FOR THIS PURPOSE.

1.3. IN WETLANDS AND HIGH WATER TABLE AREAS, BOARDWALKS MUST BE CONSTRUCTED UNLESS ANOTHER MEANS OF ACCESS IS AVAILABLE. THE STRUCTURE SHALL BE CONSTRUCTED OF TREATED PLANKS AND PILING. ALL APPROPRIATE PERMITS MUST BE OBTAINED PRIOR TO CONSTRUCTION.

2. Erosion Control

2.1. TO PREVENT SOIL EROSION FROM BEGINNING AND TO CONTROL EROSION THAT HAS STARTED, IT MAY BE NECESSARY TO SPREAD A GRASS SEED MIXTURE. THE LOCAL SOIL CONSERVATION DISTRICT STANDARD WILL DEFINE THE GRASS SEED MIXTURE.

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- 2.2. WHEN EROSION BECOMES A SERIOUS PROBLEM, A SPECIFIC MEANS OF RESTORATION WILL BE DETERMINED BY PSE&G.

PART 7 – PRECAUTIONARY MEASURES**1. New Construction and Maintenance**

- 1.1. IN ADDITION TO THE ITEMS LISTED SEPARATELY ON THE PRECEDING SHEETS, THE FOLLOWING PRECAUTIONARY MEASURES MUST BE TAKEN WHETHER PERFORMING VEGETATION MANAGEMENT FOR NEW CONSTRUCTION.

2. Safety In The Vicinity of Electrical Wires

- 2.1. MANY CONTRACTORS AND WORKMEN WHO DO TREE WORK MAY NOT FAMILIAR WITH THE HAZARDS OF WORKING IN THE VICINITY OF ELECTRICAL WIRES, ESPECIALLY HIGH VOLTAGE TRANSMISSION LINES. SPECIAL CARE SHALL BE TAKEN TO ENSURE ALL PERSONS WORKING ON THE RIGHTS – OF – WAY COMPLY WITH COMPANY SAFETY REQUIREMENTS AS SHOWN ON SHEET A892 OF THE SAFETY SECTION OF THE TOWER HANDBOOK, THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND THE AMERICAN NATIONAL STANDARDS INSTITUTE, STANDARD ANSI-Z133.1 LATEST ISSUE, "SAFETY REQUIREMENTS FOR TREE PRUNING, TRIMMING, REPAIRING OR REMOVAL". THESE CONTRACTORS SHALL BE QUALIFIED LINE CLEARANCE CONTRACTORS.
- 2.2. IN ADDITION, EXTREME CARE SHALL BE TAKEN TO ENSURE THAT ANY TREE BEING FELLED CANNOT COME WITHIN FIFTEEN FEET (15') OF ENERGIZED TRANSMISSION CONDUCTOR. IF THIS CLEARANCE CANNOT BE MAINTAINED, THE CIRCUIT SHALL BE CLEARED, TAGGED, SHORT-CIRCUITED AND GROUNDED AT THE TERMINAL ENDS AND TESTED FOR POTENTIAL IN THE VICINITY OF THE WORK AREA UNDER PSE&G'S WORK STANDARDS.

3. Fire Hazards

- 3.1. THE COMPANY SHALL GUARD AGAINST THE HAZARD OF BRUSH FIRE, ESPECIALLY DURING THE FALL AND WINTER SEASONS. THE PRESENCE OF OIL BASED SPRAY IN CONJUNCTION WITH DRY LEAVES PRESENTS A HIGHLY FLAMMABLE SITUATION.
- 3.2. THE PRESENCE OF PHRAGMITES (GIANT FOXTAIL) AND OTHER MEADOW GRASSES ON RIGHTS – OF – WAY IN HIGH-WATER TABLE AREAS PRESENTS A SERIOUS FIRE HAZARD. EXCEPT IN SPECIAL LOCATIONS, SUCH GRASSES ARE PRESENTLY CONTROLLED BY CUTTING OR BY CHEMICAL TREATMENT ON AN ANNUAL BASIS. A RADIUS OF APPROXIMATELY FIFTY FEET (50') FROM THE STRUCTURE FOUNDATION PERIMETER MUST BE CUT OR TREATED TO PROVIDE ADEQUATE PROTECTION.

4. Poisonous Plants

- 4.1. IN AREAS NEAR OR USED AS PASTURE OR GRAZING FOR LIVE STOCK, SPECIAL PRECAUTIONARY MEASURES SHALL BE TAKEN. ALL POISONOUS TREES, BRUSH OR OTHER VEGETATION CUT ON PASTURES, GRAZING LANDS, ALONG FENCE AND TREE ROWS OR OTHER AREAS ACCESSIBLE TO LIVESTOCK, SHALL BE COMPLETELY REMOVED FROM THE AREA.

5. Snake Bites

- 5.1. THE PERFORMANCE OF WORK ON THE RIGHTS – OF - WAY REQUIRES THAT CERTAIN SAFETY PRECAUTIONS BE TAKEN. THE POSSIBILITY OF POISONOUS SNAKE BITE, ESPECIALLY IN THE NORTHERN SECTION OF THE STATE, MUST BE RECOGNIZED. POISONOUS SPECIES SUCH AS RATTLESNAKES AND COPPERHEADS ARE PREVALENT. PERSONNEL WORKING IN THESE REGIONS MUST WEAR PROTECTIVE BOOTS OR WORK SHOES

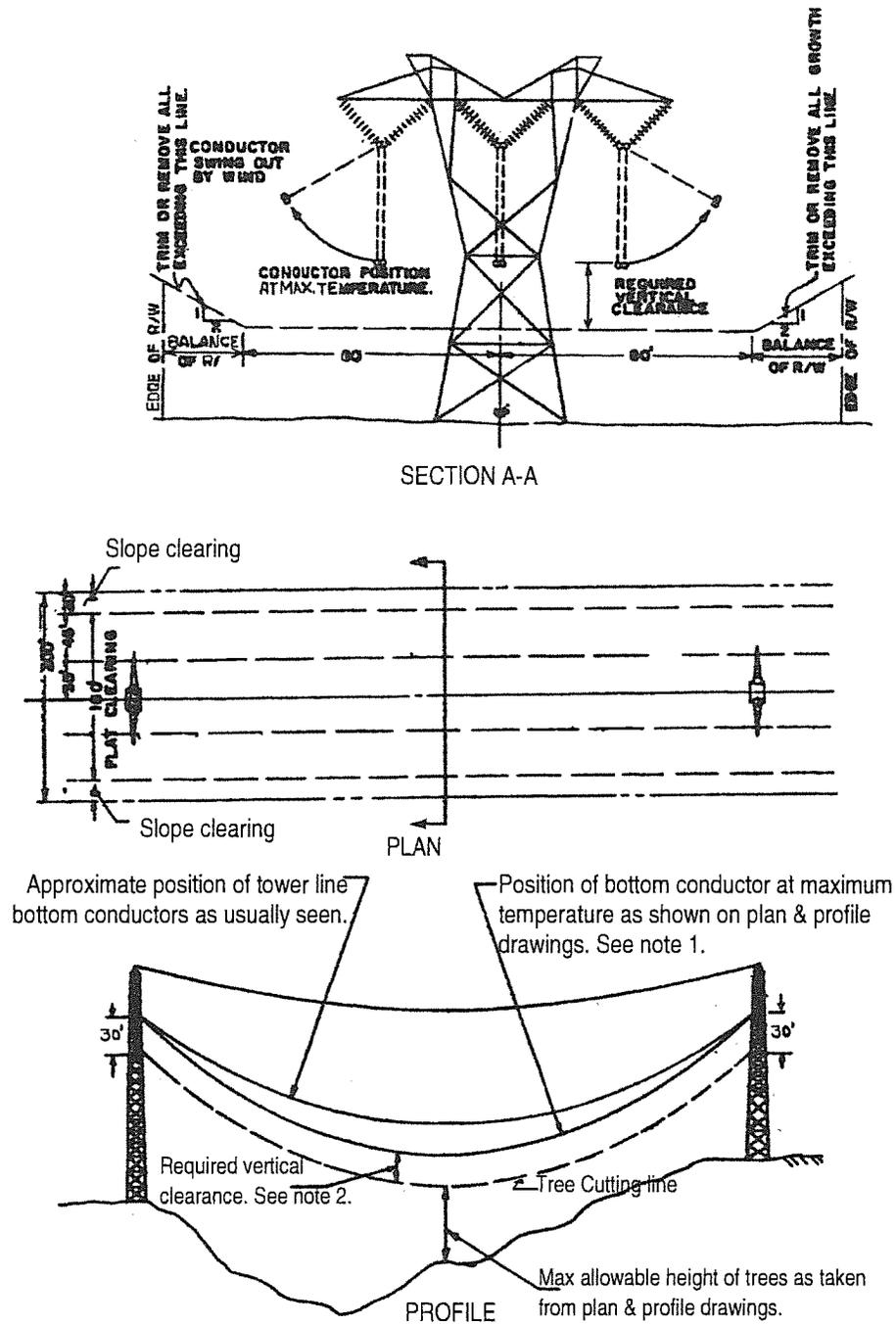
Transmission Rights-of-Way Vegetation Management

WITH SEPARATE LEATHER LEGGINGS TO KNEE HEIGHT. SNAKE BITE KITS SHALL BE CARRIED ON WORK VEHICLES.

6. Toxicological Information Chemical Brush and Weed Control

- 6.1. THE TOXICOLOGICAL PRECAUTIONS TO BE TAKEN WHEN APPLYING BRUSH AND WEED CONTROL CHEMICALS DEPEND UPON THE CARRIER BEING USED. ONLY EPA APPROVED PRODUCTS SHALL BE USED AND AT THE RECOMMENDED DOSAGE, MANUFACTURERS RECOMMENDATIONS FOR SKIN CONTACT AND CLEANUP SHALL BE FOLLOWED.
- 6.2. UNDER NO CIRCUMSTANCES SHALL ARSENICAL WEED KILLERS BE USED FOR BRUSH OR WEED CONTROL ON RIGHTS - OF - WAY. THESE COMPOUNDS ARE POISONOUS AND ALSO REQUIRE SPECIAL PRECAUTIONS DURING MIXING AND APPLICATION TO PREVENT SKIN BURNS CAUSED BY SPLASHING.
- 6.3. SINCE IT IS LITERALLY IMPOSSIBLE TO WASH ALL HERBICIDAL MATERIALS OUT OF SPRAY EQUIPMENT, THIS EQUIPMENT SHALL NOT BE USED FOR ANY OTHER TYPE OF SPRAY APPLICATION SUCH AS INSECTICIDES.
- 6.4. IN KEEPING WITH APPLICABLE ORDINANCES, NO HERBICIDAL MATERIALS SHALL BE USED ON TRANSMISSION RIGHTS - OF - WAY WITHOUT PERMISSION OF THE PROPERTY OWNER. MANUFACTURERS RECOMMENDATIONS FOR SKIN CONTACT AND CLEANUP SHALL BE FOLLOWED.

Transmission Rights-of-Way Vegetation Management



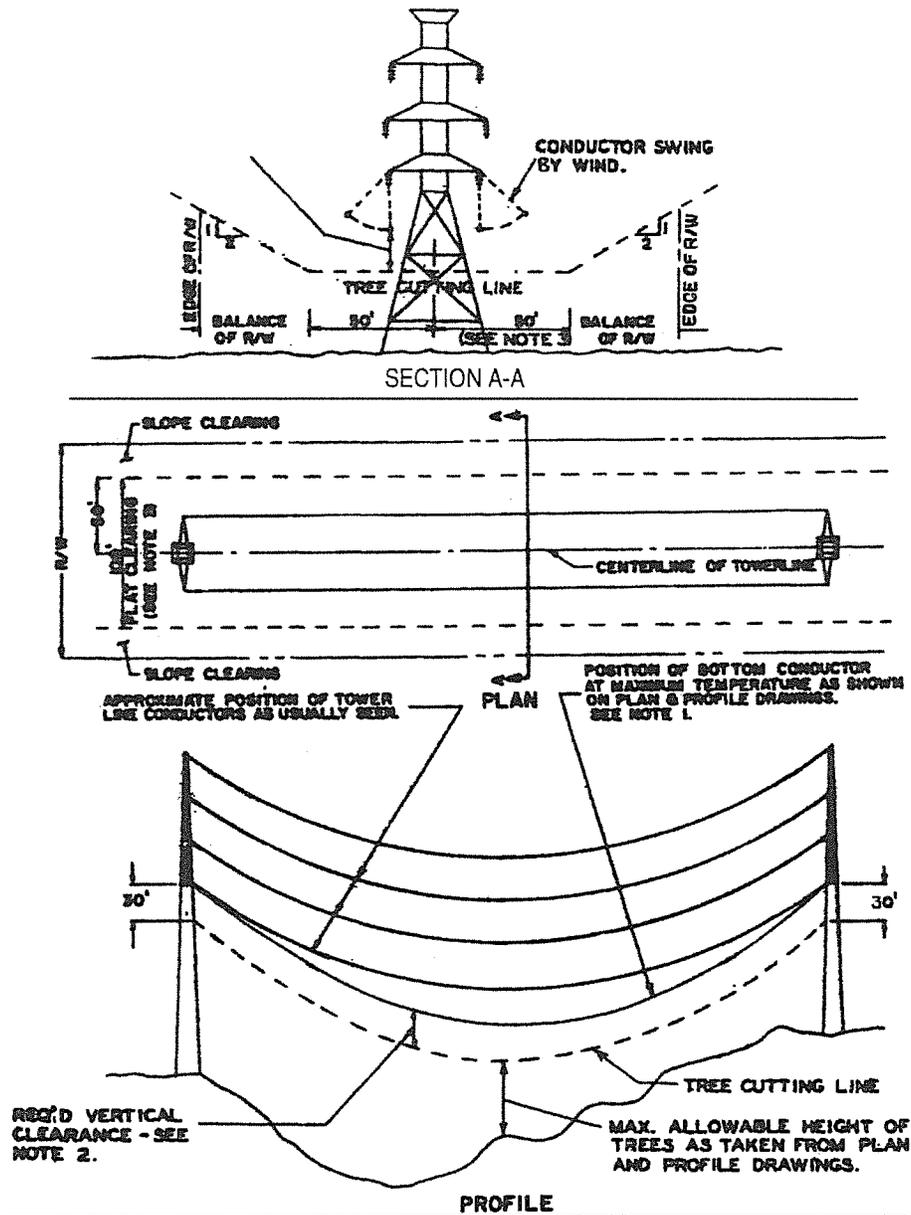
Right-of-way maintenance for proper electrical clearance (500 kV)

Figure 1

NOTES:

1. Position of conductors of maximum temperature taken at 212°F.
2. Required vertical clearance from conductor at maximum temperature (212°F.) to tree cutting line - 30 feet
3. This information taken from DWG. DO-12808-J.

Transmission Rights-of-Way Vegetation Management



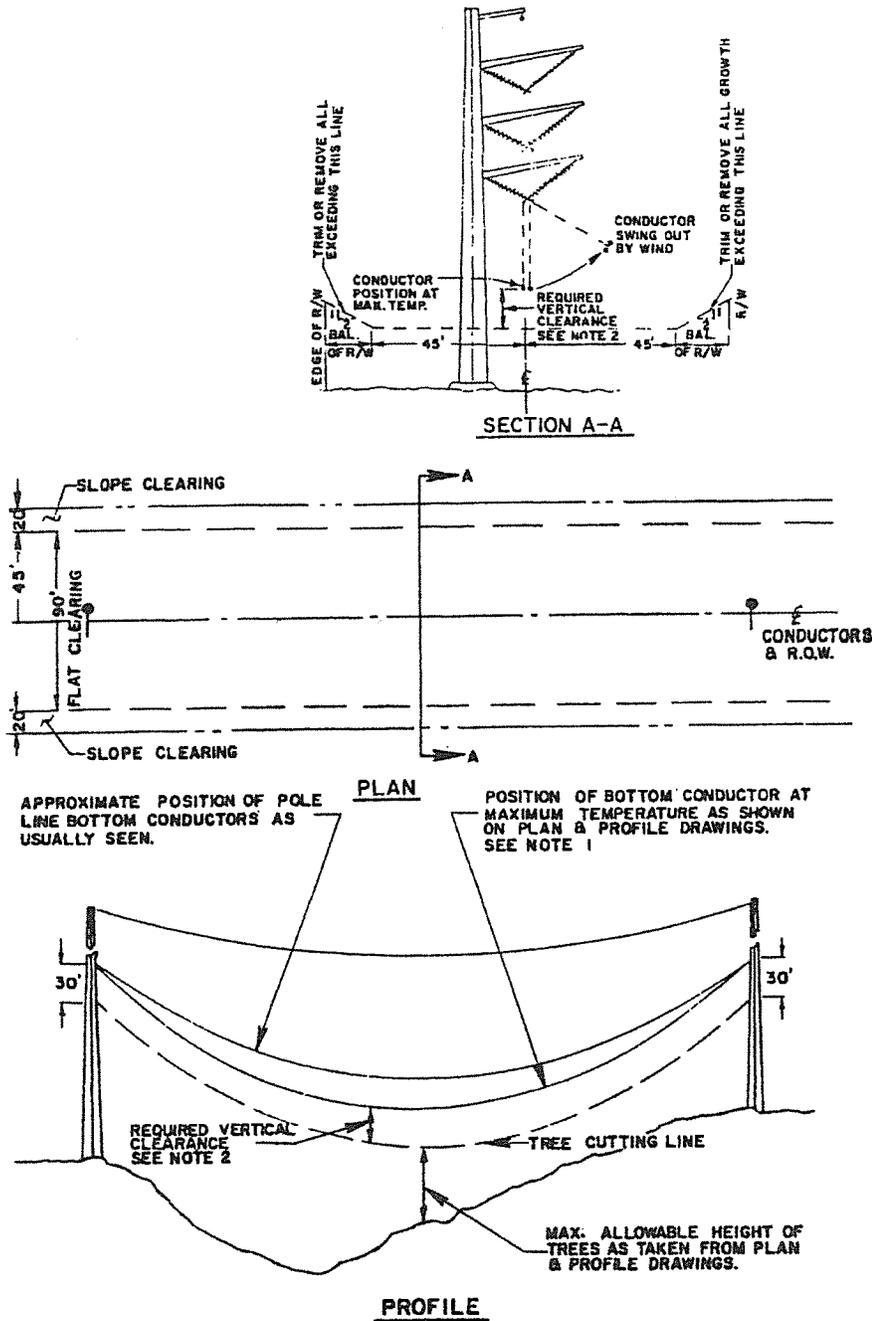
Right-of-way maintenance for proper electrical clearance for
138 kV or 230 kV Double circuit-lattice structures and steel poles

Figure 2

NOTES:

1. Position of conductors at maximum temperature taken at 257°F.
2. Required vertical clearance from conductor at maximum temperature (257°F.) to tree cutting line 30 feet.
3. Width of tree clearing is to be normally limited to the edge of the right of way, which may be less than 50 feet from the center line of towers.
4. This information taken from DWG. DO-12807-J.

Transmission Rights-of-Way Vegetation Management



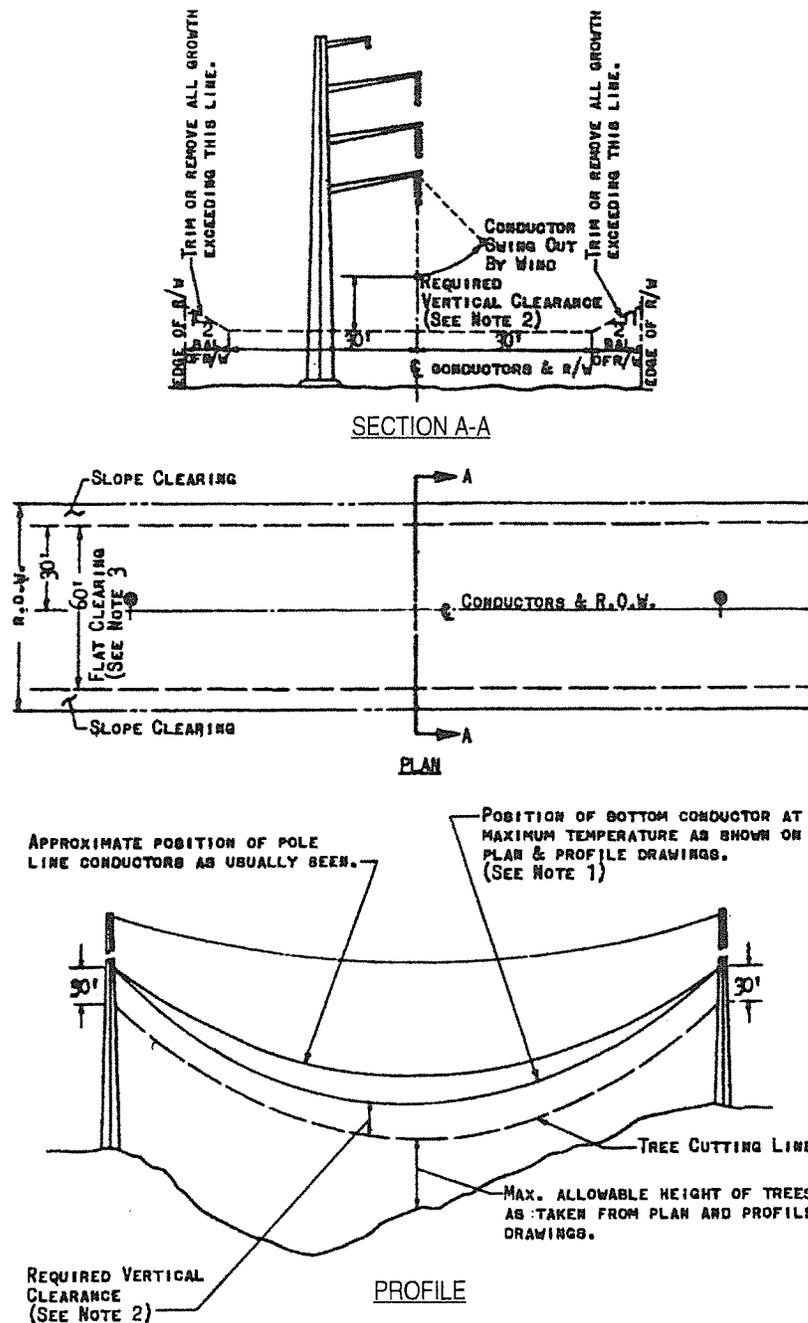
Right-of-way maintenance for proper electrical clearance of 500 kV single circuit poles

Figure 3

NOTES:

1. Position of conductors at maximum temperature taken at 212°F.
2. Required vertical clearance from conductor at maximum temperature (212°F.) To tree cutting line - 30 feet.
3. This information taken from DWG, DO-13214-J.

Transmission Rights-of-Way Vegetation Management



Right-of way maintenance for proper electrical clearance
(138 kV or 230 kV) single circuit steel poles

Figure 4

NOTES:

1. Position of conductors at maximum temperature taken at 257°F.
2. Required vertical from conductor at maximum temperature (257°F) to tree cutting line - 30 feet.
3. Width of tree clearing to be normally limited to the edge of the right-of way.
4. This information taken from DWG. DO-13229-J.

Transmission Rights-of-Way Vegetation Management

Division of Land Use Regulation Response to "Examples of Desirable shrubs species for Transmission ROWs"

Common name	Scientific name	Origin
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Non-native potentially invasive "undesirable" plants specified on original list:

Forsythia	Forsythia spp.	Asia
Common privet	<i>Ligustrum vulgare</i> L.	Europe
Burnish (Burning?) bush	<i>Euonymus alatus</i> (Thunb.) Siebold	Asia

Desirable vegetation specified on original list:

Low brush blueberry	<i>Vaccinium angustifolium</i> Aiton
Mountain Laurel	<i>Kalmia latifolia</i> L.
Rhododendron	<i>Rhododendron</i> spp.
Blueberry	<i>Vaccinium</i> spp.
Spicebush	<i>Lindera benzoin</i> (L.) Blume
Red buckeye	<i>Aesculus pavia</i> L.
Fringe tree	<i>Chionanthus virginicus</i> L.
Winterberry	<i>Ilex verticillata</i> (L.) A. Gray
Crabapple	<i>Malus</i> spp. Mill
Staghorn (Shaghorn) sumac	<i>Rhus typhina</i> L.
Smooth sumac	<i>Rhus glabra</i> L.
Viburnums	<i>Viburnum</i> L.
Buttonbush	<i>Cephalanthus occidentalis</i> L.
Silky Dogwood	<i>Cornus amomum</i> Mill.

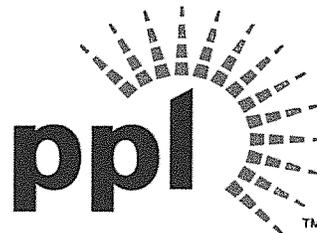
Taxonomy referenced from: USDA Plants Database Website (<http://plants.usda.gov/>)

| | | | | | | |

PPL Electric Utilities Corporation

Transmission Vegetation Management Program

EU-200-NERC-FAC-003-001
Effective Date July 31, 2011



Prepared:	_____	_____
	Tom Goldschmidt Senior Analyst	Date
Prepared:	_____	_____
	Earl Burnside Forester	Date
Reviewed:	_____	_____
	Philip J. Walnock Manager- Vegetation Management	Date
Approved:	_____	_____
	Stephanie Raymond Director EU Project & Contract Management	Date

Revision History

Revision 0	Date: 05/08/2007
Writer	Bill Taylor
Approver	Dave Schleicher
Reason Written	Documentation of PPL EU program

Revision 1	Date: 12/31/2007 – 2-25-08
Writer	Gerald Diehl, Jim Robinson, Earl Burnside
Approver	Martha Dodge
Reason Written	<p>Updated PPL Electric Utilities transmission Line Miles (200 kV and above). Section I item A, increased Lancaster total mileage from 170 to 181 with 11 miles of OTCR-YORK 230 kV.</p> <p>Added a Compliance Criteria section (Section IV) that clarifies Clearance 2 – item A, WSZ distances - item B, Clearance 1 – item C and Optimal Vegetation Management Cycles – item D.</p> <p>Added procedures for audits of Planned and Unplanned work – Section V item D.</p> <p>Added procedure to determine Bulk Power Outage category for reporting – Section V item E.</p> <p>Added Section VI – Training/Communications</p> <p>Added Appendix D with references which define evaluation and remediation periods for various emergent vegetation encroachment conditions.</p> <p>Amended Appendix G -Audit forms for work performed.</p> <p>Added Appendix H - Work sheets for transmission outage determination.</p> <p>Amended PPL Spec LA-79827-5 to reflect</p>

	WSZ differences for apical and lateral growth rates. Also, added section to Contractor Responsibilities to Outline procedure to follow in the event of work related interruption.
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Revision 2	Date: 03/2009
Writer	Earl Burnside
Approver	Kenneth L. Armstrong
Reason Written	<p>Amended Section I, part C, section 2 Organizational Structure. Reduced number of System Forester positions from two (2) to one (1).</p> <p>Clarification footnotes added to TVMP Section IV and Appendix D to note: "No corrective remediation pruning actions required for encroachments of Wire Security Zone- WSZ (only) where maximum-sag conductor conditions have been identified, species acceptability –per PPL EU Specification LA-79827-6 confirmed, and vegetation growth has been determined to be maximized or vegetation is dead".</p> <p>Appendix A replaced with revised PPL Electric Utilities Specification LA-79827-6; previously Appendix A was PPL Electric Utilities Specification LA-79827-5.</p> <p>All references in TVMP body to PPL Electric Utilities Specification LA-79827-5 replaced with LA-79827-6.</p>

Revision 3	Date: 12/2009
Writer	Earl Burnside
Approver	David A. Rodak
Reason Written	<p>Amend Section I Introduction to reflect more Accurate BES mileage and to update PPL EU Vegetation management structure Amend Section IV Compliance Criteria to clarify procedural requirements in the event of vegetation encroachment of defined compliance criteria.</p>

	<p>Amend Section IV Compliance Criteria, part A Clearance 2 defined to define maximum sag Determination.</p> <p>Amend Section IV Compliance Criteria, part C PPL's Wire Security Zone to define required remediation actions in the event of a WSZ encroachment by desirable vegetation and to clarify WSZ distance to be applied to PPL Line # 128</p> <p>Amend Section V Identification of Transmission Vegetation Clearing needs to incorporate the use of LiDAR technology and responsibilities of VM personnel in relation to reported conditions and the process for PPL EU engineering reviews of data to determine validity of reported conditions.</p> <p>Amend Section VI Transmission Vegetation Management Approved Procedures, part A to Incorporate LiDAR tool and to reflect new software data capture tools and reflect contractor invoice submission changes to one per month.</p> <p>Amend Section VI, part C to strengthen Imminent Threat Procedure for expectations and requirements of when to declare vegetation related Imminent Threats.</p> <p>Amend Section VI, part D to incorporate LiDAR and use of new software used to track work audit data.</p> <p>Amend Appendix A to reflect specification update LA-79827-7, as approved 7-09</p> <p>Amended Appendix B to reflect new contract Format.</p> <p>Amended Appendix D to reflect LiDAR data considerations and incorporate PPL EU engineering</p>
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	<p>review timelines</p> <p>Added Appendix I – PPL Electric Utilities Corporation, Transmission Vegetation Management Plan, EU-200-NERC-FAC-003-1 Supplemental Procedures Effective 9-16-09</p>
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Revision 4	Date: 07/2011
Writer	Ed Cunningham, ECI
Approver	Earl Burnside, Phil Walnock
Reason Written	<p>To update information, combine previous addendum, reorganize, modify Appendix and add additional sections to better describe PPL's transmission vegetation management program.</p> <p>The following changes effective 7/31/2011:</p> <p>Change from Roman Numeral section designation to standard numbering.</p> <p><i>ADDED</i> footnotes throughout for clarity.</p> <p><i>Old I. (A)</i> – revised to reflect change from five to six regions, revised to 2.1 PPL EU Transmission Line Miles <i>REVISED</i> in TABLE A.</p> <p><i>Old I. (B)</i> – Transmission Line Desired Clearing Width moved to 5.0 PPL EU Transmission Vegetation clearance Standards; 5.1 and to TABLE C in 6.0 PPL EU Clearance Requirements.</p> <p><i>Old I.(C)</i> - VM Employee Qualifications moved to 7.0 Transmission Vegetation Management Personnel and consolidated; <i>ADDED</i> 7.1 Qualifications, 7.2 Training and 7.3 Organization Structure.</p> <p><i>Old II.</i> Moved to 3.0 PPL Transmission Vegetation Management Goals/Objectives/Strategies</p>

	<p><i>Old III.</i> Transmission Vegetation Management Practices moved to 5.2- Transmission Vegetation Maintenance Methods.</p> <p><i>Old IV.</i> Compliance Criteria moved to 9.0 PPL EU Reporting Requirements.</p> <p><i>Old TABLE A</i> now TABLE C in 6.0 PPLEU Clearance Requirements.</p> <p><i>Old V.</i> Moved to 8.0 and updated to include LiDAR Supplemental Procedures EU-200-NERC-FAC-003-001 Effective September 16, 2009.</p> <p><i>Old VI.</i> Transmission Vegetation Management Approved Procedures – <i>CHANGED</i> to 4.0 PPL EU Transmission Vegetation Management Annual Work Determination.</p> <p><i>Old VI. (A)</i> Changed to 4.1 Annual Scope of Work.</p> <p><i>Old VI (B).</i> Vegetation to Conductor Clearance Mitigation Procedure: <i>CHANGED</i> to 12.0 Customer Inquiry and Complaint Resolution; 12.2 Property Owner Refusal Process.</p> <p><i>Old VI. (C)</i> Process for Identifying and Communicating and "Imminent Threat" Vegetation Concern: <i>MOVED</i> to 8.4.3 and updated.</p> <p><i>Old VI. (D)</i> Vegetation Management Auditing Procedure <i>AMENDED AND CHANGED</i> to 4.2 Work Completion and Data Collection.</p> <p><i>Old VI. (E)</i> Amended and <i>MOVED</i> Procedure for Bulk Power Outage Category Verification to 9.0 Compliance Reporting Requirements: 9.1 Procedure for Bulk Power Outage Category Verification; 9.2 Post Outage Investigation Procedures and Documentation.</p>
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	<p><i>ADDED</i> 4.3 Danger Tree Identification Process.</p> <p><i>ADDED</i> 5.2 Transmission Vegetation Management Methods.</p> <p><i>Old</i> VII. Training and Communications <i>CHANGED</i> to: 7.2 Training; 10.0 Property Owner Communication; and 12.0 Customer Inquiry and Complaint Resolution.</p> <p><i>ADDED</i> 10.0 Property Owner Communication.</p> <p><i>ADDED</i> 11.0 Implementing Integrated Vegetation Management (IVM).</p> <p><i>ADDED</i> 12.0 Customer Inquiry and Complaint Resolution</p> <p><i>ADDED</i> 13.0 Additional Information 13.1 List of Acronyms and Abbreviations 13.2 References</p> <p>Appendix Revisions: <i>Old</i> Appendix A.: LA-79827-7 <i>DELETED</i> from Appendix: <i>ADDED</i> 5.1 Transmission Vegetation Maintenance Methods</p> <p><i>Old</i> Appendix B. Contract for Vegetation Management - <i>DELETED</i></p> <p><i>Old</i> Appendix C. ANSI A300 - <i>DELETED</i>; see <u>13.2 References</u></p> <p><i>Old</i> Appendix D – Emergent Work Remediation Schedule, now Appendix A.</p> <p><i>Old</i> Appendix E now Appendix B-1 Sample 500kV Transmission Survey; and Appendix B-2 Sample 230kV Transmission Survey.</p>
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	<p><i>ADDED</i> Appendix C-1 PPL EU Sample Transmission Vegetation Maintenance Plan</p> <p><i>ADDED</i> Appendix C-2 PPL EU Sample Transmission Vegetation Maintenance Plan Status Report</p> <p><i>Old</i> Appendix F - Audit Report Sheets <i>CHANGED</i> to Appendix D – Completion Acceptance Report by Circuit</p> <p><i>Old</i> Appendix G – Bulk Power Outage Category Verification Worksheet- <i>DELETED</i></p> <p><i>Old</i> Appendix H – Work Action Flow Charts – NOW Appendix E: Process Flow Charts E-1 LiDAR C2 as Observed E-2 LiDAR C2 Max Sag E-3 Foot/Helicopter Patrol C2 as Observed E-4 Foot/Helicopter Patrol C Max Sag</p>
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PPL EU Transmission Vegetation Management Program ("TVMP")

1.0 Introduction

The Federal Energy Regulatory Commission ("Commission") has approved and made mandatory and enforceable various Reliability Standards proposed by the North American Electric Reliability Corporation ("NERC") in order to ensure the reliability of the bulk electric system ("BES"). One such Reliability Standard relates to Transmission Vegetation and is known as NERC Reliability Standard FAC-003-1. FAC-003-1 requires Transmission Owners ("TO") such as PPL Electric Utilities Corporation ("PPL EU" or the "Company") to, among other things, prepare and keep current a Transmission Vegetation Management Program ("TVMP"). The purpose of the TVMP is to memorialize PPL EUs' required practices intended to prevent vegetation-related transmission outages from occurring within the ROW and to minimize vegetation outages from occurring outside the ROW on all 200 kV and above transmission lines, as well as any other lower voltage transmission lines that are designated as critical to reliability.

PPL EUs' TVMP includes requirements and procedures intended to comply with FAC-003-1. Personnel involved in PPL EUs' transmission vegetation management compliance functions must be familiar with the contents of the TVMP and certify that they have read and understood the latest version of its contents.

Among other things, the TVMP:

- Defines a schedule for ROW vegetation inspections based upon the type of inspection to be conducted, such as aerial inspection or ground inspection and requires documentation to be maintained confirming that the scheduled inspections were conducted; [R1.1, M1.1]¹
- Sets forth the clearance distances, known as Clearance 1 ("C1"), that must be achieved between transmission lines and vegetation at the time regularly scheduled vegetation management work is conducted; [R1.2, R1.2.1, M1.2]²

¹ R1.1 and M1.1 – NERC FAC-003-1 Requirements and Measures

² R1.2, R1.2.1, M1.2– NERC FAC-003-1 Requirements and Measures

- Sets forth the clearance distances, known as Clearance 2 ("C2"), that must be maintained to prevent flashover between vegetation and overhead ungrounded supply conductors; [R1.2, R1.2.2, M1.2]³
- Contains measures that must be followed when restrictions exist that interfere with PPL Electric Utilities' ability to achieve the Clearance 1 distances; [R1.4, M1.4]
- Establishes a process that requires personnel who identify an imminent threat of a transmission line outage based upon vegetation conditions to communicate such information as soon as possible on the day such condition is identified to the PPL Electric Utilities Power Dispatcher; [R1.5, M1.5]
- Requires that a plan relating to vegetation work that will be conducted to ensure the reliability of the system is created and conducted on an annual basis. The plan is a living document that will be updated as changing conditions require alterations to the timing or type of work to be completed; [R2]⁴
- Requires documentation of all changes to the annual vegetation work plan; [R2]
- Sets forth the systems and procedures governing the documentation and tracking of the planned vegetation management work and ensuring that the work is completed according to adopted work specifications; [R2, M2]⁵
- Requires reporting and documentation of sustained transmission outages, determined by PPL EU to have been caused by vegetation, to be made as soon as possible after they occur; [R3, R4, M3, M4]⁶
- Discusses the appropriate qualifications and training of all personnel directly involved in the design and implementation of the TVMP [R1.3, M1.3]⁷.

³ R1.2, R1.2.2, M1.2- NERC FAC-003-1 Requirements and Measures

⁴ R2- NERC FAC-003-1 Requirements and Measures

⁵ M2- NERC FAC-003-1 Requirements and Measures

⁶ R3, R4, M3, M4- NERC FAC-003-1 Requirements and Measures

⁷ R1.3, M1.3- NERC FAC-003-1 Requirements and Measures

PPL EU is a subsidiary of PPL Corporation of Allentown, PA. PPL EU provides electric delivery service to approximately 1.35 million homes and businesses in twenty-nine counties of eastern and central Pennsylvania. The Company is a recipient of the Tree Line USA award, along with numerous J.D. Power awards for customer satisfaction. For vegetation management ("VM") purposes, the PPL EU service territory is divided into six operating regions: Lehigh, Northeast, Central, Susquehanna, Harrisburg, and Lancaster. This entire service territory is shown on the map in section 2.2.

2.0 PPL EU Transmission System Overview/Description

2.1 PPL EU Transmission Line Miles (200 kV and above)

PPL EU manages vegetation in or adjacent to its rights of way ("ROWS") for approximately 1,351 miles of transmission line (200 kV and above). The approximate breakdown, by region, is listed in Table A.

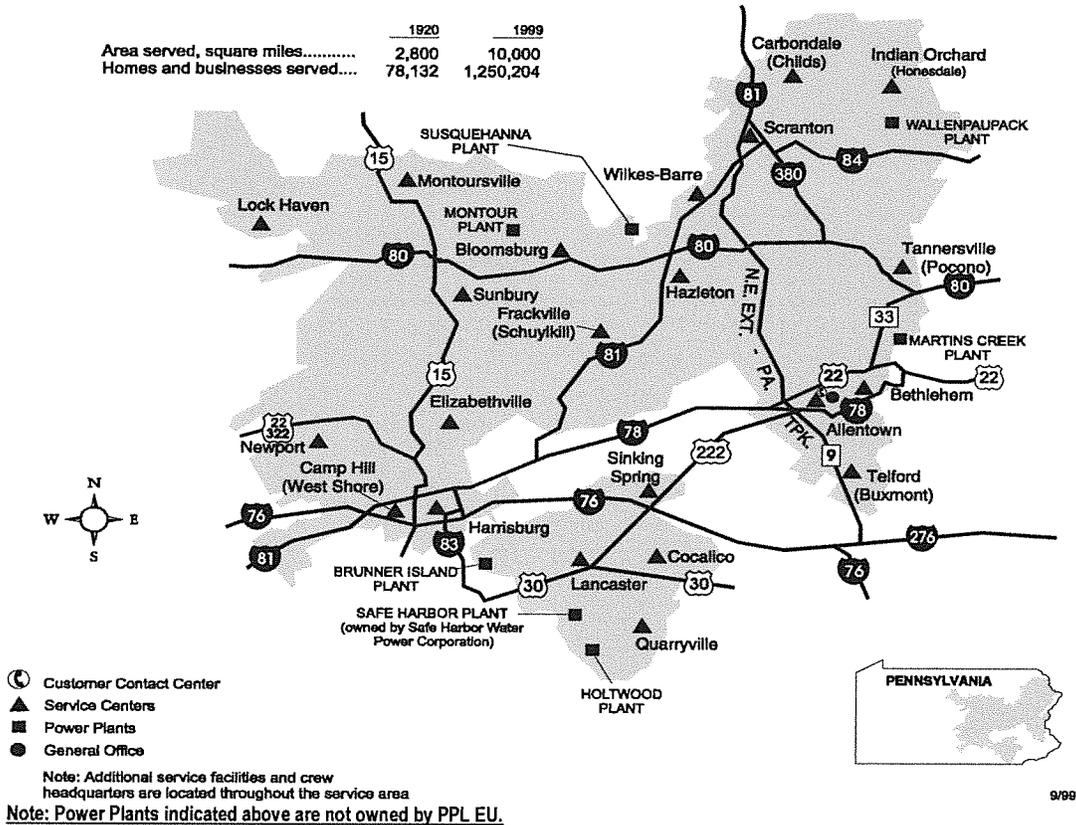
Table A

REGION	Miles (200 kV & Above)
Lehigh	262
Northeast	151
Central	216
Susquehanna	332
Harrisburg	178
Lancaster	212
System	1,351

Currently, no PPL EU lower voltage transmission lines have been designated as critical to the reliability of the electric system by ReliabilityFirst Corporation, the NERC-designated Regional Entity ("RE") for PPL EU's service territory.

2.2 PPL EU Service Area

PPL Electric Utilities Service Area



3.0 PPL EU Transmission Vegetation Management Goals/Objectives/Strategies (R1)

The primary objectives of the vegetation management program are as follows:

- Compliance with applicable laws and regulations, including compliance with all aspects of FAC-003-1
- Avoid C2 conditions from vegetation located within PPL EU ROW
- Minimize outages from vegetation located adjacent to PPL EU ROW
- Provide for the safety of the public, employees and contractors
- Establish and maintain stable, low-growing plant communities on PPL EU ROW by employing components of Integrated Vegetation Management ("IVM")

- Respect the environment by minimizing adverse environmental impacts
- Maintain a positive Company image

4.0 PPL EU Transmission Vegetation Management Annual Work Determination (R1.1; R2)

4.1 Annual Scope of Work

The primary means of determining the annual transmission VM work scope is via the use of LiDAR. An aerial LiDAR survey of all transmission lines >200kV is conducted annually to inspect for Wire Security Zone ("WSZ") / C2 encroachments and to determine VM work scope for the next calendar year. An annual schedule is developed for this survey for the 230kV and 500 kV circuits. Other means used to supplement information regarding annual VM work scope include ground patrols and emergency patrols.

After the LiDAR survey is completed, the annual work planning process proceeds as follows: PPL EU VM personnel review all information relative to ROW vegetation conditions from various sources to make a determination of the appropriate VM practices to be applied.

Typically work planning occurs during the third and fourth quarter of the year prior to when the work will be performed. Annual work planning after the completion of the LiDAR patrols and/or consideration of information from other sources proceeds as follows:

4.1.1 PPL EU provides Tree Contractor a database template for all lines (projects) that are to be worked on in the up-coming year.

4.1.2 Tree Contractor returns preplan template details with cost estimates to PPL EU.

4.1.3 PPL EU reviews returned Tree Contractor preplan template details for acceptance.

4.1.4 Following the annual budgeting process, the work is scheduled in the 3rd quarter or 4th quarter of the preceding year. PPL EU VM reserves the right to amend pre-planned estimates as changing vegetation conditions warrant. PPL EU will document adjustments to the annual work plan as they occur.

Samples of the PPL EU VM annual inspection schedule and annual work plan are found in Appendices B-1, B-2 and C-1.

4.1.5 Unplanned/Emergent Work

Work identified through LiDAR, aerial patrols, ground patrols, or other means is interpreted, identified and completed in accordance with PPL EU Specification LA-79827 and as outlined in this TVMP, including Appendix A.

4.1.6 PPL EU Forestry Audit of Unplanned Emergent Work

For unplanned emergent work identified by routine and comprehensive aerial and ground patrols, LiDAR or other means, regional forestry personnel will audit 100% of the remediation work completed by the contractors. All such clearing work done by a PPL EU employee will be audited at 100% by a different PPL EU forester or his/her designee.

4.2 Work Completion and Data Collection (M1.1)

Steps to be taken to ensure proper documentation of completed transmission circuit work, prior to invoicing approvals, as noted below:

4.2.1 Upon completion of physical VM work on a circuit, the contractor completes the PPL EU Line Clearance Maintenance Program: Completion Acceptance Report by Circuit ("CARC") and submits to PPL EU VM Forester (Appendix D).

4.2.2 The PPL EU VM Forester (or his/her designee) is responsible for a 100% field review of the work completed by the contractor as reported on the CARC form.

4.2.3 Contractor should not invoice for completed work submitted until a 100% field review has been completed and all work accepted by PPL EU Forester.

4.2.4 The PPL EU VM Forester (or his/her designee), upon 100% field inspection of completed work, completes the CARC form, signs and returns to PPL EU VM Senior Analyst for data entry and forwards approved invoice for payment.

The status of line completion, inspection and acceptance is captured utilizing the PPL EU Annual Transmission Vegetation Plan Acceptance Report (Appendix C-2).

4.3 Danger Tree Identification Process

A danger tree is generally defined as a tree exhibiting a combination of the following characteristics:

- Tall enough to pass within 6' of 230 kV and 10' of 500kV facilities if they fell and including:
 - Excessive lean (toward the PPL EU facilities),
 - Diseased, decayed, weak or otherwise structurally damaged,
 - Shallow or eroded roots, and/or
 - Subject to excessive wind throw.

Once identified, danger tree removal becomes a part of the annual work plan.

5.0 PPL EU Transmission Vegetation Clearance Standards (R1.2)

5.1 Transmission Line Desired Clearing Widths

PPL EU's BES transmission lines are located, for the most part, on prescriptive ROW easements as opposed to lands owned in fee-simple by PPL EU. The widths and VM rights on these easements vary with the applicable legal ROW agreements. The desired ROW widths, by voltage, are found in Table C.

5.2 Transmission Vegetation Maintenance Methods (R2)

The vegetation on PPL EU ROW is maintained utilizing a combination of VM techniques as described in:

- The PPL Electric Utilities Specification LA-79827.
- The American National Standard for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance – Standard Practices ANSI A 300 (Part 1).
- The American National Standard for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management, a. Electric Utility Rights-of-way), ANSI A 300 (Part 7).

Trees will generally be pruned by guidelines detailed in the most current revision of the American National Standards Institute (ANSI) - Standard Practices A300. Transmission vegetation maintenance activities, as further

described in PPL EU Specification LA-79827, are done by qualified line clearance contractors. As per (ANSI) Z133.1, a qualified line clearance tree trimmer is defined as: "A tree worker who, through related training and on-the-job experience, is familiar with the hazards in line clearance and has demonstrated his/her ability in the performance of the special techniques involved". Contractors involved in herbicide application activities are licensed as Commercial Pesticide Applicators, as required by the Pennsylvania Department of Agriculture.

Vegetation Maintenance Methods:

5.2.1 Pruning

Tree pruning is not considered the preferred management technique to provide clearances for vegetation located within an active ROW. Removal of vegetation that poses a clearance concern is the preferred method of management. Directional and crown reduction pruning will generally be completed only with PPL EU VM authorization. Side pruning is utilized when a tree grows adjacent to the conductor.

5.2.2 Danger Trees

"Danger Trees" are those off-ROW trees located adjacent to the ROW, which, in falling, would either strike the conductor or pass within PPL EU minimum clearances stated in Table B. Danger trees should be removed as specified at the time of treatment as determined by PPL EU VM personnel. Section 4.3 provides a definition/description of danger tree characteristics for removal consideration.

TABLE B

Clearance for Danger Trees

Line Voltage	Minimum Conductor Clearance Width from Falling Vegetation in Feet
230 kV	6 feet
500 kV	10 feet

5.2.3 Tree Removal

All non-compatible species, as defined in PPL EU Specification LA-79827, should be removed from the ROW corridor (Wire Zone and Border Zone areas) in accordance with said specification.

5.2.4 Disposal of Cleared Vegetation

Debris disposal shall be performed in accordance with Specification LA-79827 and the legal requirements as stated in the designated easement for the specific ROW location. Disposal methods include: piling, slashing, drop and lop, and chipping.

5.2.5 Herbicide Application

Four methods (listed in preferred priority of usage) are currently accepted by PPL EU as tools in its VM program: Cut-stubble, foliar, stump treatment and basal application. All applications, regardless of method employed, must be made in accordance to label instructions and in accordance with Pennsylvania Department of Agriculture regulations. Application methods utilized include:

- Cut-Stubble
- Foliar Application
- Stump Treatment
- Basal Application

6.0 PPL EU Clearance Requirements (R1.2)

PPL EU Clearance 1 (C1) and Clearance 2 (C2) distances for NERC FAC-003-1 compliance at rated conductor temperature and associated sag are defined in Table C. In addition, Table C also defines Wire Security Zone⁸ (WSZ) distances that are provided to vegetation management contractors through PPL EU Specification LA-79827. The WSZ distances are greater than the FAC-003-1 C2 distances and are used by PPL EU to identify vegetation concerns that should be remediated before they encroach on C2 distances. This is further explained later in this TVMP.

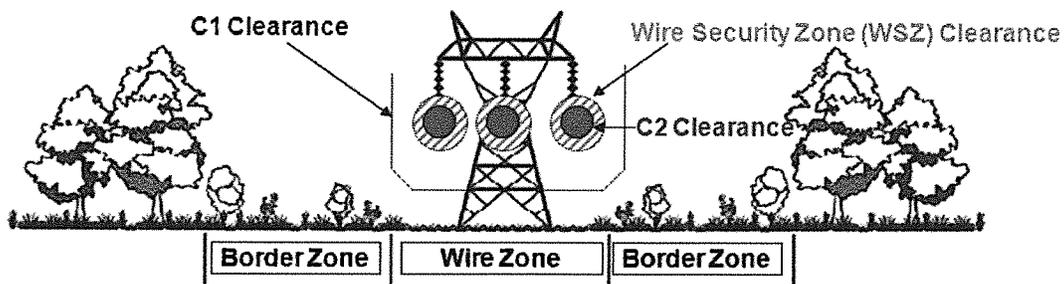


Figure 1. Wire Security Zone (WSZ) and Wire Zone / Border Zone (WZ/BZ)⁹

⁸ Wire Security Zone (WSZ) - For the purposes of safety and reliability, PPL Electric Utilities maintains a third clearance distance called the Wire Security Zone.

⁹ Drawing not to scale

TABLE C
ROW Clearing Widths and Conductor to Vegetation Clearances
(R1.2.2, M1.2)

Line Voltage	Clearing Width ¹⁰	Clearance 2 ¹¹ (C2)	Wire Security Zone ¹² (WSZ)	Clearance 1 ^{13 / 14} (C1) Under/Around
230 kV	150 feet	5.2-feet	10 feet	25 feet/ 16 feet
500 kV	200 feet	8.9 feet	17 feet	32 feet/ 23 feet

6.1 Clearance 1 (C1) Defined (R1.2.1)

FAC-003-1 defines C1 appropriate clearance distances to be achieved at the time of transmission vegetation work as determined and documented by the TO.

PPL EU defines C1 as the applicable voltage WSZ + the 3 year anticipated apical / lateral growth.

The justification for C1 defined distances in Table C is as follows:

PPL EU bases its C1 distances on a worst case three-year growth cycle. Evaluation of vegetation species in the PPL EU territory led to the selection of an average five (5) feet per year worst case expected apical vegetation growth and average two (2) feet per year lateral growth on or around the ROW, respectively. This translates to the 15-foot differential between the WSZ and the C1 "Under distance" when conductor is operating at rated temperature and with associated sag and the 6-foot differential between the WSZ and the C1 "Around distance" displayed in Table C.

6.2 Clearance 2 (C2) Defined (R1.2.2)

FAC-003-1 defines C2 as the specific radial clearance to be maintained between vegetation and conductors under all rated electrical operation conditions, as established by the TO.

¹⁰ The above are desired clearing widths. Some lines may have agreements specifying different widths.

¹¹ Distance when conductor is operating at rated temperature and associated sag at the maximum transient over-voltage factors.

¹² Distance when conductor is operating at rated temperature and associated sag at the maximum transient over-voltage factors. PPL EU has calculated the transient overvoltage for 500kV lines on its system (as defined in Section 6.1.1 and 6.1.2).

¹³ Apical (Under) distance provides 5 feet per year growth / 3 year cycle.

¹⁴ Lateral (Around) distance provides 2 feet per year growth / 3 year cycle.

The justification for C2 defined distances in Table C is as follows:

The 500 kV and 230 kV C2 requirements are 8.9 feet and 5.2 feet, respectively. This PPL EU C2 requirement definition is based on IEEE Standard 516-2003.

For the 500 kV system, PPL EU's design basis for switching surge control is 2.2 pu. This is the switching surge over voltage factor for an IEEE/ANSI Standard C37.04 550 kV circuit breaker with closing resistors. Based on 2.2 pu. switching surge and 550 kV maximum sustained over voltage, PPL EU's calculation using IEEE 516-2003 Table 7 or 5 produces a calculated value of 2.69 meters (8.826 feet). By rounding up, the 500 kV C2 distance should be 8.9 feet as noted above.

For the 230 kV system, PPL EU has no line switching surge control and therefore the IEEE Table 5 should be used. For 230 kV systems Table 5 is based on a 242 kV maximum sustained voltage and 3.5 pu. switching surge. Table 5 lists the clearance requirement to be 1.57 meters (5.15 feet) for 230 kV. By rounding up, the PPL EU 230 kV line C2 distance should be 5.2 feet, as noted above.

Maximum sag is generally calculated based upon the rated characteristics of the line per the PPL EU plan and profile. To the extent a line is not being operated at rated levels, PPL EU may adjust the line's calculated maximum sag to reflect actual operating conditions. As such conditions change, maximum sag calculations will be adjusted as needed.

6.3 PPL's Wire Security Zone

In addition to FAC-003-1 C1 and C2, PPL EU maintains a third clearance distance called the Wire Security Zone (WSZ), Figure 1.

The WSZ warning approach is intended to permit PPL EU VM personnel to systematically and efficiently handle vegetation before it encroaches on the minimum required C2 distances. Note again that the WSZ distances in PPL EU specification (LA-79827) provided to vegetation management contractors are purposely greater than the minimum distances for C2 (per the "FAC-003-1 Standard).

500 kV Example: Nominal max-sag design ground clearance for a 500 kV span is 33 feet. The WSZ for 500 kV lines is 17 feet so non-

compatible¹⁵ vegetation over 16 feet in height in the area of maximum wire sag may be within the WSZ distance. The non-compatible vegetation must be removed or trimmed to provide a minimal apical clearance of 32 feet.

230 kV Example: Nominal max-sag design ground clearance for 230 kV lines is 26 feet. The WSZ for 230 kV is 10 feet so non-compatible vegetation over 16 feet in height in the area of maximum wire sag may be within the WSZ distance. The non-compatible vegetation must be removed or trimmed to provide a minimal apical clearance of 25 feet.

No corrective remediation actions required for encroachments of "under" WSZ when compatible¹⁶ species or annual seasonal crops are in the WSZ, species acceptability has been confirmed through on-site review, vegetation growth has been maximized or vegetation is dead, and it is determined that the vegetation presents no threat that clearance 2 could be breached.

PPL EU may increase the above WSZ clearances or adopt operating limits, from time to time, where line conditions or characteristics prevent accurate modeling of maximum sag conditions. For example, a special clearance distance is applied to Bushkill Blooming Grove Line. A 16-foot WSZ applies to that line. When clearing work is conducted on this line, vegetation shall be either cleared to a distance of 31 feet for apical growth and/or 22 feet for lateral growth from the observed conductor position or removed if such distances are not obtainable.

6.3.1 Wire Security Zone Clearance – Ravine Clearing Guidelines

In order to provide some guidance with respect to mitigation efforts in and around valley and ravine areas, the following guidelines have been developed for use:

- Except as authorized by PPL EU, tree pruning is generally not an acceptable mitigation method to provide

¹⁵ Non-compatible Vegetation – tall growing woody plant species or other species that exhibit growth characteristics that pose clearance concerns. Exceptions are Valley Crossings (6.3.1).

¹⁶ Compatible Vegetation - Wire Zone (WZ) = native grasses, ferns, herbaceous plants and other compatible species as listed in PPL EU Specification LA-79827; Border Zone (BZ) = native grasses, ferns, herbaceous plants, shrubs, low growing woody plants and other compatible species as listed in PPL EU Specification LA-79827.

adequate clearances of trees located inside the defined ROW for any line.

- Trees that do not meet WSZ clearance requirements as set forth in this document must be removed.

6.3.2 Optimal Vegetation Management Cycles

PPL EU VM generally follows a three year VM cycle. In situations where it is not possible to attain C1 distances due to ROW restrictions, such as restricted widths or limited trimming rights, the vegetation management cycle will be adjusted to maintain WSZ distances on a case-by-case basis.

7.0 PPL EU Transmission Vegetation Management Personnel (R1.3)

7.1 Qualifications

The minimum qualifications for all personnel employed in PPL EU's VM section responsible for implementing PPL EU transmission VM policies and procedures (and assisting in their development) include:

- Foresters and Line Clearance Inspectors, who are directly involved in day-to-day vegetation management field activities, possess a minimum of a two-year Associates Degree in forestry or a related field. Additional desired qualifications include:
 - 3-5 years experience in utility vegetation or ROW management.
 - Knowledge of dendrology, tree physiology, and tree growth characteristics.
 - Knowledgeable in the proper herbicide use and application techniques. It is required that individuals must also possess a Pennsylvania Department of Agriculture Commercial Pesticide Applicator License).
 - Knowledgeable in the implementation of Integrated Vegetation Management ("IVM") practices such as Wire Zone-Border Zone and its application to the BES.
 - Practical knowledge of ANSI Z-133.1, ANSI A-300 and NERC Standard FAC-003-1.
 - Understanding of the electrical transmission system.

- Individuals may also be International Society of Arboriculture ("ISA") Certified Arborists and/or Utility Specialists.

7.2 Training

New employees to the PPL EU VM section receive orientation and training on processes, procedures, TVMP and specifications as they relate to transmission vegetation maintenance. Additional PPL EU VM staff training may be periodically scheduled to update staff on changes to the TVMP and associated specifications and procedures, as well as new equipment, herbicides, application methods/techniques or other significant changes in VM trends, practices, and processes in the Utility Vegetation Management ("UVM") industry.

7.3 Organizational Structure

PPL EU's Foresters and Sr. Analyst report directly to the Manager - Vegetation Management, who reports to the PPL EU Director of Project and Contract Management. The Director of Project and Contract Management reports to the PPL EU Vice President of Operations. Additionally, PPL EU employs Line Clearance Inspectors based in each of PPL EU's six Regions. The Line Clearance Inspectors are members of the Bargaining Unit and they report to the Foresters.

8.0 PPL EU Transmission Process for Identifying and Communication of an "Imminent Threat" Vegetation Concern (R1.5)

PPL EU utilizes Light Detection and Ranging (LiDAR) technology on an annual basis to determine compliance to clearance requirements. PPL EU may also rely upon other aerial inspections conducted by helicopter as well as ground-based inspections.

The following procedures set forth the steps that will be taken by PPL EU's personnel upon receipt of LiDAR patrol results from the LiDAR vendor.

8.1 LiDAR C2 "As Observed" Vegetation Encroachment¹⁷

The procedures for any encroachments that are observed by the LiDAR patrols to be within C2 distances on an as-observed basis (not adjusted for

Source of procedure: EU-200-NERC-FAC-003-1, Supplemental Procedures, effective September 16, 2009.

maximum sag) follow the process flow chart in Appendix E-1 and as described below:

8.1.1 The LiDAR vendor will provide to PPL EU VM representatives copies of LiDAR data for various transmission line spans after the spans are surveyed. This data provides information regarding the identification of the transmission line by PPL EU name and number, distance between vegetation and conductor and type of vegetation concern, among other data points. Both VM and PPL EU Engineering Departments receive these notifications via e-mail from the LiDAR vendor.

8.1.2 For all "As Observed" C2 LiDAR reported encroachments, PPL EU personnel will, within one calendar day of receipt of the LiDAR data, conduct a field review to verify that a vegetation condition appears to exist on the transmission line span identified in the LiDAR report. Upon confirmation of a vegetation condition, VM will promptly notify the Power System Dispatcher ("PSD") by telephone (484-634-4049) of the location of the "As Observed" C2 encroachment. If no vegetation condition can be confirmed on the identified span, VM personnel will take steps seeking to identify the correct span, including making contact with the LiDAR vendor to request submission of a corrected report, as necessary.

8.1.3 VM and PSD staff will treat the field-verified "As Observed" C2 LiDAR encroachment data as an "Imminent Threat" per the TVMP and follow the procedures and schedule set forth in this TVMP to remediate the vegetation concern.

8.1.4 Information on the identified "As Observed" C2 LiDAR reported encroachments, performance of field verifications, required remediation work, and required audits of completed work must be timely recorded in the appropriate database designed to track such actions for the applicable LiDAR inspection.

8.2 LiDAR C2 "Maximum Sag" Vegetation Encroachment

The procedures for any encroachments that are within the "Maximum Sag" C2 distances only when conductors are adjusted for maximum sag follow the process flow chart in Appendix E-2 and as described below:

8.2.1 The LiDAR vendor will provide to PPL EU VM representatives copies of LiDAR data for various transmission line spans after the spans are surveyed. These reports provide information

regarding the identification of the transmission line by PPL EU name and number, distance between vegetation and conductor and type of vegetation concern, among other data points.

8.2.2 LiDAR reports relating to maximum sag adjusted conductor condition "Maximum Sag" C2 encroachments will contemporaneously be made available to relevant VM personnel and transmission engineering personnel. Upon identification of an annual agricultural crop¹⁸ as the potential "Maximum Sag" C2 encroachment, VM personnel will notify PPL EU transmission engineering to commence the engineering review described in section 8.2.5 (generally the same day as receipt of the report from the LiDAR vendor).

8.2.3 Within one calendar day of PPL EU's receipt of LiDAR data on a "Maximum Sag" C2 encroachment, VM personnel will conduct a field review to confirm the existence of vegetation at the identified location. If the vegetation concern is an annual agricultural crop, VM personnel will attempt to estimate the height of the crop and provide this information to PPL EU transmission engineering personnel. If no vegetation condition can be confirmed on the identified span, VM personnel will take steps seeking to identify the correct span, including making contact with the LiDAR vendor, as necessary.

8.2.4 If the field-verified vegetation concern at issue is vegetation other than an annual crop, VM personnel will promptly notify the PSD by telephone of the location of the identified "Maximum Sag" C2 encroachment and will proceed to clear the vegetation within two (2) calendar days of the field review, unless governed by another procedure set forth in the following sections. PPL EU easement documents should be checked to verify if special exemptions have been granted to the holder of the easement. Any/all exceptions are noted in the legal easement documents for the location/property in question.

8.2.5 Upon receipt of any LiDAR data that identifies a "Maximum Sag" adjusted C2 encroachment based on vegetation that is an annual agricultural crop, VM personnel shall contact PPL EU transmission engineering personnel to request an engineering review. Transmission engineering personnel will, to the extent feasible, conduct an engineering review to test the assumptions employed by

¹⁸ Annual (seasonal) agricultural crops are defined as crops that reach maturity in one growing season (Examples: corn, beans, hay, tobacco, various grain crops).

the LiDAR vendor by comparison to the PPL EU Plan and Profile for the transmission line in question. Transmission engineering personnel shall have up to three (3) calendar days from the date of receipt of the LiDAR report to conduct such analysis. The review may consider the accuracy of the distance from the structure, the span length, the height of the vegetation from the ground, and the thermal limitation or other operating restrictions on the line, among other factors.

8.2.5.1 The engineering review may yield a conclusion that:

- **A)** There is not a "Maximum Sag" C2 condition when appropriate maximum sag-adjusted parameters are applied:
- **B)** The LiDAR identified "Maximum Sag" adjusted C2 condition is likely accurate; or
- **C)** The review was inconclusive or could not be performed.

8.2.5.2 If the result is:

- **A** – A Supervising Engineer or Senior Engineer in the engineering department must review and sign off agreeing with the conclusion and all underlying documentation should be maintained for five (5) years. Transmission Engineering will provide this conclusion to appropriate VM personnel and to the PPL EU NERC Compliance Manager. In such cases, no remediation is required by VM for the identified annual agricultural crop that is not expected to become a C2 encroachment.
- **B** or **C**, transmission engineering personnel will advise VM personnel and the vegetation should be removed within the designated timeframe for clearing work. To the extent the three calendar day period is not needed, transmission engineering personnel will provide results more promptly to VM personnel.

8.2.5.3 In all cases (**A, B or C**), the results of the engineering review must be promptly transmitted by telephone to the requestor and by electronic mail to the appropriate VM

personnel (applicable Regional Forester or his/her designee) and to the PPL EU NERC Compliance Manager.

8.2.6 If the engineering review results in B or C, VM will promptly notify the PSD by telephone of the location of the identified C2 maximum sag encroachment and follow the procedures and schedule set forth in this TVMP. (See e.g. section 8.0 and appendices A, E-1, and E-2).

8.2.7 If the engineering review results in B or C, and VM staff determines that the work can be safely and promptly performed without a line outage, VM will notify PSD by telephone of (1) the potential Imminent Threat and (2) the time and location of the performance of such work needed to eliminate the potential imminent threat, and seek PSD concurrence. The clearing work shall be completed within two (2) days of receipt of the engineering results. VM will notify the PSD when the work is completed.

8.2.8 If, based on the field review, VM staff determines that the work cannot be safely performed without a line outage; VM will notify PSD by telephone of the potential Imminent Threat. The PSD shall make a determination of whether the encroachment is an Imminent Threat per the TVMP (section 7.3). VM will follow the procedures and schedule set forth in this TVMP to remediate the vegetation concern. (See e.g. section 8.0 and appendices A, E-1, and E-2).

8.2.9 The procedure and timetable for engineering review may be triggered for a non-annual crop upon request with the approval of the PPL EU General Manager - Transmission Operations or more senior official. If not triggered, the clearing work shall be completed within two (2) calendar days from the day of the field review and any engineering review shall be performed thereafter.

8.2.10 The notes set forth in Appendix A may be applied to C2 encroachments when the circumstances dictate. In addition, if additional time is needed to conduct the engineering review, a General Manager or more senior official of PPL EU may extend the three (3) calendar day period set forth in this TVMP by executing an extension approval upon request.

8.2.11 Information on the identified encroachments and performance of field verifications, required remediation work, and required audits of completed remediation work, must be timely recorded on the

appropriate database designed to track such actions for the applicable aerial inspection.

8.3 Compliance Review

All C2 encroachments identified by LiDAR ("As Observed and at "Maximum sag") are to be reported to PPL EU Compliance Manager on a Compliance Condition Report ("CCR") upon completion of the field verification.

8.4 Other Transmission Vegetation Inspections

(Refer to process flow chart in Appendix E-1 and E-2)

8.4.1 Emergency Aerial Patrols

- Emergency patrols are performed at the request of the Transmission System Operator ("TSO") or the appointed Senior Engineer; Transmission/Substations ("SETS"), following any unexplained transmission circuit interruption.
- These patrols are flown as soon as possible and may encompass the entire circuit or selected portions as dictated by the event.
- Critical findings are reported by the AIC to the appointed SETS following the patrol. Vegetation conditions of concern are reported, disseminated, reviewed and remediated if necessary in the same manner as outlined above for the Routine patrols.
- For any potential encroachments observed by emergency helicopter patrols to be within the C2 distance on an as-observed basis or on a Maximum Sag basis, the procedures set forth in section 8.4.3 should be followed.

8.4.2 Ground Surveys

- Span by span ground surveys are conducted on regularly scheduled cycles by PPL EU VM personnel and as a part of auditing contractor work performed.
- All >200 kV lines are generally surveyed once every three years.
- For any encroachments that are observed via ground survey to be within C2 distances on an as-observed basis (not adjusted for maximum sag), or on a Maximum sag basis, follow the same procedures set forth in section 8.4.3.

8.4.3 Process for Identifying and Communicating an 'Imminent Threat' Vegetation Concern for Other Vegetation Inspections

VM personnel shall report C2 encroachments identified under all operating conditions to the PSD as an actual or potential imminent threat. All as-observed C2 conditions shall be treated as imminent threats. Any maximum sag-adjusted C2 condition that is reported to the PSD shall be assessed to determine if it constitutes an imminent threat or shall be treated as an imminent threat. Other conditions may be deemed imminent threats depending on the circumstances. Any condition that is likely to cause an outage at any moment should be identified as an imminent threat. Examples of such conditions include vegetation that is near to encroaching upon the C2 distance on an as-observed basis or that presents a near-term danger of falling into the transmission conductor. Upon identification and evaluation of a VM concern as an "imminent threat" to the transmission system (e.g., a transmission line outage), the PPL EU employee (e.g., VM or Distribution Operations personnel) is required to notify the PSD of the concern; providing the PSD with all pertinent details regarding line designation, location and extent of the concern.

Communicating and responding to a potential "Imminent Threat" must occur within the timeframes specified for each action as specified in this section and in Appendices E-1, E-2, E-3, and E-4, as applicable. A designated Senior Manager of PPL EU (an Officer or a Vice President or senior representative of PPL EU) may authorize a different timeframe based on professional judgment or an unexpected condition.

The responsibilities and steps in this process are as follows:

- The PPL EU employee identifying the concern alerts the PSD to the imminent threat as soon as possible on the same day the concern was identified.
- PSD analyzes the system and reviews the outage requirements. The PSD will also interface with PJM, as required.
- The PSD will alert the VM personnel as to the earliest time that an outage can be granted to safely remove the VM concern, (when an outage is deemed required).
- The VM personnel in the region make arrangements for tree trimming crew(s), as required.

- The PSD makes arrangements for a T&D crew to provide grounding for removal of the VM concern, as required, and identifies all switching required to create a safe work environment.
- Upon removal of the VM concern, the on-site PPL EU employee directing the work will notify the PSD that the work is complete.
- The PSD directs the facility return-to-service, if an outage was deemed required.

Additionally, for vegetation imminent threats, a daytime emergency callout must be initiated (even on weekends) for any clearing work required to remediate C2 encroachments.

9.0 PPL EU Reporting Requirements

9.1 Procedure for Bulk Power Outage Category Verification (R3.4)

PPL EU's NERC Compliance personnel shall report within 24 hours to the Regional Entity (RE) or RE designee, sustained transmission line outages determined by the TO to have been caused by vegetation to the extent such sustained transmission line outages are required to be reported. An internal PPL EU CCR is to be initiated for any sustained outage.

The following outline shall be used to determine the appropriate outage category to report, in the event of a vegetation related bulk power sustained outage. NERC has defined three (3) separate bulk power outage categories as:

- Category 1 – Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside the right of way.
- Category 2 – Fall-ins: Outages caused by vegetation falling into lines from inside the right of way.
- Category 3 – Fall-ins: Outages caused by vegetation falling into lines from outside the right of way.

9.2 Post Outage Investigation Procedure and Documentation (R3, R3.1)

An outage report must be completed for all vegetation-caused sustained outages. The report must include the following information:

9.2.1 Required Report Information (R3.3)

- PPL EU Transmission circuit/line name, PPL EU Line number, and voltage classification
- Date of event
- Time of event
- Duration of event
- Cause description
- Other pertinent comments – weather conditions, human error, etc.
- Noted TO countermeasures – e.g., steps taken by PPL EU to correct areas of past refusal, etc.

To provide the most accurate description of a vegetation-caused sustained outage, the following information, as applicable to the event, shall be collected as soon as possible following the event.

9.2.2 Field Data (R3.3)

- Photographs of the event – (all categories)
- Measure/determine the cleared ROW width – (all categories)
- Measure offending vegetation height – clinometers or appropriate device – (Category 1)
- Measure conductor height – clinometers or appropriate device – (Category 1)
- Measure distance of vegetation from affected conductor/s – (all categories)
- Noted species of tree/s involved – (all categories)
- Noted condition of tree/s involved – sound, rotted, if uprooted, whether roots were restricted in growth - (Category 2 & Category 3)
- Noted site conditions – slope, aspect, soil types – sand vs. clay, drainage concerns, human disturbance activity – (all categories)
- Noted weather conditions – wind, ice, rain – (all categories)

9.2.3 Office Data: (To be collected for all outage categories)

- Defined /documented ROW width
- Easement agreement

- Plan and profile of area
- Past VM activities within the affected area – date and scope
- Noted mitigation concerns
- Documented property owner refusals
- Names of PPL EU personnel involved with investigation

Once the appropriate information has been collected, a team led by the Manager – VM will be assembled to review the information and make a determination of the outage category to be reported. The assembled team will include the PPL EU VM-Manager, appropriate Regional Forester, and PSD representative as needed. Additionally other departments may be called upon for consultation, including but not limited to: Office of General Counsel (OGC), Real Estate, Right-of-Way, Transmission Design and Engineering.

Reporting of the event, in an Executive Summary format, to the RE (*ReliabilityFirst*) will be the responsibility of the PPL EU NERC Compliance Management Group. The report will contain the required information defined in FAC-003-1.

Reporting from the team will consist of a more detailed report which outlines all available known information used to determine the Outage Category and an explanation of how the determination was made. These reports are to be maintained by the PPL EU NERC Compliance Management Group.

10.0 Property Owner Communications

Prior to beginning scheduled transmission vegetation management, property owners are notified by letter regarding PPL EU's planned maintenance activities. Additionally, prior to beginning vegetation maintenance, the contractor that will be performing the vegetation maintenance makes contact with the property owners via personal contact, door card or phone call.

In addition, PPL EU maintains a Website to communicate vegetation management issues to customers/property owners as well as an e-mail address that customers/property owners can utilize to communicate directly with the PPL EU VM staff. PPL EU also maintains a toll-free Vegetation Management call center number for customer/property owners' convenience

- Website
(<http://www.pplweb.com/community+partners/our+environment/vegetation+management.htm>)
- Email address
(PPLVegetationManagement@pplweb.com)
- Toll-free phone number (1-877-528-2889)

11.0 Implementing Integrated Vegetation Management ("IVM")

IVM identifies an evolving set of ideas and concepts, incorporating industry recognized Best Management Practices, together with the latest research and advances in VM technology into sound VM principles and practices.

PPL EU uses IVM concepts (via WZ/BZ¹⁹, Figure 1, and other IVM techniques) as a part of the TVMP strategy of VM. PPL EU strives to minimize environmental intrusion and any disruption to the desirable plant communities present on the ROW and thus perpetuates an herbicide reduction strategy through the following: regular monitoring, cyclical scheduling, prescriptive techniques, the use of highly selective treatments and utilizing the latest chemistry and application technology to target and affect complete control of the incompatible targeted tree species.

12.0 Customer Inquiry and Complaint Resolution

12.1 Customer Inquiries

PPL EU has a toll-free number for customers/landowners as well as a website that contains pertinent information regarding vegetation management activities and PPL EU VM staff contact information. Formal customer inquiries and landowner complaints concerning vegetation management are usually received through the call center and then forwarded to the appropriate forester for resolution. These inquiries are generally responded to within 24 business hours.

12.2 Property Owner Refusal Process (Clearance Mitigation Procedure) (R1.4; M1.4)

The following steps are to be followed when the required clearances (defined in Table C as "Clearance 1: Minimum Acceptable Clearance from

¹⁹ WZ/BZ- Wire Zone/Border Zone

Vegetation to Conductor at Time of Maintenance") cannot be achieved at the time when vegetation maintenance work is performed on any transmission line which is 200 kV or higher as a result of a property owner refusal;

12.2.1 If a property owner refuses to allow PPL EU access to the property to perform needed VM work, the contractor will notify the responsible appropriate PPL EU Forester.

12.2.2 The PPL EU Forester will secure a copy of the appropriate ROW agreement to determine PPL EU's rights.

12.2.3 After the ROW agreement has been researched and PPL EU's rights have been determined, a follow-up contact will be made with the property owner. A copy of the ROW agreement will be presented and the PPL EU Forester will explain to the property owner, in detail, what needs to be done and why.

12.2.4 If the property owner still refuses to allow PPL EU to perform the necessary work, a letter will be sent from PPL Corporation's OGC to the property owner reiterating PPL EU rights and setting a date/time when the work will be performed.

12.2.5 If the property owner still offers resistance, further legal assistance/guidance will be requested within PPL EU and OGC.

13.0 Additional Information

13.1 List of Acronyms and Abbreviations

AIC	Aerial Inspection Contractor
ANSI	American National Standards Institute
BES	Bulk Electrical System
BMP	Best Management Practice
CARC	Line Clearance Maintenance Program: Completion Acceptance Report by Circuit (PPL EU)
CCR	Compliance Condition Report
EU	Electric Utilities
FERC	Federal Energy Regulatory Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IVM	Integrated Vegetation Management
LiDAR	Light Detection and Ranging
NERC	North American Electric Reliability Corporation
OGC	Office of General Counsel

PSD	Power System Dispatcher
RE	Regional Entity (new name for RRO)
RF	ReliabilityFirst (the RE for PPL EU)
ROW	Rights-of-way
RRO	Regional Reliability Organization (name changed to RE)
SETS	Senior Engineer, Transmission/Substations
TCC	Transmission Control Center
TO	Transmission Owner
TSO	Transmission System Operator
TVMP	Transmission Vegetation Management Program
UVM	Utility Vegetation Management
VM	Vegetation Management
WSZ	Wire Security Zone
WZ/BZ	Wire Zone / Border Zone

13.2 References

ANSI. 2006. Safety Requirements for Arboricultural Operations. Z 133.1. American National Standards Institute, NY

ANSI. 2006. *The American National Standard for Tree Care Operations-Tree, Shrub and Utility Rights-of-Way*, A 300 Part 7 - IVM. American National Standards Institute, NY

ANSI. 2008. *The American National Standard for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management – Standard Practices (Pruning))* A 300 Part 1. American National Standards Institute, NY

IEEE Standard 516-2003 *IEEE Guide for Maintenance Methods on Energized Power Lines*

Kempton, G.P. 2004. *Best Management Practices: Utility Pruning of Trees*. International society of Arboriculture, Champaign, IL.

NERC Standard FAC-003-1

APPENDIX

Appendix A: Emergency Work Remediation Time Table

When standard aerial inspections results are being addressed, the following periods apply:

500kV

Distance as reported by aerial inspection contractor	Time for VM to review actual conditions in field (within # of business days)	Distance as field checked by Forester	Time to completion of work (within # of business days following VM review) ²
1 – 5.99 ft	0-1 ¹	1-5.99 ft	0-2 ¹
6-10.99 ft	0-1 ¹	6-10.99 ft	0-2 ¹
11-15.99 ft	2-5	11-15.99 ft	15
16-20.99 ft	15	16-20.99 ft	16-17.99 ft; 15 days 18-20.99 ft; VM decision based on under/around, ROW restrictions, time of year, expected tree growth, planned work schedule to maintain WSZ
21-25 ft	30	21-25 ft	VM decision based on under/around, ROW restrictions, time of year, expected tree growth, planned work schedule to maintain WSZ

Appendix A: Emergency Work Remediation Time Table

230kV

Distance as reported by aerial inspection contractor	Time for VM to review actual conditions in field (within # of days)	Distance as field checked by Forester	Time to completion of work (within # of business days following VM review) ²
1-5.99 ft	0-1 ¹	1-5 ft	0-2 ¹
6-10.99 ft	2-5	6-10 ft	15
11-15.99 ft	15	11-15 ft	VM decision based on under/around, ROW restrictions, time of year, expected tree growth, planned work schedule to maintain WSZ
16-20 ft	30	16-20 ft	VM decision based on under/around, ROW restrictions, time of year, expected tree growth, planned work schedule to maintain WSZ

Appendix A: Emergency Work Remediation Time Table

When LiDAR survey results are being addressed, the following periods apply:

500 kV

Distance as reported by LiDAR contractor	Time for VM to review actual conditions in field (within # of working business days) (C2/WSZ)	Transmission Engineering review for max sag conditions (calendar days from date PPL receives LiDAR report)	Time to completion of work (within # of business days following field review) ²	Time to completion of work for max sag engineering-verified conditions (within # of days following engineering review) ²
1-8.9 ft	1	3	0-2 ¹	2
8.91-17.0 ft	2-5	3	15 ¹	N/A
11-17.0 ft	15	3	VM decision based on under/around, ROW restrictions, time of year, expected tree growth, planned work schedule to maintain WSZ	N/A

Appendix A: Emergency Work Remediation Time Table

230 kV

Distance as reported by LiDAR contractor	Time for VM to review actual conditions in field (within # of working business days) (C2/WSZ)	Transmission Engineering review for max sag conditions (calendar days from date PPL receives LiDAR report)	Time to completion of work (within # of business days following field review) ²	Time to completion of work for max sag engineering-verified conditions (within # of days following engineering review) ²
1-5.99 ft	1	3	0-2 ¹	2
6-10.99 ft	2-5	3	15 ¹	N/A
11-20 ft	15	3	VM decision based on under/around, ROW restrictions, time of year, expected tree growth, planned work schedule to maintain WSZ	N/A
<p>¹ If observed distances are less than Clearance 2 minimum per IEEE Standard; a daytime Emergency will be initiated (even on weekends).</p> <p>² Time extensions may be required for the following conditions which must be documented and filed as encountered.</p> <ul style="list-style-type: none"> A. Customer refusal to access property or trim/cut as required; B. PPL Electric Utilities determines safe working conditions cannot be guaranteed (for example, operating conditions prohibit outages required to provide safe working conditions, during hunting season in affected area, unsafe weather conditions inability to apply proper protection devices for safe work conditions; C. Storm related conditions have depleted needed resources to accomplish work; D. A designated Senior Manager of PPL EU (an Officer or a Vice President or senior representative of PPL Electric) authorizes a different timeframe based on professional judgment or an unexpected condition. 				

Appendix B-1: PPL EU Transmission Survey Schedule - 500 kV

These are circuit (wire) miles as opposed to structure miles. Double circuit lines may show the miles 2X
 500KV Lines are surveyed on a three year cycle and patrolled via helicopter yearly

Line No	Line Desc	Line Abbrev	Line KV	Miles	Previous Last Ground Survey	Last Ground Survey Date	Next Ground Survey Date	Last Previous Aerial Survey (Haverfield)	Last Aerial Survey (LIDAR)	Next Aerial Survey Date
401	ALBURTIS-BRANCHBURG 5016	ALBU-BRAN	500	19.32		2009	2012	May/June 2009	Sept 2009	2010
402	JUNATA-ALBURTIS 5009	JUN-ALBU	500	1		2009	2012	May/June 2009	Sept 2009	2010
403	SUSQUEHANNA-WESCOSVILLE 5043 (Lehi)	SUSQ-WESC (Wesc)	500	30		2009	2012	May/June 2009	Sept 2009	2010
404	WESCOSVILLE-ALBURTIS 5044	WESC-ALBU	500	11.26		2009	2012	May/June 2009	Sept 2009	2010
405	ALBURTIS-HOSENSACK 5027	ALBU-HOSE	500	4.75		2009	2012	May/June 2009	Sept 2009	2010
407	HOSENSACK-STEEL CITY	HOSE-STC	500	22.09		2009	2012	May/June 2009	Sept 2009	2010
1	SUSQUEHANNA-WESCOSVILLE 5043 (Nbre)	SUSQ-WESC (NbrE)	500	39.75		2009	2012	May/June 2009	Sept 2009	2010
189	JUNATA-SUNBURY 5046 (Susq)	JUN-SUNB (Sunb)	500	13	2004	2007	2010	May/June 2009	Sept 2009	2010
190	SUNBURY-SUSQUEHANNA 2	SUNB-SUSQ 2	500	43.5	2004	2007	2010	May/June 2009	Sept 2009	2010
301	SUSQUEHANNA GEN 2 LEADS	SUSQ-GEN 2 LDS	500	0.26	2004	2007	2010	May/June 2009	Sept 2009	2010
376	SUSQUEHANNA-WESCOSVILLE 5043 (Susq)	SUSQ-WESC (Susq)	500	1.5	2004	2009	2012	May/June 2009	Sept 2009	2010
695	CONEMAUGH-JUNATA 5005	CONE-JUN	500	25	2004	2009	2012	May/June 2009	Sept 2009	2010
699	KEYSTONE-JUNATA 5004	KEYS-JUN	500	25	2004	2009	2012	May/June 2009	Sept 2009	2010
697	JUNATA-SUNBURY 5046 (Hsbg)	JUN-SUNB (Juni)	500	24	2004	2007	2010	May/June 2009	Sept 2009	2010
698	JUNATA-THREEMILE ISLAND 5008	JUN-TM	500	44.5		2008	2011	May/June 2009	Sept 2009	2010
696	JUNATA-ALBURTIS 5009	JUN-ALBU	500	26		2009	2012	May/June 2009	Sept 2009	2010
563	TM-PEACH BOTTOM 5007	TM-FEBO 500	500	11	2004	2007	2010	May/June 2009	Sept 2009	2010

Appendix B-1: PPL EU Transmission Survey Schedule – 230 kV

These are circuit (wire) miles as opposed to structure miles. Double circuit lines may show the miles 2X:
230KV lines are surveyed on a three year cycle and patrolled via helicopter yearly

Line No	Line Desc	Line Abbrev	Line kV	Miles	Previous Last Ground Survey	Last Ground Survey Date	Next Ground Survey Date	Last Previous Aerial Survey (Haverfield)	Last Aerial Survey (LIDAR)	Next Aerial Survey Date
12	FRACKVILLE-COLUMBIA (Cent)	FRAC-COLU	230	10.00	2004	2007	2010	May/June 2009	Sept 2009	2010
14	SUNBURY-ELDRED (Cent)	SUNB-ELDR (Eldr)	230	33.69		2008	2011	May/June 2009	Sept 2009	2010
18	ELDRED-FRACKVILLE	ELDR-FRAC	230	11.50		2008	2011	May/June 2009	Sept 2009	2010
331	HARWOOD-EAST PALMERTON (Lehi)	HARW-EPAL	230	5.29	2004	2007	2010	May/June 2009	Sept 2009	2010
338	MARTINS CREEK-MONROE (Pocono)	MACR-MONR	230	14.83		2008	2011	May/June 2009	Sept 2009	2010
339	SHAWNEE - KITTA TINNY	SHAW-KITT	230	2.27		2008	2011	May/June 2009	Sept 2009	2010
369	FOXHILL-SHAWNEE	FOXH-SHAW	230	8.10	2004	2007	2010	May/June 2009	Sept 2009	2010
370	MONROE-FOXHILL TIE	MONR-FOXH TIE	230	0.12	2004	2007	2010	May/June 2009	Sept 2009	2010
379	SIEGFRIED-FRACKVILLE (Susq)	SIEG-FRAC	230	14.10	2004	2008	2011	May/June 2009	Sept 2009	2010
406	HOSENSACK-BUXMONT 3	HOSE-BUXM 3	230	15.67	2004	2008	2011	May/June 2009	Sept 2009	2010
408	HOSENSACK-WESCOSVILLE 3	HOSE-WESC 3	230	9.71	2004	2008	2011	May/June 2009	Sept 2009	2010
409	MARTINS CREEK-NORTHWOOD	MACR-NORT	230	11.35		2008	2011	May/June 2009	Sept 2009	2010
410	MARTINS CREEK-PORTLAND	MACR-PORT	230	4.49	2004	2007	2010	May/June 2009	Sept 2009	2010
411	MARTINS CREEK-QUARRY 2	MACR-QUAR 2	230	21.04		2008	2011	May/June 2009	Sept 2009	2010
412	MARTINS CREEK-SIEGFRIED 1	MACR-SIEG 1	230	23.54		2008	2011	May/June 2009	Sept 2009	2010
413	MARTINS CREEK-SIEGFRIED 2	MACR-SIEG 2	230	26.10		2008	2011	May/June 2009	Sept 2009	2010
414	QUARRY-NORTHWOOD	QUAR-NORT	230	10.93		2008	2011	May/June 2009	Sept 2009	2010
415	SIEGFRIED-EAST PALMERTON 3	SIEG-EPAL 3	230	8.48		2007	2010	May/June 2009	Sept 2009	2010
416	SIEGFRIED-FRACKVILLE (Lehi)	SIEG-FRAC	230	40.63	2004	2008	2011	May/June 2009	Sept 2009	2010
417	SIEGFRIED-HARWOOD (Lehi)	SIEG-HARW	230	9.40	2004	2007	2010	May/June 2009	Sept 2009	2010
420	MARTINS CREEK-MONROE (Lehigh)	MACR-MONR	230	16.68		2008	2011	May/June 2009	Sept 2009	2010
421	WHITPA IN-BUXMONT	WHIT-BUXM	230	16.98	2004	2008	2011	May/June 2009	Sept 2009	2010
439	STEEL CITY-QUARRY 1	STCI-QUAR 1	230	2.00		2008	2011	May/June 2009	Sept 2009	2010
441	STEEL CITY-QUARRY 2	STCI-QUAR 2	230	2.00		2008	2011	May/June 2009	Sept 2009	2010
798	MARTINS CREEK-GILBERT (P2016)	MACR-GILB	230	0.52	2004	2007	2010	May/June 2009	Sept 2009	2010
958	MARTINS CREEK - LOWER MT BETHEL ENERGY	MACR-LMBE	230	0.04	2004	2007	2010	May/June 2009	Sept 2009	2010
8	SIEGFRIED-HARWOOD (Nore)	SIEG-HARW	230	25.42		2007	2010	May/June 2009	Sept 2009	2010
9/331	HARWOOD-EAST PALMERTON (Cent)	HARW-EPAL	230	37.70		2007	2010	May/June 2009	Sept 2009	2010
10	SUSQUEHANNA-HARWOOD 1	SUSQ-HARW 1	230	12.89		2007	2010	May/June 2009	Sept 2009	2010
55	SUSQUEHANNA-HARWOOD 2	SUSQ-HARW 2	230	12.90		2007	2010	May/June 2009	Sept 2009	2010
11	SUSQUEHANNA-JENKINS	SUSQ-JENK	230	14.40		2008	2011	May/June 2009	Sept 2009	2010
13	SIEGFRIED-FRACKVILLE (Nore)	SIEG-FRAC	230	11.50		2008	2011	May/June 2009	Sept 2009	2010
120	JENKINS-STANTON	JENK-STAN	230	6.54		2009	2012	May/June 2009	Sept 2009	2010
121	LACKAWANNA-PECKVILLE 3	LACK-PECK 3	230	2.97		2008	2011	May/June 2009	Sept 2009	2010
122	MTN-LACK:MTN TO STN SUB	MOUN-LACK	230	25.72		2007	2010	May/June 2009	Sept 2009	2010
123	STANTON-LACKAWANNA	STAN-LACK	230	13.36		2009	2012	May/June 2009	Sept 2009	2010
124	STANTON-SUSQUEHANNA 1 (W-B)	STAN-SUSQ 1	230	31.77	2004	2007	2010	May/June 2009	Sept 2009	2010
125	STANTON-SUSQUEHANNA 2 (Cen)	STAN-SUSQ 2	230	14.06	2004	2007	2010	May/June 2009	Sept 2009	2010
127	BLMNG GROVE-PECKVILLE	BLGR-PECK	230	36.53	2004	2007	2010	May/June 2009	Sept 2009	2010
128	BUSHKILL-BLMNG GROVE	BUSH-BLGR	230	21.78		2008	2011	May/June 2009	Sept 2009	2010
288	STANTON-SUSQUEHANNA 1 (Haz)	STAN-SUSQ 1	230	0.27		2008	2011	May/June 2009	Sept 2009	2010
368	MTN-LACK:STN SUB TO LACK SUB	MOUN-LACK	230	13.36		2009	2012	May/June 2009	Sept 2009	2010
191	ELMSPT-LYCOMING 1	ELIM-LYCO 1	230	4.09	2004	2007	2010	May/June 2009	Sept 2009	2010
192	ELMSPT-LYCOMING 2	ELIM-LYCO 2	230	4.09	2004	2007	2010	May/June 2009	Sept 2009	2010
193	ELMSPT-LYCOMING 3	ELIM-LYCO 3	230	4.09	2004	2007	2010	May/June 2009	Sept 2009	2010
194	FRACKVILLE-COLUMBIA (Susq)	FRAC-COLU	230	13.84		2008	2011	May/June 2009	Sept 2009	2010
195	SUSQUEHANNA-GENERATOR 1	SUSQ-GEN 1	230	3.09		2008	2011	May/June 2009	Sept 2009	2010
196	MONTOUR-COLUMBIA	MONT-COLU	230	10.30		2008	2011	May/June 2009	Sept 2009	2010
197	MONTOUR-ELIMSPORT	MONT-ELIM	230	22.23	2004	2007	2010	May/June 2009	Sept 2009	2010
198	MONTOUR-SUSQUEHANNA T-10	MONT-SUSQ T10	230	28.66		2008	2011	May/June 2009	Sept 2009	2010
199	MONTOUR-SUNBURY	MONT-SUNB	230	22.93		2008	2011	May/June 2009	Sept 2009	2010
200	MONTOUR-SUSQUEHANNA	MONT-SUSQ	230	31.98		2008	2011	May/June 2009	Sept 2009	2010
201	STANTON-SUSQUEHANNA 2 (Sus)	STAN-SUSQ 2	230	7.06		2009	2012	May/June 2009	Sept 2009	2010
202	SUNBURY-ELIMSPORT	SUNB-ELIM	230	25.67	2004	2007	2010	May/June 2009	Sept 2009	2010
203	SUNBURY-ELDRED (Susq)	SUNB-ELDR (Sunb)	230	3.69		2009	2012	May/June 2009	Sept 2009	2010
204	SUNBURY-SUSQUEHANNA 1	SUNB-SUSQ 1	230	43.42	2004	2007	2010	May/June 2009	Sept 2009	2010
205	SUSQUEHANNA-TRANSFORMER 10 TAP	SUSQ-TRANS 10 TP	230	0.86	2004	2007	2010	May/June 2009	Sept 2009	2010
206	SUSQUEHANNA TRANSFORMER 20 TAP	SUSQ-TRANS 20 TP	230	1.29	2004	2007	2010	May/June 2009	Sept 2009	2010
207	SUSQUEHANNA-TRANSFORMER 21	SUSQ-TRANS 21	230	2.96	2004	2007	2010	May/June 2009	Sept 2009	2010
291	MOUNTA IN-SUSQUEHANNA T-10	MOUN-SUSQ T10	230	1.82	2004	2007	2010	May/June 2009	Sept 2009	2010
384	MONTOUR-CLINTON	MONT-CLIN	230	14.90	2004	2007	2010	May/June 2009	Sept 2009	2010
385	CLINTON-ELIMSPORT	CLIN-ELIM	230	7.37	2004	2007	2010	May/June 2009	Sept 2009	2010
700	BRUNNER ISLAND-MIDDLETOWN JUNCTION 1	BRIS-MJU 1	230	0.74	2004	2007	2010	May/June 2009	Sept 2009	2010

Appendix C-1: PPL EU Sample Annual Transmission VM Plan

Project	Project ID	Contractor	Project Class	County	Priority	Line Type	Line Number	Line Description	Line Miles	Start Month	End Month	Start Year	End Year	Cost	Contractor	Notes
34	454	DB	Harrisburg BEB	Harrisburg	Smart	TB	704 HARRISBURG-MIDDLETOWN JUNCTION 1		7.79	1/10/2011	3/1/2011	1	1	\$ 28,173.66	Asplundh	0000
25	413	DB	Leh-Cent BEB	NorthEast	Carbur	TB	10 BUCKLEHANA-MERCOSVILLE 640 (Repl)		41.28	1/10/2011	10/20/2011	1	1	\$ 584,583.00	Penn Line	0000
26	448	DB	NorthEast-Central BEB	NorthEast	High	TB	11 BUCKLEHANA-BERKS		28.53	1/10/2011	10/20/2011	1	1	\$ 357,947.00	Penn Line	0000
28	433	DB	Leh-Cent BEB	Westphalia	Carbur	TB	12 FRACKVILLE-COLUMBIA (Cont)		5.93	1/10/2011	10/20/2011	1	1	\$ 215,864.00	Penn Line	0000
28	471	DB	Westphalia BEB	Westphalia	Single	TB	204 SLIMBURY-SLUGLEHANA 1		43.83	1/10/2011	10/20/2011	1	1	\$ 228,221.00	Penn Line	0000
28	472	DB	Westphalia BEB	Westphalia	Single	TB	180 SLIMBURY-SLUGLEHANA 2		43.34	1/10/2011	10/20/2011	1	1	\$ 221,552.00	Penn Line	0000
54	763	DB	PL W2-62 High Priority	Central	Carbur	TB	180 DRED-FRACKVILLE		9.88	1/10/2011	2/1/2011	1	1	\$ 28,842.00	Penn Line	0000
54	761	DB	PL W2-62 High Priority	Central	Carbur	TB	13 DIEGFREED-FRACKVILLE (Repl)		1.65	1/10/2011	2/1/2011	1	1	\$ 43,828.00	Penn Line	0000
54	762	DB	PL W2-62 High Priority	Central	Carbur	TB	529 DIEGFREED-FRACKVILLE (Repl)		0.72	1/10/2011	2/1/2011	1	1	\$ 15,255.00	Penn Line	0000
54	765	DB	PL W2-62 High Priority	Central	Carbur	TB	14 SLIMBURY-DRED (Repl)		1.30	1/10/2011	2/1/2011	1	1	\$ 6,600.00	Penn Line	0000
24	421	DB	Harrisburg BEB	Harrisburg	Smart	TB	702 BRUNNER ISLAND-MIDDLETOWN JCT 1 (Hnt)		1.02	1/10/2011	2/1/2011	1	1	\$ 3,728.88	Asplundh	0000
24	422	DB	Harrisburg BEB	Harrisburg	Smart	TB	701 BRUNNER ISLAND-MIDDLETOWN JCT 2 (Hnt)		1.02	1/10/2011	2/1/2011	1	1	\$ 3,453.97	Asplundh	0000
53	731	DB	ATE W2-62 High Priority	Harrisburg	Smart	TB	702 BRUNNER ISLAND-WEST SHORE		0.61	1/10/2011	2/1/2011	1	1	\$ 9,100.35	Asplundh	0000
53	733	DB	ATE W2-62 High Priority	Harrisburg	Smart	TB	703 CLUMBERLAND-WEST SHORE		0.91	1/10/2011	2/1/2011	1	1	\$ 1,382.21	Asplundh	0000
25	458	DB	Lancaster BEB	Lancaster	Smart	TB	572 SOUTH AKRON-BERKS		18.91	1/10/2011	3/1/2011	1	1	\$ 227,369.48	Asplundh	0000
53	742	DB	ATE W2-62 High Priority	Lancaster	Smart	TB	580 MINNICK-CITTEER-CREEK		0.56	1/10/2011	2/1/2011	1	1	\$ 5,981.47	Asplundh	0000
22	384	DB	Lehigh BEB	Lehigh	Carbur	TB	489 SLUGLEHANA-MERCOSVILLE 640 (Repl)		22.27	1/10/2011	4/2/2011	1	1	\$ 127,704.18	Asplundh	0000
22	385	DB	Lehigh BEB	Lehigh	Carbur	TB	484 MERCOSVILLE-ALBERTUS 6644		11.28	1/10/2011	3/1/2011	1	1	\$ 115,000.00	Asplundh	0000
27	461	DB	Middlesex BEB	NorthEast	High	TB	127 SLIMBURY SHORE-PECKVILLE		28.92	1/10/2011	4/2/2011	1	1	\$ 487,416.00	Asplundh	0000
54	788	DB	PL W2-62 High Priority	Westphalia	Single	TB	188 MCKNIGHT-SLIMBURY		0.66	1/10/2011	1/20/2011	1	1	\$ 5,000.00	Penn Line	0000
54	825	DB	PL W2-62 High Priority	Westphalia	Single	TB	186 JONATA-SLIMBURY 6648 (Repl)		13.05	1/10/2011	2/1/2011	1	1	\$ 11,250.00	Penn Line	0000

SAMPLE

Appendix C-2: PPL EU Sample Annual Transmission Vegetation Maintenance Plan Status Report

Region	Miles	% Comp	Status PPL QA Date	Start	Finish	Cost	Notes
Harrisburg							
<i>RP</i>	<i>Asplundh</i>						
<input type="checkbox"/> 704	HUMMELSTOWN-MIDDLETOWN JUNCTION 1	6.19 6.19	WS-CL 2/18/2011	<i>Estimate</i> 1/10/2011	<i>Actual</i> 1/22/2011	\$29,173.55 \$46,832.93	
<input type="checkbox"/> 700	BRUNNER IS-MIDDLETOWN JCT 1 (Harr)	0.52 0.52	WS-CL 1/24/2011	<i>Estimate</i> 1/17/2011	<i>Actual</i> 1/15/2011	\$3,729.68 \$6,310.73	
<input type="checkbox"/> 701	BRUNNER IS-MIDDLETOWN JCT 2 (Harr)	0.52 0.52	WS-CL 1/24/2011	<i>Estimate</i> 1/17/2011	<i>Actual</i> 1/15/2011	\$2,457.97 \$4,663.96	
<input checked="" type="checkbox"/> 702	BRUNNER ISLAND-WEST SHORE	0.61 0.61	WS-CL 2/4/2011	<i>Estimate</i> 1/17/2011	<i>Actual</i> 1/15/2011	\$9,102.35 \$8,694.11	
<input checked="" type="checkbox"/> 703	CUMBERLAND-WEST SHORE	0.91 0.91	WS-CL 2/9/2011	<i>Estimate</i> 1/17/2011	<i>Actual</i> 1/15/2011	\$1,267.71 \$3,059.29	
<input checked="" type="checkbox"/> 695	CONEMAUGH-JUNIATA 5005	9.86 13.28	WS-WS	<i>Estimate</i> 2/14/2011	<i>Actual</i> 2/5/2011	\$205,606.03 \$127,036.79	74.4%
<input type="checkbox"/> 699	KEYSTONE-JUNIATA 5004	10.09 12.46	WS-WS	<i>Estimate</i> 2/14/2011	<i>Actual</i> 2/5/2011	\$183,162.76 \$116,369.50	50.8%
<input checked="" type="checkbox"/> 705	HUMMELSTOWN-STEELTON TAP	0.31 0.31	WS-CL 3/7/2011	<i>Estimate</i> 2/28/2011	<i>Actual</i> 1/29/2011	\$13,193.24 \$5,304.31	150.0%
<input checked="" type="checkbox"/> 707	JUNIATA-CUMBERLAND 1	0.23 0.23	WS-CL 3/24/2011	<i>Estimate</i> 3/14/2011	<i>Actual</i> 1/29/2011	\$4,490.00 \$3,584.32	150.0%
<input checked="" type="checkbox"/> 785	WEST SHORE-STEELTON	0.36 0.36	WS-CL 4/1/2011	<i>Estimate</i> 3/21/2011	<i>Actual</i> 1/29/2011	\$8,473.58 \$2,871.68	120.0%
<input checked="" type="checkbox"/> 696	JUNIATA-ALBURTIS 5009	2.19 18.13	WS-WS	<i>Estimate</i> 3/28/2011	<i>Actual</i> 4/9/2011	\$508,319.50 \$46,273.44	12.1%
<input checked="" type="checkbox"/> 794	JUNIATA-DAUPHIN	0.20 0.20	WS-CL 3/28/2011	<i>Estimate</i> 3/28/2011	<i>Actual</i> 3/28/2011	\$29.37 \$38.54	100.0%
<input checked="" type="checkbox"/> 697	JUNIATA-SUNBURY 5046 (Rsbog)	0.00 0.36	WS-WTF	<i>Estimate</i> 5/9/2011	<i>Actual</i> 6/25/2011	\$6,779.16 \$115.62	0.0%

Appendix D: Line Clearance Maintenance Program: Completion Acceptance Report by Circuit

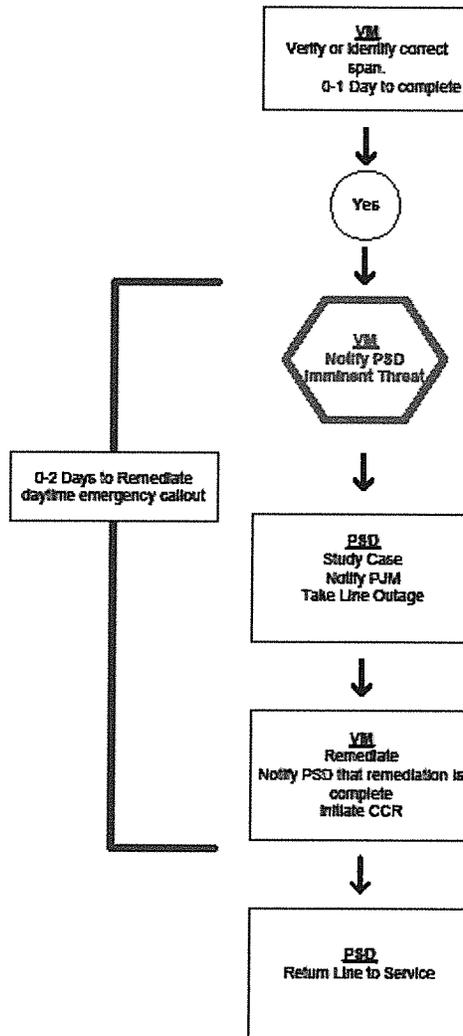
LINE CLEARANCE MAINTENANCE PROGRAM					
COMPLETION ACCEPTANCE REPORT BY CIRCUIT					
Circuit Information (to be filled out by contractor)					
<input checked="" type="checkbox"/> Trimming	<input type="checkbox"/> Spray	<input checked="" type="checkbox"/> Reclear	<input checked="" type="checkbox"/> Hazard Trees	<input type="checkbox"/> Other (Specify)	
Work Category:	BES	Region:023	Leigh	Date: 3-7-11	
Circuit #:	402	Circuit Name:	alburis-juniata		
Mileage	Spray Acres	Reclear Acres	Hazard Trees	# of inspection sheets attached	
0.7					
Contractor Information (to be filled out by contractor)					
Company: Asplundh Tree Expert Co.					
Completion Work Reviewed: <i>I have reviewed this line and agree that all work has been completed in full and that all work satisfies the specifications set forth by PPL Electric Utilities.</i>					
Print Name:	Print Title:	Signature:	Inspection Date:		
David E Irwin	General Foreman		3/7/2011		
Exceptions (Customer concerns, minimum clearance - use names, meter numbers, grids, and/or addresses.)					
PPL Information (to be filled out by PPL)					
Record #/n	QA Status:	Reinspection Date:	Notes:		
	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail				
<small>If QA status is "Fail", enter reinspection date</small>					
Print Name:	Print Title:	Signature:	Approval Date:		
EARL BUNNISSE	Forester-LEIGH		3-14-11		
Additional Comments					
Sub to 57502 342755 Spray 37, 20, including 2 wood 542756 to 595623 41755 25' each side of CL all work completed acceptable 3-14-11					

fm upd 12/2010

Appendix E-1: LiDAR C2 Observed Vegetation Encroachment

ATTACHMENT 1
LIDAR
C2 Observed
Vegetation Encroachment

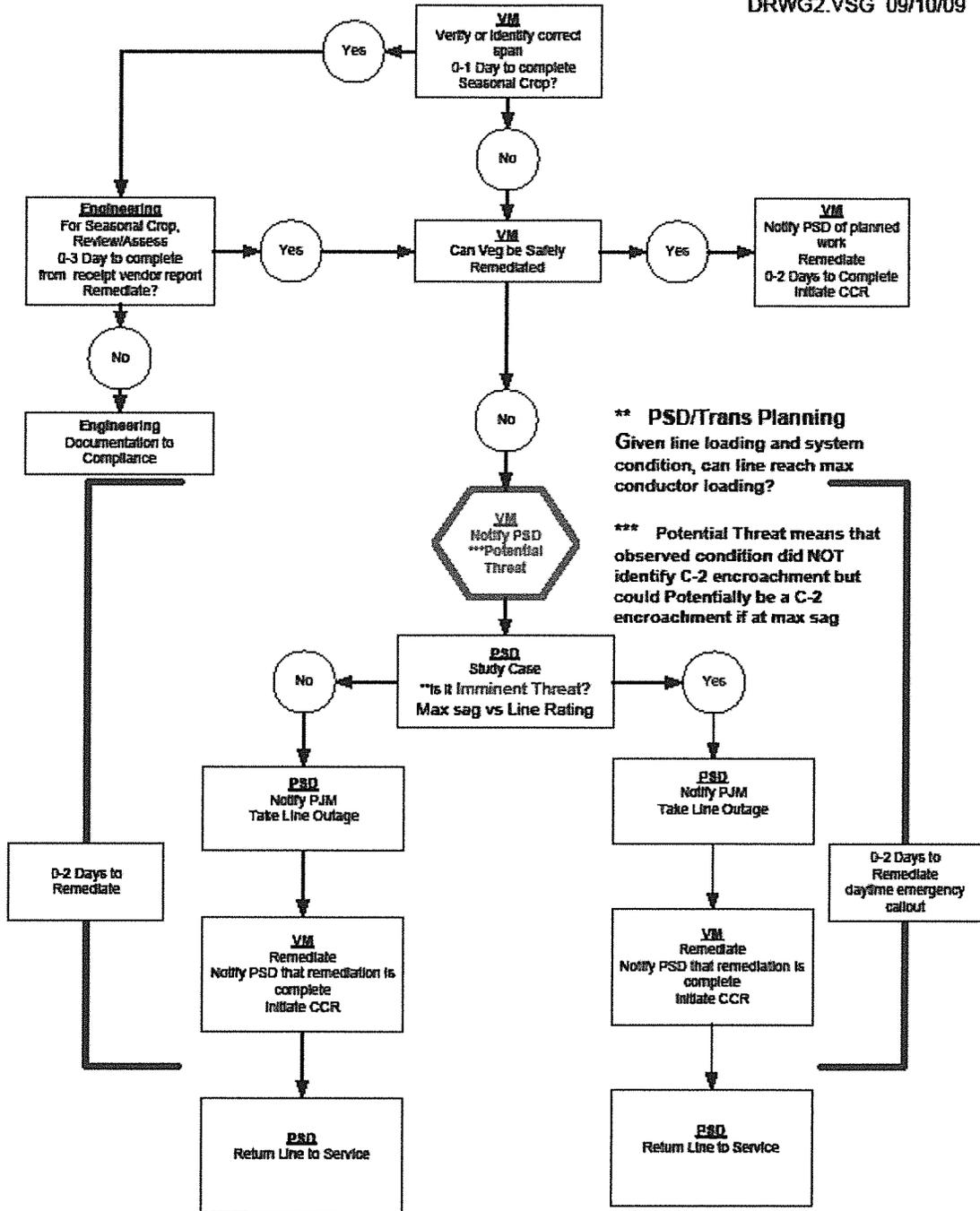
DRWG1.VSG 09/04/09



Appendix E- 2: LiDAR C2 Max Sag Vegetation Encroachment

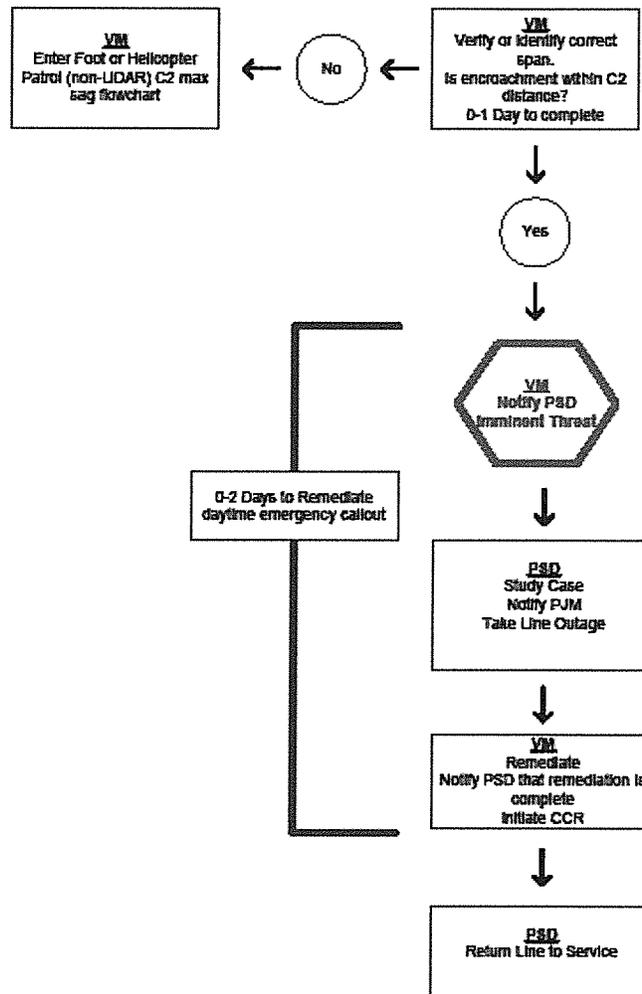
ATTACHMENT 2: LIDAR C2 Max Sag Vegetation Encroachment

DRWG2.VSG 09/10/09



Appendix E- 3: Foot or Helicopter (non-LiDAR) Identified C2 Observed Vegetation Encroachment

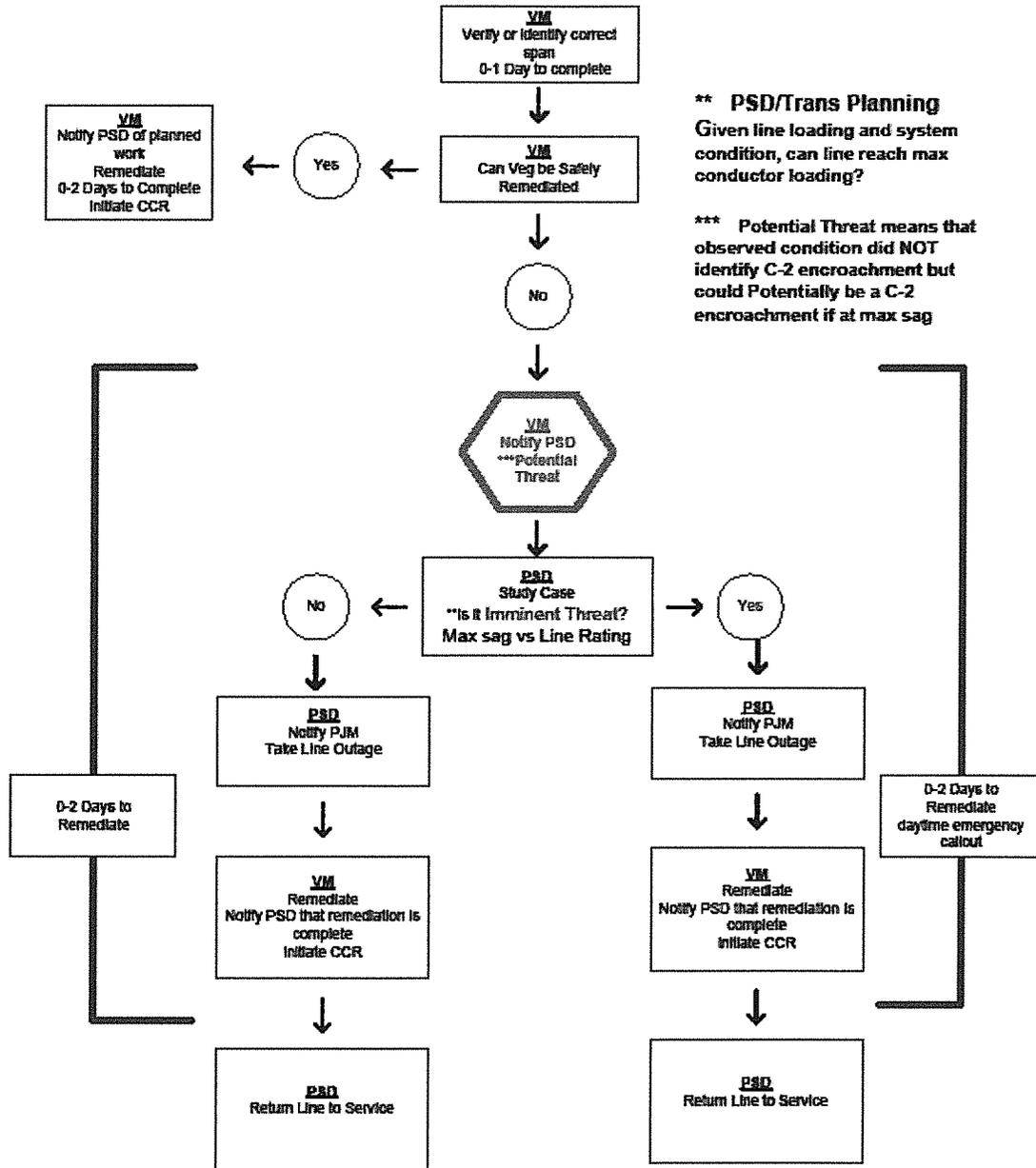
Foot or Helicopter Patrol (non-LiDAR) Identified C2 Observed Vegetation Encroachment



DRWG3.VSG 8/31/09

Appendix E-4: Foot or Helicopter Patrol (non-LiDAR Identified C2 Max Sag Vegetation Encroachment)

**Foot or Helicopter Patrol (non-LiDAR)
Identified C2 Max Sag
Vegetation Encroachment**



DRWG4.VSG 9/8/09

**Construction and Restoration Standards
within the NPS Lands Crossed by the
Susquehanna – Roseland 500 kV
Transmission Project**

Blooming Grove

209

84

206

80

Bushkill

Jefferson

▼ Kittatinny

Portland

80
May 2012

Martins Creek

▼

Ros

ards

206

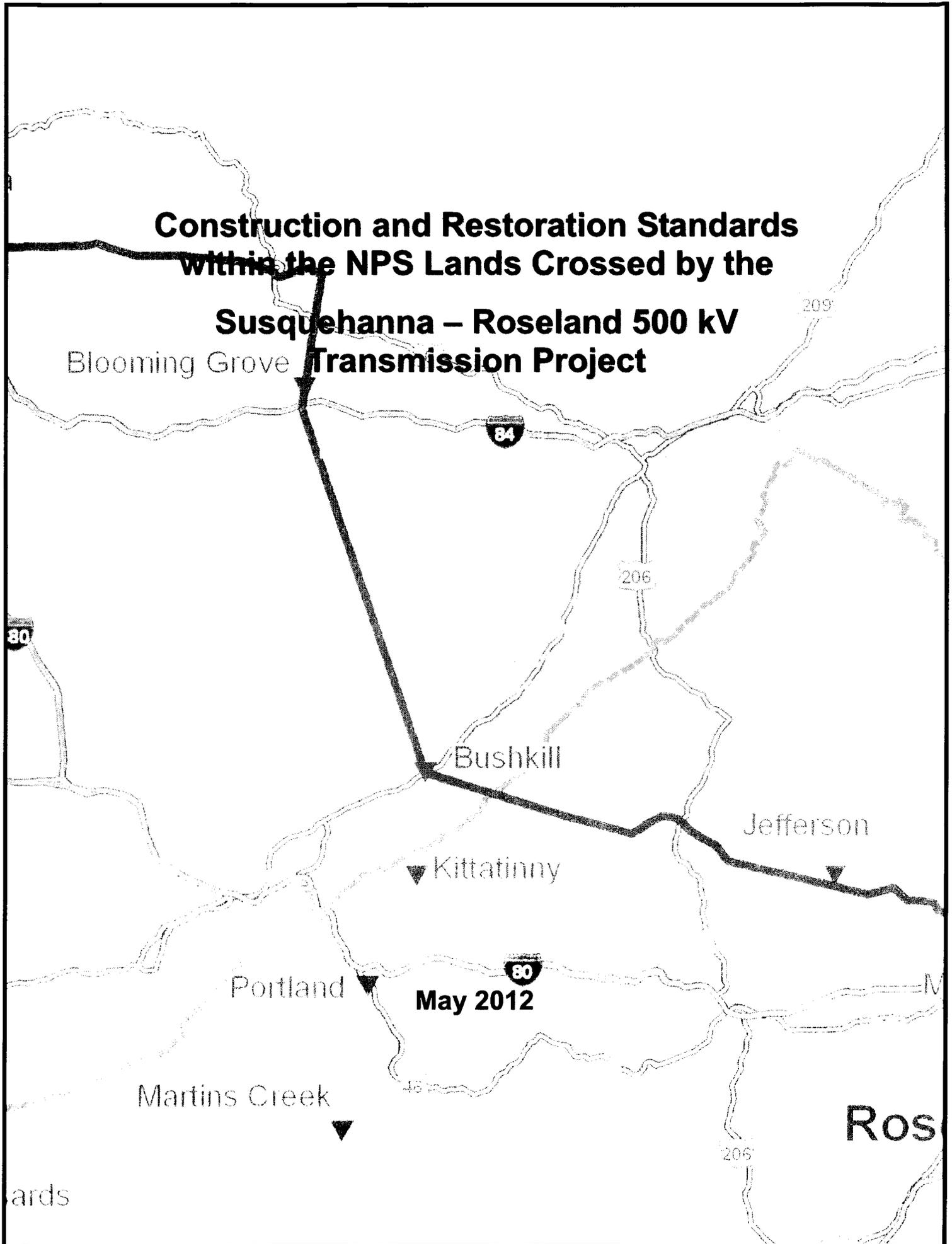


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1.0 INTRODUCTION

PPL Electric Utilities Corporation (PPL EU) and Public Service Electric and Gas Company (PSE&G) (the “Companies”) hereby submit these construction and restoration (CR) Standards for the National Park Service (NPS) Lands crossed by the Susquehanna – Roseland 500 kV Transmission Line (the “Project”). Those lands include 4.18 miles that contain the existing 230 kV transmission lines and rights-of-way, the approximately 5 acre area requested to be permitted by the NPS as additional right-of-way, as well as potential access roads that will be used to construct and operate the line (the “Job Site”). The Companies propose to rebuild this line to add a 500 kV circuit needed to avoid potential system overloads in the future. This Project has been authorized by the Regional Transmission System Operator, PJM, and approved by both the Pennsylvania Public Utility Commission (PUC) and the New Jersey Board of Public Utilities (BPU). The construction process involves removing the existing steel lattice structures and replacing them with taller, modern structures that will accommodate both the existing 230 kV circuit and the new 500 kV circuit on a single structure.

These CR Standards apply during the construction phase of the Project. They are consistent with the Proposed Project Plan and Standard Form 299 Information submitted to the NPS on November 21, 2008 and as later revised in the Companies’ March 4, 2009 Standard Form 299 Information submittal. They are further supplemented to meet the standards for avoidance and minimization necessary for the non-impairment mandate that guides NPS decisions. Any action that potentially affects NPS resources requires environmentally responsible design standards that prescribe the methods to be used for construction within and in proximity to sensitive environmental resources and for the appropriate restoration.

1.1 GUIDING PRINCIPLES AND BEST MANAGEMENT PRACTICES

These CR Standards are part of a set of comprehensive mitigation plans (CMPs) prepared by the Companies. Other components of the CMPs include standards intended to address impacts of the Project on natural and cultural resources. Viewed as a whole, the CMPs provide best management practices (BMPs) to be applied during construction and restoration and to perpetuate ecological stewardship of the right-of-way (ROW). The CMPs will meet all applicable local, state and federal agency regulations and permit conditions. These CR Standards reference specific CMPs that contain additional details.

The selection of the existing, already impacted corridor for the new Susquehanna-Roseland project is a key feature of the Companies’ commitment to avoid and minimize adverse impacts on the environment and other public values. These CR Standards dovetail with the choice of corridor to provide the greatest possible assurance that impacts will be avoided and minimized. The Companies’ CMPs offer substantial compensatory mitigation for those impacts that cannot be avoided entirely.

1.2 RESPONSIBILITY AND COMPLIANCE

Personnel entering the Job Site will comply with all relevant portions of these CR Standards. They will have a demonstrated understanding and high regard for the environmental resources of the region and the resources identified on the construction site plans. Where appropriate, personnel shall have read and shall understand all the approved permits for the Project and the CR Standards for the Project. Personnel working on the Project include, but are not limited to, the following:

- The Companies' personnel who are responsible for assuring permit compliance and for supervision of contract personnel.
- General contractors and their approved subcontractors.
- Environmental compliance firms and their environmental compliance officers, inspectors, and other specialists retained with respect to compliance with the CR Standards, public safety measures, and all other environmental compliance standards and permits.
- Inspectors and other specialists as required by local, state or federal agencies to locate, capture and move or otherwise protect threatened and endangered species.
- Restoration firms to implement specific restoration requirements of the CR Standards.

The Companies will instruct personnel working on the Project to offer the greatest possible courtesy to and cooperation with NPS resource management and other personnel. The Companies will invite the NPS to offer briefings, training or other forms of information sharing to personnel working on the Project. The Companies, at all times before, during and after construction of the Project, will provide NPS with the contact information for Project managers at a level of seniority authorized to address any resource management, safety, compliance or other issue that may arise.

1.3 TRAINING AND SAFETY

The Companies take safety very seriously. A certified Safety Manager will be retained through all construction phases to address the safety of personnel and visitors. Workers will use mandatory personal protective equipment (PPE) including, but not limited to, hard hats, safety goggles, safety harnesses, gloves, hearing protection and protective footwear to safely complete the work.

Employees, contractors and subcontractors will be required to go through mandatory safety training before being allowed to enter the Job Site. The training session will detail the environmental resource issues of the region, these CR Standards, and the responsibilities of the Companies and all other personnel for delivering a safe and environmentally responsible Project. Additional details are included in the Health & Safety Plan.

2.0 DRAWINGS AND SITE INFORMATION

The following provides descriptive information regarding the existing conditions and modifications that will take place within the Job Site. Much of this information is shown graphically on the plan drawings and other documents that were previously provided in the Proposed Project Plan and Standard Form 299 Information in November 2008 and in subsequent meetings and submittals to the NPS.

2.1 INVESTIGATORY PLANNING

Survey work will occur to identify and mark various aspects of the Project including edge of ROW, roadways and structure locations with offsets. Survey crews use light duty vehicles to access the Project and then travel on foot to locate and stake the necessary points.

Geotechnical work is required to properly design the foundations and structures. This work is accomplished with small-tracked drilling machines that must access each anticipated structure location and bore a 3-inch to 4-inch diameter hole for analysis of soil and rock conditions. This work occasionally requires support from a water truck or water tank mounted on an all-terrain vehicle. Typically, clearing and road building is not required for geotechnical work.

2.2 PLAN DRAWINGS

Plan and profile drawings that depict the plan view for the transmission line and cross-sections for typical structure profiles were included with the Standard Form 299 Information and will be updated upon receipt of the Record of Decision and the permits and updated ROW agreements.

2.3 ROADWAYS AND ACCESS ROADS

Six primary roadways will be used for all vehicle and equipment access: Creek Road, Community Drive and River Road in Pennsylvania and Millbrook, Old Mine, and Ridge Roads in New Jersey. These roadways will be used in their current condition and, if damaged, will be restored to their pre-construction condition by the Companies' contractors. If the NPS has plans to improve or modify beyond current conditions any of the roadways to be used for access, and such roadways require restoration due to damage from project-related use, the Companies will reasonably cooperate with the NPS in implementing those improvements or modifications.

Temporary access roads will also be required for project construction. To the extent practicable, the proposed Project access roads shall be located on existing gravel or paved roads. Disturbance outside of the access road rights-of-way will be avoided. New temporary access roads will be designed to the minimum standards necessary to enable equipment to safely reach a structure location.

2.4 STRUCTURE AND FOUNDATION LOCATIONS

The location, height and type of structures proposed along the ROW are shown on the plan drawings provided in the Standard Form 299 Information. A drawing depicting typical foundation characteristics was also provided. Access points for construction access roads as well as crane pad and pulling site locations were identified on the constructability drawings provided in the Standard Form 299 Information. As noted above, this information will be updated upon receipt of the Record of Decision and the permits and updated ROW agreements.

2.5 EXISTING UNDERGROUND UTILITIES

Prior to and during the construction phase of the Project, the construction contractor will be required to contact Pennsylvania One Call and New Jersey One Call to identify buried utilities, as required by state law.

3.0 CONSTRUCTION SEQUENCE

Project construction will occur in the following general phases: surveying, geotechnical boring and grading; vegetation clearing; staging; access road construction; crane pad construction; removal of existing structures; foundation installation; new structure erection; and finally, conductor stringing and energization. Construction stages may occur sequentially or simultaneously. Each phase is described in more detail in the following sections.

3.1 SURVEYING, GEOTECHNICAL BORING AND GRADING

The initial work involves the establishment of the ROW boundaries and the location of the access roads and structures by survey crews. This is followed by geotechnical borings being drilled to determine the subsurface conditions needed for final design. Necessary grading will be performed; however, no substantial changes in topography or grade will occur as a result of the construction and installation of new transmission lines. Minor deviations may occur along access roads or at stream crossings. All grades are anticipated to be restored to pre-construction conditions at the completion of the Project by the Companies' contractors (with the exception of access roads) using similar equipment that is described under Section 3.4, Access Road Construction. Access roads will be designed to minimize disturbance to the extent practicable while still allowing for the safe ingress and egress to the transmission line ROW.

3.2 VEGETATION CLEARING

3.2.1 Clearing Requirements

The proposed design within DEWA will require a cleared ROW of 150 to 200 feet (i.e., 75 to 100 feet of clearing on either side of the centerline). To achieve this clearance width, approximately 25 feet of additional vegetation clearing will be required on each side of the ROW in Pennsylvania where the ROW is currently cleared to only 100 feet (approximately 0.7 mile) in width. The practices to be used are consistent with PPL EU's Vegetation Management Standard titled *Specification for Initial Clearing and Control Maintenance of Vegetation On or Adjacent to Electric Line Right-of-Way through Use of Herbicides, Mechanical, and Hand-clearing Techniques* or the New Jersey Board of Public Utilities (BPU) Vegetation Management regulations, previously provided in the Standard Form 299 Information. The construction clearing practices include use of a buffer for wetlands and watercourses. A minimum 50-foot buffer will be used near intermittent streams and wetlands and a 100-foot buffer will be used near perennial streams; larger buffers will be maintained in certain areas as required by state regulations and permit conditions. The primary method of vegetation clearing to be employed within the NPS will be low-impact tree clearing. Additional details can be found in the Vegetation Management Plan and the Wetlands, Riparian Zones; Floodplain Resources Plan.

3.2.2 Low-Impact Tree Clearing

Low-impact tree clearing is the preferred method for clearing on the ROW. This method incorporates a variety of approaches, techniques and equipment to minimize site disturbance and to protect residual forests, wetlands, watercourses, soils and cultural resources, including stone walls, old cemeteries and old foundations that are commonly found in wooded areas in Pennsylvania and New Jersey. The following describes generally accepted practices of low-impact tree clearing:

- Preparing a harvesting plan detailing access, stream/wetland crossings and landing areas where all timber and limbs will be disposed of.
- Bidding and securing a professional harvesting contract that includes specifications for access, wetland/stream crossings, vegetation removal, cultural resource protection and residual site quality.
- Selecting tree-clearing contractors that are experienced in low-impact tree clearing and certified.
- Utilizing a professional forester to oversee the tree clearing operations, access development, wetland/watercourse crossings, wetland and archeological site protection and wood removal for contract compliance.
- Regulating days of operation due to suitable/unsuitable ground conditions.
- Using a variety of tree clearing equipment to minimize impacts including forwarders, feller bunchers (cut-to-length systems), cable and grapple skidders, high-flotation tires, portable bridges and temporary culverts. Equipment will be matched to specific sites and conditions.
- The skidding of severed trees (tips of trees are dragged along the ground behind a skidder) will be limited to areas of low erosion potential. A forwarder is the recommended equipment type in areas with sensitive soil conditions.
- Trees should be cut close to the ground, and stumps and root systems will be left in the ground to naturally decompose over time. These decaying root systems provide additional soil stability as well as hosting native organisms.
- Maximizing use of upland portions of the existing cleared ROW for landing areas and the use of existing access ways.
- Employing directional tree felling. Trees that are to be cleared will be directionally felled either by hand – a chainsaw and operator – or mechanically by the equipment described below, which typically includes a felling head (a type of rotary saw) attached to a boom. The boom extends out to the tree, the felling head severs the tree, and the boom and operator place the tree on the ground.

Skidders are large articulated tractors with either a grapple or cable winch at the rear of the machine. The winch allows the skidder to be parked away from sensitive areas and to winch trees back to the machine. They may have rubber tires or tracks. A forwarder is a tractor with a loading boom and bunk on the back of the machine to hold logs. A forwarder drives up to a pile of logs, loads the logs onto its bunk and drives back to the landing area. The logs are never skidded on the ground.

A feller buncher is a “cut-to-length” system consisting of a tractor with a specialized felling head on a boom that is capable of cutting a tree, directing its fall, removing the limbs and cutting the full size tree into logs. This system is more commonly used in smaller diameter conifer forests.

There are some variations to the equipment described above, including whether the equipment is mounted on tracks or rubber tires, but these devices are typically the equipment recommended for use in this type of clearing.

3.3 STAGING AREAS

Staging of all equipment and material for work will be primarily located on the existing ROW or at an off-site staging area(s) outside of NPS lands. The Companies do not intend to construct or use any staging areas on NPS lands outside of the ROW.

3.4 ACCESS ROAD CONSTRUCTION

Access roads include both existing access roads and new construction access roads, including spurs from existing access roads to structures where needed. Improvements to existing access roads will be necessary. New roads and improvements may include grading, placing geotextile fabric, installing and compacting gravel, and installing any necessary erosion control measures. The width of the access roads will typically be 20 feet. Location of access roads will be as shown on the site plans included with the Standard Form 299 Information submitted to the NPS on November 21, 2008 and as later revised in the Companies’ March 4, 2009 Standard Form 299 Information submittal. Prior to the initiation of construction activities, the utilities’ Environmental Inspector or Construction Supervisor will install signage identifying access roads restricted from vehicular traffic.

Road improvement or new construction road work typically requires the use of trailers to deliver the equipment, tri-axle trucks to haul in gravel, bulldozers or graders to evenly spread the material out, water trucks to control dust, an excavator to revamp areas that need stabilizing, and a roller to ensure the integrity and reliability of the access road. All equipment will be delivered to the particular proposed access road where it will be unloaded. This work typically takes between one and two days per 300 feet of road depending on topography and weather conditions.

When constructing the access road from existing roads, the Contractor shall not alter the existing drainage courses or drainage patterns of the existing roads. Stream beds, flowing or dry, shall not be used for construction roads or vehicle movement for any class vehicle. When roads are to be located adjacent to streams or wetlands, as shown on the approved regulatory agency plans, a silt fence or other approved control and a buffer or filter strip of sufficient width are to be left in place to prevent the silting of the stream until the area is sufficiently stabilized. The silt fence and a buffer or filter strip shall be installed and inspected in accordance with applicable permits.

When rutting occurs, the Contractor shall fill and repair all ruts as soon as conditions warrant. On areas where standing water collects due to construction related rutting, the Contractor shall make provisions to drain the water using appropriate sedimentation and erosion controls. Additional details can be found in the Erosion and Sediments; Spill Prevention & Response Plan.

All of the new temporary access roads will be removed and/or revegetated, unless specific roads are identified to remain as part of an environmental enhancement or mitigation project which shall be in accordance with the specifications.

3.5 CRANE PAD CONSTRUCTION

Crane pads are depicted on the constructability drawings provided in the Standard Form 299 Information. Crane pads will typically be 100 feet wide by 100 feet long and will be used to set up a crane to erect the structures. The construction of the crane pads will include grading, placing geotextile fabric, installing and compacting gravel, and installing any necessary erosion control measures. All crane pads will be removed and the area will be restored to pre-existing conditions, to the extent feasible.

This work typically requires the use of tri-axle trucks to haul in the material, a bulldozer to evenly spread the material out, an excavator to revamp areas that need stabilizing, and a roller to ensure the integrity and reliability of the crane pad. This work typically takes between one and two days per crane pad, depending on topography and weather conditions.

3.6 REMOVAL OF EXISTING FACILITIES

Equipment needed to remove existing facilities may include the following:

- Boom and bucket trucks to allow the controlled lowering and removing the conductor.
- A pulling machine for winding up the conductor or shears for chopping.
- Trucks with trailers to haul off the bundles of conductor as well as the bins containing the steel.
- Equipment to lower the steel towers.

- A machine that will chip the concrete foundations, where present, below grade.

All equipment will use public roadways and the previously identified access roads. Typically, the teardown and removal of lattice towers takes two weeks per mile, depending on specific location needs and weather.

Once the access roads and crane pads are in place, the Contractor will begin removal of the existing lattice towers. Typically, the conductor (wire) will be removed first by cutting the conductor using a hydraulic shear at a pre-determined location. If the conductor is reeled, it will be attached to a pulley system that will wind up the conductor in large, secured bundles.

Once the conductor is removed from the towers, the towers will be either dismantled or lowered onto the ground in a controlled manner. Once safely on the ground, the steel will be cut into smaller pieces and placed in dumpster-like bins that will then be hauled off to the appropriate recycling location. Lastly, concrete foundations, where present, will be chipped below grade and clean fill will be placed over the areas. These areas will then be seeded with a conservation seed mixture appropriate to the local conditions. This work will be performed in accordance with all applicable local, state, and federal laws and regulations.

3.7 FOUNDATION INSTALLATION

The new structure locations will be surveyed and properly marked using Geographical Positioning System (GPS) technology. Typically, the foundation depth will range between 15 and 40 feet with a diameter of 8 to 12 feet. Depending on specific soil and rock conditions, a combination of drilling and excavating will be used.

Drilling: For the drilling method, a rubber-tired or tracked machine is used to drive an auger into the earth and remove the soil. Specialized augers are available that are capable of drilling through rock if needed.

Excavating: For the excavating method, a rubber-tired or tracked machine is used employing a bucket and/or a hydraulic ram to remove the soil and/or rock.

Reinforcing steel and anchor bolts will then be installed in the excavated hole. Concrete will then be brought in with a standard concrete truck and placed into the excavated hole and allowed to cure.

All equipment will use public roadways and the previously identified access roads. Typically, it takes two to four days to excavate the hole and place the concrete for the foundation, depending on soil conditions and weather.

3.8 STRUCTURE ERECTION

Once the concrete has properly cured, the structures will be erected. The proposed structures on NPS lands are either a one- or a two-pole design. The height of the structures will range from 165 feet to 195 feet. Current design requires that there will be four (4) structures in Pennsylvania and eleven (11) structures in New Jersey located on NPS property. This compares to the existing eight (8) structures in Pennsylvania and thirteen (13) in New Jersey. Typically, the structures are brought on site in several pieces with a trailer and then assembled on the specific crane pad associated with the structure. Using a crane, the structure is placed on the foundation. Once in place, a series of bolts are tightened down to secure the structure to the foundation.

This work typically requires the use of a crane, a boom and bucket truck to help guide the structure onto the foundation, and an air compressor for the fastening of the bolts. All equipment will use public roadways and the previously identified access roads. Typically, this work requires one to two days per structure, depending on weather conditions.

3.9 CONDUCTOR STRINGING

A puller and rope reel will be located at one end of the transmission line section and the wire reels at the other end. Between the puller and the wire reel, rope will be installed into pulley blocks that are attached to the arms of the structures. This may be done on the ground by pulling the rope with a vehicle along the ROW from structure to structure, but it is becoming more common to use a helicopter to fly the rope from structure to structure to reduce the impact on vegetation and resources in ROW between structure locations. Once the rope is in place a “hard line” or steel wire-rope is pulled through the pulley blocks. The hard line is then used to pull the conductor into place. Once all the conductor is in place for a specific section, the conductor is then tensioned to the designed tension and attached to the insulators. The stringing operation on all areas of the project will be performed with appropriate safety oversight so that the public safety is maintained at all times on all private, public and NPS lands and resources, such as the Delaware River.

This work typically requires the use of boom and bucket trucks, a pulling machine that will wind up the conductor, and trucks with trailers to haul off spools of rope, and will include the use of a helicopter to string the rope into place. All equipment brought via ground transport will use public roadways and the previously identified access roads. Typically, the work takes one week to string each mile of line, depending on field conditions and weather conditions.

4.0 CONSTRUCTION CONTROL MEASURES

Control measures will be employed to minimize disturbance and potential impacts on natural and cultural resources associated with Project construction activities. The following sections detail the different types of control measures that will be utilized to extent practicable during Project activities. Additional details can be found in the Health & Safety Plan.

4.1 GENERAL HOUSEKEEPING

The following general housekeeping practices will be followed during construction and restoration activities:

- All products and materials shall be properly containerized, labeled and stored to minimize the risk of any unintentional release or impacts to the environment.
- All wastes and excess materials shall be properly stored and removed in a timely manner to avoid potential nuisance issues.
- All applicable federal and state regulations concerning the use, storage, transportation and disposal of all wastes and excess materials shall be followed.
- All operations will be confined to the ROW or designated construction areas, including but not limited to access roads, crane pads and pull sites.
- Care shall be exercised in placing and storage of construction tools, equipment, materials and supplies to avoid the potential risk of unintentional damage to the environment.
- All temporary structures and other facilities incidental to the new construction shall be removed and the Job Site shall be restored to pre-construction conditions, unless otherwise directed by the Companies.
- All access routes, storage yards, rights-of-way and properties associated with the Project shall be kept free of foreign material, debris and litter. The Job Site shall be left secure and orderly at the completion of each major phase of construction.

4.2 TRAFFIC CONTROL

The Companies require contractors to develop and implement specific traffic control plans in accordance with Federal, State and local laws and regulations to ensure public safety on public roads when related to movement of construction equipment, material delivery, foundation installation, structure erection and cable installation. Flagging and traffic signs identified in such plans will be used to notify drivers of short-term traffic slowing or stoppage as a result of Project activities. Construction vehicles, both gasoline and diesel-powered, which are to be operated on public

highways, shall comply with all applicable regulations. Additional details can be found in the Health & Safety Plan and the Communication Plan.

4.3 ENVIRONMENTALLY SENSITIVE AREA CONTROLS

The Companies recognize and respect that NPS lands contain environmentally sensitive areas that are known to the NPS and others that may still be discovered following completion of all studies on the Job Site. The NPS provided a letter to PPL EU on November 4, 2008, which outlines their considerations and recommendations for species, communities and their habitats within and near the Job Site. The Companies intend to comply with each of the NPS recommendations included in that letter, and many of the measures have already been implemented. The Companies have signed a confidentiality agreement with the NPS to help protect these resources and commit to ensuring that their identity and integrity remain intact. The specific known environmentally sensitive areas, as indicated in the November 4th letter, are as follows:

- Shoemakers Barren.
- Arnott Fen Wetland Complex.
- Hogback Ridge.
- Delaware River Riparian Area.
- VanCampens Brook Riparian Area.
- Kittatinny Mountain.

In addition, the NPS recommended the following general considerations for all project areas, including proposed access roads:

- The Companies have conducted field-based habitat assessments to identify potentially occurring special concern species, using NPS threatened and endangered (T&E) species list and other lists developed by consulting agencies, and documented special concern species accordingly.
- PPL EU and PSE&G have consulted and will continue to consult with the NPS, USFWS, and the Pennsylvania and New Jersey state agencies to avoid or mitigate potential adverse impacts on any species and habitats of concern. Habitat assessments and follow-up surveys will be conducted as needed, especially when impacts are not likely to be avoided. Master lists were used to target specific plant species at particular locations and habitats.
- The Companies have consulted with the NPS, USFWS, and the Pennsylvania and New Jersey state agencies regarding impacts to Indiana bats. No instances of Indiana bat were subsequently found on NPS lands along in the Project area.

In close coordination with the NPS, the Companies have conducted numerous habitat suitability evaluations and field studies to identify potential species of concern and

their habitats along and near the ROW, proposed access roads, and other areas in which any project work could occur. Species and habitats evaluated include:

- Bog turtles (*Glyptemys muhlenbergii*), as requested by U.S. Fish and Wildlife Service (USFWS), NPS, New Jersey Department of Environmental Protection (NJDEP), and Pennsylvania Fish and Boat Commission (PFBC)
- Wood turtles (*Glyptemys insculpta*), as requested by NPS and NJDEP
- Numerous plant species and habitat, as requested by per NPS, NJDEP, and Pennsylvania Department of Conservation and Natural Resources (DCNR)
- Timber rattlesnakes (*Crotalus horridus*), as requested by NPS, NJDEP, and PFBC
- Raptors, including bald eagle (*Haliaeetus leucocephalus*), red-shouldered hawk (*Buteo lineatus*), northern goshawk (*Accipiter gentilis*), Cooper's hawk (*Accipiter cooperii*), barred owl (*Strix varia*), and long-eared owl (*Asio otus*) as requested by NPS and NJDEP
- Various bat species, including Indiana bat (*Myotis sodalis*), as requested by USFWS, NJDEP, and Pennsylvania Game Commission (PGC)
- Numerous invertebrate species, as requested by NPS and NJDEP
- Wetland and vernal habitat surveys, as requested or required by NPS, U.S. Army Corps of Engineers (USACE), NJDEP, and Pennsylvania Department of Environmental Protection (PADEP).

The T&E species and habitat information gathered during the studies has and will continue to be used to avoid or otherwise minimize any potential impact on any such species and habitat within DEWA during all project phases. Locations of any species and habitats of concern have been documented and will be appropriately noted on construction plans. These T&E species and locations will be protected in accordance with permit conditions and applicable federal and state regulations. The Companies have worked and will continue to work with the NPS and state and federal agencies throughout all phases of the project to protect these valuable resources. Additional details can be found in the Avian Resources; Protected Resources Plan.

4.4 EROSION AND SEDIMENTATION CONTROL PROCEDURES

In order to avoid, minimize or mitigate the potential for erosion and sedimentation impacts, both utilities employ a range of soil erosion and sediment control measures during the construction, operation, and maintenance of transmission lines. Typical control measures that may be utilized include the following:

- Environmentally sensitive areas such as wetlands, floodplains, streams, and watersheds are identified within the Job Site. This information is utilized to minimize the environmental impact to soils and other natural resources.
- Where feasible, road grades and alignments would follow the contour of the land with smooth, gradual curves within the limits of the ROW.

- During clearing operations, soil disturbance would be kept to a minimum with rock outcrops and tree stumps remaining in place.
- Access roads on steep slopes (15% or greater) should be avoided where possible or feasible to minimize the potential for soil erosion and slower revegetation.
- Access through large rock outcrop areas should be avoided by routing access roads around or by terminating access on one side of the rock outcrop area.
- Where streams are not crossed by access roads, vehicular traffic would be restricted a minimum of 50 feet from the stream bank to avoid disturbing these sensitive environmental areas.
- Access through a wetland would be avoided where possible by routing access roads to higher ground around the wetland or by terminating the access road on either side of the wetland.
- Access roads would be located where possible to avoid existing compatible tree species remaining on the right-of-way. When it is necessary to locate an access road through a cluster of trees, the route shall be selected that minimizes tree removal and damage.
- Prior to the initial vegetation clearing, filter fabric fences would be installed below all areas to be disturbed.
- Appropriate vegetation management techniques would be used as required, mandated by law, or as otherwise discussed in Section 3.2 and in Attachment F.
- Soil disturbance would be kept to a minimum and permanent restoration would be made promptly following grading. All seeded areas will be mulched. Slopes in all cuts and fills and scarred areas shall be hydroseeded as soon as practical with an appropriate seed mix in consultation with the NPS, to reduce erosion and restore vegetative cover. The installation of an erosion control blanket may be required at critical locations where high erosion potential exists and when time of year is not suitable for seeding.
- Potential erosion areas will be inspected weekly and promptly after storm events. Ruts will be smoothed out and gravel spread to stabilize the roadway and prevent erosion.

In addition, soil and erosion control plans, incorporating applicable elements discussed above, will be developed in cooperation with the NPS and with appropriate local approvals and as mandated in state permits and approvals from the PADEP, NJDEP, Monroe County Conservation District, and Warren County Soil Conservation District. Contractors will need to comply with the practices outlined above as well as the specific BMPs identified in each approved soil and erosion control plan as applicable. Additional details can be found in the Erosion and Sediments; Spill Prevention & Response Plan.

4.5 PROTECTION OF CULTURAL RESOURCES

Cultural resources (including archaeological, historic structures and historic view sheds) along the ROW, proposed access roads, or in other areas that could be affected by the project have been surveyed and identified. All identified archaeological sites to which adverse effects cannot be avoided have been evaluated for eligibility for inclusion in the National Register of Historic Places (NRHP). Adverse effects to unavoidable eligible sites will be mitigated according to plans developed in consultation with the respective State Historic Preservation Offices (PHMC/BHP and NJDEP HPO) and in consultation with the NPS/DEWA. Project-related ground disturbing activities, such as tower construction, modification of existing access roads, and creating of new access roads will seek to avoid previously recorded archaeological resources.

Impacts to historic architectural properties (buildings, structures, and historic districts) and any cultural landscapes will primarily be visual, created by installation of new towers where none exist, of higher towers where shorter towers now exist, and by clearing of forested land. The Companies will continue to consult with the PHMC and the NJDEP HPO throughout the planning, design and construction process and conduct any additional field work and surveys as necessary as part of the project permitting process to minimize potential impacts to historic architectural properties in accordance with the requirements of Section 106 of the National Historic Preservation Act. Additional details can be found in the Compensatory Mitigation Plan.

Locations of identified cultural resources will be identified on project plans, construction specifications and applicable mapping, and protected in the field as appropriate through avoidance (e.g. fencing or cordoning off areas) or other means (e.g., matting) in accordance with recommendations or requirements of the PHMC, HPO and the NPS. If items or areas of possible archaeological interest are encountered while performing work, the appropriate agency or on-site inspector will be promptly notified. Such agency or inspector will provide immediate guidance regarding the ongoing work activities.

4.6 DISPOSAL PROCEDURES

The construction contractor will remove all construction debris and dispose of it in accordance with local, state and federal regulations. Soil and rock removed during foundation excavation will be spread on the ROW in adjacent upland areas.

4.7 SPILL RESPONSE PROCEDURES

Absorbent spill response materials shall be readily available on-site in reasonable proximity to work sites along with personnel qualified to use them. Appropriate personnel shall be immediately notified of any hazardous material spills at any location of the Project or other water quality incidents in watershed or aquifer protection zones. The following practices will be employed to prevent and address any accidental spills on the Job Site:

- Designated staff will be trained in the handling of fuels and other hazardous materials.
- The Contractor will regularly inspect and maintain construction equipment in proper working order.
- Designated areas will be established for vehicle fueling, material storage, and overnight parking of equipment.
- Equipment will be fueled at least 300 feet from the nearest waterbody or wetland, or at least 150 feet from a riparian zone or floodplain.
- To the extent practicable, equipment will be parked overnight at least 300 feet from the nearest water body or wetland, or at least 150 feet from a riparian zone or floodplain.
- Storage of hazardous materials, lubricating oils or fuels will be located at least 300 feet from a wetland or water body, or at least 150 feet from a riparian zone or floodplain.
- The Contractor will maintain spill containment and clean-up supplies.
- Lubricating oils or fuels will be stored where fueling activities take place and within active construction areas.

Additional details can be found in the Erosion and Sediments; Spill Prevention & Response Plan and the Wetlands, Riparian Zones; Floodplain Resources Plan.

4.8 WATER CROSSING TECHNIQUES FOR CONSTRUCTION EQUIPMENT

Water crossing methods that may be used at small streams during construction include flume pipe with crushed rock ramp, temporary bridge, wooden construction mats, and stone fords. Specific construction techniques at each water crossing will be dependent upon site conditions at the time of construction and will be the

responsibility of the Construction Supervisor representing the Companies, with input from the Environmental Inspector.

All wetlands in the project corridor and potential access road locations were delineated along the existing transmission line ROW to a corridor width of approximately 200 feet. Wetland boundaries were flagged and soil borings (using hand augurs) were made at various data points as determined necessary to analyze soil conditions in accordance with the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. All work was conducted in accordance with regulatory guidelines and commonly accepted best practices. The wetland teams used GPS equipment to document wetland boundary points. NPS was also consulted in the process and functional values of wetlands in the Project area were identified in accordance with NPS guidance.

The Companies have met with the PADEP, NJDEP, and the U.S. Army Corps of Engineers (USACE) to discuss water encroachments, aerial water crossings and related permits that will be necessary prior to construction. Regardless of the final permits required, wetland delineation results, erosion and sedimentation control plans, approvals from the Monroe County Conservation District (PA) and the Warren County Soil Conservation District (NJ), approval from the Delaware River Basin Commission, as well as best management practices, mitigation measures, and other conditions will be part of the permit conditions and incorporated into construction specifications and operation and maintenance manuals/requirements as applicable.

Additional details can be found in the Wetlands, Riparian Zones; Floodplain Resources Plan.

4.9 CONSTRUCTION WORK NEAR STREAMS, WETLANDS AND RIPARIAN ZONES

Construction near a stream channel will be timed and otherwise conducted pursuant to any applicable regulations. This does not preclude the ability to gain access over a stream providing a temporary bridge is provided and used for construction.

Vehicles will only be operated across a stream channel over a temporary bridge or other approved structure. Driving directly across a stream channel with machinery or vehicles is prohibited. At locations where a temporary access road must be built across a stream channel, the crossing will be constructed as closely perpendicular to the stream channel as possible and will generally span the channel using a prefabricated bridge design.

Prior to the construction of proposed temporary stream crossings, the Companies or their agent, shall conduct a physical assessment of the stream systems prior to construction to characterize the pool and riffle complexes. Authorized stream crossings should be made at the pool and not within the riffle point, while being respectful of the timing restrictions for trout and other species.

All disturbed sections of stream channels will be stabilized after construction and restored to their pre-construction conditions to the degree practical with respect to channel slope, elevation and discharge capacity. Natural streambed materials will be replaced, construction will be staged so that a minimal amount of soil will be exposed at any given time, and soil stabilization measures will be implemented as quickly as possible after clearing to minimize erosion. In addition, the following activities will be prohibited during construction and restoration activities:

- Mining of any stream channel.
- Stream channel modifications, except as included as part of a specific restoration/mitigation component.
- Direct stream channel fording.
- No logs or boulders that provide fish habitat shall be removed from the channel.
- No equipment will be operated outside of the construction limits in wetlands and riparian zones as shown on the approved plans.
- No brush or other construction debris will be disposed of within floodplains, stream corridors, wetlands and wetland transition areas.
- Construction equipment contact with non-storm induced flowing water is prohibited and shall be minimized through the use of timber mats, temporary coffer dams or culverts to divert flow around construction activities.
- Contractors shall take such measures as are necessary to ensure unrestricted passage and movement of fish and wildlife. No artificial structure or stream channel change that cause a permanent blockage to movement of fish, reptiles or amphibians shall be constructed.

In addition, low flow aquatic passage shall be maintained both during and after construction and designated concrete wash out stations will be used for all concrete disposals within DEWA. Soil and other types of stockpile areas, if any, will be located away from wetlands, transition areas, riparian zones, floodplains and State open waters. These stockpile areas will be protected with hay bale filter barriers and/or silt fencing at their down slope base.

Upon completion of construction, the following activities will occur:

- All temporarily disturbed stream channel sections will be restored to their pre-construction conditions to the extent practical through replication of channel bottom elevations, shape, width and meandering, as well as replanting of native vegetation.
- Temporarily disturbed areas will be restored to their pre-existing conditions, including replacement of vegetation removed during construction, by reseeded and replanting with the company approved seed mixtures and in

coordination with the NPS, Monroe County Conservation District and Warren County Soil Conservation District.

- Natural sediment transport patterns will be preserved by replicating the ratio of shallow areas to deep areas, anticipated flow rate and streambed material.
- Materials used for temporary stabilization will be removed after construction is completed and construction equipment access is no longer necessary.
- The existing tower footings will be excavated and removed to a depth of approximately one foot below the ground surface. Footing locations will be backfilled, graded to match existing elevations and seeded. All dismantled steel and associated hardware will be removed from the DEWA.
- Wood chips from existing trees on site may be spread within the ROW but shall not exceed three inches in depth on average and shall not be deeper than six inches in any one location. No wood chips may be left in wetlands and watercourses or their buffers.

4.10 CONSTRUCTION WORK WITHIN STREAMS, WETLANDS AND RIPARIAN ZONES

The Contractor will use BMPs to minimize disturbance to streams, wetlands and riparian zones during construction and restoration activities.

4.10.1 Construction Timing and Sequence

Whenever practical, construction activities that would impact water quality or stream resources of waters classified by New Jersey or Pennsylvania agencies as Trout Production or Trout Maintenance will be avoided during critical periods as follows:

- Trout production – September 15 through March 15
- Trout maintenance/trout stocked:
 - May 15 through June 15 (New Jersey)
 - March 1 through June 15 (Pennsylvania)

The Contractors will employ construction timing restrictions during critical periods where construction activities occurring within the designated Riparian Areas or Open Waters may affect wetlands, vernal pools and/or state or federally listed species.

The approved site plans show the locations and details for the use of timber mats (also known as marsh mats) which shall be used for all construction work within wetlands in accordance with federal and state permits to minimize the amount of disturbance to vegetation and compaction of soils within these areas. The area used for access to the construction location shall be minimized to the maximum extent practicable in accordance with approved access road site plans.

4.10.2 Construction Practices

The following general practices will be employed during construction within steams and wetland areas:

- The disturbance of existing roots and topsoil beneath timber mats, crane pads and access roads will be avoided to the maximum extent practicable. Existing surface water drainage patterns will be maintained through the use of temporary pipes and culverts to the maximum extent practicable.
- Wildlife passage shall be assured through the use of drift fence designs that lead to culverts to enable reptiles and amphibians to safely pass through the timber mats.
- Disturbance/removal of trees for access to the construction site shall be minimized to the maximum extent practicable, unless specifically designed as part of the mitigation process. Whenever trees must be removed, selective removal of trees less than four inches in diameter is preferred in lieu of removal of larger trees.
- Tree stumps will not be removed, encouraging the revegetation of the tree via sprouts unless these trees are within the ROW and would otherwise be required to be removed through the applicable federal and state regulations governing the reliability of the transmission line.
- Excavation and filling activities will be conducted in a manner to minimize turbidity and sedimentation. Placement of embankments (filling) will be conducted in such a manner as to contain sediment at the fill areas.
- The limits of disturbance have been indicated on the approved final design plans and represent the maximum area necessary for the construction of the new transmission line.
- Slopes will be protected as soon as reasonably achievable with vegetative cover, or as a temporary measure with fiber mats or straw mulch. A protective area of vegetative cover will be established as soon as reasonably achievable between embankments and wetland areas.

4.10.3 Erosion Control Measures Within the Riparian Zone and Wetlands

The following erosion and sedimentation control measures will be utilized within the riparian zone and wetlands:

- Minimize area of disturbance and soil exposure; preserve existing vegetation.

- Install silt fences and/or hay bales at up gradient boundary of wetlands and streams within no less than 25 feet of an access road or work areas in accordance with approved erosion and sedimentation control plans.
- Install silt fences in the riparian zone along streams that cross the ROW or access roads, placed in a manner that reduces concentrated stream flows.
- Manage and divert runoff from areas outside of ROW away from disturbed areas.
- Use temporary sediment traps for larger areas of disturbance.
- Establish and maintain sediment tracking controls at construction access/egress points.
- Use directional tracking and tillage as needed when working on steep slopes.
- Cover or otherwise provide temporary stabilization for soil stockpiles.
- Employ appropriate dewatering controls.
- Use sediment traps for construction dewatering, if required.
- Direct sediment trap discharge to undisturbed vegetated areas, avoiding steep slopes and concentrated flow, to prevent erosion of downstream areas.
- Employ energy dissipating measures (e.g., riprap at sediment trap outlet).
- Promptly correct and stabilize any areas disturbed by the dewatering discharge; adjust discharge approach to avoid additional erosion.
- Seed and/or mulch disturbed areas up gradient of streams and wetlands as soon as practicable to prevent soil erosion.
- Mulch may be used where additional disturbance is anticipated or when seasonal conditions necessitate delay of reseeded or replanting.
- Annual rye grass erosion control seed mix may be used for temporary revegetation prior to restoration replanting.

4.10.4 Other Construction Measures

The following additional construction measures may be employed where applicable and in accordance with approved permits and erosion and sedimentation control plans and in consultation with the NPS:

- Conduct pre-construction stream surveys at designated crossing locations to support later restoration efforts (see Section 5). Photographically document locations and identify pre-construction plant communities. GPS can be used to identify locations as well.

- Stockpile topsoil (outside of wetlands and riparian areas) for reuse during post-construction restoration.
- Use selected cut trees, root wads, rocks/boulders, and brush for potential use as in-stream habitat, bank stabilization, and/or to replace coarse woody debris in restored transitional floodplain forest, as allowed by permits governing activities in wetlands.
- Anchor or install jacks as needed to secure or raise elevation of timber mats to exceed the anticipated stream water elevation occurring during a one year storm event.
- Install temporary gravel anti-tracking pad at each end of the timber mat to minimize tracking and discharge of soil into the stream while crossing mats.
- Install filter fabric barriers along stream banks flanking timber mats.
- Limit access to riparian and wetland areas where disturbance is not required for construction.
- Use construction fencing or other physical barriers if practical; at a minimum, use visual posting/flagging of such areas.
- Clearly mark Open Water and Riparian Areas where special construction practices are required.
- Conduct visual monitoring of streams before, during and after construction.
- Complete at least two pre-construction observations (one during dry conditions and one during wet weather) for each stream crossing.
- Inspect each stream crossing in active construction or disturbed areas within a reasonable time period after each storm event. Use paired monitoring locations (one upstream of construction activities, and one downstream). A measurable storm event is defined as rainfall greater than 0.5 inch or sufficient to produce runoff in the construction zone if greater than 0.5 inch.

4.11 FUELING

No fuel storage or refueling of mobile equipment from fixed or mobile sources is permitted within 300 feet of a wetland or watercourse, or 150 feet of a riparian zone. All bulk fuel storage within the Job Site shall have 110% containment of largest container, double wall. All fuel trucks will be equipped with spill containment materials.

4.12 NOISE CONTROL

Mufflers and intake silencers will be utilized on all construction equipment, in accordance with federal and state requirements, as applicable.

4.13 DUST CONTROL

Fugitive emissions during project construction will consist primarily of dust during earth-moving activities and minor amounts of emissions from construction equipment combustion engines. However, potential impacts from these activities would be limited and short term. The Contractor will employ reasonable measures to minimize dust during construction. Measures include the following:

- Vehicles transporting fill, soil or other materials to and/or from the construction areas will be covered with canvas or similar material.
- Where appropriate, efforts will be taken to remove excess soils from construction vehicle wheels/tracks before entering paved roads.
- Unpaved access roads and construction areas may be wetted as needed to control fugitive dust emissions
- Construction equipment may be fitted with up-to-date emission controls to the degree practicable.
- Rock construction entrances will be used to control and minimize the potential spreading of soils onto public roads.

4.14 INVASIVE SPECIES CONTROL

Measures shall be taken to adequately control equipment operations and maintenance to prevent contamination (alien, plant/wildlife species or seeds, pathogens/toxic substances, etc.) of the ROW and adjacent areas and any water resources, including wetlands, watercourses and bodies of water on or adjacent to the ROW, and prevent accumulation of debris of all types and containers of liquid waste products. Washing of construction vehicles and equipment shall occur only within designated wash down areas and must be done in accordance with procedures for protection from invasive species. See the Vegetation Management Plan for additional details.

4.15 HOURS OF WORK

The Contractor will plan all work around all time-of-year restrictions associated with state or federally protected species. The Contractor will lay out work and receive approval by the Companies prior to beginning construction. Operation of machinery will be limited to work time frames as allowed by local laws and in coordination with the NPS.

5.0 RESTORATION MEASURES

All disturbed areas will be restored in accordance with approved erosion and sedimentation control plans and post-construction storm water management plans. This includes crane pad, pulling site and access road locations.

5.1 GENERAL RESTORATION ACTIVITIES

Restoration will include removing all temporary gravel and timber mat work pads, access roads, mat roads and bridges, regrading where necessary, seeding with native seed mix approved by the Companies and as specified in approved erosion and sedimentation control plans, and installing native shrub plantings where required.

Restoration activities will be conducted and their success monitored according to all applicable approved plans, permit requirements and regulations. Permanent restoration of the ROW and access roads, pulling areas and staging areas can begin as soon as the weather permits and all construction work is complete.

The Contractor shall conduct restoration activities as discussed in the following subsections.

5.1.1 General Restoration

- Restore all areas as close as practicable to their original state; match existing contours of adjacent areas and match existing landscaping.
- Provide pre- and post-construction documentation of the Project area, including but not limited to photographs and video, etc., clearly indicating the specific location. Documentation procedure is to be approved by the Companies and Program Manager.
- At all times limit the movement of crews and equipment to avoid unnecessary rutting of the ROW, marring the land and damaging crops, pasture and hay land.
- Implement “typical” or site-specific restoration design as designated for the location based on pre-construction surveys. Anticipate that a vast majority of locations will be addressed with a typical design and that a small percentage (<5%) of locations may require site-specific design.

5.1.2 Wetlands

- Sequencing of construction activity shall enable construction work that requires site access through the wetlands to be completed within six months to enable their restoration to occur as soon as possible. This will be accomplished through the removal of proposed timber mats and geotextile fabric, the regrading of the disturbance to loosen soil compaction, if needed, and the seeding of these areas with a wetland conservation seed mixture. These measures will be used along with

appropriate erosion control measures and monitoring to ensure successful reestablishment of wetlands vegetation and hydrology.

5.1.3 Vegetation/Seeding

- Contractor shall be responsible for all reseeded activities that may be needed due to disturbance.
- Where significant vehicle traffic has occurred, soils may be scarified prior to replanting, as appropriate for the planting mixtures proposed.
- Replant riparian zone to achieve conditions which approximate pre-construction conditions.
- Seed and/or mulch disturbed areas up gradient of streams and wetlands within 24 hours of disturbance to prevent soil erosion.
- Mulch may be used where additional disturbance is anticipated or when seasonal conditions necessitate delay of replanting.
- Use the Companies' upland, wetland or riparian seed mixes, as appropriate for final seeding.
- Allow for natural recruitment and introduction of native shrub and tree species as allowed for within the Companies' Right of Way Vegetation Management Plans.

5.1.4 Invasive Species

- Design restoration activities to prevent the establishment of invasive species and to eliminate existing invasive plants within the disturbance area to the fullest extent practicable.
- Implement invasive species control measures as needed until vegetation is well established.
- The Companies shall provide a photographic catalog of invasive and exotic species to the Contractor for reference in the field.

5.2 SEEDING SPECIFICATIONS

The Contractor shall submit all Certifications from suppliers that the seeding products provided meet the purpose of the technical specifications, such as, but not limited to, seed mix showing purity and germination of each seed type and total pounds of seed required per acre. Seeding shall be performed at all areas where roads are removed, in disturbed areas, and as directed by the Companies. The Contractor shall be responsible for seed germination. Seeding activities shall adhere to the following requirements/specifications:

- Furnish and install 3 inches of topsoil and seed and fertilizer as indicated on the plans. Seeding rates and mix shall be as shown on the plans. Topsoil and

seed shall be installed in all areas requiring restoration to include roadways, slopes and restored cut and fill areas.

- Seed shall be fresh, clean, new crop seed consistent with grasses native to the area and shall be approved by the Company prior to application.
- Seed shall meet the requirements of the New Jersey Department of Agriculture and the Penn State College of Agricultural Sciences Erosion Control and Conservation Plantings on Non-cropland, as applicable.
- Seed shall be labeled according to U.S. Department of Agriculture Federal Seed Act, and furnished in containers with tags showing variety of seed in mixture, purity, germination, weed content, name of seller, and date on which seed was tested.
- Seed shall be accompanied by certificate from the contractor that seed meets requirements of these technical specifications on the approved plans for the Project.

5.2.1 Seedbed Preparation

Where practical, the Contractor shall dispose of any rocks or other obstructions which might interfere with tilling and seeding operations. In areas where ground surface is compacted hard enough to prevent drill penetration, the Contractor shall thoroughly loosen and pulverize soil to a depth of at least three inches. The Contractor shall maintain tilled areas until seeded. After access roads are removed, topsoil will be placed over disturbed areas prior to seeding. Naturally occurring rock outcrops and rock fields should not be disturbed.

5.2.2 Seed Mixtures

These seed mixtures were selected as natives to the county/area and for their wildlife and aesthetic quality that they will provide.

The application areas for the permanent seed mixes shall be determined in the field by the engineer and the project restoration specialist. All disturbed areas shall be seeded within the following seed mixes at the rates recommended by the supplier.

New Jersey

Temporary Seed Mix: Apply annual ryegrass at a rate of 1 pound per 1,000 square feet.

Permanent Seed Mix: Native seed mixes were specifically formulated for the Project and the region by Ernst Conservation Seed Company of Meadville, PA and include the following mixtures:

Transmission ROW Seed Selections Mixes

- ERNST 01: Buena Vista Upland Seed Mix (Short)
- ERNST 02: Buena Vista Upland Seed Mix (Tall)
- ERNST 03 Steep Slope Scenic Mixture
- ERNST 04 Riparian Restoration Mixture
- ERNST 05 Facultative Wetlands Restoration Mixture
- ERNST 06 Obligate Wetlands Restoration Mixture

Woodland Temporary Access Road Restoration Seed Mixes

- ERNST 07 Herbaceous Upland Mix for Partial Shade
- ERNST 08 Herbaceous FACW Mix for Partial Shade
- ERNST 09 Herbaceous/Woody Upland Mix
- ERNST 10 Herbaceous/Woody FACW Mix Shade

Obtaining seed mixtures from Ernst as shown above shall be the preferred choice. However, if for unforeseen reasons they are unable to produce or reasonably provide the mixtures requested, another vendor must be approved by the Companies as being able to provide the seed mixtures of equal or better quality and species compositions as the original specifications prior to the application of the same in the field.

Pennsylvania

Temporary seed mix:

- Seeding shall be common rye grass applied at 45 pounds per acre.
- Hay or straw mulch to be applied at 3 tons per acres.

Permanent seed mix:

- Seeding shall be 15% Kentucky bluegrass, 35% Kentucky 31 fescue, 25% chewings fescue, 15% perennial rye grass, and 10% recleaned redtop at a rate of 5 pounds per 1,000 square feet.
- Hay or straw mulch to be applied at 3 tons per acre.
- For areas where property owners require a lawn mix, seeding shall be grass species as follows, with not less than 95% germination, not less than 85% pure seed and not more than 0.5% weed seed:
 - Full sun: Kentucky bluegrass, a minimum of three cultivators
 - Sun and partial shade: 15% Kentucky bluegrass, 30% chewings red fescue, 10% perennial ryegrass, 10% redtop.

Wetlands:

- Seeding shall be FAGW wetland meadow mix by Ernst Conservation Seeds (ERNMX-122) or equal applied at a rate of 15 pounds per acre.
- Hay or straw mulch to be applied at 3 tons per acres.

5.2.3 Seeding Within Wetlands or Other Sensitive Areas

If the disturbed area is located within a wetland, the area will be seeded with one of the native wetland seed mixes shown in Section 5.2.2 to stabilize the ground and prevent erosion until natural vegetation is re-established. If the disturbed area is located within erosion hazard areas, or along steep slopes the area will be restored and stabilized by seeding with the native seed mix for steep slopes and seeding with annual ryegrass for upland/transition areas. However, the grading and contouring of the landscape may also be required to diffuse or divert concentrated flow using terraces, diversion trenches or erosion control mats or blankets until the site has reached a stable condition such that it does not leave an eroding condition created by the Project.

5.3 ACCESS ROADS

Access roads will be constructed at approximately 20 feet wide, and then brought in to 15 feet wide following construction, lightly tilled with topsoil, and seeded with an appropriate conservation seed mix. The gravel will be left to allow for future access for routine or emergency maintenance on the transmission line. The equipment needed and durations for this work will be the same as for access road and crane pad construction. The Companies will ensure that the access roads will be protected from illegal or unauthorized uses by fencing, gates, bollards or other measures, following consultation with the NPS.

5.4 TOPOGRAPHY AND GRADING

No substantial changes in topography or grade will occur as a result of the construction and installation of new transmission lines. Minor deviations may occur along access roads or at stream crossings. All grades will be restored to pre-construction conditions at the completion of the project by the utilities' contractors with the exception of access roads using similar equipment that is described under Section 3.4, Access Road Construction. In areas where rock has been removed, grades and contours will be established to blend in with the surrounding topography.

5.5 STREAMS/HYDROLOGIC FEATURES

No permanent changes will occur to hydrologic features located within the transmission line ROW. Temporary changes may occur due to rutting by vehicles or tree removal, installation and removal of construction crossing structures, or other construction-related activities. These areas will be restored to pre-construction conditions. Use of site-specific water crossing techniques, careful vegetation clearing, best management practices, conditions of local, state and federal permits, and consultation with the NPS will minimize or alleviate impacts to hydrologic features so that specific remedies will not be necessary. Culverts and other control measures and designs will be constructed in the areas of access roads as necessary to allow water to be directed or redirected to its natural course. Specific practices, to the extent allowed by permits, include the following:

- Restore in-stream habitat to approximate pre-construction conditions.
- Regrade stream bed to mimic pre-construction grades (as needed).
- Remove temporary crossing structures and/or fill materials.
- Install boulders and large woody debris to replace physical features removed to accommodate equipment crossing.
- Restore stream bank to approximate pre-construction conditions.
- Remove temporary fill materials on and adjacent to banks
- Regrade bank to approximate pre-construction conditions except where significant bank erosion was evident in pre-construction conditions.
- Regrade to stable slope to correct pre-construction bank erosion.
- Restore riparian zone to approximate pre-construction conditions.
- Remove any temporary fill materials on and adjacent to banks.
- Regrade disturbed areas as necessary to restore grades to approximate pre-construction conditions.

5.6 POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

The clearing for the 500 kV transmission line is intended to provide a ROW with a typical cleared width of 150 to 200 feet, which will be generally centered on the new pole structures. Clearing of vegetation in the area of the access road widening and at construction pad, pull site and equipment laydown locations may involve the removal of stumps and grubbing. Typical vegetation clearing will not involve stump removal and grubbing. All of the areas where stump removal and grubbing will occur are within the NPDES permits from NJDEP and Monroe County Conservation District (which has been delegated NPDES permit and storm water approval authority from the Pennsylvania DEP) and limit of disturbance boundaries as specified in the approved soil and erosion plans from Monroe and Warren counties. The NPDES boundary includes all areas where clearing and grading will occur. The limit of disturbance boundary includes all areas where grading and disturbance is anticipated. The limit of disturbance and NPDES boundary are identified on the plans to generally follow the right-of-way, except for the access roads outside of the ROW. Actual earth disturbance throughout the project area may be less than shown as the contractor may, at their discretion, further minimize the size of the crane pads and roadway widening to the least amount possible while still allowing them to safely construct the transmission line.

Following construction, the temporary access roads will be removed and restored using clean fill soils and revegetated with permanent seeding as indicated in the post-construction storm water management (PCSM) plan set. The final restoration details are provided in the PCSM plan sets for both Monroe and Warren counties. The post

construction net impervious area will be equal to or reduced from the pre-construction values.

The anticipated limits of disturbance and an estimate of the surface disturbance at each structure location pull site, lay-down area, and any associated access road improvements are included in the disturbed area estimates for this project.

6.0 APPALACHIAN NATIONAL SCENIC TRAIL

The existing transmission lines pass over the Appalachian National Scenic Trail (Trail) near the eastern side of DEWA in New Jersey. The Companies recognize that visitors may use the Trail at any time. As a result, continuous access along the Trail will be maintained outside of those brief instances referred to below for maintaining user safety.

During construction, all reasonable efforts will be made to minimize the impact on the Trail. At the completion of construction, any impacts or disturbance to the Trail will be restored to its pre-construction condition. Crane pad construction at one location on the Trail will use geotextile fabric and digitally record the exact condition of the Trail.

Appropriate safety measures will be implemented during removal of the existing transmission line and installation of the new transmission line and structures on and across NPS properties, including the Trail. Examples of proposed crossing safety and public access procedures to be incorporated into plans submitted to the NPS prior to construction are as follows:

- Appropriate barriers, safety fencing and/or signs will be installed at or along the NPS/Trail property crossings prior to the initiation of construction activities.
- Personnel will be stationed at or within a specified distance from the Trail during any and all construction activities (including clearing, grading, removal and installation of structures, wire stringing and restoration activities). Stationed personnel will serve to inform hikers of construction and to regulate pedestrian traffic along the Trail to avoid conflicts with construction work.
- Removal and replacement of the existing transmission line and the installation of the new transmission line will be performed as expeditiously as possible.
- Construction materials and construction equipment in the vicinity of the Trail will be appropriately secured prior to cessation of work at the end of each workday. Construction equipment will not be placed on or near the Trail footpath in such a way that would obscure the route or markings along the footpath.
- The Companies will work with the NPS to determine if a temporary relocation of the Trail would be preferable.

Additional details can be found in the Communication Plan and the Health & Safety Plan.



Plan for Compensatory Mitigation
Susquehanna - Roseland 500kV Transmission Line



Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River

May 25, 2012

Introduction

The Companies recognize that, even after full implementation of all possible measures to avoid and minimize impacts, the proposed Project will cause some adverse impacts on resources under NPS jurisdiction. Accordingly, the Companies are proposing compensatory mitigation pursuant to a methodology and on a scale that recognize the great public value of the national parklands and associated resources adjacent to the Companies' transmission corridor. The methodology proposed by the Companies uses a multi-step analysis to translate the potential resource impacts of the Project, most of which are intangible (e.g., changed views) into an estimate of the acres of land that, if conveyed to the NPS, would compensate for the impacts, and the cost of acquiring those lands.

The intent of the proposed methodology is to more than offset every potential unavoidable impact of the proposed Project by providing secure funding to be used to acquire high value conservation lands within the two-state geographic area centered on the NPS Units affected by the Project, and to support resource stewardship by the NPS within or directly benefiting the NPS Units.

The Companies have tested the proposed compensation methodology under a range of assumptions about the selling prices of private lands in the DEWA region with high natural resource values. The Companies have focused on parcels previously identified by the region's land management agencies and conservation groups as important potential additions to the DEWA-area parks and refuges--lands with natural values that would be of great value to the public.

The Companies have identified lands potentially for sale, most already on the market in some fashion, that offer clear potential to benefit the public. If acquired for the public's benefit, these parcels could preserve natural viewsheds from future development, enhance NPS-managed areas, tie together now-isolated parcels of state or federal conservation areas, provide wildlife corridors, expand public hunting and fishing, secure key protected species habitat, or allow for restoration of previously developed areas.

The methodology proposed by the Companies would result in compensatory mitigation on the order of \$30-\$40 million. It is important to note that the Companies' approach is defined by impacts, and the natural values of mitigation lands, not by the cost of acquiring those lands. If the NPS determines that the potential impacts of the Project are different than what the Companies have calculated them to be, the amount of compensatory mitigation will change to reflect the NPS analysis.

The Companies have framed this proposal around those matters principally under the jurisdiction of the NPS. The Companies recognize, however, that the environmental review process being administered by the NPS will integrate consideration of resources, impacts and mitigation requirements under the primary jurisdiction of other agencies, primarily the U.S. Fish and Wildlife Service. The Companies believe that this plan for compensatory mitigation can readily be adapted to include appropriate, additive compensatory mitigation for unavoidable

impacts on resources under the primary jurisdiction of agencies other than the NPS—without changing the proposed methodology related to NPS resources or the levels of funding that would result from application of the methodology to impacts on resources under the primary jurisdiction of the NPS.

This description of the Companies' proposed compensatory mitigation methodology is intended to be consistent with, and incorporates by reference, the information submitted in the Companies' comments on the Draft EIS for the Project, and the March 8, 2012 letter submitted by the Companies' legal counsel to the National Park Service's Associate Director for Natural Resource Stewardship and Science.

Description of Quantification Methodology

Precautionary Assumptions

The compensatory mitigation quantification described in this document considers all NPS-recognized categories of potential resource impacts within a seven-mile zone on either side of the transmission line corridor where it crosses NPS lands. The methodology recognizes that the intensity of unavoidable impacts—measured by both the resources potentially affected, and the intensity of the actual impact on the affected resources—is likely as a general matter to be greater closer to the corridor than farther away. The approach applies to resources on more than 38,000 acres of NPS lands, an area equal to more than half of DEWA's total acreage, even though the transmission corridor itself comprises fewer than 100 acres inside the federal park lands, and the incremental right-of-way requested by the Companies is under five (5) acres. The approach is very conservative in the sense that it resolves uncertainties in favor of benefiting NPS resources.

The precautionary approach being proposed by the Companies is highly beneficial to the resource values of the NPS Units because the zone covered by the analysis is so wide and because it assumes that all NPS-recognized categories of potentially impacted resources are present on all acres in the zone. The result is a very conservative quantitative estimate of the resources potentially affected by the Project, measured in acres, and a correspondingly conservative or protective estimate of the acreage of high resource value lands needed to compensate for the potential impact. This "worst-case" approach assures that the Companies' mitigation commitment will, at a minimum, be scaled to fully compensate for the unavoidable long-term impacts of the proposed Project.

Defining the Size of Area in Which Impacts May Occur

The Companies' quantification methodology assumes that the zone where resource impacts may occur is contiguous with the viewsheds potentially affected by the project. This assumption takes into full account the emphasis placed by the NPS and public on the potential incremental visibility of the Project's features. The approach assumes that the viewshed area extends seven miles from the center-line of the proposed project, essentially a 14 mile-wide zone across the NPS Units.

The Companies have used GIS to characterize the overall viewshed area. The use of GIS has been validated for viewshed analysis as demonstrated by Maloy (2001), Chhetri (2003) and Tassinari (2006). Through the use of ARC/GIS, the Companies have been able to formulate a methodology or model that provides a reasonable estimate of the area in which impacts may occur. This model is an example of a cost-surface analysis, which “allows the simple ‘flat’ geographic space to be supplanted by a set of complex cost surfaces incorporating many relevant properties of the terrain.”¹ (Van Leusen, 2002). This approach is very conservative and more inclusive of potential impact areas compared to line-of-sight models, which use terrain and other natural features specifically to exclude particular properties not “visible” to the computer. In other words, the Companies’ model considers all acres inside the zone of potential impact, but assigns different values or weights to different areas inside the overall zone.

The following table (Table 1) describes five distance ranges from the proposed transmission line that were used to calculate the gross land areas potentially affected within each of the three NPS Units. The gross land areas are then weighted by a distance decay function to calculate the net affected land areas within each range. The distance decay function reflects the fact that not as many acres in the zone farthest away from the line are potentially affected by the Project as the number of acres potentially affected in the zone closest to the line. Distance decay refers to the decrease or loss of similarity between two observations as the distance between them increases. The distance ranges and the distance decay function are based on Fisher (1994), who estimated that visibility based on distance decay for a viewshed under ideal conditions would diminish by 50% (0.5) at approximately 3 km (1.86 miles). Tassinari (2006) also considered the maximum distance of perception significance for a viewshed to be between 3 km and 10 km (1.86 to 6.2 miles). The distance decay function relationship for this analysis is shown within Table 1 below:

Table 1		
DESCRIPTION	DISTANCE RANGE	DISTANCE DECAY FUNCTION
Immediate foreground	0 feet to ½ mile	1.00
Foreground	½ - 1 mile	0.66
Middleground	1-2 miles	0.33
Background	2-3.5 miles	0.10
Near Horizon	3.5-7 miles	0.05

The Distance Ranges from Table 1 were applied to the three NPS Units as detailed below. For purposes of the Companies’ analysis, impacts were limited to those caused by the Project within the boundaries of the NPS Units.

¹ Other complex modeling of viewsheds are also possible using ARC/GIS and raster and TIN based digital terrain data, but these have been shown to be no more valid than the Companies’ methodology described here. The other methodologies also have considerable variability and practical limitations due to the significant amount of data being analyzed.

1. **Delaware Water Gap National Recreation Area (DEWA):** For this NPS Unit, the model calculated the area within the five Distance Ranges in relation to the transmission line through the Unit.
2. **Middle Delaware Scenic & Recreational River (MDSNR):** For this NPS Unit, the model calculated the area within the five Distance Ranges for the upstream and downstream area of the river at the point where the transmission line crosses the river plus one hundred feet from the top of the bank on both sides of the river.
3. **Appalachian National Scenic Trail (ANST):** For this NPS Unit, the model calculated the area within the five Distance Ranges at the location where the transmission line crosses the ANST for the ROW plus three hundred feet on each side of the ROW confined within the DEWA.

The areas of impact analysis under this methodology, in acres, are shown in Table 2 below. A total of 38,121 acres are affected within the three NPS units.

Table 2		Distance	Acres
Delaware Water Gap National Recreation Area	0-0.5 miles		2,918
	0.5-1 miles		2,592
	1-2 miles		5,429
	2-3.5 miles		8,149
	3.5-7 miles		16,749
	Area Subtotal		35,837
Middle Delaware Scenic & Recreational River	0-0.5 miles		114
	0.5-1 miles		147
	1-2 miles		359
	2-3.5 miles		465
	3.5-7 miles		882
	Area Subtotal		1,967
Appalachian National Scenic Trail Within DEWA	0-0.5 miles		74
	0.5-1 miles		45
	1-2 miles		91
	2-3.5 miles		136
	3.5-7 miles		72
	Area Subtotal		418
	Area Total		38,221

Again, the zone of analysis, the area in which impacts are assumed to be possible, is 14 miles wide, and extends the length of the Companies' corridor inside the NPS Units. The Companies evaluated each of the NPS Units independently. The Companies' methodology

counts areas where multiple NPS Units overlap individually, as if they were separate locations, meaning that the Companies' total acreage tally includes acres that are counted more than once.

Table 2 shows that approximately 38,221 acres of land under NPS jurisdiction are proximate to the transmission line and the resources within those acres potentially could experience impacts from the Project. This is not an estimate of the direct or physical impacts of the Project. Instead, the area within the zone of analysis is an estimate of the acreage containing resources under NPS jurisdiction that could experience impacts from the Project. The use of weighting factors assigned to the different geographic zones (i.e., the distance decay function) recognizes that, within the external boundaries of the zone potentially impacted by the Project, more locations closer to the line will have impacts than locations farther away.

Estimating the Intensity of Impacts within Affected Area

Just as the number of locations in which impacts are possible will change with distance from the Project, so too will the intensity of the impacts that occur in those locations. The Companies' proposal includes a method for calculating the variation in impact intensity.

The Companies' method for calculating the intensity of impacts on the acres potentially affected by the Project relies on the information contained in Chapter 3 of the Draft Environmental Impact Statement (DEIS) regarding the categories of resources potentially affected by the Project. The DEIS retained 18 resource categories for detailed analysis. These are listed in Table 3 below.

The Companies' approach assumes, based on the information in the DEIS, that for 10 of the 18 categories of potentially impacted resources, actual impacts will be entirely avoided or reduced to a level of insignificance through implementation of direct environmentally responsible construction and restoration methods and other measures.

However, for eight (8) categories of resources, the Companies assume that there may be some level of impact from the Project. The eight categories involve visual resources (including visitor experience, cultural landscapes and historic features) and wildlife movement concerns, including protected species. This subset of the potential total number of resource categories—eight out of 18 (44%)--represents the suite (or proportion) of resources identified in the DEIS as potentially affected by the proposed Project as to which compensatory mitigation may be necessary.

<p align="center">Table 3 DEIS NPS AFFECTED ENVIRONMENT TOPICS RETAINED FOR DETAILED ANALYSIS (Page XVI)</p>	<p align="center">Visual or Wildlife Movement Concerns (Y/N)</p>	<p align="center">Y=1; N=0</p>
<p>Geologic Resources</p>	<p align="center">N</p>	<p align="center">0</p>
<p>Floodplains</p>	<p align="center">N</p>	<p align="center">0</p>

Wetlands	N	0
Vegetation	N	0
Landscape Connectivity, Wildlife Habitat & Wildlife	Y	1
Special-Status Species	Y	1
Rare and Unique Communities	Y	1
Archeological Resources	N	0
Historic Structures	Y	1
Cultural Landscapes	Y	1
Socioeconomics	N	0
Infrastructure, Access & Circulation	N	0
Visual Resources	Y	1
Soundscapes	N	0
Visitor Use and Experience	Y	1
Wild and Scenic Rivers	Y	1
Park Operations	N	0
Health and Human Safety	N	0
1. TOTAL APPLICABLE TO ANALYSIS		8
2. TOTAL DEIS AFFECTED ENVIRONMENT TOPICS		18
Line 1 divided by line 2		0.44

Under the Companies' proposed approach, the eight resource categories for which it is assumed that impacts may not be totally avoided or minimized to insignificance are combined and used as a unitary weighting factor within the mitigation compensation formula. The formula does not seek to predict which among the eight resources will be present at any point in time on any specific acre within the 14 mile-wide zone of analysis. The formula assigns a weighted value to resources, and the value declines with distance from the centerline of the Project. The value for the acreage closest to the Project is 0.44, which number is the proportion of the total set of potentially affected resources as to which impacts may not be totally avoided or minimized to insignificance (i.e., eight out of 18 categories). The initial 0.44 net value is then multiplied by the distance decay function shown in Table 1. These calculations create Intensity Level Factors from **Major** (0.44) to **Negligible** (0.022) shown in Table 4.

Table 4	Distance Decay	Intensity level
Distance	Function	Factors (ILF)
0.5	1	0.44
1	0.66	0.293
2	0.33	0.147
3.5	0.1	0.044
7	0.05	0.022

The Companies' methodology provides a formula for calculating a reasonable, albeit very conservative, estimate of the "size" of the Project's potential impact on resources under NPS jurisdiction, quantified in acres. The acreage estimate is primarily a reflection of the overall viewshed area adjacent to the Project, adjusted for proximity and intensity of impact.

Estimating the Cost of Compensatory Mitigation

The dollar value of the land area calculated to represent the unavoidable impact of the Project on NPS resources can be estimated. The Companies have assumed for the purpose of this analysis that the average cost to acquire an acre of land in the DEWA area with resource values generally equivalent to the acres inside the NPS Units is \$9,500 per acre. This specific figure is an adjusted average drawn from broad sample of transactions, and is biased upward to avoid under-estimation of possible costs. Many thousands of acres of high value land in the DEWA area could be placed in conservation status under agreements with considerably lower price terms.

The Companies derived an estimate of the cost of compensating for the potential impacts of the project by multiplying the size of the impact area by the various intensity level factors and by the per-acre cost estimate (area x intensity x cost). Table 5 shows the total cost estimate for compensation as \$36,494,241.

Table 5 Affected Resource Analysis - Impacts Tiered By Distance and Affected Resource

Delaware Water Gap National Recreation Area				
Miles from Line	Acres		Per Acre	\$Value/ILF
0.5	2,918		\$ 9,500.00	\$12,320,487
1	2,592		\$ 9,500.00	\$7,222,093
2	5,429		\$ 9,500.00	\$7,564,198
3.5	8,149		\$ 9,500.00	\$3,440,799
7	16,749		\$ 9,500.00	\$3,535,864
Area Subtotal	35,837		SUBTOTAL	\$34,083,440
Middle Delaware Scenic and Recreational River				
0.5	114		\$ 9,500.00	\$482,178
1	147		\$ 9,500.00	\$408,943
2	359		\$ 9,500.00	\$499,914
3.5	465		\$ 9,500.00	\$196,253
7	882		\$ 9,500.00	\$186,253
Area Subtotal	1,967		SUBTOTAL	\$1,773,541
Appalachian National Scenic Trail				
Within DEWA				
0.5	74		\$ 9,500.00	\$312,444
1	45		\$ 9,500.00	\$125,400
2	91		\$ 9,500.00	\$126,793
3.5	136		\$ 9,500.00	\$57,422
7	72		\$ 9,500.00	\$15,200
Area Subtotal	418		SUBTOTAL	\$637,260
Area Totals	38,221		TOTAL	\$ 36,494,241

The proposed compensation amount derived from the Companies' quantification methodology is intended to more than offset the potential diminution of resources resulting from the proposed Project's impacts that cannot otherwise be avoided or minimized to insignificance. This estimate was based on a methodology that was created and validated by a GIS analysis process specifically designed for the Project, but supported by various technical references. Through this analysis the Companies provide a reasonable and repeatable methodology to quantify the intangible impacts on a resource, such as a viewshed. The approach recognizes that distance is a major factor in determining impacts. This analysis brings together an analytical and qualitative method of assessment and expands the discussion on how to address multiple resources issues simultaneously through appropriate compensation formulas and resource assessment methods.

Description of Implementation Methodology

The Companies will provide funds to compensate for the unavoidable impacts of the Project on resources under the Department of the Interior's jurisdiction. The Companies propose to establish and endow the Middle Delaware Mitigation Fund (the "Fund"). The Fund would be administered by The Conservation Fund, a not-for-profit organization headquartered in Arlington, Virginia, with demonstrated expertise in land and resource transactions, conservation and successful collaboration with the Department of the Interior (the "Administrator"). Monies contributed to the Fund by the Companies (the "Endowment") would be used by the Administrator for the purposes of preserving, restoring and enhancing Delaware Water Gap National Recreation Area, Cherry Valley National Wildlife Refuge, the Middle Delaware Wild & Scenic River segment, and the Appalachian National Scenic Trail within the Delaware River basin, including reasonable costs associated with administration of the Fund.

The Administrator would commit Endowment funds solely to projects or activities benefiting resources under the Department of the Interior's jurisdiction. Such projects or activities would be eligible for Endowment funding only if reviewed and recommended by the Secretary of the Interior, acting directly or through a designee, following appropriate consultation with representatives of the Commonwealth of Pennsylvania and State of New Jersey, and Delaware River basin-oriented conservation organizations and recreational interests.

The Companies would convey funds to the Endowment following issuance by the NPS of all permits and approvals required by the NPS to be issued to the Companies for all activities associated with construction, operation and maintenance of the Project, including but not limited to those permits and approvals requested by the Project Sponsors on November 21, 2008 in the S-R Project SF-299 in accordance with the schedule below, provided that the terms and conditions of such permits and approvals must be reasonable, consistent with the purpose and need for the Project, including the need to have the Project in service by June 2015, and otherwise acceptable to the Companies. The Companies will convey funds to the Endowment on the following schedule:

1. Fifty (50) percent of the Endowment upon commencement of any construction-related ground- or vegetation-disturbing activities by the Companies within the boundaries of Delaware Water Gap National Recreation Area or the Appalachian National Scenic Trail; and
2. Fifty (50) percent upon completion of construction of the Project within the boundaries of Delaware Water Gap National Recreation Area or the Appalachian National Scenic Trail and placement of the Project into service.

As used in this proposal, the term *construction-related ground or vegetation-disturbing activities* means activities by the Companies or their contractors undertaken to prepare lands or fixtures for construction of the Project, including tower foundations, or to construct the Project, but not including routine right-of-way maintenance or geotechnical sampling. The term *resources under the Department of the Interior's jurisdiction* means lands, waters, animals, plants, cultural and historical sites and objects, and other natural or human-made resources under

the jurisdiction of the NPS or USFWS, including aesthetic values and the quality of the experience of visitors to Delaware Water Gap National Recreation Area, Cherry Valley National Wildlife Refuge, the Middle Delaware Wild & Scenic River segment, and the segment of the Appalachian National Scenic Trail within or immediately adjacent to the Delaware Water Gap National Recreation Area.



Plan for Communications

Susquehanna - Roseland 500kV Transmission Line



**Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River**

May 25, 2012

Communications

The Companies have prepared the following plan to specify communications activities related to the construction phase of the Project (defined as access, removal, installation and restoration) in the NPS Units. This plan is intended to define a media strategy and notification plan to ensure that local residents, businesses and officials, as well as visitors and other key audience groups, are aware of the details they need to know about construction activities. Of necessity, this draft of the plan omits certain details that will need to be developed jointly with the NPS.

Triggers for communications activities:

Construction activities will include: tree clearing for access roads, demolition of existing transmission line, construction of access roads, installation of foundations for poles, installation of poles, stringing of conductors on new poles, restoration and other similar matters. These activities will be the trigger for various communications activities to keep appropriate audiences informed.

Audiences

- Local residents
- Local businesses
- Motorists
- Local officials
- Key state officials
- Key federal officials
- Environmental permitting agencies
- Sporting clubs
- NPS unit visitors
- News media
- Other audiences to be identified in conjunction with NPS

Overview of Information to Be Provided

The following provides a brief summary of the topics that likely will be included in the communications:

- **Construction Schedule** – Information on where and when activities will occur, including items such as:
 - Mobilization – When construction crews and equipment will arrive at the site.
 - Expected Duration – Length of time the work is expected to last.
 - Demobilization – When construction crews and equipment are expected to leave a particular section of the line.

- **Construction Activities** – Information about work that will take place, including items such as:
 - Types of equipment and materials on site – Equipment at the site may include pick-up trucks to transport construction personnel, tree clearing equipment, bulldozers, excavators, drill rigs, concrete trucks, trailers, cranes to install the poles, and bucket trucks. Materials may include steel rebar, concrete for pole foundations, steel poles, insulators, wire, and other various hardware.
 - Nature of planned work - Including activities such as grading, vegetation clearing, foundation excavation and placement, structure erection, and line installation.
 - Number and type of personnel – Mostly applicant employees and contractors but could include third-party oversight personnel (such as environmental regulators) or other non-applicant personnel on occasion.

- **Mitigation Efforts** – A description of how applicants will prevent or minimize impact on people and properties along the transmission line route. Examples of these types of mitigation efforts may include:
 - Traffic re-routes and road closures.
 - Site safety and security plans – The project will have a full-time staff dedicated to safety on the job sites.
 - Access roads – Used to bring equipment and personnel to work areas. Applicants will provide information on where these roads will be located and what, if any, impacts they will have on local residents and businesses and other audiences.
 - Repair policy – The goal will be minimize impacts on property. However, if there are any impacts (for example, to lawns or roadways) Applicants will restore those features to their prior condition whenever possible.

- **Line Features** - This information will focus on describing the physical elements of the project.
 - The scope and purpose of the project.
 - Information on the new transmission equipment to be installed including pole locations and descriptions.
 - Other information on project features as appropriate.

Overview of tactics

The following communication methods will be used, in consultation with the National Park Service, to inform the public of project plans and timelines:

- Mailings – Examples of possible topics addressed in mailings:
 - Periodic updates to residents and businesses.
 - Information about construction scheduling and activities, mitigation efforts and features of the transmission line.
 - Information on who to call with questions or comments.

- News media
 - News releases or media contacts as needed to local media, prior to major work starting on particular parts of the transmission line route.

- Advertisements
 - Advertisements, if needed, sent to local media outlets.

- Project web site updates (www.pplreliablepower.com/Susquehanna-Roseland and <http://www.pseg.com/family/pseandg/powerline/index.jsp>)
 - Comprehensive information on construction schedules, line description, mitigation plans and other information.
 - A copy of this plan.
 - E-mail feedback link and toll-free phone number for comments and questions.

- E-mail
 - Periodic e-mails to those who wish to be informed in this manner.

- Toll-free phone number for community inquiries
 - Monitored by the project team with timely follow-up on all inquiries.

- Field personnel will be in contact with residents and businesses directly impacted by the project to inform them about planned work and to seek their input. Specifics will vary based on circumstances, but some potential activities may include:
 - Providing a letter summarizing planned work (to be provided upon request from local citizens or visitors.)

- Door-hangers as needed for nearby properties providing notice of planned work.
 - Answering questions from the public.
 - Adapting planned work to conform to property owners' requests when practical.
- All applicant employees and contractors working in the field on the Susquehanna-Roseland transmission line will be identified through vehicle ID plates, employee ID (via hard-hat labeling as associated with the project), and each crew will have a verification letter provided by the company.



Plan for Vegetation Management
Susquehanna - Roseland 500kV Transmission Line



Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River

June 1, 2012

Vegetation Management

Key Features: The Companies submitted “PPL Electric Utilities Transmission Vegetation Management Program” and “PSEG Transmission Rights of Way Vegetation Management” as Exhibits 5 and 6 to our comments on the DEIS. The Companies also addressed certain aspects of vegetation management in the C&R Standards. In addition to those commitments, and to respond to concerns expressed in the DEIS, the Companies will implement the following vegetation management measures:

Transmission Corridor --The Companies will adopt a uniform approach to vegetation management within the NPS Units. The Companies are prepared to discuss with the NPS changes in the width of those segments of their rights of way and easements inside the NPS Units that currently exceed 200’ in width.

Notification and Coordination -- The Companies will provide the NPS with notice of plans to conduct routine vegetation management activities in the transmission corridor through the NPS Units at least 90 days prior to the commencement of any such activities, and will solicit the views of the NPS regarding methods, timing, access plans, public notification and other relevant matters. The Companies will cooperate with efforts by the NPS to monitor and document vegetation management activities and impacts. The Companies will coordinate with the NPS to integrate their vegetation management practices with efforts by the NPS to control invasive species and promote conservation of NPS resources, including but not limited to wildlife, avian species, invertebrates and other living resources. The Companies will coordinate with the NPS to integrate landscaping and other aesthetic practices into vegetation management activities.

The Companies recommend the NPS take a role in promoting certain functional values within and adjacent to the right-of-way by encouraging the growth of desirable species and eradicating undesirable species. The Companies are prepared to support the NPS’ involvement in this effort through the Compensatory Mitigation Plan. The companies will perform inspections as outlined below to ensure compliance with each company’s TVMP. Consistent with these plans, the Companies reserve the right to take appropriate actions as needed to comply with NERC standards, other applicable laws and regulations and other agreements and commitments made by the Companies.

Ongoing Vegetation Management Maintenance Plan

Annual Survey

The Companies will perform annual inspection surveys through the use of one or all of the following methods; standard helicopter patrol, LiDAR equipped helicopter patrol, and ground patrol.

Remediation

Encroachments identified through the annual surveys will be remediated immediately following NPS notification. Remediation may include one or all of the following activities.

- Removal of all woody vegetation from the wire zone
- Removal of all non-compatible vegetation from the border zone*
- Removal of off-corridor danger trees
- Trimming of off-corridor trees which are encroaching upon ROW easement
- Application of appropriate herbicides in accordance with ROW agreements

*Border Zone Compatible Vegetation Species

Small Trees

Flowering Dogwood
Redbud
Hawthorn
Serviceberry
Dwarf Willow
Winterberry Holly

Large Shrubs

Alder
Witch-hazel
Spicebush
Common Chokecherry
Elderberry
Rhododendron
Viburnum
Dogwood
Sumac species
Chokeberry

Small Shrubs

Mountain Laurel
American Yew
Sweet Fern
Trumpet Honeysuckle
Blueberries
Viburnums
Meadowsweet (Spirea)
Wintergreen
Trail Arbutus
Blackberry (Allegheny)
Raspberry
Hazelnut
Scrub Oak species

All native grasses, ferns,
herbaceous plants

NPS Land Use Opportunities and Improvements

Vegetation management activities performed by the Companies in support of this project create areas that will present opportunities for further habitat enhancement. Capitalizing on these opportunities by NPS could result in benefits to the public, the natural resources, the NPS and the Companies. Historically, maintenance of the ROW by the Companies has been focused on the careful balance of the minimization of impacts on existing environmental conditions and providing safe and reliable operations of the transmission line.

It is important to note that the Companies have an obligation to ensure strict compliance with NERC/FERC reliability requirements. Compliance with these requirements is the key driver for

annual LiDAR surveys and routine maintenance activities. These are the sole responsibility of the Companies. It is also important to note that the Companies are not the owners of the property and as such are limited to conducting activities clearly tied to the operations and maintenance of the transmission line.

Some property owners take advantage of the cleared, open areas to plant and maintain desirable species that ultimately result in benefits to all. By planting and maintaining these areas, the owners are benefiting by having the area established and maintained to their liking. Often maintaining compatible species within the right-of-way also results in multiple benefits to adjacent natural resources and wildlife. These areas result in nesting and foraging areas that are often lacking in areas of mature forest. Additionally, the proper use and maintenance of these areas ultimately minimizes the need for the Companies to routinely perform vegetation management activities in these areas, again benefiting all.

Beyond the benefits noted above for typical owners of private property, DEWA as the government agency responsible for these public lands would have additional opportunities and benefits, especially opportunities to further enhance visitors' experience. Currently, except for the existing transmission line, existing brush areas and transitions zones are very limited in this area of DEWA. Overall, these types of areas continue to diminish. Establishing and maintaining enhanced areas within the wire zone and border zone, and even outside and adjacent to the ROW could truly result in overall benefits to everyone.

The Companies encourage the NPS to consider taking advantage of these areas to improve visitor's experience, to improve wildlife habitat, to demonstrate and educate others on the potential opportunities and benefits of these areas. With the proper planting or control of native shrubs and small trees in or adjacent to the ROW border zone, critical habitat for avian species will be created. These areas will also provide habitat and foraging areas for many other mammalian and reptilian species in the DEWA. With the proper planting or control of native grasses and flowering plants within the ROW wire zone, critical habitat will also be created for many of the above species, as well as many invertebrates, including butterflies and bees. These areas will also provide additional nesting habitat and foraging areas. An added benefit of the proper use and ongoing maintenance of these lands by NPS would be to further control the spread of invasive plant species.

The Companies would support the NPS with these efforts, by providing guidance and review of the development of associated design, construction and maintenance plans. Additionally, associated project compensatory mitigation funding could be used to further support NPS in the construction and ongoing maintenance of the enhanced environments.

Definitions

Border Zone – The area of a right of way that extends from the wire zone to the limits of the defined width right of way.

FERC – Federal Energy Regulatory Commission

LIDAR – Light Detection and Ranging

NPS – National Park Service

ROW – Right of Way

NERC – North America Electric Reliability Corporation

TVMP – Transmission Vegetation Management Plan

Wire Security Zone – Distance in addition to max-sag design that vegetation clearances are maintained in order to account for the dynamic nature of vegetation.

Wire Zone – The area from centerline to 10' past the outer most conductors.



Plan for Health and Safety; Emergency Response
Susquehanna - Roseland 500kV Transmission Line
for the
Susquehanna - Roseland 500kV Transmission Line



Crossing the
Appalachian National Scenic Trail
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June 1, 2012

The Companies will work with their contractors so that safety and emergency plans are prepared and submitted to the NPS prior to construction activities. As discussed more fully elsewhere in the Plans being submitted to NPS, the anticipated scope of work will include geotechnical borings, tree clearing for access roads, demolition and removal of the existing transmission line, construction of access roads, installation of foundations for new poles, installation of poles, stringing of conductors on new poles, and other related work. The plans will address, as applicable, the following items:

- Wearing of Personal Protective Equipment
- Operation and Inspections of Construction Equipment
- General Construction, Excavation and Restoration Standards
- Emergency Action Plans
- Medical and First Aid
- Handling of Compressed Gases
- Fire Protection
- Handling of Power Tools
- Tower Erection Standards
- Fall Protection
- Standards for Wire Stringing Activities
- Restricted Access to Work Areas

Examples of proposed crossing safety and public access procedures to be incorporated into plans submitted to the NPS prior to construction are as follows:

- Appropriate barriers, safety fencing, and/or signs will be installed at or along the NPS/Trail property crossings prior to the initiation of construction activities.
- Personnel will be stationed at or within a specified distance from work areas and the Trail during any and all construction

activities (including clearing, grading, removal and installation of structures, wire stringing, and restoration activities). Stationed personnel will serve to inform hikers and other visitors of construction and to regulate pedestrian traffic in those areas to avoid conflicts with construction work.

- Removal and replacement of the existing transmission line and the installation of the new transmission line will be performed as expeditiously as possible.
- Construction materials and construction equipment in the vicinity of the Trail and other areas of potential access by visitors will be appropriately secured prior to cessation of work at the end of each workday.
- The Companies will work with the NPS to determine if a temporary relocation of the Trail would be preferable.

The Companies will work with their contractors so that the activities inside the NPS Units are designed and implemented consistent with the requirements of OSHA and any other applicable federal, state, and local laws and regulations, including, as applicable, NPS Director's Orders #50B (Occupational Safety and Health) and #50C (Public Risk Management). The Companies will also work with their contractors to identify potential risks to the health and safety of NPS personnel, its agents and visitors to the NPS Units, and implement prior to construction plans to address the identified risks, including restricted access to construction areas and road closures as applicable. Construction activities will be coordinated with NPS law enforcement and public safety personnel consistent with the plans.



**Plan for Protection of Wetlands and Riparian Resources
For the
Susquehanna - Roseland 500kV Transmission Line**



**Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
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June 4, 2012

Wetlands and Riparian Resources Plan

The Companies have prepared this Plan to specify the means and methods related to the construction phase of the Project in proximity to sensitive water resources within the NPS Units. This plan establishes the use of best management practices to avoid and minimize the impacts of Project construction on wetlands, riparian and other water resources. The plan also delineates the appropriate buffers to these resources. The details of this plan will be based on approved procedures authorized by the reviewing agencies including US Army Corp of Engineers, NJ and PA Dept Environmental Protection, and the associated Soil Conservation Districts.

Mitigation for Permanent Impacts to Wetlands

The permanent impacts to wetlands from the project within the park units are minimal. Two proposed towers in New Jersey, (tower 40/2 and tower 40/3) are each proposed to permanently fill approximately 154 SF of wetlands for a sum total of 308 SF. A 2:1 replacement ratio (616 SF) is proposed in the NPS units at a location to be determined by the NPS.

The following goals have been established for this plan:

- Goal 1: Avoid, reduce and minimize impacts to wetlands and riparian zones, during the planning, design and construction phase of the Project.
- Goal 2: Reduce and minimize all impacts of the Project on the NPS Units, and specifically to wetland and riparian zones, which may need to be temporarily disturbed during construction. The fore mentioned areas will be restored and monitored throughout the Project in conjunction with the functional value of these systems following construction.
- Goal 3: Provide the appropriate mitigation of all wetland types and riparian zone impacts.
- Goal 4: Integrate and coordinate wetlands and riparian protection efforts with other Project related efforts, such as those intended to protect threatened and endangered species.

Most of the Companies' measures to avoid and minimize impacts on water, wetlands and riparian resources are described in the C&R Standards. Following completion of construction related disturbances; access roads and lay down areas will be restored, with the possible exception of some upland access roads that will be top soiled and seeded but the underlying base will remain for maintenance access to the ROW. The proposed practices will be in accordance with State and Federal permits.

Avoidance and Minimization of Wetland Impacts -- The Companies will implement the following practices to avoid and minimize impacts to wetlands:

- Staging, tower, and pulling and splicing locations will be located to avoid wetlands inside the NPS Units, with the exception of the two towers identified above near Van Campen's Brook.
- Access roads will avoid wetlands wherever possible, and will include buffer zones in areas adjacent to wetlands. Activities in the buffer zones will be managed to restrict vegetation clearing to the minimum necessary for access in accordance with the approved and permitted construction documents.
- Construction vehicles operating in or near wetland areas will be of a design intended to minimize soil compaction (e.g., low-profile, wide-track vehicles) whenever marsh matting is not feasible or otherwise employed.
- Marsh mats will be used to cross wetland areas and limit wetland soil compaction, unless use of mats is undesirable for environmental reasons.
- Construction activities will be timed for periods when the soil and water profiles are more likely to be frozen and vegetation is dormant, and construction sequencing will be organized to limit the period during which construction activities occur inside the NPS Units.
- To avoid impacts from known invasive and/or exotic plant species, all wheeled and tracked mounted construction equipment will be cleaned prior to entering and/or exiting the NPS area.
- Wetland areas disturbed by Project construction activities will be restored, and monitored to assure the success of restoration actions. Permanent impacts to wetlands will be compensated as prescribed by NPS Director's Order 77-1 and other applicable law.

Avoidance and Minimization of Riparian Zone Impacts: The Companies will implement the following practices to avoid and minimize impacts to riparian zones

- Streams crossing the right-of-way will be protected by silt fencing or other similar BMP that prevents sediments from entering surface waters.
- Access roads will be located and engineered to reduce concentrated flows.
- Streams will be visually monitored for siltation before, during, and after all storm events, and after construction.
- Disturbed areas located up-gradient of streams will be seeded or mulched, in accordance with the appropriate Soil Erosion and Sediment Control Plans.
- In the event that any stream bank areas are disturbed, they will be stabilized by plantings that are resistance to effects of rapid and high flows conditions and replanted with wetland herbaceous seed mixture.

- Riparian zones impacted by Project activities will be monitored to assure success of restoration efforts.

Avoidance and Minimization of Floodplain Impacts: The Companies will implement the following practices to avoid and minimize impacts to floodplains:

- Project features will be located outside floodplains where possible.
- Areas within the floodplain that are impacted by Project construction will be restored to eliminate accelerated runoff caused by soil compaction, poor vegetation cover, or the unnatural conveyance of water by roads, ditches, or trails.

Minimization of Temporary Impacts to Wetlands: The Companies will implement the following practices to reduce and minimize and then restore the temporary impacts to wetlands, riparian zones and floodplains:

- All wetland crossings will be matted with marsh mats.
- Prior to the placement of marsh mats, all removal of woody vegetation within wetlands and riparian zones will be accomplished by hand cutting the woody material near the ground surface with a chain saw or by using a mower or similar equipment which avoids significant soil disturbance. This method of clearing will leave the vegetative root mat and associated topsoil horizon intact.
- Following construction, marsh mats will be removed. Once the temporary construction materials are removed, the native vegetative material (i.e. seeds, propagules and root mats) will coppice or re-sprout. This anticipated regrowth of native material will provide supplemental stabilization in addition to the anticipated seeding and planting within these areas.
- All disturbed wetland areas will be restored to their original geometry and restoration measures will be implemented. If soil displacement is noted, the area will be re-graded to original topography.
- All geotextile and silt fencing within wetlands and riparian zones will be removed and the access road corridor will be returned to pre-disturbance topographic configuration and geometry to the extent practicable. Stockpiled topsoil material will be placed, regraded, and stabilized with the appropriate seed mix.
- If necessary, restoration within the ROW will include site/seedbed preparation by disking, seeding with native herbaceous mixes and mulching. Hydro-mulching may be used in rocky areas where disk treatment is not feasible.
- All disturbed wetland areas and riparian zones will be permanently seeded and stabilized with seed mixtures in accordance with the restoration prescription specified in C&R Standards.

Monitoring Procedures for Restoration Planting

Monitoring will be performed in accordance with applicable federal and state regulations.



Plan for Soil Erosion and Sediment Control, Spill Prevention and Response

Susquehanna - Roseland 500kV Transmission Line



**Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River**

June 4, 2012

Soil Erosion and Sediment Control, and Spill Prevention and Response Plan

The Companies have prepared this Plan to specify the procedural requirements and the means and methods related to the construction phase of the Project to avoid and minimize soil erosion and sedimentation and to prevent spills. In addition to the use of Best Management Practices (BMPs), the Companies will comply with all requirements of the County and State authorized Soil Erosion and Sedimentation Control plan (E&SC) developed for the Project and as mandated in state permits and approvals from the PADEP, NJDEP, Monroe County Conservation District, and Warren County Soil Conservation District.

Soil Erosion and Sediment Control Plan

The Companies' work conducted inside the NPS Units will include the following practices and measures to avoid, minimize or mitigate adverse impacts associated with erosion and sedimentation.

The following goals have been established for this plan

- Goal 1: Avoid and minimize adverse impacts of the Project on soil erosion and sedimentation during the planning and design phase of the Project.
- Goal 2: Avoid and minimize adverse impacts of the Project on the NPS Units, including on steep slopes and upstream of sensitive aquatic resources.
- Goal 3: Restore, stabilize, and monitor the reestablishment of soil coverage and steep slopes adversely impacted by the Project.
- Goal 4: Integrate and coordinate soil erosion and sedimentation control efforts with other Project related efforts, such as those intended to protect threatened and endangered species.

Project Team Contact Information

Prior to the beginning of construction, information will be compiled that contains the names, contact information and respective responsibilities of those Project team members that will be implementing and/or coordinating the erosion and sedimentation control (E&SC) activities.

Management Practices

The Companies intend to implement the following practices:

- E&SC plans will be developed and implemented as mandated in state permits.
- The Companies will use appropriate erosion control measures in riparian or steep slopes areas in accordance with the approved E&SC plans.
- The Companies will strive to avoid or minimize construction activities in areas with steep slopes.
- The Companies will limit vegetation removal in steep slope areas.
- The Companies will use appropriate measures to diffuse stormwater flow in sloped areas in accordance with the approved E&SC plans.
- The Companies will construct access roads in a manner that protects wetland areas and reduces the amount of potential stormwater runoff.
- Project BMPs and areas will be inspected weekly or immediately after storm events in accordance with State permits. Appropriate corrective actions will be taken to immediately restore the BMPs or to provide an alternative method of treatment.

Management Procedures

Additional management procedures to be used on the S-R Project include:

- An on-site representative will have full authority to “stop work” in order to correct, modify or improve a BMP. This person will be experienced and qualified with the maintenance and operation of erosion control facilities.
- Environmentally sensitive areas within the Project area, including wetlands, will be properly identified and marked prior to beginning construction.
- Appropriate perimeter erosion control BMPs will be installed prior to beginning construction.
- Dewatering of excavations will be conducted in a manner that is in accordance with approved permits and plans.
- All grading activities will be in accordance with approved permits and plans.
- Stabilization and restoration activities will be conducted and their success monitored according to all applicable approved plans, permit requirements and regulations. Permanent restoration of the ROW and access roads, pulling areas and staging areas can begin as soon as the weather permits and all construction work is complete.

Inspections during Construction

Routine inspections of relevant Project areas will be conducted and documented. Inspections will be performed at least once every seven (7) calendar days. Inspection will identify areas contributing to the stormwater discharge, evaluate proper implementation of the ES&C plans, and determine if additional measures are needed.

Non-routine inspections will be performed in accordance with the approved state permits and requirements. At a minimum, these will include inspections following any storm event.

These inspections will be performed by a person experienced in erosion and sediment control and stormwater quality management.

Based on the results of the inspection, necessary corrections shall be implemented immediately to restore the BMPs or to provide an alternative method of treatment. Identified corrective measures will be implemented in accordance with State permits and requirements.

Each inspection and corrective action will be documented and available for review.

Maintenance During and After Construction

During construction, erosion and sediment control measures will be maintained in accordance with approved E&SC plans.

After construction, control measures will be implemented in accordance with approved Post Construction Stormwater Management plans. The need and frequency of maintenance activities will be based on the results of routine inspections performed throughout the duration of the Project. BMPs that are no longer necessary will be removed.

Spill Prevention and Response Plan (SPRP)

The Companies work conducted inside the NPS Units will include the following practices and measures to avoid releases of hazardous materials and minimize any potential impacts.

Primary Goal

- The Companies will minimize the use and storage of hazardous materials in the NPS Units.
- The Companies will prepare and have available onsite all required spill prevention and environmental emergency response plans.

Spill Response Contact Information

- Prior to the beginning of construction, information will be compiled that contains the names, contact information and respective responsibilities of those Project team members that will be implementing and/or coordinating the spill prevention and response activities.
- The Companies will institute communication and training protocols to facilitate the prevention, response, containment, and cleanup of spills during construction activities, including procedures for briefing NPS officials and responding to NPS directives or policies
- Appropriate personnel will be immediately notified of any hazardous material spills at any location of the Project or other water quality incidents in watershed or aquifer protection zones.

Material Safety data Sheets

- The Material Safety Data Sheet (MSDS) will be available for the materials used on site. These are designed to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance.

Spill Containment Requirements and Supplies

- The Contractor will maintain spill containment and clean-up supplies. Spill kits will be available onsite or adjacent to the site for any materials used onsite.
- Onsite personnel will be qualified on the proper use of the spill kits.
- All spills will be immediately addressed, contained and cleaned up.
- Secondary containment will be utilized in accordance with applicable state and federal rules and regulations.
- Spill prevention and containment measures will be used as defined in state required spill prevention and environmental emergency response plans.
- When equipment is serviced, the equipment tender will carry appropriate spill containment kits and the operator will be properly trained.

Refueling and Equipment Storage

- Designated areas will be established for vehicle fueling, material storage, and overnight parking of equipment.
- The Contractor will regularly inspect and maintain construction equipment in proper working order.
- To the extent practicable, equipment will be fueled at least 100 feet from the nearest waterbody, wetland, or riparian zone.
- To the extent practicable, equipment parked overnight will be monitored and at least 100 feet from the nearest water body, wetland, or riparian zone.

Wastes

- All wastes, including spill wastes, shall be properly containerized, stored and disposed of offsite in accordance with applicable federal and state regulations.
- Onsite waste collection areas will be minimized in both quantity and duration.
- There will be no onsite burning of any waste or debris.
- Concrete truck washout will not be permitted.
- Sanitary sewage will be properly staged, collected and disposed offsite.



Avian Protection Plan
Susquehanna - Roseland 500kV Transmission Line



Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River

June 6, 2012

1.0 INTRODUCTION

This Avian Protection Plan (APP) covers the portion of the transmission line that runs through National Park Service land (hereafter referred to as the Project area). It describes methods that the Companies will employ to avoid, minimize, or mitigate potential direct and indirect impacts of the Project on avian resources. This APP was developed in accordance with APLIC *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC, 2006) and with the *Avian Protection Plan Guidelines* (APP Guidelines), a joint guidance document prepared by the Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS) (APLIC and USFWS, 2005). The APP Guidelines, along with related guidance documents¹, are considered the most current and comprehensive guidance tools to avoid and minimize any potential operational and avian risks that may result from avian interactions with overhead electric utility lines and towers.

The Project will not result in permanent increased impacts to avian resources from existing conditions. The design of the new transmission line is expected to reduce the potential risk of impacts. In addition, following Project implementation, restoration and vegetation management can be used to increase the avian habitat value of the Project area.

2.0 AVIAN PROTECTION PLAN

The specific objectives of this APP are:

- To document the avian resources that currently occur on and in the vicinity of the Project area;
- To identify potential avian-related risks and benefits related to the Project; and
- To define the specific measures to:
 - comply with all relevant federal and state regulations;
 - comply with all relevant NPS requirements and agreements;
 - avoid and minimize the potential risk of avian interactions, injury and mortality associated with construction and operation of the Project; and
- To enhance avian habitat within the transmission line ROW consistent with the Project purpose, safety requirements, and NPS requirements and management goals.

¹ Related documents include *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).

2.1 Regulatory Framework

Most birds are protected under one or more state or federal regulations. The following federal and state regulations are directly applicable to the issues of avian injury and mortality from electrocution or collision with electrical facilities and nest management on transmission structures.

2.1.1 Federal Regulations

Conservation of birds is required by three federal statutes: The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA), the Endangered Species Act (16 U.S.C. 1531-1544; ESA); and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; BGEPA). All three of these Acts are administered by the USFWS.

Migratory Bird Treaty Act

The MBTA is the overriding federal regulation that has guided the development of bird protection guidelines, including the APP Guidelines. The MBTA implements four treaties that prohibit taking (i.e., harming or killing), possession, transportation, and importation of all migratory, native birds (plus their eggs and active nests) occurring in the wild in the United States except for the House Sparrow (*Passer domesticus*), the European Starling (*Sturnus vulgaris*), the Rock Pigeon (*Columba livia*), any recently listed unprotected species in the Federal Register, and non-migratory upland game birds, except when specifically authorized by the USFWS. Other than the exceptions noted above, all bird species that occur in the Project area are protected under the MBTA.

Endangered Species Act

The ESA protects federally-listed endangered and threatened species and their documented habitats. Section 9 of the ESA prohibits the “take” of any listed species. Take is defined under the ESA as “...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a listed species, or attempt to engage in such conduct”. Under the ESA, significant habitat modification can result in a taking.

Bald and Golden Eagle Protection Act

The BGEPA affords specific legal protection to Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*). Under this Act, it is a violation to “...take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof...” This Act defines take as pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, and disturbing.

2.1.2 State Regulations

New Jersey Endangered and Nongame Species Conservation Act

The New Jersey Endangered and Nongame Species Conservation Act (N.J.S.A 23:2A-1 – 15) prohibits take, possession, transport, export, process, and sale of state-listed threatened or endangered species. The New Jersey Department of Environmental Protection (NJDEP) Division of Fish and Wildlife administers and enforces this Act. Several state-listed species are known to occur in the vicinity of Project lands as listed in Table 1.

Pennsylvania Endangered Species Regulations

In Pennsylvania, the Game and Wildlife Code (34 Pa.C.S.A. § 2167; 34 Pa.C.S.A. § 2924; 34 Pa.C.S.A. § 925; 32 P.S. §§ 5301 – 14) prohibits possession, transport, import, export, take, or attempt, aid, abet or conspire to take, any wild bird or wild animal, or any part thereof, or the eggs of any wild bird, which are endangered or threatened species. The Pennsylvania Game Commission administers and enforces this code. Endangered or threatened species of fish, amphibians and reptiles and invertebrates are similarly protected under 58 Pa Code § 75.1, which is enforced by the Pennsylvania Fish and Boat Commission, while endangered or threatened plants are similarly protected under 17 Pa Code § 45.1, which is enforced by the Pennsylvania Department of Conservation and Natural Resources.

2.2 Compliance with APP Guidelines

This APP was developed in accordance with the APP Guidelines (APLIC and USFWS, 2005) and includes sections for each of the 12 elements described in the Guidelines, plus additional sections that define the regulatory framework for the APP and describe avian-power-line interaction issues. The APP is organized as follows:

1. *Corporate Policy – An APP shall contain statement of company policy confirming the company's commitment to work cooperatively towards the protection migratory birds.*

As part of their ongoing commitment to the protection of natural resources, the Companies are committed to considering, adopting and/or implementing the avian protection measures described herein during construction and operation of the Project. The overall company goal is to avoid or minimize the potential for avian injury. This is reflected in the design of the proposed Project

2. *Training – All appropriate utility personnel including managers, supervisors, line crews, engineering, dispatch, and design personnel should be properly trained in avian issues.*

The training program will provide the Companies employees and contractors involved in construction with guidance on expectations and accountability with respect to implementation of the APP and consist of the following elements:

- The Companies' corporate policy and commitment related to this APP;
 - Summary of avian issues associated with the electric utility projects in general, and Project-specific avian risk;
 - Discussion of federal and state regulations that protect birds, legal implications, and the need for compliance;
 - Protocols of plan implementation including nest management, avian reporting procedures, identifying and assessing issues.
3. *Permit Compliance – The APP identifies the process under which each company obtains and complies with all necessary permits related to avian issues. Particular attention should be given to specific activities that can require permits including, but not limited to nest relocation, temporary possession, depredation, salvage/disposal and scientific collection.*

For any Project-related injury or mortality which impacts a listed or otherwise protected species, the Companies will immediately report the incident to the regulating authority (NPS, USFWS, Pennsylvania Game Commission and/or NJDEP, depending on the species involved), as required by federal and state law. It is currently not anticipated that the Project activities will require any Permits as the Companies are taking all possible efforts to avoid avian impacts. However, during the course of the project should it be determined that permits for nest relocation, temporary possession, depredation, salvage/disposal and scientific collection are required, the Companies will work with appropriate agencies to ensure proper application and implementation

4. *Construction Design Standards – Avian interactions with facilities can cause outages or system reliability issues. To improve system reliability, avian interactions should be considered in the design and installation of new facilities, as well as the operation of existing facilities. For those reasons, inclusion of accepted construction standards for both new and retrofit techniques also should be included in the APP. Companies can rely upon existing construction configurations recommended by APLIC (see Suggested Practices for Raptor Protection on Power Lines: State of the Art in 1996 and Mitigating Bird Collisions with Power Lines: State of the Art in 1994, or the most current editions of these documents, or may choose to instead develop their own internal construction standards that meet or exceed these guidelines. These standards should be used in areas where new construction should be avian-safe, as well as where existing infrastructure should be retrofitted to provide avian safety.*

Adherence to APLIC Standards - According to APLIC (2006), "transmission structures that are considered safe for raptors and other large birds are those that provide at least 60 inches of horizontal separation and 48 inches of vertical separation to accommodate the wrist-to-wrist wingspan and height of an eagle". Areas that contain concentrations of tall birds (e.g., wading birds including herons and egrets) may require vertical separation of 60 inches to be considered "bird safe."

As shown in Figure 1 the proposed horizontal separation for the entire Project (between the proposed 230kV line and 500kV line) is greater than 30 feet. In addition, the proposed phase to phase vertical separation is greater than 30 feet, which exceeds the maximum wing span of an adult female bald eagle of 5 feet (APLIC, 2006). Therefore, the APLIC bird safe standards have been met and the risk of electrocution does not exist.

Specific Construction Design and Siting Standards that demonstrate compliance with the APP standards include:

Federal Aviation Administration (FAA) Marking Standards - In accordance with aviation safety requirements, FAA regulations will require lighting. Where FAA lighting is required in DEWA, the companies will use an innovative Audio Visual Warning System (AVWS). This is an FAA-approved, on-demand lighting system that limits light run times to actual encroachment threats thus eliminating the need for constant (i.e., steady state) light. The AVWS system will minimize potential light-related impacts on birds.

Avian Safe Standards for Tower Structures and Transmission Wires - The Companies will employ avian safe standards for the entire Project, which will avoid bird electrocution and minimize collision risk especially within the avian risk areas defined in this APP. Specifically, the following design methods will be employed:

- As discussed above the APLIC-recommended eagle-safe standards for tower structures and wires along the entire ROW have been met.
- The Companies have proposed the use of an optical ground wire (OPGW) for the Project. This wire is larger in profile than a typical shield wire because it combines the ground wire, static wire, and a fiber optic cable into the shield wire casing. The optical ground wire will have a diameter of $\frac{3}{4}$ inches, which is 30-50% larger than typical shield wires.
- The Companies will use tri-bundled conductor for the 500 kV and single conductor for the 230 kV lines, which will be more visible to birds than a Non-bundled configuration. As discussed prior, the Project will consist of three vertically (30 foot) spaced phases of bundled conductors. Each bundled conductor will contain three wires configured in a triangular pattern spaced 18 inches apart. The visibility of this design will minimize the potential for avian collisions with the conductors. Individual conductor wire within a bundle are the same phase and therefore do not pose an electrocution hazard for birds
- Bird Flight Diverters (BFD) have been evaluated and considered by the Project team as a type of avian marker device for the shield wire. However, the installation of these devices is not proposed at this time. The Companies maintain thousands of miles of electrical transmission lines and several thousand miles of electrical distribution lines. There has not been any significant indication over the

years to suggest that the company wide electrical system is specifically responsible for bird deaths due to collisions.

- Because OPGW is a very sophisticated and expensive wire configuration, BFD's will not be used if it is determined by the Companies engineering team during this evaluation period that they would create increased ice loading, or would void the manufacturer's warranty for the OPGW.
- BFD's will not be used on the 230kV or 500kV conductor wires. The research conducted by Hurst, 2004 on BFD's found that above 115kV corona discharge could increase audible noise, radio interference and degradation of materials such as organic insulation of the conductors.

5. *Nest Management – The APP may include procedures for nest management on utility structures. These procedures should be explained to company employees during training to ensure uniform treatment of avian issues among personnel.*

The Companies do not encourage birds to nest on its structures; however, utility poles and transmission towers have been documented to provide nesting opportunities for many bird species. Raptors, particularly Osprey and Red-tailed Hawk often construct nest sites on transmission towers, especially in areas where other nesting habitat is limited. Many nests on transmission towers pose little risk to the nesting birds or to the functionality of the line. However, nests constructed on the top of transformers or other flat locations in close proximity to energized conductors and hardware may pose a risk to the birds that release streamers, interfere with access or maintenance of the tower, or cause power outages. In these cases, further action such as relocation or removal of the nest may be warranted, pending approval from regulating authorities.

Nests of most birds (exceptions are Bald Eagles and federally- or state-listed threatened or endangered species) can be removed during the non-breeding season when there is no risk to adults, eggs, or young birds. State and federal laws protect active bird nests with eggs or young from removal during the breeding season without first obtaining authorization from USFWS and NJDEP.

Currently, there are no nests located on any of the structures within the NPS lands. Additionally, the design for the structures will further reduce the likelihood of future nesting on these structures.

It is also the Companies intent to complete Project construction activities during the late fall to early winter months. This will help further minimize the potential of the project to impact active nests for a majority of the protected avian species. Additionally, personnel will be instructed to immediately report any sightings of eagles and other large raptors in the project area during construction activities so that potential nesting activities can be further investigated.

As part of the training program, as described above, personnel will be trained to identify active and inactive nests, and will notify appropriate parties.

6. *Avian Reporting System – Although reporting of avian mortalities may be required as a condition of Federal or State permits, a utility may choose to voluntarily monitor relevant avian interactions, including mortality, through the development of an internal reporting system. An APP should consider providing for the development of such a reporting system which can help a company pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring as well as the extent of such mortalities.*

While not anticipated, any construction related injury or mortality which impacts a listed or otherwise protected species will be immediately reported to the appropriate regulatory authority.

Based on the eighty (80) year history of the existing line there has been no evidence that the existing line has contributed to injury or mortality of avian resources. In addition, since the design of the new line is “bird safe” the Companies believe that monitoring for avian resources impacts is not necessary.

7. *Risk Assessment Methodology - A utility can have the greatest impact on reducing avian mortality by focusing its efforts in a cost-effective manner on the areas that pose the greatest risk to migratory birds.*

The proposed transmission line design will make it more visible than the existing transmission circuit. The existing conductors consist of single wires in a horizontal pattern with two static wires above them. The proposed conductors will consist of vertically configured circuits with tri-bundled conductors on the 500kV circuit and single conductor for the 230 kV circuit. These wires will be more visible than the existing conductors. The static wires will be replaced with fiber optic cables which are a larger diameter than the existing static wires making them more visible. As previously discussed the transmission line does not pose an electrocution hazard to avian resources.

8. *Mortality Reduction Measures - After completing a risk assessment, a company can focus its efforts on areas of concern, ensure that the activities taken by the utility are not out of proportion to the risks encountered by migratory birds, and then determine whether an avian mortality reduction plan needs to be implemented in certain areas.*

In addition to the design measures that reduce the risk of collision and eliminate electrocution, the Companies have committed to implement construction best management practices to minimize environmental impacts on avian habitat during construction by the following measures;

- Adherence to wetlands and flood hazard regulations;
- Soil erosion and sediment control;

- Contractor training;
- Wetland and stream mitigation/restoration;
- Targeted mitigation / management opportunities.

The Companies will coordinate Avian Timing Restrictions with the NPS. The anticipated construction schedule of late fall 2013 to early winter 2014 will avoid and minimize potential impacts to avian resources. In addition, the Companies will work with appropriate state and federal agencies to employ avoidance measures adjacent to active nest sites whenever possible. Should Bald Eagles nest within 1,000 feet of the Project area the companies will restrict activities during the nesting season (December 15 – August 31), or obtain the proper permit;

9. *Avian Enhancement Options – In addition to taking steps to reduce mortality to avian species, an APP may also include opportunities to a utility to enhance avian populations or habitat including nesting platforms, managing habitats to benefit migratory birds, or working cooperatively with agencies or organizations in such efforts.*

In addition to the mortality reduction actions and construction design standards the Companies will implement additional avian enhancements to increase habitat quality for birds and promote bird use where consistent with Project purpose and safety requirements. These enhancements are not scheduled to be implemented until the construction of the Project is almost complete. Therefore the precise locations of these enhancements and their extent continues to be refined and will also take advantage of the extensive knowledge to be gained from the physical work to occur on the ROW during construction and from the equipment and methods to be used.

Consistent with the Companies' Transmission Vegetation Management Plan the following avian enhancement measures may be undertaken:

- Planting, maintaining, or improving warm season grass communities;
 - Maintaining or restoring existing ROW vegetation conditions;
 - Controlling invasive plant species;
 - Creating snag trees in border zones;
10. *Quality Control – An APP also may include a mechanism to review existing practices, ensuring quality control. For instance, a utility may conduct an independent assessment of its avian reporting system to ensure effectiveness, or invest in research on the effectiveness of different techniques and technologies used to prevent collisions, electrocutions and problem nests.*

Through the Companies normal participation in industry groups and committees new technologies will continue to be evaluated for effectiveness and potential application on this transmission line project.

11. *Public Awareness – An APP should include a method to educate the public about the avian electrocution issue, the company’s avian protection program, as well as its success in avian protection.*

Both Companies have extensive public outreach programs including a substantial website. The Companies will include information about the APP on their projects’ website, and will continue to utilize current mechanisms for communicating with the public about the Project

12. *Key Resources – an APP should identify key resources to address avian protection issues including, for example, a list of experts who may be called upon to aid in resolving avian issues. These should include consultants, Federal and State resource agencies, universities, or conservation groups.*

The Companies will coordinate with state and federal agencies in their efforts to successfully implement this APP. In addition, other organizations and individuals will be consulted as needed for expertise in local and regional bird populations, bird behavior, habitat enhancement concepts and design, and bird protection devices.

3.0 Compliance with the Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

For purposes of these guidelines, "disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

The existing transmission lines within the DEWA are in the flight path of known communal roosts for wintering Bald Eagles and associated foraging areas (Ambler 1996).

Nonetheless, collisions are not likely and have not been documented in the Project area. It is expected that there is a low likelihood of a bald eagle collision occurring and the design of the wires and other project design elements are not expected to result in impacts. It is expected that the project will be in conformance with the Bald and Golden Eagle Protection Act.

The following describes how the Project will comply with recommendations to avoid disturbance of foraging and communal roosting areas and activities beneficial to eagles.

Recommendations for Avoiding Disturbance at Foraging Areas and Communal Roost Sites

- 1. Minimize potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.*

To the maximum extent possible, all activities will be conducted to avoid activities within the important flight path, the Delaware River Corridor. Construction is proposed between late fall 2013 and winter 2014. Tower construction will be conducted along the edges of the river corridor and no activities are scheduled to occur across the river until the conductors are installed. This installation will occur in winter 2014. It is anticipated that the majority of the eagles wintering in the vicinity will have started to move away from the roost area and have returned to nesting habitat. Therefore, impacts to the use of the communal roosting and foraging habitat will be minimized.

- 2. Locate long-term and permanent water-dependent facilities, such as boat ramps and marinas, away from important eagle foraging areas.*

This project does not involve these activities.

- 3. Avoid recreational and commercial boating and fishing near critical eagle foraging areas during peak feeding times (usually early to mid-morning and late afternoon), except where eagles have demonstrated tolerance to such activity.*

This project does not involve these activities.

- 4. Do not use explosives within ½ mile (or within 1 mile in open areas) of communal roosts when eagles are congregating, without prior coordination with the U.S. Fish and Wildlife Service and your state wildlife agency.*

There are no plans to perform blasting within the National Park.

- 5. Locate aircraft corridors no closer than 1,000 feet vertical or horizontal distance from communal roost sites.*

The project does not involve aircraft corridors. .

Additional Recommendations to Benefit Bald Eagles

- 1. Protect and preserve potential roost and nest sites by retaining mature trees and old growth stands, particularly within ½ mile from water.*

The majority of the existing ROW is scrub/shrub/herbaceous habitat. The area where the ROW needs to be expanded from 100 ft to 150 ft. is currently forested. The project will comply with NPS and USFW requirement to protect known winter roosting areas for the clearing of this additional ROW.

- 2. Where nests are blown from trees during storms or are otherwise destroyed by the elements, continue to protect the site in the absence of the nest for up to three (3) complete breeding seasons. Many eagles will rebuild the nest and reoccupy the site.*

Since there are no nests in the immediate vicinity of the ROW, this recommendation does not apply.

- 3. To avoid collisions, site wind turbines, communication towers, and high voltage transmission power lines away from nests, foraging areas, and communal roost sites.*

The proposed project is the upgrade of an existing transmission line which has been in place since the late 1920's. The existing line crosses eagle foraging and communal roosting areas. The proposed conductors will be bundled, which is anticipated to increase conductor visibility and reduce potentials for bird impacts. The proposed bundled conductors will be more visible than the existing conductors. The existing conductors consist of single wires in a horizontal pattern with two thin static wires above them. The proposed conductors will consist of vertically configured wires, a single conductor for the 230 kV circuit and tri-bundled conductors for the 500 kV circuit. These wires will be more visible than the existing conductors. The static wires will be replaced with fiber optic cables, which are a larger diameter than the existing static wires making them more visible thereby reducing potential collisions with the conductors.

- 4. Employ industry-accepted best management practices to prevent birds from colliding with or being electrocuted by utility lines, towers, and poles. If possible, bury utility lines in important eagle areas.*

The Companies will employ avian safe standards for the entire Project, which will avoid bird electrocution and minimize collision risk especially within the avian risk areas defined in this APP. Specifically, the following design methods will be employed:

- As discussed above the APLIC-recommended eagle-safe standards for tower structures and wires along the entire ROW have been met.
- The Companies have proposed the use of an optical ground wire (OPGW) for the Project. This wire is larger in profile than a typical shield wire because it combines the ground wire, static wire, and a fiber optic cable into the shield wire

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- Bird Flight Diverters (BFD) have been evaluated and considered by the Project team as a type of avian marker device for the shield wire. However, the installation of these devices is not proposed at this time. The Companies maintain thousands of miles of electrical transmission lines and several thousand miles of electrical distribution lines. There has not been any significant indication over the years to suggest that the company wide electrical system is specifically responsible for bird deaths due to collisions.
 - Because OPGW is a very sophisticated and expensive wire configuration, BFD's will not be used if it is determined by the Companies engineering team during this evaluation period that they would create increased ice loading, or would void the manufacturer's warranty for the OPGW.
 - BFD's will not be used on the 230kV or 500kV conductor wires. The research conducted by Hurst, 2004 on BFD's found that above 115kV corona discharge could increase audible noise, radio interference and degradation of materials such as organic insulation of the conductors.

5. Where bald eagles are likely to nest in human-made structures (e.g., cell phone towers) and such use could impede operation or maintenance of the structures or jeopardize the safety of the eagles, equip the structures with either (1) devices engineered to discourage bald eagles from building nests, or (2) nesting platforms that will safely accommodate bald eagle nests without interfering with structure performance.

The Companies do not encourage birds to nest on its structures; however, utility poles and transmission towers have been documented to provide nesting opportunities for many bird species. Raptors, particularly Osprey and Red-tailed Hawk often construct nest sites on transmission towers, especially in areas where other nesting habitat is limited. Many nests on transmission towers pose little risk to the nesting birds or to the functionality of the line. However, nests constructed on the top of transformers or other flat locations in close proximity to energized conductors and hardware may pose a risk to the birds that release streamers, interfere with access or maintenance of the tower, or cause power outages. In these cases, further action such as relocation or removal of the nest may be warranted, pending approval from regulating authorities.

6. Immediately cover carcasses of euthanized animals at landfills to protect eagles from being poisoned.

This recommendation does not apply to the project.

7. Do not intentionally feed bald eagles. Artificially feeding bald eagles can disrupt their essential behavioral patterns and put them at increased risk from power lines, collision with windows and cars, and other mortality factors.

This recommendation does not apply to the project.

8. Use pesticides, herbicides, fertilizers, and other chemicals only in accordance with Federal and state laws.

The Companies will comply with all Federal and State laws when utilizing pesticides, herbicides, fertilizers, and other chemicals on the ROW.

9. Monitor and minimize dispersal of contaminants associated with hazardous waste sites (legal or illegal), permitted releases, and runoff from agricultural areas, especially within watersheds where eagles have shown poor reproduction or where bioaccumulating contaminants have been documented. These factors present a risk of contamination to eagles and their food sources.

The Companies do not anticipate any discharges of hazardous materials from project related activities. However, a project specific spill prevention plan has been developed in the event of an unforeseen spill.

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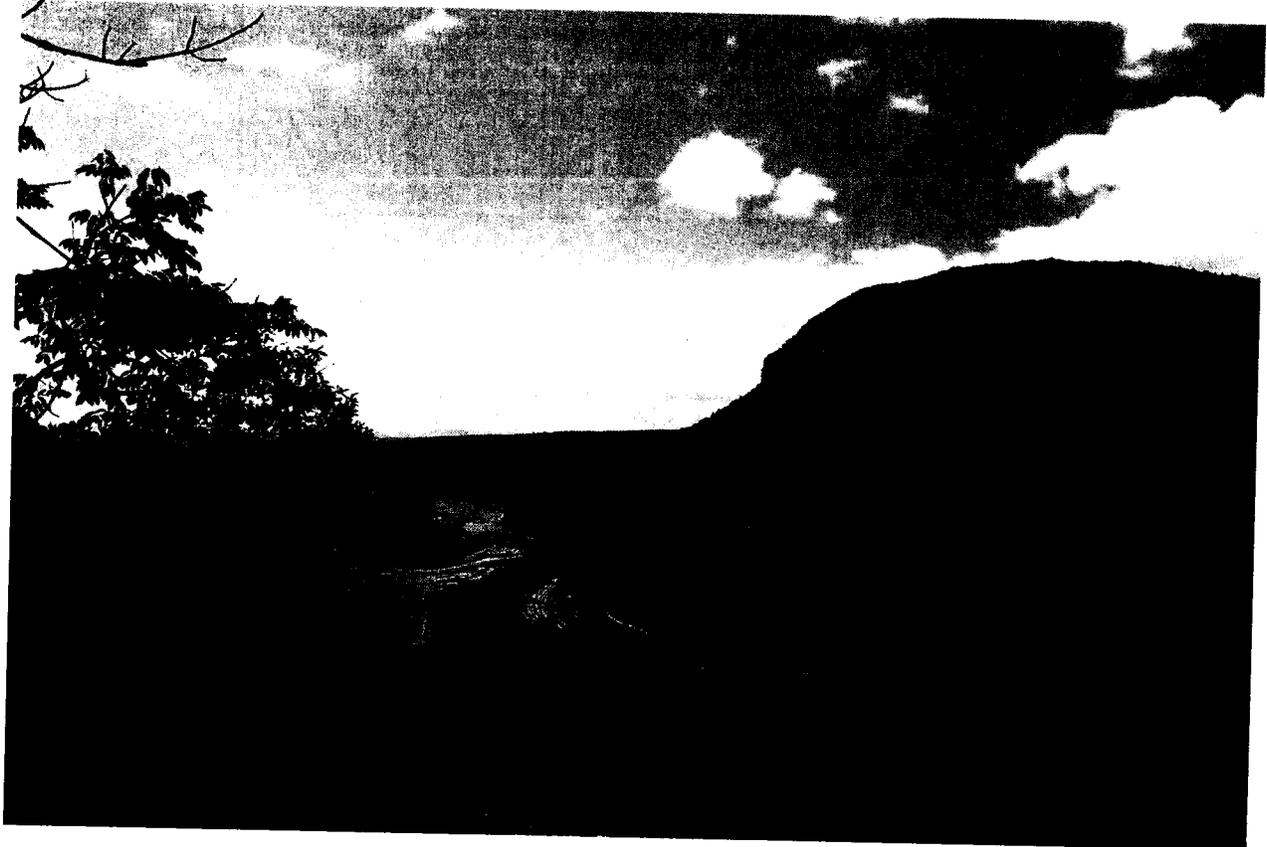
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Special Species Mitigation Plan
Susquehanna - Roseland 500kV Transmission Line



Crossing the
Appalachian National Scenic Trail
Delaware Water Gap National Recreation Area
Middle Delaware National Scenic and Recreational River

June 7, 2012

I. INTRODUCTION

This Special Species Mitigation Plan (the Plan) covers the portion of the transmission line that runs through National Park Service land (hereafter referred to as the Project area). It describes methods that PPL Electric Utilities and PSE&G (the Companies) will employ to avoid, minimize, or mitigate potential direct and indirect impacts on the special species and their habitats during construction and restoration of the Project.

Transmission line rights-of-way have been documented as important habitats for wildlife species (Lee and Norden, 1996; New Jersey Audubon, 2009), and the Project area is no exception. The extensive field studies conducted in the Project area have documented several wildlife and one plant species that are of conservation concern: the Bog Turtle (*Glyptemys muhlenbergii*); the Wood Turtle (*Glyptemys insculpta*); the Timber Rattlesnake (*Crotalus horridus*); and the Climbing Fern (*Lygodium palmatum*). These are the four special species that are the subject of this Plan. Additional details can be found in the numerous other mitigation plans that have been prepared for the Project, most notably the Construction and Restoration Standards.

The Companies have taken great effort to avoid and minimize impacts to the right-of-way communities during the design and planning phases of the Project. Ecological data continues to be shared with and reviewed by State and Federal regulatory agencies and incorporated into the species specific plans to further avoid, minimize or mitigate potential Project impacts. These efforts included delineation and survey of all wetlands and several years of environmental field surveys and assessments. Proposed structures and access roads have been designed and located to avoid sensitive areas to the greatest extent possible. Where impacts cannot be avoided, they have been minimized. All Project activities will be conducted in accordance with all appropriate permits, agency approved plans and conditions. Seasonal time of year restrictions or site monitoring by qualified environmental scientists will play an essential role during construction to further ensure that Project activities avoid and minimize potential impacts.

Implementation of this Plan will:

- Protect and manage the Special Species and their habitats within the Project area.
- Avoid, minimize or mitigate unavoidable impacts caused during project construction.
- Provide opportunities to enhance Special Species habitats.

II. DATA SYNTHESIS

Identification of Critical Habitats

The rare species investigation of the Project area involved a review of NJ and PA Natural Heritage Program (NHP) databases, consultation with appropriate federal and state agencies, analysis of aerial photography, and field evaluations of suitable habitat for a particular rare species.

Species Specific Field Surveys

Wetland delineations required that the Project area be walked. This also provided opportunities for biologists to evaluate associated on-site habitats potentially suitable for locally documented rare species. The evaluation confirmed whether wetlands or waters were present, the type of vegetative cover or land use, and any local geological features indicative of rare ecological communities (e.g. rocky outcrop, vernal pool, broomsedge / bluestem meadow, emergent wetland, stream corridor, riparian zone, forested wetland, upland forest, calcareous geology). Numerous follow-up field assessments were conducted at various segments of the Project area to gather additional data on potential rare plant or wildlife species. Surveys were conducted for Indiana bat, bog turtle, wood turtle, timber rattlesnake, and rare plants.

Summary of Wildlife Species Ecology

The primary species confirmed in the Project area include:

- the bog turtle identified in Pennsylvania,
- the timber rattlesnake identified in New Jersey ,
- the wood turtle in New Jersey, and
- the climbing fern in New Jersey.

Indiana bats were not identified within the Project area and therefore are not discussed further.

Due to the sensitivity of these species, specific locations are not discussed in the plan. Numerous reports documenting the surveys have been prepared and submitted to respective Federal and State agencies for their review and further consultations. A list of these reports is included in the Reference section at the end of this Plan.

Bog Turtle

The bog turtle is classified as an endangered species in Pennsylvania and New Jersey. In addition, its northern population (occurring in Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York and Pennsylvania) has been listed as a federally threatened species. The species is highly susceptible to habitat loss, degradation and fragmentation, and illegal taking by collectors.

The bog turtle is one of North America's smallest turtles, with an average adult carapace length of less than 100 millimeters. The best diagnostic feature to identify the species is its lightly sculpted

carapace and bright orange, often hourglass shaped marking on each side of its head. The carapace is generally dark brown to ebony in coloration, while the plastron varies in coloration.

Bog turtles are strongly associated with emergent wetlands. Bog turtles commonly use the open emergent areas for foraging and basking. Breeding occurs in mid to late spring and eggs are typically laid in mid-summer. Nests sites usually have a sunny exposure and eggs are often loosely buried or left in the open, on top of tussock sedge or other vegetative hummocks above the water line. Hatchlings typically emerge in late summer, although some may overwinter within the nest for hibernation, bog turtles may crawl into soft peat, use old muskrat or other small mammal burrows, or nest around the roots of woody vegetation (Klemens, 2001).

Unlike other turtle species, a bog turtle's range is small, with the turtles rarely leaving the marsh for upland foraging. Most bog turtle habitats are less than 2 acres in size (NJDEP, 2008). As such, micro-habitat conditions in the wetland are critical to maintaining appropriate habitat conditions. Suitable bog turtle habitat is recognized by three criteria; hydrology, soils and vegetation (although not all suitable habitats will contain bog turtle). Sustained hydrology is extremely important in maintaining the soil and vegetative characteristics preferred by this species. In general, appropriate wetland hydrology consists of shallow, spring-fed seepages with water or soil saturation present year-round. Suitable soils generally consist of organic mucks or muck-like soils. The characteristic mucky soils are often easily compressed and, in areas grazed by livestock, bog turtles are often found within pockets of standing water in old hoof-prints. Suitable vegetative communities for bog turtle are generally characterized by an open wetland meadow that may be interspersed with shrub/scrub areas and a forested wetland perimeter. Common emergent wetland species include sedges, grasses, and rushes such as tussock sedge, woolgrass, soft rush and rice cut grass. Associated herbaceous species include skunk cabbage, arrowhead, sweet flag and cattail. Shrubby vegetation includes alder, shrubby cinquefoil and red maple saplings. In disturbed areas, purple loosestrife, reed canary grass and multiflora rose are also common (USFWS, 2001; NJDEP, 1995).

Documented bog turtle habitat has been confirmed in Pennsylvania. Extensive Phase 1 habitat assessments were conducted along both the Pennsylvania and New Jersey portion of the Project area. No additional habitats were identified in the Project area in Pennsylvania. Although several suitable habitats were identified in the Project area in New Jersey, no additional bog turtle populations were identified. All bog turtle Phase 2 surveys were conducted in accordance with USFWS approved protocols.

Timber Rattlesnake

The timber rattlesnake is a New Jersey endangered species and a Species of Special Concern in Pennsylvania. The current geographic range of the timber rattlesnake encompasses 30 states from New Hampshire to Minnesota in the north, from extreme southeastern Nebraska and eastern Iowa to Texas in the mid-west, across the south to northern Florida, and along the eastern coastal plain (Brown, 1993). The species is most abundant in the Appalachian Mountains from northeastern Alabama to Pennsylvania. In northern New Jersey, timber rattlesnakes are found along the entire length of the Kittatinny Ridge from the Delaware Water Gap to High.

In the northeastern United States, this species generally prefers remote mountainous terrain characterized by steep ledges and rock slides, timbered areas with rocky outcroppings, dry ridges, and deciduous or coniferous forests, usually in areas with southern exposures (Brown, 1993). Though typically an upland species in northern New Jersey, the timber rattlesnake will utilize both upland and wetland habitats, with use of wetlands depending on the type of wetland habitat present, the percentage of wetland comprising total summer habitat areas, and the location of wetland habitats relative to the den site (NJDEP, 2008). Timber rattlesnakes hibernate during the late fall, winter, and early spring. For hibernation, northern New Jersey populations of timber rattlesnakes use communal den sites located in rock outcroppings and talus slope areas associated with major ridges (NJDEP, 2008). They emerge from their communal dens during mild weather in mid-spring. Often, snakes will remain close to their dens for days or weeks after emergence in order to take advantage of basking opportunities available on warm spring days. The snakes then begin to return to their summer foraging areas which are typically adjacent forested habitats located within a 2-mile radius of the den (NJDEP, 2008).

Timber rattlesnakes are venomous snakes that rely on cryptic coloration in order to ambush their prey, which consists of small mammals including mice, voles, chipmunks, and cottontail rabbits. Foraging activity is generally undertaken only by males and non-gravid females, as gravid females typically do not eat in the months prior to giving birth. Foraging continues until the breeding season begins in summer. At this time, sexually mature males follow scent trails and pursue receptive females over long distances and continue to do so until early fall (Beans and Niles, 2003). After successful mating, females will not give birth until the next year, at which time six to ten live young are typically born in late summer. Migration back to the winter dens begins as the weather cools in the early autumn. Adults and young snakes alike then follow scent trails back to their dens (Beans and Niles, 2003), which may be shared with numerous other individual snakes from several different species.

Den emergence and summer gestation surveys conducted in the Project area only confirmed the presence of adults and juvenile timber rattlesnakes, a shed timber rattlesnake skin, and the presence of preferred habitats suitable for den sites, basking areas, foraging, and gestation in the NJ portion of the Project area. As requested by the NPS, additional surveys were conducted to verify the presence or absence of gestation/nesting habitat within the Project area. These surveys identified additional rattlesnakes and one gestation/nesting area within the NJ portion of the Project area.

Wood Turtle

The wood turtle is not a listed or candidate endangered or threatened species in Pennsylvania. However, within New Jersey, the wood turtle is a State-threatened species. It occurs primarily in the northern two-thirds of the state. Wood turtles require both aquatic and terrestrial habitat. In general, wood turtles use streams and rivers for breeding and hibernating. Breeding occurs underwater, often in slow meandering streams with sandy bottoms and shoals in either the spring (April and May) or fall (September-October). During hibernation, wood turtles are primarily found on the bottom or in the banks of waterways. Suitable aquatic habitat for the wood turtle is considered to be streams or rivers featuring flowing water of varying depths, undercut banks, exposed roots, muskrat burrows, fish populations, and evidence of good water quality (e.g., trout-associated waters).

In New Jersey, wood turtles are primarily terrestrial from mid-May to October (Farrell and Zappalorti, 1979; Zappalorti et al., 1984). Apart from breeding and hibernating, wood turtles make use of wetlands and uplands adjacent to their aquatic habitat. Wood turtles are an extremely mobile species that have been documented to move at least 1.8 km (1 mi) along a stream corridor and exhibit familiarity with wetland habitats 2 km (1.2 mi) from an initial capture point (NJDEP, 2008). Favored adjacent upland/wetland habitats are characterized by mosaics of forest, field, shrubs, and agricultural lands, though wood turtles also occur in more monotypic areas. Thickets of alder, greenbrier, or multiflora rose adjacent to aquatic habitats are favored basking areas (NJDEP, 2008).

A presence/absence survey was initiated in the Project area in NJ in 2010. Twenty-seven (27) wood turtles were identified along an approximately one-mile segment in the New Jersey portion of the Project. To determine what areas are utilized by the turtles, and particularly to identify where the turtles nest and hibernate, external transmitters were placed on adult male and female wood turtles. These extensive surveys confirmed wood turtle habitat occurring within and adjacent to the Project area, including winter hibernation, summer foraging, mating and nesting,

Climbing Fern

Climbing fern (*Lygodium palmatum*) is considered a rare plant in Pennsylvania and State endangered (S2-imperiled) in New Jersey. Climbing fern was recently identified in the NJ portion of the Project area. This plant was found growing beneath an existing structure. Because normal demolition practices could result in disturbance to this plant the Companies will work with the NPS and other appropriate agencies to develop avoidance and mitigation plans.

III. BEST MANAGEMENT PRACTICES

Potential impacts from the Project are associated with construction activities that are needed to remove the existing lattice transmission structures and to construct the new transmission structures. These impacts may involve limited clearing of vegetation, soil excavations or fills, placement of rock or gravel, drilling, the use of construction vehicles, the placement of concrete footings, and the use of temporary matting or timbers to facilitate wetland and stream crossings. Access to the project site and maneuvering within the ROW also necessitates the construction or improvement of access roads and the establishment of laydown areas in order to stage the equipment and materials needed to remove and reconstruct the lines. Where practicable, the Project has been designed to avoid impacts to sensitive areas.

Mitigation plans have been covered in the Construction and Restoration Standards. In general, these plans include use of time of year construction to avoid active periods for sensitive species, use of on-site qualified biologists to monitor and protect sensitive species during their active periods, and the use of appropriate barriers to restrict sensitive species access to construction areas.

With the implementation of these measures, the Project is not expected to threaten the continued existence of any rare species. In addition, opportunities may exist that could substantially improve a broad array of critical habitats identified in the Park.

Time of Year Recommendations

Whenever possible and in consultation with appropriate agencies, construction activities will adhere to times recommended by the regulatory agencies to prevent disturbances during sensitive seasons for species. In general all work is anticipated to be conducted during the late fall and winter months, which will minimize impacts to most special species.

Qualified Wildlife Biologists

If project construction occurs during times when special species are active, the Companies will employ qualified wildlife biologists to conduct surveys and implement specific construction measures to avoid and minimize impacts.

Exclusion Fences and Safe Passage Pathways

If project construction occurs during times when special species are active, silt fencing and safe passage pathways will be used, if appropriate, to prevent special species from entering construction sites and to provide safe pathways for crossing of construction areas.

Contractor Training

Contractors will be trained on the identification of special species and appropriate protocols to be taken should they be encountered.

Adherence to Wetlands and Flood Hazard Regulations

The Project and all mitigation measures will be developed in accordance with applicable State and Federal laws, including existing protections for wetlands, waters, transition areas, riparian buffers, endangered and threatened wildlife, etc. All construction and environmental work will be conducted under the applicable permits including Freshwater Wetlands Permits, Flood Hazard Area Permits, Scientific Collecting Permits, and others, as necessary. Additional details are covered in the Companies Wetlands and Riparian Resources Plan.

Soil Erosion and Sediment Control

Certain elements such as soil erosion and sediment control measures are based on well-established standards developed over decades via the oversight of multiple regulatory agencies and typically administered by local Soil Conservation Districts. Correct implementation of these measures has been shown to reduce or prevent adverse affects due to erosion or sedimentation that might otherwise occur in areas adjacent to construction. See the Companies Soil Erosion and Sediment Control, Spill Prevention and Response Plan for additional details.

IV. TARGETED AVOIDANCE, MINIMIZATION AND MITIGATION MEASURES**Bog Turtle**

Initially, one of the Project's access road in PA crossed confirmed Bog Turtle habitat. To identify opportunities to avoid the potential impacts to the bog turtle in that area, federal and state agencies were consulted. An alternate access road (the southern access road) was identified that avoided this area of concern.

Following the southern access road requires crossing a forested incised tributary that flows from one wetland to another. Although bog turtles can use this forested tributary as a travel corridor, efforts will be made to avoid direct impacts by implementing all work associated with this access road and associated project activities in this area between November 1 and March 31, when bog turtles are assumed to be hibernating. If this time-of-year restriction cannot be implemented, the Companies will conduct a bog turtle survey in accordance with the following conditions:

- Prior to performing any construction work in wetlands, streams, or uplands within 300 feet of bog turtle habitats, all areas of expected disturbance will be surveyed by a qualified wildlife biologist for the presence of bog turtles.
- Prior to the survey, herbaceous vegetation will be cut to a height of 4 to 6 inches using a hand-held trimmer/weed-cutter, and then carefully raked away from the area to be searched. A qualified wildlife biologist will be present when this vegetation cutting and raking occurs.
- Immediately following the survey, silt-fencing will be placed between the wetland and the proposed construction zone while the bog turtle surveyor is present to ensure that the fencing is properly installed in the correct location. The silt-fencing will be removed immediately following construction.
- If any bog turtles are located during these surveys, the USFWS and Pennsylvania Fish and Boat Commission (PFBC) will be contacted immediately, and construction will not proceed until further consultation occurs. Survey results will be submitted to the USFWS and PFBC.
- To reduce impacts to the species and its habitat, no trees will be felled into wetlands.
- All contractors working within these areas will be trained on the identification and protection of bog turtles.
- A protocol will be established to direct contractors on the appropriate actions to be taken if turtles are encountered.
- The Companies' Vegetation Management Plan will further enhance bog turtle habitat within the Project area by keeping woody vegetation from encroaching on their habitat.

Timber Rattlesnake

It is expected that one access road and proposed structure in NJ will be in confirmed timber rattlesnake habitat. Efforts will be made to avoid direct impacts by implementing all work associated with this access road structure between the late fall and winter months, when snakes are hibernating. If this time-of-year restriction cannot be implemented, the Companies will perform the following activities:

- Prior to performing work each day, a sweep will be conducted to identify the presence of rattlesnakes within the construction area. If any are found, a qualified wildlife biologist will relocate them to a suitable area.
- When working in known rattlesnake den areas during times when snakes are active, a qualified wildlife biologist will be on site to prevent negative interactions and to relocate snakes that may wander into the Project's construction area per appropriate regulatory protocols.
- Fencing will not be used in areas of known rattlesnake dens (applicable access roads will be identified by the qualified wildlife biologist prior to construction). The Companies will ensure all contractors are trained to properly identify timber rattlesnakes and will travel no greater than 20 mph along access roads while monitoring the roads for coiled and crossing snakes. Construction vehicles must safely avoid coiled snakes and wait for crossing snakes to travel

across the road (keeping a distance at least 15 meters) or until the qualified wildlife biologist can safely move the snake from harms way.

- Accidentally injured (or potentially injured) rattlesnakes will be safely collected and released to the licensed venomous snake rehabilitator per the qualified wildlife biologist venomous snake protocol for construction monitors. Snakes run over by vehicles may continue to move but have internal injuries. These snakes will be collected for medical care. Accidentally killed rattlesnakes will be safely collected and released to the qualified wildlife biologist immediately.
- Identified dens will not be destroyed or altered.
- The Companies will adhere to the appropriate protocol pertaining to gravid and post-partum timber rattlesnakes. Active gestation/birthing areas (areas where gravid or post-partum females and/or neonates are found) will be protected from construction-related disturbances and females (and young) will not be moved. A minimum 15 meter-radius buffer around the gestation/birthing area (rock outcrop) will be maintained and a qualified wildlife biologist will monitor the gestation site and surrounding area frequently during construction to ensure no females or young are injured. Traveling gravid females (i.e., gravid females en route across the ROW during construction activities) in areas where no gestation areas have been identified will be moved to suitable habitat within the nearest wood line (in the direction of travel) adjacent to the ROW per the appropriate protocol. Traveling post-partum females (late August – October 31) will not be moved; construction activities will avoid disturbing such females to permit their natural path of travel.
- Seasonal timing restrictions (generally mid April to late-October) on cutting activities within known den site areas will be used to insure a low potential for direct impacts to above-ground individuals.
- If timing restrictions cannot be implemented prior to construction in the vicinity of a known or potential den site, silt fence barriers will be installed along the limits of the construction area. No equipment staging, vehicle access, or other activities will be permitted outside of the approved construction limits. Silt fence construction should be done following an inspection of the entire proposed construction area by a qualified wildlife biologist to ensure no timber rattlesnakes or other herptile species are inadvertently disturbed by installing the fencing. The area inside the fence should then be surveyed to verify the absence of herptiles. Any species identified within the fenced construction area should be relocated by the biologist to suitable habitat outside of the disturbance area. The monitor will notify the appropriate personnel upon arrival at the site and upon completion of the inspection. Initial monitoring may be extended to be conducted daily during construction activities if there is deemed a high probability of impact to a den or to individual rattlesnakes. If daily monitoring is not required, a qualified wildlife biologist will be available "on-call" to resolve any additional issues during the construction process, such as if a rattlesnake is encountered by a worker on the site. Upon completion of construction activities, a qualified wildlife biologist will inspect the site to ensure no timber rattlesnakes or other herptile species, are inadvertently disturbed during removal of the fencing.

Wood Turtle

There is a risk that wood turtles and/or their habitats may be impacted during the use of construction equipment, or careless entry into wetland habitats and stream corridors. Efforts will be made to avoid direct impacts by performing all work between the late fall and winter months, when wood turtles are hibernating. If this time-of-year restriction cannot be implemented, the Companies will perform the following activities:

- Prior to performing work each day, a sweep will be conducted to identify the presence of wood turtles within the construction area. If any are found, a qualified wildlife biologist will relocate them to a suitable area.
- A qualified wildlife biologist will be on site to prevent negative interactions and to relocate wood turtles that may wander into the Project's construction area per appropriate regulatory protocols.
- No temporary disturbances will take place within wetlands, wetland transition areas, and riparian areas until the areas have been surveyed for turtles.
- Silt fencing will be installed by non-mechanical means. No equipment staging, vehicle access, or other activities will be permitted outside of the approved (silt-fenced) construction limits. All silt fencing will be maintained year-round during the construction phase. Inspection and maintenance logs will be kept and provided to the appropriate personnel upon request.
- Contractors will be trained to identify wood turtles and take appropriate actions
- Additional protection of wood turtle habitat will be accomplished under the Soil Erosion and Sediment Control, Spill Prevention and Response and Vegetation Management Plans.

Climbing Fern

Climbing fern (*Lygodium palmatum*) is considered a rare plant in Pennsylvania and State endangered (S2-imperiled) in New Jersey. Climbing fern was recently identified in the NJ portion of the Project area. This plant was found growing beneath an existing structure. Because normal demolition practices could result in disturbance to this plant the Companies will work with the NPS and other appropriate agencies to develop avoidance and mitigation plans.

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NEW JERSEY:

Plants

1. "Plant Species of Special Concern Report Addendum for PPL Electric Utilities",
Susquehanna-
Roseland 500 kV Transmission Line, Delaware Water Gap National Recreation Area,
Lehman
Township, Pike County, PA; Middle Smithfield Township, Monroe County, PA; Hardwick
Township, Warren County, NJ, Nov, 4, 2009.

Wetlands

2. "Vernal Habitat Survey Results for PSEG Roseland-Bushkill Transmission Line Right-Of-Way
Proposed Access Roads", Delaware Water Gap National Recreational Area, Warren
County, New Jersey".

Reptiles

3. "Bog Turtle (*Glyptemys muhlenbergii*) Phase I Survey, PSE&G Susquehanna-Roseland Transmission Line Right-of-Way, Delaware Water Gap National Recreation Area, December 23, 2009, Warren County, New Jersey. Prepared for: Public Service Electric and Gas Company (PSE&G), 80 Park Plaza, Newark, New Jersey 07102-4194. Submitted by: EcolSciences, Inc
4. "Bog Turtle (*Glyptemys muhlenbergii*) Phase I Survey, PSE&G Susquehanna-Roseland Transmission Line Right-of-Way, Delaware Water Gap National Recreation Area, Warren County, New Jersey. September 10, 2010". Prepared for: Public Service Electric and Gas Company (PSE&G), 80 Park Plaza, Newark, New Jersey 07102-4194. Submitted by: EcolSciences, Inc. December 23, 2008" "Bog turtle (*Glyptemys muhlenbergii*) Phase 2 Survey, PSE&G Roseland-Bushkill Transmission Line Right-of-Way, Delaware Water Gap National Recreation Area, Warren County, New Jersey. Prepared for: Public Service Electric and Gas Company (PSE&G), 80 Park Plaza, Newark, New Jersey 07102-4194. Submitted by: EcolSciences, Inc. September 10, 2010"
5. "Bog turtle (*Glyptemys muhlenbergii*) Phase 2 Survey, PSE&G Roseland-Bushkill Transmission Line Right-of-Way, Delaware Water Gap National Recreation Area, Warren County, New Jersey", Prepared for Public Service Electric and Gas Company (PSE&G), 80 Park Plaza Newark, New Jersey 07102-4194. Submitted by: EcolSciences, Inc.
6. "DEWA Wood Turtle Survey Results (Preliminary Report: September 10, 2010). Prepared for: Public Service Electric and Gas Company (PSE&G), 80 Park Plaza, Newark, New Jersey 07102-4194. Submitted by: EcolSciences, Inc."
7. "Summary of the Timber Rattlesnake Surveys within the Delaware Water Gap National Recreation Area (DEWA), 2010 Field Season. September 14, 2010 Prepared for: Public Service Electric and Gas Company (PSE&G), 80 Park Plaza, Newark, New Jersey 07102-4194. Submitted by: EcolSciences, Inc."
8. "Timber Rattlesnake Study for PSEG Roseland-Bushkill Transmission Line Right-of-Way within the Delaware Water Gap National Recreation Area, Warren County, New Jersey, and Monroe and Pike Counties, Pennsylvania "

Avian:

12. "Raptor Survey Study Results for Proposed PSE&G Access Roads in the Delaware Water Gap National Recreation Area, Township Of Hardwick, Warren County, New Jersey. September 14, 2010 Prepared for: Public Service Electric and Gas Company (PSE&G), 80 Park Plaza, Newark, New Jersey 07102-4194. Prepared by: EcolSciences, Inc., 75 Fleetwood Drive, Suite 250, Rockaway, New Jersey 07866. February 2, 2010."

PENNSYLVANIA:

Plants

15. "Plant Species of Special Concern Report Addendum for PPL Electric Utilities, Susquehanna-Roseland 500 kV Transmission Line", Nov, 4, 2009 Delaware Water Gap National Recreation Area, Lehman Township, Pike County, PA; Middle Smithfield Township, Monroe County, PA; Hardwick Township, Warren County, NJ.
16. "Plant Species of Special Concern Supplemental Report for PPL Electric Utilities Susquehanna to Roseland 500 kV Transmission Line Delaware Water Gap National Recreation Area, Lehman Township, Pike County, PA, and Hardwick Township, Warren County, NJ," dated September 10, 2010. This report includes the results of rare plant surveys in Shoemaker Barrens conducted in August 2010.

Wetlands

17. Wetland Surveys, February 2010,

Mammals

18. "Report on Indiana Bat (*Myotis sodalis*) and Small-Footed Bat (*Myotis leibii*) Sampling at 136 Net Sites and 5 Mine Portals on PPL Electric Utilities' May-August, 2009, Proposed Susquehanna to Roseland 500 kV Transmission Line Project for the Pennsylvania Game Commission"

Reptiles

19. "Bog Turtle (*Glyptemys muhlenbergii*) Habitat Suitability assessment (Phase I Survey) for PPL Electric Utilities" proposed PPL Susquehanna-Roseland 500 kV Transmission Line Project"
20. "Timber Rattlesnake Construction Monitoring, Geotechnical Testing, PPL Structure 1/3, DEWA", December 12, 2009, Lehman Township, Pike County, PA"
21. "Timber Rattlesnake Study for PSEG Roseland-Bushkill Transmission Line Right-of-Way within the Delaware Water Gap National Recreation Area, December 12, 2009 Warren County, New Jersey, and Monroe and Pike Counties, Pennsylvania "

Avian:

22. "Bald Eagle (*Haliaeetus leucocephalus*) Survey Report for Susquehanna – Roseland 500 kV Transmission Line Delaware Water Gap National Recreation Area, December 11, 2009, Lehman Township, Pike County, PA, Middle Smithfield Township, Monroe County, PA, Hardwick Township, Warren County, NJ"



June 18, 2012

Mr. John J. Donahue
Superintendent
National Park Service
Delaware Water Gap National Recreation Area
HQ River Road off Route 209
Bushkill, PA 18324

Ms. Pamela Underhill
Superintendent
Appalachian National Scenic Trail
PO Box 50 252 McDowell Street
Harper's Ferry, WV 25425

RE: Updated FAA Aviation Safety Information

Dear John and Pam:

The Companies have taken action to address the concerns you raised in your April 17, 2012 letter regarding the installation of conventional aviation safety devices (e.g., lights and marker balls) on structures within the NPS lands you administer. In response to your concerns, the Companies determined that the use of an Audio Visual Warning System (AVWS), in lieu of conventional lighting and marker balls, could meet aviation safety concerns while reducing the potential for adverse impacts to an insignificant level. The use of an AVWS system requires specific approval by the FAA. The Companies recently sought the approval of the FAA to use an AVWS system for the four towers and two spans at issue. We are pleased to inform you that the FAA has provided No Hazard Determinations for these structures and spans conditioned on our use of an AVWS. Attached please find the No Hazard Determinations from the FAA, dated June 11 and June 12, 2012, for span 38-3 to 39-1 (Delaware River crossing) and span 41-3 to 41-4 (Sand Pond crossing) and the four structures supporting these spans.

As a result of the FAA approval of the use of an AVWS, neither marker balls nor always-on lights will be necessary at these locations. The AVWS will activate lights and send an audio message by radio to the pilot when an aircraft is within 2 nautical miles of the locations and heading toward the locations at an altitude lower than 1000 feet above the transmission line. The lights will be turned off during all other times. Based on the minimal amount of air traffic expected at this altitude in this area, the Companies believe that the lights will be triggered to turn on an extremely low percentage of the time and, when triggered, they will be on for approximately 60 seconds. While the AVWS does require radar units, solar panels and batteries (to power the lights and radar units) to be installed on at least two of the four structures,

these additional pieces of equipment are relatively small compared to the transmission poles, and can be positioned so as to have a negligible impact on the appearance of the structures.

It is the Companies' understanding that the addition of an AVWS at the Delaware River crossing of the S-R Project will meet federal aviation safety rules, which benefits NPS and other federal aircraft operations (e.g., fire management, wildlife surveys, law enforcement) while not otherwise changing the NPS preferred alternative or causing more than a small incremental impact on resources within the NPS units crossed by the S-R Project. We would be happy to assist you with completion of any analysis you may wish to develop. Please contact me at your convenience if the use of the AVWS does not address the concerns raised in your April 17th letter.

Sincerely,

A handwritten signature in black ink that reads "Gregory J. Smith". The signature is written in a cursive style with a small flourish above the 'i' in "Smith".

Gregory J. Smith

cc: Andrew Tittler
DEWA EIS Planning Team
Morgan Elmer
John Lain
Tom Jensen
Geraldine Smith
Rob Pollock
Amanda Stein
Pat McMackin
Ron Reybitz
Clint Riley
Pamela Shellenberger
Wendy Walsh



Mail Processing Center
 Federal Aviation Administration
 Southwest Regional Office
 Obstruction Evaluation Group
 2601 Meacham Boulevard
 Fort Worth, TX 76137

Aeronautical Study No.
 2012-AEA-2747-OE
 Prior Study No.
 2012-AEA-28-OE

Issued Date: 06/11/2012

David Carr
 PSE&G
 100 Eagle Rock Avenue
 Suite 125
 East Hanover, NJ 07936

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Lighting Study Span 41/3 (B17-17) to 41/4 (B17-18)
 Location: Hardwick, NJ
 Latitude: 41-03-44.08N NAD 83
 Longitude: 74-57-07.43W
 Heights: 1075 feet site elevation (SE)
 298 feet above ground level (AGL)
 1373 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white-medium catenary - Chapters 4,10(Catenary),&12.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part I)
- Within 5 days after the construction reaches its greatest height (7460-2, Part II)

Your request for consideration to utilize an Audio Visual Warning System to operate the White-medium catenary is approved provided that the equipment meets established technical standards.

This determination expires on 12/11/2013 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

A copy of this determination will be forwarded to the Federal Communications Commission (FCC) because the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (718) 553-4546. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2012-AEA-2747-OE.

Signature Control No: 165567693-166594336

Robert Alexander
Specialist

(DNE)

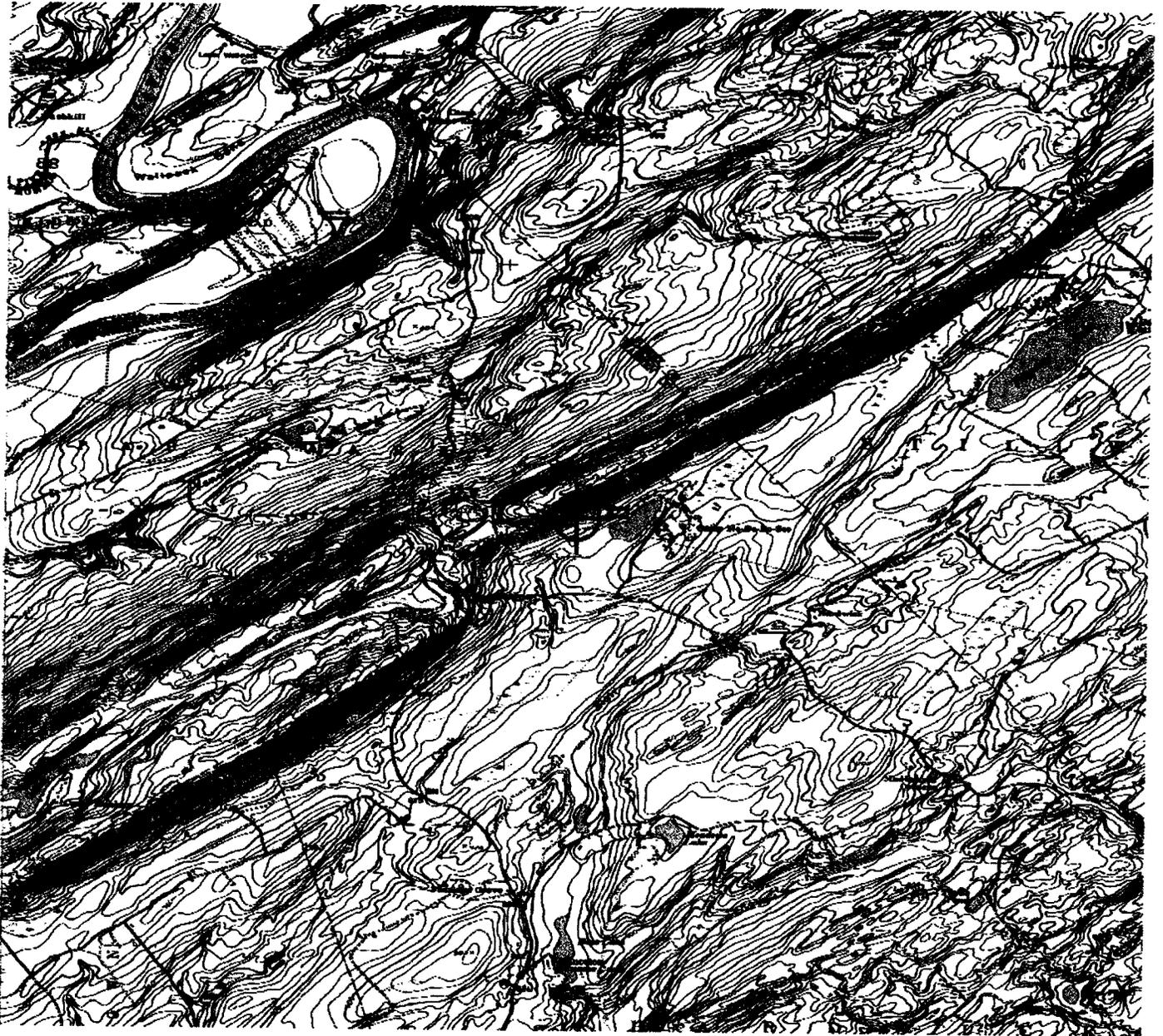
Attachment(s)
Frequency Data
Map(s)

cc: FCC

Frequency Data for ASN 2012-AEA-2747-OE

LOW FREQUENCY	HIGH FREQUENCY	FREQUENCY UNIT	ERP	ERP UNIT
1307.5	1342.5	MHz	2	W

TOPO Map for ASN 2012-AEA-2747-OE





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 2601 Meacham Boulevard
 Fort Worth, TX 76137

Aeronautical Study No.
 2012-AEA-2745-OE

Issued Date: 06/12/2012

David Carr
 PSE&G
 100 Eagle Rock Avenue
 Suite 125
 East Hanover, NJ 07936

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Transmission Line Tower 41/3 (B17-17)
 Location: Hardwick, NJ
 Latitude: 41-03-46.57N NAD 83
 Longitude: 74-57-17.72W
 Heights: 1441 feet site elevation (SE)
 204 feet above ground level (AGL)
 1645 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white-medium catenary - Chapters 4,10(Catenary),&12.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part I)
- Within 5 days after the construction reaches its greatest height (7460-2, Part II)

Your request for consideration to utilize an Audio Visual Warning System to operate the White-medium catenary is approved provided that the equipment meets established technical standards.

This determination expires on 12/12/2013 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

A copy of this determination will be forwarded to the Federal Communications Commission (FCC) because the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (718) 553-4546. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2012-AEA-2745-OE.

Signature Control No: 165567498-166626366

Robert Alexander
Specialist

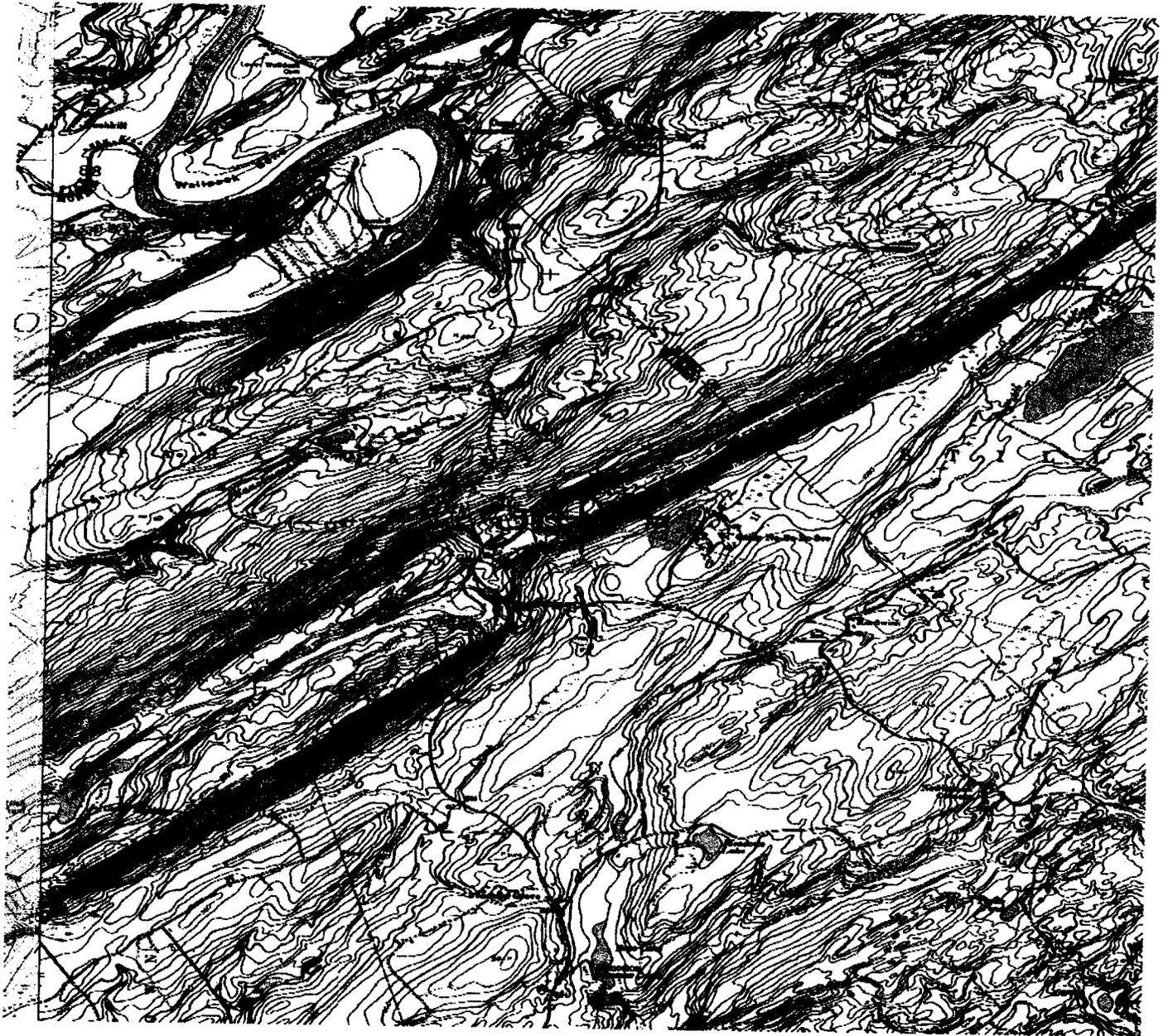
(DNE)

Attachment(s)
Frequency Data
Map(s)

cc: FCC

Frequency Data for ASN 2012-AEA-2745-OE

LOW FREQUENCY	HIGH FREQUENCY	FREQUENCY UNIT	ERP	ERP UNIT
1307.5	1342.5	MHz	2	W





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 Fort Worth, TX 76137

Aeronautical Study No.
 2012-AEA-2744-OE

Issued Date: 06/11/2012

Jay A. Keeler
 PPL Electric Utilities
 2 North 9th Street
 Allentown, PA 18101

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Transmission Line Tower 38/3 (B17-6)
 Location: Middle Smithfield, PA
 Latitude: 41-04-28.66N NAD 83
 Longitude: 75-00-17.26W
 Heights: 648 feet site elevation (SE)
 219 feet above ground level (AGL)
 867 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white-medium catenary - Chapters 4,10(Catenary),&12.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part I)
- Within 5 days after the construction reaches its greatest height (7460-2, Part II)

Your request for consideration to utilize an Audio Visual Warning System to operate the White-medium catenary is approved provided that the equipment meets established technical standards.

This determination expires on 12/11/2013 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

A copy of this determination will be forwarded to the Federal Communications Commission (FCC) because the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (718) 553-4546. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2012-AEA-2744-OE.

Signature Control No: 165567494-166590979
Robert Alexander
Specialist

(DNE)

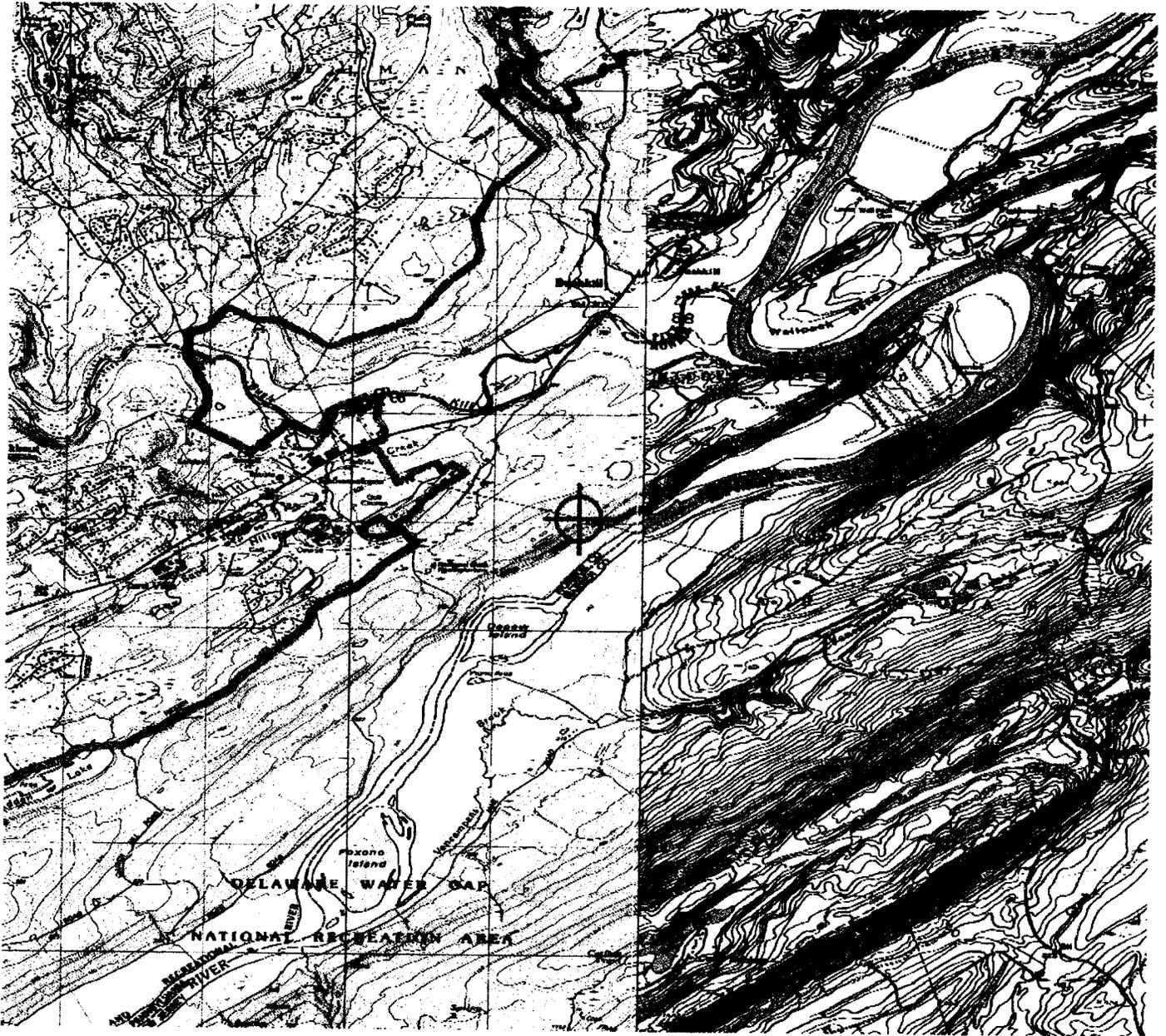
Attachment(s)
Frequency Data
Map(s)

cc: FCC

Frequency Data for ASN 2012-AEA-2744-OE

LOW FREQUENCY	HIGH FREQUENCY	FREQUENCY UNIT	ERP	ERP UNIT
1307.5	1342.5	MHz	2	W

TOPO Map for ASN 2012-AEA-2744-OE





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Aeronautical Study No.
 2012-AEA-2749-OE
 Prior Study No.
 2012-AEA-27-OE

Issued Date: 06/11/2012

Jay A. Keeler
 PPL Electric Utilities
 2 North 9th Street
 Allentown, PA 18101

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Lighting Study Span 38/3 (B-17-6) to 39/1 (B17-7)
 Location: Middle Smithfield, PA
 Latitude: 41-04-25.47N NAD 83
 Longitude: 75-00-03.62W
 Heights: 312 feet site elevation (SE)
 286 feet above ground level (AGL)
 598 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white-medium catenary - Chapters 4,10(Catenary),&12.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part I)
- Within 5 days after the construction reaches its greatest height (7460-2, Part II)

Your request for consideration to utilize an Audio Visual Warning System to operate the White-medium catenary is approved provided that the equipment meets established technical standards.

This determination expires on 12/11/2013 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates , heights, frequency(ies) and power . Any changes in coordinates , heights, and frequencies or use of greater power will void this determination. Any future construction or alteration , including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

A copy of this determination will be forwarded to the Federal Communications Commission (FCC) because the structure is subject to their licensing authority.

If we can be of further assistance, please contact our office at (718) 553-4546. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2012-AEA-2749-OE.

Signature Control No: 165567910-166591542
Robert Alexander
Specialist

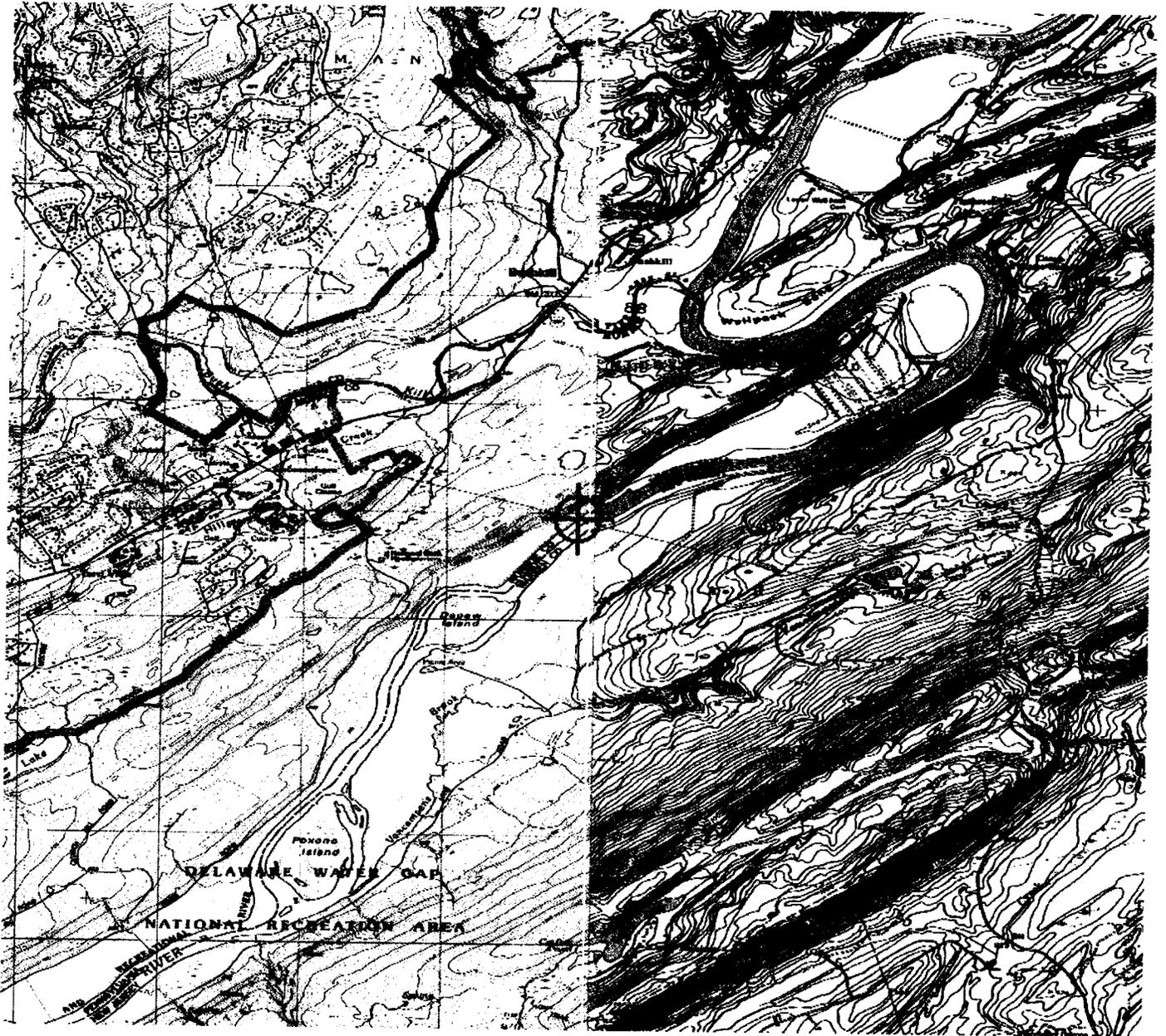
(DNE)

Attachment(s)
Frequency Data
Map(s)

cc: FCC

Frequency Data for ASN 2012-AEA-2749-OE

LOW FREQUENCY	HIGH FREQUENCY	FREQUENCY UNIT	ERP	ERP UNIT
1307.5	1342.5	MHz	2	W





June 25, 2012

Mr. John J. Donahue
Superintendent
National Park Service
Delaware Water Gap National Recreation Area
HQ River Road off Route 209
Bushkill, PA 18324

Ms. Pamela Underhill
Superintendent
Appalachian National Scenic Trail
PO Box 50 252 McDowell Street
Harper's Ferry, WV 25425

Dear John and Pam:

I want to provide you with the most current information on the design of the structures that PPL and PSE&G expect to install for the Susquehanna-Roseland Project where it crosses the NPS units you administer. Let me assure you that we remain committed to use the basic designs encompassed within the applications we previously submitted to you. Our current designs are entirely consistent with the descriptions and visual simulations used in the DEIS and related materials employed throughout the public comment process.

These designs confirm our intention to use monopole structures. We will not use lattice structures inside the NPS units. The final designs more precisely characterize the shape or profile of the monopole structures, and, most important, reflect our efforts to reduce the visual impacts of the structures. Our choice of these designs allow us to reduce the number of poles required to carry the lines at certain locations, using two-pole instead of three-pole structures where the loadings are greatest and single pole structures at about half of the locations.

All of the structures will be made of "weathering" steel which results in a brown, non-reflective finish. The structures in New Jersey will be slightly different from those used in Pennsylvania. The basic shape and profile will be essentially identical, except for two features: the towers used in New Jersey will have some additional small attachments to accommodate PSE&G's operational requirements to allow their personnel to climb the structures when necessary for periodic maintenance or repair. The cross-arms of Pennsylvania structures are entirely horizontal; the cross-arms of the New Jersey structures show a slight arc. We have prepared and attached photo simulations for your information.

- Simulation 1 shows the single pole structure that will be used in Pennsylvania.

- Simulation 2 shows the single pole structure that will be used in New Jersey.
- Simulation 3 shows the two-pole structure that will be used in Pennsylvania.
- Simulation 4 shows the two-pole structure that will be used in New Jersey.

We have also attached Truescape simulations of single pole and two-pole structures at four planned locations in Pennsylvania and New Jersey.

As we have previously discussed, the precise characteristics of certain structures may be influenced by the soil characteristics encountered at particular sites. Those details cannot be resolved until the sites are sampled through borings, a step that awaits completion of this phase of the decision-making process by the NPS.

Please do not hesitate to contact me with any questions or concerns.

Sincerely,



Gregory J. Smith

cc: Steve Black
Andrew Tittler
DEWA EIS Planning Team
Kevin Noon
Morgan Elmer
John Lain
Tom Jensen
Geraldine Smith
Rob Pollock
Amanda Stein
Pat McMackin
Ron Reybitz
Paul Wirth



July 9, 2012

Mr. John J. Donahue
Superintendent
National Park Service
Delaware Water Gap National Recreation Area
HQ River Road off Route 209
Bushkill, PA 18324

Ms. Pamela Underhill
Superintendent
Appalachian National Scenic Trail
PO Box 50 252 McDowell Street
Harper's Ferry, WV 25425

RE: Tom Jensen Email Dated July 6, 2012

Dear John and Pam:

The attached documents were emailed to you and others by Tom Jensen on July 6, 2012. Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Gregory J. Smith". The signature is written in a cursive, flowing style.

Gregory J. Smith

cc: Andrew Tittler
DEWA EIS Planning Team
Morgan Elmer
John Lain
Tom Jensen
Geraldine Smith
Rob Pollock
Amanda Stein
Pat McMackin
Ron Reybitz
Bert Frost
Beth Johnson
Ruchi Sadhir
David Carr
Albert Cretella
Paul Wirth

Information Regarding Federal Aviation Administration Flight Safety Requirements and Aircraft Operations Potentially Relevant to Frequency of Operation of the Audio Visual Warning System Proposed for Use on the Susquehanna-Roseland Transmission Line within the Boundaries of the Delaware Water Gap National Recreation Area

PPL Electric Utilities Corp. and Public Service Electric and Gas Co. (collectively, the Companies) have been coordinating with the National Park Service (NPS) and the Federal Aviation Administration (FAA) regarding measures to ensure that the Susquehanna-Roseland Transmission Line Project (S-R Project) is constructed and operated in conformance with FAA standards for aviation safety. The FAA initially proposed that the Companies install conventional aviation safety devices (e.g., constant-on lights and marker balls) on certain of the S-R Project towers and conductor spans within the Delaware Water Gap National Recreation Area (DEWA).

The NPS raised concerns with the FAA and the Companies regarding the potential incremental visual impacts of those safety devices, if added to the S-R Project features. In response to those concerns, the Companies determined that the use of an Audio Visual Warning System (AVWS), in lieu of conventional lighting and marker balls, could meet aviation safety concerns while reducing the potential for incremental adverse visual impacts to an insignificant level. An AVWS is an all-weather, day-and-night, low-voltage, radar-based obstacle-avoidance system that temporarily illuminates tower-mounted obstruction lights and temporarily sends out an audio warning to pilots on the locally monitored radio frequency(s) when the system's radar detects an aircraft traveling at low elevation, and on a trajectory that creates a risk of potential collision with selected obstructions, e.g., towers and conductor spans. It does not require additional equipment in an aircraft.

The Companies sought and obtained approval from the FAA for the use of an AVWS for the four towers and two spans at issue within the DEWA. (The Companies have previously provided copies of the four FAA approval letters to the NPS.) In particular, the FAA issued Determinations of No Hazard for span 38/3 to 39/1 (Delaware River crossing) and span 41/3 to 41/4 (Sand Pond crossing) and the four towers supporting these spans upon installation of AVWS. The purpose of this document is to provide the NPS with information regarding the AVWS and the potential frequency of its use within the DEWA.

AVWS Specifications

The AVWS will activate medium-intensity white strobe lights (FAA light type L-865) and send an audio warning by radio to the pilot when an aircraft is (1) within two nautical miles of the four towers and two spans of concern and (2) heading toward the locations at an altitude lower than approximately 1000 feet above the transmission line. When the AVWS is triggered, the lights will be on for approximately 60 seconds. The lights will be off during all other times. The AVWS requires radar units on two of the four towers and solar panels and batteries (to power the lights and radar units) to be installed on the four towers. These additional pieces of

equipment are relatively small compared to the transmission poles and can be positioned so as to have a negligible impact on the appearance of the structures.

Information on a leading AVWS product, Obstacle Collision Avoidance System (OCAS), is attached. *Attachments A and B.* Also attached is an FAA Memorandum that approves OCAS as a suitable method for meeting FAA standards on the marking and lighting of obstructions. *Attachment C.* The Companies are distributing a Request for Proposal to the manufacturer of the OCAS and other potential AVWS providers for installation of AVWS equipment consistent with the FAA's Determinations of No Hazard applicable to the S-R Project inside DEWA.

Flight Information

In order to help determine the likelihood and frequency of activation for the AVWS within the DEWA, the Companies' consultant, Federal Airways & Airspace (FA&A), gathered the following information regarding aircraft operational rules and activities in the vicinity of the DEWA. The AVWS will be triggered by approaching aircraft operating lower than 1000 feet above the AVWS-protected towers and spans. The towers range in elevation from 500' to 1650' above mean sea level (AMSL). Accordingly, the AVWS could be triggered by flights operating between approximately ground level and 1000' above the tallest tower.

Airways over DEWA. The FAA has established three airways over the DEWA, the lowest of which requires a minimum altitude of 3,500' AMSL. These airways are used by flights operating under Instrument Flight Rules (IFR) and by some flights operating under Visual Flight Rules (VFR). Each airway has a designated Minimum Obstacle Clearance Altitude (MOCA). Airway Q480 has a minimum altitude of 18,000' AMSL. Airway V162 has a minimum altitude of 3500' AMSL and Airway V226 has a minimum altitude of 4000' AMSL. Flights operating within these FAA designated airways would not trigger the AVWS.

VFR Flights. In addition to flights operating within the FAA designated airways, a smaller number of aircraft will operate over DEWA under VFR requirements. Research has not found any comprehensive survey of VFR operations over DEWA. Anecdotal information indicates air tour operations, gliders, helicopters and ultralight aircraft follow VFR requirements and they do operate over DEWA during certain times of year, and times of day. Most of this local recreational flight activity occurs during the day, rather than at night and the majority of this flight activity is concentrated south of the proposed S-R Project location.

The majority of VFR flights over the DEWA occur during the day rather than at night due, in part, to the higher collision risk at night for VFR operated flights. See National Transportation Safety Board (NTSB), *Safety Alert SA-013 - Controlled Flight Into Terrain in Visual Conditions* (January 2008) (recognizing that "darkness may render visual avoidance of high terrain nearly impossible and that the absence of ground lights may result in loss of horizon

reference.”). In addition, many VFR flights over the DEWA are for the purpose of sightseeing, which is unlikely to occur at night. If the AVWS is triggered during the day by VFR flights, the visual warning (60 seconds of light) will likely not be noticeable in the DEWA from ground level because of the ambient lighting of the sky. For those VFR flights that do occur at night, the NTSB recommends a cruising altitude of 2,000’ above ground level in mountainous areas. *Id.* If VFR operations do occur at night, the AVWS would only be triggered by those pilots that fail to follow the NTSB recommendation.

Minimum Safe Altitude. A Minimum Safe Altitude (MSA) – an altitude which allows adequate vertical clearance from nearby terrain and manmade obstacles and allows for proper navigational functions – has been established for that portion of the DEWA containing the S-R Project. *Attachment D.* Under the applicable MSA, no IFR operated flights should be within 1000’ of the AVWS and the AVWS should not be triggered.

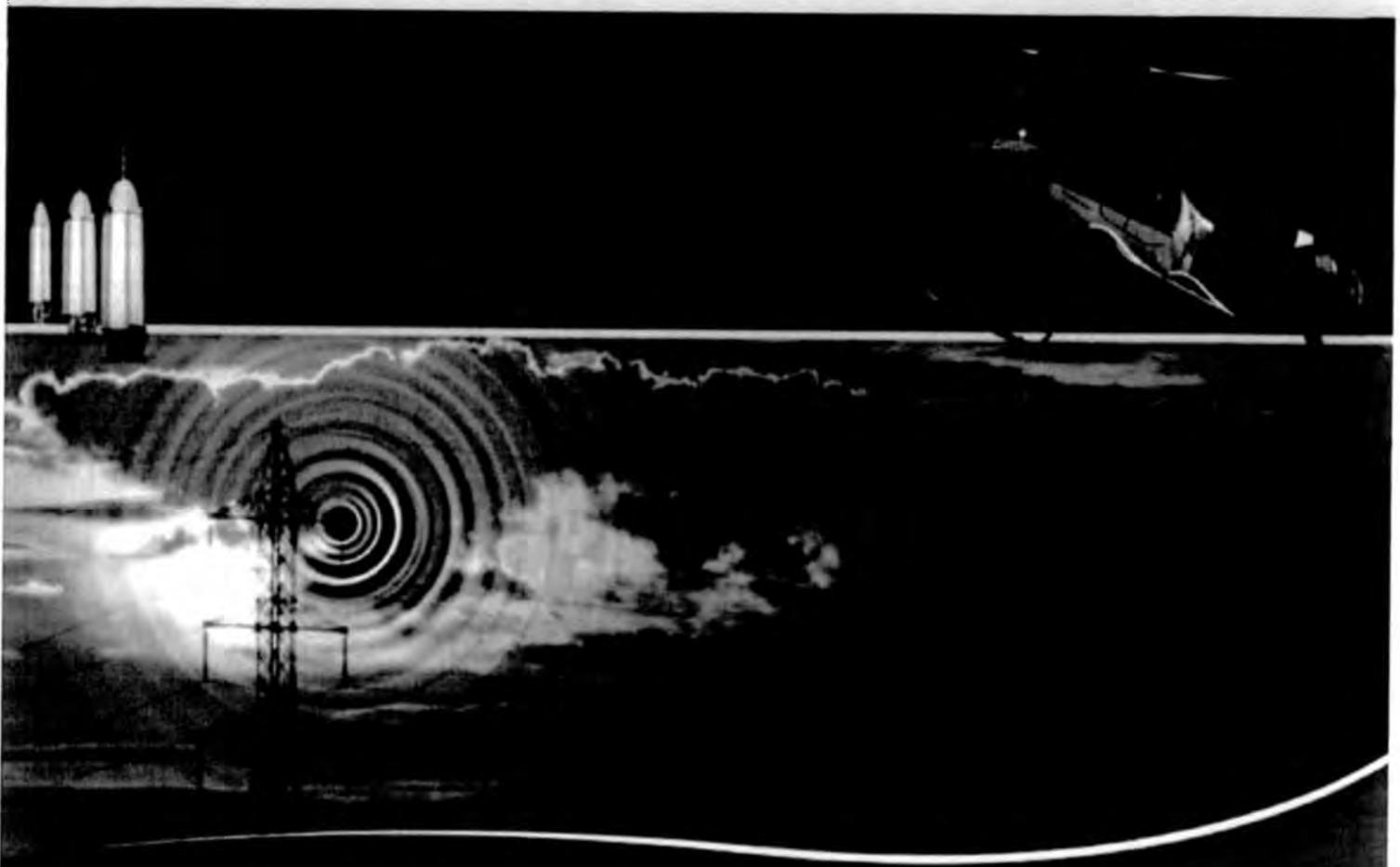
For VFR operated flights, based upon the FAA Sectional Chart (New York South, 85th Edition, May 2012), the maximum obstruction altitude in the sector containing the S-R Project in DEWA is 2,200’ AMSL. *Attachment E.* VFR aircraft at night invariably fly at least 1,000 ft. above this elevation to avoid any collisions with terrain or other unmarked obstacles in the area. In order to maintain safe flight operations, all VFR night traffic over the transmission line crossing of the DEWA would be expected to be flown at or above 3,200’ AMSL, thus, well above 2800’ AMSL (which is the 1000 foot trigger level of the AVWS system). Therefore, VFR night flights over this area of the DEWA would almost never trigger the AVWS.

Conclusion

Research did not reveal any data describing the frequency of flights in the airspace protected by the proposed AVWS for the S-R Project. However, FAA rules and standards for both IFR and VFR flights in the area limit aircraft operations to airspace above that protected by the AVWS so the AVWS should rarely be triggered. Low altitude flight in the DEWA area is likely to occur in the daytime and infrequently at night. Accordingly, the AVWS system is much more likely to be triggered, if ever, during daytime than in darkness. The AVWS system will be triggered only by aircraft operating below the set minimum altitudes, and on trajectories that could produce a collision. The AVWS system will not be triggered by each low-elevation flight, but only those on certain courses toward the obstruction. When triggered, the visual and radio warnings will last approximately 60 seconds. These factors, taken together, lead to the conclusion that the visual impact of the AVWS in DEWA can reasonably be expected to be infrequent, brief, and limited generally to daytime.

Mitigation

The AVWS avoids and minimizes the potential visual impacts of aviation safety devices that would typically be prescribed by federal rules for the S-R Project towers and conductors located inside DEWA. Constant-on lights and marker balls are visible at all times, while the AVWS will limit lighting to short increments of time, and avoid marker balls entirely. The AVWS will be monitored remotely and this monitoring will include recording each instance when the system is triggered. The AVWS will generate precise empirical information on the time of day, date, and duration of any instance in which the warning lights are activated. The AVWS will provide information that the NPS can use to assess the actual impacts of the system on the visual resources under the jurisdiction of the NPS. The Companies will provide the AVWS operational data to the NPS on a frequency set by the NPS. The Companies have proposed a broad program to compensate for the unavoidable adverse impacts of the S-R Project, including all types of visual impacts. The Companies will, and hereby commit to provide compensatory mitigation for the adverse visual impacts of the AVWS, though the actual amount of compensation for the potential impacts of the AVWS should be set within the context of ongoing discussions between the Companies and the NPS on the total amount of compensatory mitigation required for the S-R Project.



The OCAS® Solution

- Significantly Reduces Risk to Property Owners by Exceeding Current FAA AC 70/7460-1K Recommendations
- Provides Both Audible and Visual Warning of Obstructions to Aviators
- Requires No Specialized Aviation Equipment on Board Aircraft
- Eliminates Need for Marker Balls
- Reduces Strobe Light Requirements by 66% Over Legacy Systems
- Powered by 120v Secondary Service or Optional Solar Panel Configuration
- Solar Power Option Reduces Infrastructure Cost for Remote Installations
- 24/7/365 System Monitoring and NOTAM Notification Service
- Remote Configuration, Diagnostics, Troubleshooting, Maintenance and Versioning Control
- Dramatically Increases Life Expectancy of Lighting Systems Due to Reduced Run Times
- Eliminates Light Pollution Associated with Legacy System Obstruction Marking
- Improves Environmental Outcomes for Neighbors, Society and Migratory Birds

OCAS®, Inc. is setting a new standard for obstruction marking safety by delivering the first ever obstacle marking solution capable of delivering both visual and audible warnings to flight crews encroaching upon airspace surrounding transmission structures and line crossings which warrant marking. The OCAS Transmission solution is an innovative new approach coupling ground based monitoring with multi-tier warning capabilities dedicated to the protection of utility assets. The OCAS solution will drastically improve the transmission asset owner's risk position by increasing safety for the general aviation community while also decreasing public annoyance due to light pollution. In some jurisdiction, OCAS may qualify as an innovative technology investment providing an improved rate of return on shareholder investment.



OCAS Power Line Avoidance

Obstacle Collision Avoidance System
The New Standard in Obstacle Marking Safety



What OCAS® Does

At the heart of the OCAS Solution is a low-power consumption, Continuous Wave / Frequency Modulated Continuous Wave radar which scans for aircraft in the proximity of the protected asset. By tracking an approaching aircraft's heading, speed, and elevation, the radar detects whether the aircraft is following a course which may bring it into dangerous proximity of the transmission line crossing. Thirty (30) seconds prior to any calculated time of impact with a protected crossing or structure, the OCAS radar unit communicates via UHF radio link to tower-mounted strobe lights, to initiate the visual alert immediately. If a pilot has not sufficiently altered his course Twenty (20) seconds prior to calculated impact, the OCAS Solution broadcasts an alarm via a VHF radio in the general aviation band, signaling an audio warning over the in-aircraft radio warning the pilot of the obstacles presence.

OCAS® Radar Technical Specifications

OCAS Radar Unit:

Height: 10.5ft (with VHF antenna affixed)
 Diameter: 0.5ft
 Weight: 265lbs
 Number Radar Panels: 8 (each with 4 receiver/transmitter)
 Power Input 12V DC (Through AC/DC converter) 12V DC (through AC/DC converter)

Maximum Power Output 25W Max
 Radar Power Output (Peak) 2W
 VHF Power Output (Peak) 1.44W
 360° scan time 2.2sec

Scanning Capabilities:

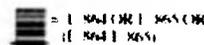
View: 360° Horizontal +/- 40° accuracy Vertical +/- 7° Horizontal +/- 1° vertical 5000m +/- 50m
 Range: 5000m +/- 50m
 Speed: 11-625mp +/- 6.5mph
 Antenna Gain: 17dB
 Radar Type: L-band
 Radar Frequency: 1307.5 - 1342.5 MHz
 VHF Band: 118-136 MHz
 UHF Band: 450-470 MHz
 Connectivity: GSM / GPRS modem
 Wireless LAN modem: for rapid field upgrades

Lighting:

Medium Intensity L-865 white strobe lights
 Power Input 230V DC Power (through DC/DC converter)
 Power Output 10-16V DC / 1.4A
 Specially designed hardware allows for rapid illumination

OCAS® Control Center (OCC)

- Provides Real-time, Continuous Monitoring via GSM/GPRS Modem Connection (worldwide)
- Provides Live, Instant Alerts to Technicians via SMS Text or eMail
- Automated Uploads, Log Downloads & Status Checks
- Real Time Reporting Ensures NOTAM Compliance is Maintained in the Event of System Degradation or Extended Power Outage



Audio warning transmitter
Radar sensor

Radar sensor



***OCAS[®] Transmission & Distribution
Obstacle Collision Avoidance System***



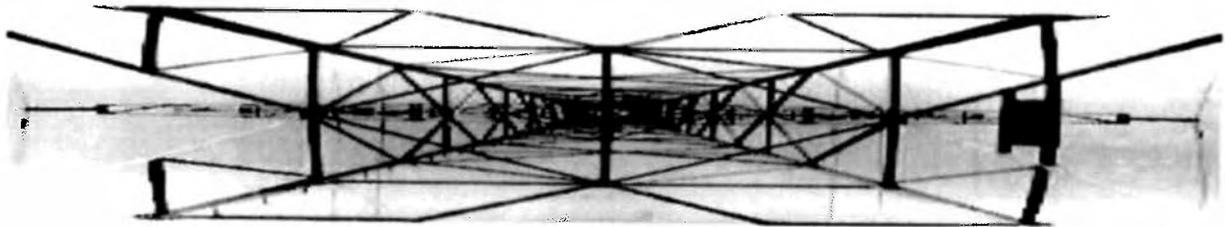
***The New Standard in Obstruction
Marking Safety***

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OCAS® Transmission & Distribution Obstacle Collision Avoidance System

Transmission and distribution system asset owners and operators face a future of increased energy demands and supply requirements which continue to stress the limits of an aging infrastructure. The Energy Information Administration (EIA) forecasts US capacity requirements will increase by 258,000 mega-watts by 2030 and according to the Edison Electric Institute (EEI) 12,500 miles of new transmission lines will be constructed by 2014.

Regulatory policy and societal expectations for improved environmental outcomes from these infrastructure investments will require asset owners to consider innovative technologies and construction practices to manage the multiple and competing externalities associated with these complex system implementation requirements.



The near future provides asset owners and operators an unprecedented opportunity to set new standards for transmission system reliability and asset protection while reducing the environmental impact of the infrastructure at the same time minimizing the impact of future O&M charges.

OCAS®, Inc. is setting new standards in obstruction marking safety with an active recognition system capable of delivering both visual and audible warnings to flight crews encroaching upon protected airspace surrounding transmission structures and line crossings which warrant marking. The Obstacle Collision Avoidance System from OCAS is an innovative new approach coupling active recognition and multi-tier warning capability dedicated to the protection of ground based flight obstacles such as electric transmission lines, telecommunications towers and windmills.

Utilizing ground based radar surveillance as part of this active recognition system allows the OCAS solution to limit obstruction light run times to actual encroachment threats thus eliminating the constant barrage of light pollution associated with legacy obstruction marking applications which traditionally run their lighting systems on a continuous basis to maintain compliance with aviation administration safety recommendations.

Because run times are significantly reduced with the OCAS solution the life expectancy of each light is dramatically improved. Typically bulbs are replaced every 12 to 24 months on legacy marking applications. With OCAS, bulb replacement requirements caused by runtime burn-out will typically exceed 10+ years.

The OCAS application is further differentiated from other obstruction marking systems, requiring no additional equipment in the approaching aircraft to provide the audible alarm. Installation of the system is compatible with transmission design and construction practices and will not compromise or complicate the transmission equipment sighting process.

Further, the OCAS solution runtime and energy consumption requirements allow the system to be powered by solar technology thus eliminating the need to build costly secondary

distribution service to a remote transmission tower site. And, OCAS offers asset owners and operators the opportunity to significantly reduce O&M expenses with an extended service and warranty contract to lock in future costs to a single annual charge.



From an environmental perspective, the basic operational characteristics allow the visual and audible warning systems to remain passive until an aircraft is detected, leaving the skies free from light pollution. This unique capability has earned the OCAS solution the distinction of being the only approved and endorsed obstacle lighting and marking system by the International Dark-Sky Association.

Use of the OCAS solution will drastically improve the asset owner's position with local property owners, environmentalists and regulators throughout the route sighting and approval process by decreasing public annoyance issues with the line, improving the habitat for wildlife while significantly increasing safety for the general aviation community. In some jurisdiction, OCAS may qualify as an innovative technology investment providing an improved rate of return on shareholder investment.

THE ISSUES

Flight Safety Issues

From January 2008 through June 2008, statistics kept by OCAS, indicate the United States and Canada combined have averaged 3 'reported' accidents per month caused by aircraft colliding with existing ground based assets such as power lines and telecom towers. Over 50% of these accidents resulted in at least one fatality.

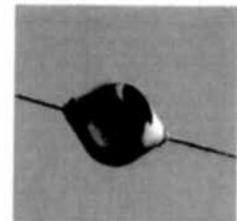
These numbers can be expected to grow over the next 20 years as new facilities such as transmission lines, telecommunication towers and windmill parks continue to expand to meet the public's growing need for electricity and voice/data systems coupled with the projected growth in both fixed wing and rotorcraft operations to meet the increasing demands society places on aviation for general transportation, construction, law enforcement, life safety transportation and leisure activities.

In order to protect both the safety of the aviation community and the operational integrity of our energy transmission and wireless communication networks, the FAA provides recommendations and guidelines via the FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting which describe the standards for marking and lighting structures such as buildings, chimneys, antenna towers, cooling towers, storage tanks, supporting structures of overhead wires, and windmills etc.

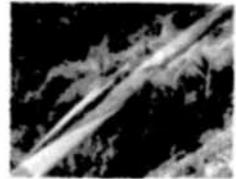
For decades, the solution to marking obstructions has been to paint structures, deploy marker balls and add more and more high and more intensity lighting.

The results in many cases have proven ineffective:

- No operational or functional tests have ever been performed on marker balls or painted towers and they have not proven their effectiveness on flight safety.
- Wire and Obstruction accidents are currently the FAA's number one problem for Rotorcraft safety with over 40% of reported incidents ending in a fatality.*



- Less than 20% of all obstacle collision accidents are even captured in the NTSB or FAA's database* bringing into focus the extensive amount of unreported damage being done to the nations ground based infrastructure(s).
- Further, projections indicate over 75% of all obstacle and wire accidents could have been avoided with adequate warning systems*



* *National Transportation Safety Board/California assembly bill 1017/University of Maryland study 2004*

Operational and Maintenance Issues

Operating and maintaining traditional obstruction marking systems in complete compliance with FAA AC70/7460-1K can be very costly. Paint and marker balls become faded over time requiring refurbishment. Of greater concern, 24/7/365 operation of obstruction lighting requires frequent maintenance and costly repairs due to continuous runtime requirements not to mention the need to inspect performance on a daily basis:

- The average cost to implement and maintain a typical legacy system for obstruction marking site can exceed \$40K annually based on a 20 year life cycle cost analysis.
- Most legacy sites do not conform to FAA guidelines for daily monitoring of system performance resulting in greater liability when accidents do occur.
- When an incident occurs, the average settlement cost per accident is \$3.2M per death.
- Current solutions provide no real quantifiable operational advantage.

Community Issues

Both federal and state aviation authorities may require ground based assets meeting specified characteristics be appropriately equipped with obstacle warning devices or systems to assist aviators in the safe operation of their aircraft. Recreational and commercial aviators and ground based asset owners must safely co-exist and assets owners have an obligation to ensure the safety of the community at large in addition to protecting the integrity of their valuable infrastructure from damage.

In addition to aviation safety, light pollution and general public annoyance caused by high intensity lighting of obstacles is becoming a significant issue in many communities as the number of windmills, telecommunications and transmission towers increases. High intensity obstacle lighting is a large contributor to light pollution in rural and suburban areas throughout North America. In fact, 99% of the population in the United States (excluding AK and HI) live in areas where the night sky is above the threshold of polluted status.

Further complicating the continued use of legacy obstacle marking applications is their environmental impact on migratory birds. U.S. Fish and Wildlife Service estimates range between five and fifty million birds are killed each year after being attracted by the lights of ground based assets and colliding with the tower's infrastructure during night migration. At least 231 species have been affected, with neo-tropical migrants making up a large proportion of all species killed.

The OCAS Solution

The OCAS system is comprised of innovative low-power (2 watt) surveillance radar, visual warning lights and audio warning VHF radio transmitter. The system comes furnished with either a self-contained solar or external powered control unit with various battery back-up options depending on the customer's power requirements.

Core Technologies

- **Radar:** Sensors based on state-of-the-art radar technology used for detecting the aircraft. The system includes:
 - Smart antenna arrays with software-controlled ray formation and guidance, accomplished without moving parts and with a very low ray emission with respect to range capabilities.
 - Software-controlled signal formation and configurable search options
 - State-of-the-art remotely configurable software for detecting and tracking aircraft
- **Communications:** In addition to the VHF audio warning to the aircraft, the OCAS solution offers a robust communications platform consisting of:
 - UHF Cluster Link Radio for remote and simultaneous control of all strobe lights within the protected area after aircraft detection
 - Low Cost GPRS/GSM technology for 24/7 remote monitoring of system performance from the OCAS Operational Control Center (OCC). GPRS also facilitates remote configuration of the system and firmware upgrades further 'future proofing' the initial investment.
- **Power/Energy System:** With extremely low energy consumption in all modules, the product can be powered by solar panels alone, keeping installation costs low even in areas that have no other electricity supply.



**Radar
& VHF Radio**



Control Unit



Solar Power Option



Lighting

Ease of Installation

The OCAS field unit is prepared for easy installation in remote locations. A solar energy system allows stand alone operations, enabling OCAS field units to be placed practically anywhere.

OCAS Solution Operational Overview



RADAR COVERAGE:

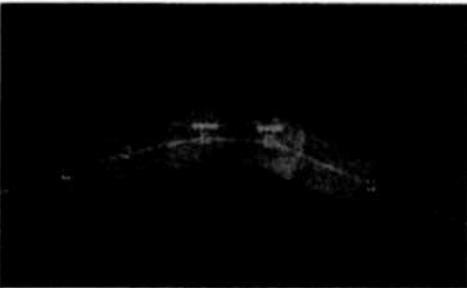
Each OCAS system is field designed to protect the owners ground based assets based on the site conditions of each specific installation. Once deployed the radar technology detects approaching aircraft and determines ground speed plus 3D trajectory and determines whether the aircraft will adequately clear the obstruction. A configurable set of rules is applied by the software in the field to define whether the

aircraft must be warned and which warning device (visual only or both visual and audible). The software calculates and stores in memory size of object, speed, heading, altitude and other operating conditions in order to predict time-to-impact with obstacle(s) and activate the warnings within the FAA recommended time frames.



INITIAL WARNING

– **HIGH INTENSITY LIGHTS:** The configurable detection threshold provides an initial visual warning to crew by activating the high-intensity strobe lights. This means that for the majority of the time the high intensity lights remain off thus preserving the dark skies environment while still adhering to strict safety standards.



SECOND WARNING

– **AUDIO BROADCAST:** If the initial visual warning does not cause the pilot to alter the flight path, a programmable VHF radio continuously broadcasts an additional obstruction warning directly to the cockpit of the aircraft. The VHF warning range is adjusted based on local requirements and terrain.

With both the visual and audio warning features, the system provides 24/7/365 operation and is unencumbered by adverse visual conditions.

Operational Control Center (OCC) Support: Through the GPRS 2-way connectivity which comes standard with each system, clients are provided 24/7/365 monitoring and support of their OCAS solution. When required, clients can be provided with date-logged, explicit radar track records of aircraft movement including speed, heading and altitude.

OCC Support will also provide notification in the event of a system issue/outage to client and the FAA in the form of a Notice to Airman (NOTAM). The OCC will assist in troubleshooting and keeping the FAA informed of any status changes. This remote operated maintenance reduces operational cost and increases reliability.

Certification:

Testing and validation of this system has been done in close cooperation with the FAA and Canadian CAA and meets all the requirements of FAA AC 70/7460-1K Obstruction Marking and Lighting in addition to CAA CAR 621.19.

ADDRESSING THE ISSUES

Flight Safety Issues: The addition of an audio warning capability provides a significant improvement over legacy systems in the ability to sufficiently warn the pilot allow them to quickly recognize and avoid an obstacle in any type of weather and visibility conditions both day and night. The two tiered warning method along with the 24/7/365 monitoring and support from the OCAS OCC notably decreases the risk level and liability for owners of ground based obstacles.

Operations and Maintenance: The OCAS solution is a stand alone system which is easily adaptable to the environment and unique configurations of each obstacle it is charged with protecting. Through the use of solar power and robust communications, the solution is essentially autonomous in its operations. With the low power radar solution combined with the passive light solution, the actual power consumption is very low, requires minimum maintenance and substantially increases the life expectancy of each light. In addition, the remote monitoring capabilities allow for fewer on site inspections while still being assured of operational effectiveness in addition to bringing the owner into full compliance with all FAA obstruction marking recommendations. In total, the OCAS system provides a very cost effective solution for both installation and life cycle operation and maintenance.

Community Issues: The advanced capabilities of the OCAS system undoubtedly promote increased safety in any area where they are installed. The passive lighting solution is also ideal for promoting a dark skies environment while maintaining the required safety standards.



Contact Information:

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melissa.mccarthy@ocasinc.com



Federal Aviation Administration

Memorandum

Date: ~~E~~ JUN 15 2009

To: Obstruction Evaluation Services Personnel

From: Kevin Haggerty
Manager, Obstruction Evaluation Services

Subject: Changes to Federal Aviation Administration (FAA) Advisory Circular (AC) 70/7460-1K, Obstruction Marking and Lighting

We are preparing changes to FAA AC 70/7460-1K, Obstruction Marking and Lighting. The changes will incorporate Audio Visual Warning Systems (AVWS) as an acceptable form of marking and lighting that will meet established technical standards to identify an obstruction to air navigation.

AVWS is an all-weather, day and night, low-voltage, Radar-based obstacle avoidance system that utilizes current obstruction lighting products and does not require additional equipment in an aircraft.

AVWS activates obstruction lighting and audio signals to alert pilots of potential collisions with obstacles such as power lines, wind turbines, bridges, and towers. The obstruction lights and audio warnings are inactive when there is no air traffic in the area of the obstruction.

The FAA has analyzed and reviewed the Obstruction Collision Avoidance System (OCAS™) and has determined that OCAS™ provides an equivalent level of safety and is a suitable alternative to the marking and lighting requirements of obstacles as recommended in FAA AC 70/7460-1K.

OCAS™ is the first AVWS to be installed, tested, and approved in the National Airspace System (NAS).

The OES will accept, analyze, and approve an AVWS as an alternative to conventional lighting systems on a case-by-case basis.

OES personnel shall:

1. Review each FAA Form 7460-1, Notice of Proposed Construction or Alteration, for requests to use an AVWS.

2. If an AVWS is indicated, select "AVWS" as the requested Marking and Lighting.
3. Ensure that Technical Operations and Spectrum Engineering are selected to provide comment on the aeronautical study.
4. Business rules will be incorporated into the Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) System based on AVWS as the Requested Marking/Lighting to override current auto screens and ensure proper coordination. If AVWS is not selected as the Requested Marking/Lighting, ensure that the case is manually unlocked for review from AF and FM.
5. Before the issuance of the Determination, ensure that comments from Technical Operations and Spectrum Engineering are reviewed and specifically acknowledge that the AVWS was reviewed, approved, or conditionally approved (e.g., No Audio).
6. Adjudicate all AVWS concerns and indicate in the Additional Information section that AVWS is approved for the specific study with or without conditions or limitations prior to the issuance of a Determination of No Hazard to Air Navigation.
7. If AVWS is approved with conditions or limitations or if AVWS is not approved: provide your supervisor with the Aeronautical Study Number and wait for approval to issue the Determination of No Hazard to Air Navigation.
8. Ensure that the 7460-2, Notice of Actual Construction or Alteration, indicates that AVWS is installed.

The OES will incorporate an AVWS section to the external OE/AAA Web site to inform the public about AVWS and its benefits in the NAS.

Please direct any questions or comments to the Manager, OES.

Minimum Safety Altitude (MSA) is an altitude below which it is dangerous to fly due to the presence of terrain and/or obstacles. There is a MSA that extends over the Delaware River portion of the Susquehanna-Roseland transmission line.

STW MSA – A 25 Nautical Mile (NM) radius plus a 4 NM buffer is applied to the STW VOR/DME. That circle is divided into three sections by the established bearings. The towers 38/3 and 41/3 and spans 38/3 and 41/3 are located inside the 3500' AMSL segment. Therefore, aircraft cannot operate at any altitude below 3500' above mean sea level (AMSL). A 1000' Required Obstacle Clearance (ROC) is applied to the MSA.

EWN MSA – A 25 NM radius plus a 4 NM buffer is applied to the EWV VOR. The towers 38/3 and 41/3 and spans 38/3 and 41/3 are located inside the 3100' AMSL segment. Therefore, aircraft cannot operate at any altitude below 3100' AMSL. A 1000' ROC is applied to the MSA.

The Delaware River portion of the Susquehanna-Roseland transmission line is located within the Stroudsburg-Pocono Airport (N53) VOR-A Holding Pattern. A holding pattern is designed to delay an aircraft already in flight while keeping it within a specified airspace. The holding pattern is an oval shape based on an established holding fix. The holding patterns were figured at 200 knots indicated airspace which permits a size 4 holding pattern at that altitude. The designated altitude an aircraft should fly when carrying out the N53 holding patterns is 3000' AMSL. Below is an image illustrating the MSA and Holding Patterns.

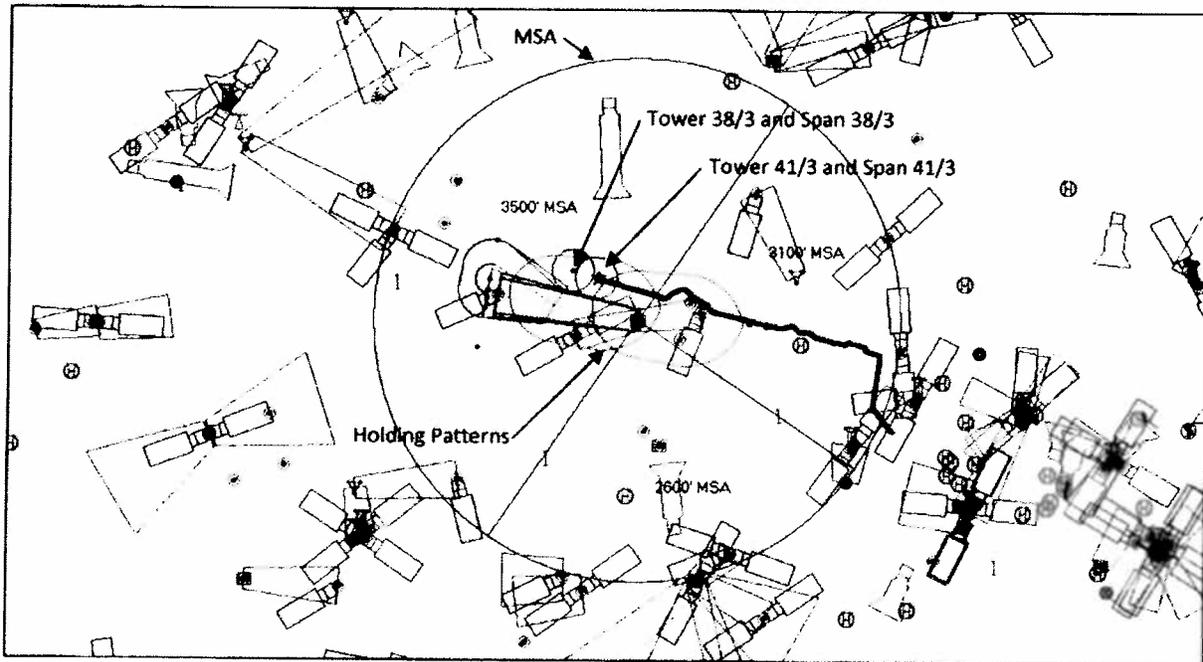


Figure 1 – 25 NM Minimum Safety Altitude and N53 Holding Patterns

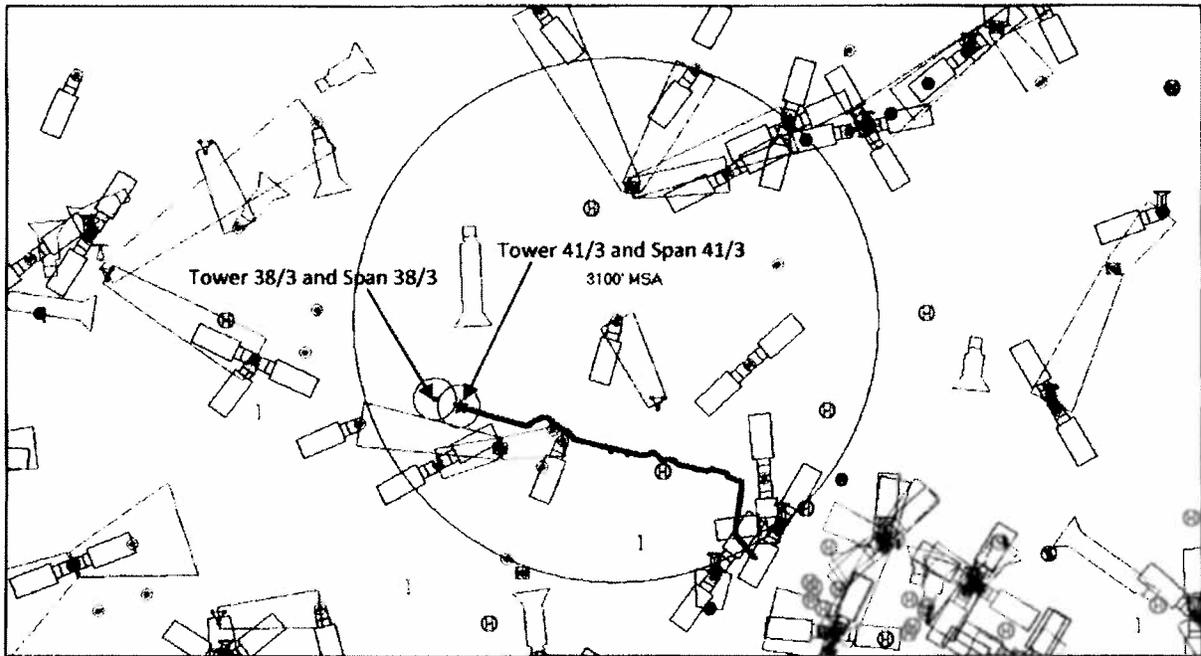


Figure 2 – EWN Minimum Safety Altitude

Minimum Vectoring Altitude (MVA) is the lowest altitude to which a radar controller may issue aircraft altitude clearances during vectoring/direct routing. There are several MVA Charts that extend over the Delaware River portion of the Susquehanna-Roseland transmission line. The most limiting MVA Chart is the ABE MVA. The towers 38/3 and 41/3 and spans 38/3 and 41/3 are located inside the 2900' AMSL sector. A 1000' ROC is applied to the MVA.

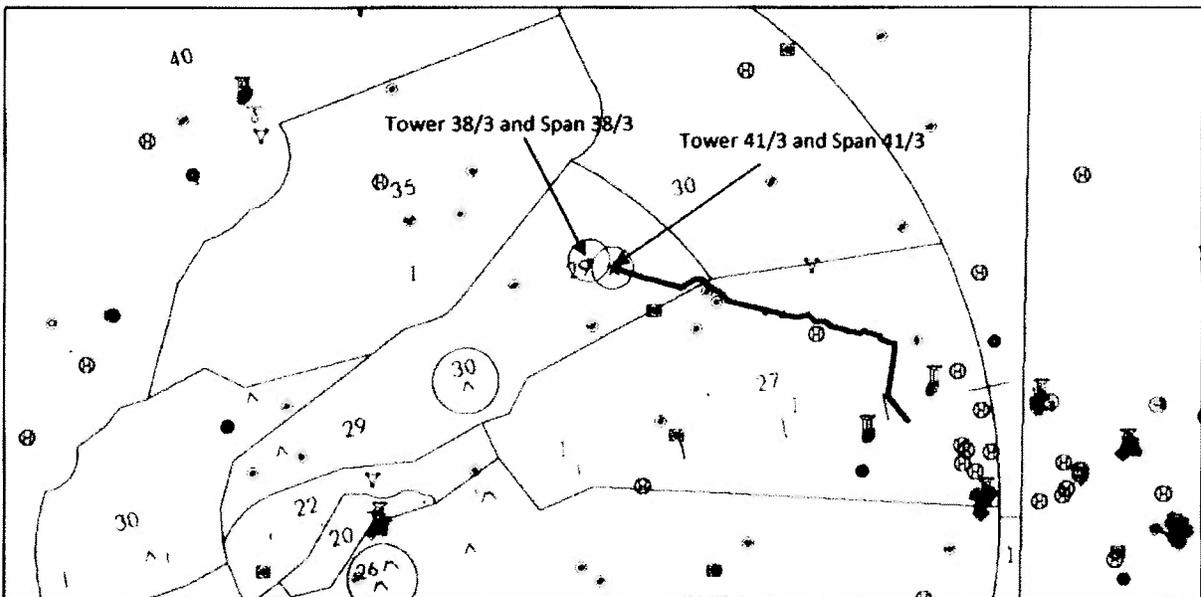


Figure 3 – ABE Minimum Vectoring Altitude Chart

Three airways have been established by the FAA over the DEWA, the lowest of which requires a minimum altitude of 3500' above mean sea level (AMSL). These airways are used by flights using instrument flight rules (IFR), and by some flights operating under Visual Flight Rules (VFR). Each Airway has a designated Minimum Obstacle Clearance Altitude (MOCA). Airway Q480 has a minimum altitude of 18000' AMSL. Airways V162 and V226 are Low Altitude Airways. Airway V162 has a minimum altitude of 3500' AMSL and Airway V226 has a minimum altitude of 4000' AMSL. Due to the minimum altitude requirements, flights operating within these airways would not trigger the AVWS.

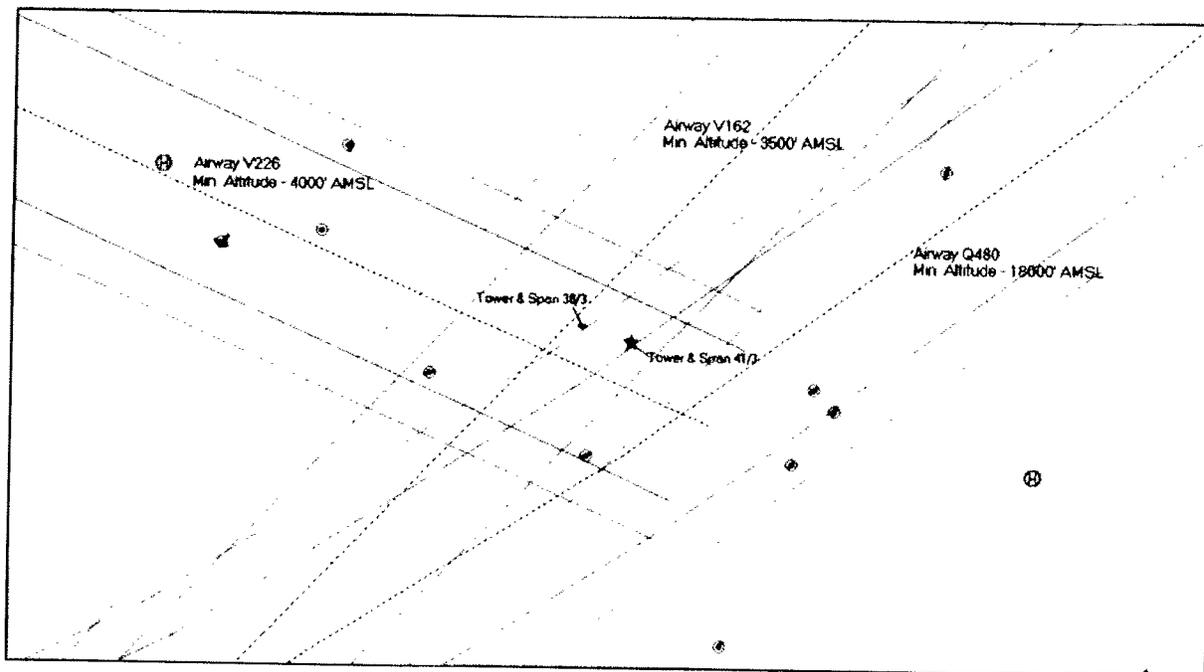


Figure 4 - Airways extending over DEWA



Smith, Gregory J

From: Tom Jensen [TCJensen@hollandhart.com]
Sent: Friday, July 06, 2012 4:07 PM
To: Andrew Tittler
Cc: Bert Frost Ph.D.; Beth Johnson; John Donahue; Pamela Underhill; Ruchi Sadhir; Kelly Johnson; John Lain; Smith, Gregory J; Pollock, Robert; Reybitz, Ronald J; Geraldine Smith; David Carr; Albert Cretella; Wirth, Paul G
Subject: Fwd: NPS AVWS Paper
Attachments: ATT00001.htm; ATT00002.htm

Andrew,

I am forwarding for your consideration a document that describes what we are able to ascertain now about the probable operation of the AVWS system that the Companies intend to use at two locations in DEWA in order to meet FAA aviation safety requirements. The document is in Word format. There are several attachments in PDF format. We will send hard copies to you and the others CC'd here on Monday.

I hope you find the attached information useful for your purposes.

Additionally, allow me to offer three thoughts on how the DEIS might be edited to incorporate information about the AVWS:

First, Ch. 1, page 13--table 1 Federal Laws---this part of the DEIS could be edited to include an entry citing the FAA regulations and advisory regarding hazard determination.

Second, Ch. 4, Environmental Consequences, beginning at p. 559. The NPS's visual impact modeling assumed that the towers used in each alternative would be two hundred feet tall. The towers themselves are just below the height that triggers the FAA standards for structure marking, namely, more than 200 feet above ground level. Each alternative route through the NPS Units crosses topography with highly variable elevation, creating the potential that towers or conductors would actually be higher than 200 feet above the ground near the towers because the ground surface slopes downward away from the towers. Thus, the potential requirement for S-R Project structures to be marked to comply with FAA standards is common to each alternative, and could be discussed in the part of Chapter 4 that presents potential consequences Common to All Action Alternatives based upon the NPS assumptions.

Appendix F-16, Visual resources---It would be appropriate to add a bullet stating that the Companies should use an AVWS system in lieu of always-on lights and marker balls typically required by the FAA to mark potential hazards to aviation, and that as the system produces quantitative data the Applicants would be able to provide compensation for the actual impacts.

Tom

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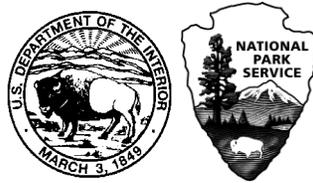
7/9/2012

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Begin forwarded message:

From: "Kelly Johnson" <KAJohnson@hollandhart.com>
To: "Tom Jensen" <TCJensen@hollandhart.com>
Subject: NPS AVWS Paper

4 page memo with attachments



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

(2012)

United States Department of the Interior · National Park Service