

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Letter of Notification of PPL Electric :  
Utilities Corporation, Filed Pursuant to :  
52 Pa. Code Chapter 57 Subchapter G, : Docket No. A-2015-\_\_\_\_\_  
for Approval of Two New 225 Foot :  
Single-Circuit 230 kV Transmission :  
Lines and One New 830 Foot Single- :  
Circuit Line in Sugarloaf Township, :  
Luzerne County, Pennsylvania to :  
Interconnect a New Independent Power :  
Producer to the Electric Grid :

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**LETTER OF NOTIFICATION**

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TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

PPL Electric Utilities Corporation (“PPL Electric”) hereby files, pursuant to 52 Pa. Code § 57.72(d), this Letter of Notification to request approval from the Pennsylvania Public Utility Commission (“Commission”) to construct two new segments of 230 kV transmission lines necessary to interconnect the proposed Buck Mountain Wind Generation Plant (“Wind Farm”) with the electric grid (hereinafter, the “Project”). Upon Commission approval, the Wind Farm will be interconnected to the PPL Electric transmission system by constructing of: (i) two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and a new Sugarloaf 230 kV Switchyard (“first segment”); and (ii) one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation (“second segment”). The Wind Farm developer, Buck Mountain Wind Energy LLC (“Buck Energy”), will then build one new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5

kV Substation and the Wind Farm (“third segment”). The third segment, as well as the Buck Mountain 230-34.5 kV Substation, will be constructed, owned, operated, and maintained by Buck Energy.<sup>1</sup> The proposed Project will be located in Sugarloaf Township, Luzerne County, Pennsylvania. PPL Electric has provided information regarding this Project to these political subdivisions, which have not objected to the Project.

The proposed Project is necessary to connect the Wind Farm to the electric grid. The Project has been reviewed and approved through the PJM Interconnection LLC (“PJM”) generation interconnection process. Subject to the Commission’s approval, construction is scheduled to begin in October/November of 2015 to support the December 2016 in-service date of the Wind Farm. In support thereof, PPL Electric states as follows:

**I. INTRODUCTION**

1. This Letter of Notification is filed by PPL Electric, a public utility that provides electric distribution, transmission, and provider of last resort services in Pennsylvania subject to the regulatory jurisdiction of the Commission.

2. PPL Electric’s address is PPL Electric Utilities Corporation, Two North Ninth Street, Allentown, Pennsylvania 18101.

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<sup>1</sup> PPL Electric is not asking for Commission approval to build the third segment of the Project because it will be constructed and owned by the Buck Energy. There are no plans in the foreseeable future for PPL Electric to own or operate the 34.5 kV transmission line between the Buck Mountain 230-34.5 kV Substation and the Wind Farm. *See also* 52 Pa. Code § 57.71 (Commission approval is not required to site or construct transmission lines operating at less than 100 kV).

3. PPL Electric's attorneys are:

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PPL Electric's attorneys are authorized to receive all notices and communications regarding this Letter of Notification.

4. PPL Electric furnishes electric service to approximately 1.4 million customers throughout its certificated service territory, which includes all or portions of twenty-nine counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania. PPL Electric is a "public utility" and an "electric distribution company" as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa.C.S. §§ 102, 2803.

5. PPL Electric owns approximately 5,000 miles of transmission lines operating at 69 kV (kilovolts) or higher, approximately 375 substations with a capacity of 10 MVA (megavolt amperes) or more, and approximately 43,000 miles of distribution lines operating at less than 69 kV.

6. This Letter of Notification includes the following accompanying attachments:

- Attachment 1 Necessity Statement.
- Attachment 2 Engineering Description.
- Attachment 3 Description of the Right-of-Way.
- Attachment 4 PPL Electric Design Criteria and Safety Practices.

7. This Letter of Notification and accompanying Attachments, which are incorporated herein by reference, contain all the information required by 52 Pa. Code § 57.72(d)(4).

**II. THE PROJECT**

**A. NEED FOR THE PROJECT**

**1. Existing System**

8. The existing double-circuit circuit Susquehanna-Harwood #1 & #2 230 kV Transmission Line currently serves load in Luzerne County.

9. The existing double-circuit Susquehanna-Harwood #1 & #2 230 kV Transmission Line is installed on double-circuit monopole towers. The Susquehanna-Harwood #1 & #2 230 kV Transmission Line extends approximately 12.9 miles from the from the Susquehanna 230 kV Switchyard to the Harwood 230 kV Switchyard.

10. A description and one-line diagram of the existing system is provided in the Necessity Statement included as Attachment 1 to this Letter of Notification.

**2. Need for the Project**

11. Buck Energy plans to construct the Wind Farm in Beaver Township, Columbia County, and North Union Township, Schuylkill County.

12. The proposed Wind Farm will consist of up to 34 new wind turbines that will produce up to 100 MW of clean, renewable energy. The Wind Farm will produce enough clean,

renewable energy to supply approximately 100,000 homes. A description of the Wind Farm to be constructed by Buck Energy is provided in Attachment 1 to this Letter of Notification. In order to get the power produced from the Wind Farm to the electric market, the Wind Farm must be interconnected with the electric grid.

13. Transmission Owners, such as PPL Electric, are required by federal law to provide open access to their transmission systems. As explained below, and in Attachment 1 to this Letter of Notification, through the PJM Interconnection LLC (“PJM”) generation interconnection process, PJM and PPL Electric determined that the proposed Project is necessary to connect the Wind Farm to the electric grid.

14. PJM is a Federal Energy Regulatory Commission (“FERC”) approved Regional Transmission Organization (“RTO”) charged with ensuring the reliability of the electric transmission system under its functional control and coordinating the movement of wholesale electricity in all or parts of thirteen states and the District of Columbia, including most of Pennsylvania and New Jersey. PPL Electric is a member of PJM.

15. As a FERC-accepted RTO, PJM administers the process for the interconnection of all new generation facilities to the PJM Transmission Grid, pursuant to the PJM Open Access Transmission Tariff – Part VI (Interconnections with the Transmission System), Subpart A – Generation Interconnection Procedures. PJM’s queue-based interconnection process offers developers the flexibility to explore their respective generation interconnection business opportunities, while at the same time evaluating the feasibility and impacts of interconnecting the generating unit into the existing transmission system. A description of PJM’s interconnection procedures is provided in Attachment 1 to this Letter of Notification.

16. Buck Energy applied for and received PJM approval to interconnect with PPL Electric's Susquehanna-Harwood #2 230 kV Transmission Line as follows. Through the PJM interconnection process, PJM and PPL Electric determined that the interconnection of the Wind Farm with the PPL Electric's transmission system will require a new 230 kV switchyard that will tie into the existing Susquehanna-Harwood #2 230 kV Transmission Line. The point of interconnection will occur at a new Buck Mountain 230-34.5 kV Substation, which will be owned by Buck Energy. The Buck Mountain 230-34.5 kV Substation will be interconnected to the Sugarloaf 230 kV Switchyard through a 230 kV transmission line.

17. The need for this Project, including a description of the Buck Energy interconnection request and PJM approval, is provided in Attachment 1 to this Letter of Notification.

**B. THE PROPOSED PROJECT**

18. In order to interconnect the Wind Farm to the electric grid, PPL Electric proposes to interconnect the existing Susquehanna-Harwood #2 230 kV Transmission Line with a new Sugarloaf 230 kV Switchyard, and to interconnect the new Sugarloaf 230 kV Switchyard with the Buck Mountain 230-34.5 kV Substation. The Wind Farm developer, Buck Energy, will then build one double-circuit 34.5 kV transmission line between the new Buck Mountain 230-34.5 kV Substation and the Wind Farm. The three segments of the Project are described below. A description and one-line diagram of the proposed Project is provided in the Necessity Statement included as Attachment 1 to this Letter of Notification.

19. The total estimated cost of the first and second segments of the Project is approximately \$3.0 million, which includes \$1.9 million for the 230 kV transmission line work

and \$1.1 million for the switchyard work.<sup>2</sup> The entire cost of the Project will be paid for Buck Energy.

20. Upon Commission approval, the Project has a scheduled construction start date of October/November of 2015 to support the December 2016 in-service date of the Wind Farm.

**1. First Segment of the Project**

21. Under the PJM-approved Interconnection Construction Service Agreement, PPL Electric will construct two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line in Sugarloaf Township, Luzerne County, Pennsylvania and a new Sugarloaf 230 kV Switchyard. This segment will be owned, operated, and maintained by PPL Electric.

22. Buck Energy will construct the Sugarloaf 230 kV Switchyard. Upon completion and receipt of all necessary approvals and permits, the Sugarloaf 230 kV Switchyard will be owned and operated by PPL Electric.

23. The existing Susquehanna – Harwood #2 230 kV Transmission Line currently is supported on double-circuit lattice towers. In order to interconnect the existing Susquehanna – Harwood #2 230 kV Transmission Line with the Sugarloaf 230 kV Switchyard, two of the existing towers will be removed and replaced with two double-circuit, weathering steel monopoles.

24. Both the 230 kV steel monopoles will be approximately 130 feet in height. Both structures will be self-supported on concrete caisson foundations. A depiction of the type of

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<sup>2</sup> The estimated cost for the proposed Project is an order-of-magnitude estimate developed using averages of recent costs for similar projects and without an in-depth analysis of filed investigation. The estimated cost is subject to change as the constructability of the Project, sequence of construction, and other factors that may affect cost are identified and analyzed as the Project progresses.

monopoles used for this Project is provided at the end of Attachment 2 to this Letter of Notification.

25. Each new 230 kV circuit will utilize three power conductors, and one steel overhead ground wire for lightning protection. The minimum conductor-to-ground clearance will be 35 feet, which occurs at a maximum conductor temperature of 125° C.

26. An engineering description of the Project is provided in Attachment 2 to this Letter of Notification.

## **2. Second Segment of the Project**

27. Under the PJM-approved Interconnection Construction Service Agreement, Buck Energy will construct the second segment of the Project. Buck Energy will construct one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation. Upon completion, the second segment will be owned and operated by PPL Electric.

28. The second segment will be constructed with two, weathering steel monopoles. Both the 230 kV monopoles will be approximately 130 feet in height, and both will be self-supported on concrete caisson foundations. A depiction of the type of monopoles used for this Project is provided at the end of Attachment 2 to this Letter of Notification.

29. Each new 230 kV circuit will utilize three power conductors, and one steel overhead ground wire for lightning protection. The minimum conductor-to-ground clearance will be 35 feet, which occurs at a maximum conductor temperature of 125° C.

30. An engineering description of the Project is provided in Attachment 2 to this Letter of Notification.

### **3. Third Segment of the Project**

31. Buck Energy also will construct the third segment of the Project under the PJM-approved Interconnection Construction Service Agreement. Buck Energy will construct a new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5 kV Substation and the Buck Energy Wind Farm.

32. The third segment, as well as the Buck Mountain 230-34.5 kV Substation, will be constructed, owned, operated, and maintained by Buck Energy.

33. PPL Electric is not asking for Commission approval to build 34.5 kV transmission line between the new Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation because it will be constructed and owned by the Buck Energy. There are no plans for PPL Electric to own or operate the 34.5 kV transmission line.

### **III. HEALTH AND SAFETY**

34. The proposed Project will not create any unreasonable risk of danger to the public health or safety.

35. The Project will be designed, constructed, operated, and maintained in a manner that meets or surpasses all applicable National Electrical Safety Code (“NESC”) minimum standards and all applicable legal requirements. Descriptions PPL Electric’s design criteria and safety practices are provided in Attachment 4 to this Letter of Notification.

36. Consistent with its Magnetic Field Management Program, the first segment will be reverse phased consistent with PPL Electric’s Magnetic Field Management Program. With respect to the second segment, the new 230 kV transmission line between the Sugarloaf 230 kV Switchyard and the Buck Mountain 230-34.5 kV Substation will be a single circuit and, therefore cannot be reverse phased. However, both the first and second segments of the Project will be

designed for ground clearances that are a minimum of five feet higher than the required NESC minimum ground clearance for 230 kV lines, which should reduce the potential for exposure to magnetic fields. A description of PPL Electric's Magnetic Field Management Program is provided in Attachment 2 to this Letter of Notification.

**IV. DESCRIPTION OF RIGHT-OF-WAY**

37. The planned Wind Farm will be located on lands leased by Buck Energy in Beaver Township, Columbia County and North Union Township, Schuylkill County. The electric collection point for the wind turbines is located approximately 1,000 feet west of the existing Susquehanna-Harwood #1 & #2 230 kV double-circuit Transmission Line near Tomhicken Road in Sugarloaf Township, Luzerne County.

38. The two segments of the Project that are the subject of this Letter of Notification - (i) two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and a new Sugarloaf 230 kV Switchyard, and (ii) one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation -- will be located in Sugarloaf Township, Luzerne County, Pennsylvania.

39. The first segment of the Project will be constructed entirely on lands owned by Buck Energy. Buck Energy will transfer PPL Electric the property in fee for the new Sugarloaf 230 kV Switchyard and the two new single-circuit 230 kV transmission lines in the first segment of the Project. No additional rights-of-way are required for the first segment of the Project.

40. The right-of-way for the second segment will be approximately 150 feet in width and 370 feet in length. The remaining 460 feet of the second segment will be constructed within

the property for the Sugarloaf 230 kV Switchyard. The second segment will be constructed by Buck Energy within an easement on lands owned by Richard E. Angelo Family Limited Partner. Upon completion of the Project, the right-of-way and easement necessary for the second segment will be transferred from Buck Energy to PPL Electric, and PPL Electric will own and operate the second segment.<sup>3</sup>

41. An aerial plot plan is provided at the end of Attachment 3 to this Letter of Notification.

42. Land use impacts are anticipated to be minimal because the PPL Electric segments of the Project will be constructed in the vicinity of the existing 230 kV transmission line and in an unpopulated area of the county.

43. Where possible, PPL Electric will use previously established access roads for construction to further reduce interference with existing land uses.

44. Tree clearing for the PPL Electric segments of the Project, segments one and two, will be completed before construction begins. In areas where vegetation management is required to complete the project, PPL Electric will apply its “Specifications for Initial Clearing and Control of Vegetation On or Adjacent to Electric Line Right-of-Way Through Use of Herbicides, Mechanical and Hand Clearing Techniques” to mitigate any impacts.

45. No communication towers, pipelines, or other utilities will be affected by the proposed Project.

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<sup>3</sup> PPL Electric provided a packet of information to fully notify the current landowner that PPL Electric will ultimately own and operate the second segment of the Project. The packet provides information about the proposed Project and informs the landowner of their legal rights and PPL Electric’s legal rights with regard to this Project. This information includes the two notices that are required by 52 Pa. Code § 57.91.

46. PPL Electric does not anticipate any interference with airport operations because of the distance from the Project area, the presence of existing electrical facilities in the Project area, and the similar height of the new facilities and the existing facilities.

47. The Project area contains no state lands, national parks, state parks, or local parks.

48. The Project will not traverse or affect any unique geological, scenic, or natural areas.

49. The Project will not affect any recreational areas or natural landmarks.

50. The Project area was reviewed with the Pennsylvania Historical and Museum Commission (“PHMC”). The PHMC has concluded that the Project will have minimal impacts to cultural and archaeological resources, and that no further work is necessary for the Project.

51. PPL Electric will avoid impacts to wetlands and streams to the maximum extent practical. PPL Electric and/or Buck Energy will obtain all necessary permits from the Pennsylvania Department of Environmental Protection and the United States Army Corps of Engineers and will comply with all of the terms and conditions placed on those permits.

52. PPL Electric and/or Buck Energy will acquire any required soil erosion and sedimentation control permits and will comply with any conditions placed on those permits.

53. Both Buck Energy and PPL Electric have consulted with state and federal agencies to obtain information regarding endangered and threatened species in close proximity to the Project. Both Buck Energy and PPL Electric have reviewed the Pennsylvania Natural Diversity Inventory records under the jurisdiction of the Pennsylvania Department of Conservation and Natural Resources, the Pennsylvania Fish and Boat Commission, the Pennsylvania Game Commission, and the U.S. Fish and Wildlife Service. PPL Electric will coordinate with Buck Energy to implement all mitigation measures required by these agencies.

**V. NOTICE**

54. PPL Electric has provided information regarding the Project to representatives of Sugarloaf Township and Luzerne County. These entities have not objected to the proposed Project.

55. Copies of this Letter of Notification will be served on the governmental agencies, municipalities, and other public entities agencies in accordance with 52 Pa. Code § 57.72(d)(3).

56. Copies of this Letter of Notification will be served on these landowners in accordance with 52 Pa. Code § 57.72(d)(3).

**VI. LETTER OF NOTIFICATION**

57. PPL Electric is proceeding by means of a Letter of Notification, instead of a full Application, pursuant to the Commission's regulations at 52 Pa. Code § 57.72(d)(1)(vi).

58. The proposed Project qualifies for use of a Letter of Notification because the two 230 kV transmission line segments to be owned and operated by PPL Electric are less than two miles, *i.e.*, 1,280 feet (225 feet for each single-circuit in segment one, and 830 feet for segment two).

59. This Letter of Notification is filed on the date set forth below. As provided in 52 Pa. Code § 57.72(d)(5), the Commission will review and, by order, approve or disapprove this Letter of Notification. If the Commission approves this Letter of Notification, the proposed Project will be constructed as proposed herein without the formal application process set forth at 52 Pa. Code §§ 57.71, *et seq.*

**VII. CONCLUSION**

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the proposed construction of (i) two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and a new Sugarloaf 230 kV Switchyard, and (ii) one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation to interconnect the proposed Buck Mountain Wind Generation Plant with the electric grid, as explained above and in the Attachments hereto.

Respectfully submitted,

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Date: April 29, 2015

Attorneys for PPL Electric Utilities Corporation

**ATTACHMENT 1**  
**SUSQUEHANNA-SUGARLOAF, SUGARLOAF-HARWOOD**  
**& SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES**  
**NECESSITY STATEMENT**

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**ATTACHMENT 1**  
**SUSQUEHANNA-SUGARLOAF, SUGARLOAF-HARWOOD**  
**& SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES**  
**NECESSITY STATEMENT**

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**A. INTRODUCTION**

PPL Electric Utilities Corporation (PPL Electric) seeks approval from the Pennsylvania Public Utility Commission (“Commission” or “PUC”) for two new single-circuit 230 kV transmission line segments to interconnect the proposed Buck Mountain Wind Generation Plant (“Wind Farm”) to be constructed by Buck Mountain Wind Energy LLC (“Buck Energy”), an independent power producer. The Wind Farm will be interconnected to the PPL Electric transmission system by constructing three segments of new transmission lines in Sugarloaf Township, Luzerne County, Pennsylvania (the “Project”).

The first segment will require the construction of two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line in Sugarloaf Township, Luzerne County, Pennsylvania and a new Sugarloaf 230 kV Switchyard. This segment will be constructed, owned, operated, and maintained by PPL Electric. The second segment will require the construction of one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation. The second segment will be constructed by Buck Energy, but will be owned and operated by PPL Electric upon completion. The third segment will require the construction of a new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5 kV Substation and the Wind Farm. The third segment, as well as the Buck Mountain 230-34.5 kV Substation, will be constructed, owned, operated, and maintained by Buck Energy.

PPL Electric herein is seeking Commission approval of the first and second segments of the Project, between the existing Susquehanna-Harwood #2 230 kV Transmission Line and the new Buck Mountain 230-34.5 kV Substation. Upon completion, both of these segments will be owned and operated by PPL Electric. PPL Electric is not requesting Commission approval of

the third segment of the Project, between the Buck Mountain 230-34.5 kV Substation and the Wind Farm, which will be constructed, owned, and operated entirely by Buck Energy.

The proposed Wind Farm is a turbine wind project that will produce up to 100 MW of generation. In order to get the renewable power produced from wind to the electric market, the Wind Farm must be interconnected with the electric grid. As explained below, through the PJM Interconnection LLC (“PJM”) generation interconnection process, PJM and PPL Electric determined that, subject to PUC approval, the proposed Project is necessary to connect the Wind Farm to the electric grid.

The estimated cost to design and construct the first and second segments of the Project is approximately \$3.0 million.<sup>1</sup> This cost estimate includes approximately \$1.9 million for the two new 230 kV single-circuit transmission lines that each will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and the new Sugarloaf 230 kV Switchyard, and the new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and the new Buck Mountain 230-34.5 kV Substation. This cost estimate also includes approximately \$1.1 million for the switchyard work at the new Sugarloaf 230 kV Switchyard. The entire cost of the Project will be the responsibility of Buck Energy, which will own the Wind Farm. Subject to the Commission’s approval, construction is scheduled to begin in October/November of 2015 to support the December 2016 in-service date of the Wind Farm.

**B. EXISTING SYSTEM**

The existing double circuit Susquehanna-Harwood #1 & #2 230 kV Transmission Line currently serves load in Luzerne County. The Susquehanna-Harwood #1 & #2 230 kV Transmission Lines are installed on double-circuit lattice towers. The Susquehanna-Harwood #1 & #2 230 kV circuits extend approximately 12.9 miles from the Susquehanna 230 kV

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<sup>1</sup> The estimated cost for the proposed Project is an order-of-magnitude estimate developed using averages of recent costs for similar projects and without an in-depth analysis of filed investigation. The estimated cost is subject to change as the constructability of the Project, sequence of construction, and other factors that may affect cost are identified and analyzed as the Project progresses.

Switchyard to the Harwood 230 kV Switchyard. A diagram of the existing transmission system is provided as **Figure 1** below.

The existing Susquehanna-Harwood #1 & #2 230 kV double circuit Transmission Line currently operates in a networked configuration between the Susquehanna 230 kV Switchyard and Harwood 230 kV Switchyard. In a “networked” configuration, the transmission line has a voltage source and power supply available at each end of the line. Power can flow from either end of the line to serve the customer load. Electrical power on both the Susquehanna-Harwood #1 & #2 230 kV circuits normally flows from the Susquehanna 230 kV Switchyard to the Harwood 230 kV Switchyard.

## **C. NEED FOR THE PROJECT**

### **1. Overview of PJM’s Role**

Transmission Owners, such as PPL Electric, are required by federal law to provide open access to their transmission systems. In 1996, the Federal Energy Regulatory Commission’s (“FERC”) issued Order No. 888 which required Transmission Owners to offer access to their transmission systems to third-parties on a non-discriminatory basis. FERC’s Order No. 890 required open and transparent transmission planning. Both orders focused on creating a level playing field to make the transmission system accessible to all market participants at fair prices. FERC Order 1000, which was issued in the summer of 2011, requires local transmission planners to participate in regional planning processes. It also requires regional authorities to allow cost recovery for transmission that is necessary to achieve public policy goals, which include bringing clean and renewable power to market. Finally, FERC Order 1000 provides procedures for non-incumbent developers (non-Transmission Owners) to construct, operate and maintain new transmission facilities necessary to interconnect with the electric grid.

As a FERC-approved Regional Transmission Organization (RTO), PJM administers the process for the interconnection of all new generation facilities to the PJM Transmission Grid, pursuant to the PJM Open Access Transmission Tariff – Part VI (Interconnections with the Transmission System), Subpart A – Generation Interconnection Procedures. PJM’s queue-

based interconnection process offers developers the flexibility to explore their respective generation interconnection business opportunities.

Under these procedures, new generation applicants may request interconnection service by submitting an Interconnection Request. As part of the Interconnection Request, the generator requesting interconnection is required to identify points of interconnection with the PJM transmission grid. Upon receipt of the completed Interconnection Request, the project is placed in a PJM interconnection queue.

PJM staff, in coordination with any affected Transmission Owner(s), undertakes a Generation Interconnection Feasibility Study and System Impact Study. The Generation Interconnection Feasibility Study assesses the practicality and cost of interconnecting the generating unit into the PJM system. The System Impact Study is a comprehensive regional analysis of the impact of adding the new generation facility to the system and an evaluation of the impact on deliverability to PJM load in the particular PJM region where the generator facility is located.

Upon completion of the Generation Interconnection Feasibility Study and System Impact Study, a Generation Interconnection Facilities Study is performed by PJM, in coordination with any affected Transmission Owner(s). The Generation Interconnection Facilities Study documents the engineering design work necessary to begin construction of any transmission facilities required to interconnect the new generation with the electric grid. The Generation Interconnection Facilities Study also provides the cost estimate for the facilities and network upgrades necessary to accommodate the project, as well as an estimate of the time required to complete detailed design and construction of the facilities and upgrades.

If the results of the Generation Interconnection Facilities Study are acceptable to the new interconnection applicant and the affected Transmission Owner(s), an Interconnection Construction Service Agreement is executed. The construction of any interconnection facilities required to interconnect a generator project with the PJM transmission grid is performed in accordance with the terms and conditions specified in the Interconnection Construction Service Agreement. In addition, the new interconnection applicant for transmission service has the

right, but not the obligation, to design and install all or any portion of the facilities necessary to interconnect with the Transmission Owner(s) system (“Option to Build”).<sup>2</sup>

## **2. The Buck Mountain Wind Farm**

Buck Energy is proposing to build up to 34 new wind turbines in Beaver Township, Columbia County, and North Union Township, Schuylkill County (the Wind Farm). The Wind Farm will produce enough clean, renewable energy to supply approximately 100,000 homes.

In order to deliver the power into the electric grid, the Wind Farm must interconnect with the existing transmission system. Through the PJM interconnection process described above, PJM and PPL Electric determined that the interconnection of the Wind Farm with PPL Electric’s transmission system will require a new 230 kV switchyard that will tie into the existing Susquehanna-Harwood #2 230 kV Transmission Line. The point of interconnection (POI) between Wind Farm and PPL Electric will occur at a new Buck Mountain 230/34.5 kV Substation, which will be owned by Buck Energy. The Buck Mountain 230-34.5 kV Substation will be interconnected to the Sugarloaf 230 kV Switchyard through a 230 kV transmission line.

Under the Interconnection Construction Service Agreement, Buck Energy requested the “Option to Build” certain portions of the facilities necessary to interconnect the Wind Farm with the existing transmission system. Under the “Option to Build,” Buck Energy and PPL Electric will be responsible to construct the following facilities:

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<sup>2</sup> In addition to the other terms and conditions applicable to the construction of facilities under the Option to Build, the applicant seeking transmission service must also: (a) obtain all necessary permits and authorizations; (b) obtain all necessary land rights; (c) accept the exclusive right and obligation of the Interconnected Transmission Owner to perform line tie-in work and to calibrate remote terminal units and relay settings; (d) follow accepted procedures to have those facilities that it builds successfully inspected, tested and energized; (e) arrange for all work to be performed by contractors, and using equipment manufacturers or vendors, that are listed on the Interconnected Transmission Owner’s List of Approved Contractors; (f) allow the Interconnected Transmission Owner full site control and reasonable access to its property at all times; (g) allow the Interconnected Transmission Owner to have a reasonable number of appropriate representatives present for all work done on its property/facilities and the right to stop work or order corrective measures for any work with an adverse effect on reliability, safety or security of persons or of property; (h) comply with the Interconnected Transmission Owner’s safety, security and work rules, environmental guidelines and training requirements applicable to the area(s) where construction activity is occurring; and (i) submit to the Interconnected Transmission Owner and PJM initial drawings, certified by a registered professional engineer, of the Transmission Owner Interconnection Facilities that the Interconnection Customer/Developer arranges to build under the Option to Build.

- The first segment of the Project - PPL Electric will construct two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line in Sugarloaf Township, Luzerne County, Pennsylvania and a new Sugarloaf 230 kV Switchyard. Buck Energy will construct the Sugarloaf 230 kV Switchyard. This segment will be owned, operated, and maintained by PPL Electric.
- The second segment of the Project - Buck Energy will construct one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation. The second segment will be constructed by Buck Energy, but will be owned and operated by PPL Electric upon completion.
- The third segment of the Project - Buck Energy will construct a new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5 kV Substation and the Wind Farm. The third segment, as well as the Buck Mountain 230-34.5 kV Substation, will be constructed, owned, operated, and maintained by Buck Energy.

PPL Electric herein seeks Commission approval of the siting and construction of the first and second segments of the Project that will be owned and operated by PPL Electric.

The Buck Mountain Wind Farm interconnection request and approval are available on the PJM website at: <http://www.pjm.com/planning/generation-interconnection/generation-queue-active.aspx>. The Buck Mountain Wind Farm is referred in the PJM Generation Interconnection Queue as “U2-015” which indicates its queue position in the PJM interconnection process.

#### **D. PROPOSED SYSTEM**

The up to 34 wind turbines for the Wind Farm will be located on leased land in in Beaver Township, Columbia County, and North Union Township, Schuylkill County. The electric collection point for the wind turbines is located approximately 1,000 feet west of the existing double-circuit Susquehanna-Harwood #1 & #2 230 kV Transmission Line near Tomhicken Road in Sugarloaf Township, Luzerne County, Pennsylvania. This location was selected due to its proximity to the high voltage transmission line system and the availability of favorable wind conditions for the nearby wind turbines.

Pursuant to the PJM-approved interconnection process described above, in order to interconnect the Wind Farm , PPL Electric proposes to interconnect the existing Susquehanna-Harwood #2 230 kV Transmission Line with a new Sugarloaf 230 kV Switchyard. Under the PJM-approved Interconnection Construction Service Agreement, the required new Sugarloaf 230 kV Switchyard will be constructed by Buck Energy. Upon completion and receipt of all necessary approvals and permits, the Sugarloaf 230 kV Switchyard will be owned and operated by PPL Electric.

In order to interconnect the Susquehanna-Harwood #2 230 kV Transmission Line into the Sugarloaf 230 kV Switchyard, PPL Electric will need to build, upon Commission approval, two new single-circuit 230 kV transmission lines that each will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and the new Sugarloaf 230 kV Switchyard.<sup>3</sup> The new lines will be designed, constructed, and operated at 230 kV. PPL Electric will own and operate the new transmission lines between the Susquehanna-Harwood #2 230 kV Transmission Line and the Sugarloaf 230 kV Switchyard. PPL Electric is therefore seeking Commission approval of these new transmission lines.

Under the PJM-approved Interconnection Construction Service Agreement, Buck Energy will construct one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the new Sugarloaf 230 kV Switchyard and a new Buck Mountain 230-34.5 kV Substation. The new line will be designed, constructed, and operated at 230 kV. Upon completion and receipt of all necessary approvals and permits, the new transmission line between the Sugarloaf 230 kV Switchyard and the Buck Mountain 230-34.5 kV Substation will be owned and operated by PPL Electric.<sup>4</sup> PPL Electric therefore is herein seeking Commission approval of the new transmission line between the Sugarloaf 230 kV Switchyard and the Buck Mountain 230-34.5 kV Substation.

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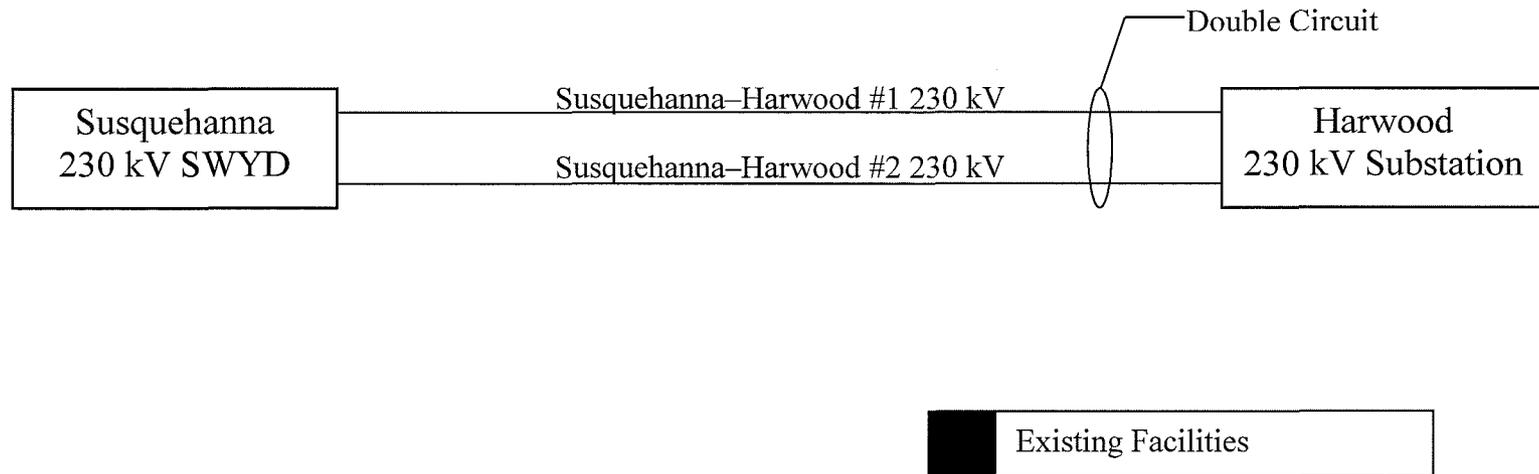
<sup>3</sup> Once the Susquehanna-Harwood #2 230 kV circuit is re-terminated into the Sugarloaf 230 kV Switchyard, the line will be split in two sections at the Switchyard and will be renamed as follows: (1) the section between the Susquehanna and Sugarloaf Switchyards will be named the Susquehanna-Sugarloaf 230 kV Transmission Line; and (2) the section between the Sugarloaf and Harwood Switchyards will be named the Sugarloaf-Harwood 230 kV Transmission Line.

<sup>4</sup> The new line from the new Sugarloaf 230 kV Switchyard to the Buck Mountain 230-34.5 kV Substation will be named Buck Mountain-Sugarloaf 230 kV Transmission Line.

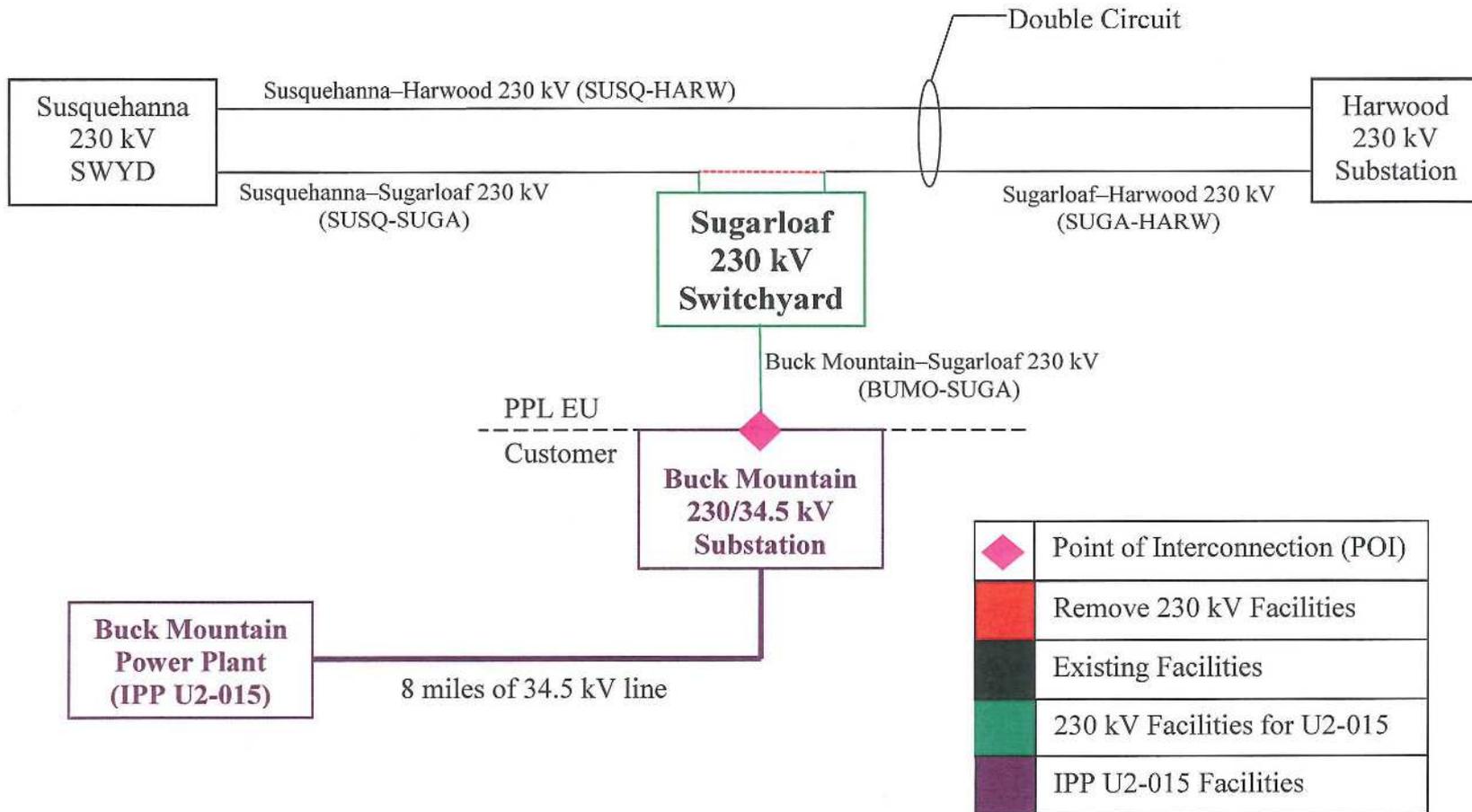
Under the PJM-approved Interconnection Construction Service Agreement, Buck Energy will also construct a new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5 kV Substation and the electric collection point for the Wind Farm. Buck Energy will construct, own, and operate the double-circuit 34.5 kV transmission line and the Buck Mountain 230-34.5 kV Substation. Because the double-circuit 34.5 kV transmission line will be constructed, owned, and operated by Buck Energy, PPL Electric is not asking for Commission approval to build this particular segment of 34.5 kV transmission line. There are no plans for PPL Electric to own or operate this segment of 34.5 kV transmission line.

The proposed transmission system configuration is provided in **Figure 2**. The total estimated cost of the PPL Electric portion of the Project is \$3.0 million, which includes all substation and transmission line work. The entire cost of the Project will be the responsibility of Buck Energy, which will own the Wind Farm, the Buck Mountain 230-34.5 kV Substation, and the 34.5 kV transmission line between the new Buck Mountain 230-34.5 kV Substation and the Wind Farm.

**Figure 1**  
**Functional One-Line Diagram of Existing Transmission System**



**Figure 2**  
**Functional One-Line Diagram of Proposed Transmission System**



**ATTACHMENT 2**  
**SUSQUEHANNA–SUGARLOAF, SUGARLOAF–HARWOOD**  
**& SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES**  
**ENGINEERING STATEMENT**

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**ATTACHMENT 2**  
**SUSQUEHANNA–SUGARLOAF, SUGARLOAF–HARWOOD**  
**& SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES**  
**ENGINEERING DESCRIPTION**

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**A. DESCRIPTION OF THE PROPOSED LINE**

PPL Electric Utilities Corporation (PPL Electric) seeks approval from the Pennsylvania Public Utility Commission (“Commission” or “PUC”) to construct two new single-circuit 230 kV transmission line segments to interconnect the proposed Buck Mountain Wind Generation Plant (“Wind Farm”) to be constructed by Buck Mountain Wind Energy LLC (“Buck Energy”), an independent power producer.

Pursuant to the PJM approved interconnection process described in Attachment 1, the electric collection point for the Wind Farm will be interconnected to the PPL Electric transmission system by constructing three segments of new transmission lines (the “Project”). The first segment will require the construction of two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line in Sugarloaf Township, Luzerne County, Pennsylvania and a new Sugarloaf 230 kV Switchyard. This segment will be constructed, owned, operated, and maintained by PPL Electric. The second segment will require the construction of one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230/34.5 kV Substation. The second segment will be constructed by Buck Energy, but will be owned and operated by PPL Electric upon completion. The third segment will require the construction of a new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5 kV Substation and the Buck Mountain Plant. The third segment, as well as the Buck

Mountain 230-34.5 kV Substation, will be constructed, owned, operated, and maintained by Buck Energy.<sup>1</sup>

PPL Electric herein is seeking Commission approval of the first and second segments of the Project, between the existing Susquehanna-Harwood #2 230 kV Transmission Line and the new Buck Mountain 230-34.5 kV Substation. Each of these new transmission lines will be designed, constructed, and operated at 230 kV.

The first segment of the Project will span approximately 225 feet between the Sugarloaf 230 kV Switchyard and the existing Susquehanna – Harwood #2 230 kV Transmission Line. The existing 230 kV transmission lines are currently supported on existing double-circuit steel lattice structures. The Susquehanna – Harwood #2 230 kV Transmission Line will be tied into the Sugarloaf 230 kV Switchyard by removing a segment of the Susquehanna – Harwood #2 230 kV Transmission Line between two existing lattice structures, replacing the two existing lattice structures with two weathering steel monopole structures, and constructing two new single-circuit 230 kV transmission lines that will each of which will extend approximately 225 feet between the new monopole structures and the Sugarloaf 230 kV Switchyard. The two new segments of single-circuit 230 kV transmission line will be equipped with pole-mounted glass 230 kV insulator assemblies, 3-1590 thousand circular mils (kcmil),<sup>2</sup> 45/7 stranding, aluminum conductor steel reinforced conductors per pole, and one 0.752-inch diameter, 64/98 mm<sup>2</sup>, 48-count Optical Ground Wire. All new poles for this segment of the Project will be self-supported on concrete caisson foundations, with an average height of 130 feet above ground level.

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<sup>1</sup> PPL Electric is not asking for Commission approval to build 34.5 kV transmission line between the new Sugarloaf 230 kV Switchyard and a new Buck Mountain 230/34.5 kV Substation because it will be constructed and owned by the Buck Energy. There are no plans for PPL Electric to own or operate the 34.5 kV transmission line.

<sup>2</sup> KCMIL wire size is the equivalent cross sectional area in thousands of circular mils. A circular mil is the area of a circle with a diameter of one thousandth (0.001) of an inch.

The second segment of this project will span approximately 830 feet between the Sugarloaf 230 kV Switchyard and the Buck Mountain 230-34.5 kV Substation. This proposed single-circuit 230 kV transmission line will be constructed with two, weathering steel monopoles equipped with pole-mounted glass 230 kV insulator assemblies, 3-1590 kcmil, 45/7 stranding, aluminum conductor steel reinforced conductors per pole, and one 0.752-inch diameter, 64/98 mm<sup>2</sup>, 48-count Optical Ground Wire.

All new poles for the PPL Electric segments of the Project will be self-supported on concrete caisson foundations, with an average height of 130 feet above ground level. A depiction of the type of structures used for this Project is provided as Figure 2-1.

The new transmission lines in the first and second segments of the Project will be designed, constructed, and operated at 230 kV. The proposed new 230 kV lines will be designed to comply with, and generally exceed, National Electrical Safety Code (NESC) standards. Design specifications and safety rules practiced by PPL Electric are set forth in PPL Electric's Design Criteria and Safety Practices, which is provided as Attachment 4. The minimum conductor to ground clearance will be 35 feet, which occurs at a maximum thermal conductor temperature of 125 degrees Celsius.

The estimated cost to design and construct the first and second segments of the Project is approximately \$3.0 million. This cost estimate includes approximately \$1.9 million for the two new 230 kV single-circuit transmission lines that each will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and the new Sugarloaf 230 kV Switchyard, and the new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and the new Buck Mountain 230-34.5 kV Substation. This cost estimate also includes approximately \$1.1 million for the switchyard work at the new Sugarloaf 230 kV Switchyard. The entire cost of the Project will be the responsibility of Buck Energy, which will own the Wind Farm. Subject to the Commission's approval, construction is

scheduled to begin in October/November of 2015 to support the December 2016 in-service date of the Wind Farm.

## **B. MAGNETIC FIELD MANAGEMENT**

PPL Electric's Magnetic Field Management Program is applied to new and reconstructed transmission line projects. The company does not believe that the current scientific evidence demonstrates that magnetic fields cause any adverse health effects or pose a health or safety danger to the public. Nevertheless, PPL Electric has determined, as a matter of policy, to design its new and rebuilt transmission lines to reduce magnetic fields when that can be done at low or no cost and consistent with functional requirements. PPL Electric's Magnetic Field Management Program has been developed to implement that policy decision. To reduce magnetic field exposures, the program generally prescribes the use of a line design that provides five feet higher ground clearance than NESC standards, and reverse phasing of new double-circuit lines where it is feasible to do so at low or no cost.

For the first segment, the two new single-circuit 230 kV transmission lines between the Susquehanna-Harwood #2 230 kV Transmission Line and the Sugarloaf 230 kV Switchyard will be reverse phased consistent with its Magnetic Field Management Program. With respect to the second segment, the new 230 kV transmission line between the Sugarloaf 230 kV Switchyard and the Buck Mountain 230-34.5 kV Substation will be a single circuit and, therefore cannot be reverse phased. However, both the first and second segments of the Project will be designed for ground clearances that are a minimum of five feet higher than the required NESC minimum ground clearance for 230 kV lines, which should reduce the potential for exposure to magnetic fields.

**Figure 2-1**  
**Typical 230 kV Structure**

**ATTACHMENT 3**  
**SUSQUEHANNA–SUGARLOAF, SUGARLOAF–HARWOOD**  
**& SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES**  
**DESCRIPTION OF THE RIGHT OF WAY**

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## ATTACHMENT 3

### SUSQUEHANNA–SUGARLOAF, SUGARLOAF–HARWOOD & SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES DESCRIPTION OF THE RIGHT OF WAY

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#### A. INTRODUCTION

Buck Mountain Wind Energy LLC (Buck Energy), an independent power producer, plans to construct the Buck Mountain Wind Generation Plant (Wind Farm) in Columbia County and Schuylkill County. The Wind Farm is a commercial wind farm project that plans to produce up to 100 MW of generation.

Through the PJM approved interconnection process described in Attachment 1, the Wind Farm will be interconnected to the PPL Electric transmission system by constructing three segments of new transmission lines (the “Project”). The first segment will require the construction of two new single-circuit 230 kV transmission lines, each of which will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and a new Sugarloaf 230 kV Switchyard. This segment will be constructed, owned, operated, and maintained by PPL Electric. The second segment will require the construction of one new single-circuit 230 kV transmission line that will extend approximately 830 feet between the Sugarloaf 230 kV Switchyard and a new Buck Mountain 230/34.5 kV Substation. The second segment will be constructed by Buck Energy, but will be owned and operated by PPL Electric upon completion. The third segment will require the construction of a new double-circuit 34.5 kV transmission line that will extend approximately 8 miles between the Buck Mountain 230-34.5 kV Substation and the Buck Mountain Plant. The third segment, as well as the Buck Mountain 230-34.5 kV Substation, will be constructed, owned, operated, and maintained by Buck Energy.

PPL Electric herein is seeking Commission approval of the first and second segments of the Project, between the existing Susquehanna-Harwood #2 230 kV Transmission Line and the new Buck Mountain 230-34.5 kV Substation. The proposed transmission lines to be owned and operated by PPL Electric are located in Sugarloaf Township, Luzerne County. The proposed Project was reviewed with the Sugarloaf Township and Luzerne County officials, which have not objected to the proposed Project.

**B. RIGHT-OF-WAY DESCRIPTION**

The up to 34 wind turbines for the Wind Farm will be located on lands leased by Buck Energy in Beaver Township, Columbia County and North Union Township, Schuylkill County. The electric collection point for the wind turbines is located approximately 1,000 feet west of the existing Susquehanna-Harwood #1 & #2 230 kV double-circuit Transmission Line near Tomhicken Road in Sugarloaf Township, Luzerne County.

The first segment of the Project will extend approximately 225 feet between the existing Susquehanna-Harwood #2 230 kV Transmission Line and a new Sugarloaf 230 kV Switchyard. This segment is will be located in Sugarloaf Township, Luzerne County. The first segment will be constructed entirely on lands to be owned by Buck Energy. Buck Energy will transfer PPL Electric the property in fee for the two new single-circuit 230 kV transmission lines in the first segment of the Project and the new Sugarloaf 230 kV Switchyard. No additional rights-of-way are required for the first segment of the Project.

The second segment of the Project will extend approximately 830 feet between the new Sugarloaf 230 kV Switchyard and the Buck Mountain 230-34.5 kV Substation. This segment will be located in Sugarloaf Township, Luzerne County. The right-of-way for the second segment will be approximately 150 feet in width and 370 feet in length. The remaining 460 feet of the second segment will be constructed within the property for the Sugarloaf 230 kV Switchyard. The second segment will be constructed by Buck Energy within an easement on lands owned by Richard E. Angelo Family Limited Partner. Upon

completion of the Project, the right-of-way and easement necessary for the second segment will be transferred from Buck Energy to PPL Electric, and PPL Electric will own and operate the second segment. No additional right-of-way is required for the second segment of the Project.<sup>1</sup>

An aerial exhibit is provided at the end of Attachment 3.

**C. ENVIRONMENTAL ASSESSMENT**

Penn Wind LLC submitted a letter to the Pennsylvania Historical and Museum Commission (PHMC) on July 15, 2009 to request information on any archeological or historic architectural resources located within the Buck Mountain Wind Project area in Sugarloaf Township, Luzerne County. By letter dated July 21, 2009 under File No. ER 2009-0245-042-B the PHMC concluded that no National Register eligible or listed historic or archaeological properties are in the area of the Project, therefore no further consultation is necessary for this Project.

Impacts to land use are anticipated to be minimal because the PPL Electric segments of the Project will be constructed in the vicinity of the existing 230 kV transmission line and in an unpopulated area of the county. PPL Electric will use and update previously established access roads for construction where possible (see attached aerial exhibit) to further reduce interference with existing land uses.

No communication towers, pipelines, or other utilities will be affected by the PPL Electric segments of the Project. The closest airport is the Hazleton Municipal Airport, a privately owned facility, located approximately 4.1 miles northeast of the area where the PPL Electric segments of the Project will be constructed. PPL Electric does not anticipate any interference with airport operations because of the distance from the

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<sup>1</sup> PPL Electric provided a packet of information to fully notify the current landowner that PPL Electric will ultimately own and operate the second segment of the Project. The packet provides information about the proposed Project and informs the landowner of their legal rights and PPL Electric's legal rights with regard to this Project. This information includes the two notices that are required by 52 Pa. Code § 57.91.

Project area, the presence of existing electrical facilities in the Project area, and the similar height of the new facilities and the existing facilities. However, PPL Electric will file any required documentation with both the Federal Aviation Administration and the Pennsylvania Department of Transportation Bureau of Aviation.

The proposed Project will not affect any unique geological, scenic or natural areas. Further, there are no state lands, national parks, state parks, local parks, recreational areas or natural landmarks located within the Project area.

Based on a wetland delineation study performed by Buck Energy, the proposed transmission lines will not cross any streams or wetlands. One stream will be crossed by the switchyard access road. All permits required by the County Conservation District and Pennsylvania Department of Environmental Protection will be obtained by PPL Electric and/or Buck Energy, as applicable. PPL Electric will comply with all of the terms and conditions placed on those permits. PPL Electric also will comply with soil erosion and sedimentation control permits obtained by PPL Electric and/or Buck Energy, as applicable, and PPL Electric will comply with any conditions placed on those permits.

Buck Energy has coordinated with state and federal agencies to obtain information regarding threatened and endangered species in close proximity to the Project area. Buck Energy has consulted with various agencies beginning in 2008. Based on these consultations, the Pennsylvania Game Commission (PGC), Pennsylvania Fish and Boat Commission (PFBC), and the U.S. Fish and Wildlife Service (USFWS) issued letters to Buck Energy identifying measures that should be implemented to avoid impacts to threatened and endangered species and/or special concern species and resources located within the Project area. In a letter dated August 21, 2013<sup>2</sup>, the Department of Conservation and Natural Resources (DCNR) indicated that no impacts are anticipated to plants, terrestrial invertebrates, natural communities or geologic features under their jurisdiction.

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<sup>2</sup> PNDI No. 22236

On July 11, 2013 the PGC advised Buck Energy that potential impacts to threatened, endangered, and species of special concern birds and bats may be associated with the Wind Farm Project. PGC identified a number of measures that should be implemented during facility construction and operation to avoid potential impacts to the federally-endangered Indiana bat (*Myotis sodalis*), the state-endangered small-footed bat (*Myotis leibii*) and the state species of special concern northern long-eared bat (*Myotis septentrionalis*). PPL Electric will coordinate with Buck Energy on the implementation of the minimization measures including an agreement to only cut trees with a diameter of 5 inches diameter at breast height or larger between November 15 and March 31 to prevent impacts to Indiana bats.

The PFBC letter<sup>3</sup> to Buck Energy dated December 16, 2013 identified measures Buck Energy should take to avoid impacts on timber rattlesnakes (*Crotalus horridus*), a Pennsylvania candidate species. PPL Electric will coordinate with Buck Energy during implementation of the minimization measures identified by the PFBC.

The USFWS September 5, 2013 letter<sup>4</sup> to Buck Energy identified measures that Buck Energy should undertake to reduce the likelihood of impact to Indiana bat and other species of bats and birds. PPL Electric will coordinate with Buck Energy and will avoid tree cutting between November 16 and March 31 per USFWS recommendations. The remaining USFWS recommendations pertain to the operation of the wind farm.

#### **D. VEGETATION MANAGEMENT**

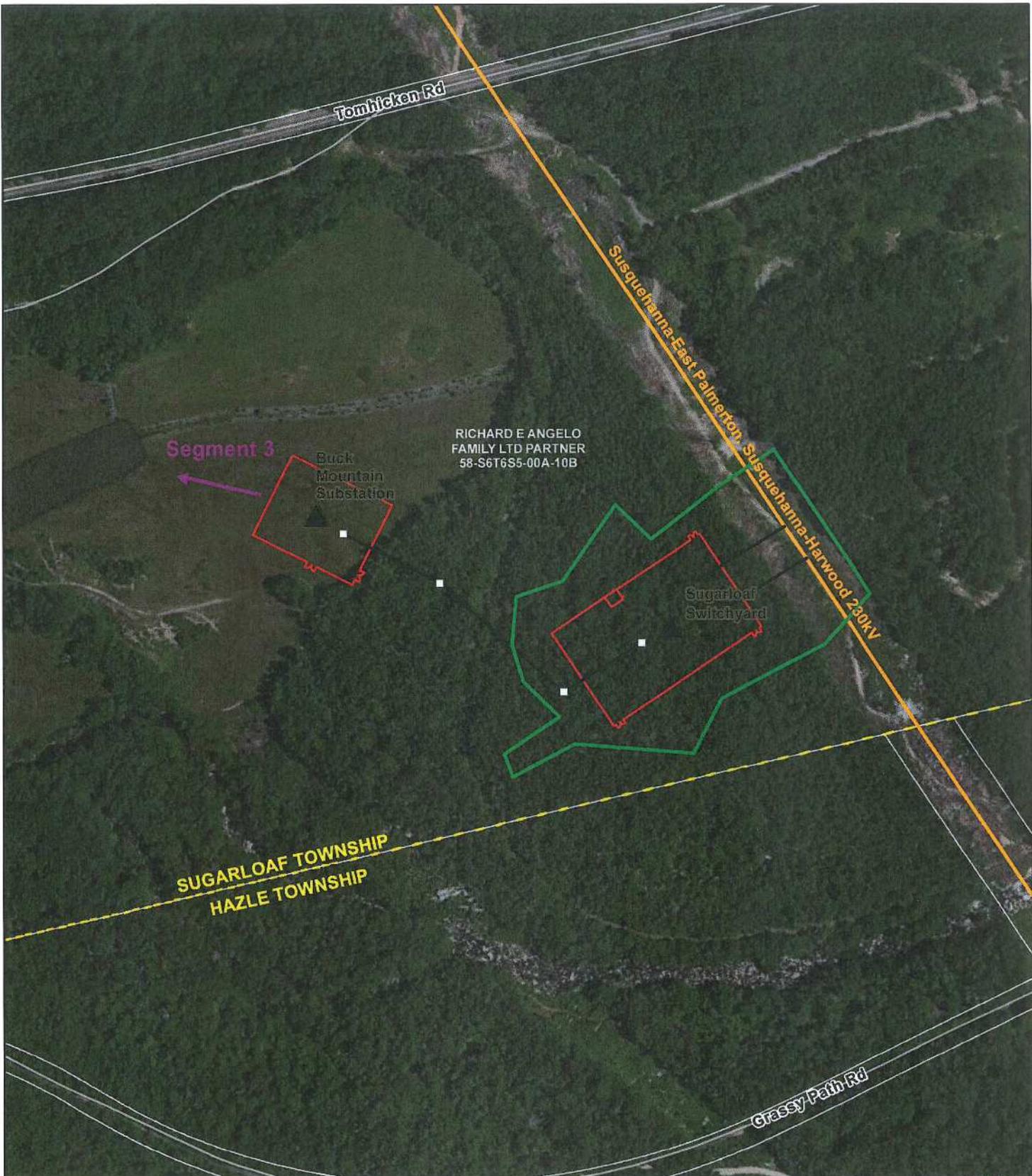
All necessary tree clearing activities will be completed before construction begins. In areas where vegetation management is required to complete the Project, PPL Electric will apply its “Specifications for Initial Clearing and Control of Vegetation On or Adjacent to Electric Line Right-of-Way Through Use of Herbicides, Mechanical and Hand Clearing

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<sup>3</sup> SIR Nos. 40188 and 31436

<sup>4</sup> USFWS Project No. 2008-1309

Techniques” to mitigate any impacts. Tree clearing activities also will follow conditions as outline in the PNDI review and approval process.



**Legend**

- Structure
- ▲ Substation
- Recent Subdivision to be Transferred to PPL
- Route
- Existing 230 kV Transmission Line
- Fenceline
- Parcel Boundary

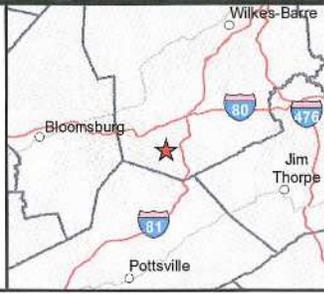
**Susquehanna- Sugarloaf,  
Sugarloaf-Harwood  
& Sugarloaf-Buck Mountain  
230 KV Transmission Lines**



Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), Lancaster County.



Projected Coordinate System: PA State Plane, North.  
Datum: North American Datum of 1983 (NAD83).  
Projection: Lambert Conformal Conic.  
Linear Unit: Feet.  
Ellipsoid: Geodetic Reference System 80.



**ATTACHMENT 4**  
**SUSQUEHANNA–SUGARLOAF, SUGARLOAF–HARWOOD**  
**& SUGARLOAF-BUCK MOUNTAIN 230 KV TRANSMISSION LINES**  
**PPL DESIGN CRITERIA AND SAFETY PRACTICES**

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The National Electrical Safety Code (NESC) is a set of rules to safeguard people during the installation, operation, and maintenance of electric power lines. The NESC contains the basic provisions considered necessary for the safety of employees and the public. Although it is not intended as a design specification, its provisions establish minimum design requirements. PPL Electric Utilities Corp. (PPL) has developed design specifications and safety rules which meet or surpass all requirements specified by the NESC.

Engineering Design Criteria and Parameters

The NESC includes loading requirements and clearances for the design, construction, and operation of power lines. The “loads” on conductors and supporting structures are the mechanical forces that develop from the weight of the conductors, the weight of ice on the conductors, plus wind pressure on the conductors and supporting structures. Loading requirements are the loads on the conductors and structures that are anticipated assuming certain ice and wind conditions. Loading requirements always contain “safety factors” to allow for unknown or unanticipated contingencies. The clearances and loading requirements contained in the NESC were developed to ensure public safety and welfare.

PPL transmission line design standards meet or surpass the NESC standards. For example, the relative order of grades of construction for conductors and supporting structures is B, C, and N; Grade B being the highest. According to the NESC standards, construction Grades B, C, or N may be used for transmission lines (except at crossings of railroad tracks and limited access highways where Grade B construction is specified). However, PPL designs all of its transmission lines for Grade B construction. The use of Grade B design and construction specifies enhancements such as larger-minimum crossarm dimensions, larger-minimum conductor size, and increased safety factors.

Another example is the design parameters utilized to account for ice and wind loadings on the overhead ground wire (OHGW) and power conductors. The NESC standard ice and wind design magnitudes for the PPL territory are 0.5 inch thickness of radial ice combined with four pounds per square foot horizontal wind pressure (equivalent to 40-mile per hour wind velocity). The conductor sags and tensions used in line designs are the result of various ice and wind combinations, depending on the elevation at the line location and line design voltage. The conductor sags and tensions used in the design of all PPL transmission lines are at least 0.5-inch ice combined with eight pounds wind pressure (equivalent to 57 miles per hour wind velocity). This means that PPL lines are designed to operate safely and reliably during inclement weather even more severe than assumed by the NESC. In addition, PPL transmission lines are designed with more clearance to the ground than required by the NESC. The tables below compare PPL and NESC ground clearances for lines of various voltages.

**138 kV**

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Design</u>
Roads, streets, alleys	21 Ft.	30 Ft.
Other land traversed by vehicles (such as cultivated field, forest, etc.)	21 Ft.	30 Ft.
Spaces accessible to pedestrians only	17 Ft.	30 Ft.
Railroad tracks	31 Ft.	35 Ft.

### 230 kV

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Design</u>
Roads, streets, alleys	23 Ft.	32 Ft.
Other land traversed by vehicles (such as cultivated field, forest, etc.)	23 Ft.	32 Ft.
Spaces accessible to pedestrians only	19 Ft.	32 Ft.
Railroad tracks	31 Ft.	36 Ft.

### 500 kV

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Design</u>
Roads, streets, alleys	28 Ft.	53 Ft.
Other land traversed by vehicles (such as cultivated field, forest, etc.)	28 Ft.	53 Ft.
Spaces accessible to pedestrians only	24 Ft.	53 Ft.
Railroad tracks	38 Ft.	53 Ft.

A relay protection system is used to protect the public safety and welfare as well as equipment and the transmission system. Relay protection is installed for all transmission lines to automatically de-energize the line in the unlikely event that the line or supporting structure fails and the line contacts the ground.

#### Periodic Maintenance Program on All Transmission Lines

To ensure continued public safety and integrity of service, a periodic maintenance and inspection program is implemented for every transmission line. The program is administered through the use of helicopter patrols, with supplemental foot and structure climbing patrols. A number of helicopter patrols are performed on all lines annually. The

two-man helicopter crew flies parallel, to the left, and above the line so that the observer can look for signs of line damage or deterioration and observe clearances between vegetation and conductors. The observations are included in a report that is forwarded to the appropriate department for corrective action.

Foot and structure climbing patrol programs for a transmission line begin approximately three to five years after the line is energized, unless a helicopter patrol reports a need for earlier action. The frequency of foot patrols varies from once every year to once every several years depending on line type and age.

An assigned foot patroller checks right-of-way conditions, including access roads, bridges, pole washouts, tower footers, vegetation height and clearance to conductors, pole and tower deterioration and, with the use of binoculars, insulators, and condition of hardware. Identified problems are included in a report that is forwarded to the appropriate department for corrective action.

A scheduled line outage is required to perform an overhead patrol because of “hands-on” inspection of hardware. Overhead patrols are conducted on a schedule determined by line age, operating record, and observed general condition. The necessary repairs are also done during the inspection outage.

#### Personnel Safety Rules

The following are a few of the PPL safety rules that demonstrate the Company's concern for employee safety:

- Work procedures have been developed to allow work to be performed on energized facilities in a safe manner. When lines or apparatus are removed from service to be worked on, the Energy Control Process system is applied. This system provides that a red tag must be physically placed on the control handle of the de-energized equipment. The red tag may be removed only after proper authorization to energize the equipment. Various other tags are used for limited

operations and informational purposes. Employees will not apply or remove a tag or change the status of tagged equipment unless authorized.

- Temporary safety grounds are used on de-energized facilities for employee safety during maintenance, construction, or reconstruction work. Safety grounds are wires connecting the de-energized facility to an electrical ground. If the facility should be energized, the safety grounds will divert the current directly to ground and reduce the likelihood of personal injury. The conductor size and attachment clamps of temporary safety grounds must be capable of conducting anticipated fault currents. Rubber gloves, rubber sleeves, and additional rubber protective equipment are used as required when applying or removing temporary safety grounds to or from the lines or apparatus to be grounded. An approved nonconductive working stick of sufficient length to allow workers to maintain the following required minimum clearances is used to test that the line has been de-energized and to apply temporary safety grounds:

<u>Voltage-kV</u>	<u>Minimum Clearance</u>
138	3'-7"
230	5'-3"
500	11'-3"

Before applying grounds, a test is done to confirm that the line is de-energized. The voltage test device is checked before and after use to assure reliability. When ground pins are used to establish proper ground points, they are driven to a depth of not less than four feet as near vertical as possible.

- Poles or structures are inspected and examined for structural integrity before climbing. If there is any reason to believe that a pole is unsafe, it is stabilized before work is performed. Appropriate safety gear in the form of body belts, safety straps, hard hats, gloves, etc., is worn by linemen during line work activity.

**VERIFICATION**

I, Stephanie Raymond being the Vice President-Transmission and Substations at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 4/27/15

S. Raymond