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Christopher T. Wright

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717-731-1985 Direct Fax  
File #: 167226

October 20, 2016

***VIA HAND DELIVERY***

Rosemary Chiavetta, Secretary  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street, 2nd Floor North  
P.O. Box 3265  
Harrisburg, PA 17105-3265

**Re: Letter of Notification of PPL Electric Utilities Corporation, Filed Pursuant to 52 Pa. Code Chapter 57 Subchapter G, for Expedited Approval to Construct Approximately 0.4 Miles of New 500 kV Transmission Lines in Salem Township, Luzerne County, Pennsylvania to Interconnect a New Independent Power Producer to the Electric Grid - Docket No. A-2016-**

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Dear Secretary Chiavetta:

Enclosed for filing is the Letter of Notification of PPL Electric Utilities Corporation ("PPL Electric") in the above-referenced proceeding. A CD containing a copy of the Letter of Notification and Attachments in Support of the Letter of Notification is also enclosed. As explained therein, PPL Electric respectfully requests that the Pennsylvania Public Utility Commission consider this Letter of Notification on an expedited basis.

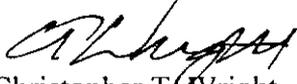
As indicated on the Certificate of Service, copies of the Letter of Notification are being served by certified mail, return receipt requested upon the involved governmental agencies, municipalities and property owners.

If you have any questions concerning this matter, please contact me at the address or telephone numbers provided above.

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Rosemary Chiavetta, Secretary  
October 20, 2016  
Page 2

Respectfully submitted,



Christopher T. Wright

CTW/jl  
Enclosures

cc: Certificate of Service  
Office of Consumer Advocate  
Office of Small Business, Advocate  
Bureau of Investigation &, Enforcement  
Robert F. Young  
Paul T. Diskin  
Yasmin Snowberger  
Kimberly Hafner

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**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of the foregoing **Letter of Notification** has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

**VIA CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

Federal Aviation Administration (FAA)  
Harrisburg Airport District Office  
3905 Hartzdale Drive, Suite 508  
Camp Hill, PA 17011

Pennsylvania Historical &  
Museum Commission  
Bureau of Historic Preservation  
Commonwealth Keystone Building  
400 North Street, 2nd Floor  
Harrisburg, PA 17120-0053

Pennsylvania Department of Transportation  
Honorable Barry Schoch, P.E., Secretary  
Commonwealth Keystone Building  
400 North Street, 9th Floor  
Harrisburg, PA 17120  
Attn: William J. Cressler

Pennsylvania Department of  
Environmental Protection  
Southcentral Regional Office  
909 Elmerton Avenue  
Harrisburg, PA 17110  
Attn: Edward Muzic, P.E. - Dam Safety,  
Waterways and Wetlands Section

Pennsylvania Department of Conservation  
& Natural Resources  
Bureau of Forestry  
P.O. Box 8552  
Harrisburg, PA 17015-8552

Pennsylvania Game Commission  
2001 Elmerton Avenue  
Harrisburg, PA 17110-9797

Pennsylvania Fish & Boat Commission  
Division of Environmental Services  
Natural Diversity Section  
450 Robinson Lane  
Bellefonte, PA 16823

Luzerne County Manager  
Luzern County Courthouse  
200 North River Street  
Wilkes-Barre, PA 18711

Luzerne County Planning Commission  
Penn Place  
20 N. Pennsylvania Avenue  
Wilkes-Barre, PA 18711

Luzerne County Conservation District  
325 Smiths Pond Road  
Shavertown, PA 18708

Salem Township  
38 Bomboy Lane  
Berwick, PA 18603

Moxie Freedom, LLC  
612 Center Street South, Suite 200  
Vienna, VA 22180

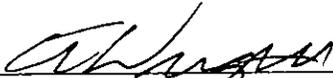
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Caithness Corporation  
c/o Mitchell Garber, Vice President Project  
Management  
565 Fifth Avenue 29<sup>th</sup> Floor  
New York, NY 10017

Date: October 20, 2016

  
\_\_\_\_\_  
Christopher T. Wright

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**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-2016-\_\_\_\_\_  
for Expedited Approval to Construct :  
Approximately 0.4 Miles of New 500 :  
kV Transmission Lines in Salem :  
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 expedited approval from the Pennsylvania Public Utility Commission (“Commission”) to construct three new single-circuit 500 kV transmission lines to interconnect the proposed Freedom Gas-Fired Power Plant (“Power Plant”) with the electric grid. Upon Commission approval, the Power Plant will be interconnected to the PPL Electric transmission system by (i) constructing two 0.1-mile single-circuit 500 kV lines to re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the newly constructed Shickshinny 500 kV Switchyard, and (ii) constructing a 0.3-mile single-circuit 500 kV transmission line from the Shickshinny 500 kV Switchyard to the Power Plant (hereinafter, the “Project”). The three proposed new 500 kV transmission lines will be located in Salem Township, Luzerne County, Pennsylvania. PPL Electric has provided information regarding this Project to these political subdivisions, which have not objected to the Project.

The Project is necessary to connect the Power Plant to the electric grid. The Project has been reviewed and approved through the PJM Interconnection LLC ("PJM") generation interconnection process. The Power Plant is scheduled to begin commercial operation on May 1, 2018. However, in order to re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the newly constructed Shickshinny 500 kV Switchyard, PPL Electric must coordinate with the outages scheduled for the Susquehanna-Lackawanna 500 kV Transmission Line and Unit 2 reactor at the Susquehanna nuclear plant discussed below. Therefore, PPL Electric respectfully requests that the Commission consider this Letter of Notification on an expedited basis. 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.

3. PPL Electric's attorneys are:

Kimberly A. Klock (I.D. #89716)  
PPL Services Corporation  
Two North Ninth Street  
Allentown, PA 18101  
Voice: 610-774-5696  
Fax: 610-774-6726  
E-mail: [kklock@pplweb.com](mailto:kklock@pplweb.com)

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Voice: 717-731-1970  
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E-mail: [cwright@postschell.com](mailto:cwright@postschell.com)

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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 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 Power Plant is located in close proximity to PPL Electric's existing Susquehanna-Lackawanna 500 kV Transmission Line.

9. The existing Susquehanna-Lackawanna 500 kV transmission extends approximately 44.07 miles between the Susquehanna 500 kV Substation in Salem Township, Luzerne County, and the Lackawanna 500-230-69 kV Substation in Blakely Borough, Lackawanna County.

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. The Power Plant is a natural gas-fired power plant planned to be constructed by Moxie Freedom LLC ("Moxie Freedom"), an independent power producer. A description of the 1,050 MW Power Plant is provided in Attachment 1 to this Letter of Notification.

12. In order to get electricity produced from the Power Plant to the electric market, the Power Plant 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 Project is necessary to connect the Power Plant 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. The Power Plant will be located in Salem Township, Luzerne County approximately two miles north of PPL Electric’s Susquehanna 500 kV Substation. The location of the planned Power Plant takes advantage of the abundant natural gas resources in the area, as well as its proximity to existing high voltage transmission lines. The Power Plant is located in close proximity to PPL Electric’s existing Susquehanna-Lackawanna 500 kV Transmission Line.

17. The Power Plant applied for and received PJM approval to interconnect with PPL Electric’s system. Through the PJM interconnection process, PJM and PPL Electric determined that the proposed Power Plant should be interconnected with the Susquehanna-Lackawanna 500 kV Transmission Line. The point of interconnection will occur at a dead-end structure located at the Power Plant switchyard.

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

**B. THE PROJECT**

19. Upon Commission approval, the Power Plant will be interconnected to the PPL Electric transmission system by: (i) constructing two 0.1-mile single-circuit 500 kV transmission lines between the existing Susquehanna-Lackawanna 500 kV Transmission Line and the newly constructed Shickshinny 500 kV Switchyard; and (ii) constructing a 0.3-mile single-circuit 500 kV transmission line from the Shickshinny 500 kV Switchyard to the dead-end structure located at the Power Plant switchyard. A description and one-line diagram of the Project is provided in the Necessity Statement included as Attachment 1 to this Letter of Notification.

20. The two 0.1-mile single-circuit transmission lines will re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the newly constructed Shickshinny 500 kV Switchyard, and form the new Susquehanna-Shickshinny 500 kV Transmission Line and new Shickshinny-Lackawanna 500 kV Transmission Line. This segment of the Project will be built, owned, and operated by PPL Electric.

21. The 0.3-mile single-circuit transmission line will connect the Shickshinny 500 kV Switchyard with the Power Plant, and will be referred to as the Shickshinny-Freedom 500 kV Transmission Line. This segment of the Project will be constructed by Moxie Freedom. However, upon completion and receipt of all necessary approvals and permits, the Shickshinny-Freedom 500 kV Transmission Line will be owned and operated by PPL Electric.

22. All three new 500 kV transmission lines will be located entirely within right-of-way across the property owned in fee by Moxie Freedom. No additional rights-of-way are required for the construction, operation, and maintenance of these new transmission lines.

23. Each new 0.1-mile 500 kV transmission line will require four new tower structures, and the new 0.3 mile 500 kV transmission line will require four new tower structures (i.e., the Project will require a total of 12 new tower structures). All new tower structures will be self-supported and either direct embedded or installed on concrete caisson foundations. The new tower structures are expected to range between 130 and 195 feet, with an average height of 165 feet above ground level. A depiction of the type of monopoles used for this Project is provided at the end of Attachment 2 to this Letter of Notification.

24. Each new 500 kV circuit will utilize three power conductors and 2 overhead ground wires for lightning protection and communications between the transmission system facilities. The minimum conductor-to-ground clearance will be 53 feet, which occurs at a maximum conductor temperature of 140° C. An engineering description of the Project is provided in Attachment 2 to this Letter of Notification.

25. The total estimated cost of the Project is \$10 million.<sup>1</sup> The entire cost of the Project will be paid for by Moxie Freedom.

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

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

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<sup>1</sup> The estimated cost for the 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.

27. 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.

28. Consistent with its Magnetic Field Management Program, PPL Electric will construct the Project for ground clearances that are a minimum of five feet higher than the required NESC minimum ground clearance for 500 kV lines in order to reduce the magnetic field exposure. 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**

29. The Project is located in Salem Township, Luzerne County, Pennsylvania.

30. The Project area is zoned as I-3 Special Industrial District. The current land use is cropland and open fields, with no 100-year floodplains or critical environmental habitats. A description of the Project area is provided in Attachment 3 to this Letter of Notification.

31. Upon Commission approval, two new 0.1-mile single-circuit 500 kV transmission lines will be constructed between PPL Electric's existing Susquehanna-Lackawanna 500 kV Transmission Line and the new Shickshinny 500 kV Switchyard. These new 500 kV transmission lines will be located entirely within a right-of-way across property owned in fee by Moxie Freedom. No additional rights-of-way are required for this segment of the Project.

32. In addition, a third new 0.3 mile single-circuit 500 kV transmission line will be constructed between the Shickshinny 500 kV Switchyard and the dead-end structure at the Power Plant switchyard. This new 500 kV transmission line will be located entirely within a right-of-way across property owned in fee by Moxie Freedom. No additional rights-of-way are required for this segment of the Project.

33. Aerial maps showing existing and proposed conditions are provided in Figures 1-2 and 1-4 at the end of Attachment 1 to this Letter of Notification.

34. Land use impacts are anticipated to be minimal due to the fact that the Project is located in areas that currently contain existing PPL Electric facilities. In addition, impacts to land use have been minimized by siting the Project away from populated areas and by avoiding environmental impacts.

35. Most of the Project area previously has been cleared of vegetation. As a result, limited vegetation management will be required for this Project. In areas where vegetation management is required to complete the project, PPL Electric will apply its "*Specifications for Transmission Vegetation Management LA-79827*" to mitigate any impacts.

36. Existing pipelines owned by Transcontinental Gas Pipe Line Corp. ("Transco") will be crossed by the new single 500 kV transmission line that extends between the Shickshinny 500 kV Switchyard and the Power Plant. Moxie Freedom is coordinating with Transco regarding the proposed pipelines crossing. No other communication towers, pipelines, or other utilities will be affected by the Project.

37. 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. However, PPL Electric will file any required documentation with both the Federal Aviation Administration and the Pennsylvania Department of Transportation, Bureau of Aviation.

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

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

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

41. 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 archaeological work is necessary for the Project.

42. PPL Electric 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.

43. PPL Electric will acquire any required soil erosion and sedimentation control permits and will comply with any conditions placed on those permits.

44. Both Moxie Freedom and PPL Electric PPL Electric have consulted with state and federal agencies to obtain information regarding endangered and threatened species in close proximity to the Project. As explained in Attachment 3, potential impacts to such species and resources may be avoided by observing time of year restrictions on construction. No other impacts are anticipated and the jurisdictional agencies have confirmed no additional consultation is required.

**V. NOTICE**

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

46. 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).

47. Copies of this Letter of Notification will be served on all owners of land subject to the right-of-way and easement in accordance with 52 Pa. Code § 57.72(d)(3).

## **VI. LETTER OF NOTIFICATION**

48. 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).

49. The Project qualifies for use of a Letter of Notification because the three proposed new 500 kV transmission lines required to interconnect the Power Plant with the electric grid are collectively less than two miles, *i.e.*, approximately 0.4 miles.

50. 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 Project will be constructed as proposed herein without the formal application process set forth at 52 Pa. Code §§ 57.71, *et seq.*

## **VII. EXPEDITED CONSIDERATION**

51. As explained in Attachment 1 to this Letter of Notification, Transmission Owners, such as PPL Electric, are required by federal law to provide open access to their transmission systems.

52. Through the PJM generation interconnection process described in Attachment 1 to this Letter of Notification, PJM and PPL Electric determined that the proposed Project is necessary to connect the planned new Power Plant to the electric grid.

53. The Power Plant is scheduled to begin commercial operations on May 1, 2018. PPL Electric's proposed Project must be fully constructed and in-service by the May 1, 2018 commercial operation date.

54. In order to re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the newly constructed Shickshinny 500 kV Switchyard, PPL Electric

must coordinate the construction activities with the outages scheduled for the Susquehanna-Lackawanna 500 kV Transmission Line and the Unit 2 reactor at the Susquehanna nuclear plant.

55. Currently, the Susquehanna-Lackawanna 500 kV Transmission Line is scheduled for an outage in December 2016 and the Unit 2 reactor at the Susquehanna nuclear plant is scheduled for an outage from February 2017 through March 2017.

56. Upon Commission approval, PPL Electric plans to begin initial construction activities during the December 2016 outage of the Susquehanna-Lackawanna 500 kV Transmission Line. PPL Electric then plans to install and complete the proposed transmission lines during the February 2017 through March 2017 outage of the Unit 2 reactor at the Susquehanna nuclear plant.

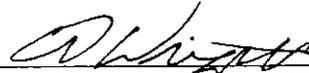
57. Therefore, PPL Electric respectfully requests that the Commission consider this Letter of Notification on an expedited basis.

**VIII. CONCLUSION**

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission (i) consider this Letter of Notification on an expedited basis, and (ii) approve the proposed construction of three new single-circuit 500 kV transmission lines in Salem Township, Luzerne County, Pennsylvania to interconnect the proposed Freedom Gas-Fired Power Plant with the electric grid, as explained above and in the Attachments hereto.

Respectfully submitted,

Kimberly A. Klock (I.D. #89716)  
PPL Services Corporation  
Two North Ninth Street  
Allentown, PA 18101  
Voice: 610-774-5696  
Fax: 610-774-6726  
E-mail: [kklock@pplweb.com](mailto:kklock@pplweb.com)

  
\_\_\_\_\_  
David B. MacGregor (I.D. # 28804)  
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Date: October 20, 2016

Attorneys for PPL Electric Utilities Corporation

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**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: 10/19/16

Stephanie Raymond

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Before the  
Pennsylvania Public Utilities Commission

**Shickshinny and Freedom  
500 kV Tie-In Project**

**ATTACHMENTS IN SUPPORT OF THE  
LETTER OF NOTIFICATION**

Submitted by: PPL Electric Utilities Corp.

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**TABLE OF CONTENTS**

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Attachment 2	Engineering Description
Attachment 3	Description of the Right-of-Way
Attachment 4	Electric Design Criteria and Safety Practices

**Attachment**

**1**

**ATTACHMENT 1**  
**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT**

**NECESSITY STATEMENT**

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Figure 1-2	Aerial Map of the Existing System
Figure 1-3	Functional One Line Diagram of Proposed System
Figure 1-4	Aerial Map of the Proposed System

**ATTACHMENT 1**  
**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT**  
**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 the construction of three new single-circuit 500 kV transmission lines to interconnect the proposed Freedom Gas-Fired Power Plant (“Power Plant”) to be constructed by Moxie Freedom LLC (“Moxie Freedom”), an independent power producer. As described below, PPL Electric proposes to construct two 0.1-mile single-circuit 500 kV lines to re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the newly constructed Shickshinny 500 kV Switchyard, and to construct a 0.3-mile single-circuit 500 kV transmission line from the Shickshinny 500 kV Switchyard to the Power Plant (hereinafter, the “Project”). The Project is necessary to interconnect the planned Power Plant with the electric grid. The Project will be located in Salem Township, Luzerne County, Pennsylvania.

As explained below, Transmission Owners, such as PPL Electric, are required by federal law to provide open access to their transmission systems. Through the PJM Interconnection LLC (“PJM”) generation interconnection process described below, PJM and PPL Electric determined that the Project is necessary to connect the planned new Power Plant to the electric grid.

The total estimated cost of the Project is approximately \$10 million.<sup>1</sup> The entire cost of the Project will be paid for by Moxie Freedom.

The Power Plant has a May 1, 2018 commercial operation date. Therefore, PPL Electric respectfully requests that the Commission consider this Letter of Notification on an expedited basis.

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<sup>1</sup> The estimated cost for the Project is an order-of-magnitude estimate developed using averages of recent costs for similar projects and without an in-depth analysis or field 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.

## **B. NEED FOR THE PROJECT**

### **1. Overview of PJM's Role**

In 1996, the Federal Energy Regulatory Commission's ("FERC") issued Order No. 888, which requires Transmission Owners to offer access to their transmission systems to third-parties on a non-discriminatory basis. FERC's Order No. 890 requires open and transparent transmission planning. Both orders focus 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 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 Service Agreement (“ISA”) and an Interconnection Construction Service Agreement (“ICSA”) are 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 ICSA.

## 2. The Freedom Power Plant

Moxie Freedom is proposing to construct and operate a new 1,050 MW natural gas-fired power plant. The Power Plant will consist of two natural gas-fired turbines to generate electricity. In order to get electricity produced from the Power Plant to the electric market, the Power Plant must be interconnected with the electric grid. The Power Plant is located in close proximity to PPL Electric’s existing Susquehanna-Lackawanna 500 kV Transmission Line. Through the PJM interconnection process described above, PJM and PPL Electric determined that the Power Plant should be interconnected with the Susquehanna-Lackawanna 500 kV Transmission Line. The point of interconnection (POI) will occur at a dead-end structure located at the Power Plant switchyard.

The Moxie Freedom interconnection request, study reports, and ISA/ICSA are available on the PJM website at: <http://www.pjm.com/planning/generation-interconnection/generation-queue-active.aspx>. The Project is referred in the PJM Generation Interconnection Queue as “Z2-046” which indicates its queue position in the PJM interconnection process.

## C. PROPOSED PROJECT

The Power Plant will be located in Salem Township, Luzerne County approximately two miles north of PPL Electric’s Susquehanna 500 kV Substation. The site selected for the Power Plant is located in close

proximity to PPL Electric's Susquehanna-Lackawanna 500 kV Transmission Line. PPL Electric's existing Susquehanna-Lackawanna 500 kV transmission extends approximately 44.07 miles between the Susquehanna 500 kV Substation in Salem Township, Luzerne County, and the Lackawanna 500-230-69 kV Substation in Blakely Borough, Lackawanna County. A one-line diagram and an aerial map of the existing system are provided in Figures 1-1 and 1-2, respectively.

Upon Commission approval, the Power Plant will be interconnected to the PPL Electric transmission system by: (i) constructing two 0.1-mile single-circuit 500 kV transmission lines between the existing Susquehanna-Lackawanna 500 kV Transmission Line and the newly constructed Shickshinny 500 kV Switchyard; and (ii) constructing a 0.3-mile single-circuit 500 kV transmission line from the Shickshinny 500 kV Switchyard to the dead-end structure located at the Power Plant switchyard. A one-line diagram and an aerial map of the proposed system are provided in Figures 1-3 and 1-4, respectively.

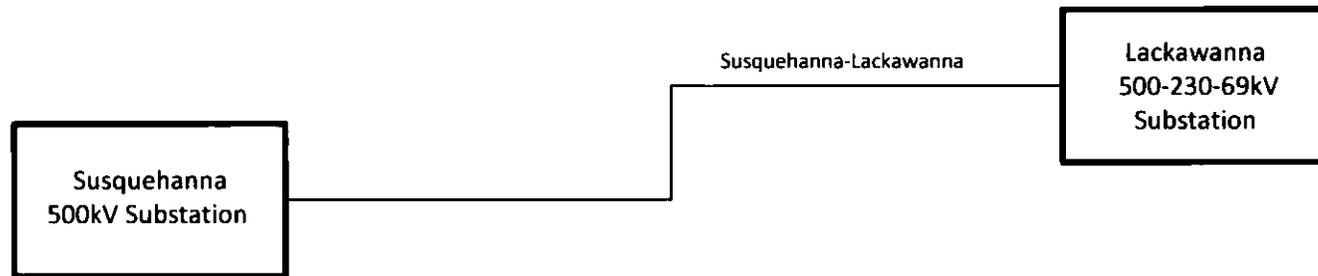
The two 0.1-mile single-circuit transmission lines will re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the newly constructed Shickshinny 500 kV Switchyard, and form the new Susquehanna-Shickshinny 500 kV Transmission Line and new Shickshinny-Lackawanna 500 kV Transmission Line. These new single-circuit 500 kV transmission line will be located entirely on right-of-way granted by Moxie Freedom. This segment of the Project will be built, owned, and operated by PPL Electric. PPL Electric is therefore seeking Commission approval for the siting and construction of the two new 0.1-mile single-circuit Susquehanna-Shickshinny and Shickshinny-Lackawanna 500 kV Transmission Lines.

The 0.3-mile single-circuit transmission line will connect the Shickshinny 500 kV Switchyard with the Power Plant, and will be referred to as the Shickshinny-Freedom 500 kV Transmission Line. This new 500 kV transmission line will be located entirely on right-of-way granted by Moxie Freedom. Under the ICSA, this segment of the Project will be constructed by Moxie Freedom. Upon completion and receipt of all necessary approvals and permits, the Shickshinny-Freedom 500 kV Transmission Line will be owned and operated by PPL Electric. PPL Electric is therefore seeking Commission approval for the siting and construction of the new 0.3-mile single-circuit Shickshinny-Freedom 500 kV Transmission Line.

The estimated cost to design and construct the approximately 0.4-miles of new 500 kV transmission lines necessary to interconnect the Power Plant with the electric grid is approximately \$10 million. The entire cost of the Project will be paid for by Moxie Freedom.

The Power Plant is scheduled to begin commercial operations on May 1, 2018. Therefore, PPL Electric respectfully requests that the Commission consider this Letter of Notification on an expedited basis.

Figure 1-1 Functional One Line Diagram of Existing System

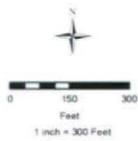


LUZERNE COUNTY  
Salem, PA



Imagery: 2015 NAIP, 30m Resolution

- Existing Structure
- Existing Susquehanna-Lackawanna 500kV Line



Shickshinny and Freedom  
500kV Tie-In Project

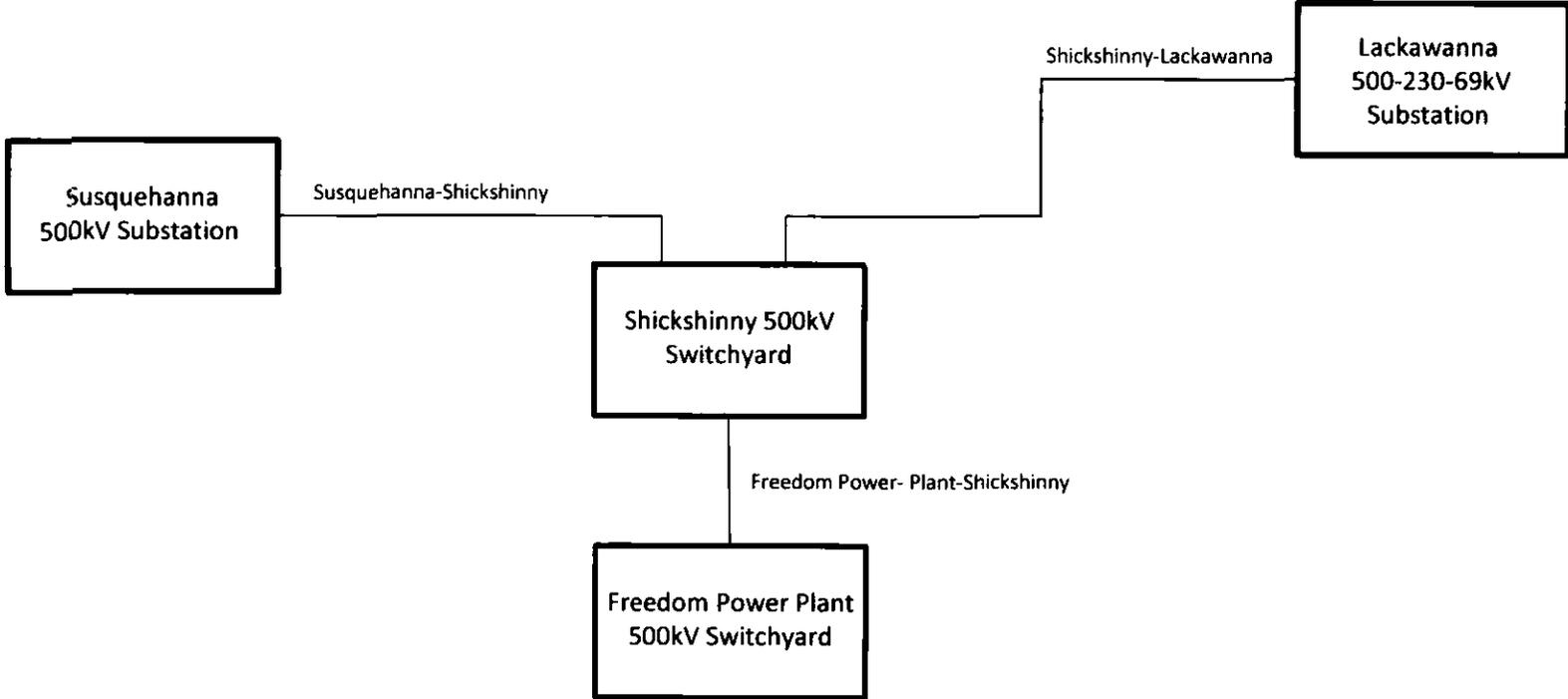
Figure 1-2  
Existing Facilities Aerial



Print Date: 09/2016

Figure 1-3 Functional One Line Diagram of Proposed System

— existing  
- - - new



Structure Number	Stake Description	X Easting (ft)	Y Northing (ft)	Longitude (deg)	Latitude (deg)
1	Pole Center	2407294.957	349194.591	-76.15747309500	41.11400311930
2L	Left Pole Center	2407422.799	349303.097	-76.15700198040	41.11429442880
2R	Right Pole Center	2407463.450	349289.084	-76.15685541120	41.11425392270
3	Pole Center	2407416.840	349606.951	-76.15700331920	41.11512855880

LUZERNE COUNTY  
Salem, PA



Imagery: 2015 NAIP, 30m Resolution

<ul style="list-style-type: none"> <li><span style="color: orange;">●</span> Existing Structure</li> <li><span style="color: yellow;">●</span> Proposed Structure</li> <li><span style="color: orange;">---</span> Existing 500kV Line</li> <li><span style="color: yellow;">---</span> New Single-Circuit 500kV Line</li> </ul>	<ul style="list-style-type: none"> <li><span style="border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> Freedom 500kV Switchyard</li> <li><span style="border: 1px solid blue; display: inline-block; width: 20px; height: 10px;"></span> Shickshinny 500kV Switchyard</li> </ul>	<p>0 150 300 Feet 1 inch = 300 Feet</p>	<p><b>Shickshinny and Freedom 500kV Tie-In Project</b></p> <p><b>Figure 1-4 Proposed Facilities Aerial</b></p> <p> </p> <p>Print Date: 8/9/2016</p>
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**Attachment**

**2**

**ATTACHMENT 2**  
**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT**

**ENGINEERING DESCRIPTION**

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Figure 2-1	Typical Single Circuit Tubular Steel Pole Structure
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**ATTACHMENT 2**  
**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT**  
**ENGINEERING DESCRIPTION**

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**A. DESCRIPTION OF THE PROPOSED ALIGNMENT**

As explained in Attachment 1, PPL Electric Utilities Corporation ("PPL Electric") seeks approval from the Pennsylvania Public Utility Commission ("Commission" or "PUC") to construct three new single-circuit 500 kV transmission lines to interconnect the Freedom Gas-Fired Power Plant ("Power Plant") to be constructed by Moxie Freedom LLC ("Moxie Freedom"), an independent power producer (hereinafter, the "Project"). The Project is necessary to interconnect the planned Power Plant with the electric grid.

Pursuant to the PJM approved interconnection process described in Attachment 1, PPL Electric proposes, upon Commission approval, to re-terminate the existing Susquehanna-Lackawanna 500 kV Transmission Line into the new Shickshinny 500 kV Switchyard. To do this, PPL Electric proposes to construct two new 0.1-mile single-circuit 500 kV transmission lines between the existing Susquehanna-Lackawanna 500 kV Transmission Line and the Shickshinny 500 kV Switchyard. Each new 0.1-mile 500 kV transmission line will require four new tower structures.

Under the Interconnection Construction Service Agreement described in Attachment 1, Moxie Freedom will construct a new 0.3-mile single-circuit transmission line between the Shickshinny 500 kV Switchyard and the dead-end structure at the Power Plant switchyard. The new 0.3 mile 500 kV transmission line will require four new tower structures.

All new tower structures will be self-supported and either direct embedded or installed on concrete caisson foundations. The new tower structures are expected to range between 130 and 195 feet, with an average height of 165 feet above ground level. A depiction of the type of monopoles used for this Project is provided at the end of this Attachment (see Figure 2-1).

The three new transmission lines will be designed and constructed for 500 kV single-circuit capabilities. The 500 kV single-circuit design will utilize three power conductors and 2 overhead ground wires. The power conductors will be triple bundle 1590 kcmil<sup>2</sup> 45/7 ACSR<sup>3</sup> conductors. The overhead ground wires will be 0.752", 48-fiber count single mode fiber optical ground wires and will provide lightning protection and communication between circuit breakers that remove the line from service should a fault in the line be detected.

The new Susquehanna-Shickshinny, Shickshinny-Lackawanna and Shickshinny-Freedom 500 kV Transmission Lines will be designed to meet, and generally exceed, National Electrical Safety Code ("NESC") minimum standards. Design specifications and safety rules practiced by PPL Electric are included in Attachment 4. The minimum conductor to ground clearance for the proposed 500 kV lines will be 53 feet.

## **B. MAGNETIC FIELD MANAGEMENT**

PPL Electric's Magnetic Field Management Program is applied to new and reconstructed transmission line projects. PPL Electric 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 the use of reverse phasing of new double-circuit lines where it is feasible to do so at low or no cost.

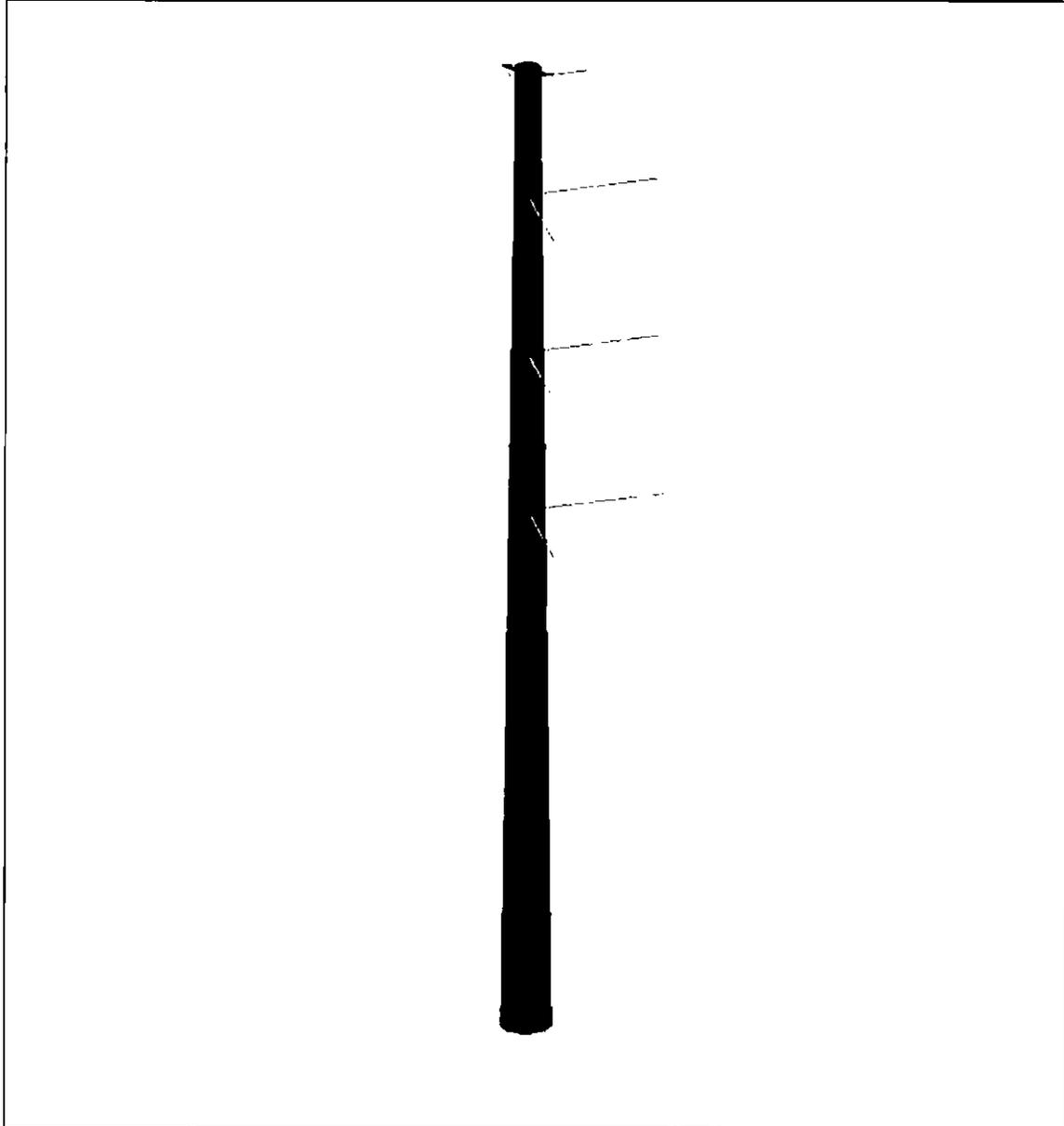
Because the three new 500 kV transmission lines will be single-circuits, reverse phasing will not be possible. However, Consistent with its Magnetic Field Management Program, PPL Electric will construct the new 500 kV transmission lines to maintain existing ground clearances that are a minimum of 24.6 feet higher than the required NESC minimum ground clearance for 500kV lines. This will help mitigate the potential for exposure to magnetic fields.

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<sup>2</sup> Kcmil stands for thousand circular mils. 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.

<sup>3</sup> ACSR stands for aluminum conductor steel reinforced.

Before the Pennsylvania Public Utilities Commission  
SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT  
ATTACHMENTS IN SUPPORT OF THE  
LETTER OF NOTIFICATION



**Figure 2-1 – Typical Single Circuit Tubular Steel Pole Structure**

**Attachment**

**3**

**ATTACHMENT 3**  
**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT**

**DESCRIPTION OF THE RIGHT-OF-WAY**

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Figure 3-1      Site Location Constraints Map

**ATTACHMENT 3**  
**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT**

**DESCRIPTION OF THE RIGHT-OF-WAY**

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**A. INTRODUCTION**

As explained in Attachment 1, PPL Electric Utilities Corporation (“PPL Electric”) is requesting Pennsylvania Public Utility Commission (“PUC” or the “Commission”) approval to construct three new single-circuit 500 kV transmission lines to interconnect the Freedom Gas-Fired Power Plant (“Power Plant”) to be constructed by Moxie Freedom LLC (“Moxie Freedom”), an independent power producer (hereinafter, the “Project”). The proposed Project is located in Salem Township, Luzerne County, Pennsylvania. The Project is necessary to interconnect the planned Power Plant with the electric grid.

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

Upon Commission approval, two new 0.1-mile single-circuit 500 kV transmission lines will be constructed between PPL Electric’s existing Susquehanna-Lackawanna 500 kV Transmission Line and the new Shickshinny 500 kV Switchyard. These new 500 kV transmission lines will be located entirely within a right-of-way across property owned in fee by Moxie Freedom. No additional rights-of-way are required for this segment of the Project.

In addition, a third new 0.3 mile single-circuit 500 kV transmission line will be constructed between the Shickshinny 500 kV Switchyard and the dead-end structure at the Power Plant switchyard. This new 500 kV transmission line will be located entirely within a right-of-way across property owned in fee by Moxie Freedom. No additional rights-of-way are required for this segment of the Project.

Aerial maps showing existing and proposed conditions are provided in Figures 1-2 and 1-4 at the end of Attachment 1.

### C. LAND USE AND ENVIRONMENTAL

Impacts to land use are anticipated to be minimal. The project site is zone I-3 Special Industrial District, and it was chosen because there is an existing high voltage transmission line system and an existing interstate gas transmission system at the project site. The current land use is cropland and open fields, with no 100-year floodplains or critical environmental habitats. The site is bounded on the south by Mingle Inn Road, on the west by PPL Electric's existing Susquehanna-Lackawanna 500 kV Transmission Line, on the north by the Transco interstate natural gas transmission line owned by Williams Partners, L.P., and on the east by cropland and open fields. Although areas of Prime Farmland are located to the south near the Power Plant, the Project will have no impact to these areas. Impacts to land use have been minimized by siting the project away from populated areas in a location where infrastructure currently exists and by avoiding environmental impacts. See Figure 3-1, Site Location Constraints Map.

Existing pipelines owned by Transcontinental Gas Pipe Line Corp. ("Transco") will be crossed by the new single 500 kV transmission line that extends between the Shickshinny 500 kV Switchyard and the Power Plant. Moxie Freedom is coordinating with Transco regarding the proposed pipelines crossing. No other utilities will be affected by the Project.

The closest airports include: public airports Benton (approximately 13.4 miles west of the Project area) and Hazleton Municipal Airports (located approximately 12.1 miles northwest of the Project area); and private airports Sutcliffe Private Airport (located approximately 6.1 miles west of the Project area), Double D Sky ranch Airport (located approximately 8.8 miles northwest of the Project area), Seesholtz Airport (located approximately 11.4 miles northeast of the Project area), Broadt Personal Use Airport (located approximately 14.3 miles north of the Project area), and McDonald's Airport (located approximately 15.6 miles west of the Project area). PPL Electric does not anticipate any interference with airport operations because the Project is located in an area where there are existing electrical facilities and because the new facilities will be a similar height as 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.

In consultation with the Pennsylvania Historical and Museum Commission ("PHMC"), cultural resource studies were completed for the entire Power Plant project, including the switchyard areas and transmission line corridor (*i.e.*, including the Project area). The PHMC Bureau for Historic Preservation cleared the project on April 14, 2015 (File No. ER#2014-1528-079-G), concluding that no impacts to cultural resources are anticipated and, therefore, no additional consultation for the Project is required.

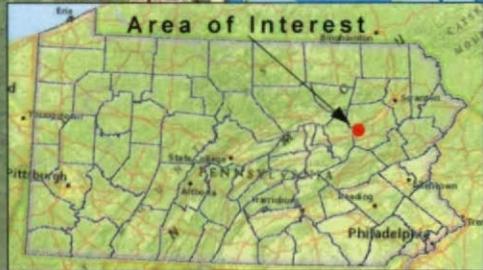
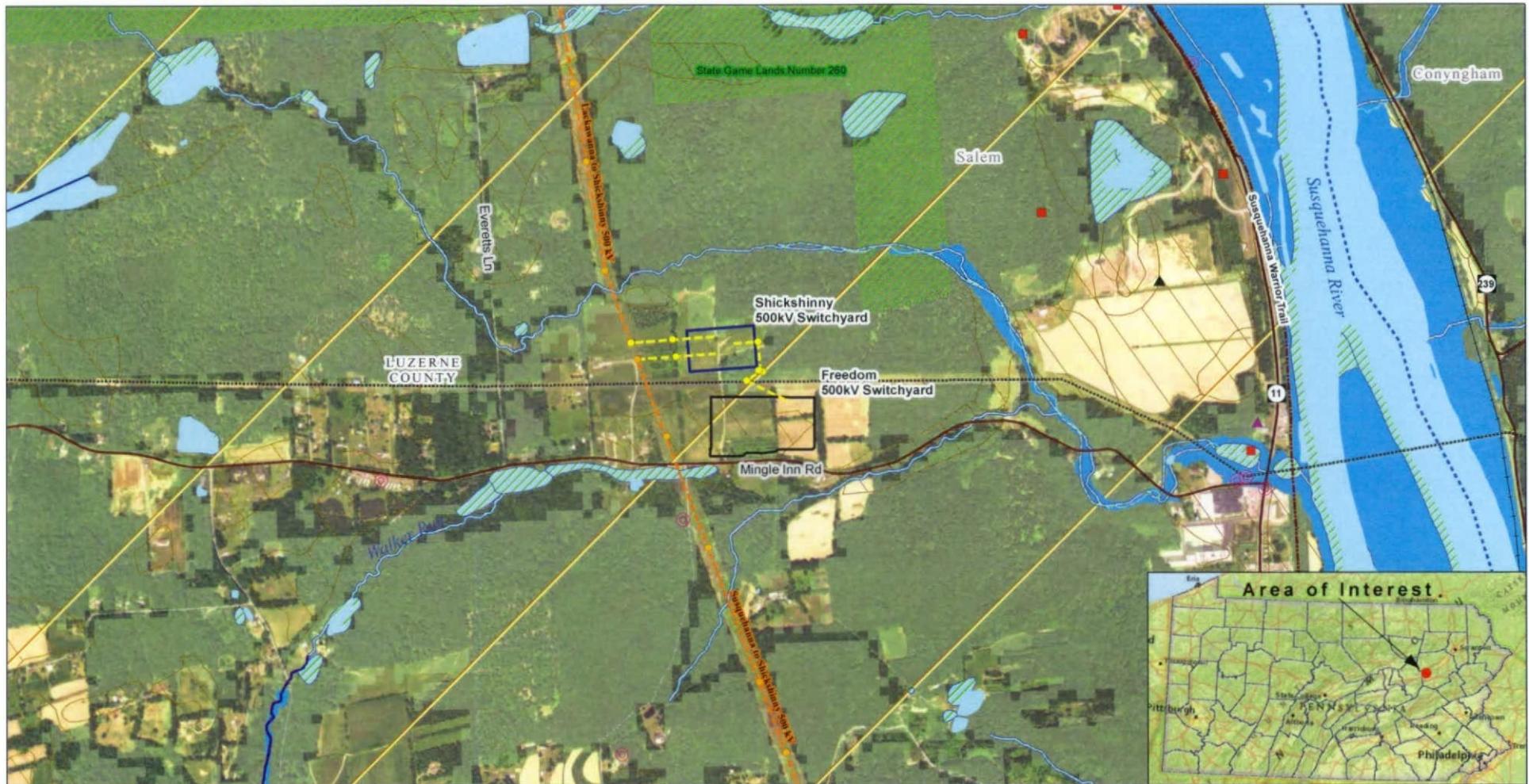
The Project will not affect any unique geological, scenic or natural areas; and there are no state lands, national parks, state parks, local parks, recreational areas or natural landmarks located within the project area.

PPL Electric will confirm total anticipated impacts, obtain permits and other authorizations from the County Conservation District, Pennsylvania Department of Environmental Protection and the United States Army Corps of Engineers, as needed, and will comply with all of the terms and conditions placed on those permits or authorizations. PPL Electric also will comply with soil erosion and sedimentation control permits, as needed, and will comply with any conditions placed on those permits.

PPL Electric has been coordinating with state and federal agencies to obtain information regarding threatened and endangered species within or in close proximity to the project area. In September 2015, PPL Electric reviewed the Pennsylvania Natural Diversity Inventory ("PNDI") 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. Based on this review, potential impacts to threatened and endangered species and/or special concern species and resources may be avoided by observing time of year restrictions on construction. Specifically, all tree clearing will take place between November 15 and March 31 only. No other impacts are anticipated and the above agencies have confirmed no additional consultation is required.

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

The Project is being completed on Moxie Freedom's property owned in fee. Most of these areas currently are cleared of vegetation; however, some additional tree clearing may be required for the construction of the three proposed 500 kV transmission lines. In areas where vegetation management is required to complete the Project, PPL Electric will apply its "*Specifications for Transmission Vegetation Management LA-79827*" to mitigate any impacts.



Legend	Transportation	Existing Utilities/Mining	Land Use	Hydrologic	Environmental/Biological	Political/Land Cover
<ul style="list-style-type: none"> <li>Proposed Structure</li> <li>New Single-Circuit 500kV Line</li> </ul>	<ul style="list-style-type: none"> <li>Local Road</li> <li>State Road</li> <li>Railroad</li> </ul>	<ul style="list-style-type: none"> <li>Mineral Quarry</li> <li>Ground Water Withdrawal-Mineral Use</li> <li>Existing Structure</li> <li>Existing 500kV Line</li> <li>Natural Gas Pipeline</li> </ul>	<ul style="list-style-type: none"> <li>DCNR Rail Trail</li> <li>Prime Farmland</li> </ul>	<ul style="list-style-type: none"> <li>Perennial</li> <li>Stream (303d)</li> <li>Waterbody</li> <li>NWI Wetland</li> <li>100-Year Floodplain</li> </ul>	<ul style="list-style-type: none"> <li>EPA Facility Registry Service Facility</li> <li>Superfund Site</li> <li>Trout Natural Reproduction Stream</li> <li>Indiana Bat Range</li> </ul>	<ul style="list-style-type: none"> <li>County Boundary</li> <li>NLCD Forested Area</li> <li>State Game Land</li> </ul>



**Shickshinny and Freedom 500kV Tie-In Project**

**Figure 3-1 Location Constraints**

**Attachment**

**4**

**ATTACHMENT 4**

**SHICKSHINNY AND FREEDOM 500 kV TIE-IN PROJECT  
DESIGN CRITERIA AND SAFETY PRACTICES**

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**ATTACHMENT 4**  
**SHICKSHINNY AND FREEDOM 500kV TIE-IN PROJECT**

**DESIGN CRITERIA AND SAFETY PRACTICES**

---

**A. DESIGN CRITERIA AND SAFETY PRACTICES**

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 Electric") 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 Electric's 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 Electric 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 Electric 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 Electric 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 Electric lines are designed to operate safely and reliably during inclement weather even more severe than assumed by the NESC. In addition, PPL Electric's transmission lines are designed with more clearance to the ground than required by the NESC. The tables below compare PPL Electric and NESC ground clearances for lines of various voltages.

**138kV**

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Electric 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	29 Ft.	32 Ft.

**230kV**

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Electric 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.	34 Ft.

**500kV**

Vertical Clearance to Ground

<u>Surface Underneath Conductors</u>	<u>NESC Standard</u>	<u>PPL Electric 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	36 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 Electric 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.