

CAPTION SHEET

CASE MANAGEMENT SYSTEM

1. REPORT DATE: 00/00/00	:	
2. BUREAU: FUS	:	
3. SECTION(S):	:	
5. APPROVED BY:	:	4. PUBLIC MEETING DATE:
DIRECTOR:	:	00/00/00
SUPERVISOR:	:	
6. PERSON IN CHARGE:	:	7. DATE FILED: 07/17/06
8. DOCKET NO: A-110500 F0379	:	9. EFFECTIVE DATE: 00/00/00

PARTY/COMPLAINANT: MONTOUR-SUNBURY 230 KV LINE, UNITED ST

RESPONDENT/APPLICANT: PPL ELECTRIC UTILITIES CORP

COMP/APP COUNTY:

UTILITY CODE: 110500

ALLEGATION OR SUBJECT

LETTER OF NOTIFICATION OF PPL ELECTRIC UTILITIES CORPORATION FILED PURSUANT TO 52 PA CODE CHAPTER 57 SUBCHAPTER G WITH RESPECT TO THE RELOCATION OF THE MONTOUR-SUNBURY 230 KV LINE FOR THE UNITED STATES GYPSUM COMPANY.

**DOCKETED**  
JUL 18 2006

**DOCUMENT  
FOLDER**



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File #: 2507-129711

July 17, 2006

VIA HAND DELIVERY

James J. McNulty  
Secretary  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street, 2nd Floor North  
PO Box 3265  
Harrisburg, PA 17105-3265

ORIGINAL

SECRETARY'S BUREAU  
2006 JUL 17 AM 3:46

**RE: Letter of Notification of PPL Electric Utilities Corporation Filed Pursuant to 52 Pa. Code Chapter 57 Subchapter G With Respect to the Relocation of the Montour-Sunbury 230 kV Line for the United States Gypsum Company - Docket No. A- 110500 F0379**

Dear Secretary McNulty:

Enclosed, for filing, are the original and six (6) copies of the Letter of Notification of PPL Electric Utilities Corporation Filed Pursuant to 52 Pa. Code Chapter 57 Subchapter G with Respect to the Relocation of the Montour-Sunbury 230 kV Line for the United States Gypsum Company, together with seven (7) copies of the accompanying exhibits and appendices which are contained in a separately-bound volume.

As indicated in the enclosed certificate of service, copies of the Letter of Notification and accompanying exhibits and appendices are being served by certified mail, return receipt requested upon all affected land owners and involved governmental agencies and municipalities. If there are any questions concerning this matter, please contact me at the addresses or telephone numbers provided above.

Respectfully submitted,

John H. Isom

JHI/jl

Enclosures

cc: Certificate of Service

DOCKETED DOCUMENT FOLDER  
JUL 18 2006

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BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DOCKETED  
JUL 18 2006

2006 JUL 17 AM 3:46  
PPL ELECTRIC UTILITIES CORPORATION'S SUBMITTAL

Re: Letter of Notification of PPL Electric Utilities Corporation Filed Pursuant To 52 Pa. Code Chapter 57 Subchapter G With Respect To The Relocation of The Montour-Sunbury 230 kV Line For The United States Gypsum Company :

Docket No. A- 110500 FO379

ORIGINAL

LETTER OF NOTIFICATION

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

1. This Letter of Notification is filed by PPL Electric Utilities Corporation ("PPL Electric"), pursuant to 52 Pa. Code §57.72(d)(1), to request the Pennsylvania Public Utility Commission's ("Commission") approval for the relocation of a portion of the existing Montour – Sunbury 230 kV Transmission Line. The purpose of the relocation is to accommodate the construction by the United States Gypsum Company of a wallboard manufacturing facility on a tract of land which presently is bisected by the Transmission Line. The estimated cost to design and relocate a section of the existing Montour – Sunbury 230 kV Transmission Line is approximately \$2,200,0000, which will be borne by the United States Gypsum Company.

2. Accompanying this Letter of Notification is a separately bound volume containing Exhibits A through C and Appendices A through D, which provide additional information about the project. This Letter of Notification and the accompanying Exhibits and Appendices, which are incorporated herein by reference, contain all of the information required by 52 Pa. Code § 57.72(d)(4).

3. The name and address of the Applicant are:

DOCUMENT  
INDEX

PPL Electric Utilities Corporation  
Two North Ninth Street  
Allentown, Pennsylvania 18101

4. PPL Electric is a Pennsylvania corporation, which provides electric distribution and provider of last resort electric supply services, subject to the Commission's regulatory jurisdiction, to approximately 1.3 million customers in all or portions of twenty-nine counties in eastern and central Pennsylvania.

5. The names, addresses and telephone numbers of PPL Electric's attorneys are:

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

7. 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). This transmission line siting and construction proceeding qualifies for use of a Letter of Notification because the relocated Transmission Line is less than two miles. Specifically, the existing Transmission Line to be relocated is approximately one half mile or 2,640 feet in length and will be replaced by 3,679 feet of Transmission Line. Further, the existing Transmission Line that will be relocated is and the new Transmission Line will be located entirely on land subject to a long term lease held by the United States Gypsum Company.

8. As indicated previously, the relocated section of Transmission Line will be approximately 3,679 feet in length. It will be supported by 9 single-shaft weathering steel poles installed on concrete foundations. Three power conductors and one overhead ground wire will be installed. The functionality of the Transmission Line will not be changed by the relocation.

9. The relocation of a section of the 230 kV Montour – Sunbury Transmission Line Construction of the modification to the Montour-Sunbury 230 kV line is scheduled to begin in November, 2006, with an in service date of May, 2007.

10. The Necessity Statement for the project is provided as Exhibit A to this Letter of Notification.

11. The project will be designed, constructed, operated and maintained in a manner that meets or surpasses National Electrical Safety Code (“NESC”) standards and all applicable legal requirements. The proposed project will not create an unreasonable risk of danger to the public health or safety. Descriptions of NESC standards and PPL Electric’s Design Criteria and Safety Practices are set forth in Appendix A to the accompanying exhibits.

12. The Engineering Description of the project is provided in Exhibit "B" to this Letter of Notification.

13. As previously explained, the relocated section of the Transmission Line will be located entirely on property being leased by the United States Gypsum Company for its new wallboard production facility and is adjacent to the Montour Steam Electric Station.

Transmission Lines are required facilities at power plants and are considered compatible with industrial land uses. Therefore, there will be no additional impact on existing land use.

14. No nearby railroads, communication towers, pipelines or other utilities will be affected by the proposed project. The nearest aviation facility is the Danville Airport which is located 8.3 miles from the project's location.

15. The increased height of the new transmission line is lower than the height of the Montour Steam Electric Station's smoke stacks and cooling towers and will pose no threat to flight operations.

16. The United States Gypsum Company is currently performing archaeological investigations required by the Pennsylvania Historical and Museum and Commission ("PHMC") before starting construction of its facility. PHMC has informed PPL Electric that the studies being performed by the United States Gypsum Company will satisfy PPL Electric's archaeological review obligations since the proposed relocated Transmission Line is to be located adjacent to the new wallboard plant.

17. Based upon a review of relevant registries of historic landmarks, districts and properties, there are several structures of historical interest in the vicinity of the project. The project, however, will have no impact on these structures due to its small scope and its location which is adjacent to the existing power plant.

18. The project will not affect any unique geological, scenic or natural areas. No National Natural Landmarks, parks, or recreational facilities are located near the project area. The relocated Transmission Line was positioned to avoid, to the extent possible, the several wetlands found in close proximity to the project and any impacts to wetlands will be minimal. PPL Electric will employ its “Specification for Soil Erosion and Sedimentation control on Transmission line rights-of-Way” as appropriate. All required permits will be obtained prior to the start of construction.

19. United States Gypsum Company, as a prerequisite to construction of their wallboard facility, has coordinated with state and federal agencies to obtain information regarding endangered and threatened species that could occur at the project location and has shared that information with PPL Electric. The agencies report that, except for occasional transient species of wildlife, no threatened or endangered plant or animal life is found in the project area. Therefore, no threatened or endangered plant or animal species will be affected by the project.

20. The Environmental Assessment for the project is provided as Exhibit “C” to this Letter of Notification.

21. Appendix B to this Letter of Notification explains PPL Electric’s standards for Magnetic Field Management.

22. Appendix C to this Letter of Notification is a list of property owners within PPL Electric’s transmission line right-of-way. As shown there, the project is situated entirely on land leased by the United States Gypsum Company. The only additional right-of-way required for the project will be obtained from the United States Gypsum Company as lessee and from PPL Montour, LLC and PPL Generation, LLC record owners and lessors of the land.

23. The proposed project was reviewed with Derry Township and Montour County, and neither the Township nor the County has any objection. A list of involved governmental agencies, municipalities and other public entities is presented in Appendix D.

24. A copy of this Letter of Notification is being served in accordance with 52 Pa. Code §57.72(d)(3).

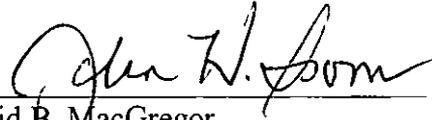
25. As soon as practicable after the filing of this Letter of Notification, PPL Electric will publish notice of the filing in newspapers of general circulation in the area of the proposed project. Such notice will contain: (a) the date this Letter of Notification was filed with the Commission; (b) a brief description of the project and its location; (c) locations where the complete Letter of Notification may be reviewed by the public; and (d) an instruction that the interested parties should contact, within 15 days, James J. McNulty, Secretary, at the Commission's Harrisburg address.

26. 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.* If the Commission does not approve this Letter of Notification, the Commission's Order shall direct PPL Electric to file for approval to construct the proposed project pursuant to the Commission's formal certification regulations.

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Commission approve the relocation of a section of the 230 kV Montour – Sunbury Transmission

Line as proposed herein.

Respectfully submitted,



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Of Counsel:

Post & Schell, P.C.

Date: July \_\_, 2006

Attorneys for PPL Electric Utilities  
Corporation



ORIGINAL

ORIGINAL



Before the  
Pennsylvania Public Utility Commission

DOCKETED  
JUL 18 2006

**Montour – Sunbury  
230 kV Line Relocation  
For United States  
Gypsum Company**

DOCUMENT  
FOLDER

SECRETARY'S BUREAU

2005 JUL 17 AM 3:46

**Letter of Notification**

Application Docket No. A-110500 F0379

Submitted by: PPL Electric Utilities Corp.

## SUMMARY

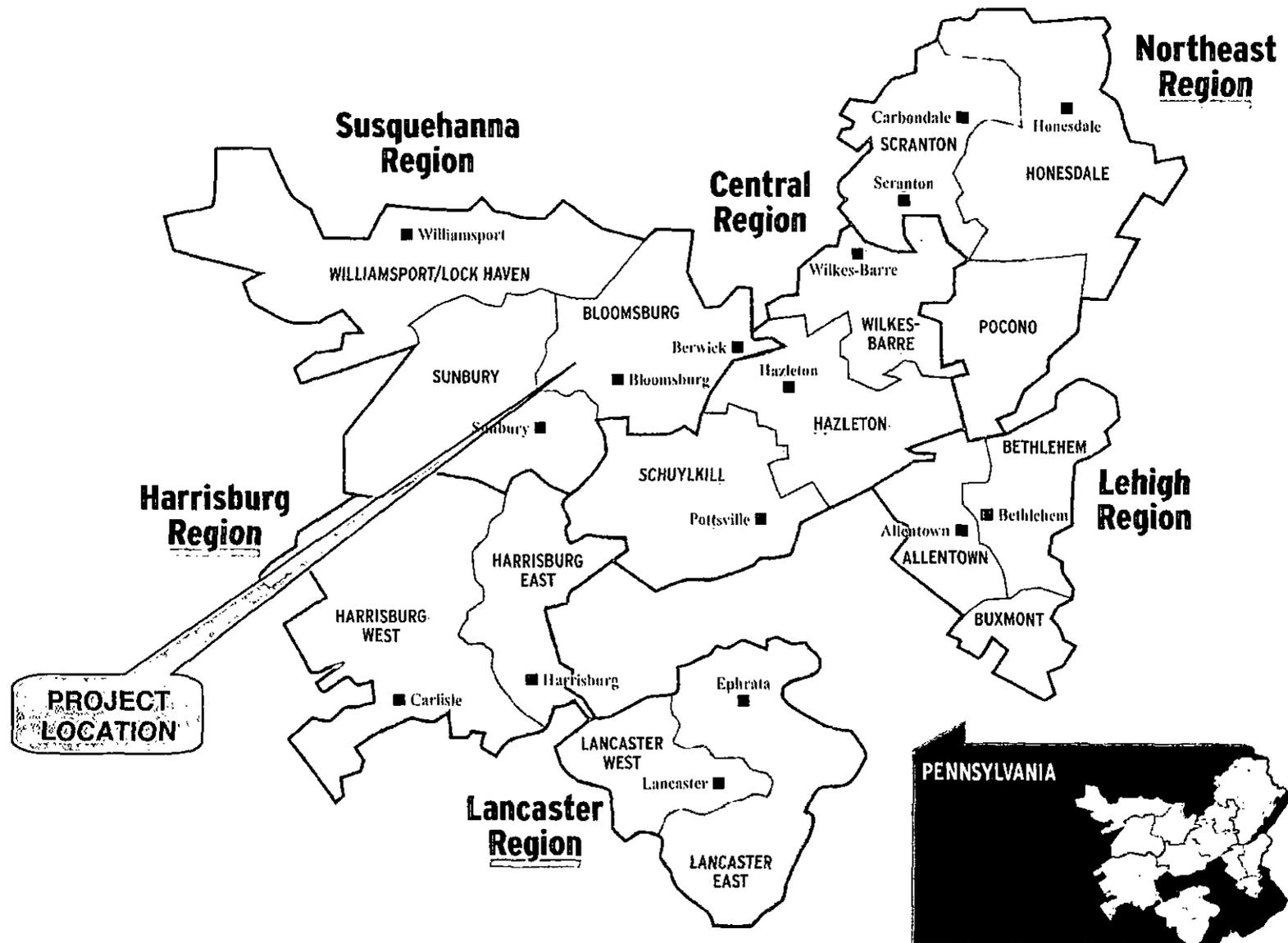
This filing is submitted by PPL Electric Utilities Corporation (PPL EU) pursuant to the Pennsylvania Public Utility Commission's (PUC or the Commission) regulations at 52 Pa. Code §§57.71 through 57.77 for PUC approval to relocate a section of the existing Montour – Sunbury 230 kV Transmission Line. The relocation is required to allow room for United States Gypsum Company (USG) to construct a wallboard manufacturing facility.

*The estimated cost to design and relocate a section of the existing Montour – Sunbury 230 kV Transmission Line is \$2,200,000 and will be borne by USG. Construction is scheduled to begin in November 2006 to support a May 2007 in-service date.*

This document, which describes the need for the project and discusses the engineering and siting analysis for the proposed construction, consists of the following exhibits and appendices:

- Exhibit "A" - Necessity Statement
- Exhibit "B" - Engineering Description
- Exhibit "C" - Environmental Assessment
  
- Appendix A - PPL Design Criteria and Safety Practices
- Appendix B - Magnetic Field Management at PPL
- Appendix C - List of Property Owners Within the Proposed Right-of-Way
- Appendix D - List of Involved Governmental Agencies, Municipalities, and Other Public Entities

# PPL ELECTRIC UTILITIES SERVICE TERRITORY



**EXHIBIT "A"**  
**MONTOUR – SUNBURY 230 kV LINE RELOCATION**  
**NECESSITY STATEMENT**

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**TABLE OF CONTENTS**

<b><u>ITEM</u></b>	<b><u>TOPIC</u></b>	<b><u>PAGE</u></b>
--	NECESSITY STATEMENT.....	1
FIGURE 1	FUNCTIONAL ONE-LINE DIAGRAM.....	2
MAP 1	PPL SYSTEM MAP.....	EXHIBIT "A" MAP POCKET

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**EXHIBIT "A"**  
**MONTOUR – SUNBURY 230 kV LINE RELOCATION**  
**NECESSITY STATEMENT**

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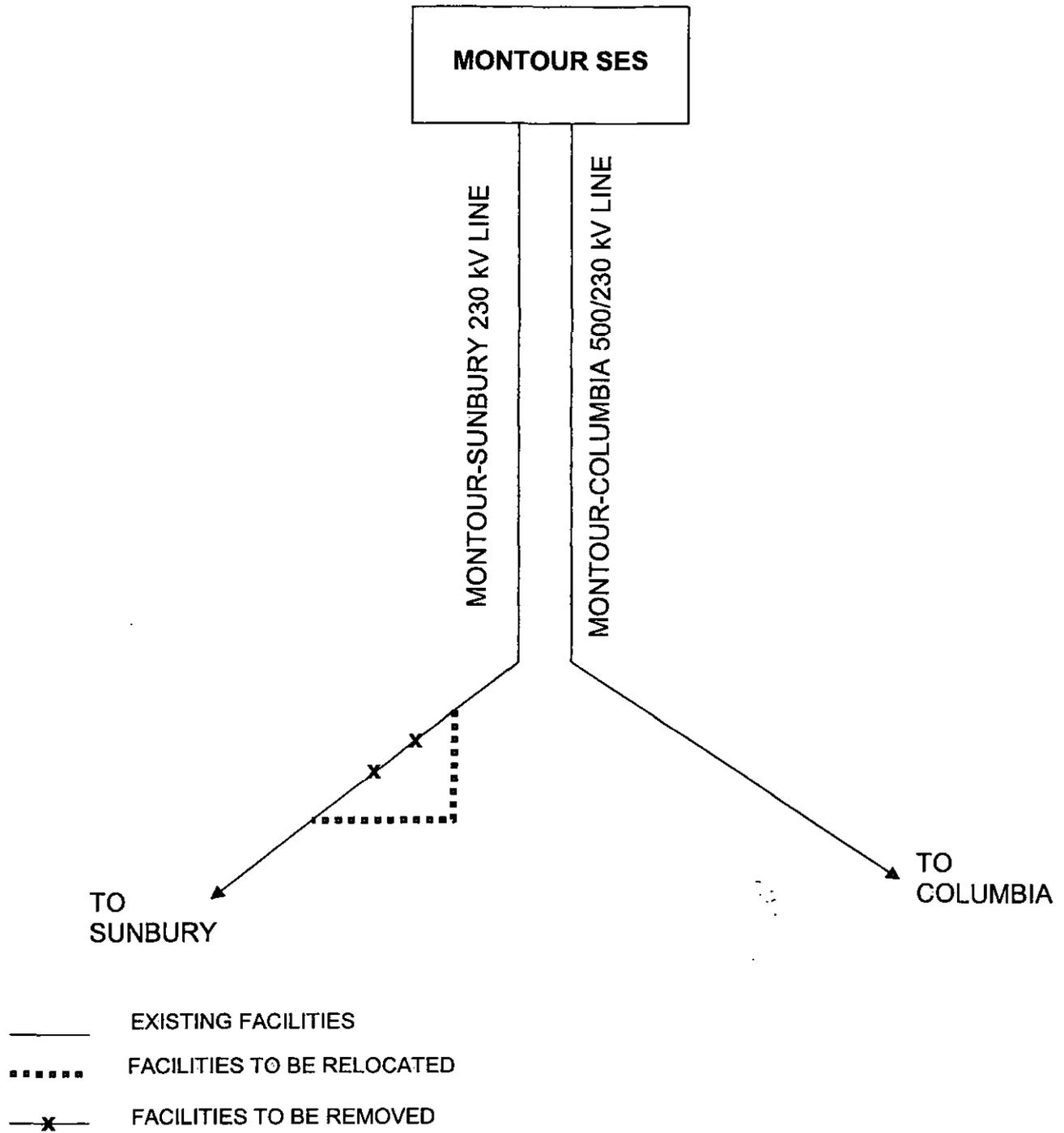
USG manufactures gypsum board from synthetic and natural gypsum. USG is constructing a new manufacturing facility in Derry Township, Montour County. The new USG facility is to be located on property bisected by the Montour – Sunbury 230 kV Transmission Line. In order to provide adequate land for the new wallboard facility, PPL EU must relocate an approximate 2,640 feet of the Montour – Sunbury 230 kV Transmission Line. The proposed modification will not change the functionality of the transmission system as shown in Figure 1 at the end of Exhibit "A".

The estimated cost to design and relocate the existing lines is approximately \$2,200,000. This cost will be paid by USG. Construction is scheduled to begin in November 2006 and be completed by May 2007.

A PPL system map showing transmission facilities with a design voltage of 35 kV or greater is included in the Exhibit "A" map pocket. This filing addresses only the existing and proposed 230 kV regional transmission system in the Derry Township area.

FIGURE 1

FUNCTIONAL 1-LINE DIAGRAM FOR THE  
MONTOUR – SUNBURY 230 kV LINE RELOCATION





**EXHIBIT "B"**  
**MONTOUR – SUNBURY 230 kV LINE RELOCATION**  
**ENGINEERING DESCRIPTION**

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**TABLE OF CONTENTS**

<b><u>SECTION</u></b>	<b><u>TOPIC</u></b>	<b><u>PAGE</u></b>
A.	DESCRIPTION OF PROPOSED PROJECT.....	1
B.	MAGNETIC FIELD MANAGEMENT.....	3
C.	RIGHT-OF-WAY STATUS.....	3

**LIST OF TABLES**

TABLE 1	DESIGN MINIMUM CONDUCTOR CLEARANCES.....	2
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**MAP**

MAP 1	AERIAL EXHIBIT.....	EXHIBIT "B" MAP POCKET
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SECRETARY'S OFFICE  
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**EXHIBIT "B"**  
**MONTOUR – SUNBURY 230 kV LINE RELOCATION**  
**ENGINEERING DESCRIPTION**

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**A. DESCRIPTION OF PROPOSED PROJECT**

PPL proposes to relocate approximately 2,640 feet of double circuit 230 kV transmission line (only one circuit presently installed) to permit construction of a wallboard manufacturing plant operated by USG. The proposed relocation is located in Derry Township, Montour County.

The proposed relocated line section will be approximately 3,679 feet long. It will consist of 9 single-shaft weathering steel poles installed on concrete foundations. Like the present facilities, the line will be constructed for future double circuit operation, however, initially only three power conductors and one overhead ground wire (OHGW) will be installed. The conductors will be 1590 KCMIL 45/7 stranding ACSR and the OHGW will be 3/8-inch high strength steel. The existing 2,640 foot line section will be removed to allow enough room for the manufacturing facility.

The new relocated section of 230 kV line will be designed to and will generally exceed National Electrical Safety Code Standards. Design specifications and safety rules practiced by PPL are included in Appendix A. The minimum conductor-to-ground clearance will be 32 feet, which occurs at a maximum thermal conductor temperature of 125°C. The designed minimum conductor clearances and conductor thermal ratings are as follow:

**TABLE 1**  
**DESIGN MINIMUM CONDUCTOR CLEARANCES**  
**FOR 1590 KCMIL 45/7 STRANDING ACSR\***

<u>Condition</u>	<u>Transmission Double-Circuit Design Clearance-to-Ground</u>
Normal load; average weather (16°C ambient temperature)	36.8 feet
Predicted extreme thermal load (125°C conductor temperature)	32.0 feet
Predicted extreme weather conditions (1-inch ice, 8 lbs. wind, -18°C)	37.0 feet

\*Clearances based on a maximum tension of 12,660 pounds and a ruling span of 500 feet.

**CONDUCTOR THERMAL RATING**  
**1590 KCMIL 45/7 STRANDING ACSR**  
**(257°F) 125°C MAXIMUM CONDUCTOR TEMPERATURE**

Condition	<u>Ambient Temperature °C</u>	<u>Wind Speed Knots</u>	<u>Ampacity Amps</u>
Summer Normal	35	0	1,640
Winter Normal	10	0	1,775
Summer Emergency	35	1 1/2	1,965
Winter Emergency	10	1 1/2	2,045

**B. MAGNETIC FIELD MANAGEMENT**

PPL's Magnetic Field Management Program, summarized in Appendix B, is applied to new and reconstructed transmission line projects. To reduce magnetic field exposures, the program generally prescribes the use of a line design that provides five feet higher ground clearance and reverse phasing of new double circuit lines where it is feasible to do so at low or no cost. The implementation of additional modifications will be considered, provided those modifications can be made at low or no cost.

Because this project involves the relocation of a section of future double circuit operation (currently operating as a single circuit line), reduction in the magnetic field by reverse phasing is not possible. However, pursuant to PPL's Magnetic Field Management Program, some reduction in magnetic field levels will be attained through the use of taller structures.

**C. RIGHT-OF-WAY STATUS**

Right-of-way for the proposed relocation will be provided by USG (Lessee) and PPL Montour LLC and PPL Generation LLC (Record Owners and Lessors). All agreements will be executed before construction begins.



**EXHIBIT "C"**  
**MONTOUR – SUNBURY 230 kV LINE RELOCATION**  
**ENVIRONMENTAL ASSESSMENT**

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**TABLE OF CONTENTS**

<b><u>SECTION</u></b>	<b><u>TOPIC</u></b>	<b><u>PAGE</u></b>
A.	INTRODUCTION.....	1
B.	LAND USE.....	1
C.	CULTURAL RESOURCES.....	2
D.	NATURAL FEATURES.....	2
E.	THREATENED AND ENDANGERED SPECIES.....	3

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**EXHIBIT "C"**  
**MONTOUR – SUNBURY 230 kV LINE RELOCATION**  
**ENVIRONMENTAL ASSESSMENT**

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**A. INTRODUCTION**

PPL EU is proposing to relocate approximately 2,640 feet of the Montour-Sunbury 230 kV Transmission Line to allow room for the construction of a wallboard manufacturing plant to be owned and operated by United States Gypsum Company. The route of the proposed relocation was determined by the site of the new plant and to minimize encroachment upon the extensive wetlands found in the area.

The proposed project was reviewed with Derry Township and Montour County, and neither the Township nor the County has any objection. A list of involved governmental agencies, municipalities and other public entities is presented in Appendix D.

**B. LAND USE**

The relocated section of transmission line will be located on property being leased by USG for their new wallboard production facility and is adjacent to PPL's Montour Steam Electric Station. Transmission lines are required facilities at power plants and are considered compatible with industrial land uses. Therefore, there will be no additional impact on existing land use.

No nearby railroads, communication towers, pipelines or other utilities will be affected by the proposed project. The nearest aviation facility is in Danville, 8.3 miles from the project location. The increased height of the line is lower than the

height of the Montour Steam Electric Station's smoke stacks and cooling towers and will pose no threat to flight operations.

**C. CULTURAL RESOURCES**

United States Gypsum Company is currently performing archaeological investigations required by PHMC before starting construction of their facility. PHMC has informed PPL that the studies being performed by USG will satisfy PPL's archaeological review obligations since the proposed relocated transmission line is located adjacent to the new wallboard plant.

The following lists were reviewed for the presence of historical districts and structures in the area:

- National Historic Landmarks in Pennsylvania
- National Register Historic Districts in Pennsylvania
- National Register Individual Properties and Historic Districts in Pennsylvania
- National Register/Listed and Eligible Properties in Pennsylvania

There are several structures of historical interest in the vicinity of the project. Impacts to these historic structures are not expected due to the small scope of the project and its location adjacent to an existing power plant.

**D. NATURAL FEATURES**

The proposed project will not affect any unique geological, scenic, or natural areas. No National Natural Landmarks, parks, recreational facilities, or natural areas are located near the project area.

The relocated line section was positioned to avoid, to the extent possible, the several wetlands found in close proximity to the project and any impacts to wetlands will be minimal. PPL will employ its "Specification for Soil Erosion and Sedimentation Control on Transmission Line Rights-of-Way" as appropriate. All required permits will be obtained prior to the start of construction.

Tree clearing will be minimal because most of the line route crosses fallow farmland. PPL will employ its "Program for Vegetation Management as appropriate.

**E. THREATENED AND ENDANGERED SPECIES**

USG has coordinated with different state and federal agencies to obtain information regarding endangered and threatened species that could occur at the project location. The agencies report that, except for occasional transient species of wildlife, no threatened or endangered plant or animal life is found in the project area.

**LIST OF APPENDICES**

- APPENDIX A - PPL Design Criteria and Safety Practices
- APPENDIX B - Magnetic Field Management at PPL
- APPENDIX C - List of Property Owners Within the Proposed Right-of-Way
- APPENDIX D - List of Involved Governmental Agencies, Municipalities, and Other Public Entities

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## APPENDIX A

### PPL 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) has developed design specifications and safety rules which meet or surpass all provisions 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 such things 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>	
	NESC Standard	PPL Design
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>	
	NESC Standard	PPL Design
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>	
	NESC Standard	PPL Design
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.



**MAGNETIC  
FIELD  
MANAGEMENT**  
PPL Electric Utilities  
Corporation

**APPENDIX B**

**DECEMBER 2004**

## TABLE OF CONTENTS

INTRODUCTION .....	1
DEVELOPMENT OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM.....	6
VARIABLES THAT AFFECT MAGNETIC FIELDS .....	6
Effect of Phase Current on Magnetic Fields .....	6
Effect of Conductor Configuration on Magnetic Fields .....	7
Effect of Distance from the Magnetic Field Source .....	7
SUMMARY OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM.....	8
MAGNETIC FIELD MANAGEMENT PROGRAM GUIDELINES.....	9
Overhead Lines .....	9
New or Rebuilt Transmission Lines .....	9
Reconductoring or Adding Additional Circuits to Existing Transmission Lines .....	14
Distribution Lines .....	14
Underground Transmission Lines.....	15
CHARTS.....	16

## INTRODUCTION

At PPL Electric Utilities Corp. (PPL EU), magnetic field management means investigating and implementing methods at low or no cost to reduce magnetic fields in new or rebuilt transmission and distribution lines. This document explains PPL EU's Magnetic Field Management Program, which is part of PPL EU's larger Electric and Magnetic Fields (EMF) policy.

### **PPL EU's View**

Some people are worried that electric and magnetic fields are harming their health. Others think the scientific research does not show a problem at all, and still others believe there's just too much scientific uncertainty to draw any conclusions.

Here's what we do know now. Various panels of scientists that have reviewed the EMF research generally have drawn two main conclusions. First, the large body of evidence does not demonstrate that EMF are harmful. Second, additional research is recommended to explore questions raised in some studies.

Given these conclusions, PPL EU is taking a reasoned approach in responding to the EMF issue. PPL EU's approach to the EMF issue consists of five elements:

- Providing EMF information to customers and employees
- Providing magnetic field measurements
- Establishing and implementing a magnetic field management program to reduce magnetic fields in new or rebuilt facilities when it can be done at no, or low, cost
- Integrating EMF in the public involvement process that PPL EU undertakes in the siting of transmission lines
- Have supported additional research

## **EMF Are All Around Us**

Electric and magnetic fields occur in nature and in all living things. The earth, for instance, has a magnetic field, which makes the needle on a compass point north.

Electric fields and magnetic fields of a different type also surround every wire that carries electricity. In everyday life, these EMF arise from several basic sources, including power lines, electrical appliances, home and building wiring, other utility lines and cables, and currents flowing on water pipes. Though they often occur together, EMF are made up of two separate components:

### **Electric Fields**

Electric fields are produced by the voltage—or electrical pressure—on a wire. The higher the voltage, the higher the electric field. As long as a wire is energized—has voltage present—an electric field is present (see Figure 1). In other words, an appliance, or an electric power line, doesn't actually have to be turned on to create an electric field. It just has to be plugged in. Electric fields diminish with distance and can be blocked or partially shielded by objects such as trees and houses.

### **Magnetic Fields**

Magnetic fields are created by the current or flow of electricity through a wire. Generally speaking, the higher the current, the higher the magnetic field. Because they only occur when current is flowing, magnetic fields are present only when the power is turned on (see Figure 1). Magnetic fields also diminish with distance, but—unlike electric fields—are not blocked by common objects. In recent years, public and scientific interest has turned toward the magnetic field component of EMF because of some scientific studies regarding these fields.

Figure 1

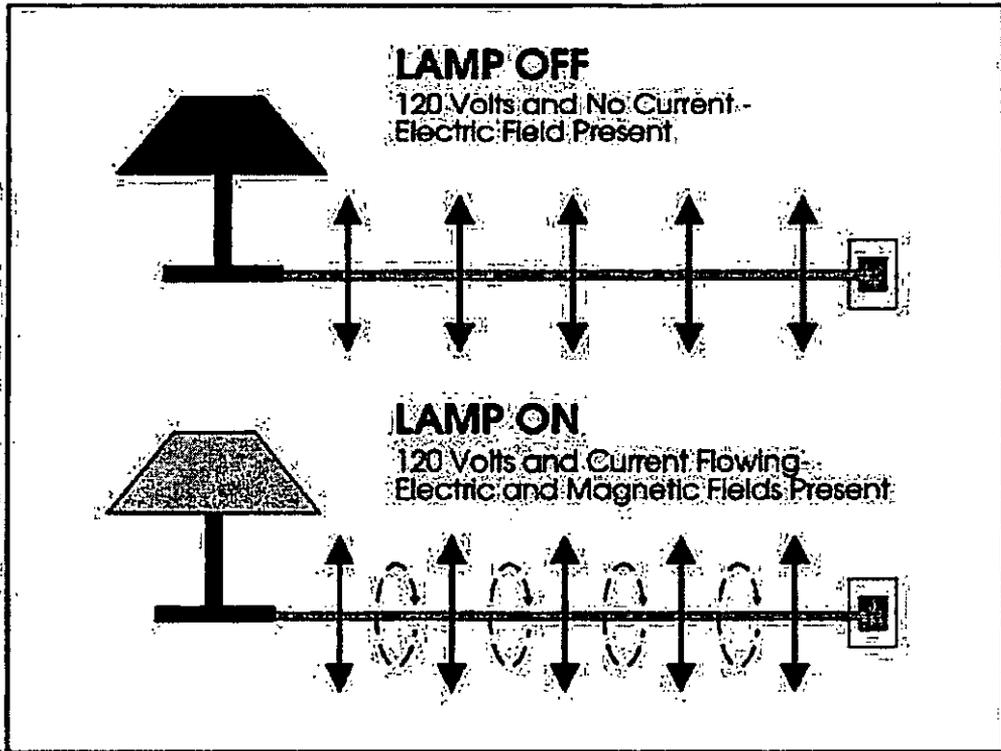


Figure 2

Magnetic field strengths decrease with distance		Source: "EMF in Your Environment", U.S. Environmental Protection Agency, 1992		
Magnetic fields are measured in milligauss		At 6 inches	At 1 foot	At 2 feet
Clothes dryer		2 to 10	* to 3	*
Microwave oven		100 to 300	1 to 200	1 to 30
Toaster		5 to 20	* to 7	*
Power drill		100 to 200	20 to 40	3 to 6
Can opener		500 to 1500	40 to 300	3 to 30
Mixer		30 to 600	5 to 100	* to 10
Hair dryer		1 to 700	* to 70	* to 10
Color television		Data not available	* to 20	* to 8

FIGURE 2 \* The magnetic field measurement at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.

### Measuring Magnetic Fields

Magnetic fields usually are measured in a unit called a milligauss. Magnetic field levels found in the living areas of homes typically range from less than 1 milligauss to about 4 milligauss according to the U.S. Environmental Protection Agency. They can be higher in some cases. The levels next to appliances can exceed 1,000 milligauss (1 gauss). Figures 2 and 3 show how the strength of the field falls off as you move away from the source, just as the heat of a campfire grows weaker as you walk away from it. For overhead power lines, the strength of the magnetic fields is dependent upon a number of factors that will be explained later. Those factors produce a magnetic field that drops off rapidly as you move away from the power line.

Figure 3

<b>Sample Magnetic Field Levels in Milligauss</b>				
<b>Type of Overhead Power Line</b>	<b>Distance from the line</b>			
	<b>Under the line</b>	<b>50 ft.</b>	<b>100 ft.</b>	<b>200 ft.</b>
220 kV and 500 kV	5-400	5-250	1-75	0.5-20
69 kV and 138 kV	3-80	0.5-2.5	0.1-10	0.1-3
12 kV and below	0.4-20	0.1-1	-	-

The magnetic field values provided in this table represent a general range of values associated with the types of overhead power lines listed and are provided for illustration. There will be circumstances in which there will be magnetic field levels above or below the range of values provided due to variations in such factors as height of the wires, current flow and so on.

## **DEVELOPMENT OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM**

One element of our response to EMF concerns expressed by some of our customers is PPL EU's Magnetic Field Management Program. The program was initiated in March 1991 because PPL EU believes it makes good sense, as a matter of policy, to respond to the concerns expressed by some of our customers and to reduce magnetic fields in new and rebuilt facilities where it can be done with either no-cost or low-cost design changes.

This document updates the original program which has been revised several times since 1991. These guidelines were developed by PPL EU's EMF Working Group.

### **VARIABLES THAT AFFECT MAGNETIC FIELDS**

Magnetic fields from transmission and distribution lines are a function of a number of design variables. The following parameters affect the magnetic field levels produced by transmission and distribution lines:

- Current
- Height of conductors above ground
- Configuration of conductors
- Distance from the line

### **EFFECT OF PHASE CURRENT ON MAGNETIC FIELDS**

At power frequencies (i.e., 60 hertz), the magnetic field level is a function of the current or flow of electricity through a wire. Keeping all other parameters the same, the magnetic field is proportional to the current. Hence, if the current increases by 25 percent, the resulting magnetic field level will increase by 25 percent.

The overall load current on any line varies with the demand for power. It's usually highest during daytime hours and lowest at night. There also are weekly, monthly, seasonal and yearly variations.

The difference in the currents between each phase in a multiphase line also can affect the magnetic field. This difference is called phase unbalance. For a constant load, a statistical analysis of this phase unbalance can be made to determine its effect on the magnetic field. Close to the line, there is very little effect. However, the phase unbalance slows the rate at which the magnetic field decreases with distance from the line.

### **EFFECT OF CONDUCTOR CONFIGURATION ON MAGNETIC FIELDS**

In the transmission and distribution of power, utilities like PPL EU presently use both three-phase and single-phase lines. Each phase on a three-phase power line has either a single conductor or a bundle of two or more conductors. In a three-phase system, the ground-level magnetic field is a result of the fields produced by the currents in each of the phases. Placing the three phases as close together as possible (compaction) creates some field cancellation, and the ground-level magnetic field is reduced. However, appropriate phase separation is required for the reliable operation of the line. In addition, the arrangement of the phases can create some; field cancellation and reduction of the ground-level magnetic field.

### **EFFECT OF DISTANCE FROM THE MAGNETIC FIELD SOURCE**

Magnetic field strength diminishes with the vertical and lateral distances from the magnetic field source. Increasing the height of the conductors above ground is useful for magnetic field reduction at ground level, but may result in increased structure costs and increased aesthetic impact of the structures. Another possible method of increasing the distance to the magnetic field source is to increase the right-of-way requirements. By keeping buildings off increased rights of way, thereby requiring the public to live and work further away from lines, exposure to magnetic fields produced by the lines can be reduced. Increases in right of way are not always practical and may increase costs significantly, however.

## **SUMMARY OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM**

Under its Magnetic Field Management Program, PPL EU has changed the way it builds and rebuilds some of its transmission and distribution lines. These design changes reduce magnetic field levels (assuming balanced circuit loadings and phase currents) by up to 69 percent in most of the company's new transmission lines. These guidelines now are being applied to new and reconstructed transmission facilities, based on this program.

The distribution component of the program focuses on 12 kV lines, the company's standard distribution voltage. It concentrates on the three-phase, primary 12 kV lines, since these are the most heavily loaded facilities and often are located in densely populated areas. The guidelines in this program are being applied to these three-phase, primary 12 kV lines.

A maximum 3-5 percent change in estimated cost was used as the limit for the guidelines since this value is consistent with low cost, is within estimating accuracy and is likely to have little impact on overall line costs.

The magnetic field calculations used in this document for the design of PPL EU's overall magnetic field management plan assume balanced load conditions among the phases and a fixed level of current, not necessarily representative of specific transmission or distribution lines. These levels were calculated using the Electric Power Research Institute's ENVIRO computer program. Under actual operating conditions, the magnetic field levels that result may vary due to such things as actual load per circuit, overall current on each phase conductor and the electrical configuration and operation of each line.

# MAGNETIC FIELD MANAGEMENT PROGRAM GUIDELINES

The guidelines for magnetic field management are noted below, with discussion points for each.

## **OVERHEAD LINES**

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### **NEW OR REBUILT TRANSMISSION LINES**

1. **Balance transmission circuit loads and phase currents as much as possible.**
  - PPL EU should continue to make every effort to balance loadings between the two circuits of a double circuit line when planning new or rebuilt facilities to *maximize the effects of reverse phasing.*
  - PPL EU should continue the practice of balancing single-phase loads across the three phases of the distribution system. (Unbalanced phase currents on the distribution system are reflected through to the transmission system.)
    - *Unbalanced phase currents result in higher magnetic fields that do not drop off as quickly with distance as do the fields resulting from balanced phase currents.*
    - *For a 5 percent phase current unbalance, the magnetic field 50 feet from the centerline of a single circuit 138 kV line could be more than twice the value than if the same line had balanced phase circuits.*
  - Balanced phase currents on each three-phase distribution circuit also reduce magnetic fields from the distribution circuits themselves. In addition, they reduce magnetic fields on the transmission system from which the distribution system circuits are supplied and connected through substations.
  - Apart from magnetic field considerations, balanced phase-currents on each three-phase distribution circuit also reduce line losses and improve the system voltage.

**2. Continue with the present practice of using long-span construction as the PPL EU 138/69 kV standard**

- Structure designs for short-span and long-span construction are illustrated on Charts I and II, respectively.
  - Short-span design does not significantly reduce magnetic fields when compared to long-span design even though it is more compact than long-span design. Comparison of the magnetic field values from Chart III indicates essentially the same values. Therefore, short-span design should not be used solely to reduce magnetic fields.
  - PPL EU will continue to use long-span construction for 138/69 kV double-circuit lines and for single-circuit/future-double-circuit lines.
  - For single-circuit/future-double-circuit lines, PPL EU will continue to install two conductors on the top positions and one in the middle position as shown in Chart IV.
    - This arrangement minimizes magnetic fields as shown in Chart V by placing the three initial conductors higher on the structure, which increases the ground clearances, and by placing the conductors in a triangular configuration.

**3. Compact design structures are not a low-cost alternative and should be used for magnetic field reduction only in special applications.**

Chart VI illustrates the compact design structure.

- The compact design increases the initial installation costs by 79 percent when compared to the long-span design but reduces the magnetic field from 9 mG to 3 mG (about 67 percent) at the edge of the 100-foot-wide right of way as shown on Chart III.

**4. Reverse phase new or rebuilt double-circuit transmission lines for all voltage levels.**

- Reverse phasing was adopted by PPL EU in March 1991 for double-circuit 138/69 kV transmission lines and in April 1992 for all other double circuit transmission lines. Reverse phasing is shown in Chart VII. Reverse phasing will reduce the magnetic fields when the current flow on both circuits is in the same

direction. Calculated values contained here are based on balanced and equal phase currents on both circuits.

- Reverse phasing reduces the magnetic field of a double circuit 138 kV single pole transmission line from 29 mG to 9 mG (about 69 percent) at the edge of the 100-foot-wide right of way as shown on Chart III.
- Reverse phasing reduces the magnetic field of a double circuit 230 kV single pole transmission line from 49 mG to 16 mG (about 67 percent) at the edge of the 150-foot-wide right of way as shown on Chart VIII.
- Reverse phasing reduces the magnetic field of a double-circuit 500 kV single pole transmission line from 37 mG to 21 mG (about 43 percent) at the edge of the 200-foot-wide right of way as shown on Chart IX.
- When new or rebuilt double-circuit lines require tapping existing double-circuit lines, PPL EU will review the existing lines to determine if reverse phasing can be provided at low cost.
- Computer modeling is required to develop the optimum phasing and overall conductor arrangements for lines added to, or rebuilt in, multiple-line corridors.
  - *Merely adding a reverse-phase double-circuit line to an existing transmission line corridor or reverse phasing a rebuilt line in the multiple-line corridor will not necessarily produce lower magnetic field levels at the edge of the corridor right of way.*
  - The corridor must be computer modeled with all the lines, existing phase conductor locations and currents. Then, magnetic field calculations must be made *varying the phase arrangements of the new or reconstructed line to determine the appropriate phasing arrangement.*
  - Current flow direction on a line also must be considered. For example, a reverse-phased line should have the current flowing in the same direction on both circuits. If the current flow is in the opposite direction for one circuit, reverse phasing will not produce the lowest magnetic field and another phase arrangement that produces lower fields may need to be utilized.

**5. Increase the minimum ground clearance for all new transmission lines.**

**138/69 kV Transmission Lines**

- Increasing the minimum line design ground clearance from 25 feet to 30 feet may add up to about 5 percent to the installed cost of a new double-circuit single pole 138/69 kV line. For a given project, such cost may be substantially less, however. In fact, PPL EU frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. With long-span reverse-phase design, the magnetic field is reduced from 9 mG to 7 mG (about 22 percent) at the edge of a 100-foot-wide right of way as shown in Chart X.
  - In the actual design of transmission lines to include higher minimum ground clearances, there may be limited segments (such as highway crossings, severe slopes and transmission line crossing locations) where National Electrical Safety Code (NESC) minimum ground clearances may need to be used. The NESC minimum ground clearances are less than the increased ground clearance discussed previously.

**230 kV Transmission Lines**

- Increasing the minimum line design ground clearances from 27 feet to 32 feet may add up to about 5 percent to the cost of a single-circuit single-pole line (current standard). For a given project, such cost may be substantially less, however. In fact, PPL EU frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. By increasing the clearances, the magnetic field is reduced from 30 mG to 28 mG (about 7 percent) at the edge of a 150-foot-wide right of way.
- Increasing clearances from 27 feet to 32 feet could theoretically add up to about 2.8 percent to the cost of a double-circuit single-pole line (current standard) and reduce the magnetic field of a reverse-phase line from 16 mG to 15 mG (about 6 percent) at the edge of a 150-foot-wide right of way. Chart XI is a summary of this data.
- Studies are required for each new 230 kV line to determine optimum structure types, ground clearances, configurations and designs to reduce field levels. Such

studies could include analysis of reduction measures such as additional minimum ground clearances, increasing conductor tensions, using reduced phase spacing (a "Delta" configuration on a single-circuit line), installing the second circuit initially, and/or adding a second set of conductors that are reverse phased and operated in parallel with the first set (bundled/split phase).

#### **500 kV Transmission Lines**

- Increasing ground clearances from 33 feet to 53 feet may add up to about 4.5 percent to the cost of a single-circuit "H-frame" line (current standard). For a given project, such cost may be substantially less, however. In fact, PPL EU frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. By increasing the clearances, the magnetic field is reduced from 42 mG to 35 mG (about 17 percent) at the edge of a 200-foot-wide right of way.
- Increasing ground clearances from 33 feet to 53 feet could theoretically add up to 2.8 percent to the cost of a double-circuit "H-frame" line (current standard) and reduces the magnetic field of a reverse-phase line from 21 mG to 16 mG (about 24 percent) at the edge of a 200-foot-wide right of way. Chart XII is a summary of this data.
- Studies are required for each new 500 kV line to determine optimum structure types, ground clearances, configurations and designs to reduce field levels. Such studies could include analysis of reduction measures such as additional minimum ground clearances, increasing conductor tensions, using reduced-phase spacing (a "Delta" configuration on a single circuit line), installing the second circuit initially, and/or adding a second set of conductors that are reverse phased and operated in parallel with the first set (bundled/split phase).

## **RECONDUCTORING OR ADDING ADDITIONAL CIRCUITS TO EXISTING TRANSMISSION LINES**

**When reconductoring or adding additional circuits to existing transmission lines, PPL EU will evaluate low-cost or no-cost options for magnetic field management on a case-by-case basis.**

When reconductoring existing transmission lines or adding additional circuits, low-cost alternatives may not exist; however, the following steps will be taken:

- For a single-circuit line, the use of a Delta arrangement or other modifications on the existing structure, with reduced-phase spacing, will be evaluated.
- For double-circuit lines, application of reverse phasing may reduce the magnetic field under the line and within the right of way and will be evaluated.
- For single- and double-circuit lines, evaluate using higher conductor tensions that can increase the minimum line design ground clearance.

## **DISTRIBUTION LINES**

**At the 12 kV distribution level, new main three-phase lines will continue to be constructed with five feet of additional ground clearance.**

- Main lines are the most heavily loaded sections of a distribution line and therefore have the highest magnetic fields associated with them.
- Increasing the ground clearance by five feet reduces the magnetic field under the line from 14 mG to 11 mG using the standard eight-foot crossarm design. These values are based on increasing pole heights from 45 feet to 50 feet and a typical operating current of 300 amps per phase.
- Chart XIII is a summary of this data. Increasing ground clearance by five feet could theoretically add about 5 percent to the cost of a typical distribution line.

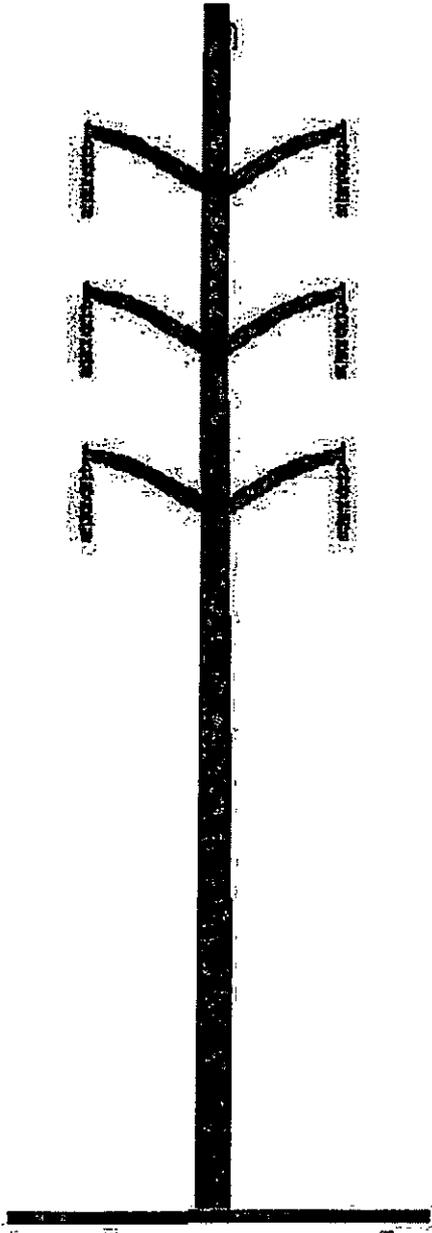
## **UNDERGROUND TRANSMISSION LINES**

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**Underground transmission lines are required due to environmental or land use factors or restrictions on available clearances, PPL EU will evaluate options for magnetic field management techniques on a case-by-case basis.**

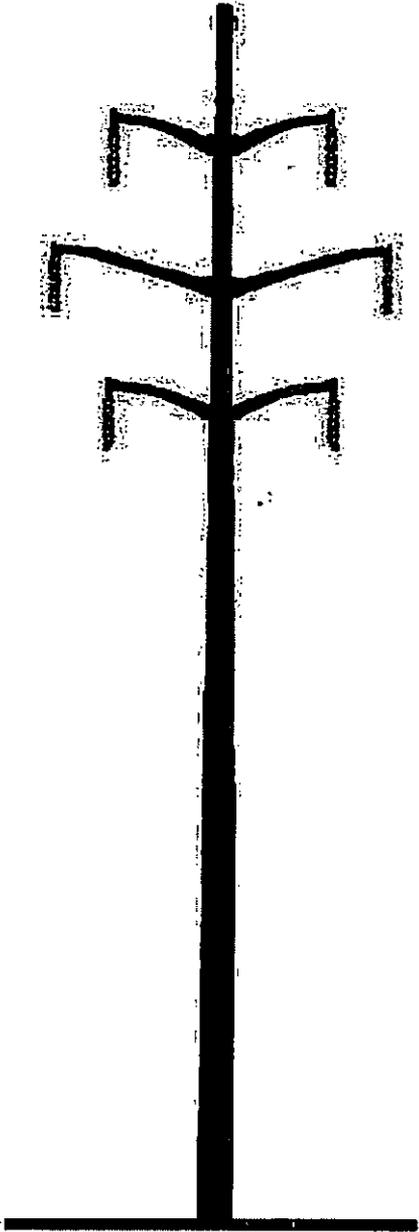
- The phase arrangement that produces the lowest field will be determined.
- The depth of burial of the line will be determined considering the cost of excavation and the location of other buried utilities in the area.
- The use of steel pipe ferromagnetic shielding that reduces magnetic fields will be evaluated.

# Short-Span Construction



- **More compact design**
- **Should not be used solely to reduce magnetic fields**
- **Typical conductor data:**
  - 1 3/8" HS steel overhead ground wire - 7.3 feet sag
  - 6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 10.0 feet sag
  - Average span - 400 feet

# Long-Span Construction Remains PPL EU 138 kV Standard



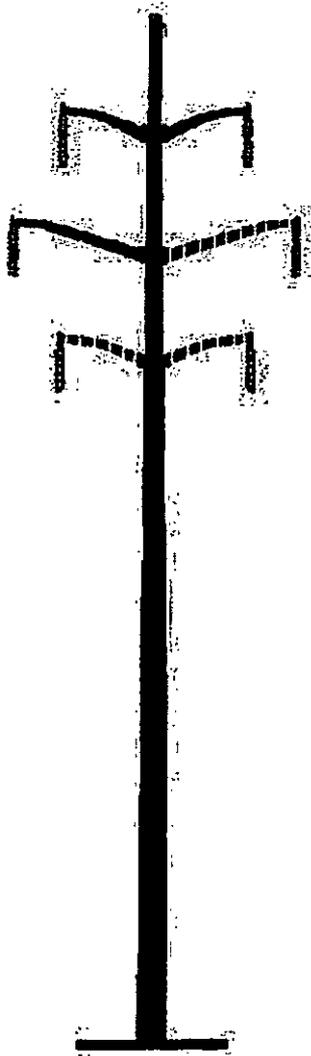
- Lower cost alternative
- Reduces magnetic fields due to higher structures
- Typical conductor data:
  - 1 3/8" HS steel overhead ground wire - 17.3 feet sag
  - 6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 23.0 feet sag
  - Average span - 600 feet

**138/69 kV REVERSE-PHASE TRANSMISSION LINES  
CALCULATED MAGNETIC FIELDS AT 400 AMPERES**

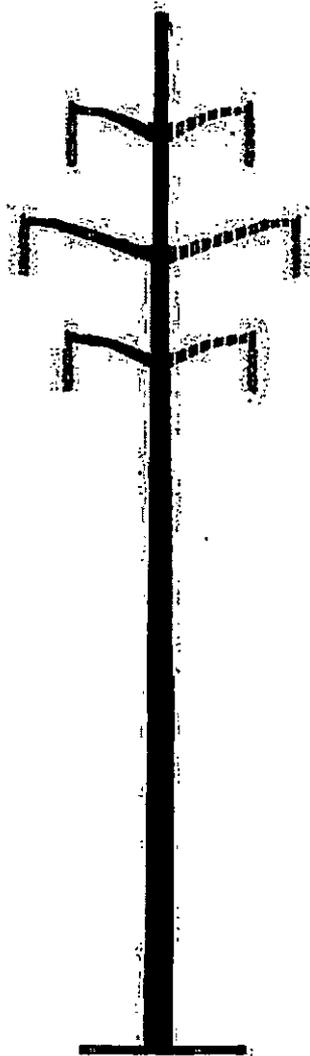
TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SHORT SPAN (CHART I)	30
SHORT SPAN (REVERSE PHASE)	8
LONG SPAN (CHART II)	29
LONG SPAN (REVERSE PHASE)	9
COMPACT (CHART VI)	14
COMPACT (REVERSE PHASE)	3

The edge of right of way is 50 feet from the line centerline.  
The 400 ampere phase current is balanced between phases.  
Calculations are based on a minimum ground clearance of 25 feet.  
LONG SPAN, SHORT SPAN and COMPACT are double-circuit lines.

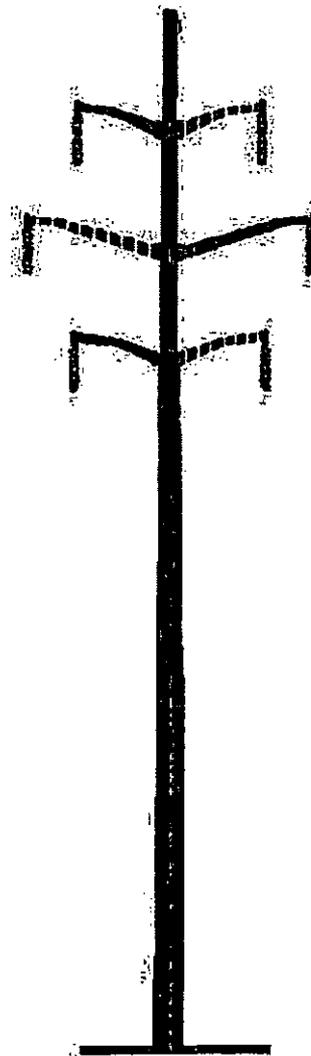
# Typical Single-Circuit Structure Designs



**Top/Middle**



**Vertical**



**Top/Middle/Bottom**

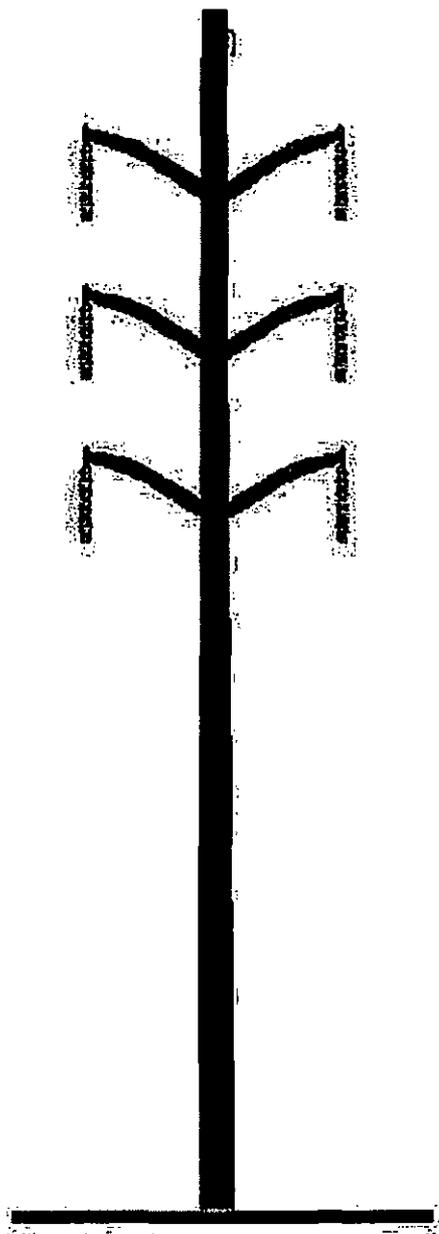
——— initial single circuit  
- - - - future second circuit

**138/69 kV SINGLE CIRCUIT TRANSMISSION LINES  
CALCULATED MAGNETIC FIELDS AT 400 AMPERES**

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
TOP/MIDDLE/BOTTOM	20
VERTICAL	17
TOP/MIDDLE	12

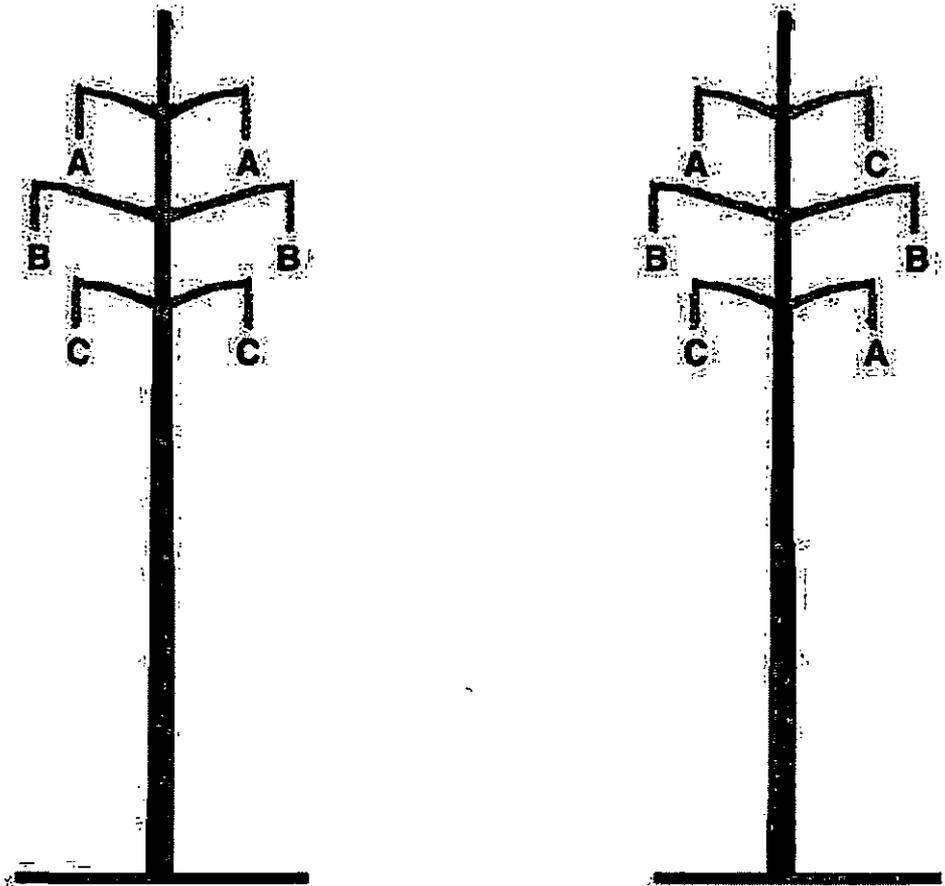
The edge of right of way is 50 feet from the line centerline.  
The 400 ampere phase current is balanced between phases.  
Calculations are based on a minimum ground clearance of 25 feet.

# Compact Design Structure



- **Minimize magnetic fields due to compact design**
- **Not a low-cost alternative**
- **Typical conductor data:**
  - 1 3/8" HS steel overhead ground wire - 9.0 feet sag
  - 6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 9.0 feet sag
  - Average span - 300 feet

# Reverse Phasing of Double-Circuit Transmission Lines



From:  $\longrightarrow \longrightarrow \longrightarrow \longrightarrow$  To:

Reverse phasing also can be one of the following phase arrangements:

A	B		B	A		B	C		C	A		C	B
C	C	or	C	C	or	A	A	or	B	B	or	A	A
B	A		A	B		C	B		A	C		B	C

**230 kV REVERSE-PHASE TRANSMISSION LINES  
CALCULATED MAGNETIC FIELDS AT 800 AMPERES**

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
DOUBLE CIRCUIT POLE	49
DOUBLE CIRCUIT POLE (REVERSE-PHASE)	16

The edge of right of way is 75 feet from the line centerline.  
The 800 ampere phase current is balanced between phases.  
Calculations are based on a minimum ground clearance of 27 feet.

**500 kV REVERSE-PHASE TRANSMISSION LINES  
CALCULATED MAGNETIC FIELDS AT 1100 AMPERES**

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
DOUBLE CIRCUIT POLE	37
DOUBLE CIRCUIT POLE (REVERSE PHASE)	21

The edge of right of way is 100 feet from the line centerline.  
The 1,100 ampere phase current is balanced between phases.  
Calculations are based on a minimum ground clearance of 33 feet.

**INCREASED 138/69 kV MINIMUM GROUND CLEARANCE  
CALCULATED MAGNETIC FIELDS AT 400 AMPERES**

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT TOP/MIDDLE	25	12
SINGLE CIRCUIT TOP/MIDDLE	30	10
LONG SPAN	25	29
LONG SPAN	30	26
LONG SPAN (REVERSE PHASE)	25	9
LONG SPAN (REVERSE PHASE)	30	7

The edge of right of way is 50 feet from the line centerline.  
The 400 ampere phase current is balanced between phases.

**INCREASED 230 kV MINIMUM GROUND CLEARANCE  
CALCULATED MAGNETIC FIELDS AT 800 AMPERES**

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT TOP/MIDDLE	27	30
SINGLE CIRCUIT TOP/MIDDLE	32	28
DOUBLE CIRCUIT POLE	27	49
DOUBLE CIRCUIT POLE	32	46
DOUBLE CIRCUIT POLE (REVERSE PHASE)	27	16
DOUBLE CIRCUIT POLE (REVERSE PHASE)	32	15

The edge of right of way is 75 feet from the line centerline.  
The 800 ampere phase current is balanced between phases.

**INCREASED 500 KV MINIMUM GROUND CLEARANCE  
CALCULATED MAGNETIC FIELDS AT 1,100 AMPERES**

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT "H" STRUCTURE	33	42
SINGLE CIRCUIT "H" STRUCTURE	53	35
DOUBLE CIRCUIT POLE	33	37
DOUBLE CIRCUIT POLE	53	31
DOUBLE CIRCUIT POLE (REVERSE PHASE)	33	21
DOUBLE CIRCUIT POLE (REVERSE PHASE)	53	16

The edge of right of way is 100 feet from the line centerline.  
The 1,100 ampere phase current is balanced between phases.

**12 kV DISTRIBUTION LINES  
CALCULATED MAGNETIC FIELDS AT 300 AMPERES**

TYPE CONSTRUCTION	POLE HEIGHT FEET	MAGNETIC FIELD IN MILLIGAUSS*	
		AT CENTERLINE	AT 30 FEET FROM CENTERLINE
STANDARD CROSSARM	45	14	7
STANDARD CROSSARM	50	11	6

\* Field level under the line at mid-span based on 300 amps, balanced loading, one meter above ground level.

APPENDIX C

LIST OF PROPERTY OWNERS WITHIN THE PROPOSED RIGHT-OF-WAY

Property Owner/Address

United States Gypsum Company (Lessee)  
Attn: Mike Colwell #143  
125 South Franklin Street  
Chicago, IL 60606

PPL Montour, LLC (Record Owner and Lessor)  
18 McMichael Road  
Washingtonville, PA 17884-0128  
Attn: Michael G. Monroe, Manager-Fossil Generation Assets

PPL Generation, LLC (Record Owner and Lessor)  
Two North Ninth Street, GENPL6  
Allentown, PA 18101  
Attn: Mr. Dennis Murphy, VP/COO

## APPENDIX D

### **LIST OF INVOLVED GOVERNMENTAL AGENCIES, MUNICIPALITIES AND OTHER PUBLIC ENTITIES**

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1. Pennsylvania Historical and Museum Commission  
Bureau for Historic Preservation  
Commonwealth Keystone Building, Second Floor  
400 North Street  
Harrisburg, Pennsylvania 17120-0053  
Attn: Mr. Douglas C. McLearn, Chief
2. Pennsylvania Department of Transportation  
Commonwealth Keystone Building  
400 North Street, 8<sup>th</sup> Floor  
Harrisburg, Pennsylvania 17120  
Attn: The Honorable Allen D. Biehler, P.E., Secretary
3. Department of Environmental Protection  
P.O. Box 2063  
Market Street State Office Building  
Harrisburg, Pennsylvania 17105-2063  
Attn: Office of Field Operations
4. Montour County Commissioners  
County Courthouse  
29 Mill Street  
Danville, PA 17821  
Attn: Mr. Harold Hurst
5. Derry Township Supervisors  
909 Shed Road  
Danville, PA 17821  
Attn: Mr. David McCollum, Chairman
6. Montour County Planning Commission  
112 Woodbine Lane  
Danville, PA 17821  
Attn: Ms. Betsy Hack
7. Northern Montour Regional Planning Commission  
909 Shed Road  
Danville, PA 17821  
Attn: Kenneth Mertz, Chair

## CERTIFICATE OF SERVICE

I hereby certify that a true and correct copies of the foregoing documents have been served upon the following persons, in the manner indicated, in accordance with the requirements of § 1.54 (relating to service by a participant).

### VIA CERTIFIED MAIL - RETURN RECEIPT REQUESTED

United States Gypsum Company  
ATTN: Mike Colwell # 143  
125 South Franklin Street  
Chicago, IL 60606

PPL Montour, LLC  
ATTN: Michael G. Monroe, Manager-Fossil  
Generation Assets  
18 McMichael Road  
Washingtonville, PA 17884-0128

PPL Generation, LLC  
ATTN: Dennis Murphy, VP/COO  
Two North Ninth Street, GENPL6  
Allentown, PA 18101

PA Historical and Museum Commission  
Bureau for Historic Preservation  
ATTN: Douglas C. McLearn, Chief  
400 North Street  
Harrisburg, PA 17120-0053

PA Department of Transportation  
ATTN: Hon. Allen D. Biehler, P.E., Sec.  
Commonwealth Keystone Building  
400 North Street, 8th Floor  
Harrisburg, PA 17120

Department of Environmental Protection  
ATTN: Office of Field Operations  
P.O. Box 2063  
Market Street State Office Building  
Harrisburg, PA 17105-2063

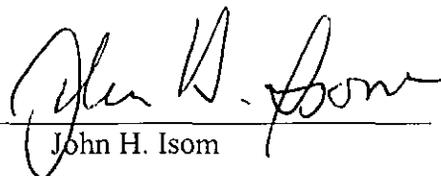
Montour County Commissioners  
County Courthouse  
ATTN: Harold Hurst  
29 Mill Street  
Danville, PA 17821

Derry Township Supervisors  
ATTN: David McCollum, Chairman  
909 Shed Road  
Danville, PA 17821

Montour County Planning Commission  
ATTN: Betsy Hack  
112 Woodbine Lane  
Danville, PA 17821

Northern Montour Regional Planning Commission  
ATTN: Kenneth Mertz, Chair  
909 Shed Road  
Danville, PA 17821

Date: July 17, 2006

  
John H. Isom

2006 JUL 17 AM 3:46  
SECRETARY'S BUREAU

COMMONWEALTH OF PENNSYLVANIA  
PENNSYLVANIA PUBLIC UTILITY COMMISSION  
P. O. BOX 3265, HARRISBURG PA 17105-3265

IN REPLY PLEASE  
REFER TO OUR FILE  
Secretary  
717-772-7777

July 18, 2006

A-110500 F0379

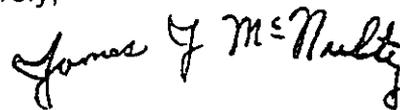
POST & SCHELL, P.C.  
JOHN H. ISOM  
17 NORTH SECOND STREET  
12<sup>TH</sup> FLOOR  
HARRISBURG PA 17101-1601

Dear Mr. Isom:

Receipt is acknowledged of the Letter of Notification of PPL Electric Utilities Corporation, which has been captioned and docketed to the above number.

This matter will receive the attention of the Commission and you will be advised of any further necessary procedure.

Sincerely,



James J. McNulty  
Secretary

JJM:jih

DOCKETED  
JUL 18 2006  
DOCUMENT  
FOLDER

**DATE:** July 18, 2006

**SUBJECT:** A-110500 F0379

**TO:** Bureau of Fixed Utility Services

**FROM:** James J. McNulty, Secretary



**Letter of Notification of PPL Electric Utilities Corporation**

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We attach hereto a copy of the Letter of Notification of PPL Electric Utilities Corporation, which has been captioned and docketed to the above number.

May we have a report prepared by your Bureau for Public Meeting.

Attachment

cc: Law Bureau

jih

**DOCKETED**  
JUL 18 2006  
**DOCUMENT  
FOLDER**