BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Re: Application Of PPL Electric Utilities Corporation Filed Pursuant To 52 Pa. Code Chapter 57, Subchapter G, For Approval Of The Siting And Construction Of The Blooming Grove – Jackson and Peckville – Jackson 138/69 kV Transmission Line In Monroe County, Pennsylvania	:	**Docket No. A-2012-__________**

PPL ELECTRIC UTILITIES CORPORATION

STATEMENT NO. 2

Direct Testimony of Barry Baker

DATE: May 15, 2012

Q. Please state your full name and business address.

A. My name is Barry Alan Baker. My business address is 335 Commerce Drive, Suite 300, Fort Washington, PA 19034.

Q. By whom are you employed and in what capacity?

A. I am employed by URS Corporation (URS) as a Department Manager for Environmental Services. In this role I am a Certified Project Manager, a Principal Geographic Information Systems ("GIS") Specialist, and the Fort Washington office lead for transmission projects. PPL Electric retained URS as a consultant to assist in developing and evaluating alternatives for the Project.

Q. What is your educational background?

A. I received a Bachelors of Science with Honors degree in Environmental Science from the University of East Anglia in Norwich, England in 1996. A key focus was on the use of GIS and computer applications for environmental problem solving. My additional continuing education relevant to my current position included the following courses and programs:

- Approximately 50 URS Project Management Classes necessary for formal certification.
- Creating and Integrating Data for Natural Resource Applications (ESRI)
- Geoprocessing with ArcGIS Desktop (ESRI)
- Spatial Hydrology Using ArcView (ESRI)
- Introduction to ArcIMS (ESRI)
- System Architecture Design for GIS (ESRI)

Q. Please describe your professional background and employment history.

A. I have been employed by URS for the last six years in the role previously discussed. In this position I have been responsible for siting studies both as a Project Manager and as a technical lead for transmission line siting as well as new power development throughout the northeast region of the U.S. including, PA, NJ, MD, NY, CT, OH, and MA. I also manage the Fort Washington Office Environmental Services Department where I am responsible for a team of biologist, ecologists, and GIS specialists. Additionally I am the URS Fort Washington Office designed transmission lead for major transmission opportunities within the northeast. Prior to joining URS I held similar GIS and environmental development lead positions for other environmental and government consultants.

Q. What are your responsibilities in connection with the Blooming Grove – Jackson and Peckville – Jackson 138/69 kV Transmission Line project?

A. PPL Electric retained URS to assist in developing and evaluating alternative routes for the Project. I led the team that conducted the siting study using the URS-adapted methodology of the siting process developed by the Electric Power Research Institute ("EPRI") and Georgia Transmission Corporation ("GTC"). The EPRI-GTC method incorporates GIS technology, statistical evaluation, site assessment and expert judgment into the decision-making process. The overall objective of the study was to select a transmission line route that would best minimize impacts to the communities and the natural environment while still being practicable to construct.

Q. What is the subject of your testimony in this proceeding?

A. My testimony explains the process PPL Electric used in the selection of the route for the Blooming Grove – Jackson and Peckville – Jackson 138/69 kV Transmission Line ("the Project").

Q. Please explain the process that URS and PPL Electric used to site the Project.?

A. The siting methodology used for determining the preferred route for the Project uses a series of grid cells on aerial photographs or maps that are assigned a value indicating whether an area in a cell is suitable for a transmission line, *i.e.*, is an opportunity, or is less suitable, *i.e.*, is a constraint. This process is repeated several times with cells of decreasing size and progressively more detailed and precise data.

The methodology utilized was adapted from a protocol developed by the Electric Power Research Institute ("EPRI") and the Georgia Transmission Corporation. This method incorporates Geographic Information System ("GIS") technology, statistical evaluation and professional judgment into the decision-making process. The methodology formalizes many of the methods and principles used in the industry to site transmission lines. It was developed over many years with collaboration and feedback from utility companies, federal, state and local government agencies and other key stakeholders such as private landowners. The process was tested and calibrated against existing transmission line siting projects that had been successfully completed.

The siting method consists of four principal steps:

a) Generate Macro Corridors. These macro corridors define the outer edges of the Project Study Area.

b) Generate Alternative Corridors. Alternative corridors most suitable for the transmission line are generated from three primary perspectives:

   i. Protection of the natural environment;
   ii. Protection of the built environment; and
   iii. Engineering requirements.

c) Identify alternative routes within the alternative corridors.

d) Select the preferred route.

We relied on three broad categories of data for our analysis – ecological, land use/cultural, and technical/engineering. Data were obtained from a wide variety of sources, including state and local GIS databases, field reconnoissance surveys, information supplied by public agencies, published documents, and publically available electronic information.

The quantitative analysis performed by PPL Electric uses a series of grid cells across the General Area of Study. Values are assigned to each cell depending upon its primary use. A value is assigned representing, for example, an opportunity area such as open land or a constraint area such as a residential neighborhood. A "least impact" corridor or path can be determined by the mathematical addition of the value numbers from the value assigned to each cell between the start and end points. Opportunity areas are assigned low numbers, and constraint areas are assigned high numbers. Therefore, the corridor or path with the lowest value is the corridor or path with the least adverse impacts.

Macro corridor analysis begins after the start and end points of the new transmission lines have been established. The first step in macro corridor development is to develop a land use/land cover GIS database that identifies the key opportunity and constraint areas that are traditionally reviewed in a siting study.

A GIS map of the General Area of Study is created using land use and land cover data and other feature data that include roads, rail, and existing transmission lines. From the GIS map, a Composite Suitability Surface Map, composed of grid cells, is created. The features of each cell are identified and the features are ranked from one (most suitable) to nine (least suitable). Corridors with the cells having the lowest values have the highest overall suitability for a transmission line.

This composite suitability surface map is used to produce a series of potential broad corridor areas for the following three scenarios:

a) Opportunities to rebuild or parallel existing transmission lines.
b) Opportunities to parallel existing road right-of-ways.
c) Opportunities to cross undeveloped land.

These corridors represent preferred opportunity areas for developing a new transmission line. This process determines the corridor across the suitability surface that minimizes the sum of the values within that corridor. Corridors with the lowest sums have the higher overall suitability. Corridors with a larger suitability sum would be considered less optimal.

The macro corridor includes all areas determined to be most suitable from all of the three perspectives. The outer boundary of this Macro Corridor area also effectively defines the Project Study Area. The Project Study Area is a subset of the larger General Area of Study discussed previously.

The next step in the process is to identify alternative corridors. In order to identify alternative corridors, additional and more detailed data are gathered. The starting point of the assignment of values was the EPRI-GTC Methodology, which assigned values through a collaborative outreach involving stakeholders from federal, state and local governments, environmental and engineering experts, homeowner associations and other groups. The values obtained from EPRI-GTC were then reviewed by PPL Electric's siting team. Values for certain land uses and land covers were refined to reflect circumstances presented in the Project Study Area. These refinements were made by PPL Electric and URS technical experts in environmental, engineering, and public outreach disciplines to better represent conditions within Pennsylvania, such as the inclusion of stream classifications to offer enhanced protection to this key resource within the natural environment perspective.

Alternative corridors were created from three different perspectives – the Built Environment, the Natural Environment and Engineering Requirements. The "Built Environment" refers to protecting human and cultural areas by reducing potential conflicts with existing residential neighborhoods and other community-valued buildings or historic sites. The "Natural Environment" refers to protecting plants, animals and aquatic resources by minimizing the impact to ecological resources and natural habitat. The "Engineering Requirements" refer to maximizing co-location and minimizing cost and schedule challenges by seeking the shortest path or utilizing existing rights-of-way, while avoiding areas that pose significant construction obstacles such as steep slopes or unique agricultural practices.

The same fundamental data sets are used in determining the alternative corridors for each of the above perspectives, *e.g.*, slope data and wetlands data are used in developing alternative corridors in all perspectives. For each perspective, however, weighting of data is based on the nature of the perspective. For example, a Built Environment assessment applies higher weight to features related to proximity and density of buildings in the Project Study Area. The Natural Environment assessment applies a higher weight to flood plain and wildlife habitat. The Engineering Assessment seeks to avoid construction obstacles such as slopes and utilize linear infrastructure features. By selecting the corridor that is optimal from each of the three perspectives, PPL Electric was able to compare environmental, social, and financial costs and benefits of each of the corridors.

The next phase of the process was route development, *i.e.*, determining the alternate routes within the alternative corridors. The alternative transmission line route development utilized a least impact tool similar to the one used to identify alternative corridors. The alternative route analysis, however, focuses on a single alignment rather than a broad corridor area. The alternative route analysis minimizes the least preferred areas that are crossed along a route connecting the starting and ending locations. Again, routes are selected from each of the three perspectives.

To assess the advantages and disadvantages of alternative routes, specific features, such as the number of residences or streams crossed per route, were considered. The quantitative feature metrics are normalized, assigned relative weights, and organized within the three perspectives — the Built Environment, the Natural Environment and Engineering Requirements. The overall score for each alternative route was then calculated. As before, lower scores indicated less difficulty or potential impacts of the route. Using this methodology, PPL Electric selected six Alternative Routes for detailed examination. At the completion of the detailed examination of the six Alternative Routes, it was determined the three worst scoring routes would not be carried forward for further evaluation.

Q. What was the next step in the siting process?

A. The next step in the evaluation process was to qualitatively assess the remaining Alternative Routes based on less tangible criteria. The qualitative assessment was performed by applying expert judgment to rank the remaining alternative routes. PPL Electric's siting team qualitatively ranked the preferred routes based on several important considerations such as visual concerns, community concerns, schedule delay risk, special permit issues, and construction and maintenance accessibility. The goal of the qualitative expert judgment was to select a preferred route from the three remaining routes through the Project Study Area. This process is designed to encourage thorough discussion in evaluating and selecting a final route in an objective, consistent, and comprehensive manner.

In conducting its qualitative assessment, PPL Electric considered the following five qualitative criteria for each alternative:

- Visual concerns;
- Community concerns;
- Special permit issues;
- Construction, maintenance, and accessibility; and
- Schedule delay risk.

Q. Were any of the Attachments to the Siting Application prepared by you or under your supervision?

A. Yes. I supervised the preparation of the following attachments: Attachment 1, the PUC Regulations Cross Reference Matrix; Attachment 3 that provides background information regarding the environmental setting of the General Area of Study; Attachment 4 that describes the methodology used by PPL Electric and URS to define alternative transmission routes (Alternative Routes) and to select the proposed transmission line route (Selected Route) for this project; Attachment 12 that reviews that status of the Agency coordination; and Attachment 14 that identifies the potential agency permit requirements.

Q. Does this complete your direct testimony?

A. Yes, it does.