COMMONWEALTH OF PENNSYLVANIA

BEFORE THE PENNSYLVANIA PUBLIC
UTILITY COMMISSION

In the Matter of: Application of	**:**	
PPL Electric Utilities Corporation	**:**	
Filed Pursuant to 52 PA. Code	**:**	
Chapter 57, Subchapter G, for	**:**	
Approval of the Siting and	**:**	**Docket No. A- 2008-2022941**
Reconstruction of the Proposed	**:**	
Coopersburg #1 and #2 138/69 kV	**:**	
TAP in Upper Saucon Township,	**:**	
Lehigh County and Springfield	**:**	
and Richland Townships, Bucks	**:**	
County, Pennsylvania	**:**	
Petition of PPL Electric Utilities	**:**	
Corporation for a Finding that a	**:**	
Building to Shelter Control	**:**	
Equipment at the Substation to be	**:**	**Docket No. P-2008-2038262**
Constructed in Springfield	**:**	
Township, Bucks County,	**:**	
Pennsylvania is Reasonably	**:**	
Necessary for the Convenience	**:**	
or Welfare of the Public	**:**	

DIRECT TESTIMONY

AND EXHIBITS OF

PETER J. LANZALOTTA, P.E.

On Behalf of Springfield Township, Bucks County, PA

August 20, 2008

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Introduction

Q. PLEASE STATE YOUR NAME, AFFILIATION AND BUSINESS ADDRESS.

A. Peter J. Lanzalotta, Lanzalotta & Associates LLC, 67 Royal Pointe Drive, Hilton Head Island, SC 29926.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I am a graduate of Rensselaer Polytechnic Institute, where I received a Bachelor of Science degree in Electric Power Engineering. In addition, I hold a Masters degree in Business Administration with a concentration in Finance from Loyola College in Baltimore.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.

A. I am a Principal of Lanzalotta & Associates LLC, which was formed in January 2001. Prior to that, I was a partner of Whitfield Russell Associates, with which I had been associated since March 1982. My areas of expertise include electric utility system planning and operation, electric service reliability, cost of service, and utility rate design. I am a registered professional engineer in the states of Maryland and Connecticut. My prior professional experience is described in Exhibit PJL-1, which is attached hereto.

I have been involved with the planning operation, and analysis of electric utility systems and with utility regulatory matters, including reliability-related matters, certification of new facilities, cost of service, cost allocation, and rate design, as an employee of and as a consultant to a number of privately- and publicly-owned electric utilities, regulatory agencies, developers, and electricity users over a period exceeding thirty years.

I have been involved in a number of projects focused on electric utility transmission and distribution system reliability. I have worked for many years on behalf of the City of Chicago on electric reliability-related matters, and have been engaged by various government offices and agencies in the states of Delaware, Maryland, New Jersey, Ohio and Pennsylvania to help address electric service reliability concerns.

Q. HAVE YOU GIVEN EXPERT TESTIMONY IN ANY JUDICIAL OR QUASI-JUDICIAL PROCEEDINGS?

A. Yes, I have presented expert testimony before the Federal Energy Regulatory Commission and before regulatory commissions and other judicial and legislative bodies in 21 states, the District of Columbia, and the Provinces of Alberta and Ontario. My clients have included utilities, regulatory agencies, ratepayer advocates, independent producers, industrial consumers, the federal government, and various city and state government agencies. In Pennsylvania, I have most recently submitted testimony in an investigation of the need for Allegheny Power's TrAILCo transmission line project, in an investigation of the electric service reliability of the First Energy electric utilities, and in investigations dealing with Pike County Light and Power Company's electric service reliability and its interconnectability with the PJM transmission system. The proceedings in which I have testified are listed in Exhibit PJL-2.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony, on behalf of the Board of Supervisors of Springfield Township, Bucks County, ("Springfield") addresses the following issues:

(1) Is there is a need for the facilities proposed by PPL Electric Utilities Corporation ("PPL" or "Company")?

(2) Are there reasonable and preferable alternatives to the facilities proposed by the Company?

Q. ON WHAT INFORMATION IS YOUR TESTIMONY BASED?

A. In preparing my testimony I have reviewed the Company's Application, the testimony of Company expert witnesses, and the Company responses to interrogatories. I have visited the general area of the proposed facilities. In addition, I have performed studies based on the information provided to evaluate the need for system reinforcement and alternatives for providing that reinforcement.

Summary

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. Based on my review, I find the following:

(1) There is adequate 69 kV[1] transformation capacity installed, or capable of being installed, in existing substations to preclude the need for a new substation as proposed by the Company. The Company's Alternative 2 provides a credible road map for increasing the 69 kV transformer capacity at existing substations.

[1] kV is an abbreviation for kilovolts, or 1,000 volts.

(2) Additional 69 kV transmission line capacity will be needed in the southern Lehigh Region. The Company's Alternative 2 provides a credible approach to meeting these needs without requiring the construction of a new substation. Alternative 2 also appears to minimize the amount of transmission line construction along virgin right-of way.

(3) While it may be less expensive to build new transmission line facilities along virgin right-of-way, or to build a new substation, than it is to rebuild older existing facilities so as to replace old components and to increase capacity, there are offsetting benefits from the rebuild option that should be taken into account.

The Existing Facilities

Q. PLEASE DESCRIBE THE EXISTING TRANSMISSION FACILITIES IN THE VICINITY OF REINFORCEMENTS PROPOSED BY THE COMPANY.

A. The area that is the subject of this PPL application, described by PPL as the Southern Lehigh Study Area, is located in Southeastern Pennsylvania and encompasses portions of three counties: Bucks, Lehigh, and Northampton. This area receives much of its electric power supply from PPL's Quarry and Buxmont 230-69 kV substations and the Elroy 500-138-69 kV Substation. The Buxmont 230-69 kV substation is supplied by the double-circuit 230 kV lines from Hosensack and Whitpain. The Buxmont substation has two transformers that feed six 69 kV lines. Two of those lines are the 9 mile Buxmont-Quakerstown #1 and #2 69 kV lines that serve Quakerstown Borough, Perkasie Borough, Richland, Ridge Road and Coopersburg Substations. The Quarry 230-69 kV Substation is supplied by four 230 kV lines from Martins Creek, Northwood and Steel City. Quarry has four transformers which feed seven 69 kV lines. Two of those lines are the 9.3 mile

Quarry-Elliot Heights #1 and #2 69 kV Lines which serve Freemansburg, Seidersville, Bingen, Elliott Heights and South Allentown Substation.

Q. DESCRIBE THE FEATURES THAT DELINEATE THE BOUNDARIES OF THE STUDY AREA.

A. The Study Area is bounded on the north by a Buckeye Petroleum Pipeline, on the east by a PPL Interstate Energy hot oil pipeline and the Richland Township boundary with Haycock Township, and on the south by the PPL Electric Quakerstown-Hosensack 138/69 kV tap Line. The boundary to the west of the Study Area is a parallel line approximately 2 miles west of PA Route 309. (page 7 of Application) The Study Area is about 42.3 square miles. (Kuhns p. 5)

The Proposed Facilities

Q. PLEASE DESCRIBE THE TRANSMISSION SYSTEM ADDITIONS AND REINFORCEMENTS THAT ARE PROPOSED FOR APPROVAL IN THIS PROCEEDING.

A. PPL's preferred alternative, also known as the Cross Country Route, includes the reconstruction of the Coopersburg #1 and #2 138/69 kV Tap. The Cross Country route is 7.09 miles long and begins at Coopersburg 69-12 kV Substation and proceeds in a southerly direction to the intersection with the existing Buxmont-Quakertown #1 and #2 69 kV transmission line. PPL's preferred alternative will occupy new rights-of-way for most of its route. In addition, a new 230-138/69 kV substation will be constructed.

Q. PLEASE PROVIDE MORE DETAILS OF THE PROJECT.

A. PPL proposes to reconstruct the existing Coopersburg 69 kV Tap for double circuit 138/69 kV operation between PPL's Coopersburg 69-12 kV Substation and its Buxmont-Quakertown #1 and #2 69 kV transmission lines. The proposed Coopersburg 138/69 kV Tap will operate at 69 kV until load growth requires its conversion to 138 kV operation. PPL's plan includes the following steps:

- By 2009, rebuild the existing six mile, 2/0 copper conductor single circuit Coopersburg 69 kV Tap for double-circuit operation utilizing 556 ACSR[2] conductor which will provide a 100 MVA[3] capacity per circuit compared to the existing 30 MVA capacity. The proposed line will be initially operated at 69 kV until load growth requires its conversion to 138 kV operation. Although a single circuit is initially required by 2009, PPL states that double-circuit will be required by 2011 with the installation of a new 230-138/69 kV regional substation. PPL also states that load growth will require the double-circuit operation to supply Coopersburg 69-12 kV Substation by 2011. PPL asserts that it will be less expensive and intrusive to construct the double-circuit facilities by 2009 rather than adding an additional circuit two years later.
- The 6.8 mile, 2/0 copper, single circuit 69 kV transmission line from Seidersville 69-12 kV Substation to Coopersburg 69-12 kV Substation will be reconductored using 795 ACSR conductor by 2009.

[2] ACSR refers to "aluminum conductor – steel reinforced" and is a type of conductor made up of multiple strands of wire, with aluminum strands wrapped around a core of steel strands. The aluminum strands provide conductivity while the steel strands provide strength.

[3] MVA is an abbreviation for megavolt ampere, a measure of electrical capacity equal to the voltage multiplied by the current. The capacity of a transmission line – that is the amount of electrical load it can carry – is measured in MVA.

- An additional 75 MVA, 230-69 kV transformer will be installed at the Hosensack 230-69 Substation by 2009. Also, the 69 kV transmission system will be resectionalized to transfer load from the Quarry 230-69 kV Substation to Hosensack Substation. This will alleviate line and transformer system concerns;
- The previously mentioned 230-138/69 kV substation would be constructed along the proposed Coopersburg #1 & #2 138/69 kV Tap. PPL's proposed new substation would have two high-capacity transmission lines supplying areas north to Coopersburg 69-12 kV Substation and two high-capacity transmission lines supplying areas south to the Quakerstown #1 & #2 69 kV Taps. In addition, PPL's plan envisions that the 69 kV transmission system in this area would be resectionalized to transfer load from the Quarry and Buxmont 230-69 kV Substations to the new 230-138/69 kV Substation by 2011.

Need for the Proposed Facilities

Q. WHY HAS THE COMPANY PROPOSED TO REINFORCE THE ELECTRIC SYSTEM?

A. PPL asserts that rapid load growth in the Southern Lehigh Region has placed great demand on the existing system in the region. The need to maintain reliable service is the primary reason given by PPL in the Application. PPL also states that the reconstruction of the Coopersburg 69 kV Tap is an integral part of its long range system reinforcement plan for the Southern Lehigh Region.

Q. PLEASE DESCRIBE THE RELIABILITY CONCERNS THAT LED PPL TO FILE THIS APPLICATION.

A. PPL states in its Application that by 2009, the Coopersburg 69 kV Tap will have insufficient capacity to maintain reliable electric service if any of numerous unplanned events, called contingencies, were to occur. In addition, the Company says that a new 230-138/69 kV substation is required by 2011, driven by the increasing demand for electricity in the area. (page 3 of Application)

Q. WHAT DO YOU MEAN BY CONTINGENCIES?

A. "Contingencies" refer to electric system occurrences when one or more individual elements of the system, such as individual transmission lines, substation transformers, or generating units, are assumed, for planning purposes, to suffer forced outages. Typically, when elements of the transmission system are forced out of service, the rest of the system becomes more heavily loaded. In order to provide reliable electric service, transmission system planners have to plan, at a minimum, for a system that will deliver reliable service even if any individual component of that system suffers an unplanned outage. This is commonly referred to as a "first contingency" or a "single contingency" planning standard.

Q. WHAT ARE THE SYSTEM IMPACTS OF THE CONTINGENCIES THAT THE COMPANY USES TO JUSTIFY THE NEED FOR REINFORCEMENT OF ITS TRANSMISSION SYSTEM IN THE LEHIGH REGION?

A. The Company's Application states that loss of one of the Buxmont-Quakertown 69 kV Transmission Lines during peak summer conditions would overload the remaining line and create the potential to interrupt service to over 20,000 customers in the area. (P. 5 of Application) Insufficient 69 kV conductor capability and transformer capacity limits PPL's ability to restore these customers from neighboring substations. (p. 5/6) The Company expresses similar concerns for the Quarry-Elliott Heights 69 kV transmission lines during peak summer conditions. Loss of one of the Quarry-Elliott Heights circuits would overload the remaining line. This could lead to service interruptions to more than 30,000 customers. Service restoration is limited due to insufficient 69 kV conductor capability and transformer capacity.

Potential transformer outages are also a reliability concern to the Company. It states that the loss of one of the 69 kV transformers at the Quarry substation or at the Elroy substation would cause the remaining transformers to approach their thermal loading rating which could jeopardize service to 30,000 customers. (P. 6)

Historical and Projected Loads

Q. THE COMPANY SAYS THESE PROJECTS ARE NEEDED TO RESPOND TO RAPID LOAD GROWTH IN THE SOUTHERN LEHIGH REGION. DO YOU HAVE ANY COMMENT?

A. Yes. A review of the historical weather-adjusted peak loads, in MW[4], for the Lehigh Region was provided in response to Springfield Request No. 37, subsection (b). These

[4] MW refers to megawatts, a measure of the real power consumed. 1 megawatt equals 1,000,000 watts. Another related type of power is MVAR, megavolt amperes reactive, which is a measure of the reactive power consumed.

loads are reproduced in Table 1.

Weather Normalized Lehigh Region Peak Load (MW) – Table 1

Year	Peak Load
2003	1,639
2004	1,771
2005	1,886
2006	1,894
2007	1,888

I note that there was virtually no growth in the weather normalized Lehigh Region peak load in 2006 and 2007, the two most recent years for which peak load data are available.

Q. WHAT DOES IT MEAN WHEN THESE PEAK LOADS ARE DESCRIBED AS WEATHER NORMALIZED?

A. Weather normalization adjusts actual peak loads based on the weather that occurred when the peak was experienced. Peak load for an electric utility, especially summer peak loads, are air temperature dependent to an extent. When the Company prepares its peak load forecast, it assumes a particular temperature level. If air temperatures at the time of the actual peak load are cooler than the planning assumptions, then weather normalization would increase these actual peaks to reflect what would have been experienced had actual temperatures matched the planning assumptions. Similarly, if temperatures at the time of the actual peak load are warmer than the planning assumptions, then, weather normalization would decrease these actual peak loads.

Reactive power does no real work, but takes up transformer capacity and line capacity, and must be supplied for the system to operate. Total loads on transformers and lines, in MVA, include both MW and MVAR such that MVA equals the square root of the sum of the squares of the MW and the MVAR. If MW equals 4 (4 squared equals 16), and MVAR equals 3 (3 squared equals 9), then MVA equals 5 (the square root of 25). If MVAR equals zero, then MW equals MVA.

Q. WHEN DID THE COMPANY PREPARE ITS STUDY OF THE REQUIRED TRANSMISSION REINFORCEMENT IN THE SOUTHERN LEHIGH REGION?

A. The Company prepared its "Regional Transmission Reinforcement Study" for the southern Lehigh region ("Study"), dated November 2006, and provided this in response to Springfield No. 26. Appendix A on page 18 of the Study provided the projected peak loads to be used in the Study. These loads, in MW, are reflected in the table below, in part.

Lehigh Region Peak Load (MW) – Table 2

Year	Peak Load
2006	1,171
2007	1,818
2008	1,856
2009	1,886
2010	1,926
2011	1,977
2012	2,008

The above 2006 load projection in the Study (1,171 MW) differs from the actual weather-adjusted 2006 peak load provided in response to Springfield No. 37 (1,894MW) by such a large amount that a typographical error is suspected. However, the 2008 and 2009 projected peak loads shown in Table 2 are less than, or roughly equal to, the historical weather adjusted peak load for 2007 shown in Table 1 (1,888 MW). There's not much load growth in evidence here through 2009.

Q. HOW DO THESE FORECASTS COMPARE WITH THE HISTORICAL PEAK LOAD DATA FOR ITS SYSTEM?

A. At the point at which this testimony was initially drafted, the Company's position was that it retains only the most recent actual historical peak loads for each region. This meant that, initially, it was not possible to do such a comparison. (See the Company's response to Springfield No. 37, subsection (b), which as the source for Table 1.)

However, subsequent to this, the Company provided responses to some Springfield requests, one of which (Springfield No. 128 (b)) asked, again, for actual historical unadjusted peak loads for the Lehigh Region. This time, the Company was able to provide actual peak loads for the Region, as reflected in Table 3 below.

Actual Peak Load – Lehigh Region (MW) – Table 3

Year	Peak Load
2003	1,672
2004	2,007
2005	1,975
2006	1,912
2007	2,019

Q. WHAT IS THE SIGNIFICANCE OF THESE ACTUAL HISTORICAL LOADS?

A. The significance of these actual historical loads is (1) that the actual 2004 peak load is virtually equal to the forecast planning peak demand for 2012 for the Lehigh Region (2,007 MW compared to 2,008 MW), and (2) from 2004 to 2007 there was virtually no growth in the actual peak load experienced by the Lehigh Region. Given the Company's position that there has been rapid load growth in the southern Lehigh Region, then loads in other parts of the Lehigh Region were apparently decreasing, in order for the total Region peak load to be flat over this period. Also, if the electric system in the Region as

a whole has already carried the peak load that is forecast for the Region for 2012, then it looks as if the Region, as a whole, should already have the installed capacity to carry the 2012 forecast peak load. However, this installed capacity may not be located properly within the Region so as to be able, without modification, to serve the forecast loads. Hence, a closer look is warranted.

Area 69 kV Substation Transformer Capacity

Q. PART OF THE COMPANY'S JUSTIFICATION FOR THESE PROPOSED FACILITIES IS THE NEED FOR ADDITIONAL SUBSTATION TRANSFORMER CAPACITY TO FEED ITS 69 KV SYSTEM IN THE SOUTHERN LEHIGH REGION. PLEASE COMMENT.

A. Included as Exhibit PJL-3 is a summary of four regional substations with 69 kV transformer capacity. This exhibit includes the 69 kV transformer capacity at the Buxmont, Elroy, Hosensack, and Quarry substations, in MVA. Exhibit PJL-3 lists the 69 kV transformers at each substation, their nameplate rating, their summer normal and emergency ratings based on discovery responses by the Company as compared to the same metrics as used in the Company's load flow study data, and 2006 actual and 2014 projected load data for each transformer.

Q. WHAT DO YOU MEAN BY LOAD FLOW STUDY DATA?

A. Load flow studies are performed by computer model to examine the performance of the transmission system with regard to loading of facilities and the voltage level of facilities, under various configurations of facilities, at various load levels, and under various types of contingencies. Load flow studies are performed on a commercially available computer

model. Data files that describe the configuration of the electric system, its loads and its resources are loaded in and the model attempts to find a convergent solution, which can then be saved, as a "saved" case. Information regarding load flow data is taken from these files. The Company has supplied several such files in response to discovery.

Q. PLEASE DESCRIBE EXHIBIT PJL-3.

A. The exhibit compares historical and projected peak loads on these transformers with the transformer capacity available to serve them. It also lets us look at the ability of each substation to withstand a substation transformer outage, called a contingency.

Each transformer has a summer normal rating, the amount of load in MVA that the transformer is intended to carry under normal conditions with all system facilities in service. Each also has a higher summer emergency rating, which is the amount of load in MVA that the transformer is intended to carry when the system is experiencing a contingency. Different emergency ratings are possible depending on how long the equipment is intended to operate at that rating, and on the loss of equipment life that the planner is willing to accept. A two-hour emergency rating is typically much higher than a one-month emergency rating.

Let's address loads under normal operating conditions first. Column C on Exhibit PJL-3 describes nameplate ratings of these transformers. Column D describes summer normal ratings for each transformer as depicted in the Company's response to Springfield No.

39.[5] Column E reflects summer emergency ratings for each transformer from the same response. Emergency ratings are used when the system is experiencing contingency conditions. Actually, the response provided a range of emergency ratings based on the length of time the rating was intended to be utilized for many of the transformers. My exhibit reflects the one month rating in Column E.

Summer normal (column F) and emergency ratings (column G) were also taken from a base case load flow data set made available by the Company that reflects the current system in the year 2010 with no reinforcements.

Two items of note should be mentioned. First, the 2010 load flow data includes a fourth Hosensack transformer that is already scheduled to be added (line 18 of Exhibit PJL-3). I note that the projected 2014 loads did not include a load for this transformer. Second, the Company uses summer emergency ratings in its load flow[6] study that are considerably higher than the one-month ratings reflected in Column E. That is because these ratings reflect much shorter utilization times than the one month utilization time reflected in Column E.

Q. WHAT DOES EXHIBIT PJL-3 TELL US ABOUT TRANSFORMER CAPACITY?

A. It tells us many things. First, it tells us that all of these substations have sufficient capacity under normal conditions to serve projected 2014 loads with all facilities in service. For example, for the Buxmont substation, the total summer normal ratings of its

[5] Transformers are frequently operated above the nameplate rating under normal conditions. Hence, the summer normal ratings exceed nameplate.
[6] As reflected in the "B" rate of its load flow data deck.

two transformers total about 357 MVA (line 8, columns D and F), as compared with a projected 2014 load of 215 MVA (line 8, column I).

Next, Exhibit PJL-3 lets us see how each substation performs if one of its transformers suffers a contingency. For Buxmont, a transformer contingency in 2014 leaves all 215 MVA of projected load on just one transformer. Based on the one month emergency ratings, the 201 MVA of available emergency capacity (lines 6-7, column E) would be short of what is needed by 14 MVA, if no other capacity is considered. Based on the emergency ratings from the Company's load flow data (lines 6-7, column G), the available emergency capacity would fall between 249 MVA and 275 MVA, depending on which transformer suffers the contingency, which is sufficient to carry the projected 2014 loads for some period of time, until loads can be transferred.

For Elroy, the 69 kV bus is linked by two high capacity 69 kV circuits with the Buxmont 69 kV bus. This means that some additional emergency transformer capacity is available to either substation in the event of a transformer contingency. In the example we discuss above, where one Buxmont transformer is out in 2014, the Elroy substation would have some 38 MVA (221.3 - 183.4 = 37.9) (line 12, columns E and I) of available transformer capacity to assist the remaining Buxmont transformer, using the one month emergency ratings. Hence, instead of being 14 MVA short, as portrayed above, the projected 2014 Buxmont and Elroy loads could still theoretically be covered in the event of a transformer outage at Buxmont, although with a very tight margin that should entirely disappear soon after 2014.

For Hosensack, let's assume that the fourth transformer will have capability comparable to the existing three transformers. Any three transformers, with a combined one-month emergency rating around 330 MVA, will be able to carry the projected 2014 load of 210 MVA (line 19, columns E and I, respectively).

For the Quarry substation, the combined one-month emergency capacity of three transformers ranges roughly from 310 to 321 MVA (lines 22-25, column D), compared with a projected 2014 load of 346 MVA (line 26, column I). If the higher emergency ratings used by the Company in the load flow program are considered, the combined emergency ratings of three transformers ranges from 347 MVA to 355 MVA (lines 22-25, column G), again compared with a projected load of 346 MVA. Either way, Quarry's 69 kV transformers will need relief or reinforcement in the vicinity of 2014, or shortly thereafter.

Q. WHY IS YOUR ANALYSIS FOCUSED ON THE YEAR 2014?

A. PPL's analysis and justification for the new line and substation are based on its projection of demands through 2014. The Company's load studies all use projected 2014 loads as the planning criterion.

Q. WHAT DO YOU CONCLUDE ABOUT PPL'S TRANSFORMER CAPACITY IN 2014?

A. I conclude that PPL requires additional 69 kV transformer capacity to reliably meet projected 2014 demands. By "reliably meet" I mean able to meet the first contingency of having one transformer out of service.

Q. ARE THERE WAYS TO ADD 69 KV TRANSFORMER CAPACITY TO THE REGION THAT DO NOT REQUIRE THE CONSTRUCTION OF A NEW SUBSTATION?

A. Yes. Rather than construct a new substation as the Company has proposed, it is possible to increase transformer capacity at existing substations. I note that both Hosensack and Quarry use 69 kV transformers with 75 MVA nameplate ratings, while Buxmont and Elroy use 69 kV transformers with 150 MVA nameplate ratings. 69 kV transformer capacity at Hosensack and Quarry substations can be increased by replacing these smaller 75 MVA transformers with larger 150 MVA transformers, as well as by adding more transformers. Replacement of the smaller 75 MVA transformers is consistent with the fact that they tend to be older than the larger 150 MVA transformers. Two of the three Hosensack 75 MVA transformers are 45 years old or older, while two of the four Quarry 75 MVA transformers are 40 years old[7], both of which are in the neighborhood of, or are approaching, the end of their expected normal service life.

At present, there is a total of 525 MVA of 69 kV transformer nameplate capacity at the Quarry and Hosensack substations. If there were four 150 MVA 69 kV transformers at

7 See the response to Springfield No. 39, Attachment 39BCDE.

Quarry and four 150 MVA transformers at Hosensack, there would be 1,200 MVA of nameplate capacity at these two substations, an increase of 675 MVA in nameplate capacity. Considering that these transformers have ratings higher than their nameplate rating, the increase in load-carrying capability would be even higher Thus, there is obviously the potential to more than double the 69 kV transformer capacity at Hosensack and Quarry substations, without the need to build a new Springfield substation.

In addition, both Buxmont and Elroy substations have fewer than four 69 kV transformers. Buxmont has two such transformers and Elroy has only one. Additional 69 kV transformers can be added to either of these substations, or both, thereby further increasing 69 kV transformer capacity in the region without the need to build a new Springfield substation.

In other words, PPL could readily triple or quadruple its transformer capacity in the region without adding a new substation. There is considerably more expansion capacity available in these existing substations than PPL would need by 2014 or for many years thereafter.

Q. HAS THE COMPANY INVESTIGATED THE POSSIBLE REINFORCEMENT OF 69 KV TRANSFORMER CAPACITY IN THE REGION WITHOUT BUILDING THE PROPOSED SPRINGFIELD SUBSTATION?

A. Yes, it has. In both its Application and in its "Regional Transmission Reinforcement Study" for the southern Lehigh region ("Study"), dated November 2006, the Company

describes an alternative approach to reinforcing the 69 kV transformer capacity in the Region which does not require the construction of the proposed Springfield substation, but, which increases the 69 kV transformer capacity in the Region by adding such capacity to existing substations. I will address this alternative in more detail later in my testimony.

69 kV Transmission Line Capacity

Q. HAVE YOU EXAMINED THE CAPACITY OF EXISTING 69 KV CIRCUITS IN THE REGION AND THE PROJECTED LOADS FOR THESE CIRCUITS?

A. Yes. Exhibit PJL-4 lists the 69 kV circuits supplied from the Hosensack, Quarry, Elroy, and Buxmont substations. Exhibit PJL-4 lists the summer normal and summer emergency ratings for each circuit, along with the actual 2006 summer peak load and the projected 2014 summer peak load. None of the individual 69 kV circuits are projected to overload on an individual basis, comparing current and projected peak loads (columns E and F, respectively) against each circuit's summer normal capacity (column C).

During contingencies, however, one circuit may have to carry more than just its own load. Note that most of the 69 kV circuits shown in Exhibit PJL-4 are named in pairs. For example, the 69 kV circuits served out of Hosensack substation are named Wescosville #1 and #2, Allentown #1 and #2, and so on. These pairs of circuits typically follow similar routes and are expected to back each other up, if one should suffer a contingency.

In its Application, the Company expressed concern about the Buxmont – Quakertown 69 kV circuits (lines 33 and 34 on Exhibit PJL-4) and the Quarry - Elliot Heights 69 kV circuits (lines 16 and 17) being able to back each other up in a contingency.

Both Buxmont – Quakertown #1 ("BQ1") and Buxmont – Quakertown #2 ("BQ2") have summer normal ratings of 93 MVA (lines 33-34, column C) and summer emergency ratings of 119 MVA (lines 33-34, column D).[8] The 2014 peak load projected for BQ1 and BQ2 is 131 MVA (52.3 + 78.3 = 130.6) (lines 33-34, column F). If either BQ1 or BQ2 suffers a contingency, and the remaining circuit has to carry the projected 2014 peak load of both circuits, the 119 MVA emergency rating of the remaining circuit would be insufficient to carry the projected 131 MVA peak load.

Both Quarry – Elliot Heights #1 ("QE1") and Quarry – Elliot Heights #2 ("QE2") also have summer normal ratings of 93 MVA and summer emergency ratings of 119 MVA (lines 16-17, columns C and D). The 2014 peak load projected for QE1 and QE2 is 144 MVA (81.8 + 62.2 = 144.0) (lines 16-17, column F). If either QE1 or QE2 suffers a contingency, and the remaining circuit has to carry the projected 2014 peak load of both circuits, the 119 MVA emergency rating of the remaining circuit would be insufficient to carry the projected 144 MVA peak load.

I agree with PPL, therefore, that both of these 69 kV circuit pairs will need reinforcement or relief prior to 2014.

[8] Emergency ratings are used in contingency conditions.

Q. HOW CAN THESE CIRCUIT PAIRS BE REINFORCED OR RELIEVED?

A. There are a number of approaches. First, load can be transferred from one 69 kV circuit to another by switching segments of one circuit to an adjacent or nearby circuit. For this to happen there have to be circuit segments that can be transferred by switching, and there has to be an adjacent or nearby circuit that has available capacity.

Second, the capacity of individual 69 kV circuits can be increased by increasing the capacity of the conductor with which the circuit is strung. Note on Exhibit PJL-4 that the summer normal ratings of the 69 kV circuits range from as low as 38 MVA (line 23, column C) to as high as 121 MVA (line 28, column C). Part of the circuit capacity problems on the Region's 69 kV system is due to the use of 2/0 copper conductor on portions of the system, with a normal rating of about 30 MVA. If all of a 69 kV circuit were strung with 556 ACSR conductor, its normal rating could increase to the 93 MVA rating we see for many of the 69 kV circuits. Use of an even larger conductor, 795 ACSR, can increase a 69 kV circuit's rating to 128 MVA.

Third, new 69 kV circuits can be added to the Region, thereby allowing load to be transferred to the new circuits from the existing circuits and eliminating the overloads on the existing circuits.

The Company's proposed reinforcement makes use of load transfers between 69 kV circuits, reconductoring and/or rebuilding parts of existing circuits to increase capacity on those circuit portions, and the construction of new 69 kV circuits out of a new substation.

Need for Facilities Above 69 kV

Q. THE COMPANY'S PROPOSAL INCLUDES A NEW TRANSMISSION LINE WITH A VOLTAGE OF 138 KV. DOES PPL NEED TO INCREASE THE VOLTAGE IN THIS REGION TO 138 KV?

A. No, PPL does not need to increase the voltage in the Southern Lehigh region to 138 kV. PPL's analyses show that it can reliably serve the expected demand in the region with a maximum voltage of 69 kV. There is no need for PPL to construct facilities at a higher voltage level.

Alternatives Considered by PPL

Q. WHAT ALTERNATIVES TO THE PROPOSED FACILITIES DID THE COMPANY SAY WERE CONSIDERED?

A. Among the alternatives considered by the Company during the planning process is what the Company calls Alternative 2. This alternative involves increasing 69 kV transformer capacity at existing substations, reconductoring existing 69 kV lines, and constructing new 69 kV lines out of existing substations. It does not require the construction of a new substation. PPL discusses and analyzes Alternative 2 starting on page 12 of Exhibit A – Necessity Statement which is part of the Company's Application.

Alternative 2 includes the following reinforcements scheduled for 2009:

i. Reconductor the existing six-mile, 2/0 copper conductor single circuit Coopersburg 69 kV Tap utilizing high-capacity 556 ACSR conductor.

ii. Replace the 2/0 copper conductor on the Quarry #1 – Coopersburg 69 kV tap between Seidersville and Coopersburg 69 – 12 kV Substations with higher capacity 556 ACSR conductor.

Alternative 2 continues with the following reinforcements scheduled for 2011:

i. Rebuild the single circuit Hosensack – Coopersburg 69 kV Line between Hosensack 230 – 69 kV Substation and the Milford 69 – 12 kV Substation for double-circuit 138/69 kV operation utilizing higher capacity 556 ACSR conductor.

ii. Site, acquire new right-of-way, design and construct a new, approximately three mile long, double-circuit transmission line from Milford 69 – 12 kV Substation to the Buxmont - Quakertown #1 & #2 69 kV Transmission Line utilizing higher capacity 556 ACSR conductor.

iii. Install a new 69 kV bay at Hosensack 230 – 69 kV Substation.

iv. Replace three existing 75 MVA 230 – 69 kV transformers at Hosensack 230 – 69 kV Substation with 150 MVA transformers.

v. Replace overdutied circuit breakers at Hosensack 230 – 69 kV Substation.

vi. Resectionalize the 69 kV transmission system to reduce load on the heavily loaded Quarry and Buxmont 230 – 69 kV Substations and related transmission facilities.

Finally, Alternative 2 includes the following projected reinforcement for the period beyond 2011, if needed:

i. Replace two 75 MVA 230 – 69 kV transformers at Quarry 230 – 69 kV Substation with two 150 MVA transformers.

ii. Replace overdutied circuit breakers at Quarry 230 – 69 kV Substation.

iii. Build a new, approximately 3 mile long double-circuit 69 kV line from the Quarry – Elliott Heights #1 & #2 Transmission Line to Bingen 69 – 12 kV Substation.

iv. Rebuild the approximate 9.5 mile Quakertown #1 – Upper Hanover 69 kV Line for double-circuit 69 kV operation utilizing higher capacity 556 ACSR conductor.

v. Install an additional 150 MVA 230 – 69 kV transformer at Hosensack 230 – 69 kV Substation.

vi. Replace the overdutied circuit breakers at Hosensack 230 – 69 kV substation.

Q. WHY WAS ALTERNATIVE 2 REJECTED?

A. As described on page 14 of Exhibit A of the Company's Application:

> Although Alternative 2 eliminates all of the contingency reliability violations outlined in Section IV, at a cost of $41 million (PVRR) it is $5 million (PVRR) more expensive than Alternative 1. In addition, this alternative does not provide the flexibility for predicted future system expansion needs. Alternative 2 does not effectively provide the benefits of a substation source located central to the load. Load transfers and resectionalizing would be limited due to the long line lengths. Also, exposure of these facilities to outages resulting from transmission line disturbances is increased due to the longer line lengths.
>
> This alternative requires advancing the reinforcements (increasing transformer capacity) at existing regional substations to accommodate projected load growth. As transformer capacity is increased, circuit breaker interrupting ratings will be exceeded due to increased fault currents. Furthermore, the physical capabilities of support structures inside these substations will no longer be adequate because of the higher fault currents. As a result, numerous circuit breakers will need to be replaced and substation structures will need to be rebuilt. In addition to being costly, rebuilding of substation structures may be difficult to accomplish because all substation load would need to be transferred away during construction. Load transfer may not be possible, even during light load periods, without construction of additional neighboring substations.

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Q. DO YOU AGREE WITH PPL'S REASONS FOR REJECTING ALTERNATIVE 2 IN FAVOR OF A NEW SUBSTATION AND A NEW TRANSMISSION LINE ALONG THE CROSS COUNTRY ROUTE?

A. No, I do not agree with PPL. In fact, there are a number of reasons to prefer Alternative 2. The cost differential of $5 million in terms of present value revenue requirements, or about 14%, is offset by some attractive benefits of Alternative 2. Alternative 2 requires no new substation. Instead, Alternative 2 makes more complete use of the Company's existing substation sites. As I mentioned earlier in my testimony, a number of the smaller transformers that supply the 69 kV system in the Region are 40 years old or older. Much of the substation infrastructure that connects these transformers to the system is sized to the demands of these small, old transformers and would have to be replaced if larger transformers are used to replace these small transformers, as described by the Company in the above quote. However, by rebuilding the existing substation facilities as described in Alternative 2, the Company increases its utilization of these substation locations and can avoid the need to build a new substation.

In addition, by eliminating the need for a new substation, Alternative 2 removes the need to reroute the rebuilt Coopersburg 69 kV Tap along virgin right of way so as to intersect the location of the new substation proposed by the Company. Instead, Alternative 2 provides for reconductoring the existing Coopersburg 69 kV Tap with 556 ACSR conductor to more than double its capacity.

It may be slightly less expensive to build a new substation than it is to rebuild and modernize facilities in an existing substation. But, the new substation is not needed if existing substations can be rebuilt to replace old facilities, or if capacity can otherwise be added at the existing substation sites, as is the case with Alternative 2. Similarly, building a new transmission line along a largely virgin right of way, as proposed by the Company for its preferred approach to rebuilding the Coopersburg Tap, may be somewhat less expensive or less complicated than rebuilding an existing, in-service, transmission line. However, the need for new transmission right of way for the proposed rebuilt Coopersburg Tap is eliminated in Alternative 2, which provides only for reconductoring the existing line that makes up the Coopersburg Tap.

In my opinion, it is preferable to make better use of existing substation sites and existing transmission line rights-of-way to meet projected needs, if it is possible to do so, as opposed to building a new substation or new transmission lines in locations or along routes that currently do not have such facilities.

Q. THE COMPANY CRITICIZES ALTERNATIVE 2 BECAUSE IT DOES NOT PROVIDE THE FLEXIBILITY FOR PREDICTED FUTURE SYSTEM EXPANSION NEEDS. DO YOU HAVE ANY COMMENT?

A. Yes. The Company's preferred alternative provides more potential options for dealing with predicted expansion needs for many years into the future. But it does so at the cost of building a new substation at a virgin site, relocating the Coopersburg Tap to a virgin

right of way, and failing to make use of potentially available capacity at existing locations. The Company's current planning needs, based on a ten-year horizon, can be met using Alternative 2 without the need to expand the number of substation sites or to relocate the Coopersburg Tap. In fact, PPL and I have evaluated both the Company preferred approach and Alternative 2 for 20 years into the future, and both approaches provide adequately for future needs well beyond the Company's 10-year planning horizon.

As for providing for predicted needs farther in the future than 20 years, there is some inherent risk in providing facilities today intended to serve loads more than ten or even twenty years into the future. For example, the generation portion of the Company's retail electric rates are under a rate freeze which is currently expected to end in 2010. If the Company's electric rates increase by a substantial percentage when this freeze ends, the peak load levels currently projected for periods after 2010 may be reduced or delayed, thus reducing the need for system reinforcement or delaying that need.

Needless to say, many other things can change over a 20-year period. We don't know how development and load growth in the region might be affected that far into the future. This is why facilities of this nature are usually designed based on projections of no more than 10 years.

Q. THE COMPANY SAYS ALTERNATIVE 2 DOES NOT EFFECTIVELY PROVIDE THE BENEFITS OF A SUBSTATION SOURCE LOCATED CENTRAL TO THE

LOAD, AND THAT LOAD TRANSFERS AND RESECTIONALIZING WOULD BE LIMITED DUE TO THE LONG LINE LENGTHS. PLEASE ADDRESS.

A. The primary consideration here is that the Company states that Alternative 2 eliminates all of the contingency reliability violations outlined in Section IV of Exhibit A of the Company's Application. These violations of the Company's planning criteria are the reasons used by the Company to justify its proposed system reinforcement. PPL claims a centrally-located substation source, or shorter transmission lines, are needed to meet the Company's reliability planning criteria. But this claim is not borne out by the Company's own studies. Those studies show that PPL can provide reliable service for many years into the future (under Alternative 2) without building a new substation or shortening the length of transmission lines.

Further, I would put into context the Company's statement that shorter transmission lines boost reliability. First, the typical retail customer's outage experience reflects relatively few service interruptions caused by outages to transmission facilities. Transmission facilities are larger, stronger, and are maintained with greater clearances to trees than are distribution systems. Also, most transmission facilities are designed to withstand outages of single transmission lines and/or transformers without interrupting service to customers. Most service interruptions experienced by customers are typically caused by problems on the lower voltage distribution system. In addition, the Company doesn't provide any reliability data showing that customer service interruptions related to transmission line length is a problem in the Region.

Q. WHAT ABOUT THE CONSTRUCTION DIFFICULTIES THAT THE COMPANY ADDRESSES REGARDING THE REBUILDING OF ITS SUBSTATIONS? DO YOU HAVE ANY COMMENT?

A. Yes. It is somewhat more complicated to rebuild existing substation facilities than it is to build a new substation, but it certainly is achievable.

In addition, looking at Exhibit PJL-3, which summarizes 69 kV substation transformer capacity, these four substations have combined summer normal ratings of around 1,200 MVA (line 29, column D) with a current (2006) summer peak demand of 756 MVA (line 29, column H). This leaves a margin of over 400 MVA of capacity at the time of the summer peak. The current 69 kV loads on the largest of these four substations is 231 MVA at Quarry (line 26, column H). Taking the 69 kV facilities at Quarry out of service removes about 129 MVA of the margin (360.1 – 231.0 = 129.1) described above, reducing the margin from 440 MVA to about 311 MVA, still sufficient to cover the 231 MVA of Quarry load. At times of the year other than peak load periods, this available margin would be higher than portrayed above, since loads would be lower, and the load that would have to be picked up from the substation undergoing construction would be lower than portrayed above.

I conclude, therefore, that it appears highly unlikely that additional substation capacity would have to be built in order to facilitate the rebuilding of parts of the 69 kV system in the Region.

Now, it is possible that some modifications to the 69 kV circuits in the field would be necessary in order to permit available substation capacity to be used in such an endeavor. However, complicated projects are a part of today's utility transmission business. For example, PPL recently filed a petition, jointly with PSE&G, with the Federal Energy Regulatory Commission ("FERC") in which the Companies proposed to use innovative construction techniques to build a new 500 kV transmission line along existing, 230 kV rights of way.[9] There, they propose to keep the 230 kV line in service while constructing a new 500 kV line in the same corridor. In that case – in contrast to the current case – PPL expressed a clear preference for maximizing the use of its existing resources instead of creating a virgin transmission line corridor.

Q. IS ALTERNATIVE 2 THE ONLY WAY TO PROVIDE RELIABLE SERVICE USING PPL'S EXISTING FACILITIES?

A. No, it is not. In reviewing Alternative 2, I identified instances where a more thorough planning process might result in modifications that could reduce the option's cost and potentially further maximize the use of existing facilities. For example, Alternative 2 contemplates the construction of a new transmission line on a new right of way between the Milford substation and the Buxmont – Quakertown #1 and #2 69 kV lines around 2011. It appears to me, however, that it might be possible to provide much of the same reliability benefit by reconductoring and otherwise enhancing the existing line between Milford and the Buxmont – Quakertown #2 69 kV line. This would actually shorten the length of the line and avoid the need to construct a line along virgin right of way.

[9] In December, 2007, PPL Electric Utilities Corporation, and Public Service Electric and Gas Company filed with the FERC a joint Petition for Declaratory Order Authorizing Incentive Rates for the Susquehanna to Roseland 500 kV Transmission Line ("Petition") in Docket No. EL08-23-000.

Simply, if PPL chose to pursue Alternative 2, I would expect it to further refine its plans, improve the utilization of its existing facilities and rights of way, and possibly achieve cost savings.

Conclusion

Q. WHAT DO YOU CONCLUDE?

A. I conclude that PPL can reliably serve electric demands in the Southern Lehigh region without building the new substation and transmission line it has proposed in this case. PPL's own studies show that it can upgrade existing facilities and enhance the use of its existing substations and rights of way to reliably serve expected demands for at least the next 20 years. This is well beyond the planning horizon for facilities of this nature.

I conclude, therefore, that: (1) PPL does not have a need to build a new substation control building in Springfield Township; and (2) PPL does not have a need to build a new transmission line along the Cross Country route, a substantial portion of which would be located in Springfield Township.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Prior Experience Of Peter J. Lanzalotta

Mr. Lanzalotta has more than twenty-five years experience in electric utility system planning, power pool operations, distribution operations, electric service reliability, load and price forecasting, and market analysis and development. Mr. Lanzalotta has appeared as an expert witness on utility reliability, planning, operation, and rate matters in more than 80 proceedings in 21 states, the District of Columbia, the Provinces of Alberta and Ontario, and before the Federal Energy Regulatory Commission. He has developed evaluations of electric utility system cost, value, reliability, and condition. He has participated in negotiations between utilities and customers or regulators in more than ten states regarding transmission access, the need for facilities, electric rates, electric service reliability, the value of electric system components, and system operator structure under wholesale competition.

Prior to his forming Lanzalotta & Associates LLC in 2001, he was a Partner at Whitfield Russell Associates for fifteen years and a Senior Associate for approximately four years before that. He holds a Bachelor of Science in Electric Power Engineering from Rensselaer Polytechnic Institute and a Master of Business Administration with a concentration in Finance from Loyola College of Baltimore.

Prior to joining Whitfield Russell Associates in 1982, Mr. Lanzalotta was employed by the Connecticut Municipal Electric Energy Cooperative ("CMEEC") as a System Engineer. He was responsible for providing operational, financial, and rate expertise to Coop's budgeting, ratemaking and system planning processes. He participated on behalf of CMEEC in the Hydro-Quebec/New England Power Pool Interconnection project and initiated the development of a database to support CMEEC's pool billing and financial data needs.

Prior to his CMEEC employment, he served as Chief Engineer at the South Norwalk (Connecticut) Electric Works, with responsibility for planning, data processing, engineering, rates and tariffs, generation and bulk power sales, and distribution operations. While at South Norwalk, he conceived and implemented, through Northeast Utilities and NEPOOL, a peak-shaving plan for South Norwalk and a neighboring municipal electric utility, which resulted in substantial power supply savings. He programmed and implemented a computer system to perform customer billing and maintain accounts receivable accounting. He also helped manage a generating station overhaul and the undergrounding of the distribution system in South Norwalk's downtown.

From 1977 to 1979, Mr. Lanzalotta worked as a public utility consultant for Van Scoyoc & Wiskup and separately for Whitman Requart & Associates in a variety of positions. During this time, he developed cost of service, rate base evaluation, and rate design

impact data to support direct testimony and exhibits in a variety of utility proceedings, including utility price squeeze cases, gas pipeline rates, and wholesale electric rate cases.

Prior to that, He worked for approximately 2 years as a Service Tariffs Analyst for the Finance Division of the Baltimore Gas & Electric Company where he developed cost and revenue studies, evaluated alternative rate structures, and studied the rate structures of other utilities for a variety of applications. He was also employed by BG&E in Electric System Operations for approximately 3 years, where his duties included operations analysis, outage reporting, and participation in the development of BG&E's first computerized customer information and service order system.

Mr. Lanzalotta is a member of the Institute of Electrical & Electronic Engineers, the National Society of Professional Engineers, the Association of Energy Engineers, the National Fire Protection Association, the American Solar Energy Society, and the Financial Management Association. He is also registered Professional Engineer in the states of Maryland and Connecticut.

Proceedings In Which
Peter J. Lanzalotta
Has Testified

1. **In re: Public Service Company of New Mexico**, Docket Nos. ER78-337 and ER78-338 before the Federal Energy Regulatory Commission, concerning the need for access to calculation methodology underlying filing.

2. **In re: Baltimore Gas and Electric Company**, Case No. 7238-V before the Maryland Public Service Commission, concerning outage replacement power costs.

3. **In re: Houston Lighting & Power Company**, Texas Public Utilities Commission Docket No. 4712, concerning modeling methods to determine rates to be paid to cogenerators and small power producers.

4. **In re: Nevada Power Company**, Nevada Public Service Commission, Docket No. 83-707 concerning rate case fuel inventories, rate base items, and O&M expense.

5. **In re: Virginia Electric & Power Company**, Virginia State Corporation Commission, Case No. PUE820091, concerning the operating and reliability-based need for additional transmission facilities.

6. **In re: Public Service Electric & Gas Company**, New Jersey Board of Public Utilities, Docket No. 831-25, concerning outage replacement power costs.

7. **In re: Philadelphia Electric Company**, Pennsylvania Public Utilities Commission, Docket No. P-830453, concerning outage replacement power costs.

8. **In re: Cincinnati Gas & Electric Company**, Public Utilities Commission of Ohio, Case No. 83-33-EL-EFC, concerning the results of an operations/fuel-use audit conducted by Mr. Lanzalotta.

9. **In re: Kansas City Power and Light Company**, before the State Corporation Commission of the state of Kansas, Docket Nos. 142,099-U and 120,924-U, concerning the determination of the capacity, from a new base-load generating facility, needed for reliable system operation, and the capacity available from existing generating units.

10. **In re: Philadelphia Electric Company**, Pennsylvania Public Utilities Commission, Docket No. R-850152, concerning the determination of the capacity, from a new base-load generating facility, needed for reliable system operation, and the capacity available from existing generating units.

11. **In re: ABC Method Proposed for Application to Public Service Company of**

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Colorado, before the Public Utilities Commission of the State of Colorado, on behalf of the Federal Executive Agencies ("FEA"), concerning a production cost allocation methodology proposed for use in Colorado.

12. **In re: Duquesne Light Company**, Docket No. R-870651, before the Pennsylvania Public Utilities Commission, on behalf of the Office of Consumer Advocate, concerning the system reserve margin needed for reliable service.

13. **In re: Pennsylvania Power Company**, Docket No. I-7970318 before the Pennsylvania Public Utilities Commission, on behalf of the Office of Consumer Advocate, concerning outage replacement power costs.

14. **In re: Commonwealth Edison Company**, Docket No. 87-0427 before the Illinois Commerce Commission, on behalf of the Citizen's Utility Board of Illinois, concerning the determination of the capacity, from new base-load generating facilities, needed for reliable system operation.

15. **In re: Central Illinois Public Service Company**, Docket No. 88-0031 before the Illinois Commerce Commission, on behalf of the Citizen's Utility Board of Illinois, concerning the degree to which existing generating capacity is needed for reliable and/or economic system operation.

16. **In re: Illinois Power Company**, Docket No. 87-0695 before the State of Illinois Commerce Commission, on behalf of Citizens Utility Board of Illinois, Governors Office of Consumer Services, Office of Public Counsel and Small Business Utility Advocate, concerning the determination of the capacity, from a new base-load generating facility, needed for reliable system operation, and the capacity available from existing generating units.

17. **In re: Florida Power Corporation**, Docket No. 860001-EI-G (Phase II), before the Florida Public Service Commission, on behalf of the Federal Executive Agencies of the United States, concerning an investigation into fuel supply relationships of Florida Power Corporation.

18. **In re: Potomac Electric Power Company**, before the Public Service Commission of the District of Columbia, Docket No. 877, on behalf of the Public Service Commission Staff, concerning the need for and availability of new generating facilities.

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19. **In re: South Carolina Electric & Gas Company**, before the South Carolina Public Service Commission, Docket No. 88-681-E, On Behalf of the State of Carolina Department of Consumer Affairs, concerning the capacity needed for reliable system operation, the capacity available from existing generating units, relative jurisdictional rate of return, reconnection charges, and the provision of supplementary, backup, and maintenance services for QFs.

20. **In re: Commonwealth Edison Company**, Illinois Commerce Commission, Docket Nos. 87-0169, 87-0427, 88-0189, 88-0219, and 88-0253, on behalf of the Citizen's Utility Board of Illinois, concerning the determination of the capacity, from a new base-load generating facility, needed for reliable system operation.

21. **In re: Illinois Power Company**, Illinois Commerce Commission, Docket No. 89-0276, on behalf of the Citizen's Utility Board Of Illinois, concerning the determination of capacity available from existing generating units.

22. **In re: Jersey Central Power & Light Company**, New Jersey Board of Public Utilities, Docket No. EE88-121293, on behalf of the State of New Jersey Department of the Public Advocate, concerning evaluation of transmission planning.

23. **In re: Canal Electric Company**, before the Federal Energy Regulatory Commission, Docket No. ER90-245-000, on behalf of the Municipal Light Department of the Town of Belmont, Massachusetts, concerning the reasonableness of Seabrook Unit No. 1 Operating and Maintenance expense.

24. **In re: New Hampshire Electric Cooperative Rate Plan Proposal**, before the New Hampshire Public Utilities Commission, Docket No. DR90-078, on behalf of the New Hampshire Electric Cooperative, concerning contract valuation.

25. **In re: Connecticut Light & Power Company**, before the Connecticut Department of Public Utility Control, Docket No. 90-04-14, on behalf of a group of Qualifying Facilities concerning O&M expenses payable by the QFs.

26. **In re: Duke Power Company**, before the South Carolina Public Service Commission, Docket No. 91-216-E, on behalf of the State of South Carolina Department of Consumer Advocate, concerning System Planning, Rate Design and Nuclear Decommissioning Fund issues.

27. **In re: Jersey Central Power & Light Company**, before the Federal Energy Regulatory

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Commission, Docket No. ER91-480-000, on behalf of the Boroughs of Butler, Madison, Lavallette, Pemberton and Seaside Heights, concerning the appropriateness of a separate rate class for a large wholesale customer.

28. **In re: Potomac Electric Power Company**, before the Public Service Commission of the District of Columbia, Formal Case No. 912, on behalf of the Staff of the Public Service Commission of the District of Columbia, concerning the Application of PEPCO for an increase in retail rates for the sale of electric energy.

29. **Commonwealth of Pennsylvania, House of Representatives**, General Assembly House Bill No. 2273. Oral testimony before the Committee on Conservation, concerning proposed Electromagnetic Field Exposure Avoidance Act.

30. **In re: Hearings on the 1990 Ontario Hydro Demand\Supply Plan**, before the Ontario Environmental Assessment Board, concerning Ontario Hydro's System Reliability Planning and Transmission Planning.

31. **In re: Maui Electric Company**, Docket No. 7000, before the Public Utilities Commission of the State of Hawaii, on behalf of the Division of Consumer Advocacy, concerning MECO's generation system, fuel and purchased power expense, depreciation, plant additions and retirements, contributions and advances.

32. **In re: Hawaiian Electric Company, Inc.**, Docket No. 7256, before the Public Utilities Commission of the State of Hawaii, on behalf of the Division of Consumer Advocacy, concerning need for, design of, and routing of proposed transmission facilities.

33. **In re: Commonwealth Edison Company**, Docket No. 94-0065 before the Illinois Commerce Commission on behalf of the City of Chicago, concerning the capacity needed for system reliability.

34. **In re: Commonwealth Edison Company**, Docket No. 93-0216 before the Illinois Commerce Commission on behalf of the Citizens for Responsible Electric Power, concerning the need for proposed 138 kV transmission and substation facilities.

35. **In re: Commonwealth Edison Company**, Docket No. 92-0221 before the Illinois Commerce Commission on behalf of the Friends of Illinois Prairie Path, concerning the need for proposed 138 kV transmission and substation facilities.

36. **In re: Commonwealth Edison Company**, Docket No. 94-0179 before the Illinois

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Commerce Commission on behalf of the Friends of Sugar Ridge, concerning the need for proposed 138 kV transmission and substation facilities.

37. **In re: Public Service Company of Colorado**, Docket Nos. 95A-531EG and 95I-464E before the Colorado Public Utilities Commission on behalf of the Office of Consumer Counsel, concerning a proposed merger with Southwestern Public Service Company and a proposed performance-based rate-making plan.

38. **In re: South Carolina Electric & Gas Company, Duke Power Company, and Carolina Power & Light Company**, Docket No. 95-1192-E, before the South Carolina Public Service Commission on behalf of the South Carolina Department of Consumer Advocate, concerning avoided cost rates payable to qualifying facilities.

39. **In re: Lawrence A. Baker v. Truckee Donner Public Utility District**, Case No. 55899, before the Superior Court of the State of California on behalf of Truckee Donner Public Utility District, concerning the reasonableness of electric rates.

40. **In re: Black Hills Power & Light Company**, Docket No. OA96-75-000, before the Federal Energy Regulatory Commission on behalf of the City of Gillette, Wyoming, concerning the Black Hills' proposed open access transmission tariff.

41. **In re: Metropolitan Edison Company and Pennsylvania Electric Company** for Approvals of the Restructuring Plan Under Section 2806, Docket Nos. R-00974008 and R-00974009 before the Pennsylvania PUC on behalf of Operating NUG Group, concerning miscellaneous restructuring issues.

42. **In re: New Jersey State Restructuring Proceeding** for consideration of proposals for retail competition under BPU Docket Nos. EX94120585U; E097070457; E097070460; E097070463; E097070466 before the New Jersey BPU on behalf of the New Jersey Division of Ratepayer Advocate, concerning load balancing, third party settlements, and market power.

43. **In re: Arbitration Proceeding In City of Chicago v. Commonwealth Edison** for consideration of claims that franchise agreement has been breached, Proceeding No. 51Y-114-350-96 before an arbitration panel board on behalf of the City of Chicago concerning electric system reliability.

44. **In re: Transalta Utilities Corporation**, Application No. RE 95081 on behalf of the

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ACD companies, before the Alberta Energy And Utilities Board in reference to the use and value of interruptible capacity.

45. **In re: Consolidated Edison Company,** Docket No. EL99-58-000 on behalf of The Village of Freeport, New York, before FERC in reference to remedies for a breach of contract to provide firm transmission service on a non-discriminatory basis.

46. **In re: ESBI Alberta Ltd.,** Application No. 990005 on behalf of the FIRM Customers, before the Alberta Energy And Utilities Board concerning the reasonableness of the cost of service plus management fee proposed for 1999 and 2000 by the transmission administrator.

47. **In re: South Carolina Electric & Gas Company,** Docket No. 2000-0170-E on behalf of the South Carolina Department of Consumer Affairs before the Public Service Commission of South Carolina concerning an application for a Certificate of Environmental Compatibility and Public Convenience and Necessity for new and repowered generating units at the Urquhart generating station.

48. **In re: BGE,** Case No. 8837 on behalf of the Maryland Office of People's Counsel before the Maryland Public Service Commission concerning proposed electric line extension charges.

49. **In re: PEPCO,** Case No. 8844 on behalf of the Maryland Office of People's Counsel before the Maryland Public Service Commission concerning proposed electric line extension charges.

50. **In re: GenPower Anderson LLC,** Docket No. 2001-78-E on behalf of the South Carolina Department of Consumer Affairs before the Public Service Commission of South Carolina concerning an application for a Certificate of Environmental Compatibility and Public Convenience and Necessity for new generating units at the GenPower Anderson LLC generating station.

51. **In re: Pike County Light & Power Company,** Docket No. P-00011872, on behalf of Pennsylvania Office of Consumer Advocate before the Pennsylvania Public Utility Commission concerning the Pike County request for a retail rate cap exception.

52. **In re: Potomac Electric Power Company and Conectiv,** Case No. 8890, on behalf of the Maryland Office of People's Counsel before the Maryland Public Service Commission concerning the proposed merger of Potomac Electric Power Company and

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Conectiv.

53. **In re: South Carolina Electric & Gas Company,** Docket No. 2001-420-E on behalf of the South Carolina Department of Consumer Affairs before the Public Service Commission of South Carolina concerning an application for a Certificate of Environmental Compatibility and Public Convenience and Necessity for new generating units at the Jasper County generating station.

54. **In re: Connecticut Light & Power Company,** Docket No. 217 on behalf of the Towns of Bethel, Redding, Weston, and Wilton, Connecticut before the Connecticut Siting Council concerning an application for a Certificate of Environmental Compatibility and Public Need for a new transmission line facility between Plumtree Substation, Bethel and Norwalk Substation, Norwalk.

55. **In re: The City of Vernon, California,** Docket No. EL02-103 on behalf of the City of Vernon before the Federal Energy Regulatory Commission concerning Vernon's transmission revenue balancing account adjustment reflecting calendar year 2001 transactions.

56. **In re: San Diego Gas & Electric Company et. al.,** Docket No. EL00-95-045 on behalf of the City of Vernon, California before the Federal Energy Regulatory Commission concerning refunds and other monies payable in the California wholesale energy markets.

57. **In re: The City of Vernon, California,** Docket No. EL03-31 on behalf of the City of Vernon before the Federal Energy Regulatory Commission concerning Vernon's transmission revenue balancing account adjustment reflecting 2002 transactions.

58. **In re: Jersey Central Power & Light Company,** Docket Nos. ER02080506, ER02080507, ER02030173, and EO02070417 on behalf of the New Jersey Division of Ratepayer Advocate before the New Jersey Board of Public Utilities concerning reliability issues involved in the approval of an increase in base tariff rates.

59. **In re: Proposed Electric Service Reliability Rules, Standards, and Indices To Ensure Reliable Service by Electric Distribution Companies,** PSC Regulation Docket No. 50, on behalf of the Delaware Public Service Commission Staff before the Delaware Public Service Commission concerning proposed electric service reliability rules, standards and indices.

60. **In re: Central Maine Power Company,** Docket No. 2002-665, on behalf of the Maine

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Has Testified

Public Advocate and the Town of York before the Maine Public Utilities Commission concerning a Request for Commission Investigation into the New CMP Transmission Line Proposal for Eliot, Kittery, and York.

61. **In re: Metropolitan Edison Company,** Docket No. C-20028394, on behalf of the Pennsylvania Office of Consumer Advocate, before the Pennsylvania Public Utility Commission concerning the reliability service complaint of Robert Lawrence.

62. **In re: The California Independent System Operator Corporation,** Docket No. ER00-2019 *et al.* on behalf of the City of Vernon, California, before the Federal Energy Regulatory Commission concerning wholesale transmission tariffs, rates and rate structures proposed by the California ISO.

63. **In re: The Narragansett Electric Company,** Docket No. 3564 on behalf of the Rhode Island Department of Attorney General, before the Rhode Island Public Utilities Commission concerning the proposed relocation of the E-183 transmission line.

64. **In re: The City of Vernon, California,** Docket No. EL04-34 on behalf of the City of Vernon before the Federal Energy Regulatory Commission concerning Vernon's transmission revenue balancing account adjustment reflecting 2003 transactions.

65. **In re: Atlantic City Electric Company,** Docket No. ER03020110 on behalf of the New Jersey Division of Ratepayer Advocate before the New Jersey Board of Public Utilities concerning reliability issues involved in the approval of an increase in base tariff rates.

66. **In re: Connecticut Light & Power Company and the United Illuminating Company,** Docket No. 272 on behalf of the Towns of Bethany, Cheshire, Durham, Easton, Fairfield, Hamden, Middlefield, Milford, North Haven, Norwalk, Orange, Wallingford, Weston, Westport, Wilton, and Woodbridge, Connecticut before the Connecticut Siting Council concerning an application for a Certificate of Environmental Compatibility and Public Need for a new transmission line facility between the Scoville Rock Switching Station in Middletown and the Norwalk Substation in Norwalk, Connecticut.

67. **In re: Metropolitan Edison Company, Pennsylvania Electric Company, and Pennsylvania Power Company,** Docket No. I-00040102, on behalf of the Pennsylvania Office of Consumer Advocate before the Pennsylvania Public Utility Commission concerning electric service reliability performance.

Proceedings In Which
Peter J. Lanzalotta
Has Testified

68. **In re: Entergy Louisiana, Inc.**, Docket No. U-20925 RRF-2004 on behalf of Bayou Steel before the Louisiana Public Service Commission concerning a proposed increase in base rates.

69. **In re: Jersey Central Power & Light Company,** Docket No. ER02080506, Phase II, on behalf of the New Jersey Division of Ratepayer Advocate before the New Jersey Board of Public Utilities concerning reliability issues involved in the approval of an increase in base tariff rates.

70. **In re: Maine Public Service Company,** Docket No. 2004-538, on behalf of the Main Public Advocate before the Maine Public Utilities Commission concerning a request to construct a 138 kV transmission line from Limestone, Maine to the Canadian border near Hamlin, Maine.

71. **In re: Pike County Light and Power Company,** Docket No. M-00991220F0002, on behalf of the Pennsylvania Office of Consumer Advocate before the Pennsylvania Public Utility Commission concerning the Company's Petition to amend benchmarks for distribution reliability.

72. **In re: Atlantic City Electric Company,** Docket No. EE04111374, on behalf of the New Jersey Division of Ratepayer Advocate before the New Jersey Board of Public Utilities concerning the need for transmission system reinforcement, and related issues.

73. **In re: Bangor Hydro-Electric Company,** Docket No. 2004-771, on behalf of the Main Public Advocate before the Maine Public Utilities Commission concerning a request to construct a 345 kV transmission line from Orrington, Maine to the Canadian border near Baileyville, Maine.

74. **In re: Eastern Maine Electric Cooperatve,** Docket No. 2005-17, on behalf of the Main Public Advocate before the Maine Public Utilities Commission concerning a petition to approve a purchase of transmission capacity on a 345 kV transmission line from Maine to the Canadian province of New Brunswick.

75. **In re: Virginia Electric and Power Company,** Case No. PUE-2005-00018, on behalf of the Town of Leesburg VA and Loudoun County VA before the Virginia State Corporation Commission concerning a request for a certificate of public convenience and necessity for transmission and substation facilities in Loudoun County.

Proceedings In Which
Peter J. Lanzalotta
Has Testified

76. **In re: Proposed Electric Service Reliability Rules, Standards, and Indices To Ensure Reliable Service by Electric Distribution Companies,** PSC Regulation Docket No. 50, on behalf of the Delaware Public Service Commission Staff before the Delaware Public Service Commission concerning proposed electric service reliability reporting, standards, and indices.

77. **In re: Proposed Merger Involving Constellation Energy Group Inc. and the FPL Group, Inc.**, Case No. 9054, on behalf of the Maryland Office of Peoples' Counsel before the Maryland Public Service Commission concerning the proposed merger involving Baltimore Gas & Electric Company and Florida Light & Power Company.

78. **In re: Proposed Sale and Transfer of Electric Franchise of the Town of St. Michaels to Choptank Electric Cooperative, Inc.,** Case No. 9071, on behalf of the Maryland Office of Peoples' Counsel before the Maryland Public Service Commission concerning the sale by St. Michaels of their electric franchise and service area to Choptank.

79. **In re: Petition of Rockland Electric Company for the Approval of Changes in Electric Rates, and Other Relief,** BPU Docket No. ER06060483, on behalf of the Department of the Public Advocate, Division of Rate Counsel, before the New Jersey Board of Public Utilities, concerning electric service reliability and reliability-related spending.

80. **In re: The Complaint of the County of Pike v. Pike County Light & Power Company, Inc.,** Docket No. C-20065942, et al., on behalf of the Pennsylvania Office of Consumer Advocate before the Pennsylvania Public Utilities Commission, concerning electric service reliability and interconnecting with the PJM ISO.

81. **In re: Application of American Transmission Company to Construct a New Transmission Line,** Docket No. 137-CE-139, on behalf of The Sierra Club of Wisconsin, before the Public Service Commission of Wisconsin, concerning the request to build a new 138 kV transmission line.

82. **In re: The Matter of the Self-Complaint of Columbus Southern Power Company and Ohio Power Company Regarding the Implementation of Programs to Enhance Distribution Service Reliability,** Case No. 06-222-EL-SLF, on behalf of The Office of The Ohio Consumers' Counsel, before the Public Utilities Commission of Ohio, concerning distribution system reliability and related topics.

Proceedings In Which
Peter J. Lanzalotta
Has Testified

83. **In re: Central Maine Power Company,** Docket No. 2006-487, on behalf of the Maine Public Advocate before the Maine Public Utilities Commission concerning CMP's Petition for Finding of Public Convenience & Necessity to build a 115 kV transmission line between Saco and Old Orchard Beach.

84. **In re: Bangor Hydro Electric Company,** Docket No. 2006-686, on behalf of the Maine Public Advocate before the Maine Public Utilities Commission concerning BHE's Petition for Finding of Public Convenience & Necessity to build a 115 kV transmission line and substation in Hancock County.

85. **In re: Commission Staff's Petition For Designation of Competitive Renewable Energy Zones,** Docket No. 33672, on behalf of the Texas Office of Public Utility Counsel, concerning the Staff's Petition and the determination of what areas should be designated as CREZs by the Commission.

86. **In re: Virginia Electric and Power Company,** Case No. PUE-2006-00091, on behalf of the Towering Concerns and Stafford County VA before the Virginia State Corporation Commission concerning a request for a certificate of public convenience and necessity for electric transmission and substation facilities in Stafford County.

87. **In re: Trans-Allegheny Interstate Line Company,** Docket Nos. A-110172 et al., on behalf of the Pennsylvania Office of Consumer Advocate, before the Pennsylvania Public Utility Commission, concerning a request for a certificate of public convenience and necessity for electric transmission and substation facilities in Pennsylvania.

88. **In re: Commonwealth Edison Company,** Docket No. 07-0566, on behalf of the Illinois Attorney General, before the Illinois Commerce Commission, concerning electric transmission and distribution projects promoted as smart grid projects, and the rider proposed to pay for them.

89. **In re: Commonwealth Edison Company,** Docket No. 07-0491, on behalf of the Illinois Attorney General, before the Illinois Commerce Commission, concerning the applicability of electric service interruption provisions.

90. **In re: Hydro One Networks ,** Case No. EB-2007-0050, on behalf of Pollution Probe, before the Ontario Energy Board, concerning a request for leave to construct electric transmission facilities in the Province of Ontario.

Proceedings In Which
Peter J. Lanzalotta
Has Testified

91. **In re: PEPCO Holdings, Inc.,** Docket No. ER-08-686-000, on behalf of the Maryland Office of Peoples' Counsel, before the Federal Energy Regulatory Commission, concerning a request for incentive rates of return on transmission projects.

92. **In re: PPL Electric Utilities Corporation and Public Service Electric and Gas Company,** Docket No. ER-08-23-000, on behalf of the Joint Consumer Advocates, including the state consumer advocacy offices for the States of Maryland, West Virginia, Pennsylvania, and New Jersey, before the Federal Energy Regulatory Commission, concerning a request for incentive rates of return on transmission projects.

	A	B	C	D	E	F	G	H	I
1	PP&L - Transformers Feeding 69 kV - Portion of Lehigh Region								
2				Response	Response	Load Flow	Load Flow	2006	2014
3	Transformers			Summer Norm	Summer Emer	Summer Norm	Summer Emer	Summer Peak	Summer Peak
4			Nameplate	Rating	Rating	Rating	Rating	Actual	Projected
5	Buxmont 230/69 kV		(MVA)	(MVA)	(MVA)	(MVA)	(MVA)	(MVA)	(MVA)
6	No. 1	230/69 kV	150	178.5	201.2	178.0	275.0	86.0	104.4
7	No. 2	230/69 kV	150	178.8	201.9	179.0	249.0	91.0	110.8
8	Sum		300	357.3	403.1	357.0	524.0	177.0	215.2
9									
10	Elroy 138/69 kV								
11	No. 2	138/69 kV	150	212.9	221.3	212.0	268.0	164.0	183.4
12	Sum		150	212.9	221.3	212.0	268.0	164.0	183.4
13									
14	Hosensack 230/69 kV								
15	No. 1	230/69 kV	75	86.0	108.1	85.0	120.0	64.0	73.2
16	No. 2	230/69 kV	75	89.1	111.5	84.0	116.0	58.0	66.3
17	No. 3	230/69 kV	75	91.3	112.7	89.0	122.0	62.0	70.9
18	No. 4	230/69 kV	75	-	-	84.0	116.0	-	-
19	Sum		300	266.4	332.3	342.0	474.0	184.0	210.4
20									
21	Quarry 230/69 kV								
22	No. 1	230/69 kV	75	88.0	99.5	88.0	121.0	57.0	86.7
23	No. 2	230/69 kV	75	88.1	99.6	88.0	121.0	57.0	87.5
24	No. 3	230/69 kV	75	92.1	111.2	86.0	113.0	59.0	87.3
25	No. 4	230/69 kV	75	92.0	111.1	86.0	113.0	58.0	85.0
26	Sum		300	360.2	421.4	348.0	468.0	231.0	346.5
27									
28									
29	Sum - Transformers feeding 69 kV		1,050.0	1,196.8	1,378.1	1,259.0	1,734.0	756.0	955.5
30									
31					1 month rate		2 hour or more		
32	Response = Springfield No. 39								
33	Load Flow = base2010.raw								

Exhibit PJL-4

	A	B	C	D	E	F
1	PP&L 69 kV Circuits - Portion of Lehigh Region					
2					2006	2014
3			Summer	Summer	Summer Peak	Summer Peak
4			Normal	Emergency	Actual	Projected
5	Hosensack		(MVA)	(MVA)	(MVA)	(MVA)
6	Wescosville #1	to n.o. point	66	86	42	45.5
7	Wescosville #2	to n.o. point	66	86	39	43.8
8	Allentown #1		66	86	8	11.4
9	Allentown #2		66	86	8	11.4
10	Coopersburg		66	86	19	18.0
11	Upper Hanover#1		93	103	40	35.9
12	Upper Hanover#2		93	103	28	37.2
13	Sum		516	636	184	203.2
14						
15	Quarry					
16	Elliot Heights #1		93	119	78	81.8
17	Elliot Heights #2		93	119	49	62.2
18	Nazareth #1	from Quarry	66	86	-19	33.7
19	Nazareth #2	from Quarry	66	86	-19	21.7
20	Siegfried #1	to n.o. point	41	60	25	24.1
21	Siegfried #2	to n.o. point	93	119	44	43.0
22	Airco		73	73	44	65.4
23	Converter #1		38	55	7	4.0
24	Converter #2		41	55	0	4.0
25	Sum		604	772	209	339.9
26						
27	Elroy					
28	Buxmont#1	from Elroy	121	154	95	91.9
29	Buxmont#2	from Elroy	119	153	69	88.8
30	Sum		240	307	164	180.7
31						
32	Buxmont					
33	Quakertown #1		93	119	52	52.3
34	Quakertown #2		93	119	68	78.3
35	Hatfield #3		93	119	56	62.8
36	Hatfield #4		93	119	42	47.0
37	Elroy #1	from Buxmont	93	119	-20	-20.1
38	Elroy #2	from Buxmont	93	119	-28	24.3
39	Sum		558	714	170	244.6
40						
41						
42	Total		1,918.0	2,429.0	727.0	968.4
43						