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February 27, 2006

FEB 27 2006

Kentucky Public Service Commission  
Attn: John A. Rogness, III, Manager  
Management Audit Branch  
211 Sower Blvd.  
Frankfort, Kentucky 40601-8294

PUBLIC SERVICE  
COMMISSION

Dear Mr. Rogness:

The Liberty Consulting Group (*Liberty*) is pleased to submit 20 copies of the attached report to The Kentucky Public Service Commission (*the Commission*). This report provides the results of Liberty's review of the application of Louisville Gas and Electric Company and Kentucky Utilities (*LG&E/KU*) for a Certificate of Public Convenience and Necessity to construct the following transmission line project:

Case Nos. 2005-00467 and 2005-00472  
345 kV Transmission Line from Mill Creek to Hardin County

The Commission found that the applications for these two cases can best be processed by consolidating them for administrative and procedural purposes.

The focus of Liberty's review for these two cases was for Liberty to evaluate whether LG&E/KU thoroughly considered "all reasonable alternatives, including locating the line partially or fully along existing transmission corridors," as specified in the Commission's directive in its final order in Case No. 2005-00142.

Liberty appreciates the opportunity to work with the Commission on projects of this importance.

Sincerely,



John Antonuk  
President

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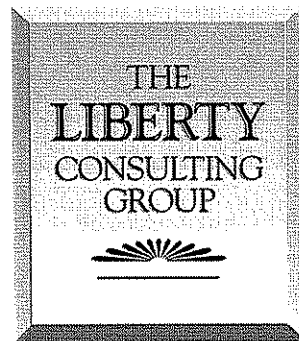
PUBLIC SERVICE  
COMMISSION

**Final Report  
Focused Review of Documentation  
Filed by LG&E/KU  
For a Proposed 345 kV Transmission Line  
Within Kentucky  
Case Nos. 2005-00467 & 2005-00472**

Presented to:

**The Kentucky Public Service Commission**

By:



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February 27, 2006

## **Table of Contents**

<b>Chapter</b>	<b>Page</b>
<b>I. Introduction and Conclusion Summary</b>	
A. Purpose and Scope of this Report	I-1
1. Background	I-1
2. Project Scope and Objectives	I-1
B. Project Overview	I-2
1. Project Description	I-2
2. Summary of Liberty's Work	I-3
C. Conclusion Summary	I-4
<b>II. Process Evaluation</b>	
A. Background	II-1
B. LG&E/KU Approach to Route Selection	II-1
C. Independent Approach to Route Selection	II-6
D. LG&E/KU Public Communication Process	II-10
E. Summary	II-11
<b>III. Technical Evaluation</b>	
A. Validity of Previous Technical Analyses	III-1
B. Collocation of Facilities	III-4
C. Other Considerations and Observations	III-6
D. Summary	III-8

# **I. Introduction and Conclusion Summary**

## **A. Purpose and Scope of this Report**

### **1. Background**

Pursuant to KRS 278.255, the Kentucky Public Service Commission (*Commission* or *KPSC*) retained The Liberty Consulting Group (*Liberty*) to perform a focused review of documentation associated with a 345 kilovolt (kV) transmission line proposed for construction by Louisville Gas and Electric Company and Kentucky Utilities (*LG&E/KU* or *Companies*).

Liberty is a management and technical consulting firm that specializes in the public-utility industry. Liberty has extensive experience in conducting focused reviews of this type. Liberty has served commissions in 33 different states and the District of Columbia in conducting focused reviews and management audits similar to this work related to the LG&E/KU transmission project.

This report provides the results of Liberty's review of the application of LG&E/KU for a Certificate of Public Convenience and Necessity (*Certificate*) to construct a 345 kV transmission line between the Mill Creek and Hardin County substations.

### **2. Project Scope and Objectives**

LG&E/KU originally applied for the construction of the 345 kV transmission line between Mill Creek and Hardin County substations in Case No. 2005-00142. This case confirmed the need for the transmission line, but the application for construction was ultimately rejected by the Commission because LG&E/KU failed to adequately consider the use of existing rights-of-way, transmission lines, and corridors.

Since the overall need for this new line has previously been established under Case No. 2005-00142, the primary objective of this project was for Liberty to evaluate whether LG&E/KU thoroughly considered "all reasonable alternatives, including locating the line partially or fully along existing transmission corridors," as specified in the Commission's directive in its final order in Case No. 2005-00142.

In its order for Case No. 2005-00142, the Commission also expressed concern that the approach used by LG&E/KU to communicate with its customers had the potential to disregard the legislative directive to conduct meaningful local hearings.

This project was a focused review. Liberty reviewed LG&E/KU's work but did not produce an independent transmission study. Liberty examined the process used by LG&E/KU in evaluating alternative transmission routes, and evaluated the two proposed alternatives from a technical perspective in terms of how these alternatives might affect the original technical analyses conducted by Liberty under the previous Case No. 2005-00142.

## **B. Project Overview**

### **1. Project Description**

LG&E and KU are the two utility businesses of E.ON U.S. LLC that are regulated in Kentucky by the Commission. E.ON U.S. LLC is headquartered in Louisville, Kentucky, and is part of E.ON U.S. Services, Inc., a member of the E.ON AG family of companies headquartered in Dusseldorf, Germany. LG&E is an electricity and natural gas utility based in Louisville and serves customers in Louisville and sixteen surrounding counties. KU is an electricity utility based in Lexington, Kentucky and serves 77 Kentucky counties and five counties in Virginia. Together these two utilities have a joint generation capacity of 7,600 MW and serve 908,000 electricity customers and 318,000 natural gas customers over a transmission and distribution network covering some 27,000 square miles.<sup>1</sup>

On May 11, 2005, LG&E/KU filed an application with the Commission to construct a 345 kV line that is more than one mile in length. By Kentucky law, such a facility requires a Certificate prior to construction. The Commission assigned the application Case No. 2005-00142.<sup>2</sup>

While the Commission established the need for the new line under Case No. 2005-00142 to integrate the Trimble County #2 (TC2) generating unit into the transmission grid, the application for construction was ultimately rejected without prejudice by the Commission because LG&E/KU failed to adequately consider the use of existing rights-of-way, transmission lines, and corridors.

Subsequently, on December 22, 2005, LG&E and KU jointly filed an application with the Commission for approval of the construction of electric transmission facilities in Jefferson, Bullitt, Meade, and Hardin Counties, Kentucky; and on the same date filed an application for approval of the construction of alternative facilities in the same counties, Case Nos. 2005-00467 and 2005-00472, respectively. The Commission found that these applications can best be processed by consolidating them for administrative and procedural purposes.

Case No. 2005-00467 proposed construction of a 345 kV transmission line, approximately 41.9<sup>3</sup> miles in length, running from LG&E's Mill Creek Generating Station through Jefferson County, Bullitt County, Meade County and Hardin County to KU's Hardin County Substation near Elizabethtown, Kentucky. The route of this proposed line is referred to as "Mill Creek to Hardin County Route No. 1."

Case No. 2005-00472 proposed construction of an alternative 345 kV transmission line, approximately 43.9 miles in length, running from LG&E's Mill Creek Generating Station through Jefferson County, Bullitt County, Meade County and Hardin County to KU's Hardin County Substation near Elizabethtown, Kentucky. The route of this proposed line is referred to as "Mill Creek to Hardin County Route No. 2."

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<sup>1</sup> LG&E Energy Web Site.

<sup>2</sup> May 11, 2005, application of LG&E/KU.

<sup>3</sup> This value was revised by LG&E/KU on February 17, 2006 to 42.03 miles.

The proposed transmission facility will be used to transmit electric power required by the projected load that will be served from the proposed 750 MW nominal (732 MW summer rating) supercritical, pulverized, coal-fired, base-load generating unit to be located at TC2 as well as base load that will be served from other sources.<sup>4</sup> The approximate cost of the proposed transmission line and ancillary facilities is \$57.7 million.<sup>5</sup>

Subsequently, on February 17, 2006, LG&E/KU filed corrected testimony and data changing the length and cost of line Segment #28.

## **2. Summary of Liberty's Work**

Liberty performed its independent project review by organizing its work in two main Task Areas. This report addresses these Task Areas as follows:

### **Task Area One – Chapter Two, Process Evaluation**

Liberty examined the process used by LG&E/KU in evaluating and selecting alternative transmission routes.

### **Task Area Two – Chapter Three, Technical Evaluation**

Liberty evaluated the two proposed alternatives from a technical perspective in terms of how these alternatives might affect the original technical analyses conducted under the previous Case No. 2005-00142. Accordingly, Liberty used the technical analysis included in its report for Case No. 2005-00142 as its baseline frame of reference for the work in evaluating the two new lines. Included in this analysis is a review of the need for additional power flow, transient stability, and other technical analyses that are used to justify the project. Other technical analyses include reactive requirements, long-term dynamic simulations, or short circuit analyses. The review included a review of the results themselves to ascertain if LG&E/KU drew proper conclusions from its analyses for the new applications.

### **Review Process**

Liberty reviewed LG&E/KU's filed applications for Case No. 2005-00467 and Case No. 2005-00472. In addition, Liberty reviewed data and documents provided by LG&E/KU in response to written information requests from Liberty, and revised LG&E/KU information submittals. Liberty conducted extensive on-site interviews in Louisville, Kentucky, on January 11-13, 2006, with LG&E/KU management and subject-matter experts as listed below:

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<sup>4</sup> December 22, 2005 application of LG&E/KU.

<sup>5</sup> This value was revised by LG&E/KU on February 17, 2006 to \$57.7 million from the original estimated value of \$56.7 million.

John Wolfram	E.ON-U.S. for LG&E/KU	Manager, Regulatory Affairs
Brandon Grillon	E.ON-U.S. for LG&E/KU	Transmission Line Engineer
Michael G. Toll	E.ON-U.S. for LG&E/KU	Manager, Trans. Planning and Substations
Mark Johnson	LG&E/KU	Director of Transmission
Beth Colanougher	LG&E/KU	Inside Counsel
Jennifer Keisling	LG&E/KU	Inside Counsel
Clay Doherty	Linear Projects for LG&E/KU	Environmental and Regulatory Coordinator
Greg Cornett	Stoll, Keenan, Ogden for LG&E/KY	Outside Counsel
Robert Watt	Stoll, Keenan, Ogden for LG&E/KU	Outside Counsel

### **C. Conclusion Summary**

On the basis of materials reviewed and interviews conducted, Liberty concluded that:

1. LG&E/KU surveyed a large number of potential routes in its route selection process. LG&E/KU's process for the evaluation and selection of alternative routes was reasonable.
2. The LP/PS (contractors of LG&E/KU) affirmation that the LG&E/KU routes selected were reasonable is a valid one.
3. The LP/PS analysis was independent and reasonable.
4. The technical studies and economic evaluations supporting the construction of the Mill Creek to Hardin County 345 kV transmission line in Case No.2005-00142 remain valid for the proposed Route #1, and its alternative, Route #2, in the current case.
5. LG&E/KU's route candidates are technically feasible, satisfy the need for the transmission line when the TC2 generating unit is brought on line, and are reasonable.
6. The collocation percentages developed by LG&E/KU in its route selection process were reasonable.

## II. Process Evaluation

### A. Background

This chapter of Liberty's report provides an analysis of the processes used by both LG&E/KU, and its contractors, Linear Projects, Inc. and Photo Science, Inc. (LP/PS) in selecting candidate routes for the subject transmission line.

### B. LG&E/KU Approach to Route Selection

#### 1. Description

The approach used by LG&E/KU for selecting the preferred transmission routing was based on an informal conference held on October 4, 2005. Discussions at the conference resulted in an outline containing the following five points:

- Establish need for the project
- Identify a universe of routes that work electrically, including identification of corridors that use existing facilities
- Identify a least cost alternative route
- Consider the rate impacts of routes that are not least cost, and
- Analyze the types of considerations contained in the analysis and evaluation method of the Electric Power Research Institute (EPRI), or the like.<sup>1</sup>

An industry software package available through EPRI is sometimes used by utilities for analysis of such a transmission line project. The EPRI package consists of two modules, the Macro Corridor Analysis component, and the Analysis and Evaluation component. LG&E/KU did not use the first component, the Macro Corridor Analysis, in conducting its route selection process because it thought that the Macro Corridor Analysis might have been too restrictive and would have eliminated options too early in the selection process. Part of LG&E/KU's concern was that the EPRI software is a tool that applies fixed weighting factors to those evaluation components that are normally considered by utilities in their traditional processes of planning for transmission lines.<sup>2</sup> LG&E/KU identified routes that were 100 percent collocated (existing electric or gas rights-of-way, roads, or rebuilds of existing transmission facilities) to the east of (out to Interstate 65) and to the west of (out to Breckinridge County) Fort Knox, a very large military facility directly between the Mill Creek and Hardin County substations.<sup>3</sup> These routes became study/evaluation boundaries for LG&E/KU.

LG&E transmission personnel manually identified route segments within the boundaries encompassed by the east and west 100 percent collocation routes. Those routes that were not practical because of self evident shortcomings, such as too many customer structures in the right-

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<sup>1</sup> Interview of January 11, 2006.

<sup>2</sup> Interview of January 11, 2006.

<sup>3</sup> Response to Liberty Data Request #26.



of-way, were eliminated at the outset. Ultimately, LG&E/KU identified 156 line segments that were considered practical to construct. A line segment is a route segment that could have multiple possible paths at either end. The 156 identified line segments resulted in the identification of 1203 unique routes within the established easterly and westerly route boundaries.<sup>4</sup>

LG&E/KU then developed cost estimates for each route in 2009 dollars, and considered the various collocation opportunities of each route. Both Liberty and LG&E/KU believed that the quality of these estimates was better than preliminary planning grade estimates; while not as precise as final estimates that would be used for budgeting purposes, they are adequate for routing decisions. The cost estimates did not include contingency costs, cost of any customer relocations, sunk costs of the project to date should the Commission deny the LG&E application or approve the alternate transmission line routing, Route #2, or any cost for technical mitigation problems due to collocation with gas pipeline facilities.<sup>5,6</sup>

LG&E/KU reviewed the East Kentucky Power Cooperative (EKPC) case, Case No. 2005-00207, and noted that the Commission requested that a route that was approximately 20 percent more costly than the preferred alternative be evaluated. Consequently, for screening purposes, LG&E/KU used a dollar value that was 125 percent of the least cost alternative as the upper limit dollar amount for reasonable route cost alternatives. This screening reduced the number of routes for consideration.<sup>7</sup>

LG&E/KU also considered the requirements of the US Army at Fort Knox. Although all routes through Fort Knox were initially considered as practical by LG&E/KU, ultimately the US Army dictated the precise location of any lines on government property so that construction would not interfere with present or future mission capabilities. Consequently, the US Army would only allow use of the route to the west of Tip Top substation. This eliminated all routes south of the substation.

While LG&E/KU did not use the EPRI macro corridor component of the EPRI transmission line planning software, they did use what is termed the “Analysis and Evaluation” component of this software. LG&E/KU used this component of the EPRI software and applied it to the 700 routes remaining after cost screening and elimination of the routes that were rejected by the US Army. LG&E/KU also added back into the route list some routes that they had originally discarded to ensure that all reasonable routes were considered.<sup>8,9</sup>

Using the EPRI Analysis and Evaluation software, the same weighting factors for route selection that had been developed by Georgia Transmission Corp. were used without change, consistent with the analysis in the EKPC case.<sup>10</sup> The EPRI software considers 3 emphasis groups which are

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<sup>4</sup> Interview of January 11, 2006.

<sup>5</sup> Response to Liberty Data Request #7.

<sup>6</sup> Interview of January 11, 2006.

<sup>7</sup> Interview of January 11, 2006.

<sup>8</sup> Interview of January 11, 2006.

<sup>9</sup> Interview of January 12, 2006.

<sup>10</sup> Response to Liberty Data Request #8.

the “As Built Environment,” “The Natural Environment,” and “Engineering Factors.” Four different model runs were made. One run was made for each of the three emphasis areas weighted at 100 percent, and then a composite run was made where each emphasis area was weighted at 33.33 percent. LG&E/KU also performed sensitivity runs to see if other routes appeared as preferable. Those sensitivity analyses consisted of runs designated as “100 percent runs,” which took each item in the data layer below the emphasis group layer (e.g., flood plains in the Natural Environment emphasis group) and considered its weight as 100 percent, with all other items within that emphasis group rated at 0 percent, and all emphasis groups with a weight of 33.33 percent each. The sensitivity runs also consisted of runs designated as “50 percent runs,” which took each item in the data layer below the emphasis group layer and considered its weight as 50 percent, with all other items within that emphasis group scaled to equal 50 percent, and all emphasis groups with a weight of 33.33 percent each.<sup>11</sup>

From the analysis above, LG&E/KU developed a “Top 50 Route List.”<sup>12</sup> To these routes LG&E/KU applied its expert judgment to develop its selection of Route #1 and Route #2. LG&E/KU stated that it was company policy not to select routes that would require the relocation of customers and that considerable weight was applied to this factor. Another important factor considered by LG&E/KU was the number of properties listed in the National Register of Historic Places (NRHP). In its analysis and evaluation runs, LG&E/KU employed conservatism in order to avoid any possible effect on NRHP sites, and used a 3000 foot distance from the right-of-way edge from these sites, based on the tallest transmission line structure of 110 feet.<sup>13</sup> When applying its expert judgment to the “Top 50 Route List”, LG&E/KU applied a more detailed evaluation of impact by considering actual topography and structure height. This evaluation eliminated some effects on perceived historic places. As an example, for Route #1, the 4 historic places originally identified turned out to be two when analyzed in greater detail. These two sites were Fort Dutfield and the West Point view shed, in the northern portion of the route.<sup>14</sup>

In order to ensure an accurate and valid routing process, LG&E/KU stated that they conducted on-site inspections of a large part of the siting area to ensure that the topographic maps were interpreted correctly for data input, and to identify collocation challenges. LG&E also stated that they talked to the various federal and state agencies involved in the siting process as a double check to ensure they were complying with appropriate rulings and that no problems were identified for any route.

## **2. Analysis**

LG&E/KU stated that one of their most important objectives was not to force customer relocation because of line construction. Other important goals were to minimize visual effects on structures contained on the NRHP, and to maximize percent collocation. LG&E/KU considered

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<sup>11</sup> Interview of January 11, 2006.

<sup>12</sup> Response to Liberty Data Request #19.

<sup>13</sup> Response to Liberty Data Request #27.

<sup>14</sup> Interview of January 11, 2006.

cost at the end of the process. LG&E/KU also stated that they used “expert judgment” and balanced an array of considerations to reduce their “Top 50 Route List” to the final two candidates.<sup>15</sup> No other documentation existed as to how LG&E/KU made the final choice.

To test the expert judgment used by LG&E/KU in the selection of their final routes, Liberty conducted its own analysis. Liberty applied the LG&E/KU stated goals to the LG&E/KU “Top 50 Route List” generated by the EPRI software. Not relocating customers was one of the most important goals incorporated by Liberty. Also, because the emphasis of the Kentucky siting statute was to maximize collocation opportunities, Liberty chose that goal as an important one. Liberty selected routes for additional consideration if two or fewer residences required relocation. This data set included 12 of the routes on the “Top 50 Route List” and was representative of routes requiring minimum relocation of customers. Liberty tabulated those 12 routes and ranked them by percent collocation, the other important goal. Those results appear in the table below.

**Routes with 2 or Fewer Relocations Ranked by Percent Collocation**

<b>Route</b>	<b>Relocations Required</b>	<b>NRHP Structures Within 3000’ of ROW Edge</b>	<b>Percent Collocation</b>	<b>Cost \$Millions</b>
<b>ADK</b>	0	1	77.1	67.8
<b>AU</b>	2	8	75.9	68.0
<b>AGU</b>	0	2	73.0	66.9
<b>HO</b>	2	9	71.6	67.0
<b>ADL</b>	2	3	70.2	67.6
<b>AJW</b>	0	2	67.7	61.0
<b>AIK</b>	1	2	67.2	64.4
<b>AGV</b>	2	4	66.0	66.6
<b>KY</b>	2	9	65.7	61.1
<b>AJX</b>	2	4	59.4	60.8
<b>AJU</b>	0	4*	57.3	57.7
<b>LC</b>	2	11*	54.8	57.9

\* Two locations in Section 28 were determined to be not visible as the actual line profile is lower than maximum height.<sup>16</sup>

Liberty then eliminated the four routes with significantly greater than 4 NRHP structures within 3,000 feet of the right-of-way edge.

<sup>15</sup> Response top Liberty Data Request #20.

<sup>16</sup> Interview of January 11, 2006.

**Routes with 2 Relocations or Fewer and 4 or Fewer NRHP Structures Affected  
 Ranked by Percent Collocation**

Route	Relocations Required	NRHP Structures Within 3000' of ROW Edge	Percent Collocation	Cost \$Millions
ADK	0	1	77.1	67.8
AGU	0	2	73.0	66.9
ADL	2	3	70.2	67.6
AJW	0	2	67.7	61.0
AIK	1	2	67.2	64.4
AGV	2	4	66.0	66.6
AJX	2	4	59.4	60.8
AJU	0	4*	57.3	57.7

\* Two locations in Section 28 were determined to be not visible as the actual line profile is lower than maximum height.

Eliminating the three routes with 2 relocations and 3 or more NRHP structures affected resulted in the following list.

**Routes with 0 or 1 Relocations and 4 or Fewer NRHP Structures Affected  
 Ranked by Percent Collocation**

Route	Relocations Required	NRHP Structures Within 3000' of ROW Edge	Percent Collocation	Cost \$Millions
ADK	0	1	77.1	67.8
AGU	0	2	73.0	66.9
AJW	0	2	67.7	61.0
AIK	1	2	67.2	64.4
AJU	0	4*	57.3	57.7

\* Two locations in Section 28 were determined to be not visible as the actual line profile is lower than maximum height.

Liberty believes that LG&E/KU considered a broad array of potential routes in its alternative route evaluation process. These final five route candidates are reasonable selections that are technically feasible, and satisfy the need for the line when TC2 is brought on line. The table shows that the number of NRHP structures affected also dropped with the number of customers to be relocated. Liberty notes that with all but the most expensive route, two NRHP structure locations will require mitigation and that the reasonable range of collocation for the facilities will be roughly 57 percent to 77 percent collocation. Another item of note is that it costs approximately one million dollars to increase collocation by 2 percent above the lowest cost and lowest percent collocation option. Liberty refined its analysis by eliminating the single route requiring customer relocation and added a column to the table showing incremental costs of collocation. The following table resulted.

**Routes with No Relocations and 4 or Fewer NRHP Structures Affected  
 Ranked by Percent Collocation**

<b>Route</b>	<b>Relocations Required</b>	<b>NRHP Structures Within 3000' of ROW Edge</b>	<b>Percent Collocation</b>	<b>Cost \$Millions</b>
<b>ADK</b>	0	1	77.1	67.8
<b>AGU</b>	0	2	73.0	66.9
<b>AJW</b>	0	2	67.7	61.0
<b>AJU</b>	0	4*	57.3	57.7

\* Two locations in Section 28 were determined to be not visible as the actual line profile is lower than maximum height.

Compared to the most economical route, route AJU, the next least expensive route, AJW, can obtain 10.4 percent additional collocation (more than one half of the additional available collocation) for \$3.3 million in additional costs. The next least expensive route, AGU, would require the expenditure of an additional \$5.9 million for an additional 5.3 percent of collocation, more than twice the cost per percentage point increased over the previous route. Liberty notes that two of these routes, AJW and AJU, are the two final routes selected by LG&E/KU from their original "Top 50 Route List".

### 3. Conclusion

LG&E/KU surveyed a large number of potential routes in its route selection process. LG&E/KU's route evaluation and selection process was reasonable. LG&E/KU's route candidates are technically feasible, satisfy the need for the transmission line when the TC2 generating unit is brought on line, and are reasonable.

## C. Independent Approach to Route Selection

### 1. Description

LG&E/KU retained Linear Projects, Inc. and Photo Science, Inc. (LP/PS) to perform an independent analysis of its route selection process. LP/PS stated that their task was to arrive at reasonable routes with an independent analysis of the LG&E/KU route selection process, based on the expanded universe of routes that attempted to take into consideration the various collocation opportunities within the study area.<sup>17</sup> The route data used were the same data constructed and used by LG&E/KU in its EPRI Evaluation and Analysis calculations.<sup>18</sup>

<sup>17</sup> Response to Liberty Data Request #15.

<sup>18</sup> Interview of January 12, 2006.

LP/PS stated that they also did not do a macro corridor analysis and as a result, routes that were considered poor on an intuitive basis scored well in the LP/PS analysis.<sup>19</sup> This led to concerns about weighting factors. LP/PS believed that the macro corridor analysis would have eliminated many of these poor routes. The macro corridor analysis uses stakeholder input and off-the-shelf data for GIS purposes. A 30-foot suitability grid is constructed, (i.e., the data is kept track of in 30-foot square blocks). In essence, the macro corridor analysis picks the best 3 percent scores of the routes using the Delphi process.<sup>20</sup> These routes are identified geographically and the corridors they represent are established. The process has the benefit of comparing similar routes to similar routes for ranking. From these data, actual route options are manually constructed. Quite often, if a route outside of the corridors identified is thought to be reasonable, it is included prior to the Evaluation and Analysis phase.<sup>21</sup>

LP/PS stated that the weighting factors in the program for macro corridor analysis were set up to weigh against roughly equivalent routes to determine the top 3 percent routes and were the same weighting factors developed for Georgia.<sup>22</sup> Since the macro corridor analysis was not conducted, the spectrum of routes in this analysis was too broad, leaving routes that normally would have been culled out in the macro corridor analysis. LP/PS also felt that in the normalization process, the routes remaining were selected primarily because of collocation traits, and the number of homes affected (0-155) did not provide sufficient differentiation in the analysis to reflect the adverse consequences of a routing that affected homes. Consequently, the normalization process gave too much weight to routes that had high effects on homes. The normalization process gave a rating of zero to the least effect in the category and a weighting of 1 to the greatest.<sup>23</sup> LP/PS felt that an alternative process had to be developed.

As an alternative to using the macro corridor analysis, the LP/PS response to the inherent possibilities for introducing error into the route selection process was to use a corridor basket approach that included the creation of five baskets of routes that put routes together that were similar. Thus LP/PS synthesized their own approach to a macro corridor analysis such that the perceived problems with the macro corridor analysis and normalization were mitigated. LP/PS also added cross over routes that existed between the five baskets. Those baskets of routes were identified as the Big Rivers Electric Cooperative (BREC), East Central, West Central, East, and Tip Top South baskets plus the Cross Over routes.<sup>24</sup>

The routes that were not compatible with the requirements of the US Army were eliminated (Tip Top South basket was eliminated). The only available route was the route west of Tip Top substation as instructed by the US Army. After this process, 1066 routes remained in the various baskets. For each emphasis category (As Built, Environment, Engineering, and Composite), the top five routes were selected in each basket including the Cross Over routes. A maximum of 20 routes are theoretically possible for each basket, resulting in a maximum possible total of 100 routes. In actuality, 49 routes were identified due to duplications within the baskets, and this list

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<sup>19</sup> Interview of January 11, 2006.

<sup>20</sup> Interview of January 11, 2006.

<sup>21</sup> Interview of January 12, 2006.

<sup>22</sup> Interview of January 11, 2006.

<sup>23</sup> Interview of January 12, 2006.

<sup>24</sup> Interview of January 12, 2006.

was identified as the Top 5 Route List. Liberty assembled the data provided by LP/PS into the table below.<sup>25</sup>

**Baskets, Number of Practical Routes Compatible with Ft. Knox  
 and Number of Top 5 Route List**

<b>Basket</b>	<b>BREC</b>	<b>E Central</b>	<b>W Central</b>	<b>East</b>	<b>X Over</b>	<b>Totals</b>
<b># Routes</b>	54	348	18	20	626	1066
<b># Top 5 Routes</b>	9	11	6	10	13	49

LP/PS's stated purpose was to reduce the field of route candidates for more detailed consideration as reasonable routes. To this end, LP/PS calculated the standard deviation for each perspective in each emphasis group of the Top 5 Route List and added it to or subtracted it from its maximum or minimum values as required to provide an additional screening mechanism. LP/PS noted the number of violations and summed them. Seven routes had no violations in any perspective. Those seven routes were considered as semi-finalists and were identified as routes AJU, AJW, AQL, KW, KY, KZ, and YB. LP/PS again calculated the standard deviations of the semi-finalist group and repeated its method. Routes AJU, AJW, and KY emerged from the analysis with either 0 or 1 violation to the screening process. LP/PS noted that route AJU was the least cost route. Route AJW cost \$3.3 million more and increased collocation by over 10 percent to 68 percent. Also, route KY affected the greatest number of property owners, was the most expensive of the three and had less collocation than route AJW. LP/PS concluded that LG&E/KU's choice of routes AJU and AJW was reasonable.<sup>26</sup>

LP/PS stated that they did not become aware of the two routes favored by LG&E/KU until after its analysis was reasonably complete.<sup>27</sup>

## 2. Analysis

Liberty voiced concerns over the process used by LP/PS in selecting the final routes from the Top 5 Route List due to the manner of use of the standard deviation for route screening. LP/PS had applied standard deviations to the maximum and minimum points of the data sets, rather than applying standard deviations to the means of the data sets. Consequently, Liberty requested that LP/PS redo the analysis of the Top 5 Route List using standard deviations either added to or subtracted from the means of the data sets and to do so in one screening operation. LP/PS performed the requested revisions and noted that the standard deviation could not be used with three data sets as one standard deviation from the mean fell out of the absolute range of the data. LP/PS therefore eliminated routes that were in excess of the average of those three items in the As Built Environment emphasis group.<sup>28</sup>

<sup>25</sup> Interview of January 12, 2006.

<sup>26</sup> Interview of January 12, 2006.

<sup>27</sup> Response to Liberty Data Request #22.

<sup>28</sup> Response to Liberty Data Request #23.

Again Liberty applied its own analysis to the LP/PS analysis similar to the approach taken with the LG&E/KU "Top 50 Route List" as discussed in the immediately preceding section of this report. LG&E/KU stated that one of their most important objectives was not to force customer relocation because of line construction. Other important goals were to minimize visual effects to structures contained on the NRHP, and to maximize percent collocation. To that end, and similar to the logic applied to the LG&E/KU "Top 50 Route List", Liberty applied the criteria of 2 or fewer customer structures within the right-of-way and 2 or fewer NRHP structure effects to the Top 5 Route List generated by LP/PS in their corridor basket approach. The resultant final routes as determined by Liberty appear in the table below.

**Routes with 2 Relocations or Fewer and 2 or Fewer NRHP Structures Affected  
 Ranked by Percent Collocation**

<b>Route</b>	<b>Relocations Required</b>	<b>NRHP Structures Within 3000' of ROW Edge</b>	<b>Percent Collocation</b>	<b>Cost \$Millions</b>
<b>ACQ</b>	2	1	98.9	74.6
<b>ACU</b>	2	1	88.1	73.1
<b>ADC</b>	0	1	83.7	71.5
<b>ADS</b>	2	1	79.8	72.3
<b>ADK</b>	0	1	77.1	67.8
<b>AGU</b>	0	2	73.0	66.9
<b>AJW</b>	0	2	67.7	61.0
<b>AIK</b>	1	2	67.2	64.4
<b>AJU</b>	0	4*	57.3	57.7

\* Two locations in Section 28 were determined to be not visible as the actual line profile is lower than maximum height.<sup>29</sup>

Considering that not displacing customers is such a high priority, Liberty reconstructed the table with no relocations and 2 or less NRHP structures affected, ranked by percent collocation.

**Routes with 0 Relocations or Fewer and 2 or Fewer NRHP Structures Affected  
 Ranked by Percent Collocation**

<b>Route</b>	<b>Relocations Required</b>	<b>NRHP Structures Within 3000' of ROW Edge</b>	<b>Percent Collocation</b>	<b>Cost \$Millions</b>
<b>ADC</b>	0	1	83.7	71.5
<b>ADK</b>	0	1	77.1	67.8
<b>AGU</b>	0	2	73.0	66.9
<b>AJW</b>	0	2	67.7	61.0
<b>AJU</b>	0	4*	57.3	57.7

\* Two locations in Section 28 were determined to be not visible as the actual line profile is lower than maximum height.

<sup>29</sup> Interview of January 11, 2006.



Liberty notes that four of the five final routes are the same routes that emerged when Liberty analyzed the LG&E/KU "Top 50 Route List". Liberty therefore has the same observations from the independent route analysis as it had from the LG&E/KU route analysis.

### **3. Conclusions**

The LP/PS affirmation that the LG&E/KU routes selected were reasonable is a valid one.

The LP/PS analysis, while performed with the same data set used by LG&E/KU, was an independent and reasonable analysis.

## **D. LG&E/KU Public Communication Process**

### **1. Process in Case No. 2005-00142**

In the former Case No. 2005-00142, voluntary (on the part of the public) public meetings were held similar to what can be characterized as an open house forum. Public concerns and questions were informally addressed. The Commission also held public meetings. Again, questions and concerns were addressed informally.<sup>30</sup>

### **2. Process in Current Consolidated Case**

In the current proceeding, customer contacts were fully documented by LG&E/KU. LG&E/KU stated that they made a proactive attempt to reach all landowners who would be affected by the construction of either Route #1 or Route #2, rather than reacting to comments from landowners, if offered. In the current consolidated case, LG&E/KU also went back to the US Military, representing Fort Knox, to get written verification of route determinations provided by the military.<sup>31</sup>

LG&E/KU stated that they tried to talk to all new landowners on new sections of the two routes and send comment forms to all existing identified landowners. LG&E/KU offered one-on-one meetings, performed on site inspections, conducted follow up on landowner comments, and spent more time improving the documentation associated with the communication process. LG&E/KU stated that they used a combination of forms, phone cards, and meetings to obtain landowner input.<sup>32</sup>

On January 27, 2006, LG&E/KU filed a Notice for Corrected Finding of Administrative Completeness in the consolidated docket consisting of Case No. 2005-00467 and Case No. 2005-00472. The reason for this filing was that LG&E/KU had become aware that Property Valuation

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<sup>30</sup> Interview of January 12, 2006.

<sup>31</sup> Interview of January 12, 2006.

<sup>32</sup> Interview of January 12, 2006.

Administrator (PVA) records used as the basis of their communication process with landowners were not up to date. The problem with the records was that property that had been transferred was not listed. Subsequently, LG&E/KU reexamined the PVA records in Jefferson, Bullitt, Meade, and Hardin counties,<sup>33</sup> and have sent notices to each additional landowner identified in the PVA record review. Notices were sent by hand-delivery and first class mail.<sup>34</sup>

### **3. Analysis**

In the consolidated docket consisting of Case No. 2005-00467 and Case No. 2005-00472, LG&E/KU has changed and improved its approach. LG&E/KU has changed its process for solicitation of landowner input from what Liberty would call a casual or reactive approach in the former Case No. 2005-00142 to one that is now proactive. It also appears to Liberty that LG&E/KU is making a good faith effort to ensure that all landowners are contacted, even if public record keeping is imperfect. LG&E/KU's improved communication efforts also enhance its ability to positively identify and locate structures and sensitive places, and to evaluate possible mitigation efforts.

### **4. Conclusion**

Liberty concluded that the public communication process in the current consolidated case is far improved from that employed in the former Case No. 2005-00142, and that LG&E/KU has attempted to overcome the shortcomings of that earlier process, as noted by the Commission in its order for the former case.<sup>35</sup>

## **E. Summary**

1. LG&E/KU surveyed a large number of potential routes in its route selection process. LG&E/KU's process for the evaluation and selection of potential routes was reasonable.
2. The LP/PS affirmation that the LG&E/KU routes selected were reasonable is a valid one.
3. The LP/PS analysis was independent and reasonable.
4. LG&E/KU's route candidates are technically feasible, satisfy the need for the transmission line when the TC2 generating unit is brought on line, and are reasonable.

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<sup>33</sup> Notice and Motion for Corrected Finding of Administrative Completeness, page 2.

<sup>34</sup> Notice and Motion for Corrected Finding of Administrative Completeness, page 3.

<sup>35</sup> Order at page 12.

5. The public communication process in the current consolidated case is far improved from that employed in the former Case No. 2005-00142, and LG&E/KU has attempted to overcome the shortcomings of that earlier process, as noted by the Commission in its order for the former case.

### III. Technical Evaluation

#### A. Validity of Previous Technical Analyses

##### 1. Discussion

In its order in Case No. 2005-00142 dated September 8, 2005, the Commission found that the Mill Creek to Hardin County 345 kV additional transmission facilities are required to integrate the proposed Trimble County Unit #2 generating plant into the transmission grid and that LG&E/KU had established the need for such a project.<sup>1</sup> The Commission ultimately denied LG&E/KU's application because of a lack of thoroughness in considering reasonable alternatives, including locating the line partially or fully along existing transmission corridors.<sup>2</sup> The Commission also expressed concern that the approach used by LG&E/KU to communicate with its customers had the potential to disregard the legislative directive to conduct meaningful local hearings.<sup>3</sup>

Liberty understands that the Commission approved the construction of Trimble County #2 in a separate proceeding and that coupled with the above decision, the need for the proposed facilities is not in question in the current proceeding.

There are, however, certain technical questions that must be answered with regard to the similar, but different facilities presented in the current consolidated Case of Case No. 2005-00467 and Case No. 2005-00472 compared to the facilities presented in Case No. 2005-00142.

It is the purpose of this chapter of Liberty's report to address and resolve these questions.

Those questions are:

- Does the change in circuit length alter the results of the technical studies performed by the Midwest System Operator (MISO) for the previous Case?
- Are the elements, or the timing of their installation, in the LG&E/KU expansion plan changed?
- Are the economics of the LG&E transmission expansion plan changed?
- Has LG&E/KU changed the manner in which they conduct system studies, such that there would be a change in the elements, or the timing of the elements, in the LG&E/KU transmission expansion plan?
- Has the load forecast changed significantly enough to impact the LG&E/KU transmission expansion plan?

LG&E/KU stated that the stability studies performed in Case No. 2005-00142 were still valid, as the studies demonstrated critical clearing times<sup>4</sup> in the order of 14 cycles<sup>5</sup> and that a small

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<sup>1</sup> Order for Case No. 2005-00142 at page 10.

<sup>2</sup> Order for Case No. 2005-00142 at page 11.

<sup>3</sup> Order for Case No. 2005-00142 at page 12.

<sup>4</sup> Critical clearing time at a specific location is the amount of time that a short circuit can remain connected to the power system without causing the loss of system stability.

change in the length of the Mill Creek to Hardin County 345 kV line, in the distances represented by the two new alternatives proposed as Routes #1 and #2, would not reduce the critical clearing time to its minimum acceptable value of approximately 9 cycles.<sup>6</sup>

LG&E/KU also stated that with regard to short circuit studies, other than the breaker at Clifty Creek, whose exceedence of interrupting capability was addressed by its owners, no other breaker was even close to its interrupting capability. Therefore, a small change in length of the Mill Creek to Hardin County 345 kV line would not cause other breakers to exceed their interrupting capabilities.<sup>7</sup>

LG&E/KU stated that in terms of the power flow studies performed for Case No. 2005-00142, all remaining power flow issues, assuming the construction of the 3 facilities required for Trimble County #2 (MISO System Impact Study A-024, dated May 1, 2003, Attachment B), have been addressed.<sup>8</sup>

LG&E/KU researched the previous MISO study input data and stated that the mileage equivalent of the line impedance for the Mill Creek to Hardin County 345 kV line used in those studies was 43 miles. LG&E/KU stated that they have now performed additional internal sensitivity studies for the two worst case system contingencies in the Hardin County area. These studies assumed line impedances of 41 miles and 45 miles for the Mill Creek to Hardin County 345 kV line. The two contingencies were the loss of the Brown North to Hardin County 345 kV line, and the loss of the Ghent to West Lexington to Brown 345 kV line. Upon such losses, the flows on the remaining facilities varied by less than 1 percent of the facility rating, when either of the contingency cases was compared to the base Case. LG&E/KU concluded that a small change in impedance of the Mill Creek to Hardin County 345 kV line would not change the elements, or the timing of elements, in their Transmission Expansion Plan.<sup>9,10</sup>

With regard to load forecasts, if the projected load for a specific time period significantly changes, the elements, and the timing of those elements, in the transmission expansion plan can change. Those changes in the transmission expansion plan can in turn affect the economic evaluation of the preferred transmission expansion, the Mill Creek to Hardin County 345 kV transmission line.

If the manner in which transmission facilities are rated to carry power were to change, such that a facility is now able to carry more or less load than originally used in the studies performed for Case No. 2005-00142, different transmission plan elements and timing could result.

Similarly, if the design contingencies are made more or less severe, or if voltage requirements are increased or decreased, compared to those originally used in the studies performed for Case No. 2005-00142, different transmission plan elements and timing could result.

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<sup>5</sup> As used here, a cycle is a unit of time and is equal to 1/60<sup>th</sup> of a second.

<sup>6</sup> Interview of January 11, 2006.

<sup>7</sup> Interview of January 11, 2006.

<sup>8</sup> Interview of January 12, 2006.

<sup>9</sup> Interview of January 12, 2006.

<sup>10</sup> Response to Liberty Data Request #5.

## 2. Analysis

LG&E/KU stated that the current 2005 50/50 (average weather adjustments) load forecast does not differ significantly from the 2004 50/50 load forecast used in the analysis of Case No. 2005-00142.<sup>11</sup> The Liberty comparison of those forecasts is depicted below.

### LG&E/KU, LGE, and KU 2004 and 2005 50/50 Load Forecast Comparison for 2015<sup>12</sup>

Company	2004 Summer Load (MW)	2005 Summer Load (MW)
LG&E	3147	3133
KU	5012	5021
LG&E/KU	8159	8154

The table shows only a very small difference exists between the 2004 and 2005 load forecasts for the year 2015. Liberty noted that other years also exhibit very small differences between the two load forecasts. Liberty concluded that the load forecasts have not materially changed and that the small load difference exhibited, when dispersed throughout the total LG&E/KU system, would not change the elements, or the timing of the elements, in the LG&E/KU transmission expansion plan.

In the former Case No. 2005-00142, LG&E/KU proposed installing the Mill Creek to Hardin County 345 kV transmission line in place of an alternative that was more economic on a short-term basis. Their proposal was based on the fact that if the more economic alternative line were constructed, the Mill Creek to Hardin County transmission line would still be required in the near future to address area voltage problems. Therefore, the construction of both facilities would result in higher costs to customers. Liberty finds that the load forecasts have not materially changed, and the need for construction of the Mill Creek to Hardin County 345 kV transmission line for system reasons has not changed; this leaves the economic reasoning presented in the former case intact.

LG&E/KU stated that they have not changed their reliability criteria<sup>13</sup> or system rating methods for the determination of system reinforcements since it was supplied in discovery in Case No. 2005-00142.<sup>14</sup> Therefore, Liberty agreed that no changes would occur to the elements, or the timing of elements, in the transmission expansion plan.

The shortest critical clearing time exhibited in the MISO studies was approximately 14 cycles. This value leaves a margin of 5 cycles above the minimum accepted value of 9 cycles. Such a large margin in critical clearing time is only exhibited by power systems that have a considerable

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<sup>11</sup> Response to Liberty Data Request #9.

<sup>12</sup> Response to Liberty Data Request #9.

<sup>13</sup> Reliability criteria for system design states the contingencies that the system must be designed to withstand and establish required voltage levels.

<sup>14</sup> Response to Liberty Data Request #10.

amount of damping capability.<sup>15</sup> Liberty concluded that small changes in line impedance proposed in the current case will not change the MISO stability study results.

LG&E/KU verified that the correct line length of Route #1 was 42.0 miles<sup>16</sup> and that the line length of Route #2 was 43.9 miles.<sup>17</sup> LG&E/KU also demonstrated that 2 mile changes in the Mill Creek to Hardin County 345 kV line result in changes in flows on facilities of less than 1 percent for the two most severe system contingencies in this area of the transmission system. Given the accuracy of study data and the model representations, Liberty concluded that the elements, and the timing of the elements, in the LG&E/KU system expansion plan or the MISO power flow studies would not change.

The fault duty to be interrupted by circuit breakers also depends on the network of impedances connected to that location. Likewise and for the same reasons, Liberty found that no additional circuit breakers would exceed their interrupting capability as a result of the line impedance changes proposed in the instant Case.

### **3. Conclusions**

Liberty concluded that the additional 0.1 mile of circuit length proposed in Route #1 or the 2.0 miles additional circuit length proposed in Route #2, when compared to the facilities considered in Case No. 2005-00142, does not alter its conclusions regarding, or the results of, the MISO system studies reviewed in Case No. 2005-00142, would not require additional or changed elements in the LG&E/KU transmission expansion plan, and would not result in a change in the timing of elements in the LG&E/KU transmission expansion plan; and the original economic evaluation of the LG&E/KU transmission expansion plan remains intact.

## **B. Collocation of Facilities**

### **1. Discussion and Analysis**

The goals of collocating transmission facilities with existing transmission corridors, gas pipelines, or roads are to prevent the cluttering of the landscape with infrastructure that is necessary for the good of the public which it serves, to use land resources in an economical manner, and to minimize the effects to society by using areas that have already been impacted to some degree, while doing so at a reasonable cost.

Collocation of transmission facilities, however, can create tensions between competing goals because of previous decisions. Those tensions tend to limit the amount of collocation of transmission facilities that can reasonably occur. This section of Liberty's report examines whether LG&E/KU has made reasonable decisions regarding collocation of transmission

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<sup>15</sup> Damping is the ability of the power system to resist being accelerated by disturbances.

<sup>16</sup> Response to Liberty Data Request #3.

<sup>17</sup> Response to Liberty Data Request #4.

facilities in the current case. This examination is also useful in that it helps to understand why some of the practical transmission routes considered, which had a high percentage of collocation, do not score well in other ways and are eliminated from consideration.

In years past, transmission siting was either an “out of sight – out of mind” or a “path of least resistance” situation. In years past, a landowner might have granted an easement to the power company with the provision that the transmission line be constructed “out in the back swamp” out of the way of farming operations. In the latter situation, transmission lines were located where they could be easily and economically constructed, because impact considerations were far different than they are today.

If we consider our first simplified example above, in today’s environment, collocation of a new transmission line with those existing facilities today results in the swamp as a desirable area to avoid because of new societal values related to environmental impacts on wetlands. In the new environment, collocation of a new transmission line along the existing line now would generally require the construction of 3 medium angle support structures to go around the swamp. The benefit of collocation of the transmission facilities now incurs an additional cost of \$160 thousand for single circuit 345 kV H frame construction, \$80 thousand for single pole steel 345 kV construction, or \$235 thousand where double circuit 345 kV construction is required.<sup>18</sup> The point to be made is that avoidance of areas that were previously thought to be sound siting decisions can increase the cost of collocation of facilities today, especially if a large number of areas need to be avoided.

In the second example cited above, the line was originally constructed for the ease and cost of construction. This was probably the least cost alternative at that time. Ease of construction for power lines in general will also mean ease of construction for highways and associated development. Many times, development occurs in proximity to transmission lines because of the ease of development. Also, the easement under the power line can serve multiple purposes, such as fulfillment of the need for zoning area requirements, parking lots, and the like. These actions tend to draw the built environment closer to existing transmission facilities. Generally, the only restriction in the power line easement is that building construction, or other uses requiring height, cannot take place within the easement. If development occurs in proximity to existing transmission lines, and collocation of transmission facilities is now desired, the issues of relocation of customers and numbers of buildings in proximity to the new facilities arise. While cost may not be the big issue here, collocation route options in such an area now score lower because of structure location and visual considerations.

## **2. Conclusion**

Very high percentage collocation route options may score lower than one would initially think due to changes in societal values, development trends of the built environment, and increased costs, and consequently lower the percentage of collocation of new transmission facilities that is considered to be reasonable.

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<sup>18</sup> Response to Liberty Data Request #18.



In Chapter Two of this report, Liberty addressed the collocation percentages developed by LG&E/KU and finds that those percentages were reasonable.

## C. Other Considerations and Observations

### 1. Statewide Calibration of the EPRI Model

LG&E/KU stated that they intended to develop a statewide transmission line siting model, based on the EPRI model, for all of Kentucky and that it would not be constructed to be utility specific. The weighting factors developed would replace the factors currently used in the EPRI model that were developed for Georgia. LG&E/KU also stated that they were starting to calibrate the EPRI siting model to Kentucky specific data. That calibration included a new stakeholder process using the Delphi process, all Kentucky utilities, and that the granularity (i.e. how many blocks that tier two data, such as distance from the power line, is broken up into) of the process and emphasis weighting were also open for recalibration.<sup>19</sup>

Liberty favors such an effort as its completion will increase confidence in the resultant route selections, and include items of public importance to Kentucky in the selection process. This process also allows for better documentation of the multitude of decisions that are made during the route selection process. Liberty does caution that by using statewide weighting data and the consensus process, the EPRI model tends to be tailored more towards longer route applications. Application of the software to shorter routes may require override of the statewide data and consensus due to very local considerations.

### 2. Right-of-Way Widths

LG&E/KU stated that in the current case they will be requesting the following typical right-of-way widths from landowners for the various line voltages listed.<sup>20</sup>

**Voltage Level Versus Right-of-Way Width<sup>21</sup>**

Voltage Level (kV)	Typical Right-of-Way Width (Feet)
69	100
138	150
161	150
345	200
500	250

Right-of-way is required so that a transmission line may operate both safely and reliably. The amount of right-of-way required for a transmission line depends on many factors. The height of

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<sup>19</sup> Interview of January 12, 2006.

<sup>20</sup> Response to Liberty Data Request #21.

<sup>21</sup> Response to Liberty Data Request #21.

the transmission towers, the distance between the transmission towers, conductors and conductor tensions, design loading, height of adjacent vegetation, and insulator restraint at the transmission towers all impact the right-of-way width required for safe and reliable transmission line operation.

LG&E/KU stated that use of restraining insulators on 345 kV H frame towers would increase line costs by about \$10 thousand per mile and that right-of-way requirements would be reduced by 15 feet to 20 feet. Hanging conductors from straight/vertical insulators results in horizontal line motion due to the effect of wind (blow out), and therefore the need for a wider right-of-way. The alternative is to hang the conductors from a “V” configuration or a post configuration (restraining insulators), that restrains conductor movement due to wind, and consequently reduces right-of-way requirements. That right-of-way reduction equates to 1.82 to 2.42 acres per mile respectively.<sup>22</sup> LG&E/KU also stated that they only use restraining insulators when technically required to do so, not to reduce right-of-way width required.<sup>23</sup>

Liberty suggests that reviewing the line design of existing transmission lines and proposed transmission lines may result in an efficient utilization of existing rights-of-ways and cost effectively increase collocation potential.

### **3. Roads as Corridors**

In its review of the siting process, Liberty understands that use of the EPRI model results in the treatment of existing transmission line rights-of-way, gas pipeline rights-of-way, and roadways all as equal collocation opportunities. Liberty points out that the use of roadways as corridors has a negative visual impact that use of existing transmission line and gas pipeline rights-of-way may not have. In the future, as LG&E/KU calibrates the EPRI model for general Kentucky use, consideration may want to be given to corridor desirability from a visual perspective. Provision should be made for reducing the desirability of roadways as collocation opportunities because of the associated negative visual impacts.

### **4. Flexibility in Determination of Final Line Location**

LG&E/KU recommends that the Commission grant them the ability to make unsubstantial changes to the final transmission line route.<sup>24</sup>

In Case No. 2005-00207, the Commission gave such approval to EKPC under strict guidelines for its application. Liberty believes that such ability, properly and strictly controlled, can enhance the utility-landowner communication process and result in a more harmonious balance of public and infrastructure construction needs.

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<sup>22</sup> Interview of January 12, 2006.

<sup>23</sup> Response to Liberty Data Request #1.

<sup>24</sup> Testimony of Mark S. Johnson at pages 19-20.

## **D. Summary**

1. The technical studies and economic evaluations supporting the construction of the Mill Creek to Hardin County 345 kV transmission line in Case No.2005-00142 remain valid for the proposed Route #1, and its alternative, Route #2, in the current case.
2. The collocation percentages developed by LG&E/KU in its route selection process were reasonable.
3. The observations made by Liberty in Section III.C of this report should be considered by the Commission in its evaluation of this project.