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The Application of East Kentucky Power Cooperative, Inc. for a Certificate of Public Convenience and Necessity for the Construction of a 161 kV Electric Distribution Substation and Tap in Spencer County, Kentucky

Technical Appraisal

Prepared by:
ICF Resources LLC.

February 15, 2005 *revised*

ICF CONSULTING

February 16, 2005

Ms. Beth O'Donnell
The Executive Director
Kentucky Public Service Commission
211 Sower Blvd
P.O. Box 615
Frankfort, KY 40602

Dear Ms. O'Donnell,

Technical Appraisal of The Application of East Kentucky Power Cooperative, Inc. for a Certificate of Public Convenience and Necessity for the Construction of a 161 kV Electric Distribution Substation and Tap in Spencer County, Kentucky - Erratum

We would like to draw your attention to a typographical error on page 24 of ICF Consulting's technical appraisal referenced above. The words "alternative B" in paragraph 5, line 4 should read "Alternative G".

Sincerely,

Kojo Ofori-Atta
Vice President
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703 934 3968 (fax)
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Outline **Page**

Exhibit 1.1: - Proposed 161 kV line and 161 kV/ 12.47 kV Little Mount Substation

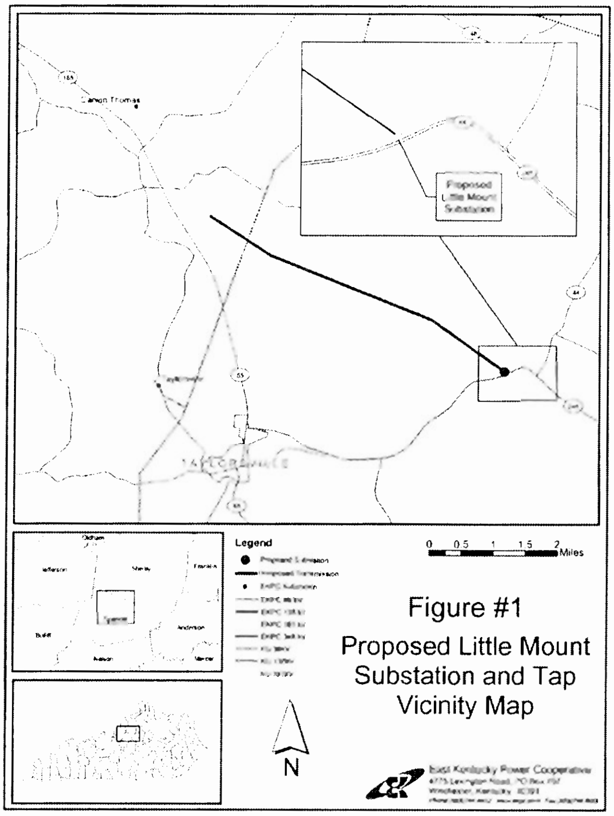


Figure #1
Proposed Little Mount Substation and Tap Vicinity Map

SRECC currently receives bulk power at twenty-seven delivery points from EKPC for distribution at 12.47 kV to customers across its service territory in ten Counties. The proposed Little Mount distribution substation would be the twenty-eighth bulk power delivery point. Exhibit 1.4 shows the 27 current delivery points and the proposed.

The bulk of SRECC's customers are in four Counties – Bullitt, Nelson, Spencer and Washington. The Little Mount distribution substation will be located in Spencer County. Exhibit 1.5 shows the number of customers served in each county and the number of EKPC bulk power substations in each of the Counties.

According to EKPC and SRECC, the Little Mount area of the SRECC system has in recent years experienced extreme load growth due new subdivisions and influx of construction activity. The increased demand is causing stresses on the existing power distribution infrastructure. The major problems include heavy line loading and declining voltage conditions associated with the heavy line loading. Without reinforcement to the distribution system, the effect to customers could be periodic supply reliability problems.

Exhibit 1.2: Interconnected Control Areas in the State of Kentucky

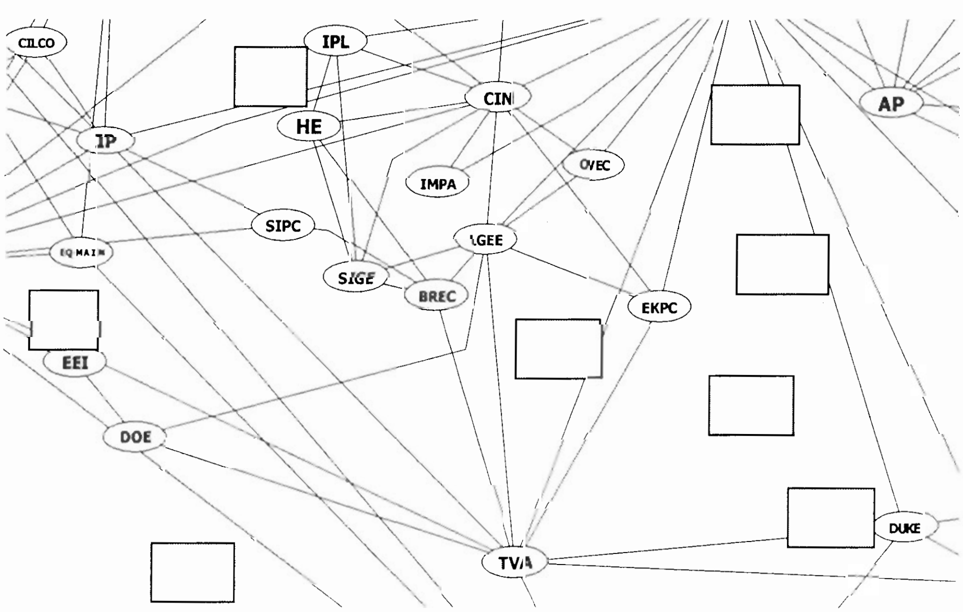
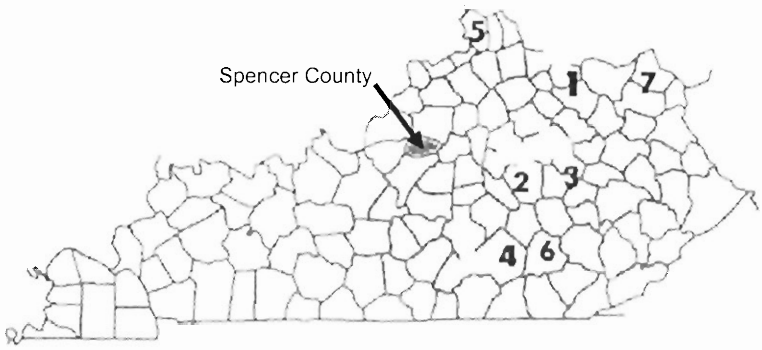
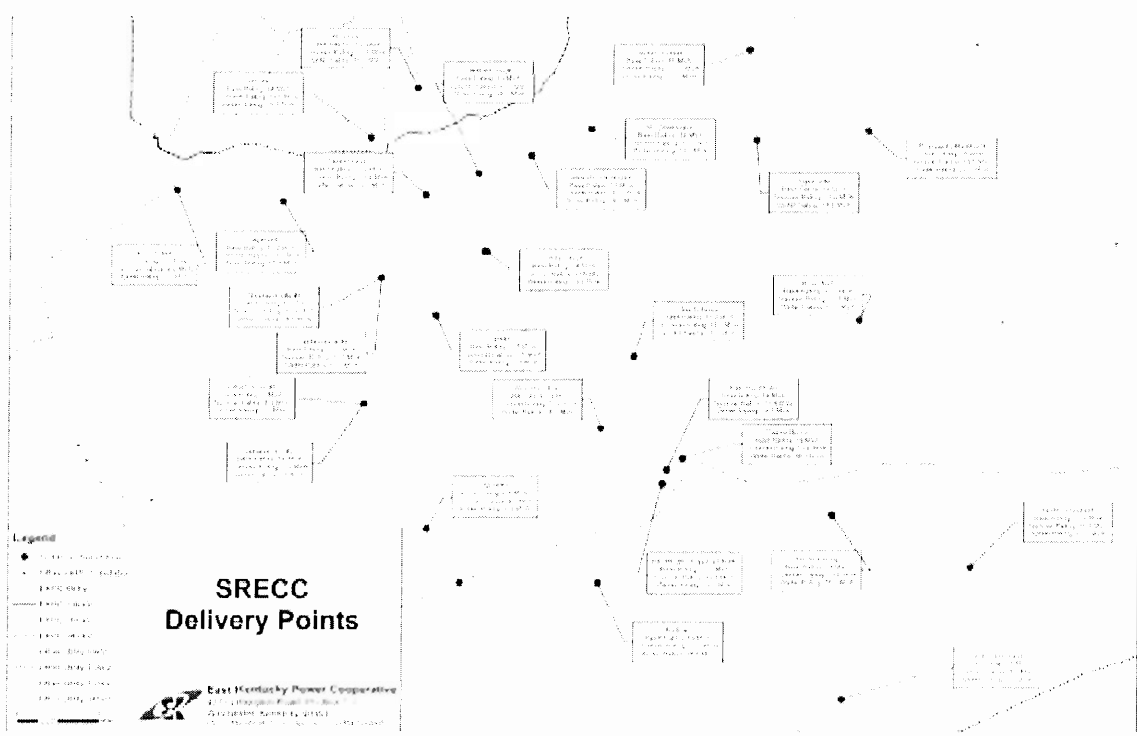


Exhibit 1.3: EKPC Service Territory and the Location of Spencer County



The Little Mount area has three existing power supply options. Under normal conditions, the area is served by a 10 mile, 12.5 kV, three-phase radial feeder from the Taylorsville substation. Under contingency conditions, two alternate supply options are available from the Darwin Thomas substation and the Bloomfield substation but on a limited basis due to thermal capacity limitations of the conductors. Thus, supply from these two alternative sources is limited by load conditions (See Exhibit 1.6).

Exhibit 1.4: Bulk Power Delivery Points in SRECC Distribution Service Territory



Source: SRECC / EKPC response to ICF data request.

In January 2005, EKPC filed an application with the KPSC for a CPCN for the construction of a 12/16/20 MVA 161 kV electric power distribution substation and a six-mile 161 kV line tap in Spencer County, Kentucky ("the Project"). The Project was submitted as the best of four alternatives that EKPC and SRECC considered to improve the power supply situation in the Little Mount area.

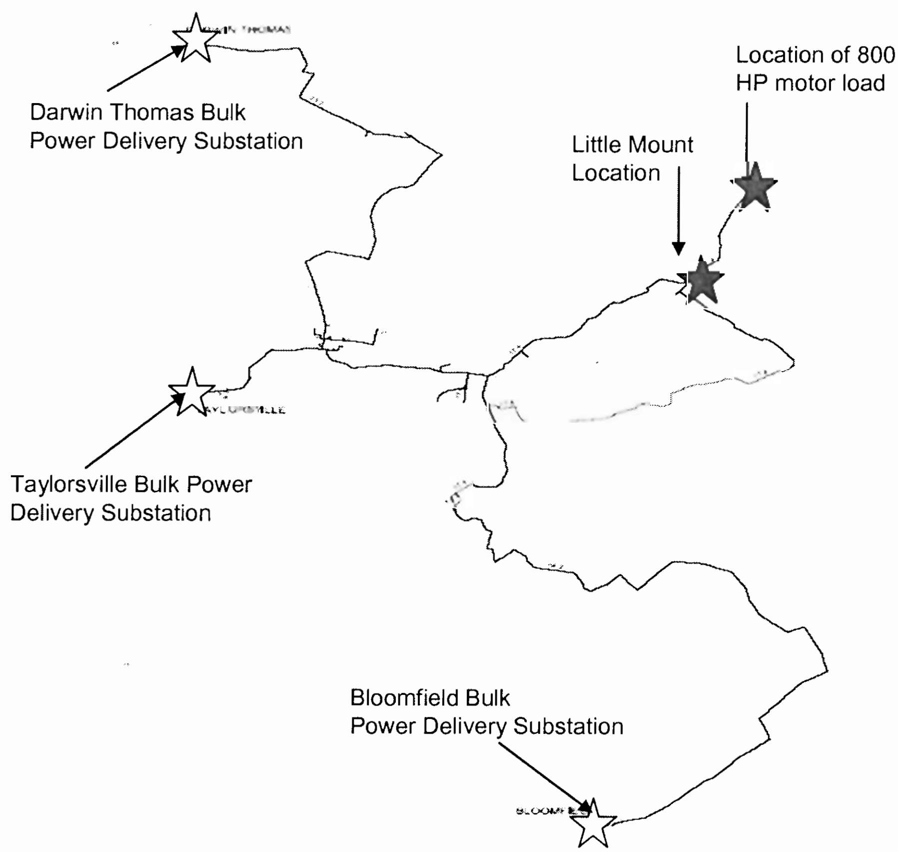
Exhibit 1.5: Number of SRECC Customers, Bulk Power Delivery Points and Total Delivery Capacity By County

	Number of Members	Number of Bulk Power Substations	Total Capacity (MVA)	Population[1]
Bullit County	19,000	13	133.5	47,567
Nelson County	12,000	8	94.4	29,710
Spencer County	4,200	2	30	6,801
Washington County	4,000	3	31.6	10,441

[1] Source: http://www.uky.edu/KentuckyAtlas/kentucky-counties.html

The remainder of this report presents ICF's technical appraisal of EKPC's filing. In preparing this assessment, ICF relied solely on documents provided by EKPC and responses by EKPC to ICF's data requests (See Appendix I). No on-site field visits and/or surveys were made by ICF in providing this appraisal.

Exhibit 1.6: Existing Power Supply Options to the Little Mount Area



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SECTION 2: DISTRIBUTION PLANNING AND ASSESSMENT OF NEED

The purpose of distribution planning is to provide consumers with the electrical energy they require, reliably and as economically as possible, while maintaining their supply voltage within reliability limits. It is therefore essential that in planning distribution systems, resources are not spent without justification and not before it is essential to do so.

The first step in any planning process is to determine existing load conditions and voltage levels, then check and confirm sources and magnitudes of new loads to be connected. The most economic design that conforms to established reliability and security criteria should be selected with due regard to:

- Safety
- Supply reliability and security
- Minimum capital cost
- Ease of maintenance
- Capability of easy and economical expansion to meet load growth
- Standardization

As load increases, it is good utility practice to reduce the feeding distance on an existing circuit to maintain acceptable voltage conditions. This means that load increases should generally be met by providing more points of supply on existing circuits rather than larger points of supply. For example, in the case of low voltage distribution lines, reinforcement should be in the form of erection of additional pole mounted substations along the length of the low voltage lines, rather than reconductoring with larger conductors and increasing the capacity of existing substations.

It is also important to take reasonable precautions to limit the system fault level over a long period in order to avoid premature obsolescence of existing equipment. This should be taken into consideration when system expansions are being planned. To limit fault levels, the distribution system should be divided into independent sections to restrict the installed transformer capacity connected to each section.

It is along these general distribution planning principles and guidelines that ICF has assessed EKPC's CPCN filing for the proposed new Little Mount Substation and transmission line.

Assessment of Existing Power Supply Conditions in the Little Mount Area:

Taylorsville Feeder 4 currently provides power to the Little Mount area. This is a three-phase radial power supply of about 10 miles and mostly of 1/0 copper conductor. The Little Mount location is at approximately 7.5 miles from the Taylorsville substation. The capacity of this feeder is 530 Amps for the first 3 miles and reduces to approximately 310 Amps for the next 5 miles to the Little Mount area. The remaining 2 miles of the feeder are beyond the proposed Little Mount substation and the capacity of this segment of the feeder is 234 Amps (See Exhibit 2.1). According to EKPC, approximately 68 percent of the entire sub feeder load is located beyond 5 miles from the Taylorsville substation. Also, at the end of this sub feeder line is an 800 HP[3] motor load.

Exhibit 2.1: Taylorsville Sub Feeder 4

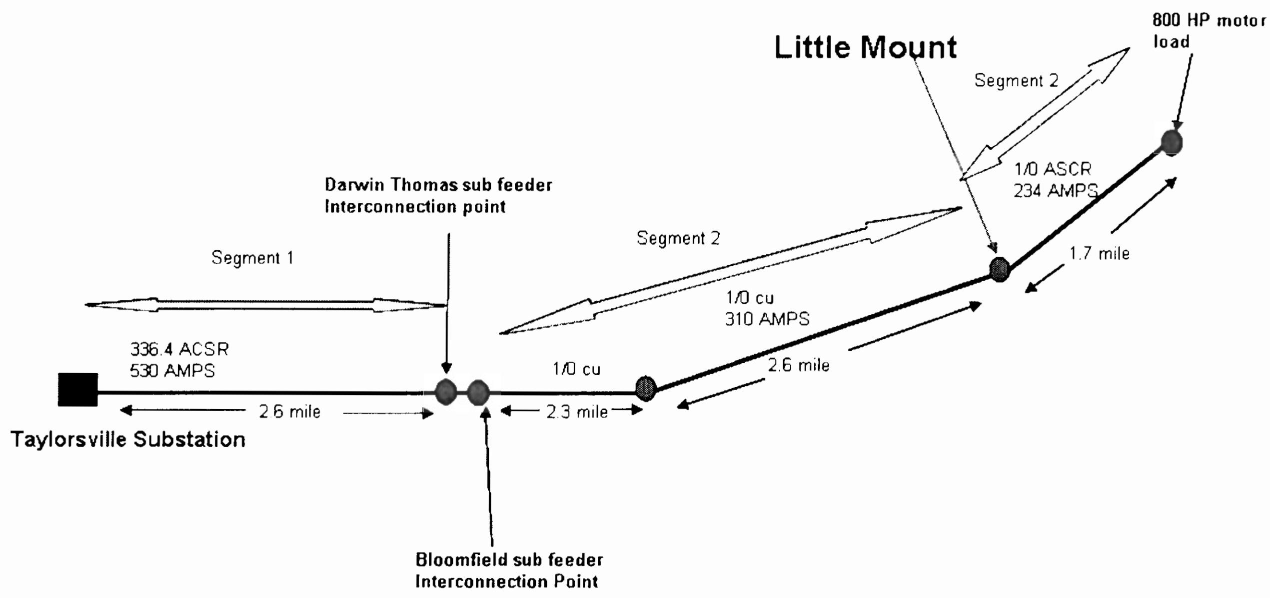
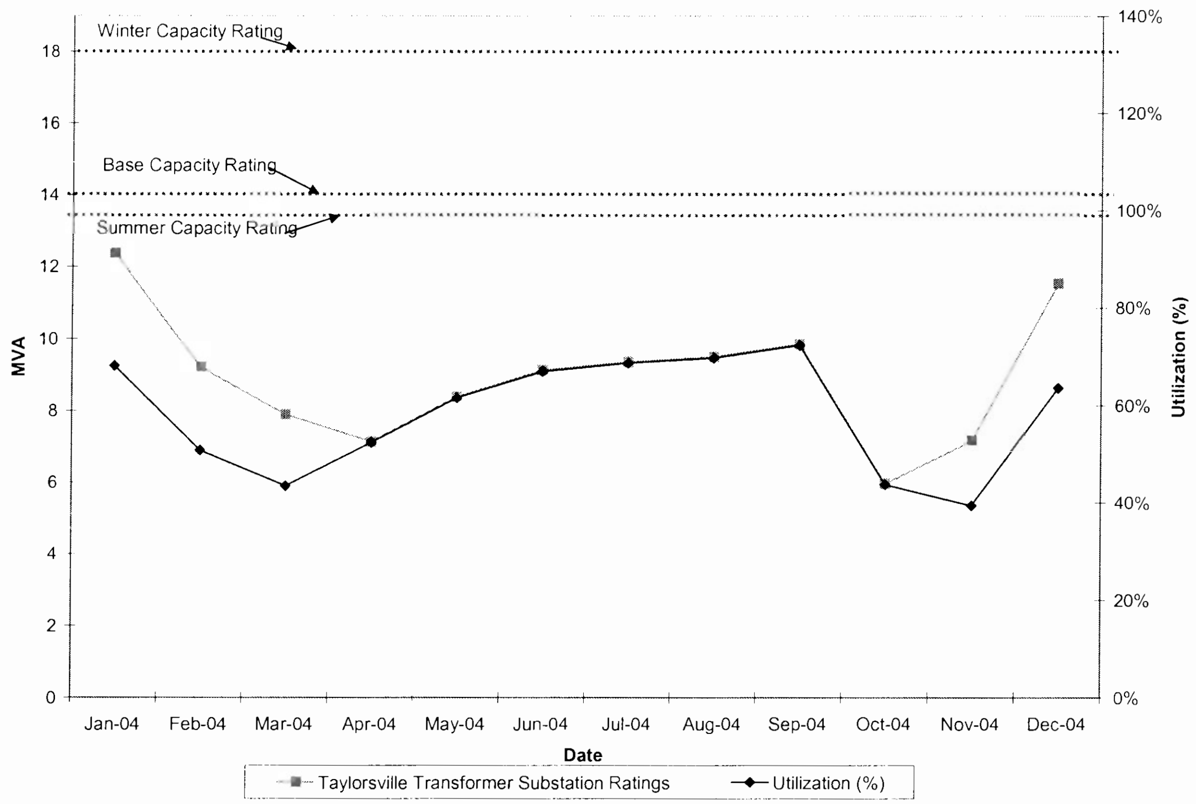


Exhibit 2.2 shows 2004 historical monthly peak loading on the Taylorsville substation and the percent utilization (as a percent of the peak summer or winter rating) by month. The Base rating of the substation is 14 MVA, with a winter and summer rating of 18.1 MVA and 14 MVA respectively. The months of November through March are assumed to be winter months and all other months are assumed to be summer months. Over the period from January 2004 through December 2004, the maximum loading was approximately 12.4 MVA which occurred in January 2004. This represents approximately 68 percent capacity utilization compared to the winter rating of the substation. The highest percent utilization was 72 percent which was in September 2004. Exhibit 2.2 shows that there is at least 28 percent extra capacity available at the Taylorsville substation for future demand growth based on 2004 demand conditions.

[3] 1 HP is approximately 746 Watts.

Exhibit 2.2: 2004 Monthly Peak Loading and Utilization of the Taylorsville Bulk Power Distribution Substation



Note: Summer ratings are used in the utilization calculation for April to October; Winter ratings are used in all other months.

Exhibit 2.3 shows the 2004 monthly peak loading on the Taylorsville sub feeder to the Little Mount area measured from the sending end of the sub feeder. In contrast to the substation, the peak load of approximately 7.5 MW on this sub feeder occurred in December 2004. The average of the monthly peaks was 5.3 MW.

Exhibit 2.4 provides a linearized estimate of loading of the Taylorsville Sub Feeder 4 based on the highest 2004 monthly peak loading of approximately 7.5 MW which occurred in January 2004. The chart indicates that based on the January 2004 monthly peak load, the loading of Segments 2 and 3 were close to or at their maximum capacities. This observation indicates an immediate need for some power distribution upgrades. However it is not conclusive as to what type of upgrade is needed until additional parameters such as line voltage and capital costs of potential upgrade options are reviewed. It is conceivable that the upgrade could be in the form of reconductoring of the last two segments or a reconfiguration of the distribution network to move some loads onto existing or new substations.

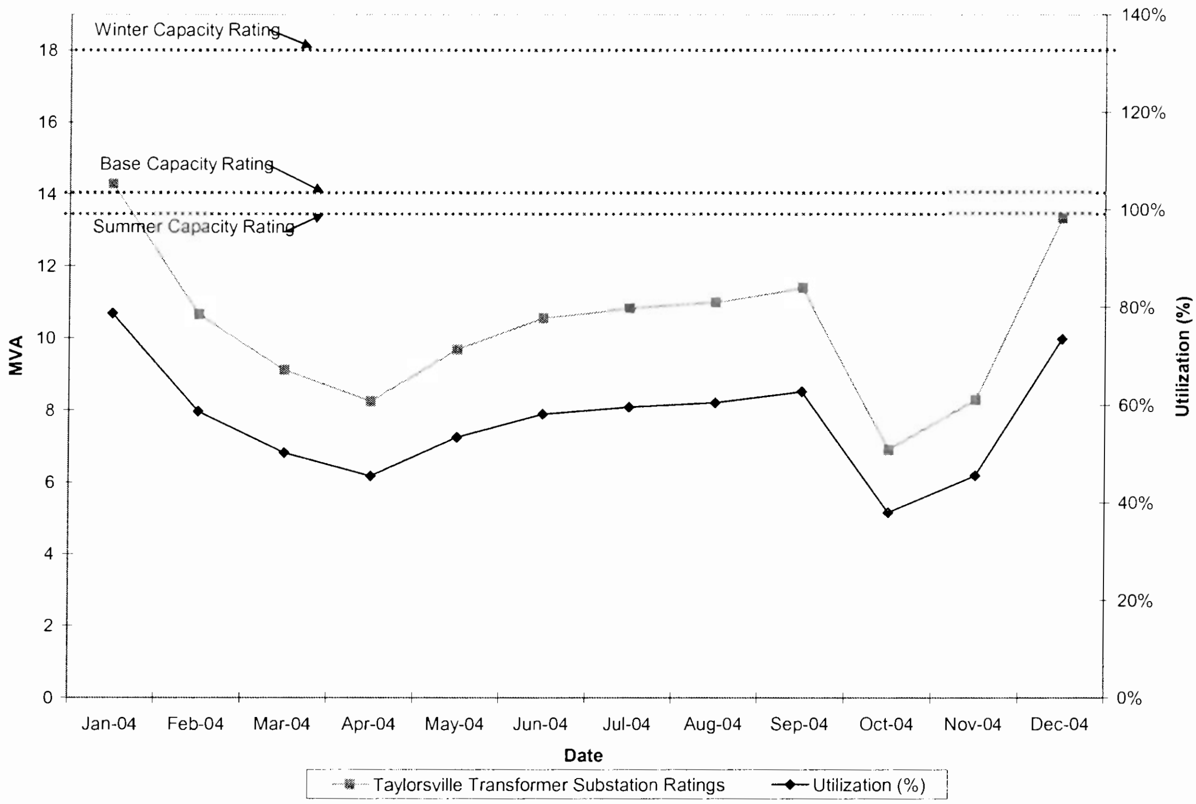
<u>Sub Feeder Line Losses and Line Voltages</u>:

It is good utility practice to maintain low line losses. Line losses generally increase non-linearly with increased line loads and line lengths. As line loss increases, voltages at receiving ends of a line also decline which could affect supply reliability. To maintain supply reliability, the power industry requires voltages to be within $\pm$5 percent of their nominal voltages. For example, at the 12.47 kV distribution level, operators are required to maintain voltages within 11.85 kV and 13.1 kV to maintain reliability. When voltages at receiving-ends of a line fall outside the $\pm$5 range, reactive power compensation schemes would have to be used to provide voltage regulation.

According to Mr Sharpe's testimony, problems in the Little Mount area include low voltage conditions due to high loading of the Taylorsville sub feeder. The existing Taylorsville sub feeder has three installed voltage regulators. The first of these regulators is at the Taylorsville substation, the second is close to the intersection with the Darwin Thomas sub feeder and the last is mounted at the intersection with the Bloomfield sub feeder. An additional Static VAR Compensator (SVC) has been installed to minimize "brown outs" from large electric motor starting currents.

In response to ICF's questions on voltage conditions EKPC and SRECC provided historical voltage profiles taken at the receiving end of the Taylorsville feeder at the Little Mount location for the period from January 1, 2004 through July 30, 2004 in roughly 2 to 3 hour intervals. These voltage profiles were taken with all three regulators in operation. Exhibit 2.5 shows the deviations of the voltages from their nominal levels. The mean of the deviations is above nominal is 1.6 percent and below nominal is 2.2 percent which is within the $\pm$5 percent range. However there are hours where voltage deviations were in excess of the $\pm$5 percent range. Baring any data errors in the submission, the deviations shown albeit in very few of the hours are significant given the fact that grid collapse are low probability but high impact events. Without the active operation of the voltage regulators, it is conceivable that voltage conditions could fall outside of this range in many more hours. According to Mr Sharpe's testimony, under peak conditions with reactive power compensation, per phase voltage drops were about 5 percent which is at the threshold level.

Exhibit 2.7: Illustrative 2008 Taylorsville Monthly Peak Substation Loading and Utilization



Note: Summer ratings are used in the utilization calculation for April to October; Winter ratings are used in all other months.

Under these assumptions, the Taylorsville substation exceeds its Base rating only in January 2008. However since the rating of the substation is higher in the winter months the projected January 2008 loading is well within the Winter rating. From a utilization perspective, the 2008 monthly peak utilization is projected at 79 percent in January 2008. Therefore ICF concludes the Taylorsville substation should be able to accommodate the expected 2008 load and that Taylorsville substation would not need an upgrade until well beyond 2008 based on assumptions on demand growth.

Demand

EKPC expects significant demand growth activity in the SRECC service territory. The historical energy growth rate derived from total sales over the period from 1994 through 2004 indicates an average of 4.6 percent growth. Peak load growth over the same period has been 4 percent for SRECC. Load factors have been around 50 percent and are projected to remain unchanged. Compared to an overall US energy and peak growth of about 2.0 percent over the same period, the SRECC load has grown quickly and is expected to continue to do so going forward.

ICF has reviewed the Salt River Electric 2004 Load Forecast prepared by SRECC and EKPC in September 2004 and found the projections to be reasonable based on several factors including:

1. Comparison to historical growth levels;
2. Review of local development activity projected by SRECC and other agencies including the Kentucky Transportation Cabinet and the economic development groups for Bullitt and Nelson counties; and
3. Comparison to the larger electric reliability area performance.

In reviewing local growth expectations, the focus was on confined to a review of local development in the geographic area spanned by the SRECC service territory. SRECC has a certified service boundary within Kentucky and hence its service territory is stable and any projections for load growth are concentrated within the known service territory. EKPC is the power supplier supporting SRECC's load requirements, and as such, EKPC supports the growth expectations for the SRECC service area.

SRECC's service territory encompasses the following ten counties in the north central region of Kentucky: Bullitt, Nelson, Spencer, Washington, Anderson, Jefferson, Larue, Marion, Mercer and Shelby. The total annual load requirement is nearly 900 GWh with a load factor of approximately 50 percent. The majority of members are concentrated in Bullitt County, followed by Nelson County – these two counties account for over half of SRECC's total members. Spencer and Washington Counties each have roughly a 10 percent of SRECC members, while the remaining six counties have a limited number of members.

SRECC and EKPC have jointly prepared a load forecast for this area for the period 2004 through 2024. Overall, the projections indicate an annual average load growth of roughly 3.7 percent for load (see Exhibit 2.10) and 3.5 percent for peak. These projections incorporate a declining growth rate over time; in particular, a faster growth rate is anticipated in the next 5 years with a continuously declining growth rate thereafter. The long-term load factor projections remain flat at roughly 50 percent. This is consistent with the current load factor as well as the 10 year average historical load factor (1993-2003). Likewise, long-term projections for load and peak growth are consistent with the ten-year average since 1993 of 4.4 and 4.1 percent respectively.

ICF further reviewed the growth projections provided by SRECC and EKPC against those of the broader East Central Area Reliability Council (ECAR) area. ECAR is a regional power market area covering the east central area of the US including the EKPC area.

Exhibit 2.12: Comparison to Larger Area Projections

Year	EKPC / SRECC	ECAR
5 Year Load Growth Rates		
1993-1998	3.2	2.3
1998-2003	5.1	0.4
2004-2009	4.8	1.7
2009-2014	3.5	1.5
2014-2019	3.2	NA
2019-2024	3.1	NA
10 Year Load Growth Rates		
1993-2003	4.1	1.4
2004-2014	4.2	1.6
2014-2024	3.2	NA
Sources: SRECC Electric 2004 Load Forecast, East Kentucky Power Cooperative, Inc. Market Research Department September 2004 and NERC ES&D.		

As seen in this comparison, SRECC and EKPC have historically experienced a faster growth than the broader electric area in which it participates. In part this is expected because ECAR market covers a fairly broad territory encompassing several already developed areas that would not anticipate strong growth and other areas with little near-term development potential. Growth in the SRECC area is expected to continue at levels consistent with history and at levels consistently above the larger market area. Further, the declining trend in the SRECC projections is consistent with a maturing of the development opportunities over time.

In conclusion, the SRECC EKPC growth projections are reasonable and consistent with historical growth and the projections of other agencies.

SECTION 3: ASSESSMENT OF FEASIBLE ALTERATIVES

In Section 2, ICF concluded there was a need for some infrastructure upgrades to maintain reliable power supplies to the Little Mount area. The upgrades could be in the form of reconductoring the existing cable with larger cables, reconfiguring the network to shift loads onto other feeders, or some other form of distribution system reinforcement. In this Section, ICF assesses the feasible alternatives offered by EKPC.

An alternative that provides the most economy and efficiency is certainly preferable; therefore the approach to assessing each of these alternatives is based on the following criteria:

- <u>Technical Feasibility</u>: Each proposed alternative must be technically feasible and should adequately address the potential overload and voltage problems identified in Section 2. The key factors under technical feasibility will be to examine if each alternative achieves the minimum reliability and security standard. Security of supply comes at a cost and the higher the level of security, the higher the cost. Unless the customer is willing to pay for security, the level of security to be provided is often a matter of subjective judgement. In this case, it should be recognized that the existing circuit to the Little Mount area was radial and probably at the low end of supply security. As a general principle the level of supply security should reflect the nature of the load. Demands of up to 1.5 MVA supply can be radial with no alternative supply – restoration time is generally the repair time. Demands between 1.5 MVA and 8 MVA should at a minimum be on an open ring circuit with a maximum restoration time of two hours. Demands of between 8 MVA and 40 MVA must have alternative supplies with a maximum restoration time of 15 minutes. Demands in excess of 40 MVA require firm supplies with no supply interruptions for single contingency faults.

- <u>Ease of Expansion</u>: Each technically feasible alternative must be capable of expansion for future load growth.

- <u>Capital Cost</u>: A technically feasible alternative that provides ease of expansion at a minimum cost is certainly preferable.

- <u>Ease of Maintenance</u>: An alternative that minimizes the cost of maintenance is desirable and so is a design based on proven technology with known going - forward maintenance costs.

- <u>Standardization</u>: Standardization of technology and equipment minimizes operational, training and inventory costs. For example, in the area of power distribution, simple and well proven designs of equipment should be used because these are likely to achieve economical, reliable and easily maintainable systems. There must be compelling reasons to switch to a new distribution voltage recognizing that with a new distribution voltage comes the need to maintain new lines of inventory, and personnel training.

line tap from the LGEE 69 kV system to feed this new delivery point. As a general matter, a new power delivery point is preferable to reconductoring because it provides more flexibility for future expansion. It is also preferable because, together with the existing circuit from Taylorsville, it provides a "looped" system such that power can be fed to the Little Mount area from Taylorsville or from this new facility. These factors make Alternative B technically more superior than Alternative A. From a supply security point of view, restoration of power under fault conditions will not be dependent on repair time. Indeed "looped" distribution systems are more reliable than radial systems.

The main disadvantage of this alternative is that it is fed from a 69 kV transmission line rather than from a higher voltage transmission line. The capacity of a 69 kV transmission line is much lower than lines at higher voltages (assuming the same conductor size). Therefore the expansion opportunity of this option would be limited to the maximum power that can be fed to the substation from the 69 kV system.

Alternative B does not pose any maintenance or standardization concerns. Distribution substations from 69 kV systems are common in many distribution systems.

The capital cost in present dollars of Alternative B is $4,476,813, which although less than Alternative A, is significantly higher than the next two alternatives. Similar to Alternative A, this alternative also entails some variable operating costs for power wheels through the LGEE transmission system and for distribution losses.

Overall, Alternative B is technically superior to Alternative A and it is also less expensive. It provides better opportunities for future expansion to meet load growth in the Little Mount area and it also provides better supply security.

<u>Assessment of Alternative C: Construct New Little Mount 12/16/20 MVA, 161 kV/12.47 kV Substation Served from EKPC 161 kV</u>

Alternative C has all the essential features of Alternative B but is technically superior because the New Little Mount Substation would be supplied from a 161 kV transmission voltage which has a higher transmission capacity than the 69 kV transmission system of Alternative B. The distance from the existing transmission systems is practically identical in both alternatives, i.e. 6.4 miles in the case of Alternative B to the existing 69 kV line and 6.3 miles to the existing 161 kV line in the case of Alternative C.

Similar to Alternative B, Alternative C does not pose any maintenance or standardization concerns.

The capital cost in present dollars of Alternative C is $3,937,437, which is significantly less than the capital costs of Alternatives A and B. Alternative C has the lowest variable operating costs for transmission losses and wheeling.

Assessment of Alternative G: Construct New 12.47 kV, 795 ACSR Distribution Feeder from Darwin Thomas Substation

Alternative G is basically a delayed implementation of Alternative C. Rather than constructing the new 161 kV/ 12.47 kV Little Mount Substation immediately as proposed in Alternative C, Alternative G delays the full implementation until 2011. In the interim period the Little Mount area load is switched from the Taylorsville substation to the Darwin Thomas substation by constructing a new sub feeder from Darwin Thomas. Although the Darwin Thomas substation is physically as close to the Little Mount area as the Taylorsville substation, the path of the existing sub feeders from Darwin Thomas is less direct (looped) and therefore makes it electrically more distant from Little Mount than the sub feeder from Taylorsville. The new sub feeder from Darwin Thomas to Little Mount would be more direct and less costly than an upgrade of the existing sub feeder.

The supply security in the period before the construction of the substation will be reasonably good since it will also be a looped system with the potential to feed power from either side of the loop in the event of an unplanned outage. Both Alternative C and Alternative G provide reasonable supply security and ease of future expansion.

Similar to all the other alternatives, Alternative G poses no maintenance or standardization risks.

The capital cost in present terms of Alterative G is $3,823,290, which is the lowest of all the alternatives presented by EKPC.

The choice between Alternative C and G is relatively close. In the absence of any load surprises, ICF would rank both options equal in terms of technical feasibility. Note that after 2011 when the substation is built, the Little Mount area would have a higher level of supply security with Alternative G compared to Alternative C. The reason for this result is that the construction of the substation in 2011 adds another loop to the loop previously enabled by the construction of the new sub feeder from Darwin Thomas. If there is a need to defer capital investments, then Alternative G would be preferable to Alternative C. Should other intangible factors, such as right-of-way risks for the construction of the substation and the 161 kV line exist, it may be best to implement Alternative C over Alternative G. Likewise, Alternative C will ultimately have a lower environmental impact than Alternative G because it requires less land-use, has a smaller environmental footprint and is therefore less disruptive.

Review of EKPC Cost Calculations and Assumptions:

In reviewing the capital costs associated with the four project alternatives, EKPC utilized consistent methodology in their examination. The discount rate employed in the analysis was based on a long-term fixed interest rate of 6.35 percent based on the Federal Financing Bank (FFB) Guaranteed Funds and considered a Times Interest Earned Ratio of 1.15 percent. The resulting discount rate used in EKPC's analysis was 7.30 percent. This level is consistent with current discount rates and the weighted average cost of capital for many companies in the utility sector.

EKPC further developed fixed charge rates for new transmission, reconductor, distribution substation, substation tap, and distribution coop that were used to determine the annual levelized costs (the annuitized value of the project based on the lifetime and fixed charge rate, i.e. the annual carrying charge) for the line item investments considered in each alternative considered. Costs for investments were appropriately adjusted to reflect the nominal annual charges in the years investment activity was expected to occur.

The fixed charge rate determination for new transmission was based on the following reconductor, distribution substation, and substation tap, as shown in Exhibit 3.1.

Exhibit 3.1: East Kentucky Power Fixed Charge Rate Determination

EAST KENTUCKY POWER COOPERATIVE

Fixed Charge Rate (October 1999)

	Transmission		Distribution			
			Substations		Related Transmission(1)	
	New Facilities	Line Reconductor	RUS Insured Rate(2)	CFC Rate(3)	RUS Insured Rate(2)	CFC Rate(3)
Interest Rate	6.35	6.35	5.25	8.60	5.25	8.60
Margins	0.95	0.95	0.79	1.29	0.79	1.29
Sinking Fund Depreciation	1.19	1.19	1.44	0.79	1.44	0.79
Taxes + Insurance	0.53	0.53	0.16	0.16	0.53	0.53
Replacements & Renewals	0.30	0.00	0.30	0.30	0.30	0.30
O & M	3.25	0.00	2.00	2.00	3.25	3.25
Total:	12.57	9.02	9.94	13.14	11.56	14.76
Weighted Average:			10.90		12.52	

Notes:
(1) Transmission tap lines
(2) Applicable to first 70% of EKPC total annual distribution expenses
(3) Applicable to last 30% of EKPC total annual distribution expenses

Although interest inputs appear to be based on 1999 data, the interest values are within a reasonable range to consider for long-term investments. As shown, fixed charges for distribution are derived as the weighted average of a 70 / 30 split in the investment costs. The larger share of investment is considered to have a lower interest or return rate and lower margins while the sinking fund for depreciation is higher for the initial 70 percent. The key difference between distribution substations and distribution substation taps is based on the tax and insurance payments and O&M charges where the transmission portions receive a higher share. Fixed charge rates were also provided for the distribution cooperative charges at 0.1819; this represents the highest fixed charge of the categories considered. Sufficient detail on the derivation of this value was not available for review. The value was consistently used to value all distribution cooperative options across the cases, and although a bias may be introduced in cases with the highest distribution cooperative charges, the relative order of the cost of the projects does not change. However, should this fixed charge estimate be high or low, the magnitude of differences across the alternatives may change.

SECTION 4: CONCLUSION

After a detailed review of EKPC's CPCN filing and relevant supporting materials, ICF Resources' concludes that:

1. The condition of the existing power supply infrastructure to the Little Mount area is close to its design capacity and could pose a reliability risk. Thermal overloads from supporting technical analyses provided by EKPC/SRECC appear significant and low voltages are prevalent even under existing load conditions. Additional load growth will only exacerbate the situation. Therefore there exists a need for an upgrade of the distribution infrastructure to the Little Mount area.
2. Growth in Spencer County and the surrounding areas has historically been strong and is expected to continue. Spencer County, in fact, has been one of the ten fastest growing Counties in the US.
3. Load factors for SRECC have been around 50 percent historically and are projected to remain at those levels because the existing SRECC customer mix is not forecasted to change.
4. Historical load growth and peak demand growth in the SRECC system and specifically at the Taylorsville substation support the future projections of peak demand and load. This minimizes any large uncertainty about the likelihood of new loads in the Little Mount area. This implies that the distribution infrastructure upgrade needs in the Little Mount area are unlikely to diminish.
5. All four alternatives proposed by EKPC are technically feasible. Alternatives B, C and G are preferable to Alternative A because they are less costly and they provide better future expansion flexibility and they also provide better supply security.
6. Alternatives C and G are technically superior to Alternative B because, whereas they all propose a new bulk power delivery substation, Alternative B is fed from a 69 kV transmission line tap that is a low capacity transmission line relative to the proposed 161 kV transmission line tap proposed in both Alternatives C and G. Additionally they are less costly than Alternative B.
7. Alternatives C and G have almost equal technical merits. Indeed Alternative G is a delayed implementation of Alternative C. Although Alternative G has a slightly lower cost in present dollars when compared to Alternative C, the cost differential is minimal and likely of little significance. The choice between the two will depend on the risk of faster than expected load growth or on the need to defer capital investments. If there is likelihood of even faster load growth than projected or of growth spikes, then Alternative C is preferable; if there is a need to defer capital investments then Alternative G is preferable. Also, if acquisition of rights-of-way is problematic then it may be preferable to implement Alternative C since that requires acquisition of rights-of-way for only the substation and the line tap unlike Alternative G that would require the same right-of-way for Alternative C in addition to a right-of-way for the new sub feeder from Darwin Thomas.
8. ICF believes that Alternatives C and G address the need for a distribution system upgrade, as identified by EKPC.

APPENDIX I: LIST OF DOCUMENTS REVIEWED

Notice of Intent to File Application, Little Mount Distribution Tap, Spencer Co.
CPCN Application for Substation and Tap in Spencer County
Request for Information Regarding Public Hearing Information (James E. Ransdell)
Letter to James E. Ransdell, Announcement of Public Hearing date of March 3, 2005 (PSC KY)
Letter of Complaint (Roswell A. Harris)
Response to Letter of Complaint from Roswell A. Harris (PSC KY)
Responses of East Kentucky Power Cooperative, Inc. to Commission Staff Requests Dated Jan 18, 2005

- Item 1: Salt River Distribution System Map
- Item 1: EKPC Transmission System Map
- Item 2: SRECC Delivery Points
- Item 2: SRECC Subsections of the Distribution System
- Item 4: Salt River Electric 2004 Load Forecast
- Item 8: Monthly Peaks - Taylorsville, Bloomfield, Darwin Thomas (Jan-Dec 2004)
- Item 8: Ratings - Taylorsville, Bloomfield, Darwin Thomas
- Item 9: Length of Existing Feeders to the Little Mount/Spencer County Area
- Item 10: History for Voltage Monitor # 17_4 (1 Jan 2004 - 30 Jul 2004)
- Item 10: History for Voltage Monitor # 17_4 (31 Jul 2004 - 21 Jan 2005)

Avoided Capacity & Avoided Energy Charge for Distribution Losses
Derivation of Discount Rate for Present Value Analysis
Fixed Charge Rate
Recommended Inflation Rates for Capital Improvements
Template for Determining Fixed Charge Rate (Carrying Charge)
Transmission Wheeling for Taylorsville Load on Kentucky Utilities
Distribution Losses: Alternatives B, C, A, G
Salt River Substation Forecast - 1998
Salt River Substation Forecast – 2002

Packet 1: Taylorsville FDR 04, Existing Load, No Corrections, Two Sets of Regulators
Packet 2: Taylorsville FDR 04, Existing Load, No Corrections, One Set of Regulators
Packet 3: Bloomfield FDR 02, Existing Load, No Corrections
Packet 4: Darwin Thomas FDR 02, Existing Load, No Corrections
Packet 5: Taylorsville FDR 04, 2010 Load Level, Before Corrections
Packet 6: Taylorsville FDR 04, 2015 Load Level, Before Corrections
Packet 7: Little Mount Fed from Bloomfield FDR 02, Existing Load Level
Packet 8: Little Mount Fed from Darwin Thomas FDR 02, Existing Load Level
Packet 9: Taylorsville FDR 04, 2010 Load Level, After Corrections
Packet 10: Taylorsville FDR 04, 2015 Load Level, After Corrections
Packet 11: Taylorsville FDR 04, 2025 Load Level, 3 Sets of Regulators
Packet 12: Little Mount Fed from Darwin Thomas, 2025 Load Level
Packet 13: Little Mount Fed from Darwin Thomas, 2015 Load Level
Packet 14: Little Mount Fed from Darwin Thomas, 2025 Load Level, 5 Sets of Regulators
Packet 15: With Little Mount Substation, 2005 Load Level
Packet 16: With Little Mount Substation, 2010 Load Level, 1 Single Phase Regulator
Packet 17: With Little Mount Substation, 2015 Load Level
Packet 18: With Little Mount Substation, 2025 Load Level, 1 Single Phase Regulator

Proposed Little Mount Tap
Phase I Archaeological Survey for the Proposed Little Mount Electrical Substation, Spencer County, KY
Categorical Exclusion from National Historical Preservation Act
Exhibits to Application for CPCN: Proposed Little Mount 161kV Tap

Exhibit VIII:

- Proposed Little Mount Tap, Final Route, Sheet 1 of 3
- Proposed Little Mount Tap, Final Route, Sheet 2 of 3
- Proposed Little Mount Tap, Final Route, Sheet 3 of 3