UPDATE TO SYSTEM IMPACT STUDY

GENERATION INTERCONNECTION REQUESTS #30-33

JK SMITH COMBUSTION TURBINES #8-12 AND CFB UNIT #1 PROJECT IN CLARK COUNTY, KENTUCKY



February 13, 2007

Section 1: Introduction and Background

A System Impact Study (SIS) was conducted beginning in October 2004 to analyze the impacts of requested generation additions -- Generation Interconnection Requests #30-#33 in the East Kentucky Power Cooperative (EKPC) generation queue -- at the J.K. Smith Station in Trapp, KY. The final report documenting the results of that study was completed on May 17, 2006.

Table 1-1J.K. Smith Planned Generation Additions as of May 2006							
Requested Project	Commercial Operation Date	Summer Net Capacity (MW)	Winter Net Capacity (MW)				
JK Smith #12	March 2008	84	98				
JK Smith #11	April 2008	84	98				
JK Smith #10	October 2008	84	98				
JK Smith #9	November 2008	84	98				
JK Smith #8	December 2008	84	98				
JK Smith CFB #1	March 2010	278	278				

The generation additions evaluated in that SIS were as follows:

The analysis performed in the SIS identified 41 overloaded facilities in 2010 Summer and 36 overloaded facilities in 2010-11 Winter due to the addition of these proposed generators. The analysis performed recommended implementation of a construction Alternative (Alternative 1) to address the thermal overloads caused by these proposed generating unit additions at J.K. Smith. The primary project of Alternative 1 was the J.K. Smith-West Garrard 345 kV line and associated terminal facilities. This project included the following components:

- Construction of approximately 35.5 miles of 345 kV line from the existing J.K. Smith Station to a point on LGEE's existing Brown-Pineville 345 kV line in Garrard County.
- Construction of a new 345 kV switching station (to be called West Garrard) at the point of intersection in Garrard County.
- Addition of terminal facilities at LGEE's Brown North and Pineville Substations, to energize the 2nd circuit on the Brown-Pineville 345 kV line. This 2nd circuit is to be connected to the J.K. Smith-West Garrard line at the new West Garrard Substation.

Nine other upgrades of existing transmission facilities were identified as part of Alternative 1.

The need for the proposed generating units in the period specified was driven in part by the plan of Warren Rural Electric Cooperative Cooperation (WRECC) to become a

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member of EKPC on April 1, 2008. Furthermore, EKPC was planning to construct nearly 100 miles of 161 kV transmission line from its Barren County Substation to the Big Rivers Electric Corporation (BREC) Wilson Substation by this date. Three interconnections in the Bowling Green area connecting to this line were also planned to provide an adequate transmission system to reliably deliver energy from EKPC generating resources to the WRECC system.

On December 7, 2006, WRECC announced its decision to remain with TVA for its power supply needs and thereby cancel its plans to become a member of EKPC. This decision has resulted in EKPC re-evaluating its generation expansion needs without WRECC as a member system. The modifications that have been identified for EKPC's generation expansion plan have driven this updated analysis of the transmission needs.

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Section 2: Criteria, Methodology, and Assumptions

The intent of this update to the original SIS is to use as much of the original study as possible. Engineering judgment has been used to determine which parts of the original study need to be conducted again. Much of the original study is still applicable, and has been used as the basis for the conclusions contained in this update.

2.1 Study Criteria

The same study criteria were used for this updated analysis as were used in the original SIS.

2.2 Transmission Planning Methodology

Only the steady-state power flow analysis was updated for this analysis. The results of the transient-stability and short-circuit analyses performed in the original study are still applicable based on the assumption that EKPC will ultimately add the generating units listed in Table 1-1 at J.K. Smith, though some of the units will be delayed.

2.2.1 Power Flow Analysis

EKPC updated the power flow analysis to reflect the following changes:

- A new generation expansion plan without EKPC serving the WRECC demand
- Continued supply of the WRECC demand by TVA generation and transmission assets
- Cancellation of the planned transmission additions by EKPC to connect its system to Warren RECC, BREC, and TVA in the Bowling Green area.
- Use of the latest available power flow models for Summer and Winter peak periods in 2007, 2010 and 2015.

EKPC's updated generation expansion plan without the requirement to serve the WRECC load is shown in Table 2-1.

Table 2-1 J.K. Smith Planned Generation Additions as of February 2007							
Requested Project	Commercial Operation Date	Summer Net Capacity (MW)	Winter Net Capacity (MW)				
JK Smith #9	January 2009	84	98				
JK Smith #10	January 2009	84	98				
JK Smith CFB #1	October 2010	278	278				
JK Smith #8	October 2011	84	98				
JK Smith #11	October 2012	84	98				
JK Smith #12	October 2013	84	98				

Comparing Tables 1-1 and 2-1 indicate that the total planned capacity additions at J.K. Smith are identical through 2013. The primary difference is that three of the CTs have been deferred at J.K. Smith for two to four years. The first two CTs to be installed are only delayed a few months from the previous plan. Likewise, the CFB Unit #1 is delayed by approximately seven months.

For the power flow analysis, EKPC started with its latest available 2007 Summer, 2007-08 Winter, 2010 Summer, 2010-11 Winter, 2015 Summer, and 2015-16 Winter models. These models were jointly developed by EKPC and LGEE in early 2006, and therefore include a detailed representation of the EKPC and LGEE transmission systems. The representation of EKPC's other neighboring utilities (AEP, BREC, CIN, DPL, and TVA) is the representation submitted by these utilities for the NERC MMWG 2005 Series Model Development. The remainder of the "outside world" is a reduced representation from that NERC MMWG 2005 Series.

EKPC then updated these power flow models to reflect the WRECC system being served by TVA. Therefore, TVA generation was increased to serve the WRECC load. EKPC generation was no longer modeled supplying any of the WRECC load. Also, the planned transmission system additions in the Bowling Green area needed for EKPC service to WRECC were removed from the models.

A list of thermal loading problems due to the addition of the proposed generators has been developed using the updated power flow models and the generation expansion schedule shown in Table 2-1. Any facilities that overload after the addition of the proposed generating units at J.K. Smith that are not already overloaded prior to the addition of these units has been identified.

2.3 Modeling & Assumptions

The models used for the power flow analysis were from EKPC's internal model library. The models used were the following peak-load representations:

2007 Summer	2007/08 Winter
2010 Summer	2010/11 Winter
2015 Summer	2015/16 Winter

These models were jointly developed by EKPC and LGEE in the first quarter of 2006, and therefore include a detailed representation of both the EKPC and LGEE transmission systems. The representation of EKPC's other neighboring utilities (AEP, BREC, CIN, DPL, and TVA) is the representation submitted by these utilities for the NERC MMWG 2005 Series Model Development. The remainder of the "outside world" is a reduced representation from that NERC MMWG 2005 Series.

For all utilities other than EKPC and LGEE, the analysis used the loads included in the base NERC MMWG cases for the appropriate year. For EKPC and LGEE, the loads in

the models are based on forecast data available to the two companies at the time these models were developed in the first quarter of 2006.

As with the loads modeled, the analysis used the future transmission projects that each utility had included in the NERC MMWG 2005 series of cases for all utilities other than EKPC and LGEE. For EKPC and LGEE, the future transmission projects in the models are those that were included by each company during development of the joint base cases. Any projects that were expected to be attributable to the J.K. Smith generation additions were removed, since the need for these projects will be addressed as part of this update to the SIS.

As mentioned earlier, all aspects of EKPC's transmission plan to serve WRECC have been removed. Also, the models have been revised to simulate TVA generation resources serving the WRECC load in 2008 and beyond instead of EKPC generation resources. The planned generation expansion at J.K. Smith has been revised to reflect EKPC's lower load forecast without WRECC. The revised plan has been provided in Table 2-1 above.

In addition to the planned generator additions at the J.K. Smith Station, a fourth generating unit is planned for EKPC's Spurlock Station. The plans for this new unit remain unchanged, despite WRECC's decision to remain with TVA. The fourth unit is scheduled to begin commercial operations on April 1, 2009. The power flow models used for this analysis include this unit addition on this date.

For the purposes of this study, the proposed units were modeled at maximum output in the analyses. If this resulted in excess generation (beyond EKPC's load requirements), the surplus generation was exported equally to "virtual" generators that were connected to AEP's Cook 765 kV bus and to the Bowen 500 kV bus in SERC. This effectively simulates equal exports to the north and south. This is necessary to ensure adequate transmission capacity for maximum output at the J.K. Smith Plant. All other EKPC units, including the future Spurlock #4, were modeled at maximum output. The Laurel Dam Hydro units were not dispatched in the models. Table 2-1 summarizes the generation output of the existing and future EKPC units dispatched for this study.

Table 2-2							
EKPC Base Case Generation							
Unit	Commercial Operation Date	Summer Net Capacity (MW)	Winter Net Capacity (MW)				
Cooper #1	existing	116	116				
Cooper #2	existing	225	225				
Dale #1	existing	24	24				
Dale #2	existing	24	24				
Dale #3	existing	80	80				
Dale #4	existing	80	80				
Spurlock #1	existing	325	325				
Spurlock #2	existing	535	535				
Gilbert #3	existing	268	268				
Spurlock #4	April 2009	278	278				
JK Smith CT #1	existing	98	142				
JK Smith CT #2	existing	98	142				
JK Smith CT #3	existing	98	142				
JK Smith CT #4	existing	75	100				
JK Smith CT #5	existing	75	100				
JK Smith CT #6	existing	75	100				
JK Smith CT #7	existing	75	100				
JK Smith CT #8	October 2011	84	98				
JK Smith CT #9	January 2009	84	98				
JK Smith CT #10	January 2009	84	98				
JK Smith CT #11	October 2012	84	98				
JK Smith CT #12	October 2013	84	98				
JK Smith CFB #1	October 2010	278	278				

Section 3: Power Flow Analysis With Proposed Generators Added and Without Transmission Upgrades

3.1 Power Flow Analysis

The power flow analysis was conducted to identify and address critical contingencies and overloads on the EKPC and neighboring systems. The initial power flow analysis identified the overloads, including the magnitudes, with the proposed generators at J.K. Smith in 2007 Summer, 2007-08 Winter, 2010 Summer, 2010-11 Winter, and 2015 Summer, and 2015-16 Winter. This initial power flow analysis did not model any new transmission in the vicinity of the J.K. Smith Station. Tables 3-1 through 3-8 show the thermal overloads (for the worst-case contingency only) identified in the power flow analysis for the various periods, with the proposed generating units added and no transmission additions. For 2010 Summer and 2010-11 Winter, the overloads are shown for two scenarios. One scenario is the addition of CTs #9 and #10 only added at J.K. Smith. The other scenario is the addition of CFB Unit #1 in addition to CTs #9 and #10. The results in all the following Tables are sorted by the severity of the overload. Appendix A contains the complete listing of overloads identified in these periods.

Table 3-1 2007 Summer Thermal Overloads with CTs 9 and 10 Installed at JK Smith and with no Additional Transmission							
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
		Fawkes EKPC-West	Cooper #2				
Hickory Plains-PPG	LOFF	Berea 138 kV Line	off, import	<i></i>	54.0	101 50/	
69 kV Line	LGEE	(EKPC)	from AEP	54	54.8	101.5%	
Fawkes EKPC-			Brown #3				
Fawkes LGEE 138	EKPC-	JK Smith-Union City	off, import				
kV Line	LGEE	138 kV Line (EKPC)	from AEP	287	288.5	100.5%	

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	Table 3-2									
2007-08 Winter Thermal Overloads with CTs 9 and 10 Installed at JK Smith and										
	with no Additional Transmission									
			Worst-Case		MVA	%				
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload				
Fawkes EKPC-		Fawkes EKPC-	Brown #3							
Fawkes Tap 138 kV	EKPC-	Fawkes LGEE 138	off, import							
Line	LGEE	kV Line	from AEP	287	305.5	106.4%				
		JK Smith-Fawkes								
		EKPC-Fawkes LGEE	Brown #3							
JK Smith-Union		138 kV Line (EKPC-	off, import							
City 138 kV Line	EKPC	LGEE)	from AEP	389	392.3	100.8%				
Lake Reba Tap-										
West Irvine Tap 161										
kV Line	LGEE	None	Base	167	168.0	100.6%				
Lake Reba Tap-		JK Smith-Powell	Cooper #2							
West Irvine Tap 161		County 138 kV Line	off, import							
kV Line	LGEE	(EKPC)	from AEP	237	238.0	100.4%				

Table 3-3 2010 Summer Thermal Overloads with CTs 9 and 10 Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
		Lake Reba Tap-West	Cooper #2					
Lake Reba-Waco 69 kV Line	LGEE	Irvine Tap 161 kV Line (LGEE)	off, import from AEP	55	57.6	104.7%		
Fawkes EKPC-			Brown #3					
Fawkes LGEE 138	EKPC-	JK Smith-Union City	off, import					
kV Line	LGEE	138 kV Line (EKPC)	from AEP	287	292.8	102.0%		
JK Smith-Union City 138 kV Line	EKPC	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	311	315.6	101.5%		
Boonesboro North		Fawkes LGEE-Clark	Ghent #1					
138-69 kV		County 138 kV Line	off, import					
Transformer	LGEE	(LGEE)	from TVA	143	144.7	101.2%		
			Brown #3					
Dale-Three Forks		JK Smith-Union City	off, import					
Jct. 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	222.4	100.2%		

Table 3-4										
2010-11 Winter Thermal Overloads with CTs 9 and 10 Installed at JK Smith and										
	with no Additional Transmission									
			Worst-Case		MVA	%				
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload				
		Lake Reba Tap-West	Cooper #2							
JK Smith-Powell		Irvine Tap-Delvinta	off, import							
County 138 kV Line	EKPC	161 kV Line (LGEE)	from AEP	287	317.8	110.7%				
		Fawkes EKPC-	Brown #3							
Fawkes Tap-Fawkes		Fawkes LGEE 138	off, import							
LGEE 138 kV Line	LGEE	kV Line	from AEP	303	315.8	104.2%				
		JK Smith-Fawkes								
		EKPC-Fawkes LGEE	Brown #3							
JK Smith-Union		138 kV Line (EKPC-	off, import							
City 138 kV Line	EKPC	LGEE)	from AEP	389	404.8	104.1%				
		JK Smith-Fawkes								
Union City-Lake		EKPC-Fawkes LGEE	Brown #3							
Reba Tap 138 kV		138 kV Line (EKPC-	off, import							
Line	EKPC	LGEE)	from AEP	371	377.7	101.8%				
West Berea Jct		Brown North-	Cooper #2							
Three Links Jct. 69		Alcalde-Pineville 345	off, import							
kV Line	EKPC	kV Line (LGEE)	from AEP	101	101.9	100.9%				

Table 3-5 2010 Summer Thermal Overloads with CTs 9-10 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission							
			Worst-Case		MVA	%	
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload	
Fawkes EKPC-	FUDO		Brown #3				
Fawkes LGEE 138	EKPC-	JK Smith-Union City	off, import	207	227 (114 10/	
kV Line	LGEE	138 kV Line (EKPC)	from AEP	287	327.6	114.1%	
Laha Daha Wasa (0		Lake Reba Tap-West	Cooper #2				
Lake Reba-Waco 69	LCEE	Irvine Tap 161 kV	off, import	55	(27	114.00/	
kV Line	LGEE	Line (LGEE)	from AEP	55	62.7	114.0%	
		JK Smith-Fawkes	Brown #3				
JK Smith-Union	FKDC	EKPC-Fawkes LGEE	off, import	211	252.0	112.00/	
City 138 kV Line	EKPC	138 kV Line JK Smith-Fawkes	from AEP	311	353.8	113.8%	
Union Oito Labo			D				
Union City-Lake	FKDC	EKPC-Fawkes LGEE	Brown #3				
Reba Tap 138 kV	EKPC-	138 kV Line (EKPC-	off, import	200	224.2	111 407	
Line	LGEE	LGEE)	from AEP	300	334.2	111.4%	
Disa Tan Wast		Lake Reba Tap-West	Cooper #2				
Rice Tap-West	LOFE	Irvine Tap 161 kV	off, import	40	44.4	111.00/	
Irvine 69 kV Line	LGEE	Line (LGEE)	from AEP	40	44.4	111.0%	
Fawkes Tap-Fawkes		Fawkes EKPC-	Brown #3				
LGEE 138 kV Line	LOFE	Fawkes LGEE 138	off, import	207	2177	110 70/	
(LGEE)	LGEE	kV Line	from AEP	287	317.7	110.7%	
W.G. 11 D.1.100			Dale #4 off,				
JK Smith-Dale 138	FUDO	North Clark-Avon	import from	211	220.4	100.00/	
kV Line	EKPC	345 kV Line (EKPC)	AEP	311	338.4	108.8%	
и р: т (о		Lake Reba Tap-West	Cooper #2				
Waco-Rice Tap 69	LOPP	Irvine Tap 161 kV	off, import	- 1	0	107.00/	
kV Line	LGEE	Line (LGEE)	from AEP	51	55.0	107.8%	
			Brown #3				
Dale-Three Forks	FUDG	JK Smith-Union City	off, import	222	220.2	107.70/	
Jct. 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	239.2	107.7%	
Boonesboro North		Fawkes LGEE-Clark	Ghent #1				
138-69 kV	LOPE	County 138 kV Line	off, import	1.40	151.0	106.00/	
Transformer	LGEE	(LGEE)	from TVA	143	151.9	106.2%	
JK Smith-Union	FUDG	N	D	0.5.1	264.2	105.20/	
City 138 kV Line	EKPC	None	Base	251	264.2	105.3%	
Fawkes LGEE-		Dale-Boonesboro	Ghent #1				
Clark County 138	LOPP	North-Avon 138 kV	off, import	1.70	100.4	104.00/	
kV Line	LGEE	Line (EKPC)	from TVA	172	180.4	104.9%	
Union City-Lake	EVE C						
Reba Tap 138 kV	EKPC-			.	0.51.0	104.00/	
Line	LGEE	None	Base	241	251.3	104.3%	
Three Forks Jct		THE STATE OF	Brown #3				
Fawkes EKPC 138	EVD C	JK Smith-Union City	off, import		001 -	104.004	
kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	231.5	104.3%	
Fawkes Tap-Lake			Cooper #2				
Reba Tap 138 kV	LOTT	JK Smith-Union City	off, import	1	102.1	10100	
Line	LGEE	138 kV Line (EKPC)	from AEP	176	183.1	104.0%	

Table 3-5 2010 Summer Thermal Overloads with CTs 9-10 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
			Mill Creek					
West Frankfort-Clay		Bullitt County-Little	#4 off,					
Village Tap 69 kV		Mount Jct. 161 kV	import from					
Line	LGEE	Line (EKPC)	AEP	43	44.2	102.8%		
Fawkes EKPC-		Fawkes EKPC-	Brown #3					
Fawkes Tap 138 kV	EKPC-	Fawkes LGEE 138	off, import					
Line	LGEE	kV Line	from AEP	287	291.8	101.7%		
			Brown #3					
JK Smith-Fawkes		JK Smith-Union City	off, import					
EKPC 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	311	314.3	101.1%		

Table 3-62010-11 Winter Thermal Overloads with CTs 9-10 & CFB Unit #1 Installed at JK									
Smith and with no Additional Transmission									
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload			
		Lake Reba Tap-West	Cooper #2						
JK Smith-Powell County 138 kV Line	EKPC	Irvine Tap-Delvinta 161 kV Line (LGEE)	off, import from AEP	287	341.6	119.0%			
Fawkes Tap-Fawkes	LOPP	Fawkes EKPC- Fawkes LGEE 138	Brown #3 off, import	2.02	256.0	117.00/			
LGEE 138 kV Line	LGEE	kV Line	from AEP	303	356.8	117.8%			
JK Smith-Union City 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	389	444.3	114.2%			
Union City-Lake Reba Tap 138 kV	EKPC-	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC-	Brown #3 off, import	271	412.5	111.50/			
Line	LGEE	LGEE) JK Smith-Powell	from AEP Dale #3 off,	371	413.5	111.5%			
Dale 138-69 kV Transformer	EKPC	County 138 kV Line (EKPC)	import from AEP	136	147.2	108.2%			
Beattyville-Delvinta 161 kV Line	EKPC- LGEE	West Irvine Tap- Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	211	223.7	106.0%			
Powell County 138- 69 kV Transformer	EKPC	Powell County- Beattyville-Delvinta 161 kV Line (EKPC- LGEE)	Dale #3 off, import from AEP	143	151.3	105.8%			
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	278	293.5	105.6%			
Delvinta-Green Hall	LGEE-	Delvinta-Hyden Tap	Cooper #2 off, import	278	293.3	105.076			
Jct. 161 kV Line	EKPC	161 kV Line (LGEE)	from AEP	223	235.4	105.6%			
West Berea Jct Three Links Jct. 69	FUDO	Brown North- Alcalde-Pineville 345	Cooper #2 off, import	101	106.6	105.50/			
kV Line Lake Reba-Waco 69 kV Line	EKPC LGEE	kV Line (LGEE) Lake Reba Tap-West Irvine Tap 161 kV Line (LGEE)	from AEP Cooper #2 off, import from AEP	101 88	92.5	105.5%			
Waco-Rice Tap 69 kV Line	LGEE	Lake Reba Tap-West Irvine Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	77	80.4	104.4%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	370	385.7	104.2%			
JK Smith-Dale 138 kV Line	EKPC	North Clark-Avon 345 kV Line (EKPC)	Dale #4 off, import from AEP	389	403.9	103.8%			

Table 3-6										
2010-11 Winter	2010-11 Winter Thermal Overloads with CTs 9-10 & CFB Unit #1 Installed at JK									
	Smith and with no Additional Transmission									
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload				
		Lake Reba Tap-West	Cooper #2							
Powell County 161-		Irvine Tap-Delvinta	off, import							
138 kV Transformer	EKPC	161 kV Line (LGEE)	from AEP	220	227.8	103.5%				
		Rowan County-								
Morehead-Hayward		Skaggs 138 kV Line								
69 kV	AEP	(EKPC)	Base	48	49.5	103.1%				
Three Forks Jct			Brown #3							
Fawkes EKPC 138		JK Smith-Union City	off, import							
kV Line	EKPC	138 kV Line (EKPC)	from AEP	278	281.8	101.4%				
		JK Smith-Powell	Cooper #2							
Lake Reba Tap 138-		County 138 kV Line	off, import							
161 kV Transformer	LGEE	(EKPC)	from AEP	270	271.9	100.7%				
			Brown #3							
JK Smith-Fawkes		JK Smith-Union City	off, import							
EKPC 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	389	390.3	100.3%				

Table 3-72015 Summer Thermal Overloads with CTs 8-12 and CFB Unit #1 Installed at JK							
Smith and with no Additional Transmission							
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
Fawkes Tap-Fawkes	• •	Fawkes EKPC-	Brown #3	8			
LGEE 138 kV Line		Fawkes LGEE 138	off, import				
(LGEE)	LGEE	kV Line	from AEP	246	336.9	137.0%	
		Lake Reba Tap-West	Cooper #2				
Lake Reba-Waco 69		Irvine Tap 161 kV	off, import				
kV Line	LGEE	Line (LGEE)	from AEP	55	74.2	134.9%	
		JK Smith-Fawkes	Brown #3				
JK Smith-Union		EKPC-Fawkes LGEE	off, import				
City 138 kV Line	EKPC	138 kV Line	from AEP	311	401.1	129.0%	
		Lake Reba Tap-West	Cooper #2				
Waco-Rice Tap 69		Irvine Tap 161 kV	off, import				
kV Line	LGEE	Line (LGEE)	from AEP	51	65.1	127.6%	
Union City-Lake Reba Tap 138 kV	EKPC-	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC-	Brown #3 off, import				
Line	LGEE	LGEE)	from AEP	300	378.0	126.0%	
JK Smith-Dale 138 kV Line	EKPC	North Clark-Avon 345 kV Line (EKPC)	Dale #4 off, import from AEP	311	387.8	124.7%	
Fawkes EKPC-			Brown #3				
Fawkes LGEE 138	EKPC-	JK Smith-Union City	off, import				
kV Line	LGEE	138 kV Line (EKPC)	from AEP	287	357.0	124.4%	
JK Smith-Union							
City 138 kV Line	EKPC	None	Base	251	303.5	120.9%	
Boonesboro North 138-69 kV Transformer	LGEE	Fawkes LGEE-Clark County 138 kV Line (LGEE)	Ghent #1 off, import from TVA	143	172.1	120.3%	
Union City-Lake		/			1		
Reba Tap 138 kV	EKPC-						
Line	LGEE	None	Base	241	287.1	119.1%	
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	222	261.2	117.7%	
JK Smith-Fawkes EKPC 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	311	354.3	113.9%	
Three Forks Jct Fawkes EKPC 138		JK Smith-Union City	Brown #3 off, import				
kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	252.7	113.8%	
Beattyville 161-69 kV Transformer	LGEE	Beattyville-Delvinta 161 kV Line (EKPC- LGEE)	Cooper #2 off, import from AEP	64	71.2	111.3%	
Lake Reba Tap-	2022	JK Smith-Powell	Cooper #2	~ '	, 1.2	111.070	
West Irvine Tap 161 kV Line	LGEE	County 138 kV Line (EKPC)	off, import from AEP	205	227.4	110.9%	

Table 3-7 2015 Summer Thermal Overloads with CTs 8-12 and CFB Unit #1 Installed at JK								
		nd with no Addition						
	G		Worst-Case	D (1	MVA	%		
Limiting Facility Boonesboro North-	Company	Contingency	Dispatch Ghent #1	Rating	Flow	Overload		
Winchester Water		Fawkes LGEE-Clark County 138 kV Line						
Works 69 kV Line	LGEE	(LGEE)	off, import from TVA	143	158.6	110.9%		
Fawkes EKPC-	LUEE	Fawkes EKPC-	Brown #3	145	138.0	110.9%		
Fawkes Tap 138 kV	EKPC-	Fawkes LGEE 138	off, import					
Line	LGEE	kV Line	from AEP	287	314.5	109.6%		
	LOLL	JK Smith-Powell	Dale #3 off,	207	514.5	109.070		
Dale 138-69 kV		County 138 kV Line	import from					
Transformer	EKPC	(EKPC)	AEP	111	119.6	107.7%		
Winchester South-	LIKI C	Fawkes LGEE-Clark	Ghent #1	111	117.0	107.770		
Winchester 69 kV		County 138 kV Line	off, import					
Line	LGEE	(LGEE)	from TVA	110	118.4	107.6%		
Line	LOLL	Delvinta-Green Hall	Cooper #2	110	110.4	107.070		
Beattyville-Oakdale		Jct. 161 kV Line	off, import					
Jct. 69 kV Line	EKPC	(LGEE-EKPC)	from AEP	47	50.5	107.4%		
West Irvine Tap-		JK Smith-Powell	Cooper #2	17	50.5	107.170		
Delvinta 161 kV		County 138 kV Line	off, import					
Line	LGEE	(EKPC)	from AEP	201	208.1	103.5%		
Line	LOLL	Powell County-	Dale #3 off,	201	200.1	105.570		
Powell County 138-		Beattyville 161 kV	import from					
69 kV Transformer	EKPC	Line (EKPC)	AEP	129	132.7	102.9%		
	LKIC	Dale-Boonesboro	Brown #3	12)	152.7	102.770		
Clark County-		North-Avon 138 kV	off, import					
Sylvania 69 kV Line	LGEE	Line (EKPC)	from AEP	137	139.6	101.9%		
Sylvania Of KV Enic	LOLL	Avon-Loudon	Brown #3	157	157.0	101.970		
Paris 138-69 kV		Avenue 138 kV Line	off, import					
Transformer	LGEE	(EKPC-LGEE)	from AEP	173	175.9	101.7%		
Farmers 138-69 kV	LOLL	Rodburn 138-69 kV	nomritti	175	175.5	101.770		
Transformer	LGEE	Transformer (LGEE)	Base	48	48.5	101.0%		
Winchester Water	LOLL	Fawkes LGEE-Clark	Ghent #1	10	10.5	101.070		
Works-Boone		County 138 kV Line	off, import					
Avenue 69 kV Line	LGEE	(LGEE)	from TVA	150	151.3	100.9%		
Fawkes LGEE-	LOLL	Lake Reba 138-69	Cooper #2	100	101.0	100.970		
Richmond 69 kV		kV Transformer	off, import					
Line	LGEE	(LGEE)	from AEP	117	118.0	100.9%		
Loudon Avenue	LOLL	Loudon Avenue 138-	Brown #3	117	110.0	100.970		
138-69 kV		69 kV Transformer	off, import					
Transformer #628	LGEE	#618 (LGEE)	from AEP	128	128.9	100.7%		
11411510111101 11020	LOLL	Lake Reba Tap-West	Cooper #2	120	120.7	100.770		
Powell County 138-		Irvine-Delvinta 161	off, import					
161 kV Transformer	EKPC	kV Line (LGEE)	from AEP	193	193.8	100.4%		
		West Irvine Tap-	Cooper #2	- / 0				
West Irvine-Dark		Delvinta 161 kV Line	off, import					
Hollow 69 kV Line	LGEE	(LGEE)	from AEP	55	55.1	100.2%		
	2022	Dale-Boonesboro	Brown #3		20.1	100.270		
Clark County 138-		North-Avon 138 kV	off, import					
69 kV Transformer	LGEE	Line (EKPC)	from AEP	143	143.1	100.1%		

	Table 3-82015-16 Winter Complete List of Identified Problems with CTs 8-12 and CFB Unit#1 Installed at JK Smith and with no Additional Transmission						
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
Fawkes Tap-Fawkes LGEE 138 kV Line	LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	303	403.8	133.3%	
JK Smith-Powell	EKPC	Lake Reba Tap-West Irvine Tap-Delvinta	Cooper #2 off, import from AEP	287			
County 138 kV Line Fawkes EKPC- Fawkes Tap 138 kV Line	EKPC- LGEE	161 kV Line (LGEE) Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	287	378.1	131.7%	
JK Smith-Union		JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC-	Brown #3 off, import				
City 138 kV Line Union City-Lake Reba Tap 138 kV Line	EKPC EKPC- LGEE	LGEE)	from AEP Base	389 277	500.7 353.9	128.7% 127.8%	
Dale 138-69 kV Transformer	EKPC	JK Smith-Powell County 138 kV Line (EKPC)	Dale #3 off, import from AEP	136	169.7	124.8%	
Union City-Lake Reba Tap 138 kV Line	EKPC- LGEE	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	371	462.7	124.7%	
JK Smith-Dale 138 kV Line	EKPC	North Clark-Avon 345 kV Line (EKPC)	Dale #4 off, import from AEP	389	470.4	120.9%	
Powell County 138- 69 kV Transformer	EKPC	Powell County- Beattyville 161 kV Line (EKPC)	Dale #3 off, import from AEP	143	169.4	118.5%	
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	278	322.5	116.0%	
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	370	428.6	115.8%	
JK Smith-Fawkes EKPC 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	389	442.5	113.8%	
Delvinta-Green Hall Jct. 161 kV Line	LGEE- EKPC	Delvinta-Hyden Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	223	253.1	113.5%	
Lake Reba-Waco 69 kV Line	LGEE	Lake Reba Tap-West Irvine Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	88	99.5	113.1%	

Table 3-82015-16 Winter Complete List of Identified Problems with CTs 8-12 and CFB Unit#1 Installed at JK Smith and with no Additional Transmission						
			Worst-Case		MVA	%
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload
Destination Delainte	FKDC	West Irvine Tap-	Cooper #2			
Beattyville-Delvinta	EKPC-	Delvinta 161 kV Line	off, import	211	235.1	111 40/
161 kV Line Boonesboro North-	LGEE	(LGEE) Fawkes LGEE-Clark	from AEP	211	233.1	111.4%
			Ghent #1			
Winchester Water	LCEE	County 138 kV Line	off, import	142	150.2	111 40/
Works 69 kV Line	LGEE	(LGEE)	from TVA	143	159.3	111.4%
Three Forks Jct			Brown #3			
Fawkes EKPC 138	FUDG	JK Smith-Union City	off, import	250	200.4	110.00/
kV Line	EKPC	138 kV Line (EKPC)	from AEP	278	308.4	110.9%
		Lake Reba Tap-West	Cooper #2			
Waco-Rice Tap 69		Irvine Tap 161 kV	off, import		6	
kV Line	LGEE	Line (LGEE)	from AEP	77	85.3	110.8%
		Lake Reba Tap-West	Cooper #2			
Powell County 138-		Irvine Tap-Delvinta	off, import			
161 kV Transformer	EKPC	161 kV Line (LGEE)	from AEP	220	243.3	110.6%
JK Smith-Union						
City 138 kV Line	EKPC	None	Base	349	381.1	109.2%
JK Smith-Powell						
County 138 kV Line	EKPC	None	Base	287	308.3	107.4%
•		Delvinta-Green Hall	Cooper #2			
Beattyville-Oakdale		Jct. 161 kV Line	off, import			
Jct. 69 kV Line	EKPC	(LGEE-EKPC)	from AEP	62	66.6	107.4%
		JK Smith-Powell	Cooper #2			
Lake Reba Tap 138-		County 138 kV Line	off, import			
161 kV Transformer	LGEE	(EKPC)	from AEP	270	289.5	107.2%
10111 110000000000000000000000000000000	LOLL	Fawkes LGEE-		2,0	207.0	107.270
		Crooksville Jct. 69	Cooper #2			
West Berea 138-69		kV Line (LGEE-	off, import			
kV Transformer	EKPC	EKPC)	from AEP	152	162.4	106.8%
is a regission filler		Dix Dam-Buena	Cooper #2	1.52	102.7	100.070
Dale-Newby #1 69		Vista 69 kV Line	off, import			
kV Line	EKPC	(LGEE)	from AEP	87	92.6	106.4%
		Rowan County-		07	12.0	100.4/0
Morehead-Hayward		Skaggs 138 kV Line				
69 kV	AED		Dece	48	50.7	105 60/
	AEP	(EKPC)	Base Ghent #1	40	50.7	105.6%
Fawkes LGEE-		Dale-Boonesboro				
Clark County 138	LOFF	North-Avon 138 kV	off, import	104	202.5	104 40/
kV Line	LGEE	Line (EKPC)	from TVA	194	202.5	104.4%
			Cooper #2			
Green Hall Jct	FUDG	Delvinta-Hyden Tap	off, import	227	245.5	104.00/
Tyner 161 kV Line	EKPC	161 kV Line (LGEE)	from AEP	237	246.5	104.0%
Powell County 138-			-		101-	101.001
161 kV Transformer	EKPC	None	Base	178	181.2	101.8%
		West Irvine Tap-	Cooper #2			
West Irvine 161-69		Delvinta 161 kV Line	off, import			
kV Transformer	LGEE	(LGEE)	from AEP	62	62.9	101.5%

Table 3-82015-16 Winter Complete List of Identified Problems with CTs 8-12 and CFB Unit#1 Installed at JK Smith and with no Additional Transmission						
#1 Inst	talled at JF	Smith and with no	Additional	I ransmi	ssion	
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload
		Spurlock-Maysville	Ghent #1			
Spurlock-Kenton	EKPC-	Industrial Jct. 138 kV	off, import			
138 kV Line	LGEE	Line (EKPC)	from TVA	287	288.2	100.4%
Farmers 138-69 kV		Rodburn 138-69 kV				
Transformer	LGEE	Transformer (LGEE)	Base	58	58.1	100.2%

The power flow results contained in Tables 3-1 through 3-8 indicate the following:

- o 2 transmission facilities are overloaded in 2007 Summer with CTs 9 and 10 added
- o 3 transmission facilities are overloaded in 2007-08 Winter with CTs 9 and 10 added
- o 5 transmission facilities are overloaded in 2010 Summer with CTs 9 and 10 added
- o 5 transmission facilities are overloaded in 2010-11 Winter with CTs 9 and 10 added
- o 16 transmission facilities are overloaded in 2010 Summer with CTs 9-10 and CFB #1 added
- o 19 transmission facilities are overloaded in 2010-11 Winter with CTs 9-10 and CFB #1 added
- o 29 transmission facilities are overloaded in 2015 Summer with CTs 8-12 and CFB #1 added
- o 28 transmission facilities are overloaded in 2015-16 Winter with CTs 8-12 and CFB #1 added

Table 3-9 Summary of Thermal Overloads with Planned Generation Additions at J.K. Smith						
Summary of Ther		out Transmissio		ons at J.K. Shifth		
	Total Generation Modeled at	Number of Overloaded	Number of Critical	Overload		
	JK Smith	Facilities	Contingencies	Ranges		
2007 Summer ⁽¹⁾	762 MW	2	2	100.5%-101.5%		
2007-08 Winter ⁽¹⁾	1022 MW	3	5	100.4%-106.4%		
2010 Summer ⁽¹⁾	762 MW	5	6	100.2%-104.7%		
2010-11 Winter ⁽¹⁾	1022 MW	5	6	100.4%-110.7%		
2010 Summer ⁽²⁾	1040 MW	16	20	100.4%-114.1%		
2010-11 Winter ⁽²⁾	1300 MW	19	21	100.1%-119.0%		
2015 Summer ⁽³⁾	1292 MW	29	32	100.1%-137.0%		
2015-16 Winter⁽³⁾	1578 MW	28	43	100.2%-133.3%		

⁽¹⁾Simulates addition of CTs 9 and 10

⁽²⁾Simulates addition of CTs 9-10 and CFB #1

 $^{(3)}\mbox{Simulates}$ addition of CTs 8-12 and CFB #1

Table 3-10Summary of Ownership of Overloaded Facilities							
Period	Number of AEP Facilities	Number of EKPC Facilities	Number of LGEE Facilities	Number of EKPC-LGEE Interconnected Facilities			
2007 Summer	0	0	1	1			
2007-08 Winter	0	1	1	1			
2010 Summer – CTs 9 and 10 added	0	2	2	1			
2010-11 Winter – CTs 9 and 10 added	0	4	1	0			
2010 Summer – CTs 9-10 and CFB #1 added	0	5	8	3			
2010-11 Winter – CTs 9-10 and CFB #1 added	1	10	4	4			
2015 Summer	0	9	17	3			
2015-16 Winter	1	13	8	6			

A breakdown of the ownership of these facilities is provided in Table 3-10.

These power flow results indicate that substantial thermal overloading of the existing transmission system will be created by the addition of the proposed generators at the J.K. Smith site. Although these results do differ somewhat from those obtained in the original SIS, they are fairly consistent. Many of the same facilities were identified as overloaded in both studies, and the magnitudes are generally of similar magnitudes. Several factors other than those already described may have contributed to the differences that are observed. These factors include:

- Inclusion of the J.K. Smith-North Clark 345 kV Line Project in this updated SIS. This line was not included in the power flow analysis performed in the original SIS that identified the thermal overloads without transmission added. It was included in the power flow analysis for the various transmission Alternatives in the original SIS.
- Increases of LGEE facility ratings in the winter across its system, which have eliminated some winter problems on the LGEE transmission system
- Updated load forecasts which have resulted in some shifts in the direction of flows

However, the results still indicate that a large number of problems of potentially severe magnitude could occur in the region without any transmission system additions.

Section 4: Alternatives Considered

4.1 Review of Alternatives Considered in Original SIS

In the original SIS, several transmission options were considered to alleviate overloading of area transmission facilities. Upgrading existing transmission facilities was eliminated from further consideration for the following reasons:

- An excessive number of major system upgrades (significant reconductoring/rebuilding of lines, replacement or addition of high voltage transformers, etc.) would be required.
- Taking the existing facilities out of service to perform the upgrades would be an extremely difficult task, and would result in decreased system reliability and generation restrictions for much of the next several years.
- Higher transmission-system losses would be incurred if new facilities are not added.
- Upgrading existing facilities does not provide significant margin for system operations during multiple contingency conditions. If no new facilities are added, the ability to withstand more extreme contingencies is less sure.
- The scope, cost, and schedule for these upgrades is very uncertain. A detailed and lengthy analysis would be required to determine these items for all of the overloaded facilities.

All of these factors are still applicable to the system based upon the results of the updated SIS. Therefore, upgrading of existing facilities as the sole means of accommodating the J.K. Smith proposed generating units is still neither viable nor desirable.

In the original SIS, a numerous set of new outlets for the J.K. Smith Station were screened singularly and in various combinations to evaluate the performance with the proposed generators added at J.K. Smith. The screening process eliminated most of these outlet options for one of the following two reasons:

- An outlet either singularly or in combination with other outlets did not eliminate a substantial number of the thermal overloads caused by the proposed generators
- An outlet did not provide any significant additional benefits when compared to the performance of another outlet that would be shorter and/or less expensive

As shown in Figure B-1 in Appendix B, the problems identified in this updated SIS with the proposed generators and without any transmission system additions through 2015 are primarily concentrated in two areas:

1. The immediate area around the J.K. Smith, Dale, Fawkes, Lake Reba Tap, Powell County, and Clark County Substations.

2. Along the 161 kV system extending southeast from the Lake Reba Tap Substation through the Delvinta Substation.

Other isolated problems (Beattyville-Oakdale Jct., Morehead AEP-Hayward AEP 69 kV, West Berea-Three Links Jct. 69 kV) were identified outside of the two primarily impacted areas.

The screening results indicate that power flows are similar for the power flow analyses conducted with the updated models and with the models used in the original SIS. The number, severity, and location of problems are consistent between the two studies. Therefore, the same rationale for eliminating the majority of these outlet options is still applicable.

The original screening analysis determined that two of the outlet options considered have a greater impact on the transmission-system problems identified than did the remainder of the outlet options. These two outlet options are:

- ✓ The J.K. Smith-Tyner 345 kV line and the installation of a 345-161 kV transformer at Tyner
- ✓ The J.K. Smith-West Garrard 345 kV line and a new 345 kV switching station at West Garrard connecting this line with LGEE's Brown-Pineville 345 kV circuit

These two outlets substantially reduced the number and severity of overloads caused by the proposed generators. These options appeared to provide these benefits for two primary reasons:

- Each is a 345 kV outlet providing a high outlet capacity from the J.K. Smith site
- Each provides a connection to the transmission system in the southern and southeastern parts of the Kentucky transmission system. A small amount of generation exists in this area. Therefore, a large amount of the power required by customers in this area presently flows into the area on the 138 kV and 161 kV interfaces in the Richmond, KY area (through the Fawkes and Lake Reba Tap substations). Either the J.K. Smith-Tyner or J.K. Smith-West Garrard 345 kV line would provide an EHV path bypassing these heavily loaded 138 and 161 kV interfaces.

The other outlet options considered either did not provide as much benefit as either of these two options or provided similar benefits at the expense of much more construction. Again, based on the similarity between the results obtained in the original SIS and in the updated SIS, these conclusions are still valid.

The original SIS determined that the Alternative developed that included the J.K. Smith-West Garrard 345 kV line (Alternative 1) was the preferred transmission plan to address the thermal overloads caused by the generator additions. This conclusion was reached for the following reasons:

- Alternative 1 was much less expensive to implement than the other Alternatives
- Alternative 1 required a substantially smaller number of ancillary upgrade projects to implement
- Alternative 1 provided the best steady-state power flow performance
- Alternative 1 provided the best transient-stability performance
- Alternative 1 provided the best opportunities for future expansion by EKPC
- Alternative 1 appeared to provide significant advantages over the other Alternatives with regard to the physical issues associated with construction and expansion.

None of the changes that have occurred since the original SIS have changed these conclusions. Therefore, Alternative 1 is still the preferred Alternative for the reasons listed above.

4.2 Common Facilities Required

As discussed in the original SIS, some common facilities are required at the J.K. Smith site to accommodate the proposed generator additions. These requirements are necessary regardless of the new outlet or outlets to be built. These system additions/modifications are necessary to accommodate the connection of the proposed generators to EKPC's transmission network. Table 4-1 lists these proposed system additions, the reason for which each is needed, and the date needed based on the latest schedule that has been provided for the generation additions.

Common	Table 4-1 Common Transmission Facilities Required to Connect the Proposed J.K. Smith Units						
Install Date	Project Description	Reason for Need					
June 2007	Install a second 345-138 kV, 450 MVA transformer at JK Smith CT Substation	Addition of CTs #9 & #10 at JK Smith; needed for desired redundancy for this critical connection between the 345 kV and 138 kV buses at J.K. Smith					
June 2007	Add 345 kV Terminal Facilities at JK Smith CT Substation for CTs #9 & #10	Addition of CTs #9 & #10 at JK Smith					
June 2009	Construct a second 345 kV substation at JK Smith for the CFB $Unit^{(†)}$	Addition of CFB Unit #1 at JK Smith					
June 2009	Add 345 kV Terminal Facilities at JK Smith CFB Substation for CFB Unit #1 ^(†)	Addition of CFB Unit #1 at JK Smith					
June 2009	Construct two 345 kV lines (0.8 miles each) between the JK Smith CT 345 kV substation and the JK Smith CFB 345 kV substation using bundled 954 MCM ACSR conductor ^(†)	Addition of CFB Unit #1 at JK Smith					
June 2009	Add 345 kV Terminal Facilities at JK Smith CT Substation for the two 345 kV lines to the JK Smith CFB Substation ^(†)	Addition of CFB Unit #1 at JK Smith					
June 2009	Add 345 kV Terminal Facilities at JK Smith CFB Substation for the two 345 kV lines to the JK Smith CT Substation ^(†)	Addition of CFB Unit #1 at JK Smith					

Common	Table 4-1 Common Transmission Facilities Required to Connect the Proposed J.K. Smith Units							
Install Date	Project Description	Reason for Need						
June 2011	Add 138 kV Terminal Facilities at JK Smith CT Substation for CT #8	Addition of CT #8 at JK Smith						
June 2012	Add 345 kV Terminal Facilities at JK Smith CT Substation for CTs #11 & #12	Addition of CTs #11 & #12 at JK Smith						

^(†) EKPC is evaluating the possibility of deferring construction of this substation until CFB Unit #2 is added at J.K. Smith. If the substation is deferred, CFB Unit #1 will be connected directly to the J.K. Smith CT Substation.

The facilities listed in Table 4-1 include the following:

- Terminal facilities to connect J.K. Smith CT #8 to the existing 138 kV bus at J.K. Smith
- Terminal facilities to connect J.K. Smith CTs #9 through #12 to a new 345 kV switchyard to be constructed at the J.K. Smith CT Substation
- A new 345 kV switchyard near the J.K. Smith CFB Unit #1 with terminal facilities to connect J.K. Smith CFB Unit #1
- Construction of a two 345 kV lines connecting the J.K. Smith 345 kV CT Substation and the J.K. Smith 345 kV CFB Substation

EKPC is evaluating the possibility of deferring the J.K. Smith 345 kV CFB Substation until CFB Unit #2 is constructed. If this is feasible, it will provide significant savings to EKPC. Prior to making a final decision, EKPC will evaluate both the feasibility and the potential reliability/availability issues for CFB Unit #1 at J.K. Smith.

Table 4-2 provides the planning estimates for costs of the projects listed in Table 4-1. Cost information is provided for the expected costs in 2006 dollars, install year dollars, and present worth dollars.

	Table 4-2							
Esti	Estimated Costs of Common Transmission Facilities Required to Connect the Proposed J.K. Smith Units							
Install Date	Project Description	Proposed J.K. Sm Planning Estimate (2006\$)	Inflated Cost (Install Year \$)	Present Worth (2006\$)				
June 2007	Install a second 345-138 kV, 450 MVA transformer at JK Smith CT Substation	2,850,000	3,064,000	4,363,000				
June 2007	Add 345 kV Terminal Facilities at JK Smith CT Substation for CTs #9 & #10	2,160,000	2,322,000	3,307,000				
June 2009	Construct a second 345 kV substation at JK Smith for the CFB Unit #1 Add 345 kV	2,160,000	2,433,000	2,952,000				
June 2009	Terminal Facilities at JK Smith CFB Substation for CFB Unit #1	1,080,000	1,217,000	1,476,000				
June 2009	Construct two 345 kV lines (0.8 miles each) between the JK Smith CT 345 kV substation and the JK Smith CFB 345 kV substation using bundled 954 MCM ACSR conductor	1,880,000	2,118,000	2,569,000				
June 2009	Add 345 kV Terminal Facilities at JK Smith CT Substation for the two 345 kV lines to the JK Smith CFB Substation	4,310,000	4,856,000	5,891,000				
June 2009	Add 345 kV Terminal Facilities at JK Smith CFB Substation for the two 345 kV lines to the JK Smith CT Substation	4,310,000	4,856,000	5,891,000				
June 2011	Add 138 kV Terminal Facilities at JK Smith CT Substation for CT #8	540,000	638,000	620,000				

Table 4-2Estimated Costs of Common Transmission Facilities Required to Connect the Proposed J.K. Smith Units						
Install Date	3 8					
June 2012	Add 345 kV Terminal Facilities at JK Smith CT Substation for CTs #9 & #10	2,160,000	2,612,000	2,337,000		
2012	Total	\$21,450,000	\$24,116,000	\$29,406,000		

4.3 Update of J.K. Smith-West Garrard Alternative Table 4-3 shows the updated transmission expansion plan for the preferred alternative.

		Table 4-							
	Alternative 1 – Project Descriptions and Reasons for Need								
Install	Project		Reason for	Critical	Unit				
Date	Ref #	Project Description	Need	Contingency	Outage				
June 2009	1.1	Construct 35.5 miles of 345 kV line from JK Smith to LGEE's Brown- Pineville double-circuit line at West Garrard using bundled 954 MCM ACSR conductor	Numerous Overloads (See Tables 3-1, 3-2, C-1, & C-2)	Numerous Contingencies (See Tables 3-1, 3- 2, C-1, & C-2)					
June 2009	1.2	Add 345 kV Terminal Facilities at JK Smith CFB Substation for the West Garrard line. ^(†)	Numerous Overloads (See Tables 3-1, 3-2, C-1, & C-2)	Numerous Contingencies (See Tables 3-1, 3- 2, C-1, & C-2)					
June 2009	1.3	Add terminal facilities at LGEE's Brown and Pineville Substations to energize the Brown-Pineville 345 kV circuit	Numerous Overloads (See Tables 3-1, 3-2, C-1, & C-2)	Numerous Contingencies (See Tables 3-1, 3- 2, C-1, & C-2)					
June 2009	1.4	Construct a 345 kV breaker station at West Garrard with three line exits. Loop the Brown-Pineville 345 kV line through the station and terminate the new line from JK Smith	Numerous Overloads (See Tables 3-1, 3-2, C-1, & C-2)	Numerous Contingencies (See Tables 3-1, 3- 2, C-1, & C-2)					
November 2009	1.5	Increase the terminal limits at LGEE's Pineville Substation associated with the low side of the Pineville 345-161 kV transformer to at least 2150A (600 MVA) winter emergency.	Overload of the 558 MVA winter emergency rating of the Pineville 345- 161 kV transformer	Alcalde 345-161 kV Transformer	Cooper #2				
November 2009	1.6	Increase the limits of LGEE's Alcalde-Elihu 161 kV line to at least 1105A (308 MVA) winter emergency.	Overload of the 288 MVA winter emergency rating of the Alcalde-Elihu 161 kV line	Wolf Creek TVA- Russell County Junction 161 kV Line	Cooper #2				
June 2010	1.7	Increase the terminal limits at LGEE's Boonesboro North associated with the Boonesboro North 138-69 kV transformer to at least 1320A (158 MVA) summer emergency.	Overload of the 143 MVA summer emergency rating of the Boonesboro North 138-69 kV transformer	Fawkes-Clark County 138 kV Line	Ghent #1				

Table 4-3								
Install	Alte Project	rnative 1 – Project Descripti	ons and Reaso Reason for	ns for Need Critical	Unit			
Date	Ref #	Project Description	Need	Contingency	Outage			
November 2010	1.8	Increase the limits of the Ferguson South-Somerset (LGEE-EKPC) 69 kV line to at least 855A (102 MVA) winter emergency.	Overload of the 101 MVA winter emergency rating of the Ferguson South- Somerset 69 kV line	Cooper 161-69 kV Transformer	Mill Creek #4			
November 2012	1.9	Reconductor EKPC's JK Smith- Union City 138 kV line using 954 MCM ACSS conductor.	Overload of the 389 MVA winter emergency rating of the JK Smith-Union City 138 kV line	JK Smith-Fawkes 138 kV Line	Brown #3			
November 2012	1.10	Increase the terminal limits of EKPC's Powell County 138-69 kV transformer to 147 MVA winter emergency.	Overload of the 143 MVA winter emergency rating of the Powell County 138-69 kV transformer	Powell County- Beattyville-Delvinta 161 kV Line	Dale #3			
June 2013	1.11	Increase the terminal limits of the Union City-Lake Reba Tap 138 kV line (EKPC-LGEE) to at least 301 MVA summer emergency.	Overload of the 300 MVA summer emergency rating of the Union City-Lake Reba Tap 138 kV line	JK Smith-Fawkes 138 kV Line	Brown #3			
June 2014	1.12	Increase the limits of LGEE's Alcalde-Elihu 161 kV line to at least 950A (265 MVA) summer emergency and 1220A (340 MVA) winter emergency.	Overload of the 254 MVA summer emergency rating and the 330 MVA winter emergency rating of the Alcalde-Elihu 161 kV line	Wolf Creek TVA- Russell County Junction 161 kV Line	Cooper #2			
June 2014	1.12	Increase the limits of LGEE's Artemus 161-69 kV transformer to at least 65 MVA summer emergency.	Overload of the 64 MVA summer emergency rating of the Artemus 161-69 kV transformer	Pineville-KU Park 69 kV Line	Cooper #2			

	Table 4-3 Alternative 1 – Project Descriptions and Reasons for Need								
Install Project		inative i Troject Descripti	Reason for	Critical	Unit				
Date	Ref #	Project Description	Need	Contingency	Outage				
June 2014	1.14	Increase the terminal limits at LGEE's Boonesboro North associated with the Boonesboro North 138-69 kV transformer to at least 163 MVA summer emergency.	Overload of the 158 MVA summer emergency rating of the Boonesboro North 138-69 kV transformer	Fawkes-Clark County 138 kV Line	Ghent #1				
June 2014	1.15	Increase the terminal limits at LGEE's Boonesboro North associated with the Boonesboro North-Winchester Water Works 69 kV circuit to at least 1245A (149 MVA) summer emergency.	Overload of the 143 MVA summer emergency rating of the Boonesboro North- Winchester Water Works 69 kV line	Fawkes-Clark County 138 kV Line	Ghent #1				
November 2014	1.16	Replace EKPC's Powell County 138-69 kV, 100 MVA transformer with a 140 MVA transformer.	Overload of the 147 MVA winter emergency rating of the Powell County 138-69 kV transformer	Powell County- Beattyville-Delvinta 161 kV Line	Dale #3				
June 2015	1.17	Increase the limits of LGEE's Pineville 161-69 kV transformer #2 to at least 139 MVA summer emergency.	Overload of the 138 MVA summer emergency rating of the Pineville 161-69 kV transformer #2	Pineville 161-69 kV Transformer #1	Cooper #2				
June 2015	1.18	Reconductor EKPC's Union City- Lake Reba Tap 138 kV line using 954 MCM ACSS conductor.	Overload of the 311 MVA summer emergency rating of the Union City-Lake Reba Tap 138 kV line Overload of the	JK Smith-Fawkes 138 kV Line	Brown #3				
November 2015	1.19	Increase the limits of LGEE's Artemus 161-69 kV transformer and the Artemus-Barbourville City 69 kV line to at least 74 MVA winter emergency.	72 MVA winter emergency rating of the Artemus 161-69 kV transformer and the Artemus- Barbourville City 69 kV line	Pineville-KU Park 69 kV Line	Cooper #2				

Table 4-3Alternative 1 – Project Descriptions and Reasons for Need								
Install	Critical	Unit						
Date	Ref #	Project Description	Need	Contingency	Outage			
			Overload of the					
			115 MVA winter					
			emergency					
		Increase the limits of LGEE's Elihu-	rating of the					
November		Ferguson South 69 kV line to at	Elihu-Ferguson	Cooper 161-69 kV				
2015	1.20	least 118 MVA winter emergency.	South 69 kV line	Transformer	Cooper #2			

^(†) EKPC is evaluating the possibility of deferring construction of this substation until CFB Unit #2 is added at J.K. Smith. If the substation is deferred, the J.K. Smith-West Garrard 345 kV line will be connected to the J.K. Smith CT Substation.

Projects 1.1 through 1.4 in Table 4-3 are the projects necessary to establish a 345 kV line from J.K. Smith to West Garrard. The need for Projects 1.5, 1.6, and 1.8 is created primarily due to the establishment of the new West Garrard interconnection, which provides substantial increases in flows into the region of southern Kentucky between Pineville and Somerset. Project 1.7 is needed due to the increased contingency flows on the Boonesboro North 138-69 kV transformer, even with the new West Garrard interconnection. The remaining Projects listed in Table 4-3 are needed to address problems caused by the future additions of CTs 8, 11, and 12 at JK Smith, which are now deferred beyond 2010. Those problems will be evaluated in more detail in a subsequent SIS to analyze the requirements for these future CTs, which are no longer specifically being addressed as part of this SIS.

Therefore, the transmission requirements identified for the planned additions of CTs #9 and #10 and CFB Unit #1 at JK Smith are Projects 1.1 through 1.8. Projects 1.1 through 1.4 are major projects necessary to implement the new West Garrard interconnection with LGEE. Projects 1.5 through 1.8 are expected to be relatively minor in scope – terminal equipment replacements and/or increases of line conductor clearances on the LGEE transmission system. Therefore, the construction of the new J.K. Smith-West Garrard 345 kV line is effective in eliminating most or all of the significant problems. Some relatively minor problems remain that will need to be addressed. Some additional projects will be necessary as additional generation is added at J.K. Smith beyond 2010. Based on the power flow analysis results from this updated SIS, none of these additional problems are expected at this time to require new line or substation construction. When the SIS is performed for these additional generator additions at J.K. Smith beyond 2010, the specific determination of the projects needed to address the additional problems will be made.

The planning cost estimates for this updated Alternative are listed by project in Table 4-4. Costs are provided in 2006 dollars, install year dollars, and present worth dollars.

Table 4-4								
Estimated Costs for Alternative 1								
Install Date	Project Description	Planning Estimate (2006\$)	Inflated Cost (Install Year \$)	Present Worth (2006\$)				
	Construct 35.5 miles of 345 kV line from JK Smith to LGEE's Brown-Pineville double-circuit line at West Garrard using bundled 954 MCM ACSR							
June 2009	Conductor Add 345 kV Terminal Facilities	41,750,000	47,035,000	57,062,000				
June 2009	at JK Smith CFB Substation for the West Garrard line. ^(†)	1,080,000	1,217,000	1,476,000				
June 2009	Add terminal facilities at LGEE's Brown and Pineville Substations to energize the Brown-Pineville 345 kV circuit	2,160,000	2,433,000	2,952,000				
	Construct a 345 kV breaker station at West Garrard with three line exits. Loop the Brown-Pineville 345 kV line through the station and terminate the new line from JK							
June 2009	Smith	6,480,000	7,299,000	8,856,000				
November 2009	LGEE's Pineville Substation associated with the low side of the Pineville 345-161 kV transformer to at least 2150A (600 MVA) winter emergency.	160,000	180,000	219,000				
November 2009	Increase the limits of LGEE's Alcalde-Elihu 161 kV line to at least 1105A (308 MVA) winter emergency.	50,000	56,000	65,000				
	Increase the terminal limits at LGEE's Boonesboro North associated with the Boonesboro North 138-69 kV transformer to at least 1320A (158 MVA)							
June 2010	summer emergency. Increase the limits of the Ferguson South-Somerset (LGEE-EKPC) 69 kV line to at	140,000	161,000	171,000				
November 2010	least 855A (102 MVA) winter emergency.	10,000	12,000	12,000				
November 2012	Reconductor EKPC's JK Smith- Union City 138 kV line using 954 MCM ACSS conductor.	2,290,000	2,769,000	2,478,000				
November	Increase the terminal limits of EKPC's Powell County 138-69 kV transformer to 147 MVA							
2012	winter emergency.	110,000	133,000	119,000				

Table 4-4								
Estimated Costs for Alternative 1								
Install Date	Project Description	Planning Estimate (2006\$)	Inflated Cost (Install Year \$)	Present Worth (2006\$)				
Date	Increase the terminal limits of	(20000)	ψ)					
June 2013	the Union City-Lake Reba Tap 138 kV line (EKPC-LGEE) to at least 301 MVA summer emergency.	10,000	12,000	10,000				
	Increase the limits of LGEE's Alcalde-Elihu 161 kV line to at least 950A (265 MVA) summer emergency and 1220A (340							
June 2014	MVA) winter emergency.	1,400,000	1,775,000	1,340,000				
	Increase the limits of LGEE's Artemus 161-69 kV transformer to at least 65 MVA summer							
June 2014	emergency.	1,100,000	1,395,000	1,053,000				
	Increase the terminal limits at LGEE's Boonesboro North associated with the Boonesboro North 138-69 kV transformer to at least 163 MVA summer							
June 2014	emergency.	30,000	38,000	29,000				
June 2014	Increase the terminal limits at LGEE's Boonesboro North associated with the Boonesboro North-Winchester Water Works 69 kV circuit to at least 1245A (149 MVA) summer emergency.	110,000	139,000	105,000				
November 2014	Replace EKPC's Powell County 138-69 kV, 100 MVA transformer with a 140 MVA transformer. Increase the limits of LGEE's	1,700,000	2,155,000	1,627,000				
June 2015	Pineville 161-69 kV transformer #2 to at least 139 MVA summer emergency.	2,120,000	2,752,000	1,904,000				
June 2015	Reconductor EKPC's Union City-Lake Reba Tap 138 kV line using 954 MCM ACSS conductor.	290,000	376,000	260,000				
November 2015	Increase the limits of LGEE's Artemus 161-69 kV transformer and the Artemus-Barbourville City 69 kV line to at least 74 MVA winter emergency.	110,000	143,000	99,000				
November 2015	Increase the limits of LGEE's Elihu-Ferguson South 69 kV line to at least 118 MVA winter emergency.	10,000	13,000	9,000				
2010	emergency. Total	\$61,110,000	\$70,093,000	\$79,846,000				

Both LGEE and AEP have performed some independent analysis, and have provided some of the resulting information to EKPC. The information provided indicates that some additional facility overloads have been attributed to the J.K. Smith generation and transmission additions based upon these companies' study methodologies and criteria. However, this work was performed based upon EKPC's previous plans to add five CTs and a CFB Unit at J.K. Smith by 2010. Also, the AEP analysis included EKPC's plans to provide power supply to Warren RECC. EKPC continues to work with LGEE and AEP to identify the transmission problems caused by EKPC's updated plans for J.K. Smith. This includes verification of the results provided in Tables 4-3 and 4-4 above, as well as other problems which may be identified by these companies based on updated models, study criteria, etc.

Section 5: Conclusions from Updated Analysis

The analysis did not re-create the analysis performed in the original SIS. Instead, engineering judgment and selected power flow analysis have been used to verify that the results and conclusions from the original SIS are still applicable. The transmission Alternative recommended in the original SIS still provides advantages over other possible Alternatives that make it the desired Alternative for implementation. Based upon the analysis performed and engineering judgment, Alternative 1 still provides the best transient generating-unit performance at J.K. Smith during system disturbances. Furthermore, Alternative 1 provides the best opportunities for construction and future expansion. The cost of this Alternative 1 requires a small number of system upgrades to accommodate the next three generating units at J.K. Smith. Therefore, more significant upgrades that may be required are deferred.

In the original SIS, several sensitivities were analyzed at the request of the ad hoc study group. These sensitivity analyses were not updated as part of this analysis. The only sensitivity that now appears to be an issue is LGEE's generation dispatch scenario at Brown. LGEE has performed its own independent analysis for its desired dispatch scenario. As stated earlier, EKPC continues to work with LGEE to address these issues.

Based on the results contained in this report, as well as the results, obtained in the original SIS, EKPC recommends proceeding with implementation of Alternative 1 to accommodate the addition of J.K. Smith CTs #9 and #10 and CFB Unit #1.

The following recommendations are made based on these conclusions:

- 1. The following common transmission facilities should be completed for connection of the proposed J.K. Smith units to the transmission network:
 - a) Install a second 345-138 kV, 450 MVA autotransformer at the J.K. Smith CT Substation by June 1, 2007.
 - b) Add 345 kV terminal facilities at the J.K. Smith CT Substation to connect CTs #9 and #10 by June 1, 2007.
 - c) Construct a second 345 kV Substation at J.K. Smith for the CFB Unit #1 (J.K. Smith CFB Substation) by June 1, 2009. (EKPC is evaluating the possibility of deferring construction of this substation until CFB Unit #2 is added at J.K. Smith. If the substation is deferred, CFB Unit #1 will be connected directly to the J.K. Smith CT Substation).
 - d) Add 345 kV terminal facilities at the J.K. Smith CFB Substation to connect CFB Unit #1 by June 1, 2009.
 - e) Construct two 345 kV lines between the J.K. Smith CT 345 kV Substation and the J.K. Smith CFB Substation (using bundled 954 MCM ACSR conductor) and associated terminal facilities by June 1, 2009.

- 2. The following transmission system additions and upgrades should be completed to provide sufficient capacity for delivery of the additional generation at J.K. Smith:
 - a) Construct a 345 kV line from J.K. Smith to LGEE's Brown-Pineville doublecircuit 345 kV line (using bundled 954 MCM ACSR conductor) and associated terminal facilities at the J.K. Smith CFB Substation by June 30, 2009.
 - b) Add 345 kV terminal facilities at LGEE's Brown Substation and Pineville Substation to energize the existing Brown-Pineville 345 kV circuit by June 30, 2009.
 - c) Construct a 345 kV switching substation (West Garrard) to connect the new 345 kV line from J.K. Smith to LGEE's Brown-Pineville 345 kV circuit by June 30, 2009.
 - d) Increase the limits of LGEE's Pineville 345-161 kV transformer to at least 600 MVA winter emergency by November 30, 2009.
 - e) Increase the limits of LGEE's Alcalde-Elihu 161 kV line to at least 308 MVA winter emergency by November 30, 2009.
 - f) Increase the limits of LGEE's Boonesboro North 138-69 kV transformer to at least 158 MVA summer emergency by June 30, 2010.
 - g) Increase the limits of the LGEE-EKPC Ferguson South-Somerset 69 kV line to at least 102 MVA winter emergency by November 30, 2010.

EKPC is coordinating with LGEE to determine the scope, cost, and schedule of the required upgrades on its system.

Appendix A: List of Overloads Identified Via Power Flow Analysis

Tables A-1 through A-8 contain complete lists of the thermal overloads identified in 2007 Summer, 2007-08 Winter, 2010 Summer, 2010-11 Winter, 2015 Summer, and 2015-16 Winter with the proposed generating units and with no transmission additions. An entry is included for all transmission contingencies that result in an overload, but only the worst-case generation dispatch is included.

Table A-1 2007 Summer Complete List of Identified Problems with CTs 9 and 10 Installed at JK Smith and with no Additional Transmission								
Limiting Facility Company Contingency Dispatch Rating Flow Overloa								
Fawkes EKPC-	•	¥	Brown #3					
Fawkes LGEE 138	EKPC-	JK Smith-Union City	off, import					
kV Line	LGEE	138 kV Line (EKPC)	from AEP	287	288.5	100.5%		
		Fawkes EKPC-West	Cooper #2					
Hickory Plains-PPG		Berea 138 kV Line	off, import					
69 kV Line	LGEE	(EKPC)	from AEP	54	54.8	101.5%		

Table A-2									
2007-08 Winter Complete List of Identified Problems with CTs 9 and 10 Installed									
at JK Smith and with no Additional Transmission									
			Worst-Case		MVA	%			
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	70 Overload			
Fawkes EKPC-		Fawkes EKPC-	Brown #3						
Fawkes Tap 138 kV	EKPC-	Fawkes LGEE 138	off, import						
Line	LGEE	kV Line	from AEP	287	305.5	106.4%			
		JK Smith-Fawkes							
		EKPC-Fawkes LGEE	Brown #3						
JK Smith-Union		138 kV Line (EKPC-	off, import						
City 138 kV Line	EKPC	LGEE)	from AEP	389	392.3	100.8%			
		JK Smith-Fawkes	Brown #3						
JK Smith-Union		EKPC 138 kV Line	off, import						
City 138 kV Line	EKPC	(EKPC)	from AEP	389	392.0	100.8%			
Lake Reba Tap-		JK Smith-Powell	Cooper #2						
West Irvine Tap 161		County 138 kV Line	off, import						
kV Line	LGEE	(EKPC)	from AEP	237	238.0	100.4%			
Lake Reba Tap-									
West Irvine Tap 161									
kV Line	LGEE	None	Base	167	168.0	100.6%			

2010 Summer C	Table A-3 2010 Summer Complete List of Identified Problems with CTs 9 and 10 Installed at JK Smith and with no Additional Transmission									
Limiting Eacility			Worst-Case Dispatch	Rating	MVA Flow	% Overload				
Limiting Facility Boonesboro North	Company	Contingency Fawkes LGEE-Clark	Ghent #1	Kating	FIOW	Overioau				
138-69 kV		County 138 kV Line	off, import							
Transformer	LGEE	(LGEE)	from TVA	143	144.7	101.2%				
		(= = = =)	Brown #3							
Dale-Three Forks		JK Smith-Union City	off, import							
Jct. 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	222.4	100.2%				
Fawkes EKPC-			Brown #3							
Fawkes LGEE 138	EKPC-	JK Smith-Union City	off, import							
kV Line	LGEE	138 kV Line (EKPC)	from AEP	287	292.8	102.0%				
Fawkes EKPC-		Union City-Lake	Brown #3							
Fawkes LGEE 138	EKPC-	Reba Tap 138 kV	off, import							
kV Line	LGEE	Line (EKPC-LGEE)	from AEP	287	291.0	101.4%				
		JK Smith-Fawkes	Brown #3							
JK Smith-Union		EKPC-Fawkes LGEE	off, import							
City 138 kV Line	EKPC	138 kV Line	from AEP	311	315.6	101.5%				
			Brown #3							
JK Smith-Union		JK Smith-Fawkes	off, import							
City 138 kV Line	EKPC	EKPC 138 kV Line	from AEP	311	315.3	101.4%				
		Lake Reba Tap-West	Cooper #2							
Lake Reba-Waco 69		Irvine Tap 161 kV	off, import			404-04				
kV Line	LGEE	Line (LGEE)	from AEP	55	57.6	104.7%				

Table A-42010-11 Winter Complete List of Identified Problems with CTs 9 and 10 Installedat JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
	Company	Fawkes EKPC-	Brown #3	Rating	1100	Overload		
Fawkes Tap-Fawkes LGEE 138 kV Line	LGEE	Fawkes LGEE 138 kV Line	off, import from AEP	303	315.8	104.2%		
JK Smith-Powell		Lake Reba Tap-West Irvine Tap-Delvinta	Cooper #2 off, import					
County 138 kV Line JK Smith-Union	EKPC	161 kV Line (LGEE) JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC-	from AEP Brown #3 off, import	287	317.8	110.7%		
City 138 kV Line	EKPC	LGEE)	from AEP	389	404.8	104.1%		
JK Smith-Union City 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC 138 kV Line (EKPC)	Brown #3 off, import from AEP	389	404.5	104.0%		
Union City-Lake Reba Tap 138 kV Line	EKPC	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	371	377.7	101.8%		
Union City-Lake Reba Tap 138 kV		JK Smith-Fawkes EKPC 138 kV Line	Brown #3 off, import					
Line	EKPC	(EKPC)	from AEP	371	377.4	101.7%		
West Berea Jct Three Links Jct. 69 kV Line	EKPC	Brown North- Alcalde-Pineville 345 kV Line (LGEE)	Cooper #2 off, import from AEP	101	101.9	100.9%		
West Berea Jct Three Links Jct. 69 kV Line	EKPC	Brown North-Alcalde 345 kV Line (LGEE)	Cooper #2 off, import from AEP	101	101.4	100.4%		

	Table A-52010 Summer Complete List of Identified Problems with CTs 9- 10 & CFB Unit #1Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload			
Boonesboro North 138-69 kV Transformer	LGEE	Fawkes LGEE-Clark County 138 kV Line (LGEE)	Ghent #1 off, import from TVA	143	151.9	106.2%			
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	222	239.2	107.7%			
Dale-Three Forks Jct. 138 kV Line	EKPC	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	222	237.5	107.0%			
Dale-Three Forks Jct. 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC 138 kV Line (EKPC)	Brown #3 off, import from AEP	222	234.7	105.7%			
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC-	Brown #3 off, import from AEP	222	222.0	105 49/			
Dale-Three Forks Jct. 138 kV Line	ЕКРС	LGEE) Dale-Boonesboro North-Avon 138 kV Line (EKPC)	Brown #3 off, import from AEP	222	233.9	105.4%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	287	327.6	114.1%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	287	325.9	113.6%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes Tap-Fawkes LGEE 138 kV Line (LGEE)	Brown #3 off, import from AEP	287	318.9	111.1%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes LGEE- Fawkes Tap-Lake Reba Tap 138 kV Line (LGEE)	Brown #3 off, import from AEP	287	308.5	107.5%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes EKPC- Fawkes Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	287	293.8	102.4%			
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Dale-Boonesboro North Tap-Avon 138 kV Line (EKPC)	Brown #3 off, import from AEP	287	289.9	101.0%			
Fawkes EKPC- Fawkes Tap 138 kV Line	EKPC- LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	287	291.8	101.7%			
Fawkes LGEE- Clark County 138 kV Line	LGEE	Dale-Boonesboro North-Avon 138 kV Line (EKPC)	Ghent #1 off, import from TVA	172	180.4	104.9%			

Table A-5 2010 Summer Complete List of Identified Problems with CTs 9- 10 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
	ineu ai JK							
			Worst-Case		MVA	%		
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload		
Fawkes LGEE-		Boonesboro North	Ghent #1					
Clark County 138		138-69 kV	off, import					
kV Line	LGEE	Transformer (LGEE)	from TVA	172	176.2	102.4%		
Fawkes Tap-Fawkes		Fawkes EKPC-	Brown #3					
LGEE 138 kV Line		Fawkes LGEE 138	off, import					
(LGEE)	LGEE	kV Line	from AEP	287	317.7	110.7%		
Fawkes Tap-Lake			Cooper #2					
Reba Tap 138 kV		JK Smith-Union City	off, import					
Line	LGEE	138 kV Line (EKPC)	from AEP	176	183.1	104.0%		
Fawkes Tap-Lake		Union City-Lake	Cooper #2					
Reba Tap 138 kV	LOPP	Reba Tap 138 kV	off, import	1.7.4	1.70.1	101.00/		
Line	LGEE	Line (EKPC-LGEE)	from AEP	176	179.1	101.8%		
			Dale #4 off,					
JK Smith-Dale 138	FUDO	North Clark-Avon	import from	211	220.4	100.00/		
kV Line	EKPC	345 kV Line (EKPC)	AEP	311	338.4	108.8%		
			Brown #3					
JK Smith-Fawkes	FUDG	JK Smith-Union City	off, import	211	214.2	101.10/		
EKPC 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	311	314.3	101.1%		
		Union City-Lake	Brown #3					
JK Smith-Fawkes	FVDC	Reba Tap 138 kV	off, import	211	212.2	100 40/		
EKPC 138 kV Line	EKPC	Line (EKPC-LGEE)	from AEP	311	312.3	100.4%		
JK Smith-Union		JK Smith-Fawkes	Brown #3					
City 138 kV Line	EKPC	EKPC-Fawkes LGEE 138 kV Line	off, import from AEP	311	353.8	113.8%		
City 150 KV Lille	EKIU	130 KV LINE	Brown #3	511	333.0	113.870		
JK Smith-Union		JK Smith-Fawkes	off, import					
City 138 kV Line	EKPC	EKPC 138 kV Line	from AEP	311	353.5	113.7%		
City 150 KV Line	LKIC	LIKI C 130 KV LIIIC	Brown #3	511	555.5	113.770		
JK Smith-Union		JK Smith-Dale 138	off, import					
City 138 kV Line	EKPC	kV Line (EKPC)	from AEP	311	329.5	105.9%		
JK Smith-Union	LICIC		IIOIII / ILI	511	527.5	105.770		
City 138 kV Line	EKPC	None	Base	251	264.2	105.3%		
		JK Smith-Powell	Brown #3	1		100.070		
JK Smith-Union		County 138 kV Line	off, import					
City 138 kV Line	EKPC	(EKPC)	from AEP	311	326.6	105.0%		
- · · j · · · · · · · · · · · · · · · ·		()	Brown #3					
JK Smith-Union		Dale-Three Forks Jct.	off, import					
City 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	311	319.8	102.8%		
ž		Three Forks Jct	Brown #3					
JK Smith-Union		Fawkes EKPC 138	off, import					
City 138 kV Line	EKPC	kV Line (EKPC)	from AEP	311	318.6	102.4%		
		, <i>,</i> , , , , , , , , , , , , , , , , ,	Brown #3					
JK Smith-Union		North Clark-Avon	off, import					
City 138 kV Line	EKPC	345 kV Line (EKPC)	from AEP	311	315.9	101.6%		
		Lake Reba Tap-West	Cooper #2					
Lake Reba-Waco 69		Irvine Tap 161 kV	off, import					
kV Line	LGEE	Line (LGEE)	from AEP	55	62.7	114.0%		

Table A-52010 Summer Complete List of Identified Problems with CTs 9- 10 & CFB Unit #1								
Insta	lled at JK	Smith and with no A	<u>Additional T</u>	ransmiss	sion	_		
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
		Lake Reba Tap-West	Cooper #2					
Rice Tap-West		Irvine Tap 161 kV	off, import					
Irvine 69 kV Line	LGEE	Line (LGEE)	from AEP	40	44.4	111.0%		
Three Forks Jct			Brown #3					
Fawkes EKPC 138		JK Smith-Union City	off, import					
kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	231.5	104.3%		
Three Forks Jct		Union City-Lake	Brown #3					
Fawkes EKPC 138		Reba Tap 138 kV	off, import					
kV Line	EKPC	Line (EKPC-LGEE)	from AEP	222	229.9	103.6%		
Three Forks Jct			Brown #3					
Fawkes EKPC 138		JK Smith-Fawkes	off, import					
kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	227.2	102.3%		
Three Forks Jct		JK Smith-Fawkes	Brown #3					
Fawkes EKPC 138		EKPC-Fawkes LGEE	off, import					
kV Line	EKPC	138 kV Line	from AEP	222	226.3	101.9%		
Union City-Lake Reba Tap 138 kV Line	EKPC- LGEE	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	300	334.2	111.4%		
Union City-Lake			Brown #3		1			
Reba Tap 138 kV	EKPC-	JK Smith-Fawkes	off, import					
Line	LGEE	EKPC 138 kV Line	from AEP	300	333.9	111.3%		
Union City-Lake								
Reba Tap 138 kV	EKPC-							
Line	LGEE	None	Base	241	251.3	104.3%		
Union City-Lake			Brown #3					
Reba Tap 138 kV	EKPC-	JK Smith-Dale 138	off, import					
Line	LGEE	kV Line (EKPC)	from AEP	300	312.6	104.2%		
Union City-Lake		JK Smith-Powell	Brown #3					
Reba Tap 138 kV	EKPC-	County 138 kV Line	off, import					
Line	LGEE	(EKPC)	from AEP	300	309.2	103.1%		
Union City-Lake		· · · · ·	Brown #3					
Reba Tap 138 kV	EKPC-	Dale-Three Forks Jct.	off, import					
Line	LGEE	138 kV Line (EKPC)	from AEP	300	302.8	100.9%		
Union City-Lake		Three Forks Jct	Brown #3					
Reba Tap 138 kV	EKPC-	Fawkes EKPC 138	off, import					
Line	LGEE	kV Line (EKPC)	from AEP	300	301.7	100.6%		
		Lake Reba Tap-West	Cooper #2					
Waco-Rice Tap 69		Irvine Tap 161 kV	off, import					
kV Line	LGEE	Line (LGEE)	from AEP	51	55.0	107.8%		
			Mill Creek					
West Frankfort-Clay		Bullitt County-Little	#4 off,					
Village Tap 69 kV		Mount Jct. 161 kV	import from					
Line	LGEE	Line (EKPC)	AEP	43	44.2	102.8%		

Table A-52010 Summer Complete List of Identified Problems with CTs 9- 10 & CFB Unit #1Installed at JK Smith and with no Additional Transmission							
Limiting Facility	Limiting Facility Company Contingency Dispatch Rating Flow Overload						
			Mill Creek				
West Frankfort-Clay		Blue Lick 345-161	#4 off,				
Village Tap 69 kV		kV Transformer	import from				
Line	LGEE	(LGEE)	AEP	43	43.3	100.7%	

Table A-6 2010-11 Winter Complete List of Identified Problems with CTs 9-10 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
Beattyville-Delvinta	EKPC-	West Irvine Tap- Delvinta 161 kV Line	Cooper #2 off, import					
161 kV Line	LGEE	(LGEE)	from AEP	211	223.7	106.0%		
Beattyville-Delvinta 161 kV Line	EKPC- LGEE	Lake Reba Tap-West Irvine Tap-Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	211	216.9	102.8%		
Dale 138-69 kV Transformer	ЕКРС	JK Smith-Powell County 138 kV Line (EKPC)	Dale #3 off, import from AEP	136	147.2	108.2%		
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	278	293.5	105.6%		
Dale-Three Forks Jct. 138 kV Line	EKPC	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	278	293.5	104.5%		
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Fawkes 138 kV Line (EKPC)	Brown #3 off, import from AEP	278	286.4	103.0%		
Dale-Three Forks Jct. 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	278	285.4	102.7%		
Delvinta-Green Hall Jct. 161 kV Line	LGEE- EKPC	Delvinta-Hyden Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	223	235.4	105.6%		
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	370	385.7	104.2%		
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	370	382.7	103.4%		
Fawkes Tap-Fawkes LGEE 138 kV Line	LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	303	356.8	117.8%		
JK Smith-Dale 138 kV Line	ЕКРС	North Clark-Avon 345 kV Line (EKPC)	Dale #4 off, import from AEP	389	403.9	103.8%		
JK Smith-Fawkes EKPC 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	389	390.3	100.3%		
JK Smith-Powell County 138 kV Line	EKPC	Lake Reba Tap-West Irvine Tap-Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	287	341.6	119.0%		
JK Smith-Powell County 138 kV Line	EKPC	Lake Reba Tap-West Irvine Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	287	335.1	116.8%		

Table A-6 2010-11 Winter Complete List of Identified Problems with CTs 9-10 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
<i>"</i> 1119			Worst-Case		MVA	%		
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload		
		West Irvine Tap-	Cooper #2					
JK Smith-Powell		Delvinta 161 kV Line	off, import					
County 138 kV Line	EKPC	(LGEE)	from AEP	287	333.9	116.3%		
			Cooper #2					
JK Smith-Powell		JK Smith-Union City	off, import					
County 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	287	320.4	111.6%		
		Union City-Lake	Cooper #2					
JK Smith-Powell		Reba Tap 138 kV	off, import					
County 138 kV Line	EKPC	Line (EKPC-LGEE)	from AEP	287	319.3	111.3%		
		JK Smith-Fawkes						
		EKPC-Fawkes LGEE	Brown #3					
JK Smith-Union		138 kV Line (EKPC-	off, import					
City 138 kV Line	EKPC	LGEE)	from AEP	389	444.3	114.2%		
		JK Smith-Fawkes	Brown #3					
JK Smith-Union		EKPC 138 kV Line	off, import					
City 138 kV Line	EKPC	(EKPC)	from AEP	389	444.0	114.1%		
•		JK Smith-Powell	Brown #3					
JK Smith-Union		County 138 kV Line	off, import					
City 138 kV Line	EKPC	(EKPC)	from AEP	389	416.4	107.0%		
5			Brown #3					
JK Smith-Union		JK Smith-Dale 138	off, import					
City 138 kV Line	EKPC	kV Line (EKPC)	from AEP	389	415.2	106.7%		
5			Brown #3					
JK Smith-Union		Dale-Three Forks Jct.	off, import					
City 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	389	401.7	103.3%		
		Three Forks Jct	Brown #3					
JK Smith-Union		Fawkes EKPC 138	off, import					
City 138 kV Line	EKPC	kV Line (EKPC)	from AEP	389	399.7	102.8%		
			Brown #3					
JK Smith-Union		North Clark-Avon	off, import					
City 138 kV Line	EKPC	345 kV Line (EKPC)	from AEP	389	389.6	100.2%		
		Powell County-		2.05				
		Beattyville-Delvinta	Brown #3					
JK Smith-Union		161 kV Line (EKPC-	off, import					
City 138 kV Line	EKPC	LGEE)	from AEP	389	389.6	100.2%		
, 100 K + Line	2	Powell County-	Brown #3	207	207.0	100.270		
JK Smith-Union		Beattyville 161 kV	off, import					
City 138 kV Line	EKPC	Line (EKPC)	from AEP	389	389.3	100.1%		
		JK Smith-Powell	Cooper #2	507	207.5	100.170		
Lake Reba Tap 138-		County 138 kV Line	off, import					
161 kV Transformer	LGEE	(EKPC)	from AEP	270	271.9	100.7%		
		Lake Reba Tap-West	Cooper #2	2,0		100.770		
Lake Reba-Waco 69		Irvine Tap 161 kV	off, import					
kV Line	LGEE	Line (LGEE)	from AEP	88	92.5	105.1%		
		Rowan County-		00	12.5	103.170		
Morehead-Hayward		Skaggs 138 kV Line						
	АЕР		Rase	18	10.5	103 10/		
69 kV	AEP	(EKPC)	Base	48	49.5	103.1%		

Table A-6 2010-11 Winter Complete List of Identified Problems with CTs 9-10 & CFB Unit								
	-	K Smith and with no				г опц		
			Worst-Case		MVA	%		
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload		
a v	• •	Powell County-	•	8				
		Beattyville-Delvinta	Dale #3 off,					
Powell County 138-		161 kV Line (EKPC-	import from					
69 kV Transformer	EKPC	LGEE)	AEP	143	151.3	105.8%		
		Powell County-	Dale #3 off,					
Powell County 138-		Beattyville 161 kV	import from					
69 kV Transformer	EKPC	Line (EKPC)	AEP	143	150.8	105.5%		
		Lake Reba Tap-West	Cooper #2	-				
Powell County 161-		Irvine Tap-Delvinta	off, import					
138 kV Transformer	EKPC	161 kV Line (LGEE)	from AEP	220	227.8	103.5%		
		West Irvine Tap-	Cooper #2					
Powell County 161-		Delvinta 161 kV Line	off, import					
138 kV Transformer	EKPC	(LGEE)	from AEP	220	223.2	101.5%		
		Lake Reba Tap-West	Cooper #2	220	223.2	101.270		
Powell County 161-		Irvine Tap 161 kV	off, import					
138 kV Transformer	EKPC	Line (LGEE)	from AEP	220	220.3	100.1%		
Three Forks Jct			Brown #3	220	220.5	100.170		
Fawkes EKPC 138		JK Smith-Union City	off, import					
kV Line	EKPC	138 kV Line (EKPC)	from AEP	278	281.8	101.4%		
Three Forks Jct	LKIC	Union City-Lake	Brown #3	270	201.0	101.470		
Fawkes EKPC 138		Reba Tap 138 kV	off, import					
kV Line	EKPC	Line (EKPC-LGEE)	from AEP	278	279.0	100.4%		
KV LIIIC	EKIC	JK Smith-Fawkes	HOIII ALI	278	279.0	100.470		
Union City-Lake		EKPC-Fawkes LGEE	Brown #3					
Reba Tap 138 kV	EKPC-	138 kV Line (EKPC-	off, import					
Line	LGEE	LGEE)	from AEP	371	413.5	111.5%		
Union City-Lake	LOLL	LULL)	Brown #3	571	415.5	111.370		
Reba Tap 138 kV	EKPC-	JK Smith-Fawkes	off, import					
Line	LGEE	138 kV Line (EKPC)	from AEP	371	413.2	111.4%		
Union City-Lake	LULE	JK Smith-Powell	Brown #3	3/1	713.2	111.470		
Reba Tap 138 kV	EKPC-	County 138 kV Line	off, import					
Line	LGEE	(EKPC)	from AEP	371	388.2	104.6%		
Union City-Lake	LULE		Brown #3	5/1	500.2	104.070		
Reba Tap 138 kV	EKPC-	JK Smith-Dale 138	off, import					
Line	LGEE	kV Line (EKPC)	from AEP	371	387.8	104.5%		
	LUEE	KV LIIIC (EKFC)	Brown #3	5/1	307.0	104.370		
Union City-Lake	EVDC	Dolo Three Fortes Let	off, import					
Reba Tap 138 kV	EKPC-	Dale-Three Forks Jct.		271	274.2	100.00/		
Line	LGEE	138 kV Line (EKPC)	from AEP	371	374.3	100.9%		
Union City-Lake	EKDO	Three Forks Jct	Brown #3					
Reba Tap 138 kV	EKPC-	Fawkes EKPC 138	off, import	271	272 6	100 40/		
Line	LGEE	kV Line (EKPC)	from AEP	371	372.6	100.4%		
W D' T (^		Lake Reba Tap-West	Cooper #2					
Waco-Rice Tap 69	LOPP	Irvine Tap 161 kV	off, import		00.4	104 407		
kV Line	LGEE	Line (LGEE)	from AEP	77	80.4	104.4%		
West Berea Jct		Brown North-	Cooper #2					
Three Links Jct. 69		Alcalde-Pineville 345	off, import		1000	10		
kV Line	EKPC	kV Line (LGEE)	from AEP	101	106.6	105.5%		

Table A-6 2010-11 Winter Complete List of Identified Problems with CTs 9-10 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
West Berea Jct		Delvinta-Green Hall	Cooper #2					
Three Links Jct. 69		Junction 161 kV Line	off, import					
kV Line	EKPC	(LGEE-EKPC)	from AEP	101	106.4	105.3%		
West Berea Jct			Cooper #2					
Three Links Jct. 69		Brown North-Alcalde	off, import					
kV Line	EKPC	345 kV Line (LGEE)	from AEP	101	106.4	105.3%		
West Berea Jct		Green Hall Junction-	Cooper #2					
Three Links Jct. 69		Tyner 161 kV Line	off, import					
kV Line	EKPC	(LGEE-EKPC)	from AEP	101	106.0	105.0%		

Table A-7 2015 Summer Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
Linning Facility	Company	Delvinta-Green Hall	Cooper #2	Rating	TIOW	Overioau		
Beattyville-Oakdale		Jct. 161 kV Line	off, import					
Jct. 69 kV Line	EKPC	(LGEE-EKPC)	from AEP	47	50.5	107.4%		
		()	Cooper #2	.,				
Beattyville-Oakdale		Green Hall JctTyner	off, import					
Jct. 69 kV Line	EKPC	161 kV Line (EKPC)	from AEP	47	50.0	106.4%		
		Beattyville-Delvinta	Cooper #2					
Beattyville 161-69		161 kV Line (EKPC-	off, import					
kV Transformer	LGEE	LGEE)	from AEP	64	71.2	111.3%		
Boonesboro North		Fawkes LGEE-Clark	Ghent #1					
138-69 kV		County 138 kV Line	off, import					
Transformer	LGEE	(LGEE)	from TVA	143	172.1	120.3%		
Boonesboro North-		Fawkes LGEE-Clark	Ghent #1					
Winchester Water		County 138 kV Line	off, import					
Works 69 kV Line	LGEE	(LGEE)	from TVA	143	158.6	110.9%		
		Dale-Boonesboro	Brown #3					
Clark County 138-		North-Avon 138 kV	off, import					
69 kV Transformer	LGEE	Line (EKPC)	from AEP	143	143.1	100.1%		
		Dale-Boonesboro	Brown #3					
Clark County-		North-Avon 138 kV	off, import					
Sylvania 69 kV Line	LGEE	Line (EKPC)	from AEP	137	139.6	101.9%		
		Boonesboro North	Brown #3					
Clark County-		138-69 kV	off, import					
Sylvania 69 kV Line	LGEE	Transformer (LGEE)	from AEP	137	137.9	100.7%		
		JK Smith-Powell	Dale #3 off,					
Dale 138-69 kV		County 138 kV Line	import from					
Transformer	EKPC	(EKPC)	AEP	111	119.6	107.7%		
			Brown #3					
Dale-Three Forks	EUS C	JK Smith-Union City	off, import			115 /		
Jct. 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	261.2	117.7%		
		Union City-Lake	Brown #3					
Dale-Three Forks	FUDO	Reba Tap 138 kV	off, import	222	250.0	110.00/		
Jct. 138 kV Line	EKPC	Line (EKPC-LGEE)	from AEP	222	259.2	116.8%		
		JK Smith-Fawkes	Brown #3					
Dale-Three Forks	EKDC	EKPC 138 kV Line	off, import	222	255 (115 10/		
Jct. 138 kV Line	EKPC	(EKPC)	from AEP	222	255.6	115.1%		
		JK Smith-Fawkes	Decorr #2					
Dolo Three Paula		EKPC-Fawkes LGEE	Brown #3					
Dale-Three Forks Jct. 138 kV Line	ENDC	138 kV Line (EKPC-	off, import from AEP	222	254.7	11/ 70/		
JCI. ISOKV LINE	EKPC	LGEE) Dale-Boonesboro		222	234.1	114.7%		
Dala Three Fortra			Brown #3					
Dale-Three Forks	EVDC	North-Avon 138 kV	off, import from AEP	222	220.4	107.90/		
Jct. 138 kV Line	EKPC	Line (EKPC) Dale-Boonesboro	Brown #3	222	239.4	107.8%		
Dale-Three Forks		North Tap 138 kV	off, import					
Jct. 138 kV Line	EKPC	Line (EKPC)	from AEP	222	228.1	102.7%		

	Table A-7 2015 Summer Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission									
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload				
Farmers 138-69 kV	LOFE	Rodburn 138-69 kV	Deer	40	49.5	101.00/				
Transformer Fawkes EKPC-	LGEE	Transformer (LGEE)	Base Brown #3	48	48.5	101.0%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-Union City 138 kV Line (EKPC)	off, import from AEP	287	357.0	124.4%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	287	355.0	123.7%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes Tap-Fawkes LGEE 138 kV Line (LGEE)	Brown #3 off, import from AEP	287	338.2	117.8%				
Fawkes EKPC- Fawkes LGEE 138	EKPC-	Fawkes LGEE- Fawkes Tap-Lake Reba Tap 138 kV	Brown #3 off, import from AEP							
kV Line Fawkes EKPC- Fawkes LGEE 138 kV Line	LGEE EKPC- LGEE	Line (LGEE) Fawkes EKPC- Fawkes Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	287 287	329.7	114.9%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Dale-Boonesboro North Tap-Avon 138 kV Line (EKPC)	Brown #3 off, import from AEP	287	311.5	108.5%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes-West Berea 138 kV Line (EKPC)	Brown #3 off, import from AEP	287	304.7	106.2%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Boonesboro North 138-69 kV Transformer (LGEE)	Brown #3 off, import from AEP	287	298.8	104.1%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Dale-Boonesboro North Tap 138 kV Line (EKPC)	Brown #3 off, import from AEP	287	291.5	101.6%				
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-North Clark 345 kV Line (EKPC)	Brown #3 off, import from AEP	287	287.1	100.1%				
Fawkes EKPC- Fawkes Tap 138 kV Line	EKPC- LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	287	314.5	109.6%				
Fawkes LGEE- Richmond 69 kV Line	LGEE	Lake Reba 138-69 kV Transformer (LGEE)	Cooper #2 off, import from AEP	117	118.0	100.9%				
Fawkes Tap-Fawkes LGEE 138 kV Line (LGEE)	LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	246	336.9	137.0%				
JK Smith-Dale 138 kV Line	ЕКРС	North Clark-Avon 345 kV Line (EKPC)	Dale #4 off, import from AEP	311	387.8	124.7%				

Table A-7 2015 Summer Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission							
Insta	alled at JK	Smith and with no .	Additional 1	ransmis	sion		
			Worst-Case		MVA	%	
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload	
		JK Smith-North	Dale #4 off,				
JK Smith-Dale 138		Clark 345 kV Line	import from				
kV Line	EKPC	(EKPC)	AEP	311	375.0	120.6%	
			Dale #4 off,				
JK Smith-Dale 138		JK Smith-Union City	import from				
kV Line	EKPC	138 kV Line (EKPC)	AEP	311	351.8	113.1%	
		Union City-Lake	Dale #4 off,				
JK Smith-Dale 138		Reba Tap 138 kV	import from				
kV Line	EKPC	Line (EKPC-LGEE)	AEP	311	349.9	112.5%	
		JK Smith-Fawkes	Dale #4 off,				
JK Smith-Dale 138		EKPC 138 kV Line	import from				
kV Line	EKPC	(EKPC)	AEP	311	339.3	109.1%	
		JK Smith-Fawkes	Dale #4 off,				
JK Smith-Dale 138		EKPC-Fawkes LGEE	import from				
kV Line	EKPC	138 kV Line (EKPC)	AEP	311	339.0	109.0%	
		JK Smith-Powell	Dale #4 off,				
JK Smith-Dale 138		County 138 kV Line	import from				
kV Line	EKPC	(EKPC)	AEP	311	320.7	103.1%	
			Brown #3				
JK Smith-Fawkes		JK Smith-Union City	off, import				
EKPC 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	311	354.3	113.9%	
		Union City-Lake	Brown #3				
JK Smith-Fawkes		Reba Tap 138 kV	off, import				
EKPC 138 kV Line	EKPC	Line (EKPC-LGEE)	from AEP	311	352.0	113.2%	
			Brown #3				
JK Smith-Fawkes		JK Smith-Dale 138	off, import				
EKPC 138 kV Line	EKPC	kV Line (EKPC)	from AEP	311	313.3	100.7%	
		JK Smith-Fawkes	Brown #3				
JK Smith-Union		EKPC-Fawkes LGEE	off, import				
City 138 kV Line	EKPC	138 kV Line	from AEP	311	401.1	129.0%	
			Brown #3			-,	
JK Smith-Union		JK Smith-Fawkes	off, import				
City 138 kV Line	EKPC	EKPC 138 kV Line	from AEP	311	400.8	128.9%	
JK Smith-Union	2.2.0					1_0.970	
City 138 kV Line	EKPC	None	Base	251	303.5	120.9%	
		1,0110	Brown #3	<i>201</i>	505.5	120.770	
JK Smith-Union		JK Smith-Dale 138	off, import				
City 138 kV Line	EKPC	kV Line (EKPC)	from AEP	311	375.2	120.6%	
City 130 KV LINC		JK Smith-Powell	Brown #3	511	515.4	120.070	
JK Smith-Union		County 138 kV Line	off, import				
City 138 kV Line	EKPC	(EKPC)	from AEP	311	372.6	119.8%	
City 150 KV LINE		JK Smith-North	Brown #3	511	572.0	117.0/0	
IV Smith I triar							
JK Smith-Union	EKDC	Clark 345 kV Line	off, import	211	272.2	110 70/	
City 138 kV Line	EKPC	(EKPC)	from AEP	311	372.3	119.7%	
IIZ Carriel I Inter		Dala Thurse Friday L.	Brown #3				
JK Smith-Union	FUDO	Dale-Three Forks Jct.	off, import	211	2000	115.00/	
City 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	311	360.6	115.9%	

Table A-7 2015 Summer Complete List of Identified Problems with CTs 8-12 & CFB Unit #1							
	-	Smith and with no				5 Unit #1	
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
W. Carith Haira		Three Forks Jct	Brown #3				
JK Smith-Union City 138 kV Line	EKPC	Fawkes EKPC 138 kV Line (EKPC)	off, import from AEP	311	359.2	115.5%	
•		, , , , , , , , , , , , , , , , , , ,	Brown #3				
JK Smith-Union	EVDC	North Clark-Avon	off, import	211	257.0	115 10/	
City 138 kV Line	EKPC	345 kV Line (EKPC) Powell County-	from AEP	311	357.9	115.1%	
JK Smith-Union City 138 kV Line	EKPC	Beattyville-Delvinta 161 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	311	349.1	112.3%	
		Powell County-	Brown #3				
JK Smith-Union City 138 kV Line	EKPC	Beattyville 161 kV Line (EKPC)	off, import from AEP	311	349.0	112.2%	
City 150 KV Line	LKIC	Beattyville-Delvinta	Brown #3	511	547.0	112.270	
JK Smith-Union City 138 kV Line	ЕКРС	161 kV Line (EKPC- LGEE)	off, import from AEP	311	335.4	107.8%	
JK Smith-Union			Brown #3 off, import				
City 138 kV Line	EKPC	None	from AEP	311	315.2	101.4%	
Lake Reba-Waco 69 kV Line	LGEE	Lake Reba Tap-West Irvine Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	55	74.2	134.9%	
Lake Reba Tap-	LUEE	JK Smith-Powell	Cooper #2		/4.2	134.970	
West Irvine Tap 161		County 138 kV Line	off, import				
kV Line	LGEE	(EKPC)	from AEP	205	227.4	110.9%	
Lake Reba Tap- West Irvine Tap 161 kV Line	LGEE	Powell County- Beattyville-Delvinta 161 kV Line (EKPC- LGEE)	Cooper #2 off, import from AEP	205	215.2	105.0%	
Lake Reba Tap-		Powell County-	Cooper #2				
West Irvine Tap 161 kV Line	LGEE	Beattyville 161 kV Line (EKPC)	off, import from AEP	205	215.0	104.9%	
Loudon Avenue		Loudon Avenue 138-	Brown #3				
138-69 kV Transformar #628	LCEE	69 kV Transformer	off, import	120	120.0	100 70/	
Transformer #628	LGEE	#618 (LGEE) Avon-Loudon	from AEP Brown #3	128	128.9	100.7%	
Paris 138-69 kV Transformer	LGEE	Avenue 138 kV Line (EKPC-LGEE)	off, import from AEP	173	175.9	101.7%	
Powell County 138- 161 kV Transformer	EKPC	Lake Reba Tap-West Irvine-Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	193	193.8	100.4%	
		Powell County-	Dale #3 off,	175	170.0	100.1/0	
Powell County 138- 69 kV Transformer	ЕКРС	Beattyville 161 kV Line (EKPC)	import from AEP	129	132.7	102.9%	

Table A-7 2015 Summer Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission							
11156			Worst-Case		MVA	%	
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload	
		Powell County-					
		Beattyville-Delvinta	Dale #3 off,				
Powell County 138-		161 kV Line (EKPC-	import from				
69 kV Transformer	EKPC	LGEE)	AEP	129	132.3	102.6%	
Three Forks Jct			Brown #3				
Fawkes EKPC 138		JK Smith-Union City	off, import				
kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	252.7	113.8%	
Three Forks Jct		Union City-Lake	Brown #3				
Fawkes EKPC 138		Reba Tap 138 kV	off, import				
kV Line	EKPC	Line (EKPC-LGEE)	from AEP	222	250.9	113.0%	
Three Forks Jct			Brown #3				
Fawkes EKPC 138		JK Smith-Fawkes	off, import				
kV Line	EKPC	138 kV Line (EKPC)	from AEP	222	247.7	111.6%	
Three Forks Jct		JK Smith-Fawkes	Brown #3		, . ,	111.070	
Fawkes EKPC 138		EKPC-Fawkes LGEE	off, import				
kV Line	EKPC	138 kV Line	from AEP	222	246.8	111.2%	
Three Forks Jct	Litite	Dale-Boonesboro	Brown #3		210.0	111.270	
Fawkes EKPC 138		North-Avon 138 kV	off, import				
kV Line	EKPC	Line (EKPC)	from AEP	222	231.0	104.1%	
K V Line	Litite	JK Smith-Fawkes	nom / tEr	222	231.0	101.170	
Union City-Lake		EKPC-Fawkes LGEE	Brown #3				
Reba Tap 138 kV	EKPC-	138 kV Line (EKPC-	off, import				
Line	LGEE	LGEE)	from AEP	300	378.0	126.0%	
Union City-Lake	LULL		Brown #3	500	578.0	120.070	
Reba Tap 138 kV	EKPC-	JK Smith-Fawkes	off, import				
Line	LGEE	EKPC 138 kV Line	from AEP	300	377.7	125.9%	
Union City-Lake	LUEE	EKIC 130 KV LIIIC	HOIII ALT	300	577.7	123.970	
	EVDC						
Reba Tap 138 kV	EKPC-	Nama	Deer	241	207.1	110 10/	
Line	LGEE	None	Base	241	287.1	119.1%	
Union City-Lake	EKDC	IV Smith Dala 129	Brown #3				
Reba Tap 138 kV	EKPC-	JK Smith-Dale 138	off, import	200	255.0	110.20/	
Line	LGEE	kV Line (EKPC)	from AEP	300	355.0	118.3%	
Union City-Lake	FUDG	JK Smith-North	Brown #3				
Reba Tap 138 kV	EKPC-	Clark 345 kV Line	off, import	200	251.0	117 20/	
Line	LGEE	(EKPC)	from AEP	300	351.8	117.3%	
Union City-Lake	Date of	JK Smith-Powell	Brown #3				
Reba Tap 138 kV	EKPC-	County 138 kV Line	off, import				
Line	LGEE	(EKPC)	from AEP	300	350.8	116.9%	
Union City-Lake			Brown #3				
Reba Tap 138 kV	EKPC-	Dale-Three Forks Jct.	off, import				
Line	LGEE	138 kV Line (EKPC)	from AEP	300	340.9	113.6%	
Union City-Lake		Three Forks Jct	Brown #3				
Reba Tap 138 kV	EKPC-	Fawkes EKPC 138	off, import				
Line	LGEE	kV Line (EKPC)	from AEP	300	339.7	113.2%	
Union City-Lake			Brown #3				
Reba Tap 138 kV	EKPC-	North Clark-Avon	off, import				
Line	LGEE	345 kV Line (EKPC)	from AEP	300	338.4	112.8%	

Table A-72015 Summer Complete List of Identified Problems with CTs 8-12 & CFB Unit #1								
Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
		Powell County-						
Union City-Lake		Beattyville-Delvinta	Brown #3					
Reba Tap 138 kV	EKPC-	161 kV Line (EKPC-	off, import					
Line	LGEE	LGEE)	from AEP	300	329.3	109.8%		
Union City-Lake		Powell County-	Brown #3					
Reba Tap 138 kV	EKPC-	Beattyville 161 kV	off, import					
Line	LGEE	Line (EKPC)	from AEP	300	329.2	109.7%		
Union City-Lake		Beattyville-Delvinta	Brown #3					
Reba Tap 138 kV	EKPC-	161 kV Line (EKPC-	off, import					
Line	LGEE	LGEE)	from AEP	300	317.1	105.7%		
		Lake Reba Tap-West	Cooper #2					
Waco-Rice Tap 69		Irvine Tap 161 kV	off, import					
kV Line	LGEE	Line (LGEE)	from AEP	51	65.1	127.6%		
		West Irvine Tap-	Cooper #2					
West Irvine-Dark		Delvinta 161 kV Line	off, import					
Hollow 69 kV Line	LGEE	(LGEE)	from AEP	55	55.1	100.2%		
West Irvine Tap-		JK Smith-Powell	Cooper #2					
Delvinta 161 kV		County 138 kV Line	off, import					
Line	LGEE	(EKPC)	from AEP	201	208.1	103.5%		
West Irvine Tap-		Beattyville-Delvinta	Cooper #2					
Delvinta 161 kV		161 kV Line (EKPC-	off, import					
Line	LGEE	LGEE)	from AEP	201	202.4	100.7%		
Winchester South-		Fawkes LGEE-Clark	Ghent #1					
Winchester 69 kV		County 138 kV Line	off, import					
Line	LGEE	(LGEE)	from TVA	110	118.4	107.6%		
Winchester Water		Fawkes LGEE-Clark	Ghent #1					
Works-Boone		County 138 kV Line	off, import					
Avenue 69 kV Line	LGEE	(LGEE)	from TVA	150	151.3	100.9%		

Table A-8 2015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission							
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
Limiting Facility	Company	West Irvine Tap-	Cooper #2	Rating	TIOW	Overioau	
Beattyville-Delvinta 161 kV Line	EKPC- LGEE	Delvinta 161 kV Line (LGEE)	off, import from AEP	211	235.1	111.4%	
Beattyville-Delvinta 161 kV Line	EKPC- LGEE	Lake Reba Tap-West Irvine Tap-Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	211	227.4	107.8%	
Beattyville-Oakdale Jct. 69 kV Line	EKPC	Delvinta-Green Hall Jct. 161 kV Line (LGEE-EKPC)	Cooper #2 off, import from AEP	62	66.6	107.4%	
Beattyville-Oakdale Jct. 69 kV Line	EKPC	Green Hall JctTyner 161 kV Line (EKPC)	Cooper #2 off, import from AEP	62	65.7	106.0%	
Boonesboro North- Winchester Water Works 69 kV Line	LGEE	Fawkes LGEE-Clark County 138 kV Line (LGEE)	Ghent #1 off, import from TVA	143	159.3	111.4%	
Dale 138-69 kV Transformer	EKPC	JK Smith-Powell County 138 kV Line (EKPC)	Dale #3 off, import from AEP	136	169.7	124.8%	
Dale 138-69 kV Transformer	EKPC	Powell County 138- 69 kV Transformer (EKPC)	Dale #3 off, import from AEP	136	159.3	117.1%	
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	278	322.5	116.0%	
Dale-Three Forks Jct. 138 kV Line	EKPC	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	278	319.1	114.8%	
Dale-Three Forks Jct. 138 kV Line	EKPC	JK Smith-Fawkes 138 kV Line (EKPC)	Brown #3 off, import from AEP	278	315.8	113.6%	
Dale-Three Forks Jct. 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	278	314.7	113.2%	
Dale-Newby #1 69 kV Line	EKPC	Dix Dam-Buena Vista 69 kV Line (LGEE)	Cooper #2 off, import from AEP	87	92.6	106.4%	
Dale-Newby #1 69 kV Line	ЕКРС	Garrard CT- Lancaster 69 kV Line (LGEE)	Cooper #2 off, import from AEP	87	88.9	102.2%	
Delvinta-Green Hall Jct. 161 kV Line	LGEE- EKPC	Delvinta-Hyden Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	223	253.1	113.5%	
Delvinta-Green Hall Jct. 161 kV Line	LGEE- EKPC	Brown North- Alcalde-Pineville 345 kV Line (LGEE)	Cooper #2 off, import from AEP	223	238.2	106.8%	

Table A-8 2015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission								
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload		
			Cooper #2					
Delvinta-Green Hall Jct. 161 kV Line	LGEE- EKPC	Brown North-Alcalde 345 kV Line (LGEE)	off, import from AEP	223	234.9	105.3%		
Delvinta-Green Hall	LGEE-	Cooper-Laurel Dam	Cooper #2 off, import	222	220.1	102 20/		
Jct. 161 kV Line Delvinta-Green Hall	EKPC LGEE-	161 kV Line (EKPC) Alcalde 345-161 kV	from AEP Cooper #2 off, import	223	230.1	103.2%		
Jct. 161 kV Line	EKPC	Transformer (LGEE) West Berea Jct	from AEP Cooper #2	223	228.0	102.2%		
Delvinta-Green Hall Jct. 161 kV Line	LGEE- EKPC	Three Links Jct. 69 kV Line (EKPC)	off, import from AEP	223	223.7	100.3%		
Farmers 138-69 kV Transformer	LGEE	Rodburn 138-69 kV Transformer (LGEE)	Base	58	58.1	100.2%		
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	370	428.6	115.8%		
Fawkes EKPC- Fawkes LGEE 138	EKPC-	Union City-Lake Reba Tap 138 kV	Brown #3 off, import	270	425.2	114.00/		
kV Line Fawkes EKPC- Fawkes LGEE 138	LGEE EKPC-	Line (EKPC-LGEE) Fawkes Tap-Fawkes LGEE 138 kV Line	from AEP Brown #3 off, import	370	425.2	114.9%		
kV Line	LGEE	(LGEE) Fawkes LGEE-	from AEP	370	405.3	109.5%		
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes Tap-Lake Reba Tap 138 kV Line (LGEE)	Brown #3 off, import from AEP	370	394.6	106.6%		
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes EKPC- Fawkes Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	370	377.5	102.0%		
Fawkes EKPC- Fawkes LGEE 138 kV Line	EKPC- LGEE	Fawkes EKPC-West Berea 138 kV Line (EKPC)	Brown #3 off, import from AEP	370	371.0	100.3%		
Fawkes EKPC- Fawkes Tap 138 kV Line	EKPC- LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	287	374.9	130.6%		
Fawkes LGEE- Clark County 138 kV Line	LGEE	Dale-Boonesboro North-Avon 138 kV Line (EKPC)	Ghent #1 off, import from TVA	194	202.5	104.4%		
Fawkes LGEE- Clark County 138 kV Line	LGEE	Boonesboro North 138-69 kV Transformer (LGEE)	Ghent #1 off, import from TVA	194	199.7	102.9%		
Fawkes Tap-Fawkes LGEE 138 kV Line	LGEE	Fawkes EKPC- Fawkes LGEE 138 kV Line	Brown #3 off, import from AEP	303	403.8	133.3%		

Table A-8 2015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission							
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
Emitting Facility	Company	JK Smith-Fawkes	Dispaten	Rating	110 1	Overioau	
Fawkes Tap-Fawkes LGEE 138 kV Line	LGEE	EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	303	321.0	105.9%	
Green Hall Jct Tyner 161 kV Line	EKPC	Delvinta-Hyden Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	237	246.5	104.0%	
JK Smith-Dale 138 kV Line	EKPC	North Clark-Avon 345 kV Line (EKPC)	Dale #4 off, import from AEP	389	470.4	120.9%	
JK Smith-Dale 138 kV Line	EKPC	JK Smith-North Clark 345 kV Line (EKPC)	Dale #4 off, import from AEP	389	454.6	116.9%	
JK Smith-Dale 138 kV Line	ЕКРС	JK Smith-Union City 138 kV Line (EKPC)	Dale #4 off, import from AEP	389	440.2	113.2%	
JK Smith-Dale 138 kV Line	EKPC	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Dale #4 off, import from AEP	389	436.7	112.3%	
JK Smith-Dale 138 kV Line	EKPC	JK Smith-Fawkes EKPC 138 kV Line (EKPC)	Dale #4 off, import from AEP	389	424.9	109.2%	
JK Smith-Dale 138 kV Line	EKPC	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Dale #4 off, import from AEP	389	424.5	109.1%	
JK Smith-Dale 138 kV Line	ЕКРС	JK Smith-Powell County 138 kV Line (EKPC)	Dale #4 off, import from AEP	389	403.4	103.7%	
JK Smith-Fawkes EKPC 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	Brown #3 off, import from AEP	389	442.5	113.8%	
JK Smith-Fawkes EKPC 138 kV Line	EKPC	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Brown #3 off, import from AEP	389	438.8	112.8%	
JK Smith-Fawkes EKPC 138 kV Line	ЕКРС	JK Smith-Dale 138 kV Line (EKPC)	Brown #3 off, import from AEP	389	392.3	100.8%	
JK Smith-Powell County 138 kV Line	ЕКРС	Lake Reba Tap-West Irvine Tap-Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	287	378.1	131.7%	
JK Smith-Powell County 138 kV Line	EKPC	Lake Reba Tap-West Irvine Tap 161 kV Line (LGEE)	Cooper #2 off, import from AEP	287	371.4	129.4%	
JK Smith-Powell County 138 kV Line	EKPC	West Irvine Tap- Delvinta 161 kV Line (LGEE)	Cooper #2 off, import from AEP	287	369.6	128.8%	

Table A-82015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit#1 Installed at JK Smith and with no Additional Transmission							
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
8		 ,	Cooper #2				
JK Smith-Powell County 138 kV Line	EKPC	JK Smith-Union City 138 kV Line (EKPC)	off, import from AEP	287	358.3	124.8%	
JK Smith-Powell County 138 kV Line	ЕКРС	Union City-Lake Reba Tap 138 kV Line (EKPC-LGEE)	Cooper #2 off, import from AEP	287	356.9	124.4%	
JK Smith-Powell County 138 kV Line	ЕКРС	JK Smith-North Clark 345 kV Line (EKPC)	Cooper #2 off, import from AEP	287	355.6	123.9%	
JK Smith-Powell County 138 kV Line	ЕКРС	Dale 138-69 kV Transformer (EKPC)	Dale #3 off, import from AEP	287	346.7	120.8%	
JK Smith-Powell County 138 kV Line	EKPC	Brown North- Alcalde-Pineville 345 kV Line (EKPC)	Cooper #2 off, import from AEP	287	345.8	120.5%	
JK Smith-Powell County 138 kV Line	EKPC	Brown North-Alcalde 345 kV Line (EKPC)	Cooper #2 off, import from AEP	287	344.4	120.0%	
JK Smith-Powell County 138 kV Line	EKPC	JK Smith-Dale 138 kV Line (EKPC)	Cooper #2 off, import from AEP	287	341.6	119.0%	
JK Smith-Powell County 138 kV Line	EKPC	JK Smith-Fawkes EKPC 138 kV Line (EKPC)	Cooper #2 off, import from AEP	287	337.5	117.6%	
JK Smith-Powell County 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Cooper #2 off, import from AEP	287	337.5	117.6%	
JK Smith-Powell County 138 kV Line	ЕКРС	Goddard-Hillsboro 69 kV Line (EKPC)	Cooper #2 off, import from AEP	287	335.3	116.8%	
JK Smith-Powell County 138 kV Line	EKPC	North Clark-Avon 345 kV Line (EKPC)	Cooper #2 off, import from AEP	287	330.8	115.3%	
JK Smith-Powell County 138 kV Line	ЕКРС	Broadford-Sullivan 500 kV Line (AEP- TVA)	Cooper #2 off, import from AEP	287	330.6	115.2%	
JK Smith-Powell County 138 kV Line	EKPC	None W. Smith Familias	Base	287	308.3	107.4%	
JK Smith-Union City 138 kV Line	EKPC	JK Smith-Fawkes EKPC-Fawkes LGEE 138 kV Line (EKPC- LGEE)	Brown #3 off, import from AEP	389	500.7	128.7%	
JK Smith-Union City 138 kV Line	ЕКРС	JK Smith-Fawkes EKPC 138 kV Line (EKPC)	Brown #3 off, import from AEP	389	500.4	128.6%	

Table A-8 2015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit #1 Installed at JK Smith and with no Additional Transmission							
Limiting Facility	Company	Contingency	Worst-Case Dispatch	Rating	MVA Flow	% Overload	
			Brown #3				
JK Smith-Union	FKDC	JK Smith-Dale 138	off, import	200	460.2	120 (0/	
City 138 kV Line	EKPC	kV Line (EKPC) JK Smith-Powell	from AEP	389	469.2	120.6%	
JK Smith-Union	EKDC	County 138 kV Line	Brown #3 off, import	290	169 7	120.50/	
City 138 kV Line	EKPC	(EKPC) JK Smith-North	from AEP	389	468.7	120.5%	
JK Smith-Union			Brown #3				
City 138 kV Line	EKPC	Clark 345 kV Line	off, import from AEP	280	150 1	117.00/	
City 156 KV Line	EKPU	(EKPC)	Brown #3	389	458.1	117.8%	
JK Smith-Union		Dale-Three Forks Jct.	off, import				
City 138 kV Line	EKPC	138 kV Line (EKPC)	from AEP	389	449.4	115.5%	
City 156 KV Line	LKIC	Three Forks Jct	Brown #3	569	449.4	113.370	
JK Smith-Union		Fawkes EKPC 138	off, import				
City 138 kV Line	EKPC	kV Line (EKPC)	from AEP	389	447.1	114.9%	
City 156 KV Line			Brown #3	507	77/.1	114.770	
JK Smith-Union		North Clark-Avon	off, import				
City 138 kV Line	EKPC	345 kV Line (EKPC)	from AEP	389	442.6	113.8%	
City 150 kv Elile	LICIC	Powell County-	HOM / ILI	507	442.0	115.070	
		Beattyville-Delvinta	Brown #3				
JK Smith-Union		161 kV Line (EKPC-	off, import				
City 138 kV Line	EKPC	LGEE)	from AEP	389	437.5	112.5%	
		Powell County-	Brown #3				
JK Smith-Union		Beattyville 161 kV	off, import				
City 138 kV Line	EKPC	Line (EKPC)	from AEP	389	437.2	112.4%	
JK Smith-Union							
City 138 kV Line	EKPC	None	Base	349	381.1	109.2%	
		Beattyville-Delvinta	Brown #3				
JK Smith-Union		161 kV Line (EKPC-	off, import				
City 138 kV Line	EKPC	LGEE)	from AEP	389	419.6	107.9%	
~		JK Smith-Powell	Cooper #2				
Lake Reba Tap 138-		County 138 kV Line	off, import				
161 kV Transformer	LGEE	(EKPC)	from AEP	270	289.5	107.2%	
		Powell County-					
		Beattyville-Delvinta	Cooper #2				
Lake Reba Tap 138-		161 kV Line (EKPC-	off, import				
161 kV Transformer	LGEE	LGEE)	from AEP	270	274.2	101.6%	
		Powell County-	Cooper #2				
Lake Reba Tap 138-		Beattyville 161 kV	off, import				
161 kV Transformer	LGEE	Line (EKPC)	from AEP	270	273.6	101.3%	
		Lake Reba Tap-West	Cooper #2				
Lake Reba-Waco 69		Irvine Tap 161 kV	off, import				
kV Line	LGEE	Line (LGEE)	from AEP	88	99.5	113.1%	
		Rowan County-					
Morehead-Hayward		Skaggs 138 kV Line					
69 kV	AEP	(EKPC)	Base	48	50.7	105.6%	

Table A-8 2015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit							
#1 Inst	talled at JF	K Smith and with no	Additional	Transmi	ssion		
			Worst-Case		MVA	%	
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload	
		Powell County-	Dale #3 off,				
Powell County 138-		Beattyville 161 kV	import from				
69 kV Transformer	EKPC	Line (EKPC)	AEP	143	169.4	118.5%	
		Powell County-					
		Beattyville-Delvinta	Dale #3 off,				
Powell County 138-		161 kV Line (EKPC-	import from				
69 kV Transformer	EKPC	LGEE)	AEP	143	168.4	117.8%	
			Dale #3 off,				
Powell County 138-		Dale 138-69 kV	import from				
69 kV Transformer	EKPC	Transformer (EKPC)	AEP	143	155.6	108.8%	
		Lake Reba Tap-West	Cooper #2				
Powell County 138-		Irvine Tap-Delvinta	off, import				
161 kV Transformer	EKPC	161 kV Line (LGEE)	from AEP	220	243.3	110.6%	
		West Irvine Tap-	Cooper #2				
Powell County 138-		Delvinta 161 kV Line	off, import			100 101	
161 kV Transformer	EKPC	(LGEE)	from AEP	220	238.5	108.4%	
		Lake Reba Tap-West	Cooper #2				
Powell County 138-		Irvine Tap 161 kV	off, import				
161 kV Transformer	EKPC	Line (LGEE)	from AEP	220	235.8	107.2%	
		Powell County 138-	Cooper #2				
Powell County 138-		69 kV Transformer	off, import			100.00/	
161 kV Transformer	EKPC	(EKPC)	from AEP	220	227.1	103.2%	
Powell County 138-	FUNC	NT.	D	170	101.0	101.00/	
161 kV Transformer	EKPC	None	Base	178	181.2	101.8%	
	FUDG	Spurlock-Maysville	Ghent #1				
Spurlock-Kenton	EKPC-	Industrial Jct. 138 kV	off, import	207	200.2	100.40/	
138 kV Line	LGEE	Line (EKPC)	from TVA	287	288.2	100.4%	
Three Forks Jct			Brown #3				
Fawkes EKPC 138	FUDO	JK Smith-Union City	off, import	270	200.4	110.00/	
kV Line	EKPC	138 kV Line (EKPC)	from AEP	278	308.4	110.9%	
Three Forks Jct		Union City-Lake	Brown #3				
Fawkes EKPC 138 kV Line	EKPC	Reba Tap 138 kV Line (EKPC-LGEE)	off, import from AEP	278	305.3	109.8%	
Three Forks Jct	ENPU	LIIIC (EKPC-LUEE)	Brown #3	2/0	303.3	109.870	
Fawkes EKPC 138		JK Smith-Fawkes	off, import				
kV Line	EKPC	138 kV Line (EKPC)	from AEP	278	302.6	108.8%	
KV LIIIC	LKIC	JK Smith-Fawkes	HOIII ALI	270	302.0	100.070	
Three Forks Jct		EKPC-Fawkes LGEE	Brown #3				
Fawkes EKPC 138		138 kV Line (EKPC-	off, import				
kV Line	EKPC	LGEE)	from AEP	278	301.5	108.5%	
Union City-Lake				270	501.5	100.370	
Reba Tap 138 kV	EKPC-						
Line	LGEE	None	Base	277	353.9	127.8%	
	LULL	JK Smith-Fawkes	Duse		555.7	127.070	
Union City-Lake		EKPC-Fawkes LGEE	Brown #3				
Reba Tap 138 kV	EKPC-	138 kV Line (EKPC-	off, import				
Line	LGEE	LGEE)	from AEP	371	462.7	124.7%	

2015 16 W. 4	Table A-8 2015-16 Winter Complete List of Identified Problems with CTs 8-12 & CFB Unit							
		E List of Identified P K Smith and with no				FB Unit		
			Worst-Case		MVA	%		
Limiting Facility	Company	Contingency	Dispatch	Rating	Flow	Overload		
Union City-Lake			Brown #3					
Reba Tap 138 kV	EKPC-	JK Smith-Fawkes	off, import					
Line	LGEE	138 kV Line (EKPC)	from AEP	371	462.4	124.6%		
Union City-Lake			Brown #3					
Reba Tap 138 kV	EKPC-	JK Smith-Dale 138	off, import					
Line	LGEE	kV Line (EKPC)	from AEP	371	436.0	117.5%		
Union City-Lake		JK Smith-Powell	Brown #3					
Reba Tap 138 kV	EKPC-	County 138 kV Line	off, import					
Line	LGEE	(EKPC)	from AEP	371	431.7	116.4%		
Union City-Lake		JK Smith-North	Brown #3					
Reba Tap 138 kV	EKPC-	Clark 345 kV Line	off, import					
Line	LGEE	(EKPC)	from AEP	371	424.2	114.3%		
Union City-Lake			Brown #3					
Reba Tap 138 kV	EKPC-	Dale-Three Forks Jct.	off, import					
Line	LGEE	138 kV Line (EKPC)	from AEP	371	416.9	112.4%		
Union City-Lake		Three Forks Jct	Brown #3					
Reba Tap 138 kV	EKPC-	Fawkes EKPC 138	off, import					
Line	LGEE	kV Line (EKPC)	from AEP	371	415.0	111.9%		
Union City-Lake			Brown #3					
Reba Tap 138 kV	EKPC-	North Clark-Avon	off, import					
Line	LGEE	345 kV Line (EKPC)	from AEP	371	409.9	110.5%		
		Powell County-						
Union City-Lake		Beattyville-Delvinta	Brown #3					
Reba Tap 138 kV	EKPC-	161 kV Line (EKPC-	off, import					
Line	LGEE	LGEE)	from AEP	371	404.2	108.9%		
Union City-Lake		Powell County-	Brown #3					
Reba Tap 138 kV	EKPC-	Beattyville 161 kV	off, import					
Line	LGEE	Line (EKPC)	from AEP	371	404.1	108.9%		
Union City-Lake		Beattyville-Delvinta	Brown #3					
Reba Tap 138 kV	EKPC-	161 kV Line (EKPC-	off, import					
Line	LGEE	LGEE)	from AEP	371	389.1	104.9%		
		Lake Reba Tap-West	Cooper #2					
Waco-Rice Tap 69		Irvine Tap 161 kV	off, import					
kV Line	LGEE	Line (LGEE)	from AEP	77	85.3	110.8%		
		Fawkes LGEE-						
		Crooksville Jct. 69	Cooper #2					
West Berea 138-69		kV Line (LGEE-	off, import					
kV Transformer	EKPC	EKPC)	from AEP	152	162.4	106.8%		
		West Irvine Tap-	Cooper #2					
West Irvine 161-69		Delvinta 161 kV Line	off, import					
kV Transformer	LGEE	(LGEE)	from AEP	62	62.9	101.5%		

