Southeastern Regional Transmission Planning Process

2011 Economic Planning Studies Final Results

December 2011

Executive Summary

The Regional Planning Stakeholder Group ("RPSG") identified three Economic Planning Scenarios to be evaluated under the Southeastern Regional Transmission Planning ("SERTP") process. The SERTP Sponsors have performed analyses to assess the performance of the transmission systems of the participating Transmission Owners for these three transfer scenarios. The assessments include the identification of potentially limiting facilities, the impact of the transfers on these facilities, and the contingency conditions causing the limitations. The assessments also provide potential solutions to alleviate the limitations, planning-level cost estimates, and the projected need-date for projects to accommodate the power flows associated with the transfers in the three Economic Planning Scenarios. Additionally, projects are identified as potential solutions to address the identified constraints and are based on the economic assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. The information contained in this report does not represent a commitment to proceed with the recommended enhancements nor implies that the recommended enhancements could be implemented by the study dates. The assessment cases model the currently projected improvements to the transmission system. However, changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. Planning staff of the participating Transmission Owners performed the assessments and the results are summarized in this report.

Study Assumptions

- The year evaluated for the three economic studies, as selected by the stakeholders, was 2016. Each request was evaluated for that particular year.
- The load levels evaluated were Summer Peak and Shoulder

  (93% of Summer Peak load).
- The following economic transfer scenarios were assessed according to the reliability criteria of each of the participating Transmission Owners:
  - TVA Border to Southern Balancing Authority ("SBA") – 3500 MW
    - Year: 2016
    - Type of Transfer: Generation to Generation
    - Source: New generator interconnecting to the Shelby 500 kV substation in TVA near Memphis, TN (Bus #: 360021).
    - Sink: Generation within the SBA.
    - Table A.1 below describes system improvements added to the TVA model in association with the Shelby 500 kV interconnection (per stakeholder request).
    - Additionally, this study evaluated the above scenario at an 80% of Summer Peak load level.

Table A.1: System improvements added to the TVA model

1	Constructed a new, parallel 500 kV T.L. from Shelby to Cordova
2	Constructed a new 500 kV T.L. from Johnsonville to Maury
3	Constructed a new 500 kV T.L. from Jackson to Lagoon Creek.
4	Uprated the Pleasant Hill – Benton 500 kV T.L.
5	Uprated the Pleasant Hill – Union 500 kV T.L.
6	Uprated the Shelby – Cordova 500 kV T.L. #1
7	Uprated the Jackson – Haywood 500 kV T.L.

- EES Border to SBA – 1500 MW
  - Year: 2016
  - Type of Transfer: Generation to Generation
  - Source: New generator interconnecting to the El Dorado 500 kV substation in EES near El Dorado, AR (Bus #: 337561).
  - Sink: Generation within the SBA.
  - Additionally, this study evaluated the above scenario at an 80% of Summer Peak load level.

- SCPSA Border to SBA – 1000 MW
  - Year: 2016
  - Type of Transfer: Load to Generation
  - Source: Uniform load scale of SCPSA area.
  - Sink: Generation within the SBA.

- PSS/E and/or MUST were used for the study.
- Generation, interchange, and other assumptions were coordinated between participating Transmission Owners and Stakeholders.

Study Criteria

The study criteria with which results were evaluated included the following reliability elements:

- NERC Reliability Standards
- Individual company criteria (voltage, thermal, stability, and short circuit)

Case Development

- For all evaluations, the “2011 Series, Version 2A”, 2016 cases were used as a starting point for the analysis of the five economic study requests.

Methodology

- Initially, power flow analyses were performed based on the assumption that thermal limits were the controlling limit for the reliability plan. Voltage, stability, and short circuit studies were performed if circumstances warranted.

Technical Analysis and Study Results

The technical analysis was performed in accordance with the study methodology. Results from the technical analysis were reported throughout the study area to identify transmission elements approaching their limits such that all participating Transmission Owners and Stakeholders would be aware of any potential issues and, as such, suggest appropriate solutions to address the potential issues if necessary. The SERTP reported results on elements of 115 kV and greater within their respective service area based on:

- Thermal loadings greater than 100% (with potential solutions).
- Thermal loadings greater than 90% that increase with the addition of the transfer.
- Voltages appropriate to each participating Transmission Owner's planning criteria (with potential solutions if criteria were violated).

Assessment and Problem Identification

- The participating Transmission Owners ran assessments in order to identify any constraints within the participating Transmission Owners' service territory as a result of the three economic planning study requests. Any reliability constraints identified were documented and reviewed by each participating Transmission Owner.

Solution Development

- The participating Transmission Owners, with input from the Stakeholders, will develop potential solution alternatives due to the economic studies requested by the stakeholders.
- The participating Transmission Owners will test the effectiveness of the potential solution alternatives using the same cases, methodologies, assumptions and criteria described above.
- The participating Transmission Owners will develop rough, planning-level cost estimates and construction schedules for the selected solution alternatives.

Report on the Study Results

The participating Transmission Owners compiled all the study results and prepared a report for review by the Stakeholders. The report contains the following:

- A description of the study approach and key assumptions for the three economic planning studies
- For each economic planning study, the results of that study including:
    1. Limits to the transfer
    2. Selected solution alternatives to address the limit
    3. Rough, planning-level cost estimates and construction schedules for the selected solution alternatives

TVA Border to Southern Balancing Authority ("SBA")

3500 MW

Study Structure and Assumptions

Transfer Sensitivity	Transfer Amount	Transfer Source	Transfer Sink	Study Year
TVA Border to SBA	3500 MW	TVA Border	SBA	2016
Load Flow Cases				
2011 Series Version 2A Cases: Summer Peak and Shoulder (93% load level)				
Source Modeled				
The source for this transfer was assumed to be a new generator interconnecting to the existing Shelby 500 kV Substation near Memphis, TN.				

Transmission System Impacts

The 3500 MW transfer from TVA border to the SBA results in overloads of several 230 kV, 161 kV, and 115 kV facilities. Tables 1.1 through 1.5 below identify thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Southern Balancing Authority

Table 1.1. Pass 0 – Transmission System Impacts With No Enhancements – *Southern Balancing Authority*
The following table identifies significant constraints in the Southern Balancing Authority ("SBA") without any enhancements to the transmission system. Projects were first identified to alleviate these constraints before alleviating the remaining constraints because the proposed enhancements could significantly alter load flow in the SBA.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	104 LEXINGTON 230 133 R_E WATKNVL 230 1	602	93.7	105.8	11 S HALL 500 306105 8OCONEE 500 1	12	P1
SBA	94 BIO 230 105 VANNA 230 1	433	96.2	106.9	11 S HALL 500 306105 8OCONEE 500 1	12	P1
SBA	104 LEXINGTON 230 339100 6RUSSEL 230 1	596	98.0	110.3	11 S HALL 500 306105 8OCONEE 500 1	12	P1

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Table 1.2. Pass 1 – Transmission System Impacts With Proposed Enhancement "P1" – ***Southern Balancing Authority***

The following table identifies constraints in the Southern Balancing Authority ("SBA") with the proposed enhancement "P1" applied to the transmission system. Enhancements were identified to alleviate the remaining constraints.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	612 FIRST AVE + 115 616 BLNCHARD IP 115 1	199	99.1	100.1	614 BROOKHAVEN 115 1561 RIVERFRONTJ 115 1	4	P7
SBA	240 E POINT B1 115 303 COL PK #3 J 115 1	135	97.1	100.1	251 E POINT B2 115 264 E POINT 4 115 1	5	P19
SBA	1783 RIDGE RD 115 1956 BLANKETS CK 115 1	188	69.5	100.4	20 BOWEN 500 21 MOSTELLER 500 1	5	P20
SBA	5203 AIRPT LN 115 5706 BNTBRKTP 115 1	138	49.7	103.1	4157 MILLER8 500 4375 S.BESS 8 500 1	10	P15
SBA	4182 BLOUNT 115 360280 3GUNTERSV HP115 1	93	63.8	103.2	21 MOSTELLER 500 2499 CONASAUGA 500 1	20	N/A[1]
SBA	4504 CLANT TP 115 4733 CRH TAP 115 1	138	95.7	103.4	4489 N SELMA6 230 5500 AUTAUG6 230 1	11	P16
SBA	1626 KATHLEEN 115 1627 FRITO LAY + 115 1	124	92.4	103.7	150 BONAIRE 230 1603 KATHLEEN 230 1	4	P13
SBA	4311 GS STEEL 115 5069 NRAINBOW 115 1	112	81.7	103.8	4323 EGADSDEN 115 4324 GADSDEN 115 1	20	P11
SBA	4428 MITCHDAM 115 4733 CRH TAP 115 1	138	97.0	104.6	4489 N SELMA6 230 5500 AUTAUG6 230 1	11	P16
SBA	8270 HATBG SW 230 303222 6ANGIE 230 1	420	61.4	105.0	8425 LOGTWN W 230 303223 6FRNBRA 230 1	15	N/A[2]
SBA	4678 TANERWIL 115 8832 HARLESTN 115 1	107	80.7	105.1	4642 BIG CK 6 230 8702 DANIEL 230 1	2	P8
SBA	8245 PETAL 115 8251 HATBG NO 115 1	155	74.7	105.4	8271 HATBG SW 115 8273 HWY 11 115 1	2	P17
SBA	2035 S HALL 230 3067 CANDLER 230 1	509	94.9	105.7	3 NORCROSS 500 11 S HALL 500 1	26	P3[4]
SBA	4740 GKN W LD 115 5257 HALACLTP 115 1	107	92.6	106.0	4514 S MONTG3 115 4547 PINEDALE 115 1	3	P12
SBA	4412 ALEX TAP 115 5059 KELLYTON 115 1	113	97.1	106.0	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	28	P7
SBA	4311 GS STEEL 115 4331 ATTALLA3 115 1	138	71.5	106.8	21 MOSTELLER 500 2499 CONASAUGA 500 1	20	P11
SBA	1099 N JESUP 115 1100 RAYONIER + 115 1	124	98.6	106.9	15 THALMANN 500 2158 MCCALL RD 500 1	21	P10
SBA	4241 LEEDSTS6 230 5039 ARGO DS 230 1	602	75.8	107.0	4157 MILLER8 500 4375 S.BESS 8 500 1	20	P4
SBA	4260 SO PARK 115 4261 ALAMETAL 115 1	246	84.1	107.3	4157 MILLER8 500 4375 S.BESS 8 500 1	20	P14
SBA	4189 PRATCTY3 115 4261 ALAMETAL 115 1	246	84.3	107.5	4157 MILLER8 500 4375 S.BESS 8 500 1	20	P14
SBA	4410 SUNLEVTP 115 5059 KELLYTON 115 1	113	99.0	107.8	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	28	P7
SBA	4400 GASTON 230 4996 POWERSYS 230 1	602	92.9	108.4	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P2
SBA	4234 CLAY 6 230 5039 ARGO DS 230 1	602	78.2	109.5	4157 MILLER8 500 4375 S.BESS 8 500 1	20	P4
SBA	8273 HWY 11 115 8275 HBG CNTY 115 1	135	79.4	110.6	8245 PETAL 115 8251 HATBG NO 115 1	2	P18
SBA	2499 CONASAUGA 500 360662 8BRADLEY TN 500 1	2783.4	79.0	107.0	11 S HALL 500 306105 8OCONEE 500 1	1	N/A[1]
SBA	1627 FRITO LAY + 115 2263 WATERFORD 115 1	124	101.4[3]	111.3	150 BONAIRE 230 1603 KATHLEEN 230 1	5	P13
SBA	5058 FAYETVIL 230 5897 CO LINE6 230 1	577	95.7	111.9	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P2
SBA	4996 POWERSYS 230 5058 FAYETVIL 230 1	577	96.6	112.8	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P2
SBA	4409 HOLLINS 115 4410 SUNLEVTP 115 1	113	99.8	114.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	28	P7

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	8816 WADE SS 115 8832 HARLESTN 115 1	104	89.3	114.4	4642 BIG CK 6 230 8702 DANIEL 230 1	2	P8
SBA	8280 COLLINS 115 336760 3MAGEE 115 1	100	107.5[3]	118.0	8270 HATBG SW 230 8310 PURVIS 230 1	11	P21
SBA	4395 SYLCAUTS 115 4409 HOLLINS 115 1	113	104.6[3]	119.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	28	P7
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 2	111	88.4	121.4	4234 CLAY 6 230 4247 ONEONTA6 230 1	20	P6
SBA	4131 OAKMANTP 161 4135 GORGAS 161 1	193	80.7	122.6	4157 MILLER8 500 5307 WVERN SS 500 1	27	P5
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 1	99	89.4	122.9	4234 CLAY 6 230 4247 ONEONTA6 230 1	20	P6
SBA	4131 OAKMANTP 161 4978 BERRY 161 1	193	81.2	123.0	4157 MILLER8 500 5307 WVERN SS 500 1	27	P5
SBA	4128 PIT&MTAP 161 4978 BERRY 161 1	193	83.4	125.2	4157 MILLER8 500 5307 WVERN SS 500 1	27	P5
SBA	4332 ATTALLA5 161 360283 5ALBERTVILLE161 1	193	96.7	132.9	4234 CLAY 6 230 4247 ONEONTA6 230 1	20	P6
SBA	4128 PIT&MTAP 161 4979 BANKSTON 161 1	193	92.0	133.9	4157 MILLER8 500 5307 WVERN SS 500 1	27	P5
SBA	8420 NASA 115 8426 LOGTWN W 115 1	216	77.8	134.7	8400 KILN 230 8425 LOGTWN W 230 1	15	P9
SBA	4121 FAYET TS 161 4127 FAY COTN 161 1	193	93.8	135.8	4157 MILLER8 500 5307 WVERN SS 500 1	27	P5
SBA	4127 FAY COTN 161 4979 BANKSTON 161 1	193	93.8	135.8	4157 MILLER8 500 5307 WVERN SS 500 1	27	P5

(1) The limiting element of this tie-line constraint is located within TVA
(2) The limiting element of this tie-line constraint is located within EES
(3) A current operating procedure is sufficient to alleviate this identified constraint without the addition of the proposed transfer. However, the additional transfer exacerbates the loading on this transmission facility such that the operating procedure becomes insufficient.
(4) Reconductoring only the identified constrained transmission line segments results in overloads of subsequent line segments. Therefore, the proposed enhancement includes the reconductor of the identified line segments and any additional segments required.

Table 1.3. Pass 2 – Transmission System Impacts With Proposed Enhancements "P1" through "P23" – *Southern Balancing Authority*
The following table identifies constraints in the Southern Balancing Authority ("SBA") with the proposed enhancements "P1" through "P21" applied to the transmission system. Enhancements were identified to alleviate the remaining constraints.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	8114 FORINDT2 115 336898 3MORTON 115 1	155	79.7	100.7	360654 8CHOCTAW MS 500 360688 8CLAY 500 1	11	P22
SBA	4329 LOOK MTN 115 4331 ATTALLA3 115 1	101	54.3	103.9	4311 GS STEEL 115 4331 ATTALLA3 115 1	20	P23

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Table 1.4. Pass 3 – Transmission System Impacts With All Proposed Enhancements– *Southern Balancing Authority*

The following table depicts loadings of transmission facilities in the Southern Balancing Authority ("SBA") with all proposed enhancements applied to the transmission system. The resulting facilities in the table below could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the 2016 study year.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
The following facilities could become potential constraints in future years or with different queuing assumptions							
SBA	4155 GORGAS 6 230 4215 HOLT 6 230 1	502	83.7	91.0	4155 GORGAS 6 230 4215 HOLT 6 230 2	11	--
SBA	722 PEARSON J 115 1085 KETTLECK PR 115 1	47	81.3	91.1	222 N TIFTON 230 1877 OSCEOLA SW 230 1	13	--
SBA	4561 ECIGREEN 115 4562 COASTFOR 115 1	138	56.8	91.2	4622 N BREW 3 115 4623 N BREW 6 230 1	2	--
SBA	4189 PRATCTY3 115 4190 PRATCTY6 230 1	398	90.7	91.3	5144 ACIPCO6 230 5145 ACIPCO3 115 1	20	--
SBA	224 OFFERMAN 230 1093 OFFERMAN 115 1	160	89.9	91.3	224 OFFERMAN 230 1093 OFFERMAN 115 2	13	--
SBA	8110 FOREST 115 8113 FORINDT1 115 1	155	69.7	91.3	360654 8CHOCTAW MS 500 360688 8CLAY 500 1	23	--
SBA	4864 PHIL TAP 161 5099 NHALYVIL 161 1	303	73.0	91.4	4156 MILLER6 230 4157 MILLER8 500 1	6	--
SBA	50 BULL SLUICE 230 52 N SPRINGS 230 1	539	88.4	91.7	3 NORCROSS 500 4 BULL SLUICE 500 1	5	--
SBA	8420 NASA 115 8421 NASA SAT 115 1	216	50.6	91.7	8400 KILN 230 8425 LOGTWN W 230 1	15	--
SBA	4179 DC SHORT 115 4191 MAYTOWN 115 1	128	85.1	91.8	4153 GORGAS#1 115 5707 EP SHORT 115 1	7	--
SBA	4154 GORGAS#4 115 4179 DC SHORT 115 1	128	85.0	91.8	4153 GORGAS#1 115 5707 EP SHORT 115 1	7	--
SBA	4311 GS STEEL 115 4331 ATTALLA3 115 1	159	71.5	91.8	21 MOSTELLER 500 2499 CONASAUGA 500 1	20	--
SBA	132 FIRST AVE B 230 612 FIRST AVE + 115 1	298	91.3	91.9	130 GOAT ROCK 230 131 FIRST AVE A 230 1	19	--
SBA	4552 UNION SP 115 17995 HARDWYTP 115 1	112	77.8	91.9	4514 S MONTG3 115 4547 PINEDALE 115 1	3	--
SBA	8425 LOGTWN W 230 303223 6FRNBRA 230 1	797	25.9	91.9	8700 DANIEL 500 8702 DANIEL 230 1	15	--
SBA	863 ZUTA 115 2397 TOWNSEND 115 1	114	87.1	92.0	15 THALMANN 500 2158 MCCALL RD 500 1	22	--
SBA	4611 SAMSON 230 7310 SHOAL RV 230 1	427	66.3	92.1	7836 L SMITH 230 7837 SMITH#3CB 230 1	2	--
SBA	1049 N TIFTON 115 1858 TIFTON J 115 1	180	88.3	92.4	222 N TIFTON 230 1875 E MOULTRIE 230 1	13	--
SBA	4136 JASPTSTP 161 4496 TAFTCOAL 161 1	141	91.3	92.5	4864 PHIL TAP 161 360263 5WILSON HP 161 1	20	--
SBA	222 N TIFTON 230 1877 OSCEOLA SW 230 1	509	90.0	92.5	1875 E MOULTRIE 230 1888 E BERLIN 230 1	13	--
SBA	160 HATCH + 230 164 UNION SCHL 230 1	509	91.4	92.6	15 THALMANN 500 2380 THAL LS1 230 1	13	--
SBA	5003 GRANTMIL 115 5191 MTSITETP 115 1	138	90.6	92.6	4156 MILLER6 230 4157 MILLER8 500 1	6	--
SBA	461 JACKSON LK 115 752 LLOYD SHL 115 1	72	84.4	92.7	746 S GRIFFIN 115 750 GA BRD CORR 115 1	22	--
SBA	224 OFFERMAN 230 1093 OFFERMAN 115 2	155	91.4	92.9	224 OFFERMAN 230 1093 OFFERMAN 115 1	13	--
SBA	170 S GRIFFIN 230 746 S GRIFFIN 115 1	298	92.4	93.1	736 OHARA 115 739 BONANZA 115 1	5	--
SBA	4528 N MONTGY 115 4529 FORBESRD 115 1	210	86.2	93.1	4512 SNOWDN8 500 5178 AUTAUSS8 500 1	4	--
SBA	4594 WEBB 3 115 4602 ECI WEBB 115 1	215	71.0	93.2	4595 WEBB 6 230 4598 PINCK 6 230 1	2	--
SBA	1883 ADEL 1J 115 1884 S ADEL J 115 1	124	88.5	93.3	222 N TIFTON 230 1877 OSCEOLA SW 230 1	13	--

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AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	4153 GORGAS#1 115 5023 DRUMTAPB 115 1	138	84.5	93.3	4155 GORGAS 6 230 4215 HOLT 6 230 1	11	--
SBA	7310 SHOAL RV 230 7311 SHOAL RV 115 1	284	81.5	93.4	7280 WRIGHT 230 7310 SHOAL RV 230 1	2	--
SBA	4374 S.BESS 6 230 4950 DUNCANVL 230 1	502	91.3	93.6	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	11	--
SBA	844 E VIDALIA 115 1476 W LYONS J2 115 1	135	89.9	93.6	160 HATCH + 230 162 S HAZLEHRST 230 1	4	--
SBA	131 FIRST AVE A 230 612 FIRST AVE + 115 1	298	93.1	93.7	132 FIRST AVE B 230 3011 LEE ROAD 230 1	19	--
SBA	4135 GORGAS 161 4496 TAFTCOAL 161 1	141	92.5	93.7	4864 PHIL TAP 161 360263 5WILSON HP 161 1	20	--
SBA	4192 USS #8 115 4916 APEX DS 115 1	108	85.7	93.7	4153 GORGAS#1 115 5707 EP SHORT 115 1	7	--
SBA	4156 MILLER6 230 4157 MILLER8 500 1	1613	69.3	93.8	4157 MILLER8 500 4375 S.BESS 8 500 1	24	--
SBA	4361 MCADORTP 115 5706 BNTBRKTP 115 1	138	41.7	93.8	4157 MILLER8 500 4375 S.BESS 8 500 1	10	--
SBA	8322 HILSDL T 115 8330 LUMBERTN 115 1	99	59.8	93.9	8425 LOGTWN W 230 303223 6FRNBRA 230 1	15	--
SBA	4508 MONTG SS 230 5897 CO LINE6 230 1	502	86.8	94.0	4512 SNOWDN8 500 5178 AUTAUSS8 500 1	4	--
SBA	4430 BOULDDAM 115 4518 ELMORE 115 1	171	86.6	94.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	--
SBA	196 CARTERSVL 230 197 AMERISTEEL+ 230 1	596	76.8	94.3	2499 CONASAUGA 500 360662 8BRADLEY TN 500 1	12	--
SBA	1417 HORSE CRK 115 2162 ELAM CH 115 1	155	88.2	94.4	15 THALMANN 500 2158 MCCALL RD 500 1	21	--
SBA	914 GALEY&LORD+ 115 915 PINSON 115 1	96	90.9	94.5	907 HAMMOND 115 2403 COOSA J1 115 1	5	--
SBA	5257 HALACLTP 115 17995 HARDWYTP 115 1	112	80.4	94.5	4514 S MONTG3 115 4547 PINEDALE 115 1	3	--
SBA	911 ARMUCHEE J 115 914 GALEY&LORD+ 115 1	96	91.0	94.6	907 HAMMOND 115 2403 COOSA J1 115 1	5	--
SBA	2512 PROPEX J2 115 2556 NASHVILLE 1 115 1	79	89.4	94.6	1051 TIFTON J 115 1052 S TIFTON 115 1	13	--
SBA	1058 NASHVILLE 2 115 2512 PROPEX J2 115 1	79	89.3	94.6	1051 TIFTON J 115 1052 S TIFTON 115 1	13	--
SBA	4965 DANWAYSS 230 5310 HILLABEE 230 1	641	89.1	94.6	5180 N.OPEL6 230 5310 HILLABEE 230 1	18	--
SBA	4329 LOOK MTN 115 4331 ATTALLA3 115 1	101	54.3	94.6	4311 GS STEEL 115 4331 ATTALLA3 115 1	20	--
SBA	86 CUMMING 230 88 MCGRAU FORD 230 1	596	79.6	94.8	20 BOWEN 500 21 MOSTELLER 500 1	5	--
SBA	4156 MILLER6 230 4172 BOYLESM1 230 1	602	93.0	94.9	4157 MILLER8 500 5312 CLAY 8 500 1	20	--
SBA	208 NELSON 230 954 NELSON 115 2	176	91.8	94.9	208 NELSON 230 954 NELSON 115 1	5	--
SBA	8443 NCLSN TP 115 8445 PICAYUNE 115 1	99	55.5	95.2	8400 KILN 230 8425 LOGTWN W 230 1	15	--
SBA	4864 PHIL TAP 161 360263 5WILSON HP 161 1	302	76.8	95.3	4156 MILLER6 230 4157 MILLER8 500 1	6	--
SBA	8425 LOGTWN W 230 8426 LOGTWN W 115 1	440	62.4	95.5	8400 KILN 230 8425 LOGTWN W 230 1	15	--
SBA	165 W BRUNSWICK 230 2592 THALMANN 2 230 1	509	94.8	95.6	2380 THAL LS1 230 2591 THALMANN 1 230 1	8	--
SBA	969 BREMEN 115 1731 N MOUNTZION 115 1	188	92.7	95.7	976 SAND HILL 115 2486 HICKORY LVL 115 1	5	--
SBA	5060 GREENWD 115 5203 AIRPT LN 115 1	216	61.9	96.0	4157 MILLER8 500 4375 S.BESS 8 500 1	10	--
SBA	5160 TATELYLE 115 5327 FL GAS TAP 115 1	216	48.9	96.5	4586 W MCTSH6 230 5313 CALVRTSS 230 1	2	--
SBA	4574 MCINOLIN 115 5160 TATELYLE 115 1	216	49.0	96.7	4586 W MCTSH6 230 5313 CALVRTSS 230 1	2	--
SBA	149 S MACON 230 767 S MACON 115 1	280	95.6	96.8	149 S MACON 230 767 S MACON 115 2	16	--
SBA	4200 BESSEMER 115 5060 GREENWD 115 1	216	62.8	96.8	4157 MILLER8 500 4375 S.BESS 8 500 1	10	--

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AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	4557 GREENVL3 115 4561 ECIGREEN 115 1	138	62.4	96.8	4622 N BREW 3 115 4623 N BREW 6 230 1	2	--
SBA	4118 PRTBRKTP 115 4523 HUNTERSS 115 1	138	96.7	96.9	4942 E.PRATVL 115 5898 CO LINE3 115 1	10	--
SBA	5180 N.OPEL6 230 5310 HILLABEE 230 1	602	86.2	96.9	4965 DANWAYSS 230 5310 HILLABEE 230 1	5	--
SBA	8430 LOGTOWN 115 8432 ANSLEY 115 1	124	58.8	97.0	8400 KILN 230 8425 LOGTWN W 230 1	15	--
SBA	5069 NRAINBOW 115 5419 KEYSTONE TP 115 1	112	71.5	97.1	21 MOSTELLER 500 2499 CONASAUGA 500 1	20	--
SBA	4942 E.PRATVL 115 5898 CO LINE3 115 1	216	94.6	97.2	4512 SNOWDN8 500 5178 AUTAUSS8 500 1	4	--
SBA	8423 NASA N 115 8443 NCLSN TP 115 1	107	59.6	97.2	8400 KILN 230 8425 LOGTWN W 230 1	15	--
SBA	198 PINSON 230 2434 KINGSTON 230 1	664	81.6	97.3	2499 CONASAUGA 500 360662 8BRADLEY TN 500 1	12	--
SBA	149 S MACON 230 767 S MACON 115 2	280	96.2	97.5	149 S MACON 230 767 S MACON 115 1	16	--
SBA	150 BONAIRE 230 1603 KATHLEEN 230 1	433	92.1	97.7	24 N TIFTON 500 222 N TIFTON 230 1	3	--
SBA	592 DANIEL SD 115 9144 RICH HL TAP 115 1	255	95.8	98.0	2140 DORCHESTER 115 2152 DORCHESTER 230 1	21	--
SBA	1729 W V RICA 115 2486 HICKORY LVL 115 1	124	93.3	98.1	184 BREMEN 230 969 BREMEN 115 1	20	--
SBA	4240 LEEDSTS3 115 5003 GRANTMIL 115 1	138	96.3	98.2	4156 MILLER6 230 4157 MILLER8 500 1	6	--
SBA	25 MCGRAU FORD 500 88 MCGRAU FORD 230 1	2016	80.6	98.2	20 BOWEN 500 21 MOSTELLER 500 1	17	--
SBA	1882 N CAMILLA 230 2510 RACCOON CK 230 1	509	94.6	98.4	218 S BAINBRDGE 230 4601 FARLEY 6 230 1	13	--
SBA	95 WINDER P 230 3073 BRASELTON 230 1	497	78.7	98.4	3 NORCROSS 500 11 S HALL 500 1	26	--
SBA	4233 CLAY 3 115 4234 CLAY 6 230 1	398	93.4	98.5	4234 CLAY 6 230 5039 ARGO DS 230 1	20	--
SBA	4294 SHLJW7METTP 115 4997 DRUMTAPA 115 1	112	87.9	98.7	4155 GORGAS 6 230 4215 HOLT 6 230 1	11	--
SBA	4997 DRUMTAPA 115 5051 TAYLORFY 115 1	112	87.9	98.7	4155 GORGAS 6 230 4215 HOLT 6 230 1	11	--
SBA	4737 HOPEHULL 115 5513 LAMAR TP 115 1	138	73.8	98.7	4557 GREENVL3 115 4558 GREENVL6 230 1	2	--
SBA	1102 FT MITCH J 115 1114 FT BEN AL 115 1	124	97.5	98.8	10 FORTSON 500 24 N TIFTON 500 1	4	--
SBA	618 S COLUMBUS 115 1102 FT MITCH J 115 1	124	97.5	98.8	10 FORTSON 500 24 N TIFTON 500 1	4	--
SBA	147 BRANCH + 230 148 GORDON 230 1	497	94.2	98.8	13 BONAIRE 500 18 SCHERER 500 1	9	--
SBA	4443 THURLOW 115 4445 YATESDAM 115 1	117	82.4	99.1	4418 MART DAM 115 4443 THURLOW 115 1	3	--
SBA	33 ADAMSVILLE 230 36 JACK MCD 230 1	485	95.9	99.5	36 JACK MCD 230 41 PEACHTREE 230 1	14	--
SBA	4249 RED MTN 115 4252 SMISTEEL 115 1	216	95.8	99.7	4157 MILLER8 500 5312 CLAY 8 500 1	20	--

Scenario Explanations:

1) Bowen Unit #4 Offline, Summer Peak Case
2) Crist Unit #7 Offline, Summer Peak Case
3) Farley Unit #1 Offline, Summer Peak Case
4) Farley Unit #2 Offline, Summer Peak Case
5) Franklin Unit #2 Offline, Summer Peak Case
6) Gorgas Unit #10 Offline, Summer Peak Case
7) Gaston Unit #5 Offline, Summer Peak Case
8) Hatch Unit #1 Offline, Summer Peak Case
9) Hatch Unit #2 Offline, Summer Peak Case
10) Harris Unit #1 Offline, Summer Peak Case
11) Kemper IGCC Unit Offline, Summer Peak Case
12) Scherer Unit #1 Offline, Summer Peak Case

13) Smith Unit #3 Offline, Summer Peak Case
14) Wansley Unit #1 Offline, Summer Peak Case
15) Watson Unit #5 Offline, Summer Peak Case
16) Yates Unit #7 Offline, Summer Peak Case
17) Bowen Unit #4 Offline, Shoulder (93% Load Level) Case
18) Franklin Unit #2 Offline, Shoulder (93% Load Level) Case
19) Greene Co. Unit #1 Offline, Shoulder (93% Load Level) Case
20) Gaston Unit #5 Offline, Shoulder (93% Load Level) Case
21) Hatch Unit #1 Offline, Shoulder (93% Load Level) Case
22) Hatch Unit #2 Offline, Shoulder (93% Load Level) Case
23) Kemper IGCC Unit O, Shoulder (93% Load Level) Case
24) Miller Unit #1 Offline, Shoulder (93% Load Level) Case
25) Watson Unit #5 Offline, Shoulder (93% Load Level) Case
26) McDonough Unit #5 Offline, Summer Peak Case
27) Gorgas Unit #10 Offline, Shoulder (93% Load Level) Case
28) Harris Unit #1 Offline, Shoulder (93% Load Level) Case

PowerSouth

Table 1.5. Transmission System Impacts – *PowerSouth*
The following table identifies constraints in PowerSouth attributable to the proposed transfer. Enhancements were identified to alleviate these constraints.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
PS	17012 BREWTON 115 17225 CSTLBRYJ 115 1	142	84.8	101.0	4612 BREWT TP 115 4622 N BREW 3 115 1	1	P24
PS	17018 BELLVIL3 115 17225 CSTLBRYJ 115 1	142	87.5	103.8	4612 BREWT TP 115 4622 N BREW 3 115 1	1	P24

Scenario Explanations:
1) Crist Unit #7 Offline, Summer Peak Case

South Mississippi Electric

Table 1.6. Transmission System Impacts – *South Mississippi Electric*
The following table identifies constraints in South Mississippi Electric (SME) attributable to the proposed transfer. Enhancements were identified to alleviate these constraints.

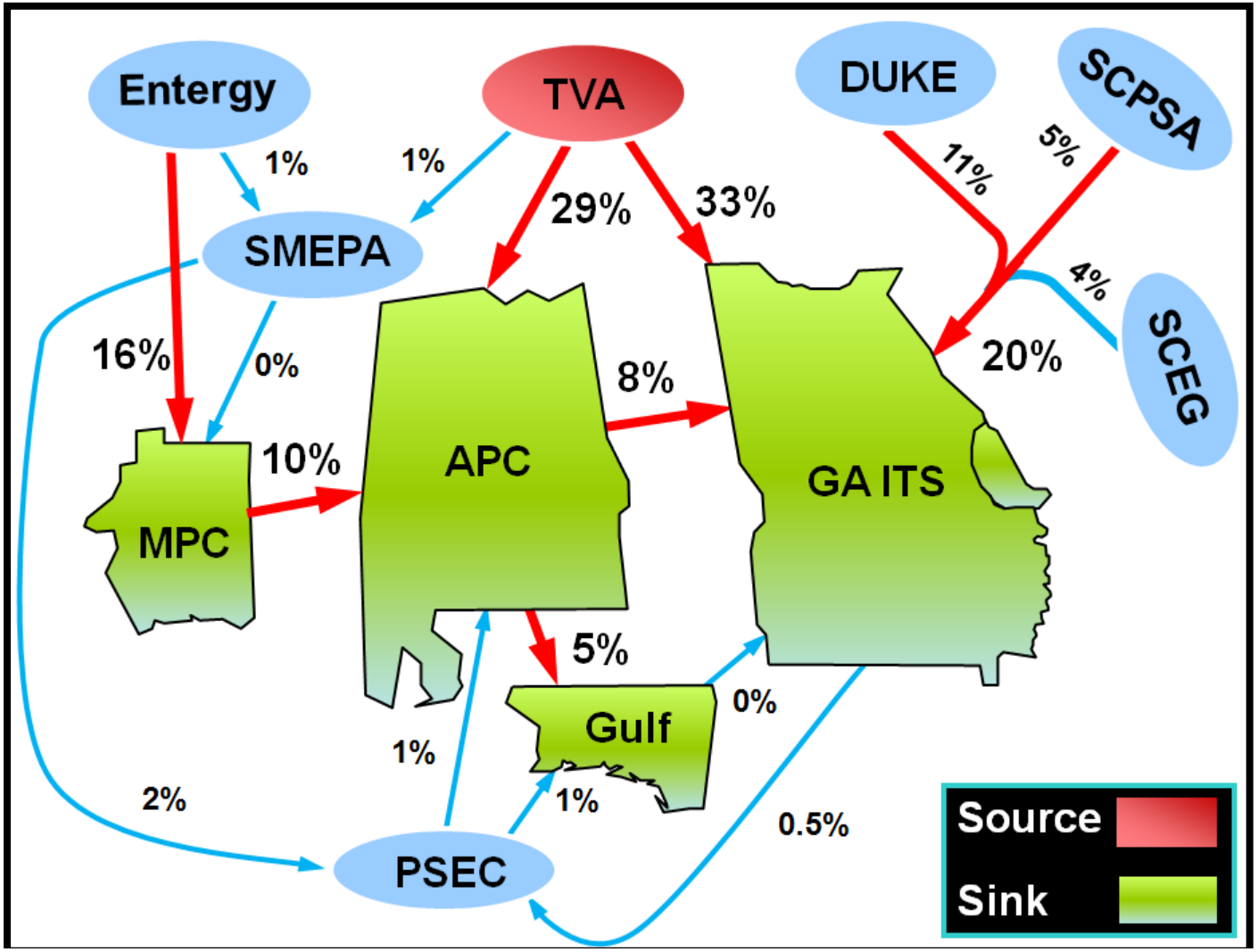
SERTP 2011 Economic Study Results
December 2011

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SME	318004 PURVIS 318007 5MOROW161 1	296	58.0	108.5	318004 PURVIS 318007 5MOROW161 2	1	P25
SME	318004 PURVIS 318007 5MOROW161 2	296	57.5	108.3	318004 PURVIS 318007 5MOROW161 1	1	P26

Scenario Explanations:

1) No Unit Offline, Summer Peak Case

TVA Border to the SBA: Transfer Flows within the SERTP



Note: Red arrows indicate transfer percentages of greater than 5%.

Potential Solutions for Identified Constraints

The following projects are potential solutions to address the identified constraints and are based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the current projected enhancements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. These potential solutions only address constraints identified within the SERTP Sponsors' areas that are associated with the proposed transfer. Other Balancing Areas were not monitored which could result in additional limitations and required system improvements.

Table 1.7. Potential Solutions for Identified Constraints – *Southern Balancing Authority*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P1	**Russell Dam – Athena 230 kV T.L.** • Construct approximately 45 miles of new 230 kV transmission line from Russell Dam to Athena with bundled (2) 1351 ACSR at 100 ℃.	2016	$61,000,000
P2	**Gaston – County Line Road 230 kV T.L.** • Reconductor approximately 53.5 miles along the Gaston – County Line Road 230 kV T.L. with 1351 ACSS at 160 ℃. (Advancement of a 2019 project)	2016	Total Cost $53,500,000 Advancement Cost $12,200,000
P3	**South Hall – Winder Primary 230 kV T.L.** • Reconductor the 8.3 mile section from South Hall to Braselton along the South Hall – Winder Primary 230 kV transmission line with bundled (2) 1351 ACSR at 100 ℃. •	2016	$10,000,000
P4	**Clay TS – Leeds TS 230 kV T.L.** • Reconductor approximately 17.3 miles along the Clay – Leeds 230 kV T.L. with bundled (2) 1351 ACSR at 100 ℃.	2016	$18,600,000
P5	**Fayette – Gorgas 161 kV T.L.** • Reconductor approximately 38.8 miles along the Fayette – Gorgas 161 kV T.L. with 1351 ACSR at 100 ℃.	2016	$29,000,000
P6	**Attalla – Albertville 161 kV T.L.** • Reconductor approximately 19.5 miles of the 19.6 mile 161 kV transmission line with 1351 ACSR at 100 ℃ from Attalla to Albertville • Replace the two (2) 161 / 115 kV Autobanks at Attalla substation with two (2) 200 MVA Autobanks.	2016	$18,700,000(1)
P7	**Sylacauga – Martin 115 kV T.L.** • Reconductor the 23.6 mile section from Sylacauga TS to Alex Tap along the existing Sylacauga – Martin 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$8,300,000
P8	**Wade – Big Creek 115 kV T.L.** • Reconductor approximately 16.8 miles along the Wade – Big Creek 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$6,300,000

SERTP 2011 Economic Study Results
December 2011

Item	Potential Solution	Estimated Need Date	Estimated Cost
P9	**Logtown West - NASA 115 kV T.L.** • Reconductor approximately 3.0 miles along the Logtown West – NASA 115 kV T.L. with 1033 ACSS at 160 ℃.	2016	$2,900,000
P10	**Jesup – Ludowici 115 kV T.L.** • Reconductor the 7.5 mile section from Jesup to Rayonier along the Jesup – Ludowici 115 kV T.L. with 795 ACSR at 100 ℃. (Advancement of a 2017 project)	2016	Total Cost $2,700,000 Advancement Cost $250,000
P11	**Attalla – Henry Dam 115 kV T.L.** • Reconductor the 4.4 mile section from Attalla to Gulf States Steel to North Rainbow City along the Henry Dam – Attalla 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,600,000
P12	**Thurlow Dam – Union Springs 115 kV T.L.** • Reconductor the 3.1 mile section from GKN Westland Aerospace to Halla Climate Control Tap along the Thurlow Dam – Union Springs 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,100,000
P13	**Kathleen – Bonaire 115 kV T.L.** • Reconductor the 4.2 mile section from Kathleen to Waterford along the Kathleen – Bonaire 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,500,000
P14	**South Park DS – Pratt City 115 kV T.L.** • Reconductor approximately 3.0 miles along the South Park D.S. – Pratt City 115 kV T.L. with 1033 ACSS at 160 ℃.	2016	$1,500,000
P15	**Bessemer – South Bessemer 115 kV T.L.** • Reconductor the 0.3 mile section from Airport Lane to Bent Brook Tap along the Bessemer – South Bessemer 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$100,000
P16	**Mitchell Dam – North Selma 115 kV T.L.** • Reconductor the 10.2 mile section from Mitchell Dam to Clanton Tap along the Mitchell Dam – North Selma 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$3,600,000
P17	**Hattiesburg North – Eaton 115 kV T.L.** • Reconductor the 4.1 mile section from Hattiesburg North to Petal along the Hattiesburg North – Eaton 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,500,000
P18	**Hattiesburg County – Highway 11 115 kV T.L.** • Reconductor approximately 3.2 miles along the Highway 11 – Hattiesburge County 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,200,000
P19	**East Point – Morrow 115 kV T.L.** • Reconductor the 3.7 mile section from East Point to College Park along the East Point – Morrow 115 kV transmission line with 795 ACSR at 100 ℃. (Advancement of a 2017 project)	2016	Total Cost $1,300,000 Advancement Cost $150,000

Item	Potential Solution	Estimated Need Date	Estimated Cost
P20	**Blankets Creek – Woodstock 115 kV T.L.** • Reconductor the 1.0 mile section from Blankets Creek to Ridge Road along the Blankets Creek – Woodstock 115 kV transmission line with 1033 ACSR at 100 ℃.	2016	$500,000
P21	**Collins – Magee 115 kV T.L.** • Reconductor approximately 8.5 miles of the Collins – Magee 115 kV transmission line with 795 ACSR at 100 ℃.	2016	$3,000,000(1)
P22	**Morton – Forest Industrial 115 kV T.L.** • Reconductor approximately 3.86 miles along the Morton – Forest Industrial 115 kV T.L. with 636 ACSR at 100℃.	2016	$1,400,000(1)
P23	**Attalla – Lookout Mountain 115 kV T.L.** • Reconductor approximately .05 miles of Cu conductor along the Attalla – Lookout Mountain 115 kV transmission line with 397 ACSR at 100 ℃ • Upgrade the remaining approximately 8.95 miles of 397 ACSR to 100℃ operation.	2016	$1,800,000
SBA Total ($2011)			$186,200,000

(1) This transmission solution was proposed to alleviate the loading of a tie-line constraint between the SBA and a non-participating Transmission Owner. Therefore, the cost associated with the transmission solution is only for the portion of solution that is located within the participating Transmission Owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating Transmission Owners were not evaluated. These impacts, as well as coordinated transmission solutions to alleviate any identified constraints, can be determined if this transfer is brought forth to be evaluated in the Southeast Inter-Regional Participation Process ("SIRPP").

Table 1.8. Potential Solutions for Identified Constraints – *PowerSouth*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P24	**Belleville – Brewton 115 kV T.L.** • Reconductor approximately 24 miles of 115 kV transmission line from Belleville to Brewton with 795 ACSR at 100 ℃.	2016	$3,600,000
PowerSouth Total ($2011)			$3,600,000

Table 1.9. Potential Solutions for Identified Constraints – *South Mississippi Electric*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P25	**Purvis Bulk – Morrow 161 kV Circuit 1** • Rebuild approximately 4.55 miles of 161 kV transmission line from Purvis Bulk to Morrow with 2-bundle, 795 ACSR at 100 ℃.	2016	$1,900,000

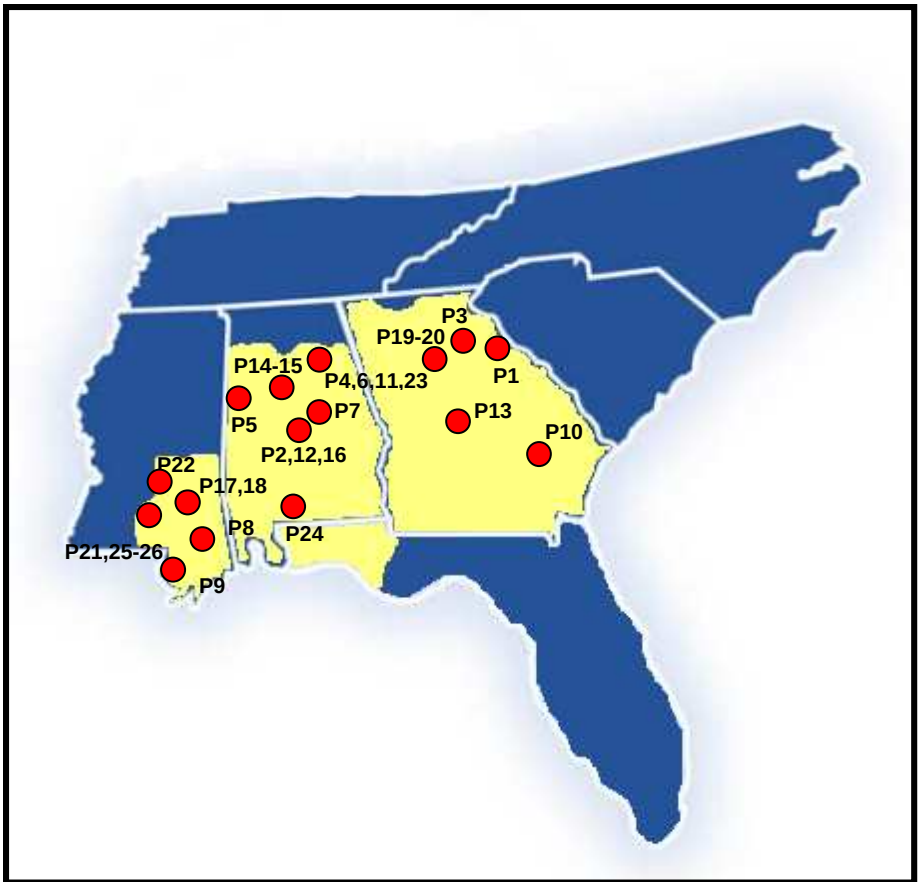
Item	Potential Solution	Estimated Need Date	Estimated Cost
P26	**Purvis Bulk – Morrow 161 kV Circuit 2** • Rebuild approximately 4.59 miles of 161 kV transmission line from Purvis Bulk to Morrow with 2-bundle, 795 ACSR at 100 ℃.	2016	$1,900,000
South Mississippi Electric Total ($2011)			$3,800,000

Table 1.10. Total Cost of the TVA Border to SBA 3500 MW Transfer

Area	Estimated Cost
SBA Total	$186,200,000
PowerSouth Total	$3,600,000
South Mississippi Electric Total	$3,800,000
TOTAL ($2011)	**$193,600,000[(1)]**

[(1)] Total cost does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by 6/1/2016. The studied transfer depends on these projects being in-service by 6/1/2016. If any of these projects are delayed or cancelled, the cost to support the study transfer could be greater than the total shown above.

Diagram 1.1. Approximate Location of Potential Solutions



Interchange Assumptions

Table 1.11. Transactions Modeled in Starting Point Cases

OASIS Ref. #	POR	POD	Amount (MW)
735231	*SOCO*	*Duke*	*50*
735232	*SOCO*	*Duke*	*25*
823644	*SOCO*	*Duke*	*90*
823646	*SOCO*	*Duke*	*90*
891294	*SOCO*	*Duke*	*35*
940076	*EES*	*Duke*	*100*
911948	*EES*	*GTC*	*50*
921615	*EES*	*GTC*	*50*
787707	*SOCO*	*TVA*	*46*
672440	*TVA*	*SOCO*	*214*
77603	*SOCO*	*PSEC*	*114*
765080	*PSEC*	*SOCO*	*1024*
--	*SOCO*	*PSEC*	*5*
--	*MEAG*	*PSEC*	*62*
--	*SOCO*	*PSEC*	*267*
--	*SEPA*	*SOCO*	*681*
--	*SBA*	*FRCC*	*3700*

Table 1.12. Additional Transactions Modeled in Cases

OASIS Ref. #	POR	POD	Amount (MW)
869848	*EES*	*SOCO*	*150*
903932	*EES*	*SOCO*	*500*
854479	*EES*	*SOCO*	*163*
882565	*SCPSA*	*SOCO*	*50*
869847	*Duke*	*SOCO*	*50*
147617	*SC*	*GTC*	*296*
147616	*SCEG*	*GTC*	*285*
147615	*Duke*	*GTC*	*465*
147613	*TVA*	*GTC*	*310*
72133712	*Duke*	*MEAG*	*50*

Table 1.13. Capacity Benefit Margin Modeled (CBM)

Transmission Owner	Interface	Amount (MW)
Southern	*Duke*	*310*
Southern	*TVA*	*400*
Southern	*EES*	*100*
Southern	*SCPSA*	*120*
Southern	*SCEG*	*120*

Table 1.14. Transmission Reliability Margins Modeled (TRM)

Transmission Owner	Interface	Amount (MW)
Southern	*From Duke*	*196*
GTC	*From Duke*	*106*
MEAG	*From Duke*	*25*
Dalton	*From Duke*	*3*
Southern	*From Entergy*	*205*
Southern	*From TVA*	*231*
GTC	*From TVA*	*51*
MEAG	*From TVA*	*12*
Dalton	*From TVA*	*2*

TVA Border to Southern Balancing Authority ("SBA")

80% Load Level Screen

3500 MW

Study Structure and Assumptions

Transfer Sensitivity	Transfer Amount	Transfer Source	Transfer Sink	Study Year
TVA Border to SBA	3500 MW	TVA Border	SBA	2016
Load Flow Cases				
2011 Series Version 2A Cases: Summer Conditions (80% load level)				
Source Modeled				
The source for this transfer was assumed to be a new generator interconnecting to the existing Shelby 500 kV Substation near Memphis, TN.				

Transmission System Impacts

The 3500 MW transfer from TVA border to the SBA results in overloads of several 230 kV, 161 kV, and 115 kV facilities. Tables 2.1 through 2.3 below identify thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Southern Balancing Authority

Table 2.1. Pass 0 – Transmission System Impacts With No Enhancements – *Southern Balancing Authority*
The following table identifies constraints in the Southern Balancing Authority ("SBA") without any enhancements to the transmission system.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	4996 POWERSYS 230 5058 FAYETVIL 230 1	577	89.8	100.2	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P1
SBA	9021 MCINTOSH 115 370475 3JASPER 115 1	254	52.2	100.6	9001 MCINTOSH 230 312721 6PURRYSB 230 1	16	N/A(2)
SBA	4260 SO PARK 115 4261 ALAMETAL 115 1	246	84.5	100.8	4157 MILLER8 500 4375 S.BESS 8 500 1	15	P7
SBA	4189 PRATCTY3 115 4261 ALAMETAL 115 1	246	84.7	101.1	4157 MILLER8 500 4375 S.BESS 8 500 1	15	P7
SBA	2499 CONASAUGA 500 360662 8BRADLEY TN 500 1	2783.4	67.4	103.9	11 S HALL 500 306105 8OCONEE 500 1	2	N/A(1)
SBA	4643 BIG CK 3 115 4678 TANERWIL 115 1	107	72.4	105.4	4642 BIG CK 6 230 8702 DANIEL 230 1	1	P6
SBA	4412 ALEX TAP 115 5059 KELLYTON 115 1	113	91.7	106.6	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	5	P5

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 2	111	76.4	107.7	4234 CLAY 6 230 4247 ONEONTA6 230 1	15	P4
SBA	4410 SUNLEVTP 115 5059 KELLYTON 115 1	113	93.2	108.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	5	P5
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 1	99	77.3	109.0	4234 CLAY 6 230 4247 ONEONTA6 230 1	15	P4
SBA	4241 LEEDSTS6 230 5039 ARGO DS 230 1	602	64.1	109.4	4157 MILLER8 500 4375 S.BESS 8 500 1	6	P2
SBA	4678 TANERWIL 115 8832 HARLESTN 115 1	107	77.2	110.3	4642 BIG CK 6 230 8702 DANIEL 230 1	1	P6
SBA	4234 CLAY 6 230 5039 ARGO DS 230 1	602	66.1	111.5	4157 MILLER8 500 4375 S.BESS 8 500 1	6	P2
SBA	4409 HOLLINS 115 4410 SUNLEVTP 115 1	113	98.4	113.3	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	5	P5
SBA	4395 SYLCAUTS 115 4409 HOLLINS 115 1	113	99.7	117.4	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	5	P5
SBA	4332 ATTALLA5 161 360283 5ALBERTVILLE161 1	193	83.7	118.0	4234 CLAY 6 230 4247 ONEONTA6 230 1	15	P4
SBA	8816 WADE SS 115 8832 HARLESTN 115 1	104	84.2	118.2	4642 BIG CK 6 230 8702 DANIEL 230 1	1	P6
SBA	4131 OAKMANTP 161 4135 GORGAS 161 1	193	67.8	129.1	4157 MILLER8 500 5307 WVERN SS 500 1	14	P3
SBA	4131 OAKMANTP 161 4978 BERRY 161 1	193	68.2	129.5	4157 MILLER8 500 5307 WVERN SS 500 1	14	P3
SBA	4128 PIT&MTAP 161 4978 BERRY 161 1	193	70	131.4	4157 MILLER8 500 5307 WVERN SS 500 1	14	P3
SBA	4128 PIT&MTAP 161 4979 BANKSTON 161 1	193	77.6	139.2	4157 MILLER8 500 5307 WVERN SS 500 1	14	P3
SBA	4121 FAYET TS 161 4127 FAY COTN 161 1	193	79.1	140.8	4157 MILLER8 500 5307 WVERN SS 500 1	14	P3
SBA	4127 FAY COTN 161 4979 BANKSTON 161 1	193	79.1	140.8	4157 MILLER8 500 5307 WVERN SS 500 1	14	P3

(1) The limiting element of this tie-line constraint is located within TVA
(2) The limiting element of this tie-line constraint is located within SCE&G

Table 2.2. Pass 1 – Transmission System Impacts With Proposed Enhancements "P1" through "P8" – *Southern Balancing Authority*
The following table identifies constraints in the Southern Balancing Authority ("SBA") with the proposed enhancements "P1" through "P8" applied to the transmission system. Enhancements were identified to alleviate the remaining constraints.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	4311 GS STEEL 115 4331 ATTALLA3 115 1	138	53.3	105.7	21 MOSTELLER 500 2499 CONASAUGA 500 1	4	P8

Table 2.3. Pass 2 – Transmission System Impacts With All Proposed Enhancements– *Southern Balancing Authority*

The following table depicts loadings of transmission facilities in the Southern Balancing Authority ("SBA") with all proposed enhancements applied to the transmission system. The resulting facilities in the table below could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the 2016 study year.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
The following facilities could become potential constraints in future years or with different queuing assumptions							
SBA	821 MILLEDGEVL 115 1612 FISHING CRK 115 1	188	89.8	90.2	147 BRANCH + 230 148 GORDON 230 1	8	--
SBA	17221 LIBERTY6 230 17222 LIBERTY3 115 1	168	74.2	90.2	17221 LIBERTY6 230 17222 LIBERTY3 115 2	4	--
SBA	147 BRANCH + 230 172 W MILLEDGVL 230 1	596	87.2	90.3	13 BONAIRE 500 18 SCHERER 500 1	8	--
SBA	4485 FAUNSDAL 115 4744 SONGALTP 115 1	138	78.8	90.3	4471 GREENCO6 230 4489 N SELMA6 230 1	10	--
SBA	1626 KATHLEEN 115 1627 FRITO LAY + 115 1	124	82.1	90.4	150 BONAIRE 230 1603 KATHLEEN 230 1	5	--
SBA	9001 MCINTOSH 230 312721 6PURRYSB 230 1	956	56.2	90.5	8 VOGTLE 500 9 W MCINTOSH 500 1	8	--
SBA	4471 GREENCO6 230 4489 N SELMA6 230 1	502	76.4	90.9	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	--
SBA	5069 NRAINBOW 115 5419 KEYSTONE TP 115 1	112	50.7	91.1	4323 EGADSDEN 115 4324 GADSDEN 115 1	6	--
SBA	4297 MOODY SS 115 4762 LEHGH TP 115 1	212	90.3	91.8	4233 CLAY 3 115 4246 SPRINGVL 115 1	9	--
SBA	4660 SPAN FT 115 4661 BELFORST 115 1	212	72.3	91.8	4638 CHICK 6 230 5341 EST SHR TAP 230 1	3	--
SBA	4397 CHEAHATP 115 5199 FRIENDSH 115 1	113	72.2	91.8	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	5	--
SBA	4156 MILLER6 230 4157 MILLER8 500 1	1613	65.8	91.9	4157 MILLER8 500 4375 S.BESS 8 500 1	12	--
SBA	7320 NICEVLE 115 7325 VALPARAI 115 1	207	33.1	91.9	7310 SHOAL RV 230 7915 SHAKY JO 230 1	4	--
SBA	8420 NASA 115 8426 LOGTWN W 115 1	216	71.3	92.2	8400 KILN 230 8425 LOGTWN W 230 1	13	--
SBA	4249 RED MTN 115 4252 SMISTEEL 115 1	216	65.7	92.8	4157 MILLER8 500 5312 CLAY 8 500 1	6	--
SBA	4182 BLOUNT 115 360280 3GUNTERSV HP115 1	92.8	46.4	92.8	21 MOSTELLER 500 2499 CONASAUGA 500 1	6	--
SBA	1081 TARVER 115 1865 W HOMERVL 115 1	59	85.9	92.9	220 PINE GROVE 230 1870 ERCO 230 1	4	--
SBA	4329 LOOK MTN 115 4331 ATTALLA3 115 1	101	27.1	92.9	4311 GS STEEL 115 4331 ATTALLA3 115 1	6	--
SBA	4156 MILLER6 230 4172 BOYLESM1 230 1	602	68.4	93.0	4157 MILLER8 500 5312 CLAY 8 500 1	6	--
SBA	8273 HWY 11 115 8275 HBG CNTY 115 1	135	83.6	93.5	8245 PETAL 115 8251 HATBG NO 115 1	1	--
SBA	5160 TATELYLE 115 5327 FL GAS TAP 115 1	216	88.0	93.7	4586 W MCTSH6 230 5313 CALVRTSS 230 1	1	--
SBA	4574 MCINOLIN 115 5160 TATELYLE 115 1	216	88.2	93.8	4586 W MCTSH6 230 5313 CALVRTSS 230 1	1	--
SBA	1612 FISHING CRK 115 1653 FISHINGCK J 115 1	188	93.6	94.0	147 BRANCH + 230 148 GORDON 230 1	8	--
SBA	1653 FISHINGCK J 115 1664 W MILLEDGVL 115 1	188	93.6	94.0	147 BRANCH + 230 148 GORDON 230 1	8	--
SBA	4233 CLAY 3 115 4234 CLAY 6 230 1	398	65.5	95.2	4234 CLAY 6 230 5039 ARGO DS 230 1	6	--
SBA	4547 PINEDALE 115 4548 ECI HALS 115 1	138	80.2	95.9	4512 SNOWDN8 500 4600 FARLEY 8 500 1	4	--
SBA	4240 LEEDSTS3 115 4762 LEHGH TP 115 1	212	95.0	96.5	4233 CLAY 3 115 4246 SPRINGVL 115 1	9	--
SBA	4965 DANWAYSS 230 5310 HILLABEE 230 1	641	84.8	96.5	5180 N.OPEL6 230 5310 HILLABEE 230 1	6	--

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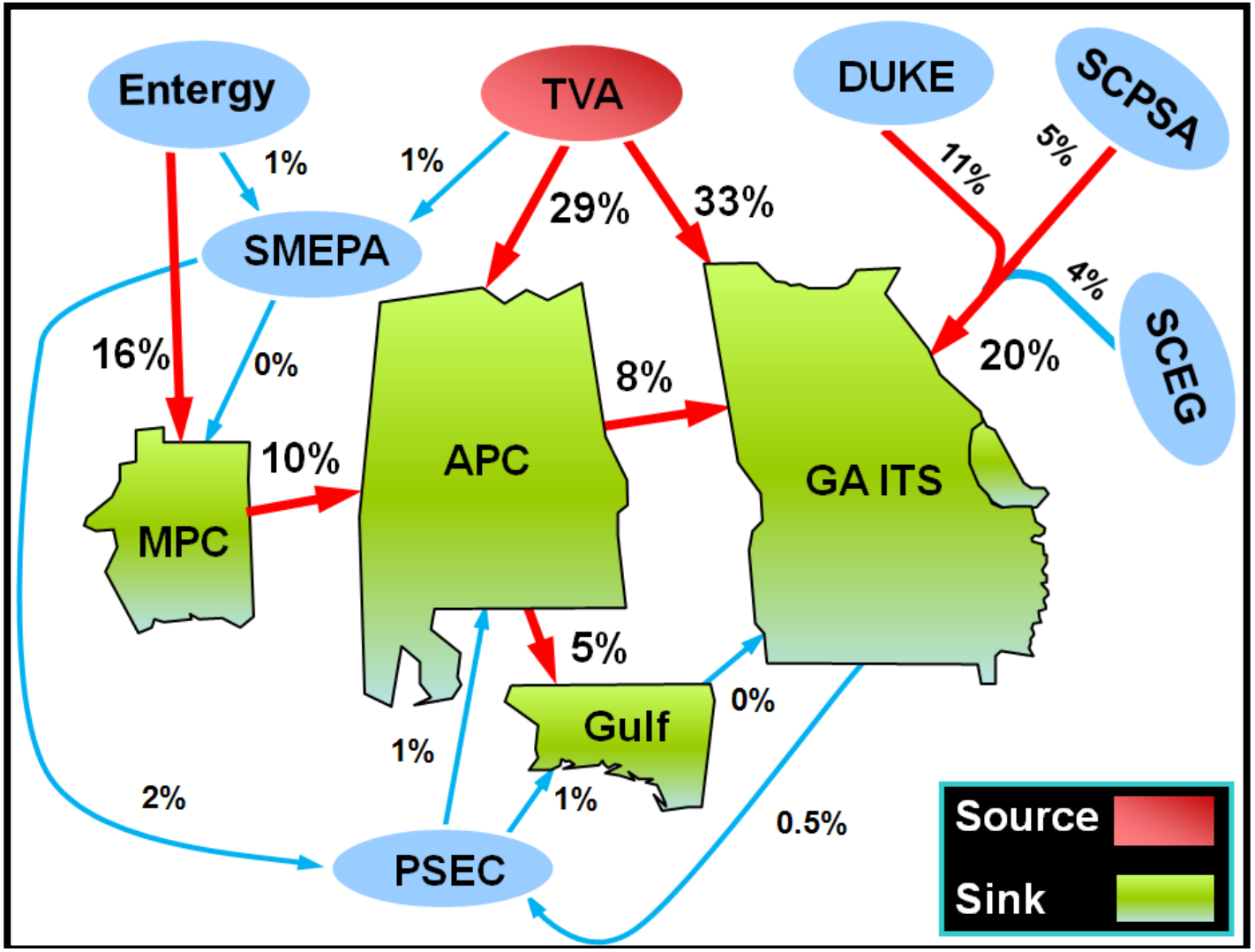
AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	8280 COLLINS 115 336760 3MAGEE 115 1	100	88.3	97.6	8270 HATBG SW 230 8310 PURVIS 230 1	11	--
SBA	1627 FRITO LAY + 115 2263 WATERFORD 115 1	124	89.3	97.7	150 BONAIRE 230 1603 KATHLEEN 230 1	5	--
SBA	461 JACKSON LK 115 1917 S COV J 115 1	71	88.2	98.8	746 S GRIFFIN 115 750 GA BRD CORR 115 1	8	--
SBA	5180 N.OPEL6 230 5310 HILLABEE 230 1	602	86.7	99.3	4965 DANWAYSS 230 5310 HILLABEE 230 1	6	--
SBA	4658 BLAKELEY 115 4659 KIMCLARK 115 1	216	87.7	99.5	4655 N MOBILE 115 5159 CHKBOGSS 115 1	3	--

Scenario Explanations:

1) Barry Unit #5 Offline, Summer 80% Load Level Case
2) Bowen Unit #4 Offline, Summer 80% Load Level Case
3) Crist Unit #7 Offline, Summer 80% Load Level Case
4) Farley Unit #1 Offline, Summer 80% Load Level Case
5) Farley Unit #2 Offline, Summer 80% Load Level Case
6) Franklin Unit #2 Offline, Summer 80% Load Level Case
7) Hatch Unit #1 Offline, Summer 80% Load Level Case
8) Hatch Unit #2 Offline, Summer 80% Load Level Case
9) Hammond Unit #4 Offline, Summer 80% Load Level Case
10) Harris Unit #1 Offline, Summer 80% Load Level Case
11) Kemper IGCC Unit Offline, Summer 80% Load Level Case
12) Miller Unit #1 Offline, Summer 80% Load Level Case
13) Watson Unit #5 Offline, Summer 80% Load Level Case
14) Gorgas Unit #10 Offline, Summer 80% Load Level Case
15) Gaston Unit #5 Offline, Summer 80% Load Level Case
16) Vogtle Unit #2 Offline, Summer 80% Load Level Case

TVA Border to the SBA: Transfer Flows within the SERTP



Note: Red arrows indicate transfer percentages of greater than 5%

Potential Solutions for Identified Constraints

The following projects are potential solutions to address the identified constraints and are based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the current projected enhancements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. These potential solutions only address constraints identified within the SERTP Sponsors' areas that are associated with the proposed transfer. Other Balancing Areas were not monitored which could result in additional limitations and required system improvements.

Table 2.4. Potential Solutions for Identified Constraints – *Southern Balancing Authority*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P1	**Gaston – County Line Road 230 kV T.L.** • Reconductor approximately 53.5 miles along the Gaston – County Line Road 230 kV T.L. with 1351 ACSS at 160 ℃. (Advancement of a 2019 project)	2016	Total Cost $53,500,000 Advancement Cost $12,200,000
P2	**Clay TS – Leeds TS 230 kV T.L.** • Reconductor approximately 17.3 miles along the Clay – Leeds 230 kV T.L. with bundled (2) 1351 ACSR at 100 ℃.	2016	$18,600,000
P3	**Fayette – Gorgas 161 kV T.L.** • Reconductor approximately 38.8 miles along the Fayette – Gorgas 161 kV T.L. with 1351 ACSR at 100 ℃.	2016	$29,000,000
P4	**Attalla – Albertville 161 kV T.L.** • Reconductor approximately 0.05 miles of the 19.6 mile 161 kV transmission line with 1351 ACSR at 100 ℃ from Attalla to Albertville • Replace the two (2) 161 / 115 kV Autobanks at Attalla substation with two (2) 200 MVA Autobanks.	2016	$18,700,000[(1)]
P5	**Sylacauga – Martin 115 kV T.L.** • Reconductor the 23.6 mile section from Sylacauga TS to Alex Tap along the existing Sylacauga – Martin 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$8,300,000
P6	**Wade – Big Creek 115 kV T.L.** • Reconductor approximately 16.8 miles along the Wade – Big Creek 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$6,300,000
P7	**South Park DS – Pratt City 115 kV T.L.** • Reconductor approximately 3.0 miles along the South Park D.S. – Pratt City 115 kV T.L. with 1033 ACSS at 160 ℃.	2016	$1,500,000
P8	**Attalla – Henry Dam 115 kV T.L.** • Reconductor the 4.4 mile section from Attalla to Gulf States Steel to North Rainbow City along the Henry Dam – Attalla 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,600,000
SBA Total ($2011)			$96,200,000

[(1)] This transmission solution was proposed to alleviate the loading of a tie-line constraint between the SBA and a non-participating Transmission Owner. Therefore, the cost associated with the transmission

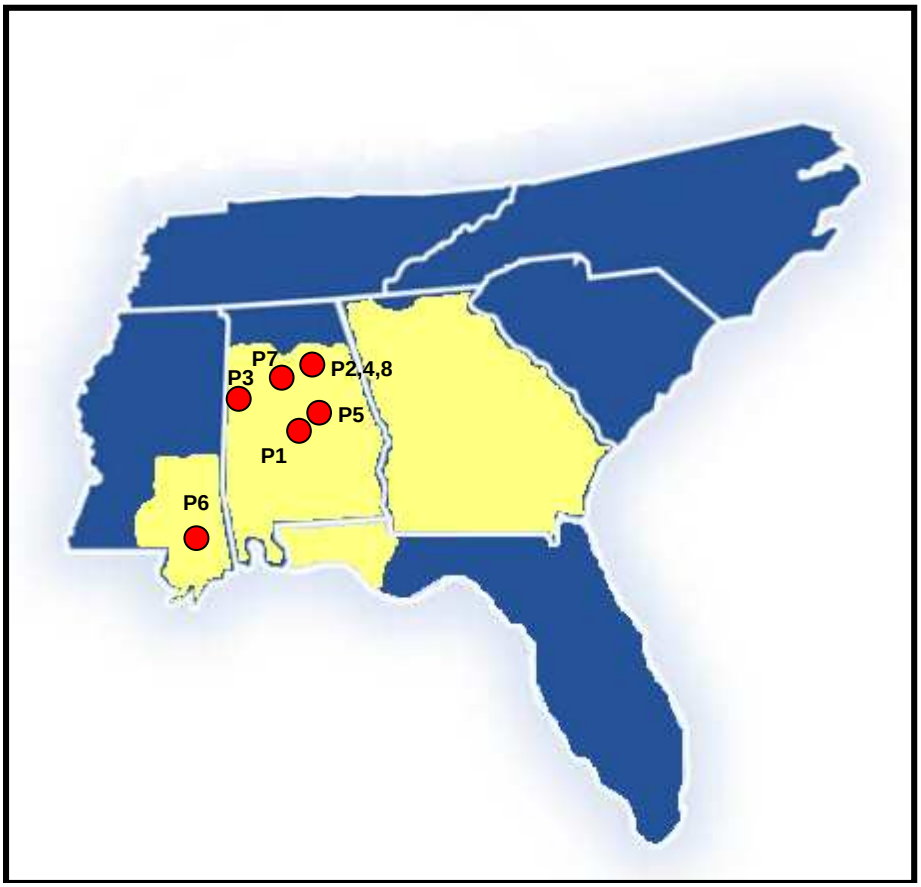
solution is only for the portion of solution that is located within the participating Transmission Owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating Transmission Owners were not evaluated. These impacts, as well as coordinated transmission solutions to alleviate any identified constraints, can be determined if this transfer is brought forth to be evaluated in the Southeast Inter-Regional Participation Process ("SIRPP").

Table 2.5. Total Cost of the TVA Border to SBA 3500 MW Transfer (80% of Summer Peak Screen)

Area	Estimated Cost
SBA Total	$96,200,000
TOTAL ($2011)	**$96,200,000[(1)]**

(1) Total cost does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by 6/1/2016. The studied transfer depends on these projects being in-service by 6/1/2016. If any of these projects are delayed or cancelled, the cost to support the study transfer could be greater than the total shown above.

Diagram 2.1. Approximate Location of Potential Solutions



Interchange Assumptions

Table 2.6. Transactions Modeled in Starting Point Cases

OASIS Ref. #	POR	POD	Amount (MW)
735231	*SOCO*	*Duke*	*50*
735232	*SOCO*	*Duke*	*25*
823644	*SOCO*	*Duke*	*90*
823646	*SOCO*	*Duke*	*90*
891294	*SOCO*	*Duke*	*35*
940076	*EES*	*Duke*	*100*
911948	*EES*	*GTC*	*50*
921615	*EES*	*GTC*	*50*
787707	*SOCO*	*TVA*	*46*
672440	*TVA*	*SOCO*	*214*
77603	*SOCO*	*PSEC*	*114*
765080	*PSEC*	*SOCO*	*1024*
--	*SOCO*	*PSEC*	*5*
--	*MEAG*	*PSEC*	*62*
--	*SOCO*	*PSEC*	*267*
--	*SEPA*	*SOCO*	*681*
--	*SBA*	*FRCC*	*3700*

Table 2.7. Additional Transactions Modeled in Cases

OASIS Ref. #	POR	POD	Amount (MW)
869848	*EES*	*SOCO*	*150*
903932	*EES*	*SOCO*	*500*
854479	*EES*	*SOCO*	*163*
882565	*SCPSA*	*SOCO*	*50*
869847	*Duke*	*SOCO*	*50*
147617	*SC*	*GTC*	*296*
147616	*SCEG*	*GTC*	*285*
147615	*Duke*	*GTC*	*465*
147613	*TVA*	*GTC*	*310*
72133712	*Duke*	*MEAG*	*50*

Table 2.8. Capacity Benefit Margin Modeled (CBM)

Transmission Owner	Interface	Amount (MW)
Southern	*Duke*	*310*
Southern	*TVA*	*400*
Southern	*EES*	*100*
Southern	*SCPSA*	*120*
Southern	*SCEG*	*120*

Table 2.9. Transmission Reliability Margins Modeled (TRM)

Transmission Owner	Interface	Amount (MW)
Southern	*From Duke*	*196*
GTC	*From Duke*	*106*
MEAG	*From Duke*	*25*
Dalton	*From Duke*	*3*
Southern	*From Entergy*	*205*
Southern	*From TVA*	*231*
GTC	*From TVA*	*51*
MEAG	*From TVA*	*12*
Dalton	*From TVA*	*2*

EES Border to the Southern Balancing Authority ("SBA")

1500 MW

Study Structure and Assumptions

Transfer Sensitivity	Transfer Amount	Transfer Source	Transfer Sink	Study Year
EES Border to SBA	1500 MW	EES	SBA	2016
Load Flow Cases				
2011 Series Version 2A Cases: Summer Peak and Shoulder (93% load level)				
Source Modeled				
The source for this transfer was assumed to be a new generator interconnecting to the existing El Dorado 500 kV Substation near El Dorado, AR.				

Transmission System Impacts

The 1500 MW transfer from EES to the SBA results in overloads of several 230 kV, 161 kV and 115 kV facilities. Tables 3.1 and 3.4 below identify thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Southern Balancing Authority

Table 3.1. Pass 0 – Transmission System Impacts With No Enhancements – *Southern Balancing Authority*
The following table identifies significant constraints in the Southern Balancing Authority ("SBA") without any enhancements to the transmission system. Projects were first identified to alleviate major problems within the SBA because the proposed enhancements significantly alter load flow in the SBA.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	104 LEXINGTON 230 133 R_E WATKNVL 230 1	602	93.7	102.5	11 S HALL 500 306105 8OCONEE 500 1	11	P1
SBA	94 BIO 230 105 VANNA 230 1	433	96.2	104.5	11 S HALL 500 306105 8OCONEE 500 1	11	P1
SBA	104 LEXINGTON 230 339100 6RUSSEL 230 1	596	98.0	107.0	11 S HALL 500 306105 8OCONEE 500 1	11	P1

Table 3.2. Pass 1 – Transmission System Impacts With Proposed Enhancement "P1" – ***Southern Balancing Authority***

The following table identifies constraints in the Southern Balancing Authority ("SBA") with the proposed enhancement "P1" applied to the transmission system. Enhancements were identified to alleviate the remaining constraints.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	5365 LSA1 TP 115 5367 GDC TP 115 1	112	86.4	100.2	4755 FULTON 115 5065 LPAC TP 115 1	25	P2
SBA	1099 N JESUP 115 1100 RAYONIER + 115 1	124	98.6	101.0	15 THALMANN 500 2158 MCCALL RD 500 1	23	P3
SBA	4660 SPAN FT 115 4661 BELFORST 115 1	212	96.9	102.8	4638 CHICK 6 230 5341 EST SHR TAP 230 1	17	P5[(2)]
SBA	4629 EMCSTOCK 115 4701 BARRY 3 115 1	212	97.7	103.1	4612 BREWT TP 115 4622 N BREW 3 115 1	3	P6
SBA	8420 NASA 115 8426 LOGTWN W 115 1	216	77.8	103.2	8400 KILN 230 8425 LOGTWN W 230 1	29	P7
SBA	4572 JACKTAPB 115 4755 FULTON 115 1	138	88.9	103.8	4584 JACKTAPA 115 4738 LOWMTAPA 115 1	25	P2
SBA	4572 JACKTAPB 115 5899 LOWMTAPB2 115 1	138	88.9	103.8	4584 JACKTAPA 115 4738 LOWMTAPA 115 1	25	P2
SBA	8114 FORINDT2 115 336898 3MORTON 115 1	155	79.7	104.2	360654 8CHOCTAW MS 500 360688 8CLAY 500 1	25	P8
SBA	5351 S.ENTER TS6 230 17149 OPP 6 230 1	498	96.7	104.8	4512 SNOWDN8 500 4600 FARLEY 8 500 1	18	P9
SBA	4412 ALEX TAP 115 5059 KELLYTON 115 1	113	91.3	105.0	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	P10
SBA	8816 WADE SS 115 8832 HARLESTN 115 1	104	87.5	105.7	4642 BIG CK 6 230 8702 DANIEL 230 1	16	P11
SBA	4755 FULTON 115 5367 GDC TP 115 1	112	92.1	105.9	4755 FULTON 115 5065 LPAC TP 115 1	25	P2
SBA	4410 SUNLEVTP 115 5059 KELLYTON 115 1	113	93.2	106.9	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	P10
SBA	5351 S.ENTER TS6 230 5352 S.ENTER TS3 115 1	250	96.1	106.9	4598 PINCK 6 230 5351 S.ENTER TS6 230 1	18	P9
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 2	111	88.4	106.9	4234 CLAY 6 230 4247 ONEONTA6 230 1	22	P4
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 1	99	89.4	108.2	4234 CLAY 6 230 4247 ONEONTA6 230 1	22	P4
SBA	4584 JACKTAPA 115 4755 FULTON 115 1	112	92.6	109.3	5121 BOISE TP 115 5899 LOWMTAPB2 115 1	25	P2
SBA	4574 MCINOLIN 115 4738 LOWMTAPA 115 1	112	92.7	109.4	5121 BOISE TP 115 5899 LOWMTAPB2 115 1	25	P2
SBA	4409 HOLLINS 115 4410 SUNLEVTP 115 1	113	99.4	113.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	P10
SBA	4131 OAKMANTP 161 4135 GORGAS 161 1	193	80.7	116.0	4157 MILLER8 500 5307 WVERN SS 500 1	28	P12
SBA	4131 OAKMANTP 161 4978 BERRY 161 1	193	81.2	116.4	4157 MILLER8 500 5307 WVERN SS 500 1	28	P12
SBA	4332 ATTALLA5 161 360283 5ALBERTVILLE161 1	193	96.7	117.0	4234 CLAY 6 230 4247 ONEONTA6 230 1	22	P4
SBA	8280 COLLINS 115 336760 3MAGEE 115 1	100	107.5[(1)]	117.6	8270 HATBG SW 230 8310 PURVIS 230 1	28	P13
SBA	4395 SYLCAUTS 115 4409 HOLLINS 115 1	113	104.6[(1)]	118.0	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	P10
SBA	4128 PIT&MTAP 161 4978 BERRY 161 1	193	83.4	118.6	4157 MILLER8 500 5307 WVERN SS 500 1	28	P12
SBA	4128 PIT&MTAP 161 4979 BANKSTON 161 1	193	92.0	127.3	4157 MILLER8 500 5307 WVERN SS 500 1	28	P12
SBA	4121 FAYET TS 161 4127 FAY COTN 161 1	193	93.8	129.1	4157 MILLER8 500 5307 WVERN SS 500 1	28	P12
SBA	4127 FAY COTN 161 4979 BANKSTON 161 1	193	93.8	129.1	4157 MILLER8 500 5307 WVERN SS 500 1	28	P12

(1) A current operating procedure is sufficient to alleviate this identified constraint without the addition of the proposed transfer. However, the additional transfer exacerbates the loading on this transmission facility such that the operating procedure becomes insufficient.

(2) Reconductoring only the identified constrained transmission line segments results in overloads of subsequent line segments. Therefore, the proposed enhancement includes the reconductor of the identified line segments and any additional segments required.

Table 3.3. Pass 2 – Transmission System Impacts With All Proposed Enhancements – *Southern Balancing Authority*

The following table depicts loadings of transmission facilities in the Southern Balancing Authority ("SBA") with all proposed enhancements applied to the transmission system. The resulting facilities in the table below could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the 2016 study year.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
The following facilities could become potential constraints in future years or with different queuing assumptions							
SBA	612 FIRST AVE + 115 1561 RIVERFRONTJ 115 1	251	89.8	90.0	612 FIRST AVE + 115 616 BLNCHARD IP 115 1	7	--
SBA	614 BROOKHAVEN 115 1561 RIVERFRONTJ 115 1	251	89.8	90.0	612 FIRST AVE + 115 616 BLNCHARD IP 115 1	7	--
SBA	4700 BARRY 6 230 7057 ECUA 230 1	693	85.2	90.1	4640 SILVER 6 230 17264 ELSNRSW6 230 1	17	--
SBA	614 BROOKHAVEN 115 653 BULLCRK 115 1	216	90	90.2	612 FIRST AVE + 115 616 BLNCHARD IP 115 1	7	--
SBA	3067 CANDLER 230 3073 BRASELTON 230 1	509	82.5	90.3	3 NORCROSS 500 11 S HALL 500 1	13	--
SBA	935 CARTERSVL 115 938 CARTERVL 4 115 1	298	89.6	90.4	194 S ACWORTH 230 943 S ACWORTH 115 1	10	--
SBA	4471 GREENCO6 230 4489 N SELMA6 230 1	502	71.1	90.6	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	--
SBA	222 N TIFTON 230 1877 OSCEOLA SW 230 1	509	90.1	90.7	1875 E MOULTRIE 230 1888 E BERLIN 230 1	12	--
SBA	2499 CONASAUGA 500 360662 8BRADLEY TN 500 1	2783.4	75.3	90.8	11 S HALL 500 306105 8OCONEE 500 1	2	--
SBA	915 PINSON 115 1754 METAL CON 115 1	135	88.3	90.9	181 ROCKY MTN 230 182 HAMMOND 230 1	8	--
SBA	615 VICTORY DR 115 616 BLNCHARD IP 115 1	199	90.5	91.0	612 FIRST AVE + 115 1561 RIVERFRONTJ 115 1	7	--
SBA	4189 PRATCTY3 115 4190 PRATCTY6 230 1	398	90.7	91.2	5144 ACIPCO6 230 5145 ACIPCO3 115 1	22	--
SBA	938 CARTERVL 4 115 983 CARTERVL 1J 115 1	269	90.3	91.2	194 S ACWORTH 230 943 S ACWORTH 115 1	10	--
SBA	4643 BIG CK 3 115 4678 TANERWIL 115 1	107	73.1	91.2	4642 BIG CK 6 230 8702 DANIEL 230 1	16	--
SBA	4294 SHLJW7METTP 115 4997 DRUMTAPA 115 1	112	87.6	91.4	4155 GORGAS 6 230 4215 HOLT 6 230 1	9	--
SBA	4997 DRUMTAPA 115 5051 TAYLORFY 115 1	112	87.6	91.4	4155 GORGAS 6 230 4215 HOLT 6 230 1	9	--
SBA	130 GOAT ROCK 230 3023 FRANKLIN 1 230 1	1244	88.0	91.5	Base Case	7	--
SBA	4638 CHICK 6 230 4642 BIG CK 6 230 1	807	85.7	91.5	4638 CHICK 6 230 4700 BARRY 6 230 1	17	--
SBA	4965 DANWAYSS 230 5310 HILLABEE 230 1	641	89.3	91.6	5180 N.OPEL6 230 5310 HILLABEE 230 1	20	--
SBA	7295 OCEAN CY 115 7350 TURNER 115 1	124	85.3	91.7	7281 WRIGHT 115 7300 W GATE T 115 1	27	--
SBA	8037 VIMVILLE 115 8045 KEWNE TP 115 1	135	76.7	91.8	4471 GREENCO6 230 8006 LAUDRDL E 230 1	21	--
SBA	160 HATCH + 230 164 UNION SCHL 230 1	509	91.4	91.9	15 THALMANN 500 2380 THAL LS1 230 1	12	--
SBA	224 OFFERMAN 230 1093 OFFERMAN 115 2	155	91.4	91.9	224 OFFERMAN 230 1093 OFFERMAN 115 1	12	--

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AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	132 FIRST AVE B 230 612 FIRST AVE + 115 1	298	90.4	91.9	131 FIRST AVE A 230 612 FIRST AVE + 115 1	18	--
SBA	7281 WRIGHT 115 7300 W GATE T 115 1	155	86.5	91.9	7281 WRIGHT 115 7295 OCEAN CY 115 1	27	--
SBA	298 TYRONE TP 115 1900 LINE CREEK 115 1	188	90.9	92.0	1523 TURIN EAST 230 1594 DRESDEN 230 1	11	--
SBA	50 BULL SLUICE 230 52 N SPRINGS 230 1	539	90.5	92.0	3 NORCROSS 500 4 BULL SLUICE 500 1	13	--
SBA	4311 GS STEEL 115 5069 NRAINBOW 115 1	112	87.8	92.3	4302 JAXSHOAL 115 5205 HONDA 115 1	22	--
SBA	4924 MTVMILTP 115 5116 TUSK TAP 115 1	138	82.8	92.4	3021 LONGLEAF 500 4600 FARLEY 8 500 1	5	--
SBA	4565 EVERGREN 115 4624 CASTBERY 115 1	112	77.4	92.4	4633 ARPULPTP 115 4701 BARRY 3 115 1	24	--
SBA	7850 HIGH CTY 115 7855 REDWOOD1 115 1	135	90.1	92.5	7860 CALLAWAY 230 7861 CALLAWAY 115 1	26	--
SBA	8273 HWY 11 115 8275 HBG CNTY 115 1	135	83.7	92.6	8245 PETAL 115 8251 HATBG NO 115 1	1	--
SBA	4136 JASPTSTP 161 4496 TAFTCOAL 161 1	141	91.5	92.7	4864 PHIL TAP 161 360263 5WILSON HP 161 1	22	--
SBA	4156 MILLER6 230 4172 BOYLESM1 230 1	602	93.0	93.1	4157 MILLER8 500 5312 CLAY 8 500 1	22	--
SBA	4374 S.BESS 6 230 5036 S BESS 3 115 1	480	87.8	93.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	--
SBA	208 NELSON 230 954 NELSON 115 2	176	91.8	93.2	208 NELSON 230 954 NELSON 115 1	13	--
SBA	198 PINSON 230 2434 KINGSTON 230 1	664	86.6	93.2	21 MOSTELLER 500 2499 CONASAUGA 500 1	13	--
SBA	4484 CUBA 115 5303 SONYORTP 115 1	112	75.1	93.2	4471 GREENCO6 230 8006 LAUDRDL E 230 1	21	--
SBA	150 BONAIRE 230 1603 KATHLEEN 230 1	433	91.2	93.4	24 N TIFTON 500 222 N TIFTON 230 1	12	--
SBA	4813 ENTPRISE 115 5352 S.ENTER TS3 115 1	290	84.1	93.4	4598 PINCK 6 230 5351 S.ENTER TS6 230 1	18	--
SBA	4485 FAUNSDAL 115 4744 SONGALTP 115 1	138	78.3	93.4	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	--
SBA	472 AIRLINE 1 115 473 BIO 115 1	249	90.7	93.6	94 BIO 230 105 VANNA 230 1	2	--
SBA	131 FIRST AVE A 230 612 FIRST AVE + 115 1	298	92.2	93.7	132 FIRST AVE B 230 3011 LEE ROAD 230 1	18	--
SBA	4135 GORGAS 161 4496 TAFTCOAL 161 1	141	92.6	93.8	4864 PHIL TAP 161 360263 5WILSON HP 161 1	22	--
SBA	1379 GUMLOG J 115 2406 TNS JN 115 1	188	90.4	93.8	94 BIO 230 105 VANNA 230 1	10	--
SBA	8705 MSPT EFR 230 8710 MOSSPT E 230 1	866	86.1	93.8	4642 BIG CK 6 230 8702 DANIEL 230 1	3	--
SBA	17221 LIBERTY6 230 17222 LIBERTY3 115 2	168	93.0	93.9	17221 LIBERTY6 230 17222 LIBERTY3 115 1	27	--
SBA	17077 PERYSTRJ 115 17079 OPINE RD 115 1	157	92.3	94.2	17010 COFFEE SP JC115 17222 LIBERTY3 115 1	27	--
SBA	8280 COLLINS 115 8295 TAYLRSVL 115 1	99	80.4	94.3	336897 3PELAHE 115 336898 3MORTON 115 1	25	--
SBA	4622 N BREW 3 115 4624 CASTBERY 115 1	112	79.3	94.3	4633 ARPULPTP 115 4701 BARRY 3 115 1	24	--
SBA	4200 BESSEMER 115 4202 BESSGRCO 230 1	392	87.4	94.5	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	19	--
SBA	4241 LEEDSTS6 230 5039 ARGO DS 230 1	602	75.7	94.5	4157 MILLER8 500 4375 S.BESS 8 500 1	22	--
SBA	5180 N.OPEL6 230 5310 HILLABEE 230 1	602	87.0	94.6	4965 DANWAYSS 230 5310 HILLABEE 230 1	5	--
SBA	4233 CLAY 3 115 4234 CLAY 6 230 1	398	93.3	94.7	4234 CLAY 6 230 5039 ARGO DS 230 1	22	--
SBA	4640 SILVER 6 230 5341 EST SHR TAP 230 1	807	89.7	94.7	4638 CHICK 6 230 4640 SILVER 6 230 2	17	--
SBA	7061 CRIST 115 7111 PACE2 115 1	155	88.6	94.8	7060 CRIST 230 7310 SHOAL RV 230 1	27	--
SBA	1882 N CAMILLA 230 2510 RACCOON CK 230 1	509	94.6	94.9	218 S BAINBRDGE 230 4601 FARLEY 6 230 1	12	--

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AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	914 GALEY&LORD+ 115 915 PINSON 115 1	96	93.7	95.0	907 HAMMOND 115 2403 COOSA J1 115 1	8	--
SBA	4638 CHICK 6 230 4640 SILVER 6 230 2	807	90.2	95.0	4638 CHICK 6 230 5341 EST SHR TAP 230 1	17	--
SBA	165 W BRUNSWICK 230 2592 THALMANN 2 230 1	509	94.8	95.1	2380 THAL LS1 230 2591 THALMANN 1 230 1	6	--
SBA	911 ARMUCHEE J 115 914 GALEY&LORD+ 115 1	96	93.8	95.1	907 HAMMOND 115 2403 COOSA J1 115 1	8	--
SBA	1102 FT MITCH J 115 1114 FT BEN AL 115 1	124	94.6	95.6	10 FORTSON 500 24 N TIFTON 500 1	7	--
SBA	618 S COLUMBUS 115 1102 FT MITCH J 115 1	124	94.6	95.6	10 FORTSON 500 24 N TIFTON 500 1	7	--
SBA	1626 KATHLEEN 115 1627 FRITO LAY + 115 1	124	94.5	95.6	150 BONAIRE 230 1603 KATHLEEN 230 1	4	--
SBA	4572 JACKTAPB 115 4755 FULTON 115 1	159	80.3	95.7	4584 JACKTAPA 115 4738 LOWMTAPA 115 1	25	--
SBA	4572 JACKTAPB 115 5899 LOWMTAPB2 115 1	159	80.3	95.7	4584 JACKTAPA 115 4755 FULTON 115 1	25	--
SBA	592 DANIEL SD 115 9144 RICH HL TAP 115 1	255	95.4	96.0	2152 DORCHESTER 230 9051 LT OGEECHEE 230 1	23	--
SBA	149 S MACON 230 767 S MACON 115 1	280	95.6	96.1	149 S MACON 230 767 S MACON 115 2	15	--
SBA	612 FIRST AVE + 115 4466 PHENX DS 115 1	135	95.5	96.2	5158 FULLERRD 230 5517 FULL RD3 115 1	24	--
SBA	147 BRANCH + 230 148 GORDON 230 1	497	94.6	96.2	147 BRANCH + 230 172 W MILLEDGVL 230 1	7	--
SBA	4443 THURLOW 115 4924 MTVMILTP 115 1	138	86.6	96.2	3021 LONGLEAF 500 4600 FARLEY 8 500 1	5	--
SBA	1729 W V RICA 115 2486 HICKORY LVL 115 1	124	93.4	96.3	184 BREMEN 230 969 BREMEN 115 1	22	--
SBA	8702 DANIEL 230 8705 MSPT EFR 230 1	866	88.6	96.3	4642 BIG CK 6 230 8702 DANIEL 230 1	3	--
SBA	2035 S HALL 230 3067 CANDLER 230 1	509	88.5	96.3	3 NORCROSS 500 11 S HALL 500 1	13	--
SBA	4644 N THEO 6 230 8710 MOSSPT E 230 1	574	81.8	96.3	4642 BIG CK 6 230 8702 DANIEL 230 1	16	--
SBA	4249 RED MTN 115 4252 SMISTEEL 115 1	216	96.0	96.5	4157 MILLER8 500 5312 CLAY 8 500 1	22	--
SBA	4719 WESTGATE 115 4841 RUCKERTP 115 1	107	83.7	96.5	4598 PINCK 6 230 5351 S.ENTER TS6 230 1	18	--
SBA	4484 CUBA 115 8045 KEWNE TP 115 1	117	79.3	96.7	4471 GREENCO6 230 8006 LAUDRDL E 230 1	21	--
SBA	149 S MACON 230 767 S MACON 115 2	280	96.3	96.8	149 S MACON 230 767 S MACON 115 1	15	--
SBA	33 ADAMSVILLE 230 36 JACK MCD 230 1	485	95.6	96.8	36 JACK MCD 230 41 PEACHTREE 230 1	14	--
SBA	4638 CHICK 6 230 5341 EST SHR TAP 230 1	807	91.8	96.8	4638 CHICK 6 230 4640 SILVER 6 230 2	17	--
SBA	4118 PRTBRKTP 115 4523 HUNTERSS 115 1	138	96.9	96.9	4942 E.PRATVL 115 5898 CO LINE3 115 1	4	--
SBA	612 FIRST AVE + 115 616 BLNCHARD IP 115 1	199	96.4	96.9	612 FIRST AVE + 115 1561 RIVERFRONTJ 115 1	7	--
SBA	4678 TANERWIL 115 8832 HARLESTN 115 1	107	78.9	96.9	4642 BIG CK 6 230 8702 DANIEL 230 1	16	--
SBA	615 VICTORY DR 115 1500 CHLORIDE + 115 1	124	96.0	97.0	614 BROOKHAVEN 115 1561 RIVERFRONTJ 115 1	10	--
SBA	4234 CLAY 6 230 5039 ARGO DS 230 1	602	78.1	97.0	4157 MILLER8 500 4375 S.BESS 8 500 1	22	--
SBA	7528 SINAI3 115 403153 WOODRUFF TP2115 1	320	96.9	97.2	218 S BAINBRDGE 230 1813 R_S BAINBRG 230 1	13	--
SBA	471 N LAVONIA 115 2003 AIRLINE 2 115 1	216	94.4	97.7	94 BIO 230 105 VANNA 230 1	2	--
SBA	318004 PURVIS 161 318007 5MOROW161 161 2	296	96.3	98.0	318004 PURVIS 161 318007 5MOROW161 161 1	25	--
SBA	318004 PURVIS 161 318007 5MOROW161 161 1	296	96.4	98.1	318004 PURVIS 161 318007 5MOROW161 161 2	25	--
SBA	17079 OPINE RD 115 17147 OPP SW 3 115 1	157	96.9	98.9	17010 COFFEE SP JC115 17222 LIBERTY3 115 1	27	--

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	4260 SO PARK 115 4261 ALAMETAL 115 1	246	84.1	99.2	4157 MILLER8 500 4375 S.BESS 8 500 1	22	--
SBA	821 MILLEDGEVL 115 1612 FISHING CRK 115 1	188	97.9	99.3	147 BRANCH + 230 148 GORDON 230 1	7	--
SBA	4189 PRATCTY3 115 4261 ALAMETAL 115 1	246	84.3	99.5	4157 MILLER8 500 4375 S.BESS 8 500 1	22	--
SBA	7116 JAY RD2 115 7120 MUNSON 115 1	100	90.0	99.5	7060 CRIST 230 7310 SHOAL RV 230 1	27	--

Scenario Explanations:

1) Barry Unit #5 Offline, Summer Peak Case
2) Bowen Unit #4 Offline, Summer Peak Case
3) Farley Unit #1 Offline, Summer Peak Case
4) Farley Unit #2 Offline, Summer Peak Case
5) Franklin Unit #2 Offline, Summer Peak Case
6) Hatch Unit #1 Offline, Summer Peak Case
7) Hatch Unit #2 Offline, Summer Peak Case
8) Hammond Unit #4 Offline, Summer Peak Case
9) Kemper IGCC Unit Offline, Summer Peak Case
10) McDonough Unit #5 Offline, Summer Peak Case
11) Scherer Unit #1 Offline, Summer Peak Case
12) Smith Unit #3 Offline, Summer Peak Case
13) Vogtle Unit #2 Offline, Summer Peak Case
14) Wansley Unit #1 Offline, Summer Peak Case
15) Yates Unit #7 Offline, Summer Peak Case
16) Barry Unit #5 Offline, Shoulder (93% Load Level) Case
17) Crist Unit #7 Offline, Shoulder (93% Load Level) Case
18) Farley Unit #1 Offline, Shoulder (93% Load Level) Case
19) Farley Unit #2 Offline, Shoulder (93% Load Level) Case
20) Franklin Unit #2 Offline, Shoulder (93% Load Level) Case
21) Greene Co. Unit #1 Offline, Shoulder (93% Load Level) Case
22) Gaston Unit #5 Offline, Shoulder (93% Load Level) Case
23) Hatch Unit #1 Offline, Shoulder (93% Load Level) Case
24) Harris Unit #1 Offline, Shoulder (93% Load Level) Case
25) Kemper IGCC Unit Offline, Shoulder (93% Load Level) Case
26) Scholtz Unit #2 Offline, Shoulder (93% Load Level) Case
27) Smith Unit #3 Offline, Shoulder (93% Load Level) Case
28) Gorgas Unit #10 Offline, Shoulder (93% Load Level) Case
28) Watson Unit #5 Offline, Summer Peak Case

PowerSouth

Table 3.4. Transmission System Impacts – *PowerSouth*

The following table identifies constraints in PowerSouth attributable to the proposed transfer. Enhancements were identified to alleviate these constraints.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project

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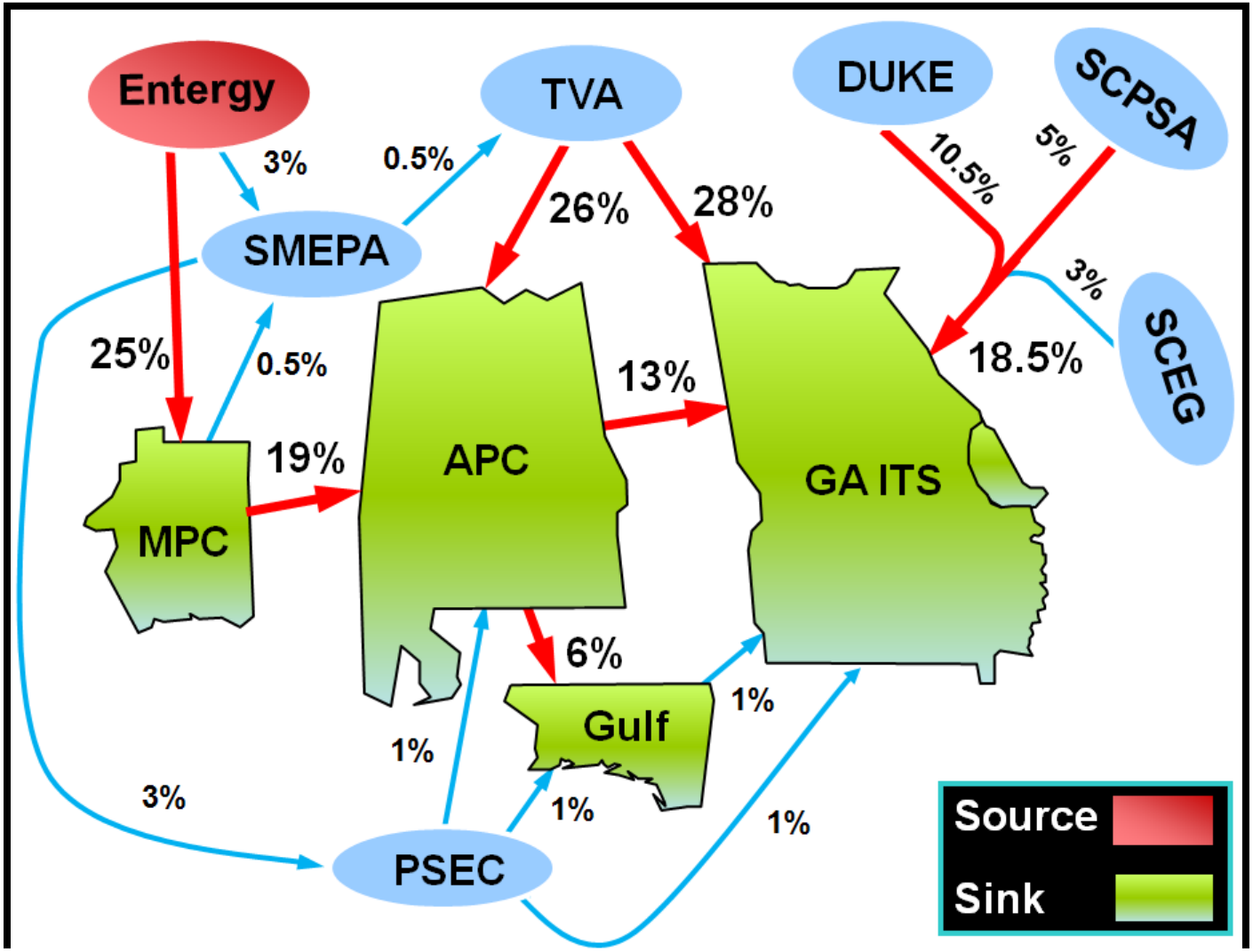
AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
PS	17048 CLAYHAT3 115.00 17300 DALE CO 115.00 1	157	83.0	105.0	17149 OPP 6 230 5351 S.ENTER TS6 230 1	1	P14

Scenario Explanations:

1) No Unit Offline, Shoulder (93% Load Level) Case

EES Border to the SBA: Transfer Flows within the SERTP



Note: Red arrows indicate transfer percentages of greater than 5%.

Potential Solutions for Identified Constraints

The following projects are potential solutions to address the identified constraints and are based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the current projected enhancements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. These potential solutions only address constraints identified within the SERTP Sponsors' areas that are associated with the proposed transfer. Other Balancing Areas were not monitored which could result in additional limitations and required system improvements.

Table 3.5. Potential Solutions for Identified Constraints – *Southern Balancing Authority*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P1	**Russell Dam – Athena 230 kV T.L.** • Construct approximately 45 miles of new 230 kV transmission line from Russell Dam to Athena with bundled (2) 1351 ACSR at 100 ℃.	2016	$61,000,000
P2	**Fulton Area Improvements** • Reconductor the 9.1 mile section from Fulton to Thomasville DS along the Fulton – Thomasville TS 115 kV T.L with 795 ACSR at 100 ℃. • Upgrade approximately 23.1 miles of the Fulton – Lowman 115 kV T.L. to 125 ℃. • Upgrade approximately 41.6 miles of the Fulton – McIntosh 115 kV T.L. to 125 ℃.	2016	$27,600,000
P3	**Jesup – Ludowici 115 kV T.L.** • Reconductor the 7.5 mile section from Jesup to Rayonier along the Jesup – Ludowici 115 kV T.L. with 795 ACSR at 100 ℃. (Advancement of a 2017 project)	2016	Total Cost $2,700,000 Advancement Cost $250,000
P4	**Attalla – Albertville 161 kV T.L.** • Reconductor approximately 0.05 miles of the 19.6 mile 161 kV transmission line with 1351 ACSR at 100 ℃ from Attalla to Albertville • Replace the two (2) 161 / 115 kV Autobanks at Attalla substation with two (2) 200 MVA Autobanks.	2016	$18,700,000(1)
P5	**Blakeley Island – Silverhill 115 kV T.L.** • Reconductor the 11.7 mile section from Spanish Fort to Silverhill along the Blakeley Island – Silverhill 115 kV T.L. with 1033 ACSS at 160 ℃.	2016	$11,100,000
P6	**Barry – Atmore 115 kV T.L.** • Reconductor the 16.9 mile section from Barry to Stockton Tap along the Barry – Atmore 115 kV T.L. with 795 ACSR at 125 ℃.	2016	$6,300,000
P7	**Logtown West - NASA 115 kV T.L.** • Reconductor approximately 3.0 miles along the Logtown West – NASA 115 kV T.L. with 795 ACSS at 125℃.	2016	$1,100,000
P8	**Morton – Forest Industrial 115 kV T.L.** • Reconductor approximately 3.86 miles along the Morton – Forest Industrial 115 kV T.L. with 636 ACSR at 100℃.	2016	$1,400,000(1)

Item	Potential Solution	Estimated Need Date	Estimated Cost
P9	**South Enterprise – Opp 230 kV T.L.** • Reconductor approximately 22.1 miles along the South Enterprise – Opp 230 kV T.L. with 1351 ACSR at 100℃. • Upgrade the 230/115 kV Transformer at South Enterprise substation to 400 MVA.	2016	$22,100,000
P10	**Sylacauga – Martin 115 kV T.L.** • Reconductor the 23.6 mile section from Sylacauga TS to Alex Tap along the existing Sylacauga – Martin 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$8,300,000
P11	**Wade – Big Creek 115 kV T.L.** • Upgrade approximately 16.8 miles along the Wade – Big Creek 115 kV T.L. from 100 ℃ to 125 ℃ operation.	2016	$6,300,000
P12	**Fayette – Gorgas 161 kV T.L.** • Reconductor approximately 38.8 miles along the Fayette – Gorgas 161 kV T.L. with 1351 ACSR at 100 ℃.	2016	$29,000,000
P13	**Collins – Magee 115 kV T.L.** • Reconductor approximately 8.5 miles of the Collins – Magee 115 kV transmission line with 795 ACSR at 100 ℃.	2016	$3,000,000[(1)]
SBA Total ($2011)			$196,150,000

[(1)] This transmission solution was proposed to alleviate the loading of a tie-line constraint between the SBA and a non-participating Transmission Owner. Therefore, the cost associated with the transmission solution is only for the portion of solution that is located within the participating Transmission Owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating Transmission Owners were not evaluated. These impacts, as well as coordinated transmission solutions to alleviate any identified constraints, can be determined if this transfer is brought forth to be evaluated in the Southeast Inter-Regional Participation Process ("SIRPP").

Table 3.6. Potential Solutions for Identified Constraints – *PowerSouth*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P14	**Clayhatchee – Dale Co. 115 kV T.L.** • Reconductor approximately 10 miles of 115 kV transmission line from Clayhatchee to Dale Co. with 795 ACSR at 100 ℃.	2016	$1,500,000
PowerSouth Total ($2011)			$1,500,000

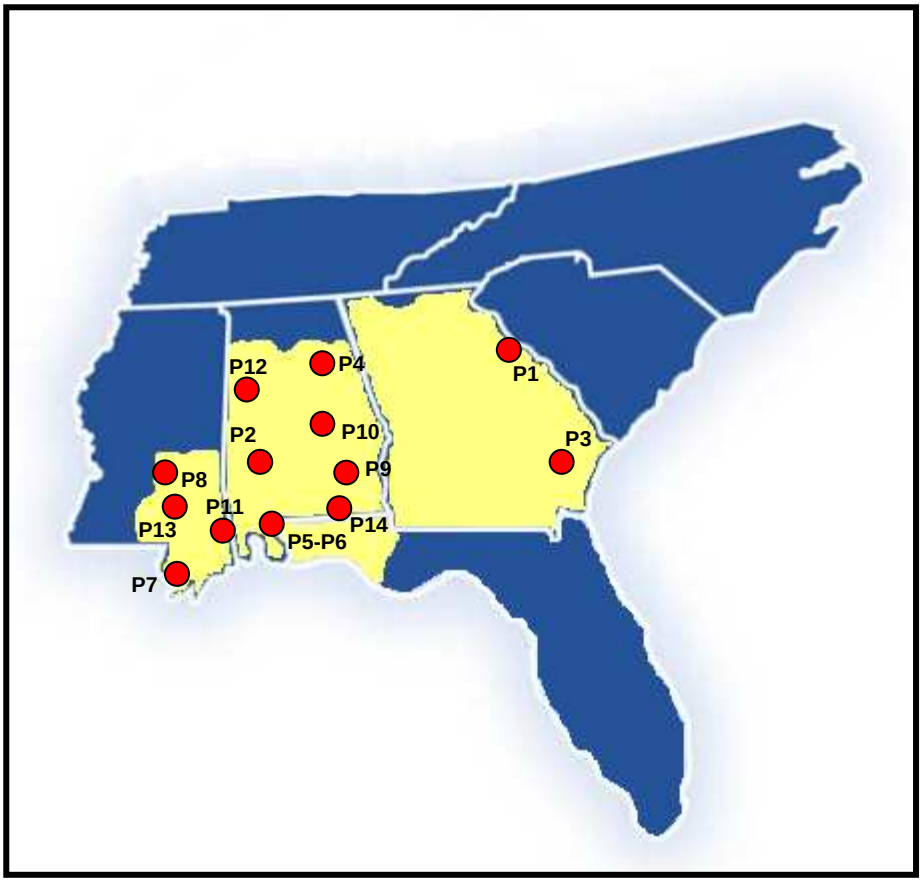
Table 3.7. Total Cost of the EES Border to SBA 1500 MW Transfer

Area	Estimated Cost
SBA Total	$196,150,000
PowerSouth Total	$1,500,000

Area	Estimated Cost
TOTAL ($2011)	**$197,650,000[(1)]**

[(1)] Total cost does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by 6/1/2016. The studied transfer depends on these projects being in-service by 6/1/2016. If any of these projects are delayed or cancelled, the cost to support the study transfer could be greater than the total shown above.

Diagram 3.1. Approximate Location of Potential Solutions



Interchange Assumptions

Table 3.8. Transactions Modeled in Starting Point Cases

OASIS Ref. #	POR	POD	Amount (MW)
735231	*SOCO*	*Duke*	*50*
735232	*SOCO*	*Duke*	*25*
823644	*SOCO*	*Duke*	*90*
823646	*SOCO*	*Duke*	*90*
891294	*SOCO*	*Duke*	*35*
940076	*EES*	*Duke*	*100*
911948	*EES*	*GTC*	*50*
921615	*EES*	*GTC*	*50*
787707	*SOCO*	*TVA*	*46*
672440	*TVA*	*SOCO*	*214*
77603	*SOCO*	*PSEC*	*114*
765080	*PSEC*	*SOCO*	*1024*
--	*SOCO*	*PSEC*	*5*
--	*MEAG*	*PSEC*	*62*
--	*SOCO*	*PSEC*	*267*
--	*SEPA*	*SOCO*	*681*
--	*SBA*	*FRCC*	*3700*

Table 3.9. Additional Transactions Modeled in Cases

OASIS Ref. #	POR	POD	Amount (MW)
869848	*EES*	*SOCO*	*150*
903932	*EES*	*SOCO*	*500*
854479	*EES*	*SOCO*	*163*
882565	*SCPSA*	*SOCO*	*50*
869847	*Duke*	*SOCO*	*50*
147617	*SC*	*GTC*	*296*
147616	*SCEG*	*GTC*	*285*
147615	*Duke*	*GTC*	*465*
147613	*TVA*	*GTC*	*310*
72133712	*Duke*	*MEAG*	*50*

Table 3.10. Capacity Benefit Margin Modeled (CBM)

Transmission Owner	Interface	Amount (MW)
Southern	*Duke*	*310*
Southern	*TVA*	*400*
Southern	*EES*	*100*
Southern	*SCPSA*	*120*
Southern	*SCEG*	*120*

Table 3.11. Transmission Reliability Margins Modeled (TRM)

Transmission Owner	Interface	Amount (MW)
Southern	*From Duke*	*196*
GTC	*From Duke*	*106*
MEAG	*From Duke*	*25*
Dalton	*From Duke*	*3*
Southern	*From Entergy*	*205*
Southern	*From TVA*	*231*
GTC	*From TVA*	*51*
MEAG	*From TVA*	*12*
Dalton	*From TVA*	*2*

EES Border to the Southern Balancing Authority ("SBA")

80% Load Level Screen

1500 MW

Study Structure and Assumptions

Transfer Sensitivity	Transfer Amount	Transfer Source	Transfer Sink	Study Year
EES Border to SBA	1500 MW	EES	SBA	2016
Load Flow Cases				
2011 Series Version 2A Cases: Summer Conditions (80% load level)				
Source Modeled				
The source for this transfer was assumed to be a new generator interconnecting to the existing El Dorado 500 kV Substation near El Dorado, AR.				

Transmission System Impacts

The 1500 MW transfer from EES to the SBA results in overloads of several 161 kV and 115 kV facilities. Tables 4.1 through 4.2 below identify thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Southern Balancing Authority

Table 4.1. Pass 0 – Transmission System Impacts With No Enhancements – *Southern Balancing Authority*
The following table identifies constraints in the Southern Balancing Authority ("SBA") without any enhancements to the transmission system.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	4412 ALEX TAP 115 5059 KELLYTON 115 1	113	91.3	105.0	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P1
SBA	4128 PIT&MTAP 161 4979 BANKSTON 161 1	193	92.0	127.3	4157 MILLER8 500 5307 WVERN SS 500 1	8	P2
SBA	4678 TANERWIL 115 8832 HARLESTN 115 1	107	77.2	101.8	4642 BIG CK 6 230 8702 DANIEL 230 1	1	P3
SBA	4410 SUNLEVTP 115 5059 KELLYTON 115 1	113	93.2	106.9	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P1
SBA	1099 N JESUP 115 1100 RAYONIER + 115 1	124	98.6	101.0	15 THALMANN 500 2158 MCCALL RD 500 1	5	P4
SBA	4127 FAY COTN 161 4979 BANKSTON 161 1	193	93.8	129.1	4157 MILLER8 500 5307 WVERN SS 500 1	8	P2
SBA	4121 FAYET TS 161 4127 FAY COTN 161 1	193	93.8	129.1	4157 MILLER8 500 5307 WVERN SS 500 1	8	P2

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	4409 HOLLINS 115 4410 SUNLEVTP 115 1	113	99.4	113.1	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P1
SBA	8816 WADE SS 115 8832 HARLESTN 115 1	104	84.2	109.4	4642 BIG CK 6 230 8702 DANIEL 230 1	1	P3
SBA	4395 SYLCAUTS 115 4409 HOLLINS 115 1	113	99.7	111.8	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	P1

Table 4.2. Pass 1 – Transmission System Impacts With All Proposed Enhancements – *Southern Balancing Authority*

The following table depicts loadings of transmission facilities in the Southern Balancing Authority ("SBA") with all proposed enhancements applied to the transmission system. The resulting facilities in the table below could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the 2016 study year.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following facilities could become potential constraints in future years or with different queuing assumptions							
SBA	4547 PINEDALE 115 4548 ECI HALS 115 1	138	80.2	90	4512 SNOWDN8 500 4600 FARLEY 8 500 1	4	--
SBA	821 MILLEDGEVL 115 1612 FISHING CRK 115 1	188	89.8	90.4	147 BRANCH + 230 148 GORDON 230 1	12	--
SBA	4260 SO PARK 115 4261 ALAMETAL 115 1	246	84.5	91.4	4157 MILLER8 500 4375 S.BESS 8 500 1	7	--
SBA	4189 PRATCTY3 115 4261 ALAMETAL 115 1	246	84.7	91.7	4157 MILLER8 500 4375 S.BESS 8 500 1	7	--
SBA	461 JACKSON LK 115 1917 S COV J 115 1	71	85.7	92	746 S GRIFFIN 115 750 GA BRD CORR 115 1	2	--
SBA	4297 MOODY SS 115 4762 LEHGH TP 115 1	212	90.3	92.4	4233 CLAY 3 115 4246 SPRINGVL 115 1	9	--
SBA	9052 LT OGEECHEE 115 9144 RICH HL TAP 115 1	255	90.7	92.6	2140 DORCHESTER 115 2152 DORCHESTER 230 1	5	--
SBA	8280 COLLINS 115 336760 3MAGEE 115 1	100	88.3	92.9	8270 HATBG SW 230 8310 PURVIS 230 1	13	--
SBA	7320 NICEVLE 115 7325 VALPARAI 115 1	207	34	93.1	7310 SHOAL RV 230 7915 SHAKY JO 230 1	4	--
SBA	4400 GASTON 230 5220 BYNUM6 230 1	502	92.8	93.4	4234 CLAY 6 230 4247 ONEONTA6 230 1	9	--
SBA	4965 DANWAYSS 230 5310 HILLABEE 230 1	641	86.2	93.8	5180 N.OPEL6 230 5310 HILLABEE 230 1	6	--
SBA	1612 FISHING CRK 115 1653 FISHINGCK J 115 1	188	93.6	94.2	147 BRANCH + 230 148 GORDON 230 1	12	--
SBA	1653 FISHINGCK J 115 1664 W MILLEDGVL 115 1	188	93.6	94.3	147 BRANCH + 230 148 GORDON 230 1	12	--
SBA	4332 ATTALLA5 161 360283 5ALBERTVILLE161 1	193	83.7	94.6	4234 CLAY 6 230 4247 ONEONTA6 230 1	7	--
SBA	4658 BLAKELEY 115 4659 KIMCLARK 115 1	216	87.7	95.1	4655 N MOBILE 115 5159 CHKBOGSS 115 1	3	--
SBA	4400 GASTON 230 4996 POWERSYS 230 1	602	86.4	95.4	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	--
SBA	1627 FRITO LAY + 115 2263 WATERFORD 115 1	124	94.6	95.4	150 BONAIRE 230 1603 KATHLEEN 230 1	5	--
SBA	5180 N.OPEL6 230 5310 HILLABEE 230 1	602	88.1	96.3	4965 DANWAYSS 230 5310 HILLABEE 230 1	6	--
SBA	4240 LEEDSTS3 115 4762 LEHGH TP 115 1	212	95	97.2	4233 CLAY 3 115 4246 SPRINGVL 115 1	9	--
SBA	117 WAYNESBORO 230 562 WAYNESBORO 115 1	280	96.3	97.9	117 WAYNESBORO 230 118 WADLEY PRI 230 1	11	--

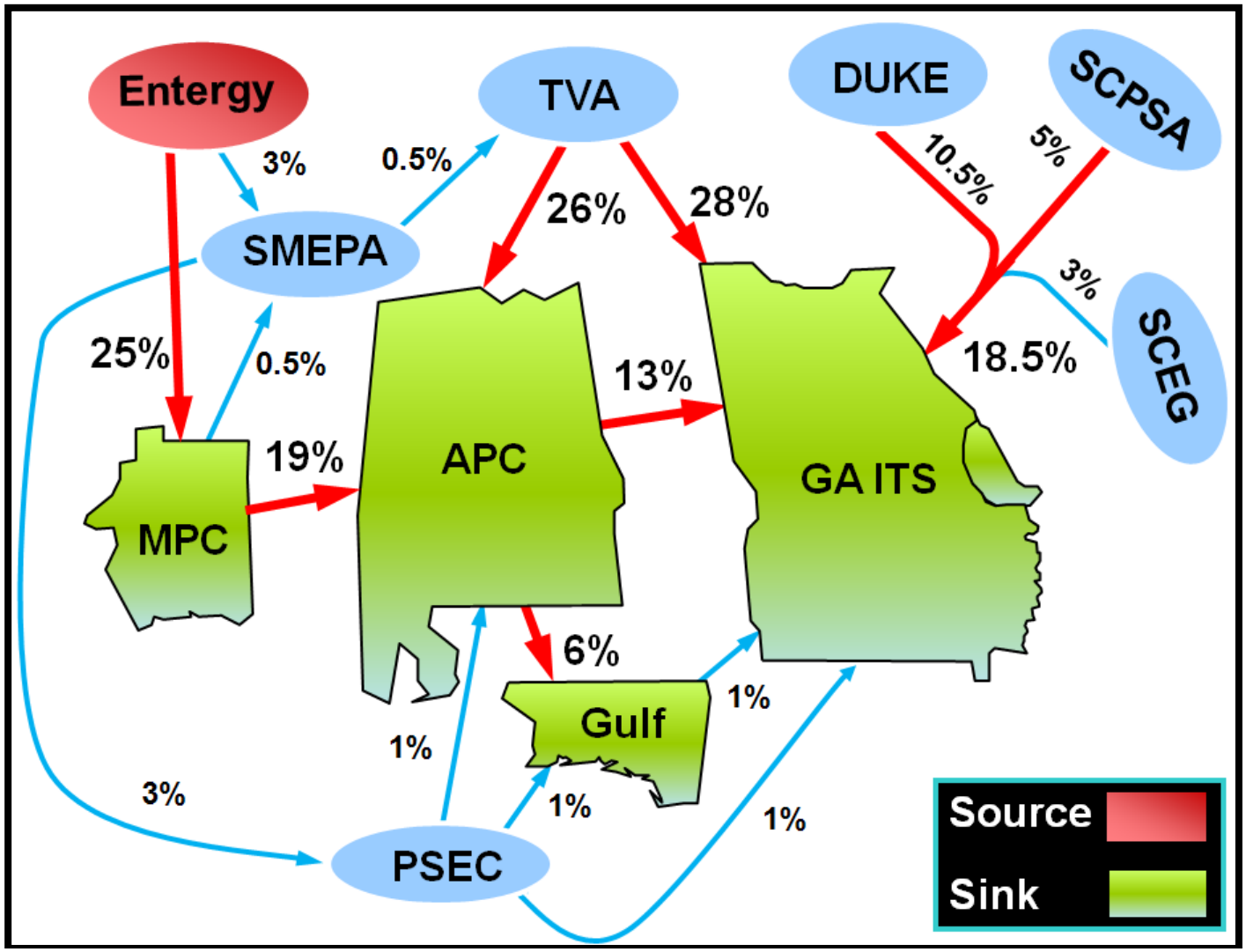
SERTP 2011 Economic Study Results
December 2011

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	5058 FAYETVIL 230 5897 CO LINE6 230 1	577	89.1	98.6	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	--
SBA	4996 POWERSYS 230 5058 FAYETVIL 230 1	577	89.8	99.3	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	10	--

Scenario Explanations:

1) Barry Unit # 5 Offline, Summer 80% Load Level Case
2) Branch Unit # 4 Offline, Summer 80% Load Level Case
3) Crist Unit # 7 Offline, Summer 80% Load Level Case
4) Farley Unit # 1 Offline, Summer 80% Load Level Case
5) Farley Unit # 2 Offline, Summer 80% Load Level Case
6) Franklin Unit # 2 Offline, Summer 80% Load Level Case
7) Gaston Unit # 5 Offline, Summer 80% Load Level Case
8) Gorgas Unit # 10 Offline, Summer 80% Load Level Case
9) Hammond Unit # 4 Offline, Summer 80% Load Level Case
10) Harris Unit # 1 Offline, Summer 80% Load Level Case
11) Hatch Unit # 1 Offline, Summer 80% Load Level Case
12) Hatch Unit # 2 Offline, Summer 80% Load Level Case
13) Kemper IGCC Unit Offline, Summer 80% Load Level Case

EES Border to the SBA: Transfer Flows within the SERTP



Note: Red arrows indicate transfer percentages of greater than 5%.

Potential Solutions for Identified Constraints

The following projects are potential solutions to address the identified constraints and are based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the current projected enhancements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. These potential solutions only address constraints identified within the SERTP Sponsors' areas that are associated with the proposed transfer. Other Balancing Areas were not monitored which could result in additional limitations and required system improvements.

Table 4.3. Potential Solutions for Identified Constraints – *Southern Balancing Authority*

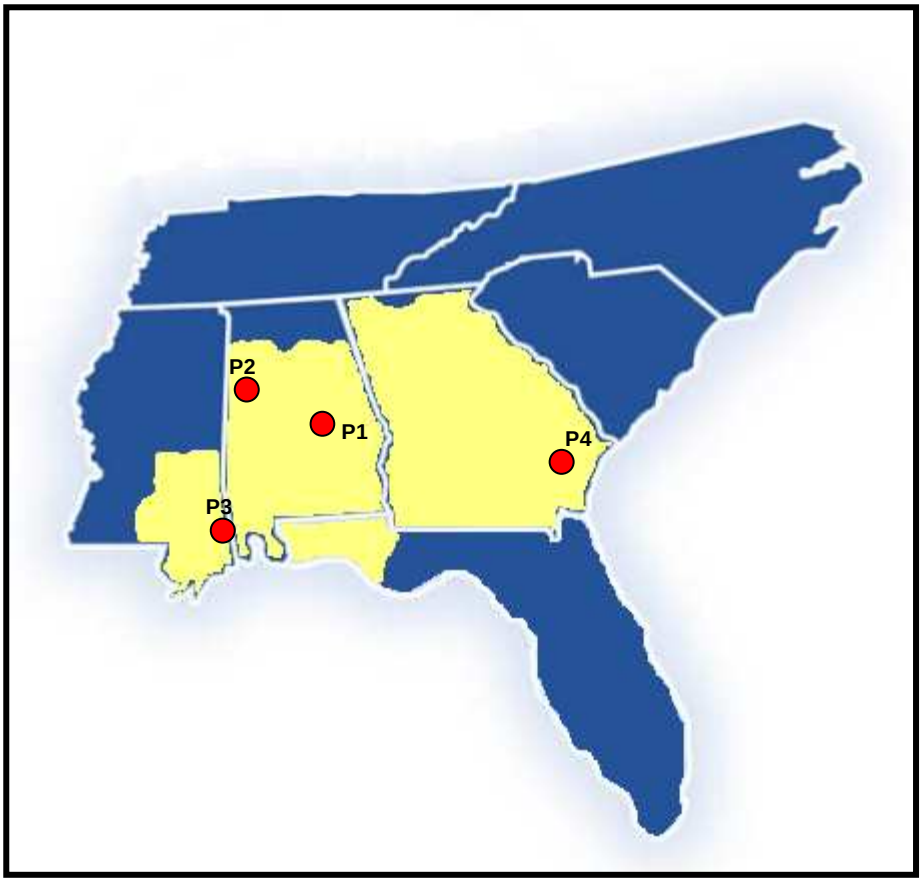
Item	Potential Solution	Estimated Need Date	Estimated Cost
P1	**Sylacauga – Martin 115 kV T.L.** • Reconductor the 23.6 mile section from Sylacauga TS to Alex Tap along the existing Sylacauga – Martin 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$8,300,000
P2	**Fayette – Gorgas 161 kV T.L.** • Reconductor approximately 38.8 miles along the Fayette – Gorgas 161 kV T.L. with 1351 ACSR at 100 ℃.	2016	$29,000,000
P3	**Wade – Big Creek 115 kV T.L.** • Upgrade the 16.8 miles of the Wade – Big Creek 115 kV T.L. from 100 ℃ to 125 ℃ operation.	2016	$6,300,000
P4	**Jesup – Ludowici 115 kV T.L.** • Reconductor the 7.5 mile section from Jesup to Rayonier along the Jesup – Ludowici 115 kV T.L. with 795 ACSR at 100 ℃. (Advancement of a 2017 project)	2016	Total Cost $2,700,000 Advancement Cost $250,000
SBA Total ($2011)			$43,850,000

Table 4.4. Total Cost of the EES Border to SBA 1500 MW Transfer (80% of Summer Peak Screen)

Area	Estimated Cost
SBA Total	$43,850,000
TOTAL ($2011)	**$43,850,000[(1)]**

[(1)] Total cost does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by 6/1/2016. The studied transfer depends on these projects being in-service by 6/1/2016. If any of these projects are delayed or cancelled, the cost to support the study transfer could be greater than the total shown above.

Diagram 4.1. Approximate Location of Potential Solutions



Interchange Assumptions

Table 4.5. Transactions Modeled in Starting Point Cases

OASIS Ref. #	POR	POD	Amount (MW)
735231	*SOCO*	*Duke*	*50*
735232	*SOCO*	*Duke*	*25*
823644	*SOCO*	*Duke*	*90*
823646	*SOCO*	*Duke*	*90*
891294	*SOCO*	*Duke*	*35*
940076	*EES*	*Duke*	*100*
911948	*EES*	*GTC*	*50*
921615	*EES*	*GTC*	*50*
787707	*SOCO*	*TVA*	*46*
672440	*TVA*	*SOCO*	*214*
77603	*SOCO*	*PSEC*	*114*
765080	*PSEC*	*SOCO*	*1024*
--	*SOCO*	*PSEC*	*5*
--	*MEAG*	*PSEC*	*62*
--	*SOCO*	*PSEC*	*267*
--	*SEPA*	*SOCO*	*681*
--	*SBA*	*FRCC*	*3700*

Table 4.6. Additional Transactions Modeled in Cases

OASIS Ref. #	POR	POD	Amount (MW)
869848	*EES*	*SOCO*	*150*
903932	*EES*	*SOCO*	*500*
854479	*EES*	*SOCO*	*163*
882565	*SCPSA*	*SOCO*	*50*
869847	*Duke*	*SOCO*	*50*
147617	*SC*	*GTC*	*296*
147616	*SCEG*	*GTC*	*285*
147615	*Duke*	*GTC*	*465*
147613	*TVA*	*GTC*	*310*
72133712	*Duke*	*MEAG*	*50*

Table 4.7. Capacity Benefit Margin Modeled (CBM)

Transmission Owner	Interface	Amount (MW)
Southern	*Duke*	*310*
Southern	*TVA*	*400*
Southern	*EES*	*100*
Southern	*SCPSA*	*120*
Southern	*SCEG*	*120*

Table 4.8. Transmission Reliability Margins Modeled (TRM)

Transmission Owner	Interface	Amount (MW)
Southern	*From Duke*	*196*
GTC	*From Duke*	*106*
MEAG	*From Duke*	*25*
Dalton	*From Duke*	*3*
Southern	*From Entergy*	*205*
Southern	*From TVA*	*231*
GTC	*From TVA*	*51*
MEAG	*From TVA*	*12*
Dalton	*From TVA*	*2*

SCPSA Border to the Southern Balancing Authority ("SBA")

1000 MW

Study Structure and Assumptions

Transfer Sensitivity	Transfer Amount	Transfer Source	Transfer Sink	Study Year
SCPSA Border to SBA	1000 MW	SCPSA	SBA	2016
Load Flow Cases				
2011 Series Version 2A Cases: Summer Peak and Shoulder (93% load level)				
Source Modeled				
The source for this transfer was a uniform load reduction in SCPSA.				

Transmission System Impacts

The 1000 MW transfer from SCPSA to the SBA results in overloads of several 230 kV and 115 kV facilities. Tables 5.1 through 5.3 below identify thermal constraints attributable to the requested transfer for the contingency and scenario that resulted in the highest facility loading for the conditions studied. Other unit out scenarios or contingencies may also result in constraints to these or other facilities.

Southern Balancing Authority

Table 5.1. Pass 0 – Transmission System Impacts With No Enhancements – *Southern Balancing Authority*

The following table identifies significant constraints in the Southern Balancing Authority ("SBA") without any enhancements to the transmission system. Projects were first identified to alleviate these constraints before alleviating the remaining constraints because the proposed enhancements could significantly alter load flow in the SBA.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	104 LEXINGTON 230 133 R_E WATKNVL 230 1	602	93.7	103.3	11 S HALL 500 306105 8OCONEE 500 1	19	P1
SBA	94 BIO 230 105 VANNA 230 1	433	96.2	104.0	11 S HALL 500 306105 8OCONEE 500 1	19	P1
SBA	104 LEXINGTON 230 339100 6RUSSEL 230 1	596	98.0	107.8	11 S HALL 500 306105 8OCONEE 500 1	19	P1

Table 5.2. Pass 1 – Transmission System Impacts With Proposed Enhancement "P1" – *Southern Balancing Authority*

The following table identifies constraints in the Southern Balancing Authority ("SBA") with the proposed enhancement "P1" applied to the transmission system. Enhancements were identified to alleviate the remaining constraints.

AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
The following constraints have been identified as directly attributable to the above defined transfer.							
SBA	4410 SUNLEVTP 115 5059 KELLYTON 115 1	113	93.5	100.3	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	14	P2(2)
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 2	111	88.4	100.4	4234 CLAY 6 230 4247 ONEONTA6 230 1	4	P11
SBA	8816 WADE SS 115 8832 HARLESTN 115 1	104	99.4	100.7	4642 BIG CK 6 230 8702 DANIEL 230 1	1	P3
SBA	4127 FAY COTN 161 4979 BANKSTON 161 1	193	93.8	101.3	4157 MILLER8 500 5307 WVERN SS 500 1	5	P4
SBA	863 ZUTA 115 2397 TOWNSEND 115 1	114	87.1	101.4	15 THALMANN 500 2158 MCCALL RD 500 1	11	P5
SBA	4121 FAYET TS 161 4127 FAY COTN 161 1	193	93.8	101.4	4157 MILLER8 500 5307 WVERN SS 500 1	5	P4
SBA	4331 ATTALLA3 115 4332 ATTALLA5 161 1	99	89.4	101.6	4234 CLAY 6 230 4247 ONEONTA6 230 1	4	P11
SBA	1626 KATHLEEN 115 1627 FRITO LAY + 115 1	124	93.8	101.8	150 BONAIRE 230 1603 KATHLEEN 230 1	13	P6
SBA	592 DANIEL SD 115 9144 RICH HL TAP 115 1	255	95.8	102.1	2152 DORCHESTER 230 9051 LT OGEECHEE 230 1	9	P7
SBA	1417 HORSE CRK 115 2162 ELAM CH 115 1	155	88.2	102.3	15 THALMANN 500 2158 MCCALL RD 500 1	9	P8(2)
SBA	1095 JESUP 115 1099 N JESUP 115 1	124	87.7	106.0	15 THALMANN 500 2158 MCCALL RD 500 1	9	P9
SBA	4409 HOLLINS 115 4410 SUNLEVTP 115 1	113	99.8	106.5	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	14	P2(2)
SBA	1099 N JESUP 115 1100 RAYONIER + 115 1	124	98.6	116.6	15 THALMANN 500 2158 MCCALL RD 500 1	9	P9
SBA	9052 LT OGEECHEE 115 9144 RICH HL TAP 115 1	255	105.2(1)	111.5	2152 DORCHESTER 230 9051 LT OGEECHEE 230 1	9	P7
SBA	4395 SYLCAUTS 115 4409 HOLLINS 115 1	113	104.6(1)	111.4	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	14	P2(2)
SBA	1627 FRITO LAY + 115 2263 WATERFORD 115 1	124	101.4(1)	109.4	150 BONAIRE 230 1603 KATHLEEN 230 1	13	P6
SBA	4332 ATTALLA5 161 360283 5ALBERTVILLE161 1	193	96.7	109.9	4234 CLAY 6 230 4247 ONEONTA6 230 1	4	P11
SBA	9021 MCINTOSH 115 370475 3JASPER 115 1	254	71.5	122.0	9001 MCINTOSH 230 312721 6PURRYSB 230 1	18	N/A(3)

(1) A current operating procedure is sufficient to alleviate this identified constraint without the addition of the proposed transfer. However, the additional transfer exacerbates the loading on this transmission facility such that the operating procedure becomes insufficient.

(2) Reconductoring only the identified constrained transmission line segments results in overloads of subsequent line segments. Therefore, the proposed enhancement includes the reconductor of the identified line segments and any additional segments required.

(3) The limiting element of this tie-line constraint is located within SCE&G

Table 5.3. Pass 2 – Transmission System Impacts With Proposed Enhancements – *Southern Balancing Authority*

The following table depicts loadings of transmission facilities in the Southern Balancing Authority ("SBA") with all proposed enhancements applied to the transmission system. The resulting facilities in the table below could become potential constraints in future years or with different queuing assumptions, but are not overloaded in the 2016 study year.

			Thermal Loadings (%)				
AREA	**Limiting Element**	**Rating (MVA)**	**Without Request**	**With Request**	**Contingency**	**Scenario**	**Project**
The following facilities could become potential constraints in future years or with different queuing assumptions							
SBA	915 PINSON 115 1754 METAL CON 115 1	135	88.5	88.6	181 ROCKY MTN 230 182 HAMMOND 230 1	6	--
SBA	5180 N.OPEL6 230 5310 HILLABEE 230 1	602	84.8	89.1	4965 DANWAYSS 230 5310 HILLABEE 230 1	18	--
SBA	115 VOGTLE + 230 116 WILSON 230 1	807	87.1	89.4	8 VOGTLE 500 9 W MCINTOSH 500 1	8	--
SBA	856 THAL SS J 115 1472 CYPRESS PT 115 1	155	87.6	89.8	163 COLERAIN 230 2591 THALMANN 1 230 1	13	--
SBA	5058 FAYETVIL 230 5897 CO LINE6 230 1	577	73.7	89.8	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	14	--
SBA	722 PEARSON J 115 1085 KETTLECK PR 115 1	47	81.3	89.9	222 N TIFTON 230 1877 OSCEOLA SW 230 1	20	--
SBA	222 N TIFTON 230 1877 OSCEOLA SW 230 1	509	90.0	90.4	1875 E MOULTRIE 230 1888 E BERLIN 230 1	20	--
SBA	4996 POWERSYS 230 5058 FAYETVIL 230 1	577	74.5	90.7	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	14	--
SBA	160 HATCH + 230 164 UNION SCHL 230 1	509	91.5	91.7	15 THALMANN 500 2380 THAL LS1 230 1	13	--
SBA	4678 TANERWIL 115 8832 HARLESTN 115 1	107	90.6	91.9	4642 BIG CK 6 230 8702 DANIEL 230 1	1	--
SBA	560 LOUISVL JCT 115 562 WAYNESBORO 115 1	124	84.8	92.1	117 WAYNESBORO 230 118 WADLEY PRI 230 1	9	--
SBA	4644 N THEO 6 230 8710 MOSSPT E 230 1	574	91.0	92.3	4642 BIG CK 6 230 8702 DANIEL 230 1	1	--
SBA	3067 CANDLER 230 3073 BRASELTON 230 1	509	89.0	92.4	3 NORCROSS 500 11 S HALL 500 1	19	--
SBA	4128 PIT&MTAP 161 4979 BANKSTON 161 1	193	92.0	92.6	4157 MILLER8 500 5307 WVERN SS 500 1	5	--
SBA	8705 MSPT EFR 230 8710 MOSSPT E 230 1	866	92.0	92.8	4642 BIG CK 6 230 8702 DANIEL 230 1	1	--
SBA	117 WAYNESBORO 230 118 WADLEY PRI 230 1	556	84.7	93.0	15 THALMANN 500 2158 MCCALL RD 500 1	9	--
SBA	4572 JACKTAPB 115 4755 FULTON 115 1	138	88.9	93.2	4584 JACKTAPA 115 4755 FULTON 115 1	16	--
SBA	4572 JACKTAPB 115 5899 LOWMTAPB2 115 1	138	88.9	93.2	4584 JACKTAPA 115 4755 FULTON 115 1	16	--
SBA	969 BREMEN 115 1731 N MOUNTZION 115 1	188	92.7	93.3	976 SAND HILL 115 2486 HICKORY LVL 115 1	15	--
SBA	844 E VIDALIA 115 1476 W LYONS J2 115 1	135	90.5	93.4	160 HATCH + 230 162 S HAZLEHRST 230 1	13	--
SBA	4374 S.BESS 6 230 5036 S BESS 3 115 1	480	91.4	93.5	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	4	--
SBA	4260 SO PARK 115 4261 ALAMETAL 115 1	246	88.3	93.5	4157 MILLER8 500 4375 S.BESS 8 500 1	3	--
SBA	594 RIVER 115 9029 MELDRIM 115 1	155	85.0	93.5	15 THALMANN 500 2158 MCCALL RD 500 1	9	--
SBA	4233 CLAY 3 115 4234 CLAY 6 230 1	398	93.4	93.7	4234 CLAY 6 230 5039 ARGO DS 230 1	4	--
SBA	4189 PRATCTY3 115 4261 ALAMETAL 115 1	246	88.5	93.7	4157 MILLER8 500 4375 S.BESS 8 500 1	3	--
SBA	914 GALEY&LORD+ 115 915 PINSON 115 1	96	93.8	93.9	907 HAMMOND 115 2403 COOSA J1 115 1	6	--
SBA	5060 GREENWD 115 5203 AIRPT LN 115 1	216	93.7	93.9	4374 S.BESS 6 230 5036 S BESS 3 115 1	17	--

SERTP 2011 Economic Study Results
December 2011

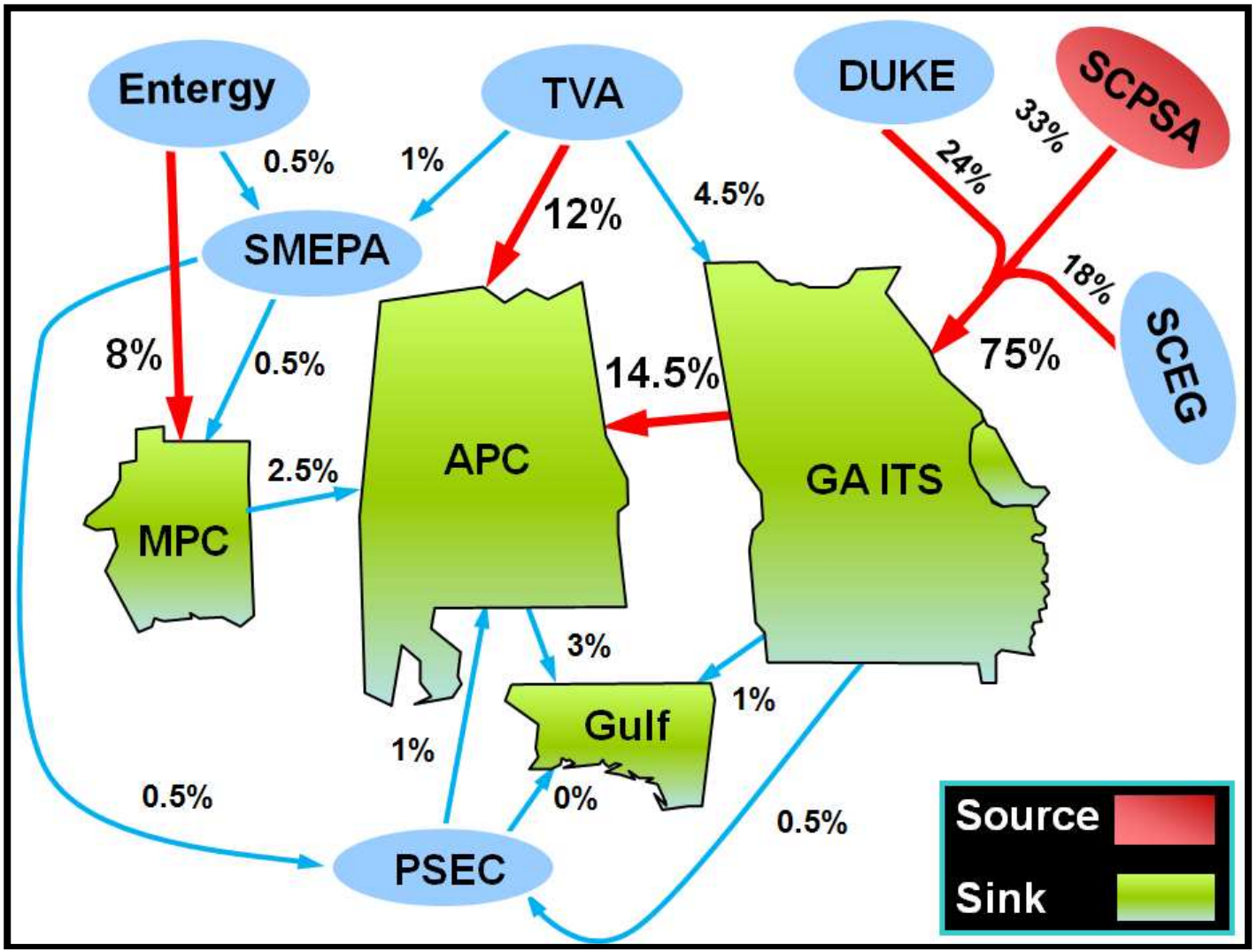
AREA	Limiting Element	Rating (MVA)	Thermal Loadings (%) Without Request	Thermal Loadings (%) With Request	Contingency	Scenario	Project
SBA	4740 GKN W LD 115 5257 HALACLTP 115 1	107	92.2	93.9	4514 S MONTG3 115 4547 PINEDALE 115 1	12	--
SBA	863 ZUTA 115 2397 TOWNSEND 115 1	124	87.1	93.9	15 THALMANN 500 2158 MCCALL RD 500 1	11	--
SBA	588 LUDOWICI 115 2397 TOWNSEND 115 1	124	80.2	94.1	15 THALMANN 500 2158 MCCALL RD 500 1	11	--
SBA	1882 N CAMILLA 230 2510 RACCOON CK 230 1	509	94.6	94.7	218 S BAINBRDGE 230 4601 FARLEY 6 230 1	20	--
SBA	4200 BESSEMER 115 5060 GREENWD 115 1	216	94.5	94.7	4374 S.BESS 6 230 5036 S BESS 3 115 1	17	--
SBA	165 W BRUNSWICK 230 2592 THALMANN 2 230 1	509	94.8	95.1	2380 THAL LS1 230 2591 THALMANN 1 230 1	8	--
SBA	4755 FULTON 115 5367 GDC TP 115 1	112	92.1	95.1	4755 FULTON 115 5065 LPAC TP 115 1	17	--
SBA	8702 DANIEL 230 8705 MSPT EFR 230 1	866	94.4	95.3	4642 BIG CK 6 230 8702 DANIEL 230 1	1	--
SBA	592 DANIEL SD 115 2159 STRLNGTP 115 1	124	86.2	95.6	2152 DORCHESTER 230 9051 LT OGEECHEE 230 1	9	--
SBA	9001 MCINTOSH 230 312721 6PURRYSB 230 1	956	66.1	95.7	8 VOGTLE 500 9 W MCINTOSH 500 1	18	--
SBA	150 BONAIRE 230 1603 KATHLEEN 230 1	433	92.7	96.0	24 N TIFTON 500 222 N TIFTON 230 1	12	--
SBA	33 ADAMSVILLE 230 36 JACK MCD 230 1	485	95.9	96.6	36 JACK MCD 230 41 PEACHTREE 230 1	22	--
SBA	318004 PURVIS 161 318007 5MOROW161 161 2	296	96.5	97.3	318004 PURVIS 161 318007 5MOROW161 161 1	17	--
SBA	318004 PURVIS 161 318007 5MOROW161 161 1	296	96.7	97.4	318004 PURVIS 161 318007 5MOROW161 161 2	17	--
SBA	149 S MACON 230 767 S MACON 115 1	280	95.6	97.4	149 S MACON 230 767 S MACON 115 2	23	--
SBA	5203 AIRPT LN 115 5706 BNTBRKTP 115 1	138	97.3	97.6	4374 S.BESS 6 230 5036 S BESS 3 115 1	17	--
SBA	1729 W V RICA 115 2486 HICKORY LVL 115 1	124	94.7	97.6	184 BREMEN 230 969 BREMEN 115 1	7	--
SBA	4200 BESSEMER 115 4202 BESSGRCO 230 1	392	96.0	97.8	5123 BILLNGSS 500 5178 AUTAUSS8 500 1	4	--
SBA	149 S MACON 230 767 S MACON 115 2	280	96.2	98.0	149 S MACON 230 767 S MACON 115 1	23	--
SBA	2035 S HALL 230 3067 CANDLER 230 1	509	95.0	98.3	3 NORCROSS 500 11 S HALL 500 1	19	--
SBA	4584 JACKTAPA 115 4755 FULTON 115 1	112	93.8	98.4	5121 BOISE TP 115 17099 LOWMAN3 115 1	16	--
SBA	4574 MCINOLIN 115 4738 LOWMTAPA 115 1	112	93.9	98.5	5121 BOISE TP 115 17099 LOWMAN3 115 1	16	--
SBA	4629 EMCSTOCK 115 4701 BARRY 3 115 1	212	98.2	98.6	4612 BREWT TP 115 4622 N BREW 3 115 1	2	--
SBA	147 BRANCH + 230 148 GORDON 230 1	497	94.3	98.8	147 BRANCH + 230 172 W MILLEDGVL 230 1	10	--
SBA	863 ZUTA 115 864 W BRUNSWICK 115 1	114	83.9	99.1	15 THALMANN 500 2158 MCCALL RD 500 1	11	--
SBA	240 E POINT B1 115 303 COL PK #3 J 115 1	135	98.1	99.8	251 E POINT B2 115 264 E POINT 4 115 1	21	--

Scenario Explanations:

1) Barry Unit #5 Offline, Summer Peak Case
2) Crist Unit #7 Offline, Summer Peak Case
3) Gaston Unit #5 Offline, Summer Peak Case
4) Gaston Unit #5 Offline, Shoulder (93% Load Level) Case
5) Gorgas Unit #10 Offline, Shoulder (93% Load Level) Case
6) Hammond Unit #4 Offline, Summer Peak Case
7) Harris Unit #1 Offline, Shoulder (93% Load Level) Case
8) Hatch Unit #1 Offline, Summer Peak Case
9) Hatch Unit #1 Offline, Shoulder (93% Load Level) Case
10) Hatch Unit #2 Offline, Summer Peak Case

11) Hatch Unit #2 Offline, Shoulder (93% Load Level) Case
12) Farley Unit #1 Offline, Summer Peak Case
13) Farley Unit #2 Offline, Summer Peak Case
14) Farley Unit #2 Offline, Shoulder (93% Load Level) Case
15) Franklin Unit #2 Offline, Summer Peak Case
16) Greene Co. Unit #1 Offline, Shoulder (93% Load Level) Case
17) Kemper IGCC Offline, Shoulder (93% Load Level) Case
18) McIntosh CC Offline, Shoulder (93% Load Level) Case
19) Scherer Unit #1 Offline, Summer Peak Case
20) Smith Unit #3 Offline, Summer Peak Case
21) Vogtle Unit #2 Offline, Summer Peak Case
22) Wansley Unit #1 Offline, Summer Peak Case
23) Yates Unit #7 Offline, Summer Peak Case

SCPSA Border to the SBA: Transfer Flows within the SERTP



Note: Red arrows indicate transfer percentages of greater than 5%.

Potential Solutions for Identified Constraints

The following projects are potential solutions to address the identified constraints and are based on the assumptions used in this study. It must be noted that changes to the load forecast, and/or changes in the expansion plan could occur, and would impact the results of this study. In addition, the current projected enhancements to the transmission system were modeled in the cases. Changes to system conditions and/or the transmission system expansion plans could also impact the results of this study. These potential solutions only address constraints identified within the SERTP Sponsors' areas that are associated with the proposed transfer. Other Balancing Areas were not monitored which could result in additional limitations and required system improvements.

Table 5.4. Potential Solutions for Identified Constraints – *Southern Balancing Authority*

Item	Potential Solution	Estimated Need Date	Estimated Cost
P1	**Russell Dam – Athena 230 kV T.L.** • Construct approximately 45 miles of new 230 kV transmission line from Russell Dam to Athena with bundled (2) 1351 ACSR at 100 ℃.	2016	$61,000,000
P2	**Sylacauga – Martin 115 kV T.L.** • Reconductor the 23.6 mile section from Sylacauga TS to Alex Tap along the existing Sylacauga – Martin 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$8,300,000
P3	**Wade Substation** • Replace the 4/0 CU jumpers at Wade substation on the Wade – Big Creek 115 kV T.L.	2016	$50,000
P4	**Fayette – Gorgas 161 kV T.L.** • Reconductor the 9.5 mile section from Fayette to Bankston along the Fayette – Gorgas 161 kV T.L. with 1351 ACSR at 100 ℃.	2016	$4,800,000
P5	**Zuta Substation** • Replace the 350 AAC jumpers at Zuta substation along the West Brunswick – Ludowici 115 kV T.L. with 2-350 AAC jumpers. (Advancement of a 2017 project)	2016	Total Cost $50,000 Advancement Cost $10,000
P6	**Kathleen – Bonaire 115 kV T.L.** • Reconductor the 4.2 mile section from Kathleen to Waterford along the Kathleen – Bonaire 115 kV T.L. with 795 ACSR at 100 ℃.	2016	$1,500,000
P7	**Daniel Siding – Little Ogeechee 115 kV T.L.** • Reconductor approximately 9.6 miles along the Daniel Siding – Little Ogeechee 115 kV T.L. with bundled (2) 336 ACSS at 200 ℃. (Advancement of a 2017 project)	2016	Total Cost $4,800,000 Advancement Cost $400,000
P8	**Hinesville – Ludowici 115 kV T.L.** • Reconductor approximately 8.1 miles along the Horse Creek – Ludowici 115 kV T.L. with 795 ACSR at 100 °C. (Advancement of a 2017 project)	2016	Total Cost $2,900,000 Advancement Cost $250,000
P9	**Jesup – Ludowici 115 kV T.L.** • Reconductor the 7.5 mile section from Jesup to Rayonier along the Jesup – Ludowici 115 kV T.L. with 795 ACSR at 100 ℃. (Advancement of a 2017 project)	2016	Total Cost $2,700,000 Advancement Cost $250,000
P10	**Attalla – Albertville 161 kV T.L.** • Reconductor approximately 0.05 miles of the 19.6 mile 161 kV transmission line with 1351 ACSR at 100 ℃ from Attalla to Albertville	2016	$18,700,000[(1)]

Item	Potential Solution	Estimated Need Date	Estimated Cost
	• Replace the two (2) 161 / 115 kV Autobanks at Attalla substation with two (2) 200 MVA Autobanks.		
SBA Total ($2011)			$95,260,000

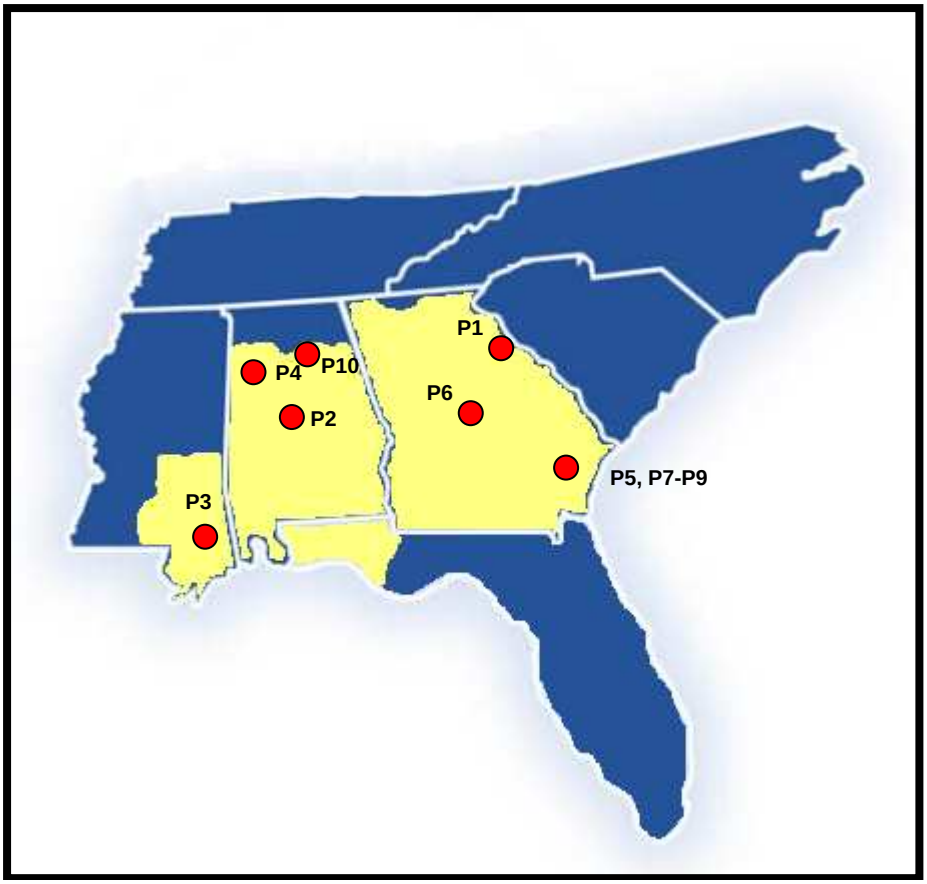
(1) This transmission solution was proposed to alleviate the loading of a tie-line constraint between the SBA and a non-participating Transmission Owner. Therefore, the cost associated with the transmission solution is only for the portion of solution that is located within the participating Transmission Owners' territory. This solution effectively alleviates the identified constraint(s), however, the impacts to adjacent transmission systems that are external to the participating Transmission Owners were not evaluated. These impacts, as well as coordinated transmission solutions to alleviate any identified constraints, can be determined if this transfer is brought forth to be evaluated in the Southeast Inter-Regional Participation Process ("SIRPP").

Table 5.5. Total Cost of the SCPSA Border to SBA 1000 MW Transfer

Area	Estimated Cost
SBA Total	$95,260,000
TOTAL ($2011)	**$95,260,000(1)**

(1) Total cost does not include the cost of projects that are included in SERTP Sponsors' expansion plans and are scheduled to be completed by 6/1/2016. The studied transfer depends on these projects being in-service by 6/1/2016. If any of these projects are delayed or cancelled, the cost to support the study transfer could be greater than the total shown above.

Diagram 5.1. Approximate Location of Potential Solutions



Interchange Assumptions

Table 5.6. Transactions Modeled in Starting Point Cases

OASIS Ref. #	POR	POD	Amount (MW)
735231	*SOCO*	*Duke*	*50*
735232	*SOCO*	*Duke*	*25*
823644	*SOCO*	*Duke*	*90*
823646	*SOCO*	*Duke*	*90*
891294	*SOCO*	*Duke*	*35*
940076	*EES*	*Duke*	*100*
911948	*EES*	*GTC*	*50*
921615	*EES*	*GTC*	*50*
787707	*SOCO*	*TVA*	*46*
672440	*TVA*	*SOCO*	*214*
77603	*SOCO*	*PSEC*	*114*
765080	*PSEC*	*SOCO*	*1024*
--	*SOCO*	*PSEC*	*5*
--	*MEAG*	*PSEC*	*62*
--	*SOCO*	*PSEC*	*267*
--	*SEPA*	*SOCO*	*681*
--	*SBA*	*FRCC*	*3700*

Table 5.7. Additional Transactions Modeled in Cases

OASIS Ref. #	POR	POD	Amount (MW)
869848	*EES*	*SOCO*	*150*
903932	*EES*	*SOCO*	*500*
854479	*EES*	*SOCO*	*163*
882565	*SCPSA*	*SOCO*	*50*
869847	*Duke*	*SOCO*	*50*
147617	*SC*	*GTC*	*296*
147616	*SCEG*	*GTC*	*285*
147615	*Duke*	*GTC*	*465*
147613	*TVA*	*GTC*	*310*
72133712	*Duke*	*MEAG*	*50*

Table 5.8. Capacity Benefit Margin Modeled (CBM)

Transmission Owner	Interface	Amount (MW)
Southern	*Duke*	*310*
Southern	*TVA*	*400*
Southern	*EES*	*100*
Southern	*SCPSA*	*120*
Southern	*SCEG*	*120*

Table 5.9. Transmission Reliability Margins Modeled (TRM)

Transmission Owner	Interface	Amount (MW)
Southern	*From Duke*	*196*
GTC	*From Duke*	*106*
MEAG	*From Duke*	*25*
Dalton	*From Duke*	*3*
Southern	*From Entergy*	*205*
Southern	*From TVA*	*231*
GTC	*From TVA*	*51*
MEAG	*From TVA*	*12*
Dalton	*From TVA*	*2*