



**TRANSMISSION LINE & SUBSTATION PROJECTS**

**COMPANY: EAI, ELL, EMI, ETI**

**PROJECT NAME: ARKANSAS IPPS TO SPP SOUTH 2408MW TRANSFER**

**REQUESTED ON: 01/12/2012**

**COMPLETED ON 04/13/2012**

**CLASS 5**  
**SCOPE AND ESTIMATE**

**Rev 0**

<b>Rev</b>	<b>Issue Date</b>	<b>Description of Revision</b>	<b>Prepared By</b>
0	04/13/12	Approved Draft	Transmission Project Development
F	4/12/12	Final Draft for Review	Transmission Project Development
E	4/10/12	Compiled Document with PM&C	Transmission Project Development

**DISCLAIMER**

*This Class 5 estimate has been prepared without the benefit of detailed engineering or study data. The solution set reflects the current understanding of the proposed project. **The estimate should not be considered to be more than - 50%+100% accurate and is intended to be used as a screening tool by the Customer.** There are many variables which are unknown at this time and which will be addressed during detailed scoping. These variables could significantly change the scope of work and this cost estimate. In order to proceed with the project, a Project Execution Plan should be developed which will result in a more definitive scope of work and cost estimate. Please note the major assumptions used in preparation of this preliminary scope and estimate which are listed in section 2.*

## 1. PROJECT SUMMARY

### 1.1. Background on Customer Need and Location

The FERC Order 890 calls for a coordinated, open and transparent planning process. In particular, the Order required Transmission Providers to engage in planning processes on both a local and regional level and to meet the Commission's nine planning principles which include information exchange and regional coordination.

The Entergy OATT Attachment K satisfies FERC Order 890's regional planning process requirements. In particular, Section 13 of Attachment K (and the SPP OATT Attachment O) provide for the creation of the Entergy SPP RTO Regional Planning Process (ESRPP) to identify system enhancements that may relieve regional congestion between Entergy and Southwest Power Pool. The process includes sharing of system plans to ensure that they are simultaneously feasible and otherwise use consistent assumptions and data. The main objectives of the ESRPP are to:

- Improve regional transfer capability, improve regional optimization, and relieve constraining flowgates.
- to provide a more robust transmission system capable of more economic delivery of power across the region

To facilitate this process, the ICT coordinates with Entergy, SPP and its respective members by sharing system plans, addressing requests for regional studies, and identifying opportunities for regional optimization of the Construction Plan. To the extent other adjoining transmission owners have seams agreements or joint planning processes with Entergy, the ICT will identify any opportunities for regional optimization of Entergy's Construction Plan with the construction plans of those adjoining transmission owners. The ICT also reviews such optimization opportunities with the Entergy, other affected transmission owners, Interested Government Agencies, stakeholders, and other interested parties.

The ICT conducts up to five stakeholder requested studies intended to identify system enhancements that may relieve regional congestion in the ESRPP process. ESRPP projects are studied through load flow and transfer analyses to determine their scope and benefit. Upgrades are studied in a long-term Entergy/SPP RTO combined model. Upgrades generally focus on EHV expansion, rather than upgrading the underlying system.

The following two-step process is used to study up to five different projects annually.

- Step 1 (high-level): Projects are identified such that they increase transfer capability between a control area in SPP and a control area in Entergy
- The evaluation will consist of a high level transfer study and identification of constraints and likely transmission enhancements to resolve the identified constraints.

## ESRPP – IPP to SPP Class 5 Scope & Estimate Summary

- The ICT also provides approximate costs and timelines associated with the identified transmission enhancements to facilitate the stakeholders' determination of whether they have sufficient interest to pursue the more detailed Step 2 evaluation
- Step 2 (detailed): This step involves more detailed full-AC analysis of the project with the transfer baked into the loadflow model in the subsequent year's planning cycle. This step is performed by Entergy.
- May include additional coordination with external processes, impacted stakeholders and TOs.
- Entergy also develops detailed cost estimates and timelines associated with these final transmission enhancements.

The transmission projects whose class 5 cost estimates are included in this document were identified as upgrades necessary to alleviate thermal and voltage constraints observed in the ESRPP 2011 Step 2 process for the transfer scenario of 2408 MW transfer from Arkansas IPPs to SPP South. The Class 5 estimates provided in this document will be used in the final report for the ESRPP 2011 study and for the fulfillment of Entergy's obligations for the providing these cost estimates for this step 2 study scenario.

### **1.2. Planning Studies**

Based on the load flow analysis, the projects shown in Table 1.2 were identified. These projects will be required for the requested transfer.

### **1.3. Proposed Solution**

Each project identified in Table 1.2 was reviewed and a scope and estimate were developed. The detail project descriptions are shown in the appendices.

### **1.4. Cost Estimate**

A cost estimate summary for the projects is shown in Table 1.4 with an Appendix Reference Number. The estimates shown in the table do not include a Tax Gross Up (TGU) allocation which may apply (except as noted). Any project that will be subject to a TGU will be charged the rate applicable to the jurisdiction the project is constructed.

These estimates are based on the assumptions detailed within this report. There may be additional costs, outside the stated accuracy range (-50% +100%) that are required based on final construction considerations.

### **1.5. Duration Schedule**

Each project was reviewed and high level durations were developed. Table 1.5 is a duration summary for of each project. For additional details, see the individual project. A schedule has not been developed to that includes all the projects. However many projects are in the approved construction plan and are being developed.

**1.6. Projects Included in Construction Plan**

Projects that have been identified in the Entergy Delivery Construction Plan are identified in Table 1.6.

**2. GENERAL ASSUMPTIONS AND RISK**

The assumptions and risks for each project are detailed with each project detailed in the appendices.

**Table 1.2  
Project Identification**

<b>S. No</b>	<b>Name of the project</b>	<b>Rating based on worst case flow*</b>	<b>Rating used in load flow for new project</b>
1	Construct Etta to Pittsburg 500 kV line		2800 MVA
1A	Provide new 500 kV terminal at Etta		
2	Install two 500/345 kV autos at Pittsburg.		800 MVA
2A	Provide new 500 kV ring bus at Pittsburg		
3	Construct 2 <sup>nd</sup> ANO to Fort Smith 500kV line		1299 MVA
3A	Provide new 500 kV Terminal at ANO		
4	Install 2 <sup>nd</sup> 500/345 kV Auto at Fort Smith		
5	Upgrade RSS – Pecan Creek 345 kV line		1195 MVA
6	Upgrade Calico Rock to Norfolk 161 kV section.	170 MVA	335 MVA
7	Upgrade Melbourne to Calico Rock 161 kV section.	170 MVA	335 MVA
8	Upgrade Quitman to Bee Branch 161 kV terminal equipment	190 MVA	223 MVA
9	Upgrade Cheetah to Hot Springs Village 115 kV section	112 MVA	239 MVA
10	Construct new 115 kV line from Hot Springs Hamilton (Albright) to Carpenter Dam		239 MVA
10A	Construct Hot Springs Hamilton Substation		
10B	Construct new terminal at Hot Springs Milton		
10C	Construct new line from Hot Springs Milton to Hot Springs Hamilton		
10D	Construct new terminal at Carpenter Dam		
10E	Upgrade Mt Pine to Breaker Station		
11	Upgrade Cedar Hill to Plantation 138 kV section.	290 MVA	478 MVA
12	Upgrade Plantation to Conroe 138 kV section.	275 MVA	478 MVA
13	Upgrade Truman to AECC Truman West 161 kV section.	182 MVA	335 MVA
14	Upgrade East Vicksburg to Edwards 115 kV section.	168 MVA	240 MVA
15	Upgrade Little Rock South to Little Rock Creek 115kV section.	310 MVA	398 MVA
16	Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section		239 MVA
17	Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section		239 MVA
18	Upgrade Jacinto to Splendor 138 kV section.	250 MVA	478 MVA
19	Upgrade Splendor to Apollo 138 kV section.	210 MVA	478 MVA

**Table 1.2  
Project Identification**

20	Upgrade Baxter Wilson to South East Vicksburg 115kV section.	170 MVA	240 MVA
21	Upgrade Little Rock West to Little Rock Palm Street 115 kV section.	161 MVA	239 MVA
22	Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section		239 MVA
23	Upgrade Harrison East to Summit 161 kV section	181 MVA	363 MVA
24	Upgrade ISES to Moorefield 161 kV section.	334 MVA	363 MVA
25	Upgrade Moorefield to Batesville 161 kV section.	334 MVA	363 MVA
26	Upgrade Walnut Ridge to Hoxie South 161 kV section.	175 MVA	234 MVA
27	Upgrade Cane River to Winn Prison 115 kV section.	85 MVA	114 MVA
28	Upgrade Winn Prison to Winnfield 115 kV section.	85 MVA	114 MVA
29	Add 2 <sup>nd</sup> 161/69 kV auto at Thayer South		50 MVA
30	Add 20.4 MVAR capacitor bank at Wilmar.		
31	Upgrade Conroe 138 kV bus tie breaker.	295 MVA	-

\* At this rating the line may be closer to 100 % loading.

Project high-lighted in **Rose** are other customer  
 Projects high-lighted in **Green** are ETI projects.  
 Projects high-lighted in **Yellow** are EMI projects  
 Projects not high-lighted are EAI projects

**Table 1.4  
Project Cost Summary**

<b>S. No</b>	<b>Name of the project</b>	<b>Estimate</b>	<b>Reference</b>
1	Construct Etta to Pittsburg 500 kV line	\$196,430,000	A-1
1A	Provide new 500 kV terminal at Etta	\$9,625,000	A-2
2	Install two 500/345 kV autos at Pittsburg.	By owner	
2A	Provide new 500 kV Ring bus at Pittsburg	By owner	
3	Construct 2 <sup>nd</sup> ANO to Fort Smith 500kV line	\$191,800,000	B-1
3A	Provide new 500 kV Terminal at ANO	\$9,549,000	B-2
4	Install 2 <sup>nd</sup> 500/345 kV Auto at Fort Smith	By owner	
5	Upgrade RSS – Pecan Creek 345 kV line	By owner	
6	Upgrade Calico Rock to Norfolk 161 kV section	\$6,375,000	C-1
7	Upgrade Melbourne to Calico Rock 161 kV section	\$12,665,000	C-2
8	Upgrade Quitman to Bee Branch 161 kV terminal equipment	\$131,000	D
9	Upgrade Cheetah to Hot Springs Village 115 kV section	\$14,297,000	E
10	Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam (239 MVA)	\$8 016,000	F-1
10A	Construct new Hot Springs Hamilton Substation	\$3,776,000	F-2
10B	Construct new 115 kV Terminal at Hot Springs Milton (176 MVA)	\$47,000	F-3
10C	Construct new 115 kV line from HS Milton to HS Hamilton	\$7,796,000	F-4
10D	Construct new 115 kV terminal at Carpenter Dam	\$4,123,000	F-5
10F	Upgrade Mt Pine to Breaker Station	\$4,644,000	F-6
11	Upgrade Cedar Hill to Plantation 138 kV section.	\$2,098,000	G
12	Upgrade Plantation to Conroe 138 kV section.	\$3,148,000	H
13	Upgrade Truman to AECC Truman West 161 kV section	\$6,388,000	I
14	Upgrade East Vicksburg to Edwards 115 kV section. <i>(Cost includes TGU for EMI)</i>	\$16,9260,000	J
15	Upgrade Little Rock South to Little Rock Creek 115kV section	\$4,760,000	K
16	Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section	\$398,000	L-1
17	Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section	\$111,000	L-2
18	Upgrade Jacinto to Splendor 138 kV section	\$11,475,000	M-1
19	Upgrade Splendor to Apollo 138 kV section	\$2,241,000	M-2
20	Upgrade Baxter Wilson to South East Vicksburg 115kV section. <i>(Cost includes TGU for EMI)</i>	\$7,417,000	N
21	Upgrade Little Rock West to Little Rock Palm Street 115 kV section	\$5,070,000	O

**Table 1.4  
Project Cost Summary**

22	Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section	\$93,000	L-3
23	Upgrade Harrison East to Summit 161 kV section	\$17,004,000	P
24	Upgrade ISES to Moorefield 161 kV section	\$3,501,000	Q-1
25	Upgrade Moorefield to Batesville 161 kV section	\$3,480,000	Q-2
26	Upgrade Walnut Ridge to Hoxie South 161 kV section	\$5,500,000	R
27	Upgrade Cane River to Winn Prison 115 kV section	\$10,447,000	S-1
28	Upgrade Winn Prison to Winnfield 115 kV section	\$4,773,000	S-2
29	Add 2 <sup>nd</sup> 161/60 kV auto at Thayer South	\$2,260,000	T
30	Add 20.4 MVAR capacitor bank at Wilmar	\$832,000	U
31	Upgrade Conroe 138 kV bus tie breaker	Removed	
	<b>Total for all projects</b>	<b>\$708,201,000</b>	



**Table 1.5  
Project Duration Summary**

<b>S. No</b>	<b>Name of the project</b>	<b>Duration</b>	<b>Ref</b>
1	Construct Etta to Pittsburg 500 kV line	70 - 96 Months	A-1
1A	Provide new 500 kV terminal at Etta	32 Months	A-2
2	Install two 500/345 kV autos at Pittsburg		
2A	Provide new 500 kV Ring bus at Pittsburg		
3	Construct 2 <sup>nd</sup> ANO to Fort Smith 500kV line	70 - 96 Months	B-1
3A	Provide new 500 kV Terminal at ANO	36 Months	B-2
4	Install 2 <sup>nd</sup> 500/345 kV Auto at Fort Smith		
5	Upgrade RSS – Pecan Creek 345 kV line		
6	Upgrade Calico Rock to Norfolk 161 kV section	32 Months	C-1
7	Upgrade Melbourne to Calico Rock 161 kV section	38 Months	C-2
8	Upgrade Quitman to Bee Branch 161 kV terminal equipment	14 Months	D
9	Upgrade Cheetah to Hot Springs Village 115 kV section	38 Months	E
10	Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam (239 MVA)	61 Months	F-1
10A	Construct new Hot Springs Hamilton Substation	40 Months	F-2
10B	Construct new 115 kV Terminal at Hot Springs Milton (176 MVA)	6 Months	F-3
10C	Construct new 115 kV line from HS Milton to HS Hamilton	61 Months	F-4
10D	Construct new 115 kV terminal at Carpenter Dam	29 Months	F-5
10F	Upgrade Mt Pine to Breaker Station	33 Months	F-6
11	Upgrade Cedar Hill to Plantation 138 kV section	19 Months	G
12	Upgrade Plantation to Conroe 138 kV section	19 Months	H
13	Upgrade Truman to AECC Truman West 161 kV section	32 Months	I
14	Upgrade East Vicksburg to Edwards 115 kV section.	14 Months	J
15	Upgrade Little Rock South to Little Rock Creek 115kV section	31 Months	K
16	Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section	25 Months	L-1
17	Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section	15 Months	L-2
18	Upgrade Jacinto to Splendora 138 kV section	22 Months	M-1
19	Upgrade Splendora to Apollo 138 kV section	16 Months	M-2
20	Upgrade Baxter Wilson to South East Vicksburg 115kV section	12 Months	N

**Table 1.5  
Project Duration Summary**

21	Upgrade Little Rock West to Little Rock Palm Street 115 kV section	27 Months	O
22	Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section	17 Months	L-3
23	Upgrade Harrison East to Summit 161 kV section	46 Months	P
24	Upgrade ISES to Moorefield 161 kV section.	41 Months	Q-1
25	Upgrade Moorefield to Batesville 161 kV section	28 Months	Q-2
26	Upgrade Walnut Ridge to Hoxie South 161 kV section	28 Months	R
27	Upgrade Cane River to Winn Prison 115 kV section	27 Months	S-1
28	Upgrade Winn Prison to Winnfield 115 kV section	23 Months	S-2
29	Add 2 <sup>nd</sup> 161/60 kV auto at Thayer South	28 Months	T
30	Add 20.4 MVAR capacitor bank at Wilmar	18 Months	U
31	Upgrade Conroe 138 kV bus tie breaker	Removed	

**Table 1.6  
Energy Delivery Construction Plan ID**

<b>Reference</b>	<b>Name of the project</b>	
A-1	Construct Etta to Pittsburg 500 kV line	<i>Not in Construction Plan</i>
A-2	Provide new 500 kV terminal at Etta	<i>Not in Construction Plan</i>
B-1	Construct 2 <sup>nd</sup> ANO to Fort Smith 500kV line	<i>Not in Construction Plan</i>
B-2	Provide new 500 kV Terminal at ANO	<i>Not in Construction Plan</i>
C-1	Upgrade Calico Rock to Norfolk 161 kV section	2012-2016 Final CP 11-EAI-025-CP
C-2	Upgrade Melbourne to Calico Rock 161 kV section	2012-2016 Final CP 12-EAI-001-CP
D	Upgrade Quitman to Bee Branch 161 kV terminal equipment	2012-2016 Final CP 12-EAI-028-CP (Line)
E	Upgrade Cheetah to Hot Springs Village 115 kV section	2012-2016 Final CP 12-EAI-029-HZ
F-1	Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam (239 MVA)	2012-2016 Final CP 11-EAI-007-CP
F-2	Construct new Hot Springs Hamilton Substation	2012-2016 Final CP 11-EAI-007-CP
F-3	Construct new 115 kV Terminal at Hot Springs Milton (176 MVA)	2012-2016 Final CP 11-EAI-007-CP
F-4	Construct new 115 kV line from HS Milton to HS Hamilton	2012-2016 Final CP 11-EAI-007-CP
F-5	Construct new 115 kV terminal at Carpenter Dam	2012-2016 Final CP 11-EAI-007-CP
F-6	Upgrade Mt Pine to Breaker Station	2012-2016 Final CP 11-EAI-007-CP
G	Upgrade Cedar Hill to Plantation 138 kV section	2012-2016 Final CP 11-ETI-008-CP
H	Upgrade Plantation to Conroe 138 kV section	2012-2016 Final CP 11-EAI-036-CP
I	Upgrade Truman to AECC Truman West 161 kV section	2012-2016 Final CP 11-EAI-021-CP
J	Upgrade East Vicksburg to Edwards 115 kV section	2012-2016 Final CP 11-EMI-006-HZ
K	Upgrade Little Rock South to Little Rock Creek 115kV section	2012-2016 Final CP 12-EAI-022-HZ (Term Equip)
L-1	Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section	2012-2016 Final CP 12-EAI-017-CP (Term Equip)
L-2	Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section	2012-2016 Final CP 12-EAI-016-CP (Term Equip)
M-1	Upgrade Jacinto to Splendora 138 kV section.	2012-2016 Final CP 11-ETI-039-CP
M-2	Upgrade Splendora to Apollo 138 kV section.	2012-2016 Final CP 11-ETI-026-CP
N	Upgrade Baxter Wilson to South East Vicksburg 115kV section	<i>Not in Construction Plan</i>

**Table 1.6  
Energy Delivery Construction Plan ID**

O	Upgrade Little Rock West to Little Rock Palm Street 115 kV section	2012-2016 Final CP 12EAI-009-HZ
L-3	Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section	2012-2016 Final CP 12-EAI-018-CP (Term Equip)
P	Upgrade Harrison East to Summit 161 kV section	<b><i>Not in Construction Plan</i></b>
Q-1	Upgrade ISES to Moorefield 161 kV section	<b><i>Not in Construction Plan</i></b>
Q-2	Upgrade Moorefield to Batesville 161 kV section	<b><i>Not in Construction Plan</i></b>
R	Upgrade Walnut Ridge to Hoxie South 161 kV section	<b><i>Not in Construction Plan</i></b>
S-1	Upgrade Cane River to Winn Prison 115 kV section	<b><i>Not in Construction Plan</i></b>
S-2	Upgrade Winn Prison to Winnfield 115 kV section	<b><i>Not in Construction Plan</i></b>
T	Add 2 <sup>nd</sup> 161/60 kV auto at Thayer South	<b><i>Not in Construction Plan</i></b>
U	Add 20.4 MVAR capacitor bank at Wilmar	2012-2016 Final CP 11-EAI-010-CP

### 3. ATTACHMENTS

Reference	Name of the project
A-1	Construct Etta to Pittsburg 500 kV line
A-2	Provide new 500 kV terminal at Etta
B-1	Construct 2 <sup>nd</sup> ANO to Fort Smith 500kV line
B-2	Provide new 500 kV Terminal at ANO
C-1	Upgrade Calico Rock to Norfolk 161 kV section
C-2	Upgrade Melbourne to Calico Rock 161 kV section
D	Upgrade Quitman to Bee Branch 161 kV terminal equipment
E	Upgrade Cheetah to Hot Springs Village 115 kV section
F-1	Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam (239 MVA)
F-2	Construct new Hot Springs Hamilton Substation
F-3	Construct new 115 kV Terminal at Hot Springs Milton (176 MVA)
F-4	Construct new 115 kV line from HS Milton to HS Hamilton
F-5	Construct new 115 kV terminal at Carpenter Dam
F-6	Upgrade Mt Pine to Breaker Station
G	Upgrade Cedar Hill to Plantation 138 kV section
H	Upgrade Plantation to Conroe 138 kV section
I	Upgrade Truman to AECC Truman West 161 kV section
J	Upgrade East Vicksburg to Edwards 115 kV section
K	Upgrade Little Rock South to Little Rock Creek 115kV section
L-1	Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section
L-2	Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section
M-1	Upgrade Jacinto to Splendora 138 kV section
M-2	Upgrade Splendora to Apollo 138 kV section
N	Upgrade Baxter Wilson to South East Vicksburg 115kV section
O	Upgrade Little Rock West to Little Rock Palm Street 115 kV section
L-3	Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section
P	Upgrade Harrison East to Summit 161 kV section
Q-1	Upgrade ISES to Moorefield 161 kV section
Q-2	Upgrade Moorefield to Batesville 161 kV section
R	Upgrade Walnut Ridge to Hoxie South 161 kV section
S-1	Upgrade Cane River to Winn Prison 115 kV section
S-2	Upgrade Winn Prison to Winnfield 115 kV section
T	Add 2 <sup>nd</sup> 161/60 kV auto at Thayer South
U	Add 20.4 MVAR capacitor bank at Wilmar

ESRPP  
EAI – IPP to SPP

Project Summary

Construct Etta to Pittsburg 500 kV line

Appendix  
A-1

## **Project Estimate Scope**

Construct Etta to Pittsburg 500 kV line 2800 MVA

### **Requirements:**

A new line from the Etta Switch Station, just south of Malvern, AR will be built to the Pittsburg Substation, near Pittsburg OK. The line will be rated for 2800 MVA. (Standard 500 kV 120°C rating will be triple bundle 954 ACRS (3279 amps 3236 amps required).

### **Description of existing:**

There is not an existing line.

### **Constraints:**

- A Certificate of Environmental Compliance and Public Need (CECPN) will be required.
- The impact to the DeGray Lake and Lake Greeson water sheds should be minimized.
- Interstate I-30 and the Ouachita River will be crossed which may require special permitting.
- The area is rich in historical sites and could require special construction methods.

### **Proposed Solution:**

A new 500 kV line will be installed from Etta Switch Station to the east Howard County, AR line. The ownership of the line will change approximately at the county line. A reconfiguration of the Etta station will be required to provide a connection terminal. A new 500 kV T-line will be installed from the new terminal to the existing Hot Springs EHV T-line. The existing EHV line into Etta will be relocated to the new line section and terminal. The existing HS EHV terminal will become the Pittsburg line terminal. (See Appendix A-2). Steel "H" frames with triple bundled 954 ACSR would be used for the new line. A Right of Way (ROW) of 180-ft X 60 miles (~1310 acres) will be required.

A fiber optic cable will be provided in the overhead shield wire to provide communication with the remote substation.

### **General Assumptions & Risks**

- An Environmental Impact Study will be developed.
- A CECPN permit can be obtained for the project.
- The ROW can be obtained for the project.
- Etta Switch Station can be reconfigured to provide a new terminal.
- There will be historical sites in the proposed routing that will have to be addresses.
- A Storm Water Pollution Prevention Plan (SWPPP) can be obtained, installed, monitored and completed.
- There will not be any endangered species identified in the t-line routing.
- No detailed studies have been performed.
- Estimate based on one route. Upon funding CECPN development may identify alternate routes.
- ROW availability has not been addressed.

## Appendix A-1

- Project milestones will be developed after all design and constructability reviews have been completed and the environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Unknown underground factors will add mitigation costs and may impact schedule.
- ROW may pass through flood plains, wetlands, or rocky areas. Each of which could impact the schedule.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate	
Item	Estimate
T-Line Cost	\$196,430,000
<b>Full Financial</b>	<b>\$196,430,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$98.2 - \$392.9 Million</b>

### Duration Schedule

- A schedule will be developed after the project has been approved for construction.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.



Appendix A-1

Duration Table

<b>Task</b>	<b>Months</b>
Definition	6
Routing Study	12
Environmental Impact Study	12
Regulatory (CECPN & NRC) approval	18
T-Line Design	6
ROW Acquisition	18
<b>Pre Construction Duration</b>	<b>72</b>
ROW Clearing	30-36
T-Line Work	40-60
<b>Construction Duration</b>	<b>70-96</b>

**Class 5**  
**Environmental Support & Risk Summary**  
**Etta to Howard County T-Line**

Based on provided information related to routing, site selection, proposed construction efforts, and desk-top analyses, the following efforts for environmental permitting related activities and associated costing are provided. Proposed construction timeline is undetermined.

- Assume the construction and installation of an approximate 60 mile Transmission Line spanning from the Etta substation located approximately 5 miles south of Malvern, AR in a general west direction to the Howard County line. This Entergy transmission line will result in the development of a new right-of-way (ROW) and will be built within the new ROW.
- Assume that there is no Federal connectivity of the project, and no compliance with the National Environmental Policy Act (NEPA) will be required.
- Based on desk-top analysis of USFWS wetland inventory maps, NRCS soil survey maps, aerial photographs, and topographical maps for Arkansas, the landscape/land use of the proposed transmission line has been identified as being primarily rural and forested with residential dwellings as well as pasture land scattered along the entire route. The USFWS wetland inventory maps for the area display several wetlands located in each of the low areas adjacent to each of the three rivers (Ouachita, Caddo, and Little Missouri) crossed by the route. Additionally, numerous streams and ponds are identified along the proposed area for the route. While topographic maps, soil survey maps, and aerial photographs do not provide overwhelming evidence that wetlands are present throughout the remainder of the proposed route area, there is a possibility that there are some depressional areas and stream floodplains along the route that may contain wetlands. A site visit would be required to determine the presence and locations of all any wetlands along the ROW route. The proposed route will cross three rivers (Ouachita River, Caddo River, and Little Missouri River) as well as several named and unnamed tributaries to these Rivers. Performance of on-the-ground surveys to determine the extent and potential impact to the wetlands and streams along the route will be required. The United States Army Corps of Engineers (USACE) has a nationwide permit (NW-12) available for utility line activities that includes utility line substations and foundations for overhead utility line towers, poles and anchors. The nature of the efforts to secure a nationwide permit will include field survey and delineation, delineation report, consultation with Clean Water Act (CWA) commenting agencies, development of a Wetland Impact Mitigation Plan (including the negotiation of credits with an approved mitigation bank) if required, and the preparation and submittal of the permit application to the USACE.  
*Estimated cost - \$40,000.*

## Appendix A-1

- While the exact route for the proposed project has not yet been identified, there are three areas that have a high likely hood of containing wetlands. These include low areas adjacent to each of the river crossings. The remainder of the area is characterized by rolling hills to steep terrain. These landforms have a low potential to contain wetlands; however, wetlands may exist in depressions or along stream floodplains. The flat land along the east side of the Ouachita River contains the greatest likelihood of containing wetlands. Assuming approximately 2,600 feet of wetland in this location, approximately 400 feet along the Caddo River, and 300 feet along the Little Missouri River (estimates from USFWS National Wetland Inventory Maps); the total length of wetland would be approximately 3,300 feet. Assuming a 100 feet ROW this comes to approximately 7.5 acres. Adding an additional 2.5 acres of wetland along the remainder of the line would result in a potential of 10 acres of wetlands disturbed. Current mitigation ratios are about 5/1 for the acres impacted with mitigation credits somewhere on the order of 10 credits per acre (10 X 5 X 10 X \$2,500.00/credit). The cost of \$2,500 per credit is the current going rate for wetland credits, but may vary depending on selection and availability of an approved mitigation bank for the area. *Estimated cost to mitigate for possible loss of wetlands - \$1,250,000.*
- Construction Planning Support will include Constructability Review to assess site conditions requiring special consideration during the development of best management practices (BMPs) or regulatory permitting from the County government or the Arkansas Highway Transportation Department. It will include the review of stream crossings and consideration for all-weather access based on hydrological calculations of watershed size, topography, land use, etc. Ecologically/geographically sensitive areas will be identified and clearly marked. *Estimated cost - \$35,000.*
- Arkansas Department of Environmental Quality (ADEQ) requires compliance with applicable regulations for coverage under the Construction Storm Water General NPDES Permit. It includes the development and implementation of the Notice of Intent (NOI) and the Storm Water Pollution Prevention Plan (SWPPP) to provide a site-specific description of the best management practices to prevent contamination of the site storm flows from potential pollutants associated with construction activities. The plan also outlines implementation, inspection and maintenance requirements. *Estimated cost - \$20,000.*
- Routine inspection and monitoring required by NPDES Construction Storm Water General Permit for the SWPPP. This will include review of BMPs and permit monitoring requirements, travel to construction site once per 7 days and preparing inspection reports. It will identify incidents of non-compliance and associated conditions, recommendations for corrective actions, their status and effectiveness including assessment of proper installation and maintenance. This will include a 24-week construction

## Appendix A-1

effort and 8 weeks of expected stabilization after construction. *Estimated cost - \$112,000* ( $\$3,500.00/\text{week} \times 32 \text{ weeks}$ ).

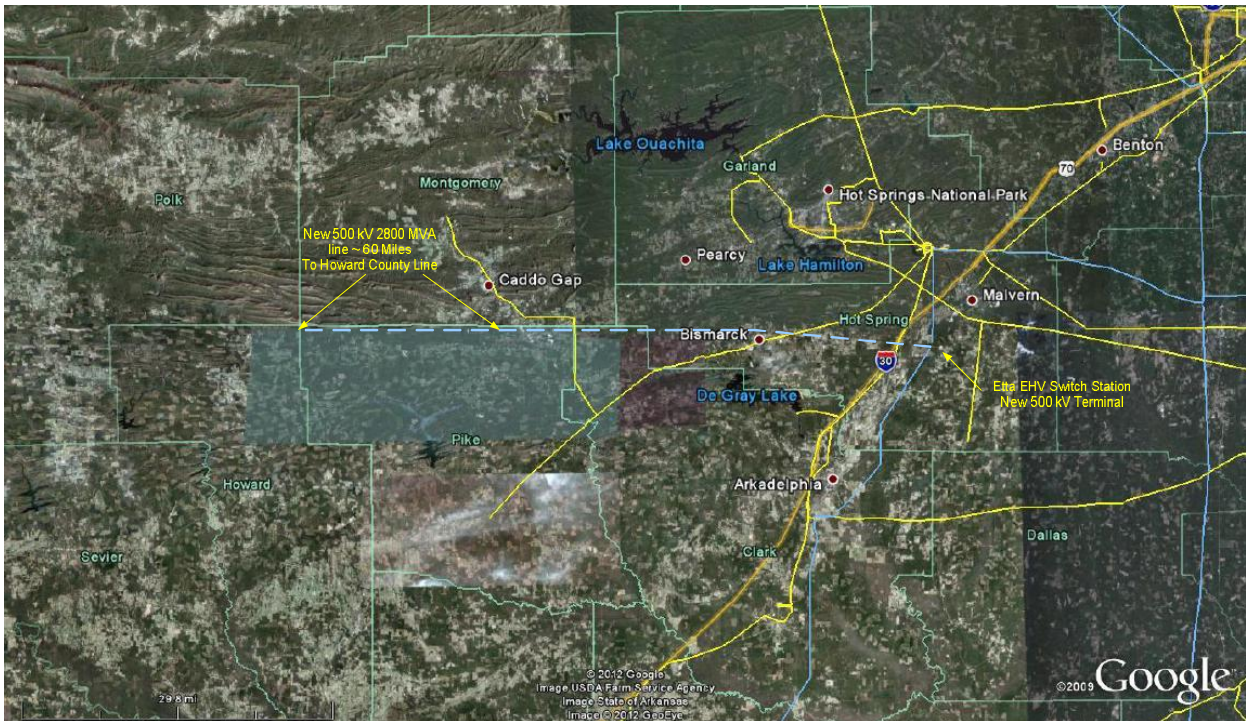
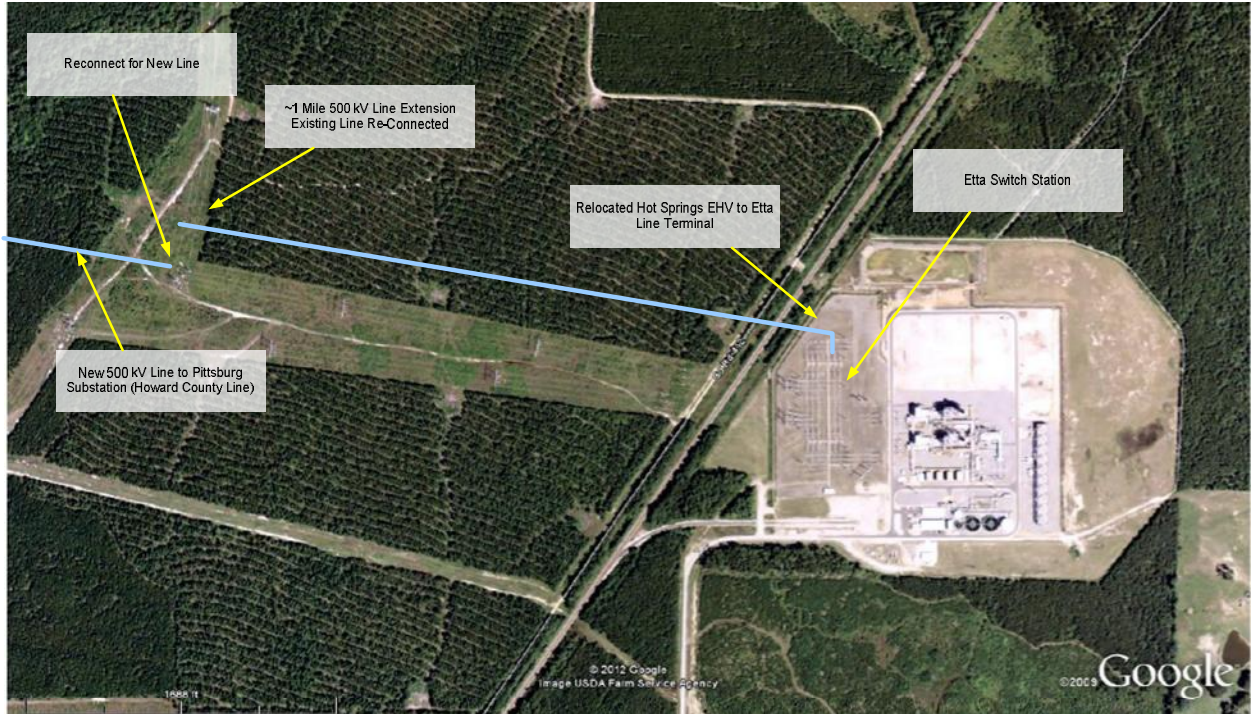
- Installation of Best Management Practices (BMPs) in accordance with SWPPP. Cost for silt fence installation and removal ( $\$9.00 \text{ linear ft.} \times 50,000 \text{ linear ft.}$ ) = **\$450,000** based upon 50,000 linear feet of potential silt fence including hill sides, culvert locations, and swales that may require utilization of sediment barriers. There are approximately 250 streams and 50 identified road crossings (potentially 100 driveways). While the price for culvert installation varies with stream size and proximity to an access point from a paved road, a good estimate is \$5,000/culvert. Likewise, the price for installation of access driveways vary based on several factors including necessary width, culvert size, and length of driveway. A good estimate is approximately \$5,000/driveway. *Estimated cost - \$1,750,000* ( $100 \text{ driveways} + 250 \text{ streams} \times \$5,000 \text{ per installation}$ ). The ROW transverses approximately 50,000 feet of area along the line that will likely require the use of mats for access (particularly pastures located in stream floodplains and yards. If 16 ft. X 8 ft. mats are utilized, then this will require about  $(50,000/16) = \sim 3200$  mats. The cost for mats is about \$200.00 per mat per month for rent, install, pick-up and ship-back. For 1100 mats plus an additional 300 contingency for the project duration computed at 6 mos. the cost is  $\$3,840,000$  ( $\$200 \times 6 \times 3200$ ). If the project were properly staged, this cost could be less. The cost for a water truck and sweeper to minimize dust and clean/remove dirt and debris along the construction route from entering and being tracked onto various county roads and state highways is  $\$36,000$  ( $\$6,000.00/\text{mo.} \times 6 \text{ mo}$ ). Stabilization for those areas requiring a seeding effort is calculated on the project length ( $60 \text{ mi.} \times 5280 \text{ ft./mi.}$ ) X (100 ft. ROW width) / 43,560 sq.ft./ac) =  $\sim 728$  ac. for a cost of ( $\$500.00/\text{ac} \times 728.0 \text{ ac.}$ ) =  $\$364,000$  seeding. Mulch cost will be calculated on the same area ( $\$1000.00/\text{ac.} \times 728.0 \text{ ac.}$ ) =  $\$728,000.00$  mulch. *Estimated Total cost - \$7,168,000* ( $\$120,000/\text{mile}$ ).
- Migratory Bird Treaty Act protection covers most bird species found in the project area. Construction to (Avian Powerline Interaction Committee (APLIC) standards as described in Entergy's Avian Protection Plan. Review of the area indicates concerns for wintering waterfowl and other water birds utilizing the habitats associated with the Ouachita River. Potential for highway crossing lengths associated with these areas, at a minimum, total to approximately 3 mi. Bird flappers are recommended for these areas at a placement of 1/15ft. of line length. This 3 mi. length equates to 1056 flappers ( $3 \text{ mi.} \times 5280 \text{ ft./mi.}$ ) =  $15840 \text{ ft./15} = 1056$  flappers @ \$25.00 each for a total of \$26,400.00. *Estimated cost - \$26,400* (cost for product). *Installation will occur during construction when the lines are clipped in.*
- Actions performed necessary to terminate the NPDES permit upon completion of construction and stabilization associated with the project. This will include photo documentation, delivery of all project

## Appendix A-1

documentation, and preparation of Notice of Termination (NOT) with signatures for submittal to the regulatory authority. *Estimated cost - \$4,500.*

- *Total costs associated with these identified environmental concerns = \$8,655,900 (\$144,265/mile) (This projection includes costing for wetland mitigation previously noted).*

# Appendix A-1



ESRPP  
EAI – IPP to SPP

Project Summary

Provide new 500 kV terminal at Etta

Appendix  
A-2

### **Project Estimate Scope**

Provide new 500 kV terminal at Etta Switch Station

### **Requirements:**

New line from Etta Switch Station Pittsburg Substation, near Pittsburg OK will be required. A connection terminal must be provided for the new connection.

### **Description of existing:**

Etta Switch Station was constructed to provide a point of interconnection for an Independent Power Producer. The switch station is ~ one mile from the 500 kV line and an in / out connection was provided to connect the station to the line. The switch station is configured as a four breaker ring with connections for Unit 1 and Unit 2. The customer has not authorized construction for the second unit and this terminal is open.

### **Constraints:**

- Expansion of the switch station to the west and north is constrained by the Union Pacific Railroad.
- The vacant terminal was provided for the second generator. If this terminal is used for a new line, the Company would have to provide a new terminal for the second generator, or obtain a release of the terminal for the second unit.

### **Proposed Solution:**

A new node will be made between breakers B8018 and B8015 by installing a new breaker and switches. Due to the access limitations, Gas Insulated Bus (GIB) will be installed to bring the 500 kV bus to the north side of the substation and terminate on a new turning dead-end structure north of the existing unit 2 terminal. This structure will be the new terminal connection point. The existing Hot Springs EHV line into Etta will be relocated to the new line section and terminal. The existing HS EHV terminal will become the Pittsburg line terminal.

### **General Assumptions & Risks**

- This project will be included in the Environmental Impact Study for the T-line.
- The substation can be expanded as described.
- Site conditions will be reviewed for changes since the substation was completed ~ 10 years ago.
- Budgeting estimates for GIB were not available. Estimate assumes \$4000/ft with 1500 ft required.
- No detailed studies have been performed.
- Detailed interconnection studies (such as relay impact, ground resistivity, soil borings & other geo-technically) have not been completed.



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- Project milestones will be developed after all design and constructability reviews have been completed and the environmental and regulatory compliance has been determined.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

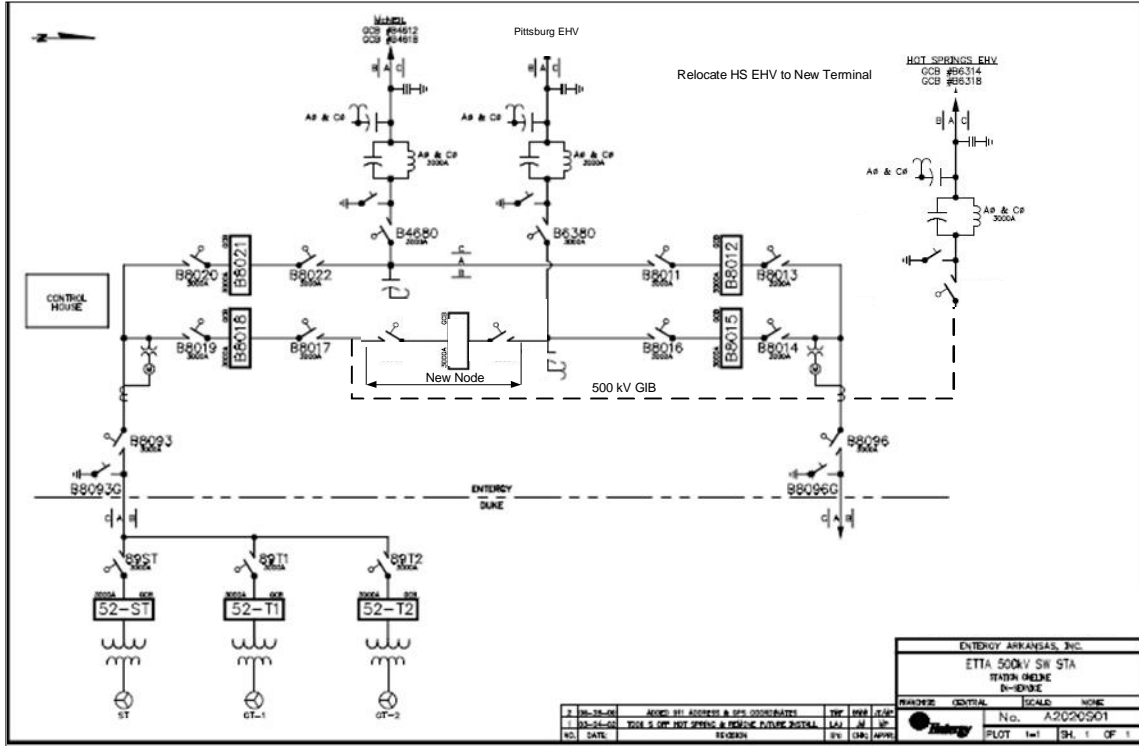
Estimate	
Item	Estimate
Substation Costs	\$9,625,000
<b>Total</b>	<b>\$9,625,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$4.8 - \$19.3 Million</b>

**Duration Schedule**

- A schedule will be developed after the project has been approved for construction.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	6
Regulatory	6
Substation Work	24
T-Line Work	N/A
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>32</b>

# Appendix A-2



ESRPP  
EAI – IPP to SPP

Project Summary

Construct 2<sup>nd</sup> ANO to Fort Smith 500kV line

Appendix  
B-1

### **Project Estimate Scope**

Construct 2nd ANO to Fort Smith 500kV line 1299 MVA

#### **Requirements:**

A new 500 kV line is required from Arkansas Nuclear One Substation to Ft Smith. The line rating will be 1299 MVA (1500 amps)

#### **Description of existing:**

ANO has three 500 kV t-lines into the substation; Mabelvale, Ft. Smith, & Pleasant Hill. The Pleasant Hill line parallels the other two lines into the substation for ~ 1.5 miles. It then splits and turns east. The Mabelvale & Ft. Smith lines are parallel from the branch with Pleasant Hill to the tap point in Yell County (~28 miles). At the tap point, the Ft Smith line turns west for ~ 22 miles to the change of ownership point at the west Yell County line.

#### **Constraints:**

With the ANO work process to be followed while working in and around the nuclear facility, additional time will be required.

The expansion of the substation will require approval of the Nuclear Regulatory Commission and ANO engineering review.

#### **Proposed Solution:**

A new 500 kV line will be completed between ANO and the western edge of the Yell County line ~ 50 miles. A standard triple bundled 954 MCM ACSR (3279 amps) configuration will be used. The new line will parallel the existing Mabelvale & Ft Smith lines on the north side. The type of construction (steel H frame or guyed structures) will be determined during design.

Two new terminals will be required at ANO substation; one for the second Ft Smith line and the second for the relocated Pleasant Hills line. A new line segment will be installed between one of the new terminals to the Mabelvale – Ft Smith and Pleasant Hill junction. The existing Pleasant Hills line will be moved to the new segment to allow the existing Pleasant Hills line to be used for the second Ft Smith line. (See ANO Substation task for details)

#### **General Assumptions & Risks**

- An Environmental Impact Study will be developed.
- A CECPN permit can be obtained for the project.
- The ROW can be obtained for the project.
- ANO Substation can be reconfigured to provide a new terminal.
- Approvals from the Nuclear Regulatory Commission can be obtained.
- There will not be any significant historical sites in the proposed routing.
- A Storm Water Pollution Prevention Plan (SWPPP) can be obtained, installed, monitored and completed.
- There will not be any endangered species identified in the t-line routing.

## Appendix B-1

- No detailed studies have been performed.
- Estimate based on one route. Upon funding CECPN development may identify alternate routes.
- ROW availability has not been addressed.
- Project milestones will be developed after all design and constructability reviews have been completed and the environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Unknown underground factors will add mitigation costs and may impact schedule.
- ROW may pass through flood plains, wetlands, or rocky areas. Each of which could impact the schedule.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost

### Estimate

Item	Estimate
T-Line Cost (Structures & Conductor)	\$191,800,000
<b>Full Financial</b>	\$191,800,000
<b>Total Estimate Range (-50% +100%)</b>	<b>\$95.9 - \$383.6 Million</b>

### Duration Schedule

- A schedule will be developed after the project has been approved for construction.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Appendix B-1

Duration Table

<b>Task</b>	<b>Months</b>
Definition	6
Routing Study	12
Environmental Impact Study	12
Regulatory (CECPN & NRC) approval	18
T-Line Design	6
ROW Acquisition	18
<b>Pre Construction Duration</b>	<b>72</b>
ROW Clearing	30-36
T-Line Work	40-60
<b>Construction Duration</b>	<b>70-96</b>

**Class 5**

**Environmental Support & Risk Summary**

**ANO to Yell City, AR**

**Date: 1-30-12**

Based on provided information related to routing, site selection and desk-top analyses, the following efforts for environmental permitting, related activities and associated costing are provided as very rough cost.

- Assume the route to be approximately 50 mile in length.
- Assume that the proposed new t-line will require all new ROW 180 ft. in width.
- All new property will be required to have, at a minimum, a Phase I Environmental Site Assessment should be performed in accordance with ASTM E 1527-05, in order to satisfy the “all appropriate inquiry” standard set out in 40 CFR Part 312. The purpose of the assessment is to determine if certain visible and/or documented recognized environmental conditions (RECs) exist on the property or adjacent properties. The Phase I Environmental Site Assessment is preliminary in nature and broad in scope. It is designed to identify obvious adverse environmental conditions. The possible need for a more definitive study addressing specific visible areas of concern may still exist. *Estimated cost - \$6500.*
- Assume that there is no Federal connectivity associated with this project. As such no compliance with the National Environmental Policy Act (NEPA) will be required.
- Assume one year of construction effort (used to compute cost).
- Assume that the Arkansas Historic Preservation Program (State Historic Preservation Office-SHPO) will require a Phase I Cultural Resources survey and possible mitigation. No cost is provided at this time but should be anticipated as the area is noted for its potential for cultural and historical significance.
- Based on desk-top review of USFWS wetland status maps for Arkansas, the rural landscape of the proposed t-line is dominated by extensive wetlands and waterbody crossings. Small to medium crossings number approximately 74 and 5 medium to major crossings. High quality mapped jurisdictional wetlands and/or streams, particularly those associated with the Arkansas River, the Petite Jean River and the Illinois Bayou offer the possibility of construction impacts to those areas. Performance of on-the-ground surveys to determine the extent and potential impact to jurisdictional wetlands and/or other waters of the US (WOUS) will be required once a defined route is provided. The USACE has a nationwide permit (NW-12) available for utility line activities that includes utility line substations and foundations for overhead utility line towers, poles and anchors. The nature of the efforts to secure a nationwide permit will include field survey and delineation, delineation report, consultation with Clean Water Act (CWA) commenting agencies, development of a Wetland Impact Mitigation Plan (including the negotiation of credits with an approved mitigation bank) if required and the preparation and submittal of

## Appendix B-1

the permit application to the USACE. The estimated time for the USACE permit acquisition is three to six months. *Estimated cost - \$30,000.*

- Based on desk-top review and assuming a 180 ft. wide footprint for the t-line effort, approximately 50% of the total length (25 miles is comprised of potential high quality wetlands that could impact approximately 545 acres (assuming edge to edge impacts). Current mitigation ratios are about 10/1 credits per acre at a cost of \$3,000/credit (\$30,000/acre) from a previous quote in the Cadron Creek Mitigation Bank. *Estimated cost to mitigate for possible impacts to wetlands - \$16,350,000. If only temporary impacts exist (no permanent impacts), this number could be less once the project is permitted thru the USACE.*
- Construction Planning Support will include Constructability Review to assess site conditions requiring special consideration during the development of best management practices (BMPs) or regulatory permitting from the County governments or the Arkansas Highway Transportation Department. It will include the review of stream crossings and consideration for all-weather access based on hydrological calculations of watershed size, topography, land use, etc. Ecologically/geographically sensitive areas will be identified and clearly marked. *Estimated cost - \$18,700.*
- Arkansas Department of Environmental Quality (ADEQ) requires compliance with applicable regulations for coverage under the Construction Storm Water General NPDES Permit. It includes the development and implementation of the Notice of Intent (NOI) and the Storm Water Pollution Prevention Plan (SWPPP) to provide a site-specific description of the best management practices to prevent contamination of the site storm flows from potential pollutants associated with construction activities. The plan also outlines implementation, inspection and maintenance requirements. The estimated time for this effort is approximately one month. *Estimated cost - \$11,000.*
- Routine inspection and monitoring is required by NPDES Construction Storm Water General Permit for the SWPPP. This will include review of BMPs and permit monitoring requirements, travel to construction site once per 7 days and preparing inspection reports. It will identify incidents of non-compliance and associated conditions, recommendations for corrective actions, their status and effectiveness including assessment of proper installation and maintenance. This will include a 52-week construction effort and 8 weeks of expected stabilization after construction. *Estimated cost - \$114,000. (\$1900.00/week X 60 weeks).*
- Installation of Best Management Practices (BMPs) in accordance with SWPPP. This includes cost for silt fence installation and removal (\$9.00 linear ft. X 5280 linear ft.) = \$47,520.00 per mile X 25 miles that is \$1,188,000. Matting and culvert installation will depend upon realized site conditions but 74 minor to medium waterbody crossings have been identified. The cost for only culverted crossings at these 74 locations is \$740,000 (\$10,000 each X 74). At 25 miles of wet areas crossed times



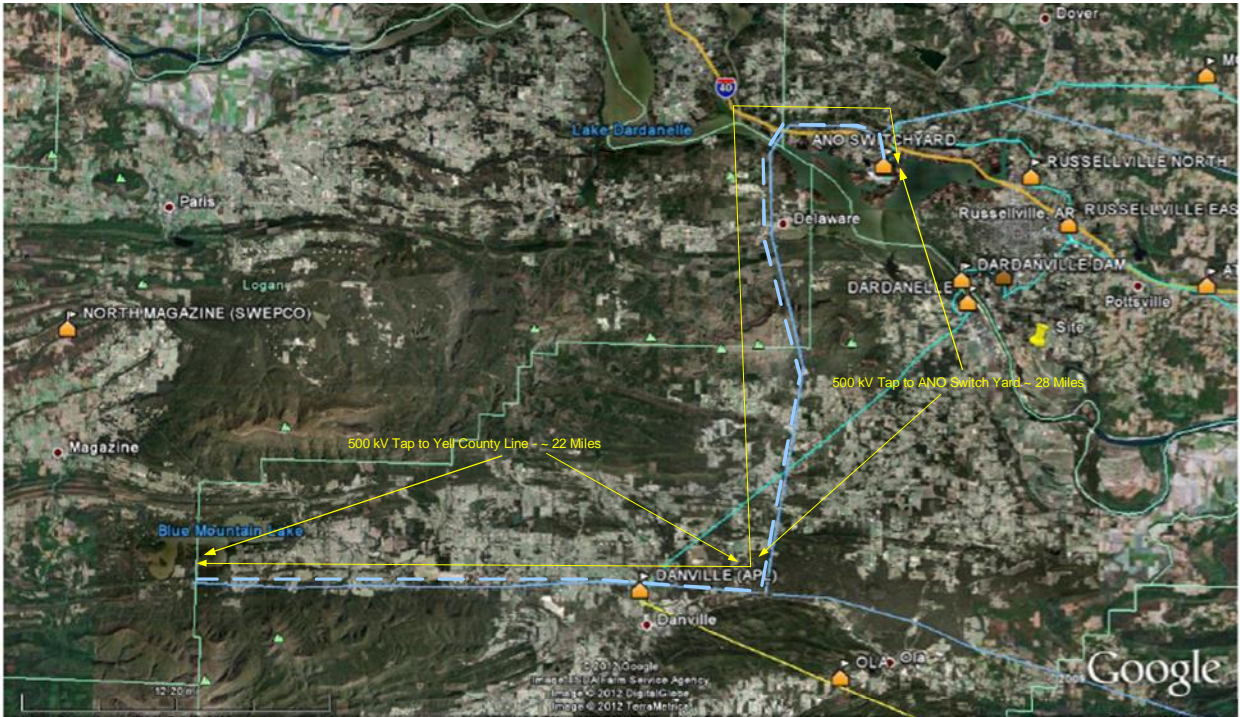
## Appendix B-1

5280 ft./mile equals 132,000 ft. At 16 ft. each that is 8250 mats. The cost for mats is about \$200.00 per mat per month for rent, install, pick-up and ship-back. For 8250 mats for the project duration computed at 12 months, the cost is \$19,800,000 (\$200 X 12 mos. X 8250 mats. No cost for water truck/sweeper and stabilization costs have been included but could be realized costs to the project. *Estimated cost - \$21,728,000. Cost for matting is computed for the entire length of project need. If timing of use of the required mats can be adjusted to fit a schedule for use and removal of the mats, this amount could be reduced.*

- Migratory Bird Treaty Act protection covers most bird species found in the project area. Construction to (Avian Powerline Interaction Committee (APLIC) standards as described in Entergy's Avian Protection Plan. Review of the area indicates concerns for wintering waterfowl and other water birds utilizing the habitats associated area lakes and the nearby Arkansas River. Potential concern for crossing length associated with this area, at a minimum, should include the ROW along the Arkansas River, the Petit Jean River, and the Illinois Bayou. Avian impact collision mitigation requirements are recommended for these areas at a placement of 1/15ft. of line length. These should include the installation of "bird flappers" or "bird diverters" in this area at a placement of 1/15ft. of line length. *This will be a cost to the project but has not been computed at this time.*
- Contracting support for additional site visits above those noted as SWPPP inspections to develop more detailed erosion/sediment controls to be included in contract specifications prepared by Entergy. This will include any additional or modified BMPs in revisions of the SWPPP site maps and will support Entergy during the contracting process and after Entergy has selected the BMP installation contractor. *Estimated cost - \$18,500.*
- Actions performed necessary to terminate the NPDES permit upon completion of construction and stabilization associated with the project. This will include photo documentation, delivery of all project documentation, and preparation of Notice of Termination (NOT) with signatures for submittal to the regulatory authority. *Estimated cost-\$1,500.*
- *Total costs associated with these identified environmental concerns = \$38,278,200.*

# Appendix B-1

ANO – Yell County Line 500 kV Line  
Conceptual Location



ESRPP  
EAI – IPP to SPP

Project Summary

Provide new 500 kV Terminal at ANO

Appendix  
B-2

### **Project Estimate Scope**

Provide new 500 kV 3000 amp terminal at ANO

#### **Requirements:**

A new 500 kV terminal is required at ANO Switch Station for a new 500 kV line to Ft Smith. Only a 1299 MVA (1500 amps) is required.

#### **Description of existing:**

The ANO Substation 500 kV switchyard is configured as a dual operating bus. The 500 kV terminals are connected in a three breaker arrangement with two nodes and connections to both the north and south 500 kV bus. The station has three 500 kV lines into the station; Mabelvale, Ft Smith, & Pleasant Hill.

#### **Constraints:**

Completing work inside the ANO Switch Station will require coordination and monitoring by the plant staff and security.

Expanding the switch station will require approval of the Nuclear Regulatory Commission.

#### **Proposed Solution:**

To add one terminal, two terminals will be added as part of a three breaker ring. The rating standard for 500 kV terminals requires 3000 amp equipment and this rating will be used for all additional equipment. The existing dual 500 kV bus will be extended to the east to allow a three breaker ring be added to the end of the bus. The Pleasant Hill line will be relocated to the east terminal and the new terminal between Pleasant Hills and the existing Ft Smith line will be used for the second Ft Smith line. The arrangement will place the second Ft Smith line on the north side of the existing line.

#### **General Assumptions & Risks**

- The operating bus can be expanded as described.
- The additional equipment panels can be installed in the existing control house.
- Assumed no clearance issues that could negatively impact the cost or duration of the project.
- The revised ANO switch station configuration can be approved by all regulatory agencies.
- Construction labor man-hours were doubled due to additional security requirements at ANO.
- Site conditions need to be addressed.
- No detailed studies have been performed.
- Detailed interconnection studies (such as relay impact, ground resistivity, motor start analysis, soil borings & other geo-technically) have not been completed.
- Schedule milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined. SWPPP creation, implementation and monitoring can vary greatly dependant on outcome of constructability review.
- Project duration does not begin until project has been authorized.
- Project delays or overhead changes will affect final removed cost.

## Appendix B-2

- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate	
Item	Estimate
Substation Costs	\$9,549,000
<b>Full Financial</b>	<b>\$9,549,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$4.8 - \$19.1 Million</b>

### Duration Schedule

- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>8</b>
<b>Regulatory</b>	<b>8</b>
<b>Substation Work</b>	<b>20</b>
<b>T-Line Work</b>	<b>N/A</b>
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>36</b>

ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Calico Rock to Norfolk 161 kV section

Appendix  
C-1

### **Project Estimate Scope**

Upgrade Calico Rock to Norfolk 161 kV section 335 MVA

Upgrade terminal equipment at Calico Rock

### **Requirements:**

The line segment between Calico Rock and SPA Norfolk Dam Substation will be upgraded to at least 335 MVA (1200 amps)

### **Description of existing:**

Line 901.1 SAGE - NORFORK (SPA) 161 kV 901.1

901-005 8.12 miles wood H frame 336.4 MCM 26/7 ACSR

Line segment 901-005 consists of wood pole H-frame and wood 3 pole angle and dead end structures with 8.12 miles of 336MCM ACSR conductor.

The Norfolk line bay at Calico Rock has 336 MCM ACSR conductors from the line to switch B0572.

The line rating of the Sage line bay at SPA Norfolk is unknown.

### **Constraints:**

The SPA Norfolk substation may require upgrades. Drawings are unavailable for review.

### **Proposed Solution:**

The structures will be replaced with single steel poles in tangent locations and 3 steel pole, guyed structures for dead ends and angels. The new conductor will be 1272MCM ACSR Bittern wire and OPGW will be used as the shield wire.

The line bay riser and line bay bus at the line bay will be upgraded to 1272 MCM ACSR conductor.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required.
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line is in a rocky terrain area.
- The line and terminal conductors will be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.

## Appendix C-1

- Unknown underground factors will add mitigation costs and may impact schedule
- Some ROW may be in flood plain or wetlands.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

### Estimate

Item	Estimate
Terminal equipment upgrade	\$86,000
T-Line Cost	\$6,289,000
<b>Full Financial</b>	<b>\$6,375,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$3.18 - \$12.75 Million</b>

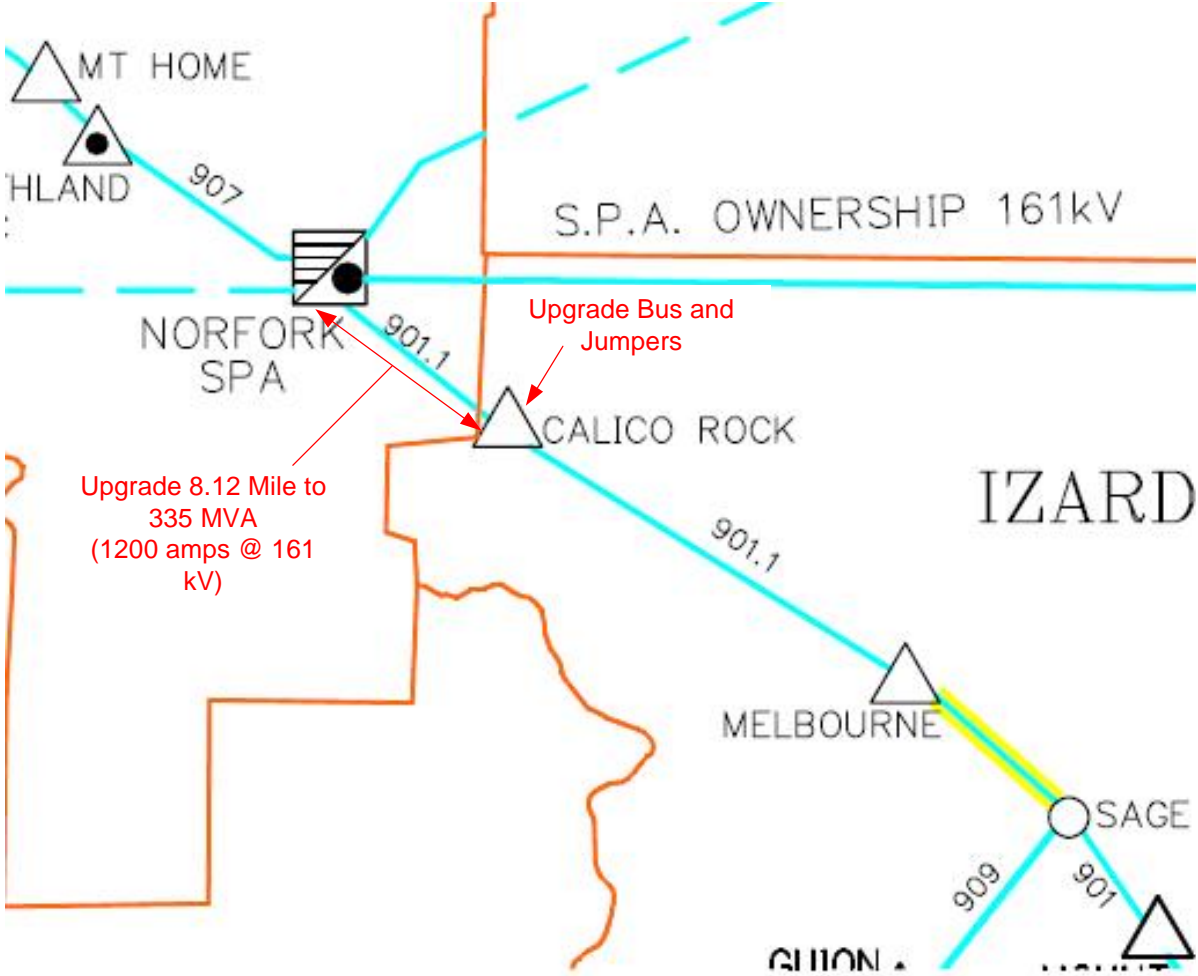
### Duration Schedule

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>12</b>
<b>Substation Work</b>	<b>2</b>
<b>T-Line Work</b>	<b>16</b>
<b>Less Parallel Tasks</b>	<b>4</b>
<b>Total Duration</b>	<b>32</b>



Appendix C-1



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Melbourne to Calico Rock 161 kV section

Appendix  
C-2

**Project Estimate Scope**

Upgrade Melbourne to Calico Rock 161 kV section 335 MVA  
Upgrade terminal equipment at Melbourne  
Upgrade terminal equipment at Calico Rock

**Requirements:**

Line segment 901-004, Upgrade to at least 335 MVA (1200 amps)

**Description of existing:**

901.1 SAGE - NORFORK (SPA) 161 kV 901.1  
901-004 16.63 miles wood H frame 336.4 MCM 26/7 ACSR

Line segment 901-004 consists of wood pole H-frame and wood 3 pole angle and dead end structures with 16.63 miles of 336MCM ACSR conductor.

The Norfolk line bay at Melbourne has 666 ACSR conductor risers and 500 MCM copper conductor bus to the operating bus. (882 amp & 976 amps)

The Sage line bay at Calico Rock has 336 MCM ACSR conductors from the line to switch B0458. (882 amps)

**Constraints:**

**Proposed Solution:**

The structures will be replaced with single steel poles in tangent locations and 3 steel pole, guyed structures for dead ends and angels. The new conductor will be 1272MCM ACSR Bittern wire and OPGW will be used as the shield wire.

The line bay risers and line bay bus at both line bays will be upgraded to 1272 MCM ACSR conductor.

**General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line is in a rocky terrain area.
- The line and terminal conductors will be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.

## Appendix C-2

- Unknown underground factors will add mitigation costs and may impact schedule
- ROW may be in flood plain or wetlands.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

### Estimate

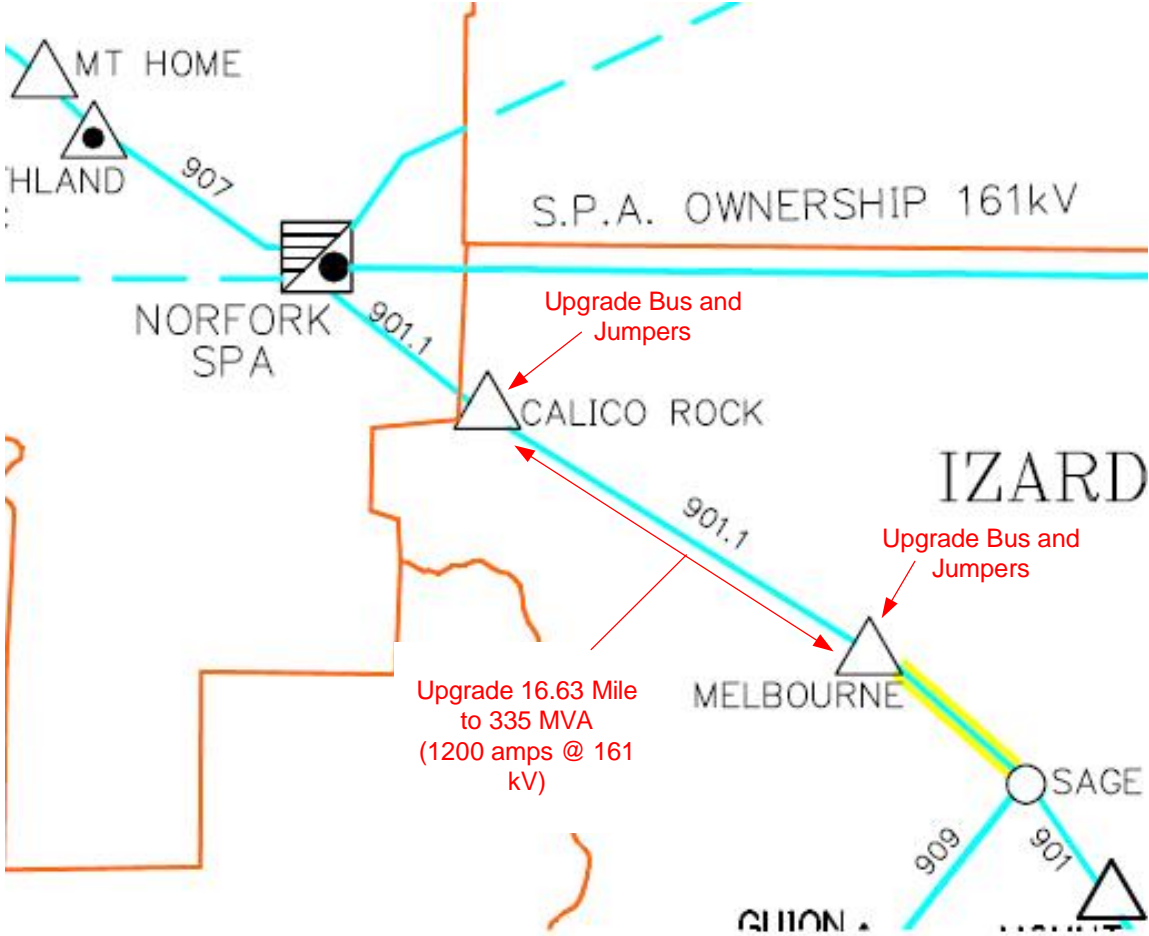
Item	Estimate
Terminal equipment upgrade Calico Rock	\$86,000
Terminal equipment upgrade Melbourne	\$93,000
T-Line Cost	\$12,486,000
<b>Full Financial</b>	<b>\$12,665,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$6.3 - \$25.3 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>12</b>
<b>Substation Work</b>	<b>4</b>
<b>T-Line Work</b>	<b>24</b>
<b>Less Parallel Tasks</b>	<b>8</b>
<b>Total Duration</b>	<b>38</b>

Appendix C-2



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Quitman to Bee Branch 161 kV terminal  
equipment

Appendix  
D

## Appendix D

### Project Estimate Scope

Upgrade Quitman to AECC Bee Branch 161 kV terminal equipment 223 MVA

### Requirements:

The line air break switch to breaker B4031 has to be upgraded from 600 amps to at least 800 amps.

### Description of existing:

The AECC Bee Branch terminal at Quitman has a line bay bus and risers to support up to 975 amps with a 2000 amp trap on phase A. The line air break switch and the air break transfer bus switch B3102 are rated for 600 amps.

### Constraints:

None identified

### Proposed Solution:

The two switches will each be replaced with a 2000 amp switch.

### General Assumptions & Risks

- No detailed studies have been performed
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate	
Item	Estimate
Terminal Equipment at Quitman	\$131,000
T-Line Cost	N/A
<b>Full Financial</b>	<b>\$131,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$65.5 - \$262 Thousand</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as

## Appendix D

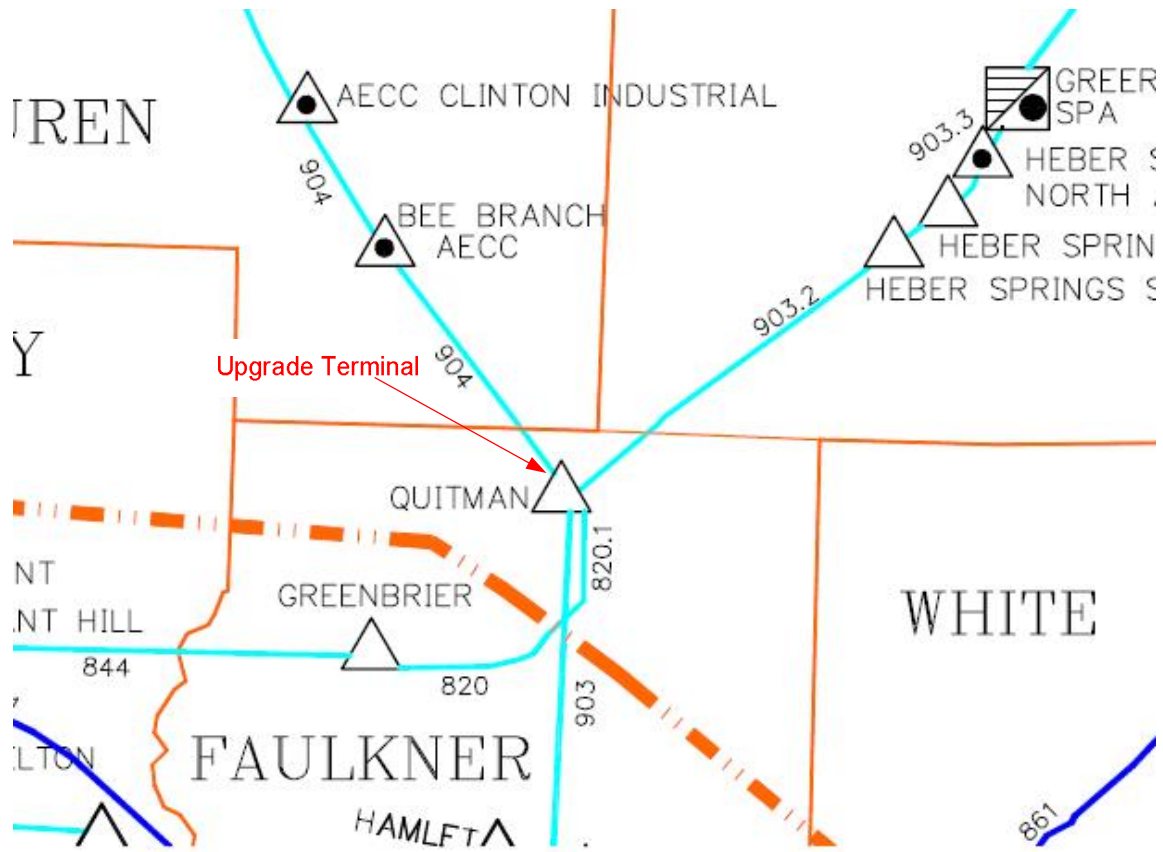
planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.

- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are assumed to be available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

<b>Task</b>	<b>Months</b>
<b>Definition</b>	<b>4</b>
<b>Regulatory &amp; Permitting</b>	<b>N/A</b>
<b>Substation Design &amp; Work</b>	<b>10</b>
<b>T-Line Work</b>	<b>N/A</b>
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>14</b>



Appendix D



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Cheetah to Hot Springs Village 115 kV  
section

Appendix  
E

## Appendix E

### **Project Estimate Scope**

Upgrade Cheetah to Hot Springs Village 115 kV section 239 MVA  
Upgrade terminal equipment at Hot Springs Village  
Upgrade terminal equipment at Cheetah

### **Requirements:**

The 115 kV line segment between Cheetah and Hot Springs Village Substation will be upgraded to 239 MVA (1200 amps).

### **Description of existing:**

2505.0 DANVILLE (APL) - CHEETAH 115 kV 2,505.0  
2505-004 15.37 miles wood H frame 250.0 MCM Type V Copper-Copperweld

The Arklahoma to Danville line is a leased line from Arklahoma Corporation (Oklahoma Gas & Electric (OG&E) Entergy Arkansas, Inc. (EAI) and Southwestern Electric Power Company (SWEPCO). The Cheetah to Hot Springs Village line segment is 15.37 miles of 250.0 MCM Type V Copper-Copperweld conductors installed on wood H frame structures.

The Cheetah line terminal at HS Village and operating bus are 666 MCM ACSR conductors with a rating of 882 amps.

The HS Village line terminal at Cheetah has line riser and line bay bus with 954 MCM conductors with a rating of 1088 amp.

### **Constraints:**

Agreement from Arklahoma Corp will be required to upgrade the line.  
Outages on the operating bus at Hot Springs Village will require a mobile transformer to support the load during bus outages.

### **Proposed Solution:**

The line will be upgraded to a 1272 MCM ACSR Bittern conductor on steel poles in the existing ROW. The shield wire will be installed with fiber optic cable for future use.

The terminal line and bus jumpers and the operating bus at Hot Springs Village Substation will be upgraded to 1272 MCM ACSR conductor. A new 2000 amp 115 kV bus isolation switch will be installed between the transformer connections (between B0725 & B0757). A mobile transformer will be required to support distribution during the bus upgrade.

The terminal line and bus jumpers at Cheetah Substation will also be upgraded to 1272 MCM ACSR conductor.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required due to building in existing ROW.

## Appendix E

- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line is in a rocky terrain area.
- The line and terminal conductors will be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- ROW may be in flood plain or wetlands.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate	
Item	Estimate
Hot Springs Village Substation Costs (Jumpers, Switch, & structures)	\$182,000
Cheetah Substation Costs (Jumpers, Switch, & structures)	\$108,000
T-Line Cost	\$14,007,000
<b>Full Financial</b>	<b>\$14,297,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$7.1 - \$28.6 Million</b>

### Duration Schedule

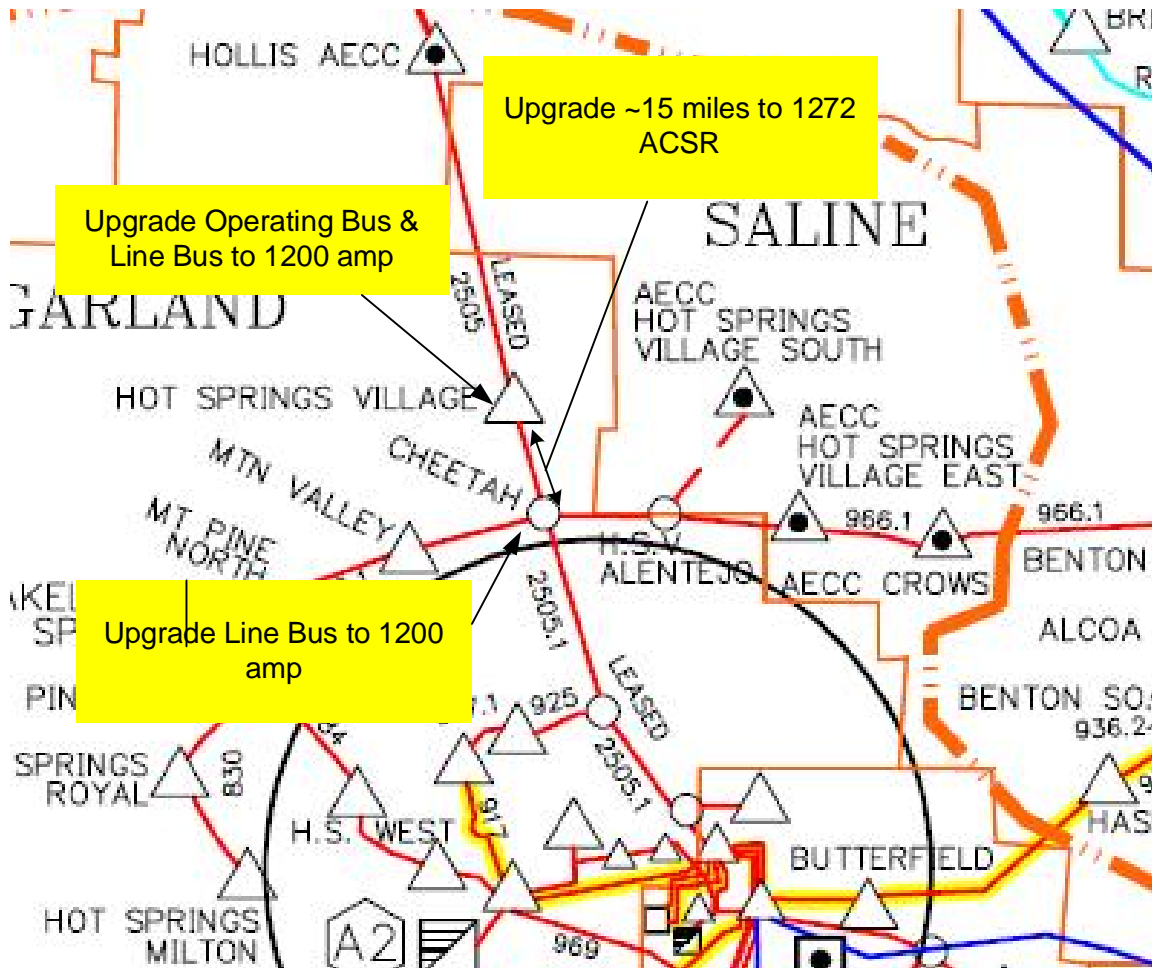
- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.

## Appendix E

- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

<b>Task</b>	<b>Months</b>
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>12</b>
<b>Substation Design &amp; Work</b>	<b>4</b>
<b>T-Line Work</b>	<b>24</b>
<b>Less Parallel Tasks</b>	<b>8</b>
<b>Total Duration</b>	<b>38</b>

Appendix E



ESRPP  
EAI – IPP to SPP

Project Summary

Construct new 115 kV line from Hot Springs Hamilton  
to Carpenter Dam (239 MVA)

Appendix  
F-1

### **Project Estimate Scope**

Construct new 115 kV line from Hot Springs Hamilton (Albright) to Carpenter Dam 239 MVA.

### **Requirements:**

A new 115 kV line is required from Carpenter Dam to a new substation Hot Springs Hamilton (Albright) located on the southwest side of Lake Hamilton. The new line will be rated for 239 MVA 1200 amps)

### **Description of existing:**

Carpenter Dam Substation is located adjacent to the dam and has six 115 kV transmission lines, two generators and a 115/13.8 kV 33 MVA transformer. The substation is configured with an operating bus and a transfer bus with a transfer breaker. Expansion of the station is very limited.

### **Constraints:**

- Completion of the Hot Spring Hamilton (Albright) substation is required prior to the capacity being available. (see appendix F-2)
- Completion of a new line terminal at Hot Springs Milton is required. (See appendix F-3)
- Completion of a new line from Hot Springs Hamilton to Hot Springs Milton is required prior to the capacity being available. (See appendix F-4)
- Completion of a new terminal at Carpenter Dam is required. (See appendix F-5) This may require the addition of a new ring breaker station south of the existing substation.
- Completion of upgrading Mt. Pine South Substation to a ring bus is required prior to the capacity being available. (See appendix F-6)

### **Proposed Solution:**

Right of Way for a new line will be obtained and cleared. A ROW path of 80-ft X 7.4 miles (~72 acres) will be required. A new line will be installed between Carpenter Dam and Hot Springs Hamilton. The line will be ~7.4 miles of 1272 MCM ACSR conductor on steel poles.

### **General Assumptions & Risks**

- Completion of a connection terminal at Hot Spring Hamilton Substation and the terminal addition at Carpenter Dam will be made prior to completion of the t-line.
- A Certificate of Environmental Compliance & Public Need (CECPN) will be obtained for the entire project: Carpenter Dam to HS Hamilton, HS Hamilton to HS Milton, and HS Hamilton Substation construction.
- ROW can be obtained for the route without litigation.
- Environmental monitoring will be required for the Storm Water Pollution Prevention Plan (SWPPP).
- The routing will be in rocky soil.
- No detailed studies have been performed
- Estimate based on one route. Upon funding a routing study will be completed to define three routes for the CECPN application.



## Appendix F-1

- Schedule milestones will be developed after a design and constructability review has been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

### Estimate

Item	Estimate
Substation Costs	N/A
T-Line Cost	\$8,016,000
<b>Full Financial</b>	<b>\$8,016,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$4.0 - \$16.0 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Appendix F-1

<b>Task</b>	<b>Months</b>
Definition	5
Routing Study	5
Environmental Impact Study	10
Regulatory Approval Process	9
Environmental/ROW Permitting	9
T-Line Design	4
ROW Acquisition	5
<b>Pre Construction Duration</b>	<b>47</b>
ROW Clearing	5
T-Line Work	7
Sub Work non-parallel tasks	2
<b>Less Parallel Tasks</b>	<b>0</b>
<b>Construction Duration</b>	<b>14</b>
<b>Total Duration</b>	<b>61 mos.</b>

## **Class 5**

### **Environmental Support & Risk Summary**

#### **Hot Springs Milton to Hot Springs Carpenter Dam 115kV T-Line And new Distribution Substation**

Based on provided information related to routing, site selection, proposed construction efforts, and desk-top analyses, the following efforts for environmental permitting related activities and associated costing are provided. Proposed timeline is uncertain.

- Assume the construction and installation of an approximate 14.6 mile 115 kV Transmission Line and new distribution substation located near Hot Springs, AR. It originates at the Hot Springs Milton Substation and orients southeast approximately 7.4 miles to the location of the proposed site for the Hot Springs Hamilton Distribution Substation located off of Albright Rd. From the new distribution station the line orients in a general east direction then in a north direction for approximately 7.2 miles. This Entergy transmission line will result in the development of a new right-of-way (ROW) and will be built within the new ROW. The new substation will also require a site be cleared and the station will be built on this clearing.
- Assume that there is no Federal connectivity of the project, and no compliance with the National Environmental Policy Act (NEPA) will be required.
- Based on desk-top analysis of USFWS wetland inventory maps, NRCS soil survey maps, aerial photographs, and topographical maps for Arkansas, the landscape/land use of the proposed transmission line has been identified as being primarily rural and forested with residential dwellings as well as pasture land scattered along the entire route. The USFWS wetland inventory maps for the area do not indicate that any wetlands are located along the route; however, numerous streams and ponds are identified along the proposed route. The lack of presence on the wetland inventory maps does not eliminate the potential for wetlands to be present along the proposed route. While topographic maps, soil survey maps, and aerial photographs do not provide overwhelming evidence that wetlands are present, there is a possibility that there are some depressional areas and stream floodplains along the route that may be wetlands. Four soil map units along the route are listed as partially hydric with the hydric components of each of the map units composed of aquic soils found in depressions. These components only make up 5 to 10% of each map unit. A site visit would be required to determine the locations of these or to completely rule out the presence of wetlands. The proposed route will cross several streams (Ouachita River , White Oak Creek, Mt Carmel Creek, Fourche Loupe Creek, Rush Fork, Little Mazarn Creek, and several unnamed tributaries of these streams.), presenting the possibility of impacts during construction. Performance of on-the-ground surveys to determine the extent and potential impact to these streams as

## Appendix F-1

well as to confirm that no wetlands are present will be required. The United States Army Corps of Engineers (USACE) has a nationwide permit (NW-12) available for utility line activities that includes utility line substations and foundations for overhead utility line towers, poles and anchors. The nature of the efforts to secure a nationwide permit will include field survey and delineation, delineation report, consultation with Clean Water Act (CWA) commenting agencies, development of a Wetland Impact Mitigation Plan (including the negotiation of credits with an approved mitigation bank) if required, and the preparation and submittal of the permit application to the USACE. *Estimated cost - \$10,000. If wetlands are present and require a delineation report and mitigation plan the cost will increase to \$30,000.*

- The proposed route does not appear to contain any wetlands. However, an on-site evaluation is necessary to completely rule out the presence of wetlands. Should wetlands be present the following assumptions apply. Current mitigation ratios are about 5/1 for the acres impacted with mitigation credits somewhere on the order of 10 credits per acre (7 X 5 X 10 X \$2,500.00/credit). The cost of \$2,500 per credit is the current going rate for wetland credits, but may vary depending on selection and availability of an approved mitigation bank for the area. *Estimated cost to mitigate for possible loss of wetlands - \$0.00\*.*
- Construction Planning Support will include Constructability Review to assess site conditions requiring special consideration during the development of best management practices (BMPs) or regulatory permitting from the County government or the Arkansas Highway Transportation Department. It will include the review of stream crossings and consideration for all-weather access based on hydrological calculations of watershed size, topography, land use, etc. Ecologically/geographically sensitive areas will be identified and clearly marked. *Estimated cost - \$22,800.*
- Arkansas Department of Environmental Quality (ADEQ) requires compliance with applicable regulations for coverage under the Construction Storm Water General NPDES Permit. It includes the development and implementation of the Notice of Intent (NOI) and the Storm Water Pollution Prevention Plan (SWPPP) to provide a site-specific description of the best management practices to prevent contamination of the site storm flows from potential pollutants associated with construction activities. The plan also outlines implementation, inspection and maintenance requirements. *Estimated cost - \$13,000.*
- Routine inspection and monitoring required by NPDES Construction Storm Water General Permit for the SWPPP. This will include review of BMPs and permit monitoring requirements, travel to construction site once per 7 days and preparing inspection reports. It will identify incidents of non-compliance and associated conditions, recommendations for corrective actions, their status and effectiveness including assessment of proper installation and maintenance. This will include a 24-week construction

## Appendix F-1

effort and 8 weeks of expected stabilization after construction. *Estimated cost - \$67,200* (\$2,100.00/week X 32 weeks).

- Installation of Best Management Practices (BMPs) in accordance with SWPPP. Cost for silt fence installation and removal (\$9.00 linear ft. X 10,500 linear ft.) = \$94,500 based upon 10,500 linear feet of potential silt fence including hill sides, culvert locations, and swales that may require utilization of sediment barriers. There are approximately 50 streams and 16 identified road crossings (potentially 32 driveways). While the price for culvert installation varies with stream size and proximity to an access point from a paved road, a good estimate is \$5,000/culvert. Likewise, the price for installation of access driveways vary based on several factors including necessary width, culvert size, and length of driveway. A good estimate is approximately \$5,000/driveway. *Estimated cost - \$410,000* (32 driveways + 50 streams X \$5,000 per installation). The ROW transverses approximately 16,200 feet of area along the line that will likely require the use of mats for access (particularly pastures located in stream floodplains and yards. If 16 ft. X 8 ft. mats are utilized, then this will require about  $(16,200/16) = \sim 1100$  mats. The cost for mats is about \$200.00 per mat per month for rent, install, pick-up and ship-back. For 1100 mats plus an additional 300 contingency for the project duration computed at 6 mos. the cost is \$1,680,000 (\$200 X 6 X 1400). If the project were properly staged, this cost could be less. The cost for a water truck and sweeper to minimize dust and clean/remove dirt and debris along the construction route from entering and being tracked onto various Camden city streets, county roads, and state Hwy 79 is \$36,000 (\$6,000.00/mo. X 6 mo). Stabilization for those areas requiring a seeding effort is calculated on the project length (14.6 mi. X 5280 ft. /mi.) X (100 ft. ROW width) / 43,560 sq.ft./ac) =  $\sim 177$  ac. for a cost of (\$500.00/ac X 177.0 ac.) = \$88,500 seeding. Mulch cost will be calculated on the same area (\$1000.00/ac. X 177.0 ac.) = \$177,000.00 mulch. *Estimated Total cost - \$2,486,000* (\$170,000/mile).
- Migratory Bird Treaty Act protection covers most bird species found in the project area. Construction to (Avian Powerline Interaction Committee (APLIC) standards as described in Entergy's Avian Protection Plan. Review of the area indicates concerns for wintering waterfowl and other water birds utilizing the habitats associated with the Ouachita River. Potential for highway crossing lengths associated with these areas, at a minimum, total to approximately 3 mi. Bird flappers are recommended for these areas at a placement of 1/15ft. of line length. This 3 mi. length equates to 1056 flappers (3 mi. X 5280 ft. /mi) = 15840 ft. /15 = 1056 flappers @ \$25.00 each for a total of \$26,400.00. *Estimated cost - \$26,400* (cost for product). *Installation will occur during construction when the lines are clipped in.*
- Actions performed necessary to terminate the NPDES permit upon completion of construction and stabilization associated with the project. This will include photo documentation, delivery of all project

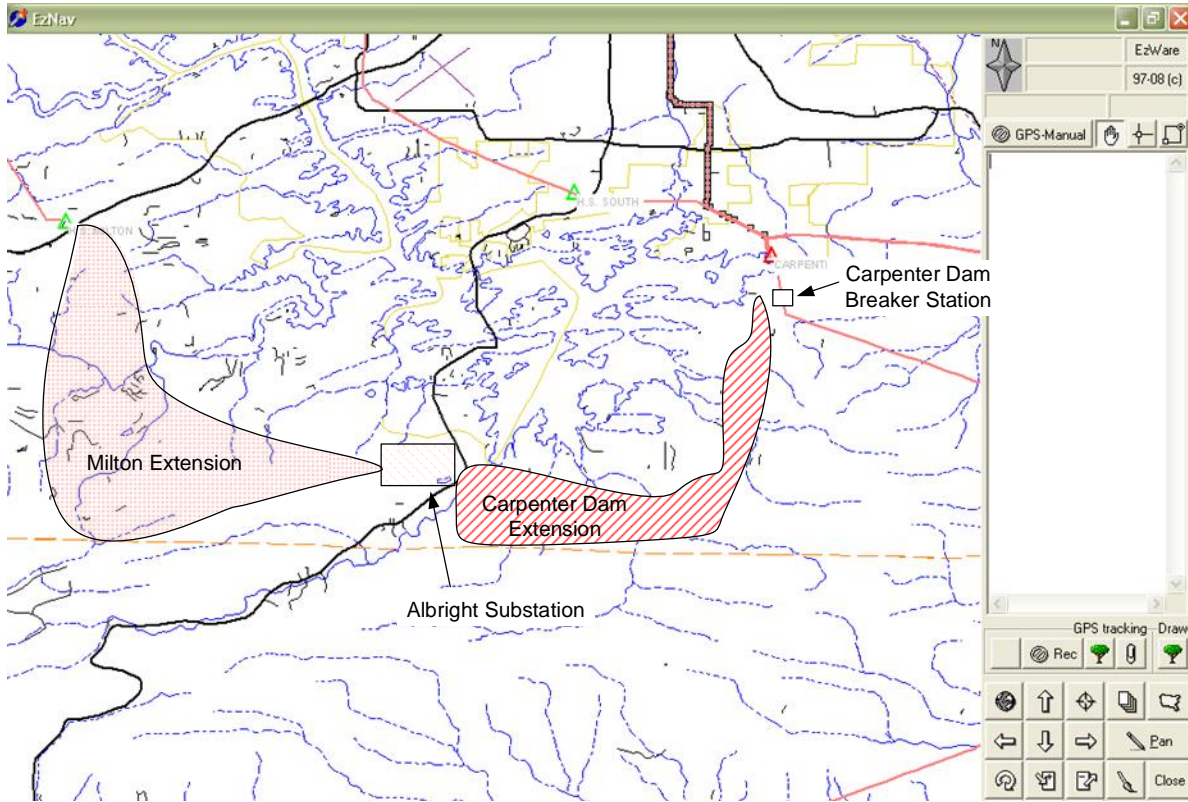
## Appendix F-1

documentation, and preparation of Notice of Termination (NOT) with signatures for submittal to the regulatory authority. *Estimated cost- \$1,500.*

- *Total costs associated with these identified environmental concerns = \$2,626,900.00 (180,000/mile) (This projection excludes costing for wetland mitigation since the proposed route does not appear to contain wetlands. However, on-the-ground surveys will have to be conducted for verification).*

# Appendix F-2

## Proposed Albright Substation & Carpenter Dam Line Extension Location



ESRPP  
EAI – IPP to SPP

Project Summary

Construct new Hot Springs Hamilton Substation

Appendix  
F-2



## **Project Estimate Scope**

Construct Hot Springs Hamilton Substation

### **Requirements:**

A new substation is required in southern Garland County to support additional loads. The substation will be located on the southwest side of Lake Hamilton. The station will be configured for two 115/13.8 kV 40 MVA LTC transformers with only one being installed.

A new 176 MVA rated line will be installed from Hot Springs Milton and a new 239 MVA rated line will be installed from Carpenter Dam to support the new substation.

### **Description of existing:**

A radial line ends at Hot Springs Milton and there is not an open terminal at Carpenter Dam.

### **Constraints:**

A new 115 kV terminal is required at HS Milton for the new line. (See appendix F-3 & F-4)

A new 115 kV line is required to Carpenter Dam. (See appendix F-1 & F-5)

Mt. Pine Substation must be upgraded to a breaker station. (See appendix F-6)

### **Proposed Solution:**

The HS Hamilton (Albright) Substation would be built for two transformers with only a single 40 MVA LTC being installed at this time. The substation would have, one (1) 2000 A main and a capacity for up to four 1200 A feeder breakers. Space would be provided for the substation to be expanded to a breaker station with an operating and transfer bus. Approximately 302-ft X 236-ft (~1.64 acres) However, initially only motor operated switches will be required for the line terminations.

### **General Assumptions & Risks**

- The Certificate of Compliance and Need (CCN) for this project will be completed with the line permitting.
- The property can be obtained.
- Detailed interconnection studies (such as relay impact, ground resistivity, motor start analysis, soil borings & other geo-technically) have not been completed.
- Schedule milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Site may be in flood plain, wetlands, Soil Contamination
- Transformers (or other equipment) will require special transport to substation site
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix F-2

Estimate

Item	Estimate
Substation Costs	\$3,776,000
T-Line Cost	N/A
<b>Full Financial</b>	<b>\$3,776,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.8 - \$7.6 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to approval with the project.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>20</b>
<b>Substation Work</b>	<b>12</b>
<b>T-Line Work</b>	<b>12</b>
<b>Less Parallel Tasks</b>	<b>10</b>
<b>Total Duration</b>	<b>40</b>

ESRPP  
EAI – IPP to SPP

Project Summary

Construct new 115 kV Terminal at Hot Springs Milton  
(176 MVA)

Appendix  
F-3

**Project Estimate Scope**

Construct new terminal at Hot Springs Milton

**Requirements:**

A new line is required between HS Milton and the new HS Hamilton Substation. The new line will be rated for 176 MVA (883 amps) and will be 666 MCM ACSR conductor. A new connection point is required for connection to the new line.

**Description of existing:**

The existing substation is at the end of a 666 MCM ACSR line and terminates at an A frame dead-end structure in the substation. Switch B3142 was installed at the end of the operating bus for the future connection.

**Constraints:**

None identified

**Proposed Solution:**

The new line will be terminated at the existing A frame structure. New terminal bus jumpers will be installed between the existing line switch and the new line.

**General Assumptions & Risks**

- The new line can be connected to the existing structure.
- New jumpers can be installed.
- Switch B3142 has been wired for service.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate

Item	Estimate
Substation Costs	\$47,000
T-Line Cost	N/A
<b>Full Financial</b>	<b>\$47,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$24 - \$94 Thousand</b>

**Duration Schedule**

- This project would be scheduled to be completed at the same time, and as a part of, the installation of the new line.
- Substation construction will be coordinated with the transmission line outages when possible.
- Outage denial would affect the estimated project schedule, by increasing the duration schedule.
- Assumed that construction resources are available when required.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Appendix F-3

<b>Task</b>	<b>Months</b>
<b>Definition</b>	<b>4</b>
<b>Regulatory &amp; Permitting</b>	<b>N/A</b>
<b>Substation Work</b>	<b>2</b>
<b>T-Line Work</b>	
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>6</b>

ESRPP  
EAI – IPP to SPP

Project Summary

Construct new 115 kV line from HS Milton to HS  
Hamilton

Appendix  
F-4

### **Project Estimate Scope**

Construct new line from Hot Springs Milton to Hot Springs Hamilton

#### **Requirements:**

A new 115 kV line is required between the existing Hot Springs Milton Substation and the new Hamilton Substation.

#### **Description of existing:**

The construction of the Hot Springs Hamilton Substation has been approved and is currently being scoped. A switch has been installed at HS Milton for a future line connection.

#### **Constraints:**

The completion of the Hot Springs Hamilton Substation terminal is required.

#### **Proposed Solution:**

Right of Way for a new will obtained and cleared for the line. A path 80 ft wide x ~7.2 miles (~ 70 acres) will be required for the ROW. Steel poles will be installed with for 666 MCM ACSR conductor rated for 176 MVA.

A connection to the existing switch (B3142) and dead-end structure will be made at HS Milton. The connection for the HS Hamilton will be provided with the construction of the substation.

#### **General Assumptions & Risks**

- This project will be included in the CECPN permitting for the Carpenter Dam to HS Hamilton project.
- ROW for the line can be obtained without litigation.
- Environmental monitoring will be required for the Storm Water Pollution Prevention Plan (SWPPP).
- The routing will be in rocky soil.
- No detailed studies have been performed
- Estimate based on one route. Upon funding a routing study will be completed to define three routes for the CECPN application.
- Schedule milestones will be developed after a design and constructability review has been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix F-4

Estimate

Item	Estimate
Substation Costs	Included in other projects
T-Line Cost	\$7,796,000
<b>Full Financial</b>	\$7,796,000
<b>Total Estimate Range (-50% +100%)</b>	<b>\$3.90 - \$15.59 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.
- The regulatory duration will be completed at the same time as the Carpenter Dam to HS Hamilton project. Delays may occur if the construction of this project cannot be completed at the same time as the Carpenter Dam to HS Hamilton project is being completed.



Appendix F-4

<b>Task</b>	<b>Months</b>
Definition	5
Routing Study	5
Environmental Impact Study	10
Regulatory Approval Process	9
Environmental/ROW Permitting	9
T-Line Design	4
ROW Acquisition	5
<b>Pre Construction Duration</b>	<b>47</b>
ROW Clearing	5
T-Line Work	7
Sub Work non-parallel tasks	2
<b>Less Parallel Tasks</b>	<b>0</b>
<b>Construction Duration</b>	<b>14</b>
<b>Total Duration</b>	<b>61 mos.</b>

ESRPP  
EAI – IPP to SPP

Project Summary

Construct new 115 kV Terminal at Carpenter Dam

Appendix  
F-5

## **Project Estimate Scope**

Construct new terminal at Carpenter Dam

### **Requirements:**

A new 115 kV terminal is required for the new Carpenter Dam to Hot Springs Hamilton (Albright) line.

### **Description of existing:**

The station is adjacent to Carpenter Dam. There are nine breakers in an operating and transfer bus arrangement. Two of the nodes are to the hydro station. A maintenance building has been built next to the substation and limits expansion. The elevation on the other end of the breaker bus drops quickly down to the lake and also limits expansion.

### **Constraints:**

The substation is space limited on either end and expansion of the substation will be difficult.

### **Proposed Solution:**

To resolve the expansion limitations, a new three breaker ring is proposed to the south side of the river on the Carpenter Dam to Malvern line. The three breaker station would be built and the existing Carpenter Dam to Malvern line would be terminated at two of the nodes at the new station. The third node will be for the Carpenter Dam to HS Hamilton line.

### **General Assumptions & Risks**

- The new Carpenter Dam to HS Hamilton line CECPN would also include this switch station.
- Site conditions have not been addressed.
- No detailed studies have been performed
- The availability for the site property has not been addressed.
- Detailed interconnection studies (such as relay impact, ground resistivity, soil borings & other geo-technically) have not been completed.
- Schedule milestones will be developed after the design and constructability review has been completed and environmental and regulatory compliance has been determined.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix F-5

Estimate

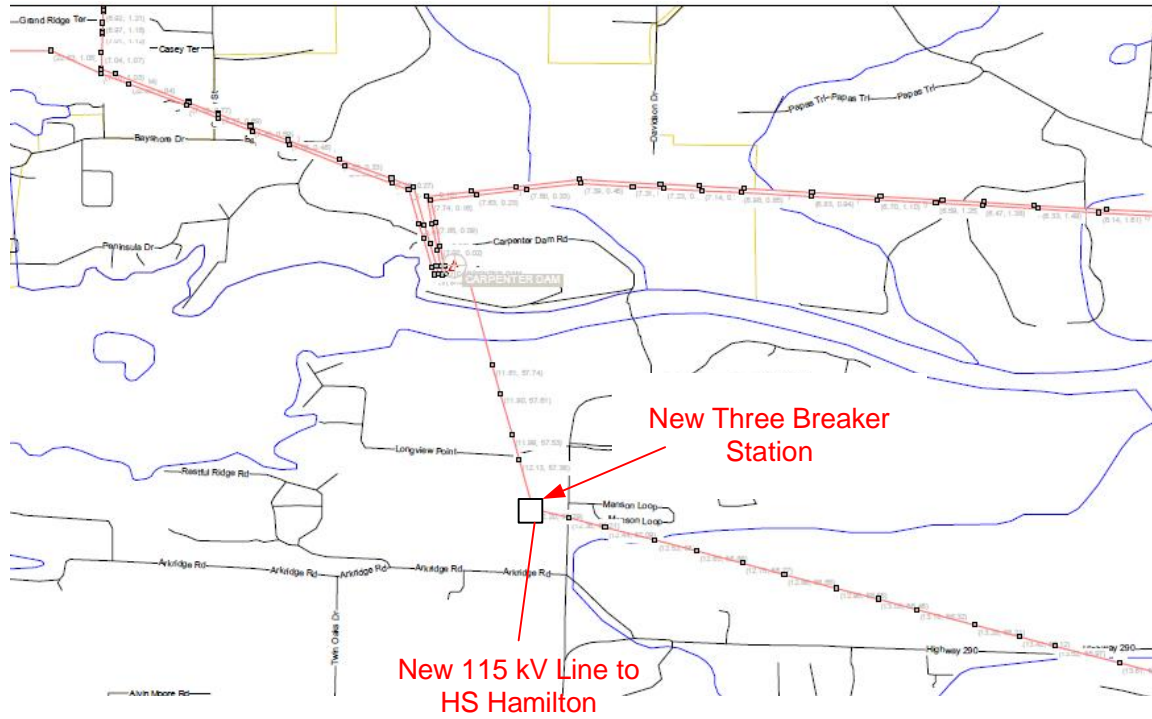
Item	Estimate
Switch Station Costs	\$3,483,000
T-Line Cut-In Cost	\$640,000
<b>Full Financial</b>	<b>\$4,123,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$2.1 - \$8.2 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Regulatory</b>	<b>9</b>
<b>Substation Work</b>	<b>12</b>
<b>T-Line Work</b>	<b>12</b>
<b>Less Parallel Tasks</b>	<b>10</b>
<b>Total Duration</b>	<b>29</b>

# Appendix F-5



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Mt Pine to Breaker Station

Appendix  
F-6

### **Project Estimate Scope**

Upgrade Mt Pine South Substation to a five breaker ring.

#### **Requirements:**

With the completion of the new 115 kV line from Carpenter Dam to Hot Springs Milton, the loop is complete from Mt Pine South to Carpenter Dam. The completion makes Mt Pine South a three terminal node and will require the existing substation to be upgraded to a breaker station.

#### **Description of existing:**

Mt Pine has a single 115/14.4 kV 33 MVA LTC transformer with three transmission lines. The through line is the Blakely Dam to Hot Springs West with a radial line to Hot Springs Royal / Hot Springs Milton. The new line from Milton to HS Albright to Carpenter Dam will close the radial line.

#### **Constraints:**

None identified

#### **Proposed Solution:**

A new four breaker ring will be built adjoining the existing substation. A second control house will be built for the new control panels. The existing t-line will be moved to the new breaker station and the existing transformer will be connected to the breaker node.

#### **General Assumptions & Risks [add or delete as required]**

- A CCN will be required for expanding the substation.
- A mobile transformer will be required to maintain service.
- Site conditions have not been addressed.
- No detailed studies have been performed
- The availability for the site property has not been addressed.
- Detailed interconnection studies (such as relay impact, ground resistivity, soil borings & other geo-technically) have not been completed.
- Schedule milestones will be developed after the design and constructability review has been completed and environmental and regulatory compliance has been determined.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix F-6

Estimate

Item	Estimate
Breaker Upgrade Costs	\$3,687,000
T-Line Cut-In Cost	\$957,000
<b>Full Financial</b>	<b>\$4,644,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$2.3 - \$9.3 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	6
Regulatory	9
Substation Work	12
T-Line Work	14
<b>Less Parallel Tasks</b>	<b>8</b>
<b>Total Duration</b>	<b>33</b>



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Cedar Hill to Plantation 138 kV section

Appendix  
G

## Appendix G

### **Project Estimate Scope:**

Upgrade Cedar Hill to Plantation 138kV Section

### **Requirements:**

Upgrade the Cedar Hill to Plantation 138kV line section to at rating of 478 MVA (2000 amps).

### **Description of existing:**

L-886 from Cedar Hill to Plantation consists of 3 miles bundled 336.4 MCM ACSR conductor built on wood H-frame structures.

Plantation 138kV substation Cedar line bay consist of 750 CU bus (1252 amps), two 1200 amp LDS switches and 1033 AAC strung bus (1017 amps).

### **Constraints:**

Cedar hill consists of a three way GOAB that serves a customer owned station and outages will have to be coordinated with that customer.

### **Proposed Solution:**

Replace three miles of bundled 336.4 MCM ACSR conductor and wood H-frames with bundled 954 MCM ACSR Cardinal (2216 amps) built on single steel poles.

Upgrade the Plantation 138kV substation Cedar Hill line bay buswork, line bay risers and two LDS switches to a rating of 2000 amps.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) is not required.
- Line is in existing ROW and no new ROW is required
- No detailed engineering studies have been performed
- Entergy will not perform work on customer owned facilities and is not included
- Schedule milestones after design and constructability review and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- The overheads are based on 2013-2014 with all work being completed in 2014.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

## Appendix G

### Estimate

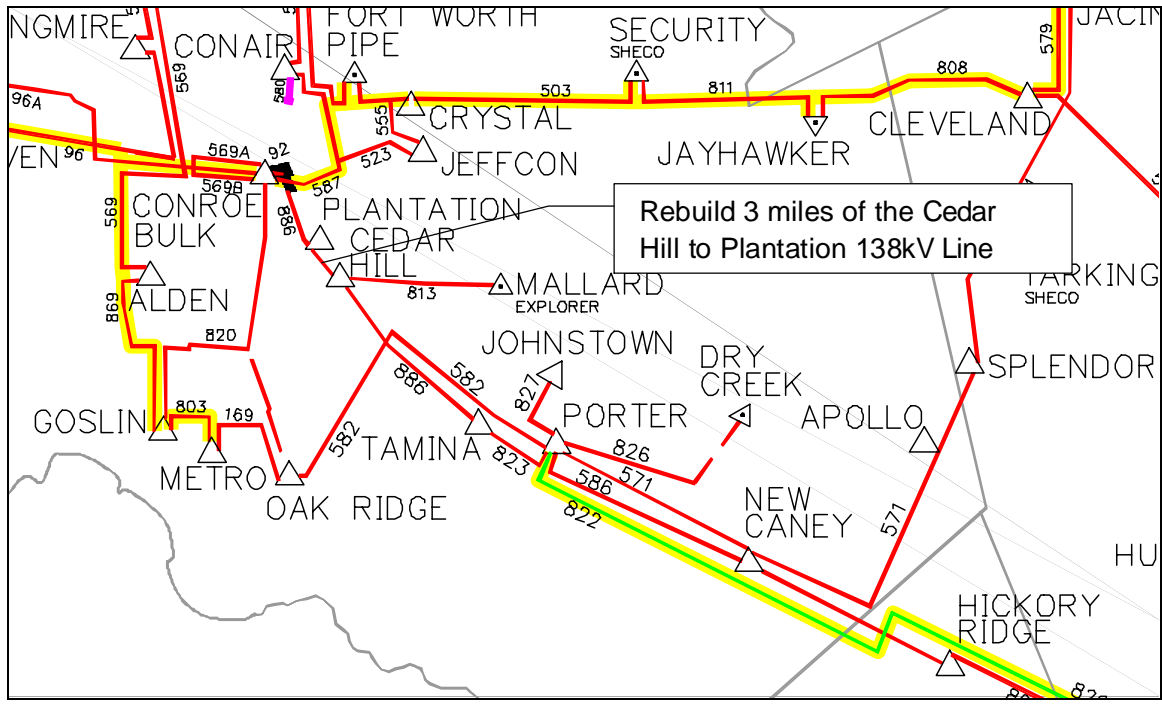
Item	Estimate
Plantation 138kV Substation Work	\$209,000
T-Line Cost	\$1,889,000
<b>Full Financial</b>	<b>\$2,098,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.05 - \$4.2 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project. The following are rough durations:
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>4</b>
<b>Design &amp; Procurement</b>	<b>9</b>
<b>Substation Work</b>	<b>2</b>
<b>T-Line Work</b>	<b>6</b>
<b>Less Parallel Tasks</b>	<b>2</b>
<b>Total Duration</b>	<b>19</b>

Appendix G



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Plantation to Conroe 138 kV section

Appendix  
H

## Appendix H

### **Project Estimate Scope:**

Upgrade the Plantation to Conroe Bulk 138kV Section

### **Requirements:**

Upgrade the Plantation to Conroe Bulk 138kV line section to at rating of 478 MVA (2000 amps).

### **Description of existing:**

L-886 from Plantation to Conroe Bulk consists of 2.8 miles of bundled 336.4 MCM ACSR conductor built on wood H-frame structures.

Plantation 138kV substation Conroe Bulk line bay consists of 750 CU bus (1252 amps), two 1200 amp LDS switches and 1033 AAC strung bus risers (1017 amps).

Conroe Bulk 138kV substation Plantation line bay consists of 750 CU bus (1252 amps), two 1600 amp LDS switches and bundled 336.4 MCM ACSR strung bus risers (1150 amps) and one 1200 amp line panel.

### **Constraints:**

Outage coordination at Conroe Bulk due to the large number of lines affected by replacing the 750 CU strung bus on the Plantation line bay.

### **Proposed Solution:**

Replace 2.8 miles of bundled 336.4 MCM ACSR conductors and wood H-frames with bundled 954 MCM ACSR Cardinal built on single steel poles.

Upgrade the Plantation 138kV substation Conroe Bulk line bay buswork, line bay risers and one LDS switch to a rating of 2000 amps.

Upgrade the Conroe Bulk 138kV substation Plantation line bay buswork, line bay risers and two LDS switches to a rating of 2000 amps and replace a line panel.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) is not required.
- Line is in existing ROW and no new ROW is required
- No detailed engineering studies have been performed
- Entergy will not perform work on customer owned facilities and is not included
- Schedule milestones after design and constructability review and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- The overheads are based on 2013-2014 with all work being completed in 2014.
- Project delays or overhead changes will affect final removed cost.

## Appendix H

- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

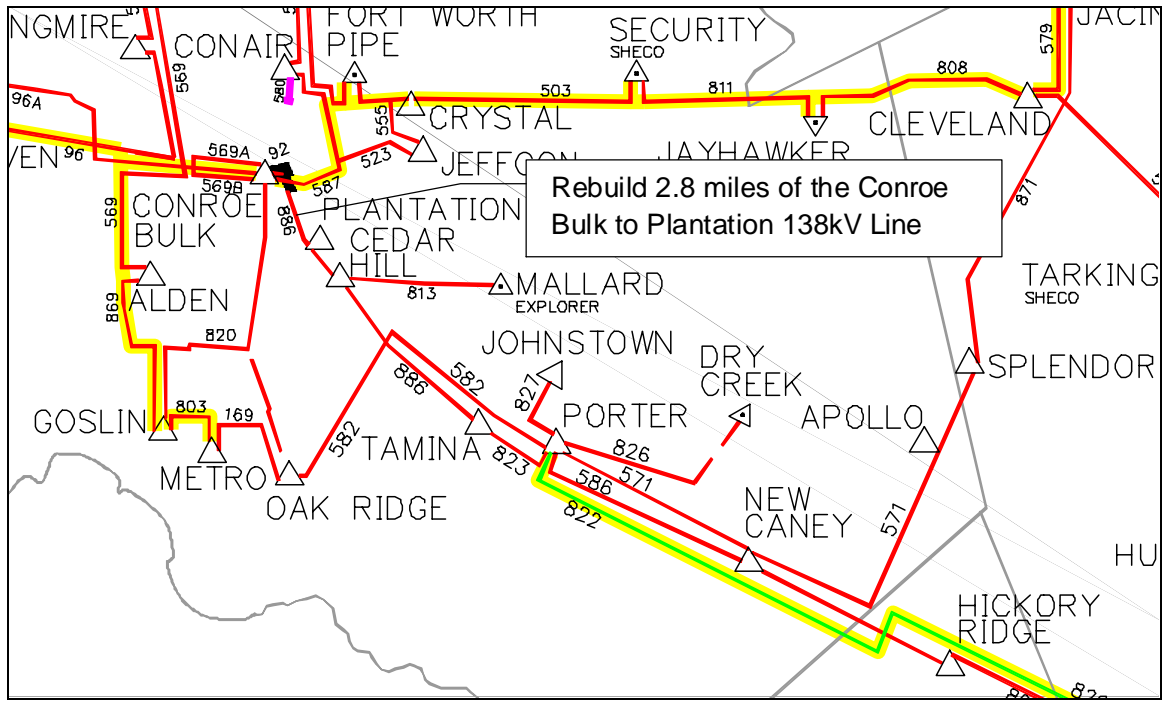
Estimate	
Item	Estimate
Plantation 138kV Substation Work	\$171,000
Conroe Bulk 138kV Substation Work	\$381,000
T-Line Cost	\$2,596,000
<b>Full Financial</b>	<b>\$3,148,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.57 - \$6.3 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project. The following are rough durations:
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>4</b>
<b>Design &amp; Procurement</b>	<b>9</b>
<b>Substation Work</b>	<b>3</b>
<b>T-Line Work</b>	<b>6</b>
<b>Less Parallel Tasks</b>	<b>3</b>
<b>Total Duration</b>	<b>19</b>

Appendix H





ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Truman to AECC Truman West 161 kV  
section

Appendix  
I

## **Project Estimate Scope**

Upgrade Truman to AECC Truman West 161 kV section – 335 MVA

### **Requirements:**

The 161 kV line segment between Truman and AECC Truman West Substations will be upgraded to at least 335 MVA (1200 amps)

### **Description of existing:**

Line segment 941-003 consists of a wood H frame structures with 6.48 miles of 336 of MCM ACSR conductor.

The terminal equipment at Truman and AECC Truman West will support 1200 amps and no upgrades will be required at the substations.

### **Constraints:**

None identified.

### **Proposed Solution:**

The structures will be replaced with single steel poles in tangent locations and 3 steel pole, guyed structures for dead ends and angles. The new conductor will be 1272 MCM ACSR Bittern wire and OPGW will be used as the shield wire.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line conductors will be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- ROW may be in flood plain or wetlands.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix I

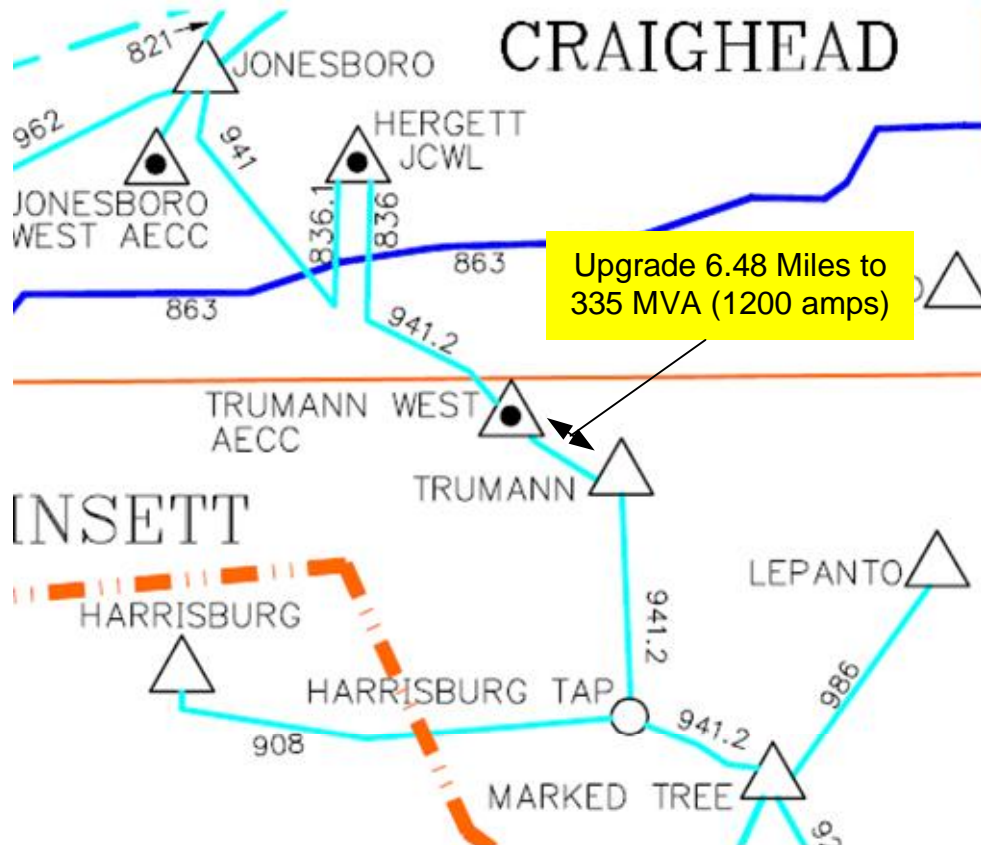
Estimate

Item	Estimate
Terminal equipment upgrades	N/A
T-Line Cost	\$6,388,000
<b>Full Financial</b>	<b>\$6,388,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$3.1 - \$12.7 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Approvals &amp; Permitting</b>	<b>12</b>
<b>Substation Work</b>	<b>2</b>
<b>T-Line Work</b>	<b>16</b>
<b>Less Parallel Tasks</b>	<b>4</b>
<b>Total Duration</b>	<b>32</b>



ESRPP  
EAI – IPP to SPP

Project Summary

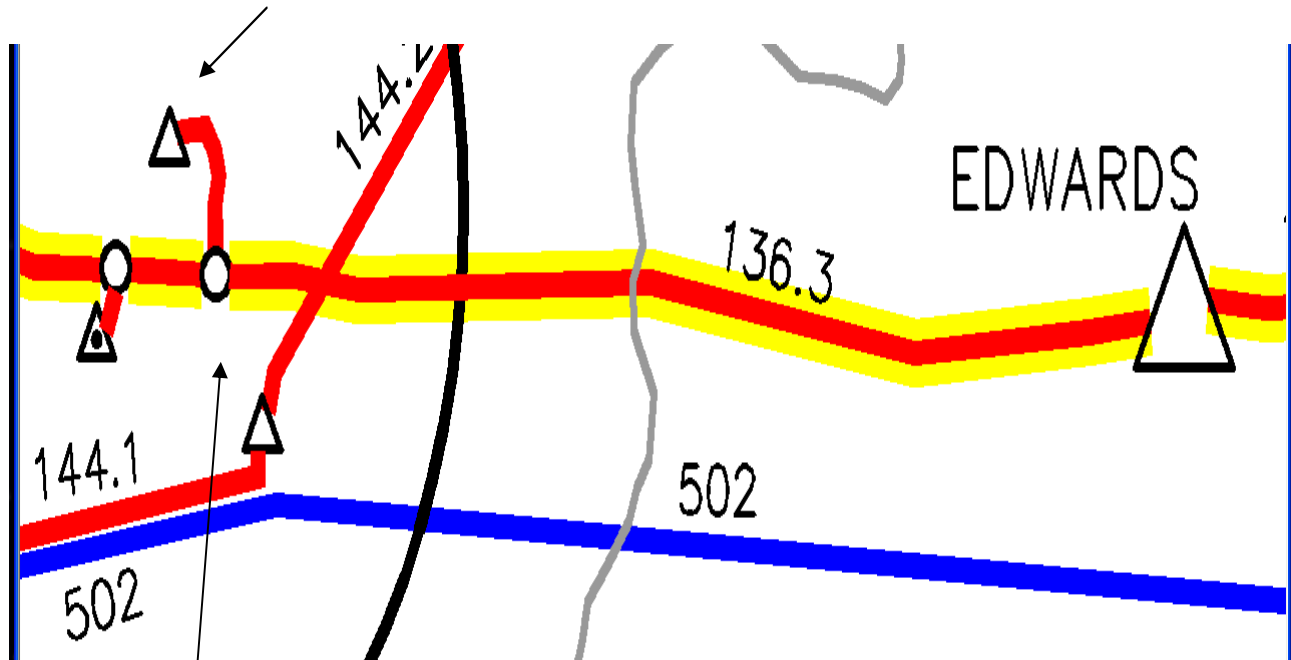
Upgrade East Vicksburg to Edwards 115 kV section

Appendix  
J

**PROJECT SUMMARY**

**Background on Customer Need and Location**

**EAST VICKSBURG**



**EAST VICKSBURG SWITCHING STATION**

The purpose of this class 5 estimate is to reconductor between the East Vicksburg 115kV substation and Edwards 115kV substation. There is 3.14 miles between East Vicksburg 115kV substation and East Vicksburg 115kV switching station. There is 11.42 miles between East Vicksburg 115kV switching station and Edwards 115kV substation for a total of 14.56 miles to be reconducted.

Remove and replace approximately 14.56 miles of existing conductor and install new 1272 ACSR Bittern conductor supplying 260 MVA (1304 A). Existing shield wire and OPGW will be retained.

Line Capacity	MVA	Amps
Existing Line Rating	161	800
Required Line Rating (minimum)	240	1200
Proposed Line Rating (based on equipment to be installed)	260	1304

**Outages**

Two outages will be needed:

- 1 Between East Vicksburg 115kV substation and East Vicksburg 115kV switching station.

## Appendix J

- 2 Between East Vicksburg 115kV switching station and Edwards 115kV substation.

Total outage duration for both sections is 17 weeks.

### T-line Scope

The ultimate design will be determined during development of the Project Execution Plan. For the purposes of developing this estimate several major design assumptions were made. The structures being removed are H-frame wood structures. The new structures will be single circuit guyed concrete structures. No new ROW will be needed.

### Cost Estimate

It is not known at this time what the customer contribution, if any, will be.

For purposed of quantifying a project estimate, it is assumed the customer is funding this project and will be responsible for pre-paying the anticipated cash flow. Because this project is assumed to be customer funded and pre-paid, no AFUDC has been included in the following estimates. The customer should note that the estimates are subject to many variables, known and unknown, and may be modified. Additionally, due to the associated tax obligations created by customer contributions, a "Tax Gross Up" for EMI of 26.89 % has been included in the total customer contribution. (This Tax Gross Up rate and resulting tax obligation is also subject to change.)

#### Estimate

Item	Cost
Direct T-Line Costs	\$10,843,046
Indirect Costs	\$2,495,755
Full financial w/o AFUDC	\$13,338,801
TGU 26.89%	\$3,586,804
TOTAL Customer Contribution	\$16,925,605

*The cost range reflected by this Class 5 estimate is from -50% to +100% or from \$8.5 million to \$34 million*

### Duration Schedule

There are numerous scheduling variables that impact a project schedule and the following information is only provided as a "ball park guess". A detailed schedule will be prepared subsequent to customer approval to proceed with the project. Based on the duration schedules listed below and given a start date of October 1, 2012, the overall project in-service date is estimated to be December 1, 2013.

## Appendix J

Task	Months
<b>Definition</b>	<b>4</b>
<b>Design (Parallel Task)</b>	<b>5</b>
<b>Procurement</b>	<b>5</b>
<b>T-Line Construction</b>	<b>5</b>
<b>Less Parallel Tasks</b>	<b>5</b>
<b>Total Duration</b>	<b>14</b>

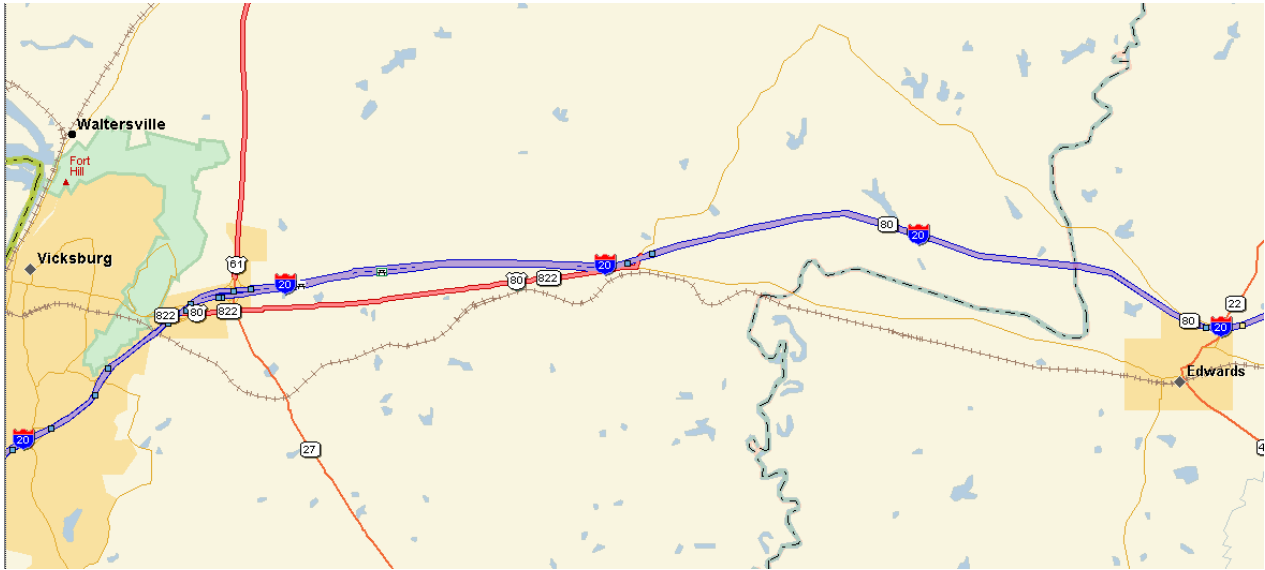
### GENERAL ASSUMPTIONS and RISK

- RISK: There is NO contingency in the duration schedules. Assumption is made that any substantial rain will delay construction of the transmission line.
- RISK: All transmission line ROW is assumed to be owned by Entergy.
- RISK: It is assumed that there is the risk wetlands mitigation will be required. Costs have not been included in the estimate however due to the project location there is a risk of additional costs associated with regulatory intervention by the Coastal Management Authority or other environmental agencies. Should this risk occur and since we cannot speculate what action may be required we cannot quantify a contingency and as such these costs will be an addition to the supplied estimate.
- RISK: It is assumed wetlands or environmental construction practices (such as use of mats and rock) will be required for the transmission line construction. Use of these mitigating products will be added to the cost of the project and may require schedule modification.
- ASSUMPTION: Required outages will be available in the fall and spring.
- ASSUMPTION: Overhead rates will hold steady without substantial deviation during the project cycle. Increases or decreases to these rates will directly translate into additional costs or savings on this project
- ASSUMPTION: The project duration does not begin until all relevant agreements are executed
- ASSUMPTION: There is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- RISK: Project delays or overhead changes will affect final cost.
- RISK: Unknown underground factors will add mitigation costs and may impact schedule
- RISK: Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.
- NOTE: This Class 5 scope and estimate is only valid for 90 days after issuance.
- Since Transmission Planning's assessment was based on current asset & system capabilities, it is assumed the 115 kV system will not be altered prior to the start of this project.
- RISK: No detailed studies have been performed. Customer will need to go to facility study to verify assumptions about route, schedule and outage availability.



## Appendix J

- ASSUMPTION: Estimate based on one route and it is assumed a CCN (Certificate of Convenience and Necessity) will not be required.
- ASSUMPTION: No distribution work was figured in this estimate.



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Little Rock South to Little Rock Creek  
115kV section

Appendix  
K

## Appendix K

### **Project Estimate Scope**

Upgrade Little Rock South to Little Rock Creek 115kV section - 398 MVA

Upgrade terminal equipment at LR South

Upgrade terminal equipment at LR Rock Creek

### **Requirements:**

The line segment between Little Rock South and Little Rock – Rock Creek Substations will be upgraded to at least 398 MVA (2000 amps)

### **Description of existing:**

Line segment 938-010 is 3.06 miles of a double bundle of 666 MCM ACSR conductors on wood poles.

The terminal equipment at LR South has a current limit of 1494 amps (1590 MCM ACSR jumpers) and air line breaker air switches rated for 1600 amp switches

Terminal equipment and operating bus at LR Rock Creek have a current limit of 1494 amps (1590 MCM ACSR jumpers & bus)

### **Constraints:**

Outages on the operating bus at LR Rock Creek will require a mobile transformer to support the load during bus outages.

### **Proposed Solution:**

The line will be upgraded to a double bundle of 954 MCM ACSR cable on steel poles in the existing ROW. The shield wire will be installed with fiber optic cable for protective relay communications.

The LR Rock Creek line terminal bus and jumpers will be upgraded to 2000 amps. Air break switches will be upgraded from 1600 amps to 2000 amps.

At Rock Creek, the LR South terminal bus, jumpers and line drop switch will be upgraded to 2000 amps. The operating bus will also be upgraded to 2000 amps. A new 115 kV 2000 amp motor operated bus tie switch will be added to the operating bus between the transformers. A mobile transformer will be required for the operating bus outages.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required due to building in existing ROW.
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- Part of the line is in a wet land area.
- The line and terminal conductors can be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.

## Appendix K

- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate	
Item	Estimate
LR South Substation Costs (Jumpers, Bus, & Switches)	\$188,000
LR Rock Creek Substation Costs (Jumpers, Bus, Switches, & structure)	\$345,000
T-Line Cost	\$4,227,000
<b>Full Financial</b>	<b>\$4,760,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$2.4 - \$9.5 Million</b>

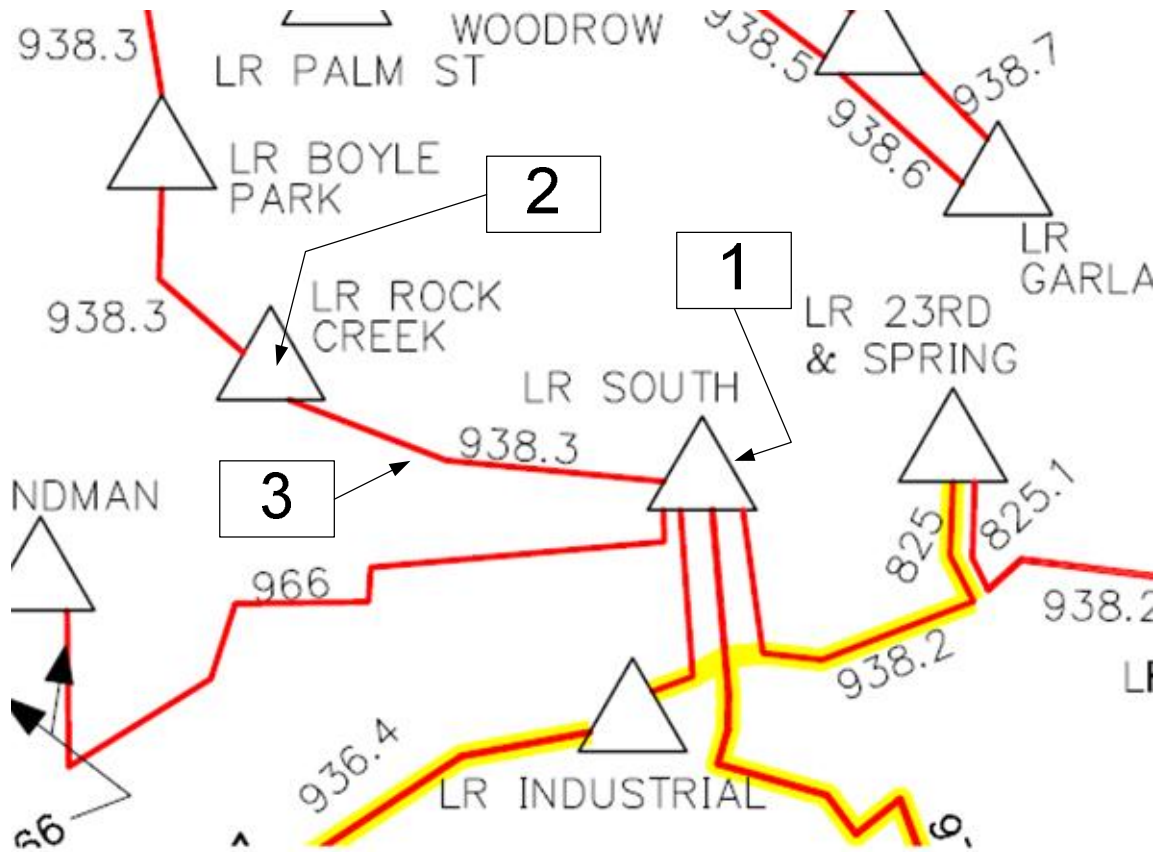
### Duration Schedule

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Appendix K

<b>Task</b>	<b>Months</b>
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>10</b>
<b>Substation Work</b>	<b>12</b>
<b>T-Line Work</b>	<b>9</b>
<b>Less Parallel Tasks</b>	<b>6</b>
<b>Total Duration</b>	<b>31</b>

Appendix K



- 1 - Upgrade Terminal jumpers, air break switches, and terminal bus to 2000 amps
- 2 - Upgrade Terminal jumpers, Switch B3340 and operating bus to 2000 amps
- 3 - Upgrade ~3 miles to double bundle 954 MCM ACSR conductor

ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade terminal equipment on Hot Springs  
Industrial to Hot Springs Union Carbide 115kV  
section

Appendix  
L-1

### **Project Estimate Scope**

Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section – 239 MVA

### **Requirements:**

The rating of the 115 kV terminal equipment at Hot Springs Industrial and Hot Springs Union Carbide be upgraded for 239 MVA (1200 amps).

### **Description of existing:**

Hot Springs Industrial Substation has a 1200 amp line switch (B3614) on the Union Carbide line terminal. The substation operating bus is 666 MCM ACSR conductor rated for 882 amps and the line bay bus and line bay risers are 500 MCM copper rated for 975 amps. The station has a single 115/13.8 kV 10/12.5 MVA transformer with a 1200 amp main, 1000 kVA regulator and two 600 amp feeder breakers.

Hot Springs Union Carbide station has a 1200 amp line switch (B1436) on the HS Industrial line terminal with an operating bus of 666 MCM ACSR (882 amps) and line bay risers and bus with either 666 MCM ACSR or 500 MCM copper conductor. A single 115/13.8 kV 12/16/20 VA transformer with a 1200 amp main breaker, 2000 kV voltage regulator one 1200 amp feeder and one 600 feeder provide service to the customers.

### **Constraints:**

Replacing the operating bus at both substations will require a mobile transformer to support the loads. Coordination with the large industrial customers will be required.

### **Proposed Solution:**

The strung bus conductors (operating bus, line bus, and line risers) at both substations will be upgraded to 1272 MCM ACSR conductor.

### **General Assumptions & Risks**

- The line and terminal conductors can be upgraded for the required current.
- A mobile transformer will be required during operating bus outages.
- No detailed studies have been performed
- Estimate based on completing the work in the substations ROW.
- Detailed relay protection studies have not been completed and will be required for the new line rating.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.



Appendix L-1

Estimate

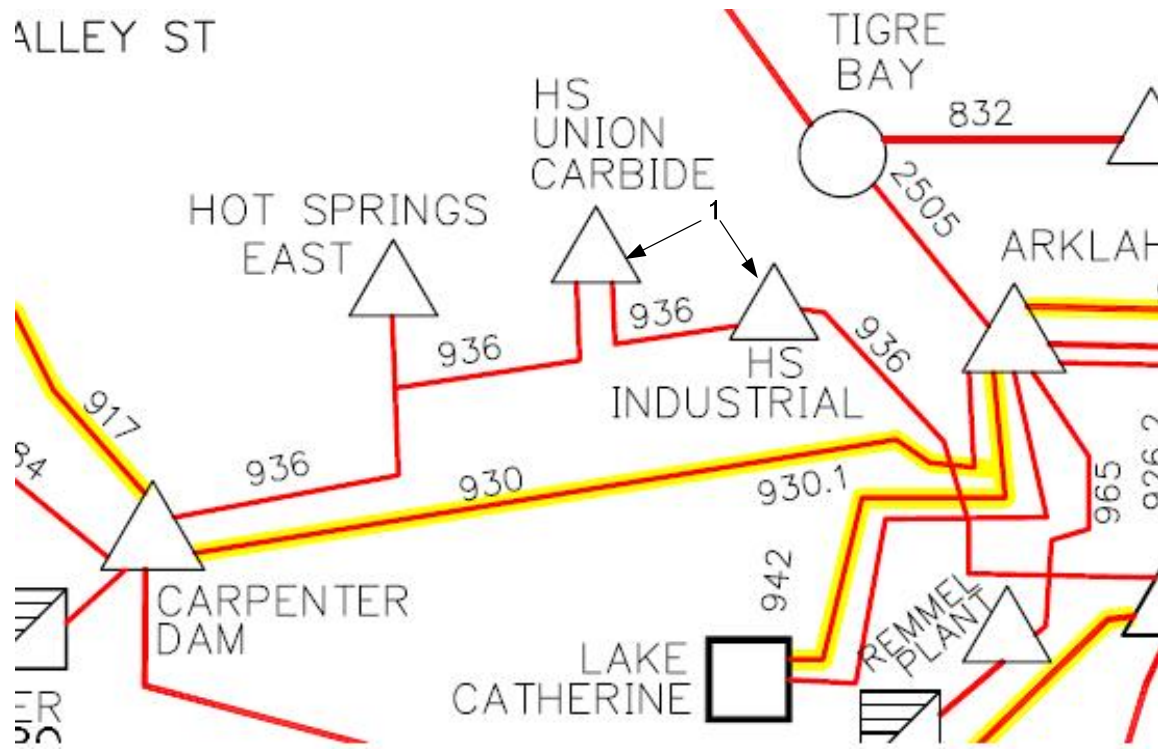
Item	Estimate
HS Industrial Substation Costs (Bus & Jumper Upgrade)	\$159,000
HS Union Carbide Costs (Bus & Jumper Upgrade)	\$169,000
<b>Full Financial</b>	<b>\$398,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$200 - \$796 Thousand</b>

**Duration Schedule**

- Only one substation at a time will be backed by a mobile transformer.
- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	5
Regulatory & Permitting	4
Substation Work	16
T-Line Work	N/A
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>25</b>

Appendix L-1



1 – Upgrade line terminal and operating bus to 1200 amps

ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade terminal equipment on Hot Springs EHV to  
Hot Springs Industrial 115kV section

Appendix  
L-2

**Project Estimate Scope**

Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section – 239 MVA

**Requirements:**

The line terminal equipment at HS EHV and HS Industrial will be upgraded to support 239 MVA (1200 amps at 115 kV)

**Description of existing:**

The HS Industrial line terminal equipment at HS EHV station is rated for at least 1200 amps.

The HS EHV line terminal at HS Industrial has 500 MCM copper line bay bus conductors with a rating of 975 amps.

**Constraints:**

None identified.

**Proposed Solution:**

The line bay jumpers at HS EHV line terminal will be upgraded to at least 1200 amps.

**General Assumptions & Risks**

- The line and terminal conductors can be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on completing the work in the substations ROW.
- Detailed relay protection studies have not been completed and will be required for the new line rating.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

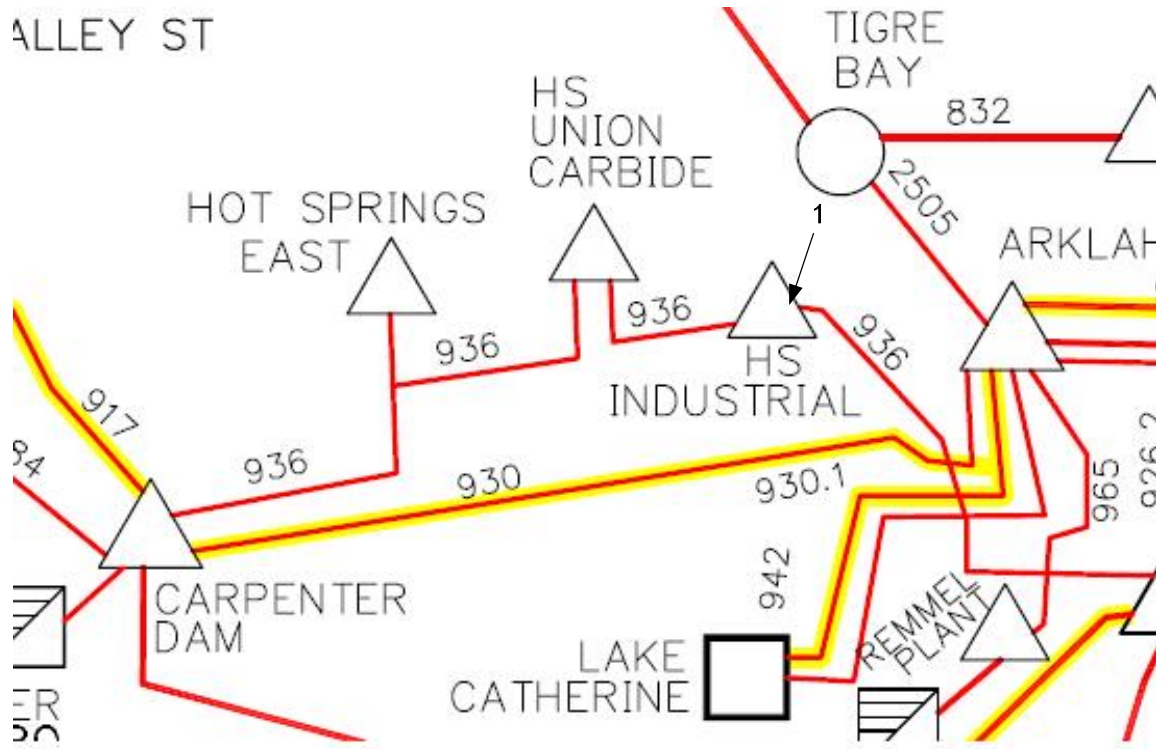
Estimate	
Item	Estimate
HS Industrial Substation Cost (Bay Bus)	\$111,000
<b>Full Financial</b>	<b>\$111,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$55.5 - \$220.0 Thousand</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- The inability to receive approval for required outages could extend the duration of this work.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

<b>Task</b>	<b>Months</b>
<b>Definition</b>	<b>4</b>
<b>Regulatory</b>	<b>4</b>
<b>Substation Work</b>	<b>9</b>
<b>T-Line Work</b>	<b>N/A</b>
<b>Less Parallel Tasks</b>	<b>2</b>
<b>Total Duration</b>	<b>15</b>

Appendix L-2



1 – Upgrade line terminal bus to 1200 amps

ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade terminal equipment on Hot Springs Union  
Carbide to Hot Springs East 115kV section

Appendix  
L-3

**Project Estimate Scope**

Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section – 239 MVA

**Requirements:**

The line terminal at Hot Springs Union Carbide for the HS East line will be upgraded to 239 MVA (1200 amps at 115 kV).

**Description of existing:**

The line bay bus is either 666 MCM ACSR or 500 MCM copper with a line bay riser, also of 500 copper. These conductors limit the terminal to 882 amps.

The line from HS Union Carbide to HS East tap is 1590 MCM ACSR and is adequate for the required load.

**Constraints:**

None Identified.

**Proposed Solution:**

The line bay bus and riser will be upgraded for 1200 amps.

**General Assumptions & Risk**

- The line and terminal conductors can be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on completing the work in the substations ROW.
- Detailed relay protection studies have not been completed and will be required for the new line rating.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Estimate

Item	Estimate
HS Union Carbide Substation Costs (Line terminal Equipment)	\$93,000
<b>Full Financial</b>	<b>\$93,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$47 - \$186 Thousand</b>

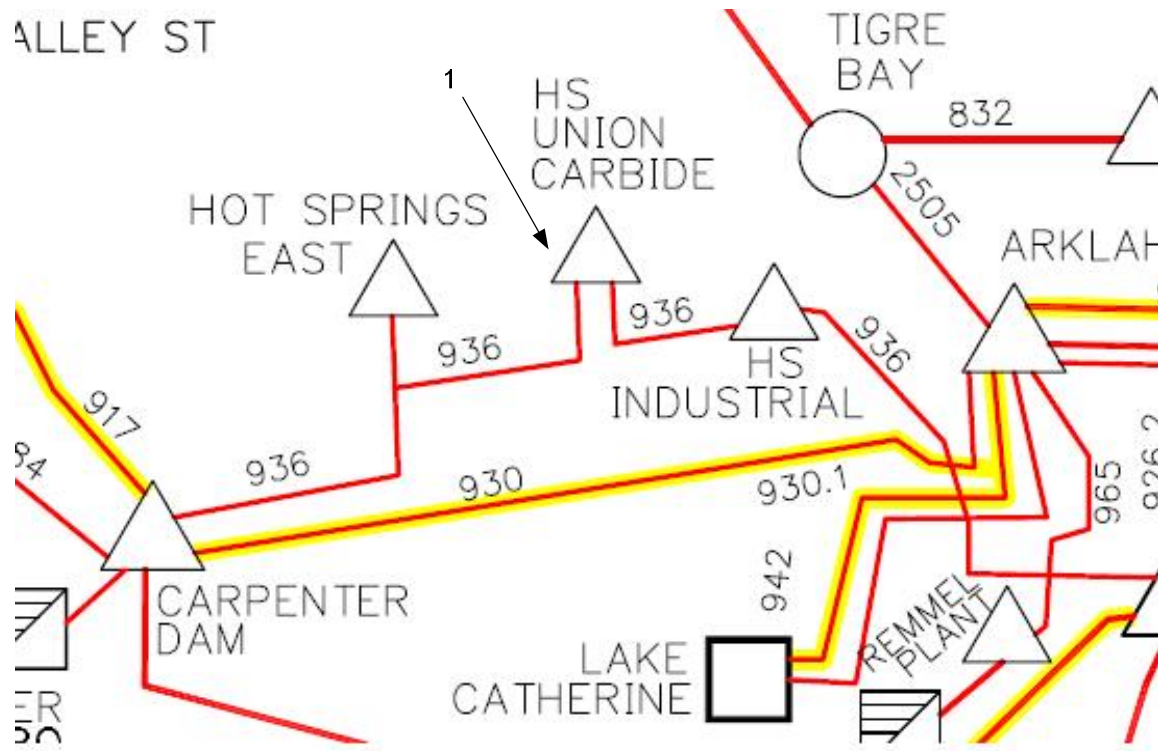


**Duration Schedule**

- Only one substation at a time will be backed by a mobile transformer.
- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

<b>Task</b>	<b>Months</b>
<b>Definition</b>	<b>5</b>
<b>Regulatory &amp; Permitting</b>	<b>6</b>
<b>Substation Work</b>	<b>8</b>
<b>T-Line Work</b>	<b>N/A</b>
<b>Less Parallel Tasks</b>	<b>2</b>
<b>Total Duration</b>	<b>17</b>

Appendix L-3



1 – Upgrade line terminal bus to 1200 amps

ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Jacinto to Splendora 138 kV section

Appendix  
M-1

**Project Estimate Scope:**

Upgrade Jacinto to Splendora 138kV Section

**Requirements:**

Upgrade the Jacinto to Splendora 138kV line section to at rating of 478 MVA (2000 amps).

**Description of existing:**

L-871 from Jacinto to Splendora consists of 12.5 miles of 649.5 MCM ACAR conductor built on wood H-frame structures.

Jacinto 138kV substation Splendora line bay consist of bundled 1000 CU bus (2976 amps), two 3000 amp breakers, four 3000 amp LDS switches, a 1200 amp line trap and one 1000 CU line bay bus (1488 amps).

Splendora 138kV substation Jacinto line bay consist of bundled 750 CU bus (2504 amps), one 3000 amp breaker, two 2000 amp LDS switches, a 2000 amp line trap, multiple 750 CU line bay bus (1252 amps) and 1033 ACSR line bay risers (1144 amps).

**Constraints:**

The Jacinto to Splendora line section is double circuited with the Jacinto to Cleveland 138kV Line 579 for 4 miles (from Jacinto to str#38). L-579 will be de-energized during the rebuilding of this 4 mile line section. There is a potential risk that both lines cannot be de-energized at the same time without assuming some load at risk.

**Proposed Solution:**

Rebuild 12.5 miles of 649.5 MCM ACAR conductor and wood H-frames with bundled 954 MCM ACSR Cardinal (2216 amps) built on single steel poles. 4 miles will be rebuilt with double circuit steel poles to accommodate the existing second circuit (L-579). L-579 existing conductor will remain.

Upgrade the Jacinto 138kV substation Splendora line bay strung bus to bundled 1000 CU (2976 amps) and install a new 2000 amp line trap.

Upgrade the Splendora 138kV substation Jacinto line bay strung bus and line risers to bundled 1000 CU (2976 amps).

**General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) is not required due to rebuilding in existing ROW.
- Line is in existing ROW and no new ROW is required
- No detailed engineering studies have been performed
- Entergy will not perform work on customer owned facilities and is not included
- Schedule milestones after design and constructability review and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed

## Appendix M-1

- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- The overheads are based on 2013-2014 with all work being completed in 2014.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

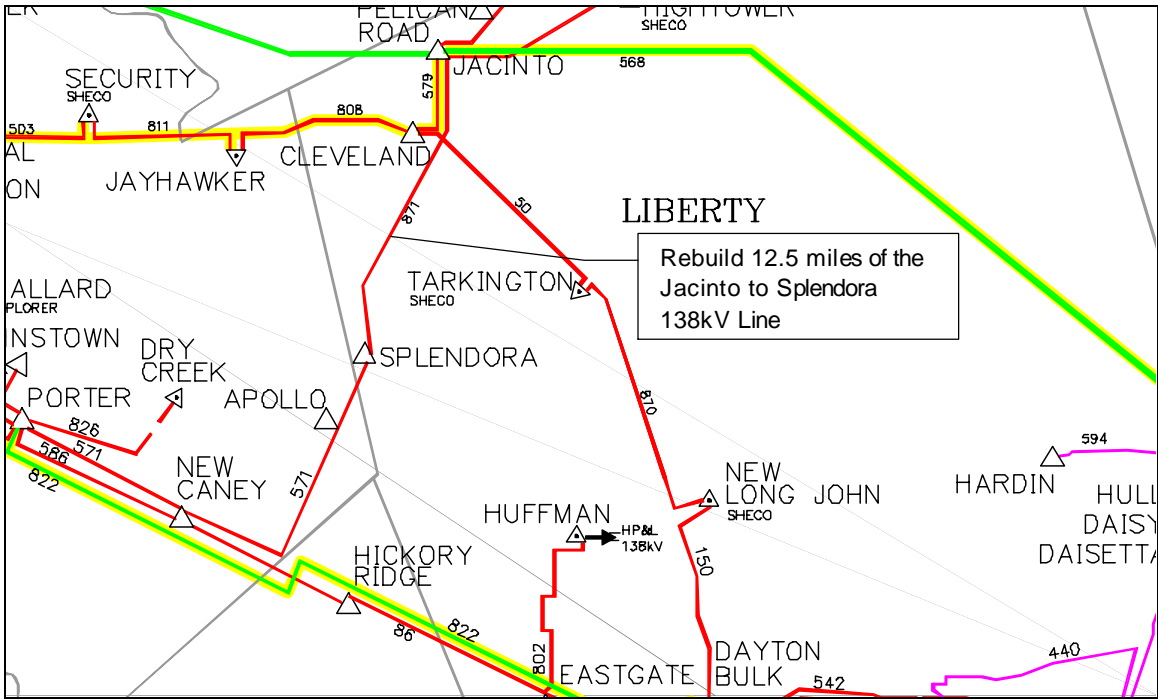
Estimate	
Item	Estimate
Jacinto 138kV Substation Work	\$224,000
Splendora 138kV Substation Work	\$79,000
T-Line Cost	\$11,172,000
<b>Full Financial</b>	<b>\$11,475,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$5.74 - \$22.95 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project. The following are rough durations:
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Appendix M-1

Task	Months
Definition	4
Design & Procurement	9
Substation Work	3
T-Line Work	9
Less Parallel Tasks	3
Total Duration	22



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Splendora to Apollo 138 kV section

Appendix  
M-2

**Project Estimate Scope:**

Upgrade Splendora to Apollo 138kV Section

**Requirements:**

Upgrade the Splendora to Apollo 138kV line section to at rating of 478 MVA (2000 amps).

**Description of existing:**

L-571 from Splendora to Apollo consists of 2.7 miles of 649.5 MCM ACAR conductor built on wood H-frame structures.

Splendora 138kV substation Jacinto line bay consist of bundled 750 CU bus (2504 amps), one 3000 amp breaker, three 2000 amp LDS switches, a 2000 amp line trap, multiple 750 CU line bay bus (1252 amps) and 1033 ACSR line bay risers (1144 amps).

Apollo 138kV substation Splendora line bay consist of 750 CU bus (1252 amps), one 2000 amp LDS switch and 1033 AAC line bay risers (1017 amps).

**Constraints:**

Replacing the buswork at Apollo may require that the entire substation be de-energized. The total outage will have to be coordinated with the customers fed from this station.

**Proposed Solution:**

Rebuild 2.7 miles of 649.5 MCM ACAR conductor and wood H-frames with bundled 954 MCM ACSR Cardinal (2216 amps) built on single steel poles.

Upgrade the Splendora 138kV substation Apollo line bay bus and line risers to bundled 1000 CU (2976 amps).

Upgrade the Apollo 138kV substation Splendora line bay bus and line risers to bundled 1000 CU (2976 amps).

**General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) is not required due to rebuilding in existing ROW.
- Line is in existing ROW and no new ROW is required
- No detailed engineering studies have been performed
- Entergy will not perform work on customer owned facilities and is not included
- Schedule milestones after design and constructability review and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- The overheads are based on 2013-2014 with all work being completed in 2014.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule



Appendix M-2

- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

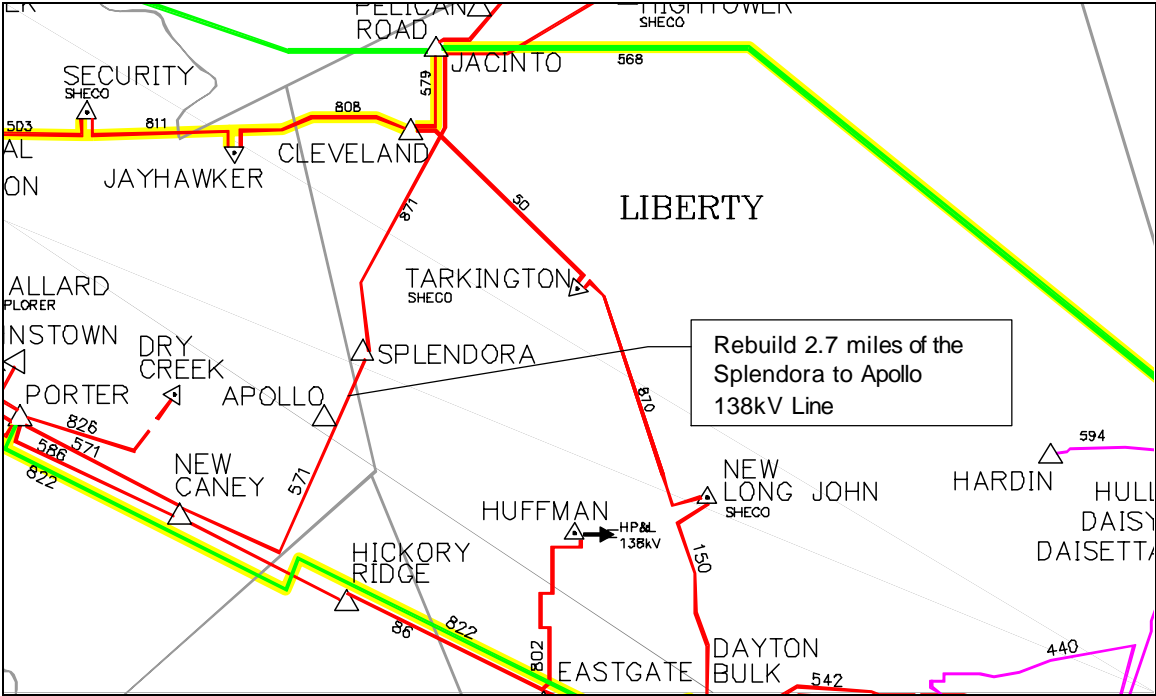
Estimate	
Item	Estimate
Apollo 138kV Substation Work	\$80,000
Splendora 138kV Substation Work	\$80,000
T-Line Cost	\$2,241,000
<b>Full Financial</b>	<b>\$2,401,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.2 - \$4.8 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project. The following are rough durations:
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>4</b>
<b>Design &amp; Procurement</b>	<b>7</b>
<b>Substation Work</b>	<b>3</b>
<b>T-Line Work</b>	<b>5</b>
<b>Less Parallel Tasks</b>	<b>3</b>
<b>Total Duration</b>	<b>16</b>

Appendix M-2



ESRPP  
EAI – IPP to SPP

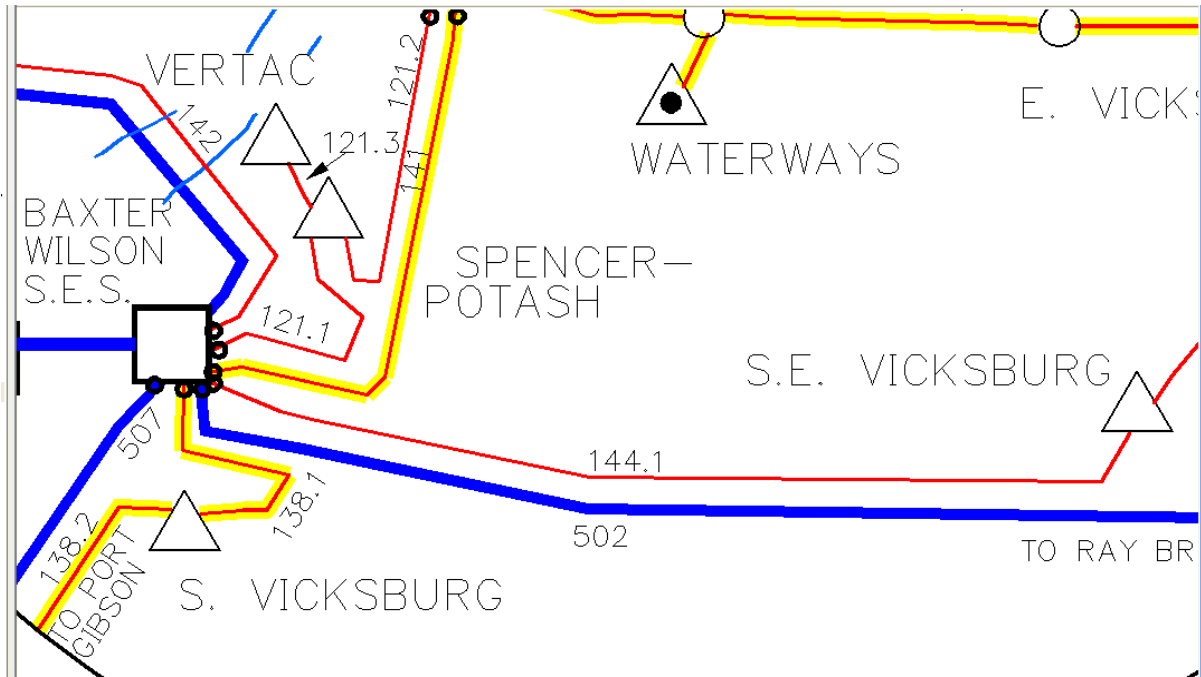
Project Summary

Upgrade Baxter Wilson to South East Vicksburg  
115kV section

Appendix  
N

**PROJECT SUMMARY**

**Background on Customer Need and Location**



The purpose of this class 5 estimate is to reconductor between the Baxter Wilson 115kV substation and South East Vicksburg 115kV substation. There is 6.38 miles between Baxter Wilson 115kV substation and South East Vicksburg 115kV substation.

Remove and replace approximately 6.38 miles of existing conductor and install approximately new 1272 ACSR Bittern conductor supplying 260 MVA (1304 A). Existing shield wire and OPGW will be retained.

Line Capacity	MVA	Amps
Existing Line Rating	161	800
Required Line Rating (minimum)	240	1200
Proposed Line Rating (based on equipment to be installed)	260	1304

**Outages**

One outage will be needed:

Between East Vicksburg 115kV substation and East Vicksburg 115kV switching station

Total outage duration for both sections is 12 weeks.

**T-line Scope**

The ultimate design will be determined during development of the Project Execution Plan. For the purposes of developing this estimate several major design assumptions were

## Appendix N

made. The structures being removed are H-frame wood structures. The new structures will be single circuit guyed concrete structures. No new ROW will be needed.

### Cost Estimate

It is not known at this time what the customer contribution, if any, will be.

For purposed of quantifying a project estimate, it is assumed the customer is funding this project and will be responsible for pre-paying the anticipated cash flow. Because this project is assumed to be customer funded and pre-paid, no AFUDC has been included in the following estimates. The customer should note that the estimates are subject to many variables, known and unknown, and may be modified. Additionally, due to the associated tax obligations created by customer contributions, a "Tax Gross Up" for EMI of 26.89 % has been included in the total customer contribution. (This Tax Gross Up rate and resulting tax obligation is also subject to change.)

Item	Cost
Direct T-Line Costs	\$4,751,280
Indirect Costs	\$1,093,607
Full financial w/o AFUDC	\$5,844,887
TGU 26.89%	\$1,571,690
TOTAL Customer Contribution	\$7,416,577

*The cost range reflected by this Class 5 estimate is from -50% to +100% or from \$3.7 million to \$15 million*

### Duration Schedule

There are numerous scheduling variables that impact a project schedule and the following information is only provided as a "ball park guess". A detailed schedule will be prepared subsequent to customer approval to proceed with the project. Based on the duration schedules listed below and given a start date of December 1, 2012, the overall project in-service date is estimated to be December 1, 2013.

Task	Months
<b>Definition</b>	<b>4</b>
<b>Design (Parallel Task)</b>	<b>5</b>
<b>Procurement</b>	<b>5</b>
<b>T-Line Construction</b>	<b>3</b>
<b>Less Parallel Tasks</b>	<b>5</b>
<b>Total Duration</b>	<b>12</b>

## GENERAL ASSUMPTIONS and RISK

- RISK: There is NO contingency in the duration schedules. Assumption is made that any substantial rain will delay construction of the transmission line.
- RISK: All transmission line ROW is assumed to be owned by Entergy.
- RISK: It is assumed that there is the risk wetlands mitigation will be required. Costs have not been included in the estimate however due to the project location there is a risk of additional costs associated with regulatory intervention by the Coastal Management Authority or other environmental agencies. Should this risk occur and since we cannot speculate what action may be required we cannot quantify a contingency and as such these costs will be an addition to the supplied estimate.
- RISK: It is assumed wetlands or environmental construction practices (such as use of mats and rock) will be required for the transmission line construction. Use of these mitigating products will be added to the cost of the project and may require schedule modification.
- ASSUMPTION: Required outages will be available in the fall and spring.
- ASSUMPTION: Overhead rates will hold steady without substantial deviation during the project cycle. Increases or decreases to these rates will directly translate into additional costs or savings on this project
- ASSUMPTION: The project duration does not begin until all relevant agreements are executed
- ASSUMPTION: There is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- RISK: Project delays or overhead changes will affect final cost.
- RISK: Unknown underground factors will add mitigation costs and may impact schedule
- RISK: Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.
- NOTE: This Class 5 scope and estimate is only valid for 90 days after issuance.
- Since Transmission Planning's assessment was based on current asset & system capabilities, it is assumed the 115 kV system will not be altered prior to the start of this project.
- RISK: No detailed studies have been performed. Customer will need to go to facility study to verify assumptions about route, schedule and outage availability.
- ASSUMPTION: Estimate based on one route and it is assumed a CCN (Certificate of Convenience and Necessity) will not be required.
- ASSUMPTION: No distribution work was figured in this estimate.

Appendix N



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Little Rock West to Little Rock Palm Street  
115 kV section

Appendix  
O



## Appendix O

### **Project Estimate Scope**

Upgrade Little Rock West to Little Rock Palm Street 115 kV section - 239 MVA  
Upgrade terminal equipment at LR West

### **Requirements:**

The line segment between Little Rock West and Little Rock Palm Street Substation will be upgraded to at least 239 MVA (1200 amps).

### **Description of existing:**

Line segment 938-014 from LR West to Structure #181 is 1.5 miles of single wood poles with 666 MCM ACSR conductors. The line segment from Structure #181 (LR Palm St West Loop) is 1272 MCM ACSR conductors 0.3 miles long.

At LR West Substation, the line bay risers and bus are 666 MCM ACSR conductors and are limited to 882 amps. The remaining line bay equipment is rated for at least 1200 amps.

The terminal equipment at LR Palm Street Sub is rated for at least 1494 amps.

### **Constraints:**

The U of A Medical Services complex will be on a radial line from LR Gains Street Substation while the line upgrade is being completed.

### **Proposed Solution:**

The line will be upgraded to 1272 MCM ACSR cable on steel poles in the existing ROW up to structure #181. The shield wire will be installed with fiber optic cable for protective relay communications.

The Gaines Street terminal at LR West will be upgraded to 1275 MCM ACSR jumpers and bus.

### **General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required due to building in existing ROW.
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line upgrade will be in residential and commercial areas and will impact traffic flows on public streets.
- The line and terminal conductors can be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.

## Appendix O

- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

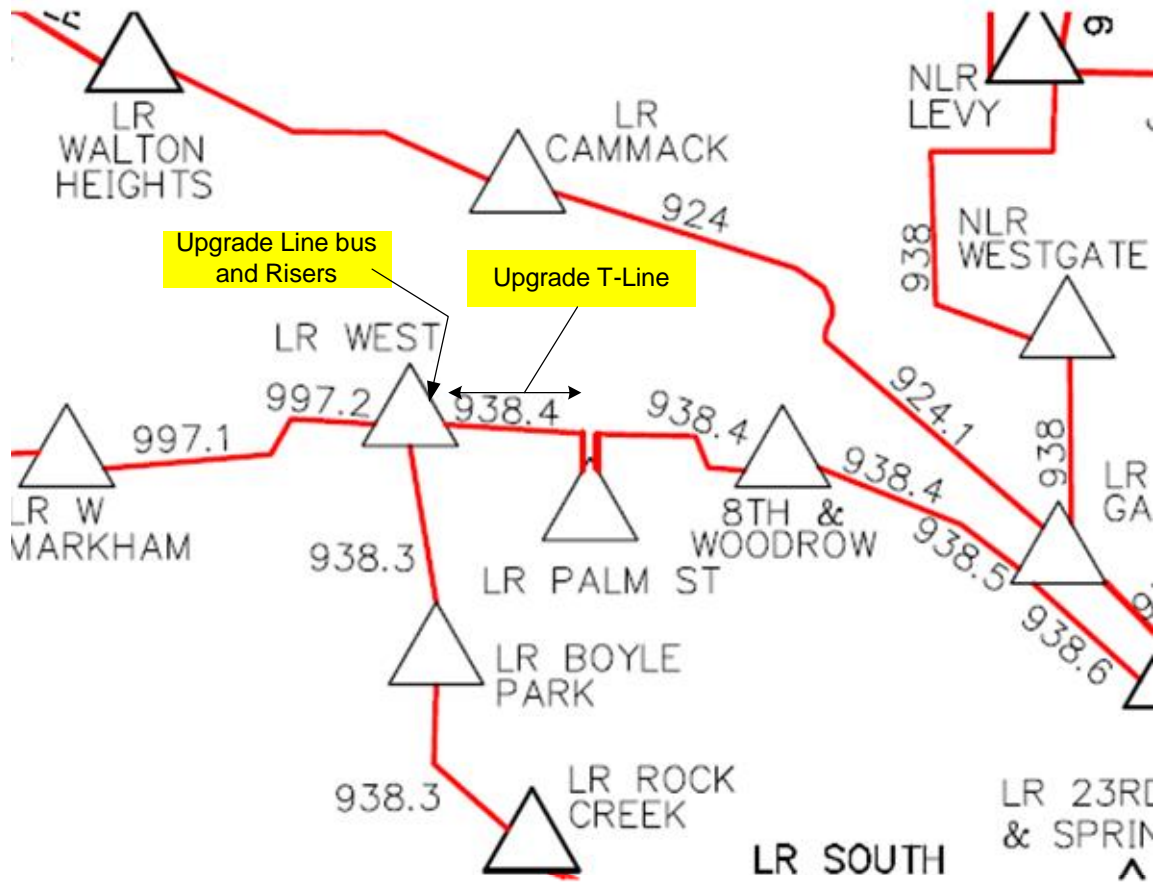
Estimate	
Item	Estimate
LR West Substation Costs ( Jumpers & Bus)	\$93,000
T-Line Cost	\$4,977,000
<b>Full Financial</b>	<b>\$5,070,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$2.5 – \$10.1 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to project approval.
- The impact of working in residential & commercial areas may cause delays in the schedule.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>6</b>
<b>Substation Work</b>	<b>9</b>
<b>T-Line Work</b>	<b>12</b>
<b>Less Parallel Tasks</b>	<b>6</b>
<b>Total Duration</b>	<b>27</b>

Appendix O



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Harrison East to Summit 161 kV section

Appendix  
P

**Project Estimate Scope**

Upgrade Harrison East to Summit 161 kV section - 363 MVA

Upgrade terminal equipment at Harrison East

**Requirements:**

The line segment between Harrison East and Summit Substations will be upgraded to at least 363 MVA (1303 amps).

**Description of existing:**

907.4 BULL SHOALS TAP - HARRISON EAST 161 kV 907.4

907-007 21.58 miles wood H frame 250.0 MCM Type 24R1 Hollow Core CU

Line segment 907-007 is 250 MCM type 24R1 Hollow core copper conductors, 21.58 miles long built on wood H frame poles.

The line bay risers on the Harrison East terminal at Summit are 250 MCM copper and limit the current to 624 amps.

The jumpers for the terminal equipment at Harrison East, on the Summit terminal, are 350 MCM Copper. The line air break switch is rated for 600 amps, the line bay bus is 4/0 copper, the line trap is rated for 800 amps and the line bay riser is 250 MCM copper. This equipment limits the capacity of the terminal.

**Constraints:**

**Proposed Solution:**

The line will be upgraded to 1272 MCM ACSR cable on steel poles in the existing ROW. The shield wire will be installed with fiber optic cable for protective relay communications.

The line bay riser for the Harrison East terminal at Summit will be upgraded for 1303 amps.

The terminal equipment for the Summit terminal at Harrison East will be upgraded to 1303 amps. The air break switches and the line trap will be upgraded to 2000 amps.

**General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line conductors will be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.

## Appendix P

- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- ROW may be in flood plain or wetlands.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

### Estimate

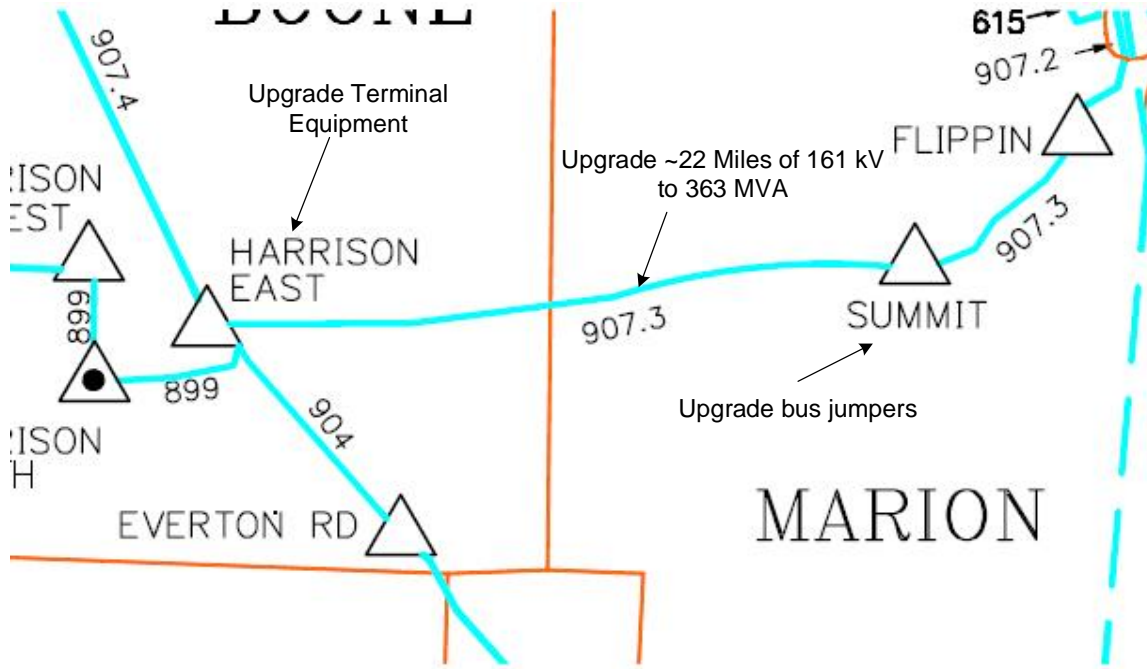
Item	Estimate
Harrison East Substation Terminal Equipment	\$206,000
Summit Substation Terminal Equipment	\$85,000
T-Line Cost	\$16,713,000
<b>Full Financial</b>	<b>\$17,004,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$8.5 - \$34.0 Million</b>

### Duration Schedule

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
<b>Definition</b>	<b>6</b>
<b>Regulatory &amp; Permitting</b>	<b>12</b>
<b>Substation Work</b>	<b>12</b>
<b>T-Line Work</b>	<b>24</b>
<b>Less Parallel Tasks</b>	<b>8</b>
<b>Total Duration</b>	<b>46</b>

Appendix P



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade ISES to Moorefield 161 kV section

Appendix  
Q-1



### **Project Estimate Scope**

Upgrade ISES to Moorefield 161 kV section – 363 MVA

Upgrade terminal equipment at Moorefield

### **Requirements:**

The 161 kV line from ISES to Moorefield Substations will be upgraded for at least 363 MVA (1303 amps)

### **Description of existing:**

906.1 ISES-BATESVILLE

906-002 8.16 miles DC Lattice Steel 1590.0 MCM 45/7 ACSR

906-003 3.68 miles wood H frame 954.0 MCM 54/7 ACSR

This section of line has two segments; one from ISES to Moorefield Junction and one from Moorefield Junction to Moorefield. The first segment (#906-002) is 8.16 miles of 1590 MCM ACSR conductors on DC lattice steel towers. The second segment (#906-003) is 3.68 miles of 954 MCM ACSR conductors on wood H frames.

The terminal equipment at ISES can support the required 1303 amps.

The ISES line bay terminal at Moorefield is limited to 1110 amps due to a 954 MCM ACSR line bay riser.

### **Constraints:**

### **Proposed Solution:**

Line segment #906-003 Moorefield Junction to Moorefield will be upgraded to 1590 MCM ACSR on steel H frames.

The line bay riser at Moorefield will be upgraded to 1303 amps (1590 MCM ACSR). Both the ISES & Sage terminals will be upgraded.

### **General Assumptions & Risk**

- The line and terminal conductors can be upgraded for the required current.
- A mobile transformer will be required during operating bus outages.
- No detailed studies have been performed
- Estimate based on completing the work in the substations ROW.
- Detailed relay protection studies have not been completed and will be required for the new line rating.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix Q-1

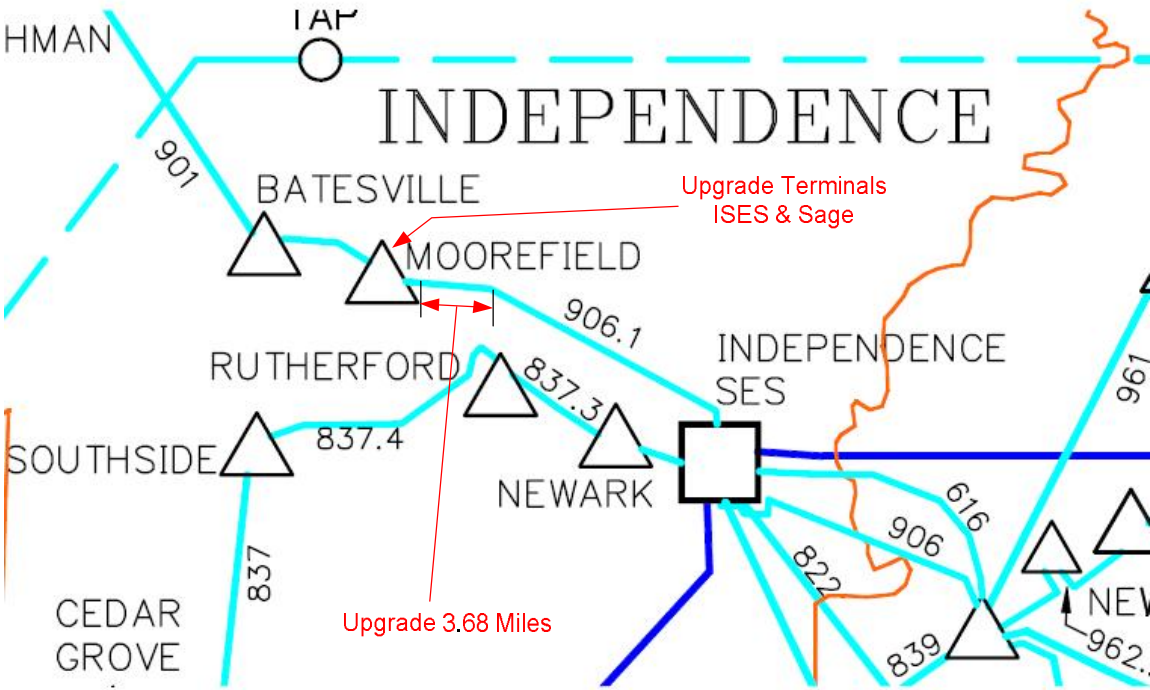
Estimate

Item	Estimate
Moorefield Substation Terminals (ISES & Sage)	\$128,000
T-Line Cost	\$3,373,000
<b>Full Financial</b>	<b>\$3,501,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.7 - \$7.00 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	6
Regulatory & Permitting	12
Substation Work	10
T-Line Work	20
<b>Less Parallel Tasks</b>	<b>7</b>
<b>Total Duration</b>	<b>41</b>



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Moorefield to Batesville 161 kV section

Appendix  
Q-2

**Project Estimate Scope**

Upgrade Moorefield to Batesville 161 kV section – 363 MVA

Upgrade terminal equipment at Moorefield

Upgrade terminal equipment at Batesville

**Requirements:**

The 161 kV line from Moorefield to Batesville Substations will be upgraded to at least 363 MVA (1303 amps).

**Description of existing:**

906.1 ISES-BATESVILLE

906-004 3.7 miles wood H frame 954.0 MCM 54/7 ACSR

The Moorefield to Batesville line segment (#906-004) is 3.7 miles of 954 MCM ACSR conductors on wood H frame structures.

The Batesville line bay equipment at Moorefield will support the 1303 amps except for the line bay bus and line bay risers which limit the load to 1110 amps (954 ACSR).

The Moorefield line bay equipment at Batesville will support the required load except for the line bay riser which is 954 ACSR (1100 amps).

**Constraints:**

None identified

**Proposed Solution:**

Line segment #906-004 Moorefield to Batesville will be upgraded to 1590 MCM ACSR on steel H frames.

**General Assumptions & Risk**

- The line and terminal conductors can be upgraded for the required current.
- A mobile transformer will be required during operating bus outages.
- No detailed studies have been performed
- Estimate based on completing the work in the substations ROW.
- Detailed relay protection studies have not been completed and will be required for the new line rating.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix Q-2

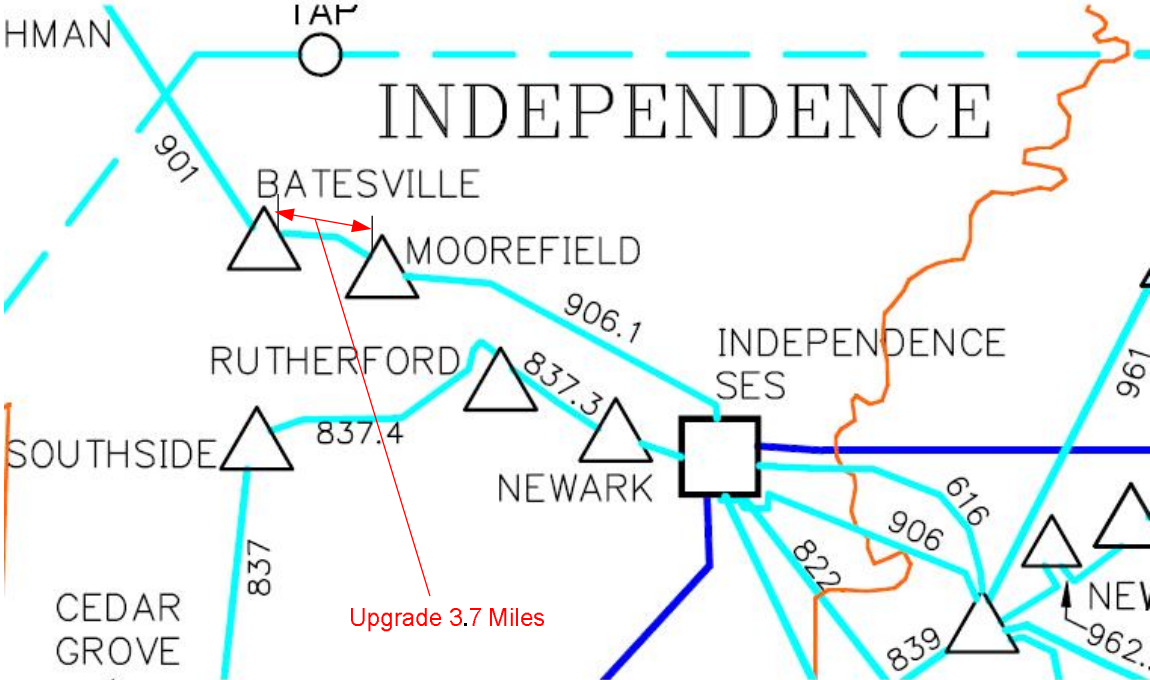
Estimate

Item	Estimate
T-Line Cost	\$3,480,000
<b>Full Financial</b>	<b>\$3,480,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.7 - \$6.9 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	6
Regulatory & Permitting	9
Substation Work	N/A
T-Line Work	13
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>28</b>



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Walnut Ridge to Hoxie South 161 kV  
section

Appendix  
R



**Project Estimate Scope**

Upgrade Walnut Ridge to Hoxie South 161 kV section – 234 MVA  
Upgrade terminal equipment at Walnut Ridge (line trap)

**Requirements:**

The 161 kV line segment between Walnut Ridge and Hoxie South Substations must be upgraded to 234 MVA (840 amps)

**Description of existing:**

Line segment 707-000 has 636 MCM ACSR conductors mounted on wood H frame poles and is 3.52 mile long. This conductor will only support 780 amps.

The line trap for the AECC Hoxie South line at Walnut Ridge Substation is rated at 800 amps. All the other terminal equipment will support 840 amps.

**Constraints:**

None identified.

**Proposed Solution:**

The line will be upgraded to a 666 MCM ACSR Flamingo conductor on steel poles in the existing ROW. The shield wire will be installed with fiber optic cable for future use.

The line trap at Walnut Ridge will be upgraded to 2000 amp. The mounting pedestal for the line trap will be replaced / upgraded for the larger trap.

**General Assumptions & Risks**

- A Certificate of Compliance & Need (CCN) will not be required
- An allocation has been made for environmental monitoring and compliance for the duration of the project. The actual costs may be greater or less depending on the surrounding conditions during construction.
- The line conductors will be upgraded for the required current.
- No detailed studies have been performed
- Estimate based on building in the existing ROW.
- Detailed line studies have not been completed.
- Milestones will be developed after design and constructability reviews have been completed and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- It is assumed, for this estimate, there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- ROW may be in flood plain or wetlands.
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix R

Estimate

Item	Estimate
Substation Costs	\$129,000
T-Line Cost	\$5,371,000
<b>Full Financial</b>	<b>\$5,500,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$2.7 - \$11.0 Million</b>

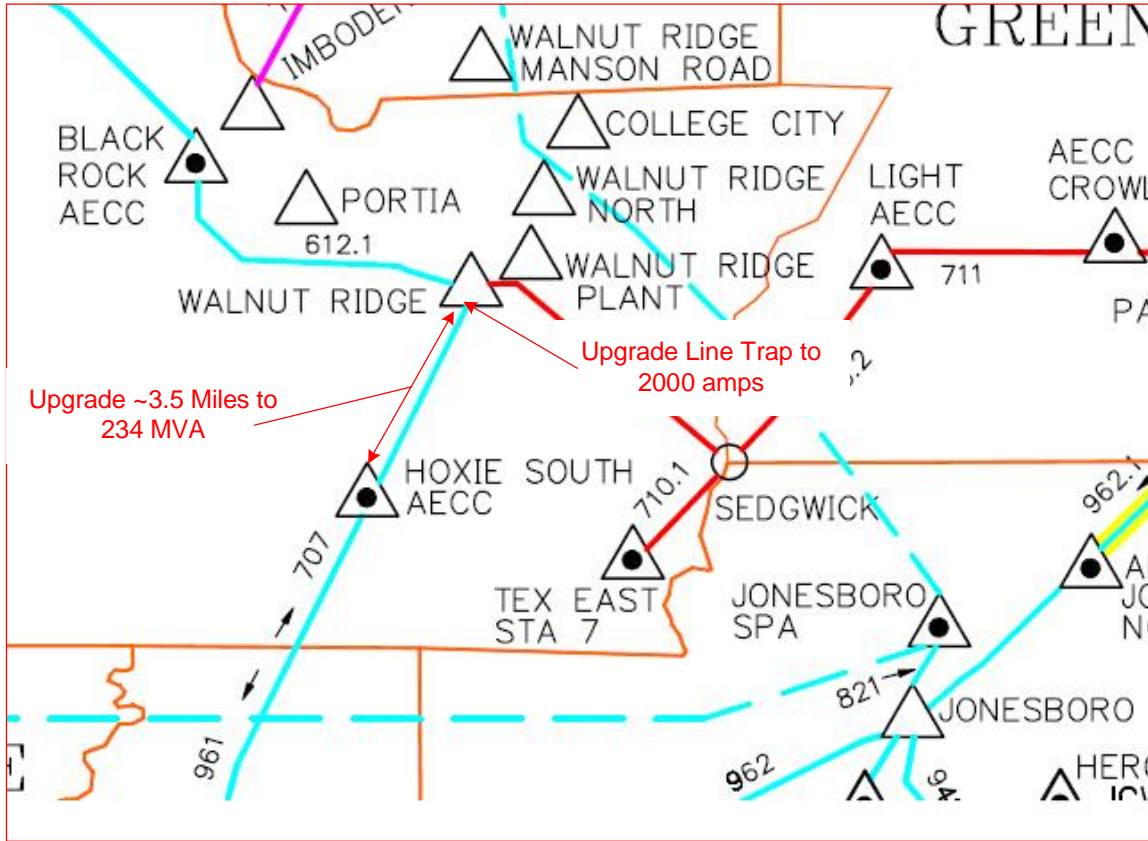
**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	6
Regulatory	9
Substation Work	6
T-Line Work	13
<b>Less Parallel Tasks</b>	<b>6</b>
<b>Total Duration</b>	<b>28</b>

# Appendix R

## Walnut Ridge to AECC Hoxie Line Upgrade



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Cane River to Winn Prison 115 kV section

Appendix  
S-1

**Project Estimate Scope:**

Upgrade Cane River to Winn Prison 115kV Section

**Requirements:**

Upgrade the Cane River to Winn Prison 115kV line to 114 MVA (572 amps).

**Description of existing:**

L-119.2 CANE RIVER – WINN PRISON 115kV

119.2 18.41 miles of 4/0 ACSR conductor rated at 385 amps.

Line consist of wood H-frames from Cane River to Structure 141 then becomes double circuited on steel poles with the Montgomery to Winnfield 230kV line.

**Constraints:**

The Montgomery to Winnfield 230kV line will be on a non-crippling outage once field crews begin the reconductor on the steel pole line section.

**Proposed Solution:**

Replace L-119.2 structures 141 to 249 with single steel poles and reconductor the entire line section with 336.4MCM ACSR Linnet (575 amps).

Revise settings on the SHPM relay on the Winnfield line panel at Cane River 115kV.

**General Assumptions & Risks**

- Line is in existing ROW and no new ROW is required
- Existing steel poles will not require replacement
- No detailed engineering studies have been performed
- Entergy will not perform work on customer owned facilities and is not included
- Schedule milestones after design and constructability review and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- The overheads are based on 2013-2015 with all work being completed in 2015.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

AppendixS-1

Estimate

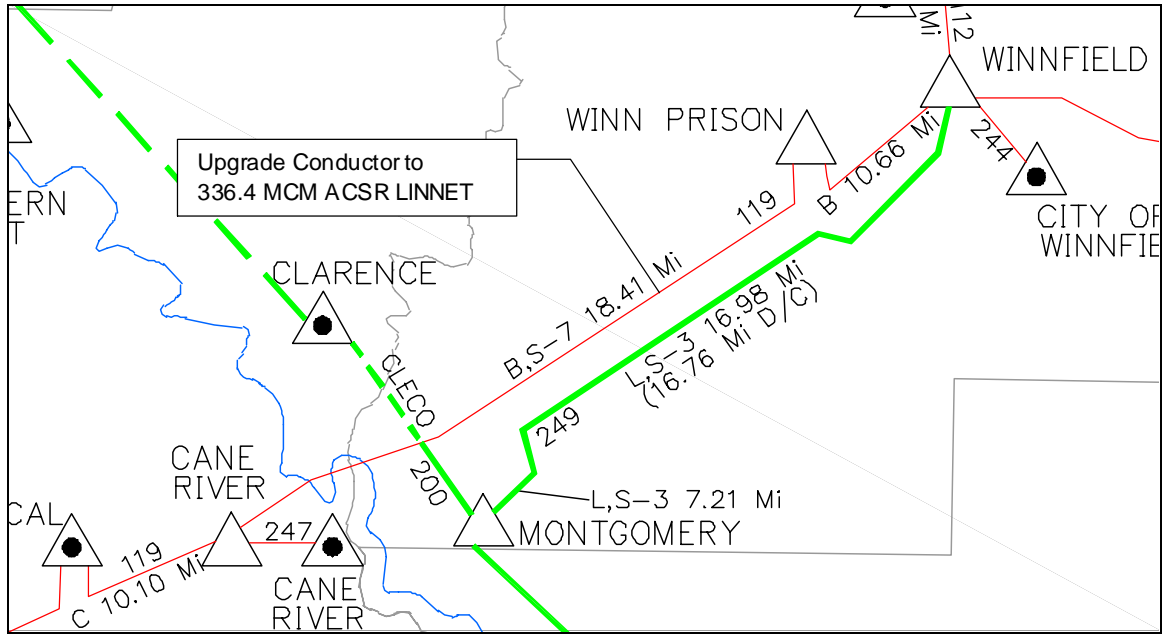
Item	Estimate
T-Line Cost	\$10,447,000
<b>Full Financial</b>	<b>\$10,447,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$5.22 - \$20.89 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project. The following are rough durations:
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	4
Design & Procurement	9
Substation Work	1
T-Line Work	14
<b>Less Parallel Tasks</b>	<b>1</b>
<b>Total Duration</b>	<b>27</b>

AppendixS-1



ESRPP  
EAI – IPP to SPP

Project Summary

Upgrade Winn Prison to Winnfield 115 kV section

Appendix  
S-2



**Project Estimate Scope:**

Upgrade Winn Prison to Winnfield 115kV Section

**Requirements:**

Upgrade the Winn Prison to Winnfield 115kV line to 114 MVA (572 amps).

**Description of existing:**

L-119.1 WINN PRISON - WINNFIELD 115kV

119.1 10.66 miles of 4/0 ACSR conductor rated at 385 amps.

Line is double circuited on steel poles with the Montgomery to Winnfield 230kV line.

**Constraints:**

The Montgomery to Winnfield 230kV line will be on a non-crippling outage once field crews begin the reconductor on the steel pole line section.

**Proposed Solution:**

Reconductor the entire line section with 336.4 MCM ACSR Linnet (575 amps)

Replace Cane River line panel and line breaker CTs at Winnfield 115kV.

**General Assumptions & Risks**

- Line is in existing ROW and no new ROW is required
- No detailed engineering studies have been performed
- Entergy will not perform work on customer owned facilities and is not included
- Schedule milestones after design and constructability review and environmental and regulatory compliance has been determined.
- Wetland mitigation is undetermined until all environmental analysis is complete.
- Project duration does not begin until all relevant agreements are executed
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- The overheads are based on 2013-2014 with all work being completed in 2014.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix S-2

Estimate

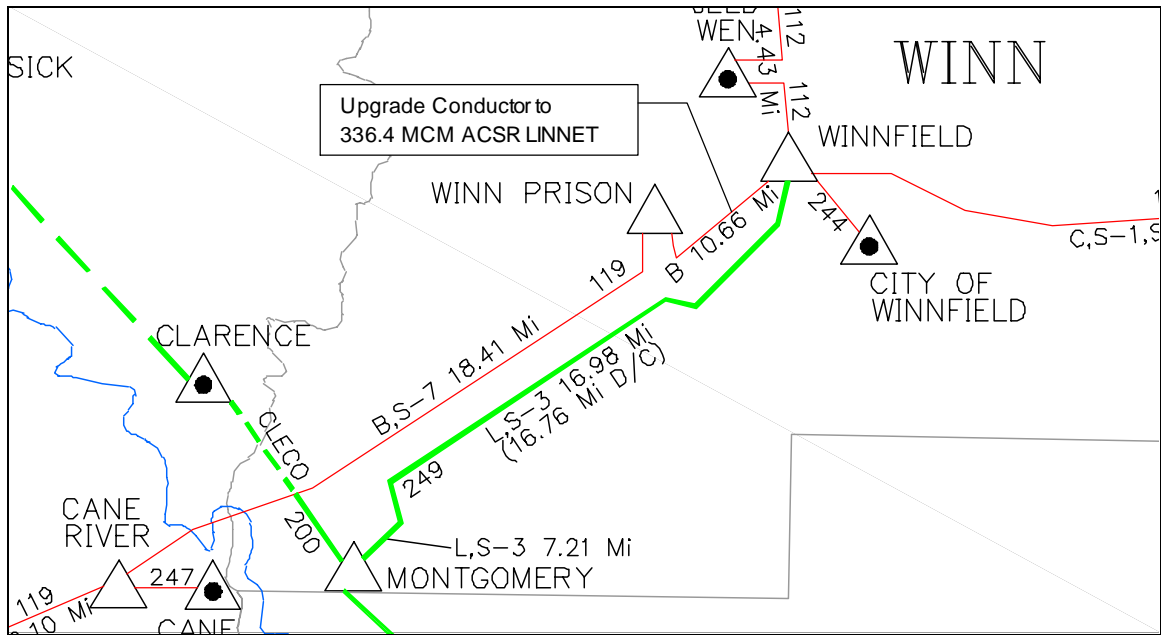
Item	Estimate
Substation Costs	\$355,000
T-Line Cost	\$4,418,000
<b>Full Financial</b>	<b>\$4,773,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$2.4 - \$9.55 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to customer approval to proceed with the project. The following are rough durations:
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	4
Design & Procurement	9
Substation Work	1
T-Line Work	10
<b>Less Parallel Tasks</b>	<b>1</b>
<b>Total Duration</b>	<b>23</b>

Appendix S-2



ESRPP  
EAI – IPP to SPP

Project Summary

Add 2<sup>nd</sup> 161/60 kV auto at Thayer South

Appendix  
T

### **Project Estimate Scope**

Upgrade Thayer 161/69 kV 50 MVA transformer to 75 MVA (628 amps).  
Upgrade 69 kV switches

### **Requirements:**

The Thayer South 161/69 kVA transformer will be upgraded from a 50 MVA LTC to a 75 MVA LTC

### **Description of existing:**

The substation has a 161 kV line to AECC Mammoth Springs South and AECl Cox Creek. The station is configured with an operating and transfer bus for up to six breakers, with only three being installed. A single 161/69 kV transformer owned by Sho-Me Power and a single 69 kV breaker for a 69 kV service to Thayer North. The 69 kV operating bus is 336 MCM ACSR cable (rated for 575 amps) and has 600 amp isolation switches.

Thayer North is fed from Thayer South and Alton Substations

### **Constraints:**

To reduce the 69 kV loading at Thayer South coordination with AECl will be required to allow Thayer North be connected only to Alton Substation while the substation is being upgraded.

### **Proposed Solution:**

A mobile transformer will be required to provide power to the 69/12.47 kV transformer, while the transformer is being replaced. The 69 kV service to Thayer North will be out of service. A 161/69 kV 75 MVA LTC transformer will be installed. The operating bus will be upgraded to 666 MCM ACSR (883 amps) and the 600 amp switches will be upgraded to 1200 amps. Transformer differential and metering CT's will be upgraded for the higher rating.

### **General Assumptions & Risks**

- A 161/69 kV mobile transformer is available.
- Thayer North can be supported from Alton Substation during the upgrade.
- The existing transformer pad will be replaced.
- No detailed studies have been performed
- Detailed interconnection studies (such as relay impact, ground resistivity, soil borings & other geo-technically) have not been completed
- Schedule milestones will be developed after a design and constructability review has been completed and environmental and regulatory compliance has been determined.
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Unknown underground factors will add mitigation costs and may impact schedule
- Transformers (other equipment) will require special transport to substation site

Appendix T-1

- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

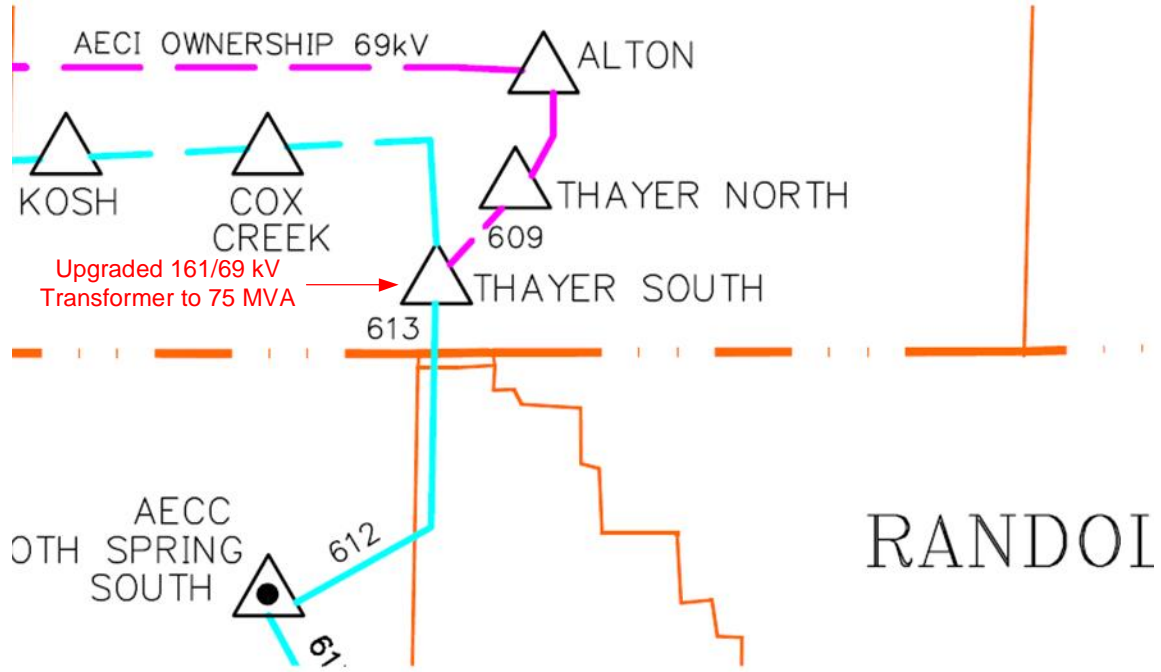
Estimate	
Item	Estimate
Substation Costs	\$2,260,000
T-Line Cost	N/A
<b>Full Financial</b>	<b>\$2,260,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$1.1 - \$4.5 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to approval with the project.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	6
Regulatory & Permitting	6
Substation Work	18
T-Line Work	N/A
<b>Less Parallel Tasks</b>	<b>2</b>
<b>Total Duration</b>	<b>28</b>

Appendix T-1



ESRPP  
EAI – IPP to SPP

Project Summary

Add 20.4 MVAR capacitor bank at Wilmar

Appendix  
U



**Project Estimate Scope**

Add 20.4 MVAR capacitor bank at Wilmar

**Requirements:**

A new 20.4 MVR capacitor bank will be installed in the existing Wilmar Substation, in Drew County, AR.

**Description of existing:**

Wilmar Substation is on the 115 kV line between Monticello South and Warren East. The substation is configured for two transformers with only one transformer installed. The operating bus is a 666 MCM ACSR conductor with a fused 115/13.8 kV 6.67 MVA transformer.

**Constraints:**

None identified

**Proposed Solution:**

The capacitor bank will be added at the second transformer slot. When the substation requires upgrading, the existing transformer will be upgraded to a larger transformer. A capacitor control panel will be installed for the cap bank. It will be connected to the operating bus through a motor operated switch and a capacitor switcher.

**General Assumptions & Risks**

- The open slot can be used for the capacitor bank
- The new control panel can be mounted in the existing control house.
- No detailed studies have been performed.
- Detailed interconnection studies (such as relay impact, ground resistivity, motor start analysis, soil borings & other geo-technically) have not been completed.
- Schedule milestones will be developed after a design and constructability review has been completed and environmental and regulatory compliance has been determined. Best guess on SWPPP creation, implementation and monitoring can vary greatly dependant on outcome of environmental studies
- Project duration does not begin until completion of the project execution plan.
- It is assumed there is no value in retired equipment and all equipment will be disposed of without benefit of salvage credit.
- Project delays or overhead changes will affect final removed cost.
- Capacitor banks will may require special transport to substation site
- Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.

Appendix U

Estimate

Item	Estimate
Substation Costs	\$832,000
T-Line Cost	N/A
<b>Full Financial</b>	<b>\$832,000</b>
<b>Total Estimate Range (-50% +100%)</b>	<b>\$0.42 - \$1.66 Million</b>

**Duration Schedule**

- A detailed schedule will be prepared subsequent to project approval.
- All construction work requiring outages will be performed during acceptable periods of system load flow, which most often is the off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Substation construction will be coordinated with the transmission line outages when possible.
- Construction resources are available when required.
- Transmission Line and Substation projects will begin subsequent to Definition phase Project Execution Plan.
- This schedule does not account for adverse weather conditions.
- Schedule durations are high level estimates at this time. A detailed schedule will be prepared upon project approval.

Task	Months
Definition	4
Regulatory	2
Substation Work	12
T-Line Work	N/A
<b>Less Parallel Tasks</b>	
<b>Total Duration</b>	<b>18</b>

Appendix U

