TRANSMISSION LINE & SUBSTATION PROJECTS

COMPANY:ENTERGY GULF STATES LOUISIANA, L.L.C.

Customer: PID 225

FACILITIES STUDY

EJO # F4PPGS0435

INTERCONNECT REQUEST

Revision: 2

Rev	Issue Date	Description of Revision	Prepared By	Approved By
A	04/20/09	Shell for engineering input	IK	KW
B	05/14/09	Construction Input added	IK	KW
C	05/17/09	Submitted for JET Vote	IK	KW
0	05/21/09	Submitted to TPD	IK	KW
1	06/08/09	Revised by TPD	SB	BW
2	06/22/09	ICT Classification of Upgrades - FINAL	BEF	JDH

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1. PROJECT SUMMARY

1.1. Background and Project Need

The facilities study identifies transmission constraints resulting from the requested Customer interconnection through PID 225 for an uprate of 13 MW at Big Cajun 2. The requested in-service date is 1 August 2009. The facilities study also includes cost estimates to correct any transmission constraints.

1.2. Scope Summary

The Facilities Study has identified the following transmission constraint.

The following line sections overload for the loss of the Webre-Wells 500kV transmission line:

- Terrebonne-Greenwood 115kV
- Greenwood-Humphrey 115kV
- Humphrey-Gibson 115kV
- Gibson-Ramos 138kV
- Livonia-Wilbert 138kV

The constraints can be addressed in the following manner:

- Upgrade the Livonia-Wilbert 138kV transmission line.

It is required that the Livonia-Wilbert 138kV transmission line be upgraded to double bundled 666 ACSR (422MVA or 1765A). By upgrading this transmission line, the power flow on the Terrebonne-Greenwood-Humphrey-Gibson 115kV and Gibson-Ramos 138kV sections is reduced to acceptable levels. Consequently, the Livonia-Wilbert 138kV line upgrade is the only upgrade required under NRIS guidelines.

1.3. Cost Summary

- The estimated total project cost is $26,348,000. This cost does not include Tax Gross Ups which may apply.
- Tax gross ups vary based on jurisdictions and time periods. The rate will be acquired as needed.
- The costs presented in this facilities study are in 2009 dollars.
- The ICT has assigned ***$26,348,000.00*** as Supplemental Upgrade Costs based on Attachment “T” of Entergy’s ICT (Independent Coordinator of Transmission) filing to the FERC.
- Nothing in this Facilities Study addresses the funding for the facilities identified herein. Cost allocation for the upgrades will be pursuant to Attachment T to Entergy’s OATT.

1.4. Schedule Summary

- The requested in-service date is 1 August 2009. However, the work on constraints would not be completed until 31 December 2011.

2. SAFETY REQUIREMENTS

- Safety is a priority with Entergy. Safety will be designed into substations and lines. The designs will be done with the utmost safety for personnel in mind for construction, operation, and maintenance of the equipment.

- All employees working directly or indirectly for Entergy shall adhere to all rules and regulations outlined within the Entergy Safety manual. Entergy requires safety to be the highest priority for all projects. All Entergy and Contract employees must follow all applicable safe work procedures.

3. SCOPE OF WORK

3.1. Scope Details: Livonia 138kV Substation – Upgrade Through Bus

3.1.1. Electrical

- Livonia Line Bay (Livonia - Wilbert: Upgrade to 422 MVA).
- Replace switches with 2000A: 20169 & 20171.
- Replace breaker with 2000A: 20170.
- Replace bus with double 1000MCM Copper - (1) box structure run and (1) half bay.
- Install one (1) 138kV CVT pedestal.

3.1.2. Foundation

- Reconnect all new equipment to ground grid.

3.1.3. Site

- No work required

3.1.4. Relay and Configuration

- Install one (1) 138kV CVT and associated conductors.
- Install one (1) Line potential Junction Box.
- Upgrade RTU motherboard to ME / with associated set chips and add status card.
- Install one (1) lot of cable.
- Develop new breaker schematics and cable schedule as required and add alarms into RTU and develop configuration.
- Perform limited classical relay impact studies on affected lines and buses from remote stations.
- Perform Standard compliance studies for setting revisions and setting updates.
- Model the new 138KV Wilbert-Livonia into ASPEN ® based on Transmission Plan and Profile.
- Revise relay settings and update relay firmware for 138KV La Station-Wilbert L303 to Entergy Standard if permitted. The setting scheme has been SEL421/SEL311C.
- Revise relay settings for 138KV Addis-Wilbert L392. The setting scheme has been SEL321/EM.
- Update relay settings and relay firmware for 138KV Wilbert-Livonia-Krotz Spring L236/L312 to Entergy Standard if permitted. The setting scheme has been SEL421/SEL311C.
- Revise relay settings and update relay firmware for 138KV Champagne- Krotz Spring L641 to Entergy Standard if permitted. The setting scheme has been SEL421/SEL311C.

- Revise relay settings for Wilbert 230KV Bus PVD. And, notify Relay Designer for 1200/5 CTR C800 for the new 2000A breaker.
- Provide off site/ on site setting supports during construction for setting database issues, relay software and firmware compatibility.
- Perform setting logistics such as relay date base, relay viewable document, project work folders for Web posting DOCUMENTUM, and relay modeling in ASPEN®.
- Perform relay settings corrections and issue new “as built” settings based on returned “as left” settings.

3.1.5. Construction

- If this project is approved and enters the Transmission Business’s (EMCC) process for executing projects, there will be constructability reviews performed during the definition phase. These reviews will try to incorporate any known hazards from a safety perspective, as well as any obstacles that could/would be experienced during the construction and installation process. After receipt of the final design drawings and details for each discipline of work, a determination will be made to either perform a competitive bid process to award the work to an Entergy approved contractor, or to allow internal Entergy Resources to perform the work.

- The normal process would be to perform all of the site, foundation, grounding, and conduit work with a single source. Dependant on the final design a determination will be made to address any system outages that may be required to perform the installations of any proposed foundations. It is assumed that the existing foundation for breaker 20170 will be adequate in size for the new 2000A GCB. In the event that foundation modifications are required, efforts will be made to utilize low profile excavation equipment. This will enable the installation of any foundations that will be under, near, adjacent to or in close proximity of energized conductors that could be identified as a safety risk. In the instances that this is not attainable, outages will be required. The disapproval of any outages could poses risk to all schedules.

- Upon completion of the site and foundation installations including all associated conduit and grounding installations, Steel and Electrical installations as well as Protection & Control Installations will commence.

3.1.6. Required Outages (High Level)

- Wilbert to Livonia L-236 to replace breaker 20170 and switch 20169 & 20171 (3 weeks).

- Livonia line bay 138kV Bus outage to replace bus (2 weeks).

3.1.7. Assumptions

- Required line and bus outages are attainable.

3.2. Scope Details: Wilbert 138kV Substation – Upgrade Through Bus

3.2.1. Electrical

- Krotz Springs Line Bay (Krotz Springs - Livonia: Upgrade to 422MVA – while this bay is not a constraint in solution set, it is being replaced due to being part of the bus and Livonia bay is required to be upgraded).
- Replace Motorized Load Break Switch 14697 with 2000A and ground switch (same as above).
- Wilbert Line bay (Livonia - Wilbert: Upgrade to 422MVA).
- Replace Motorized Line Drop Switch 14698 with 2000A and ground switch.
- Replace bus with double 1000MCM Copper - (2) 138kV box structure runs.

3.2.2. Foundation

- Reconnect all new equipment to ground grid.

3.2.3. Site

- No work required.

3.2.4. Relay and Configuration

- Upgrade RTU motherboard to ME / with associated set chips and add status card.
- Install one (1) lot of cable.
- Develop new breaker schematics and cable schedule as required and add alarms into RTU and develop configuration.

3.2.5. Construction

- If this project is approved and enters the Transmission Business's (EMCC) process for executing projects, there will be constructability reviews performed during the definition phase. These reviews will try to incorporate any known hazards from a safety perspective, as well as any obstacles that could/would be experienced during the construction and installation process. After receipt of the final design drawings and details for each discipline of work, a determination will be made to either perform a competitive bid process to award the work to an

Entergy approved contractor, or to allow internal Entergy Resources to perform the work.

- The normal process would be to perform all of the site, foundation, grounding, and conduit work with a single source. Dependant on the final design a determination will be made to address any system outages that may be required to perform the installations of any proposed foundations. It is assumed that no foundation modifications will be required for this scope of work. In the event that foundation modifications are required, efforts will be made to utilize low profile excavation equipment. This will enable the installation of any foundations that will be under, near, adjacent to or in close proximity of energized conductors that could be identified as a safety risk. In the instances that this is not attainable, outages will be required. The disapproval of any outages could poses risk to all schedules.

- Upon completion of the site and foundation installations including all associated conduit and grounding installations, Steel and Electrical installations as well as Protection & Control Installations will commence.

3.2.6. Required Outages (High Level)

- Livonia to Wilbert L-312 to replace switch 14698 (1 week)
- Wilbert line bay 138kV Bus outage to replace bus (2 weeks)
- Livonia to Colonial Springs L-236 to replace switch 14697 (1 week)

3.2.7. Assumptions

- Required line and bus outages are attainable

3.3. Scope Details: Upgrade Wilbert to Livonia to at least 422MVA

3.3.1. General

- Remove approximately 19.3 miles of existing bundled 336 ACSR and bundled 395 ACAR conductor, insulator assemblies, and wood H-frame structures. Install approximately 19.3 miles (123 structures) using approximately 580,000 lbs of 666.6 ACSR Flamingo conductor, 34,200 meters of 0.528 24-fiber OPGW, and 465 polymer insulator assemblies. The structures will be single circuit, single pole structures with vibratory pile foundations.
  - 19.3 miles
  - Install Double Bundled 666.6 ACSR “Flamingo” conductor
  - Install 107 steel tangent with socket pile foundations
  - Install 16 steel dead-ends with base-plated caisson foundations
  - Install 112,094 ft of OPGW 24 fiber shield wire

- o Install 465 Polymer insulator assemblies
- o Remove 123 wooden structures
- o Assume no hazard tree removal or clearing needed

Long Lead Material: Livonia – Wilbert

Quantity	Material Description	*Lead Time (weeks)
16	Steel dead-ends with base-plated caisson fdns	18
107	Steel tangents in socket piles	18
112,094 ft	OPGW 24 fiber shield wire	18
465	Polymer insulator assemblies	18
577,667 lbs	666.6 ACSR “Flamingo” Conductor	16

3.3.2. ROW Clearing/Permits/Restoration

- There is a need to clear portion of ROW and remove trees in order to undertake construction. Also, we would need to inform property owners about our plans to undertake construction, secure permits as required and restore any damaged access roads, properties and crops.

3.3.3. Construction

- If this project is approved and enters the Transmission Business’s (EMCC) process for executing projects, there will be constructability reviews performed during the definition phase. These reviews will try to incorporate any known hazards from a safety perspective, as well as any obstacles that could/would be experienced during the construction and installation process. After receipt of the final design drawings and details, a competitive bid process to award the work to an Entergy approved contractor will be performed.

- The normal process would be to identify all hazards, identify all rights of access and egress, install storm water pollution prevention controls, perform all of the clearing, establish strategically located lay down yards, receive the materials and equipment, install foundations & structures, and then subsequently perform the wire stringing. These components could be contracted between multiple sources for execution. Dependant on the final design a determination will be made to address any system outages that may be required to perform the installations of all proposed facilities. Efforts will be made to utilize low profile equipment where reasonable and practical as part of the installation process for the facilities to be installed that will be under, near, adjacent to, or in close proximity of energized facilities and

conductors that could be determined to be a safety risk. In the instances that this is not attainable, outages will be required.

3.3.4. Required Outages (High Level)

- Wilbert to Livonia L-236

3.3.5. Assumptions

- Outages can be obtained to facilitate construction of the structures.
- Reasonable access to structures is available.
- No additional ROW is required.
- No extraordinary environmental, crossing, or permitting conditions exist.
- Required line and bus outages are attainable.
- No major environmental issues.
- No problems with crossing permits.

4. COST

- The ICT has reviewed and determined whether each required upgrade will be considered a Base Plan Upgrade or a Supplemental Upgrade. For more information on cost responsibility for Base Plan and Supplemental Upgrades, see Attachment T to Entergy's OATT.
- The costs shown in the table includes overheads and AFUDC (referred to as indirect cost), but do not include tax gross ups. Entergy incurs a tax liability proportional to the amount of customer contributions. In addition to proposed project costs, the customer may be charged a "Tax gross-up" at applicable rates. Please note these are 2009 dollars and do not include tax gross-up if and where applicable (tax gross ups vary based on jurisdictions and time periods, rate will be acquired as needed).
- No soil borings, survey, environmental assessment, etc has been performed in determining the cost and schedule. As a result, the estimates are good faith and should be considered order of magnitude.
- Projected Costs including indirect cost in 2009 US dollars:

Entergy's scope of work as listed in section 1.2.1	TOTAL with indirect	Base Case	Supplemental	Comments
Wilbert Substation	$621,000	n/a	***$621,000***	
Livonia Substation	$453,000	n/a	***$453,000***	
Livonia – Wilbert line	$25,274,000	n/a	***$25,274,000***	
Total	$26,348,000	n/a	***$26,348,000***	

5. SCHEDULE

5.1. General

- A detailed schedule will be prepared subsequent to customer approval. The line upgrades are dependent on obtaining outages for the line work. If outages cannot be obtained or must be sequenced due to seasonal requirements, additional time will be required to complete the upgrades. The following are rough durations:

- The estimated date of completion assumes funding approval to commence definition phase and approval to proceed with the project starting 1 July 2009.

5.2. Project Definition

- Includes surveys, soil borings, and Project Execution Plan.
- 24 Weeks

5.3. Design, Procurement, and Construction

- Includes design, ROW acquisition, permits, material procurement, and construction.
- 156 weeks

5.4. Assumptions

- Most of the construction work requiring outages will be performed during 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.
- The availability of the necessary outages on transmission lines and other utility equipment are assumptions at this point. Availability of these outages can have a significant impact on the nature of the defined solution set and the estimated costs provided in the Facilities Study. Likewise, changes in the duration of the necessary outages could impact schedule and cost.
- Transmission Line project will begin subsequent to Definition phase Project Execution Plan.
- Schedule durations are high level estimates at this time. Upon project approval, a detailed schedule will be produced.
- Based on Construction input, assumed 1 crew, 4 weeks /mile to construct the line. Length of line is approximately 19.3 miles. Duration for longest activity would be 4X19.3 + 24 weeks for definition phase + 24 weeks for

design and procurement = 125 weeks. Should number of crews be doubled, the duration will be reduced to 90 weeks.

- Based on duration schedule, requested power delivery of the magnitude specified commencing 01 August 2009 would not be possible. Completion of work is estimated to be by 31 December 2011. Please note that multiple crews for working on the same line may not be available and work on each section of line may have to be done using one crew.
- 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.

5.5. Clarifications

The upgrades presented in this facilities study are associated with the Customer's Network Resource Interconnection Service (NRIS) request. There have been no upgrades identified for the Customer’s Energy Resource Interconnection Service (ERIS) request.

6. RISK ASSESSMENT

Risk	Comment	Impact
ROW acquisition and clearing could exceed estimated cost)	Increased cost to the project	***
Material transportation could affect cost/schedule	Large transformers(other equipment) may require special transport to substation site	**
Material costs steel & Equipment	Rising steel, copper, fuel and other market conditions could greatly affect estimated cost.	****
Storm-water plan implementation	Best guess on SWPPP creation, implementation and monitoring can vary greatly dependant on outcome of environmental study.	**
Weather & Equipment Lead Times	Unexpected delays on material lead times, unusually inclement weather will impact schedule but might impact AFUDC costs as well.	**
Wetland mitigation	Undetermined until environmental analysis is complete.	***
Outages may not be available	Preliminary schedule only considers general outage constraints. Specific project schedule may be delayed by days, weeks or months dependant on system conditions. Delays of months = increased project costs. The nature of the solution set and overall cost of project may be drastically affected by the availability of outages.	****
Scope based on design assumptions which may change	Varied impact on cost and schedule.	***

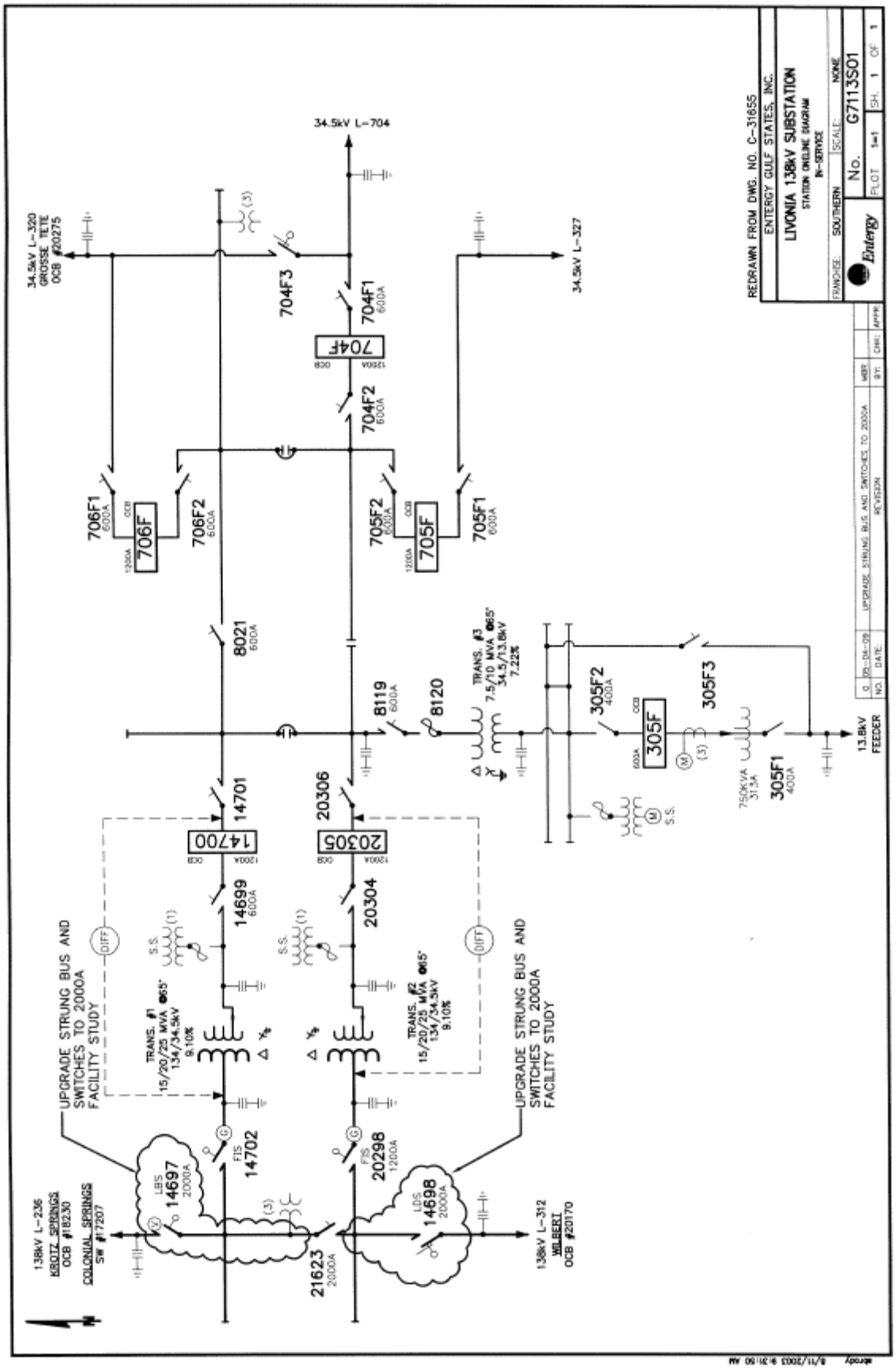
*-low impact to cost, ** - moderate impact to cost, ***- high impact to cost, **** - very high impact to cost.

7. ATTACHMENTS

7.1. Attachment "A" – Table of Acronyms

ACSR	**Aluminum Conductor Steel Reinforced**
ACSS	**Aluminum Conductor Steel Supported**
ADEQ	**Arkansas Department of Environmental Quality**
AFUDC	**Allowance for Funds Used During Construction**
ATC	**Available Transfer Capability**
EES	**Entergy Control Area**
EHV	**Extra-High Voltage**
ICT	**Independent Coordinator of Transmission**
kV	**Kilo-Volt**
MCM	**(M) Thousand Circular Mils**
MVA	**Mega-Volt Amp**
MW	**Mega-Watt**
NPDES	**National Pollution Discharge Elimination System**
NOI	**Notice of Intent**
OASIS	**Online Access and Same-time Information System**
OATT	**Open Access Transmission Tariff**
OG&E	**Oklahoma Gas & Electric**
POD	**Point of Delivery**
POR	**Point of Receipt**
SES	**Steam Electric Station**
SOC	**System Operations Center**
SHPO	**Arkansas State Historic Preservation Office**
SHV	**Super High Voltage**
SW	**Switch Station**
SWEPCO	**Southwest Electric Power Company**
TOC	**Transmission Operations Center**
WMUC	**City of West Memphis Control Area**

7.2. Attachment "B" – Livonia 138kV Substation Oneline Diagram



7.3. Attachment "C" – Wilbert 138kV Substation Oneline Diagram