



Transmission and Distribution Substation Projects

Operating Company: Entergy Gulf States - Texas

Customer: PID # 202

Funding Project Number: F4PPGS0386

Facility Study

for

PID # 202: Study for 146 MW

Revision History			
No	Date	Description	Author
A	June 20, 2007	Initial Facility Study	Gabe Munoz
B	June 21, 2007	Incorporation of comments and edits from a Project Team Review. Updated estimates and modified Relay/substation work & added L554 upgrade.	Gabe Munoz
C	June 22, 2007	Incorporate final team review.	Gabe Munoz
ZERO	June 28, 2007	JET Approved Facility Study	Gabe Munoz
One	July 3, 2007	ICT Review	ICT
Two	July 12, 2007	Remove work identified by Load Flow Analysis	Gabe Munoz

EXECUTIVE SUMMARY

- This facility study details the project scope and cost estimate associated with the proposed PID # 202 expansion in Port Arthur. To accommodate Customer's request to integrate an addition of 146 MW of internal generation, Entergy has completed a system impact study which has identified the need to upgrade breaker # 3505 at Kolbs Substation 69 kV to a minimum of 63 kA. The estimated cost of the upgrades is \$ 507,640 which includes estimated overheads but does not include tax gross up.

Notes:

- 1) **The scope of work detailed in this study is based on the referenced system impact study. Variations of the studied scenarios may reveal these upgrades unnecessary or may reveal additional necessary upgrades.**
- 2) **Due to potential violations with confidentiality agreements, detailed line item project estimates will not be included in the attachments.**

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1. INTRODUCTION

The Facility Study serves as the scope document for Interconnection Request PID #202. This Facility Study will include a project scope and a +/- 20% cost estimate for the designated project. Unlike a Project Execution Plan, the Facility Study will omit sections and sub-sections not required for compliance with this request.

2. PROJECT INITIATION

Combined, PID #202, the Project Scoping Plan ("PSP") and the Customer Interconnection Agreement will serve as the project charter which authorizes the Project Manager to spend financial and human resources to execute the facility study. PID #202 for this project was issued to Entergy's EMCC group for completion on April 5, 2007 by project sponsor Chuck Hughes. The PSP was developed by the Jurisdictional Expert Team ("JET") on June 07, 2007 to validate PID #202 and initiate a plan to scope the project. The Interconnection Facilities Study Agreement was executed between the ITC (Southwest Power Pool), Customer and Entergy Services on March 20, 2007 to fund the Facility Study Request.

3. GENERAL PROJECT DATA

3.1. Summary

Customer wishes to integrate the addition of 146 MW of internal generation with Entergy's existing transmission system. The purpose of this facility study is to create a scope and estimate the cost of the work associated with the Customer's proposed expansion. The Facility Study will be conducted by internal transmission resources following Entergy's Engineering Management and Capital Construction capital process. No other alternative methods of completing this study were discussed. This is a Customer Initiated project and the requested completion date by the customer is July 18, 2007.

3.2. System Impact Study

A System Impact Study was conducted to identify applicable upgrades necessary to the system to accommodate Customer's expansions. The study was based on the assumption there would be no export of the additional generation into Entergy's Transmission system. The study revealed the addition of the Customer expansion would only cause one breaker at Kolbs Substation to be underrated under certain specific events and would therefore need to be upgraded.

3.3. Key assumptions

- 3.3.1. This study assumes funding will be handled by the execution of the reimbursement agreement and will not burden the 2007 Texas Jurisdictional budget.
- 3.3.2. The duration schedules assume outages will not be unreasonably restrictive due to additional new projects, load growth or weather.
- 3.3.3. System upgrades due to additional load demands will be detailed and estimated as a separate project.

3.4. Strategy for Facility Study Execution

The project team is to meet and complete their departmental input by June 20, 2007. A Scope review will be initiated through e-room voting. The Facility Study will then be processed for approval by the JET team in e-room voting. The result of a JET team approved study will be the customer's final deliverable.

3.5. Risk

The Facility Study will make no attempt to create a risk plan. Risk planning will be addressed by the assigned project team if and when the project associated with this Facility Study is approved. The project team will define cost, impact and mitigation strategies in the risk plan.

3.6. Construction

The facility study does not define a construction and outage plan. If and when this is an approved project the assigned project team will create a construction plan detailing contracting strategy, outage specifics and work sequences.

4. SAFETY

A detailed safety plan will be created by the assigned project team if and when this project is approved and funded. At the approval of this project the Project Manager will assign a Construction Engineer to create and follow the project safety plan & develop a safety audit form. The Construction Engineer will use appropriate departmental safety tracking forms to audit project incidents & statistical data. All team members will reference the Entergy Safety Manual.

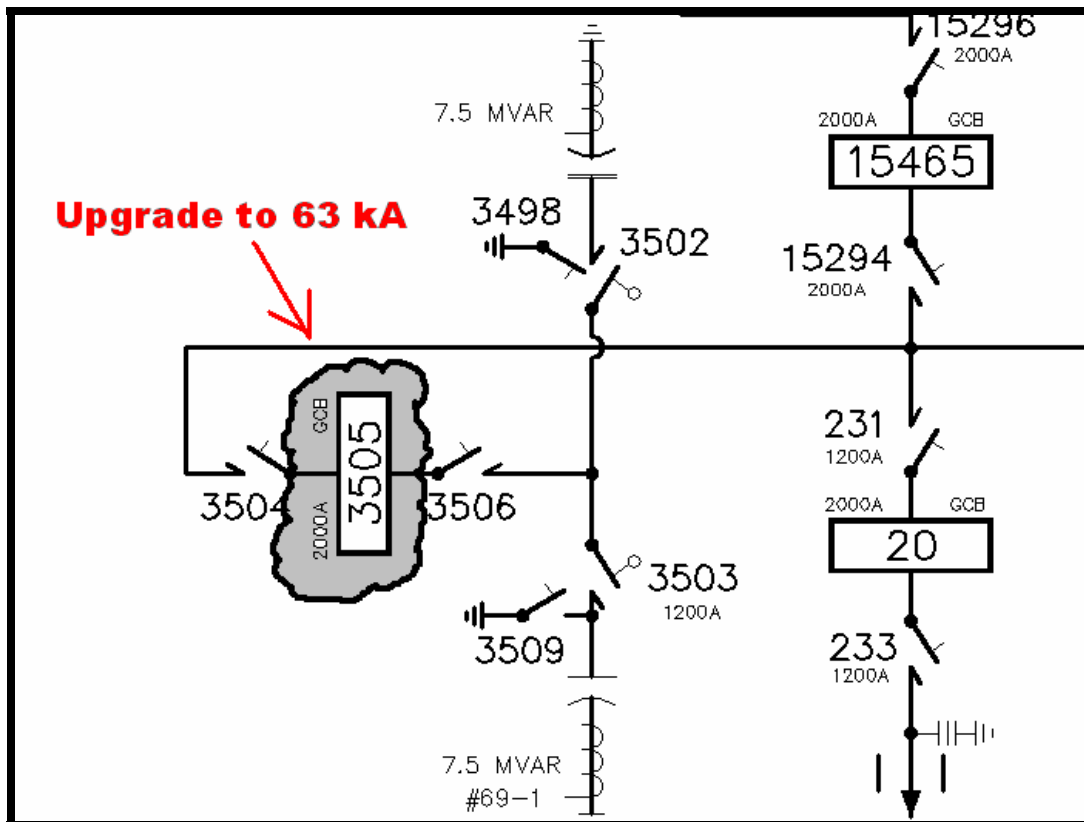
4.1. Site Observations and Special Considerations

All site visits by EMCC personnel are to be documented with a site visit check list to be archived in eRoom. The following is a preliminary list of observed safety concerns

- Kolbs Substation is located near residential neighborhoods. Diligence is required in keeping the substation gate secured.
- Kolbs Substation has been vandalized several times. Precaution and due diligence will need to be executed regarding the inspection of equipment grounding.
- Precautions need to be taken working near energized equipment.
- A security service will be employed during construction while materials and equipment are in the field. The security service will remain outside of energized areas and will be required to have "Substation Awareness" training if stationed in a substation site.

5. SCOPE

To accommodate Customer's request to integrate an addition of 146 MW of internal generation with Entergy's existing transmission system, Entergy has completed a system impact study which has identified the need to upgrade GCB # 3505 at Kolbs Substation to a minimum of 63 kA.



Highlight of upgrade at Kolbs

This facility study was requested to be completed by July 18, 2007 with a +/- 20% cost estimate. The project is expected to take 40 weeks to complete once the project is funded and the estimated cost of the upgrade is \$ 507,640 which includes estimated overheads but does not include tax gross up.

5.1. Scope Details Kolbs Substation

The only identified upgrade at Kolbs Substation is GCB # 3505. Upgrade to a minimum of 63 kA is required. The estimated cost of these upgrades is \$ 507,640 which includes estimated overheads but does not include tax gross up.

5.1.1. Site Work

- Minimal site work will need to be performed (back fill and dressing of excavated soil and limestone from conduit and miscellaneous foundation installation).

5.1.2. Foundation Work

- The existing foundation is not large enough to accommodate the new circuit breaker. Civil design will be required to modify the existing foundation to accommodate the new circuit breaker.
- Install four (4) new Hilti anchor bolts to secure the new gas circuit breaker. Civil design will be required for proper Hilti anchor bolt sizing.
- Install two (2) new 4/0 copper below-ground pigtails for the new circuit breaker installation.
- Install six (6) 2" PVC conduits from the existing cable trough to each of the following six circuit breakers: #20, #40, #2705, #5235, #15465, & #15460.

NOTE:

This document assumes that there is sufficient room in the existing cable trough to run this new control cable from the new bus differential panel to the identified circuit breakers.

5.1.3. Electrical Work

- Disconnect, remove and scrape the existing gas circuit breaker (Breaker # 3505) and the jumpers connected to the existing disconnect switches (#3504 & #3506). Cut off the protruding portion of the existing anchor bolts.
- Purchase and Install one (1) new 145 kV, 3000A, 63 kA, 3-cycles interrupting time, 125 VDC control voltage, gas circuit breaker. 69 kV circuit breakers are not available with a 63 kA interrupting rating; therefore, a 145 kV class circuit breaker must be used for this application.

Care must be taken to ensure that no minimum substation electrical clearances are violated once the new breaker has been installed. Preliminary engineering has determined that there is sufficient clearance between the breaker terminal pads and the 69 kV lattice steel for the installation.

- The new circuit breaker will be oriented with bushings 2-4-6 in the West direction. The circuit breaker's control cabinet will be oriented in the North direction.
- Purchase and Install new 500 MCM conductor and terminal pads to replace the existing jumpers from the disconnect switches to the new circuit breaker bushings.
- Purchase and install six (6) new 2" flex conduits that will be run from the new replaced breaker (position #3505) to the existing circuit breaker junction box.
- Install and connect new 4/0 copper ground leads from the two appropriate circuit breaker legs to the existing station ground grid.
- The existing circuit breaker disconnect switches will not be replaced. Standard momentary ratings of 69 kV switches is 44 kA which is adequate for the new installation

5.1.4. Kolbs Substation Relay Work

The relaying for Bus #2 consists of PVD High Impedance Relaying with 2000:5A CT ratios tapped at 1200:5. It has been determined that the Bus relays cannot be properly set for this application due to the high fault current present. The 69 kV Bus #2 relays must be replaced. Both the 69 kV Bus differential schemes #1 and #2 are located on the same panel. Consequently, the panel is extremely congested and there is limited space for the retrofit installation. For this reason, a new bus #2 differential panel will be installed if there is adequate space in the control house. Any cables wired directly to the bus differential panel from any breaker tied to bus #2 must be replaced with a new cable. Current Entergy standard calls for installation of a low impedance bus differential scheme.

- Replace GCB 3505 with a new 145 kV, 3000A, 63 kA, 3-cycles interrupting time, 125 VDC control voltage, gas circuit breaker. 69 kV circuit breakers are not available with a 63 kA interrupting rating; therefore, a 145 kV class circuit breaker must be used for this application.
- Purchase, design and install one (1) Bus Differential Panel referencing Entergy standard PM0602, option E. However, the panel layout will need to be the 28" GSU wing-wall design.

These drawings have not been created and are not currently listed in the ESI Standards in the AM Meridian database. Contact standards engineer Mark Allen for drawings.

Reference Entergy HV Circuit Breaker Purchase Specification SD020204, Entergy Bus Differential Panel Design Standard PM0602 option E, current revision.

- The existing current, control, supply and SCADA circuits shall be reused and the new breaker wired to facilitate the existing circuits. New cables shall be pulled as needed from the breakers to the control house to maintain all existing circuits and new alarm points. A breaker junction box may be required to minimize any requirement for new cable. Existing control cables will be reused and terminated at the breaker junction box. New cables will be run through flexible conduit to the new breaker cabinet. Existing capacitor bank relaying will be reused. New breaker CTs have tap ratios available that match existing ratios if relay settings will not be modified. Reference the existing breaker connection and panel wiring prints
- There is an existing Basic D20 RTU. A new status card will be required. Reference RTU Edit Sheets from TOC.

5.1.5. Settings

Due to the replacement of OCB 3505 with 69 kV, 3000A GCB with 63 kA fault duty:

- System modeling verification will be required and settings for Bus #2 low impedance differential will need generated.
- Perform ground over current study in the immediate area

5.1.6. RTU

No RTU configuration will be required by Technology Delivery Group at this station because the existing RTU is a Basic. The work for the RTU will be done by the field personnel.

5.1.7. SCADA

Kolbs Substation SCADA details will need to reflect modified breaker rating.

6. SCHEDULE

A detailed project schedule will be created, baselined and maintained if and when the project associated with this Facility Study is approved. The following is a rough duration schedule based on a 5 day work week where 1 calendar month is equal to 4 weeks. The duration of the entire project is estimated to be 40 weeks.

6.1. Kolbs Substation total = 40 weeks

6.1.1. Initiation through definition 12 weeks

6.1.2. Design & Procurement 24 weeks (lead time breaker = 20 weeks)

6.1.3. Construction & Closeout 4 weeks

7. ESTIMATES

Project	Material	Internal Labor	Contract Labor	Expense	Direct Subtotal	Estimated OH (38%)	Total Cost
Kolbs	\$ 113,940	\$ 128,053	\$ 120,862	\$ 5,000	\$ 367,855	\$ 139,785	\$ 507,640

8. UPGRADE CLASSIFICATION

The ICT has reviewed the projects identified and have determined that all projects should be classified as Supplemental Upgrades. For more information on cost responsibility for Base Plan and Supplemental Upgrades, see Attachment T to Entergy's OATT.