



TRANSMISSION PROJECTS

COMPANY:EGSI-TX

CUSTOMER: PID 206

FACILITIES STUDY

EJO # F4PPTX0007

PID 206 - 168 MW Plant Near Jacinto substation

**Revision:
D**

Rev	Issue Date	Description of Revision	Revised By	Project Manager
A	1/10/2008	First Draft		M. Ketterer
B	1/14/2008	Incorporate Team and JET comments	M. Ketterer	M. Ketterer
C	1/15/2008	ICT Classified Upgrades	B. Hentschel	M. Ketterer
D	1/25/2008	Estimate Update	M. Ketterer	M. Ketterer

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1. EXECUTIVE SUMMARY

PID-206 intends to install a generation plant to connect two 83.8 MW combustion turbine units to Entergy’s transmission system. The point of interconnection will be approximately 4 miles north of the existing Jacinto Bulk Substation on the 138kV line from Jacinto to Shepherd.

The 168 MW of generation will be injected from the PID 206 plant to the Entergy Transmission System between the Jacinto and Shepherd substations (Figure 1). The requested in-service date for this facility is January 1, 2009.

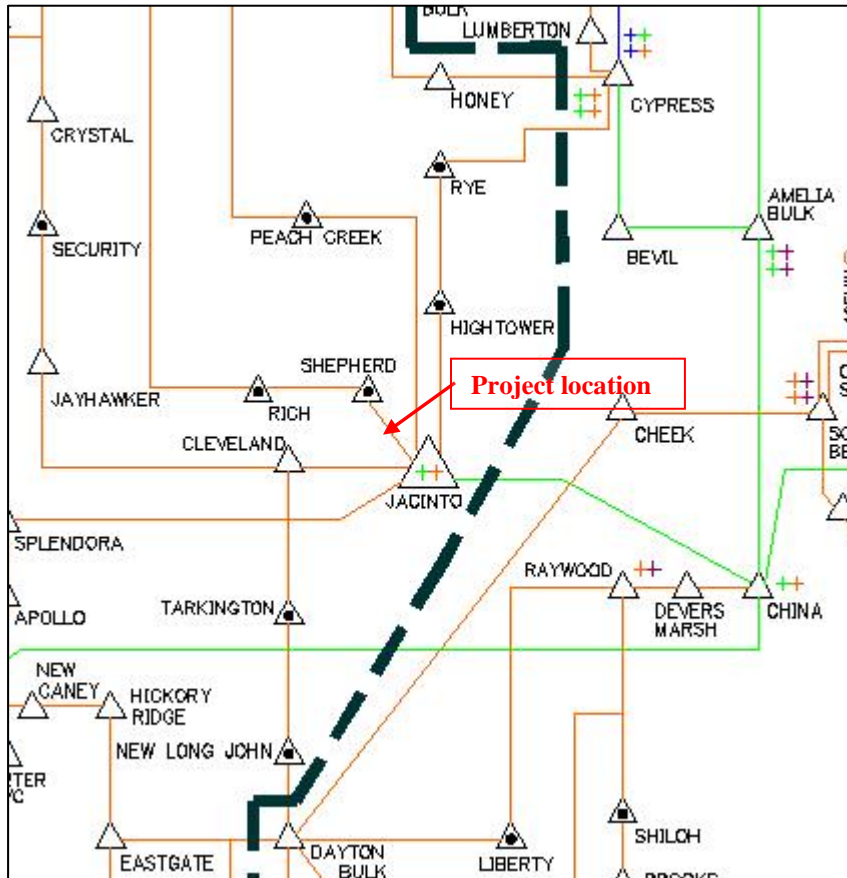


Figure 1 – Transmission System Area Map Identifying PID-206

Major transmission upgrades needed to connect PID 206 include:

- Construction of a three breaker switching station on plant property
- Construction of the turn-in structures from Line 418 to the plant
- Installation of fiber from PID 206 to Jacinto Substation
- Communication upgrades at Jacinto Substation to accept the new fiber
- Installation of necessary communications and relaying at Shepherd Substation by others

Work identified in the Facility Study is estimated at \$6,013,489 and includes overheads.

The estimated project duration for the Entergy Transmission portion of this project is approximately 12 months, based on a start date of January 31, 2008. This includes Design, Procurement, and Construction. This estimated duration assumes the PID 206 provides Entergy with a site that is cleared and graded, and Entergy is provided with an exclusive easement for the substation land and lines to connect to the station. PID 206 will provide all environmental permitting and compliance.

Due to continuous system changes, the scope and cost estimates contained in this study may require changes until such time as the customer commits to the agreement. Presently, Entergy is performing Sub-synchronous Resonance (SSR) screening study for the Western Region of the Entergy system. Based on the results of SSR screening study a detailed SSR analysis for the subject facility may be required.

2. SAFETY AWARENESS

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 SUMMARY

PID 206 Substation will be constructed as a standard through bus with two incoming lines and two lines connecting to the generation facility (one for each generator). The major components to the project are the construction of a PID 206 substation and associated turn-in structures, and installation of fiber to Jacinto Substation.

Major subprojects for the transmission upgrades needed to connect PID 206 include:

- Construction of a three breaker switching station on plant property
- Construction of the turn-in structures from Line 418 to the plant
- Installation of fiber from PID 206 to Jacinto Substation
- Communication upgrades at Jacinto Substation to accept the new fiber
- Installation of necessary communications and relaying at Shepherd Substation by others

4. SCOPE DETAILS

Transmission Line Details

Geotechnical Report (Soil Borings)

Geotechnical reports including the boring logs and the laboratory data are required to properly design and size the foundations for the transmission line structures. Entergy has provided PID 206's consultants with the coordinates to obtain soil borings near proposed structure locations. It is anticipated that this data will be available and used during the design phase of this project, however, this facility study estimate was performed without the benefit of any specific soil data. The costs may change dependent on the results obtained from the soil data.

Survey and Plan & Profile Drawings

A topographical survey of the T-line alignment will be required.

Line Route

PID 206's proposed facility is adjacent to the L-418 T-Line Right-of-Way. It is estimated that the new cut-in lines will be approximately 450 feet in length.

Right of Way (ROW)

This project will not require purchasing any additional ROW.

Permits (SWPPP, Waterway, Road, Highway and Railroad Crossings)

This project will likely require the design, installation, and monitoring of a Storm Water Pollution Prevention Plan. No waterway, highway, or railroad crossings will be required.

Design

The transmission line will be designed in accordance with the Entergy 161 kV standards. The project, in San Jacinto County, falls within an NESC Medium Zone. The Extreme Wind load used is 100 mph (25.6 PSF), and a Heavy Ice Load of 0.75 in. 1272.0 ACSR "Bittern" conductor has been chosen to match the ampacity of 1033 AA, as instructed by planning to accommodate possible expansion in the future.

Foundations

In the absence of specific soil boring data, based on the conductor used, the anticipated pole height and general knowledge of soil conditions in the area, it has been assumed that the 4 new dead end structures will each require drilled pier foundations.

Structures

Based on limited space available on the ROW and an undetermined configuration near the switching station, self-supporting steel structures were used to develop this estimate. 4 deadend structures will be required to turn into the new switchyard.

Conductor

This project was estimated assuming single 1272.0 kcmil ACSR "Bittern" conductor operating at 212°F. Deadends are bolted type connections. The conductor will be slack spanned between the substation deadend bay and the deadend transmission structure.

Shield Wire

OPTGW will be used as the shield wire for this project. The shield wire will be slack spanned between the substation deadend bay and the deadend transmission Structures. Deadends are bolted type connections.

In addition to the cut-in section, the existing shield wire will be removed and replaced with OPGW all the way to Jacinto substation, which is a run of approximately 4 miles.

Insulators

All insulators installed are polymer 161 kV class insulators. All insulators and conductor hardware shown on the MacLean Insulator Assembly Drawings are provided by MacLean.

PID 206 Substation

The customer will provide a level site cleared, stripped of vegetation and sterilized to Entergy's specifications.

Site Preparation

Site preparation including waste disposal, excavation, grading, backfill, dirt compaction, crushed rock and site drainage shall be performed in accordance with Entergy Standards and drawings. Site preparation shall be performed in accordance with Entergy Specification SL1202 Rev. 2. Fence shall be installed in accordance with Entergy Specification SL0701 Rev. 3. Ground Covering and Access Road shall be performed in accordance with Entergy Specification SL1201 Rev. 3. The site preparation work shall include the furnishing of all labor, material, transportation, tools, utilities, equipment, appurtenances, and performance of all operations necessary for excavating, filling, grading, and surfacing for the development of the yard approximately 375ft. x 200ft. The site work includes the following:

Install approximately 3000 cubic feet of compacted fill

Install approximately 2700 tons of lime stone surfacing

Install approximately 1000 feet of access road

Install approximately 1100 feet of fence

Install approximately 40 linear feet of 24 inch access road culvert

Foundation Conduits & Grounding

Concrete Spread Footings and Pile Caps Construction shall be performed in accordance with Entergy Specification TO0117 Rev. 01. Concrete Drilled Pier Foundation Design Guidelines shall be performed in accordance with Entergy Specification TC0303 Rev.00. The foundation work includes the following:

Design and Install three (3) foundations for 138kV 2000A Breaker

Design and Install four (4) foundations for 138kV Dead-End, Reduced Tension

Design and Install twenty-one (21) foundations for 138kV CVT/CT/Arrester Supports

Design and Install twenty-two (22) foundations for 138kV Single Phase Low Bus Supports

Design and Install thirteen (13) foundations for 138kV Single Phase High Bus Supports

Design and Install four (4) foundations for 138kV Vertical Break Low Switch Structures

Design and Install four (4) foundations for 138kV Vertical Break High Switch Structures

Design and Install three (3) foundations for 125ft. Lightning Mast

Design and Install one (1) foundation for a 20ft. X 36ft. Control House

Design and Install one (1) foundation for a Demarcation Box

Design and Install six (6) foundations for Yard Lights

Install 300ft. of precast cable trench

Install all required below grade conduits, connectors, fittings and conduit accessories (Approx. 2000ft). Substation Conduits shall be in accordance with Entergy specification SL0205 Rev. 00.

Purchase and install all required below grade #4/0 AWG copper ground wire (Approx. 3500 ft), ground rods, ground rod couplers, connectors, fittings and accessories for substation main grounding grid. Substation Grounding shall be in accordance with Entergy specification SF0201 Rev. 01.

A soil resistivity study will be performed during detailed design to aid in the design of the stations ground grid. Fifty feet (50ft) pigtailed will be left at appropriate intervals to allow for interconnection with the customer's ground grid.

Electrical

All Equipment shall be installed in accordance with Entergy Specifications for Electrical Minimum Clearances (SB0701 Rev. 01) and High Voltage Electrical Connections (SL0206 Rev. 00.)

Entergy will design, construct, and maintain a new 138kV switchyard to accommodate the new customer generation installed in Cleveland, TX. The new switchyard will be arranged with two line breakers and a bus tie breaker. The new switchyard will tap the existing 138kV transmission line 418 (Jacinto to Shepherd). All bus and equipment will be rated for a continuous current of 2000A and an interrupting capability of 40kA. See the preliminary oneline and electrical arrangement for detailed equipment location.

Install three (3) 138kV 2000A 40kA Breakers

Install eight (8) 138kV 2000A Vertical Break Switches

Install four (4) 138kV 70kA Ground Switches

Install two (2) 125VDC Motor Operators on the line disconnect switches

Install six (6) 138kV Surge Arresters (spec. SA0101 Rev. 00)

Install six (6) 480watt yard lights

Install one (1) Auxiliary Transformer for station service

Install one-hundred twenty two (122) 138kV Station Post Insulators (bus supports & switches)

Install six (6) 138kV Polymer Suspension Dead-End Insulators including connectors, fittings and hardware for terminating strain bus and transmission lines.

Install approximately 2000ft of 4" Sch 40 Rigid Aluminum Tubing (138kV bus)

Install approximately 500ft of bundled 954 MCM "Magnolia" Aluminum Conductors (138 kV jumpers, connectors, and fittings)

Install approximately 2000ft of 954 MCM "Magnolia" Aluminum Conductor (138kV damping cable)

Install one (1) 20ft X 36ft Control House (Atkinson Pre-Fab)

Install one (1) Demarcation Box

Install two (2) Line Trap on phase A & B of the Shepherd line

Install four (4) CVT junction boxes on appropriate CVT structures

Install two (2) CT junction boxes on appropriate CT structures

Install above grade conduit, connectors, fittings and conduit accessories. Substation Conduit shall be in accordance with Entergy specification SL0205 Rev. 00.

Install above grade #4/0 AWG copper ground wire, connectors and fittings for connecting to the substation main ground grid. Substation Grounding shall be in accordance with Entergy specification SF0201 Rev. 01.

Install one (1) lot of Substation Signs (Spec. SL1301 Rev. 04)

All structures shall be erected and installed in accordance to Entergy Specification SL0201 Rev. 01.

Install six (6) structures for 138kV CT

Install nine (9) structures for 138kV CVT

Install six (6) structures for 138kV Surge Arresters

Install twenty two (22) structures for 138kV Single Phase Low Bus Supports

Install thirteen (13) structures for 138kV Single Phase High Bus Supports

Install four (4) structures for 138kV Vertical Break Low Switch Supports

Install four (4) structures for 138kV Vertical Break High Switch Supports

Install one (1) steel support for Station Service

Install one (1) structure for a Demarcation Box

Install three (3) 125ft lightning masts.

Install four (4) Dead Ends

Relay

Purchase and install (1) line panel with fiber communications with (1) breaker control for the Jacinto line. This line panel will consist of a SEL-421 and a SEL-311L that will communicate via fiber to Jacinto. (Entergy Standard PM1803 Option B)

Purchase and install (2) line panels with unblocking (FSK) carrier capabilities for the Shepherd line: one with (1) breaker control and the other with no breaker control. These line panels will be providing protection similar to a 500kV line with dual primary protection (ex. Ft. Smith Line at ANO). System planning requires dual primary protection on this line. (Entergy Standard PM1803 Option H & Option I)

Purchase and install (1) high voltage breaker control panel using the SEL-351 for the bus-tie breaker. (Entergy Standard PM0501)

Purchase and install (2) bus differential panels using SEL-487B: one panel per bus. (Entergy Standard PM0602 Option B)

Purchase and install (1) metering panel for two transformers (3 phase, 4 wire, delta system). (Entergy Standard PI0501)

Purchase and install (1) GE Harris D20 RTU with 3 ports and modem. (one port for TOC, 1 for SOC, and one for EMO)

Purchase and install (1) AC panel and (1) DC panel. (Entergy Standard PM0101)

Purchase and install (1) AC Transfer switch (flip-flop) for automatic switching to backup AC substation source. (Entergy Standard PM3401)

Purchase and install (1) station AC service panel.

Purchase and install Costcom communication channel bank and fiber optic patch panel for fiber communication with Entergy fiber backbone. Fiber will be installed between PID 206 and Jacinto.

Purchase and install communication processor SEL-2032 and GPS clock SEL2407.

Purchase and install (2) line traps (2000 amp) and line tuners for the Shepherd line for dual Power Line Carrier. (Entergy Standard PM0802 & PM0804)

Purchase and install (9) CCVT's rated at 138kV with carrier accessories. Three CCVT's will be used for each phase of each bus. These CCVT's will have 2 secondary windings: one winding for revenue metering and the other for relaying. Two will be needed for Shepherd's power line carrier schemes and hot line indication, and 1 for Jacinto's hot line indication.

Purchase and install (6) CT's rated at 138kV for metering. (3 for each phase of each generator node)

Purchase and install (2) CT junction boxes. (CT's used for metering)

Purchase and install (2) bus potential junction boxes. (Entergy Standard PM2402)

Purchase and install (2) bus potential distribution boxes for control house.

Purchase and install (2) junction boxes to interface with customer CT's and breaker status's.

Purchase and install (3) CVT junction boxes. (Two for the Shepherd line and one for the Jacinto line)

Purchase and install (2) sets of 125V 200 AH Battery, 25A charger, and 200A battery test switch. Dual battery sets are needed for generating stations connecting to the grid (Entergy Standard PM0203 & battery sizing spreadsheet)

Purchase and install ADSS fiber from the final line splice box on the Jacinto transmission line to the Jacinto line panel in the control house.

Assumptions:

Fiber will be used for SCADA, phone, and other communications via Entergy's fiber backbone through Jacinto.

PID 206 will provide a GE Harris D25 that will supply SCADA information from the plant to EMO through the fiber system

PID 206 will supply two independent sources for station service, one of which is 120/240 single phase from the plant system, the second will be from the local distribution system.

Relay Settings

The following relay settings will need to be implemented due to the addition of PID 206 generation that will be added near Jacinto Substation:

- New PID 206 Station looking to Jacinto
- New PID 206 Station looking to Shepard.
- New PID 206 Station Bus tie
- New PID 206 Station Bus Protection

SCADA

Modify system SCADA displays and data point tables to reflect the addition of the new 138 kV connection for PID 206.

Jacinto Substation:

Relay

Remove L-418 Line panel and line trap to Shepherd.

Purchase and install (1) line panel with fiber communications with (1) breaker control for Shepherd L-418 line. (Entergy Standard PM1803 Option B)

Relay Settings

The following relay settings will need to be updated:

- Jacinto Substation
- Hightower to Jacinto
- Peach Creek to Jacinto
- Splendora to Jacinto
- Cleveland to Jacinto

Shepherd Substation (Customer Owned):

Relay

Notify Sheco to upgrade line relaying by adding a second line trap & relaying associated with line trap. Sheco’s relaying should match what will be installed at PID 206. In addition, relay settings will need to be updated.

5. COSTS

The estimated costs shown in the table include overheads and AFUDC.

Cost Summary for PID 206 Substation and Associated Upgrades			
Subproject	Direct	Indirect	Total
LINE 418 Jacinto - Shepherd	\$673,496	\$367,689	\$1,041,185
PID 206 Switching Station	\$3,197,487	\$1,576,976	\$4,774,463
Jacinto Upgrades	\$132,264	\$65,577	\$197,841
Total Project	\$4,003,247	\$2,010,242	\$6,013,489

Upgrade Classification

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

Subproject	Base Plan	Supplemental Upgrades
LINE 418 Jacinto - Shepherd		\$1,041,185
PID 206 Switching Station		\$4,774,463
Jacinto Upgrades		\$197,841
Total		\$6,013,489

6. SCHEDULE

This project is estimated to take approximately 12 months from the time the service agreement is signed to the in-service date, and is dependent on ROW obtainment, regulatory approval, equipment availability, weather, and outage availability.

PRELIMINARY SCHEDULE*

Task Name	Duration	Start	Finish
Project Approval	1 day	1/31/08	1/31/08
Design	137 days	2/1/08	8/1/08
Procurement	150 days	4/14/08	10/14/08
Construction	90 days	9/15/08	1/31/09
Closeout	120 days	2/1/2009	5/31/2009

*This schedule is subject to change and assumes a funding date of January 31, 2008.

7. ATTACHMENTS:

PID 206 Switching Station (Page 16)

PID 206 Electrical Arrangement (Page 17)

