



TRANSMISSION AND SUBSTATION PROJECTS

OPERATING COMPANY: EMI

CUSTOMER: WARREN POWER, LLC

EJO # MS0010

SCOPE DOCUMENT

FOR

**340 MW, IPP PROJECT at VICKSBURG, MS
WITH INTERCONNECTION AT
BAXTER WILSON 500kV SUBSTATION**

Revision: 0

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1. DEFINITION OF PROJECT

This project provides the facilities for the interconnection and optional system upgrades necessary for the operation of the proposed Warren Power 340MW gas fired generating plant located in Warren County in Vicksburg, MS. This project will establish a new node in the existing 500kV ring bus for termination of the Warren Power single tie line. This work was identified in the Interconnection Study, dated April 2000, prepared by the Entergy Transmission System Planning group.

The interconnection part of this project, with an estimated cost of \$3,746,513, which includes gross-ups for taxes. The following mandatory work is listed below:

- Installation of a new 500kV Gas Insulated Breaker in the Baxter Wilson 500kV Substation and connecting to Warren Power's 500kV Gas Insulated Bus Duct interconnection point.
- Installation of three (3) 500kV disconnect switches and additional 500kV bus in the Baxter Wilson 500kV Substation.

The optional system upgrades, with an estimated cost of \$9,575,160, which includes gross-ups for taxes. The following optional work is listed below:

- Rebuilding of four (4) 115kV transmission lines from Vicksburg to West Vicksburg, West Vicksburg to North Vicksburg, S. E. Vicksburg to Bovina, and Ray Braswell to Clinton.
- Replace upper and lower strain bus (existing 666 kcmil ACSR conductor) at switch structure, including porcelain insulators and jumpers, with 1272 ACSR conductors at Bovina 115kV substation
- Replace existing 600A GOAB disconnect switch J4661 with a new 2000A GOAB switch and replace the 800A line trap on the West Vicksburg line with a 2000A line trap at Vicksburg 115kV Substation.

The Interconnection Study indicates that the requested commercial in-service date for the Warren Power generating station is August 2001.

2. SAFETY

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

3. SCOPE DETAIL FOR INTERCONNECTION (MANDATORY WORK)

A. SUBSTATIONS

The work in the substation interconnection part of this scope will be at the Baxter Wilson 500kV Substation in Vicksburg, MS.

BAXTER WILSON 500KV SUBSTATION

This project will establish a 500kV connection between the 500kV air insulated bus at Baxter Wilson 500kV Substation and Warren Power's gas-to-air bushings. See drawing No. M3020FS1.

ELECTRICAL WORK

Entergy equipment required for interconnection point to Warren Power will be:

- One (1) 500kV, 3000A, 50kA gas circuit breaker with two (2) 3000/5 MRCT per bushings.
- Three (3) 500kV, 3000A MOAB, disconnect switches. The line disconnect switch will be equipped with a manually operated grounding switch.
- Three (3) 500kV revenue metering CT's, 400/800:5A ratio, and with 0.3B-1.8 accuracy/burden.
- Three (3) 500kV revenue metering CVT's, 2500/4000:1 ratio, 0.3% accuracy.
- One (1) 500kV CVT for Hot Line indication, 2500/4000:1 ratio, 0.3% accuracy.
- Three (3) 500kV Station Class Lightning Arresters (MCOV = 318kV).
- Four (4) 500kV Lightning Mast

Warren Power's interconnection point will be at Entergy's 500kV bus at the fence line. A new 500kV gas circuit breaker will be installed at Baxter Wilson 500kV Substation completing the ring bus between breakers J2240 and J2252. The 500kV bus will be extended to include: 500kV revenue metering CT's and CVT's, a 500kV CVT on phase B of the Warren Power 500kV line for Hot Line indication to the TOC, a 500kV disconnect switch with manually operated grounding switch, and 500kV lightning arresters, up to the existing fence line.

The existing grounding system will be extended to include the new addition of the substation yard while tying in the new substation equipment. Crushed rock or limestone will be spread over the new 500kV grounding area per Entergy Standards.

ASSUMPTIONS

Entergy will provide a 500kV interconnection point inside of the extended substation chain-link fence. Warren Power will install 500kV gas insulated bus duct from their 500kV substation and connecting to their 500kV gas-to-air terminal bushings near the Baxter Wilson 500kV substation fence. Warren Power will extend their 500kV bus and will connect to Entergy's bus with welded connections at the fence line. Entergy will connect the bus to the 500kV disconnect switch at Baxter Wilson 500kV substation. The bus-to-bus connection is considered the interconnection point. Entergy will provide the 500kV lightning arresters connected between the gas-to-air bushing and the 500kV disconnect switch.

Warren Power will provide its own operating substation with circuit breakers, protective relaying, remote terminal unit, revenue metering equipment with dial-in capability on auxiliary transformers, power transformers, buses, bus supports, CT's, CVT's, distribution system, station service, 125VDC batteries and charger, and control house. The revenue metering equipment shall be in compliance with Entergy Standard PM3901, Rev. 02, "Non-Utility Generator Interconnection Requirements" (NUG).

Additional improvements may be required after the analysis of the regional transmission system is made as part of the System Impact Study. The scope covered in this document does not include any upgrades that may be needed at neighboring utility facilities that are not owned by Entergy. Evaluation of these facilities by Warren Power must be made to identify possible impacts.

Transient stability analysis concerns are not completely evaluated at this time. A complete evaluation of transient stability parameters will need to be made and the associated work required coordinated between Entergy and Warren Power.

LONG LEAD ITEMS:

The following long lead equipment is required for this project:

<u>Equipment</u>	<u>Quantity</u>	<u>Estimated Lead Time</u> (as of 12/11/00)
three phase 550kV, 3000 Amp, 50 kA, gas circuit breaker	1 each	58 weeks
500kV MO Air Break Disconnect Switch (one w/gnd sw.)	3 each	32 weeks
500kV Station Class Lightning Arresters (MCOV=318kV)	3 each	16 weeks
Substation steel structures	15 each	26 weeks
500kV Lightning Mast	4 each	26 weeks

SITE WORK

The site preparation activities at Baxter 500kV substation include: surveying, site clearing, grading, excavation, fill, compaction and rock. The substation yard will be increased by approximately 10,000 sq. ft to enclose the 500kV equipment owned by Entergy. Two hundred (200) feet of chain-link fence with a vehicle gate will be added to enclose the new area owned by Entergy.

FOUNDATIONS

The following foundations are required:

	<u>Quan.</u>
• three phase 500kV, 3000A, 50 kA Gas Circuit Breaker	1
• three phase set of 500kV insulator supports	5
• three phase 500kV disconnect switch with ground switch support	3
• three phase set of 500kV metering CT's	1
• three phase set of 500kV metering and relaying CVT's	1
• 500kV CVT support for Hot Line indication	1
• three phase set of 500kV lightning arrester support	1
• 500kV Lightning Mast tower supports	4

ASSUMPTIONS

Soil borings are required for this substation to confirm foundation design.

B. RELAYING

The following facilities will be installed in the control house at the Baxter Wilson 500kV substation to provide relay protection, breaker control, revenue metering, and SCADA information for the Warren Power connection:

1 - Transmission Line Relay Panel (Primary #1 Alstom Type P544 and Primary #2 Type SEL-321 on Warren Power 500kV Tie-Line)
1 - Breaker Control Relay Panel --- new breaker
1 - GE Harris D20 RTU with a DNP 3.0 port to Warren Power D20 RTU
4 - Fiber Optic Modems, Dymec Model 5844S
1 - Modem, G. E. Harris Model 580-0771
1 - Modem, Star Com. Model 240-0199
1 - SEL 240-0201 AC Power Adapter (for programming Star Com. Modem)
1 - Converter, Black Box, RS-485 to RS-232

1 - Revenue Metering Panel with PSI Quad 4 meter
1 - SEL 2020 Communications Processor
1 - Teltone SLSS Substation Line Sharing Switch
2 - Fiber Optic Patch Panels (for 2-32 fiber cables) with 19" rack
1 - Three phase CVT Junction Box
1 - Single phase CVT Junction Box
1 - Bus Potential Distribution Junction Box
1 - Metering CT/CVT Junction Box

A new D20 RTU will be installed at the Baxter Wilson 500kV control house and at the Warren Power control house. A peer-to-peer connection will be provided between RTU's to allow data transfer between them.

Quantities telemetered directly from the Warren Power D20 RTU, as per the NUG Interconnection Requirements to Entergy's TOC and SOC, includes: customer breaker and disconnect switch status (open/closed), instantaneous MW & MVAR flow from customer generation, integrated MW-Hours and MVAR-Hours from customer generation (hourly)-(gross generation, totaled if required). Two dedicated 4-wire, full duplex, data quality communication circuits from Entergy approved telephone switching equipment shall be installed and maintained at the customer's expense in order for the Baxter Wilson D20 RTU to communicate with the host computer system at Entergy's TOC and SOC. Warren Power will retrieve from the Baxter Wilson RTU, 500kV tie-line revenue metering data and status indication for the tie-line breakers at the Baxter Wilson 500kV switching station. This data will be transferred via DNP 3.0 connection between the RTU's. A MODBUS RTU connection at Warren Power's D20 RTU will be provided to transfer data to their DCS system.

The two new dedicated 4-wire data circuits will be via fiber optic cable and will be connected to Entergy's backbone fiber system at Baxter Wilson and routed to the TOC and SOC.

Two (2) single mode fiber optic cables will be installed from Baxter Wilson 500kV control house to Warren Power control house. Both will be ADSS fiber optic cables installed in separate cable trenches or conduits, as continuous runs, between the two control houses. Warren Power will purchase and install both fiber optic cables. Entergy will provide two (2) fiber optic patch panels for fiber distribution to fiber equipment in the Baxter Wilson control house. All fiber optic equipment within Warren Power's facilities will be purchased, installed and maintained by them. Warren Power will test the ADSS cables, while on the shipping reels, to verify compliance with specifications before installation.

Each fiber optic cable shall provide independent relay protection, i.e., primary relaying #1 (Micom P544) in one cable and primary relaying #2 (SEL 321) in the other. A Teltone substation line sharing switch will be provided at the Baxter Wilson control house to route the existing dial-in telephone circuit at the control house to the revenue meter panel at Baxter Wilson and to the SEL 2020 communications processor. Separate port connections from the SEL 2020, one to the SEL 321 relay, and one to the Micom P544 relay will be provided. The data collected from these ports will be transmitted to the new D20 RTU for diagnosis purposes. Warren Power's auxiliary meter panel will be metered by Entergy's Retail Department. A telephone dial-in circuit to this panel will be provided by Warren Power.

All communications circuits between the Baxter Wilson control house and the Warren Power control house will be via fiber optic cable. See drawing No. MJ0010CSDIPPW.

Fiber optic cables required to the Baxter Wilson 500kV control house will include:

- Two (2) 1310nm, single mode fiber optic ADSS cable, 32 fibers 2400 ft each

All fiber optic equipment, including cables, patch panels, etc. installed between Warren Power and Baxter Wilson switchyard, shall be of the same type and manufacturer.

This installation will include the configuration and checkout of the Remote Terminal Unit, and the calibration, setting and testing of the protective relays. Entergy will provide the engineering for wiring, relay coordination and determination of the protective relay settings. During the construction phase, the technicians will set the applicable relays and perform relay calibration, testing and checkout. There are no protective relay upgrades required at the Baxter Wilson 500kV substation for system stability due to Warren Power generation.

ASSUMPTIONS

Warren Power will install its own CVT's for use in synchronizing with the Entergy system. The dual primary relay protection equipment for the 500kV transmission line between the Entergy and Warren Power shall be of the same type and manufacturer at both ends. All equipment at Warren Power's facilities will be purchased, installed and maintained by them. The Entergy contractor will be used to splice and test the fiber cables between Warren Power's facilities and the Baxter Wilson 500 kV substation as part of this scope. Warren Power will make terminations of the fiber cables at their facilities.

LONG LEAD ITEMS

The following long-lead equipment is required for this relay work:

<u>Equipment</u>	<u>Quantity</u>	<u>Estimated Lead Time</u> (as of 12/11/00)
• Breaker Control Panel	1 each	20 weeks
• Dual Primary Relaying Panel	1 each	20 weeks
• 500kV Metering Accuracy CVT's	3 each	14 weeks
• 500kV CVT for Hot Line Indication	1 each	14 weeks
• 500kV Metering and Relaying Accuracy CT's	3 each	14 weeks
• Revenue Metering Panel	1 each	20 weeks
• D20 Remote Terminal Unit	1 each	16 weeks
• D20 Remote Terminal Unit (for Warren Power)	1 each	16 weeks
• ADSS Single Mode Fiber Cable (32 fibers)	4800 feet	48 weeks

C. TRANSMISSION LINES

Warren Power will provide a 500kV transmission line and gas insulated bus from their substation to the interconnection point.

4. SCOPE DOCUMENT FOR OPTIONAL SYSTEM UPGRADES (OPTIONAL WORK)

The following work is optional to Warren Power.

A. SUBSTATIONS

ELECTRICAL WORK

The electrical work in the following substations is required for the optional system upgrades:

1. Vicksburg 115kV Substation: Upgrade Substation

Replace one (1) 115kV, 600A GO vertical air break disconnect switch, J4661, with a 2000A disconnect switch; replace jumpers to new line disconnect switch with 2000A conductor; replace the 2 1/2" iron pipe transfer bus with 2 1/2" schedule 40 aluminum tubing and 1 1/2" "A" frames.

2. Bovina 115kV Substation: Upgrade Substation

Replace upper and lower strain bus and jumpers with 1272 kcmil ACSR conductor and replace all porcelain insulators on the strain buses with polymer insulators. Conductors in strain bus will be sagged to 6 inches minimum.

SITE WORK

Site work required at this substation includes grading and adding new rock over worked areas. Final clean up and restoration of substation to be done at end of substation construction work.

FOUNDATION WORK

It is assumed that no new foundation work will be required at these substations.

LONG-LEAD ITEMS

The following long-lead equipment is required for the optional substation work:

<u>Time</u> <u>Equipment</u>	<u>Quan.</u>	<u>Estimated</u> <u>Lead</u> (as of 12/11/00)
115kV, 2000A GOAB disconnect switch	1 each	34 weeks

B. RELAYING

The relaying work in the following substation is required for the optional system upgrades:

1. Vicksburg 115kV Substation: Upgrade Substation

Replace the existing 800A line trap at Vicksburg 115kV substation on the West Vicksburg 115kV transmission line with a 2000A, single frequency line trap. The jumpers connected to the line trap must be replaced with 2000A jumpers as part of this substation work.

Entergy will provide the engineering for relay coordination and determination of the protective relay settings for this substation. During the construction phase, the technicians will set the applicable relays and perform relay calibration, testing and checkout.

ASSUMPTIONS

The carrier line tuner can be re-tuned to match the upgraded transmission lines. All existing bus differential and line relays will be able to accommodate line upgrades.

LONG-LEAD ITEMS

The following long-lead equipment is required for the optional relay work:

<u>Time</u> <u>Equipment</u>	<u>Quan.</u>	<u>Estimated</u> <u>Lead</u> (as of 12/11/00)
Line Trap, 2000A, Single Frequency	1 each	14 weeks

C. TRANSMISSION LINES

The following 115 kV transmission lines are not be adequately rated for the export levels that will exist in this part of the transmission system due to the Warren Power power generation. These lines will be rebuilt to provide adequate line capacity in each case.

1. Rebuild Vicksburg to West Vicksburg 115kV Line

Rebuild the existing 2.76 mile 115kV transmission line between Vicksburg and Vicksburg West. Approximately 30 structures will be replaced with concrete direct embedded poles. The capacity of this line must be increased to 1306A, by replacing the existing conductor with 1272 kcmil ACSR conductor and 7 No. 7 Alumoweld shield wire in accordance with current Entergy loading, clearance and construction criteria.

2. Rebuild West Vicksburg to North Vicksburg 115kV Line

Rebuild the existing 2.84 mile 115kV transmission line between West Vicksburg and North Vicksburg. Approximately 32 structures will be replaced with concrete direct embedded poles. The capacity of this line must be increased to 1306A, by replacing the existing conductor with 1272 kcmil ACSR conductor and 7 No. 7 Alumoweld shield wire in accordance with current Entergy loading, clearance and construction criteria.

3. Rebuild S. E. Vicksburg to Bovina 115kV Line

Rebuild the existing 8.19 mile 115kV transmission line between S.E. Vicksburg and Bovina. Approximately 95 structures will be replaced with concrete direct embedded poles. The capacity of this line must be increased to 1306A, by replacing the existing conductor with 1272 kcmil ACSR conductor and 7 No. 7 Alumoweld shield wire in accordance with current Entergy loading, clearance and construction criteria.

4. Rebuild Ray Braswell to Clinton 115kV Line

Rebuild the existing 2.39 mile 115kV transmission line between Clinton and Ray Braswell. Approximately 27 structures will be replaced with concrete direct embedded poles. The capacity of this line must be increased to 1306A, by replacing the existing conductor with 1272 kcmil ACSR conductor and 7 No. 7 Alumoweld shield wire in accordance with current Entergy loading, clearance and construction criteria.

LONG LEAD ITEMS

The following long-lead equipment is required for the transmission line rebuilds:

<u>Time</u> <u>Equipment</u>	<u>Quantity</u>	<u>Estimated</u> <u>Lead</u> (as of 12/11/00)
Concrete Structures	185 each	8 weeks
115kV Line Insulators	550 each	16 weeks
1272 kcmil ACSR, "Bittern" Line Cond.	250,000 ft (358,000 lbs)	20 weeks
7 No. 7 Alcoa Alumoweld Shield Wire	85,000 ft (28,050 lbs)	17 weeks

ASSUMPTIONS

Final design regarding structure type will be made during design phase. The cost estimate is based on using concrete poles. Where necessary, steel poles with steel socket pile foundations will be used. There is no requirement for additional right-of-way. No OPGW fiber optic shield wire is being used for these transmission line rebuilds. CNN's are not required.

5. SUMMARY OF COST

INTERCONNECTION (MANDATORY WORK)

The cost estimate for the interconnection work that is MANDATORY is listed below:

Baxter Wilson 500kV Switching Station **\$3,746,513**

SYSTEM UPGRADES (OPTIONAL WORK)

The cost estimate for the system upgrade work that is OPTIONAL is listed below:

Vicksburg 115kV Substation: Upgrade Substation \$140,189

Bovina 115kV Substation: Upgrade Substation \$56,061

Rebuild Vicksburg to West Vicksburg 115kV Line \$2,487,568

Rebuild West Vicksburg to North Vicksburg 115kV Line \$1,524,251

Rebuild S.E. Vicksburg to Bovina 115kV Line \$4,082,635

Rebuild Ray Braswell to Clinton 115kV Line \$1,284,456

Total cost estimated for the OPTIONAL work is: **\$9,575,160**

TOTAL COST

The cost estimated for all MANDATORY and OPTIONAL work above is given below:

\$13,321,673

6. SCHEDULE MILESTONES

Entergy will make commercially reasonable efforts to complete this project to meet your requested in-service date. The attached detailed project schedule is based on having an executed Interconnection and Operating agreement in place within one month of the date of presentation of this facility agreement. Any delay in the date of signing will impact critical milestone dates within this schedule. In many cases, delays to any critical milestone dates can result in a far greater impact to completion of any or all milestone dates. We also note that the ability of Entergy to schedule power outages on its substation and transmission systems is very limited year-round and not possible at all during peak summer months (May through October). Further, by regulation, available transmission transfer capacity is committed up to thirteen months in advance and this could limit outage capabilities. Finally, long lead times for critical materials identified in this schedule are based on current lead times offered by our suppliers and are subject to change with the commitment of actual purchase orders.

INTERCONNECTION (MANDATORY WORK)

BAXTER WILSON 500kV SUBSTATION

Milestone - Estimated Completion Dates

2/8/01	Foundation Construction
4/27/01	Substation Construction
4/24/01	Relay Construction

SYSTEM UPGRADES (OPTIONAL WORK)

VICKSBURG 115kV SUBSTATION

Milestone - Estimated Completion Dates

3/8/01	Substation Construction
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BOVINA 115kV SUBSTATION

Milestone - Estimated Completion Dates

3/8/01	Substation Construction
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115kV TRANSMISSION LINE REBUILDS (OPTIONAL UPGRADES)

VICKSBURG to WEST VICKSBURG: Upgrade Line (2.76 mi)

Milestone - Estimated Completion Dates

12/19/00	Transmission Line Construction
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WEST VICKSBURG to NORTH VICKSBURG: Upgrade Line (2.84 mi)

Milestone - Estimated Completion Dates

10/11/00	Transmission Line Construction
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S. E. VICKSBURG to BOVINA: Upgrade Line (8.19 mi)

Milestone - Estimated Completion Dates

3/9/01	Transmission Line Construction
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RAY BRASWELL to CLINTON Upgrade Line (2.39 mi)

Milestone - Estimated Completion Dates

4/20/01	Transmission Line Construction
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7. OUTAGE REQUIREMENTS

INTERCONNECTION (MANDATORY WORK)

BAXTER WILSON 500kV SUBSTATION

Outage ID	Outage Description	Work Description	Estimated Completion Date	Outage Duration
1	Open Circuit Breaker J2252, Switch J2253, and switch J2243.	Install 500kV Gas Insulated Circuit Breaker, (3) Disconnect Switches, (3) CT's, (3) CVT's and 500kV air insulated bus from Entergy to Warren Power interconnection point.	4/27/01	3 days

SYSTEM UPGRADES (OPTIONAL WORK)

115kV SUBSTATIONS (REMOTE FROM BAXTER WILSON)

Outage ID	Outage Description	Work Description	Estimated Completion Date	Outage Duration
1	Open Bkr J4246, line and bus disconnects; De-energize West Vicksburg 115kV line; and De-energize 115kV transfer bus.	Vicksburg: Replace switch J4661 and nine (9) cap and pin insulators. Replace bus tubing to switch J4661. Replace bus tubing connecting breaker J4246 to line and load side buses.	3/8/01	10 days
2	Open Switch J0805; Bypass substation to replace bus conductors	Bovina: Replace upper and lower 115kV strain buses and associated porcelain insulators.	3/8/01	10 days

115kV TRANSMISSION LINES

Outage ID	Outage Description	Work Description	Estimated Completion Date	Outage Duration
1	De-energize existing line to rebuild new line.	Rebuild 115kV line from Vicksburg to Vicksburg West	12/19/00	25 days
2	De-energize existing line to rebuild new line.	Rebuild 115kV line from West Vicksburg to North Vicksburg	10/11/00	30 days
3	De-energize existing line to rebuild new line.	Rebuild 115kV line from S.E. Vicksburg to Bovina	3/9/01	20 days
4	De-energize existing line to rebuild new line.	Rebuild 115kV line from Ray Braswell to Clinton	4/20/01	20 days

8. ATTACHMENTS

Baxter Wilson 500kV Substation - Station Oneline	M3020SO1
Baxter Wilson 500kV Substation - Station Oneline (FS)	M3020FS1
Vicksburg 115kV Substation Station - Oneline	M4370SO1
Vicksburg 115kV Substation Station - Oneline (FS)	M4370FS1
Bovina 115kV Substation Station - Oneline	M3070SO1
Bovina 115kV Substation Station - Oneline (FS)	M3070FS1
Communication Specification Diagram	MJ0010CSDIPPW
Baxter Wilson 500kV Substation – Interconn. Relaying Proposal	MJ0010OP5IPPW
Baxter Wilson 500kV Substation - Plan View	MJ0010EAIPPW