DRAFT
Transmission Interconnection and Delivery Cost Estimate
Request # GI-2007-2

675 MW Integrated Gasification Combined Cycle (IGCC) Facility Near Las Animas, Colorado

PSCo Transmission Planning
May 16, 2007

Executive Summary

PSCo Transmission received a generation request to determine the feasibility of interconnecting a 675 MW (IGCC) Plant at a new 345 kV Las Animas Switching Station. The Customer proposed commercial operation date is May 2014 with an assumed back feed date of September 2012. The request was studied as a stand-alone project. To meet the Customer proposed In-Service Dates, this project must be initiated by January 2008.

Stand Alone Results

PSCo evaluated the network to determine the upgrades required to deliver the full 675 MW of the IGCC to PSCo native load customers.

The total estimated cost of the recommended system upgrades to accommodate the project is approximately **$287.83** million and includes:

- $0.94 million for Transmission Provider Owned, Customer Funded Interconnection Facilities
- $74.66 million for Transmission Provider Network Upgrades for Interconnection
- $212.23 million for Transmission Provider Network Upgrades for Delivery

These basic upgrades including interconnection as shown in Figure 1 would consist of:

- Constructing a new 345 kV Station at Las Animas just outside the proposed IGCC for both Interconnection and Delivery
- Construct a new 82-mile 345 kV line from Boone Substation to Las Animas
- Substation expansion at Boone for the 345 kV Interconnection and Delivery
- Construct a new 345 kV line from Las Animas to the Southeast Tap (S.E. Tap) location.
- Construct a new 50-mile 345 kV line from Boone to a S.E. Tap location. (S.E. Tap is the location where the Boone and Las Animas Line Converge).
- Construct a new 135-mile double circuit 345 kV line from the S.E. Tap location to Brick Center.

- Substation expansion at Brick Center for a new 345 kV yard and 230 kV yard expansion.
- Rebuild the existing 16-mile Brick Center to Quincy to Smoky Hill 230 kV line to a double circuit 345 kV capable line operated at 230 kV.

A partial one-line of the Las Animas Switching Station detailing the Interconnection is shown in Figure 2.

Figure 1 - Transmission Network with Recommended Upgrades for Delivery

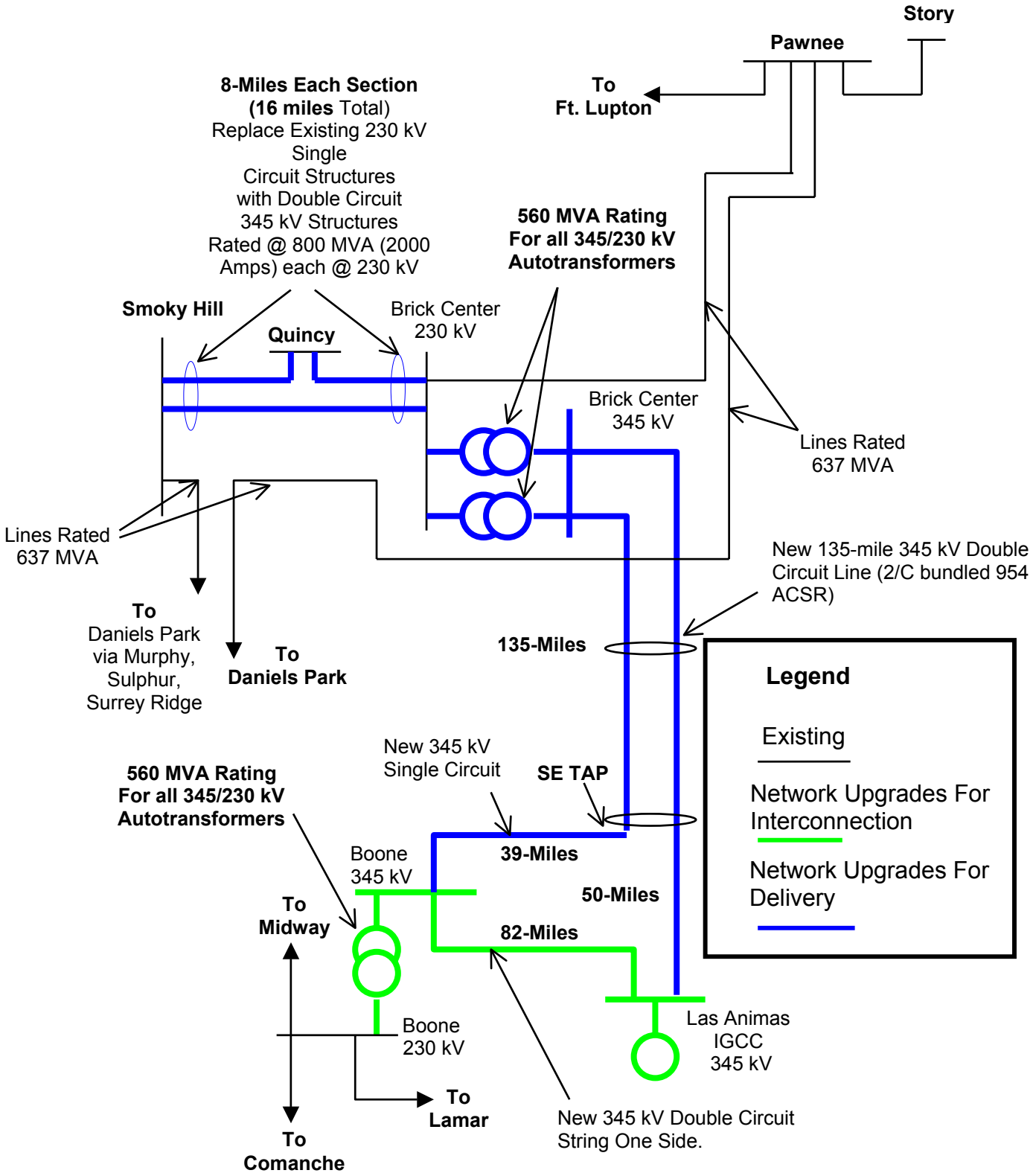
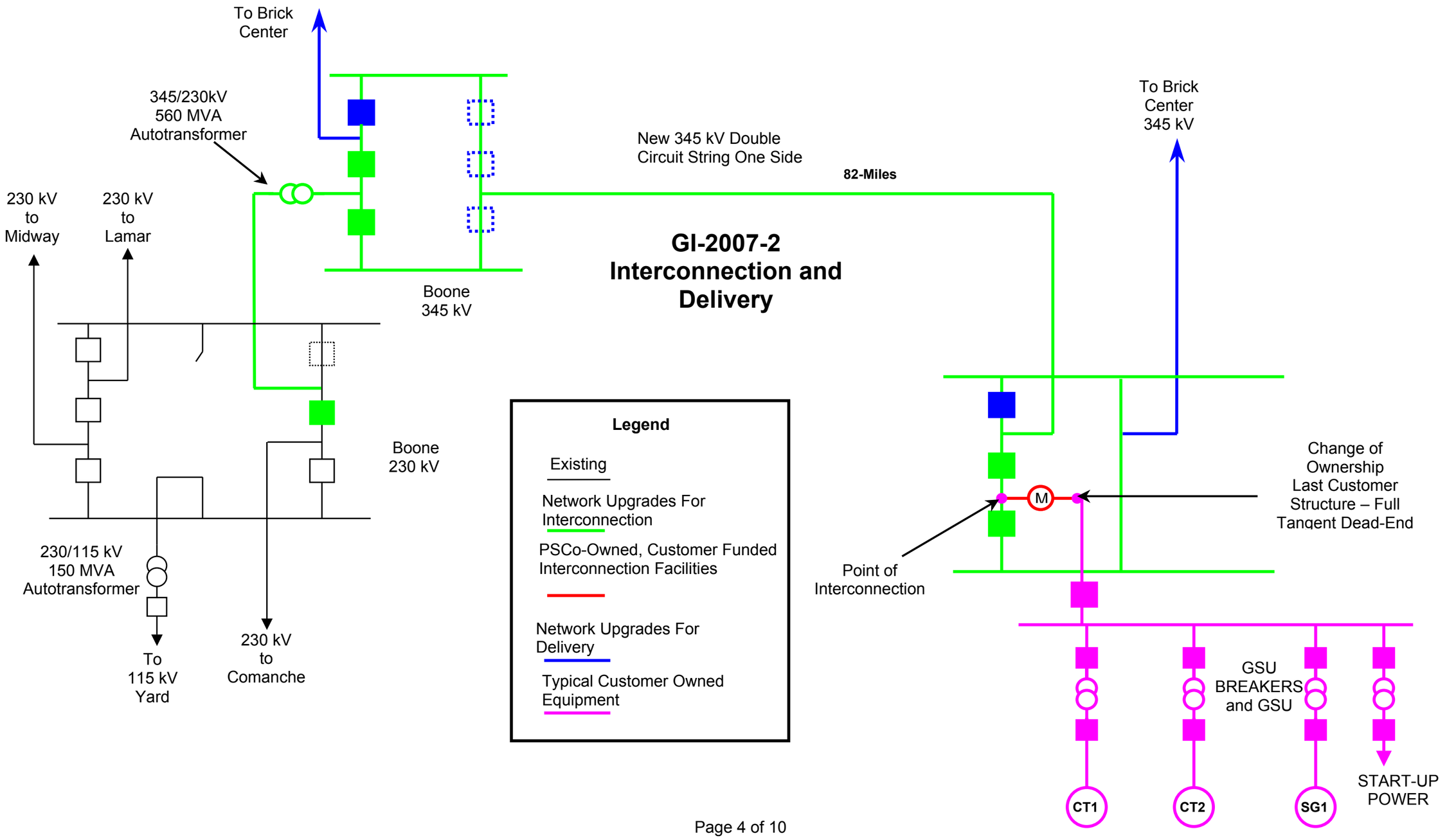


Figure 2: Las Animas IGCC Interconnection One-line



The estimated time required to engineer, permit, and construct all the required PSCo facilities for interconnection is estimated to be at 57 months. The estimated time required to engineer, permit, and construct the Network Upgrade facilities for delivery is 77 months.

Costs Estimates and Assumptions

The estimated total cost for the required upgrades for is **$287,830,000.**

The estimated costs shown are "scoping" (+/-30%) estimates in 2007 dollars and are based upon typical construction costs for previously performed similar construction. These estimated costs include all applicable labor and overheads associated with the engineering, design, and construction of these new PSCo facilities. This estimate does not include any costs for any Customer-owned, supplied, and installed equipment and associated design and engineering. This estimate also does not include any costs that may be required for other entities' systems. The following tables list the improvements required to accommodate the interconnection and the delivery of the Project. The cost responsibilities associated with these facilities shall be handled as per current FERC guidelines. System improvements are subject to change upon more detailed analysis.

The estimated costs for interconnection are detailed in Tables 1 and Table 2. Table 3 shows the detailed costs for Network Upgrades required for Firm Delivery.

Table 1 – Transmission Provider Owned Customer Funded Interconnection Facilities

Element	Description	Cost Est. Millions
Las Animas Substation	PSCo's new 345 kV Las Animas Substation Metering and Communications and Witness Testing.	**$0.67**
	Transmission tie line into Las Animas IGCC Substation.	**$0.25**
	Siting and Land Rights for required easements, reports, permits and licenses.	**$0.02**
Total		**$0.94**

Table 2 – Transmission Provider Network Upgrades for Interconnection

Element	Description	Cost Est. Millions
Las Animas Substation	345 kV line into new 345 kV Yard. The new equipment required includes: Two new 345 kV 2000 A, 40 kA circuit breakers Ten 345 kV switches, 362kV, 3000A Transmission line relaying and testing Required steel supporting structures and foundations	**$5.04**
Boone Substation	Interconnect Customer's 345 kV line into new 345 kV Yard and existing 230kV Yard. The new equipment required includes: Two new 345 kV 2000 A, 40 kA circuit breakers One 345/230, 560MVA Autotransformer Twelve 345 kV switches, 362kV, 3000A One 230kV, 3000A Circuit Breaker Two 230kV Gang Switches Transmission line relaying and testing Required steel supporting structures and foundations	**$10.34**
Las Animas - Boone 345 kV Line	Single Circuit 82-mile 345 kV Line from Las Animas Substation to Boone Substation	**$55.95**
	Total Cost Estimate for PSCo Network Upgrades for Interconnection	**$71.33**
Time Frame		**57 Months**

Table 3 – PSCo Network Upgrades for Delivery

Element	Description	Cost Est. Millions
Boone 345kV Substation	New 345 kV Line terminals to Brick Center requiring the following equipment: One 345 kV, 2000 Amp, 40 kA circuit breakers Required steel and foundations Electrical bus work Control, relaying, and testing	**$1.03**

Element	Description	Cost Est. Millions
Las Animas 345kV Substation	New 345 kV line terminals to Brick Center. The following equipment will be required: One 345 kV, 2000 Amp, 40 kA circuit breakers Misc. supporting steel and foundations Electrical bus work Associated control, relaying, and testing	**$0.91**
Brick Center Substation	New 345 kV Yard with 230 kV yard expansion including onw 230 kV line terminal to Smoky Hill, and two 345 kV, one each to Boone and Las Animas. This includes the following equipment: Six 345 kV 2000 Amp 40 kA circuit breakers Two 345/230 kV 556 MVA autotransformers Fourteen 345 kV 2000 Amp, gang switches Six 230 kV 3000 Amp, 50 kA circuit breakers Eleven 230 kV gang switches Associated steel and foundations Associated control, relaying, and testing Electrical bus work	**$18.71**
Quincy 230kV Substation	Upgrade to Line Rupters to 2000A Three 230kV 2000A Line Rupters Associated Cable & Wiring	**$0.47**
Smoky Hill 230kV Substation	Upgrade Existing Line Terminal to Brick Center and Add a 2nd line Terminal to Brick Center. Equipment includes: Eight 230 kV 3000 Amp, gang switches Four 230 kV 3000 Amp, 50 kA circuit breakers Associated steel and foundations Associated control, relaying, and testing Electrical bus work	**$1.23**
Transmission	New 39-mile Boone - SE TAP Single Circuit 345 kV Line	**$22.79**
	New 50-mile Las Animas - SE TAP Single Circuit 345 kV	**$29.36**
	New 135-mile SE TAP - Brick Center Double Circuit 345 kV line.	**$104.05**
	Replace the 16-mile Brick Center - Quincy - Smoky Single Circuit 230 kV line with 345 kV Double Circuit Line operated at 230 kV.	**$15.97**
Siting and Permitting	Obtain necessary siting, permits, and ROW as required	**$17.71**

Element	Description	Cost Est. Millions
	Total Cost Estimate for PSCo Network Upgrades for Delivery	**$212.23**
	Total Cost of Project	**$287.83**
Time Frame		**77 Months**

Assumptions

- The estimates and time frames given are for reference only are subject to change with a more detailed system study.
- The cost estimates provided are “scoping estimates” with an accuracy of +/- 30%.
- Estimates are based on **2007** dollars.
- PSCo crews will perform all substation construction and wiring associated with PSCo owned and maintained facilities. Contractor Crews may perform transmission construction.
- The estimated time for design and construction of PSCo network upgrades for interconnection at the Las Animas Switching Station is 57 months.
- It is anticipated that in order to construct the PSCo network upgrades for Delivery and Interconnection, a Certificate of Public Convenience and Necessity (CPCN) will be required by the Colorado Public Utilities Commission (CPUC). The application for a CPCN will not be submitted until the Interconnection Agreement is fully executed. The estimated time frame for the CPCN process for the PSCo network upgrades is at least 14 months from the time the Interconnection Agreement is fully executed.
- A siting study will be required for network upgrades for interconnection and delivery. Extensive public involvement is anticipated. Permit applications and possible minor right-of-way acquisition will be required. Land use permits will be required from multiple local jurisdictions.
- This interconnection and delivery affects the following entities: Bent, Kiowa, Crowley, Pueblo Counties.
- 10 temporary staging areas for line construction at 5 acres per site will be needed and are included in this estimate.
- Any 345 kV line will require 200’ width easements along the planned route.

- Implementation of the recommended infrastructure for Delivery and Interconnection will require that existing facilities be taken out of service for sustained periods. In most cases, these outages cannot be taken during peak load periods due to operational constraints. As a result, the estimated time frame for implementation could be increased.

- The last span into Las Animas Switching Station from the Customer owned 345 kV yard will be a slack span between the Transmission Provider's substation dead-end and the Customer's last structure, which is assumed to be a dead-end tangent structure.

Project Schedule

The following schedule, depicted in Figure 3, identifies the main milestones needed to complete the interconnection and the delivery portion of the proposed 675 MW IGCC generation facility.

The following schedule identifies project milestones for three separate phases of work needed to complete the proposed interconnection: Siting, Permitting & Land Acquisition, Substation Design & Construction and Transmission Line Design & Construction. The total estimated duration to complete all of the required activities and tasks is 77 months.

Figure 3 – Preliminary Schedule