

# **Report 40850R11**

## **Quarterly Technical Progress Report 11 Demonstration of Black Liquor Gasification at Big Island**

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## **ABSTRACT**

This Technical Progress Report provides an account of the status of the project for the demonstration of Black Liquor Gasification at Georgia-Pacific Corporation's Big Island, VA facility. The report also includes budget information and a milestone schedule.

Additional information may also be found on the project web site listed below:

<http://www.gp.com/containerboard/mills/big/steam.html>

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Note: Any section marked by an asterisk is required (by DOE) in all technical reports.

## **SUBCONTRACTORS**

Fluor Daniel  
Greenville, SC

StoneChem  
Baltimore, MD

CB&I Constructors  
The Woodlands, TX

Rentech Boiler Systems  
Abilene, TX

CSE  
Madison Heights, VA

W.C. English  
Lynchburg, VA

IMCO  
Monroe, VA

Danser  
Parkersburg, WV

Mohawk Construction and Supply  
McMurray, PA

Teton Industrial Group  
Alpharetta, GA

ABB  
Norcross, GA

Emlex  
Moneta, VA

VOS Electric  
Green Bay, WI

ThyssenKrupp Elevator Corporation  
Roanoke, VA

Bay Mechanical, Inc.  
Virginia Beach, VA

## **PROJECT DESCRIPTION**

The project to be conducted by G-P is a comprehensive, complete commercial-scale demonstration that is divided into two phases. Phase I is the validation of the project scope and cost estimate. Phase II is project execution, data acquisition and reporting, and consists of procurement of major equipment, construction and start-up of the new system. Phase II also includes operation of the system for a period of time to demonstrate the safe operation and full integration of the energy and chemical recovery systems in a commercial environment.

The objective of Phase I is to validate the process design and to engineer viable solutions to any technology gaps. This phase includes engineering and planning for the integration of the full-scale MTCI/StoneChem PulseEnhanced™ black liquor steam-reformer chemical recovery system into G-P's operating pulp and paper mill at Big Island, Virginia. During this phase, the scope and cost estimate will be finalized to confirm the cost of the project and its integration into the existing system at the mill.

The objective of Phase II of the project is the successful and safe completion of the engineering, construction and functional operation of the fully integrated full-scale steam reformer process system. This phase includes installation of all associated support systems and equipment required for the enhanced recovery of both energy and chemicals from all of the black liquor generated from the pulping process at the Big Island Mill. The objective also includes operation of the steam reformer system to demonstrate the ability of the system to operate reliably and achieve designed levels of energy and chemical recovery while maintaining environmental emissions at or below the limits set by the environmental permits.

## **SUMMARY**

The project continues Phase II. Construction activities are complete to the point where commissioning activities can begin. The project construction activities are almost complete. All equipment has been installed, piping is 90% complete, electrical and instrumentation is 85% complete with only punch list items, heat tracing and insulation remaining. Estimated total cost of the project remains at \$97.6 million. The current spending through September is \$ 67.8 million, which is approximately \$ 6.7 million less than estimated in the spending curve presented to DOE in August 2002. G-P continues to work with DOE to secure matching funds to cover the changes in scope.

On August 5 and 6, project team members hosted a visit from Norampac. Norampac is in the process of commissioning a project using the MTCI technology. On September 29 and 30, GP was scheduled to visit the Norampac project in Trenton, Canada. This trip was postponed due to changes in the Norampac commissioning schedule. In August, the project team prepared a slide presentation for the September IEA Annex XV meeting. Jim Keiser of ORNL made this presentation for GP. In September, GP received the refractory test panels installed on our may way plugs and the corrosion coupons from ORNL. These will be installed in the operating units for data collection by ORNL.

## **SAFETY and ENVIRONMENTAL**

There were no recordable incidents during this reporting period. We currently stand at two OSHA recordables on the project. The first recordable occurred on 4-24-2001 (see Quarterly Technical Progress Report 02) and the second recordable occurred on 9-18-2002 (see Quarterly Technical Progress Report 07). The OSHA incident rate for the project is currently 1.0 (better than the industry average). GP Corporate and Mill safety departments have had active participation in the project, performing periodic safety audits to augment the efforts of the project team.

There were no environmental incidents during the reporting period. We currently stand at 2 environmental incidents (see Quarterly Technical Progress Report 04) thus far on the project.

All of the project environmental reporting and permits are current. The site-specific rule was published as a "Direct Final Rule" on 8/5. The comment period ended on 9/4 and no comments have been received. The rule will be effective on 11/3. The XL FPA Amendment became effective on the date of signature (July 18, 2003) and has been published on the EPA website with the original FPA.

## **ACCOMPLISHMENTS**

### **Engineering / Project Management/Procurement**

During the reporting period, the engineering and procurement efforts concentrated on support of the construction activities. The project acceptance and test plan development was developed. The procedure for blowing the steam lines was developed and the necessary temporary piping for this purpose was designed. A chemical cleaning consultant was retained and a cleaning methodology developed for the waterside of the Reformer Boiler, HRSG and Pulse heaters.

Procurement activities included the award of the insulation and heat trace packages. The Continuous Emissions Monitoring system was purchased. The decision was also made to purchase an air compressor for start up of

the fluid bed. Originally the plan was to rent compressors for start up, then purchase a unit in the future. It was more cost effective to purchase a unit for start up and avoid the rental fees. This is the last major package to be awarded.

### **Construction**

All major equipment installation was complete by the end of the reporting period. The Reformer Boiler was hydrostatically tested and the Bed Media Transport system was installed.

Piping installation reached approximately 90% complete at the end of the reporting period. The piping/mechanical contractor has turned over 36 of 73 process systems for final GP acceptance. The remaining process systems are in the contractor checkout phase. Assembly of the elevator was complete at the end of the reporting period. The building including the elevator, fire protection system, electrical system and lighting were placed in service during this period.

The installation of all of the eight pulse heaters was completed during this period. This included the installation of the rope packing at both ends, as well as the nozzle refractory and welding of the exhaust end expansion joint to the vessel.

The electrical and instrumentation installation continued, reaching approximately 85% complete at the end of the reporting period. DCS loop checks were started and 38% were completed.

### **Training**

Simulator based operator training was conducted and completed during this quarter. The last phase of operator training involved walking systems with P&IDs to get familiar with the layout of the piping systems and to check systems against the process design. The last phase of training was completed in early October.

### **Commissioning**

The project team completed definition of the check out process and compiled the necessary document templates to support the check out effort. Meetings were held with the mechanical and electrical contractors to determine which in-line devices are required to be removed for flushing, testing and steam blowing of piping systems. The project team assisted the mechanical contractor's development of flushing/hydrostatic testing packages and verified that all components were suitable for the proposed testing pressures. The project team also conducted system walk downs and generated punch lists for those systems that the mechanical contractor reported as substantially complete.

The steam line steam blow plan was finalized. A consultant was hired to provide specifications and assist with the chemical cleaning of the HRSG/Pulse Heater water circuits and the boil out of the Steam Reformer Boiler.

## **ACTIVITIES NEXT QUARTER**

- Begin system commissioning.
- Blow steam lines.
- Chemical clean HRSG / Pulse Heater circuits.
- Boil out Reformer Boiler.
- Complete piping punch list items and system turn over.
- Begin heat tracing of piping.
- Begin piping and equipment insulation and lagging.
- Begin touch-up painting.
- Begin start-up of systems.



## PROJECT COSTS

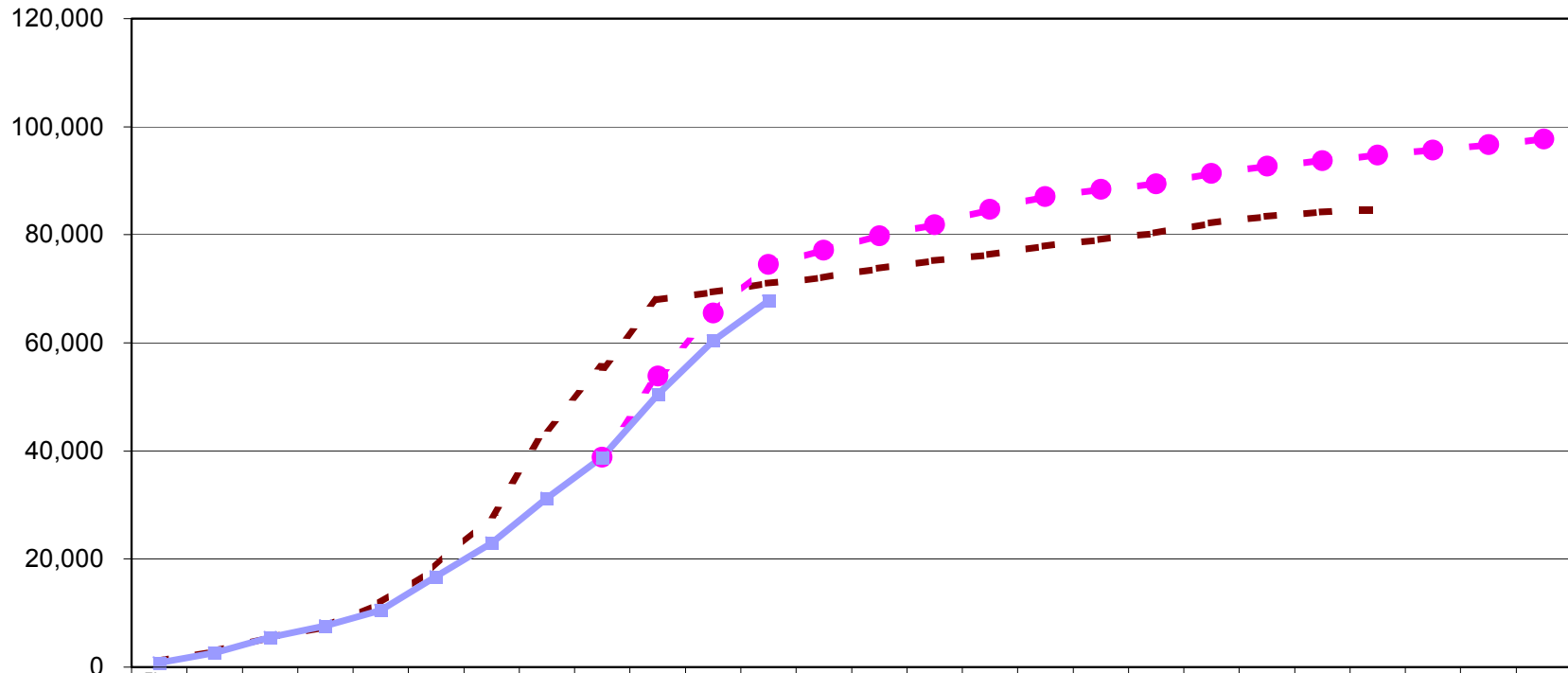
### Budget Data

Project Budget Period	Period			Cumulative		
	From - To	DOE	G-P	Total	DOE	G-P
06/29/03-09/27/03	\$2,763,870	\$4,610,802	\$7,374,672	\$41,022,981	\$26,787,288	\$67,810,269
Previous Total	\$38,259,111	\$22,176,486	\$60,435,597	60.5%	39.5%	100.0%

DOE Obligated Funds			
Amendment	Amount	Total	Date
000	\$4,537,776	\$4,537,776	2/13/2001
001	\$0	\$4,537,776	4/25/2001
002	\$0	\$4,537,776	5/3/2001
003	\$0	\$4,537,776	8/13/2001
004	\$0	\$4,537,776	8/17/2001
005	\$4,671,000	\$9,208,776	9/10/2001
006	\$13,130,000	\$22,338,776	9/17/2001
007	\$162,665	\$22,501,441	9/26/2001
008	\$0	\$22,501,441	10/31/2001
009	\$0	\$22,501,441	11/6/2001
010	\$6,385,000	\$28,886,441	2/1/2002
011	\$3,684,000	\$32,570,441	9/16/2002
012	\$44,540	\$32,614,981	9/30/2002
013	\$4,000,000	\$36,614,981	3/24/2003
014	\$4,408,000	\$41,022,981	5/7/2003

Spending Curve

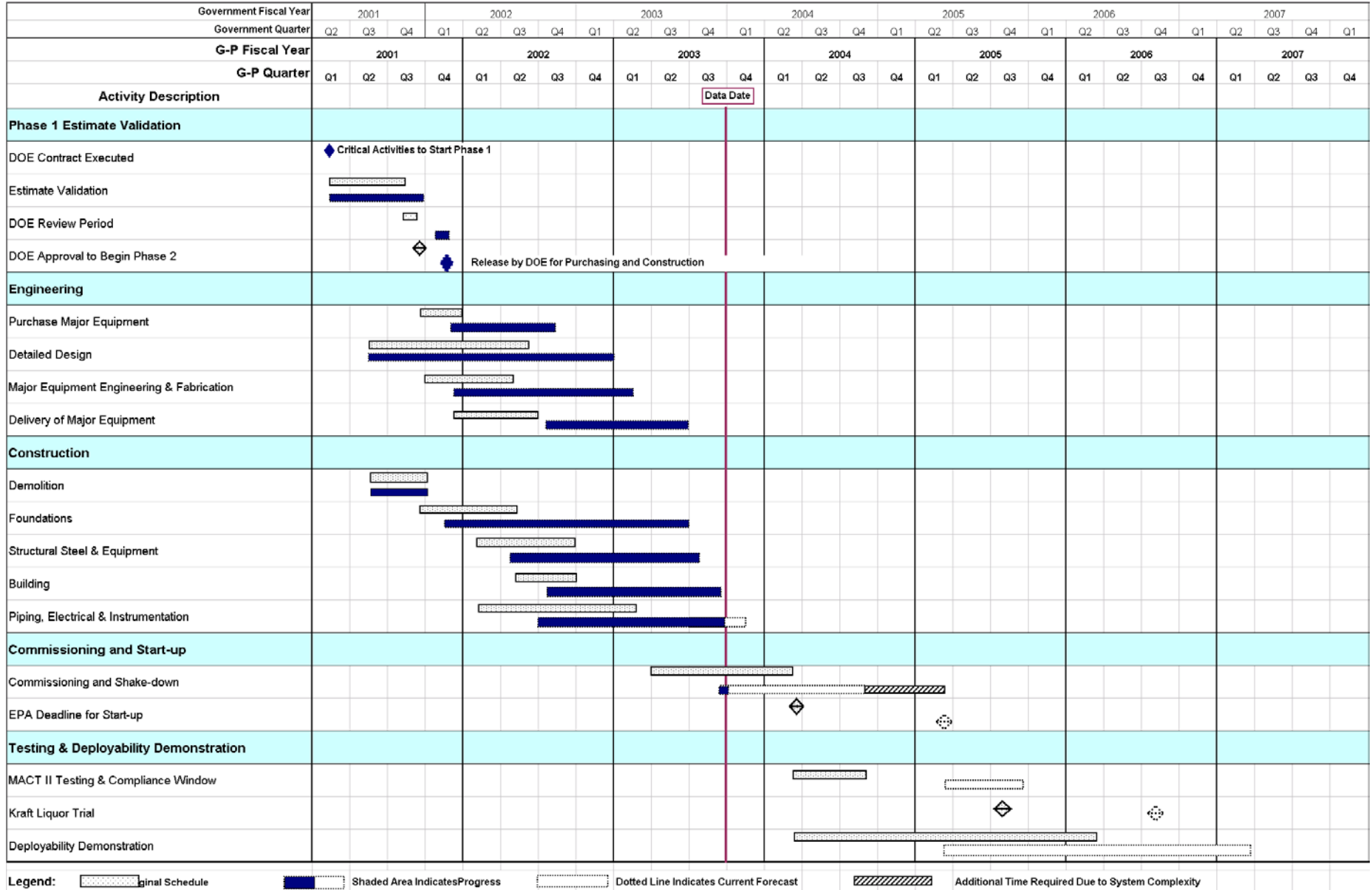
Cumulative Spending  
Government Fiscal Year



	Thru 1Q01	2Q01	3Q01	4Q01	1Q02	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04	2Q04	3Q04	4Q04	1Q05	2Q05	3Q05	4Q05	1Q06	2Q06	3Q06	4Q06	1Q07	2Q07	
PLAN TOTAL	1,089	2,935	5,558	7,415	11,818	18,476	28,199	44,274	55,456	67,984	69,445	71,029	72,071	73,832	75,229	76,375	77,933	79,106	80,318	82,130	83,404	84,245	84,644				
AUG 2002 PLAN									38,814	53,841	65,500	74,472	77,159	79,820	81,851	84,749	87,099	88,405	89,488	91,370	92,676	93,719	94,769	95,717	96,665	97,715	
ACTUAL TOTAL	851	2,627	5,557	7,622	10,530	16,724	22,978	31,248	38,814	50,536	60,436	67,810															

# SCHEDULE

## Project Milestone Summary



## **EXPERIMENTAL**

This report is for a demonstration project that is still in the engineering and construction phase. As such, no experimental methods were used during this reporting period.

The project team is providing support to various DOE supported R&D projects. Some of this support is through this project and some is provided outside of this project. Projects supported include:

- DE-FC26-02NT41490 - University of Utah project "Investigation of Fuel Chemistry and Bed Performance in Fluidized Bed Black Liquor Steam Reformer"
- NETL Project - NT02.2 "Fuels Chemistry"
- NETL Project - NT02.3 "Fuels Chemistry"
- NETL BL/Biomass Gasification – Mill Integration Effort - Yocum
- NETL BL/Biomass Gasification – BL Containment – Chaddock
- ORNL Materials Evaluation for Black Liquor Gasifiers – Keiser
- MTCI Liquor Injection / Tar Formation Study - Chandran

## **RESULTS and DISCUSSION**

This report is for a demonstration project that is still in the engineering and construction phase. As such, no performance or test data was collected during this reporting period.

## **CONCLUSION**

This report is for a demonstration project that is still in the engineering and construction phase. As such, no conclusions can be reached during this reporting period.

## **REFERENCES**

No references have been used in the preparation of this report.

# PHOTOGRAPHS

## Facing South



## Facing North



# PHOTOGRAPHS

## Facing East



## South Yard – Facing North - Northwest

