



Project Review

Qalhat LNG Project - Sur, Sultanate of Oman



PROJECT PROFILE

In February 2003, M/s Qalhat LNG SAOG awarded a contract to M/s Chiyoda Foster Wheeler LLC for Engineering, Procurement & Construction of 3.3 MMTPA 3rd LNG train comprising the following units in the LNG complex, Sur.

Process Area

- Acid Gas Removal
- Dehydration
- Mercury Removal
- Scrub Section
- Fractionation
- Liquefaction

Offplot & Utility Areas

- Sea Cooling Water
- Tempered Cooling Water
- Fire Water
- Heat Transfer Fluid
- Instrument Air
- Nitrogen Production
- Power Generation
- Gas Metering
- Tie-in to other existing Facilities/Utilities

Chiyoda Foster Wheeler LLC in turn awarded three Sub-contract packages to Bahwan Engineering Co. LLC in October 2003 for Mechanical 1 package for Process, Mechanical 2 Package for Offplot and Utility areas and Electrical & Instrumentation works for the complete plant.

BEC's main scope of works for the packages were

- 1 Erection of Steel Structural works
- 2 Equipment erection works excluding heavy rigging, Installation of Vessel Internals / Externals and Catalyst Loading works
- 3 Piping fabrication, erection & testing
- 4 E & I construction works for the plant
- 5 Pre-commissioning & Commissioning Assistance

EXECUTION OF WORK

Steel Structural Works: Scope of steel structural works were mainly pre-assembly and Installation of fabricated steel members supplied by CFW. The works included the erection of 2800 Tonnes of steel structural items, which includes Compressor shelter (1050 MT), Pipe Racks (810 MT), Equipment supporting structures (600 MT), Vessel platform / ladders-(360 MT) and Miscellaneous supports etc.

Equipment Installation Works: Equipment erection works scope was mainly erection of equipment, alignment, grouting, platform & ladder installation, Vessel internals installation and catalyst loading.

Scope of equipment erection under the contract were

- Columns – 1015 MT
- Vessels - 35 Nos. (990 MT)
- Heat exchangers – 66 Nos. (2350 MT)
- Compressors – 5 Nos. (1950 MT)
- GT/GTGs – 4 Nos. (800 MT)
- Pumps – 56Nos. (140 MT)
- Fired Heater assembly & installation – 2 Nos.
- Seawater Intake equipment – 13 Nos.
- Other Miscellaneous Equipment – 38 Nos.
- Vessel Internals – 147 MT
- Catalyst loading – 202 MT

Critical equipment were MR Compressor (Driven by Frame 7F turbine), PR Compressor (Driven by Frame 6 turbine), 2 Nos. Gas Turbine Generators (Frame 6) for power generation, End Flash Gas Compressor, Fired Heater Installation, Main Cryogenic Heat Exchanger, Absorber column (32 Tons of vessel internals), Seawater intake equipment (1No. Raked bar screens, 2 Nos. Rotary drum screen and 10 Nos. Stop gates).

Piping: Scope of piping works included, piping fabrication, piping erection, Pipe support fabrication & erection, pressure testing and pre-commissioning works. Pipe sizes varied from ½" to 84" and materials involved were Carbon steel, Stainless Steel, Low Temperature Carbon Steel, Cu-Ni, and GRE / GRP pipes.

The major work volumes were

Butt Welding

- Carbon steel Welding – 130,630 DI
- Stainless steel Welding – 106,860 DI
- Low Temp. Carbon steel Welding – 79,300
- Cu-Ni Welding – 780 DI ▪ GRE piping – 51250 DI

Fillet & Pad Welding

Carbon steel Welding – 52850 DI , Stainless steel Welding – 24250 DI, Low Temp. Carbon steel Welding – 18790

Total Welding Volume - 464, 710 DI

Testing (Test Packs)

Hydro testing – 740 Nos, Pneumatic Testing – 187 Nos
Visual testing – 256 Nos, In-service Testing – 60 Nos

Total Test Packs – 1159 Nos

Piping scope also included cleaning of following systems

- Chemical cleaning of Fuel gas lines to MR/PR Compressor
- Chemical cleaning of Fuel gas lines to Gas Turbine Generators
- Chemical Cleaning of Regenerator Compressor suction lines
- Chemical cleaning of seal oil lines to MR/PR compressor
- Chemical cleaning of Unit 1300.
- Degreasing of Sulfinol system ▪ Degreasing of HTF circuit

Electrical & Instrumentation Works:

- E&I Ladder / Tray 36 kMs ▪ E&I Cables 778 kMs
- HV, LV Switchgears & Transformers 121 Nos.
- Lighting, Telephones & Speakers 1594 Nos.
- Instrument Tubing 1680 Nos.
- Instrumentation Operator Consoles, Cabinets 148 Nos.
- Instrument Installation 2625 Nos.
- Instrumentation Loop Checking 5610 Nos.

Pre-commissioning & Commissioning Works: A strategy of achieving a Flawless Startup was followed from early on in the project. Strict quality control procedures for tightness, cleanliness etc. were followed during erection and this ensured a record achievement of the plant producing LNG within 9 days after it was readied for Start Up.

PROJECT HIGHLIGHTS

- **World's fastest 1st drop of LNG in 9 days after RFSU**
- **Commercial LNG Cargo embarkation in 1 month after RFSU**
- **Overall project achieved 20 million man hours without LTI**
- **Tie-in & integration works to existing plant was carried out safely and within time.**
- **Over 35% Omanisation was achieved during construction**

OMANISATION

Project Omanisation took into account the Omanisation Key Performance Indicators (KPI) agreed between CFW and QLNG. The factors were

- 1 Omanisation of 35% - KPI - 1
- 2 Recruitment of Omanis from Sur and Sharqiya region – KPI-2
- 3 Off the job training – KPI - 3
- 4 Employment of such Omanis graduated from the off-the job training- KPI - 4
- 5 Utilising of Local sources for procurement and sub-contracting – KPI - 5

All the above KPIs were achieved.

A training center facility (on land provided by CFW) was set up for the required trades with facilities for classroom training & workshops. 322 Omanis were trained at site. On successful completion of training, the candidates were absorbed at applicable trade levels.



Top: View of The Qalhat LNG Process Train.

Bottom: View of Fractionation Unit and MR Cooling Area.

Bottom Right: Pipe Rack and Main Cryogenic Heat Exchanger.

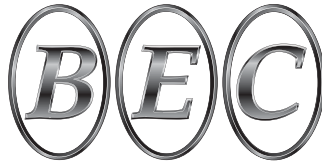




Top: View of Propane Cooling & Compressor Intercooling.
Left: View of MV and LV Switchgear Room.
Centre Right: MRPR Compressor Shelter & VSD System.
Bottom: A panoramic view of The Qalhat LNG Train with the Oman LNG Trains.

Top: View of the Process Train.
Centre Left: The Two Frame 6 Gas Turbines.
Centre Right: View of Compressor Shelter and Pipe Rack.
Bottom: View of MR/PR Compressors.





G R O U P

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CORE ACTIVITIES

Oil, Gas & Power Projects

Electro-Mechanical Services

District Cooling

Civil Construction

Electrical Projects

Facilities Management & Maintenance

Elevators & Escalators

Diesel Power Generation

Water & Waste Water Projects

Electrical Products

Mechanical Products

Chemical & Industrial Products

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