



Project: South Caucasus Pipeline Expansion

Contractor: CB&I

End User: BP

Product: Gas Metering & Analysis

Location: Georgia

Year: 2015

Application

There were three distinct packages on this project, firstly to meter gas (MX71 import) entering Georgia at the Azerbaijan border, and then to meter gas as it leaves (MX81 export) Georgia at the Turkish border. The third and final package was supplied for the offtake metering (MS72) within Georgia. Each package employed Orifice meters as the primary measuring device with the design in accordance with ISO.5167.

Description

MX71 – Dimensions 35.0m long x 17.9m wide x 6.9m high. Weight 420t.

The packages were manufactured from low temperature Carbon Steel pipework and consisted of the following equipment:

- 42" 600# inlet header c/w Sample Take-Off Probes (1½" wall thickness).
- 6 x 24"-600# meter streams (1" wall thickness) to cover the full flow range (5-duty and 1-standby).
- Each stream comprised of:
 - 2-off 24"-600# inlet isolation valves.
 - A 24" upstream meter tube with Zanker Plate flow straightener.
 - 24"-600# meter tube with single chamber Orifice fitting.
 - A 24" downstream meter tube.
 - 2-off 24"-600# outlet isolation valves.
 - A 24" outlet expansion loop.
- 42"-600# outlet header (1½" wall thickness).

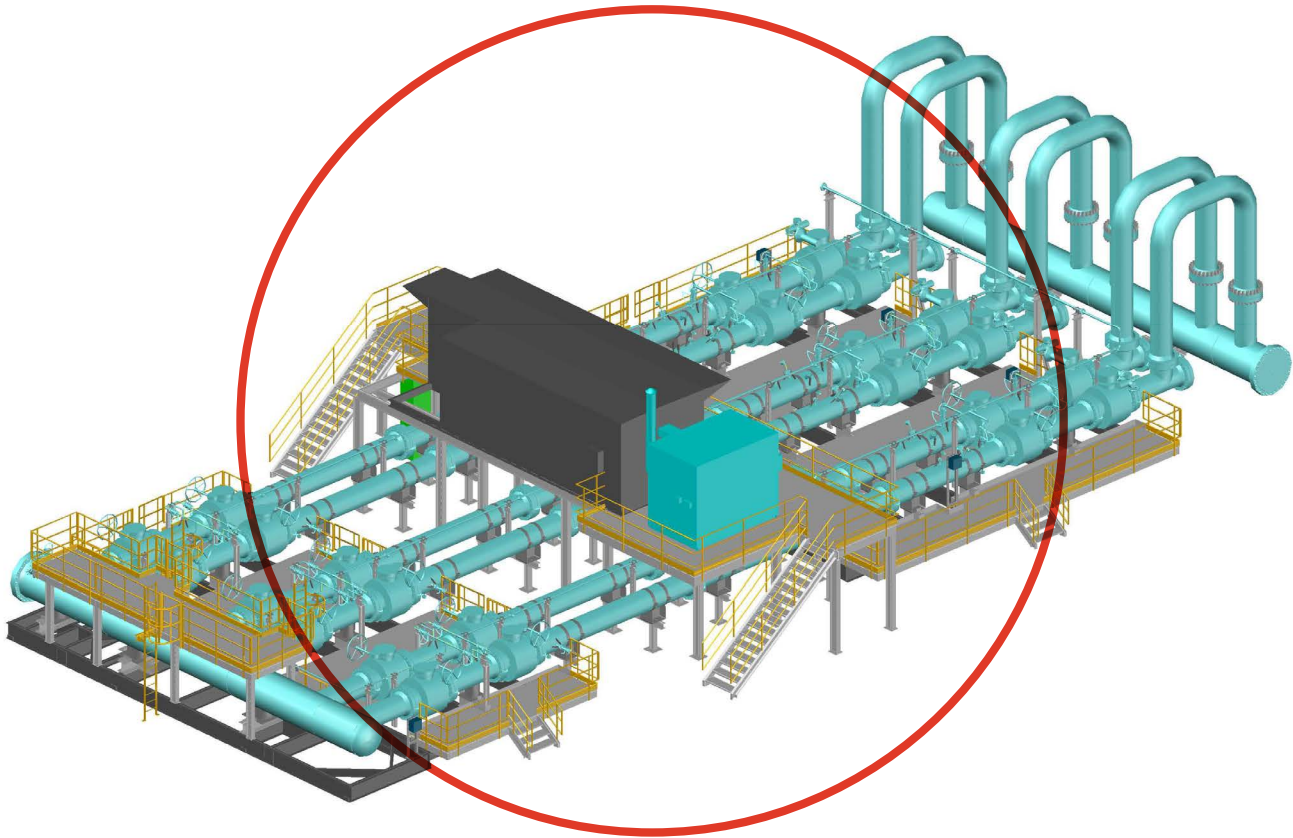
- Analyser House c/w Flow measurement instrumentation, Gas Chromatographs, Fire & Gas Detection Equipment and a Duty/Standby HVAC Unit.
- A heated Bottle Rack to house utility gas cylinders for the gas analysers.
- A 'safe area' Metering Control Panel c/w Omni Flow Computers and a Metering Supervisory Computer.

MX81 – Dimensions 35.0m long x 17.9m wide x 6.9m high. Weight 368t.

The metering skid was almost identical to MX71, apart from being a 5-stream system due to the lower max flowrate.

The Analyser House was similar to MX71, but also included a Total Sulphur Analyser, Hydrocarbon Dewpoint Analyser and a Water Dewpoint Analyser.





MS72 – Dimensions 14.8m long x 4.0m wide x 5.2m high. Weight 28t.

This package was built to replace an existing metering system, designed to cover a higher flowrate than the existing. As this site already had an Analyser House and Metering Control System, those items were not in OGS scope. The MS72 package consisted of:

- 12"-600# inlet header.
- 3 x 10"-600# meter streams to cover the new flow range (2-duty and 1-standby).
- Each stream has:
 - 2-off 10"-600# inlet isolation valves.
 - A 10" upstream meter tube with Zanker Plate flow straightener.
 - 10"-600# meter tube with single chamber Orifice fitting.
 - A 10" downstream meter tube.
 - 2-off 10"-600# outlet isolation valves.
- A 12"-600# high level outlet header.



Challenges

The first issue was the physical size and weight of the larger skid packages. OGS' original offer and the basis for the contract was for part assembly only, due to the size of the skids. During the contract the scope was changed to full assembly in our workshops, excluding the Analyser House and platform. As the MX71 skid was too wide to fully assemble within the OGS workshop, the assembly work was contracted out. OGS were heavily involved in monitoring and controlling the sub-contract workforce at a different location.

The contract was initially designed using operating parameters when carrying out the pipe stress analysis. This was changed post award and OGS were requested to use design parameters. This change resulted in additional stream expansion loops being included before the outlet headers in the MX71 & MX81 packages.

The design pressure for the piping systems required the supply of heavy wall pipework. This resulted in the use of two sub-arc welding units running continuously over a 6-month period; there were also considerable logistics involved in organising NDE and PWHT.

The Analyser Houses and HVAC systems were assembled at OGS' clean workshop in Ely. All instrumentation and analyser equipment was installed, along with all instrument cables and

tubing. The HVAC unit and Metering Control Systems were then temporarily hooked-up for FAT testing.

During the life of the contract the gas analysis requirements for MX81 changed, which meant upgrading the original analysers and re-fitting them in to the House. Upgrades to the Control System were also required.

Careful disassembly, preservation and packing was completed to ensure damage free delivery to site. OGS have been involved in numerous site visits to inspect and then supervise unpacking and installation to minimise the risk of improper storage and handling, and will be heavily involved in pre-commissioning and commissioning.

