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## **Caspian Challenge for Marine Installation**

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### **Abstract**

The geographical position of the landlocked Caspian Sea presented a huge challenge for the marine installation of the ACG (Azeri, Chirag, Gunashli) development offshore Azerbaijan. Access to the Caspian is limited to two canals in the north which are frozen for up to six months of the year. There was limited reliable hydrographic and meteorological data and the Caspian had a history of relaxed marine discipline.

The ACG Project had a pipe lay barge, heavy lift derrick barge, transportation barge and dive support vessel available for installation activities, all requiring major upgrades prior to utilization. The Project brought in a new supply vessel that was converted into a dedicated subsea construction vessel.

This paper describes the technical challenges, schedule constraints/optimisation and innovative installation solutions from project start through to offshore installation.

The marine installation was successful regardless of the limitations of the vessels and equipment available. Installation included;

- 4 Drilling Templates with 12 well slots (circa 120 te each)
- Six Jacket Structures (circa 16000te) in water depths from 118m to 175m.
- Six Floatover Topside Facilities with an installed weight of up to 15800te.
- 4 Brownfield Packages (water coalesor and injection equipment)
- 1200km of Pipelines from 4 to 30 inch diameter.
- 3 Subsea Remote Water Injection Manifolds
- 10 Subsea Remote Water Injection Trees
- 400km of Fibre Optic Cable for telecommunications, IT and integrated control systems.
- 2 Power Cable systems 5.6km and 9.6km in length to provide interfield power.
- 6 Wye Structures (circa 120te each)

Numerous vessel upgrades were necessary to optimise the efficiency of the vessels available to the project. These were strategically planned to minimise impact on achieving key milestones. For the subsea system, facilities to receive, test and store were established.

The contracting strategy with the main contractors proved successful in achieving project delivery targets. Major interfaces were managed with other delivery teams, Company Operations and third party assets.

The ACG Project delivered a number of marine 'firsts' in the Caspian, including the floatover of 15800te topsides, wet towing of 600te jacket piles, pre-drilling templates, pin pile temporary jacket foundations and use of underwater hammers. This was achieved through creative design and installation execution strategy, integrated planning across many stakeholders and by significantly enhancing the existing marine fleet with the optimisation of vessel upgrades.