Expro Excellence

Expro delivers integrated well testing services for Northern Lights Carbon Capture and Storage (CCS) well

Carbon Capture Utilization and Storage | Well Flow Management

Objectives and background

- The Northern Lights consortium was formed with the objective of developing an open-source transportation and storage complex for CO_2 in Europe
- CO_2 will be permanently stored in a deep saline aquifer in the Aurora reservoir, ~2,600m below the Northern North Sea. While the aquifer could store >100Mt CO_2, the geology, fluid properties and total storage volumes were under characterized
- A well test was planned on the appraisal well to de-risk uncertainty in the geological, injection and storage simulation models
- Key challenges were to design a DST for an under-pressured formation, that would not flow naturally to surface, and be able to manage the produced fluids on the semi-submersible rig
- The test had to meet governmental timelines, meaning drilling and testing operations were conducted during the harsh winter season in the North Sea
- This was a high-profile well, and operations were conducted under intense scrutiny from the Norwegian government, partners, sponsors and environmental groups

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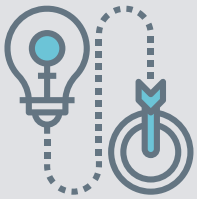
- Expro was chosen as the trusted service provider for the Well Test, Fluids, Subsea, DST and TCP operations – owing to their long-standing track record and collaboration with consortium members and over 47 years' experience
- We designed a combined DST and electric submersible pump (ESP) tool string, with flexibility to allow for mid-project changes to address the evolving design criteria
- Applying years of Fluids analysis experience for proposed CO_2 storage reservoirs, our leading accredited onshore oil-in-water measurement capability was used to calibrate offshore instruments. Onsite water chemistry and analysis was conducted on the rig, allowing the reservoir fluids to be disposed of overboard whilst ensuring the critical "no oil to sea" criteria for the project was achieved
- Heavy well test equipment required modifications to fit the limited deck space on the rig; and planning schedules and specialist crews required agility to adapt to dynamic operations
- The complexity of the DST string and interface with multiple third-party providers increased planning, logistics and equipment handling challenges. All aspects were seamlessly managed by Expro, as a fully integrated team across all services, to deliver impeccable planning, operational performance and adaptability

Value to the client

- The integrated testing operations that Expro delivered, enabled the successful execution of the first CCS well in the Northern Lights project
- All data gathering objectives for the well were met. The client received the dynamic DST data, (near wellbore formation and fluid identification, quantification of gas-in-water solution, information on heterogeneities confirming reservoir connectivity, flowing/injectivity data) required to enable the creation of the geological, injection and storage simulation models for future operations
- Following this successful operation, Equinor were able to formulate, confirm and submit their development plans to the government authorities; on-schedule for parliamentary review of the Phase 1 progress plan for commercialization of CCS as a new business

Innovative solution



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