Modernization Initiative Extends Life of North Sea Platforms
Operator saves USD 420,000 per well with upgraded technologies

**CHALLENGE**
Extend platform life and enhance long-term well integrity while meeting stringent North Sea operating standards.

**SOLUTION**
Integrate next-generation technologies with legacy equipment to upgrade operator’s infrastructure.

**RESULTS**
- Decreased completion time by an average of one day per well, saving USD 350,000 on each well
- Reduced NPT for a savings of USD 70,000 per well
- Extended the life of the field

**Mature assets presented long-term well integrity challenges**
A major North Sea operator planned to refurbish its offshore infrastructure, which was installed in the 1980s and 1990s. Through its ambitious North Sea renewal program, the company aimed to extend the life of some existing platforms by performing long-term maintenance and equipment upgrades in parallel with drilling and other activities.

Well integrity was a critical issue. Defects resulting from lack of equipment maintenance and exposure to multiple forms of degradation and external factors—such as corrosion, erosion, fatigue, physical impacts, and environmental loading—can lead to catastrophic consequences. Recognizing the need for a focus on engineering quality and reliability, the operator approached Cameron for assistance.

**Proactive engineering helped operator upgrade legacy technology**
The two companies collaborated closely to review equipment design and complete failure mode and effects analysis for defining failure probability and criticality of components and identifying contingencies. Our fast response times and ability to customize equipment helped to qualify alternative solutions in preparation for future requirements.

On one platform, Cameron supplied three sets of equipment for the water-alternating-gas (WAG) injection well, two for the production well, one for the backup well, and two sets of running tools. Among the updates was the installation of the Cameron compact wellhead system, which uses fast makeup connectors throughout and eliminates the need for at least one flange connection, thus reducing field makeup time and the need for heavy torque equipment. The wellhead was designed to interface with the existing starter head, which housed the previously cemented 13 3/8-in casing string. Older style equipment could not be monogrammed to API 6A specification, so new equipment now carries the API monogram. The new design incorporates double-sealing valve technology in the interface between the bonnet and body on the lower master valve and inboard valve on the A-annulus.

Four sets of 13 5/8-in SSMC* standard snap-ring modular compact wellheads for sidetracking previously drilled wells, three 5 1/8-in 10,000-psi Christmas trees, and two sets of running tools were supplied on another platform. The wellhead was again designed to interface with the existing starter head housing the previously cemented 13 3/8-in casing string.

On a third platform, Cameron replaced outdated equipment and also upgraded to single-stack 18 1/2-in BOP compatibility. A “dry” system integration test (SIT) was performed for the produced water reinjection project. The test involved a full stack-up with Christmas tree, spool, and a three-stage SSMC wellhead.
**CASE STUDY:** North Sea operator saves USD 420,000 per well with upgraded technologies

Mature North Sea assets presented long-term well integrity challenges and operational inefficiencies that were successfully mitigated through engineering expertise and close collaboration between Cameron and the operator.

**Operator reduced completion time and NPT, saving approximately USD 420,000 per well**

The updated equipment enabled the operator to reduce completion time by an average of one day per well for a savings of about USD 350,000. In addition, NPT decreased significantly, saving an additional USD 70,000 per well on average.

Successful engineering of equipment to meet operator needs and quality standards in a timely manner kept the project on track, extended field life, improved efficiency, and increased production for years to come.