



**Contract:** Enhanced Reliability Project for Turret Moored Drillship

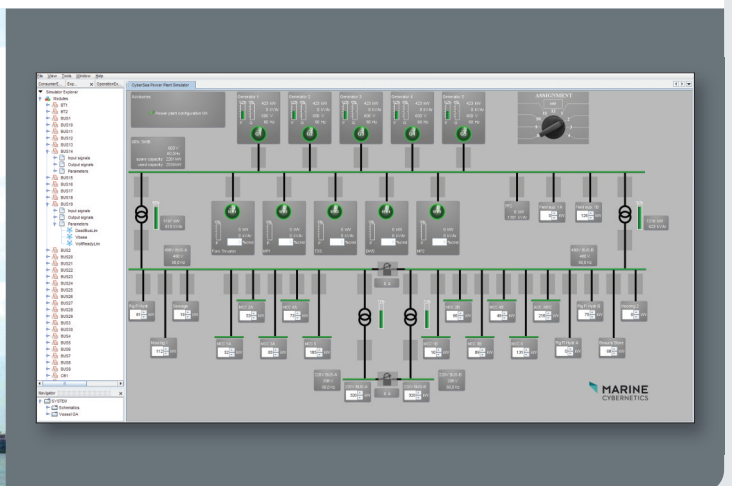
**Client:** Shell

**Location:** Philippines and Singapore

## Challenge

The oil and gas industry faces significant challenges in developing offshore Arctic oil and gas fields. A limited drilling season means there is little margin for unscheduled maintenance and repair activities. Oil and gas operators must be aware of the effects of such activities on well programmes, so that maintenance can be planned during periods where the impact of equipment outage is low. The 'knock on' effects of equipment unavailability can be projected using computer aided decision making.

Shell appointed GL Noble Denton to provide FMECA services to support its Enhanced Reliability Project, and assist in the development of Marine Cybernetics' Operations, Planning and Management Tool (OPMT) for the operator's Turret Moored Drillship.





## Expertise provided

GL Noble Denton carried out Failure Mode Effects and Criticality Analyses (FMECA) of the power plant and key elements of the drilling system on a turret-moored drillship being prepared for an Arctic drilling campaign. The company provided a multi-disciplinary team of marine, electrical and control system engineers to assess plant design by inspection, analysis and testing.

The two key outputs from the FMECA process were:

- Identification of opportunities to enhance design with graded recommendations to improve overall reliability during the short Arctic offshore drilling season
- Information on system dependencies and levels of redundancy in a structured form for use in a power plant simulator

Marine Cybernetics created the OPMT by combining well completion equipment requirements from Shell with the failure analysis performed by GL Noble Denton. The tool was then used to predict the effects of equipment outage directly on the proposed well completion programme; allowing 'what if' scenarios to be run automatically and highlight critical equipment at each stage of well development. The OPMT provided a unique interactive FMEA solution, simulating the actual power system failure effects down to individual consumer and motor control centre level.

## Outcome and benefit

Cooperation between GL Noble Denton, Marine Cybernetics and Shell has produced a ground breaking new approach to improve planning, performance and reliability in challenging operating environments. This enabled Shell to implement an effective and efficient process to enhance reliability and planning of its complex drilling activities in the Arctic.

The Operations, Planning, and Management Tool can be used to assess the effects of maintenance and equipment unavailability on other types of offshore activities and on the redundant propulsion and control systems of dynamically positioned vessels. The success of this partnership means that Shell's future applications of this process could include development of similar tools to aid in efficient management of operations.