

Case Study

Power & protection system studies for ten Chevron offshore rigs

Client: INTECH / Chevron
Location: Meji & Okan Fields, Nigeria
Commissioned: 2019
Scope: Turnkey

Introduction

Nigeria is rich in hydrocarbons, especially in the Niger Delta. Among the fields in this region is the Agbami Field, discovered in 1998, located 70 miles off the coast and spanning 45,000 acres. It lies at a water depth of approximately 4,800 feet. Agbami is part of the NNPC/Chevron joint venture and includes blocks such as OML90, OML91, and OML49. This region has extensive infrastructure with over 20 platforms and numerous pipelines.

Problem Statement

By 2015, many of Chevron Nigeria Ltd.'s (CNL) platforms, accounting for 9.08% of Nigeria's total production with an average of 198,159 barrels per day, had aging power systems. These systems required a thorough review due to issues like protection maloperation and system adequacy. The power systems included embedded gas or diesel generation and medium and low-voltage distribution, crucial for motoring, instrumentation, and auxiliary loads. Given the economic importance of these platforms, Chevron decided to evaluate ten platforms in the South Offshore Area (SOA).

Solution

As the power system of these platforms include myriad of equipment including MV and LV generators, motors, VFDs, cables, protection relays, vacuum contactors and breakers, ACBs, and MCCBs among other equipment. To thoroughly investigate the power systems that had already been designed and commissioned, we proposed a number of steady-state network studies including:

- Load flow
- Short-circuit
- Protection coordination
- Relay settings review
- Motor starting analysis
- Harmonic analysis

To successfully address the needs of the project, we mainly used state-of-the-art power system analysis software ETAP, from Operation Technology Inc., USA. Following services were rendered during the course of project:

- Site survey: which took months of engineering hours to identify and complete the as-found conditions on sites.
- Data collection, verification, and validation.
- System model development
- Scenario build-ups
- Inferences on the as-found systems
- Recommendations on adequacy and reliability

Conclusion

The power system network study was comprehensive in all aspects that lead CNL to require EPENAM's field services for relays and protection devices testing and the implementation of recommendations from network studies at all sites. The intervention by EPENAM reduced the down times at sites considerably thus increasing the useful life of the platforms. This resulted in the reduced operational costs in the range of Millions of Dollars over the life time and enabled maximum production at sites for increased revenues.



Reach Us!



+1 (368) 887 4833



company/epenam



Richmond, British Columbia, Canada



info@epenam.com



www.EPENAM.com

