

# Addax Okwori and Antan



Client:  
Addax

Location:  
Offshore Nigeria, Africa

Project Type:  
SURF

The Addax Okwori and Antan projects were successfully completed offshore Nigeria in 2010, representing another safe and successful display of Subsea 7's capabilities in Africa.

Workscopes on the two projects included the transportation, installation and testing of flexible flowlines, risers and umbilicals in the Okwori field, and tie-in of rigid spool pieces at Antan. A notable highlight is the excellent security and HSE record demonstrated on these works in Nigeria, whilst efficiently co-ordinating several hundred personnel and numerous vessel operations.

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## Project

Addax Okwori and Antan

## Client

Addax

## Location

Offshore Nigeria, Africa

## Water depth

Up to 140m

## Project Type

SURF

## Date Awarded

2008

## Date Completed

April 2010

## Vessels/Spoolbases Utilised

*Toisa Perseus*  
*Rockwater 1*  
*Heavy lift vessels*

## Overview

In Subsea 7's Africa region, worksopes for the Addax Okwori and Antan projects were successfully completed offshore Nigeria in 2010, representing another safe and successful display of Subsea 7's capabilities in Africa. Worksopes on the two projects included the transportation, installation and testing of flexible flowlines, risers and umbilicals in the Okwori field, and tie-in of rigid spool pieces at Antan.

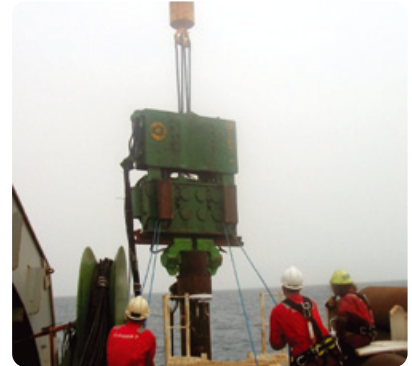
Subsea 7 had 8 vessels involved in the Okwori programme - amounting to over 310 vessel days and around 560 personnel to co-ordinate over the course of the operations. Nigeria presents a challenging environment from a security perspective and like any project, Subsea 7 is committed to ensuring the security of its people in the region, whilst maintaining efficient and timely project delivery. Subsea 7 completed the Okwori project with no security or HSE incidents, as well as being on schedule and on budget, with four new wells brought on-stream for Addax.

The Okwori field is located within Addax Petroleum's OML126 field and works were split into four campaigns, commencing in August 2008 with the collection of 14 flexible reels (2 separate trips) and equipment from Newcastle, UK and three further umbilical reels from the USA before heading to Lagos, Nigeria where all reels were offloaded and stored in Lagos to await installation.

The installation stage involved both the *Toisa Perseus* and the *Rockwater 1*. The *Toisa Perseus* installed two flexible flowline / riser systems and two umbilical systems from the FPSO to the associated wells in the field ND-07 and ND-8G1. All crossings for the flowlines and umbilicals were achieved using Uraduct, installed on the product during lay, which saved considerable time and mobilisation costs. The tie-in and testing phase of the Okwori project was completed by the *Rockwater 1*, which also completed the final phase involving the installation, tie-in, testing and pre-commissioning of two flexibles and two umbilicals to wells OK-17 and OK-18. During the same campaign a damaged umbilical was recovered on to the *Rockwater 1*, repaired and tied back in to its associated well to allow production to continue. The project was completed in March 2010.

The Antan project was completed immediately following Okwori and involved the combination of diver and diverless installation activities from the *Rockwater 1*, to tie-in and test seven 12.75 inch outer diameter (OD) rigid spool pieces between a pipeline end manifold at Antan's FPSO 'Knock Adoon' and the end of the existing 12.75 inch OD pipeline.

The Antan project included the first moored DSV operation in recent times for Subsea 7 and identified many potential benefits of the system which could be employed on other projects. The mooring system was identified as a requirement early on in the project owing to prevailing "blow-on" conditions precluding DP operations inside the FPSO's anchor chains. Hence a bespoke four point mooring system was designed and analysed. This indicated that a system involving four driven 24" OD x 12 metre long piles, pennant lines and mid-line surface support buoys (to ensure clearance to seabed infra-structure) was fabricated and procured in short notice to allow the works to be executed. Minimal fuel usage; longer umbilicals for shallow working; minimal thruster noise for divers and accurate station keeping, are just some of the demonstrable benefits achieved from this operation. The project was completed in April 2010.



Installation of mooring piles at Antan



Installation of 12 inch tie-in spool



Flexible connection on Toisa Perseus