

CAPABILITY DOCUME

Sustainability through continuous innovation

tel: +44 (0) 1779-480-357 | +234 (0) 909-1177-738 email: info@pimsglobal.com info@pulse-enterprise.co.uk

PUSE

www.pimsglobal.com www.pulse-enterprise.co.uk



Asset Integrity Gap Assessment

Location Nigeria – OML-29 Nembe

Water depth

Swamp and land

Systems

Structural, lifting, housings Process equipment Safety systems Electrical and control Pipelines

- 11 gas pipelines (1 not operational)
- 9 oil delivery lines
 (1 abandoned, 1 not-operational, 1 disused)
- 6 oil trunk lines (3 disused pipelines)

Wells & Xmas Trees

- 153 wells drilled
 Asset design capacity of 240,000 bopd
- Asset production @2013 was 64,112 bopd
- Operating at only 27% of design capacity

Activities Integrity Management Duration





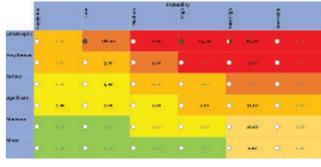
Anomaly register creation

Detailed Integrity Review and Audit Report

- Summary of IM policy and expectations and deficiencies
- Summary of asset performance measurement
- Current practices and recommendation updates
- Incident management process review
- Emergency repair systems summary
- Asset component list
- Site visit survey reports Gap assessment
- KP4 integrity concerns and recommendations
- System overview fitness for service

- Statement of integrity – Santa Barbara concrete barge

Integrity workshop session



Asset specific risk register created

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Creation of Asset Database

- Wellheads & xmas trees
- Pipelines & valves
- Structures and lifting
- Manifolds and swamp
- equipment
 - Flow and pump stations



Site Inspection - General Visual Inspection

- High Level HAZID & presentation
 Communications and Bridging
 Document
 - Inspection work-packs for
 - o Nembe 1, 2, 3 & 4
 - o Santa Barbara
 - o Odeama
 - o Nembe 1, 2, 3 Oil Manifold

Site Daily Progress Reports Site Inspection Report for Each Asset







Pig Refurbishment Services – North Sea Operations

Location United Kingdom

Water depth n/a

Activities

Pig design ILI tool cleaning Cleaning pigs management Pig damage review

Duration 2016 - on-going



Pigging support contract, several projects for

managing their pigs before and after use by

Pig platform prior to cleaning

Inspection planning and feasibility studies; procedure review; HAZID/HAZOP; contractor liaison; project management and

on-site supervision.

Tools

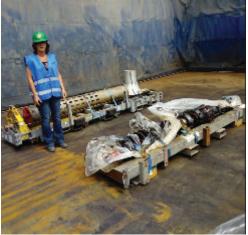
- Varying pigging and gauging tools



Waste management - cleaning program pigging slug

Scope of work

- Pig cleaning
- · Pig wax disposal
- Pig storage and transportation
 Pig refurbishment



Discharge management – ensuring all wastes and contaminants are effectively contained







PL80000 6-inch x 26.7 km Gas Condensate Pipeline 2017 ILI

their pipelines.

Location England

Water depth n/a

Activities

Pig design ILI tools selection Pumping spread Temporary facilities Temporary valves Pig damage review

Duration 2016 - 2018



Pigging support contract, several projects for Perenco from cleaning, through to inspection of

Set up of intelligent pigging units

on-site supervision.

Inspection planning and feasibility studies; procedure review; HAZID/HAZOP; contractor liaison; project management and





Tools

Varying pigging and gauging tools
 Temporary pig launch and receipt facilities



Development of bespoke pigging procedures

Scope of work

- Development of pigging procedure
- Cleaning
 - Gauging
 - Inspection
 - All necessary pipeline modification to perform
 - work
 - Pig tracking

- Permitting, approvals and assistance to the Owner

- as required as described
- Monitoring and recording
- Pig damage assessment



Brush Pig used for operation







Addax Pipeline Inspection 6" and 12"

Location Owerri, Nigeria Pigging support contract, for the commissioning of the 6 and 12" oil pipelines

Water depth n/a

Activities

Pig design ILI tools selection Pumping spread support Temporary facilities Temporary valves Pig damage review

Duration 2018



Set up of intelligent pigging units

Inspection planning and feasibility studies; procedure review; HAZID/HAZOP; contractor liaison; project management and on-site supervision.

Tools

- Varying pigging and gauging tools
- Temporary pig launch and receipt facilities



Development of bespoke pigging procedures

Scope of work

- Development of pigging procedure
- Cleaning
- Gauging
- Inspection
- All necessary pipeline modification to perform
 - work Die treetin
- Pig tracking

- Permitting, approvals and assistance to the Owner

- as required as described
- Monitoring and recording
- Pig damage assessment









TRACK RECORD

PULSE

Engineering 2018 | ongoing | Deepblue Energy Services Limited | Engineering and Pi Support and Integrity 2018 Aiteo | OML 29 Asset Integrity 2018 | Addax Petroleum | x2 Pipeline Baseline Inspection 2018 | Addax Petroleum | x2 Pipeline Baseline Inspection Pipeline inspection and cleaning 2017 | Perenco UK | PL80000 6 inch x 26.7 km Gas Condensate Pipeline Support 2017 | Perenco UK | PL80000 6 inch x 26.7 km Gas Condensate Pipeline

Procedure Support 2017 | Rosen UK | Service Agreement Pigs Support and Cleaning Service

2019 | CNR International | Pipeline Pig Cleaning & Refurbishment Service Pigging services

2018 | Addax Petroleum | x2 Pipeline Baseline Inspection

2017 Rosen UK | Service Agreement - Pigs Support and Cleaning Servi











<u>PIMS Global</u> Burnside Business Centre, Burnside Road, Peterhead, AB42 3AW +441779 822 032 <u>info@pimsglobal.com</u> <u>www.pimsglobal.com</u> www.pulse-enterprise.co.uk

Presence: United Kingdom (HQ) | Nigeria | Equatorial Guinea