BP SWOPS
Single Well Oil Production System

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BP SWOPS
Single Well Oil Production System

Concept
“A means of producing oil from small offshore fields which would be uneconomic for fixed platforms or other conventional means.”

System Overview
Comprised
- Production Vessel with riser system and storage capability.
- Subsea Wellhead Assemblies

Regards as one of the first ‘diverless’ subsea production systems.
Vessel – Seillean (Honey Bee)
BP Fields – Cyrus and Donan, NorthSea.
1st operation for BP in 1989
Sold to Reading & Bates 1993, and largely been in Brazil waters ever since
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Production Vessel
- Purpose built at Harland & Wolff, Belfast
- 250m long x 37m wide, displacement 76,500Te
- Very early FPSO
- Fully dynamically positioned

Facilities included
- Storage tanks – 51,000m³ (320,000 bbl)
- Process equipment – 15,000 bbl/day
- Two moonpools – for riser system and ROV
- Derrick for riser handling, and tensioning system
- Cargo offloading

Operating depth range 75 – 200m
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Riser System
- 5 ½” o/d x 4” bore drill pipe, made up of 32ft long pipe joints.
- 5,000 psi operating pressure

Top end
- Pipe handling and tensioning facilities in moonpool
- Surface tree, based on wireline BOP system
- Swivel joint to allow 360 deg vessel rotation.

Bottom end
- Connection package
- Flex joint to permit 15 deg offset
- Safety joint
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Riser Connect Package
- Orientationless, ie no guidelines
  Incorporated
- Soft landing system
- Collet connector for connection to tree assembly
- Conical O-ring interface which provided flow paths for hydraulic transfer between riser and tree assembly.
- Valves for isolation of, and flushing the riser, also for shearing wireline. ( 1 x riser foot valve, 2 x crossover valves, 1 x wireline shear valve)
- Diver panel for recovery of riser connector package in event of safety joint separation.
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Subsea Wellhead Assembly
- Flowline stab base
- Production tree
- Re-entry hub

All run from conventional drilling rig and permanently installed on wellhead
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Flowline stab base
- situated below the tree
- to permit oil production from single or dual wells, tied together by a flowline and control umbilical
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Xmas tree
- Conventional 4” x 2” dual bore, 5,000 psi, Cameron tree (One Subsea)
- 5 x failsafe valves – Prod master, upper and lower prod swabs, annulus wing and annulus swab.
- ROV operated flowline isolation valve and choke
- 18 ¾” wellhead collet connector
- 3 1/8” flowline connector
- Series of ROV operated control line isolation valves
- Acoustic monitoring system for relaying pressure information from tree/flowline, back to production vessel.
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Re-entry hub
- Fitted on top of tree via 13 5/8” collet connector.
- Provided guidance for landing riser connector package.
- Incorporated mandrel for locking riser connector package to tree assembly.
- Contained lower half of the hydraulic interface for controlling the tree valves.
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Controls
- Direct hydraulic, provided via umbilical which was run in conjunction with riser connect package.
- Umbilical had 23 hydraulic lines and 2 x riser flushing cores.
- Most of hydraulic lines were used for the riser connect package system.
- 5 x hydraulic links, plus 1 x monitoring line between riser connect package and wellhead assembly.
- Line 1 – PMV tree 1; line 2 – DHSV’s both trees; line 3 – PMV tree 2; line 4 – AWV both trees; line 5 – PSV on connected tree.
- Monitoring line to confirm integrity of AX seal between riser connect package and the re-entry hub.
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ROV
- Low spec work class (Scorpio)
- General operations monitoring.
- Monitoring riser connect package during deployment/recovery.
- Alignment of riser connect package for landing onto the re-entry hub.
- Riser connect package debris cover removal/replacement, and inhibitor injection below the cover after replacement.
- Choke and flowline isolation valve operation/adjustment.
- Xmas tree control line isolation valve operation.
- Any manipulator tasks, eg DP transponder recovery for battery changeout.