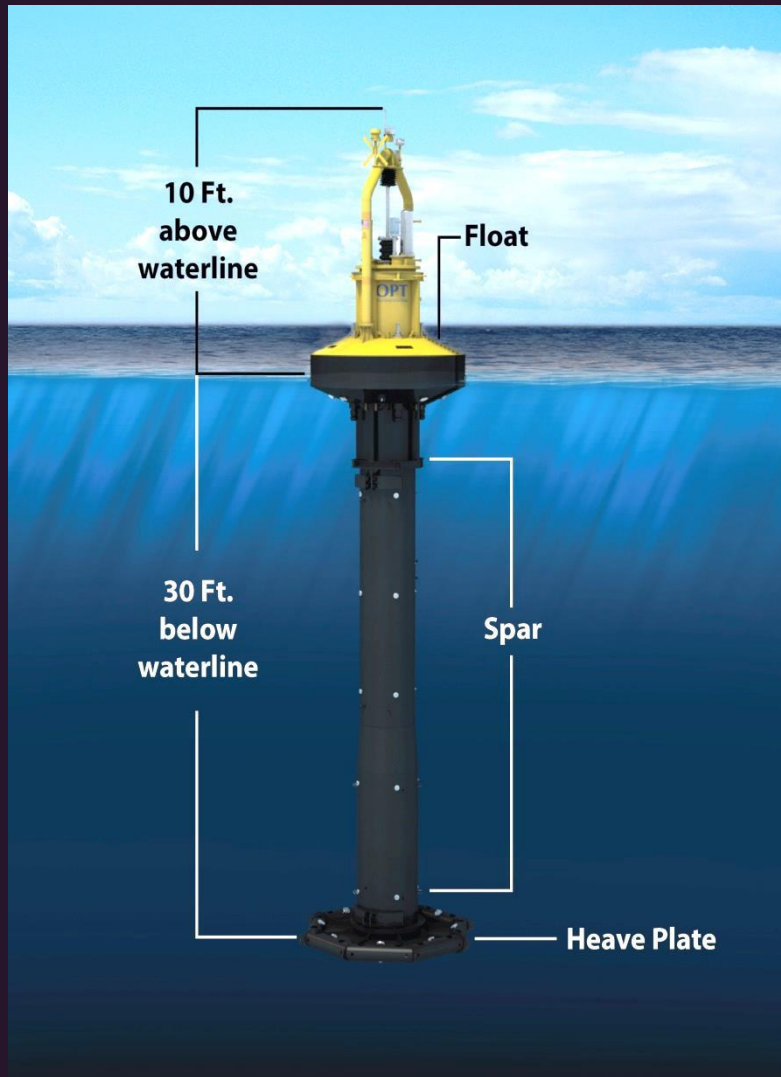


OVERVIEW OF SELF POWERING WELL MONITORING AND SITE SECURITY SYSTEM

By: Paul Watson
Director of Business Development UK & Europe

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PowerBuoy PB3 – How it works

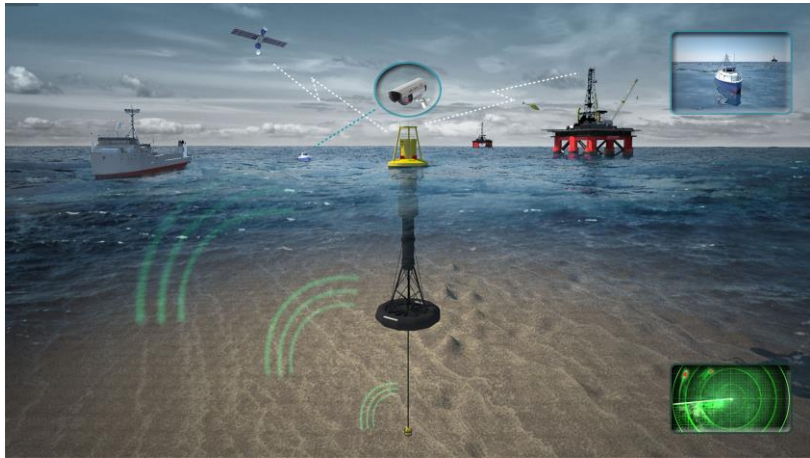


- The PowerBuoy consists of a float, spar, and heave plate
- The float moves up and down the spar in response to the motion of the waves.
- The heave plate maintains the spar in a relatively stationary position.
- The relative motion of the float with respect to the spar drives a mechanical system contained in the spar that converts the linear motion of the float into a rotary one.
- The rotary motion drives electrical generators that produce electricity
- Electricity is provided to the payload or is exported to nearby marine applications using a submarine electrical cable.
- Excess electricity not needed for the payload is stored.
- Minimum deployment water depth - 20m (65 feet).

2018 Feasibility Study of the Intelligent monitoring buoy for Premier Oil

- **Purpose:** To discover if the PB3 intelligent autonomous monitoring system can be used in two different configurations at the same time

Configuration 1. Site monitoring – As part of decommissioning operations, the PB3 is to be anchored on site to warn other marine users of exclusion zones which contain snagable infrastructure



Configuration 1 Equipment:

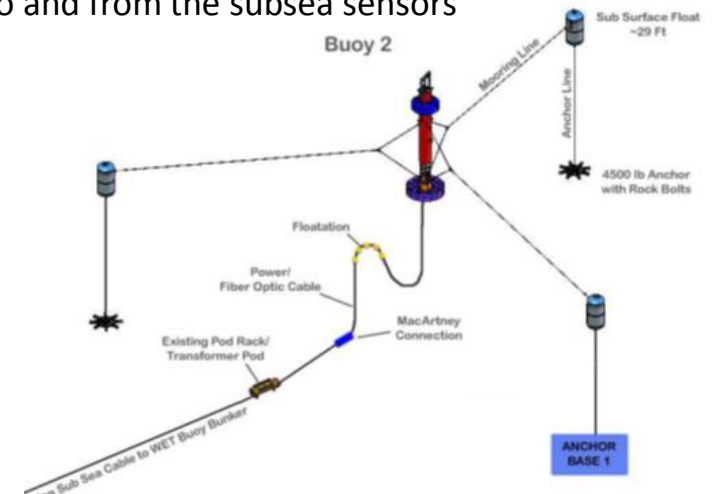
Camera, Radar, AIS, 4G Comms

(optional ADCP, moorings monitoring, weather station)

Features:

- Real-time communications to operators on shore
- 24/7/365 warning to marine users (regardless of weather)
- Radar tracking of marine users in the area
- Early real-time warning of incursions to remote operators
- Evidence gathering of incursions
- Monitoring of moorings

Configuration 2. Site AND well monitoring system – The PB3 will provide all the functionality of phase 1 AND be connected to a legacy subsea control system via an umbilical, to provide power and communications to and from the subsea sensors



Configuration 2 Equipment:

Config 1 equip AND Topside controller, Umbilical

(subsea power gen with wireless comms from seabed to buoy under consideration)

Features:

- On-demand wellhead monitoring and condition analysis
- Onboard information storage
- Delivery of power to SCM's
- Delivery of two way data from seabed equipment to anywhere in the world

Benefits of the system

Site Monitoring:

- Real-time site monitoring and reporting 24/7/365
- Live data feed to shore
- Greatly reduced man-hour exposure in guarding location
- Buoy generates its own power - Zero emissions
- Reduced cost

Well Monitoring:

- Real-time pressure and temperature data from the wells
- Demonstrate well integrity by analysing pressure and temperature trends
- Better planning of well P&A activities and expenditure

Potential future applications for intelligent, remotely controlled small field developments

OGTC Funding Support

'TieBack of the Future' initiative

- Bringing a circular economy model to the development of UKCS subsea tiebacks
- Systems designed for disassembly and reuse
- 1/2 the COST in 1/2 the TIME



Fishing Industry Interface:

- Drill centres free of fishing activity
- Supports cost effective installation and recovery
- Requires use of new technology such as the PB3



The image shows the interface for 'GLOBAL FISHING WATCH'. It features logos for OCEANA, SKYTRUTH, and Google. Below the logos, there is a text box that reads: 'Global Fishing Watch enables anyone with an Internet connection to see fishing activity anywhere in the ocean in near real-time, for free.'

Polling Question!

What is the main reason for the reluctance of industry to use new technology in offshore decommissioning operations?

- 1) Potential risk to operational success
- 2) Potential risk to career if it fails
- 3) Safety considerations
- 4) Company/industry culture – (wanting to be 2nd!)

Conclusion – What does the PB3 deliver?

Increased performance at a substantial reduction in the cost for decommissioning operations

- A re-usable platform tested to North Sea conditions
- Real-time operational control
- Increased safety of personnel
- Zero emissions
- Long term operational capability at minimum cost



Contact Information

Paul Watson

Director of Business Development UK & Europe

pwatson@oceanpowertech.com

Phone: +44(0)7789907038

Head Office

Ocean Power Technologies Inc.

28 Engelhard Drive

Monroe Township, NJ 08831

USA

Phone: +1 609 730 0400

www.oceanpowertechnologies.com

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