

“Where will our knowledge take you?”

Oil and Gas Monitoring – Industry Perspective



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MASTS O&G Forum Webinar

Selection of Offshore Oil and Gas Legislation

- **The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended)**
- **The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended)**
- **Offshore Petroleum Activities (Conservation of Habitats) (Amendment) Regulations 2007**
- **The Offshore Chemicals Regulations 2002 (as amended)**
- **The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended)**
- **The Offshore Combustion Installations (Pollution Prevention and Control) Regulations 2013**
- **The Marine and Coastal Access Act 2009**

Marine Survey Data Requirements

- **New developments and for exploration in areas without baseline information, Environmental Baseline Survey (EBS):**
 - Physical, chemical and biological data collected
 - Habitats mapped
- **Routine monitoring is not required during the life of the development, unless there is an expansion or new facilities**
- **Prior to decommissioning of oil and gas facilities**
 - Pre-decommissioning survey required
 - Similar chemical and biological data collected as for EBS

Oil and gas Facilities Monitoring Requirements

Chemical use and Discharge

- **Permitting required for all offshore chemical use**
- **Chemical risk assessment undertaken as part of permitting**
- **Operational monitoring is for overboard discharge of oil in produced waters**
- **Regulations prohibit the discharge of oil to sea other than in accordance with the terms and conditions of a permit**
- **No additional chemical monitoring requirements**

Oil and gas Facilities Monitoring Requirements

Air emissions

- Offshore gaseous emissions and fuel use are monitored as part of the EU Emissions Trading Scheme
- The Greenhouse Gas Emissions Trading Scheme Regulations 2012 (2012 Regulations) require that operators must notify the regulator of changes in activity levels which occurred during the year

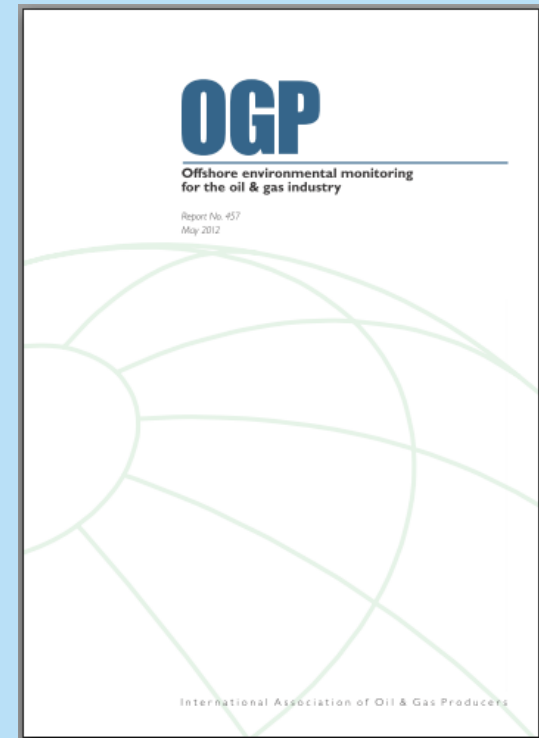
Species/ seabed monitoring

- No set regulation/ requirements, case-by-case basis
- Marine permits required for deposits to or removals from the seabed

Monitoring phases for Oil and Gas Industry

- Exploration
- Development
- Production
- Decommissioning

**Main guidance Oil and Gas Producers –
Offshore Environmental Monitoring for the
Oil and Gas Industry - 2012, Report No. 457**

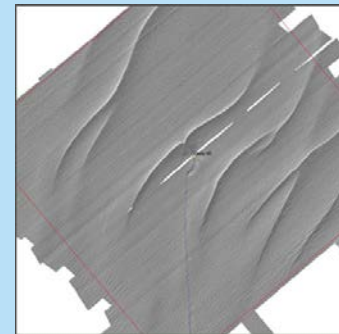
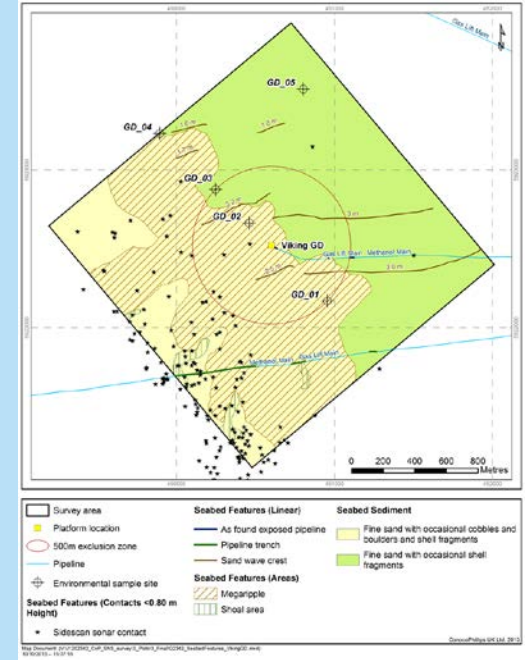


Oil and Gas Offshore Environmental Monitoring

- **Water column and sediment seaward of the intertidal zone**
- **Does not include the monitoring of beach zones, onshore areas or possible impacts from seismic operations, oil spills or unplanned events (these are subject to individual monitoring requirements, case by case basis)**
- **Should gather information to support responsible oil and gas operations**
- **Feed regulatory reporting requirements or provide supporting information for operation activities and monitor impacts of activities and changes to the receiving marine environment**

Exploration

- Collection of environmental data to support EIA and detect seabed physical or biological features of interest
- Collected during a number of survey techniques but generally these include:
 - Seismic or rig site surveys
 - Geophysical surveys e.g. Multibeam, sidescan sonar,
 - ROV habitat survey, drop down video
 - Benthic sampling

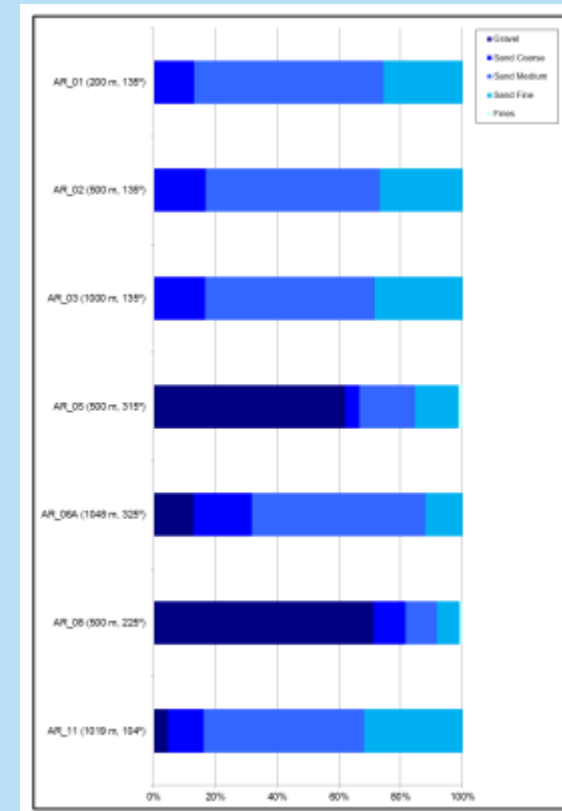
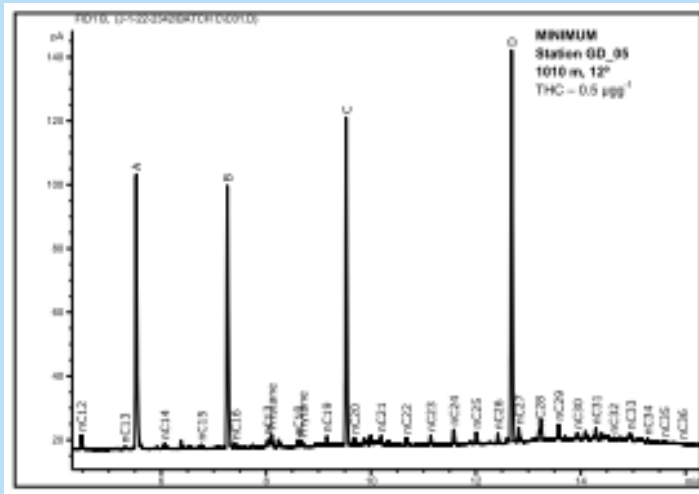


Project Development/ Appraisal

- **Monitor effects of drilling activities**
- **Impacts on seabed environment, organisms sensitive to increased sedimentation, contamination from drill cuttings or chemical discharge.**
- **Usually sessile organisms**
- **Physical, biological and chemical characterisation of the sediment**
- **Used to benchmark against baseline sampling**
- **When considering effects and scale of monitoring programmes, consider long term spatial extent of potential impacts and dispersion.**

Project Execution

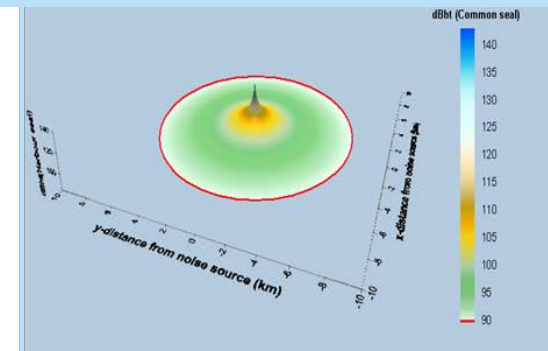
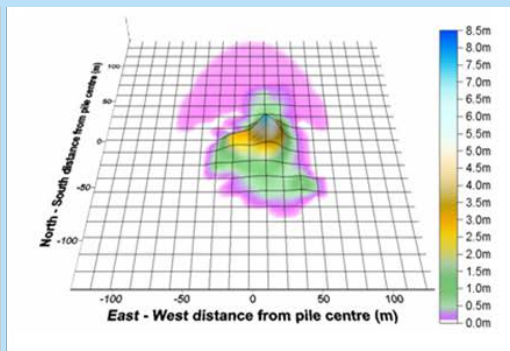
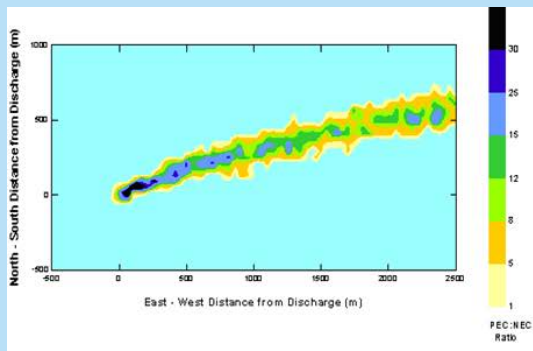
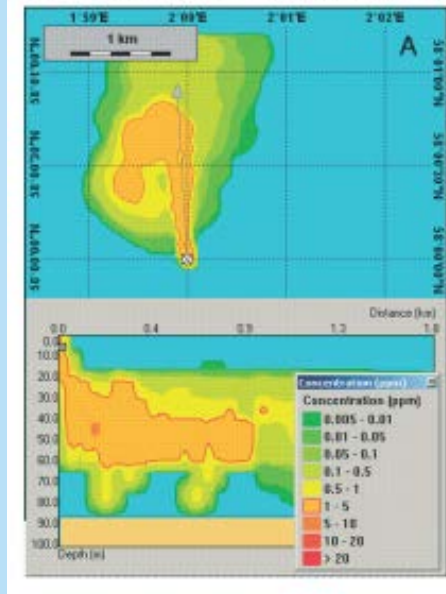
- Sets baseline following initial drilling phase operations and gauges future progress towards recover once installation is installed.



Operations

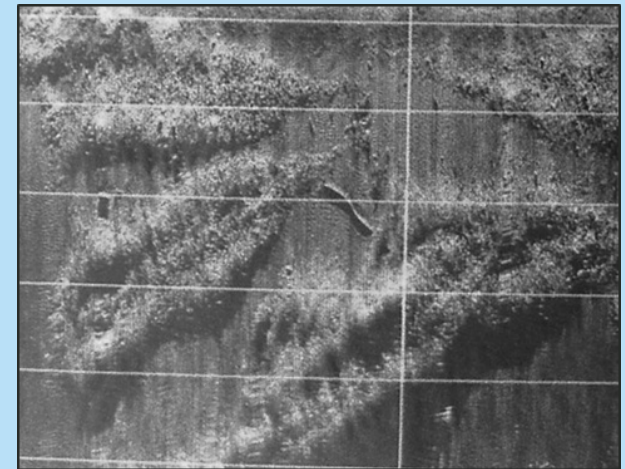
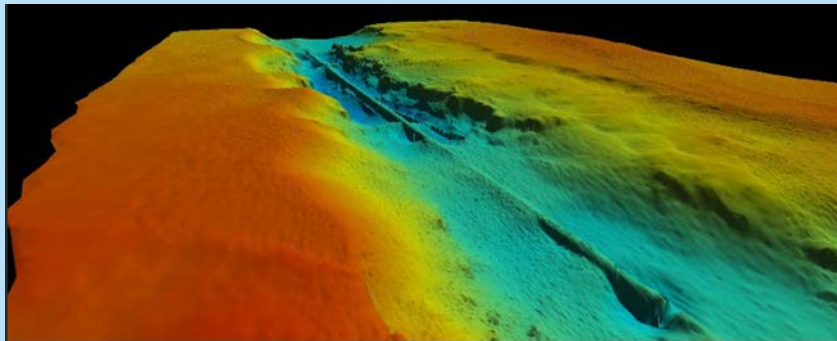
- Periodic sampling of sediments, water column and operational system outputs provide details of material discharged and resulting impacts to receiving environments
- Looking for contamination levels from operating facility

Figure 8: Snapshot of a produced water discharge modelling result



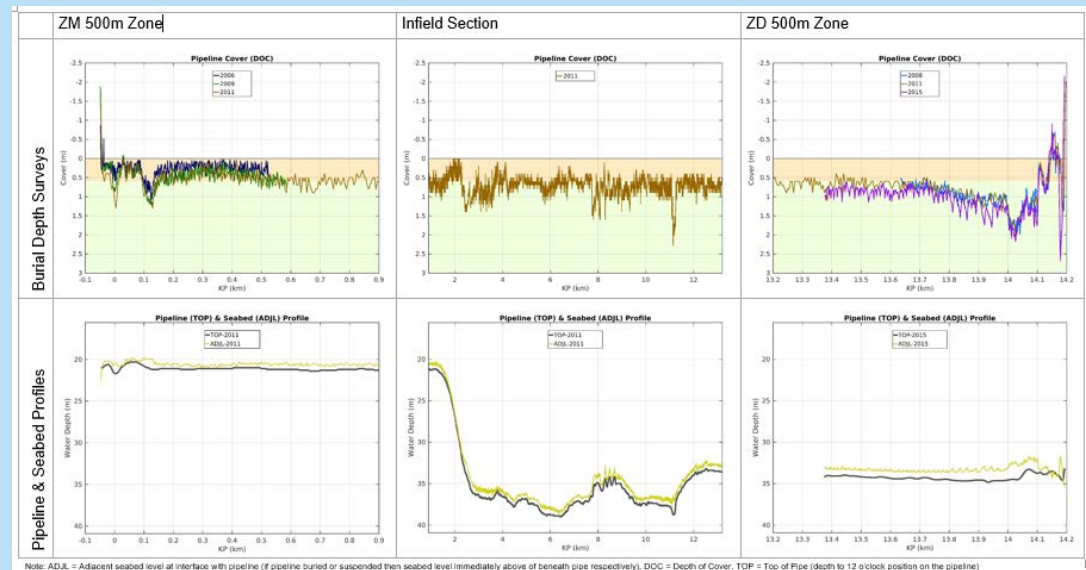
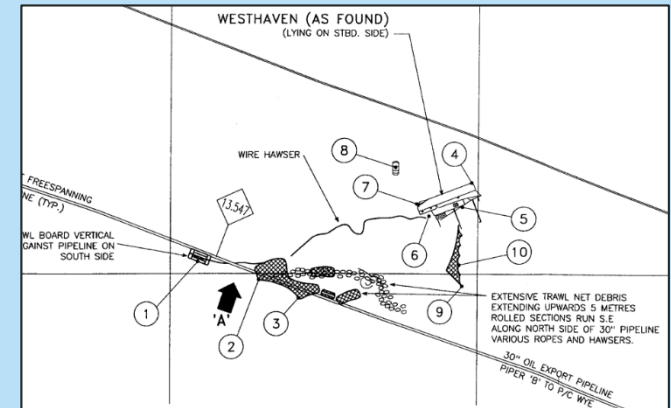
Decommissioning

- Pre- and post-decommissioning sampling
- Establishes the resulting impacts from decommissioning activities and sets baseline for future monitoring and ongoing liability risk
- Assess the state of recovery during operation and through decommissioning phase
- Verify clearance post removal



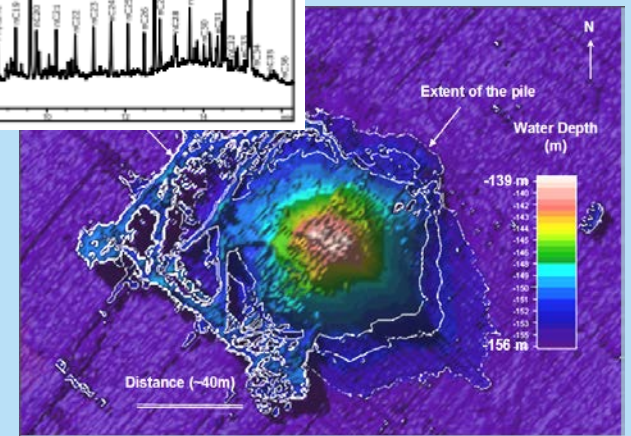
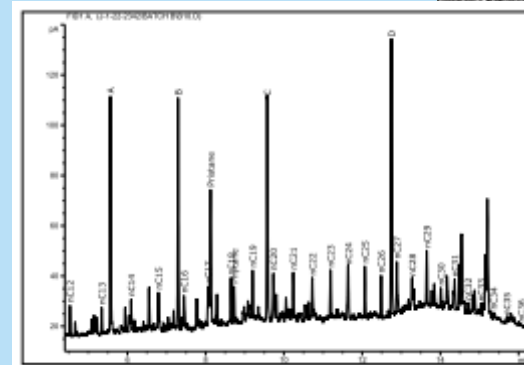
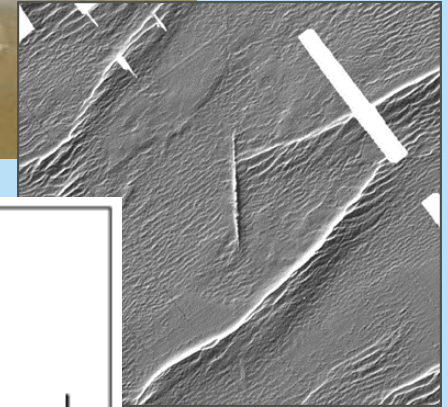
Ongoing liability and residual impact

- Residual monitoring post decommissioning
- Monitor infrastructure decommissioned in situ
- Assess large scale recoverability of sediment conditions
- Determine remediation requirements



What is Sampled

- Water column (contaminants)
- Metocean conditions (wave, current, temp, salinity)
- Sediment sampling (contaminants, species etc)
- Bathymetry
- UXO
- Production streams , ppm oil discharge, chemical discharge, NORM, heavy metals
- Burial and stability (ROV, DoB, pipe tracker)



Water column

- **Physical** – Ocean currents, wind, turbidity, salinity and temperature
- **Chemical** – Suspended solids, organic compounds, anthropogenic inputs/substances
- **Biological** – Number and distribution of organisms, toxicity to or more general health variables of marine organisms



Sediments

- **Physical – Particle size distributions**
- **Chemical – Sediment concentrations of metals, hydrocarbons**
- **Biological – Number and distribution of organisms**



Decommissioning

- Pipeline stability and burial
- Degradation of structures
- Overtrawlability
- Scouring
- Chemical / hydrocarbon concentrations
- Overboard discharges from pipe flushings/cleaning
- Waste management
- Marine growth/ invasive
- Oil spills

Challenges

- **Common methodologies**
- **Consistent unit metrics**
- **Merging with historic data sets**
- **Restrictions to use of innovative techniques**
- **Risk adverse industry**
- **Needs to be low cost**
- **Automation (AUVs)**
- **Quality assurance, quality control and known standards**

A photograph of an offshore oil rig in the middle of a stormy sea. The rig is a complex of metal structures with several tall towers. The water is dark and turbulent, with large, white-capped waves crashing. The sky is overcast with grey clouds, and a hint of sunset or sunrise is visible on the right side of the horizon. The overall mood is dramatic and industrial.

Thank You

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