

Offshore Environmental Monitoring and Research

Produced Water Studies



1



2

The Problem

Produced Water is the largest discharge from the oil and gas industry, estimated at about 260 million m³ per annum for the UK Sector of the North Sea. This value is likely to increase as wells become older and more pressure is required to bring the remaining reserves to the surface. Produced water contains a wide range of contaminants from the oil itself and also from chemicals used in the offshore industry. Offshore oil and gas operators need reliable environmental information for assessing the effectiveness of their environmental management systems

Our Science

Scientists at our laboratories have many years experience in assessing the environmental impacts of effluent streams from many industries. In recent years this work has extended to include produced water, and several projects have been undertaken to establish environmental impacts and causes of toxicity within this very challenging matrix.

Our Services

We design all investigations to suit the needs of the customer. Typically this involves the field collection and analysis of environmental samples using both biological effects and chemical techniques.

In the past this has included:

- Comparing *in vitro* oestrogenic activity with alkylphenol content; assessing the contribution of alkylphenols to overall activity observed in all UK installations.
- Full scale biomonitoring using caged fish and mussels to look at biomarker responses to contaminants in produced water.
- *In vivo* and *in vitro* bioassays
- Chemical fractionation
- Broad spectrum chemical analysis
- Full Toxicity Identification Evaluation (TIE)

Case Study

In a recent programme of work, 20 PW samples were analysed using a variety of *in vivo* and *in vitro* assays:

- Oyster embryo bioassay
- Algal growth assay using *S. costatum*
- Acute toxicity assay using *T. battagliai*
- Yeast Oestrogen Screen (YES) for oestrogenic potency
- DR CALUX assay for aryl hydrocarbon receptor activity

The most potent in each assay was then fractionated and further tested to attempt to identify causal agents. This was done using High Performance Liquid Chromatography (HPLC). Positive fractions were analysed using a variety of chemical techniques including GC-EI-MS, GC-NCI-MS and GCxGC-TOF-MS.

- 1 Produced water extraction
2 Large volume water sampling

Contact us

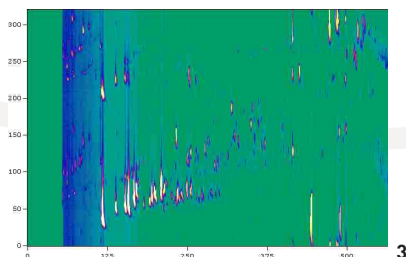
Steve Millward
Environment Business Development
Manager
Cefas
Pakefield Road,
Lowestoft, Suffolk NR33 0HT UK

Tel +44 (0) 1502 527776
Mob +44 (0) 7768 171159
Fax +44 (0) 1502 524569
Email steve.millward@cefas.co.uk
or marketing@cefas.co.uk
Web www.cefas.co.uk

Or for more information on produced water studies, please contact:

Jan Balaam **Tel** +44 (0) 1621 787221 **Email** jan.balaam@cefas.co.uk

Mark Kirby **Tel** +44 (0) 1621 787287 **Email** mark.kirby@cefas.co.uk



3



4

About us

Cefas is a multidisciplinary scientific research and consultancy centre providing a comprehensive range of services in fisheries management, environmental monitoring and assessment, and aquaculture to a large number of clients worldwide. We have more than 500 staff based in 3 laboratories, our own ocean-going research vessel, and over 100 years of fisheries experience. We have a long and successful track record in delivering high-quality services to clients in a confidential and impartial manner. (www.cefas.co.uk)

Cefas Technology Limited (CTL) is a wholly owned subsidiary of Cefas specialising in the application of Cefas technology to specific customer needs in a cost-effective and focussed manner. CTL systems are developed by teams that are experienced in fisheries and environmental management and in working closely with clients to ensure that their needs are fully met. (www.cefastechnology.co.uk)

Customer focus

Our unique facilities and breadth of expertise in environmental and fisheries management enable us to rapidly put together a multi-disciplinary team of experienced specialists, fully supported by our comprehensive in-house resources.

Our existing customers are drawn from a broad spectrum with wide ranging interests. Clients include:

- international and UK government departments
- the European Commission
- the World Bank
- United Nations Food and Agriculture Organisation (UNFAO)
- oil, water, chemical, pharmaceutical, agro-chemical, aggregate and marine industries
- non-governmental and environmental organisations
- regulators and enforcement agencies
- local authorities and other public bodies

We also work successfully in partnership with other organisations, operate in international consortia and have several joint ventures commercialising our intellectual property.