

# Application Report

## Oil (HC) Traces in Produced Water

Produced water is a term used in the oil industry to describe water that is produced along with the oil and gas during the extraction process. Oil and gas reservoirs have a natural water layer (formation water) that lies under the hydrocarbons. In order to achieve maximum oil recovery additional water is often injected into the reservoirs to help force the oil to the surface. Both the formation water and the injected water are eventually produced along with the oil and therefore as the field becomes depleted the amount of produced water increases.

### Benefit

The effectiveness of the oil separation process is very important for the oil field operations. The more oil is captured, the more benefit for the operator and the better for the environment. Oil spills are very harmful to the environment and extremely costly. An oil spill could ruin the reputation of the operator. The OilGuard Ex measures the oil content of the produced water online. It instantly warns about process abnormality and will help to avoid environmental pollutions and fines.

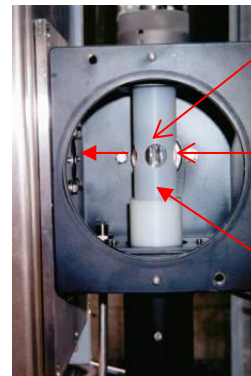
### Typical Application

Produced water contains a certain amount of hydrocarbons, that must be separated prior over board discharge or disposal.

To correspond to several environmental standards and to improve the separation process, it is essential to monitor the remaining hydrocarbons in the effluent pipeline or prior re-injection.

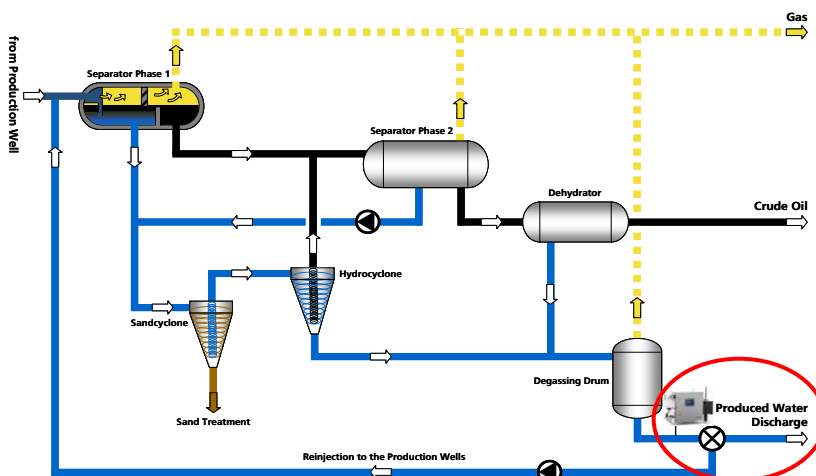
The SIGRIST Oil-in-Water Analyzer OilGuard Ex is specially designed for this tough application for use on offshore platforms, FPSO's as well as for land based water treatment sites.

### Measuring cell:



- Contact free measuring stream:  
-> No contamination of the optics
- Protecting windows  
-> protection of the optics against spills, simple cleaning without any tools
- Protection tube over measuring stream  
-> protect the lenses against spills

Picture 2: Free-fall measuring cell PVDF



Picture 1: Process scheme oil separation



Picture 3: Oil-in-water Analyzer system with sample preparation, pumps and sampling kit

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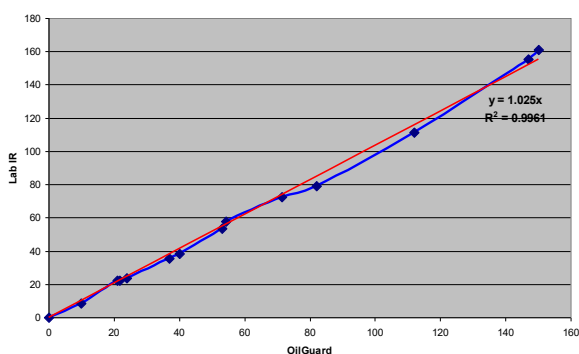
## Oil (HC) Traces in Produced Water

### Typical Installation:



Picture 4: OilGuard installation on an oil platform

### Practical Measurement (Example):



Picture 5: Comparison online measurement vs. IR lab method

The diagram above demonstrates the excellent correlation between the results obtained from the OilGuard Ex and one of the most widely used standard reference methods in the laboratory, IR absorption.

The OilGuard Ex was calibrated with the oil to be measured. Triple samples were taken directly at the outlet of the free fall measuring cell and analysed in the laboratory.

Equal correlations were obtained by comparing the readings from The OilGuard Ex with the result obtained from the modified ISO 9377-2 standard (GC method).

This test was conducted at the OPUS test facilities on the Orkney Island in Scotland.

Typically the instruments are calibrated for a measuring range of 0...100 ppm oil in water

### Products

#### SIGRIST Product and Configuration for this Application:

- OilGuard Ex 2 230 VAC or OilGuard Ex 2 115 VAC
- Flow cell 1.4435 (316L) KPFLJC PVDF OilGuard(Ex)
- Calibration with customer oil

#### Optional:

- Sample conditioning system for PVDF measuring cell OilGuard 2 (Ex)
- Big rack for OilGuard 2 (Ex)
- Sample feed pump OilGuard 2 (Ex)
- Sample return pump OilGuard 2 (Ex)
- Tubing, compressed-air to pump OilGuard 2 (Ex)
- Sampling kit OilGuard 2 (Ex)
- Factory acceptance test

#### Parameter Setting

- 0...100 ppm calibrated (typical) with the corresponding crude oil

#### Advantage of the SIGRIST OilGuard

- True non-contact measuring cell
- Very low zero drift; < 1 %/year, therefore recalibration is very seldom required
- Very simple recalibration with checking unit
- No special tools for maintenance required
- Extremely low maintenance
- No consumables and no chemicals needed