

Oil in Water Analyser Utilization Experience



StatoilHydro

StatoilHydro : Arne Henriksen



TALISMAN
ENERGY

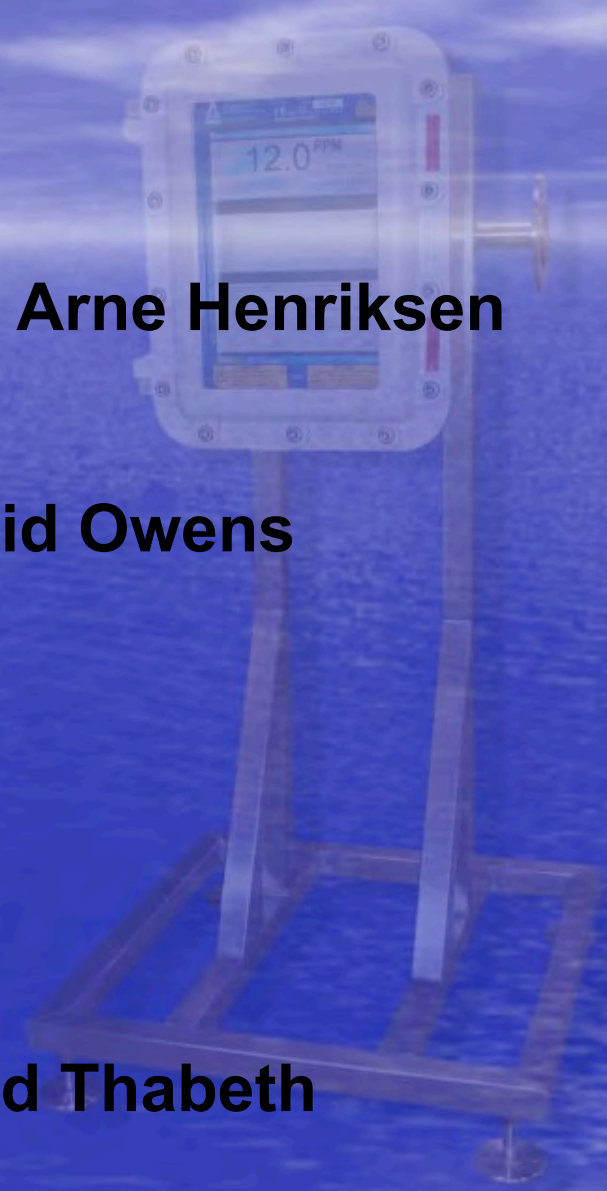
Talisman : David Owens



Chevron : Darrell Gallup

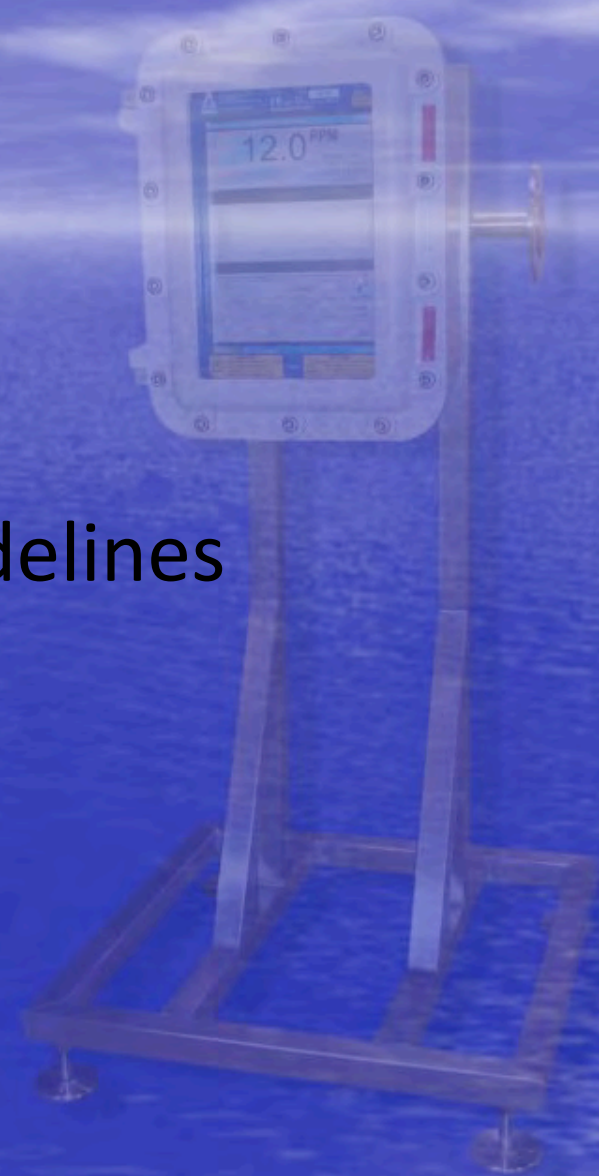


Advanced Sensors : Khalid Thabeth



The Challenges

- Fouling
- Chemical Interference
- Analyser & Lab Correlation
- Selecting an Analyser - Guidelines



Fouling

The fouling of the sensor window/s affects all optically based analysers.

Talisman use of analysers have suffered from a fouling on a variety of sensor's windows. Noticeable effects in less than 1 hour.

An EX1000 was installed September 2005.

Zero cleaning required following 24 months of service to-date.

Chevron use of analysers have suffered from "schmoo" (iron sulfate) build up on a variety of sensor's windows.

Noticeable deposits in hours.

Two EX1000's installed in December 2006.

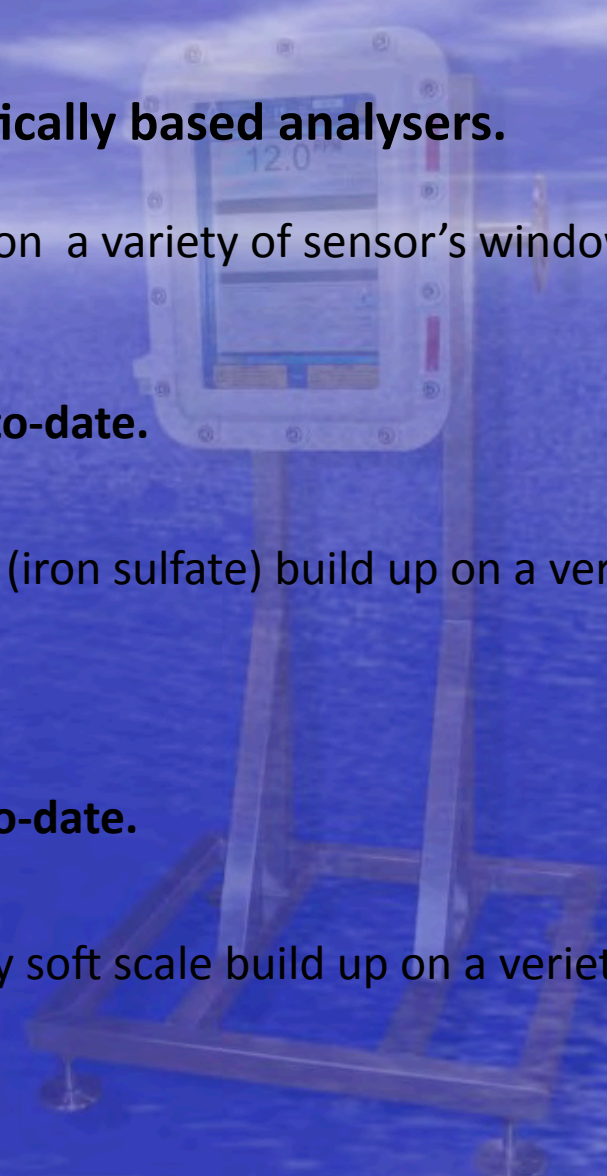
Zero cleaning required following 22 months of service to-date.

StatoilHydro use of analysers have suffered from Heavy soft scale build up on a variety of sensor's windows.

Noticeable deposits in hours.

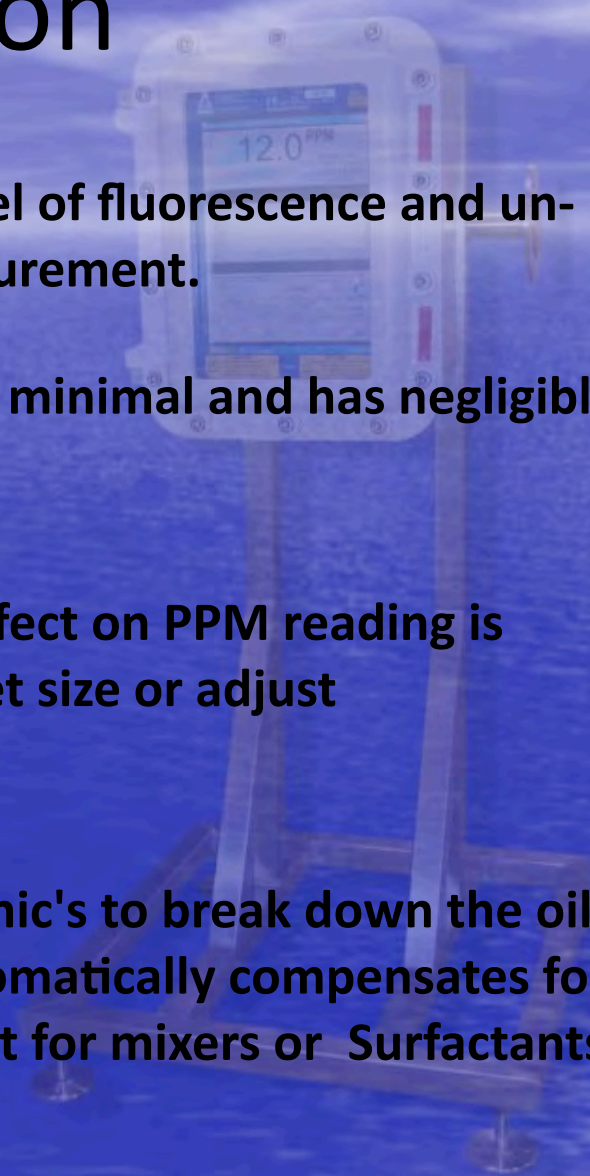
EX1000's installed January and July 2007.

Zero cleaning required following 21 months of service to-date.



Oil Droplet Size Variation

- Oil Droplet size variation directly affects the level of fluorescence and unchecked directly affects the resulting ppm measurement.
- In many applications Oil droplet size variation is minimal and has negligible affect.
- Where oil droplet size varies significantly, the affect on PPM reading is drastic unless the analyser can control oil droplet size or adjust accordingly.
- The EX100 and EX1000 periodically uses ultrasonic's to break down the oil droplets to a standard size, so the analyser automatically compensates for the variation in droplet size. There is no requirement for mixers or Surfactants to reduce oil droplet size.



Fouling & Oil Droplet Size Adjustment Ultrasonic Cleaning and Homogenization Video



Chemical Interference

Many process chemicals fluoresce, and many fluoresce more than oil.

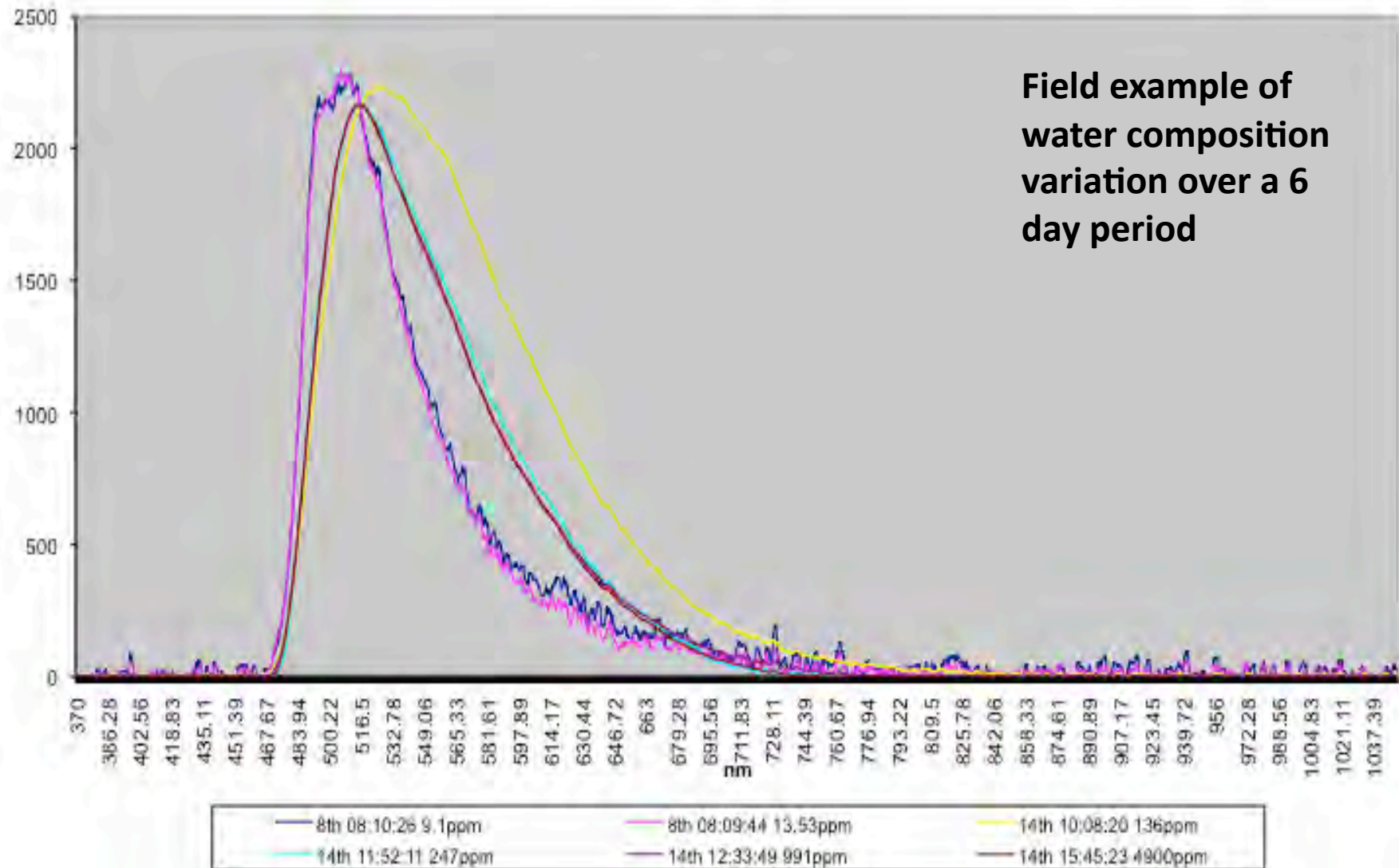
The fluorescence of chemical additives can swamp the fluorescence of oil in certain parts of the optical Spectra, creating a false high ppm reading

The affects of process chemicals following retuning of the analyser

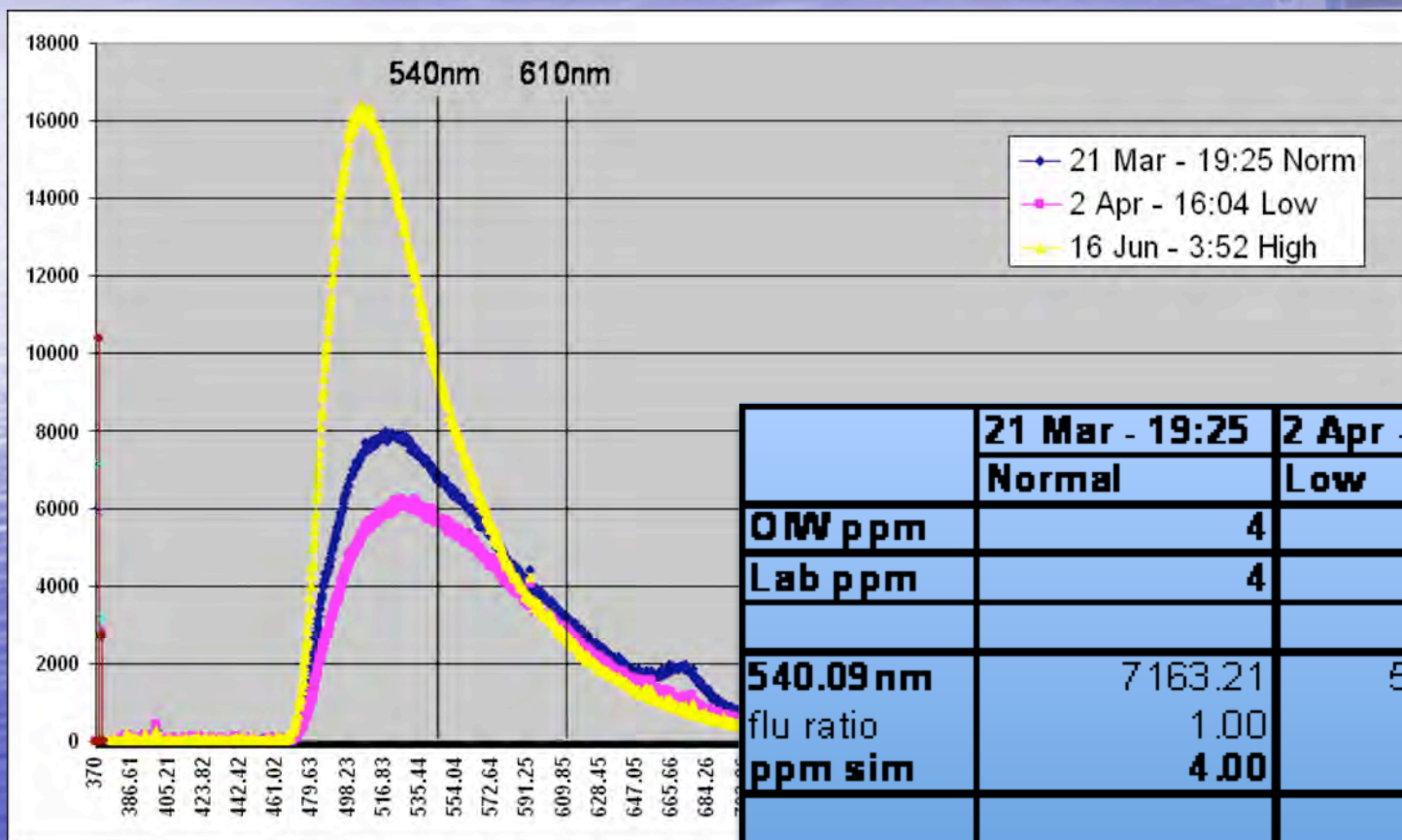
• Chemical	Typically	Concent'n	Before	After
• EC1110A	Corrosion inhibitor	42 ppm	15ppm	1.2ppm
• EC2176A	Demulsifier	9 ppm	7.2ppm	0.6ppm
• EC1188A	Heating medium Cl	0.60 ppm	0.0ppm	0.0ppm
• EC1442A	Corrosion inhibitor	45 ppm	6.2ppm	0.0ppm
• EC9021A	H2S scavenger	73 ppm	6.9ppm	0.0ppm
• EC6354A	Coagulant/de-oiler	100 ppm	0.0ppm	0.0ppm
• EC1470A	Corrosion Inhibitor	100ppm	6.5ppm	0.7ppm
• Methanol		100%	16ppm	0.0ppm
• Meg		100%	12pm	0.0ppm

Chemical Interference

Aligned Spectra for SN00063 for 8th and 14th Aug 2008 based on reading at 516.17nm



Interference - example



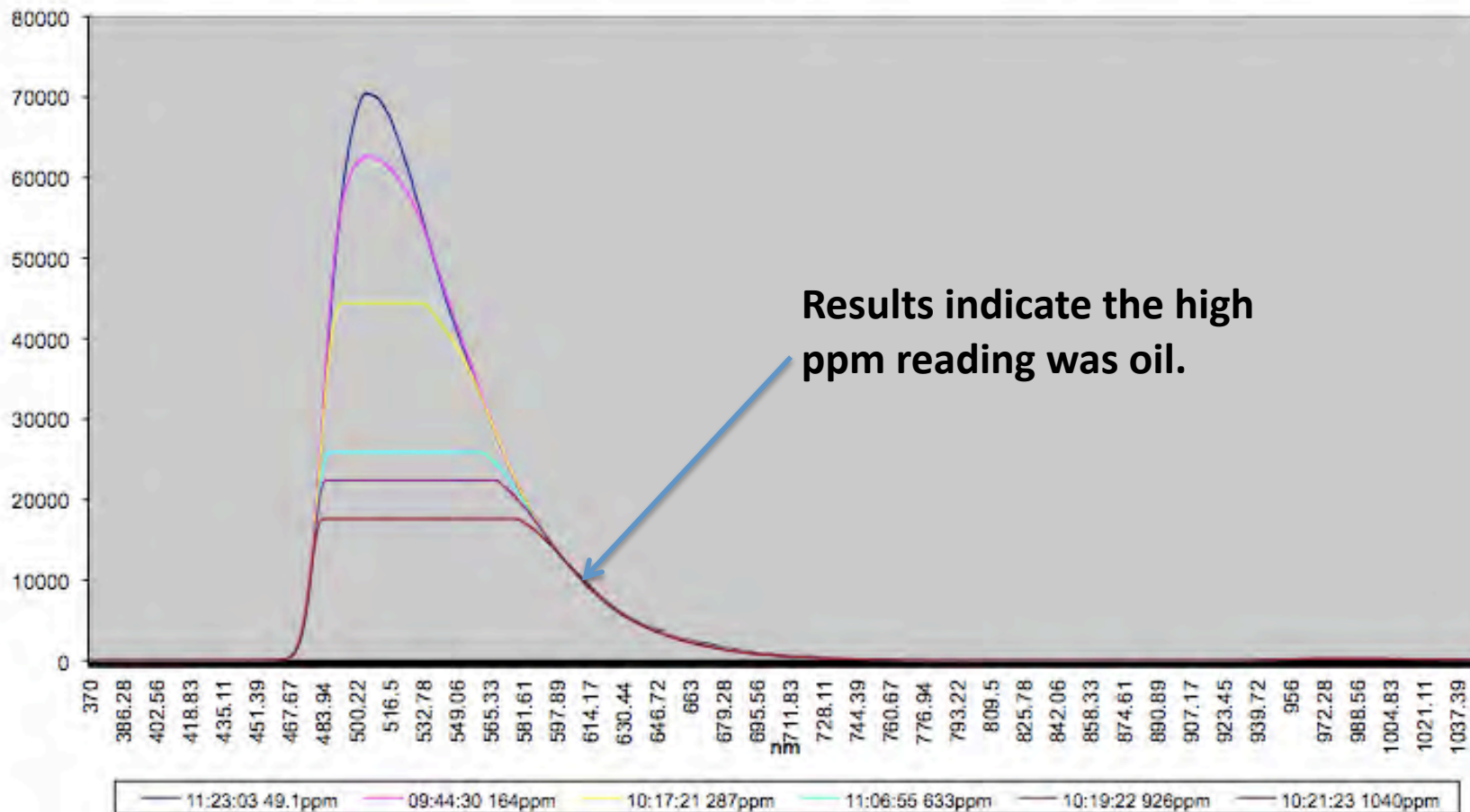
Recent
analysis at
Talisman
Flotta
Terminal

	21 Mar - 19:25	2 Apr - 16:04	16 Jun - 3:52
	Normal	Low	High
OW ppm	4	2	6.8
Lab ppm	4	4	4
540.09 nm	7163.21	5914.15	10386.42
flu ratio	1.00	0.83	1.45
ppm sim	4.00	3.00	6.20
610.18 nm	3245.67	2859.09	2724.49
flu ratio	1.00	0.88	0.84
ppm sim	3.80	3.40	3.30

Chemical Interference – Evaluating Water Composition

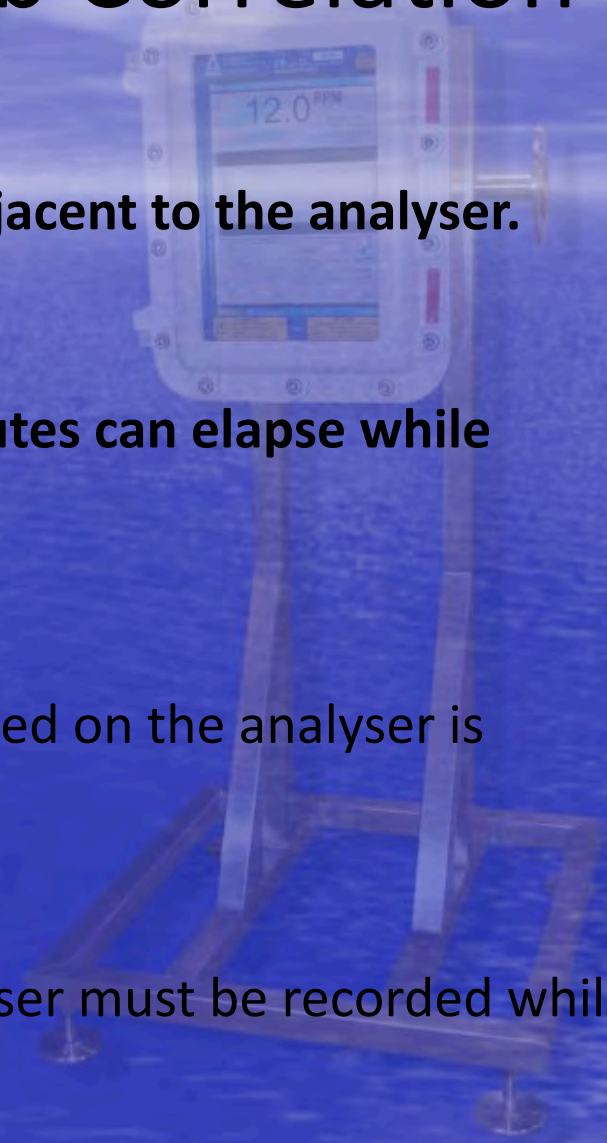
Concern that high ppm (>1000ppm) was a process chemical effect.

Aligned Spectra for SN00077 on 27th July 2008 based on reading at 600.21nm



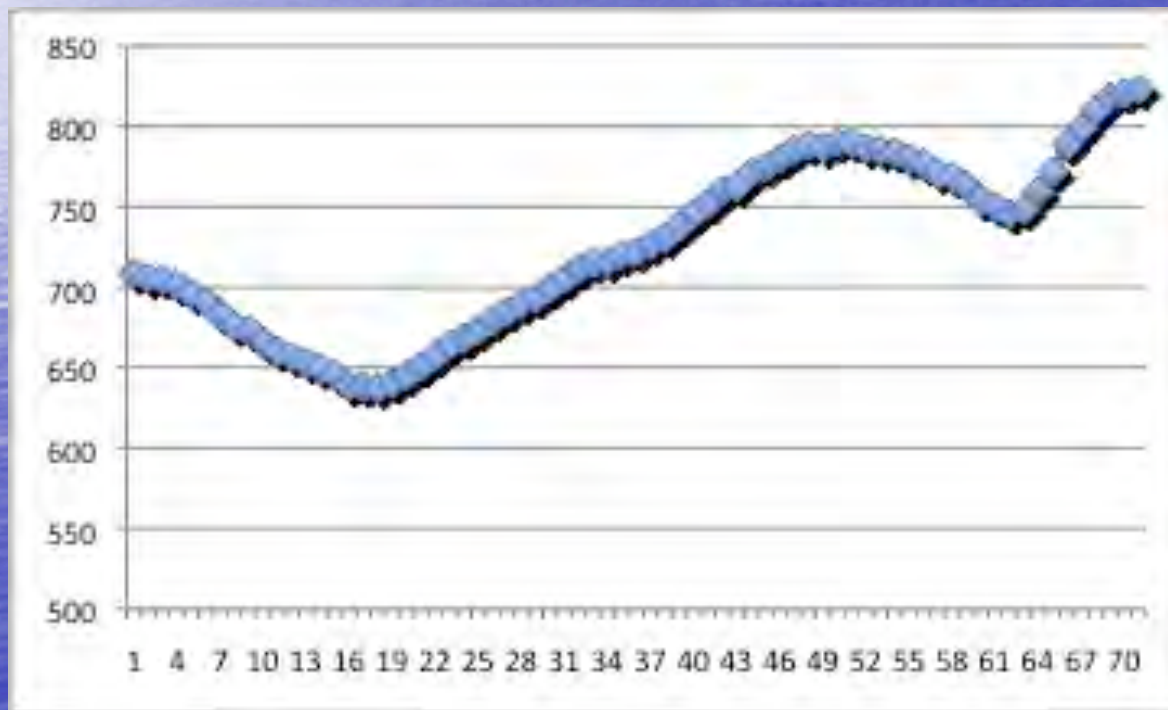
Improving Analyser & Lab Correlation

- **Sample Take-off proximity**
 - The ideal location to draw a sample adjacent to the analyser.
- **Drawing The Sample**
 - Depending on flow and pressure 2minutes can elapse while drawing the sample.
- **In very stable conditions,**
 - a quick glance at the ppm levels displayed on the analyser is enough to take a reading.
- **In rapidly fluctuating conditions**
 - multiple measurements from the analyser must be recorded whilst the sample is being drawn.



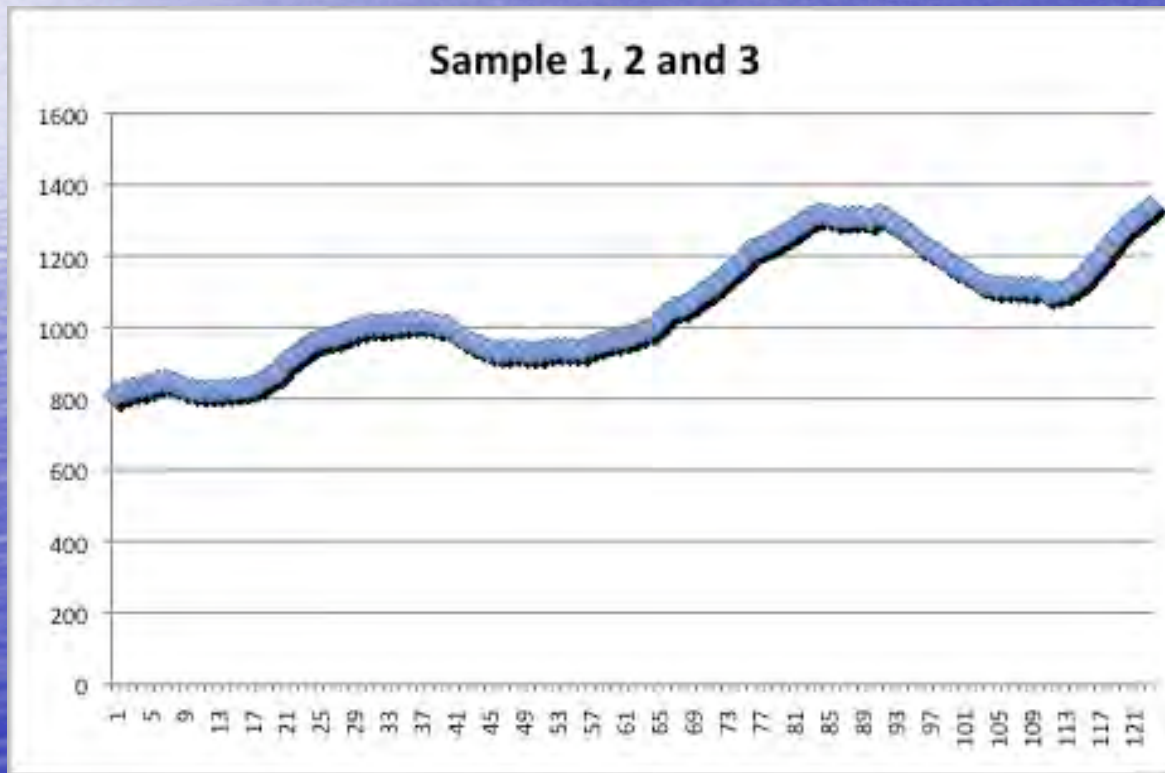
Sample Duration and Relevance

- The EX1000 takes measurements every sec.
- In this example **70 seconds** had elapsed in drawing the sample.
- The measurements ranged from **637ppm** to **823ppm**
- The average reading from the analyser data was **725ppm**
- The laboratory was **758ppm**



Importance of a Control Sample

- The accuracy and repeatability of the laboratory is critical when trying establish alignment of the analyser to the lab.
- A control sample is necessary in evaluating the above.
 - E.g Draw on large sample, mixed thoroughly and divide into three sample bottles.
- Results from a recent installation:



**Analyser result Avg
1056ppm**

Lab results were

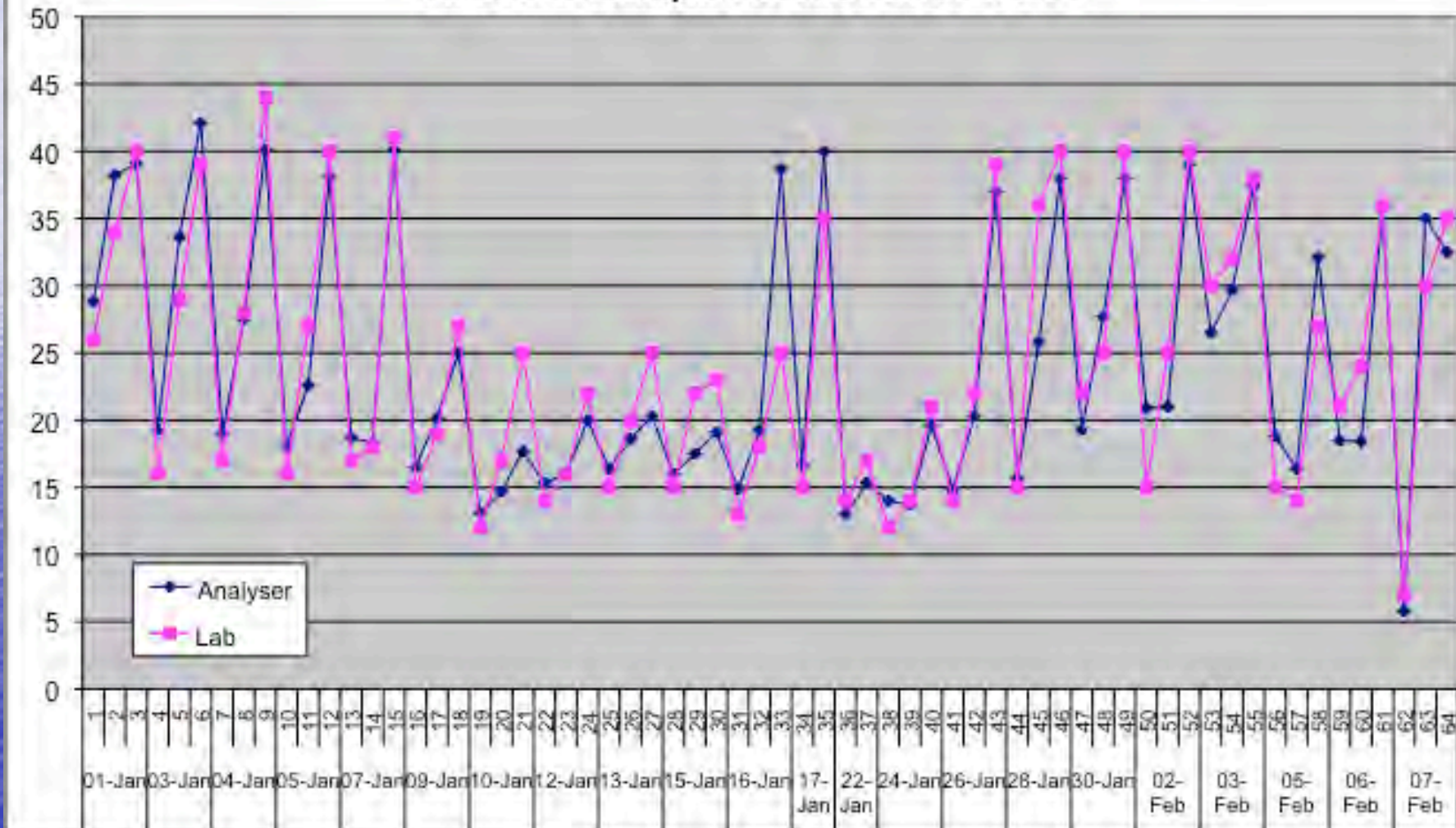
1. 469ppm
2. 1269ppm
3. 933ppm

**300% variation for
the same sample!**

Chevron Tantawan

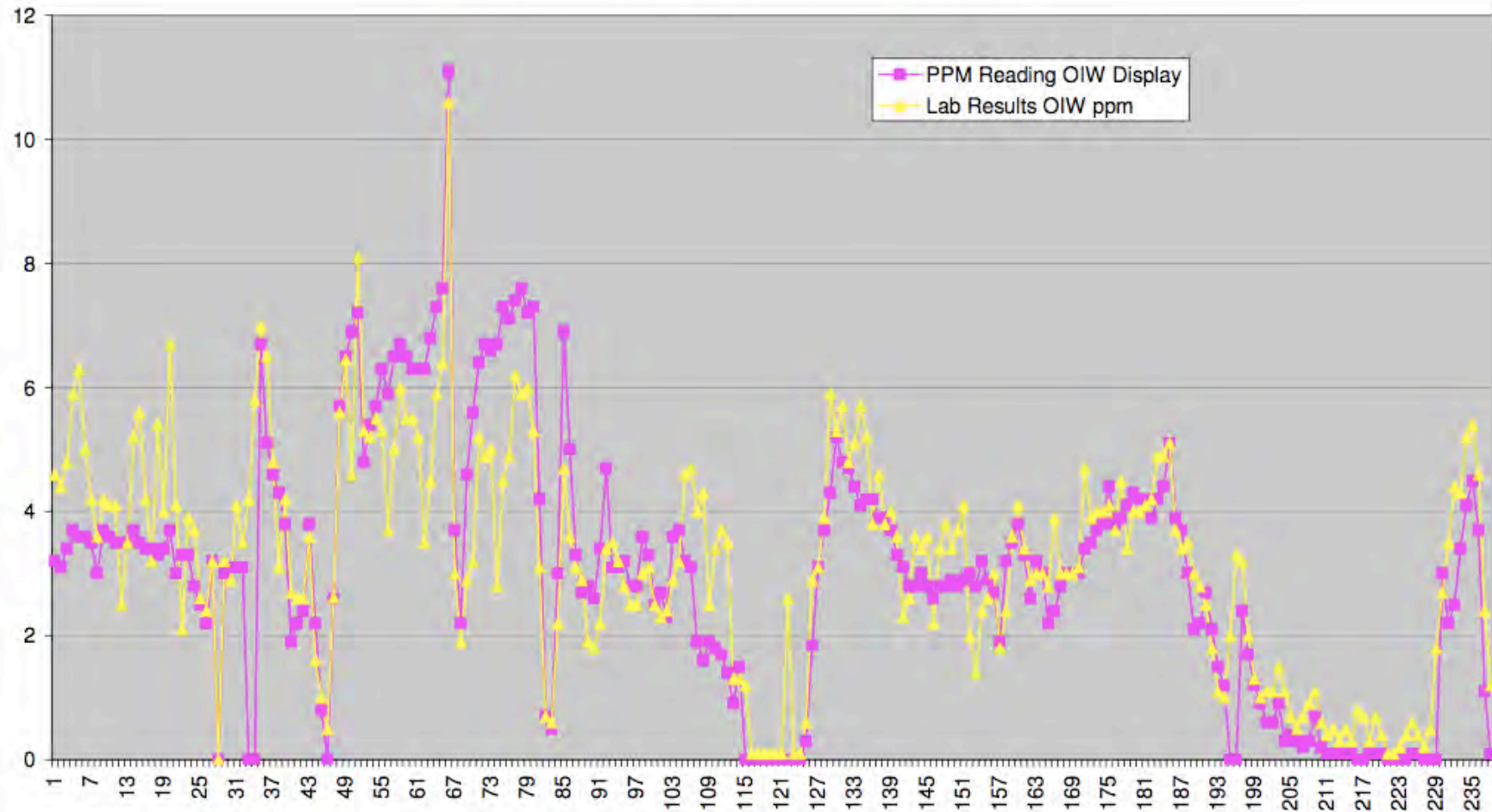


Chevron Tantawan FPSO
Installed Dec 2006 No Maintenance or Cleaning Required.
Individual Sample Results Jan-Feb 2008



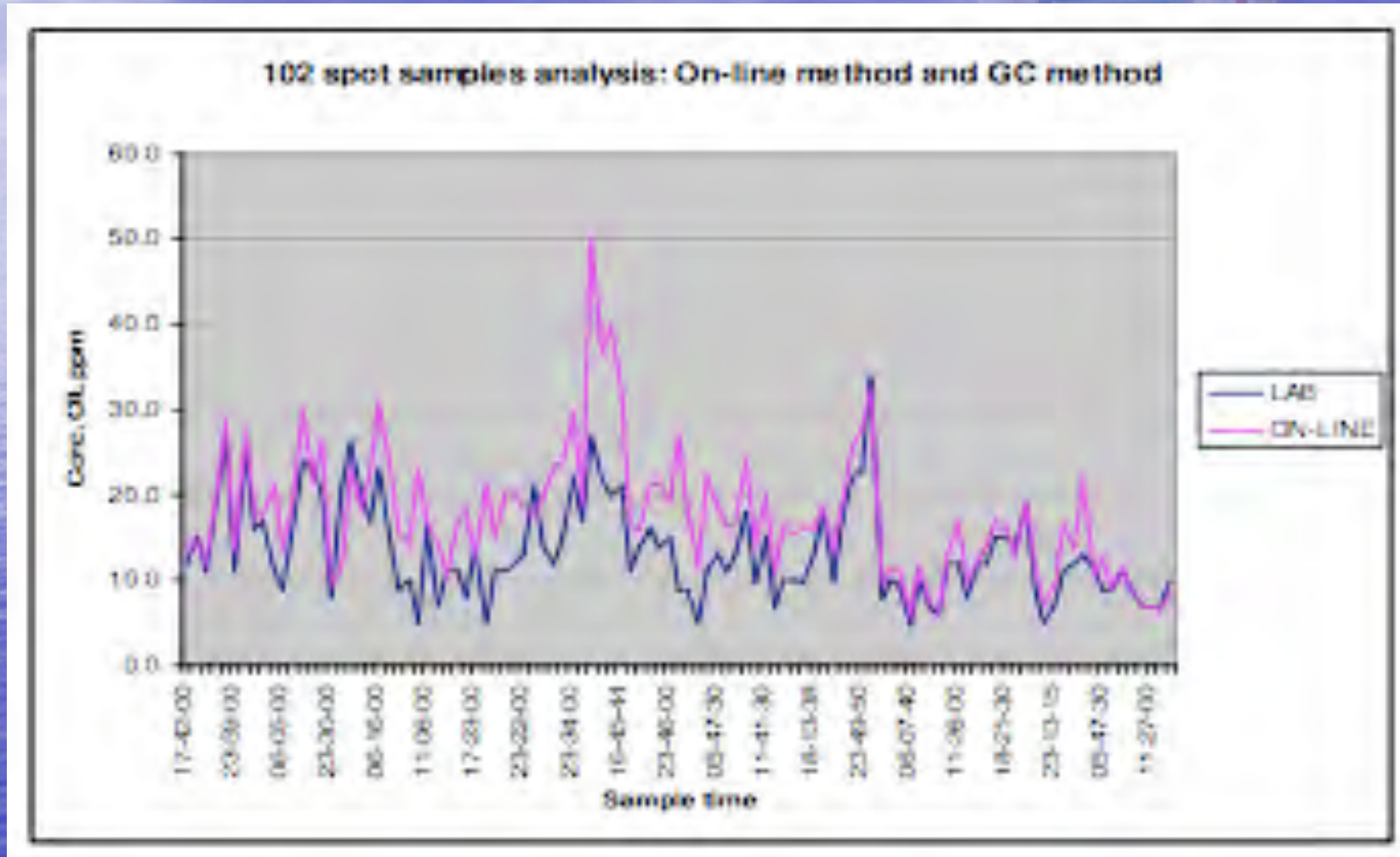
Talisman Flotta

Talsiman Flotta 240 grab samples over a Six Week Period



Statoil Hydro

StatoilHydro



Summary Results & Current Status

Previous Experience

Company	Application	Analysers Used*	Fauling	Blocking	Chemical Interference	Maintenance Interval	Measurement correlation to Lab
Chevron	Discharge	Various	Yes	Yes	Yes	Days	Process Dependant
Talisman	Discharge	Various	Yes	Yes	Yes	Days	Process Dependant
Statoil Hydro	Discharge & P.Mgm't	Various	Yes	Yes	Yes	Days	Process Dependant

Current Experience

Company	Application	Replacement Analyser	Fauling	Blocking	Chemical Interference	Maintenance Interval	Measurement correlation to Lab
Chevron	Discharge	EX1000	None	None	None	None	Consistant
Talisman	Discharge	EX1000	None	None**	None	None	Consistant
Statoil Hydro	Discharge & P.Mgm't	EX1000	None	None**	None	None	Consistant


Chevron - Have already reduced grab sample frequency.

Talisman – Preparing a program to stop using grab samples

Statoil Hydro - Re-initiated program to replace grab samples

Selecting an Analyser - Guidelines

- **Range:**
- **Maintenance Requirement:**
- **Cleaning Requirement:**
- **Blocking:**
- **Chemical Interference:**
- **Sample Pressure Variation:**
- **Flow Variation:**
- **Gas Bubble interference:**
- **Solids Interference:**
- **Wetted Part Materials:**
- **Remote Connectivity and Support:**
- **Remote alarming:**
- **Data logs:**
- **User Interface:**
- **Water Composition:**
- **Proof of Performance:**
- **Hazardous Environment:**



Ask these questions From Customer References

END

