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Attn: Jari Reinikka
Cc:

Our ref.: 2012-04582
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Your ref.:
Date: 26.nov.2012
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Laboratory report

Received date: 12.june.2012
Sampled by: 12.june.2012
Sampled by (Id): Oy Operative Recovery Solutions
Analysed date: June –September 2012
Scope of work:
Comment:

If you should have any questions to this report, please do not hesitate to contact us.

With Regards

Intertek West Lab AS

Technical responsible

Analysed by

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ANALYSES REPORT ON SAMPLES FROM NIGER

Types of samples delivered at Intertek West Lab were as follows.

- Original sample – absorbing product (not pressed)
- Pressed crude oil in glass flasks
Absorbing product , as dry substance after oil pressed out
Water in glass flask and
Unused - oil absorbing material

Samples were delivered at Intertek West Lab on 11th of June for various analyses.
Samples were labelled as follows.

SAMPLE NR.1 Samples pressed out at Intertek West Lab. 11.06.12

- 1a. Original sample (absorbing product)
- 1b. Crude oil pressed at IWL of sample nr.1 (0.5 litre bottle)
- 1c. Crude oil pressed of sample nr.1 (100ml. bottle)
- 1d. Dry substance after oil is pressed out

SAMPLE NR.2 Sample taken at the surface & samples pressed out at IWL 11.06.12

- 2a. Crude oil pressed at IWL (100ml. bottle)
- 2b. Dry substance after oil is pressed out

SAMPLE NR.3 Sample taken at the surface from a tube leakage Sample is pressed in Niger 22.05.2012

- 3a. Crude oil pressed at Niger (100ml. bottle)
- 3b. Dry substance after oil is pressed out

SAMPLE NR.4 Sample taken at the surface from a tube leakage Sample is pressed in Niger 22.05.2012

- 4a. Water sample
- 4b. Dry substance after oil is pressed out
- 4c. Crude oil pressed at Niger (100ml. bottle)

Sample information

<i>Sampleno.</i>	<i>Samplingpoint - description</i>	<i>Date sampled.</i>
<i>Sampleno.1</i>	<i>Samples pressed out at Intertek West Lab.</i>	<i>11.06.12</i>
<i>1a</i>	<i>Original sample (not pressed absorbing product)</i>	
<i>1b</i>	<i>Crude oil pressed at IWL of sample nr.1 (0.5 litre bottle)</i>	
<i>1c</i>	<i>Crude oil pressed of sample nr.1 (100ml. bottle)</i>	
<i>1d</i>	<i>Dry substance after oil is pressed out</i>	
<i>Sampleno.2</i>	<i>Sample taken at the surface & samples pressed out at IWL</i>	<i>11.06.12</i>
<i>2a</i>	<i>Crude oil pressed at IWL (100ml. bottle)</i>	
<i>2b</i>	<i>Dry substance after oil is pressed out</i>	
<i>Sampleno.3</i>	<i>Sample taken at the surface from a tube leakage Sample is pressed in Niger</i>	<i>22.05.2012</i>
<i>3b</i>	<i>Dry substance after oil is pressed out</i>	
<i>Sampleno.4</i>	<i>Sample taken at the surface from a tube leakage Sample is pressed in Niger</i>	<i>22.05.2012</i>
<i>4a</i>	<i>Water sample</i>	

Results

SAMPLE NR.1 Samples pressed out at Intertek West Lab. 11.06.12

2012- 04582-001 1a. Original sample (not pressed absorbing product)

- Basic Nitrogen n.a

2012- 04582-002 1b Crude oil pressed at IWL of sample nr.1 (0.5 litre bottle)

Parameter	Results	Unit	PQL		Method/standard	Uncertainty	
			Lower	Upper		Rel	Abs
Water and sediments in oil, BS&W, centrifuging							
Water content, BS&W	12	vol%	0,025	50	Mod. ASTM D 4007	-	±0,12
Density of crude v/15°C							
Density @15°C	0,7777	g/cm³	0,6	1,0	Mod. ASTM D 5002	-	±0,0009

Explanation: PQL = Practical Quantification limit. # = The analysis is performed by sub contractor.

The uncertainty is expressed at 95% confidence level. If both a relative and an absolute uncertainty argument is stated, it is the argument that represents the highest uncertainty that applies.

2012- 04582-003 1c. Crude oil pressed of sample nr.1 (100ml. bottle)

Parameter	Results	Unit	PQL		Method/standard	Uncertainty	
			Lower	Upper		Rel	Abs
Density of crude v/15°C							
Density @ 15°C	0,7809	g/cm ³	0,6	1,0	Mod. ASTM D 5002	-	±0,0009
Sulphur in oil, XRF							
Total Sulphur, S	0,03	wt%			IP-336	5%	-
Water in crude, coulometric titration							
Water content in crude	0,18	wt%	0	5	Mod. ASTM D-4928	10%	±0,005
Basig nitrogen in oil, titration							
Basic nitrogen	0,005	wt%			Mod. UOP 269 B		
Organic nitranden, total in oil, Kjeldahl							
Total Nitrogen, N	0,26	wt%	0,015		ASTM D-3228		
Salt in crude, elektrometric							
Salt as NaCl	30	mg/l	0		ASTM D-3230	20%	-

Explanation: PQL = Practical Quantification limit. # = The analysis is performed by sub contractor.

The uncertainty is expressed at 95% confidence level. If both a relative and an absolute uncertainty argument is stated, it is the argument that represents the highest uncertainty that applies.

PNA Distribution

Job no.: 2012-04582-003

Component	Weight %	BTEX	wt% total prøve
Nitrogen	0,00	Benzene	0,266
Carbondioksid	0,00	Toluen	1,068
C1, (P)	0,00	Etylbenzen	0,222
C2, (P)	0,00	Xylene	1,583
C3, (P)	0,07	BTEX	wt% total prøve
i-C4, (P)	0,30		
n-C4, (P)	0,84		
2,2-DM-C3 (P)	0,01		
Ic5 (P)	1,65		
nC5 (P)	1,73		
Hexanes Total	4,51		
Hexanes - P	4,19		
Hexanes - N	0,32		
Heptanes Total	8,73		
Heptanes - P	3,48		
Heptanes - N	4,98		
Heptanes - A	0,27		
Octanes Total	11,68		
Octanes - P	3,23		
Octanes - N	7,38		
Octanes - A	1,07		
Nonanes Total	7,46		
Nonanes - P	4,01		
Nonanes - N	1,64		
Nonanes - A	1,81		
Decanes Plus	63,02		
Totals	100,00		

Total Paraffins include both n-paraffins and i-paraffins

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2012- 04582-004 1d. Dry substance after oil is pressed out

Parameter	Results	Unit	PQL		Method/standard	Uncertainty	
			Lower	Upper		Rel	Abs
Oil in sand, GC/FID							
Oil i sand	72000	mg/kg DM			M-040	20%	±20
Oil in sand (wt%)	7,2	wt% DM			M-040	20%	±20
Metals in solids, ICP, decomposed sample							
Aluminium, Al	<1,4	mg/kg DM	0,4	200000	NS 4770MCP-OES	25%	±0,8
Arsenium, As	<2,2	mg/kg DM	0,6	5000	NS 4770MCP-OES	30%	±0,2
Calcium, Ca	220	mg/kg DM	2	10000	NS 4770MCP-OES	15%	±8
Cadmium, Cd	<0,29	mg/kg DM	0,08	2500	NS 4770MCP-OES	15%	±0,08
Cobalt, Co	<0,29	mg/kg DM	0,08	10000	NS 4770MCP-OES	20%	±0,08
Chromium, Cr	0,45	mg/kg DM	0,08	5000	NS 4770MCP-OES	20%	±0,08
Copper, Cu	0,93	mg/kg DM	0,12	2500	NS 4770MCP-OES	20%	±0,12
Iron, Fe	170	mg/kg DM	0,4	100000	NS 4770MCP-OES	20%	±0,4
Magnesium, Mg	14	mg/kg DM	0,4	5000	NS 4770MCP-OES	15%	±0,4
Manganese, Mn	2,3	mg/kg DM	0,08	10000	NS 4770MCP-OES	20%	±0,08
Sodium, Na	100	mg/kg DM	8	200000	NS 4770MCP-OES	20%	±8
Nickel, Ni	<0,29	mg/kg DM	0,08	10000	NS 4770MCP-OES	20%	±0,08
Lead, Pb	7,4	mg/kg DM	0,4	20000	NS 4770MCP-OES	30%	±0,8
Sulphur, S	1200	mg/kg DM	1,4	20000	NS 4770MCP-OES	15%	±1,2
Zinc, Zn	34	mg/kg DM	0,08	20000	NS 4770MCP-OES	20%	±0,2
Crystalline phases in solids, XRD							
Amorphous material	se komm,	-			X-031 (XRD)		
Elements in solids, XRF							
Aluminum, Al	0,5	wt%	0,1		X-021 (XRF)	10%	-
Barium, Ba	9,4	wt%	0,1		X-021 (XRF)	10%	-
Calcium, Ca	2,0	wt%	0,1		X-021 (XRF)	10%	-
Chromium, Cr	0,1	wt%	0,1		X-021 (XRF)	10%	-
Copper, Cu	0,5	wt%	0,1		X-021 (XRF)	10%	-
Iron, Fe	3,6	wt%	0,1		X-021 (XRF)	10%	-
Potassium, K	0,2	wt%	0,1		X-021 (XRF)	10%	-
Magnesium, Mg	0,6	wt%	0,1		X-021 (XRF)	10%	-
Manganese, Mn	<0,1	wt%	0,1		X-021 (XRF)	10%	-
Sodium, Na	4,8	wt%	0,1		X-021 (XRF)	10%	-
Nickel, Ni	0,1	wt%	0,1		X-021 (XRF)	10%	-
Phosphorus, P	9,7	wt%	0,1		X-021 (XRF)	10%	-
Lead, Pb	0,1	wt%	0,1		X-021 (XRF)	10%	-
Silicon, Si	2,2	wt%	0,1		X-021 (XRF)	10%	-
Strontium, Sr	0,2	wt%	0,1		X-021 (XRF)	10%	-
Titanium, Ti	0,1	wt%	0,1		X-021 (XRF)	10%	-
Zinc, Zn	0,6	wt%	0,1		X-021 (XRF)	10%	-
Sulphur, S	15	wt%	0,1		X-021 (XRF)	10%	-
Chlorine, Cl	1,8	wt%	0,1		X-021 (XRF)	10%	-
Total solids and loss on ignition in solids and sludge, gravimetric							
Dry solids content	75,4	wt%	0,8	100	NS 4764	10%	±0,8
Solids after ignition pr/dry sample	3,5	wt% DM	0,01		NS 4764	5%	-
Organic matter	97	wt% DM	0,01		NS 4764	5%	-
Organic nitranden, total in oil, Kjeldahl							
Total Nitrogen, N	30	wt%	0,015		ASTM D-3228		
Basig nitrogen in oil, titration							
Basic nitrogen	0,000	wt%			Mod. UOP 269 B		

Explanation: PQL = Practical Quantification limit. # = The analysis is performed by sub contractor.

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SAMPLE NR.2 *Sample taken at the surface & samples pressed out at IWL*
11.06.12

Parameter	Results	Unit	PQL		Method/standard	Uncertainty
			Lower	Upper		Rel Abs
Oil in sand, GC/FID						
Oil i sand	110000	mg/kg DM			M-040	20% ±20
Oil in sand (wt%)	11	wt% DM			M-040	20% ±20
Total solids and loss on ignition in solids and sludge, gravimetric						
Dry solids content	80,0	wt%	0,8	100	NS 4764	10% ±0,8
Solids after ignition pr/dry sample	3,6	wt% DM	0,01		NS 4764	5% -
Organic matter	96	wt% DM	0,01		NS 4764	5% -
Density of crude v/15°C						
Density @15°C	0,8880	g/cm ³	0,6	1,0	Mod. ASTM D 5002	- ±0,0009
Specific density in water, Anton Paar						
Specific gravity at 15°C	0,8888	-			Mod. ASTM D-4052	
Density of crude v/15°C						
API gravity @60°F	17,8	-			Mod. ASTM D 5002	
Sulphur in oil, XRF						
Total Sulphur, S	0,23	wt%			IP-336	5% -
Water in lubeoil, coulometric titration (Karl Fisher)						
wWater content	30,00	vol%	0,01	2,5	ASTM D-6304 A	10% -
Salt in crude, elektrometric						
Salt as NaCl	130,2	mg/l	0		ASTM D-3230	20% -
Organic nitranden, total in oil, Kjeldahl						
Total Nitrogen, N	24,53	wt%	0,015		ASTM D-3228	

Explanation: PQL = Practical Quantification limit. # = The analysis is performed by sub contractor.

The uncertainty is expressed at 95% confidence level. If both a relative and an absolute uncertainty argument is stated, it is the argument that represents the highest uncertainty that applies.

PNA Distribution

Job no.: 2012-04964-001

Component	Weight %
Nitrogen	0,01
Carbondioksid	0,01
C1, (P)	0,01
C2, (P)	0,01
C3, (P)	0,01
i-C4, (P)	0,01
n-C4, (P)	0,01
2,2-DM-C3 (P)	0,01
lc5 (P)	0,01
nC5 (P)	0,01
Hexanes Total	0,06
Hexanes - P	0,05
Hexanes - N	0,01
Heptanes Total	0,13
Heptanes - P	0,05
Heptanes - N	0,07
Heptanes - A	0,01
Octanes Total	0,10
Octanes - P	0,07
Octanes - N	0,02
Octanes - A	0,01
Nonanes Total	0,07
Nonanes - P	0,04
Nonanes - N	0,00
Nonanes - A	0,03
Decanes Plus	99,54
Totals	100,00

Total Paraffins include both n-paraffins and i-paraffins

BTEX	wt% total prøve
Benzene	0,009
Toluen	0,012
Etylbenzen	0,000
Xylene	0,028

SAMPLE NR.3 Sample taken at the surface from a tube leakage

Sample is pressed in Niger 22.05.2012

3a. Crude oil pressed at Niger (100ml. bottle)

2012-05363-001 3b. Dry substance after oil is pressed out

Parameter	Results	Unit	PQL		Method/standard	Uncertainty
			Lower	Upper		Rel Abs
Oil in sand, GC/FID						
Oil i sand	39000	mg/kg DM			M-040	20% ±20
Oil in sand (wt%)	3,9	wt% DM			M-040	20% ±20
Total solids and loss on ignition in solids and sludge, gravimetric						
Dry solids content	80,3	wt%	0,8	100	NS 4764	10% ±0,8
Solids after ignition pr/dry sample	4,7	wt% DM	0,01		NS 4764	5% -
Organic matter	95	wt% DM	0,01		NS 4764	5% -
Organic nitrogen, total in oil, Kjeldahl						
Total Nitrogen, N	28,74	wt%	0,015		ASTM D-3228	

Explanation: PQL = Practical Quantification limit. # = The analysis is performed by sub contractor.

The uncertainty is expressed at 95% confidence level. If both a relative and an absolute uncertainty argument is stated, it is the argument that represents the highest uncertainty that applies.

SAMPLE NR.4 Sample taken at the surface from a tube leakage

Sample is pressed in Niger 22.05.2012

2012-04735-001 4.a Water sample

Parameter	Results	Unit	PQL		Method/standard	Uncertainty
			Lower	Upper		Rel Abs
Oil in water, (C7-C40), GC/FID						
Oil in Water (C7-C40)	100	mg/l	0,4		Mod. NS-EN ISO 9377-2 / OSPAR 2005-15	15% ±0,2

Explanation: PQL = Practical Quantification limit. # = The analysis is performed by sub contractor.

The uncertainty is expressed at 95% confidence level. If both a relative and an absolute uncertainty argument is stated, it is the argument that represents the highest uncertainty that applies.

4b. Dry substance after oil is pressed out

4c. Crude oil pressed at Niger (100ml. bottle)

Comments:

n.a Since the basic nitrogen method is used on oil samples, samples
1a not pressed absorbing product &
1d dry substance after oil pressed out
were difficult to determine the nitrogen content

*) samples analysed at another lab.

Attached: Crude oil profile on sample 1c analysed at IWL

Comments

XRD & XRF is performed on samples as received.

The elements (XRF) are calculated as oxides (100%), but reported as elements wt%.

Conclusions

Please note that the report is originated from different jobb numbers.

This is due to the anayses were performed during a period of time and the samples were given different jobb numbers.

Job no.: 2012-04582-003

Profile of a crude oil.

