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Characterisation of the cuttings piles at the Beryl A and Ekofisk 2/4 A platform - UKOOA Phase II, task 1

Appendixes

Report RF – 2001/092

RF - Rogaland Research has a certified Quality System in compliance with the standard NS - EN ISO 9001

Appendixes

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Appendix 1

Sampling locations and sample identification

Appendix 1

Sample identification

		Labelling of samples								
BERYL	**Label**	**Slice**	**Met-Org**		**Grain size**	**EKOFISK**		**Met-Org**		**Grain size**
Core			**Ref nr**	**Slice**	**Ref nr**			**Ref nr**	**Slice**	**Ref nr**
V1	**V1-1**	0-10	422-1	0-20	423-1	V9	0-5	422-43	0-15	423-19
V1		10-22	422-2	30-40	423-2	V9	5-11	422-44	15-33	423-20
V1		22-28	422-3	40-48	423-3	V9	11-15	422-45	33-43	423-21
V1		28-36	422-4	50-68	423-4	V9	15-22	422-46	43-53	423-22
V1		36-40	422-5	68-76	423-5	V9	22-33	422-47	53-68	423-23
V1		40-48	422-6			V9	33-36	422-48	68-90	423-24
V1		48-56	422-7			V9	36-38	422-49		
V1		58-60	422-8			V9	38-43	422-50		
V1		60-68	422-9			V9	43-53	422-51		
V1		68-76	422-10			V9	53-68	422-52		
V1	**V1-2**	0-15	422-11	0-30	423-6	V9	68-90	422-53		
V1		15-30	422-12	30-60	423-7	V9	90-120			
V1		30-45	422-13	60-65	423-8	V10	1-10	422-54		
V1		45-60	422-14	65-90	423-9	V10	10-20	422-55		
V1		60-65	422-15			V10	20-30	422-56		
V1		65-75	422-16			SW3	0-7	422-57	0-15	423-25
V1		75-85	422-17			SW3	7-13	422-58	15-23	423-26
V1		85-90	422-18			SW3	13-15	422-59	23-30	423-27
V3-G	**V3-G**	0-6	422-19	0-25	423-10	SW3	15-23	422-60	30-39	423-28
V3-G		6-10	422-20	25-39	423-11	SW3	23-30	422-61	39-47	423-29
V3-G		10-14	422-21	39-48	423-12	SW3	30-39	422-62		
V3-G		14-16	422-22	48-60	423-13	SW3	39-47	422-63		
V3-G		16-25	422-23			V 1 corec	v1-xx			
V3-G		25-30	422-24			MUC2	M2	422-64		
V3-G		30-34	422-25			CFAS3	CFAS3	422-65		
V3-G		34-39	422-26							
V3-G		39-48	422-27							
V3-G		48-56	422-28							
V3-G		56-60	422-29							
V3-G	**V3G2**	0-6	422-30	0-6						
V3G2		6-13	422-31	6-13						
V3G2		13-28	422-32	13-28						
V3G2		28-37	422-33	28-37						
V4	**V4**	0-10	422-34	0-18	423-14					
V4		10-18	422-35	18-24	423-15					
V4		18-24	422-36	24-40	423-16					
V4		24-30	422-37							
V4		30-40	422-38							
K1	**K1**	0-4	422-39	0-10	423-17					
K1		4-10	422-40	10-20	423-18					
K1		10-13	422-41							
K1		13-20	422-42							

Samples from bulk material

Installation	REF- Nr	Origin
2/4 A	422-67	RF 7-8
2/4 A	422-68	RF 7-8
2/4 A	422-71	Sintef crust
2/4 A	422-72	Sintef no crust
Beryl	422-69	RF 1-2
Beryl	422-70	RF 1-2
Beryl	422-73	Sintef
Beryl	422-74	Sintef

Sample location in UTM Co-ordinates

	Beryl A sample location in UTM Co-ordenates				
	No.	Easting	Northing	Depth	Comment
Vibrocore	V1	417309	6601830	102	
Vibrocore	V4	417330	6601764	120	CPT test
Gravity core	VCG2	417317	6601810	113	
Boxcorer	K1	417317	6601816	107	
Grab	Benthos	417291	6601823	106	
Grab	Benthos	417293	6601825	104	
Grab	Benthos	417295	6601825	107	
Grab	Benthos	417295	6601824	108	
Grab	Benthos	417292	6601825	110	
Grab -Ref	Benthos	417746	6600927	118	
Grab -Ref	Benthos	417739	6600933	118	
Grab -Ref	Benthos	417739	6600928	118	
Grab -Ref	Benthos	417738	6600927	118	
Grab -Ref	Benthos	417737	6600928	118	

	Ekofisk 2/4 A sample locations in UTM Co-ordenates				
	No.	Easting	Northing	Depth	
Vibrocore	V9	513733	6264257	73	CPT test
Vibrocore	V10	513735	6264267	73	
Multiple corer	MUC	513733	6264249	73	
Boxcorer	SW3	513692	6264200	73	
Grab	Benthos	513681	6264202	73	
Grab	Benthos	513681	6264201	73	
Grab	Benthos	513679	6264202	73	
Grab	Benthos	513680	6264203	73	
Grab	Benthos	513679	6264201	73	
Grab -Ref	Benthos	513310	6263256	72	
Grab -Ref	Benthos	513309	6263255	72	
Grab -Ref	Benthos	513310	6263254	72	
Grab -Ref	Benthos	513313	6263250	72	
Grab -Ref	Benthos	513312	6263249	72	

Appendix 2

Density LOI and TOC

Appendix 2

Density, Total organic matter as loss ignition (LOI) and total organic carbon (TOC)

Ref nr	Core	Sample	Density Wet material g/cm^3	Density Dry material g/cm^3	LOI* %	TOC** %	TOC/LOI Ratio
Beryl							
423-1	V1-1	0-20	1.75	1.40	7.8	1.67	0.21
423-2		30-40	1.88	1.50			
423-3		40-48	1.86	1.49	7.7	2.17	0.28
423-4		50-68	2.08	1.67			
423-5		68-76	1.99	1.59	11.8	3.1	0.26
423-6	V1-2	0-30	1.84	1.29			
423-7		30-60	2.60	2.21	4.4	1.52	0.35
423-8		60-65	2.04	1.74			
423-9		65-90	1.79	1.47	8.9	2.43	0.27
423-10	V3-G	0-25	1.84	1.44			
423-11		25-39	2.01	1.59			
423-12		39-48	2.31	2.10			
423-13		48-60	1.86	1.40			
423-14	V4	0-18	1.88	1.48	8.5	1.46	0.17
423-15		18-24			5.2	1.6	0.31
423-16		24-40	2.00	1.60	1.4	0.45	0.32
423-17	K1	0-10	1.91	1.49	5.3	0.71	0.13
423-18		10-20	1.81	1.38			
Average			1.97	1.58			
Ekofisk 2/4 A							
423-19	V9	0-15	1.68	1.26	12.1	4.13	0.34
423-20		15-33	1.97	1.58	5.35	1.44	0.27
423-21		33-43	2.00	1.60	4.45	1.11	0.25
423-22		43-53	1.84	1.46			
423-23		53-68	2.04	1.70	1.26	0.1	0.08
423-24		68-90	1.66	1.40	12.2	4.4	0.36
423-25	SW3	0-15	1.68	1.16			
423-26		15-23	1.81	1.12	7.6	1.45	0.19
423-27		23-30	1.63	1.31			
423-28		30-39	1.62	1.04	2.7	0.34	0.13
Average			1.80	1.36			0.25

* Rogaland Research, NS 4764. Full data set in appendix 3 labled "Glødetap"
** NIVA, Oslo

Appendix 3

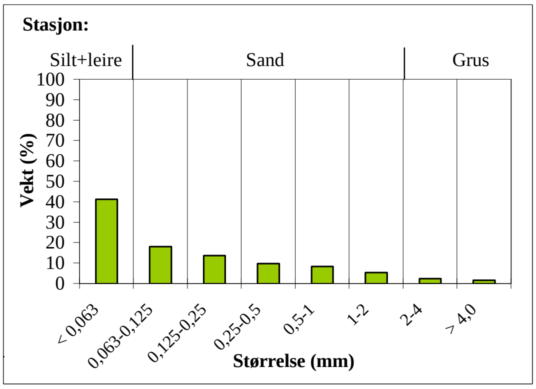
Grain size distribution data

Appendix 3

Stasjon:	**Beryl Vl-1**	Analyseperiode:	19.10.-08.11.00
Slice:	0-20 cm	RF-Miljølab. Analytiker:	R.M.
Lb.ref.nr.	00423-1		

Partikkelstørrelsesfordeling i sediment - sikteanalyse

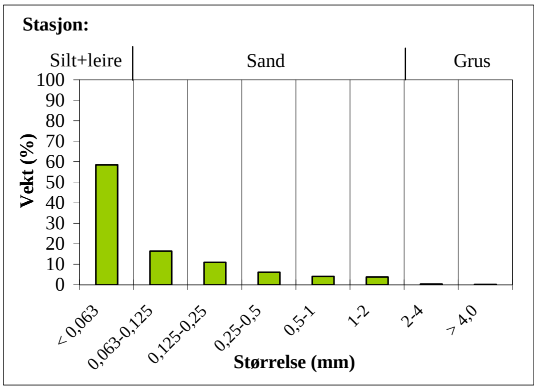
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.44	1.5	100.0
2-4	÷1 - ÷2	0.68	2.4	98.5
1-2	0 - ÷1	1.51	5.3	96.1
0,5-1	1-0	2.35	8.2	90.8
0,25-0,5	2-1	2.75	9.7	82.5
0,125-0,25	3-2	3.87	13.6	72.9
0,063-0,125	4-3	5.15	18.1	59.3
< 0,063	< 4	11.74	41.2	41.2
Innveiet prøve før analyse		28.49		
			Glødetap	7.8 %



Stasjon:	**Beryl Vl-1**	Analyseperiode:	19.10.-08.11.00
Slice:	30-40 cm	RF-Miljølab. Analytiker:	R.M.
Lab.ref.nr.:	00423-2		

Partikkelstørrelsesfordeling i sediment - sikteanalyse

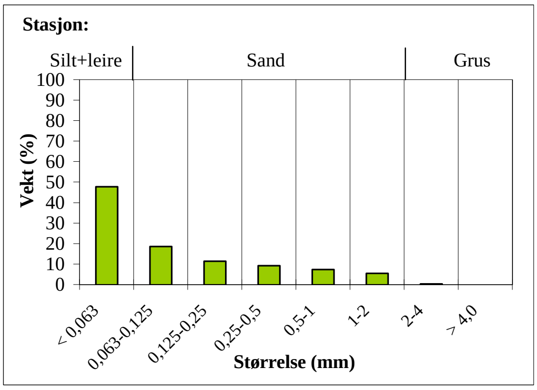
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.04	0.1	100.0
2-4	÷1 - ÷2	0.10	0.3	99.9
1-2	0 - ÷1	1.09	3.7	99.5
0,5-1	1-0	1.21	4.1	95.9
0,25-0,5	2-1	1.80	6.1	91.8
0,125-0,25	3-2	3.24	10.9	85.7
0,063-0,125	4-3	4.84	16.3	74.8
< 0,063	< 4	17.32	58.4	58.4
Innveiet prøve før analyse		29.64		
			Glødetap	6.4 %



Stasjon:	**Beryl Vl-1**	Analyseperiode:	19.10.-08.11.00
Slice:	40-48 cm	RF-Miljølab. Analytiker:	R.M.
Lab.ref.nr.:	00423-3		

Partikkelstørrelsesfordeling i sediment - sikteanalyse

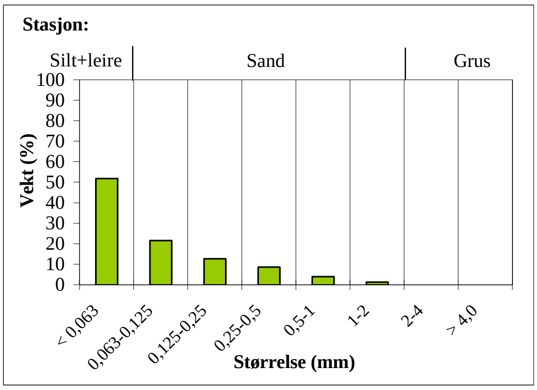
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.09	0.3	100.0
1-2	0 - ÷1	1.61	5.5	99.7
0,5-1	1-0	2.16	7.3	94.2
0,25-0,5	2-1	2.69	9.1	86.9
0,125-0,25	3-2	3.34	11.4	77.7
0,063-0,125	4-3	5.47	18.6	66.4
< 0,063	< 4	14.06	47.8	47.8
Innveiet prøve før analyse		29.42		
			Glødetap	7.7 %



Stasjon:	**Beryl Vl-1**	Analyseperiode:	19.10.-08.11.00
Slice:	50-68 cm	RF-Miljølab. Analytiker:	R.M.
Lab.ref.nr.:	00423-4		

Partikkelstørrelsesfordeling i sediment - sikteanalyse

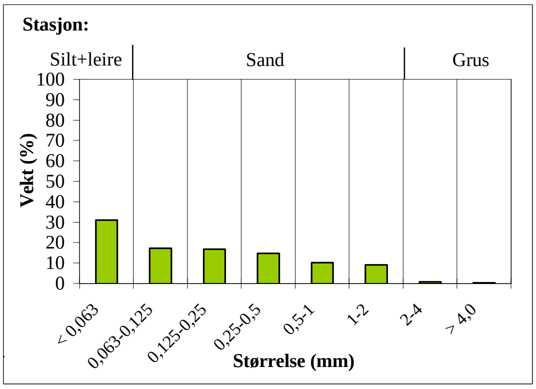
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.02	0.1	100.0
1-2	0 - ÷1	0.39	1.3	99.9
0,5-1	1-0	1.18	3.9	98.6
0,25-0,5	2-1	2.56	8.6	94.7
0,125-0,25	3-2	3.80	12.7	86.1
0,063-0,125	4-3	6.45	21.6	73.4
< 0,063	< 4	15.52	51.9	51.9
Innveiet prøve før analyse		29.92		
			Glødetap	4.8 %



Stasjon **Beryl Vl-1** Analyseperiode: 19.10.-08.11.2000
Slice: 68-76 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-5

Partikkelstørrelsesfordeling i sediment - sikteanalyse

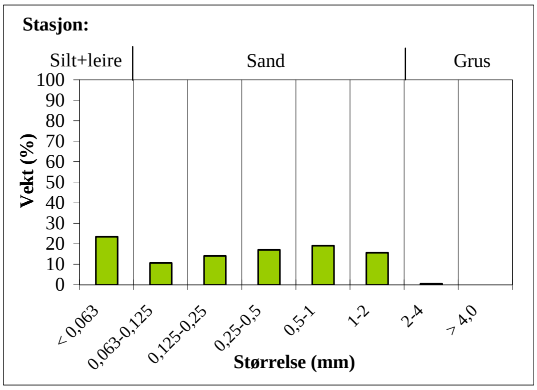
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.07	0.3	100.0
2-4	÷1 - ÷2	0.22	0.8	99.7
1-2	0 - ÷1	2.51	9.1	99.0
0,5-1	1-0	2.82	10.2	89.9
0,25-0,5	2-1	4.08	14.7	79.7
0,125-0,25	3-2	4.62	16.7	64.9
0,063-0,125	4-3	4.78	17.3	48.2
< 0,063	< 4	8.57	31.0	31.0
Innveiet prøve før analyse		27.67		
			Glødetap	11.8 %



Stasjon: **Beryl Vl-2** Analyseperiode: 19.10.-08.11.2000
Slice: 0-30 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 0000423-6

Partikkelstørrelsesfordeling i sediment - sikteanalyse

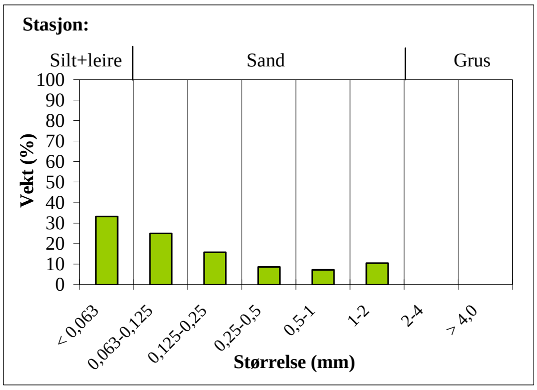
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.15	0.5	100.0
1-2	0 - ÷1	4.63	15.6	99.5
0,5-1	1-0	5.64	19.0	83.9
0,25-0,5	2-1	5.03	16.9	64.9
0,125-0,25	3-2	4.17	14.0	47.9
0,063-0,125	4-3	3.13	10.5	33.9
< 0,063	< 4	6.93	23.3	23.3
Innveiet prøve før analyse		29.68		
			Glødetap	9.0 %



Stasjon: **Beryl Vl-2** Analyseperiode: 19.10.-08.11.2000
Slice: 30-60 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-7

Partikkelstørrelsesfordeling i sediment - sikteanalyse

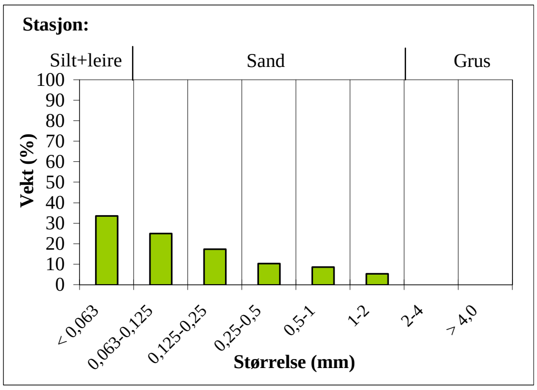
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.00	0.0	100.0
1-2	0 - ÷1	3.09	10.4	100.0
0,5-1	1-0	2.12	7.1	89.6
0,25-0,5	2-1	2.54	8.5	82.5
0,125-0,25	3-2	4.71	15.8	74.0
0,063-0,125	4-3	7.44	25.0	58.2
< 0,063	< 4	9.88	33.2	33.2
Innveiet prøve før analyse		29.78		
			Glødetap	4.4 %



Stasjon: **Beryl Vl-2** Analyseperiode: 19.10.-08.11.2000
Slice: 60-65 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-8

Partikkelstørrelsesfordeling i sediment - sikteanalyse

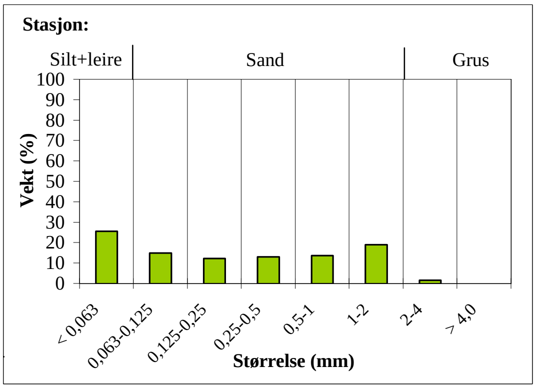
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.00	0.0	100.0
1-2	0 - ÷1	1.50	5.4	100.0
0,5-1	1-0	2.39	8.6	94.6
0,25-0,5	2-1	2.86	10.2	86.1
0,125-0,25	3-2	4.85	17.4	75.8
0,063-0,125	4-3	6.98	25.0	58.5
< 0,063	< 4	9.36	33.5	33.5
Innveiet prøve før analyse		27.94		
			Glødetap	9.5 %



Stasjon: **Beryl Vl-2** Analyseperiode: 24.10.-08.11.2000
Slice 65-90 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-9

Partikkelstørrelsesfordeling i sediment - sikteanalyse

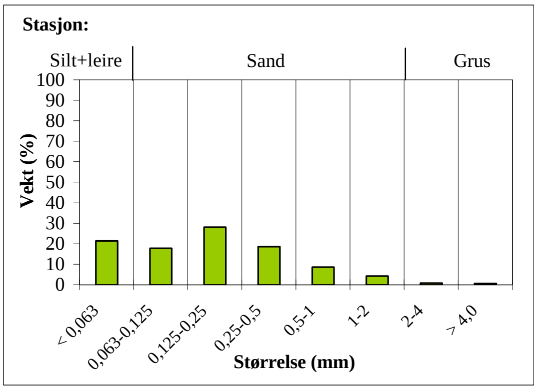
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.47	1.6	100.0
1-2	0 - ÷1	5.75	19.0	98.4
0,5-1	1-0	4.14	13.7	79.4
0,25-0,5	2-1	3.94	13.0	65.7
0,125-0,25	3-2	3.67	12.1	52.7
0,063-0,125	4-3	4.52	15.0	40.5
< 0,063	< 4	7.72	25.6	25.6
Innveiet prøve før analyse		30.21		
			Glødetap	8.9 %



Stasjon: **Beryl V3-9** Analyseperiode: 24.10.-08.11.2000
Slice: 0-25 RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-10

Partikkelstørrelsesfordeling i sediment - sikteanalyse

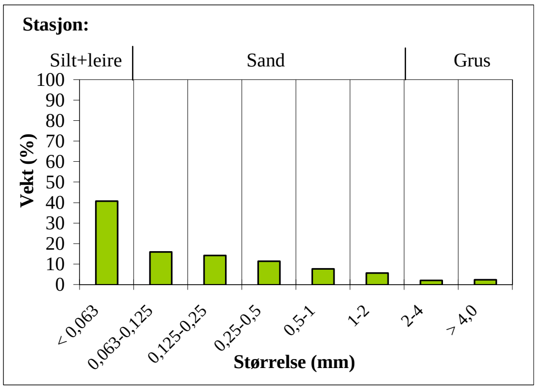
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.17	0.6	100.0
2-4	÷1 - ÷2	0.23	0.8	99.4
1-2	0 - ÷1	1.21	4.2	98.6
0,5-1	1-0	2.50	8.6	94.5
0,25-0,5	2-1	5.40	18.6	85.8
0,125-0,25	3-2	8.16	28.1	67.2
0,063-0,125	4-3	5.15	17.8	39.1
< 0,063	< 4	6.19	21.3	21.3
Innveiet prøve før analyse		29.01		
			Glødetap	4.5 %



Stasjon: **Beryl V3-9** Analyseperiode: 24.10.-08.11.2000
Slice: 25-39 RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-11

Partikkelstørrelsesfordeling i sediment - sikteanalyse

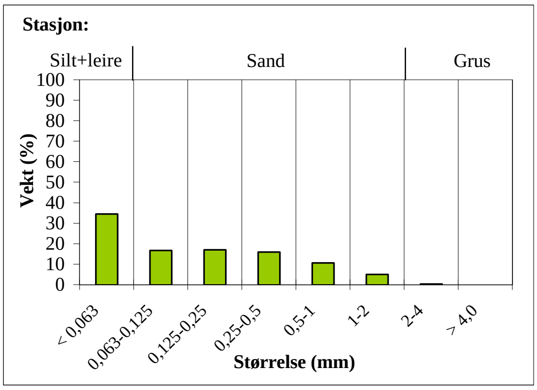
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.68	2.4	100.0
2-4	÷1 - ÷2	0.59	2.1	97.6
1-2	0 - ÷1	1.60	5.6	95.5
0,5-1	1-0	2.16	7.6	89.9
0,25-0,5	2-1	3.23	11.4	82.2
0,125-0,25	3-2	4.02	14.2	70.8
0,063-0,125	4-3	4.51	15.9	56.6
< 0,063	< 4	11.53	40.7	40.7
Innveiet prøve før analyse		28.32		
			Glødetap	6.6 %



Stasjon: **Beryl V3-9** Analyseperiode: 24.10.-08.11.2000
Slice: 39-48 RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-12

Partikkelstørrelsesfordeling i sediment - sikteanalyse

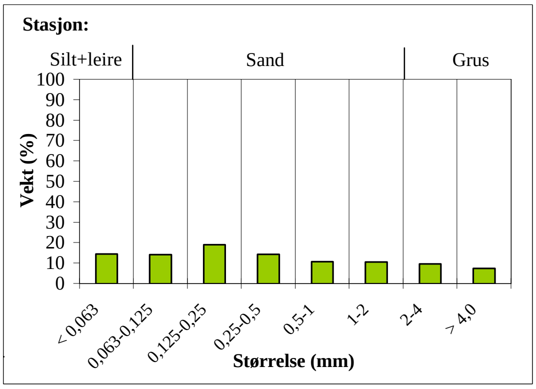
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.10	0.3	100.0
1-2	0 - ÷1	1.57	5.0	99.7
0,5-1	1-0	3.34	10.7	94.7
0,25-0,5	2-1	4.98	15.9	84.0
0,125-0,25	3-2	5.31	16.9	68.1
0,063-0,125	4-3	5.25	16.7	51.2
< 0,063	< 4	10.80	34.4	34.4
Innveiet prøve før analyse		31.35		
			Glødetap	5.9 %



Stasjon: **Beryl V3-9** Analyseperiode: 24.10.-08.11.2000
Slice: 48-60 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-13

Partikkelstørrelsesfordeling i sediment - sikteanalyse

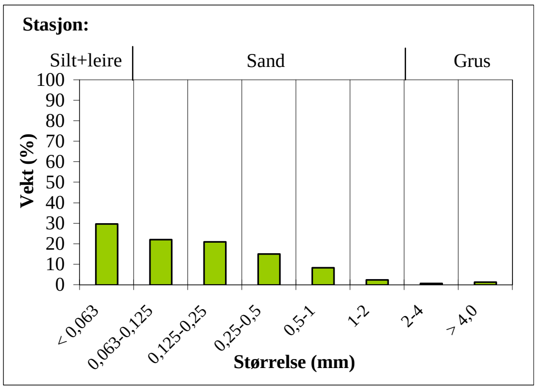
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	2.10	7.4	100.0
2-4	÷1 - ÷2	2.72	9.6	92.6
1-2	0 - ÷1	2.99	10.6	83.0
0,5-1	1-0	3.01	10.6	72.4
0,25-0,5	2-1	4.06	14.3	61.8
0,125-0,25	3-2	5.37	18.9	47.5
0,063-0,125	4-3	3.99	14.1	28.5
< 0,063	< 4	4.10	14.5	14.5
Innveiet prøve før analyse		28.34		
			Glødetap	8.3 %



Stasjon: **Beryl V4** Analyseperiode: 24.10.-08.11.2000
Slice 0-18 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-14

Partikkelstørrelsesfordeling i sediment - sikteanalyse

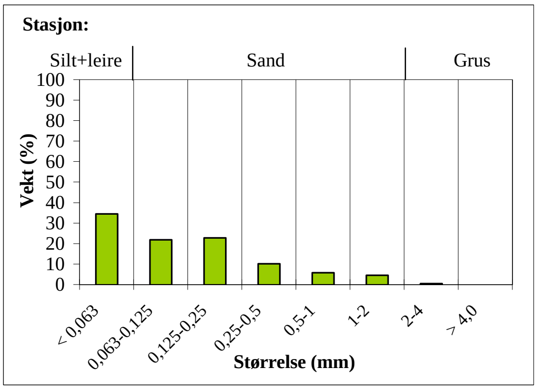
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.34	1.2	100.0
2-4	÷1 - ÷2	0.20	0.7	98.8
1-2	0 - ÷1	0.68	2.3	98.1
0,5-1	1-0	2.40	8.3	95.8
0,25-0,5	2-1	4.34	15.0	87.5
0,125-0,25	3-2	6.04	20.9	72.5
0,063-0,125	4-3	6.37	22.0	51.6
< 0,063	< 4	8.58	29.6	29.6
Innveiet prøve før analyse		28.95		
			Glødetap	8.5 %



Stasjon: **Beryl V4** Analyseperiode: 24.10.-08.11.2000
Slice: 18-24 RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-15

Partikkelstørrelsesfordeling i sediment - sikteanalyse

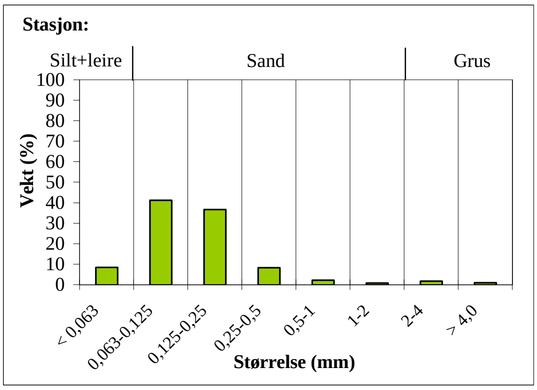
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.12	0.4	100.0
1-2	0 - ÷1	1.23	4.5	99.6
0,5-1	1-0	1.59	5.8	95.1
0,25-0,5	2-1	2.78	10.2	89.2
0,125-0,25	3-2	6.20	22.7	79.0
0,063-0,125	4-3	5.97	21.9	56.3
< 0,063	< 4	9.41	34.5	34.5
Innveiet prøve før analyse		27.30		
			Glødetap	5.2 %



Stasjon: **Beryl V 4** Analyseperiode: 24.10.-08.11.2000
Slice: 24-40 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-16

Partikkelstørrelsesfordeling i sediment - sikteanalyse

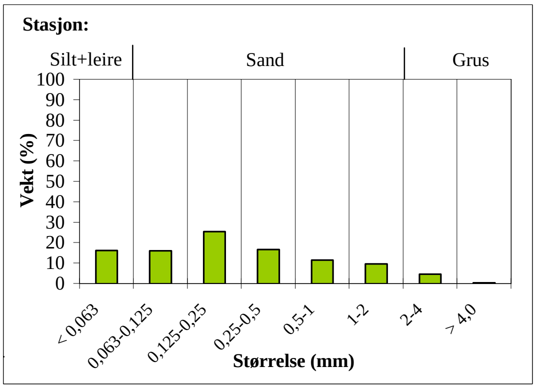
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.27	1.0	100.0
2-4	÷1 - ÷2	0.47	1.7	99.0
1-2	0 - ÷1	0.23	0.8	97.4
0,5-1	1-0	0.60	2.1	96.6
0,25-0,5	2-1	2.31	8.2	94.4
0,125-0,25	3-2	10.33	36.7	86.2
0,063-0,125	4-3	11.59	41.1	49.6
< 0,063	< 4	2.38	8.4	8.4
Innveiet prøve før analyse		28.18		
			Glødetap	1.4 %



Stasjon: **Beryl K l** Analyseperiode: 26.10-08.11.2000
Slice: 0-10 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-17

Partikkelstørrelsesfordeling i sediment - sikteanalyse

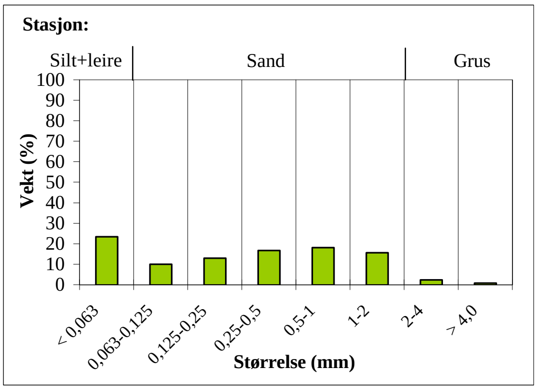
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.09	0.3	100.0
2-4	÷1 - ÷2	1.27	4.5	99.7
1-2	0 - ÷1	2.72	9.6	95.2
0,5-1	1-0	3.23	11.4	85.6
0,25-0,5	2-1	4.68	16.6	74.1
0,125-0,25	3-2	7.18	25.4	57.6
0,063-0,125	4-3	4.53	16.0	32.2
< 0,063	< 4	4.56	16.1	16.1
Innveiet prøve før analyse		28.26		
			Glødetap	5.3 %



Stasjon: **Beryl K l** Analyseperiode: 26.10.-08.11.2000
Slice: 10-20 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-18

Partikkelstørrelsesfordeling i sediment - sikteanalyse

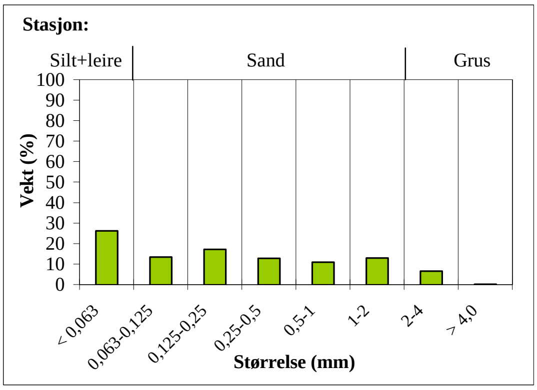
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.24	0.8	100.0
2-4	÷1 - ÷2	0.66	2.3	99.2
1-2	0 - ÷1	4.45	15.7	96.8
0,5-1	1-0	5.15	18.1	81.2
0,25-0,5	2-1	4.75	16.7	63.0
0,125-0,25	3-2	3.67	12.9	46.3
0,063-0,125	4-3	2.82	9.9	33.4
< 0,063	< 4	6.66	23.5	23.5
Innveiet prøve før analyse		28.40		
			Glødetap	6.9 %



Stasjon: **Ekofisk V 9** Analyseperiode: 26.10.-08.11.2000
Slice 0-15 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-19

Partikkelstørrelsesfordeling i sediment - sikteanalyse

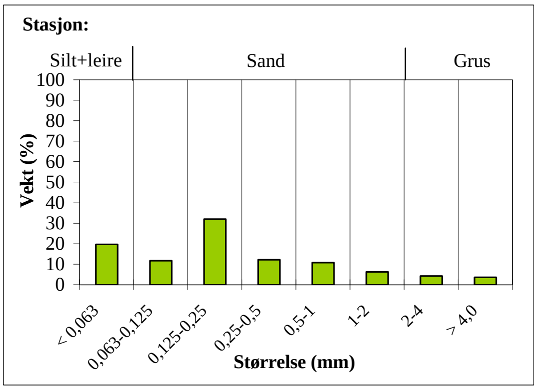
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.05	0.2	100.0
2-4	÷1 - ÷2	1.78	6.5	99.8
1-2	0 - ÷1	3.54	12.9	93.3
0,5-1	1-0	2.99	10.9	80.4
0,25-0,5	2-1	3.50	12.8	69.5
0,125-0,25	3-2	4.69	17.1	56.8
0,063-0,125	4-3	3.68	13.4	39.7
< 0,063	< 4	7.21	26.3	26.3
Innveiet prøve før analyse		27.44		
			Glødetap	12.1 %



Stasjon: **Ekofisk V 9** Analyseperiode: 26.10.-08.11.2000
Slice: 15-33 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-20

Partikkelstørrelsesfordeling i sediment - sikteanalyse

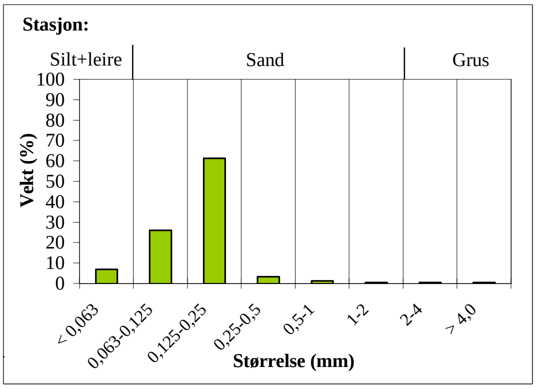
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.98	3.6	100.0
2-4	÷1 - ÷2	1.15	4.2	96.4
1-2	0 - ÷1	1.71	6.2	92.2
0,5-1	1-0	2.94	10.7	86.0
0,25-0,5	2-1	3.32	12.1	75.3
0,125-0,25	3-2	8.76	31.9	63.2
0,063-0,125	4-3	3.21	11.7	31.3
< 0,063	< 4	5.38	19.6	19.6
Innveiet prøve før analyse		27.45		
			Glødetap	5.3 %



Stasjon: **Ekofisk V 9** Analyseperiode: 26.10-08.11.2000
Slice: 33-43 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-21

Partikkelstørrelsesfordeling i sediment - sikteanalyse

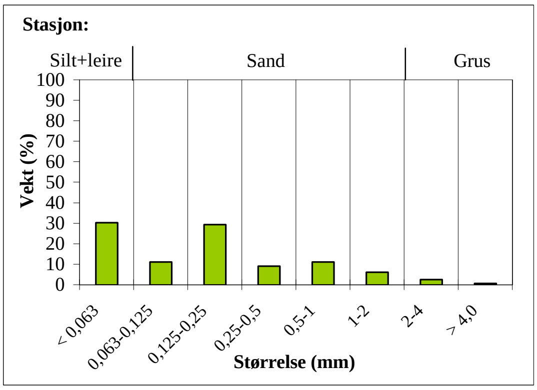
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.12	0.4	100.0
2-4	÷1 - ÷2	0.14	0.5	99.6
1-2	0 - ÷1	0.13	0.5	99.0
0,5-1	1-0	0.33	1.2	98.6
0,25-0,5	2-1	0.88	3.2	97.4
0,125-0,25	3-2	16.65	61.2	94.1
0,063-0,125	4-3	7.07	26.0	32.9
< 0,063	< 4	1.87	6.9	6.9
Innveiet prøve før analyse		27.19		
			Glødetap	4.5 %



Stasjon: **Ekofisk V 9** Analyseperiode: 26.10.-08.11.2000
Slice: 43-53 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-22

Partikkelstørrelsesfordeling i sediment - sikteanalyse

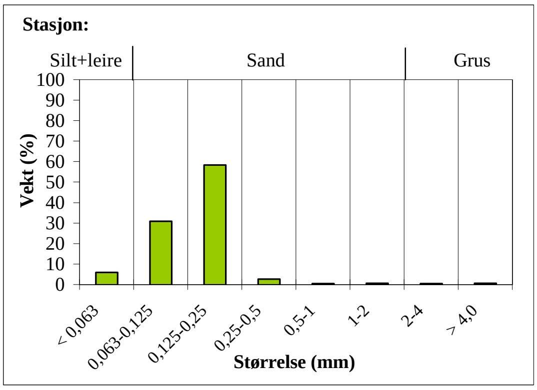
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.19	0.7	100.0
2-4	÷1 - ÷2	0.74	2.6	99.3
1-2	0 - ÷1	1.76	6.1	96.8
0,5-1	1-0	3.21	11.1	90.7
0,25-0,5	2-1	2.62	9.0	79.6
0,125-0,25	3-2	8.50	29.3	70.6
0,063-0,125	4-3	3.20	11.0	41.2
< 0,063	< 4	8.75	30.2	30.2
Innveiet prøve før analyse		28.97		
			Glødetap	1.3 %



Stasjon: **Ekofisk V 9** Analyseperiode: 26.10.-08.11.2000
Slice: 53-68 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-23

Partikkelstørrelsesfordeling i sediment - sikteanalyse

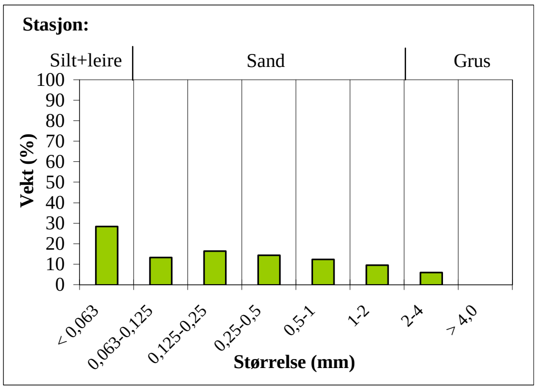
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.17	0.6	100.0
2-4	÷1 - ÷2	0.15	0.5	99.4
1-2	0 - ÷1	0.18	0.6	98.8
0,5-1	1-0	0.12	0.4	98.2
0,25-0,5	2-1	0.73	2.6	97.8
0,125-0,25	3-2	16.17	58.3	95.1
0,063-0,125	4-3	8.58	30.9	36.8
< 0,063	< 4	1.63	5.9	5.9
Innveiet prøve før analyse		27.73		
			Glødetap	0.6 %



Stasjon: **Ekofisk SW 3** Analyseperiode: 26.10.-08.11.2000
Slice: 0-15 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-24

Partikkelstørrelsesfordeling i sediment - sikteanalyse

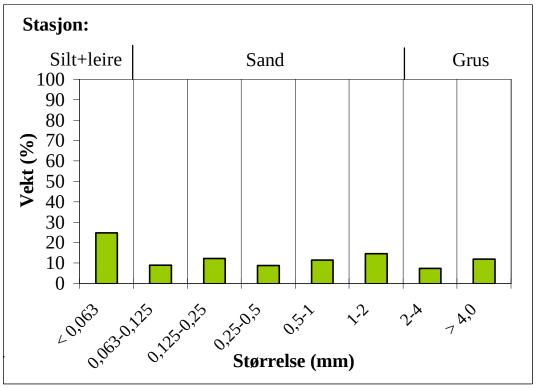
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	1.65	5.9	100.0
1-2	0 - ÷1	2.66	9.5	94.1
0,5-1	1-0	3.43	12.3	84.6
0,25-0,5	2-1	4.01	14.3	72.3
0,125-0,25	3-2	4.57	16.3	58.0
0,063-0,125	4-3	3.71	13.3	41.7
< 0,063	< 4	7.95	28.4	28.4
Innveiet prøve før analyse		27.98		
			Glødetap	12.2 %



Stasjon: **Ekofisk SW3** Analyseperiode: 02.11.-08.11.2000
Slice: 15-23 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-25

Partikkelstørrelsesfordeling i sediment - sikteanalyse

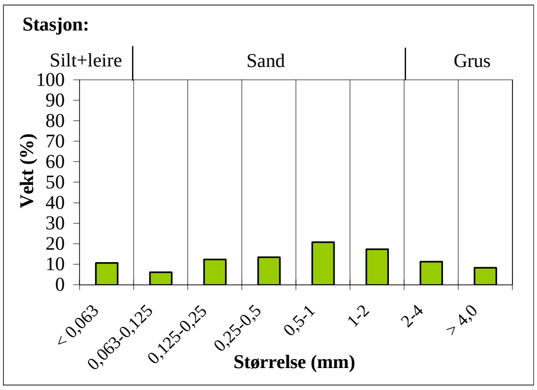
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	3.33	11.9	100.0
2-4	÷1 - ÷2	2.04	7.3	88.1
1-2	0 - ÷1	4.07	14.6	80.8
0,5-1	1-0	3.19	11.4	66.2
0,25-0,5	2-1	2.46	8.8	54.8
0,125-0,25	3-2	3.43	12.3	46.0
0,063-0,125	4-3	2.49	8.9	33.7
< 0,063	< 4	6.91	24.7	24.7
Innveiet prøve før analyse		27.92		
			Glødetap	7.5 %



Stasjon: **Ekofisk SW3** Analyseperiode: 02.11.-08.11.2000
Slice: 23-30 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-26

Partikkelstørrelsesfordeling i sediment - sikteanalyse

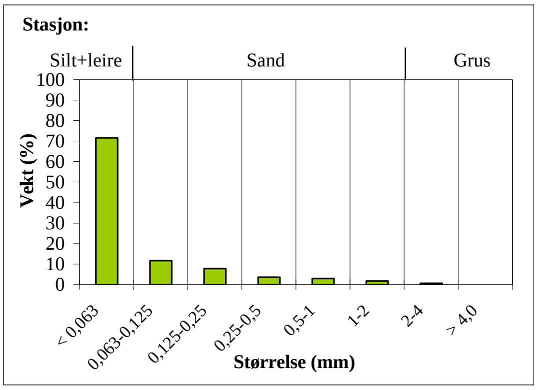
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	2.28	8.2	100.0
2-4	÷1 - ÷2	3.11	11.2	91.8
1-2	0 - ÷1	4.79	17.3	80.6
0,5-1	1-0	5.77	20.8	63.3
0,25-0,5	2-1	3.70	13.3	42.5
0,125-0,25	3-2	3.42	12.3	29.1
0,063-0,125	4-3	1.69	6.1	16.8
< 0,063	< 4	2.96	10.7	10.7
Innveiet prøve før analyse		27.72		
			Glødetap	7.6 %



Stasjon: **Ekofisk SW3** Analyseperiode: 02.11.-08.11.2000
Slice: 30-39 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-27

Partikkelstørrelsesfordeling i sediment - sikteanalyse

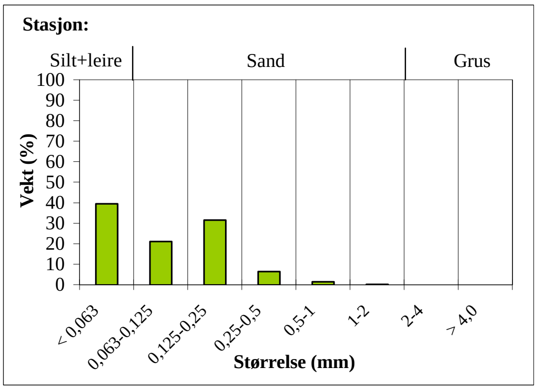
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.16	0.6	100.0
1-2	0 - ÷1	0.49	1.7	99.4
0,5-1	1-0	0.85	3.0	97.7
0,25-0,5	2-1	1.05	3.7	94.8
0,125-0,25	3-2	2.23	7.8	91.1
0,063-0,125	4-3	3.38	11.8	83.4
< 0,063	< 4	20.59	71.6	71.6
Innveiet prøve før analyse		28.75		
			Glødetap	4.8 %



Stasjon: **Ekofisk SW3** Analyseperiode: 02.11.-08.11.2000
Slice: 39-47 cm RF-Miljølab. Analytiker: R.M.
Lab.ref.nr.: 00423-28

Partikkelstørrelsesfordeling i sediment - sikteanalyse

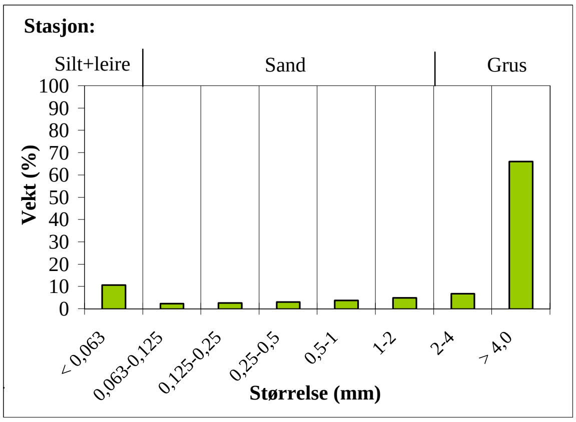
Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	0.00	0.0	100.0
2-4	÷1 - ÷2	0.00	0.0	100.0
1-2	0 - ÷1	0.05	0.2	100.0
0,5-1	1-0	0.40	1.4	99.8
0,25-0,5	2-1	1.80	6.3	98.4
0,125-0,25	3-2	8.95	31.5	92.1
0,063-0,125	4-3	5.97	21.0	60.5
< 0,063	< 4	11.20	39.5	39.5
Innveiet prøve før analyse		28.37		
			Glødetap	2.8 %



Stasjon:	**xx**	Analyseperiode:	02.11.-08.11.2000	
Hugg nr.	x	RF-Miljølab. Analytiker:	R.M.	
Lab.ref.nr.:	00423-29			

Partikkelstørrelsesfordeling i sediment - sikteanalyse

Størrelse (mm)	Phi ϕ	Vekt (g)	Vekt (%)	Kumulativ vekt (%)
> 4,0	> ÷2	16.91	66.0	100.0
2-4	÷1 - ÷2	1.74	6.8	34.0
1-2	0 - ÷1	1.26	4.9	27.2
0,5-1	1-0	0.97	3.8	22.3
0,25-0,5	2-1	0.79	3.1	18.5
0,125-0,25	3-2	0.67	2.6	15.4
0,063-0,125	4-3	0.57	2.2	12.8
< 0,063	< 4	2.71	10.6	10.6
Innveiet prøve før analyse		25.62		
			Glødetap	16.1 %



Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	VI-1	0-20
Filename: BERY1M-.#01		

Phi	Particle	Number	Cum. No.	Volume	Cum. Vol.	Cum. S. A.
	Diameter		% <		% <	% <
	um					
>4,00	63	100.0	100.0	2.3	99.0	99.8
4.50	44	0.0	100.0	13.4	96.6	99.3
5.00	31	0.1	99.9	15.8	83.2	95.4
5.50	22	0.3	99.6	15.8	67.5	89.0
6.00	15	0.9	98.7	27.8	51.7	79.6
7.00	8	7.6	91.0	17.1	23.9	52.8
8.00	4	34.3	56.7	6.8	6.8	21.0
9.00	2	56.7	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	VI-1	30-40
Filename: BERY2M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	3.5	100.0	100.0
4.5	44	0.1	100.0	13.1	96.5	99.2
5	31	0.3	99.9	16.9	83.4	95.2
5.5	22	1.1	99.6	19.1	66.5	88.1
6	15	6.8	98.4	25.2	47.4	76.6
7	8	32.1	91.6	15.4	22.2	51.7
8	4	59.5	59.5	6.8	6.8	22.0
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	VI-1	40-48
Filename: BERY3M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	5.8	97.2	99.5
4.5	44	0.2	100.0	17.0	91.4	98.2
5	31	0.3	99.8	14.1	74.5	92.6
5.5	22	1.0	99.5	14.2	60.4	86.3
6	15	8.8	98.5	25.8	46.1	76.9
7	8	36.3	89.7	15.2	20.3	49.0
8	4	53.4	53.4	5.2	5.2	17.9
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	VI-1	50-68
Filename: BERY4M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	1.0	99.1	99.9
4.5	44	0.1	100.0	9.0	98.1	99.6
5	31	0.4	99.9	19.0	89.1	96.9
5.5	22	1.2	99.5	20.4	70.1	89.0
6	15	7.8	98.3	27.7	49.7	76.8
7	8	32.7	90.5	15.5	22.0	49.8
8	4	57.8	57.8	6.4	6.4	20.4
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	VI-1	60-76
Filename: BERY5M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	5.7	97.7	99.6
4.5	44	0.3	100.0	22.7	92.0	97.9
5	31	0.7	99.7	20.1	69.4	88.9
5.5	22	1.7	99.0	17.9	49.3	77.6
6	15	8.4	97.4	18.8	31.4	63.5
7	8	29.0	89.0	8.5	12.6	39.1
8	4	60.0	60.0	4.1	4.1	17.5
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	VI-2	0-30
Filename: BERY6M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
	65	0.0	100.0	1.5	93.1	98.7
>4,00	63	0.0	100.0	4.4	91.5	98.3
4.5	44	0.2	100.0	12.7	87.1	97.0
5	31	0.8	99.8	19.2	74.4	91.9
5.5	22	2.3	99.0	18.2	55.2	81.2
6	15	14.7	96.7	25.2	37.1	66.7
7	8	36.5	82.1	9.3	11.8	33.5
8	4	45.5	45.5	2.5	2.5	10.7
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	VI-2	30-60
Filename: BERY7M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
	65	0.0	100.0	2.0	90.2	97.6
>4,00	63	0.1	100.0	16.5	88.2	97.1
4.5	44	0.2	99.9	14.9	71.7	91.7
5	31	0.6	99.6	13.5	56.8	84.9
5.5	22	1.9	99.0	13.6	43.3	76.2
6	15	12.1	97.2	19.3	29.7	63.7
7	8	33.6	85.1	7.8	10.4	34.7
8	4	51.4	51.4	2.6	2.6	12.7
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V1-2	60-65
Filename: BERY8M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
	65	0.0	100.0	1.2	92.0	98.1
>4,00	63	0.1	100.0	9.3	90.9	97.8
4.5	44	0.3	99.9	19.6	81.6	94.8
5	31	0.8	99.6	17.0	62.0	85.9
5.5	22	2.4	98.8	17.3	45.0	75.0
6	15	12.4	96.3	18.3	27.7	59.3
7	8	33.5	83.9	7.1	9.4	31.6
8	4	50.4	50.4	2.4	2.4	11.6
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V1-2	65-90
Filename: BERY9M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
	65	0.0	100.0	0.7	89.1	97.9
>4,00	63	0.0	100.0	10.1	88.4	97.7
4.5	44	0.2	99.9	14.6	78.4	94.9
5	31	0.7	99.7	16.3	63.7	88.6
5.5	22	2.0	99.0	13.9	47.4	78.7
6	15	14.6	97.0	22.6	33.5	66.3
7	8	33.3	82.4	8.5	11.0	33.6
8	4	49.1	49.1	2.5	2.5	11.6
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	V3-G	0-25
Filename: BERY10M-.#01		

Phi	Particle Diameter um	Number	Cum. No. % <	Volume	Cum. Vol. % <	Cum. S. A. % <
>4,00	63	0.0	100.0	7.8	100.0	100.0
4.5	44	0.1	100.0	10.0	92.2	98.4
5	31	0.3	99.9	14.8	82.1	95.4
5.5	22	1.0	99.6	17.6	67.3	89.3
6	15	7.4	98.7	27.9	49.7	78.7
7	8	28.5	91.3	14.4	21.9	51.2
8	4	62.8	62.8	7.5	7.5	23.9
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V3-G	25-39
Filename: BERY11M-.#01		

Phi	Particle Diameter um	Number	Cum. no % <	Volume	Cum. vol. % <	Cum.S.A. % <
>4,00	63.00	0.0	100.0	6.7	96.4	99.4
4.5	44.00	0.1	100.0	13.0	89.8	97.7
5	31.00	0.5	99.9	18.7	76.8	93.2
5.5	22.00	1.5	99.3	18.9	58.1	83.9
6	15.00	8.8	97.8	23.3	39.2	70.5
7	8.00	32.0	89.0	11.2	15.9	43.3
8	4.00	57.1	57.1	4.7	4.7	17.9
9	2.00	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V3-G	39-48
Filename: BERY12M-.#01		

Phi	Particle Diameter um	Number	Cum. No. % <	Volume	Cum. Vol. % <	Cum. S. A. % <
	65	0.0	100.0	4.2	100.0	100.0
>4,00	63	0.1	100.0	11.7	95.8	98.9
4.5	44	0.5	99.9	20.2	84.2	94.8
5	31	1.3	99.4	19.3	64.0	85.3
5.5	22	3.3	98.1	17.1	44.7	72.3
6	15	17.8	94.9	20.1	27.6	56.0
7	8	34.3	77.0	6.0	7.5	24.7
8	4	42.8	42.8	1.5	1.5	7.6
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	V3-G	48-60
Filename: BERY13M-.#01		

Phi	Particle	Number	Cum. No.	Volume	Cum. Vol.	Surface Area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	4.3	100.0	100.0
4.5	44	0.1	100.0	12.6	95.7	99.0
5	31	0.4	99.9	16.6	83.2	94.8
5.5	22	1.4	99.5	20.5	66.6	87.3
6	15	9.2	98.0	27.3	46.0	74.2
7	8	32.5	88.8	13.4	18.7	45.3
8	4	56.3	56.3	5.4	5.4	18.3
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V-4	0-18
Filename: BERY14M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Surface Area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.1	100.0	10.9	100.0	100.0
4.5	44	0.5	99.9	20.3	89.1	96.3
5	31	1.2	99.4	19.3	68.8	87.0
5.5	22	3.7	98.3	20.8	49.5	74.7
6	15	17.0	94.6	21.1	28.8	55.8
7	8	30.1	77.7	5.9	7.7	24.7
8	4	47.6	47.6	1.8	1.8	8.8
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V-4	18-24
Filename: BERY15M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Surface Area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	6.5	100.0	100.0
4.5	44	0.2	100.0	15.1	93.6	98.3
5	31	0.6	99.8	18.3	78.5	92.9
5.5	22	2.1	99.2	21.9	60.2	83.6
6	15	10.9	97.2	24.3	38.3	67.5
7	8	31.4	86.3	10.1	14.0	38.2
8	4	54.9	54.9	4.0	4.0	15.4
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	V-4	24-40
Filename: BERY16M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Surface Area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	10.1	91.9	98.4
4.5	44	0.2	100.0	16.1	81.8	95.5
5	31	0.4	99.8	15.5	65.7	89.5
5.5	22	1.4	99.4	17.1	50.2	81.1
6	15	7.4	98.0	18.3	33.1	68.0
7	8	24.1	90.6	9.5	14.9	44.4
8	4	66.5	66.5	5.4	5.4	22.2
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	K1	0-10
Filename: BERY17M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	6.3	100.0	1.4	100.0	100.0
4.5	44	20.0	93.7	6.8	98.6	100.0
5	31	14.0	73.7	6.6	91.9	99.8
5.5	22	17.0	59.7	11.4	85.3	99.5
6	15	24.2	42.7	26.7	73.9	98.3
7	8	12.7	18.5	26.7	47.2	90.3
8	4	5.8	5.8	20.6	20.6	60.0
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	K1	10-20
Filename: BERY18M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
	65	0.0	100.0	1.5	100.0	100.0
>4,00	63	0.0	100.0	5.4	98.5	99.8
4.5	44	0.1	100.0	11.4	93.2	98.6
5	31	0.2	99.9	14.7	81.8	95.5
5.5	22	0.8	99.7	15.6	67.1	89.8
6	15	6.1	98.9	25.2	51.5	81.0
7	8	31.1	92.9	17.8	26.2	57.3
8	4	61.7	61.7	8.5	8.5	25.4
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	V9	0-15
Filename: BERY19M-.#01		

Phi	Particle Diameter um	Number	Cum. No % <	Volume	Cum. Vol % <	Cum. Surface area % <
>4,00	63	0.0	100.0	8.7	98.3	99.6
4.5	44	0.2	100.0	16.6	89.6	97.2
5	31	0.7	99.7	18.9	73.0	90.6
5.5	22	2.3	99.0	19.5	54.1	80.1
6	15	11.9	96.7	22.4	34.6	64.5
7	8	34.1	84.8	9.2	12.2	35.3
8	4	50.7	50.7	3.0	3.0	12.8
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V9	15-33
Filename: BERY20M-.#01		

Phi	Particle Diameter um	Number	Cum. No % <	Volume	Cum. Vol % <	Cum. Surface area % <
>4,00	63	0.0	100.0	2.2	100.0	100.0
4.5	44	0.1	100.0	9.0	97.8	99.6
5	31	0.3	99.9	16.1	88.8	97.1
5.5	22	1.1	99.7	19.9	72.6	90.8
6	15	6.9	98.6	27.4	52.7	79.6
7	8	32.9	91.7	17.8	25.3	54.2
8	4	58.9	58.9	7.5	7.5	22.4
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V9	33-43
Filename: BERY21M-.#01		

Phi	Particle Diameter um	Number	Cum. No % <	Volume	Cum. Vol % <	Cum. Surface area % <
>4,00	63	0.0	100.0	3.3	98.4	99.8
4.5	44	0.0	100.0	6.8	95.2	99.2
5	31	0.1	100.0	11.0	88.4	97.5
5.5	22	0.7	99.8	17.2	77.4	93.8
6	15	5.5	99.1	29.0	60.3	85.2
7	8	28.7	93.7	20.2	31.3	61.4
8	4	65.0	65.0	11.1	11.1	29.3
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	V9	43-53
Filename: BERY22M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
	65	0.0	100.0	0.0	88.6	98.0
>4,00	63	0.0	100.0	6.3	88.6	98.0
4.5	44	0.1	100.0	13.6	82.2	96.2
5	31	0.5	99.8	19.0	68.7	91.1
5.5	22	1.2	99.3	14.4	49.6	81.1
6	15	8.2	98.1	19.8	35.3	70.1
7	8	27.5	90.0	10.4	15.5	44.8
8	4	62.4	62.4	5.1	5.1	20.6
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V9	53-68
Filename: BERY23M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	18.3	100.0	100.0
4.5	44	0.1	100.0	15.6	81.7	95.9
5	31	0.2	99.9	11.0	66.1	91.3
5.5	22	0.7	99.7	12.4	55.1	86.4
6	15	6.1	99.0	20.8	42.8	78.4
7	8	24.2	92.9	14.0	22.0	55.4
8	4	68.7	68.7	8.0	8.0	27.9
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	V9	68-90
Filename: BERY24M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	8.5	100.0	100.0
4.5	44	0.4	100.0	22.5	91.5	97.4
5	31	0.9	99.6	20.5	69.1	88.0
5.5	22	2.3	98.7	17.8	48.5	75.8
6	15	12.2	96.4	20.5	30.8	60.7
7	8	32.6	84.2	7.6	10.3	32.2
8	4	51.6	51.6	2.7	2.7	12.2
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

		Core	Slice
COULTER MULTISIZER		SW3	0-15
Filename:	BERY25M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	1.9	100.0	100.0
4.5	44	0.1	100.0	9.6	98.1	99.6
5	31	0.2	99.9	15.0	88.5	97.0
5.5	22	0.8	99.7	18.2	73.5	91.4
6	15	6.2	98.9	27.6	55.3	81.8
7	8	30.1	92.7	18.4	27.7	57.3
8	4	62.6	62.6	9.2	9.2	26.1
9	2	0.0	0.0	0.0	0.0	0.0

		Core	Slice
COULTER MULTISIZER		SW3	15-23
Filename:	BERY26M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	4.2	100.0	100.0
4.5	44	0.1	100.0	9.6	95.8	99.3
5	31	0.3	99.9	15.4	86.2	96.8
5.5	22	0.7	99.7	16.7	70.8	90.8
6	15	6.0	99.0	27.3	54.2	81.9
7	8	25.3	93.0	16.6	26.8	57.4
8	4	67.7	67.7	10.3	10.3	29.4
9	2	0.0	0.0	0.0	0.0	0.0

		Core	Slice
COULTER MULTISIZER		SW3	23-30
Filename:	BERY27M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	2.1	100.0	100.0
4.5	44	0.0	100.0	8.5	97.9	99.6
5	31	0.2	100.0	15.5	89.4	97.3
5.5	22	0.8	99.7	19.8	74.0	91.7
6	15	5.0	98.9	25.6	54.1	81.4
7	8	27.8	93.9	18.0	28.5	59.6
8	4	66.2	66.2	10.5	10.5	29.3
9	2	0.0	0.0	0.0	0.0	0.0

Coulter multisizer fine fraction tables.XLS

	Core	Slice
COULTER MULTISIZER	SW3	30-39
Filename: BERY28M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	0.0	100.0	6.1	99.3	99.9
4.5	44	0.1	100.0	13.6	93.2	98.8
5	31	0.2	99.9	16.4	79.7	95.3
5.5	22	0.5	99.7	15.2	63.2	89.3
6	15	3.1	99.2	18.4	48.0	81.4
7	8	22.3	96.1	15.9	29.6	65.7
8	4	73.8	73.8	13.7	13.7	38.2
9	2	0.0	0.0	0.0	0.0	0.0

	Core	Slice
COULTER MULTISIZER	SW3	39-47
Filename: BERY29M-.#01		

Phi	Particle	Number	Cum. No	Volume	Cum. Vol	Cum. Surface area
	Diameter		% <		% <	% <
	um					
>4,00	63	2.3	100.0	0.5	100.0	100.0
4.5	44	13.2	97.7	4.4	99.5	100.0
5	31	17.0	84.5	7.9	95.1	99.9
5.5	22	21.6	67.5	14.3	87.2	99.4
6	15	29.4	45.9	32.3	72.8	97.7
7	8	11.8	16.5	23.9	40.6	86.4
8	4	4.7	4.7	16.7	16.7	56.2
9	2	0.0	0.0	0.0	0.0	0.0

Appendix 4

Organic contaminants and nitrogen

Appendix 4

Rapport

Analyse av sedimenter
Ekofisk og Beryl

Rekvirent: **RF-Rogalandsforskning**
Stig Westerlund
Professor Olav Hanssensvei 15
Pb 2503 Ullandhaug
N-4004 Stavanger

Dato utgitt: 12.01.2001

Utført av: MILJØ-KJEMI, Norsk Miljø Senter
Nils Hansens vei 13, N-0667 Oslo

Bente Breyholtz
cand. scient.

Einar Richter Jordfald
laboratorieleder

Generelt

MILJØ-KJEMI Norsk Miljø Senter har foretatt analyse av 73 sedimentprøver.

Analysene er rekvirert av Rogalandsforskning ved Stig Westerlund.

Prøvemateriale og analyseomfang

Laboratoriet mottok den 17.10.2000 65 sedimentprøver og den 16.11.2000 8 sedimentprøver til følgende analyseprogram:

-THC

-PAH

-PCB

-NPD

-Dekaliner

-Nitrogen ved Kjeldahl

I samråd med kunden ble det valgt å analysere for total nitrogen i stedet for Kjeldahl nitrogen. Forskjellen utgjøres av nitrat/nitritt og stikkprøveanalyser viste forsvinnende lite nitrat/nitritt (maks 1,56 mg/kg TS).

I tillegg skulle noen av prøvene analyseres for polyalfaolifin borevæske og esterbasert borevæske.

Prøvene var merket som i liste vedlagt sedimentprøvene.

Hver prøve ble mottatt nedfrosset i aluminiumsfolie pakket i plastpose med lynlås.

Prøvene ble holdt nedfrosset frem til analyse

Analysene er utført i perioden 17.10.2000-10.01.2001.

Analysemetoder

Prøve til analyse ble tatt ut ved å ta ut 10 delprøver fra prøven.

MK-2020 **THC i sediment**

***Prinsipp*:**
Prøven forsåpes i metanolisk KOH. Prøven filtreres, og filtratet ekstraheres med diklormetan. Den polare fraksjonen fjernes ved kolonnekromatografi.
Etter inndamping analyseres ekstraktet ved gasskromatografi med flamme-ionisasjonsdetektor (GC/FID).

Borevæskene PETROFREE mud, ANCO GREEN ester mud og NOVATEC Drilling fluid er benyttet til å identifisere/kvantifisere hhv. esterbasert borevæske og polyalfa-olifin borevæske.

Analyseusikkerhet:
RSD 15%, men ved verdier mindre enn 10 ganger metodens deteksjonsgrense opp til 50%.

Referanse:
Anon, 1982. Manual and Guides No. 11. *The determination of petroleum hydrocarbons in sediments*

MK-2021 **16 EPA PAH, PCB (7 "dutch"), NPD og dekaliner**

***Prinsipp*:**
Prøven forsåpes i metanolisk KOH. Prøven filtreres, og filtratet ekstraheres med diklormetan. Den polare fraksjonen fjernes ved kolonnekromatografi.
Etter inndamping analyseres ekstraktet ved gasskromatografi med massespektrometrisk detektor (GC/MS-SIM).
Ifølge EPA bestemmes benzo(b)fluoranten og benzo(j)fluoranten som enkeltkomponenter. Ved denne metoden bestemmes disse som en sum sammen med benzo(k)fluoranten. Det anvendes 4 deutermerkede PAH som intern standard.

Analyseusikkerhet:
RSD 15%, men ved verdier mindre enn 10 ganger metodens deteksjonsgrense opp til 50%.

Referanse:
Anon, 1982. Manual and Guides No. 11. *The determination of petroleum hydrocarbons in sediments*

Erhardt, M; J. Klungsøyr & R.J. Law, 1991. *Hydrocarbones: Review of methods for analysis in seawater, biota and sediments.* ICES Techniques in Marine Evironmental Sciences No. 12.

MK-4031 **Tørstoff i sediment**

***Prinsipp*:**
Sedimentprøven tørres ved 105°C til konstant vekt og differanseveies.

Analyseusikkerhet:
RSD 5%.

MK-4268 **Total nitrogen i sediment**

***Prinsipp*:**
Sedimentprøven destrueres med svovelsyre under tilstedeværelsen av salisylsyre, hydrogenperoksid og katalysator. Syreløsningen gjøres basisk med NaOH. Ammoniakk dampdestilleres og titreres med saltsyre.

Analyseusikkerhet:
RSD 10%.

Referanse:
Norforsk, Miljøvårdssekretariatet. Publikasjon 1975:6.

Resultater

Resultatene er sammenfattet i de etterfølgende tabellene.

Verdier som er oppgitt som mindre enn deteksjonsgrensen inngår ikke i summeringstallene.

Deteksjonsgrensen er oppgitt i mg/kg tørrvekt for THC og total nitrogen og µg/kg våtvekt for PAH, PCB, NPD og dekaliner.

Alle rapporterte verdier for PAH som er mindre enn 2 µg/kg tørrvekt er ikke akkreditert. De er derfor kun rapportert med ett gjeldende siffer. Alle rapporterte verdier for PCB som er mindre enn 1 µg/kg tørrvekt er ikke akkreditert.

Resultatene for NPD, dekaliner og borevæskene er ikke omfattet av akkrediteringen.

GC/FID-kromatogram til prøvene, blindprøve og standardblanding er presentert i vedlegg 1.

Det er benyttet følgende forkortelser i resultatdelen:

<	Mindre enn den oppgitte deteksjonsgrensen
i.p.	Ikke påvist
i.a.	Ikke analysert
3-ring:	Asenaftylen, asenaften, fluoren, fenantren og antrasen
4-ring:	Fluoranten, pyren, benzo(a)antrasen og krysen/trifenylen
5-ring:	Benzo(b,j,k)fluorantener, benzo(a)pyren, dibenzo(a,h)antrasen
6-ring:	Indeno(1,2,3-c,d)pyren og benzo(g,h,i)perylen.

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-1**	**V1-1**	**V1-1**	**V1-1**	grense
Slices:	**0-10**	**10-22**	**22-28**	**28-36**	
THC (mg/kg TS)	84000	82000	100000	66000	2
Total Nitrogen (mg/kg TS)	310	330	350	440	300
TS %	73,2	73,4	79,4	73,7	0,002
PAH (µg/kg TS)					
Naftalen	2400	1800	2000	2200	0,4
Asenaftylen	1900	200	4700	71	0,2
Asenaften	2400	490	1000	310	0,2
Fluoren	950	800	930	610	0,2
Fenantren	2200	1300	1900	1700	0,2
Antrasen	400	63	320	90	0,2
Fluoranten	1000	120	100	110	0,2
Pyren	750	210	180	150	0,2
Benzo(a)antrasen	49	52	50	46	0,2
Krysen/trifenylen	120	94	155	110	0,2
Benzo(b+j+k)fluoranten	81	96	97	47	0,4
Benzo(a)pyren	55	50	54	31	0,4
Indeno(1,2,3-c,d)pyren	23	26	27	<20*	0,4
Benzo(g,h,i)perylen	55	53	61	36	0,4
Dibenzo(a,h)antrasen	11	13	<20*	<20*	0,4
SUM:					
3-ringer	7900	2900	8900	2800	
4-ringer	1900	480	490	420	
5-ringer	150	160	150	78	
6-ringer	78	79	88	36	
SUM PAH	12000	5400	12000	5500	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-1**	**V1-1**	**V1-1**	**V1-1**	grense
Slices:	**0-10**	**10-22**	**22-28**	**28-36**	
NPD/dekaliner(mg/kg TS)					
Naftalen	2400	1900	2000	2200	0,4
C1-naftalener	9400	11000	13000	13000	0,5
C2-naftalener	40000	35000	61000	41000	0,5
C3-naftalener	13000	12000	12000	7900	0,5
Fenantren	2200	2000	1900	1700	0,2
C1-fenantrener	7200	3900	8600	7000	0,5
C2-fenantrener	4400	4700	5800	4300	0,5
C3-fenantrener	4400	3500	5200	3400	0,5
Dibenzotiofen	380	600	500	800	0,2
C1-dibenzotiofener	1700	2000	2200	3000	0,5
C2-dibenzotiofener	4200	6100	4800	6600	0,5
C3-dibenzotiofener	1600	2600	1900	2500	0,5
C5-dekaliner	750000	1000000	720000	520000	5
C6-dekaliner	300000	280000	200000	110000	5
C7-dekaliner	140000	180000	84000	35000	5
C8-dekaliner	84000	110000	49000	22000	5
SUM:					
Naftalener	65000	60000	88000	64000	
Fenantrener	18000	14000	22000	16000	
Dibenzotiofener	7900	11000	9400	13000	
Dekaliner	1300000	1600000	1100000	690000	
SUM NPD	91000	85000	120000	93000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-1**	**V1-1**	**V1-1**	**V1-1**	grense
Slices:	**36-40**	**40-48**	**48-56**	**68-76**	
THC (mg/kg TS)	130000	150000	83000	190000	2
Total Nitrogen (mg/kg TS)	330	310	390	490	300
TS %	71,1	77,8	79,6	72,2	0,002
PAH (µg/kg TS)					
Naftalen	7600	15000	9900	11000	0,4
Asenaftylen	1600	2100	2600	1300	0,2
Asenaften	1000	1200	1500	1800	0,2
Fluoren	2600	3900	2500	4000	0,2
Fenantren	6900	9300	6300	12000	0,2
Antrasen	840	1500	830	630	0,2
Fluoranten	370	430	500	580	0,2
Pyren	5120	700	540	850	0,2
Benzo(a)antrasen	91	110	49	120	0,2
Krysen/trifenylen	310	310	220	500	0,2
Benzo(b+j+k)fluoranten	99	66	40	140	0,4
Benzo(a)pyren	35	40	20	48	0,4
Indeno(1,2,3-c,d)pyren	<20*	<20*	<20*	56	0,4
Benzo(g,h,i)perylen	<20*	50	<20*	58	0,4
Dibenzo(a,h)antrasen	<20*	<20*	<20*	43	0,4
SUM:					
3-ringer	13000	18000	14000	20000	
4-ringer	5900	1600	1300	2100	
5-ringer	130	110	60	230	
6-ringer	i.p.	50	0	110	
SUM PAH	27000	35000	25000	33000	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	BERYL	BERYL	BERYL	BERYL	
Core:	V1-1	V1-1	V1-1	V1-1	grense
Slices:	36-40	40-48	48-56	68-76	
NPD/dekaliner(mg/kg TS)					
Naftalen	7600	15000	9900	11000	0,4
C1-naftalener	36000	56000	44000	84000	0,5
C2-naftalener	120000	180000	150000	230000	0,5
C3-naftalener	41000	57000	45000	86000	0,5
Fenantren	6900	9300	6300	12000	0,2
C1-fenantrener	30000	42000	25000	31000	0,5
C2-fenantrener	18000	25000	17000	41000	0,5
C3-fenantrener	12000	15000	11000	25000	0,5
Dibenzotiofen	2400	3800	2800	8500	0,2
C1-dibenzotiofener	8900	14000	11000	31000	0,5
C2-dibenzotiofener	21000	35000	28000	77000	0,5
C3-dibenzotiofener	7800	14000	12000	29000	0,5
C5-dekaliner	510000	710000	480000	510000	5
C6-dekaliner	140000	200000	150000	180000	5
C7-dekaliner	65000	100000	66000	92000	5
C8-dekaliner	53000	90000	46000	64000	5
SUM:					
Naftalener	200000	310000	250000	410000	
Fenantrener	67000	91000	59000	110000	
Dibenzotiofener	40000	67000	54000	150000	
Dekaliner	770000	1100000	740000	850000	
SUM NPD	310000	470000	360000	670000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-1**	**V1-1**	**V1-2**	**V1-2**	grense
Slices:	**58-60**	**60-68**	**0-15**	**15-30**	
THC (mg/kg TS)	67000	58000	200000	160000	2
Total Nitrogen (mg/kg TS)	380	<	860	500	300
TS %	81,9	84,1	68,1	66,7	0,002
PAH (µg/kg TS)					
Naftalen	3500	4100	21000	17000	0,4
Asenaftylen	540	600	2500	1900	0,2
Asenaften	760	670	2600	2000	0,2
Fluoren	1900	1600	5700	4300	0,2
Fenantren	4300	3900	13000	8400	0,2
Antrasen	170	230	1200	920	0,2
Fluoranten	200	170	580	330	0,2
Pyren	293	300	960	610	0,2
Benzo(a)antrasen	49	52	250	160	0,2
Krysen/trifenylen	210	180	610	330	0,2
Benzo(b+j+k)fluoranten	63	110	410	280	0,4
Benzo(a)pyren	4,6	<40*	180	120	0,4
Indeno(1,2,3-c,d)pyren	2,4	42	120	98	0,4
Benzo(g,h,i)perylen	3,1	<40*	170	100	0,4
Dibenzo(a,h)antrasen	<	<40*	93	48	0,4
SUM:					
3-ringer	7700	7000	25000	18000	
4-ringer	750	700	2400	1400	
5-ringer	68	110	680	450	
6-ringer	5,5	42	290	200	
SUM PAH	12000	12000	49000	37000	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-1**	**V1-1**	**V1-2**	**V1-2**	grense
Slices:	**58-60**	**60-68**	**0-15**	**15-30**	
NPD/dekaliner(mg/kg TS)					
Naftalen	14000	4100	21000	17000	0,4
C1-naftalener	62000	34000	170000	140000	0,5
C2-naftalener	210000	91000	380000	340000	0,5
C3-naftalener	60000	32000	120000	920000	0,5
Fenantren	7400	3900	13000	8400	0,2
C1-fenantrener	39000	11000	36000	24000	0,5
C2-fenantrener	24000	15000	48000	30000	0,5
C3-fenantrener	16000	11000	30000	24000	0,5
Dibenzotiofen	4700	2700	7900	4700	0,2
C1-dibenzotiofener	16000	9900	27000	14000	0,5
C2-dibenzotiofener	40000	28000	57000	32000	0,5
C3-dibenzotiofener	17000	11000	21000	9500	0,5
C5-dekaliner	610000	270000	1000000	800000	5
C6-dekaliner	200000	92000	290000	230000	5
C7-dekaliner	90000	42000	130000	95000	5
C8-dekaliner	65000	33000	84000	64000	5
SUM:					
Naftalener	350000	160000	690000	1400000	
Fenantrener	86000	41000	130000	86000	
Dibenzotiofener	78000	52000	110000	60000	
Dekaliner	970000	440000	1500000	1200000	
SUM NPD	510000	250000	930000	1600000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-2**	**V1-2**	**V1-2**	**V1-2**	grense
Slices:	**30-45**	**45-60**	**60-65**	**65-75**	
THC (mg/kg TS)	42000	39000	75000	35000	2
Total Nitrogen (mg/kg TS)	380	360	1000	330	300
TS %	82,9	83,8	82,6	79,9	0,002
PAH (µg/kg TS)					
Naftalen	8700	8500	12000	4700	0,4
Asenaftylen	520	530	940	340	0,2
Asenaften	720	840	1500	1100	0,2
Fluoren	1800	2000	3800	1900	0,2
Fenantren	3700	4100	8800	4700	0,2
Antrasen	300	330	720	370	0,2
Fluoranten	160	150	490	210	0,2
Pyren	320	330	790	350	0,2
Benzo(a)antrasen	77	63	230	49	0,2
Krysen/trifenylen	170	190	400	120	0,2
Benzo(b+j+k)fluoranten	130	110	370	66	0,4
Benzo(a)pyren	43	41	170	<40*	0,4
Indeno(1,2,3-c,d)pyren	<40*	<40*	87	<40*	0,4
Benzo(g,h,i)perylen	<40*	46	190	<40*	0,4
Dibenzo(a,h)antrasen	<40*	<40*	<40*	<40*	0,4
SUM:					
3-ringer	7000	7800	16000	8400	
4-ringer	730	730	1900	730	
5-ringer	170	150	540	66	
6-ringer	i.p.	46	280	i.p	
SUM PAH	17000	17000	30000	14000	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-2**	**V1-2**	**V1-2**	**V1-2**	grense
Slices:	**30-45**	**45-60**	**60-65**	**65-75**	
NPD/dekaliner(mg/kg TS)					
Naftalen	8700	8500	12000	4700	0,4
C1-naftalener	62000	60000	82000	33000	0,5
C2-naftalener	130000	130000	190000	89000	0,5
C3-naftalener	33000	34000	63000	33000	0,5
Fenantren	3700	4100	8800	4700	0,2
C1-fenantrener	11000	12000	27000	12000	0,5
C2-fenantrener	13000	14000	34000	15000	0,5
C3-fenantrener	8800	9300	22000	7400	0,5
Dibenzotiofen	1700	1900	4800	2300	0,2
C1-dibenzotiofener	5100	5700	16000	7700	0,5
C2-dibenzotiofener	10000	11000	33000	16000	0,5
C3-dibenzotiofener	3000	3500	12000	5900	0,5
C5-dekaliner	190000	200000	450000	180000	5
C6-dekaliner	52000	52000	120000	30000	5
C7-dekaliner	24000	24000	52000	18000	5
C8-dekaliner	17000	17000	30000	10000	5
SUM:					
Naftalener	230000	230000	350000	160000	
Fenantrener	37000	39000	92000	39000	
Dibenzotiofener	20000	22000	66000	32000	
Dekaliner	280000	290000	650000	240000	
SUM NPD	290000	290000	500000	230000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-2**	**V1-2**	**V3-G**	**V3-G**	grense
Slices:	**75-85**	**85-90**	**0-6**	**6-10**	
THC (mg/kg TS)	47000	110000	8400	17000	2
Total Nitrogen (mg/kg TS)	<	360	300	<	300
TS %	78,8	73,6	78,7	78,2	0,002
PAH (µg/kg TS)					
Naftalen	5400	15000	430	1900	0,4
Asenaftylen	380	1600	750	1700	0,2
Asenaften	800	3300	450	1200	0,2
Fluoren	2000	8800	600	1100	0,2
Fenantren	4800	23000	760	1800	0,2
Antrasen	4900	1500	110	170	0,2
Fluoranten	210	1200	460	160	0,2
Pyren	330	1900	1200	1200	0,2
Benzo(a)antrasen	47	340	64	95	0,2
Krysen/trifenylen	120	960	220	320	0,2
Benzo(b+j+k)fluoranten	64	210	200	300	0,4
Benzo(a)pyren	<40*	80	62	94	0,4
Indeno(1,2,3-c,d)pyren	<40*	42	58	76	0,4
Benzo(g,h,i)perylen	<40*	51	93	170	0,4
Dibenzo(a,h)antrasen	<40*	<40*	<40*	<40*	0,4
SUM:					
3-ringer	13000	38000	2700	6000	
4-ringer	710	4400	1900	1800	
5-ringer	64	290	260	390	
6-ringer	i.p.	93	150	250	
SUM PAH	19000	58000	5500	10000	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V1-2**	**V1-2**	**V3-G**	**V3-G**	grense
Slices:	**75-85**	**85-90**	**0-6**	**6-10**	
NPD/dekaliner(mg/kg TS)					
Naftalen	5400	15000	430	1900	0,4
C1-naftalener	29000	150000	1900	7800	0,5
C2-naftalener	80000	470000	12000	42000	0,5
C3-naftalener	28000	220000	7200	19000	0,5
Fenantren	4800	23000	760	1800	0,2
C1-fenantrener	10000	78000	3400	5700	0,5
C2-fenantrener	12000	110000	7800	8500	0,5
C3-fenantrener	6600	58000	9100	9100	0,5
Dibenzotiofen	2100	13000	650	910	0,2
C1-dibenzotiofener	6600	45000	2900	3500	0,5
C2-dibenzotiofener	14000	120000	8100	7600	0,5
C3-dibenzotiofener	4900	39000	3000	2500	0,5
C5-dekaliner	160000	450000	1200000	1200000	5
C6-dekaliner	25000	210000	780000	760000	5
C7-dekaliner	16000	140000	470000	460000	5
C8-dekaliner	11000	110000	280000	270000	5
SUM:					
Naftalener	140000	860000	22000	71000	
Fenantrener	33000	270000	21000	25000	
Dibenzotiofener	28000	220000	15000	15000	
Dekaliner	210000	910000	2700000	2700000	
SUM NPD	200000	1300000	57000	110000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3-G**	**V3-G**	**V3-G**	**V3-G**	grense
Slices:	**10-14**	**14-16**	**16-25**	**25-30**	
THC (mg/kg TS)	1700	51000	6900	28000	2
Total Nitrogen (mg/kg TS)	<	<	<	570	300
TS %	79,2	78,8	78,1	80,3	0,002
PAH (µg/kg TS)					
Naftalen	70	320	42	1200	0,4
Asenaftylen	16	840	64	310	0,2
Asenaften	19	570	69	300	0,2
Fluoren	25	350	55	640	0,2
Fenantren	68	530	120	1700	0,2
Antrasen	6,2	70	6,7	150	0,2
Fluoranten	4,6	440	9,9	140	0,2
Pyren	28	920	99	730	0,2
Benzo(a)antrasen	2,5	25	6	94	0,2
Krysen/trifenylen	7,6	99	14	160	0,2
Benzo(b+j+k)fluoranten	6,1	91	15	180	0,4
Benzo(a)pyren	2,0	<40*	8,7	64	0,4
Indeno(1,2,3-c,d)pyren	1,9	<40*	3,9	<40*	0,4
Benzo(g,h,i)perylen	7,2	44	14	<40*	0,4
Dibenzo(a,h)antrasen	1,0	<40*	<	<40*	0,4
SUM:					
3-ringer	130	2400	310	3100	
4-ringer	43	1500	130	1100	
5-ringer	9,1	91	24	240	
6-ringer	9,1	44	18	i.p.	
SUM PAH	270	4300	530	5700	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3-G**	**V3-G**	**V3-G**	**V3-G**	grense
Slices:	**10-14**	**14-16**	**16-25**	**25-30**	
NPD/dekaliner(mg/kg TS)					
Naftalen	70	320	42	1200	0,4
C1-naftalener	220	3000	300	6800	0,5
C2-naftalener	900	16000	1800	16000	0,5
C3-naftalener	500	9200	1100	9500	0,5
Fenantren	68	530	120	1700	0,2
C1-fenantrener	200	2100	360	5500	0,5
C2-fenantrener	240	3800	510	7500	0,5
C3-fenantrener	160	5800	500	7000	0,5
Dibenzotiofen	31	280	29	880	0,2
C1-dibenzotiofener	120	1200	220	2900	0,5
C2-dibenzotiofener	220	2700	490	6300	0,5
C3-dibenzotiofener	74	1100	160	2200	0,5
C5-dekaliner	13000	640000	52000	230000	5
C6-dekaliner	11000	440000	37000	180000	5
C7-dekaliner	7600	260000	25000	120000	5
C8-dekaliner	5100	160000	16000	77000	5
SUM:					
Naftalener	1700	29000	3200	34000	
Fenantrener	670	12000	1500	22000	
Dibenzotiofener	450	5300	900	12000	
Dekaliner	37000	1500000	130000	610000	
SUM NPD	2800	46000	5600	67000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3-G**	**V3-G**	**V3-G**	**V3-G**	grense
Slices:	**30-34**	**34-39**	**39-48**	**48-56**	
THC (mg/kg TS)	3900	82000	72000	12000	2
Total Nitrogen (mg/kg TS)	560	570	300	<	300
TS %	82,8	77,2	83,9	80,4	0,002
PAH (µg/kg TS)					
Naftalen	430	1200	1700	130	0,4
Asenaftylen	62	750	890	120	0,2
Asenaften	91	710	530	58	0,2
Fluoren	380	940	960	90	0,2
Fenantren	1300	1400	2200	140	0,2
Antrasen	110	130	190	8,1	0,2
Fluoranten	150	96	130	13	0,2
Pyren	200	480	340	75	0,2
Benzo(a)antrasen	110	41	48	5,4	0,2
Krysen/trifenylen	180	86	150	11	0,2
Benzo(b+j+k)fluoranten	180	94	96	9,5	0,4
Benzo(a)pyren	86	17	50	7	0,4
Indeno(1,2,3-c,d)pyren	47	6,5	17	3,7	0,4
Benzo(g,h,i)perylen	210	22	40	12	0,4
Dibenzo(a,h)antrasen	54	3,4	7,8	<	0,4
SUM:					
3-ringer	1900	3900	4800	420	
4-ringer	640	700	670	100	
5-ringer	320	110	150	17	
6-ringer	260	29	57	16	
SUM PAH	3600	6000	7300	680	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3-G**	**V3-G**	**V3-G**	**V3-G**	grense
Slices:	**30-34**	**34-39**	**39-48**	**48-56**	
NPD/dekaliner(mg/kg TS)					
Naftalen	430	1200	1700	130	0,4
C1-naftalener	3600	8200	11000	780	0,5
C2-naftalener	10000	30000	42000	3200	0,5
C3-naftalener	4900	15000	18000	1800	0,5
Fenantren	1300	1400	2200	140	0,2
C1-fenantrener	3600	3400	6300	310	0,5
C2-fenantrener	4200	5200	9800	430	0,5
C3-fenantrener	2500	5700	6800	520	0,5
Dibenzotiofen	730	570	1100	34	0,2
C1-dibenzotiofener	1800	2200	4200	310	0,5
C2-dibenzotiofener	2700	4800	9000	400	0,5
C3-dibenzotiofener	1000	1900	3200	170	0,5
C5-dekaliner	22000	480000	450000	65000	5
C6-dekaliner	19000	290000	250000	37000	5
C7-dekaliner	14000	170000	140000	21000	5
C8-dekaliner	10000	110000	790000	21000	5
SUM:					
Naftalener	19000	54000	73000	5900	
Fenantrener	12000	16000	25000	1400	
Dibenzotiofener	6200	9500	18000	910	
Dekaliner	65000	1100000	1600000	140000	
SUM NPD	37000	80000	120000	8200	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3-G**	**V3G2**	**V3G2**	**V3G2**	grense
Slices:	**56-60**	**0-6**	**6-13**	**13-28**	
THC (mg/kg TS)	7300	18000	4300	6500	2
Total Nitrogen (mg/kg TS)	<	<	<	<	300
TS %	67,5	75,6	80,8	77,6	0,002
PAH (µg/kg TS)					
Naftalen	26	200	34	50	0,4
Asenaftylen	60	300	47	66	0,2
Asenaften	54	240	42	51	0,2
Fluoren	87	230	47	53	0,2
Fenantren	240	250	81	110	0,2
Antrasen	16	19	6,6	8,6	0,2
Fluoranten	16	100	6,1	15	0,2
Pyren	35	230	57	110	0,2
Benzo(a)antrasen	4,2	20	3,4	3,6	0,2
Krysen/trifenylen	14	48	12	15	0,2
Benzo(b+j+k)fluoranten	7,6	62	11	13	0,4
Benzo(a)pyren	3,8	4,3	4,5	6,8	0,4
Indeno(1,2,3-c,d)pyren	<	5,2	2,3	3,9	0,4
Benzo(g,h,i)perylen	4,6	17	7,3	12	0,4
Dibenzo(a,h)antrasen	<	2,0	<	<	0,4
SUM:					
3-ringer	460	1000	220	290	
4-ringer	69	400	79	140	
5-ringer	11	68	16	20	
6-ringer	4,6	22	9,6	16	
SUM PAH	570	1700	360	520	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3-G**	**V3G2**	**V3G2**	**V3G2**	grense
Slices:	**56-60**	**0-6**	**6-13**	**13-28**	
NPD/dekaliner(mg/kg TS)					
Naftalen	26	200	34	50	0,4
C1-naftalener	470	740	200	360	0,5
C2-naftalener	2900	3900	1300	1700	0,5
C3-naftalener	2100	2000	760	1100	0,5
Fenantren	240	250	81	110	0,2
C1-fenantrener	800	540	280	360	0,5
C2-fenantrener	1200	1200	430	550	0,5
C3-fenantrener	910	2900	560	660	0,5
Dibenzotiofen	97	53	11	11	0,2
C1-dibenzotiofener	530	340	160	240	0,5
C2-dibenzotiofener	1300	800	280	440	0,5
C3-dibenzotiofener	470	340	140	170	0,5
C5-dekaliner	37000	150000	35000	47000	5
C6-dekaliner	23000	96000	28000	37000	5
C7-dekaliner	14000	60000	19000	25000	5
C8-dekaliner	10000	36000	12000	18000	5
SUM:					
Naftalener	5500	6800	2300	3200	
Fenantrener	3200	4900	1400	1700	
Dibenzotiofener	2400	1500	590	860	
Dekaliner	84000	340000	94000	130000	
SUM NPD	11000	13000	4200	5800	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3G2**	**V4**	**V4**	**V4**	grense
Slices:	**28-37**	**0-10**	**10-18**	**18-24**	
THC (mg/kg TS)	22000	76000	47000	27000	2
Total Nitrogen (mg/kg TS)	<	590	600	430	300
TS %	75,5	66,5	73,5	72,4	0,002
PAH (µg/kg TS)					
Naftalen	230	660	520	210	0,4
Asenaftylen	280	800	380	470	0,2
Asenaften	240	770	440	800	0,2
Fluoren	350	970	540	780	0,2
Fenantren	1200	1500	850	1500	0,2
Antrasen	58	180	90	160	0,2
Fluoranten	70	680	460	110	0,2
Pyren	180	1200	970	410	0,2
Benzo(a)antrasen	31	31	16	32	0,2
Krysen/trifenylen	83	120	60	120	0,2
Benzo(b+j+k)fluoranten	100	45	17	35	0,4
Benzo(a)pyren	26	19	<10*	<10*	0,4
Indeno(1,2,3-c,d)pyren	<10*	<10*	<10*	<10*	0,4
Benzo(g,h,i)perylen	<10*	22	11	19	0,4
Dibenzo(a,h)antrasen	<10*	<10*	<10*	<10*	0,4
SUM:					
3-ringer	2100	4200	2300	3700	
4-ringer	360	2000	1500	670	
5-ringer	130	64	17	35	
6-ringer	i.p.	22	11	19	
SUM PAH	2800	7000	4400	4600	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V3G2**	**V4**	**V4**	**V4**	grense
Slices:	**28-37**	**0-10**	**10-18**	**18-24**	
NPD/dekaliner(mg/kg TS)					
Naftalen	230	660	520	210	0,4
C1-naftalener	2600	3600	2600	2100	0,5
C2-naftalener	11000	19000	10000	14000	0,5
C3-naftalener	6300	12000	6300	12000	0,5
Fenantren	1200	1500	850	1500	0,2
C1-fenantrener	2200	2700	1400	3200	0,5
C2-fenantrener	3600	4300	2100	5800	0,5
C3-fenantrener	2100	4300	2500	5700	0,5
Dibenzotiofen	410	480	210	640	0,2
C1-dibenzotiofener	1500	2400	850	3500	0,5
C2-dibenzotiofener	3400	5800	2000	11000	0,5
C3-dibenzotiofener	1100	2100	790	4300	0,5
C5-dekaliner	180000	510000	270000	270000	5
C6-dekaliner	97000	330000	160000	140000	5
C7-dekaliner	67000	220000	120000	100000	5
C8-dekaliner	40000	140000	76000	68000	5
SUM:					
Naftalener	20000	35000	19000	28000	
Fenantrener	9100	13000	6900	16000	
Dibenzotiofener	6400	11000	3900	19000	
Dekaliner	380000	1200000	630000	580000	
SUM NPD	36000	59000	30000	64000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**BERYL**	**BERYL**	
Core:	**V4**	**V4**	**K1**	**K1**	grense
Slices:	**24-30**	**30-40**	**0-4**	**4-10**	
THC (mg/kg TS)	7,6	370	7800	17000	2
Total Nitrogen (mg/kg TS)	<	<	<	<	300
TS %	79,7	80,6	77,3	80,9	0,002
PAH (µg/kg TS)					
Naftalen	13	19	110	160	0,4
Asenaftylen	0,6	6,7	100	240	0,2
Asenaften	1,5	7,1	290	200	0,2
Fluoren	8,4	17	130	200	0,2
Fenantren	22	34	30	300	0,2
Antrasen	2,1	3,7	120	38	0,2
Fluoranten	6,1	11	27	30	0,2
Pyren	4,4	15	190	200	0,2
Benzo(a)antrasen	2,8	4,3	47	<10*	0,2
Krysen/trifenylen	4,6	7,5	40	47	0,2
Benzo(b+j+k)fluoranten	29	37	20	14	0,4
Benzo(a)pyren	5,9	7,4	8,0	<10*	0,4
Indeno(1,2,3-c,d)pyren	21	20	6,4	<10*	0,4
Benzo(g,h,i)perylen	20	19	16	13	0,4
Dibenzo(a,h)antrasen	4,4	4,2	2,4	<10*	0,4
SUM:					
3-ringer	35	69	670	980	
4-ringer	18	38	300	280	
5-ringer	39	49	30	14	
6-ringer	41	39	22	13	
SUM PAH	150	210	1100	1400	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	BERYL	BERYL	BERYL	BERYL	
Core:	V4	V4	K1	K1	grense
Slices:	24-30	30-40	0-4	4-10	
NPD/dekaliner(mg/kg TS)					
Naftalen	13	19	110	160	0,4
C1-naftalener	56	110	280	860	0,5
C2-naftalener	480	650	2600	3700	0,5
C3-naftalener	320	420	2300	2100	0,5
Fenantren	22	34	30	300	0,2
C1-fenantrener	27	84	490	600	0,5
C2-fenantrener	32	140	1200	980	0,5
C3-fenantrener	26	95	820	2200	0,5
Dibenzotiofen	19	13	54	69	0,2
C1-dibenzotiofener	27	97	500	320	0,5
C2-dibenzotiofener	46	300	1700	620	0,5
C3-dibenzotiofener	19	110	690	330	0,5
C5-dekaliner	140	6100	200000	140000	5
C6-dekaliner	110	4600	130000	82000	5
C7-dekaliner	150	3100	90000	57000	5
C8-dekaliner	100	2100	63000	33000	5
SUM:					
Naftalener	870	1200	5300	6800	
Fenantrener	110	350	2500	4100	
Dibenzotiofener	110	520	2900	1300	
Dekaliner	500	16000	480000	310000	
SUM NPD	1100	2100	11000	12000	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**EKOFISK**	**EKOFISK**	
Core:	**K1**	**K1**	**V9**	**V9**	grense
Slices:	**10-13**	**13-20**	**0-5**	**5-11**	
THC (mg/kg TS)	<	670	44000	79000	2
Esterbasert borevæske, vekt% av THC	i.a.	i.a.	100	100	
Total Nitrogen (mg/kg TS)	<	<	760	800	300
TS %	71,6	77,7	68,6	75,1	0,002
PAH (µg/kg TS)					
Naftalen	<	280	97	150	0,4
Asenaftylen	<	10	130	330	0,2
Asenaften	<	16	140	120	0,2
Fluoren	<	52	280	150	0,2
Fenantren	0,8	380	940	400	0,2
Antrasen	<	25	67	54	0,2
Fluoranten	0,2	32	70	64	0,2
Pyren	0,4	38	78	60	0,2
Benzo(a)antrasen	<	15	19	18	0,2
Krysen/trifenylen	<	54	70	81	0,2
Benzo(b+j+k)fluoranten	0,7	43	50	48	0,4
Benzo(a)pyren	1,1	16	5,1	14	0,4
Indeno(1,2,3-c,d)pyren	<	9,4	<	<	0,4
Benzo(g,h,i)perylen	<	52	33	27	0,4
Dibenzo(a,h)antrasen	<	4,9	<	<	0,4
SUM:					
3-ringer	0,8	480	1600	1100	
4-ringer	0,6	140	240	220	
5-ringer	1,8	64	55	62	
6-ringer	i.p.	61	33	27	
SUM PAH	3,2	1000	2000	1500	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

Plattform:					Det.
Felt:	**BERYL**	**BERYL**	**EKOFISK**	**EKOFISK**	
Core:	**K1**	**K1**	**V9**	**V9**	grense
Slices:	**10-13**	**13-20**	**0-5**	**5-11**	
NPD/dekaliner(mikrog/kg TS)					
Naftalen	**	280	97	150	0,4
C1-naftalener	**	1100	680	190	0,5
C2-naftalener	**	4500	8000	4800	0,5
C3-naftalener	**	3200	5300	2500	0,5
Fenantren	**	380	940	400	0,2
C1-fenantrener	**	760	1500	870	0,5
C2-fenantrener	**	1100	2800	2300	0,5
C3-fenantrener	**	650	1100	320	0,5
Dibenzotiofen	**	140	2500	1500	0,2
C1-dibenzotiofener	**	540	1100	480	0,5
C2-dibenzotiofener	**	1100	1700	2200	0,5
C3-dibenzotiofener	**	420	1200	7900	0,5
C5-dekaliner	**	3400	24000	13000	5
C6-dekaliner	**	3500	13000	18000	5
C7-dekaliner	**	3200	12000	5100	5
C8-dekaliner	**	3300	14000	7900	5
SUM:					
Naftalener	**	9100	14000	7600	
Fenantrener	**	2900	6300	3900	
Dibenzotiofener	**	2200	6500	12000	
Dekaliner	**	13000	63000	44000	
SUM NPD	**	14000	27000	24000	

**: Kan ikke rapporteres pga. feil under analysen

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**V9**	**V9**	**V9**	**V9**	grense
Slices:	**11-15**	**15-22**	**22-33**	**33-36**	
THC (mg/kg TS)	52000	1300	560	780	2
Esterbasert borevæske, vekt% av THC	100	7,5	i.p.	i.p.	
Total Nitrogen (mg/kg TS)	1300	610	<	550	300
TS %	71,9	75,6	82,8	77,6	0,002
PAH (µg/kg TS)					
Naftalen	110	180	57	59	0,4
Asenaftylen	230	18	11	6,0	0,2
Asenaften	570	31	16	39	0,2
Fluoren	120	87	24	100	0,2
Fenantren	260	370	78	110	0,2
Antrasen	18	46	20	60	0,2
Fluoranten	47	38	39	72	0,2
Pyren	58	49	51	56	0,2
Benzo(a)antrasen	18	9,5	15	12	0,2
Krysen/trifenylen	64	55	24	24	0,2
Benzo(b+j+k)fluoranten	39	27	27	23	0,4
Benzo(a)pyren	15	9,5	9,3	8,8	0,4
Indeno(1,2,3-c,d)pyren	<	7,4	7,2	6,6	0,4
Benzo(g,h,i)perylen	22	20	13	16	0,4
Dibenzo(a,h)antrasen	<	4,9	2,9	3	0,4
SUM:					
3-ringer	1200	550	150	320	
4-ringer	190	150	130	160	
5-ringer	54	41	39	35	
6-ringer	22	27	20	23	
SUM PAH	1600	950	390	600	
PCB (µg/kg TS)					
PCB 28	<	12	4,6	<	0,5
PCB 52	<	23	26	17	0,5
PCB 101	<	8,6	52	33	0,5
PCB 118	<	3,8	29	24	0,5
PCB 138	<	6,6	60	40	0,5
PCB 153	<	5,9	48	33	0,5
PCB 180	<	3,8	44	43	0,5
SUM PCB	i.p.	64	260	190	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**V9**	**V9**	**V9**	**V9**	grense
Slices:	**11-15**	**15-22**	**22-33**	**33-36**	
NPD/dekaliner(mg/kg TS)					
Naftalen	110	180	57	59	0,4
C1-naftalener	180	1200	220	190	0,5
C2-naftalener	3400	7100	900	1400	0,5
C3-naftalener	1500	5600	1000	1600	0,5
Fenantren	260	370	78	110	0,2
C1-fenantrener	700	1000	200	250	0,5
C2-fenantrener	1600	1900	360	530	0,5
C3-fenantrener	410	960	250	340	0,5
Dibenzotiofen	260	78	19	69	0,2
C1-dibenzotiofener	300	470	230	270	0,5
C2-dibenzotiofener	1400	1400	790	810	0,5
C3-dibenzotiofener	5300	550	300	350	0,5
C5-dekaliner	8500	9900	14000	1400	5
C6-dekaliner	12000	8000	3200	1000	5
C7-dekaliner	2900	5800	1500	880	5
C8-dekaliner	4700	5500	1200	1000	5
SUM:					
Naftalener	5200	14000	2200	3200	
Fenantrener	3000	4200	890	1200	
Dibenzotiofener	7300	2500	1300	1500	
Dekaliner	28000	29000	20000	4300	
SUM NPD	15000	21000	4400	6000	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**V9**	**V9**	**V9**	**V9**	grense
Slices:	**36-38**	**38-43**	**43-53**	**53-68**	
THC (mg/kg TS)	340	1300	12	<	2
Esterbasert borevæske, vekt% av THC	i.p.	i.p.	i.p.	i.p.	
Total Nitrogen (mg/kg TS)	<	430	480	<	300
TS %	84,9	77,9	79,0	84,0	0,002
PAH (µg/kg TS)					
Naftalen	10	100	18	1,5	0,4
Asenaftylen	4,4	23	<	<	0,2
Asenaften	7,5	51	51	<	0,2
Fluoren	17	110	27	<	0,2
Fenantren	34	370	22	1,3	0,2
Antrasen	24	200	7,9	<	0,2
Fluoranten	42	660	4,5	0,5	0,2
Pyren	42	560	11	0,5	0,2
Benzo(a)antrasen	11	300	5,2	0,3	0,2
Krysen/trifenylen	24	240	13	0,5	0,2
Benzo(b+j+k)fluoranten	29	310	16	1,0	0,4
Benzo(a)pyren	10	150	16	<	0,4
Indeno(1,2,3-c,d)pyren	10	54	3,9	<	0,4
Benzo(g,h,i)perylen	13	54	6,1	0,6	0,4
Dibenzo(a,h)antrasen	3,0	6,8	<	<	0,4
SUM:					
3-ringer	87	750	110	1,3	
4-ringer	120	1800	34	1,8	
5-ringer	42	470	32	1,0	
6-ringer	23	110	10	0,6	
SUM PAH	280	3200	200	6,2	
PCB (µg/kg TS)					
PCB 28	18	17	<	<	0,5
PCB 52	130	190	19	<	0,5
PCB 101	290	300	48	<	0,5
PCB 118	210	170	29	<	0,5
PCB 138	290	290	34	<	0,5
PCB 153	220	250	21	<	0,5
PCB 180	180	210	3,7	<	0,5
SUM PCB	1300	1400	150	i.p.	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**V9**	**V9**	**V9**	**V9**	grense
Slices:	**36-38**	**38-43**	**43-53**	**53-68**	
NPD/dekaliner(mg/kg TS)					
Naftalen	10	100	18	1,5	0,4
C1-naftalener	36	560	74	1,7	0,5
C2-naftalener	240	4900	340	3,9	0,5
C3-naftalener	380	4800	130	2,1	0,5
Fenantren	34	370	22	1,3	0,2
C1-fenantrener	110	780	24	1,8	0,5
C2-fenantrener	260	1300	39	3,0	0,5
C3-fenantrener	340	940	33	4,0	0,5
Dibenzotiofen	53	260	<	<	0,2
C1-dibenzotiofener	220	1000	21	<	0,5
C2-dibenzotiofener	1000	3300	59	<	0,5
C3-dibenzotiofener	550	1400	29	<	0,5
C5-dekaliner	2100	9300	110	<	5
C6-dekaliner	1900	7000	65	8,5	5
C7-dekaliner	1600	5400	56	14	5
C8-dekaliner	1700	4700	69	<	5
SUM:					
Naftalener	670	10000	560	9,2	
Fenantrener	740	3400	120	10	
Dibenzotiofener	1800	6000	110	i.p.	
Dekaliner	7300	26000	300	23	
SUM NPD	3200	20000	790	19	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**V9**	**V10**	**V10**	**V10**	grense
Slices:	**68-90**	**1-10**	**10-20**	**20-30**	
THC (mg/kg TS)	<	260	2100	1200	2
Esterbasert borevæske, vekt% av THC	i.p	i.p.	100	100	
Total Nitrogen (mg/kg TS)	<	<	530	<	300
TS %	83,9	83,5	81,1	82,6	0,002
PAH (µg/kg TS)					
Naftalen	1,2	29	4,2	24	0,4
Asenaftylen	<	1,2	2,7	8,8	0,2
Asenaften	<	5,2	3,3	19	0,2
Fluoren	0,2	20	13	6,0	0,2
Fenantren	1.2	66	42	19	0,2
Antrasen	<	18	5,0	3,2	0,2
Fluoranten	2,5	43	26	10	0,2
Pyren	2,9	45	20	10	0,2
Benzo(a)antrasen	1,3	8,4	3,6	1,5	0,2
Krysen/trifenylen	1,5	19	12	5,6	0,2
Benzo(b+j+k)fluoranten	3,4	16	14	3,7	0,4
Benzo(a)pyren	1,4	5,2	4,6	1,2	0,4
Indeno(1,2,3-c,d)pyren	0,9	5,8	5,0	1,5	0,4
Benzo(g,h,i)perylen	1,0	12	8,3	3,4	0,4
Dibenzo(a,h)antrasen	<	1,8	2,0	0,7	0,4
SUM:					
3-ringer	0,2	110	66	56	
4-ringer	8,2	120	62	27	
5-ringer	4,8	23	21	5,6	
6-ringer	1,9	18	13	4,9	
SUM PAH	16	300	170	120	
PCB (µg/kg TS)					
PCB 28	<	*	4,2	<	0,5
PCB 52	<	310	11	3,4	0,5
PCB 101	<	210	17	4,8	0,5
PCB 118	<	120	7,1	2,7	0,5
PCB 138	<	120	11	3,6	0,5
PCB 153	<	100	10	3,0	0,5
PCB 180	<	99	18	1,6	0,5
SUM PCB	i.p.	960	78	19	

* Kan ikke bestemmes pga. interferens

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**V9**	**V10**	**V10**	**V10**	grense
Slices:	**68-90**	**1-10**	**10-20**	**20-30**	
NPD/dekaliner(mg/kg TS)					
Naftalen	1,2	29	4,2	24	0,4
C1-naftalener	1,0	60	80	49	0,5
C2-naftalener	1,3	350	690	200	0,5
C3-naftalener	0,75	670	570	95	0,5
Fenantren	1.2	66	42	19	0,2
C1-fenantrener	0,69	160	240	37	0,5
C2-fenantrener	1,9	370	630	120	0,5
C3-fenantrener	3,6	220	410	71	0,5
Dibenzotiofen	<	7,8	110	31	0,2
C1-dibenzotiofener	<	130	87	41	0,5
C2-dibenzotiofener	<	440	680	130	0,5
C3-dibenzotiofener	<	210	280	130	0,5
C5-dekaliner	<	840	2800	790	5
C6-dekaliner	<	610	1400	590	5
C7-dekaliner	<	580	1600	260	5
C8-dekaliner	<	600	1100	310	5
SUM:					
Naftalener	4,3	1100	1300	370	
Fenantrener	6,2	820	1300	250	
Dibenzotiofener	i.p.	790	1200	330	
Dekaliner	i.p.	2600	6900	2000	
SUM NPD	11	2700	3800	950	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**SW3**	**SW3**	**SW3**	**SW3**	grense
Slices:	**0-7**	**7-13**	**13-15**	**15-23**	
THC (mg/kg TS)	71000	71000	31000	470	2
Esterbasert borevæske, vekt% av THC	100	100	100	i.p.	
Total Nitrogen (mg/kg TS)	750	1000	1800	750	300
TS %	69,2	70,5	63,2	60,4	0,002
PAH (µg/kg TS)					
Naftalen	140	150	260	35	0,4
Asenaftylen	160	240	390	5,2	0,2
Asenaften	160	560	780	16	0,2
Fluoren	110	110	100	30	0,2
Fenantren	420	300	180	75	0,2
Antrasen	39	19	15	9,2	0,2
Fluoranten	49	27	36	7,2	0,2
Pyren	58	42	41	13	0,2
Benzo(a)antrasen	14	16	6,0	2,3	0,2
Krysen/trifenylen	45	43	9,0	8,6	0,2
Benzo(b+j+k)fluoranten	11	24	12	5,2	0,4
Benzo(a)pyren	7,1	6,5	8,0	0,7	0,4
Indeno(1,2,3-c,d)pyren	6,4	<5*	4,9	2,6	0,4
Benzo(g,h,i)perylen	13	21	16	9,2	0,4
Dibenzo(a,h)antrasen	5,4	<5*	4,1	1,2	0,4
SUM:					
3-ringer	890	1200	1500	140	
4-ringer	170	130	92	31	
5-ringer	24	31	24	7,1	
6-ringer	19	21	21	12	
SUM PAH	1200	1600	1900	220	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

* Forhøyet deteksjonsgrense pga. interferens

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**SW3**	**SW3**	**SW3**	**SW3**	grense
Slices:	**0-7**	**7-13**	**13-15**	**15-23**	
NPD/dekaliner(mg/kg TS)					
Naftalen	140	150	260	35	0,4
C1-naftalener	470	590	1100	770	0,5
C2-naftalener	4800	4100	3900	2900	0,5
C3-naftalener	2800	1700	1300	1600	0,5
Fenantren	420	300	180	75	0,2
C1-fenantrener	650	630	420	270	0,5
C2-fenantrener	1600	1700	950	500	0,5
C3-fenantrener	38	120	41	220	0,5
Dibenzotiofen	2400	770	57	14	0,2
C1-dibenzotiofener	520	440	230	90	0,5
C2-dibenzotiofener	1100	1600	1200	190	0,5
C3-dibenzotiofener	1600	7500	4700	91	0,5
C5-dekaliner	14000	8800	4100	1800	5
C6-dekaliner	8800	13000	7100	1300	5
C7-dekaliner	5500	4100	2200	1000	5
C8-dekaliner	10000	4000	1400	890	5
SUM:					
Naftalener	8200	6500	6600	5300	
Fenantrener	2700	2800	1600	1100	
Dibenzotiofener	5600	10000	6200	390	
Dekaliner	38000	30000	15000	5000	
SUM NPD	17000	20000	14000	6800	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**SW3**	**SW3**	**SW3**	**MUC2**	grense
Slices:	**23-30**	**30-39**	**39-47**	**M2**	
THC (mg/kg TS)	740	2400	16	58000	2
Esterbasert borevæske, vekt% av THC	i.p.	i.p.	i.p.	100	
Total Nitrogen (mg/kg TS)	750	580	<	780	300
TS %	77,4	67,5	64,6	70,6	0,002
PAH (µg/kg TS)					
Naftalen	120	200	1,9	310	0,4
Asenaftylen	12	13	<	150	0,2
Asenaften	30	15	1,7	130	0,2
Fluoren	84	110	<	130	0,2
Fenantren	260	650	3,1	430	0,2
Antrasen	19	31	0,2	19	0,2
Fluoranten	36	68	2,1	5,7	0,2
Pyren	37	110	2,6	17	0,2
Benzo(a)antrasen	2,8	11	0,4	7,1	0,2
Krysen/trifenylen	15	81	1,4	39	0,2
Benzo(b+j+k)fluoranten	14	42	1,6	13	0,4
Benzo(a)pyren	5,4	15	0,7	5,4	0,4
Indeno(1,2,3-c,d)pyren	3,3	8,8	<	3,8	0,4
Benzo(g,h,i)perylen	12	29	<	12	0,4
Dibenzo(a,h)antrasen	1,8	6,9	<	3,9	0,4
SUM:					
3-ringer	410	820	5,0	860	
4-ringer	91	270	6,5	69	
5-ringer	21	64	2,3	22	
6-ringer	15	38	i.p	16	
SUM PAH	650	1400	16	1300	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	3,3	<	<	<	0,5
PCB 153	2,6	<	<	<	0,5
PCB 180	3,2	<	<	<	0,5
SUM PCB	9,1	i.p.	i.p.	i.p.	

Plattform:					Det.
Felt:	**EKOFISK**	**EKOFISK**	**EKOFISK**	**EKOFISK**	
Core:	**SW3**	**SW3**	**SW3**	**MUC2**	grense
Slices:	**23-30**	**30-39**	**39-47**	**M2**	
NPD/dekaliner(mg/kg TS)					
Naftalen	120	200	1,9	310	0,4
C1-naftalener	1100	4000	19	1700	0,5
C2-naftalener	4000	13000	<	4900	0,5
C3-naftalener	2600	7300	<	2000	0,5
Fenantren	260	650	3,1	430	0,2
C1-fenantrener	760	2500	<	600	0,5
C2-fenantrener	1200	4800	<	1300	0,5
C3-fenantrener	530	2500	<	7,2	0,5
Dibenzotiofen	92	160	<	1400	0,2
C1-dibenzotiofener	430	780	<	410	0,5
C2-dibenzotiofener	990	1900	<	1300	0,5
C3-dibenzotiofener	320	760	<	3300	0,5
C5-dekaliner	5100	4600	<	6500	5
C6-dekaliner	2300	4000	<	6100	5
C7-dekaliner	1900	4600	<	2000	5
C8-dekaliner	1700	5200	<	4200	5
SUM:					
Naftalener	7800	25000	21	8900	
Fenantrener	2800	10000	3,1	2300	
Dibenzotiofener	1800	3600	i.p.	6400	
Dekaliner	11000	18000	i.p.	19000	
SUM NPD	12402	39000	24	18000	

Plattform:					Det.
Felt:	**EKOFISK**				
Core/Intallasjon:	**CFAS3**	**2/4 A**	**2/4 A**	**2/4 A**	grense
Slices/REF-Nr:	**CFAS3**	**442-67**	**442-68**	**442-71**	
THC (mg/kg TS)	56000	30000	130000	54000	2
Esterbasert borevæske, vekt% av THC	100	100	100	100	
Total Nitrogen (mg/kg TS)	800	950	800	810	300
TS %	71,5	65,9	66,2	70,6	0,002
PAH (µg/kg TS)					
Naftalen	120	150	300	180	0,4
Asenaftylen	140	120	100	81	0,2
Asenaften	630	310	570	100	0,2
Fluoren	88	71	110	210	0,2
Fenantren	330	220	310	680	0,2
Antrasen	5,2	13	29	49	0,2
Fluoranten	30	34	32	80	0,2
Pyren	16	37	21	47	0,2
Benzo(a)antrasen	6,1	9,9	10	18	0,2
Krysen/trifenylen	31	28	37	63	0,2
Benzo(b+j+k)fluoranten	17	12	13	37	0,4
Benzo(a)pyren	6,5	6,5	6,7	9,1	0,4
Indeno(1,2,3-c,d)pyren	5,7	4,1	5,3	6,9	0,4
Benzo(g,h,i)perylen	17	12	12	18	0,4
Dibenzo(a,h)antrasen	5,0	<	6,2	8,1	0,4
SUM:					
3-ringer	1200	730	1100	1100	
4-ringer	83	110	100	210	
5-ringer	29	19	26	54	
6-ringer	23	16	17	25	
SUM PAH	1400	1000	1600	1600	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

Plattform:					Det.
Felt:	**EKOFISK**				
Core:	**CFAS3**	**2/4 A**	**2/4 A**	**2/4 A**	grense
Slices:	**CFAS3**	**442-67**	**442-68**	**442-71**	
NPD/dekaliner(mg/kg TS)					
Naftalen	120	150	300	180	0,4
C1-naftalener	680	900	1300	1100	0,5
C2-naftalener	3400	3800	4400	7700	0,5
C3-naftalener	1700	1500	1800	4600	0,5
Fenantren	330	220	310	680	0,2
C1-fenantrener	560	510	440	1000	0,5
C2-fenantrener	1400	1400	1400	2500	0,5
C3-fenantrener	2600	3800	1800	4900	0,5
Dibenzotiofen	1600	1000	1200	3600	0,2
C1-dibenzotiofener	230	530	810	510	0,5
C2-dibenzotiofener	480	710	1100	1500	0,5
C3-dibenzotiofener	2500	2400	4100	1100	0,5
C5-dekaliner	8000	9100	9500	29000	5
C6-dekaliner	7900	7100	6200	17000	5
C7-dekaliner	3900	4800	4300	14000	5
C8-dekaliner	6200	5300	6600	20000	5
SUM:					
Naftalener	5900	6400	7800	14000	
Fenantrener	4900	5900	4000	9100	
Dibenzotiofener	4800	4600	7200	6700	
Dekaliner	26000	26000	27000	80000	
SUM NPD	16000	17000	19000	29000	

Plattform:					Det.
Felt:					
Core:	**2/4 A**	**Beryl**	**Beryl**	**Beryl**	grense
Slices:	**442-72**	**442-69**	**442-70**	**442-73**	
THC (mg/kg TS)	51000	2800	2700	28000	2
Esterbasert borevæske, vekt% av THC	100	i.a.	i.a.	i.a.	
Total Nitrogen (mg/kg TS)	1500	<	<	470	300
TS %	65,3	77,2	77,1	79,0	0,002
PAH (µg/kg TS)					
Naftalen	140	57	51	100	0,4
Asenaftylen	61	48	48	480	0,2
Asenaften	890	40	37	470	0,2
Fluoren	77	47	46	360	0,2
Fenantren	220	160	140	320	0,2
Antrasen	19	8,3	8,9	40	0,2
Fluoranten	36	14	11	190	0,2
Pyren	22	52	51	280	0,2
Benzo(a)antrasen	12	7,0	4,9	8,0	0,2
Krysen/trifenylen	24	28	25	31	0,2
Benzo(b+j+k)fluoranten	12	15	15	23	0,4
Benzo(a)pyren	5,1	5,4	5,1	9,4	0,4
Indeno(1,2,3-c,d)pyren	4,7	2,7	3,2	4,8	0,4
Benzo(g,h,i)perylen	8,8	14	15	14	0,4
Dibenzo(a,h)antrasen	<	1,7	1,4	3,5	0,4
SUM:					
3-ringer	1300	300	280	1700	
4-ringer	94	100	92	510	
5-ringer	17	22	22	36	
6-ringer	14	17	18	19	
SUM PAH	1500	500	460	2300	
PCB (µg/kg TS)					
PCB 28	<	<	<	<	0,5
PCB 52	<	<	<	<	0,5
PCB 101	<	<	<	<	0,5
PCB 118	<	<	<	<	0,5
PCB 138	<	<	<	<	0,5
PCB 153	<	<	<	<	0,5
PCB 180	<	<	<	<	0,5
SUM PCB	i.p.	i.p.	i.p.	i.p.	

Plattform: **Felt:** **Core:** **Slices:**	**2/4 A** **442-72**	**Beryl** **442-69**	**Beryl** **442-70**	**Beryl** **442-73**	Det. grense
NPD/dekaliner(mg/kg TS)					
Naftalen	140	57	51	100	0,4
C1-naftalener	500	320	260	620	0,5
C2-naftalener	3300	1500	1200	5400	0,5
C3-naftalener	1100	800	710	3100	0,5
Fenantren	220	160	140	320	0,2
C1-fenantrener	430	420	380	510	0,5
C2-fenantrener	1200	640	540	720	0,5
C3-fenantrener	2700	340	280	450	0,5
Dibenzotiofen	120	44	40	50	0,2
C1-dibenzotiofener	230	200	170	350	0,5
C2-dibenzotiofener	2000	380	360	560	0,5
C3-dibenzotiofener	6300	160	130	280	0,5
C5-dekaliner	8400	36000	33000	280000	5
C6-dekaliner	11000	24000	23000	180000	5
C7-dekaliner	4700	16000	15000	120000	5
C8-dekaliner	1800	11000	9700	67000	5
SUM:					
Naftalener	5000	2700	2200	9200	
Fenantrener	4600	1600	1300	2000	
Dibenzotiofener	8700	780	700	1200	
Dekaliner	26000	87000	81000	650000	
SUM NPD	18000	5000	4300	12000	

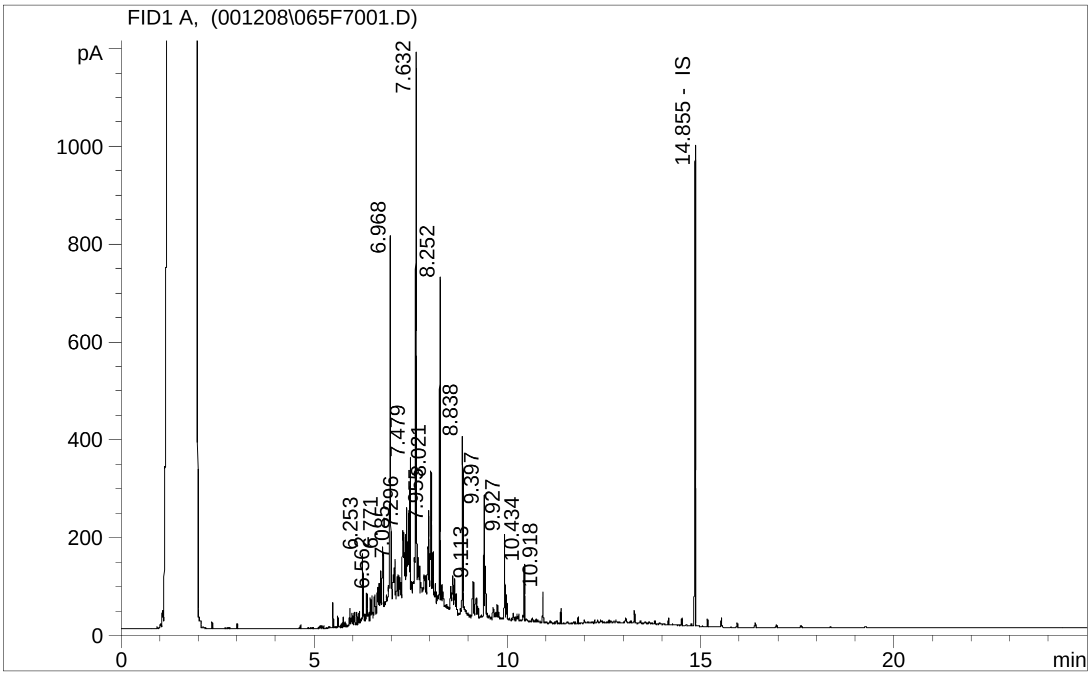
Plattform:		Det.
Felt:		
Intallasjon:	**Beryl**	grense
REF-Nr:	**442-74**	
THC (mg/kg TS)	12000	2
Total Nitrogen (mg/kg TS)	380	300
TS %	79,5	0,002
PAH (µg/kg TS)		
Naftalen	67	0,4
Asenaftylen	130	0,2
Asenaften	200	0,2
Fluoren	120	0,2
Fenantren	170	0,2
Antrasen	20	0,2
Fluoranten	21	0,2
Pyren	130	0,2
Benzo(a)antrasen	6,5	0,2
Krysen/trifenylen	34	0,2
Benzo(b+j+k)fluoranten	15	0,4
Benzo(a)pyren	4,6	0,4
Indeno(1,2,3-c,d)pyren	3,2	0,4
Benzo(g,h,i)perylen	13	0,4
Dibenzo(a,h)antrasen	1,9	0,4
SUM:		
3-ringer	640	
4-ringer	190	
5-ringer	22	
6-ringer	16	
SUM PAH	940	
PCB (µg/kg TS)		
PCB 28	<	0,5
PCB 52	<	0,5
PCB 101	<	0,5
PCB 118	<	0,5
PCB 138	<	0,5
PCB 153	<	0,5
PCB 180	<	0,5
SUM PCB	i.p.	

Plattform: **Felt:** **Core:** **Slices:**	 **Beryl** **442-74**	Det. grense
NPD/dekaliner(mg/kg TS)		
Naftalen	67	0,4
C1-naftalener	390	0,5
C2-naftalener	2300	0,5
C3-naftalener	1200	0,5
Fenantren	170	0,2
C1-fenantrener	440	0,5
C2-fenantrener	720	0,5
C3-fenantrener	350	0,5
Dibenzotiofen	64	0,2
C1-dibenzotiofener	270	0,5
C2-dibenzotiofener	590	0,5
C3-dibenzotiofener	250	0,5
C5-dekaliner	130000	5
C6-dekaliner	78000	5
C7-dekaliner	46000	5
C8-dekaliner	30000	5
SUM:		
Naftalener	4000	
Fenantrener	1700	
Dibenzotiofener	1200	
Dekaliner	280000	
SUM NPD	6800	

MILJØ-KJEMI Norsk Miljø Senter	Saksnr.	15545-12-5
	Vedlegg	1 side 1

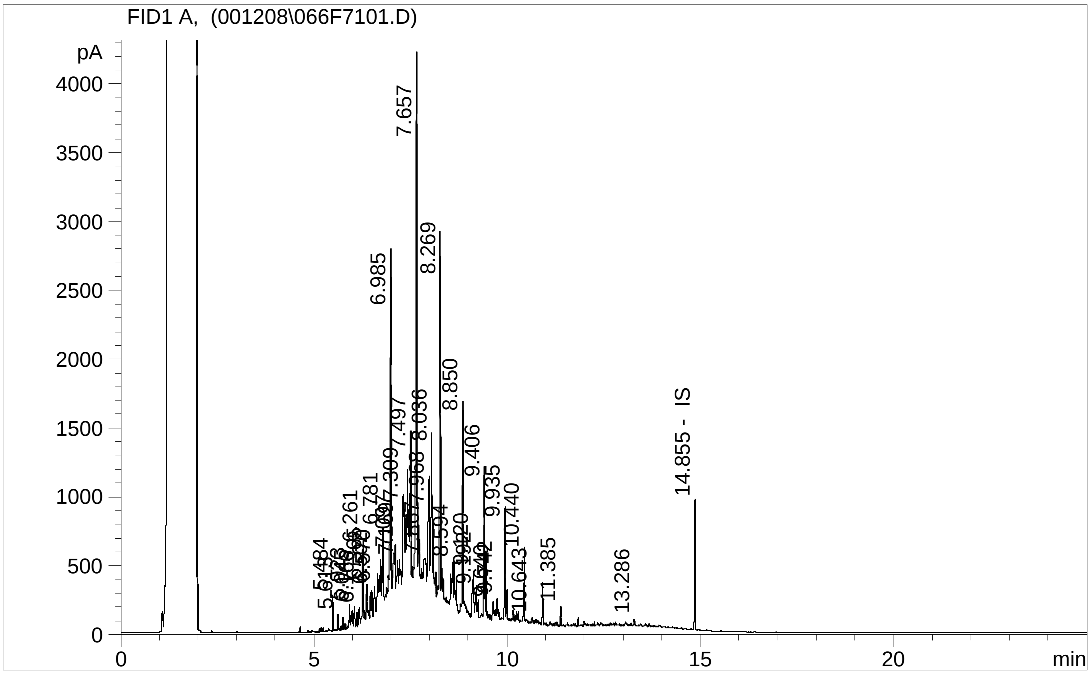
GC/FID-kromatogram: Sedimentprøve

BERYL V1-1 0-10

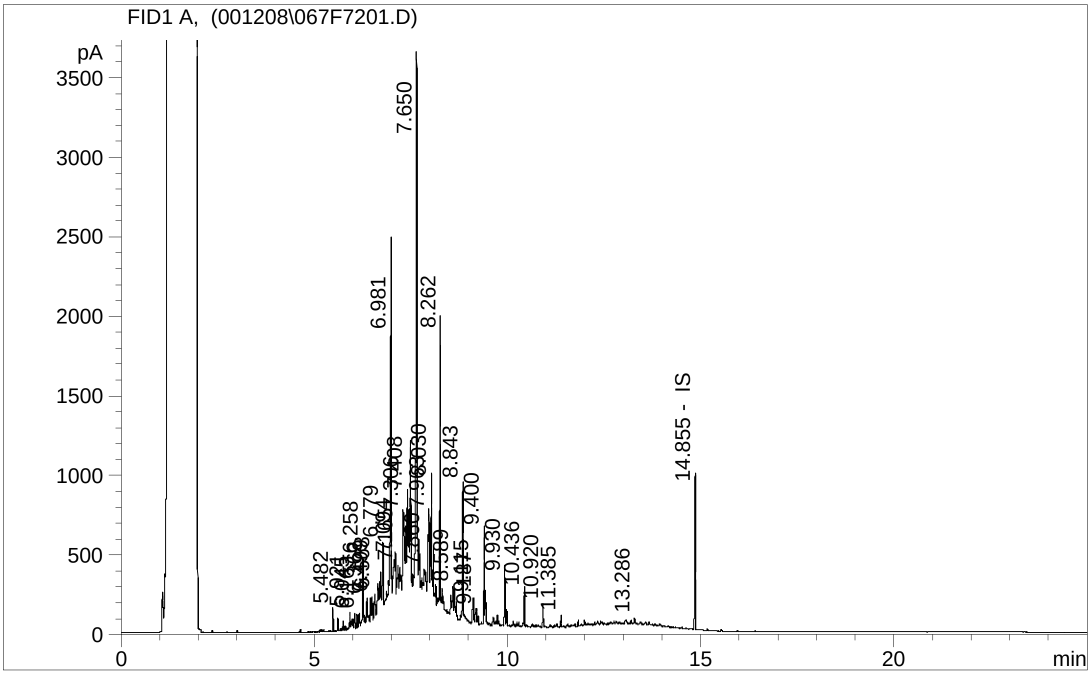


GC/FID-kromatogram: Sedimentprøve

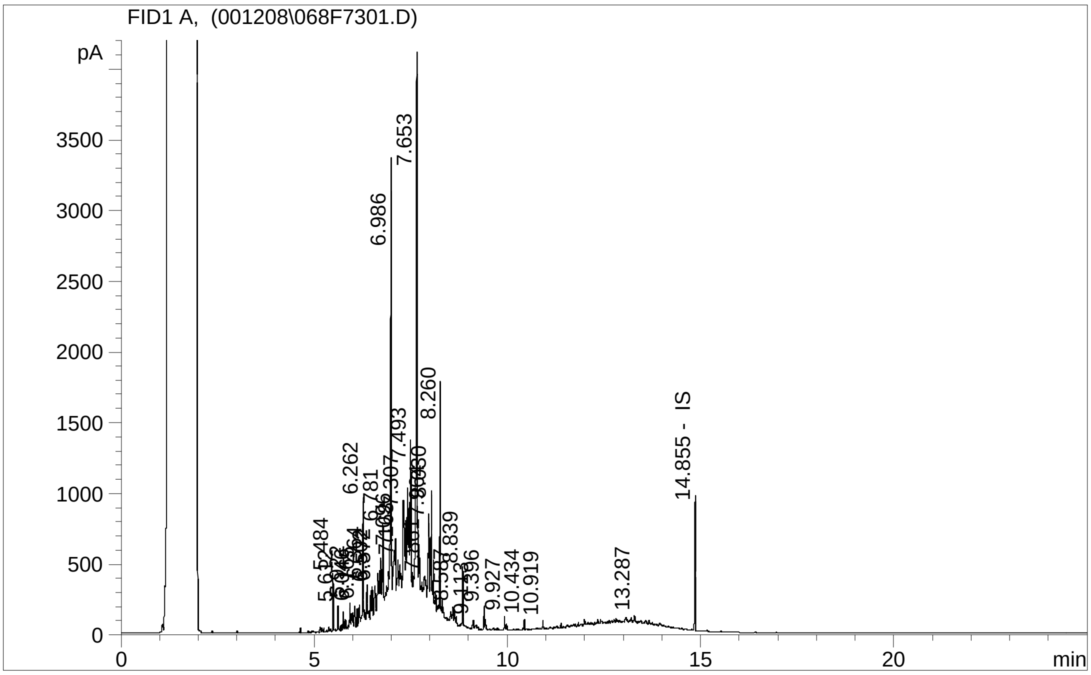
BERYL V1-1 10-22



GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 22-28

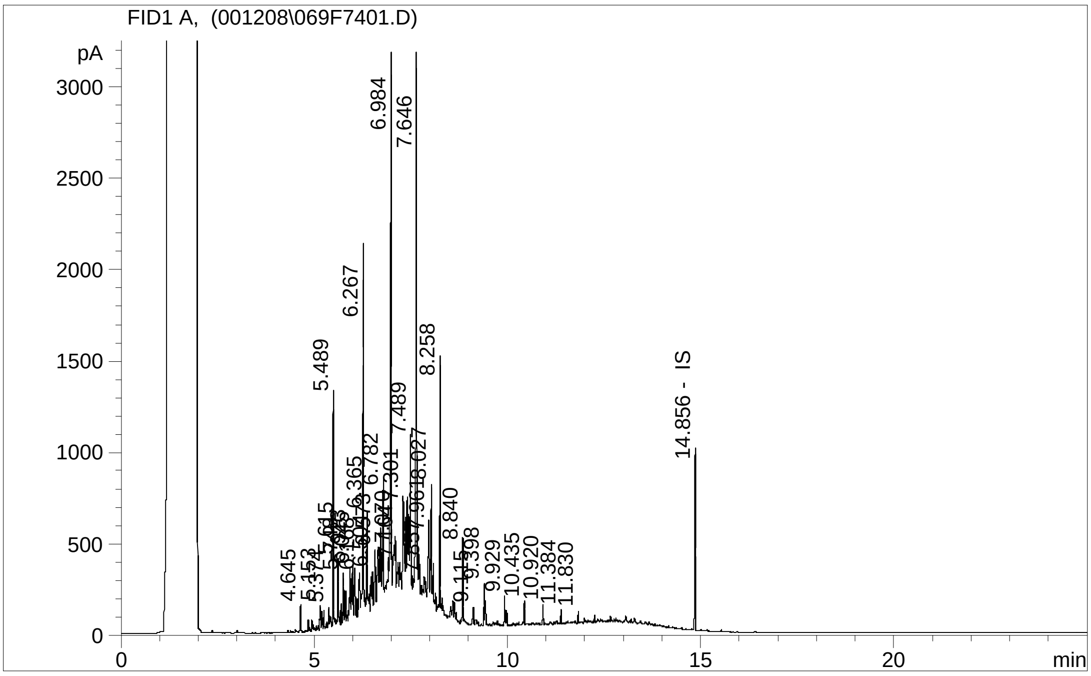


GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 28-36

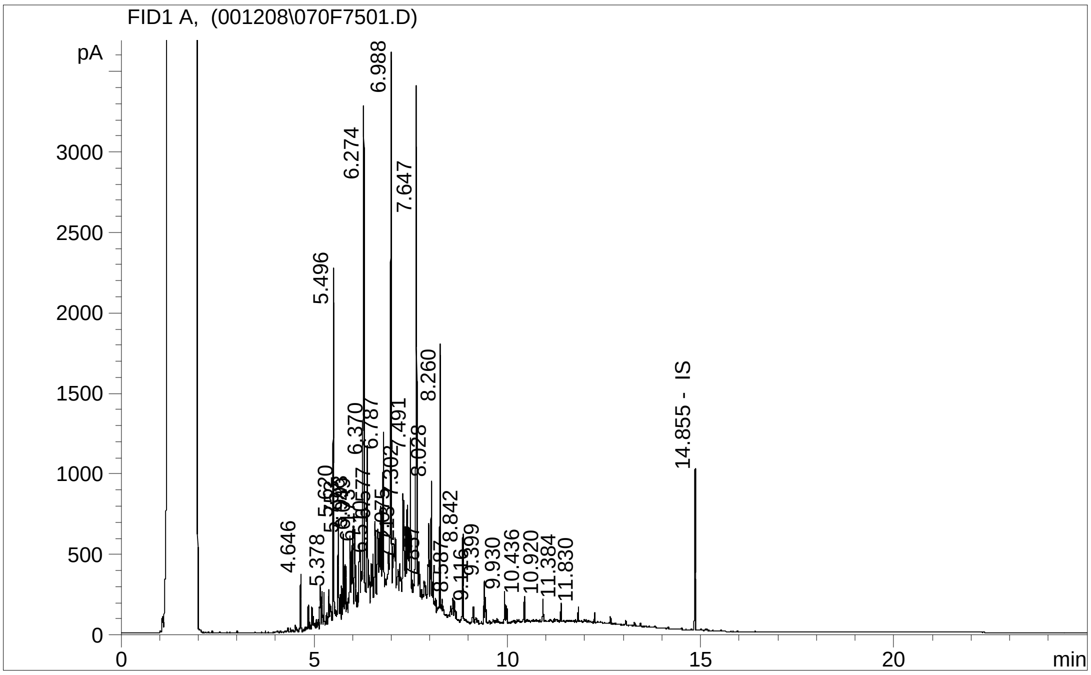


MILJØ-KJEMI Norsk Miljø Senter	Saksnr.	15545-12-5
	Vedlegg	1 side 3

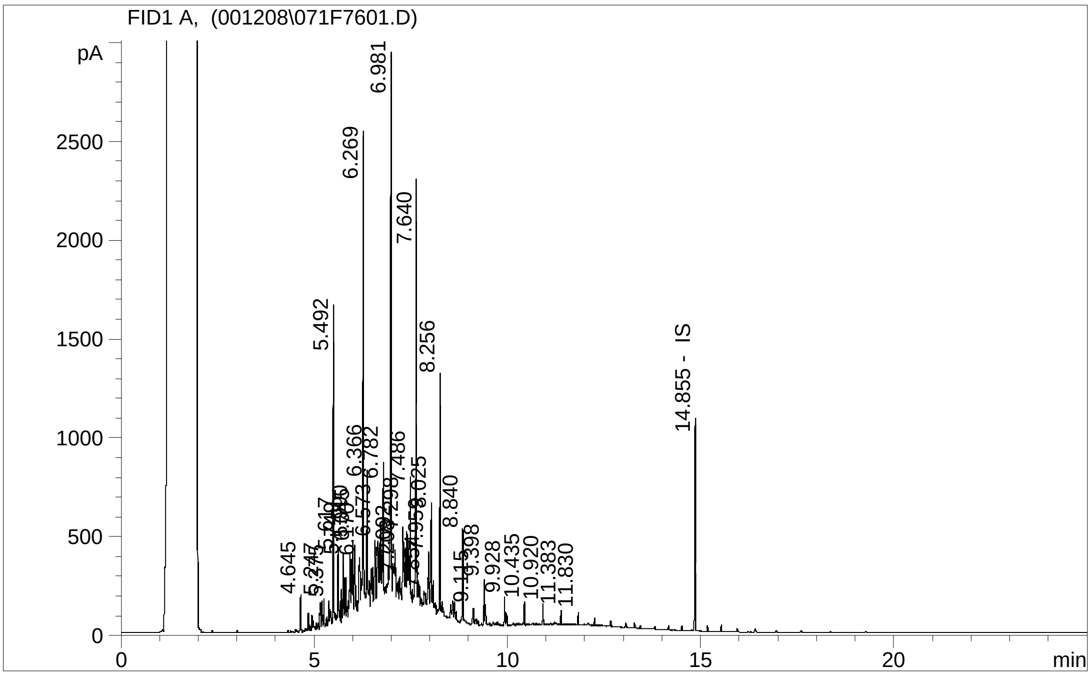
GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 36-40



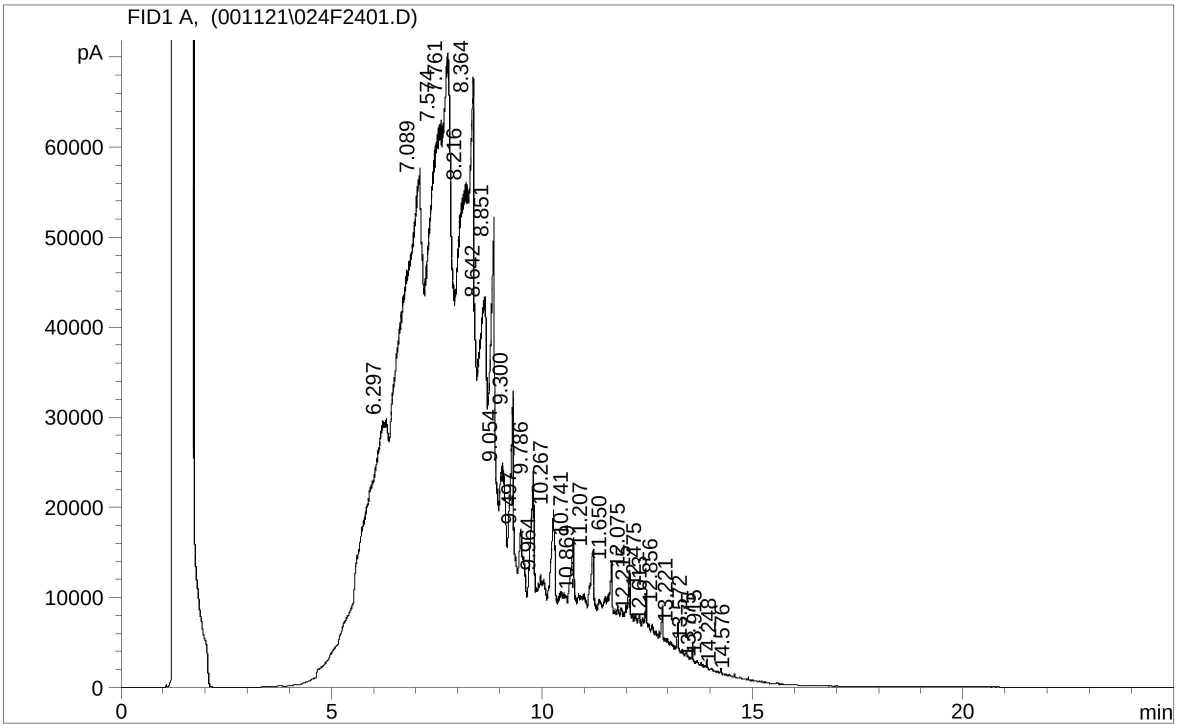
GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 40-48



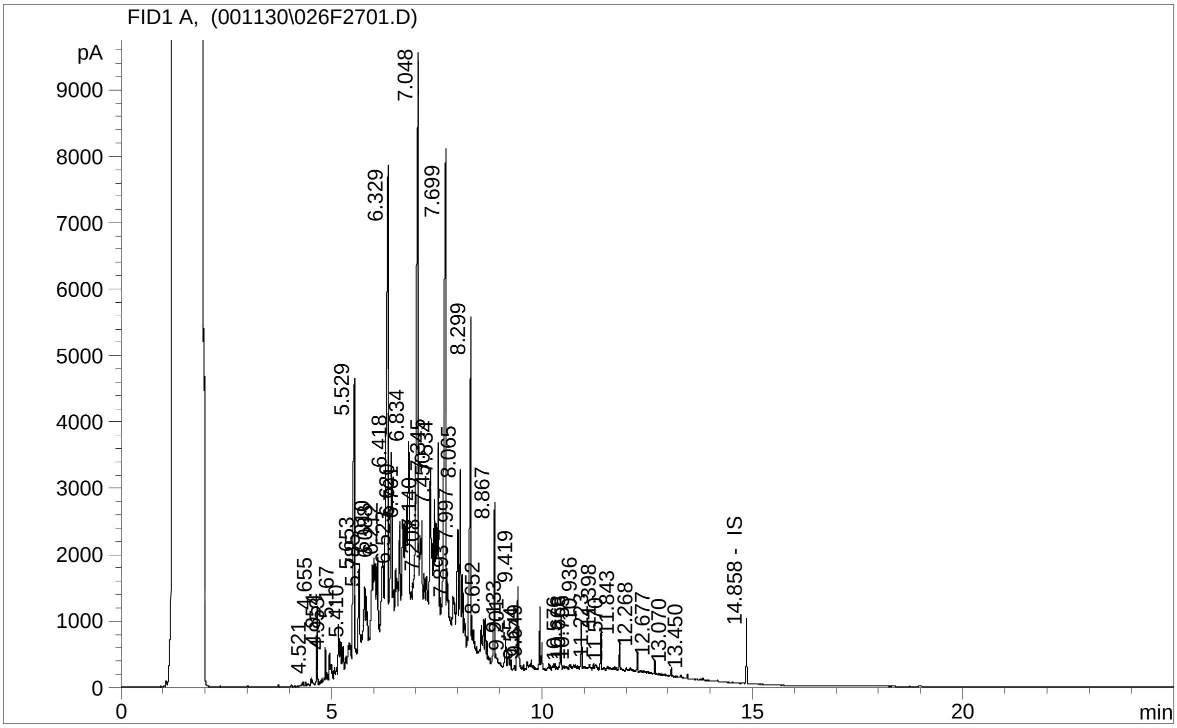
GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 48-56



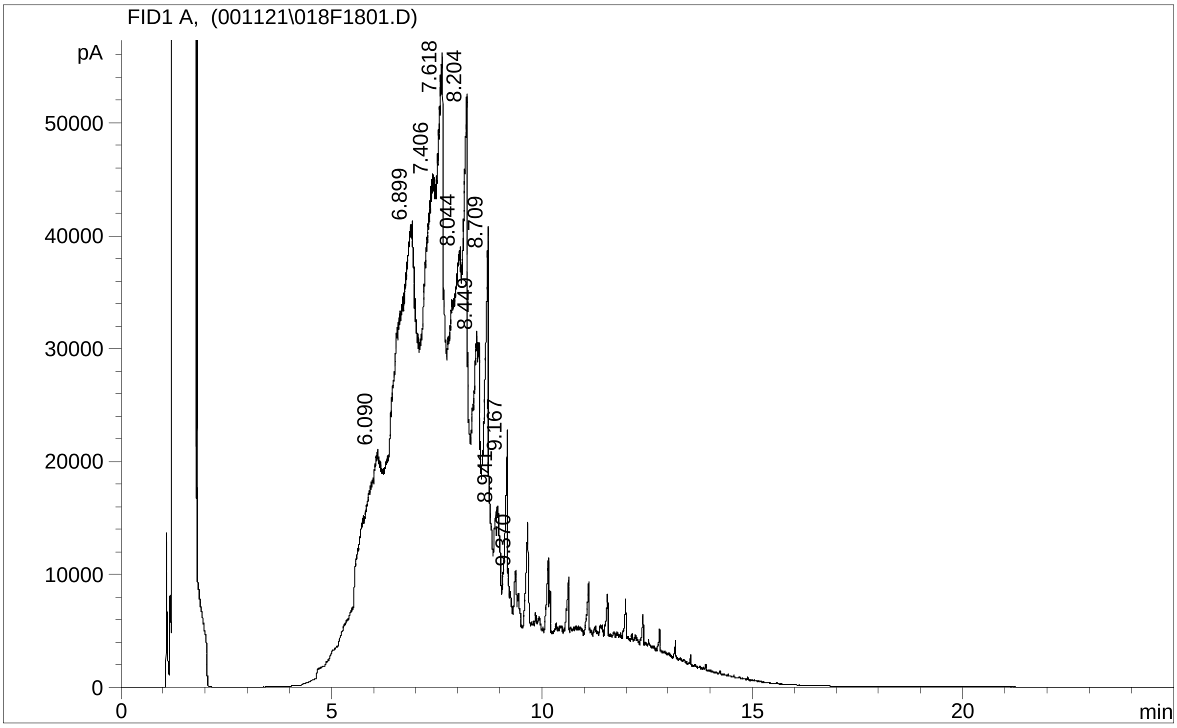
GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 68-76



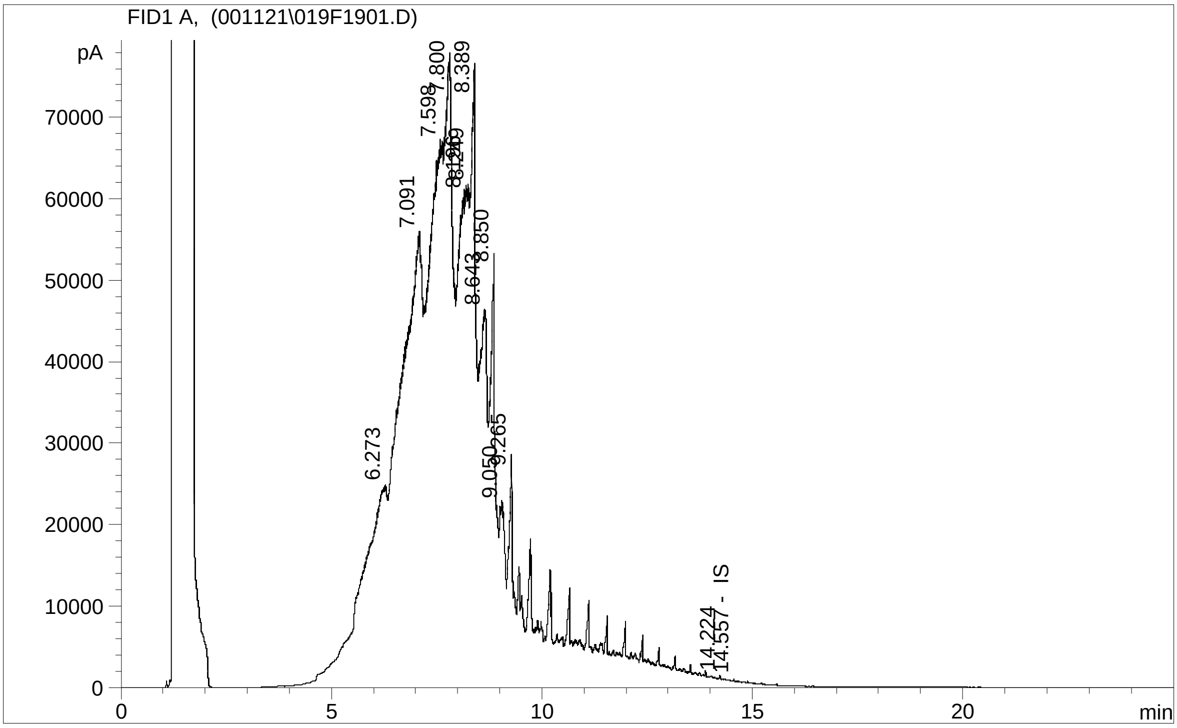
GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 58-60



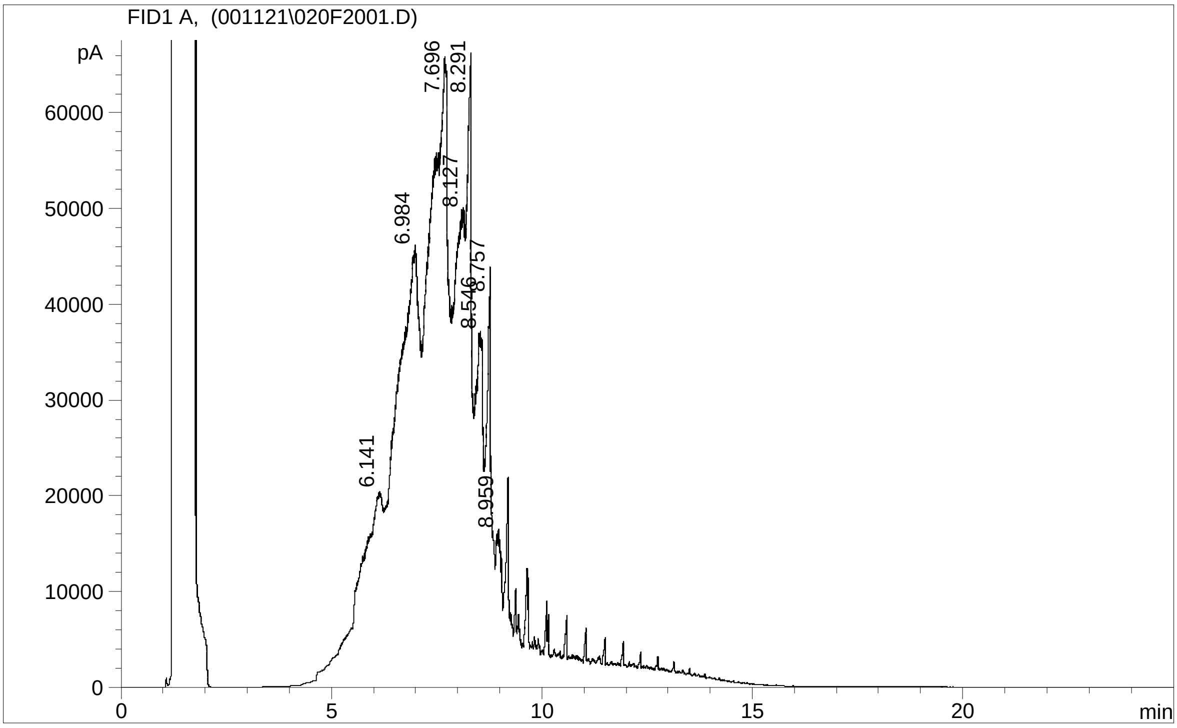
GC/FID-kromatogram: Sedimentprøve
BERYL V1-1 60-68



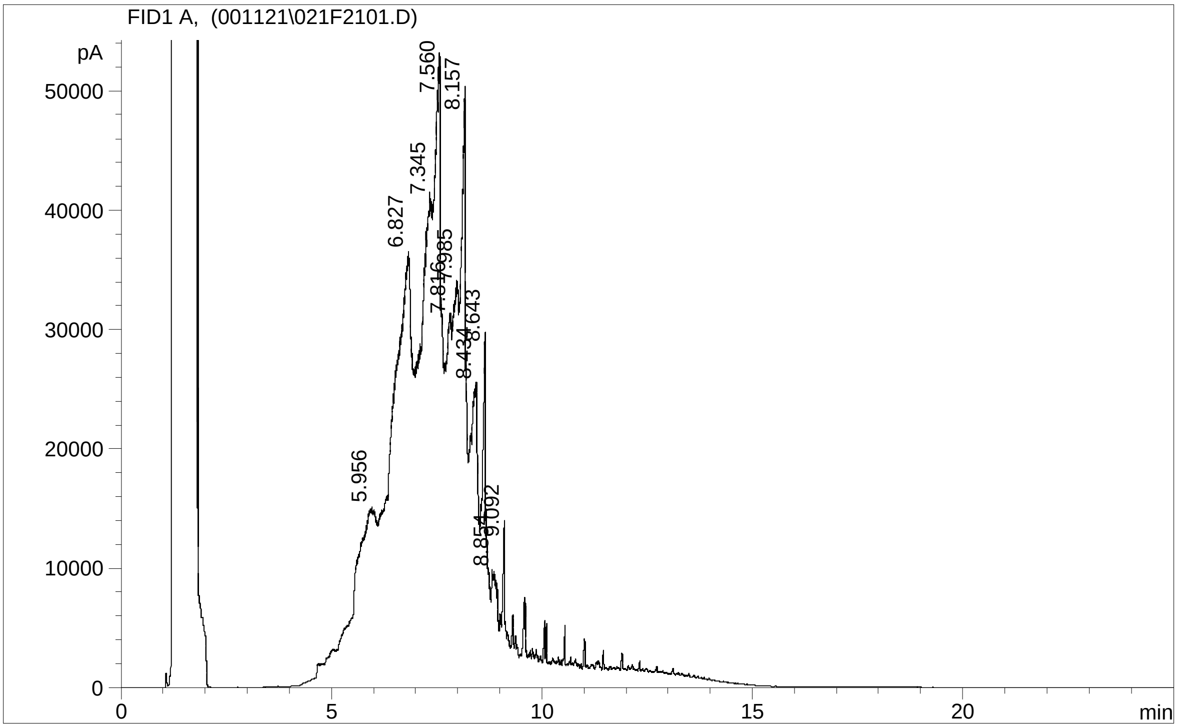
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 0-15



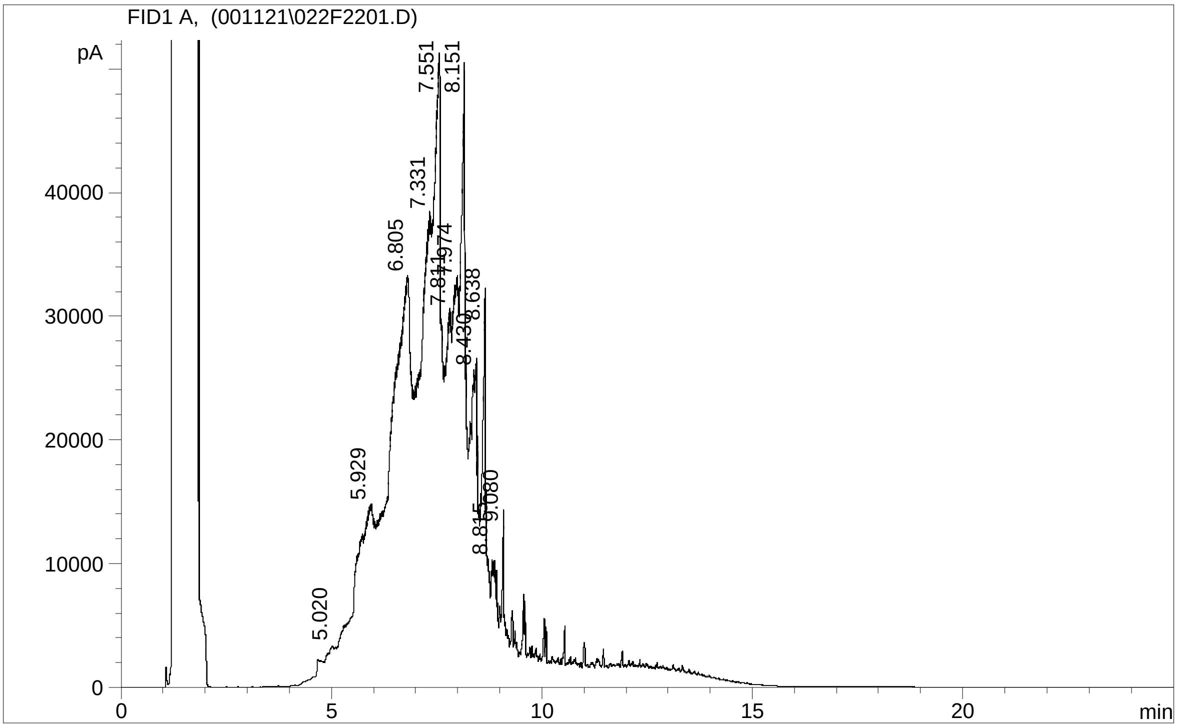
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 15-30



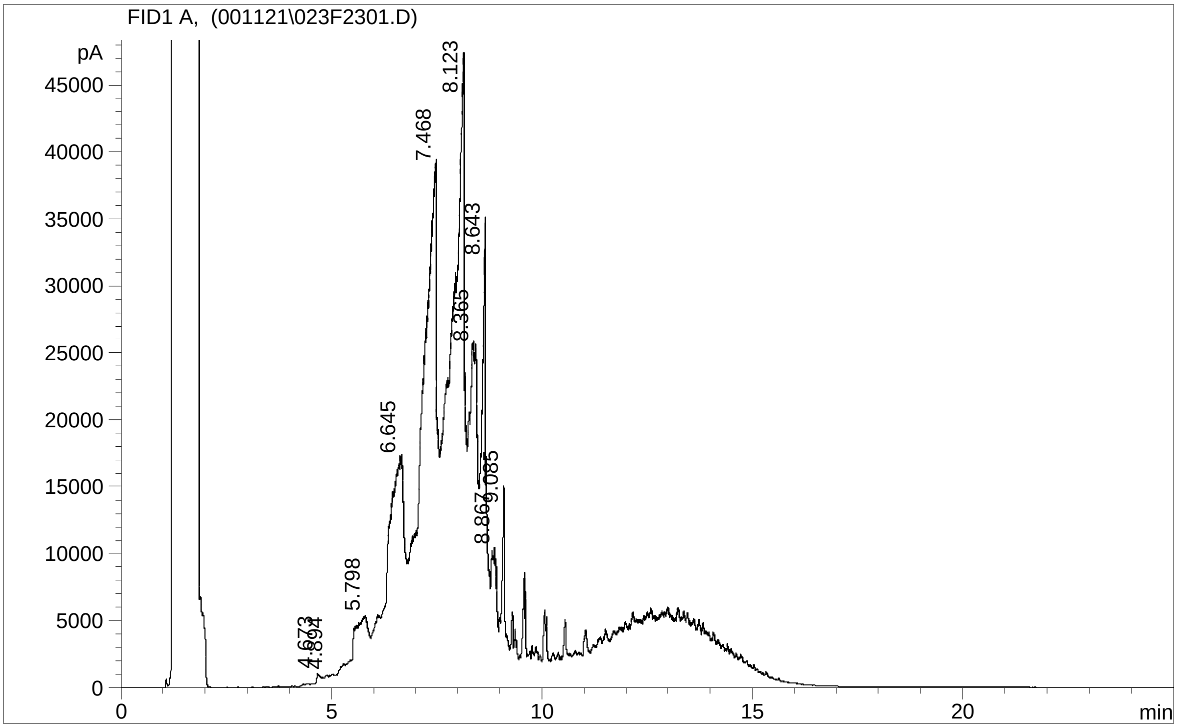
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 30-45



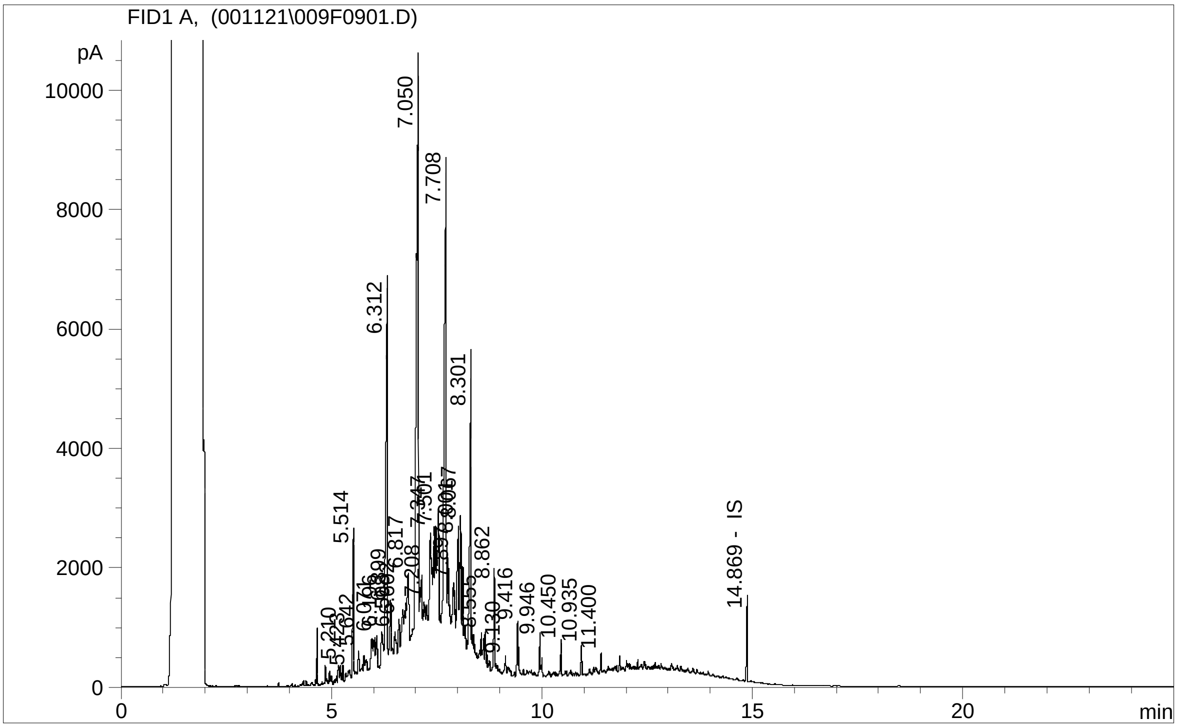
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 45-60



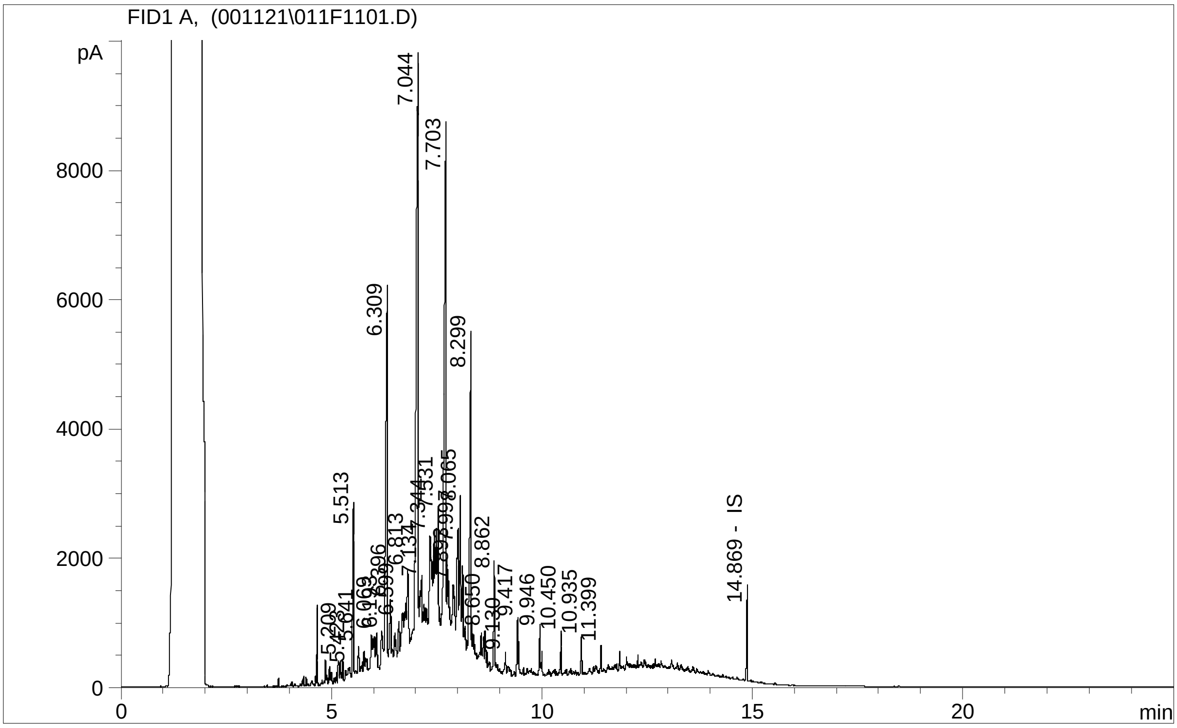
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 60-65



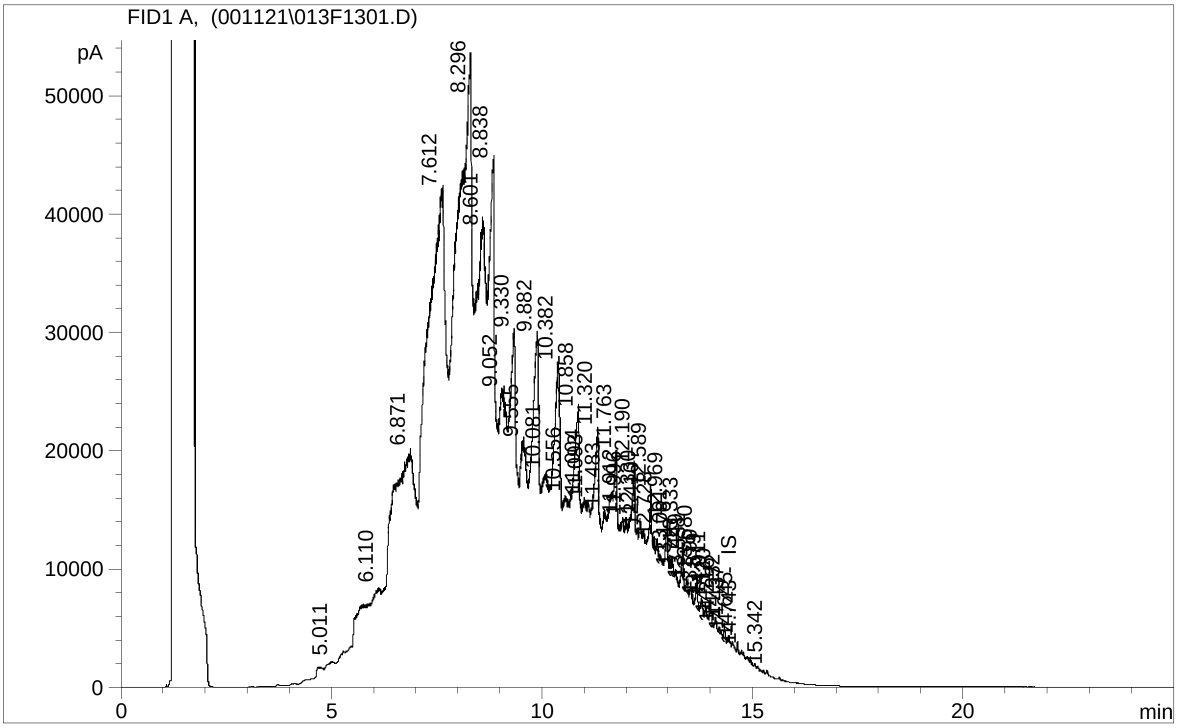
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 65-75



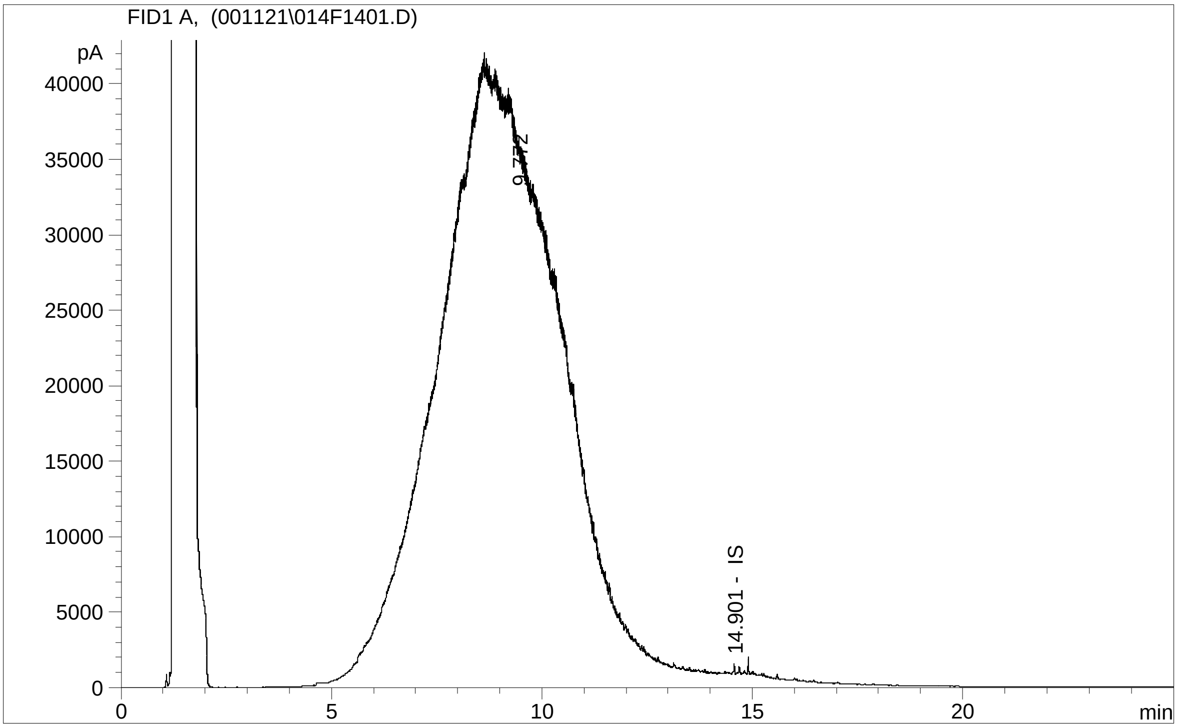
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 75-85



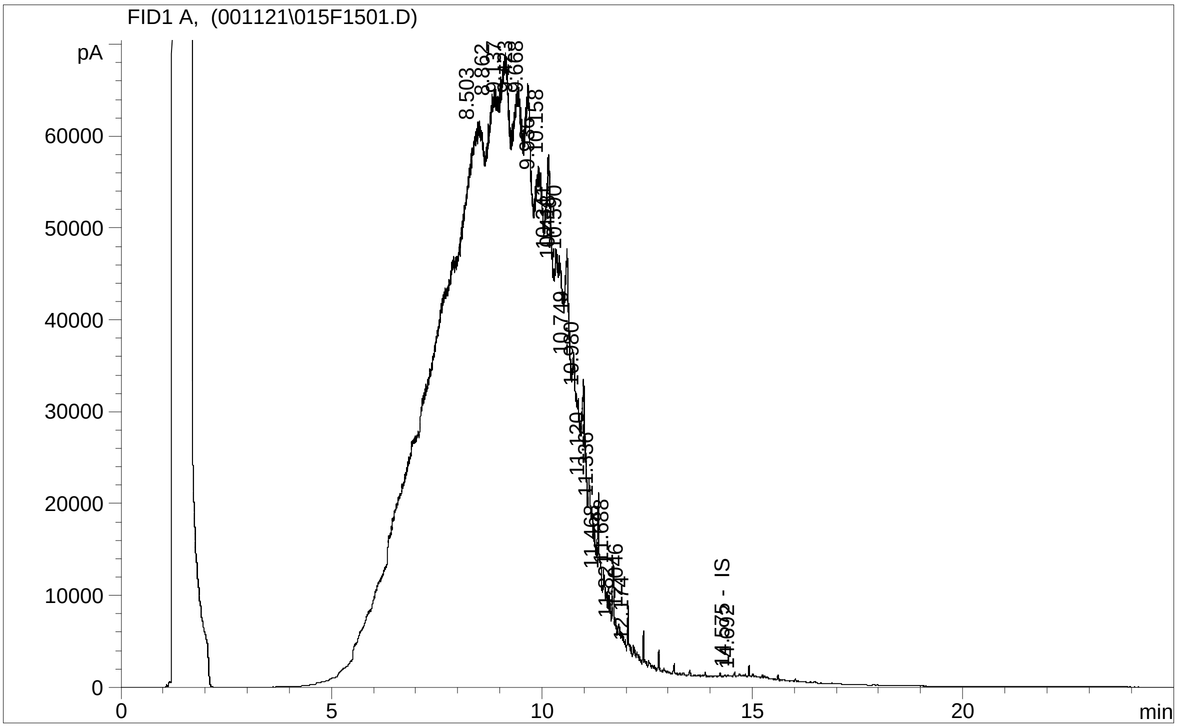
GC/FID-kromatogram: Sedimentprøve
BERYL V1-2 85-90



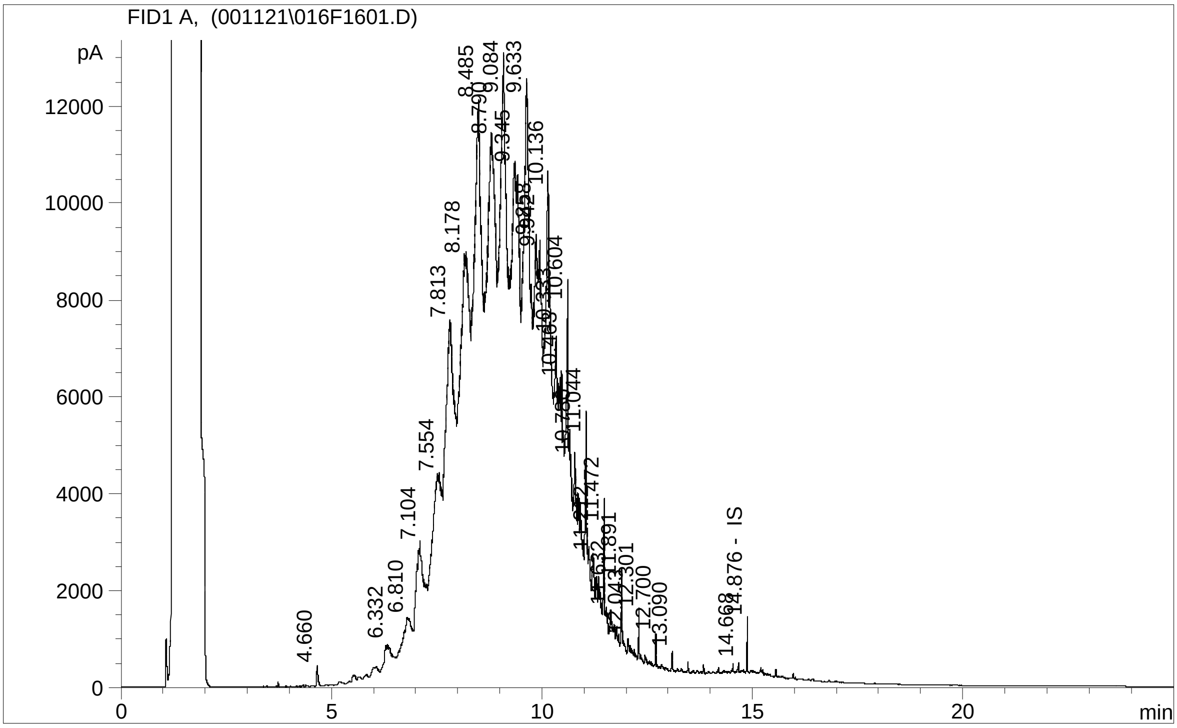
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 0-6



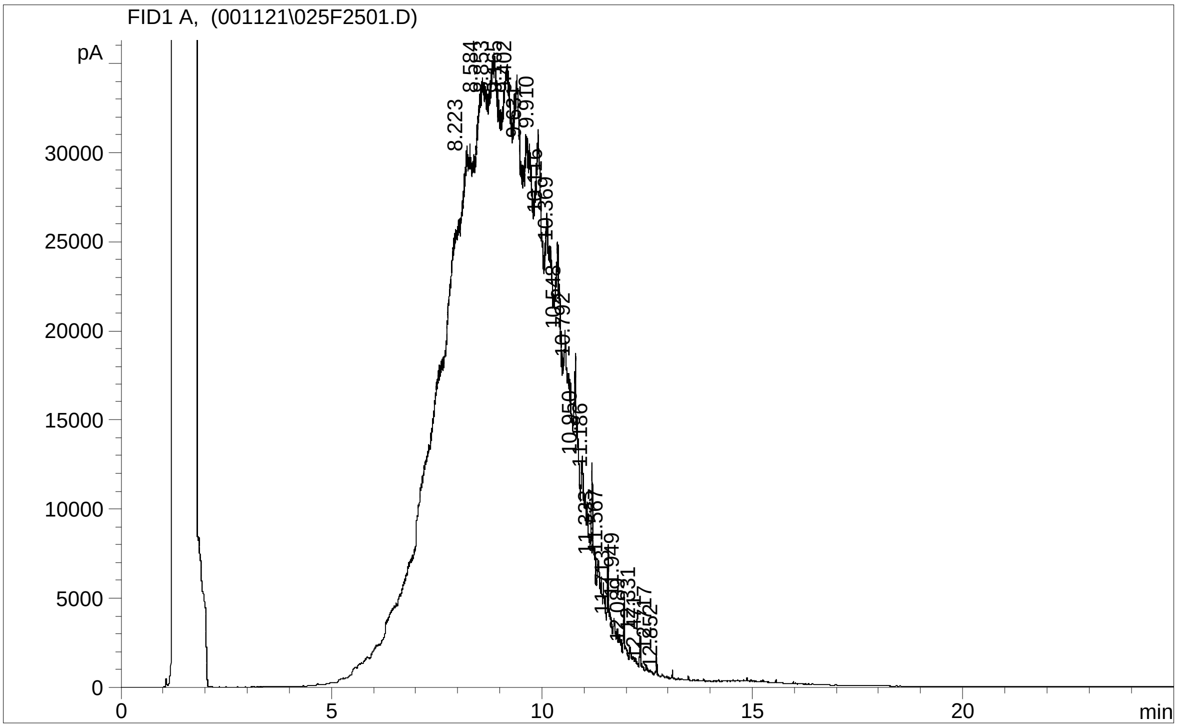
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 6-10



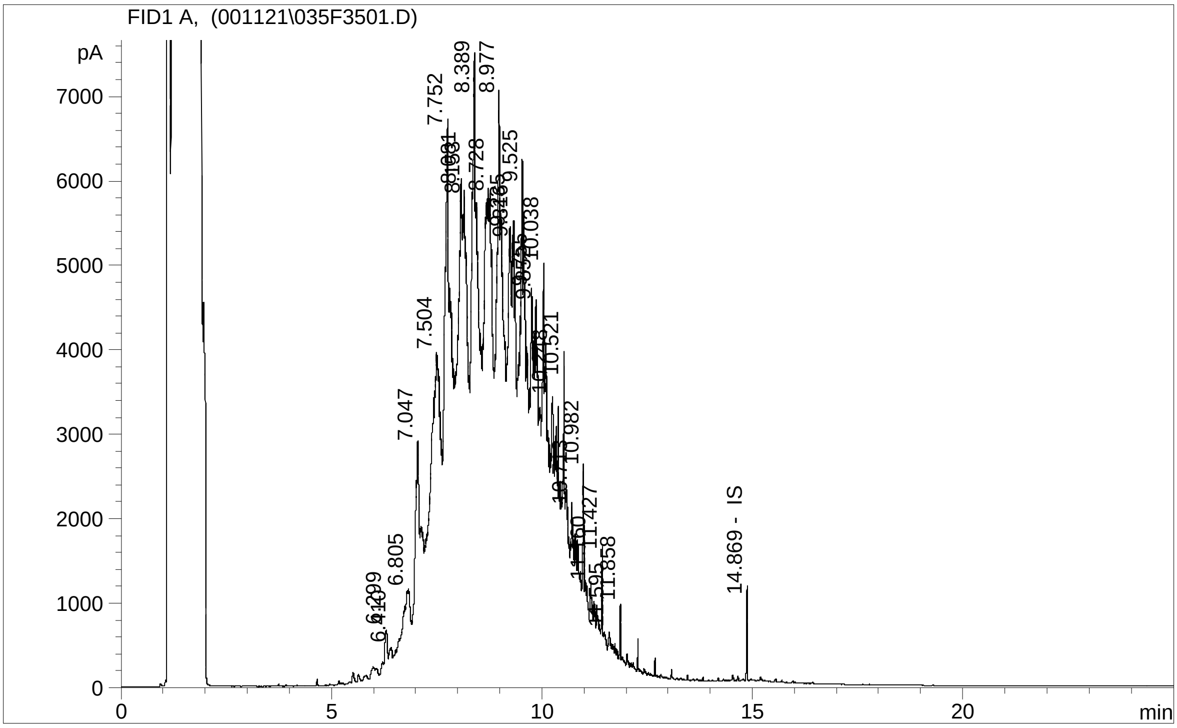
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 10-14



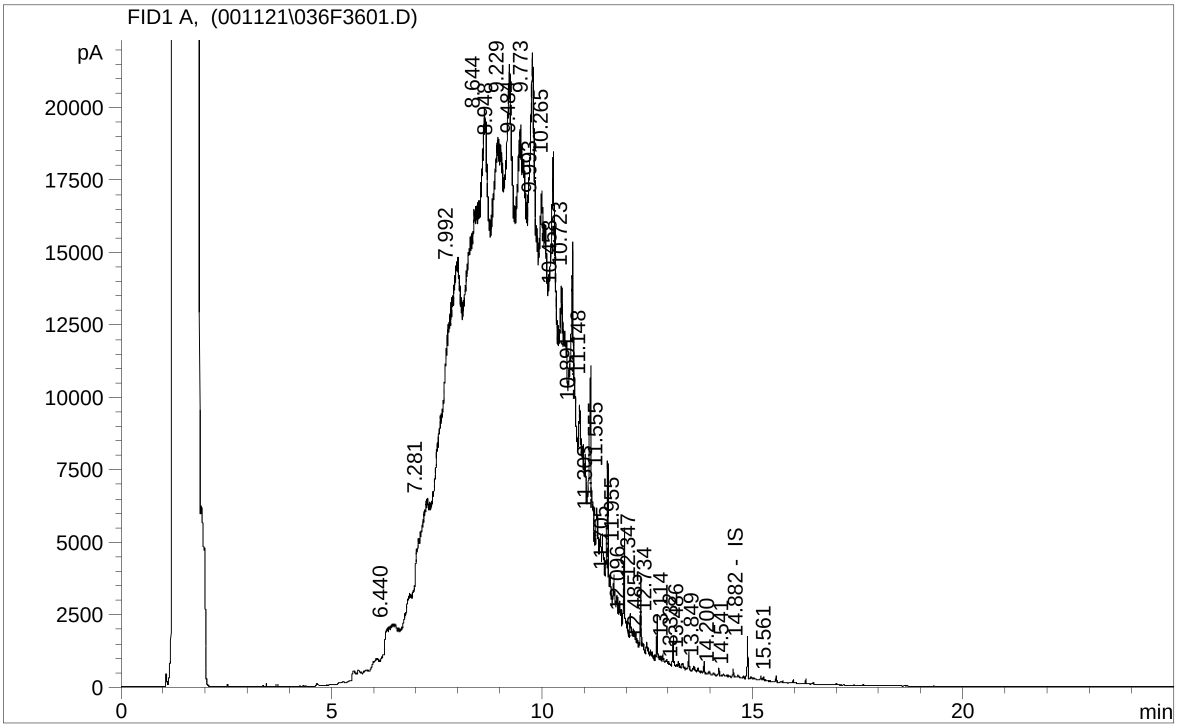
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 14-16



GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 16-25

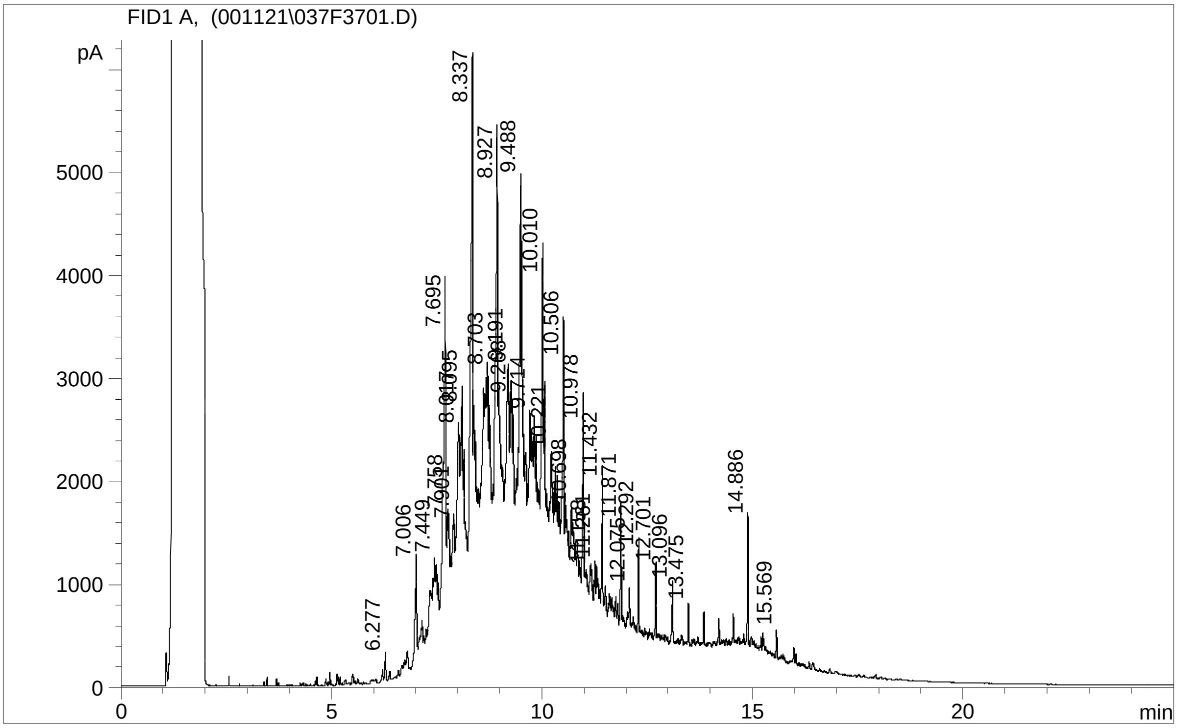


GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 25-30



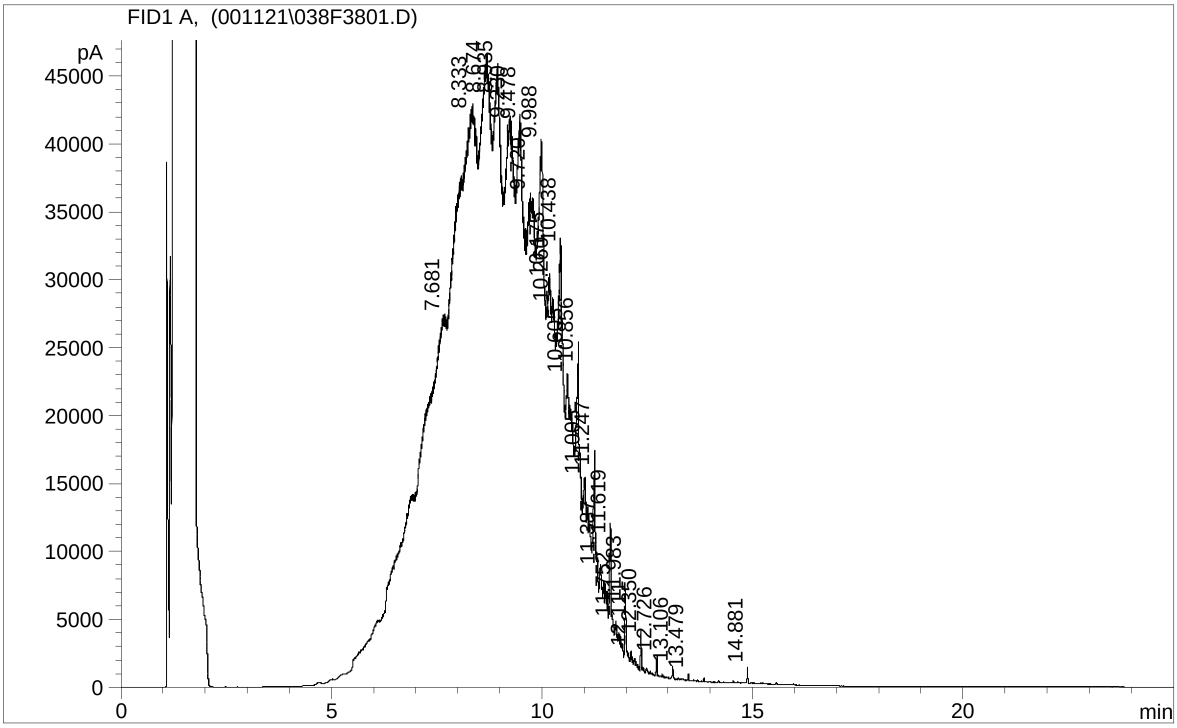
GC/FID-kromatogram: Sedimentprøve

BERYL V3-G 30-34

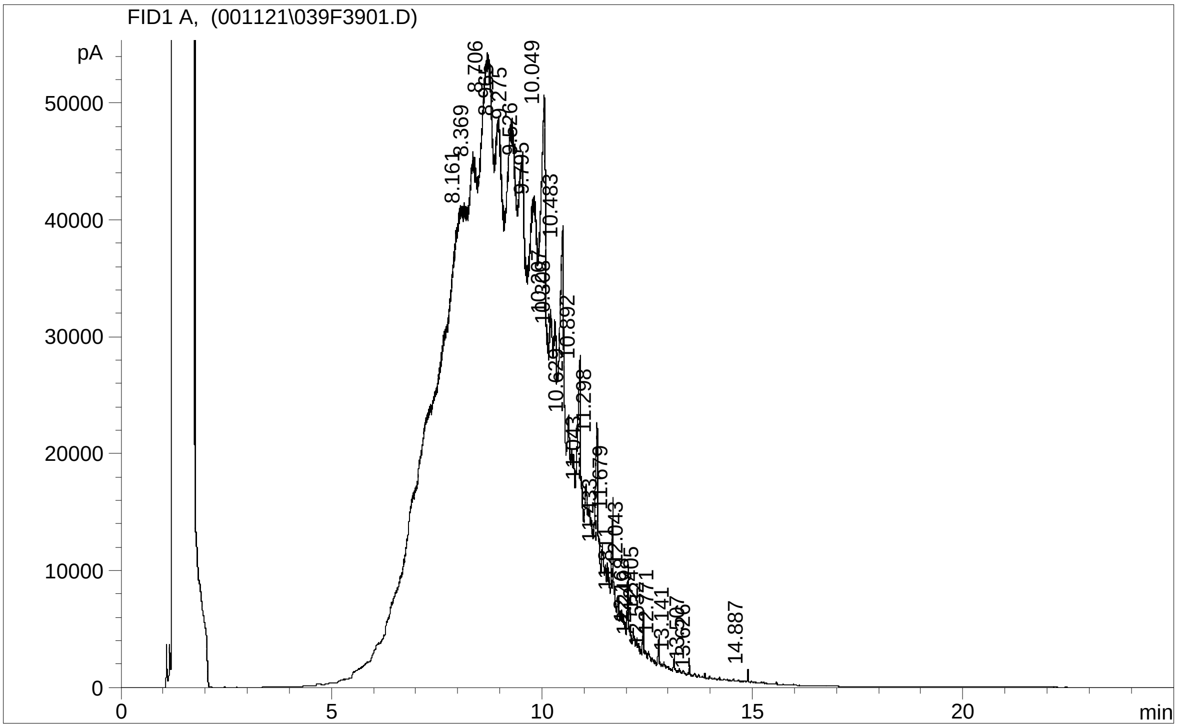


GC/FID-kromatogram: Sedimentprøve

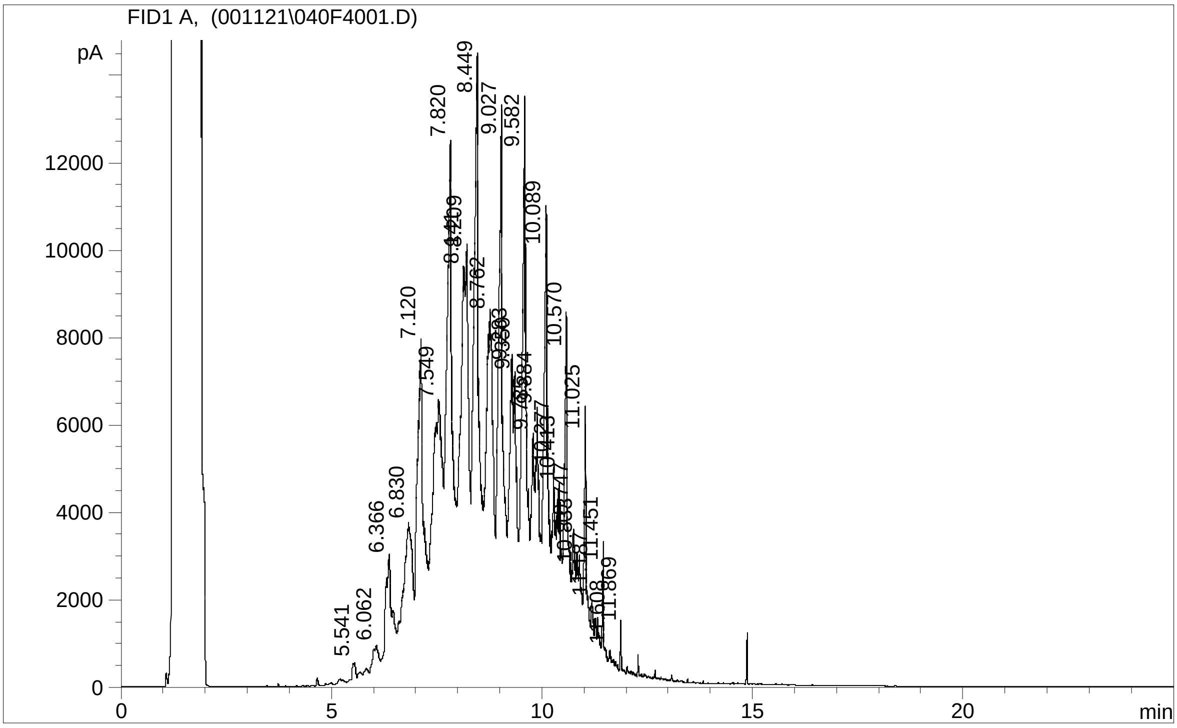
BERYL V3-G 34-39



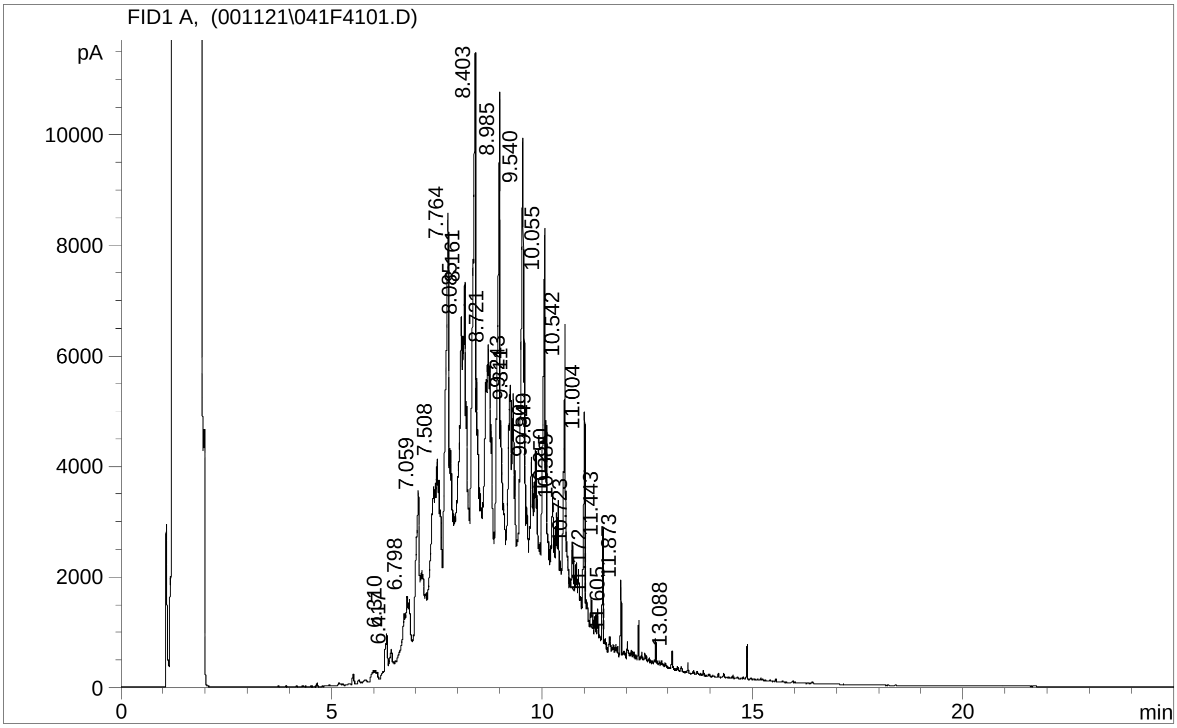
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 39-48



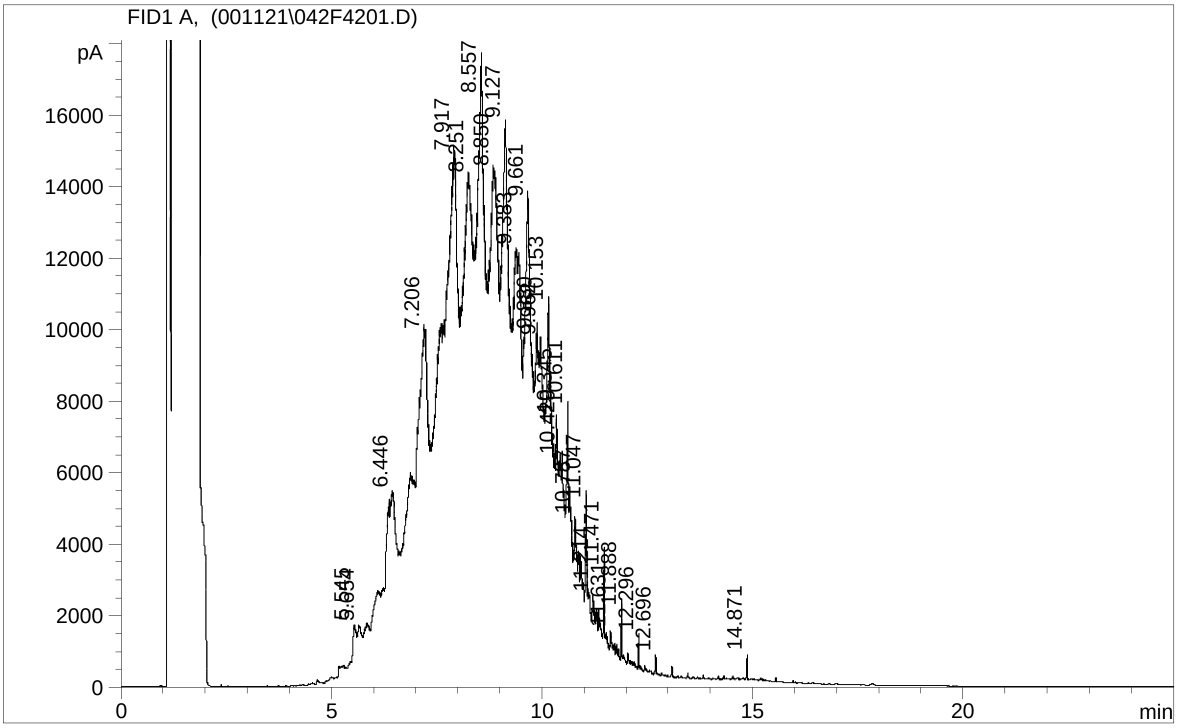
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 48-56



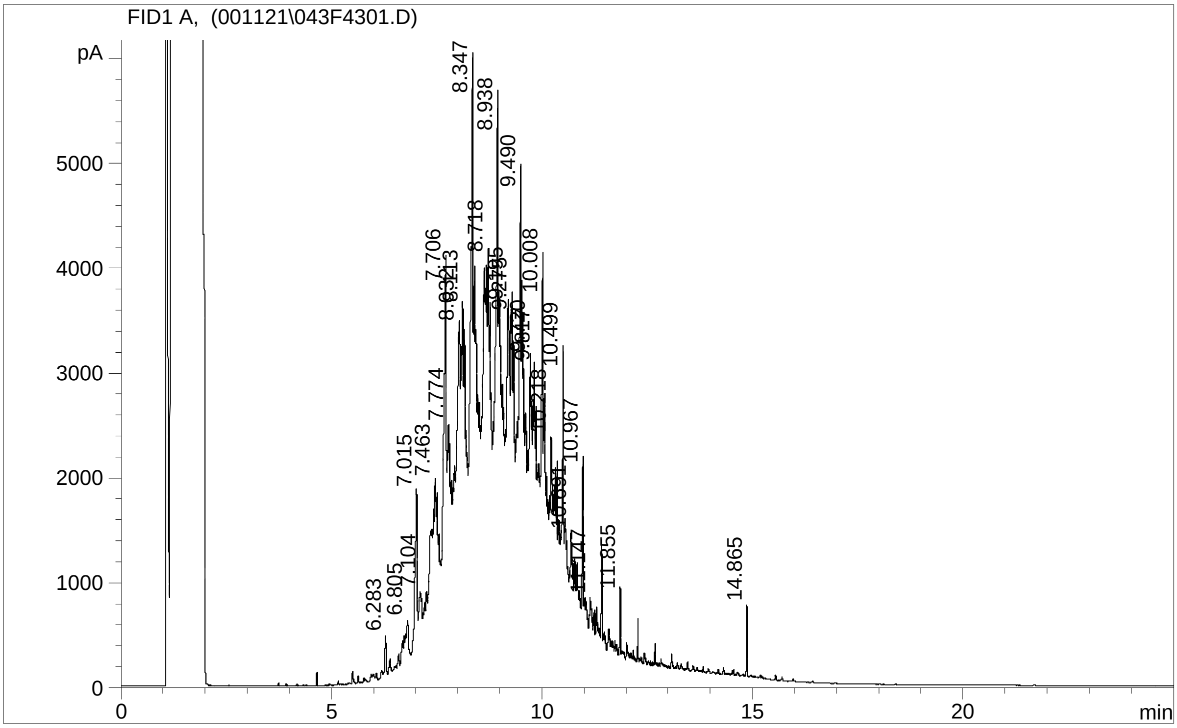
GC/FID-kromatogram: Sedimentprøve
BERYL V3-G 56-60



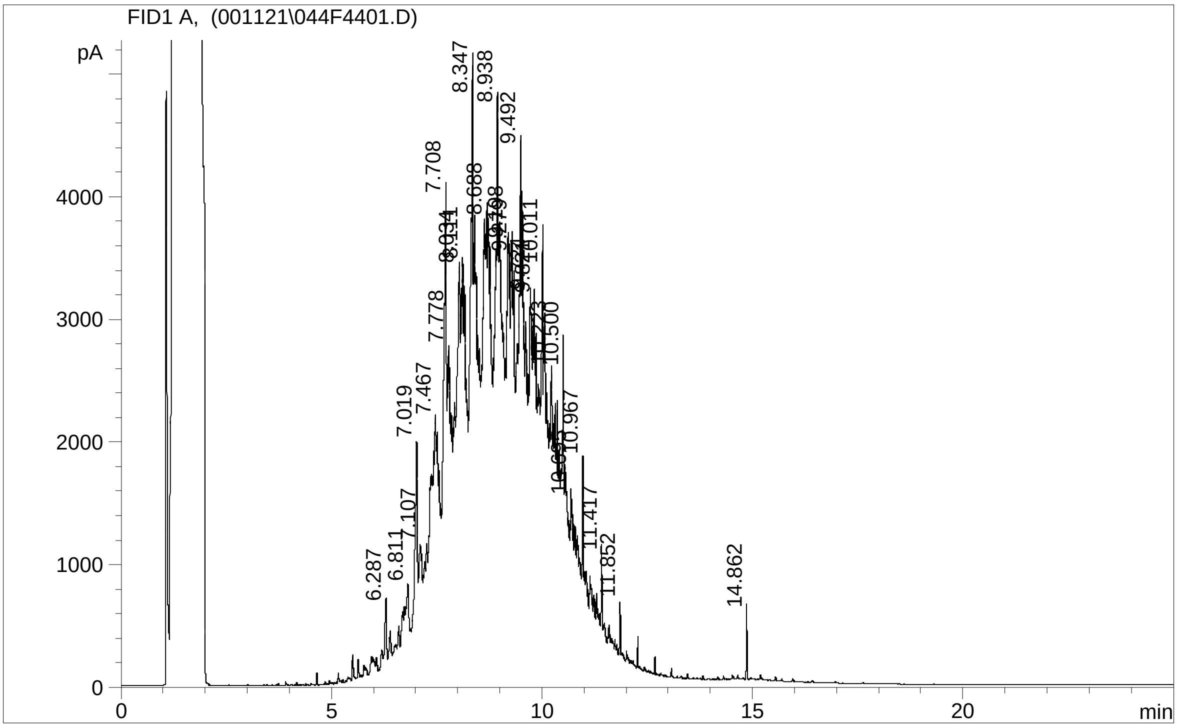
GC/FID-kromatogram: Sedimentprøve
BERYL V3G2 0-6



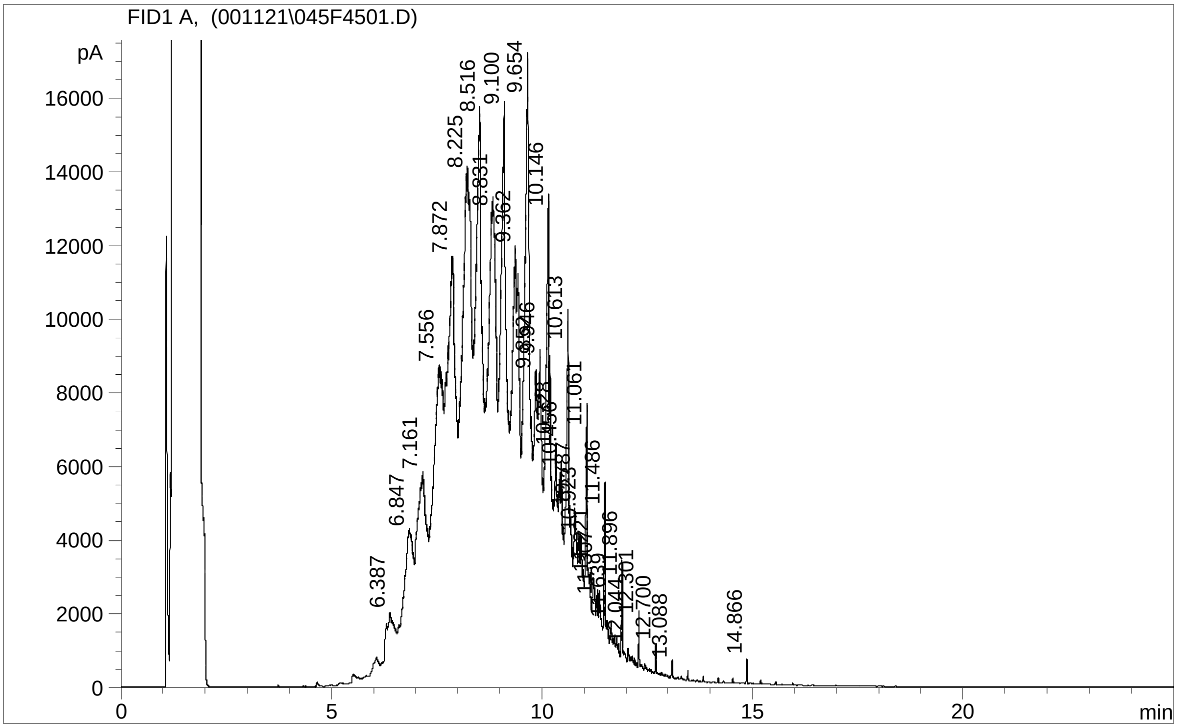
GC/FID-kromatogram: Sedimentprøve
BERYL V3G2 6-13



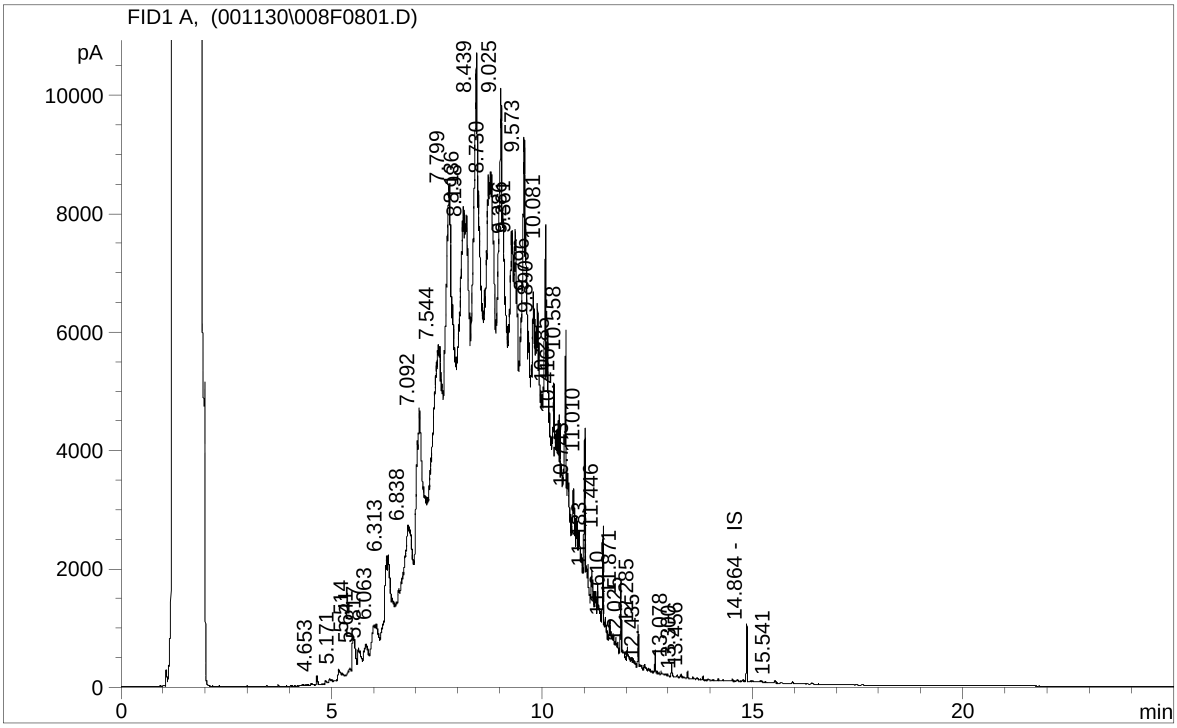
GC/FID-kromatogram: Sedimentprøve
BERYL V3G2 13-28



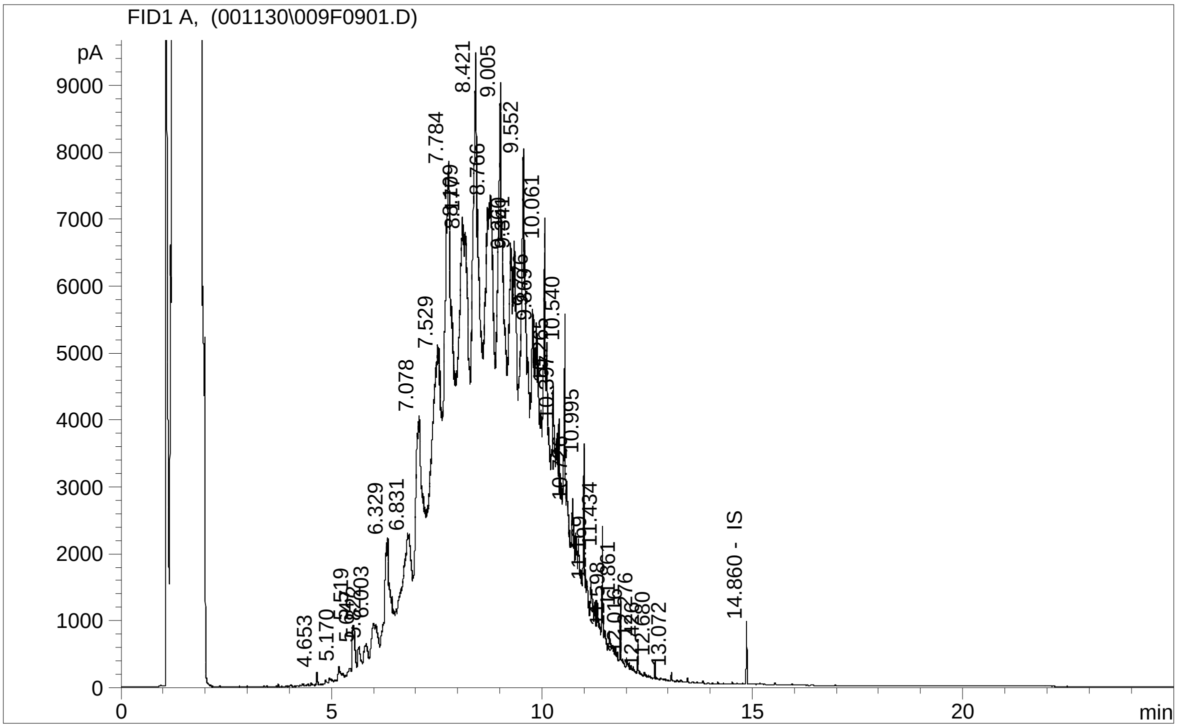
GC/FID-kromatogram: Sedimentprøve
BERYL V3G2 28-37



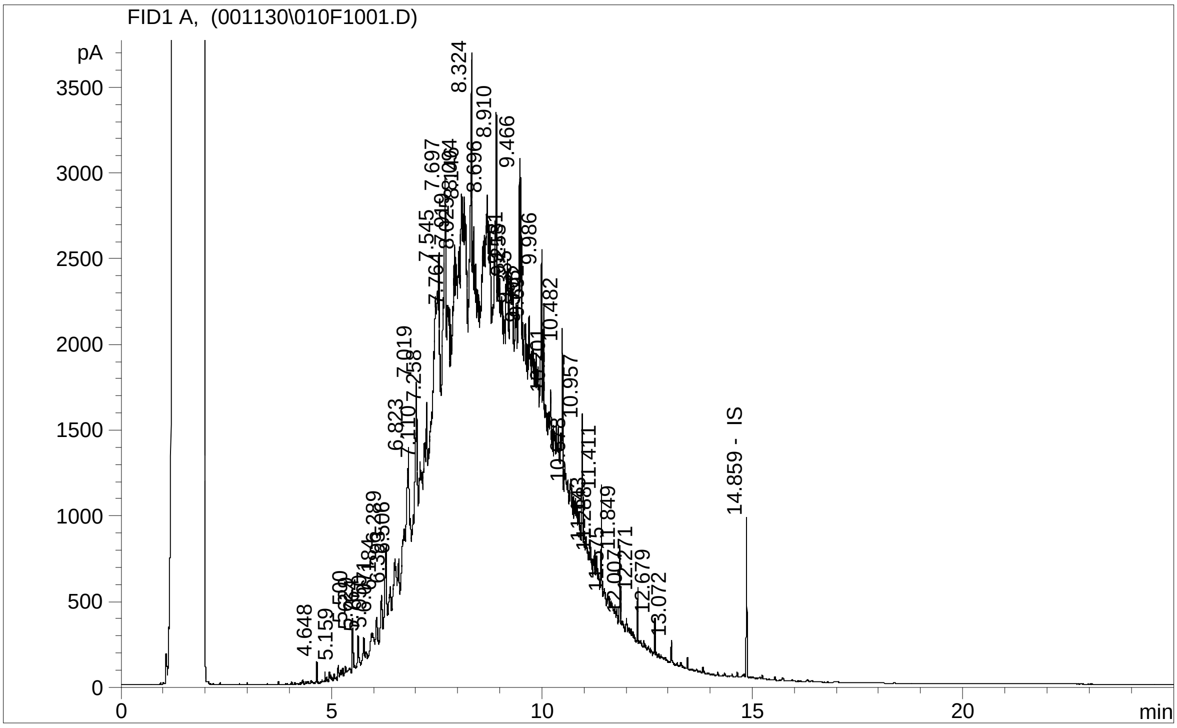
GC/FID-kromatogram: Sedimentprøve
BERYL V4 0-10



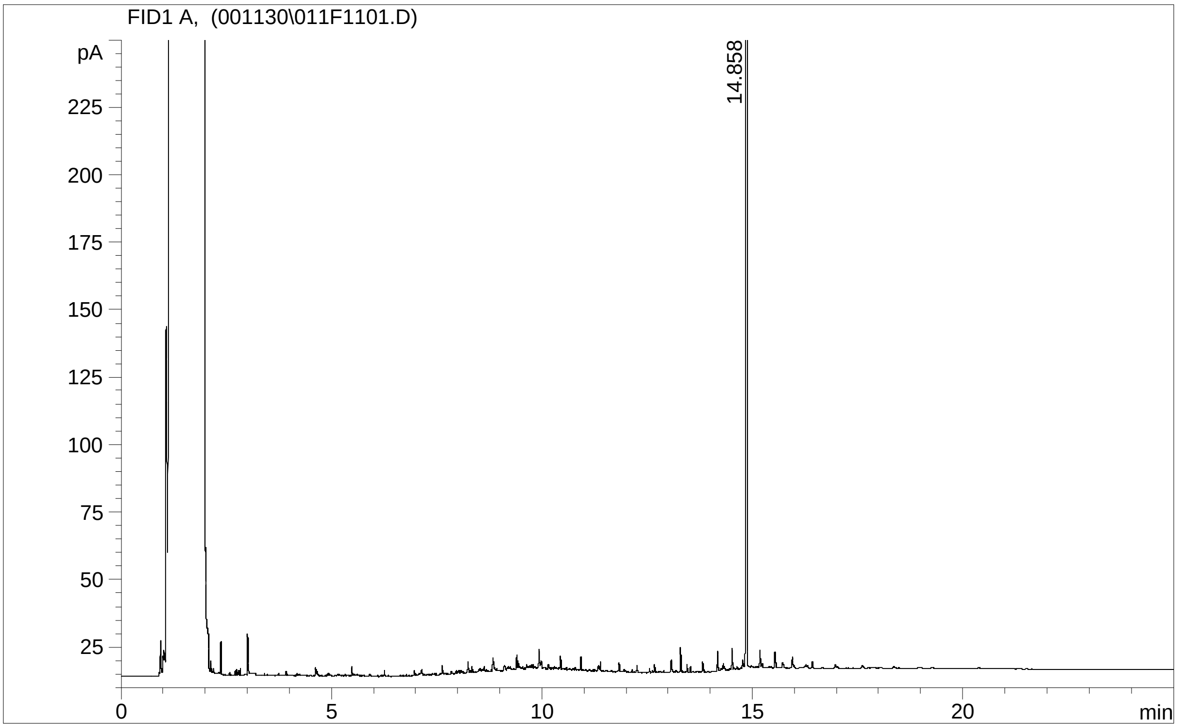
GC/FID-kromatogram: Sedimentprøve
BERYL V4 10-18



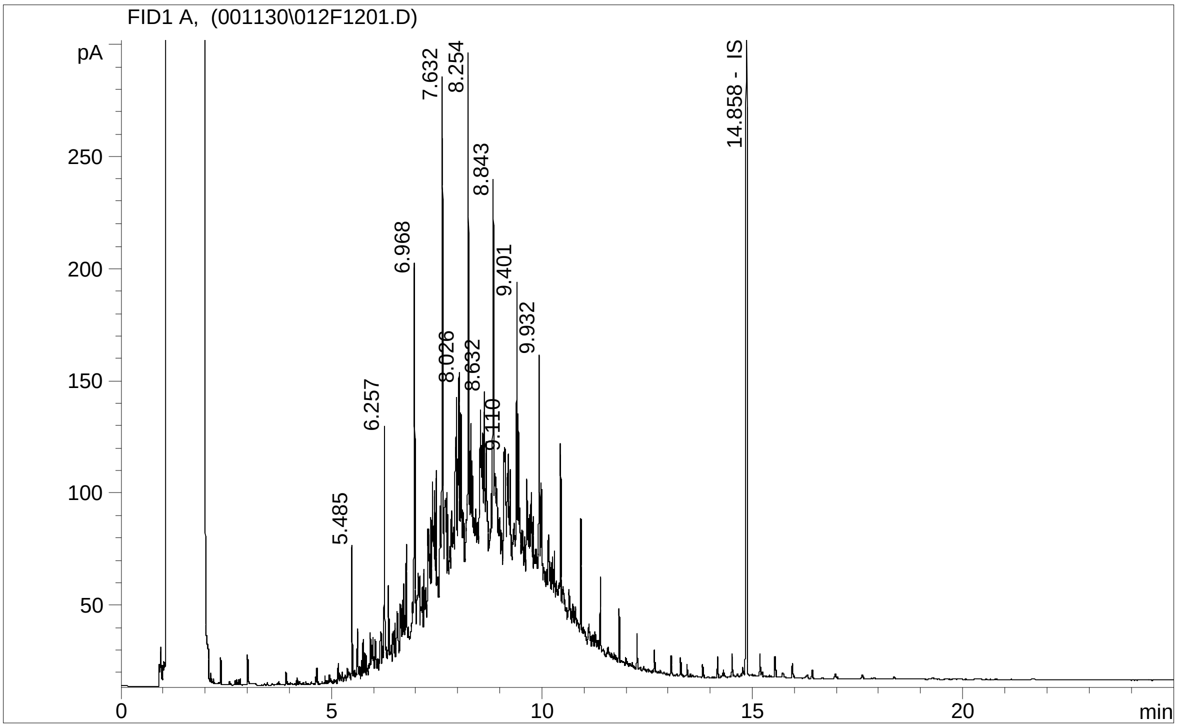
GC/FID-kromatogram: Sedimentprøve
BERYL V4 18-24



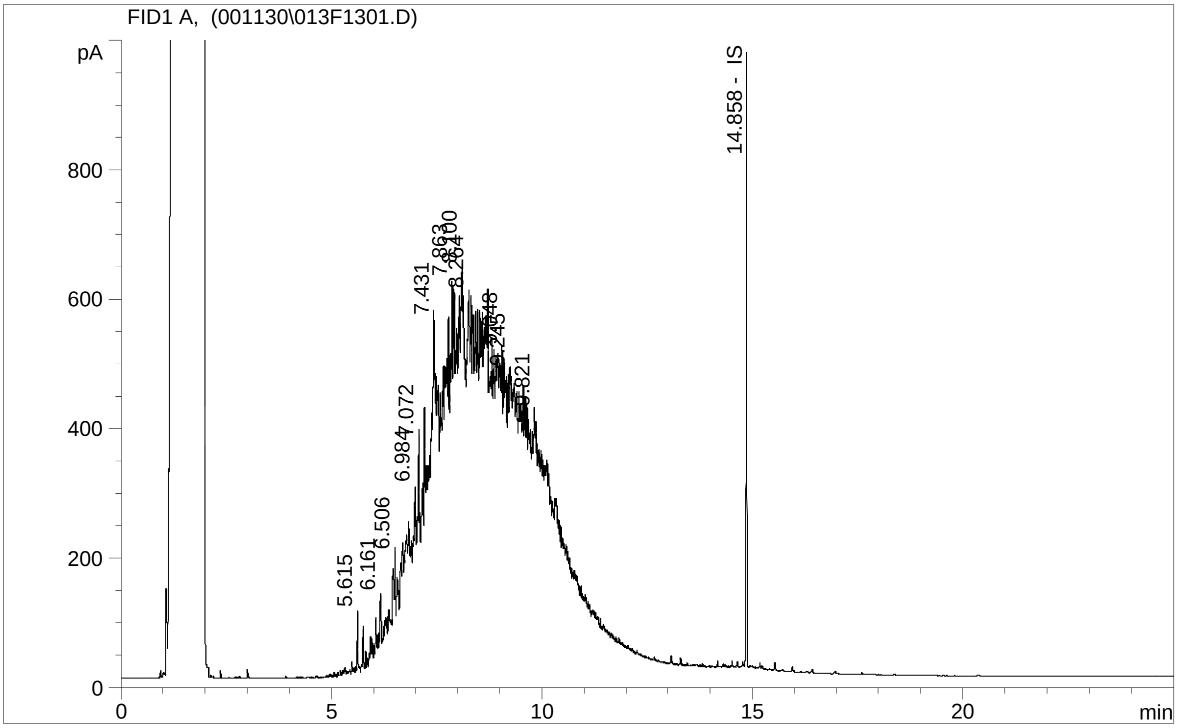
GC/FID-kromatogram: Sedimentprøve
BERYL V4 24-30



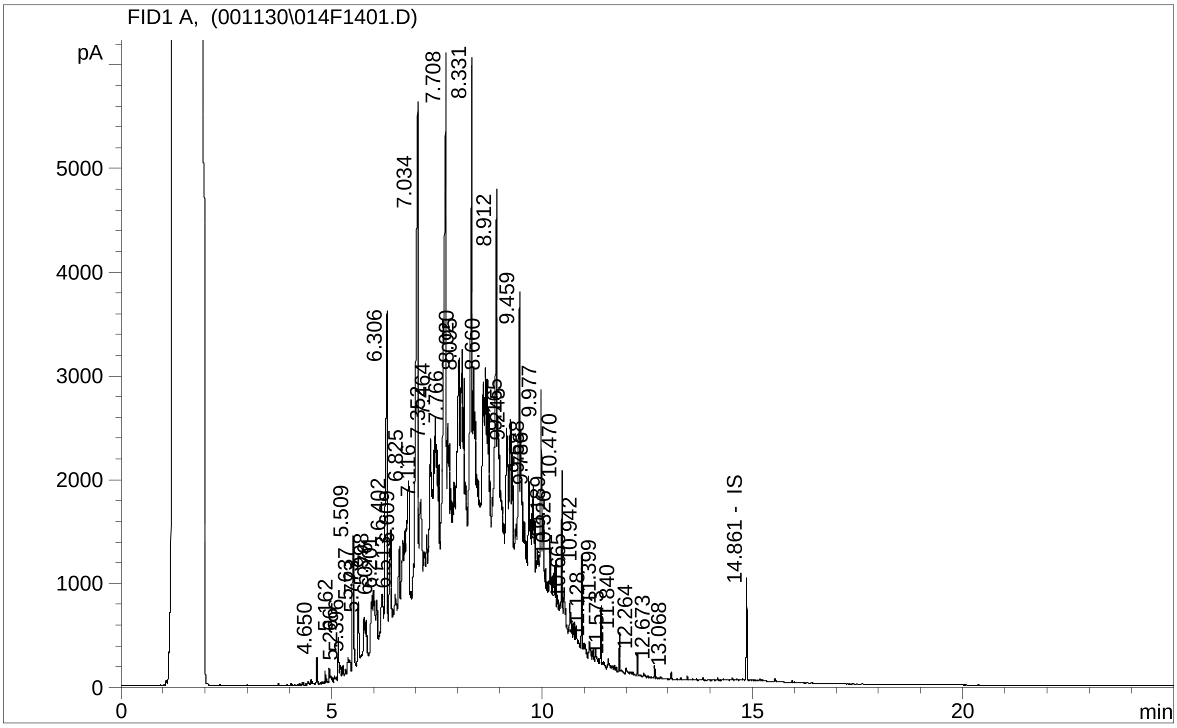
GC/FID-kromatogram: Sedimentprøve
BERYL V4 30-40



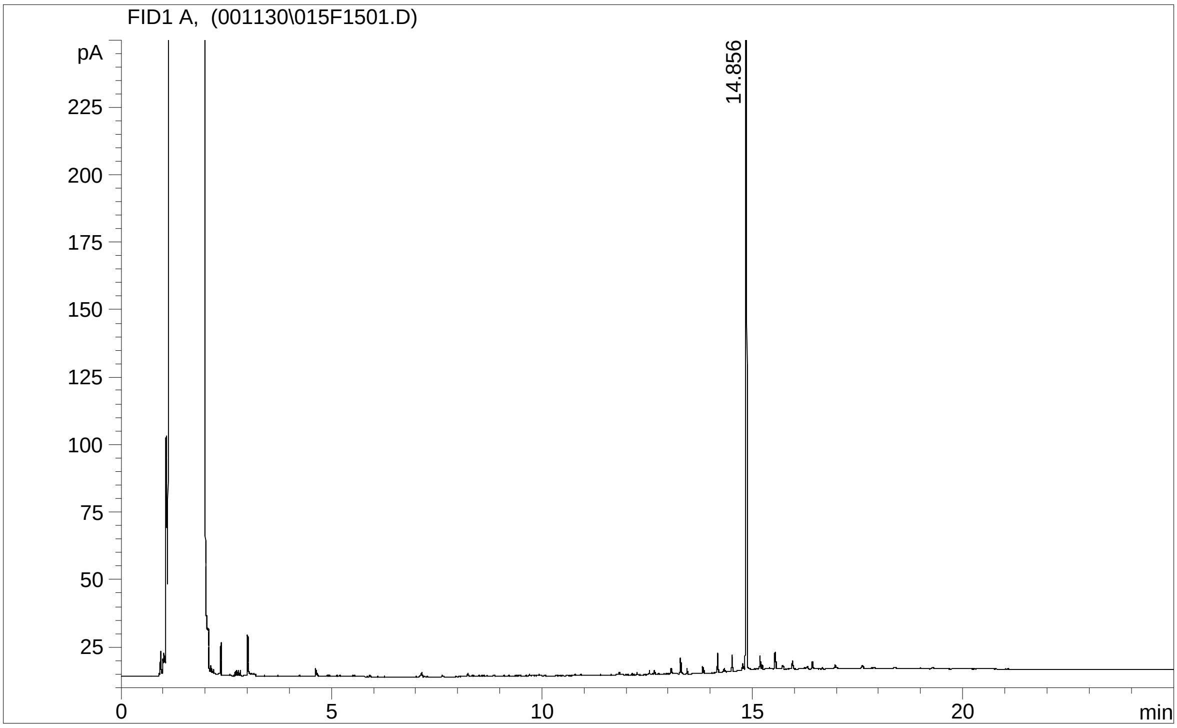
GC/FID-kromatogram: Sedimentprøve
BERYL K1 0-4



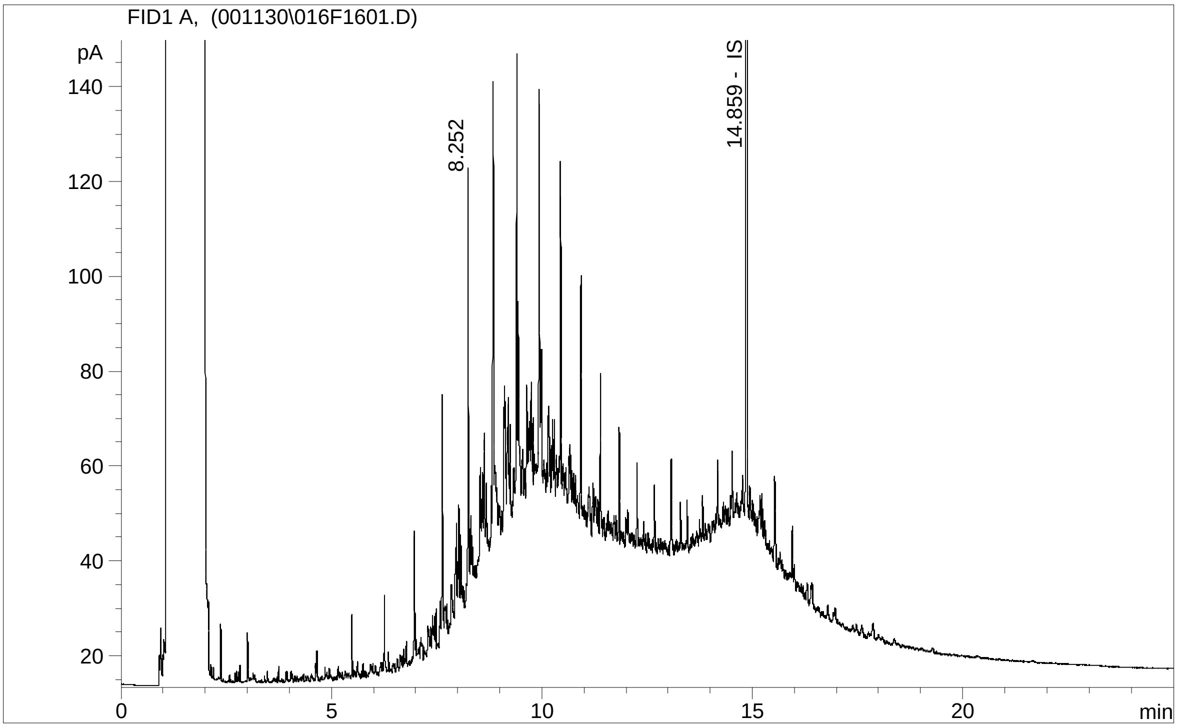
GC/FID-kromatogram: Sedimentprøve
BERYL K1 4-10



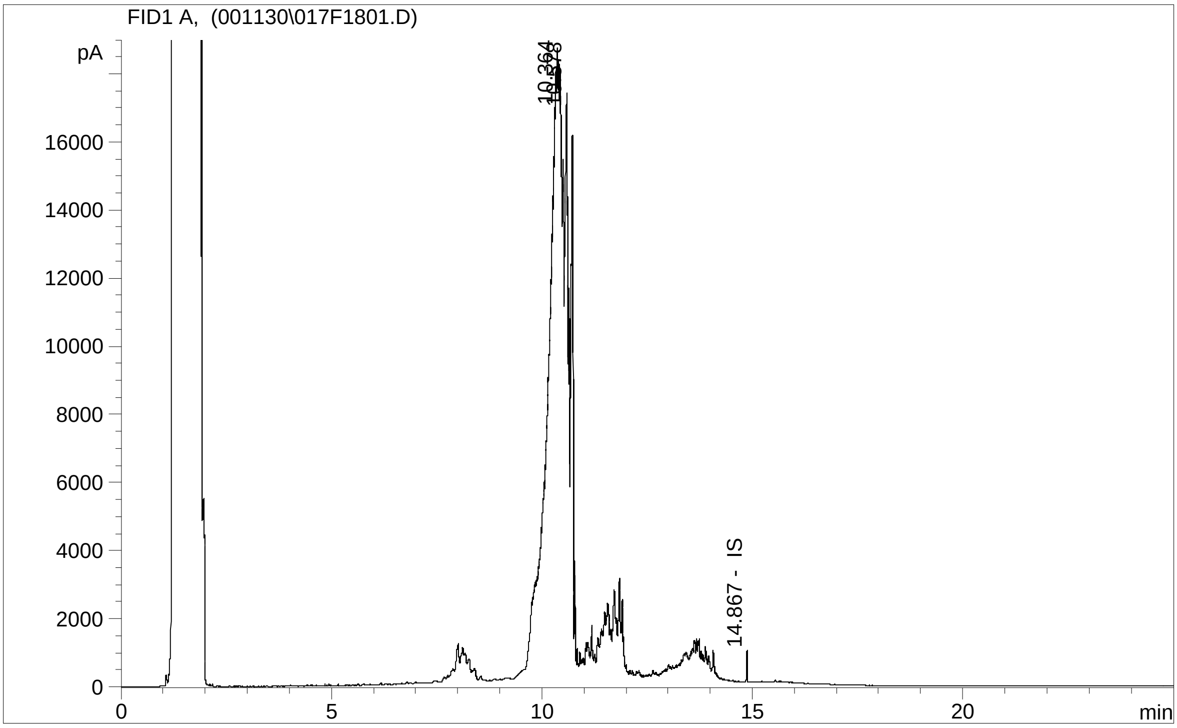
GC/FID-kromatogram: Sedimentprøve
BERYL K1 10-13



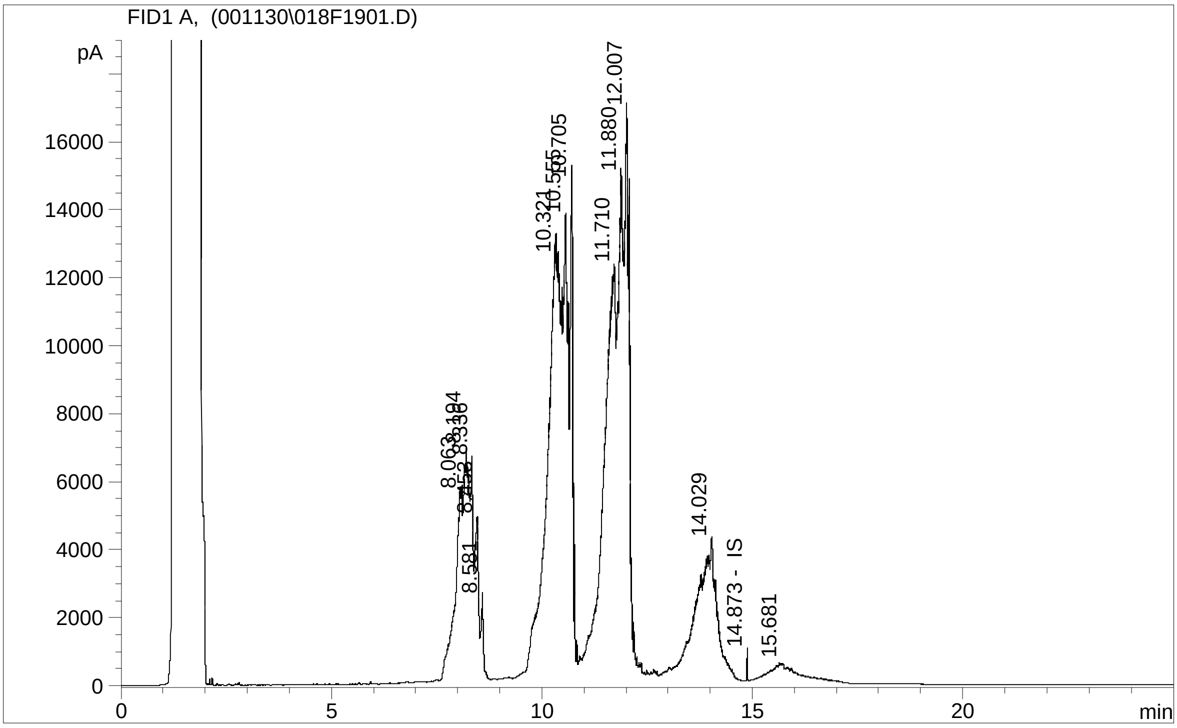
GC/FID-kromatogram: Sedimentprøve
BERYL V4 13-20



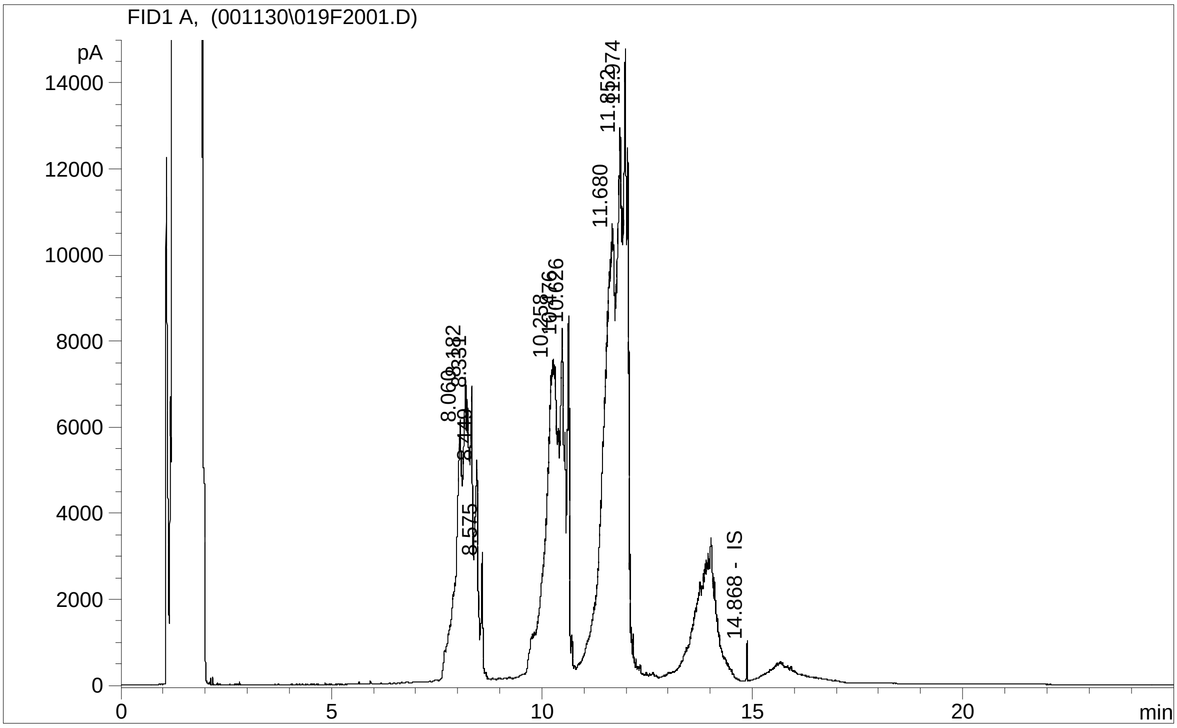
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 0-5



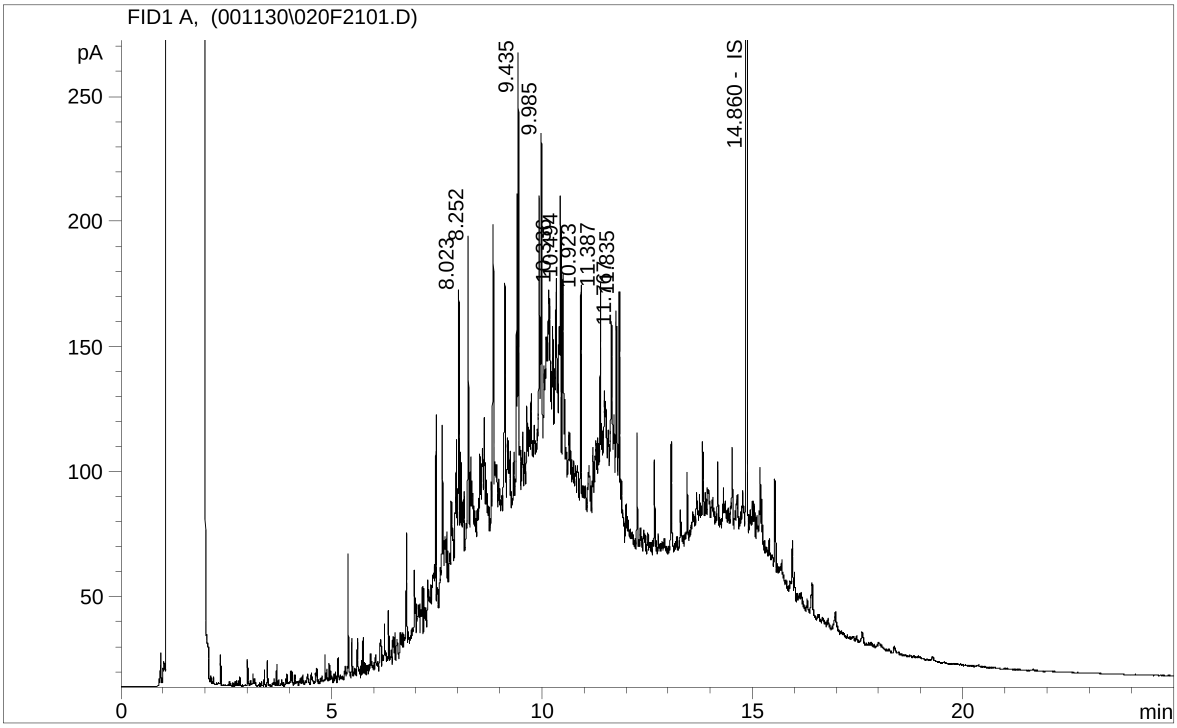
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 5-11



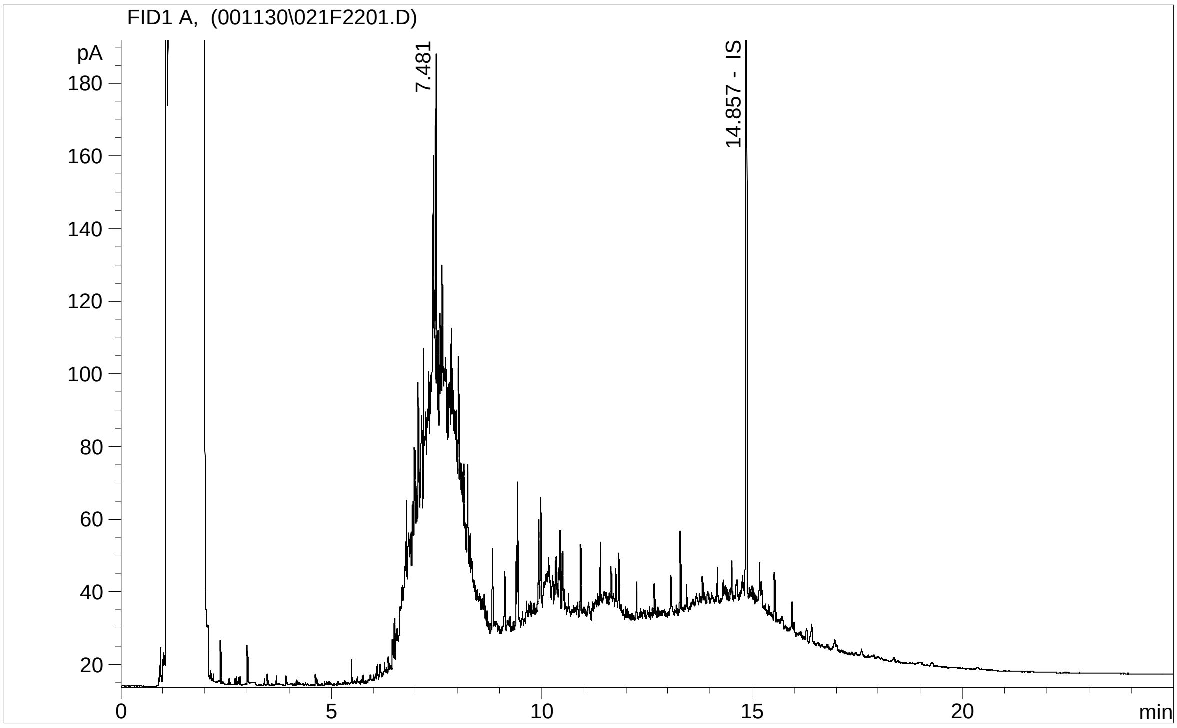
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 11-15



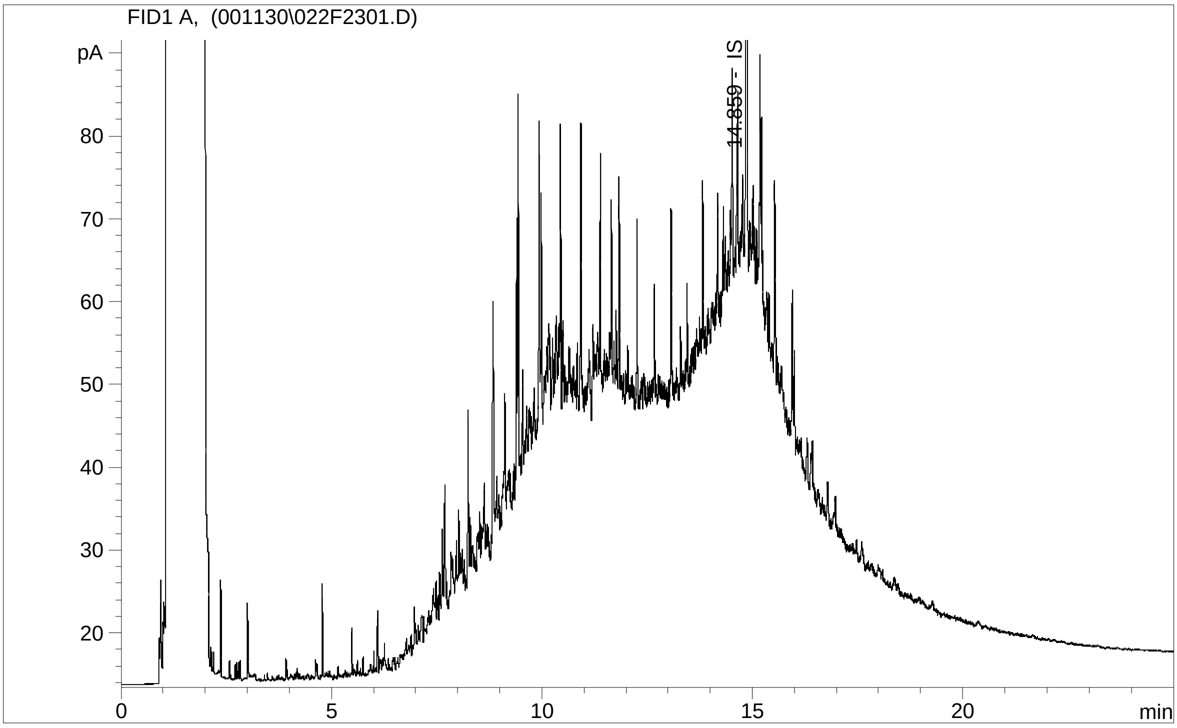
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 15-22



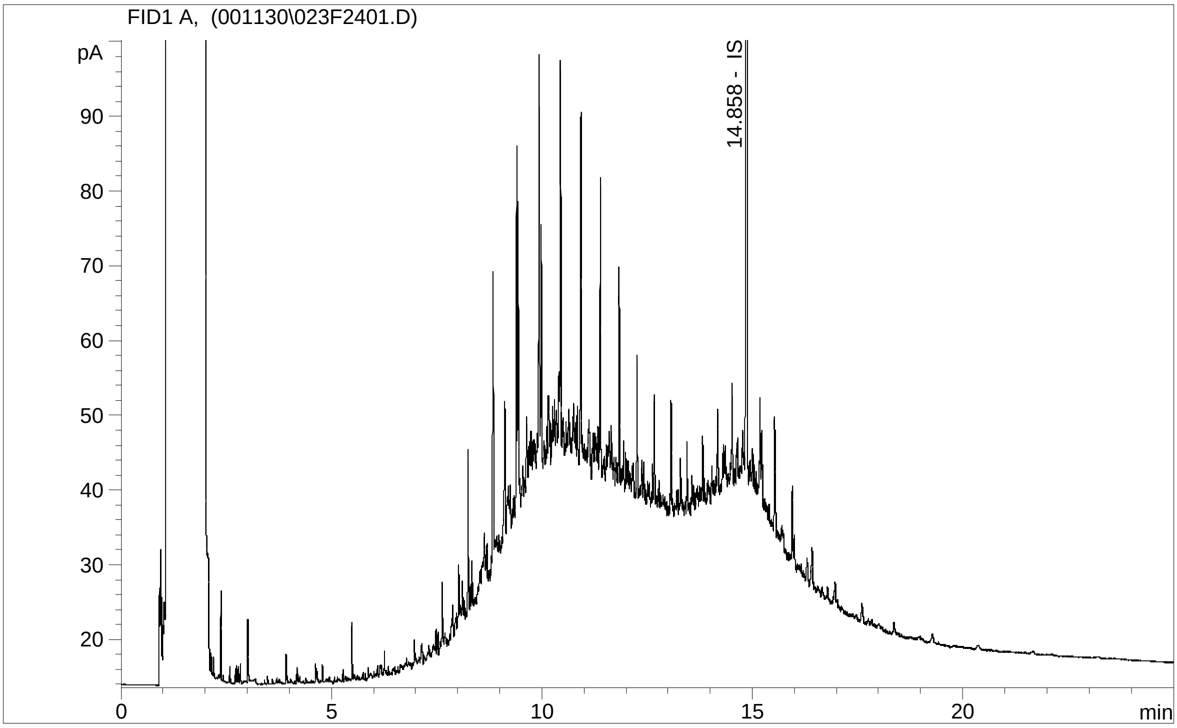
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 22-33



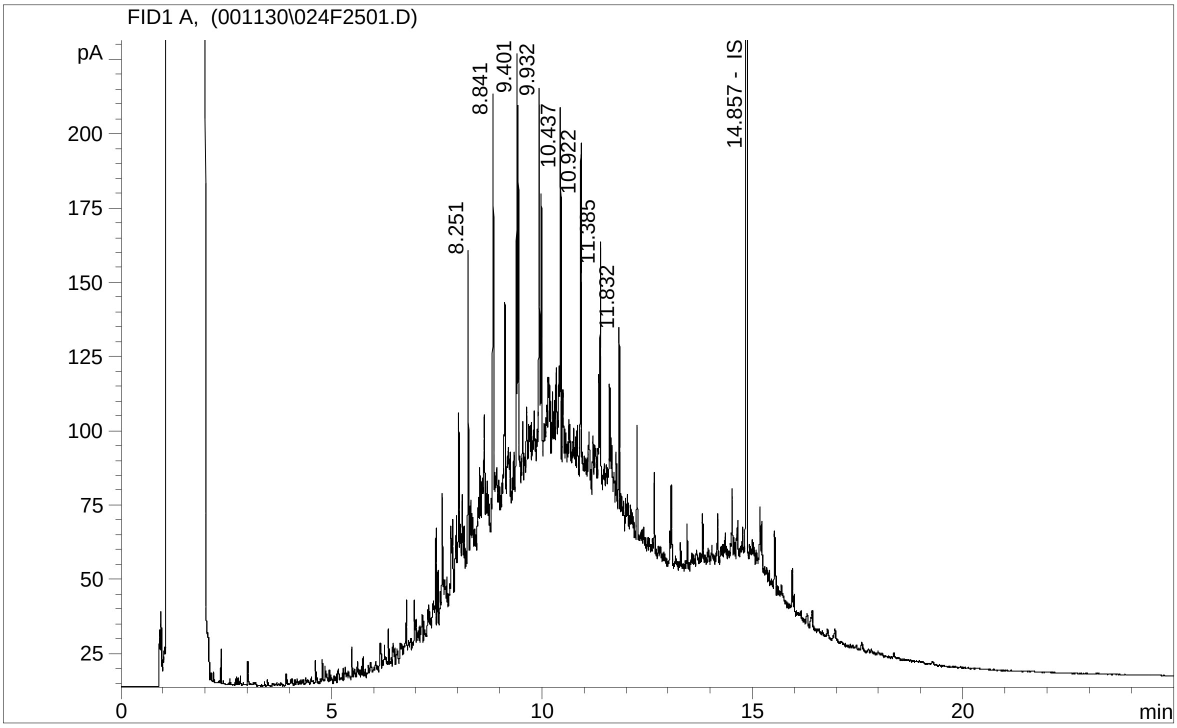
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 33-36



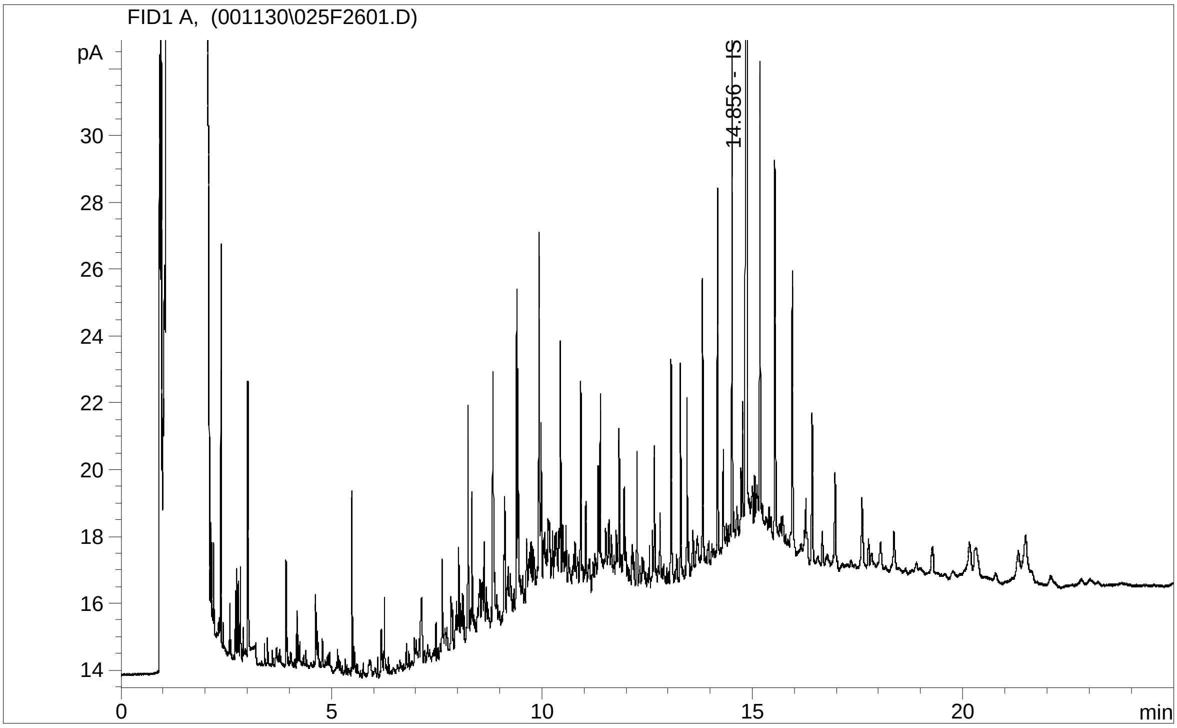
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 36-38



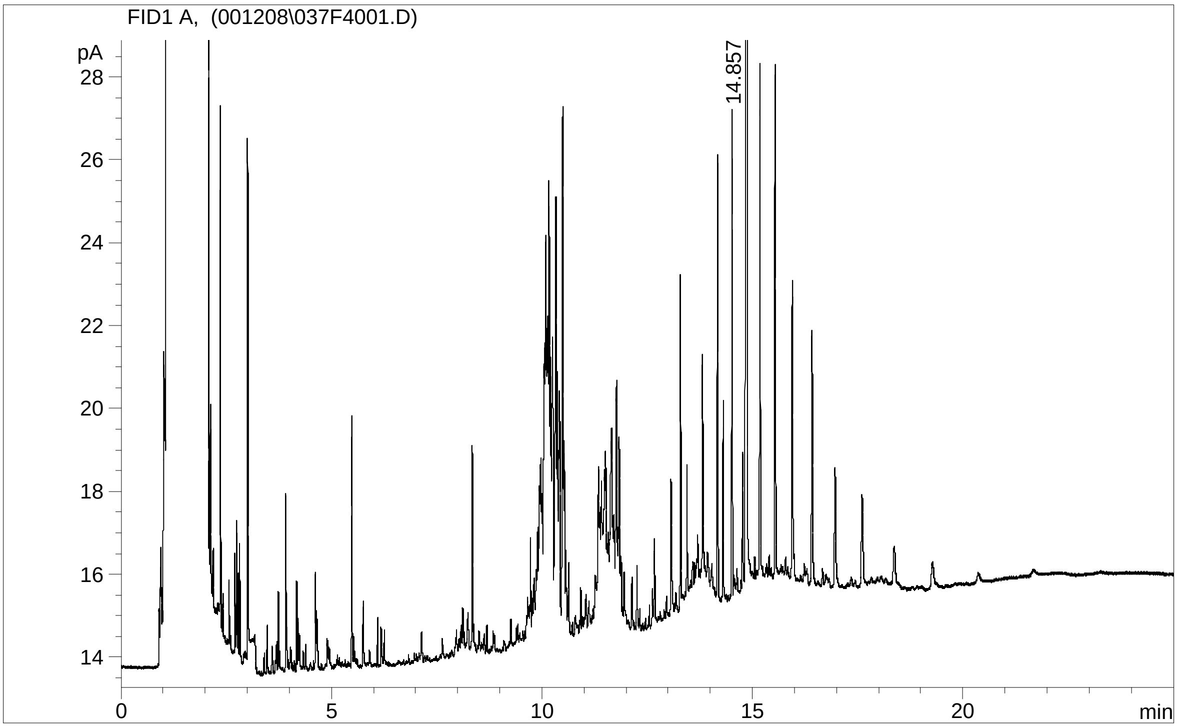
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 38-43



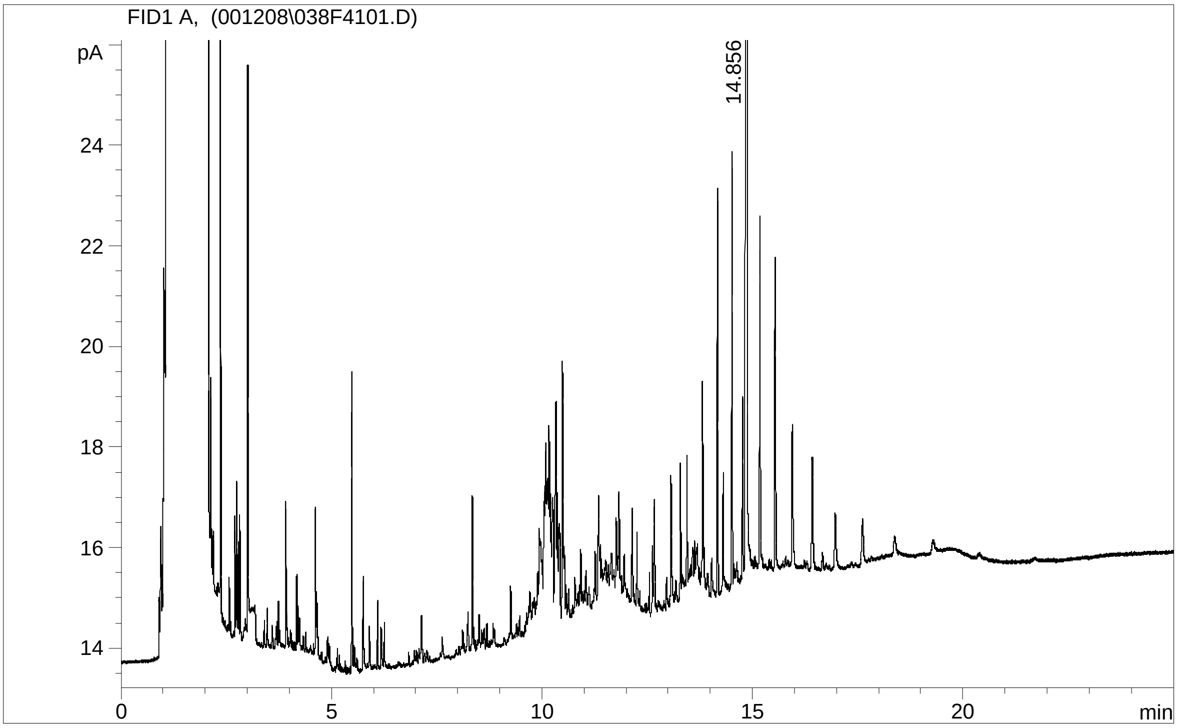
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 43-53



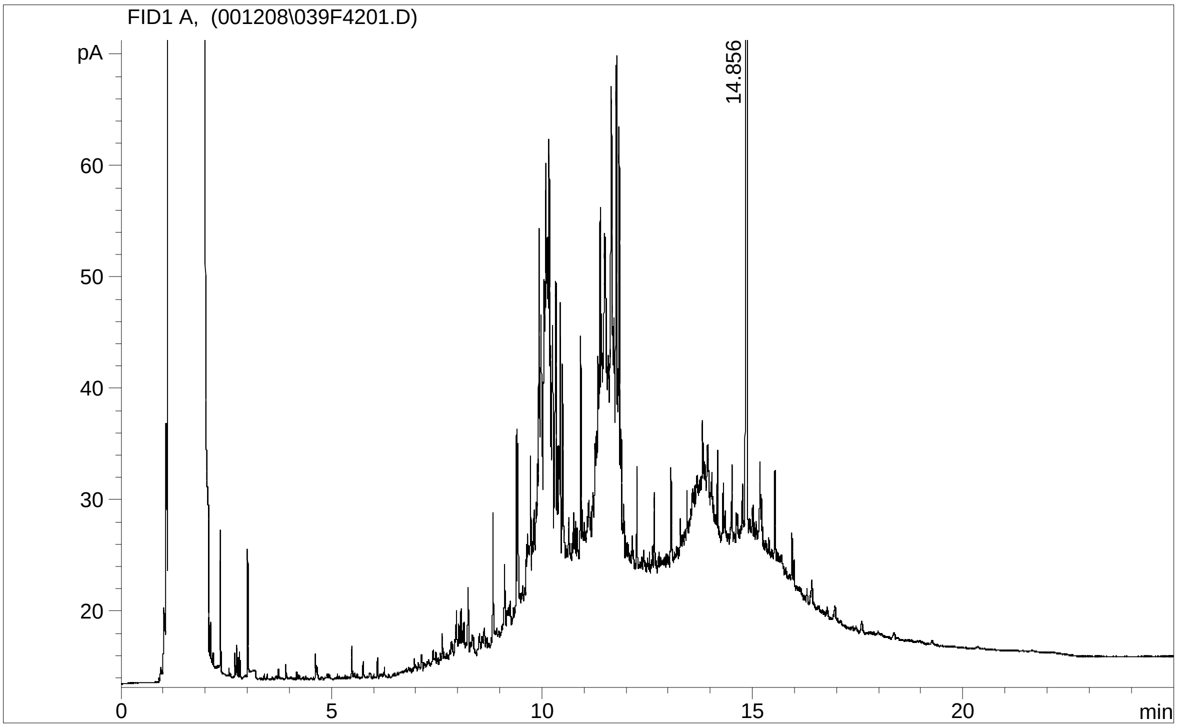
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 53-68



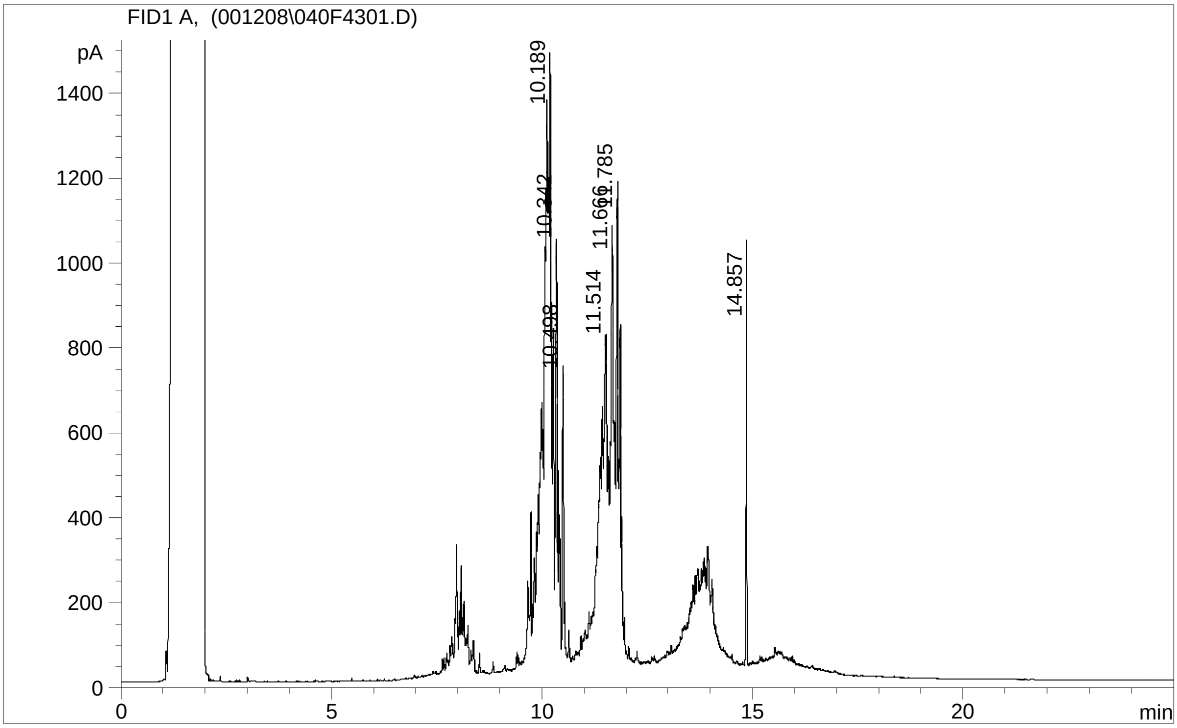
GC/FID-kromatogram: Sedimentprøve
EKOFISK V9 68-90



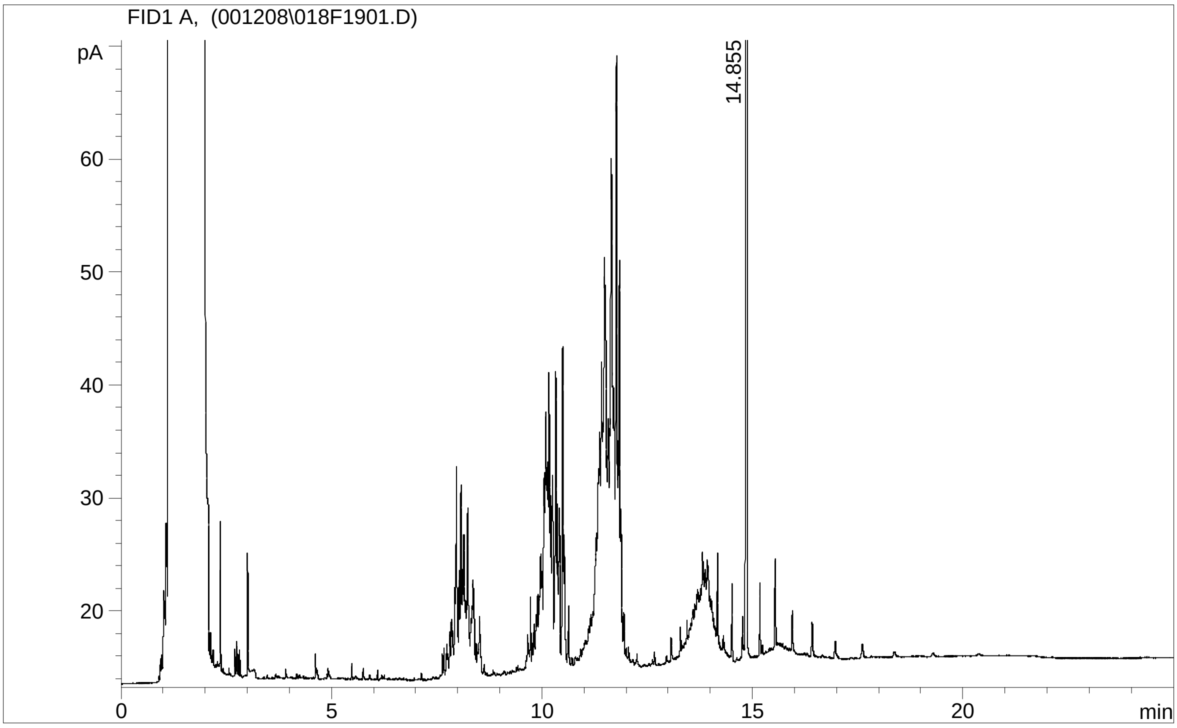
GC/FID-kromatogram: Sedimentprøve
EKOFISK V10 1-10



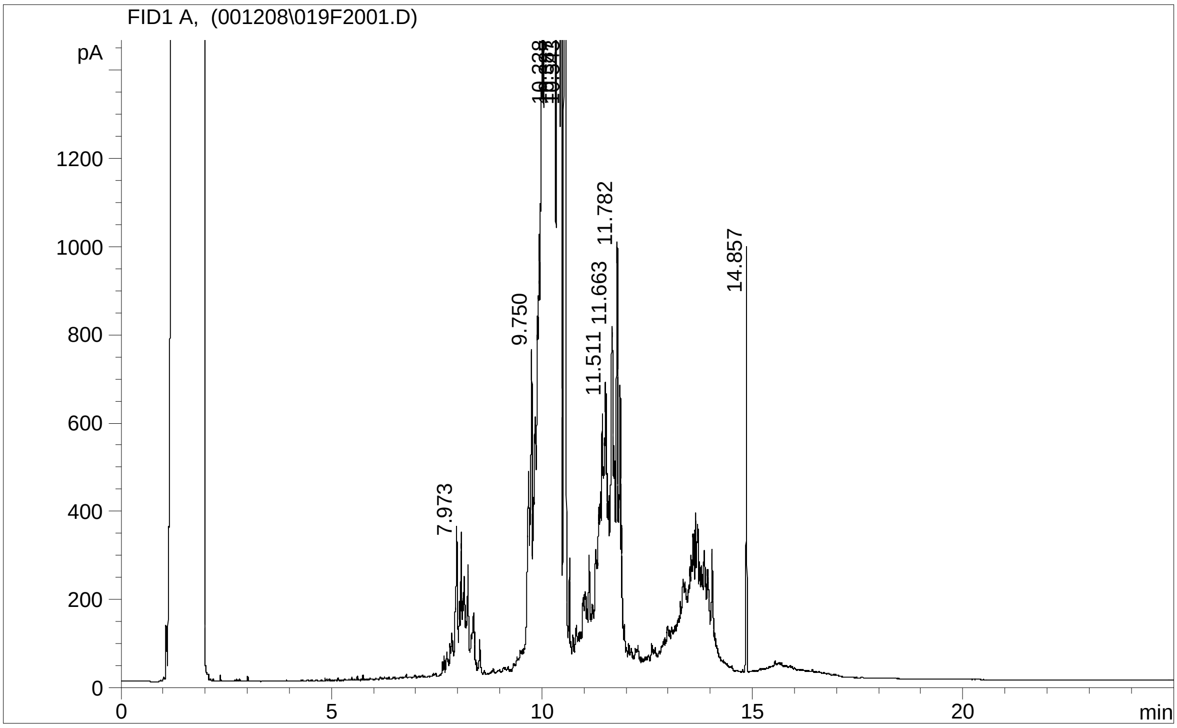
GC/FID-kromatogram: Sedimentprøve
EKOFISK V10 10-20



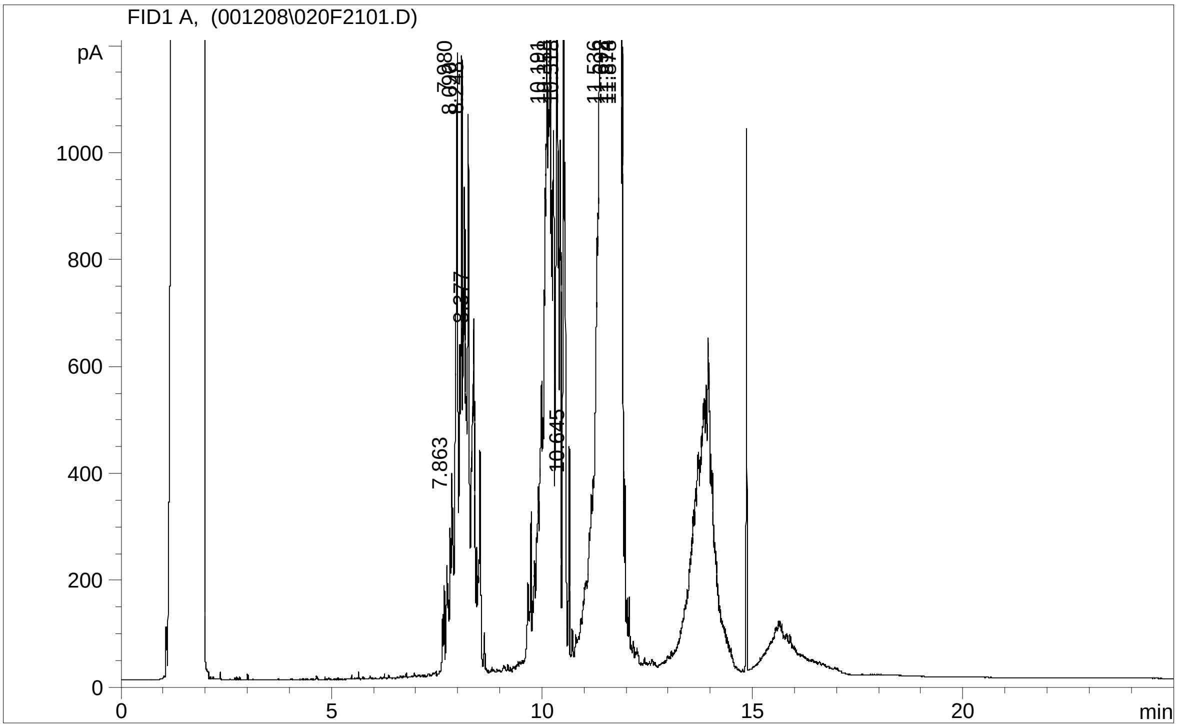
GC/FID-kromatogram: Sedimentprøve
EKOFISK V10 20-30



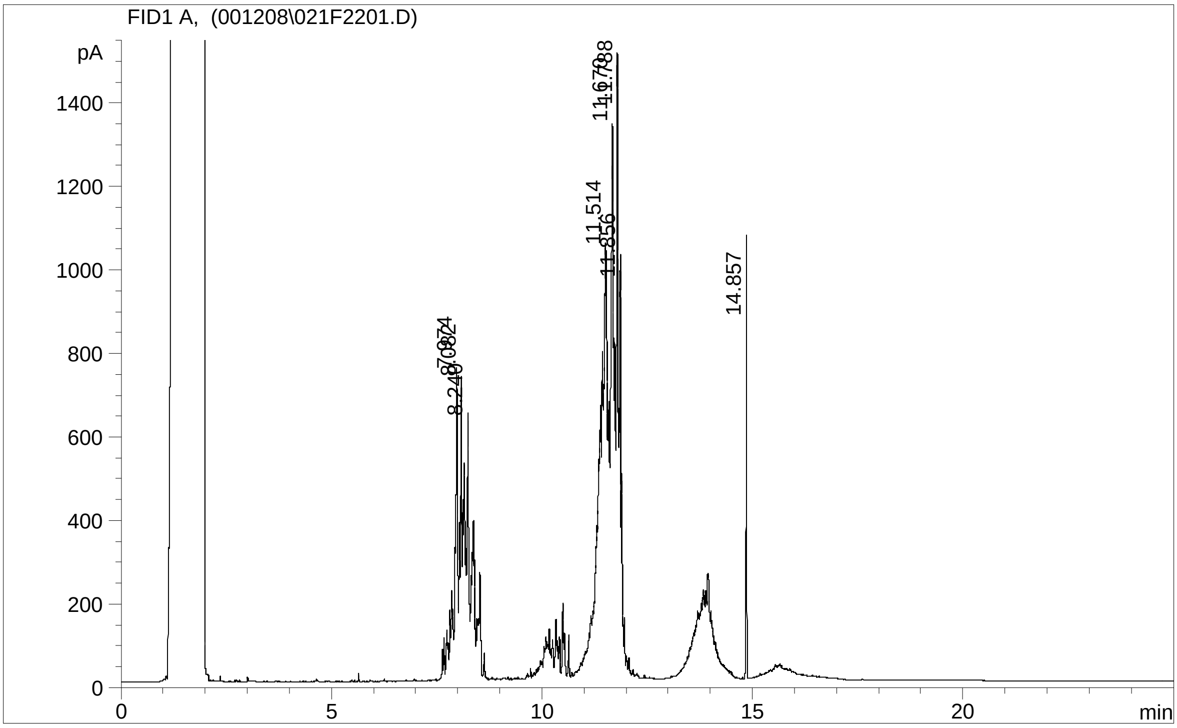
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 0-7



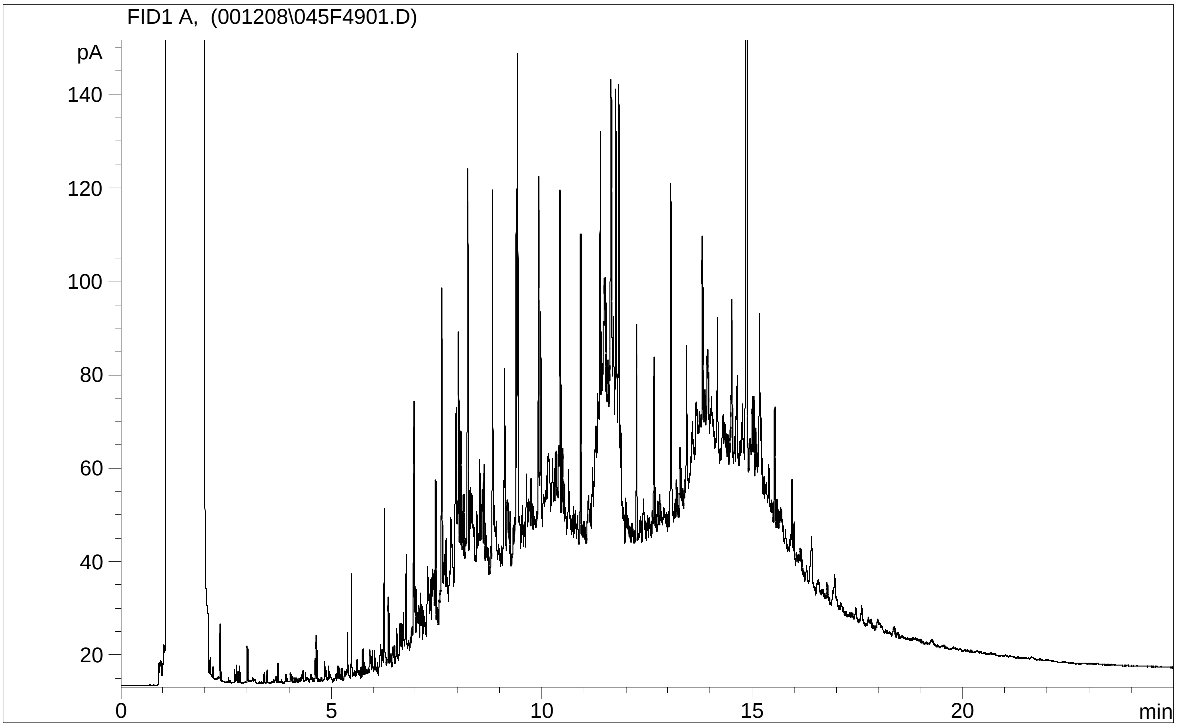
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 7-13



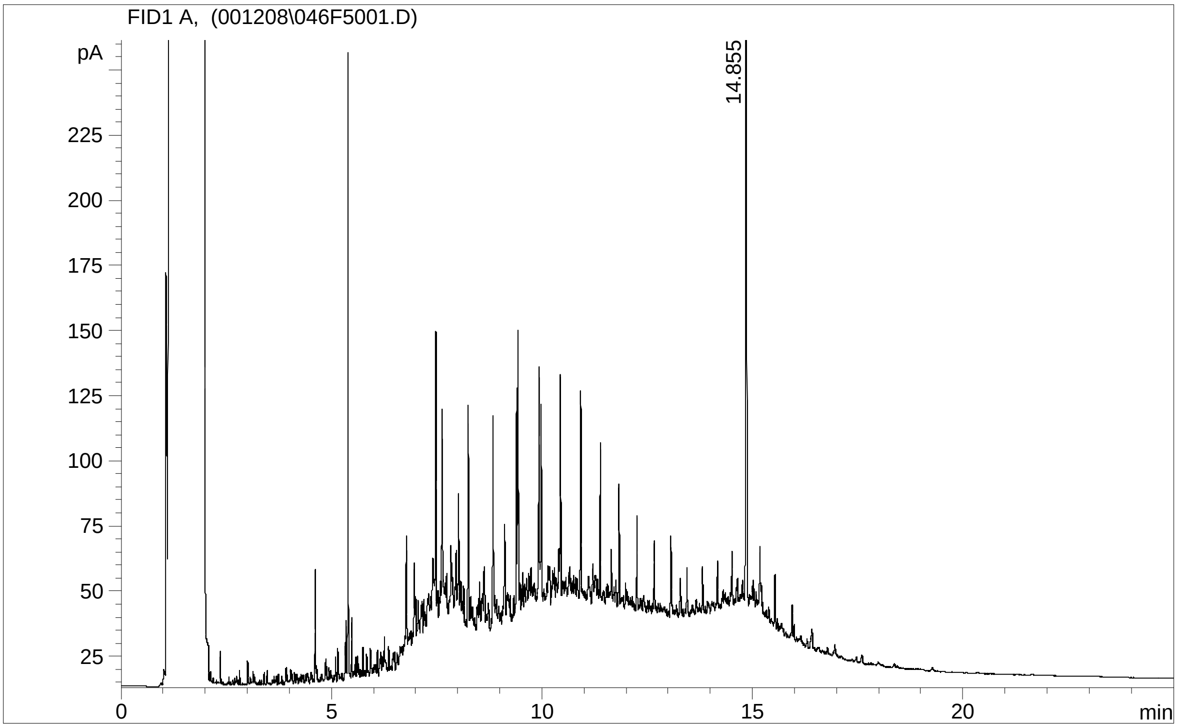
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 13-15



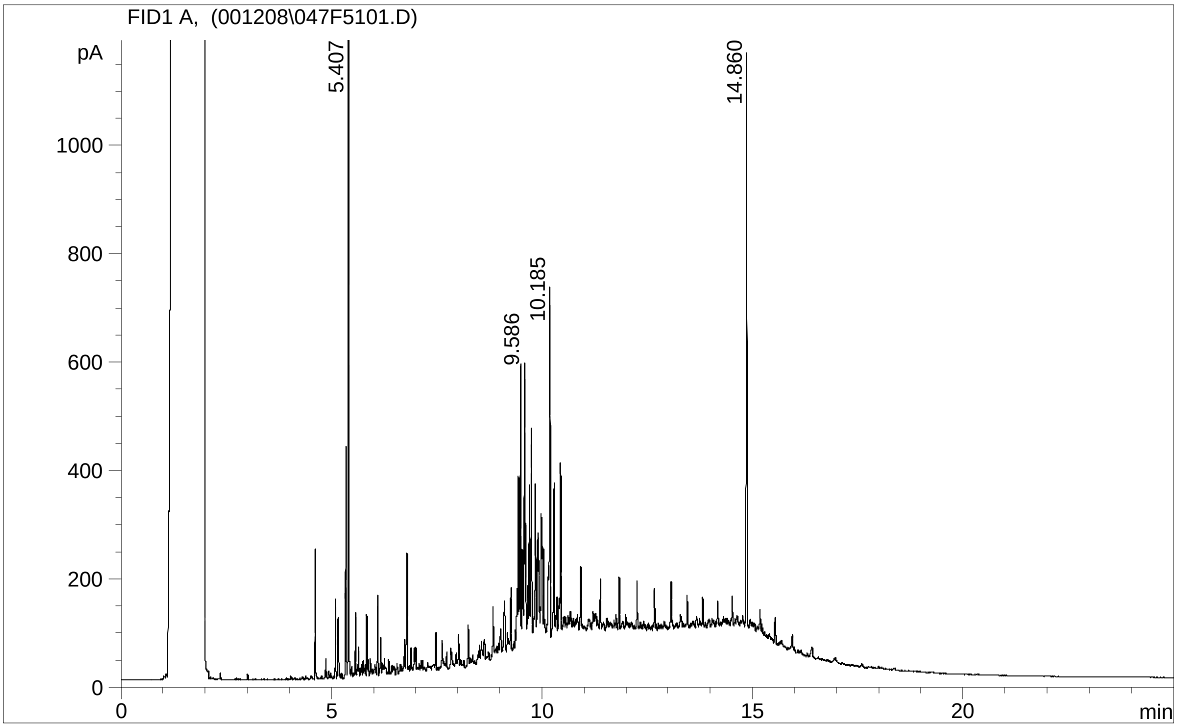
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 15-23



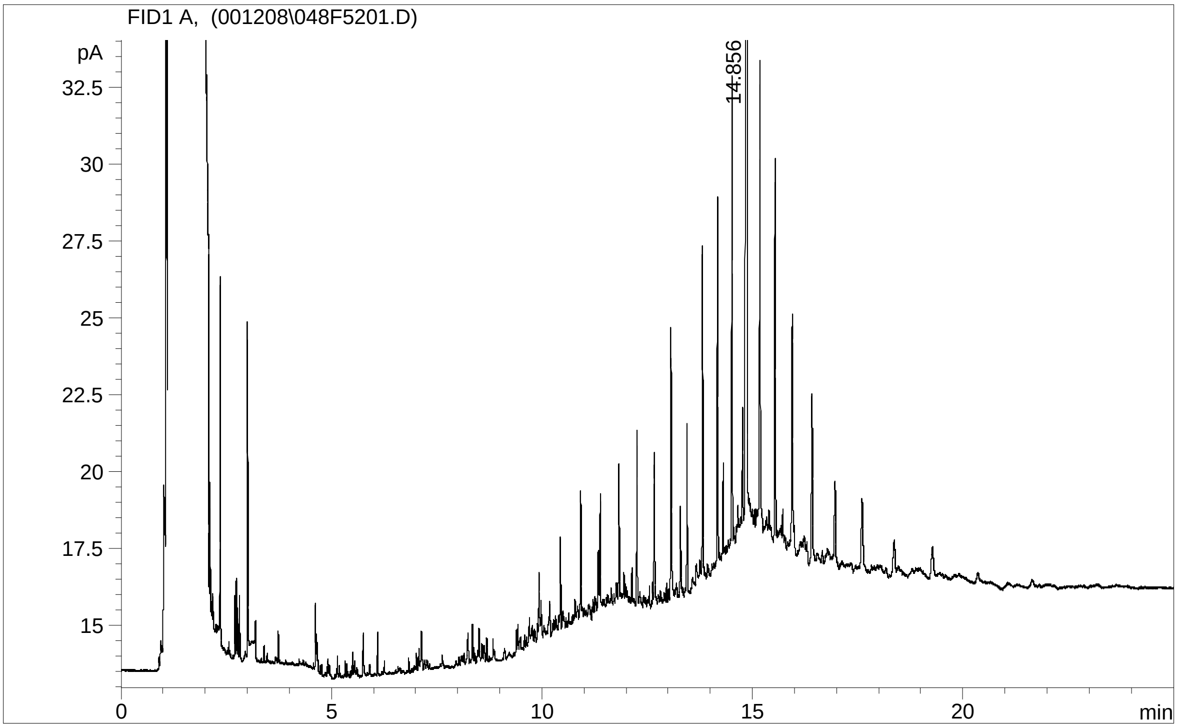
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 23-30



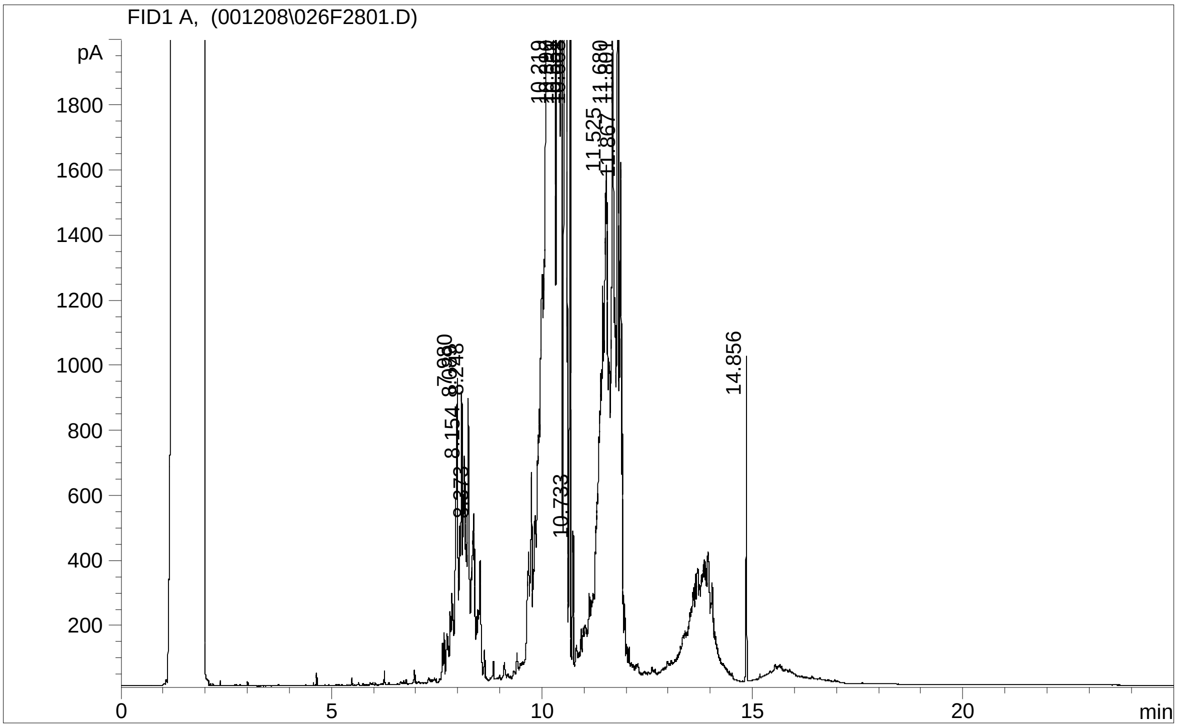
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 30-39



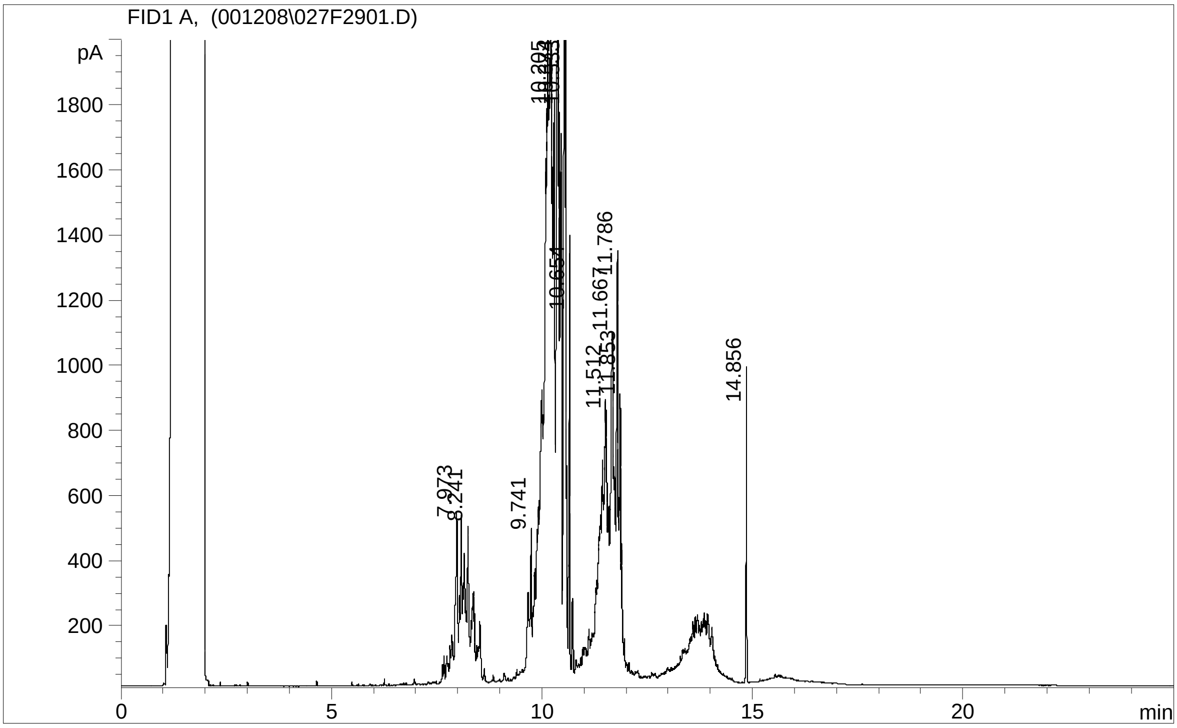
GC/FID-kromatogram: Sedimentprøve
EKOFISK SW3 39-47



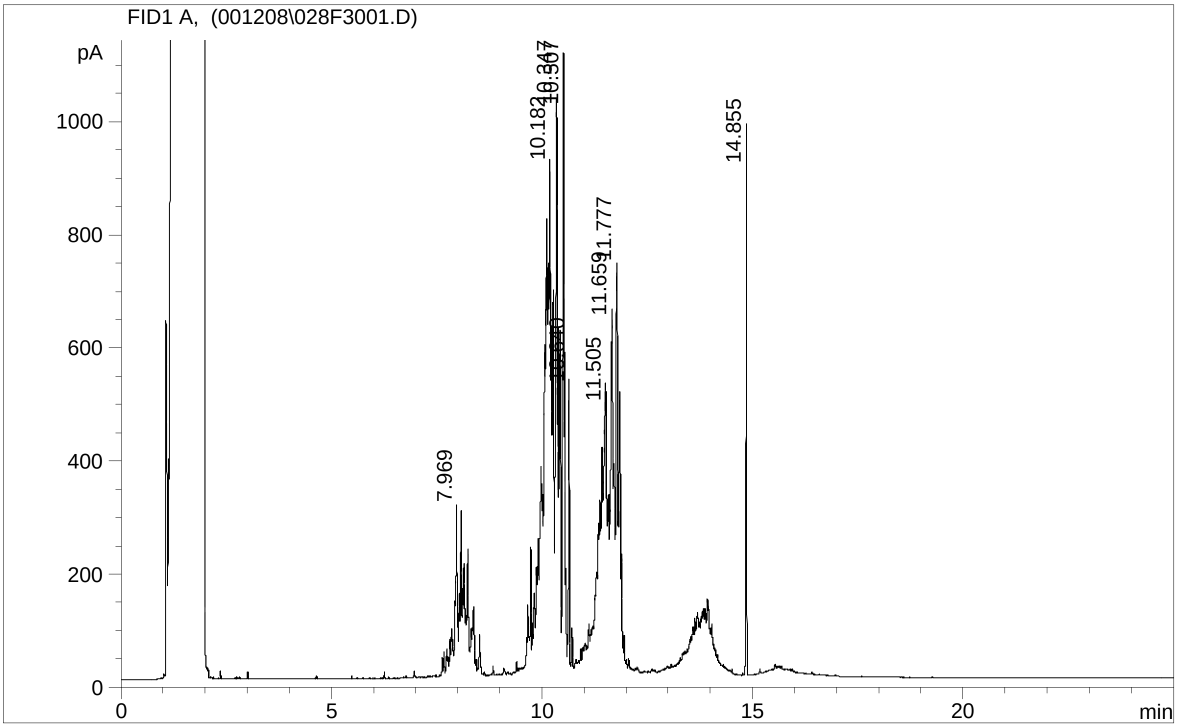
GC/FID-kromatogram: Sedimentprøve
EKOFISK MUC2 M2



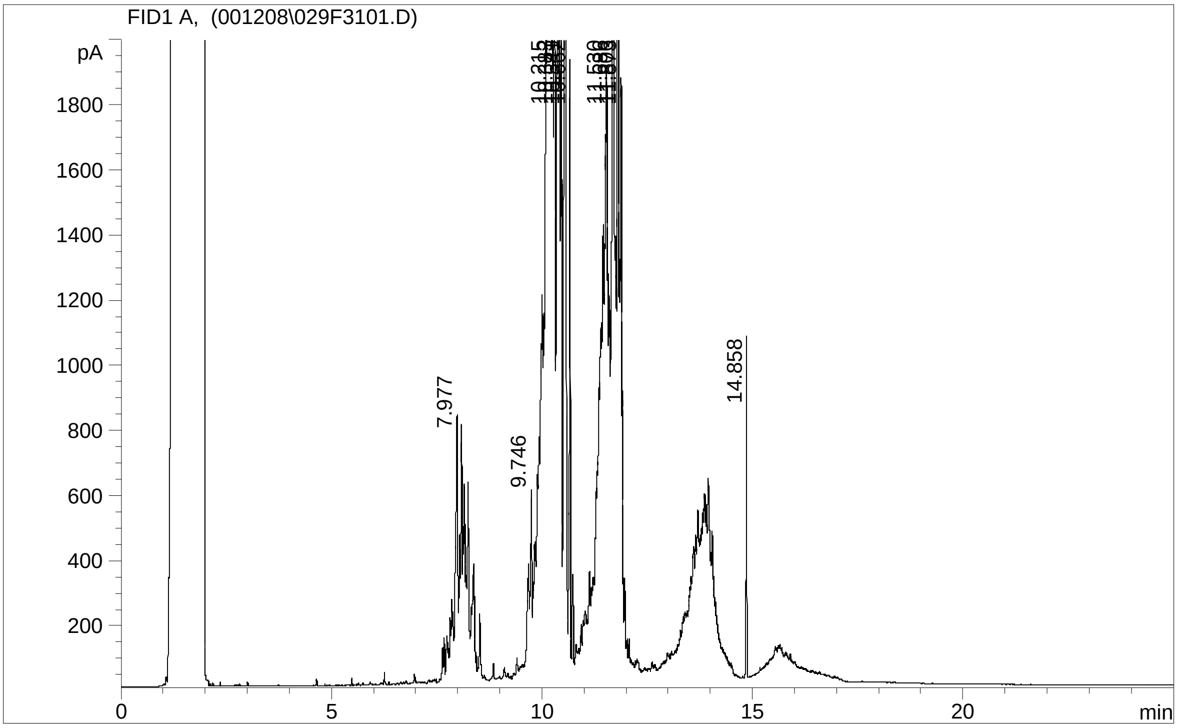
GC/FID-kromatogram: Sedimentprøve
EKOFISK CFAS3 CFAS3



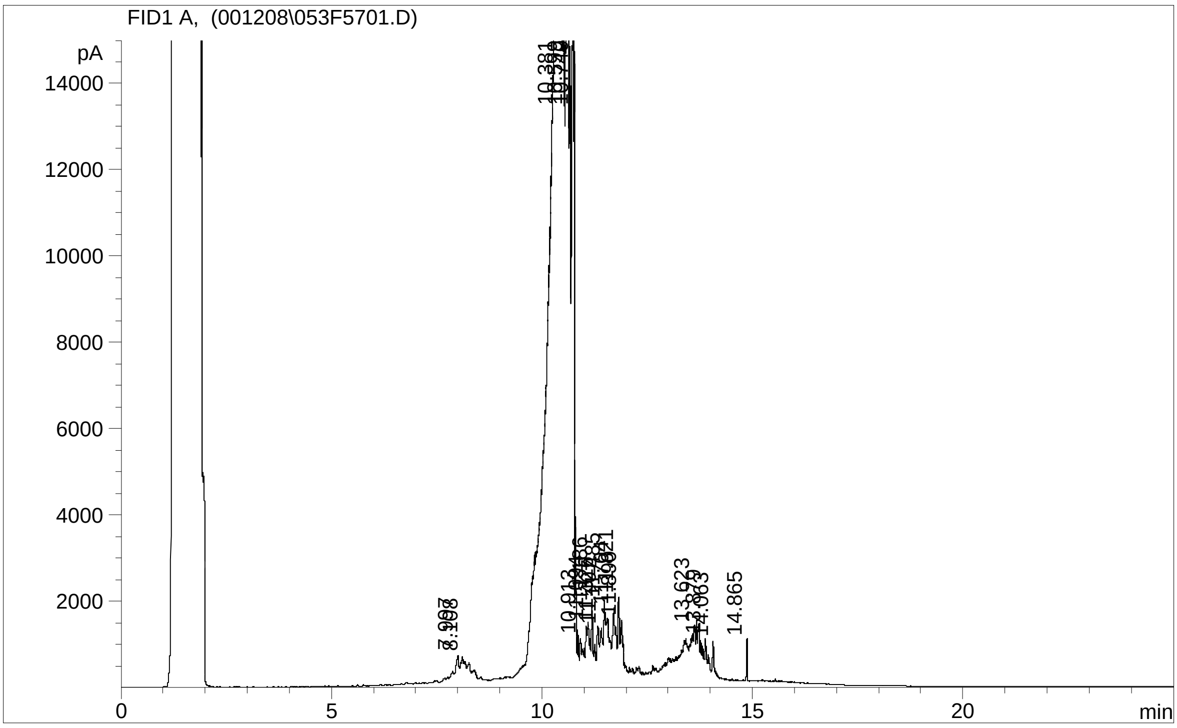
GC/FID-kromatogram: Sedimentprøve
2/4 A 442-67



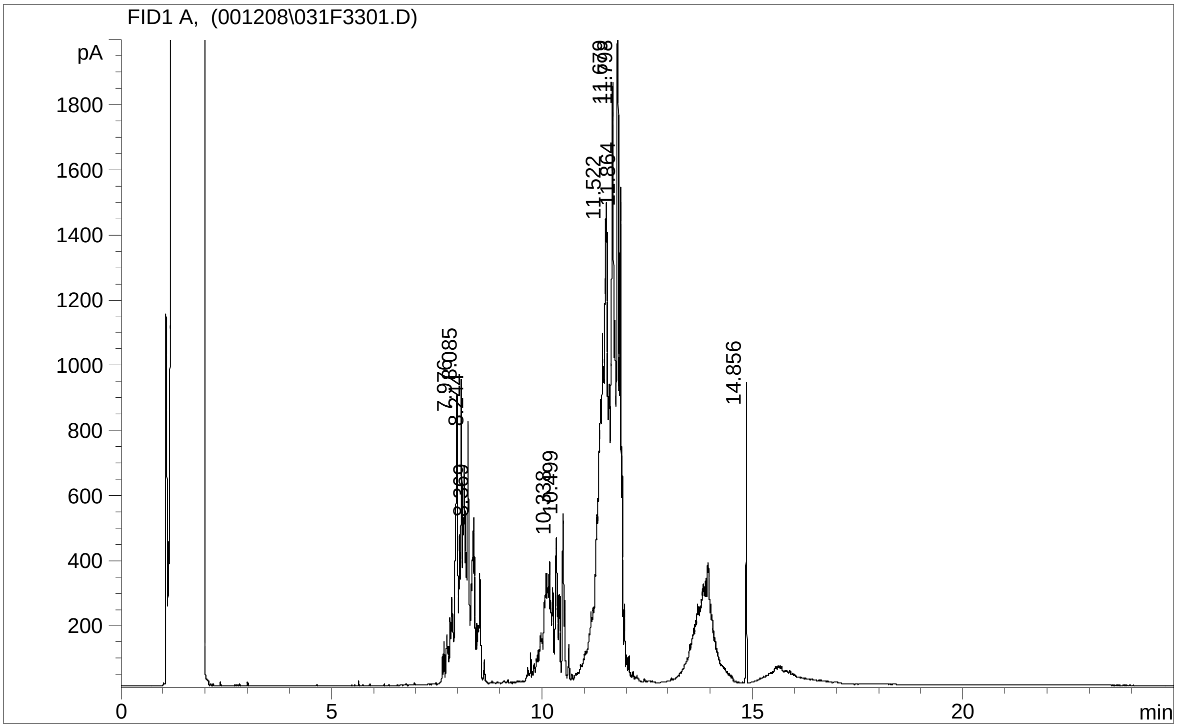
GC/FID-kromatogram: Sedimentprøve
2/4 A 442-68



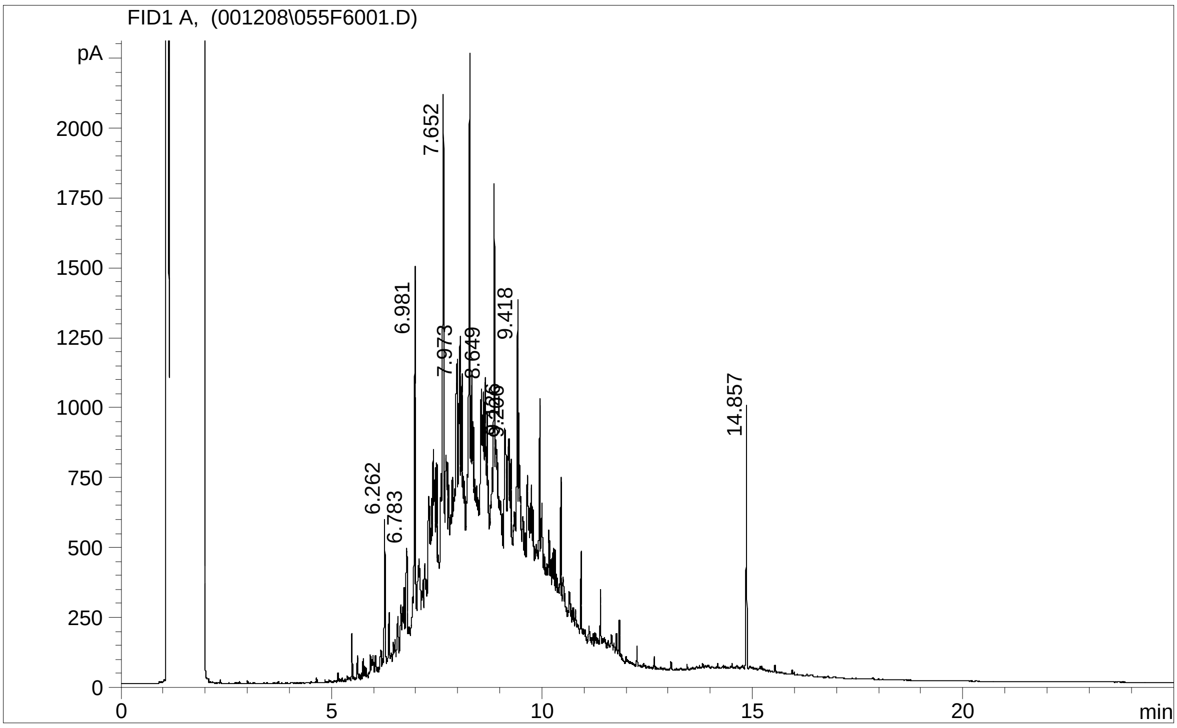
GC/FID-kromatogram: Sedimentprøve
2/4 A 442-71



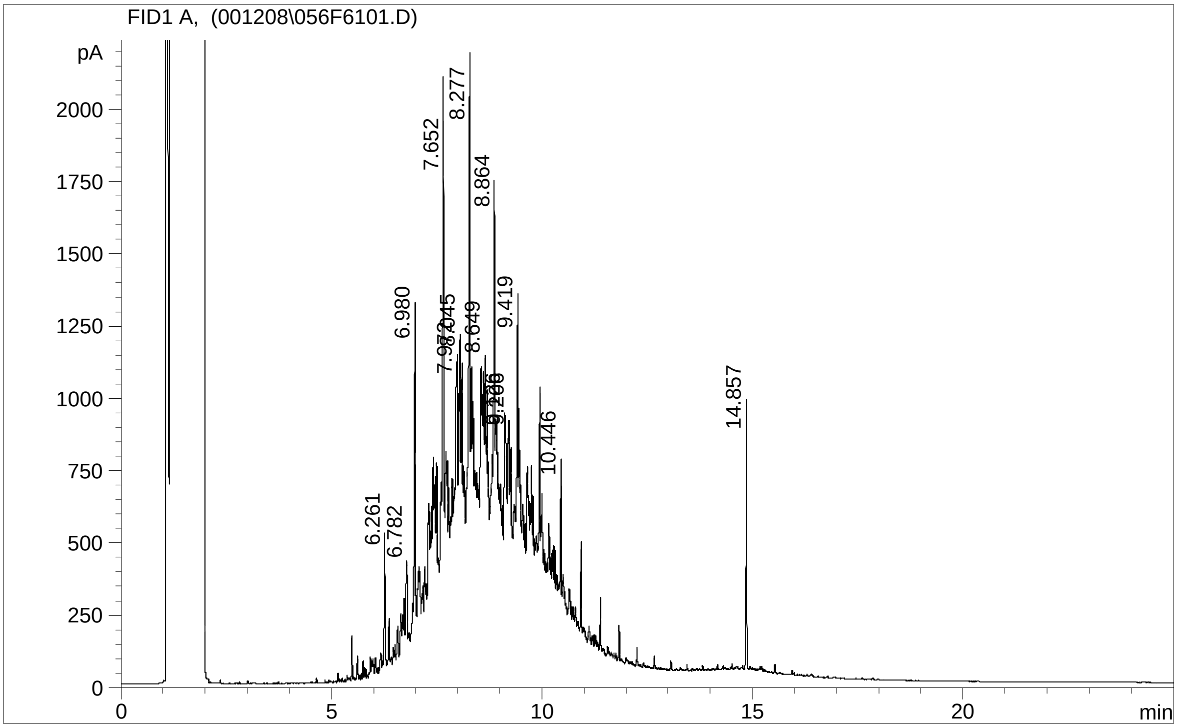
GC/FID-kromatogram: Sedimentprøve
2/4 A 442-72



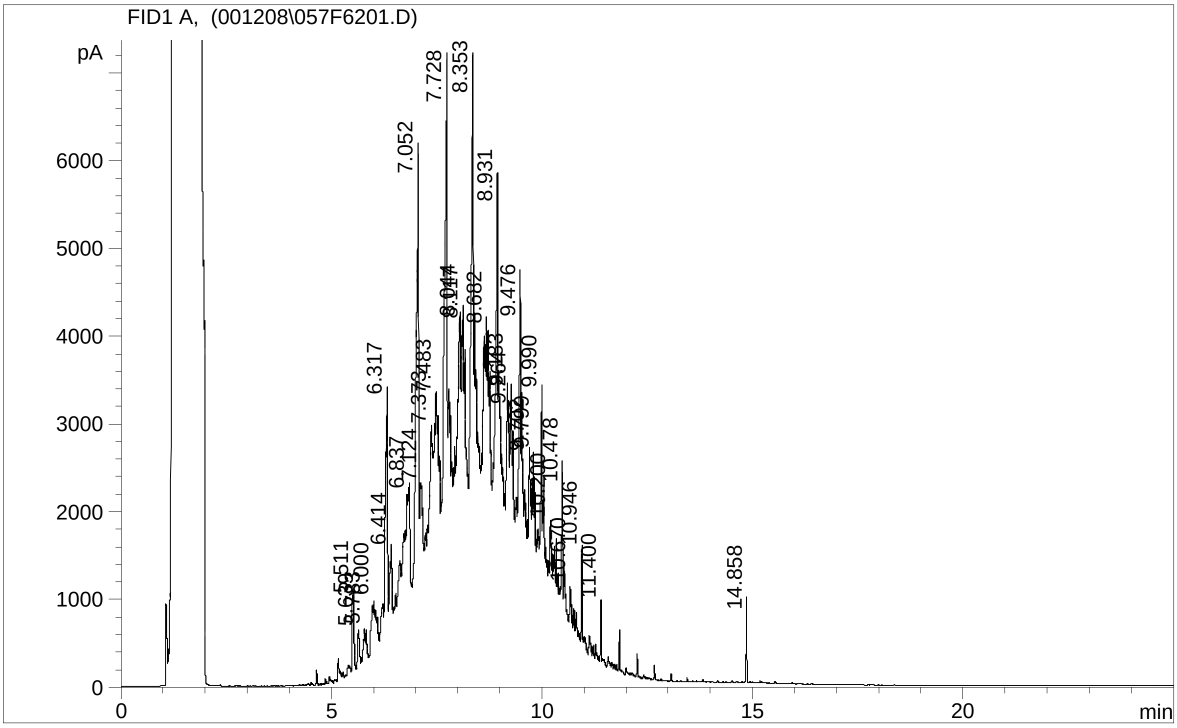
GC/FID-kromatogram: Sedimentprøve
Beryl 442-69



GC/FID-kromatogram: Sedimentprøve
BERYL 442-70

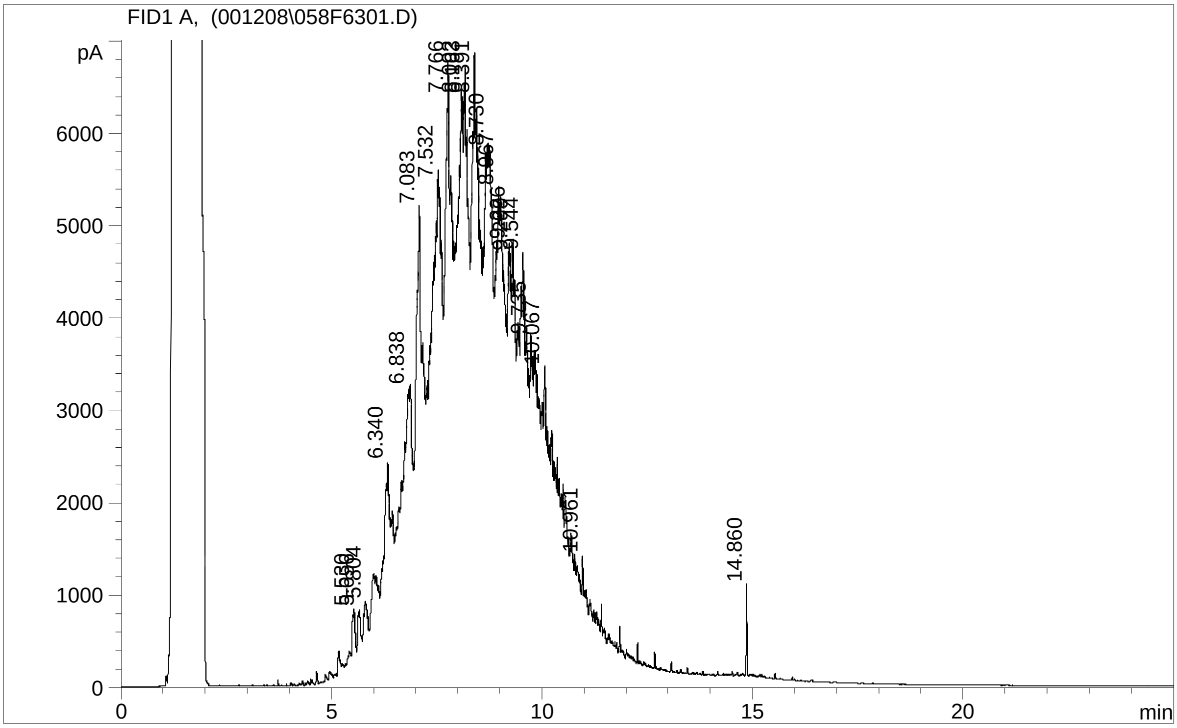


GC/FID-kromatogram: Sedimentprøve
Beryl 442-73

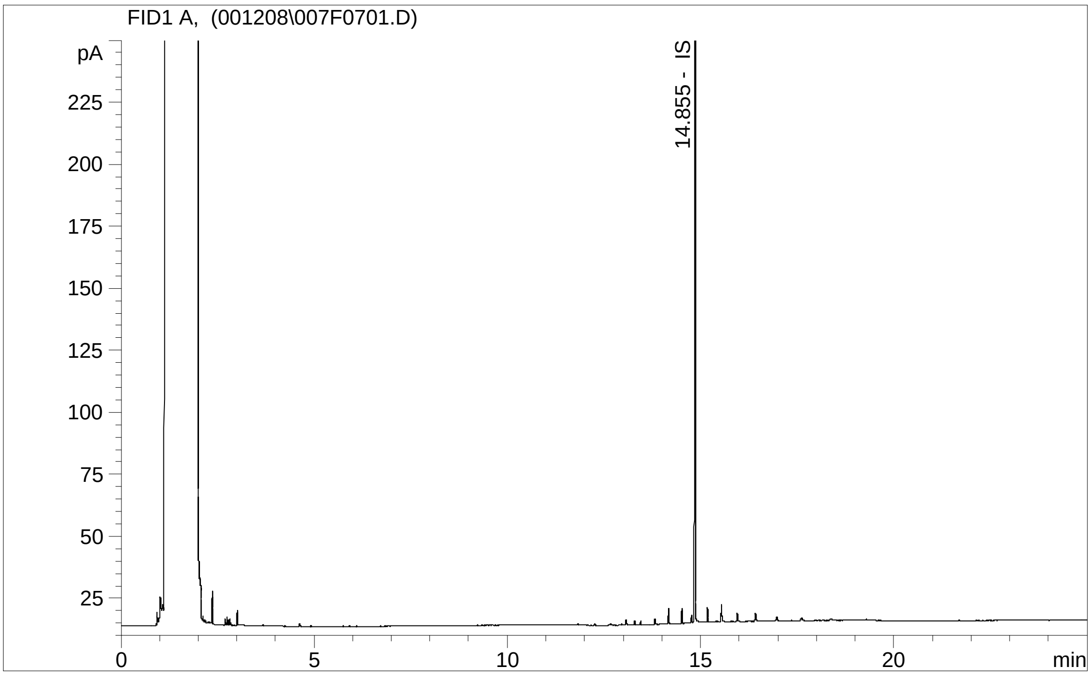


MILJØ-KJEMI Norsk Miljø Senter		Saksnr.	15545-12-5
		Vedlegg	1 side 37

GC/FID-kromatogram: Sedimentprøve
Beryl 442-74



GC/FID-kromatogram: Blindprøve



Appendix 5

Inorganic contaminants

Appendix 5

Internt RF-Rogelandsfoskningen
Pr. nr. 715 16 16

Henv: Stig Westerlund

Prøver tatt dato:		Ref.nr.:	00422
Prøver mottatt dato:	27.06.00	Prøvested:	Beryl A and Ekofisk 2/4A
Analyseperiode:	14.11-22.12.00	Prøvetype:	Sediment
Analyserapport sendt:	02.03.01		

Analyse:	**Analyse-metode:**	**Ikke akreditert analyse**	**Merknad**
Metaller i sediment	RF/2.1-401	V	
Hg(CVAAS)	RF/2.1-408		

RF - Miljølab er akkreditert i Norsk Akkreditering (NA) i henhold til kravene i EN-NS 45001 og ISO/IEC Guide 25.
Analyseresultatene gjelder utelukkende på de analyserte prøvene.

Med vennlig hilsen
RF - Miljølab

Inger-Lisa Andersen
Kvalitetssikrer

Stig Westerlund
Analytiker

Vedlegg : Kvalitetskontrolldata ved de aktuelle analyser.

RF-Miljølab
Stavanger
Norge

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Li	Al	V	Mn	Fe
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
422-1	V1-1	0-10	5	24.8	16660	41.7	814	44890
422-2	V1-1	10-22	16	22.3	17170	39.9	680	39860
422-3	V1-1	22-28	25	24.0	17640	35.3	647	37550
422-4	V1-1	28-36	32	16.7	14720	42.7	531	35510
422-5	V1-1	36-40	38	18.7	14980	40.4	571	35650
422-6	V1-1	40-48	44	14.5	10900	31.8	624	29180
422-6(2)	V1-1		44	13.8	10060	32.6	651	26410
422-7	V1-1	48-56	52	15.6	9630	31.7	1042	27080
422-8	V1-1	58-60	59	11.4	7330	25.9	921	23160
422-9	V1-1	60-68	64	9.4	6530	29.7	679	20020
422-10	V1-1	68-76	72	15.0	9790	51.8	924	41680
422-11	V1-2	0-15	7.5	12.4	7200	30.5	959	25270
422-12	V1-2	15-30	22.5	13.4	8710	34.5	1200	24880
422-12(2)	V1-2		22.5	14.6	8720	37.3	1378	24570
422-13	V1-2	30-45	37.5	10.2	5820	23.9	904	24080
422-14	V1-2	45-60	52.5	7.7	5300	22.1	829	22720
422-15	V1-2	60-65	62.5	6.3	6520	61.2	674	35580
422-16	V1-2	65-75	70	6.7	7840	27.8	451	21110
422-17	V1-2	75-85	80	6.3	6780	21.1	383	19290
422-18	V1-2	85-90	87.5	6.0	8140	24.2	977	26830
422-18(2)	V1-2		87.5	6.3	7700	22.5	991	20170
422-19	V3-G	0-6	3	14.9	8470	36.5	248	19570
422-20	V3-G	6-10	8	20.2	12630	49.8	617	21620
422-21	V3-G	10-14	12	17.2	21110	36.7	462	33530
422-22	V3-G	14-16	15	31.0	17800	64.0	382	27720
422-23	V3-G	16-25	20.5	34.6	18420	72.0	363	27910
422-24	V3-G	25-30	27.5	26.1	10750	37.6	532	31220
422-24(2)	V3-G		27.5	25.1	11970	35.0	520	30920
422-25	V3-G	30-34	32	23.4	13210	33.8	832	32680
422-26	V3-G	34-39	36.5	23.4	14110	42.8	861	26240
422-27	V3-G	39-48	43.5	1.7	2720	5.4	124	8470
422-28	V3-G	48-56	52	19.7	15000	45.6	296	20180
422-29	V3-G	56-60	58	14.9	15320	35.8	333	18360
422-30	V3G2	0-6	3	25.1	18210	53.2	421	23870
422-30(2)	V3G2		3	24.8	21160	48.7	469	25220
422-31	V3G2	6-13	9.5	9.7	9540	18.1	415	16150
422-32	V3G2	13-28	20.5	34.8	23180	49.4	318	29170
422-33	V3G2	28-37	32.5	20.8	20080	28.6	548	30910
422-34	V4	0-10	5	13.3	11850	18.2	408	17300

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Ba	Cr	Co	Ni
				mg/kg	mg/kg	mg/kg	mg/kg
422-1	V1-1	0-10	5	455	39.4	13.8	32.9
422-2	V1-1	10-22	16	1667	48.9	12.4	26.5
422-3	V1-1	22-28	25	1593	30.9	12.4	28.6
422-4	V1-1	28-36	32	1380	25.2	12.9	26.8
422-5	V1-1	36-40	38	1219	33.4	11.8	28.5
422-6	V1-1	40-48	44	991	27.0	10.6	22.1
422-6(2)	V1-1		44	1696	29.7	9.6	24.5
422-7	V1-1	48-56	52	235	25.0	11.3	25.4
422-8	V1-1	58-60	59	151	21.5	9.4	21.0
422-9	V1-1	60-68	64	131	23.4	9.5	23.2
422-10	V1-1	68-76	72	278	204.1	22.6	73.0
422-11	V1-2	0-15	7.5	209	56.3	12.7	31.2
422-12	V1-2	15-30	22.5	417	27.1	10.7	24.9
422-12(2)	V1-2		22.5	178	27.2	10.7	25.2
422-13	V1-2	30-45	37.5	99	20.6	8.7	21.4
422-14	V1-2	45-60	52.5	149	19.3	8.5	19.7
422-15	V1-2	60-65	62.5	116	25.1	13.2	45.9
422-16	V1-2	65-75	70	568	25.0	8.7	20.1
422-17	V1-2	75-85	80	343	26.7	8.3	18.5
422-18	V1-2	85-90	87.5	403	57.0	12.2	32.1
422-18(2)	V1-2		87.5	337	49.7	14.5	33.3
422-19	V3-G	0-6	3	183	43.2	11.3	32.3
422-20	V3-G	6-10	8	125	39.1	14.5	30.8
422-21	V3-G	10-14	12	161	30.6	11.3	24.7
422-22	V3-G	14-16	15	150	64.3	19.8	43.3
422-23	V3-G	16-25	20.5	161	60.1	18.1	42.4
422-24	V3-G	25-30	27.5	65	45.2	19.0	39.6
422-24(2)	V3-G		27.5	231	42.9	18.9	65.8
422-25	V3-G	30-34	32	155	52.6	19.8	34.5
422-26	V3-G	34-39	36.5	196	59.6	14.5	32.4
422-27	V3-G	39-48	43.5	702	12.9	3.7	10.2
422-28	V3-G	48-56	52	495	35.7	15.4	28.3
422-29	V3-G	56-60	58	923	38.2	11.8	24.6
422-30	V3G2	0-6	3	201	48.3	18.0	33.1
422-30(2)	V3G2		3	259	45.8	18.0	29.8
422-31	V3G2	6-13	9.5	468	21.8	9.5	13.4
422-32	V3G2	13-28	20.5	392	50.3	25.0	42.8
422-33	V3G2	28-37	32.5	873	29.8	19.0	26.6
422-34	V4	0-10	5	313	36.5	9.9	18.7

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Cu	Zn	As	Sr
				mg/kg	mg/kg	mg/kg	mg/kg
422-1	V1-1	0-10	5	72.1	366	14.9	354
422-2	V1-1	10-22	16	42.3	421	9.6	307
422-3	V1-1	22-28	25	35.9	340	9.3	442
422-4	V1-1	28-36	32	33.4	215	10.5	279
422-5	V1-1	36-40	38	58.4	322	12.8	434
422-6	V1-1	40-48	44	50.3	420	20.7	695
422-6(2)	V1-1		44	51.6	454	20.5	658
422-7	V1-1	48-56	52	34.4	262	26.9	596
422-8	V1-1	58-60	59	32.4	267	26.3	602
422-9	V1-1	60-68	64	32.0	226	23.3	331
422-10	V1-1	68-76	72	188.1	348	23.3	405
422-11	V1-2	0-15	7.5	90.1	723	26.6	506
422-12	V1-2	15-30	22.5	40.6	432	31.2	711
422-12(2)	V1-2		22.5	42.1	422	29.8	658
422-13	V1-2	30-45	37.5	22.9	431	33.5	765
422-14	V1-2	45-60	52.5	19.9	424	31.6	590
422-15	V1-2	60-65	62.5	49.1	798	61.3	267
422-16	V1-2	65-75	70	43.2	296	24.2	403
422-17	V1-2	75-85	80	35.0	165	21.4	666
422-18	V1-2	85-90	87.5	88.7	283	44.5	567
422-18(2)	V1-2		87.5	86.6	308	44.7	516
422-19	V3-G	0-6	3	107	244	6.1	122
422-20	V3-G	6-10	8	68.3	218	10.5	279
422-21	V3-G	10-14	12	55.5	137	6.6	91
422-22	V3-G	14-16	15	99.4	205	8.5	133
422-23	V3-G	16-25	20.5	64.4	129	8.2	151
422-24	V3-G	25-30	27.5	71.8	173	13.4	227
422-24(2)	V3-G		27.5	65.7	174	12.0	303
422-25	V3-G	30-34	32	84.3	210	12.7	334
422-26	V3-G	34-39	36.5	74.9	151	14.7	443
422-27	V3-G	39-48	43.5	24.0	123	3.7	78
422-28	V3-G	48-56	52	41.2	77.6	7.3	121
422-29	V3-G	56-60	58	39.0	163	4.5	252
422-30	V3G2	0-6	3	57.4	210	7.2	148
422-30(2)	V3G2		3	80.9	179	6.4	172
422-31	V3G2	6-13	9.5	36.8	123	3.0	86.4
422-32	V3G2	13-28	20.5	41.5	99	6.5	136
422-33	V3G2	28-37	32.5	35.9	59	5.1	177
422-34	V4	0-10	5	47.5	273	4.0	301

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Cd	Pb	Hg	Dry matter
				mg/kg	mg/kg	mg/kg	%
422-1	V1-1	0-10	5	4.36	282	1.09	78.1
422-2	V1-1	10-22	16	0.42	325	1.28	77.7
422-3	V1-1	22-28	25	0.16	226	0.927	80.2
422-4	V1-1	28-36	32	0.16	160	1.24	76.1
422-5	V1-1	36-40	38	0.40	282	1.36	74.4
422-6	V1-1	40-48	44	0.98	456	1.19	77.5
422-6(2)	V1-1		44	1.04	438	1.31	
422-7	V1-1	48-56	52	0.51	630	1.32	80.9
422-8	V1-1	58-60	59	0.54	611	1.27	83.6
422-9	V1-1	60-68	64	0.47	503	1.22	83.8
422-10	V1-1	68-76	72	0.65	1136	0.862	77.4
422-11	V1-2	0-15	7.5	1.21	566	0.465	71.8
422-12	V1-2	15-30	22.5	1.23	469	0.615	71.1
422-12(2)	V1-2		22.5	1.26	377	0.584	
422-13	V1-2	30-45	37.5	1.42	261	0.707	85.4
422-14	V1-2	45-60	52.5	1.39	256	0.614	86.5
422-15	V1-2	60-65	62.5	5.60	477	0.671	86.1
422-16	V1-2	65-75	70	0.96	592	0.465	83.7
422-17	V1-2	75-85	80	0.46	229	0.319	83.0
422-18	V1-2	85-90	87.5	1.21	969	0.361	81.5
422-18(2)	V1-2		87.5	1.37	886	0.320	
422-19	V3-G	0-6	3	0.30	61.3	0.165	78.7
422-20	V3-G	6-10	8	0.43	93.8	0.452	75.6
422-21	V3-G	10-14	12	0.06	40.8	0.514	80.0
422-22	V3-G	14-16	15	0.10	36.9	0.169	78.3
422-23	V3-G	16-25	20.5	0.19	45.7	0.324	78.4
422-24	V3-G	25-30	27.5	0.21	496	0.560	81.1
422-24(2)	V3-G		27.5	0.14	253	0.303	
422-25	V3-G	30-34	32	0.15	342	0.591	82.6
422-26	V3-G	34-39	36.5	0.70	97.0	0.235	81.3
422-27	V3-G	39-48	43.5	0.37	73.3	0.270	91.4
422-28	V3-G	48-56	52	0.05	27.7	0.071	78.3
422-29	V3-G	56-60	58	0.10	155	0.051	69.3
422-30	V3G2	0-6	3	0.24	55.5	0.224	77.5
422-30(2)	V3G2		3	0.23	63.2	0.322	
422-31	V3G2	6-13	9.5	0.06	60.3	0.336	80.5
422-32	V3G2	13-28	20.5	0.15	11.8	0.061	78.2
422-33	V3G2	28-37	32.5	0.17	71.2	0.067	74.7
422-34	V4	0-10	5	0.75	152	0.596	75.9

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Li	Al	V	Mn	Fe
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
422-35	V4	10-18	14	10.0	10010	14.8	413	15140
422-36	V4	18-24	21	20.1	14090	54.1	378	27740
422-36(2)	V4		21	18.3	14610	44.0	384	26180
422-37	V4	24-30	27	2.7	1960	5.5	45	2930
422-38	V4	30-40	35	3.5	2200	5.4	218	3800
422-39	K1	0-4	2	22.4	15650	47.3	259	28760
422-40	K1	4-10	7	24.4	14970	44.3	471	26100
422-41	K1	10-13	11.5	20.8	14780	45.4	664	22650
422-42	K1	13-20	16.5	21.9	12470	35.8	807	22090
422-42(2)	K1		16.5	24.7	11910	43.7	856	22700
422-43	V9	0-5	2.5	16.8	8240	24.9	1397	28500
422-44	V9	5-11	8	7.8	5600	19.8	1197	19010
422-45	V9	11-15	13	9.4	8900	17.3	1586	19220
422-46	V9	15-22	18.5	6.6	9960	11.6	1199	23730
422-47	V9	22-33	27.5	1.9	5660	6.4	518	17980
422-48	V9	33-36	34.5	5.1	6090	14.8	437	20420
422-48(2)	V9		34.5	5.5	6930	16.0	519	23530
422-49	V9	36-38	37	3.7	3750	10.2	423	17870
422-50	V9	38-43	40.5	5.1	7000	16.1	322	18280
422-51	V9	43-53	48	2.3	1800	10.9	23	5050
422-52	V9	53-68	60.5	0.9	1290	7.8	23	2210
422-53	V9	68-90	79	1.4	1240	3.0	24	1470
422-54	V10	1-10	5.5	9.6	8160	15.6	926	22070
422-54(2)	V10		5.5	6.8	6330	12.2	842	20860
422-55	V10	10-20	15	8.6	5830	14.3	620	15170
422-56	V10	20-30	25	3.6	1950	10.0	137	9220
422-57	SW3	0-7	3.5	16.5	5930	22.6	918	22480
422-58	SW3	7-13	10	24.5	6960	24.9	1474	16450
422-59	SW3	13-15	14	26.4	7650	24.1	569	16280
422-60	SW3	15-23	19	26.7	9260	30.9	718	18590
422-60(2)	SW3		19	21.3	8390	37.4	719	25290
422-61	SW3	23-30	26.5	23.3	8870	26.7	1544	53140
422-62	SW3	30-39	34.5	21.4	7160	30.1	440	28880
422-63	SW3	39-47	43	5.4	3360	9.2	101	5870
422-64	MUC2	M2		12.8	7590	22.2	1812	19600
422-65	CFAS3	CFAS3		13.8	7720	20.8	1285	29880
422-66	v1xx			30.1	13180	52.7	544	30550

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Ba	Cr	Co	Ni
				mg/kg	mg/kg	mg/kg	mg/kg
422-35	V4	10-18	14	282	36.2	7.7	13.2
422-36	V4	18-24	21	383	101	22.0	43.1
422-36(2)	V4		21	715	76.0	19.2	42.6
422-37	V4	24-30	27	110	5.8	1.7	4.8
422-38	V4	30-40	35	624	5.7	2.4	7.8
422-39	K1	0-4	2	727	51.2	20.2	64.3
422-40	K1	4-10	7	287	42.6	18.0	43.6
422-41	K1	10-13	11.5	358	47.0	13.5	43.0
422-42	K1	13-20	16.5	116	36.1	16.5	47.5
422-42(2)	K1		16.5	508	49.1	18.3	49.1
422-43	V9	0-5	2.5	136	49.2	15.9	36.2
422-44	V9	5-11	8	146	31.3	14.1	21.0
422-45	V9	11-15	13	117	14.3	8.2	20.2
422-46	V9	15-22	18.5	258	13.8	7.5	27.2
422-47	V9	22-33	27.5	992	11.2	11.8	22.0
422-48	V9	33-36	34.5	497	29.1	12.3	34.2
422-48(2)	V9		34.5	675	29.1	13.4	38.4
422-49	V9	36-38	37	1452	34.4	8.8	83.0
422-50	V9	38-43	40.5	267	52.8	8.1	41.1
422-51	V9	43-53	48	470	18.5	1.7	4.5
422-52	V9	53-68	60.5	4	11.6	1.3	2.0
422-53	V9	68-90	79	4	4.6	1.1	1.6
422-54	V10	1-10	5.5	234	26.1	21.7	39.6
422-54(2)	V10		5.5	305	20.7	20.3	27.9
422-55	V10	10-20	15	1184	27.1	17.4	42.5
422-56	V10	20-30	25	872	10.3	7.2	14.2
422-57	SW3	0-7	3.5	127	43.3	19.8	37.6
422-58	SW3	7-13	10	206	15.4	12.7	31.7
422-59	SW3	13-15	14	222	18.3	10.9	36.8
422-60	SW3	15-23	19	614	31.3	16.3	32.5
422-60(2)	SW3		19	265	28.7	20.9	32.6
422-61	SW3	23-30	26.5	357	64.2	43.5	81.2
422-62	SW3	30-39	34.5	431	35.4	17.9	33.6
422-63	SW3	39-47	43	1220	9.8	3.9	6.7
422-64	MUC2	M2		266	17.5	13.2	23.8
422-65	CFAS3	CFAS3		114	65.1	13.6	26.1
422-66	v1xx			163	35.9	21.1	39.1

Results:

Reference nr 00422

All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Cu	Zn	As	Sr
				mg/kg	mg/kg	mg/kg	mg/kg
422-35	V4	10-18	14	40.8	260	3.8	342
422-36	V4	18-24	21	154	906	10.5	228
422-36(2)	V4		21	180	664	13.9	213
422-37	V4	24-30	27	2.7	11.2	1.1	28
422-38	V4	30-40	35	3.4	15.5	5.8	68
422-39	K1	0-4	2	119	987	10.7	144
422-40	K1	4-10	7	144	340	16.1	173
422-41	K1	10-13	11.5	127	352	21.0	243
422-42	K1	13-20	16.5	81.7	172	26.1	306
422-42(2)	K1		16.5	94.4	203	36.8	386
422-43	V9	0-5	2.5	121	170	25.6	362
422-44	V9	5-11	8	51.4	398	7.0	342
422-45	V9	11-15	13	28.8	175	5.1	142
422-46	V9	15-22	18.5	22.7	211	6.0	127
422-47	V9	22-33	27.5	25.8	161	3.0	140
422-48	V9	33-36	34.5	678	183	8.3	89.0
422-48(2)	V9		34.5	78.2	712	9.7	91.0
422-49	V9	36-38	37	20.6	344	6.0	65.0
422-50	V9	38-43	40.5	87.1	422	12.2	124
422-51	V9	43-53	48	1.7	14.2	8.4	21.8
422-52	V9	53-68	60.5	0.8	3.0	0.7	19.5
422-53	V9	68-90	79	0.9	3.5	<0.1	10.5
422-54	V10	1-10	5.5	56.9	835	12.5	411
422-54(2)	V10		5.5	50.4	1204	11.5	285
422-55	V10	10-20	15	56.5	273	8.7	306
422-56	V10	20-30	25	21.8	88	9.1	86.1
422-57	SW3	0-7	3.5	65.8	184	10.8	361
422-58	SW3	7-13	10	47.0	346	15.5	272
422-59	SW3	13-15	14	35.1	360	15.3	237
422-60	SW3	15-23	19	38.8	232	16.2	262
422-60(2)	SW3		19	45.6	493	10.1	237
422-61	SW3	23-30	26.5	97.8	438	21.4	355
422-62	SW3	30-39	34.5	41.7	711	18.2	224
422-63	SW3	39-47	43	4.7	54.8	2.8	94.9
422-64	MUC2	M2		59.0	384	11.8	382
422-65	CFAS3	CFAS3		49.4	107	11.7	260
422-66	v1xx			45.3	114	16.2	283

Results:
Reference nr 00422
All results on dry weight basis

Ref nr	Core	Slice	Slice avr	Cd	Pb	Hg	Dry matter
				mg/kg	mg/kg	mg/kg	%
422-35	V4	10-18	14	0.68	204	0.841	79.4
422-36	V4	18-24	21	0.54	196	0.292	72.4
422-36(2)	V4		21	0.53	201	0.265	
422-37	V4	24-30	27	<0.01	4.0	0.002	79.6
422-38	V4	30-40	35	<0.01	4.1	0.002	80.2
422-39	K1	0-4	2	0.24	76.7	0.103	78.8
422-40	K1	4-10	7	0.48	202	0.244	77.6
422-41	K1	10-13	11.5	0.80	158	0.278	73.6
422-42	K1	13-20	16.5	0.42	82.4	0.276	81.0
422-42(2)	K1		16.5	0.36	105	0.348	
422-43	V9	0-5	2.5	0.31	70.8	0.091	73.7
422-44	V9	5-11	8	0.76	209	0.415	78.5
422-45	V9	11-15	13	0.52	141	0.363	74.2
422-46	V9	15-22	18.5	0.74	147	0.304	76.9
422-47	V9	22-33	27.5	0.63	148	0.143	84.4
422-48	V9	33-36	34.5	1.51	488	0.176	79.2
422-48(2)	V9		34.5	1.95	513	0.201	
422-49	V9	36-38	37	0.91	229	0.318	83.8
422-50	V9	38-43	40.5	3.53	600	0.729	77.8
422-51	V9	43-53	48	0.07	22.8	0.015	79.6
422-52	V9	53-68	60.5	<0.01	2.1	0.001	83.5
422-53	V9	68-90	79	<0.01	1.3	0.002	83.8
422-54	V10	1-10	5.5	1.11	211	0.194	80.4
422-54(2)	V10		5.5	3.14	212	0.239	
422-55	V10	10-20	15	0.38	125	0.233	80.8
422-56	V10	20-30	25	0.02	33.2	0.042	81.7
422-57	SW3	0-7	3.5	0.24	65.3	0.175	71.5
422-58	SW3	7-13	10	0.47	141	0.373	72.5
422-59	SW3	13-15	14	0.42	92.5	0.109	65.5
422-60	SW3	15-23	19	0.29	88.9	0.170	62.4
422-60(2)	SW3		19	0.56	123	0.158	
422-61	SW3	23-30	26.5	0.79	134	0.214	79.7
422-62	SW3	30-39	34.5	0.63	203	0.164	64.4
422-63	SW3	39-47	43	<0.01	29.4	0.026	66.6
422-64	MUC2	M2		0.51	214	0.591	76.6
422-65	CFAS3	CFAS3		0.24	44.5	0.091	70.0
422-66	v1xx			0.43	189	0.081	79.0

Vedlegg: QA-Data
Reference nr 00422

Analyse av referansematerial MESS-1

	Referanseverdi Innehold iflg. sertifikat	RF-Normalverdi	Måling ved denne analyse
	µg/g tørrvekt	µg/g tørrvekt	µg/g tørrvekt
Litium		34.0	31.8
Aluminium	58394	14000	15000
Vanadium	74.2	32.0	31.8
Chromium	71.00	21.7	29.0
Manganese	513.00	280.0	270.0
Iron	30520	20200	21000
Cobalt	11	10.0	11.0
Nickel	29.50	20.7	23.5
Copper	25.10	22.0	23.8
Zinc	191	160	170
Arsenic	10.60	8.62	9.60
Strontium		26.0	23.0
Cadmium	0.59	0.63	0.60
Barium		42.6	45.0
Lead	34.00	26.8	28.0
Hg CVAAS		0.24	0.22

Data from 1998
Core from the SW side of Ekofisk 2/4 A

All data on dry weight basis

Core		VC21	VC21	VC21	VC21	VC21	VC21	VC21	VC21
Layer		0--9	9--12	12--15	15--30	30--44	44--50	50--58	58--68
THC	mg/kg	7100	27000	25000	23000	27000	41000	18000	3600
TS	%	64.4	67.1	68.2	69.3	70.8	70.7	67	59.6
Naftalen	µg/kg	390	410	590	660	530	350	260	66
Asenaftylen	µg/kg	23	70	68	65	110	320	160	< 10
Asenaften	µg/kg	47	110	170	180	810	2200	1100	160
Fluoren	µg/kg	72	220	390	340	340	220	67	17
Fenantren	µg/kg	130	350	650	540	570	340	140	33
Antrasen	µg/kg	< 10	< 40	< 40	< 40	52	44	22	< 10
Fluoranten	µg/kg	< 10	< 20	21	17	38	56	29	< 10
Pyren	µg/kg	24	63	71	58	150	120	38	< 10
Benzo(a)antrasen	µg/kg	< 10	13	16	14	23	41	14	< 10
Krysen/trifenylen	µg/kg	16	34	58	55	77	81	28	< 10
Benzo(b+j+k)fluoranten	µg/kg	< 20	< 20	< 20	< 20	< 70	< 100	< 100	< 20
Benzo(a)pyren	µg/kg	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Indeno(1,2,3--c,d)pyren	µg/kg	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Benzo(g,h,i)perylen	µg/kg	< 20	< 20	21	< 20	26	39	< 20	< 20
Dibenzo(a,h)antrasen	µg/kg	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
3--ringer sum	µg/kg	270	750	1280	1130	1880	3120	1490	210
4--ringer sum	µg/kg	40	110	170	140	290	300	110	i.r.
5--ringer sum	µg/kg	<	<	<	<	<	<	<	<
6--ringer sum	µg/kg	<	<	21	<	26	39	<	<
PAH Sum	µg/kg	700	1270	2060	1930	2700	3810	1860	280
Naftalener	µg/kg	5690	13700	22900	20100	15100	10500	4460	1200
Fenantrener	µg/kg	2680	7550	8150	8240	7770	3850	1470	720
Dibenzotiofener	µg/kg	6320	14500	14100	17100	15800	15400	6600	2210
Dekaliner	µg/kg	24100	79000	29400	40600	32400	35400	15500	4270
SUM NPD	µg/kg	14700	35800	46200	45400	38700	29800	12500	4130

From report nr
RF-1999/041
Volume 2 Raw data

Data from 1998
Core from the SW side of Ekofisk 2/4 A

All data on dry weight basis

Core		VC21	VC21	VC21	VC22	VC22	VC22	VC22
Layer		68--77	77--89	89--100	100-113	113-135	135-160	160-182
THC	mg/kg	2700	2000	<	<	<	<	<
TS	%	60.4	83.4	79.8	82.4	84.7	84.1	84.3
Naftalen	µg/kg	280	200	0.59	<	<	<	<
Asenaftylen	µg/kg	22	36	<	<	<	<	<
Asenaften	µg/kg	120	55	<	<	<	<	<
Fluoren	µg/kg	170	180	0.59	0.33	<	<	0.25
Fenantren	µg/kg	250	330	2.8	1.4	1.8	<	0.38
Antrasen	µg/kg	27	54	0.6	<	<	<	<
Fluoranten	µg/kg	12	57	4	1.2	0.56	<	<
Pyren	µg/kg	52	120	5.9	1.1	0.75	<	<
Benzo(a)antrasen	µg/kg	< 10	21	2.4	0.48	0.34	<	<
Krysen/trifenylen	µg/kg	23	59	4	0.92	0.58	<	<
Benzo(b+j+k)fluoranten	µg/kg	< 20	< 30	23	1.6	0.9	<	<
Benzo(a)pyren	µg/kg	< 20	< 20	5.2	0.61	0.56	<	<
Indeno(1,2,3--c,d)pyren	µg/kg	< 20	< 20	14	0.56	<	<	<
Benzo(g,h,i)perylen	µg/kg	< 20	23	14	0.87	0.93	<	<
Dibenzo(a,h)antrasen	µg/kg	< 20	< 20	2.9	<	<	<	<
3--ringer sum	µg/kg	590	660	4	1.7	1.8	<	0.63
4--ringer sum	µg/kg	87	260	16	3.7	2.2	<	<
5--ringer sum	µg/kg	<	<	31	2.2	1.5	<	<
6--ringer sum	µg/kg	<	23	28	1.4	0.93	<	<
PAH Sum	µg/kg	960	1120	52	7.6	5.5	<	0.63
Naftalener	µg/kg	5150	5980	12	11	10	<	2.3
Fenantrener	µg/kg	2800	4330	14	8.4	9.4	<	0.38
Dibenzotiofener	µg/kg	2800	4510	5.2	4.5	1.4	<	<
Dekaliner	µg/kg	21500	40900	39	7.4	13	6.1	<
SUM NPD	µg/kg	10800	14800	31	24	21	<	2.6

From report nr
RF-1999/041
Volume 2 Raw data

Data from 1998
Core taken on SW side of EKOFISK 2/4 A

All data on dry weight basis

		Cr	Fe	Ni	Cu	Zn	As
Core	Layer	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	cm						
VC2-1	0-9	39.5	33472	25.9	26.7	101	14.8
VC2-1	0-9	34.8	28912	28.3	24.3	98.4	14.3
VC2-1	9-12	73.6	25095	34.8	45.6	225	14.9
VC2-1	12-15	24.5	22055	39.3	35.6	80.5	10.8
VC2-1	15-30	20.8	19491	37.7	45.4	94.1	9.1
VC2-1	30-44	20.0	21675	32.8	41.6	195	12.3
VC2-1	44-50	21.2	17527	35.0	35.0	202	10.6
VC2-1	50-58	26.7	22113	29.1	34.9	340	11.6
VC2-1	58-68	23.5	21133	15.3	30.1	72.5	12.8
VC2-1	68-77	70.3	42402	31.8	48.2	450	18.6
VC2-1	68-77	136	101289	45.3	78.1	282	30.8
VC2-1	77-89	63	28830	36.5	49.0	299	17.4
VC2-1	89-100	9.2	4013	3.9	2.2	9.0	8.8
VC2-2	100-113	8.3	5198	4.6	1.5	8.4	19.8
VC2-2	113-135	4.1	1686	1.2	0.8	5.0	1.4
VC2-2	135-160	3.7	2229	1.8	1.1	6.2	0.4
VC2-2	160-182	3.1	2125	1.3	1.7	5.9	0.4

		Sr	Cd	Ba	Pb	Hg
Core	Layer	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	cm					
VC2-1	0-9	223	0.29	2280	32.2	0.034
VC2-1	0-9	248	0.37	3440	29.6	0.037
VC2-1	9-12	483	0.99	4380	89.2	0.064
VC2-1	12-15	243	0.38	1533	37.1	0.065
VC2-1	15-30	275	0.44	1545	45.6	0.071
VC2-1	30-44	209	0.61	849	76.9	0.228
VC2-1	44-50	241	0.68	2270	94.4	0.151
VC2-1	50-58	156	0.36	1875	75.1	0.115
VC2-1	58-68	194	0.15	1773	25.8	0.032
VC2-1	68-77	377	0.88	3696	174	0.279
VC2-1	68-77	302	0.96	1985	96.4	0.197
VC2-1	77-89	178	1.16	3727	256	0.392
VC2-1	89-100	11.2	0.56	26.2	3.2	0.001
VC2-2	100-113	34.9	0.15	86.5	2.7	0.001
VC2-2	113-135	49.6	<0.01	5.7	1.8	0.000
VC2-2	135-160	22.0	0.01	3.6	1.6	0.000
VC2-2	160-182	22.6	0.03	5.2	2.0	0.001

From Report nr
RF-19997041
Volume 2 Raw data

Installation	Core	Layer	Sr				Ba			
			mg/kg wet sediment				mg/kg wet sediment			
			Le	Re	Org	Re	Le	Re	Org	Re
Beryl	V1-1	0-10	117.9	35.3	5.3	8.2	11.3	29.6	13.7	55
Beryl	V1-1	40-48	127.7	34.2	4.2	65.4	5.1	28.3	12.8	348
Beryl	V1-1	60-68	184.8	33.9	3.6	44.9	58.5	58.2	10.4	167
Beryl	V1-2	65-75	113.0	59.2	35.2	57.8	15.5	17.9	11.8	216
Beryl	V1-2	85-90	71.2	63.4	28.7	93.1	22.0	6.4	21.6	253
Beryl	V4	10-18	34.5	25.1	14.9	61.1	6.8	13.8	8.5	185
Beryl	V4	18-24	61.7	16.6	5.0	49.0	50.4	66.9	11.4	1360
Beryl	K1	0-4	27.7	15.6	4.0	22.7	14.1	48.5	10.7	980
Beryl	K1	13-20	104.3	103.1	83.6	77.5	10.4	38.3	10.2	603
Albusjell 1/6A	Grabb	A3 0-6	54.2	35.8	2.4	132.7	11.3	46.4	10.6	877
Ekofisk 2/4A	V9	0-5	162.8	49.6	10.1	97.0	9.4	20.6	8.2	750
Ekofisk 2/4A	V9	15-22	109.3	38.8	11.9	77.5	7.3	46.8	5.2	457
Ekofisk 2/4A	V9	33-36	78.9	14.6	3.6	49.0	8.2	36.0	<1	1767
Ekofisk 2/4A	V10	1-10	129.3	63.0	19.4	50.0	8.5	25.1	6.1	157
Ekofisk 2/4A	VC2	0-9	38.7	16.8	6.2	66.3	3.5	10.5	6.4	2430
Ekofisk 2/4A	VC2	15-30	48.3	37.0	12.6	125.1	47.5	57.4	8.2	1749
Ekofisk 2/4A	VC2	68-77	25.1	28.1	19.3	99.4	1.1	2.3	8.2	1172
Ekofisk 2/4B	VC6	0-3	64.3	58.0	26.8	63.6	10.0	16.0	14.8	2136
Ekofisk 2/4B	VC6	65-93	39.8	32.0	14.1	68.3	2.5	9.3	8.0	1747
Ekofisk 2/4B	VC6	33-42	41.1	20.4	6.9	58.7	3.9	16.1	9.5	1327
Ekofisk 2/4C	VC4	0-8	28.9	28.8	4.8	73.6	11.8	41.2	8.0	1026
Ekofisk 2/4C	VC4	94-100	51.2	26.7	8.4	81.4	117.9	99.9	5.2	769
Ekofisk 2/4C	VC4-2	65-72	90.5	29.1	13.2	96.3	147.7	108.8	11.8	2276
Ekofisk 2/4C	VC4-2	81-92	220.3	66.0	28.5	98.3	120.5	65.9	5.5	129
Ekofisk 2/4C	VC4-2	92-100	94.9	27.7	8.8	77.2	100.0	105.9	6.7	2647
Ekofisk 2/4D	D51C	9-17	50.3	28.7	8.6	6.6	3.4	23.6	3.4	70
Ekofisk 2/4D	D51C	19-40	23.9	13.5	4.3	18.4	19.6	72.3	28.4	507
Ekofisk 2/4D	D51C	63-80	237.6	54.0	18.9	72.3	35.0	101.5	11.0	347
Frigg DP2	CORE 7 98	1-2	120.6	99.1	9.7	58.8	3.6	26.1	6.8	541
Frigg DP2	CORE 7 98	12-17	122.4	27.0	7.2	34.7	3.7	34.8	13.6	730
Frøy	CORE1 99	0-5	47.0	67.1	27.8	94.8	8.9	38.1	6.9	1622
Frøy	CORE1 99	5-15	102.9	132.5	61.3	116.6	36.7	69.5	32.0	1748
Frøy	CORE1 99	15-22	73.0	35.2	7.7	63.3	12.3	42.1	8.8	1807
Lille Frigg	L FR MSA 3	0-4	85.3	9.0	5.4	39.5	7.7	56.2	57.6	1149
Lille Frigg	L FR MSA 3	8-12	24.9	5.8	6.4	44.3	1.6	43.6	73.9	1315
East Frigg PSA	E FR PSA 10	0-10	32.8	116.4	173.7	197.4	1.2	6.5	29.8	719
East Frigg PSA	E FR PSA 3-	2-12	55.3	14.8	13.8	90.9	10.3	44.8	18.8	2955
East Frigg PSB	E FR PSB 3-	0-4	168.1	7.5	3.3	29.7	3.1	26.7	42.6	1083
East Frigg PSB	E FR PSB 3	4-10	109.9	8.8	4.0	48.9	5.0	29.5	56.9	1915
NE Frigg	NE FR 4	8-16	71.1	11.6	4.9	62.4	2.5	17.1	16.5	1842
NE Frigg	NE FR 11A	3-10	54.3	14.0	5.6	46.2	2.9	23.2	15.2	2001
Ekofisk 2/4A	Substrate*	68-90	13.7	2.0	0.1	0.7	0.2	0.5	0.1	2
Beryl	Substrate*		58.4	9.6	1.2	2.1	0.4	6.8	8.3	47
Frigg	Substrate*		124.2	21.8	1.2	16.5	0.9	9.4	1.2	28

* Sand layer below the cutting deposits

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Installation	Core	Layer	Mn				Co			
			mg/kg wet sediment				mg/kg wet sediment			
			Le	Re	Org	Re	Le	Re	Org	Re
Beryl	V1-1	0-10	143.2	174.2	77.2	18.7	1.15	1.04	4.88	0.53
Beryl	V1-1	40-48	116.8	144.8	77.0	27.8	8.50	1.92	3.96	0.83
Beryl	V1-1	60-68	374.4	202.0	71.0	26.4	0.78	0.65	3.46	0.81
Beryl	V1-2	65-75	6.6	116.1	69.1	168.3	0.09	0.37	2.70	2.83
Beryl	V1-2	85-90	0.8	115.8	55.0	509.1	0.20	0.11	2.05	7.42
Beryl	V4	10-18	319.5	78.7	98.9	116.3	0.41	0.23	3.40	2.75
Beryl	V4	18-24	643.5	63.1	46.6	21.1	1.00	1.04	3.98	1.24
Beryl	K1	0-4	429.0	60.2	43.8	35.3	0.68	1.49	5.09	2.58
Beryl	K1	13-20	638.3	142.6	63.5	507.1	0.71	0.13	1.50	7.51
Albusjell 1/6A	Grabb	A3 0-6	890.3	194.0	25.9	713.0	3.03	0.78	0.64	29.13
Ekofisk 2/4A	V9	0-5	610.8	325.0	114.8	53.5	0.61	0.48	2.88	0.66
Ekofisk 2/4A	V9	15-22	269.0	300.9	209.9	381.4	0.47	0.54	4.27	3.39
Ekofisk 2/4A	V9	33-36	93.2	104.7	86.4	85.1	0.66	0.79	2.09	2.41
Ekofisk 2/4A	V10	1-10	922.8	204.6	167.3	295.4	0.95	0.34	3.90	4.51
Ekofisk 2/4A	VC2	0-9	685.3	169.1	80.9	114.5	0.66	1.08	2.22	2.54
Ekofisk 2/4A	VC2	15-30	1954.1	489.5	191.5	105.0	1.64	1.78	3.21	1.14
Ekofisk 2/4A	VC2	68-77	15.3	258.2	157.5	791.0	0.12	0.11	1.36	6.02
Ekofisk 2/4B	VC6	0-3	64.9	322.0	259.6	980.1	0.26	0.44	4.15	3.91
Ekofisk 2/4B	VC6	65-93	49.6	210.1	138.8	180.2	0.34	1.09	3.52	2.61
Ekofisk 2/4B	VC6	33-42	87.1	79.6	74.0	82.5	0.81	0.96	3.46	2.43
Ekofisk 2/4C	VC4	0-8	2095.6	325.9	140.3	75.8	0.24	0.34	4.18	0.98
Ekofisk 2/4C	VC4	94-100	631.7	110.0	152.6	82.1	0.53	0.30	4.88	1.76
Ekofisk 2/4C	VC4-2	65-72	247.1	119.6	321.7	35.9	0.70	0.42	7.56	1.65
Ekofisk 2/4C	VC4-2	81-92	377.7	175.9	347.4	207.0	0.49	0.34	5.30	1.97
Ekofisk 2/4C	VC4-2	92-100	276.0	406.3	264.7	58.5	0.65	0.59	6.03	2.14
Ekofisk 2/4D	D51C	9-17	7.4	28.0	51.8	25.2	0.39	0.52	3.25	2.00
Ekofisk 2/4D	D51C	19-40	98.0	46.2	11.9	37.5	3.08	1.65	0.72	2.38
Ekofisk 2/4D	D51C	63-80	46.5	95.2	117.6	111.6	1.47	1.30	7.10	5.68
Frigg DP2	CORE 7 98	1-2	20.0	115.7	34.7	629.4	0.44	1.33	2.28	34.20
Frigg DP2	CORE 7 98	12-17	31.4	64.7	41.1	154.4	0.61	4.55	3.48	15.81
Frøy	CORE1 99	0-5	233.8	474.7	836.9	5619.7	0.15	0.09	12.45	4.03
Frøy	CORE1 99	5-15	74.6	133.1	25.1	154.2	0.27	0.06	0.44	2.87
Frøy	CORE1 99	15-22	27.7	97.3	71.5	59.2	0.22	0.45	2.15	1.46
Lille Frigg	L FR MSA 3	0-4	52.6	40.3	6.8	11.0	0.55	0.45	0.16	0.33
Lille Frigg	L FR MSA 3	8-12	123.5	29.6	2.6	8.9	0.98	0.34	0.20	0.36
East Frigg PSA	E FR PSA 10	0-10	0.0	8.4	1.1	73.4	0.01	0.04	0.33	2.38
East Frigg PSA	E FR PSA 3-:	2-12	94.7	93.6	22.6	15.9	0.39	0.52	2.21	0.93
East Frigg PSB	E FR PSB 3-:	0-4	17.2	13.6	1.8	7.6	0.21	0.21	0.13	0.25
East Frigg PSB	E FR PSB 3	4-10	34.3	24.4	4.5	11.1	0.54	0.71	0.23	0.76
NE Frigg	NE FR 4	8-16	48.0	34.6	6.9	17.3	0.18	0.40	0.24	0.62
NE Frigg	NE FR 11A	3-10	21.4	27.3	15.1	17.5	0.26	0.53	0.59	0.71
Ekofisk 2/4A	Substrate*	68-90	15.5	4.3	0.1	4.1	0.09	0.12	0.01	0.23
Beryl	Substrate*		5.1	15.7	1.1	10.6	0.03	0.13	0.09	0.52
Frigg	Substrate*		7.5	44.6	0.8	39.7	0.52	2.85	0.37	11.58

* Sand layer below the cutting deposits

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Installation	Core	Layer	Fe				Zn			
			mg/kg wet sediment				mg/kg wet sediment			
			Le	Re	Org	Re	Le	Re	Org	Re
Beryl	V1-1	0-10	347	2429	1077	3315	9.3	27.1	41.1	32.5
Beryl	V1-1	40-48	278	2903	3283	2018	47.9	47.3	49.2	81.8
Beryl	V1-1	60-68	180	1073	4721	2405	6.2	16.1	35.0	101.0
Beryl	V1-2	65-75	140	502	106	5010	0.1	25.1	46.8	144.6
Beryl	V1-2	85-90	537	165	88	6457	0.2	0.3	17.0	191.5
Beryl	V4	10-18	481	841	36	6069	8.4	28.6	67.2	134.1
Beryl	V4	18-24	2832	3037	2035	1881	33.3	99.1	47.2	44.9
Beryl	K1	0-4	1826	4566	1020	4026	30.7	113.7	32.1	47.9
Beryl	K1	13-20	730	378	118	7420	1.6	4.9	12.6	90.4
Albusjell 1/6A	Grabb	A3 0-6	3147	808	21	7591	181.5	44.3	65.2	78.3
Ekofisk 2/4A	V9	0-5	1519	4198	2219	7116	5.2	11.8	15.2	15.1
Ekofisk 2/4A	V9	15-22	95	1504	578	14473	17.2	108.5	112.8	289.0
Ekofisk 2/4A	V9	33-36	103	1990	726	9830	48.2	99.0	40.7	107.9
Ekofisk 2/4A	V10	1-10	994	1729	213	7901	15.5	110.5	115.5	129.4
Ekofisk 2/4A	VC2	0-9	584	6883	78	13149	0.6	9.4	12.4	33.7
Ekofisk 2/4A	VC2	15-30	347	2907	2256	8931	14.7	28.5	35.4	152.9
Ekofisk 2/4A	VC2	68-77	713	148	60	55244	0.2	1.6	25.8	117.8
Ekofisk 2/4B	VC6	0-3	732	3398	38	22053	1.0	66.9	91.5	241.2
Ekofisk 2/4B	VC6	65-93	740	2180	75	14779	1.0	65.3	131.6	266.9
Ekofisk 2/4B	VC6	33-42	650	3158	526	13331	17.1	59.3	79.0	314.3
Ekofisk 2/4C	VC4	0-8	2773	3736	3849	5501	5.3	11.9	16.9	25.7
Ekofisk 2/4C	VC4	94-100	1242	2526	2799	10954	12.8	22.8	53.9	152.9
Ekofisk 2/4C	VC4-2	65-72	476	3069	4623	9482	21.9	28.7	61.5	116.9
Ekofisk 2/4C	VC4-2	81-92	525	1362	2091	16223	34.3	66.0	141.7	611.8
Ekofisk 2/4C	VC4-2	92-100	1478	3925	3337	10039	28.3	35.7	78.6	221.1
Ekofisk 2/4D	D51C	9-17	348	4728	2307	10456	0.6	14.1	9.3	21.5
Ekofisk 2/4D	D51C	19-40	1556	4405	39	7973	8.7	16.1	6.3	40.3
Ekofisk 2/4D	D51C	63-80	236	10889	4928	25546	5.4	37.5	20.5	51.8
Frigg DP2	CORE 7 98	1-2	205	1530	4	24724	10.4	217.9	62.6	1752.0
Frigg DP2	CORE 7 98	12-17	132	3954	20	20749	11.9	286.5	113.4	891.5
Frøy	CORE1 99	0-5	225	394	321	20442	0.5	2.5	33.5	34.2
Frøy	CORE1 99	5-15	418	396	70	5309	0.4	1.3	4.0	18.4
Frøy	CORE1 99	15-22	325	1197	28	7889	0.6	16.4	21.0	19.2
Lille Frigg	L FR MSA 3	0-4	260	1044	<10	1740	1.6	4.5	2.6	4.3
Lille Frigg	L FR MSA 3	8-12	667	2678	<10	2310	2.5	4.0	2.2	5.2
East Frigg PSA	E FR PSA 10	0-10	18	77	35	4965	0.4	0.1	0.4	12.3
East Frigg PSA	E FR PSA 3-	2-12	669	1639	43	3844	4.9	10.4	6.9	13.6
East Frigg PSB	E FR PSB 3-	0-4	90	513	<10	1194	0.6	2.9	0.7	3.2
East Frigg PSB	E FR PSB 3	4-10	361	1089	<10	1629	1.4	5.7	2.4	6.3
NE Frigg	NE FR 4	8-16	109	934	50	2746	1.2	13.3	4.7	10.9
NE Frigg	NE FR 11A	3-10	224	1143	22	3913	2.1	10.2	5.4	10.8
Ekofisk 2/4A	Substrate*	68-90	86	96	<10	672	0.3	0.9	0.2	1.7
Beryl	Substrate*		85	229	13	2027	0.2	2.6	0.5	5.4
Frigg	Substrate*		109	1367	<10	8115	21.2	36.0	4.0	24.2

* Sand layer below the cutting deposits

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Installation	Core	Layer	Cu				Ni			
			mg/kg wet sediment				mg/kg wet sediment			
			Le	Re	Org	Re	Le	Re	Org	Re
Beryl	V1-1	0-10	0.09	0.73	22.53	3.65	1.69	3.64	9.06	1.69
Beryl	V1-1	40-48	0.48	6.36	19.68	6.16	2.52	2.30	8.00	2.52
Beryl	V1-1	60-68	0.15	1.23	12.99	6.87	2.30	1.65	6.83	2.30
Beryl	V1-2	65-75	0.58	0.17	15.69	20.22	9.26	2.00	7.45	9.26
Beryl	V1-2	85-90	0.45	0.13	24.74	41.80	16.71	0.92	5.08	16.71
Beryl	V4	10-18	0.14	0.04	26.25	34.00	9.23	1.24	8.46	9.23
Beryl	V4	18-24	0.17	5.34	32.51	9.13	4.48	2.22	8.18	4.48
Beryl	K1	0-4	0.15	5.20	26.10	17.43	8.29	3.21	10.22	8.29
Beryl	K1	13-20	0.15	0.09	8.35	28.61	20.54	1.71	6.18	20.54
Albusjell 1/6A	Grabb	A3 0-6	0.22	1.64	6.91	43.37	24.86	0.54	2.76	24.86
Ekofisk 2/4A	V9	0-5	0.06	0.22	14.93	10.02	2.16	1.59	7.04	2.16
Ekofisk 2/4A	V9	15-22	0.04	0.02	14.39	18.43	6.29	1.39	12.70	6.29
Ekofisk 2/4A	V9	33-36	0.12	0.61	13.26	12.80	12.31	1.77	7.62	12.31
Ekofisk 2/4A	V10	1-10	0.13	0.05	22.41	19.66	14.34	1.52	11.54	14.34
Ekofisk 2/4A	VC2	0-9	0.06	0.03	6.38	9.38	6.09	2.58	6.50	6.09
Ekofisk 2/4A	VC2	15-30	0.53	10.29	15.12	17.35	4.06	4.80	13.98	4.06
Ekofisk 2/4A	VC2	68-77	0.15	0.07	3.62	29.11	17.87	1.09	6.93	17.87
Ekofisk 2/4B	VC6	0-3	0.20	0.11	22.34	23.04	8.12	8.62	13.97	8.12
Ekofisk 2/4B	VC6	65-93	0.18	0.04	15.69	22.63	6.54	3.23	11.06	6.54
Ekofisk 2/4B	VC6	33-42	1.31	1.91	40.50	26.78	5.23	2.14	9.60	5.23
Ekofisk 2/4C	VC4	0-8	0.05	0.56	11.86	16.66	3.03	1.28	9.11	3.03
Ekofisk 2/4C	VC4	94-100	0.12	0.46	8.83	13.38	6.48	1.02	18.71	6.48
Ekofisk 2/4C	VC4-2	65-72	0.10	1.44	15.87	9.08	2.19	0.96	23.60	5.07
Ekofisk 2/4C	VC4-2	81-92	0.10	0.05	17.23	30.60	2.95	3.41	18.92	8.50
Ekofisk 2/4C	VC4-2	92-100	0.13	2.10	15.71	14.03	1.89	1.40	22.91	7.03
Ekofisk 2/4D	D51C	9-17	0.16	0.03	2.58	7.11	5.34	1.87	7.73	5.34
Ekofisk 2/4D	D51C	19-40	0.04	0.23	2.38	10.37	7.31	3.07	2.41	7.31
Ekofisk 2/4D	D51C	63-80	0.07	0.36	11.50	19.11	13.60	3.75	20.29	13.60
Frigg DP2	CORE 7 98	1-2	0.04	0.03	12.24	111.31	13.69	1.33	2.38	13.69
Frigg DP2	CORE 7 98	12-17	0.11	0.12	21.12	60.73	10.27	2.35	5.89	10.27
Frøy	CORE1 99	0-5	0.04	0.03	18.54	18.99	12.05	0.93	24.37	12.05
Frøy	CORE1 99	5-15	0.09	0.07	3.41	8.48	7.75	1.09	1.70	7.75
Frøy	CORE1 99	15-22	0.12	0.03	7.76	7.41	4.06	1.46	6.31	4.06
Lille Frigg	L FR MSA 3	0-4	0.12	1.83	0.92	1.44	0.86	0.82	0.62	0.86
Lille Frigg	L FR MSA 3	8-12	0.47	1.48	0.85	1.53	0.79	0.63	0.24	0.79
East Frigg PSA	E FR PSA 10	0-10	0.06	0.09	0.26	4.70	6.00	0.95	0.51	6.00
East Frigg PSA	E FR PSA 3-:	2-12	0.33	2.70	6.37	7.99	2.19	1.36	5.34	2.19
East Frigg PSB	E FR PSB 3-:	0-4	0.05	0.77	0.45	1.20	0.53	0.42	0.49	0.53
East Frigg PSB	E FR PSB 3	4-10	0.07	1.41	1.30	2.56	2.09	0.73	0.90	2.09
NE Frigg	NE FR 4	8-16	0.02	0.49	2.26	3.62	1.54	0.59	0.52	1.54
NE Frigg	NE FR 11A	3-10	0.02	0.94	2.66	2.99	1.79	1.15	1.59	1.79
Ekofisk 2/4A	Substrate*	68-90	0.04	0.29	0.03	0.39	0.43	0.20	0.03	0.43
Beryl	Substrate*		0.02	0.13	0.18	1.22	1.52	0.82	0.86	1.52
Frigg	Substrate*		0.31	0.03	9.34	22.37	9.82	0.70	2.62	9.82

* Sand layer below the cutting deposits

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Installation	Core	Layer	Pb				Ag			
			mg/kg wet sediment				mg/kg wet sediment			
			Le	Re	Org	Re	Le	Re	Org	Re
Beryl	V1-1	0-10	0.40	27.0	78.7	131.9	0.002	0.003	0.004	0.091
Beryl	V1-1	40-48	7.74	22.5	76.0	125.4	0.005	0.003	0.009	0.459
Beryl	V1-1	60-68	16.72	51.9	174.8	217.6	0.003	0.002	0.019	1.733
Beryl	V1-2	65-75	0.07	0.3	16.9	438.6	0.002	0.002	0.006	0.682
Beryl	V1-2	85-90	0.08	0.1	20.0	667.1	0.001	0.001	0.001	0.828
Beryl	V4	10-18	0.16	0.7	39.6	95.7	0.001	0.001	0.000	0.249
Beryl	V4	18-24	11.66	36.4	31.6	59.2	0.001	0.002	0.003	0.338
Beryl	K1	0-4	5.29	12.5	3.7	21.2	0.004	0.000	0.006	0.092
Beryl	K1	13-20	0.09	0.2	0.4	63.6	0.002	0.002	0.005	0.207
Albusjell 1/6A	Grabb	A3 0-6	4.06	6.6	0.4	34.4	0.032	0.001	0.004	0.098
Ekofisk 2/4A	V9	0-5	0.08	2.5	7.4	22.6	0.001	0.001	0.017	0.224
Ekofisk 2/4A	V9	15-22	0.83	0.9	23.7	191.0	0.001	0.002	0.006	0.777
Ekofisk 2/4A	V9	33-36	20.02	56.9	10.6	157.8	0.002	0.002	0.010	0.336
Ekofisk 2/4A	V10	1-10	0.16	0.2	16.3	48.5	0.003	0.001	0.003	0.064
Ekofisk 2/4A	VC2	0-9	0.00	0.1	1.0	20.6	0.000	0.002	0.006	0.125
Ekofisk 2/4A	VC2	15-30	0.99	10.9	9.7	42.7	0.001	0.015	0.009	0.029
Ekofisk 2/4A	VC2	68-77	0.01	0.01	0.04	44.0	0.006	0.001	0.001	0.144
Ekofisk 2/4B	VC6	0-3	0.02	0.1	8.9	110.5	0.003	0.004	0.001	0.247
Ekofisk 2/4B	VC6	65-93	0.53	27.8	238.7	291.9	0.003	0.001	0.001	0.598
Ekofisk 2/4B	VC6	33-42	45.56	144.3	133.0	317.8	0.000	0.018	0.010	0.420
Ekofisk 2/4C	VC4	0-8	0.88	3.9	4.8	13.8	0.007	0.002	0.008	0.062
Ekofisk 2/4C	VC4	94-100	11.28	31.3	11.6	106.3	0.002	0.002	0.097	0.157
Ekofisk 2/4C	VC4-2	65-72	59.90	118.0	16.6	78.3	0.010	0.010	0.029	0.665
Ekofisk 2/4C	VC4-2	81-92	45.35	61.8	32.8	392.5	0.002	0.001	0.003	
Ekofisk 2/4C	VC4-2	92-100	75.51	142.4	33.5	77.4	0.008	0.010	0.013	0.236
Ekofisk 2/4D	D51C	9-17	0.06	0.9	0.8	12.1	0.003	0.002	0.211	0.022
Ekofisk 2/4D	D51C	19-40	2.98	24.3	4.4	14.9	0.013	0.003	0.021	0.032
Ekofisk 2/4D	D51C	63-80	0.40	5.9	0.4	37.3	0.005	0.010	0.037	0.049
Frigg DP2	CORE 7 98	1-2	0.04	1.0	7.1	350.7	0.001	0.003	0.000	0.256
Frigg DP2	CORE 7 98	12-17	0.16	4.3	21.6	213.2	0.001	0.003	0.040	0.118
Frøy	CORE1 99	0-5	0.01	0.01	0.13	9.8	0.002	0.006	0.012	0.026
Frøy	CORE1 99	5-15	0.01	0.02	<0.01	6.5	0.001	0.002	0.001	0.030
Frøy	CORE1 99	15-22	0.02	0.20	0.80	10.9	0.001	0.002	0.000	0.020
Lille Frigg	L FR MSA 3	0-4	1.58	6.8	0.6	1.7	0.011	0.007	0.009	0.011
Lille Frigg	L FR MSA 3	8-12	0.04	6.2	2.5	2.8	0.004	0.005	0.003	0.014
East Frigg PSA	E FR PSA 10	0-10	<0.01	<0.01	<0.01	5.0	0.002	0.002	0.003	0.025
East Frigg PSA	E FR PSA 3-	2-12	1.09	6.6	0.9	9.2	0.002	0.013	0.032	0.056
East Frigg PSB	E FR PSB 3-	0-4	0.14	2.0	0.2	1.0	0.006	0.002	0.007	0.008
East Frigg PSB	E FR PSB 3	4-10	0.51	2.7	0.5	1.8	0.002	0.005	0.018	0.016
NE Frigg	NE FR 4	8-16	0.44	2.6	2.9	10.2	0.001	0.001	0.011	0.021
NE Frigg	NE FR 11A	3-10	0.85	6.8	1.7	8.0	0.003	0.003	0.013	0.008
Ekofisk 2/4A	Substrate*	68-90	0.04	0.6	0.0	0.5	0.001	0.002	0.214	0.005
Beryl	Substrate*		0.04	2.3	0.1	1.7	0.003	0.001	0.046	0.009
Frigg	Substrate*		0.02	0.0	0.3	8.5	0.001	0.001	0.012	0.018

* Sand layer below the cutting deposits

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Installation	Core	Layer	Cr				As			
			mg/kg wet sediment				mg/kg wet sediment			
			Le	Re	Org	Re	Le	Re	Org	Re
Beryl	V1-1	0-10	0.03	1.06	3.79	6.85	0.04	0.12	0.20	2.14
Beryl	V1-1	40-48	0.59	3.61	3.37	7.93	0.03	0.57	0.64	6.06
Beryl	V1-1	60-68	0.08	1.48	2.65	5.37	0.09	0.81	3.85	9.19
Beryl	V1-2	65-75	0.09	0.30	3.75	15.90	0.15	0.11	0.07	14.52
Beryl	V1-2	85-90	1.16	0.32	12.38	33.31	0.08	0.22	0.84	26.37
Beryl	V4	10-18	1.77	0.84	8.77	31.95	0.04	0.07	0.03	4.46
Beryl	V4	18-24	7.17	22.56	37.93	18.55	0.23	0.46	0.35	4.23
Beryl	K1	0-4	1.32	7.40	4.92	19.52	0.12	0.22	0.24	3.19
Beryl	K1	13-20	1.12	0.34	2.82	22.50	0.02	0.08	0.08	8.22
Albusjell 1/6A	Grabb	A3 0-6	0.21	0.33	1.43	25.33	0.23	0.14	0.05	3.22
Ekofisk 2/4A	V9	0-5	0.12	2.97	3.59	8.48	0.03	0.10	0.22	3.59
Ekofisk 2/4A	V9	15-22	0.02	0.27	3.35	14.97	0.08	0.09	0.01	11.73
Ekofisk 2/4A	V9	33-36	0.32	3.35	4.06	14.29	0.13	0.65	<0.02	10.60
Ekofisk 2/4A	V10	1-10	0.75	0.16	3.13	8.23	0.03	0.03	<0.02	2.83
Ekofisk 2/4A	VC2	0-9	0.26	0.17	1.49	16.11	0.04	0.04	<0.02	7.36
Ekofisk 2/4A	VC2	15-30	1.40	1.55	1.96	11.66	0.06	0.74	<0.02	4.61
Ekofisk 2/4A	VC2	68-77	0.95	0.08	1.15	54.55	0.03	0.06	<0.02	12.87
Ekofisk 2/4B	VC6	0-3	1.16	0.55	4.37	26.06	0.02	0.02	<0.02	7.91
Ekofisk 2/4B	VC6	65-93	0.55	2.20	17.77	52.56	0.06	0.16	<0.02	20.09
Ekofisk 2/4B	VC6	33-42	1.49	10.31	8.36	28.79	0.04	0.64	0.63	17.77
Ekofisk 2/4C	VC4	0-8	0.36	3.79	2.01	6.20	0.15	0.55	1.27	2.94
Ekofisk 2/4C	VC4	94-100	1.01	4.54	9.08	24.46	0.13	0.55	1.01	8.94
Ekofisk 2/4C	VC4-2	65-72	32.15	28.85	17.32	21.45	0.17	1.75	4.43	13.98
Ekofisk 2/4C	VC4-2	81-92	3.57	4.63	38.52	22.85	0.47	0.38	1.43	32.00
Ekofisk 2/4C	VC4-2	92-100	13.13	23.44	19.51	25.33	0.57	2.36	0.59	12.64
Ekofisk 2/4D	D51C	9-17	<0.02	1.17	2.68	15.77	0.23	0.57	1.17	7.20
Ekofisk 2/4D	D51C	19-40	0.35	3.43	2.24	16.28	0.45	2.19	0.07	4.85
Ekofisk 2/4D	D51C	63-80	0.28	2.67	3.18	37.18	0.35	1.60	1.13	16.89
Frigg DP2	CORE 7 98	1-2	0.04	0.15	0.38	41.15	0.09	0.23	0.00	14.67
Frigg DP2	CORE 7 98	12-17	0.07	0.50	1.63	30.83	0.11	0.24	0.11	17.50
Frøy	CORE1 99	0-5	2.36	0.07	0.53	15.78	0.06	0.04	0.26	9.66
Frøy	CORE1 99	5-15	2.40	0.13	0.27	5.19	0.03	0.04	0.08	3.09
Frøy	CORE1 99	15-22	2.95	0.18	0.60	10.96	0.02	0.10	0.07	4.93
Lille Frigg	L FR MSA 3	0-4	0.52	0.81	0.18	2.37	0.09	0.87	0.05	1.17
Lille Frigg	L FR MSA 3	8-12	0.48	2.56	0.14	5.34	0.01	0.62	0.21	1.04
East Frigg PSA	E FR PSA 10	0-10	0.10	0.34	2.86	5.31	0.16	0.03	0.11	4.80
East Frigg PSA	E FR PSA 3-2	2-12	83.06	42.15	25.05	40.70	0.90	0.84	0.36	4.37
East Frigg PSB	E FR PSB 3-2	0-4	1.01	6.19	1.38	2.44	0.10	0.62	0.30	1.03
East Frigg PSB	E FR PSB 3	4-10	4.57	11.54	2.12	4.15	0.28	1.25	0.34	1.30
NE Frigg	NE FR 4	8-16	16.20	42.45	54.49	16.87	0.11	0.55	0.15	2.91
NE Frigg	NE FR 11A	3-10	0.43	3.10	0.59	8.15	0.13	0.78	0.04	3.80
Ekofisk 2/4A	Substrate*	68-90	0.05	0.12	-0.10	0.88	0.04	0.04	0.03	0.15
Beryl	Substrate*		0.07	0.30	0.59	3.10	0.12	0.31	0.07	0.97
Frigg	Substrate*		0.05	0.88	0.36	9.28	0.02	0.09	0.06	1.51

* Sand layer below the cutting deposits

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Installation	Core	Layer	V				Hg**	
			mg/kg wet sediment				mg/kg dry sediment	
			Le	Re	Org	Re	Volitile	Total
Beryl	V1-1	0-10	0.01	2.93	0.11	4.88	0.321	1.090
Beryl	V1-1	40-48	0.02	4.24	0.21	6.76	0.395	1.190
Beryl	V1-1	60-68	0.01	2.48	0.62	4.85	0.254	1.220
Beryl	V1-2	65-75	0.27	5.36	0.05	8.97	0.072	0.465
Beryl	V1-2	85-90	0.45	4.97	0.18	10.16	0.068	0.361
Beryl	V4	10-18	0.21	2.13	1.72	10.96	0.302	0.841
Beryl	V4	18-24	0.28	6.04	0.52	8.94	0.114	0.292
Beryl	K1	0-4	0.14	9.06	0.52	14.98	0.040	0.103
Beryl	K1	13-20	0.17	3.40	0.03	21.40	0.077	0.276
Albusjell 1/6A	Grabb	A3 0-6	0.19	1.88	0.53	12.08	0.170	0.450
Ekofisk 2/4A	V9	0-5	0.00	1.74	0.12	6.35	0.048	0.091
Ekofisk 2/4A	V9	15-22	0.00	1.33	0.08	8.60	0.161	0.304
Ekofisk 2/4A	V9	33-36	0.01	2.53	0.03	8.22	0.048	0.176
Ekofisk 2/4A	V10	1-10	0.06	1.41	0.01	4.18	0.186	0.194
Ekofisk 2/4A	VC2	0-9	0.14	2.67	0.01	14.86	0.020	0.036
Ekofisk 2/4A	VC2	15-30	0.17	2.71	0.19	8.82	0.050	0.071
Ekofisk 2/4A	VC2	68-77	0.29	2.79	0.00	14.34	0.172	0.238
Ekofisk 2/4B	VC6	0-3	0.12	4.22	1.18	10.43	0.445	0.779
Ekofisk 2/4B	VC6	65-93	0.21	4.68	0.02	13.75	2.081	2.789
Ekofisk 2/4B	VC6	33-42	0.11	4.58	0.11	13.35	0.636	1.210
Ekofisk 2/4C	VC4	0-8	0.13	1.89	0.32	5.99	0.055	0.098
Ekofisk 2/4C	VC4	94-100	0.06	2.09	0.43	12.97	0.149	0.220
Ekofisk 2/4C	VC4-2	65-72	0.21	4.93	0.85	8.63	0.420	0.839
Ekofisk 2/4C	VC4-2	81-92	0.10	3.32	0.36	9.96	0.227	0.849
Ekofisk 2/4C	VC4-2	92-100	0.37	4.49	0.55	10.89	0.145	1.063
Ekofisk 2/4D	D51C	9-17	0.15	4.41	0.51	9.72	0.010	0.045
Ekofisk 2/4D	D51C	19-40	0.33	4.88	2.19	12.31	0.053	0.086
Ekofisk 2/4D	D51C	63-80	0.33	18.04	0.42	28.65	0.000	0.068
Frigg DP2	CORE 7 98	1-2	0.01	2.45	<0.01	20.11	<0.001	0.022
Frigg DP2	CORE 7 98	12-17	0.02	4.40	<0.01	22.09	0.001	0.020
Frøy	CORE1 99	0-5	0.06	1.23	0.02	20.32	0.023	0.049
Frøy	CORE1 99	5-15	0.16	0.69	<0.01	6.37	0.029	0.034
Frøy	CORE1 99	15-22	0.06	1.64	<0.01	8.95	0.019	0.035
Lille Frigg	L FR MSA 3	0-4	0.11	1.98	0.17	2.28	<0.001	0.004
Lille Frigg	L FR MSA 3	8-12	0.23	3.71	0.11	1.83	0.022	0.027
East Frigg PSA	E FR PSA 10	0-10	0.06	5.63	1.41	3.77	0.026	0.042
East Frigg PSA	E FR PSA 3-:	2-12	0.46	2.80	0.14	5.75	0.068	0.191
East Frigg PSB	E FR PSB 3-:	0-4	0.02	1.53	0.23	1.51	0.039	0.055
East Frigg PSB	E FR PSB 3	4-10	0.02	2.88	0.32	1.93	0.014	0.061
NE Frigg	NE FR 4	8-16	0.02	1.63	0.59	3.25	0.008	0.058
NE Frigg	NE FR 11A	3-10	0.02	2.06	0.15	4.54	0.014	0.035
Ekofisk 2/4A	Substrate*	68-90	0.08	0.56	0.08	0.85		
Beryl	Substrate*		0.30	0.99	0.54	2.16		
Frigg	Substrate*		0.02	1.26	0.44	6.93		

* Sand layer below the cutting deposits

**Organic<0.001

Le	Leachable
Re	Reducible
Org	Organic
Re	Refractory

Appendix 6

Benthic fauna

Appendix 6

Benthos summary

Index , Beryl A		SFT Class
Individuals	1314	
Taxa	31	
Shannon-Wiener	1.39	III
Evenness	0.28	
Hurlbert index (ESn=10(	7.68	III

Index, Ekofisk 2/4 A		SFT Class
Individuals	2188	
Taxa	30	
Shannon-Wiener	0.83	IV
Evenness	0.17	
Hurlbert index (ESn=10(	8.00	Few data

Specie	\ntall	% av N
Capitella capitata	978	74.4%
Cerianthus lloydii	209	15.9%
Cirratulus cirratus	41	3.1%
Ophryotrocha sp	28	2.1%
Chaetozone setosa	14	1.1%
Phyllodoce groenlandica	6	0.5%
Nemertini indet	4	0.3%

Specie	Antall	% av N
Capitella capitata	1986	90.8%
Polydora ciliata	39	1.8%
Harmothoe sp	16	0.7%
Paramphinome jeffreysi.	15	0.7%
Phyllodoce groenlandica	15	0.7%
Macropipus sp	12	0.5%
Anthozoa indet	11	0.5%

Index, Beryl Ref		SFT Class
Individuals	778	
Taxa	80	
Shannon-Wiener	4.95	I
Evenness	0.78	
Hurlbert index (ESn=10(	32.91	I

Index, Ekofisk Ref		SFT Class
Individuals	1428	
Taxa	67	
Shannon-Wiener	2.30	II
Evenness	0.38	
Hurlbert index (ESn=10(	19.52	I

Specie	\ntall	% av N
Amphiura filiformis	77	9.9%
Thyasira croulinensis	60	7.7%
Diplocirrus glaucus	56	7.2%
Myriochele oculata	54	6.9%
Pectinaria koreni	54	6.9%
Paramphinome jeffreysi:	51	6.6%
Polydora ciliata	43	5.5%

Specie	Antall	% av N
Myriochele oculata	1030	72.1%
Paramphinome jeffreysi.	36	2.5%
Nemertini indet	29	2.0%
Caudofoveata indet.	29	2.0%
Scoloplos armiger	25	1.8%
Goniada maculata	22	1.5%
Chaetozone setosa	17	1.2%

Soft bottom macrofauna
Indivduals / 0.5 m2

Station	Beryl A	Beryl Ref	Ekofisk 2/4 A	Ekofisk Ref
CNIDARIA				
Anthozoa indet			11	
Cerianthus lloydii	209	26		16
Pennatula phosphorea		1		
NEMERTINI				
Nemertini indet	4	16	1	29
SIPUNCUlA				
Priapulus caudataus			3	
Sipuncula indet				1
ANNELIDA				
Polychaeta				
Ampharete finmarchica				
Ampharete sp		2		
Ampharetidae indet				
Ampharetidae indet				
Amphichteis gunneri				
Amphitrite sp				
Anobothrus gracilis				
Aonides paucibranchiata				
Aphrodita aculeata				
Aricidea suecica				
Capitella capitata	978		1986	8
Ceratocephale loveni				
Chaetopterus variopedatus				
Chaetozone setosa	14	5		17
Cirratulidae indet				
Cirratulus cirratus	41		8	
Dasybranchus sp				
Diplocirrus glaucus		56		9
Eclysippe vanelli				
Ehlersia cornuta				
Eteone longa	4		9	1
Eulalia viridis			4	
Eumida bahusiensis				
Eupolymnia nebulosa				
Eupolymnia sp				
Fimbriosthenelais zetlandica		1		
Galathowenia oculata				
Glycera sp		1	4	
Glycera alba			2	
Glycera lapidum				16
Glycera tesselata		9		
Goniada maculata		3		22
Harmothoe sp		1	16	2
Heteromastus filiformis				
Laetmonice filicornis				
Laonice bahusiensis		2		
Laphania boecki				

Soft bottom macrofauna
Indivduals / 0.5 m2

Station	Beryl A	Beryl Ref	Ekofisk 2/4 A	Ekofisk Ref
Lipobranchus jeffreysii				
Lumbrineris spp		11		4
Malacoceros vulgaris		1		
Malacoceros fuliginosus		1		8
Malacoceros tetracerus				4
Maldane sarsi				1
Maldanidae indet		2		
Melinna cristata				
Melinna sp				
Nephtys sp		7	11	3
Nerimyra punctata	1		1	
Myriochele oculata		54	1	1030
Nephtys cf. ciliata				
Nereis sp			9	
Nephtys hombergi				
Nothria conchylega		1		
Notomastus latericeus		5		
Ophelina acuminata		4		
Ophelina cylindricaudata				
Ophelina norvegica				
Ophiodromus flexuosus		1		
Ophryotrocha sp	28			
Orbinia sertulata				
Owenia fusiformis		1		2
Paramphinome jeffreysii		51	15	36
Paradoneis lyra				10
Paraonis sp				1
Pectinaria auricoma		10		14
Pectinaria koreni		54		5
Pectinaria sp.				
Pholoe inornata	1	7	9	10
Phyllodoce groenlandica	6	1	15	6
Phyllodoce sp	1			2
Phyllodocidae indet				
Pista cristata				
Platynereis dumerillii				
Polycirrus medusa				
Polydora caeca		1		
Polydora ciliata		43	39	7
Polydora sp				
Praxilella praetermissa				
Prionospio cirrifera	1	25		5
Prionospio sp		2		2
Protodorvillea kefersteini				
Rhodine sp				
Sabellidae indet		3		2
Sabellides octocirrata				2
Scalibregma inflatum				1
Scolelepis foliosa		3		1
Scoloplos armiger				25
Serpulidae indet	1		1	

Soft bottom macrofauna
Indivduals / 0.5 m2

Station	**Beryl A**	**Beryl Ref**	**Ekofisk 2/4 A**	**Ekofisk Ref**
Sphaerodoropsis balthicum				
Sphaerodorum flavum				
Spio sp		1		1
Spiochaetopterus typicus				
Spionidae indet				
Spiophanes krøyeri		3		5
Spiophanes bombyx		6		6
Streblosoma baiardi				
Syllidae indet				3
Terebellidae indet				
Terebellides stroemi				
Tharyx marioni				
Trichobranchus roseus		3		3
CRUSTACEA				
Crustacea indet	2			
Acidostoma sp.		4		
Ampelisca sp				3
Brachyura indet	1	1		
Branchyrhyncha indet	1	1		
Caprellidae indet				1
Caridea indet	1			
Cirolana borealis		1		
Corophiidae indet		1		
Crangon sp			1	
Cumacea indet		3		
Cypridina sp	1			
Decapoda indet		2		
Diastylidae indet		3		3
Diastylis cf. Cornuta		2		
Gamaridae indet	1		3	
Gnathiidae indet		1		
Harpinia spp		9		1
Hippomedon denticulatus		2		
Isopoda indet			2	
Leuconidae indet		42		5
Lysianassidae indet		6		
Macrocypris sp	2	8		
Macropipus sp	2		12	
Majidae indet				1
Ostracoda indet	1	32		
Paguridae indet	4			
Pagurus bernhardus				1
Pagurus spp.		6	4	
Phiotidae sp				1
Tryphosites longipes		2		1
Westwoodilla caecula		1		1
MOLLUSCA				
Caudofoveata				
Caudofoveata indet.		1		29

Soft bottom macrofauna
Indivduals / 0.5 m2

Station	**Beryl A**	**Beryl Ref**	**Ekofisk 2/4 A**	**Ekofisk Ref**
Polyplachophora				
Leptochiton sp				
Gastropoda				
PROSOBRANCHIATA				
Aporrhais pespelecani		1		
Buccinum undatum				1
Cylichna alba		1		
Cylichna cylindracea		1		
Diaphana minuta		1		
Hinia incrassata	1			
Iothia fulva				
Lunatia alderi	1	1	2	1
Lunatia montagui	1			
Pelsneeria stylifera				
Philbertia leufroyi				
Philbertia linearis				
Philine scabra		4		3
Philine sp		1		
Puncturella noachina				
Prosobranchiata indet				
Retusa umbilicata		1		
Bivalvia				
Bivalvia indet			3	
Abra prismatica				1
Acanthocardia echinata				2
Arca tetragona				
Arcopagia balaustina		1		
Astarte montagui				2
Cerastsoderma papillosum				
Chlamys distorta				
Chamelea striatula				5
Cuspidaria cuspidata		1		
Heteranomia squamula				1
Hiatella sp			4	
Kellia suborbicularis				
Modiolula phaseolina	1			
Modiolus modiolus				
Musculus niger				2
Mya truncata				
Mysella bidentata				1
Mytilus edulis	2		10	
Nuculoma tenuis		1		
Palliolum striatum				
Phaxas pellucidus		1		
Thracia villosiuscula		1		
Thyasira croulinensis		60		1
Thyasira equalis		22		
Thyasira ferruginea		31		

Soft bottom macrofauna
Indivduals / 0.5 m2

Station	**Beryl A**	**Beryl Ref**	**Ekofisk 2/4 A**	**Ekofisk Ref**
Thyasira flexuosa				2
Thyasira cf granulosa	1			
Thyasira obsoleta		7		
Thyasira sarsii	1			
Timoclea ovata		2		1
Scaphopoda				
Antalis entale		4		10
Antalis occidentale		3		
ECHINODERMATA				
Asterias rubens				
Astropecten irregularis		4		2
Martasterias glacialis			1	
Ophiopholis aculeata	1			
Amphipholis squamata				
Amphiura chiajei				15
Amphiura filiformis		77		9
Amphilepis norvegica				
Ophiacantha abyssicola				
Ophiura affinis				
Ophiura albida				
Ophiura sp				
Echinocyamus pusillus				
Brisopsis lyrifera				
Echinocardium cordatum			1	2

Appendix 7

CPT test report

Appendix 7

DANISH
GEOTECHNICAL
INSTITUTE

North Sea. GeoCore
CPT and vibrocore sampling
CPT results

Report 1, 2000-11-22

Summary

GEO have carried out CPT and vibrocore sampling in the North Sea. In total 3 CPT's and 6 vibrocore drillings were executed. This report presents the CPT results of the investigation. The CPTs have been interpreted in terms of strength and deformation properties.

1 Maglebjergvej
P.O.Box 119
DK-2800 Lyngby
Phone: +45 4588 4444
Fax: +45 4588 1240
e-mail: dgi@geoteknisk.dk
Web: www.geoteknisk.dk
Reg.No. 169.017

Your ref.:
Our ref.: 161 18431 GeoCore, Report 1, 2000-11-20

GEO

Prepared for
GeoCore as
Att.: Kristian Bjerkli
Transittgt. 10 B
7441 Trondheim
Norway

Prepared by
Hans Denver, phone +45 4520 4154, e-mail hd@geoteknisk.dk

Controlled by: Jens Brink Clausen

Contents

Enclosures

1 CPT No. V4
2 CPT No. V6
3 CPT No. V7

1 Introduction

GEO have carried out CPT and vibrocoring for GeoCore as. The work was carried out from a vessel supplied by GeoCore as in the Norwegian and United Kingdom sectors of the North Sea.

A total of 3 CPTs and 6 vibrocore drillings were performed. The results and the interpretations of the CPTs are presented in this report. The vibrorore records and the samples were delivered to the client immediately after the test and are not discussed herein.

The location for each test was determined and registered by the client and not indicated in this report (in agreement with the client).

2 Equipment

GEO's Combi-rig equipped with a CPT unit and a vibrocore unit was used. The rig was mobilised in a 6 m version capable of performing CPT and vibrocore sampling to maximum 6 m depth (dependent on the soil conditions). The overall dimensions of the rig were a height of 9 m and a base plate area of 2.3 m x 2.3 m. The total weight was 7.5 t (submerged 6 t).

Both the launch and the recovery of the rig were made by GeoCore. These operations were made by means of the vessel's crane.

3 Results

3.1 General

The test locations for both CPT and vibrocore drillings were selected by the client's representative. All positioning work was carried out by GeoCore as. A summary of the performed tests is shown in Table 1.

Table 1. CPT and vibrocore drillings

CPT No.	-	V4	V6	V7	-	-	-
Vibrocore No.	V1	V4	-	V7	V8	V9	V10

3.2 CPT results

The complete CPT profiles are shown in enclosure no. 1-3, where all the registered values are plotted against the depth beneath the sea bottom.

The point resistance (q_c), is indicated as a stress defined as the registered force over the cross section area of the probe. The latter being 1000 mm^2 for the standard probe used. The values are shown as two curves in two scales to enable a detailed interpretation of both strong and weak layers. The first (the right) curve corresponds to the upper scale and the second (the left) curve corresponds to the lower scale.

The local friction (f_s) is defined as shear stress during the penetration measured on the probe on a small part of the cylindrical part above the tip.

The friction ratio (R_f) is defined as f_s / q_c. The pore water pressure (u) is measured just above the tip during the penetration.

All the above measured quantities are shown as increments from the values registered at the sea bottom.

4 CPT Interpretation

4.1 General

The interpretation is mainly based on the CPT results as the samples obtained from the vibrocore drillings have not been identified and geological classified by GEO. However, GEO have been informed by the client that the soil penetrated is expected to consist of two layers, namely an upper soft layer of piles of drill cuttings and a lower layer of intact sand.

4.2 Soil units

The different soil units are shown in Table 2. Each unit has been given a number. The relevant strength and deformation parameters are estimated by means of the CPT results and shown in the table.

Table 2: Soil units

Unit	Soil	φ [deg]	c_u [kN/m^2]	E [MN/m^2]
1	Drill Cuttings	0-25	0-2	-
2	Sand	>45	-	30

4.3 Stratification

The stratification is estimated by the CPT profiles and shown in Table 3.

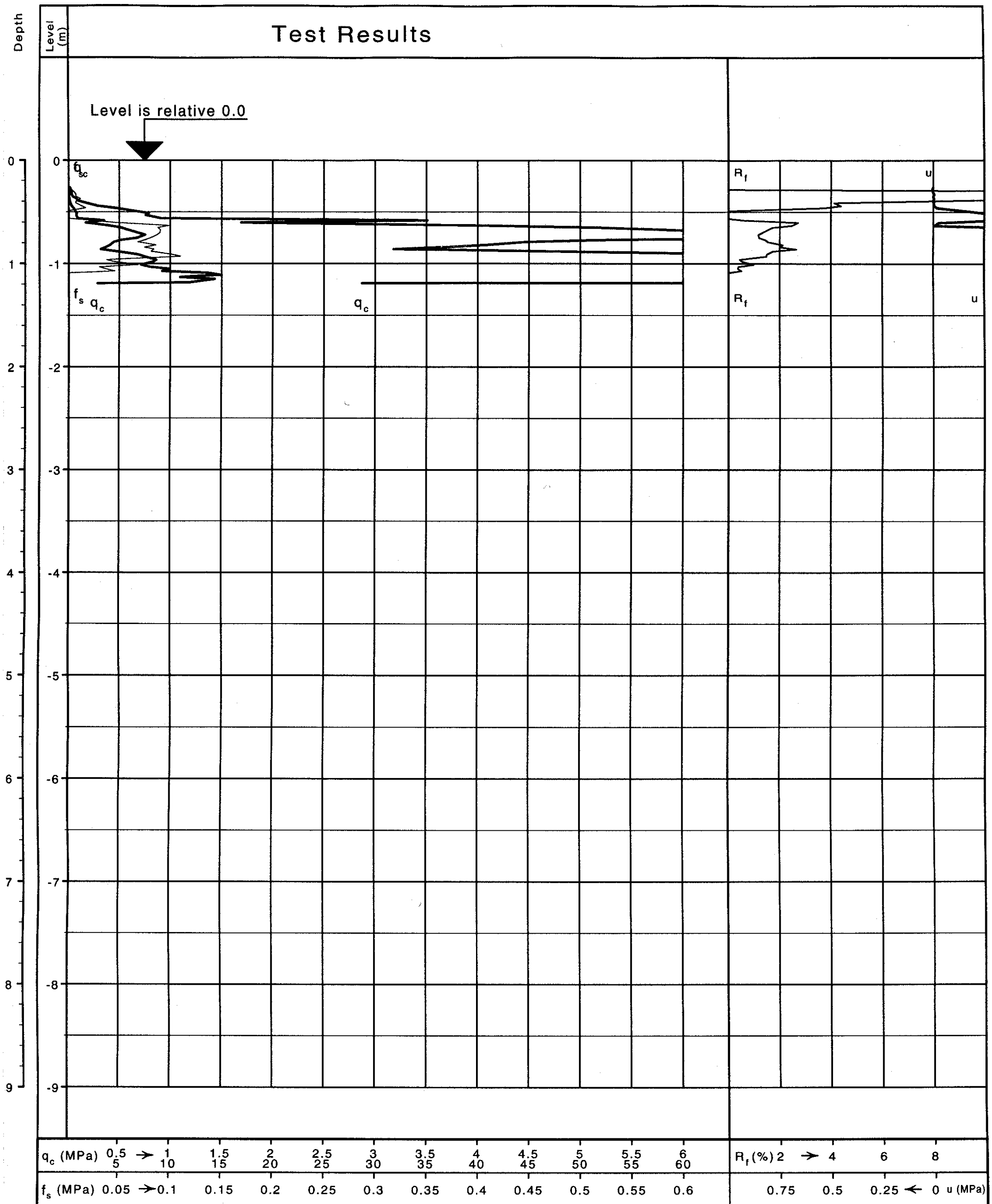
Table 3. Estimated soil profile (intervals of depth below the sea bed in meter)

Unit	Layer	CPT No.		
		V4	V6	V7
1	Cuttings	0-0.4	0-0.7	0-1.0
2	Sand	0.4-1.2	0.7-2.1	1.0-3.4

The upper value of the depth interval for the sand layer corresponds to the penetration depth and not a lower boundary of the layer

4.4 Discussion

The top layer (unit 1) has in practice no bearing and will exhibit substantial deformations when loaded. On the other hand, unit 2 consists of a firm sand layer with an excellent bearing capacity.



Penetration velocity : 20 mm/sec - Friction reducer : N
Cone cross sectional area : 1000 mm2 - Sleeve area : 15000 mm2

Penetrometer :	980809	E:	0 (m)
Penetrometer type :	QFU	N:	0 (m)
		Plan:	

Job : 16118431 GeoCore

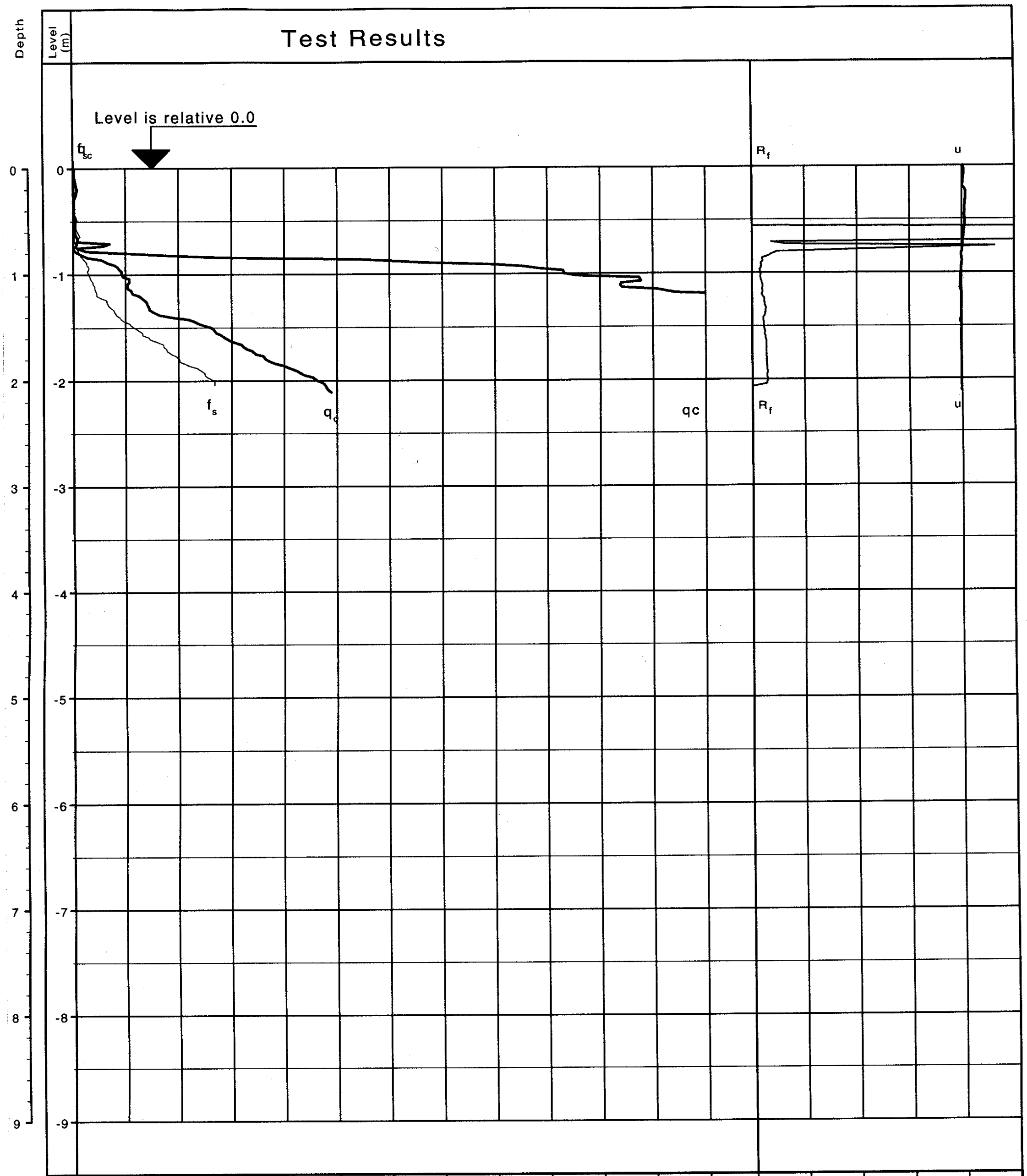
Project :	Drilled by : GEO	Date : 2000-09-23	Rig : COMBI	CPT No.: V4
Executed by : LAC	Checked by : ANK	Approved by : JBO	Date : 2000.11.21	Encl. No.: 1 P. 1 / 1

GEO

CPT profile

BRegister - PSTCUK 2.0 - 2000/11/21 10:14:01

Test Results



q_c (MPa)	0.5 / 5 →	1 / 10	1.5 / 15	2 / 20	2.5 / 25	3 / 30	3.5 / 35	4 / 40	4.5 / 45	5 / 50	5.5 / 55	6 / 60	R_f (%)	2 →	4	6	8
f_s (MPa)	0.05 →	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6		0.75	0.5	0.25 ←	0 u (MPa)

Penetration velocity : 20 mm/sec - Friction reducer : N
Cone cross sectional area : 1000 mm2 - Sleeve area : 15000 mm2

Penetrometer : 980809
Penetrometer type : QFU

E: 0 (m)
N: 0 (m)
Plan:

Job : 16118431 GeoCore

Project : Drilled by :GEO Date : 2000-09-28 Rig : COMBI CPT No.: V6

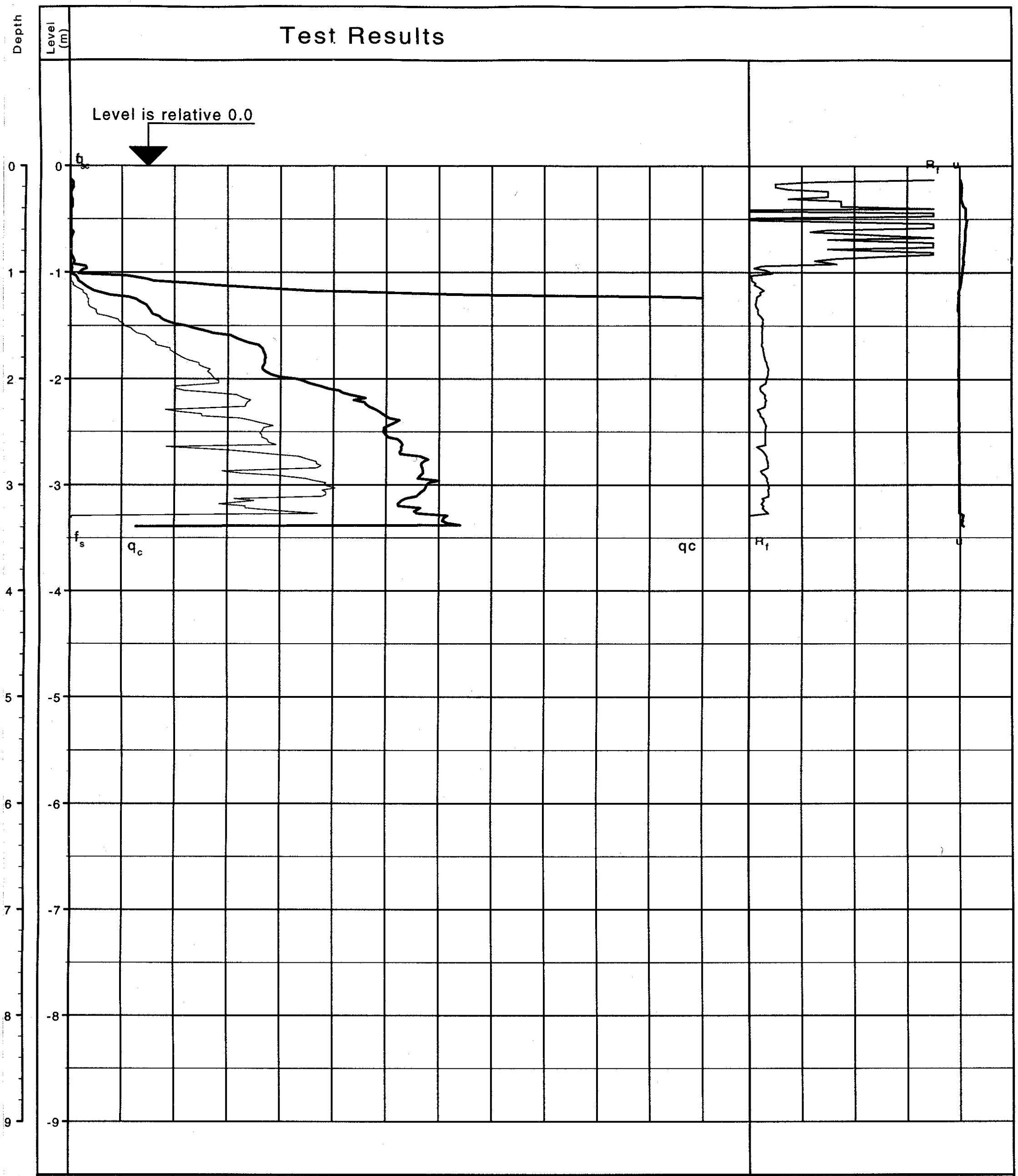
Executed by : LAC Checked by : ANK Approved by : JBC/RK Date : 2000.11.21 Encl. No.: 2 P. 1 / 1

GEO

CPT profile

BRegister - PSTCUK 2.0 - 2000/11/21 10:14:22

Test Results



qc (MPa) 0.5 → 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 | Rf (%) 2 → 4 6 8
5 10 15 20 25 30 35 40 45 50 55 60

fs (MPa) 0.05 → 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 | 0.75 0.5 0.25 ← 0 u (MPa)

Penetration velocity : 20 mm/sec - Friction reducer : N
Cone cross sectional area : 1000 mm2 - Sleeve area : 15000 mm2

Penetrometer : 980809
Penetrometer type : QFU

E: 0 (m)
N: 0 (m)
Plan:

Job : 16118431 GeoCore
Project : Drilled by :GEO Date : 2000-09-29 Rig : COMBI CPT No.: V7
Executed by : LAC Checked by : ANK Approved by : JBO Date : 2000.11.21 Encl. No.: 3 P. 1 / 1

GEO

CPT profile

Appendix 8

Ekofisk 2/4A Mapping

Appendix 8

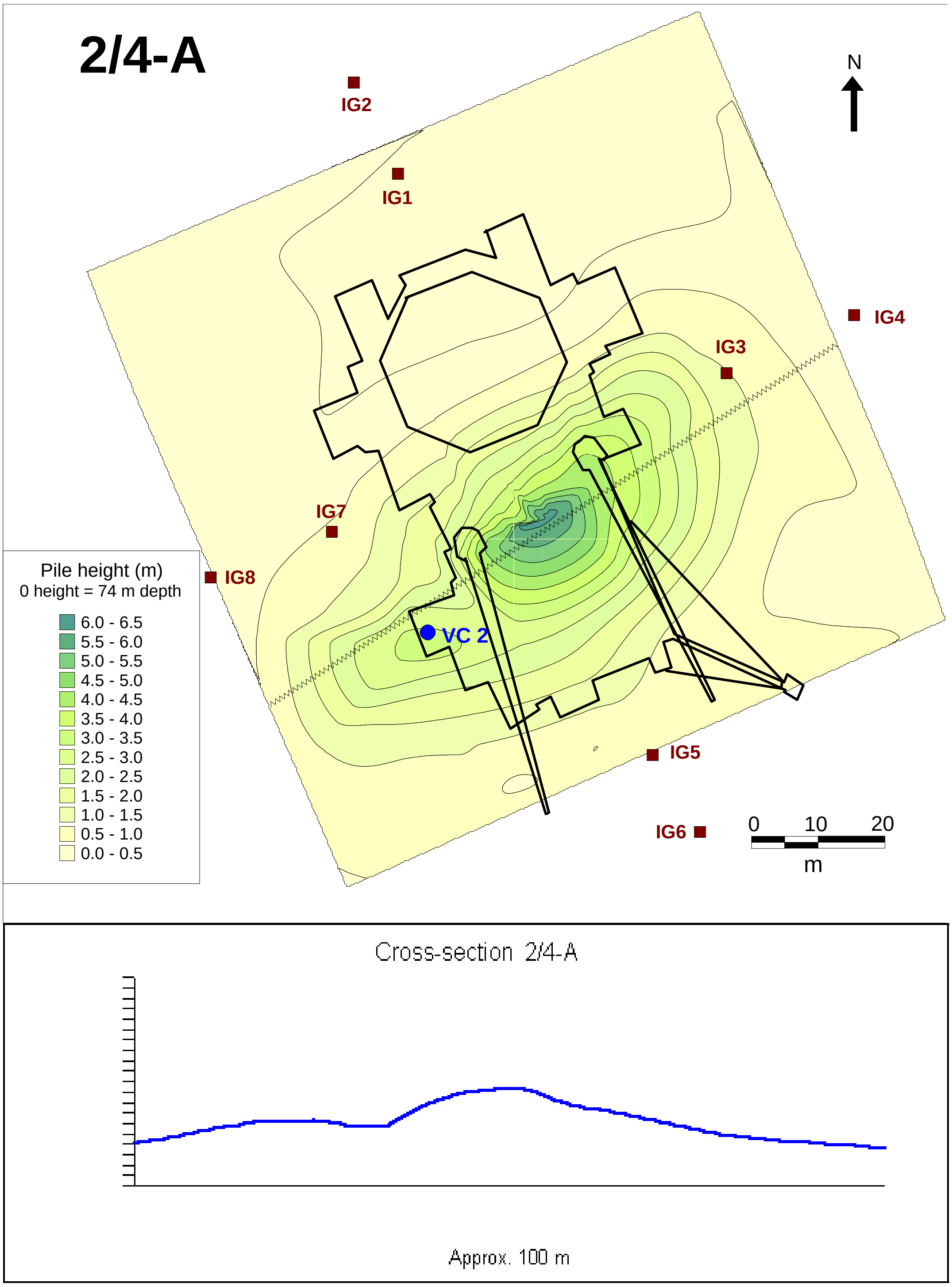


Figure from:
Surveying drill cuttings piles – a 7 pile case-study from the Ekofisk field by Simon J. Cripps and Stig Westerlund.
Presented at: IBC Conference:
Minimising the Environmental Effects of Drilling Operations, Aberdeen, 20-21 March 2000, IBC Global Conferences Limited.

Appendix 9

Beryl A Mapping

Appendix 9

Mobil

SUBSEA OFFSHORE LTD

Mobil North Sea limited

Mobil Beryl Field 1996

Sonar Graphics Survey Results

SubSea

SUBSEA OFFSHORE LTD

MOBIL BERYL FIELD
1996
Sonar Graphics Survey Results

DOC. NO. AB-R-RP-00132

Copy No. 2

Distributed to: MOBIL NORTH SEA (ROGER WALLS) W.P. No. RRP00132.DOC

Revision	Description	Date	Prep	Check	Approved
0	For Client Comment	25/10/96	PLW	MG	
A	Approved For Use	19/11/96	PLW	MG	AMcNeill

AMENDMENTS

Rev 0 For Client Comment

Rev A Approved For Use

CONTENTS

1. INTRODUCTION

This report present the results of a Sonar Graphics survey performed in the Beryl Field during August 1996 using equipment deployed from the survey vessel Kommandor Subsea. The work was performed within the scheduled 1996 Mobil pipeline and underwater structures inspection programme.

After completing a number of test dives at various positions around the field, the Sonar Graphics buoy was deployed to map the dimensions of the shale cuttings piles firstly at Beryl Alpha and secondly at Beryl Bravo.

Good results were obtained at Beryl Alpha where a total of three scans were performed.

Initial results at Beryl Bravo were less satisfactory, however, due to reflected noise interference from the steelwork within the jacket.

Whilst at Beryl Bravo, the Sonar Graphics system was rendered inoperable as a result of umbilical failure. From this point, no further survey was possible with the system for the remainder of the inspection programme.

2. SURVEY RESULTS

2.1 Coverage

Beryl Alpha

Good data coverage was obtained of the shale mound and the surrounding areas at the south side of the concrete structure. Three separate surveys were performed and were located as follows :-

1. 417350 E 6601800 N
2. 417300 E 6601830 N
3. 417288 E 6601801 N

The above positions are shown in figure 1.

The positions of cell nos. 9, 10, 11 and the position of the edge of the Riser Access Tower were discernible in the scans

For each survey the Sonar Graphics buoy was positioned approximately 20 metres above the seabed creating a footprint of radius 50 metres.

A Digiquartz transducer mounted on the Sonar Graphics buoy provided a continuos depth indication for the buoy. A second Digiquartz transducer mounted on the survey ROV was used to check the indicated depth of the Sonar buoy when deployed at the survey operating height above seabed. After checking sonar buoy depth, the ROV was relocated to top of the concrete cells where a reference depth reading was obtained. By deduction, the difference between the two indicated depths provided a measure which was used to identify the sonar buoy position relative to the platform datum. The platform datum from engineering drawings was taken to be -71 metres.

Beryl Bravo

Data coverage was obtained at one position on the south side and one position on the east side of the Beryl Bravo jacket. Of the two sets of data, only the survey data from the east side was processable, this was at the position 416135E / 6609073N).
However, due to the offset between the buoy and the structure there was insufficient coverage of seabed inside the structure. No further surveys were performed at Beryl Bravo.

2.2 Scan Summary

Beryl Alpha

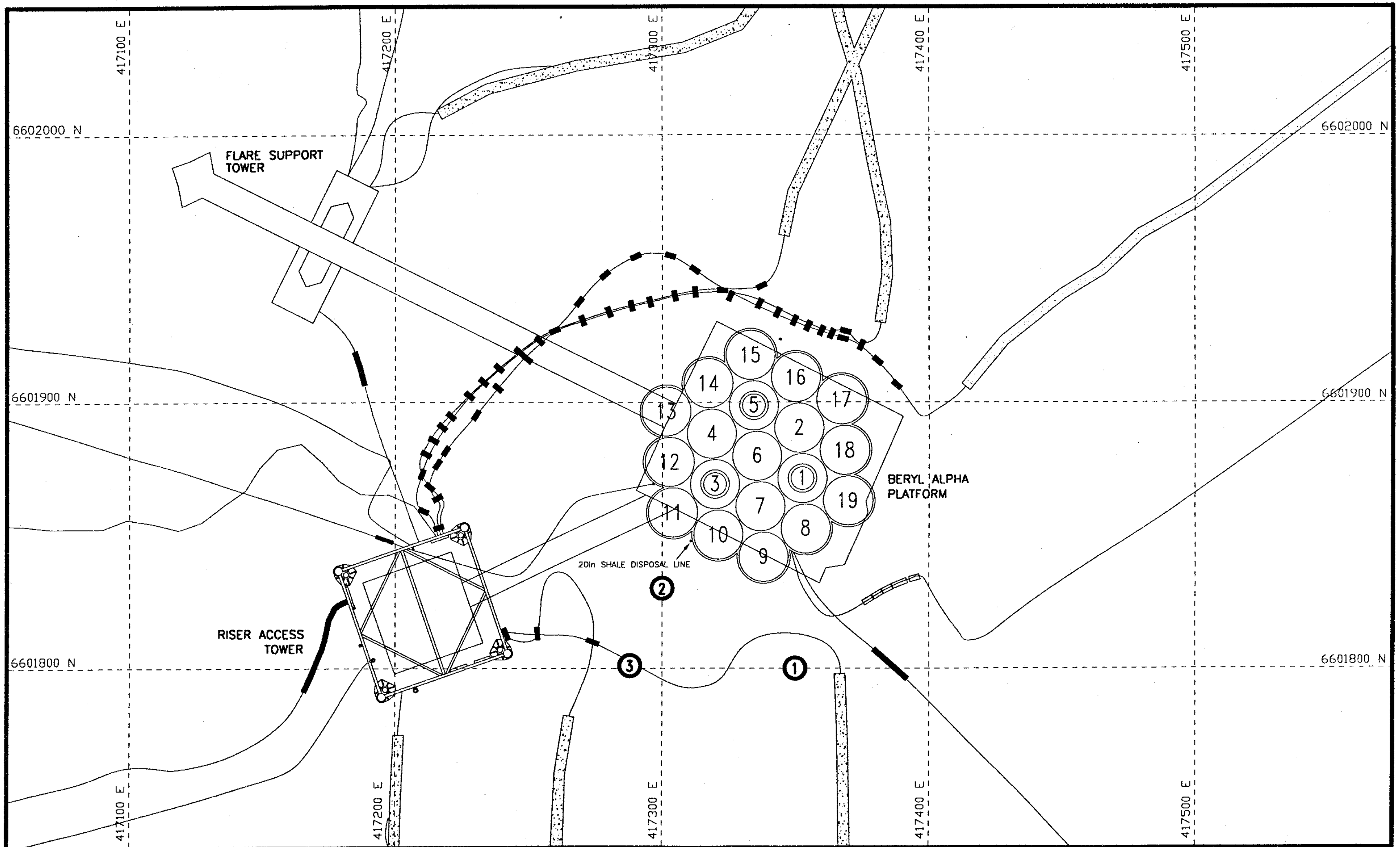
For general topography of the area refer to the following drawings:

Appendix A: Three dimensional view
Appendix B: Cross section view
Appendix C: Contour plot

From these drawings, the shale mound appears to be 22 metres high with its peak at the outlet of the shale disposal line. The natural seabed appears to be around the 116.5 metre level. The volume in cubic metres of the shale pile, above various depth contours, is given in section 2.4.

Beryl Bravo

Due to insufficient data no volumes or dimensions of the mound within the platform could be calculated.



Rev.	Date	Reason For Issue	Drawn	Chkd	Appvd	Appvd

SUBSEA OFFSHORE LTD

CAD PRODUCED DRAWING-NOT TO BE CHANGED MANUALLY

PROJECT: BERYL FIELD SONARGRAPHICS SURVEY 1996

TITLE

BERYL ALPHA PLATFORM
SONARGRAPHICS SURVEY POSITIONS

SIZE: A4 | SCALE: NTS | DRAWING No: AB-R-RP-00132-FIG1

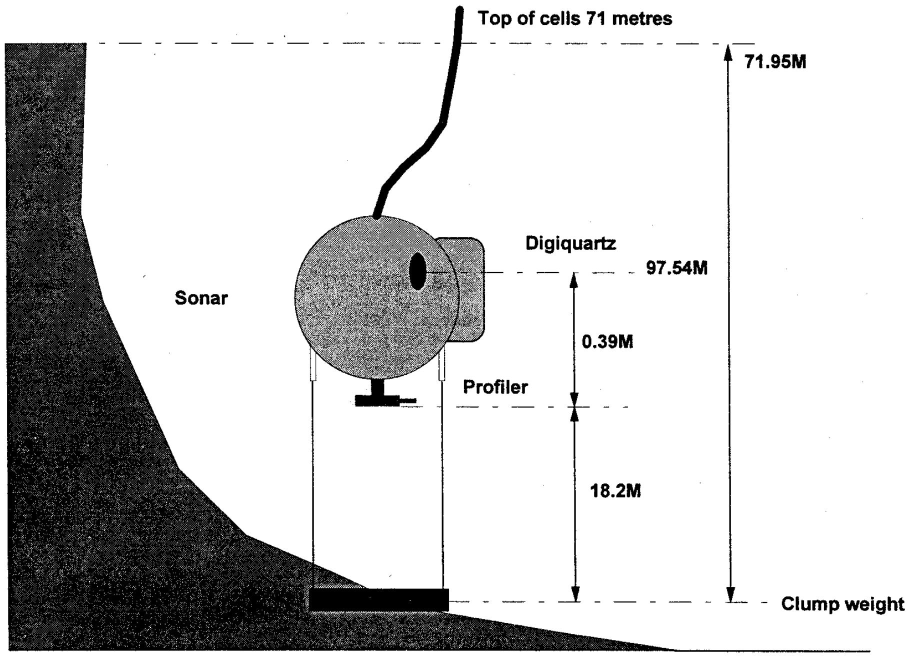
2.3 Depth Data

Beryl Alpha

Digiquartz pressure transducers were mounted on the ROV and Sonar Graphics buoy. During the survey the ROV was located on a reference level of known depth on the Beryl Alpha platform. From using the two Digiquartz readings, from ROV and Buoy, a relative height difference between the platform and the Sonar Graphics buoy could be established, this in turn gave the absolute position of the Sonar Graphics buoy and relevant depths relative to the platform datum.

Platform depth of cell tops :	71.00m
Digiquartz reading on cell tops	71.95m
Digiquartz reading on Buoy	97.54m
Offset between Digiquartz & Profiler head	00.39m
Total depth of profiler head	97.93m
From this head was reading	00.95m deep
Platform related depth of head	96.98m
Head height above seabed	18.20m
Hence, platform depth of buoy during first survey	96.98 + 18.20 = 115.18

Depth of SonarGraphics at Beryl Alpha



This method was used in all three surveys to tie the seabed to the platform datum. Although the natural seabed was given by Mobil as 118m the natural seabed found using this method was around the 116.5m mark.

Beryl Bravo

Due to buoy /structure offset and operational constraints no valid depth data was obtained under the Beryl Bravo platform.

2.4 Shale Volumes

Beryl Alpha

The volumes in the table below are given in cubic metres The depth contours are given in metres. All the results were taken from the second survey on the shale mound except the 116 metre volume which was taken from the merge of all three surveys.

Contour	Volume	Contour	Volume	Contour	Volume
116	24,624	109	5773	102	917
115	21,787	108	4611	101	657
114	16,128	107	3643	100	454
113	13,234	106	2842	99	300
112	10,844	105	2188	98	182
111	8843	104	1667	97	112
110	7167	103	1250	96	63

From the above table, the total measured volume of the drill cuttings pile at the Beryl Alpha Platform was 24,624 cubic metres (maximum degree of error ±10%).

Beryl Bravo

Due to insufficient data no volumes could be calculated.

2.5 Survey Datums

All Co-ordinates given are UTM 3 deg. East to conform with Mobil inspection specifications.

The Beryl Alpha Print outs are in local grid with the reference centre of 0,0 being the site of the second survey which had the following position 417300 E 6601830 N.

All depths quoted are relative to the platform datum.

3. OPERATIONAL SUMMARY

3.1 Mobilisation

The Sonar Graphics launcher, sonar buoy and control cabin were fastened to the aft deck of the Kommandor Subsea on the 21st of August 1996 whilst in Aberdeen harbour.

A load test was performed to confirm the integrity of the launcher tie downs.

Upon completion of commissioning onboard, a wet trial of the system was performed in the outer harbour, prior to departure for the field.

3.2 Operational Summary

Whilst the vessel was on location for separate ROV inspection work at wellheads SS20, SS48 and SSIV, the opportunity was taken to trial the Sonar Graphics system in order to check and fine tune system operation prior to deployment at Beryl Alpha.

The surveys at Beryl Alpha commenced at 23:00 on the 28th of August and were completed at 05:10 on the 29th of August. The survey data was processed immediately upon scan completion which allowed coverage results to be ascertained quickly.

Upon completion of the Beryl Alpha workscope, the vessel moved to the Beryl Bravo location.

The sonar buoy was deployed at the south face of the Beryl Bravo where a full scan was performed. The initial results at this location were poor due to noise interference problems. In order to eliminate part of the back scatter from the jacket internal steelwork, the system was re-deployed at the east side of the structure. The initial survey on the east face provided insufficient coverage under the platform hence it was decided that the buoy should be moved closer to the base of the jacket.. During re-deployment of the sonar buoy, a serious technical problem arose which precluded further Sonar Graphics activity.
The 3 dimensional image from the initial survey carried out on the east face was preserved and is included in Appendix D

The Sonar Graphics system remained onboard the vessel for the duration of the pipeline and underwater structures inspection programme then was finally demobilised from the vessel in Aberdeen on the 5th of September 1996.

4. PERSONNEL

4.1 Sonar Graphics Personnel

In addition to the complete vessel compliment, the following personnel were assigned specifically to the Sonar Graphics operations team :-

Name	Position	Date Onboard	Date Departed
I. Florence	Supervisor/Engineer	21.08.96	10:09.96
B. Farquhar	Engineer	22.08.96	05:09.96

4.2 Equipment List

The following equipment comprised the main components of the Sonar Graphics system:-

1 off Winch and handling / deployment skid

1 off Sonar Graphics buoy c/w :-

- 973 Mesotech profiling head
- Digiquartz depth sensor
- RSG underwater gyro
- Subsea processor
- Mini HPR Transponder

1 Control container c/w :-

- On-line computer
- On-line Mesotech surface unit
- Surface Digiquartz display
- Off-line computer
- P.C. computer

5. SAFETY

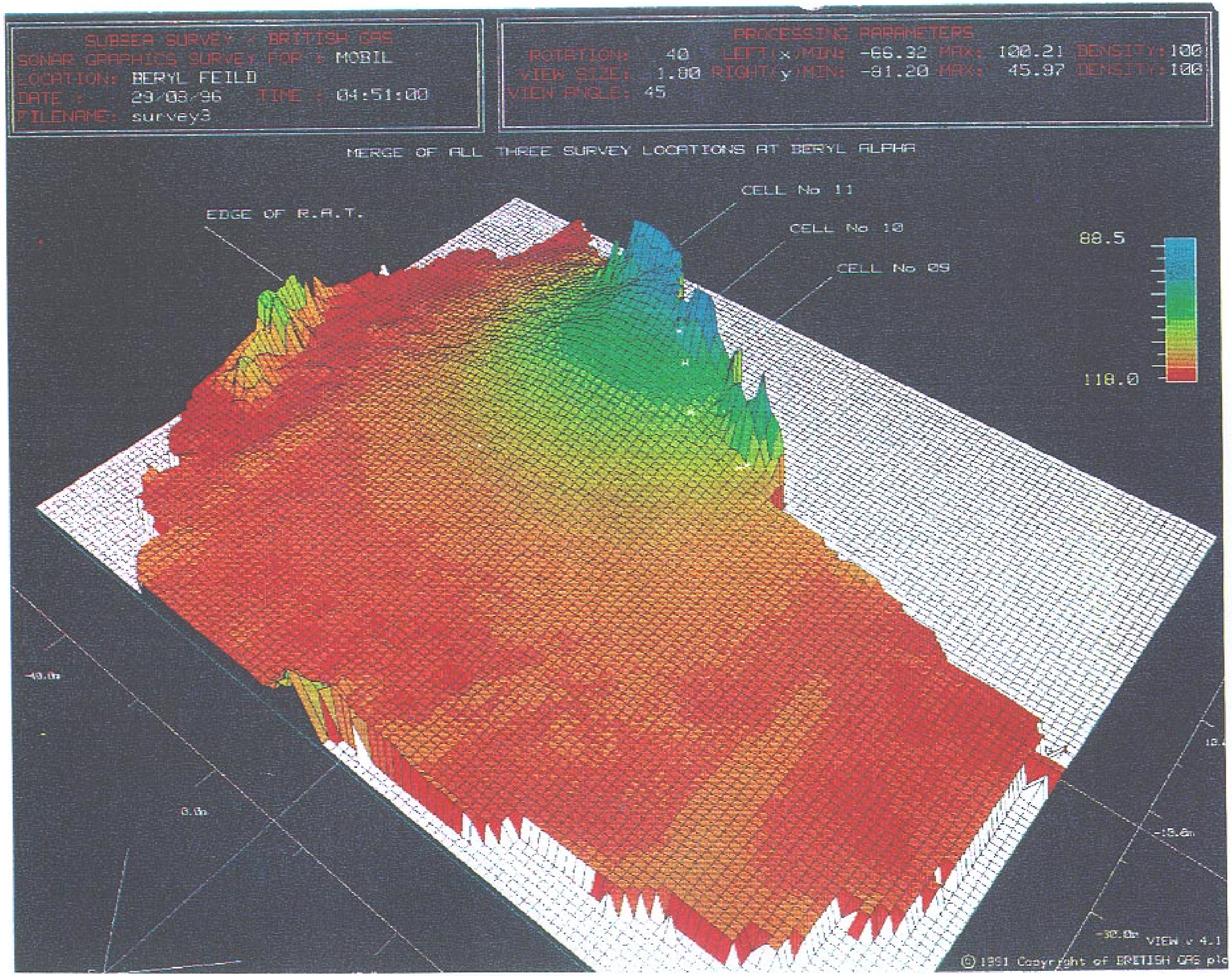
A safety induction was arranged for all personnel joining the vessel.

The vessel permit to work system was operated throughout the contract period and validated permits were obtained prior to any work being undertaken on the system.

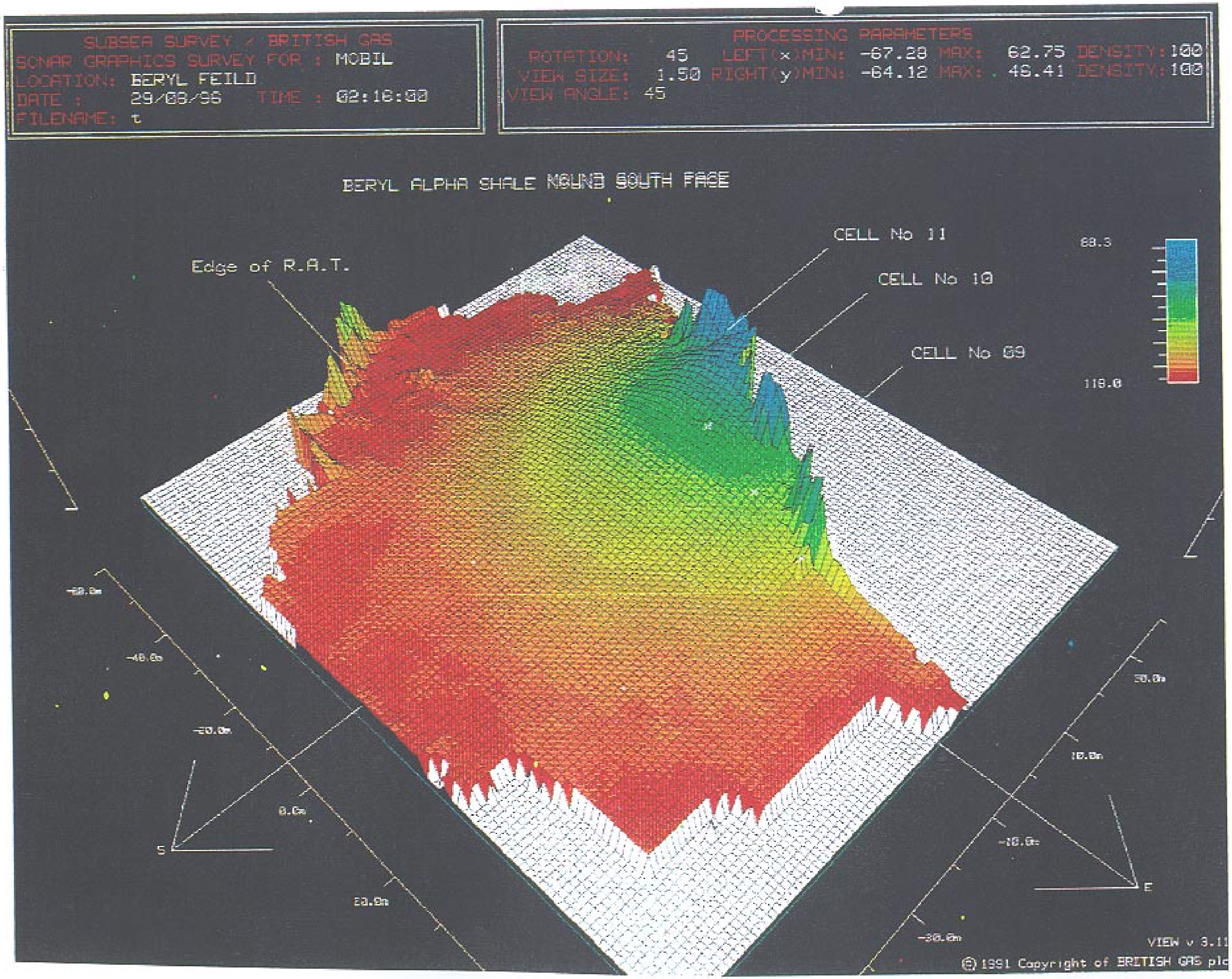
A J.S.A. (Job Safety Analysis) was completed prior to any deployment or maintenance of the buoy and reviewed and approved on board.

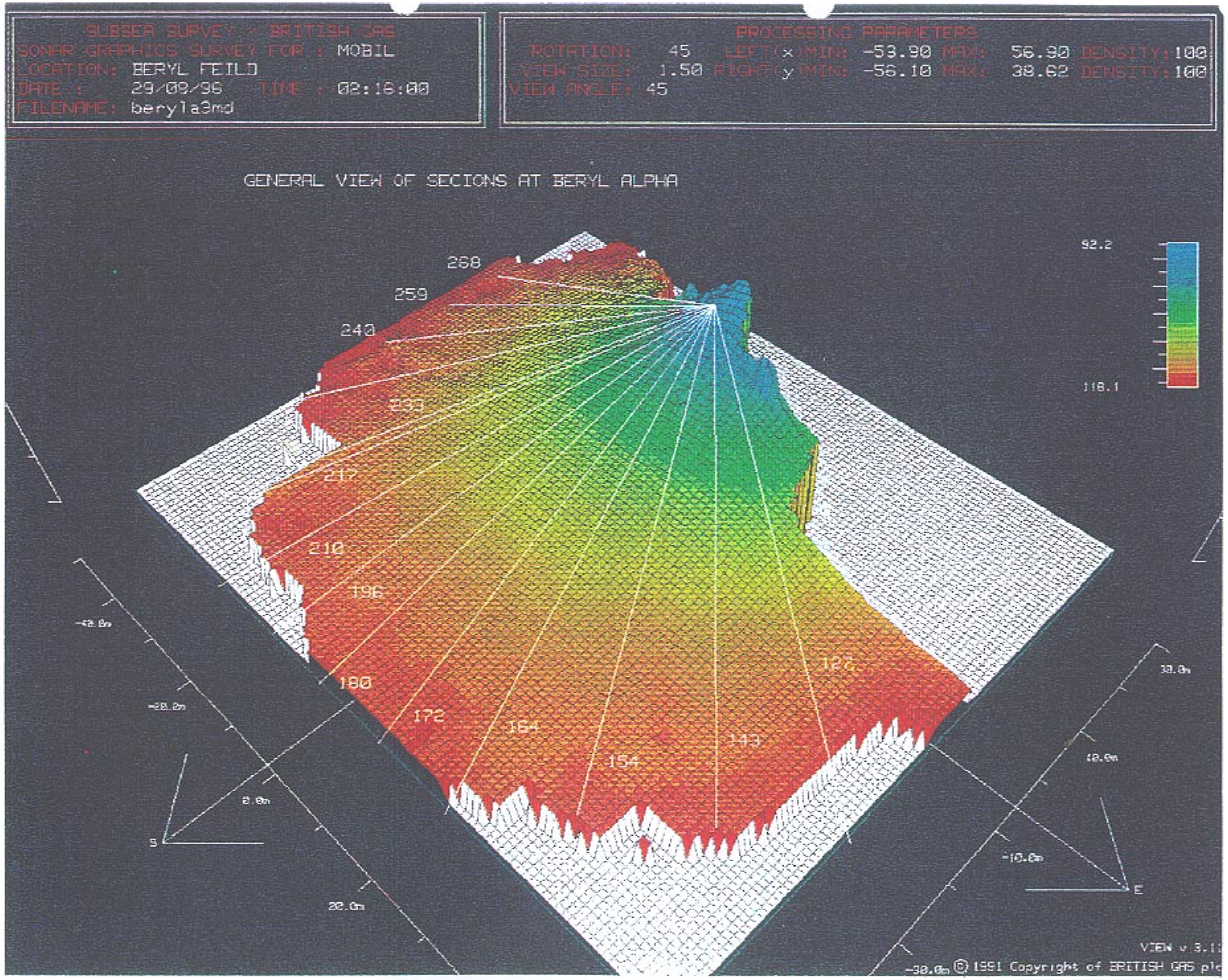
No safety incidents were reported during the execution of the work.

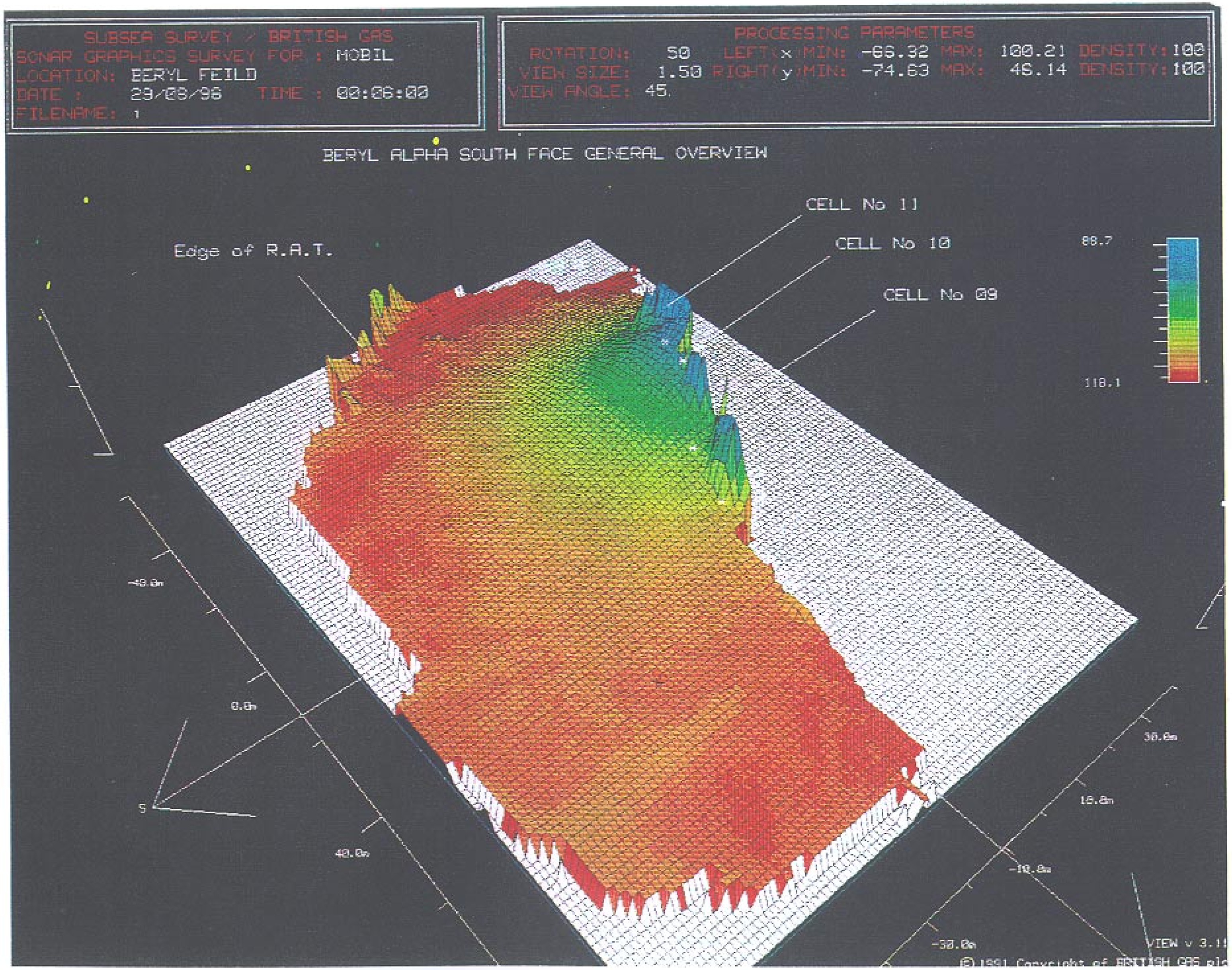
APPENDIX A - THREE DIMENSIONAL VIEW (BERYL ALPHA)



SUBSEA SURVEY × BRITISH GAS
SONAR GRAPHICS SURVEY FOR : MOBIL
LOCATION: BERYL FEILD
DATE : 29/03/96 TIME : 04:51:00
FILENAME: survey3
PROCESSING PARAMETERS
ROTATION: 40 LEFT(x)MIN: -66.32 MAX: 100.21 DENSITY:100
VIEW SIZE: 1.00 RIGHT(y)MIN: -81.20 MAX: 45.97 DENSITY:100
VIEW ANGLE: 45
MERGE OF ALL THREE SURVEY LOCATIONS AT BERYL ALPHA
EDGE OF R.A.T.
CELL No 11
CELL No 10
CELL No 09
88.5
118.0
-30.0m
VIEW v 4.1
© 1991 Copyright of BRITISH GAS plc


SUBSEA SURVEY / BRITISH GAS
SONAR GRAPHICS SURVEY FOR : MOBIL
LOCATION: BERYL FEILD
DATE : 29/08/96 TIME : 02:16:00
FILENAME: t
PROCESSING PARAMETERS
ROTATION: 45 LEFT(x)MIN: -67.28 MAX: 62.75 DENSITY:100
VIEW SIZE: 1.50 RIGHT(y)MIN: -64.12 MAX: 46.41 DENSITY:100
VIEW ANGLE: 45
BERYL ALPHA SHALE MOUND SOUTH FACE
Edge of R.A.T.
CELL No 11
CELL No 10
CELL No 09
88.3
118.0
S
E
VIEW v 3.11
© 1991 Copyright of BRITISH GAS plc


SUBSEA SURVEY : BRITISH GAS
SONAR GRAPHICS SURVEY FOR : MOBIL
LOCATION: BERYL FEILD
DATE : 29/09/96 TIME : 02:16:00
FILENAME: beryla3md
PROCESSING PARAMETERS
ROTATION: 45 LEFT(x)MIN: -53.90 MAX: 56.90 DENSITY:100
VIEW SIZE: 1.50 RIGHT(y)MIN: -56.10 MAX: 38.62 DENSITY:100
VIEW ANGLE: 45
GENERAL VIEW OF SECIONS AT BERYL ALPHA
92.2
118.1
268
259
240
233
217
210
196
180
172
164
154
143
127
-40.0m
-20.0m
0.0m
20.0m
30.0m
10.0m
-10.0m
-30.0m
S
E
VIEW v 3.1
© 1991 Copyright of BRITISH GAS plc


SUBSEA SURVEY / BRITISH GAS
SONAR GRAPHICS SURVEY FOR : MOBIL
LOCATION: BERYL FEILD
DATE : 29/08/96 TIME : 00:06:00
FILENAME: 1
PROCESSING PARAMETERS
ROTATION: 50 LEFT(x)MIN: -66.32 MAX: 100.21 DENSITY:100
VIEW SIZE: 1.50 RIGHT(y)MIN: -74.63 MAX: 46.14 DENSITY:100
VIEW ANGLE: 45.
BERYL ALPHA SOUTH FACE GENERAL OVERVIEW
CELL No 11
CELL No 10
CELL No 09
Edge of R.A.T.
88.7
118.1
-40.0m
0.0m
40.0m
S
30.0m
10.0m
-10.0m
-30.0m
VIEW v 3.1
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Appendix 10

Endocrine Activity, Yeast screen test

Appendix 10

BL7052/B **Copy number**

Drill Cuttings Sediment: Screening for Potential Endocrine Activity in the Recombinant Yeast Androgen and Oestrogen Assays

Performing laboratory	**Brixham Environmental Laboratory** **AstraZeneca UK Limited** **Brixham Devon TQ5 8BA** **UK**
Sponsor	**RF - Rogaland Research** **PO Box 2503** **Ullandhaug** **4091 Stavanger** **Norway**
Authors	**KL Thorpe** **MJ Hutchings** **TH Hutchinson**
Approved by	**N Gore** **March 2001**

CONFIDENTIAL (CATEGORY B)

CONTENTS

page

1 EXECUTIVE SUMMARY

A total of 32 drill cutting sediment samples were received from the Sponsor on 4 January 2001 for *in vitro* screening for potential endocrine disrupter activity. Briefly, samples were extracted in methanol, blown to dryness and re-dissolved in ethanol to provide a 20-fold concentrate for screening.

The solvent extracts were evaluated using the recombinant yeast assay, incorporating either the human androgen receptor (hAR) or human oestrogen receptor (hER). Both the yeast hAR and hER assays have been widely used for environmental investigations to detect potential endocrine disrupting activity. Screening sought to identify whether each solvent extract displayed evidence for agonist or antagonist activity in both the hAR and hER assays. The *in vitro* cytotoxicity was also evaluated in parallel with the endocrine activity screening.

Based on this simple screening approach (samples either positive or negative), the solvent extracts of 7/32 samples were oestrogenic, 5/32 were anti-oestrogenic, 0/32 were androgenic and 4/32 were anti-androgenic. Furthermore, solvent extracts of 18/32 samples were cytotoxic and so endocrine activity could not be evaluated.

There was concern over the choice of materials used for packaging of the samples (some samples were in plastic bags or aluminium foil, with the bright side sometimes on the inside or outside of the sample) hence methanol washes of the packaging were conducted. Methanol washes of the plastic packaging indicated endocrine activity; the aluminium foil solvent washes were not endocrine active nor cytotoxic.

As a precaution for the future, one should avoid the use of any plastics during the storage of environmental samples for subsequent endocrine disrupter screening (especially using sensitive in vitro assays).

For additional work in the future, it would be helpful to consider quantifying the degree of hormonal activity (eg a full dose-response study in the yeast assays) associated with those samples shown in the current study to be positive in the yeast assays. In those samples shown in the current study to be positive in the yeast assays, analyzing for suspected contaminants which have been listed as endocrine disrupters (eg alkylphenols in the oestrogenic samples) is recommended. Finally, it should be noted that the cause of cytotoxicity from some samples is unknown and could have been caused by a variety of contaminants (eg heavy metals).

2 MATERIALS AND METHODS

2.1 Sediment samples

A total of 32 drill cutting sediment samples originating from North Sea oil production areas were received from the Sponsor on 4 January 2001. The batch of samples was given the Brixham Environmental Laboratory (BEL) test substance reference AJ0003 and stored in the refrigerator in the dark until required for screening (BEL study number AJ003/A). The study was conducted between 31st January - 6th February 2001.

The objective of screening using the yeast assay was to ascertain whether this *in vitro* assay would detect (anti-) androgenic or (anti-) oestrogenic activity in solvent extracts of the drill cutting sediments.

2.2 The Recombinant Yeast Oestrogen Assay

The DNA sequence of the human oestrogen receptor (hER) has been integrated into a yeast genome containing expression plasmids carrying oestrogen-responsive sequences (ERE). These control the expression of a reporter gene, lac-Z (encoding the enzyme β-galactosidase). In the presence of oestrogenic compounds, β-galactosidase is synthesised and secreted into the medium where it causes a colour change from yellow to red (results read on a microplate spectrophotometer at a wavelength of 540 nm). The results are compared to the effects of reference oestrogenic chemicals. The assay is run over three to four days and can successfully be used on chemicals or extracts. The yeast assay is based on the work by Routledge and Sumpter (Ref 1).

2.3 Screening Study Design

At the request of the Sponsor, a simple screening approach was adopted based on a solvent extraction procedure. For this purpose, samples were extracted in methanol, blown to dryness and re-dissolved in ethanol to provide a 20-fold concentrate for screening.

The solvent extracts were evaluated using the recombinant yeast assay, incorporating either the human androgen receptor (hAR) or human oestrogen receptor (hER). Both the yeast hAR and hER assays have been widely used for environmental investigations to detect potential endocrine disrupting activity. Screening sought to identify whether each solvent extract displayed evidence for agonist or antagonist activity in both the hAR and hER assays (based on colorimetric measurement). The *in vitro* cytotoxicity was also evaluated in parallel with the endocrine activity screening (based on turbidity measurement).

Using the simple screening approach requested (with a single 20-fold solvent concentration step), it is not possible to quantify the degree of (anti-) androgenic and (anti-) oestrogenic response in the test samples.

3 RESULTS

Table 1 presents the results of the screening of the solvent extracts. Solvent extracts were evaluated for the presence or absence of cytotoxicity and a hormonal response (agonist or antagonist activity assessed in the hAR and hER screen). It was not appropriate to attempt to quantify the magnitude of the response in this single concentration study design.

Based on this simple screening approach (samples either positive or negative), the solvent extracts of 7/32 samples were oestrogenic, 5/32 were anti-oestrogenic, 0/32 were androgenic and 4/32 were anti-androgenic. Furthermore, solvent extracts of 18/32 samples were cytotoxic and so endocrine activity could not be evaluated.

On starting the study there was concern over the packaging material for the samples (some samples were in plastic bags or aluminium foil, with the bright side sometimes on the inside or outside of the sample) hence methanol washes of the packaging were conducted. Methanol washes of the plastic packaging indicated endocrine activity; the aluminium foil solvent washes were not endocrine active nor cytotoxic.

4 DISCUSSION

It was apparent that while several of the drill cutting sediment extracts showed endocrine activity *in vitro*, it is possible that there could have been leaching of something from the plastic packing into the sample. The yeast hAR and hER assays met all the required quality control criteria (reference hormones gave positive responses after three days and the methanol controls were negative) (Ref 1).

It is therefore advisable to consider the details of the choice of packing material used and the potential for contamination of the drill cutting sediment samples. For any possible future work, it is recommended that samples might be stored in solvent rinsed, clean glass vials with a foil-protected lid. As a precaution for the future, one should avoid the use of any plastics during the storage of environmental samples for subsequent endocrine disrupter screening (especially using sensitive in vitro assays).

For additional work in the future, it would be useful to quantify the degree of hormonal activity (eg a full dose-response study in the yeast assays) associated with those samples shown in the current study to be positive in the yeast assays. In those samples shown in the current study to be positive in the yeast assays, it is recommended to analyse for suspected contaminants which have been listed as endocrine disrupters (eg alkylphenols in the oestrogenic samples). Finally, it should be noted that the cause of cytotoxicity from some samples is unknown and could have been caused by a variety of contaminants (eg heavy metals).

5 REFERENCES

1. Routledge E J and Sumpter J P (1996). Estrogenic Activity of Surfactants and Some of Their Degradation Products Assessed Using a Recombinant Yeast Assay. *Environmental Toxicology & Chemistry*, **13,** 241-248.
2. Sohoni P and Sumpter JP (1998) Several environmental oestrogens are also anti-androgens. *Journal of Endocrinology*, 158, 327-339.

GLOSSARY

Androgen receptor:
A structure in a cell, which in combination with an androgen results in a specific change in cell function.

DNA (Deoxyribonucleic acid):
A complex nucleic acid molecule found in the chromosomes of almost all organisms, which acts as the primary genetic material, controlling the structure of proteins and hence influencing all enzyme-driven reactions.

Endocrine Disrupter:
A man-made or natural chemical that mimics a hormone and in turn can cause alterations in normal growth, development and/or reproduction.

Genome:
The complete complement of genetic material in a cell.

Oestrogenic Chemical:
A chemical, man-made or natural, that mimics the action of the natural female steroid, oestradiol-17β.

Oestrogen receptor:
A structure in a cell, which in combination with an oestrogen results in a specific change in cell function.

Plasmid:
A naturally occurring circle of DNA or RNA that is capable of replicating independently of the host chromosome.

Reporter Gene:
A gene with ability to react to specific genetic signals by activating a measurable response.

TABLE 1

DRILL CUTTING SEDIMENT SAMPLES: SCREENING FOR POTENTIAL ENDOCRINE ACTIVITY IN THE RECOMBINANT YEAST ANDROGEN AND OESTROGEN ASSAYS

BEL sample ref	Rogaland sample ref	Cytotoxic	Oestrogen agonist	Oestrogen antagonist	Androgen agonist	Androgen antagonist
1	13		√			√
2	10	√				
3	11	√				
4	15	√				
5	12					
6	14		√			
7	16	√				
8	17	√				
9	20	√				
10	19	√				
11	18		√			
12	30	√				
13	32	√				
14	31			√		
15	25		√			√
16	22		√			
17	21	√				
18	23		√			
19	24	√				
20	26	√				
21	27	√				
22	28		√			
23	5			√		√
24	4	√				
25	1	√				
26	3	√				
27	9	√		√		
28	8			√		√
29	6			√		
30	7					
31	2	√				
32	Plastic bag		√			
33	Foil					
34	Methanol					

CIRCULATION

Copy number		
1 - 3	Grethe Kjeilen	RF - Rogaland Research
4	KL Thorpe	Brixham Environmental Laboratory
5	MJ Hutchings	Brixham Environmental Laboratory
6	TH Hutchinson	Brixham Environmental Laboratory
7-8	Reports Centre	Brixham Environmental Laboratory, AstraZeneca UK Limited

BL7172/B **Copy number DRAFT**

Drill Cuttings Sediment: Assessment of Endocrine Activity in the Recombinant Yeast Androgen and Oestrogen Assays

Performing laboratory **Brixham Environmental Laboratory**
AstraZeneca UK Limited
Brixham
Devon
TQ5 8BA
UK

Sponsor **RF - Rogaland Research**
PO Box 2503
Ullandhaug
4091 Stavanger
Norway

Authors **MJ Hutchings**

Approved by **DRAFT**

CONFIDENTIAL (CATEGORY B)

CONTENTS

1 EXECUTIVE SUMMARY

A total of 10 drill cutting sediment samples were received from the Sponsor on 11 July 2001 for *in vitro* testing for potential endocrine disrupter activity. Samples were extracted in methanol, blown to dryness and re-dissolved in ethanol to provide a 5-fold concentrate. This was then prepared in a two fold dilution series to give concentrations of 31.3, 62.5, 125, 250 and 500% for testing.

The concentration range used for testing was dictated by the solubility in ethanol of the sediment extracts and the inherent dilution in the yeast assays. All samples were prepared using the same method to ensure comparisons could be made. Due to the cytotoxicity present the concentration range used for some extracts was not optimal to demonstrate a concentration response.

The solvent extracts were evaluated using the recombinant yeast assay, incorporating either the human androgen receptor (hAR) or human oestrogen receptor (hER). Both the yeast hAR and hER assays have been widely used for environmental investigations to detect potential endocrine disrupting activity.

The results from the oestrogen and androgen assays showed that for majority of samples the values were either negative, suggesting possible toxicity to the yeast, or close to zero suggesting no endocrine activity. RF3 REF SED (sample 4) was the exception, showing a low concentration response in the oestrogen assay. RF3 REF SED (sample 4) also exhibited a possible effect at the top concentration in the androgen assay. The yeast hAR and hER assays met all the required quality control criteria (reference hormones gave positive responses after three days and the ethanol controls were negative).

2 MATERIALS AND METHODS

2.1 Sediment samples

A total of 10 drill cutting sediment samples originating from North Sea oil production areas were received from the Sponsor on 11 July 2001. The batch of samples were given the Brixham Environmental Laboratory (BEL) test substance reference AJ0257 and stored, in the refrigerator, in the dark until required for testing. The study (BEL study number AJ0257/A) was conducted between 13 and 19 August 2001.

The objective of this testing was to ascertain the level of endocrine activity present in solvent extracts of the drill cutting sediments.

2.2 Dose Response Study Design

At the request of the Sponsor, a dose response test was completed using solvent extracts from drill cutting samples. Samples were extracted in methanol, blown to dryness and re-dissolved in ethanol to provide a 5-fold concentrate. This concentrate was then used to prepare a test dilution series of; 31.3, 62.5, 125, 250 and 500 %. Due the dilution inherent in the assay procedure this results in final assay concentrations of 3.1, 6.3, 12.5, 25 and 50%.

The solvent extracts were evaluated using the recombinant yeast assay, incorporating either the human androgen receptor (hAR) or human oestrogen receptor (hER). A reference chemical was assessed simultaneously to the solvent extracts with both the androgen (Dihydrotestosterone (DHT)) and oestrogen (oestradiol) assay. Both the yeast hAR and hER assays have been widely used for environmental investigations to detect potential endocrine disrupting activity.

2.3 The Recombinant Yeast Oestrogen Assay

The DNA sequence of the human oestrogen receptor (hER) has been integrated into a yeast genome containing expression plasmids carrying oestrogen-responsive sequences (ERE). These control the expression of a reporter gene, lac-Z (encoding the enzyme β-galactosidase). In the presence of oestrogenic compounds, β-galactosidase is synthesised and secreted into the medium where it causes a colour change from yellow to red (results read on a microplate spectrophotometer at a wavelength of 540 nm). The results are compared to the effects of reference oestrogenic chemicals. The assay is run over four to five days and can successfully be used on chemicals or extracts. The yeast assay is based on the work by Routledge and Sumpter (Ref 1). The DNA sequence of the human androgen receptor (hER) has been integrated into a yeast genome and this assay can be used in the same way to detect potentially androgenic compounds (Ref 2).

The primary aim of this assay is to assess endocrine activity, determined through measuring changes in the colour of the media (A_{540}). However, in calculating the results it is necessary to first correct for any factors that may influence the final readings. As yeast grows it forms a turbid layer over the base of the plate wells, which may interfere with the light path of the spectrophotometer. This growth is not always uniform and may be positively or negatively influenced in the presence of a chemical. The plates are therefore read at an absorbance of 620nm (A_{620}) to measure the turbidity of the yeast in each well, allowing a comparison between the test chemical and the controls (blanks). Reduction in turbidity is considered to be an indication of possible cytotoxicity to the yeast. This cytotoxicity can be caused by any of a number of chemicals present in the sediment and hence without extensive chemical analysis it is not possible to indicate a likely causative agent.

3 RESULTS

Tables 1 and 2 present the results from the recombinant yeast assays. The data for each sample is presented as a percentage of the maximum response indicated by the reference chemicals. The negative values generated for many of the samples indicate cytotoxicity.

Figures 1 and 2 show the concentration response curves for the reference chemicals and the solvent extracts from the drill cuttings sediments, along with the relevant controls. Values obtained below the blank again suggest a cytotoxic response.

4 DISCUSSION

The concentration range used for testing was dictated by the solubility in ethanol of the sediment extracts and the inherent dilution in the yeast assays. All samples were prepared using the same method to ensure comparisons could be made. Due to the cytotoxicity present the concentration range used for some extracts was not optimal to demonstrate a concentration response. The yeast hAR and hER assays met all the required quality control criteria (reference hormones (oestradiol and DHT) gave positive responses after three days and the ethanol controls were negative).

The results for the oestrogen assay show that for majority of samples the values are either negative (samples 1, 2, 5, 7 and 8), suggesting possible toxicity to the yeast, or close to zero (samples 3, 6, 9 and 10) suggesting no oestrogenic effects. The values obtained for samples 1 and 8 at the lower concentrations indicate that no oestrogenic activity occurs when cytotoxicity is minimised. RF3 REF SED (sample 4) is the exception, showing a low concentration response in the oestrogen assay. An oestradiol equivalent of 6 ng l^{-1} for this sediment extract was estimated from the graph (fig 1). Oestrogenic effects have been reported in rainbow trout at concentrations as low as 8.9 ng oestradiol l^{-1} (Ref 3). Direct comparison of the yeast assay result to endocrine effects in fish would be unwise, but the values given indicate the possibility of endocrine activity caused by the ethanol extract from sample 4.

The results for the androgen assay show a similar picture in that for the majority of samples the values are either negative (samples 1, 2, 5, 7 and 9), suggesting possible toxicity to the yeast, or approximately zero (samples 3, 6 and 10) suggesting no androgenic effects. RF3 REF SED (sample 4) exhibits a possible effect at the top concentration (50%) in the androgen assay.

The data from the androgen assay indicates increased cytotoxicity of the samples to the Androgen receptor yeast. This result is not unexpected as separate yeast cultures are used and little is known about the variation in the cytotoxic response. This difference is also manifested in differing growth rates and this will affect the turbidity readings. The results for both assays are, however, consistent in demonstrating which samples are cytotoxic to yeast. The cytotoxicity observed does not necessarily indicate possible cytotoxic effects in other species.

5 REFERENCES

1. Routledge E J and Sumpter J P (1996). Estrogenic activity of surfactants and some of their degradation products assessed using a recombinant yeast assay. Environmental Toxicology & Chemistry, **13,** 241-248.
2. Sohoni P and Sumpter JP (1998). Several environmental oestrogens are also anti-androgens. Journal of Endocrinology, **158**, 327-339.
3. Thorpe K L, Hutchinson T H, Hetheridge M J, Sumpter J P and Tyler C R (2000). Development of an *in vivo* screening assay for estrogenic chemicals using juvenile rainbow trout (*oncorhynchus mykiss*). Environmental Toxicology & Chemistry, **19,** 2812-2820.

GLOSSARY

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Plasmid:
A naturally occurring circle of DNA or RNA that is capable of replicating independently of the host chromosome.

Reporter Gene:
A gene with ability to react to specific genetic signals by activating a measurable response.

TABLE 1

DRILL CUTTING SEDIMENT SAMPLES: ENDOCRINE RECOMBINANT YEAST OESTROGEN ASSAY

Concentration %	Sample 1 BERYL K2 7-10	Sample 2 6A 2-6	Sample 3 BERYL K2 13-20	Sample 4 RF3 REF SED	Sample 5 V9 33-73
50	-20	-20	-4	14	-15
25	-19	-19	-5	12	-14
12.5	-13	-22	1	8	-15
6.25	-5	-5	1	6	-7
3.13	-3	10	-1	-9	-17

Concentration %	Sample 6 SW2 70-50	Sample 7 SW2 0-7	Sample 8 V9 68-90	Sample 9 V1-1 68-76	Sample 10 System blank
50	2	-31	-13	4	0
25	2	-29	-12	3	0
12.5	2	-23	-3	3	1
6.25	2	-18	-1	2	1
3.13	3	-17	-1	2	3

All results are report as percentage of assay maximum response

TABLE 2

DRILL CUTTING SEDIMENT SAMPLES: RECOMBINANT YEAST ANDROGEN ASSAY

Concentration %	Sample 1 BERYL K2 7-10	Sample 2 6A 2-6	Sample 3 BERYL K2 13-20	Sample 4 RF3 REF SED	Sample 5 V9 33-73
50	-46	-45	-10	10	-42
25	-46	-36	-6	-2	-43
12.5	-38	-46	1	-2	-40
6.25	-20	-45	3	-3	-21
3.13	-8	-40	7	-2	-10

Concentration %	Sample 6 SW2 70-50	Sample 7 SW2 0-7	Sample 8 V9 68-90	Sample 9 V1-1 68-76	Sample 10 System blank
50	-4	-46	-3	-18	-2
25	0	-42	0	-20	0
12.5	1	-44	1	-15	2
6.25	3	-44	1	-12	2
3.13	8	-32	5	-6	7

All results are report as percentage of assay maximum response

FIGURE 1

DRILL CUTTING SEDIMENT SAMPLES: RECOMBINANT YEAST OESTROGEN ASSAY

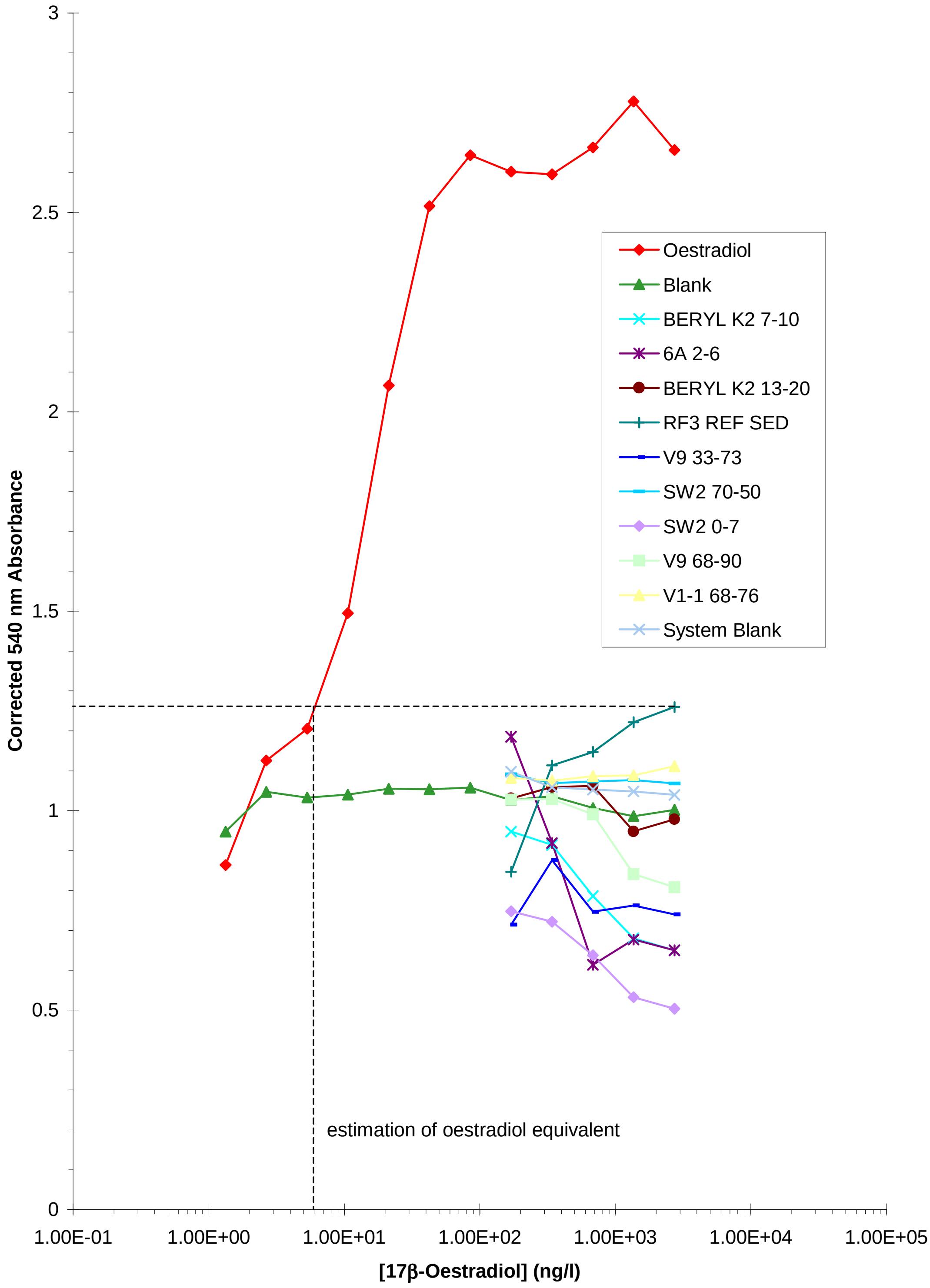
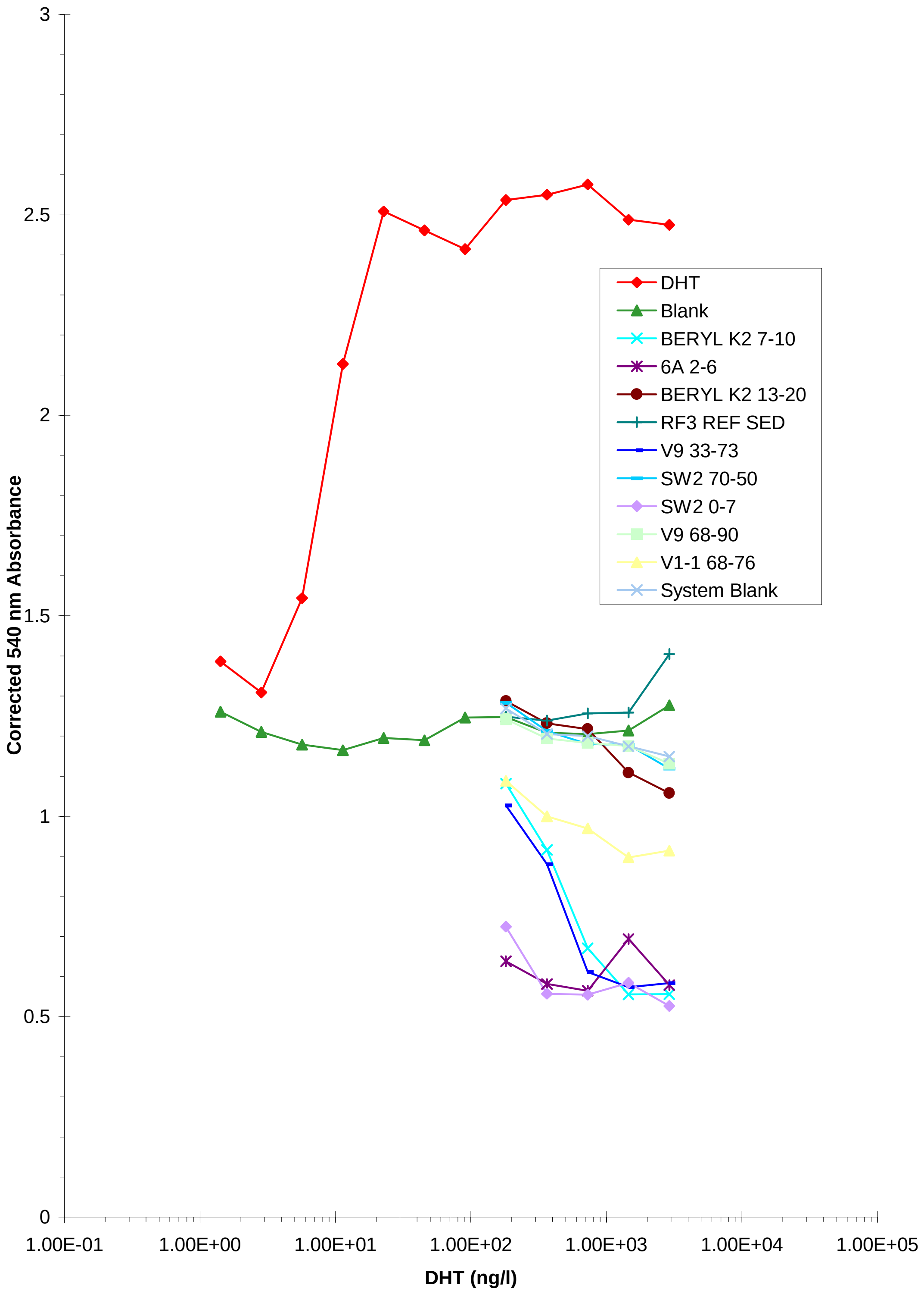


FIGURE 2

DRILL CUTTING SEDIMENT SAMPLES: RECOMBINANT YEAST ANDROGEN ASSAY



CIRCULATION

Copy number		
1 - 3	Grethe Kjeilen	RF - Rogaland Research
4	MJ Hutchings	Brixham Environmental Laboratory, AstraZeneca UK Limited
5-6	Reports Centre	Brixham Environmental Laboratory, AstraZeneca UK Limited

Return address: P.O.Box 360, 3700 AJ, Zeist, The Netherlands

RF-Rogaland Research
Attn. Ms. G. Kjeilen
Mekjarvik 12
N-4070 Randaberg
Norway

Location Zeist
Utrechtseweg 48
P.O. Box 360
3700 AJ Zeist

www.tno.nl

T +31 30 694 41 44
F +31 30 695 72 24
infofood@voeding.tno.nl

Subject
Q2001_7_0049/1

Date
2001-10-05

Our reference
DAM 01-5015/BLB

E-mail
Blankvoort@voeding.tno.nl

Direct dialing
+31 30 694 49 58

Direct fax
+31 30 695 72 24

Dear Grethe,

This letter describes the results found in study Q2001_7_0049/1: Analysis of three drill cutting samples by ER-CALUX and AR-LUX assays. The samples that were sent by RF-Rogaland research (Beryl-slice 68-76, code V1-1 [R1]; Beryl-k2 (core) slice 4-10 [R2]; core SW2, slice 0-7, 654815 cuttings Elofu [R3]) were extracted according to a protocol the provided by M.J. Hutchings with minor modifications (see appendix 1). Extraction resulted in turbid solutions, and an oil like residue in sample [R1], which was included in the final 1 ml EtOH solution.

AR-LUX

All samples were found to show a slight androgenic activity at the highest dosages (see appendix 2) used although maximum values of the assay were not reached.
Using higher concentrations was only possible to a limited extend due to cytotoxicity. Developing a more extensive extraction procedure might be a solution to this problem. The dose response relationship for sediment [R1] was not linear, suggesting the presence of antiandrogens or other compounds interfering with the androgen pathway. Furthermore, when measuring the samples six weeks (AR-LUX-2) after the first measurement (AR-LUX-1) androgenic activity in sample [R1] and [R2] had virtually disappeared while [R3] remained constant, suggesting the presence of unstable (androgenic) compounds in [R1] and [R2].

Rogaland code	*TNO code*	*AR-LUX-1 (ng R1881/ gram)*	*AR-LUX-2 (ng R1881/ gram)*	*ER-CALUX (ng 17β-estradiol/gram)*
Beryl-slice 68-76, code V1-1	[R1]	38.81 (+/- 6.94)	X	0.46
Beryl-k2 (core) slice 4-10	[R2]	21.46 (+/- 5.36)	X	0.21
core SW2, slice 0-7, 654815	[R3]	35.61 (+/- 3.81)	37.13 (+/- 9.65)	0.28 (+/- 0.04)

ER-CALUX

The ER-CALUX was performed by Biodetection Systems bv., Amsterdam.
The result reported was as follows:
"Only in the sample *Beryl-slice 68-76, code V1-1* a quantifiable signal of 1.3 nmol EEQ/liter undiluted extract was found. In samples *Beryl-k2 (core) slice 4-10* and *core SW2, slice 0-7, 654815,* a response was present but not quantifiable in the undiluted samples." However upon using higher dosages a response value could be calculated (see also appendix 2).

General considerations

Although hormonal activities were found in all samples it is unfortunate that no full dose response curves could be made due to cytotoxicity and/or compounds interfering with or antagonising steroid receptor pathways. More research including more elaborate extraction procedures might prove useful in this respect. Furthermore, fractionating samples in for instance an oil fraction, precipitate fraction and soluble fraction might provide valuable extra insights into the characteristics of the compounds involved. When comparing the data for androgens and estrogens one has to keep in mind that the concentrations needed for an estrogenic effect are lower then that for androgens in these assays. Thus, having a hundred times more androgens than estrogens does not necessarily mean that potential risks involving androgens are a hundred times higher. However, at TNO Voeding no risk assessment regarding these subjects is being carried out and therefore we are not able to make a well considered judgement about the ecological aspects regarding the levels of steroid-like activity found in the sediments.
We hope we have satisfied your expectations regarding this project and if you have any questions please feel free to contact us.

Sincerely,

Study Director:
Richard J.T. Rodenburg, Ph.D.
Product manager
Molecular Pharmacology/immunopharmacology

Research Scientist:
Barry M.G. Blankvoort, M.Sc.

Appendix 1

As agreed we have followed the extraction protocol of Mr. M. Hutchings as written below. However a few modifications were made:
1 All glassware used was washed with methanol and dried on air prior to use to remove possible contaminating steroid compounds
2 Samples were mixed thoroughly and subsequently put on a shaker for 1 hour, after which they sediment particles were allowed to sink to the bottom during 1 hour.
3 Filters were pre-washed with methanol to prevent possible loss of extract on a dry filter and leakage of contaminating steroids into the extract.

protocol provided by Mr. Hutchings:

Van: Hutchings, Matt J[SMTP:Matt.Hutchings@brixham.astrazeneca.com]
Verzonden: dinsdag 31 juli 2001 14:31

Unfortunately I will not be able to sort out sediment extracts for you until the week beginning the 6th August. Although not ideal I think it would be best if you prepare your own following the same procedure as we have used here.

Add 25 ml of methanol to 1 g of sediment sample, mix thoroughly and leave for 1 hour. Remove 20 ml of supernatum and filter through 0.2 um filter. Blow the 20 ml methanol samples to dryness over night and redissolve in 1ml of ethanol (20 X concentration step). These samples are then stored at below zero for up to three weeks or preferably used immediately in the assay. All preparations carried out in presterilised glassware

I hope this is clear, if you have any questions please get in touch.

Regards

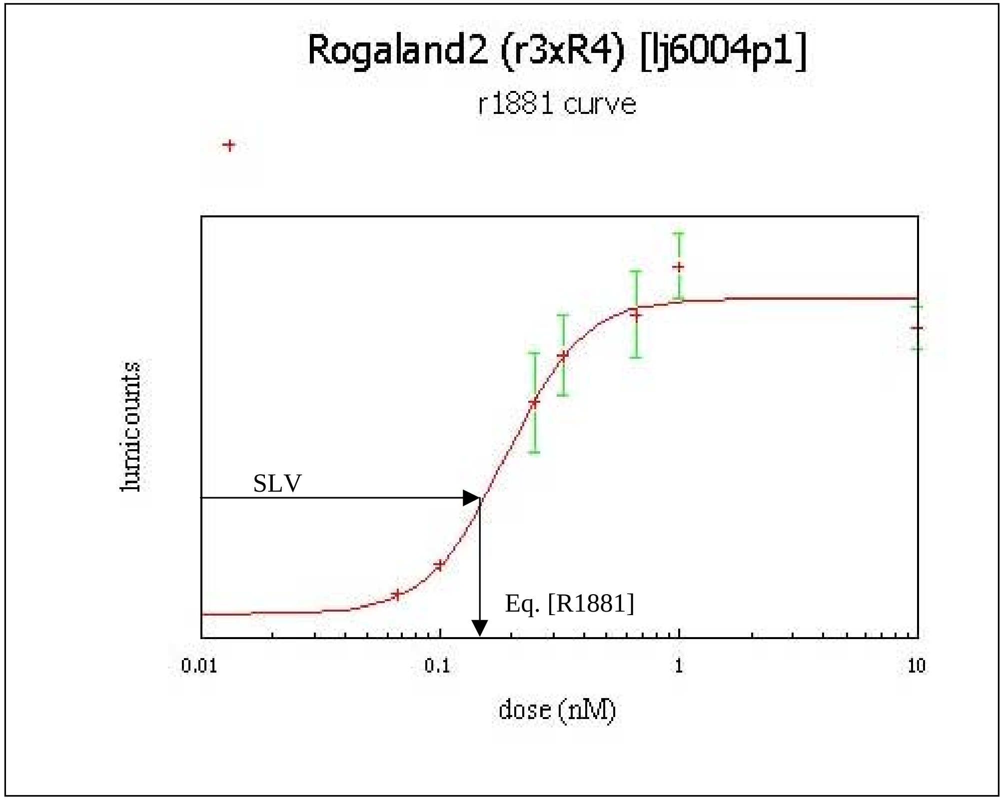
APPENDIX 2

Ar-lux code	no.	slice no.	code	grams in extractic	ng R1881/gram se	ug DHT/gram sedime	ng EE/gram sediment
R1	Sed 1	beryl slice 68-76	code V1-1	0.9704	38.82	36.69	0.46
R2	Sed 2	beryl -K2 (core) slice 4-10		0.9532	21.47	20.29	0.21
R3	Sed 3	core sw2 slice 0-7	654815 cutting	0.9758	35.61	35.82	0.28
					AR-LUX	AR-LUX	ER-CALUX
						R1881 values	17B-estradiol values
						recalculated to DHT	

abreviation	full name	
R1881	methyltrienolone	synthetic androgen
EE	17-beta-estradiol	natural human estrogen
ng	nanogram	
ug	microgram	
DHT	di hydro testosteron	natural male androgen

measurement done 6 weeks after first one

Ar-lux code	no.	slice no.	code	grams in extractic	ng R1881/gram se	ug DHT/gram sedime	ng EE/gram sediment
R1	Sed 1	beryl slice 68-76	code V1-1	0.9704	x	x	x
R2	Sed 2	beryl -K2 (core) slice 4-10		0.9532	x	x	x
R3	Sed 3	core sw2 slice 0-7	654815 cutting	0.9758	***37.13***	x	x
				mean R3	36.3706761		



AR-LUX in short

day1 cells having an androgen responsive luciferase reporter gene are seeded in 96 wells plates

day 2 cells are exposed to concentration range R1881 and samples of interest (in this case sediment samples)

day 3 luciferase activity is measured

The R1881 values are fitted with a 4 parameter Hill plot equation.Giving a figure like the one above.
Next the luciferase values of samples (SLV) are taken and put into the Hill equation as Y-values.(see arrows)
This results in an output of the R1881 concentration that would be needed to give rise to the same luciferase response as the one the sample gave
Therefore now one has a measure of androgenic activity in a sample without actually knowing the compounds causing it.
Subsequently from the concentration in nM the amount of nanograms/gram sediment can be calculated.
I added DHT no's as sort of a reference since most people do not know R1881 but do know DHT, however DHT is less potent than R1881 and will therefore give rise to a higher ng/gram sediment number.

Tabel 2 Respons ER-CALUX(R) assay.

TNO monster code in extract	dilution factor std	pM in wel	Reported valu	nmol EEQ/l	stdev	nmol EEQ/L extract (al gecorrigeerd op verdunningen door BDS)	
5168-76 V1-1 8/8/11 resistant	300	0.3	<1.0a	<300	n.v.t.	n.d.	
5168-76 V1-1 8/8/11 resistant	30	0.4	<1.0a	<30	n.v.t.	n.d.	
5168-76 V1-1 8/8/11 resistant	10	0.5	<1.0a	<10	n.v.t.	n.d.	
5168-76 V1-1 8/8/11 resistant	3	0.9	<1.0a	<3.0	n.v.t.	n.d.	
5168-76 V1-1 8/8/11 resistant	1	1.3	1.3	1.3	0		1.3
51-4-10 beayl K2 8/8/1 resistant	300	<0	<0.3b	n.d.	n.v.t.	n.d.	
51-4-10 beayl K2 8/8/1 resistant	30	<0	<0.3b	n.d.	n.v.t.	n.d.	
51-4-10 beayl K2 8/8/1 resistant	10	<0	<0.3b	n.d.	n.v.t.	n.d.	
51-4-10 beayl K2 8/8/1 resistant	3	<0	<0.3b	n.d.	n.v.t.	n.d.	
51-4-10 beayl K2 8/8/1 resistant	1	0.4	<1.0a	<1.0	0.1		
51-4-10 beayl K2 8/8/1 resistant	0.3	1.7	1.7	0.6	0		0.6
core sw2 sl. 0-7 8/8/01 resistant	300	<0	<0.3b	n.d.	n.v.t.	n.d.	
core sw2 sl. 0-7 8/8/01 resistant	30	<0	<0.3b	n.d.	n.v.t.	n.d.	
core sw2 sl. 0-7 8/8/01 resistant	10	0.2	<0.3b	n.d.	n.v.t.	n.d.	
core sw2 sl. 0-7 8/8/01 resistant	3	0.1	<0.3b	n.d.	n.v.t.	n.d.	
core sw2 sl. 0-7 8/8/01 resistant	1	0.7	<1.0a	<1.0	n.v.t.	n.d.	
core sw2 sl. 0-7 8/8/01 resistant	0.3	2.3	2.3	0.8	0.1		0.8
MeOH pure extr blanco 8/8/11	10	<0	<0.3b	n.d.	n.v.t.		
MeOH pure extr blanco 8/8/11	3	<0	<0.3b	n.d.	n.v.t.	n.d.	
MeOH pure extr blanco 8/8/11	1	<0	<0.3b	n.d.	n.v.t.	n.d.	
MeOH pure extr blanco 8/8/11	0.3	<0	<0.3b	n.d.	n.v.t.	n.d.	
a Uitkomst tussen detectielimiet en bepalingsgrens, waarde is bepalingsgrens						n.d.	

b Uitkomst lager dan detectielimiet, waarde is detectielimiet

a value between detection limit and determination limit, value is determination limit

b value below detection limit, value is detection limit

slice no.
beryl slice 68-76
beryl -K2 (core) slice 4-10
core sw2 slice 0-7
x

plate 1

				induction	equivalents R1881 (nM)
nM R1881	0	167	15.6205	1	0.09354
	0.067	410.333	34.1223	2.45709	0.20433
	0.1	699.667	41.9325	4.18962	0.25109
	0.25	1988.67	30.2379	11.9082	0.18107
	0.33	2473.33	317.146	14.8104	1.89908
	0.66	2882	272.353	17.2575	1.63085
	1	3039	72.7736	18.1976	0.43577
nM R1881	10	3136	189.787	18.7784	1.13645

nM R1881 equivalents in medium

0.105798218 ***100 nM DHT***

DHT/R1881 945.195505

equivalents/gram sediment

					nM R1881 equivalent in medium		dilution factor vs stock	nM R1881/liter extract (*1000)	ug R1881/l extrac	ng/ml extract	grams sediment	ng R1881/gram sed (uncorrect	ng R1881/gram sed (corrected for metoh filtervolume)		ug DHT gram sediment	
medium blanl	217.667	46.694	1.30339	0.27961	0.032219141	medium blanl										
100 nM DHT	754.667	112.251	4.51896	0.67216	0.105798218	100 nM DHT										
R1x1	756.333	135.537	4.52894	0.8116	0.10596547	R1x1	1	105.96547	30.13657967	30.13658	0.9704	31.0558323	***38.81979038***	R1x1	***36.6923***	*used as final amount/gram*
R1x5	601	55.7584	3.5988	0.33388	0.089840792	R1x5	5	449.20396	127.7536062	127.75361	0.9704	131.6504598	164.5630748	R1x5	155.544	
R1x25	382	14.1774	2.28743	0.08489	0.063237598	R1x25	25	1580.93995	449.6193218	449.61932	0.9704	463.3340084	579.1675105	R1x25	547.427	
R1x125	245.667	41.489	1.47106	0.24844	0.039440728	R1x125	125	4930.091025	1402.117888	1402.1179	0.9704	1444.886529	1806.108161	R1x125	1707.13	
R1x625	212.667	33.126	1.27345	0.19836	0.030720622	R1x625	625	19200.38875	5460.590561	5460.5906	0.9704	5627.154329	7033.942911	R1x625	6648.45	
R2x1	343.667	85.8739	2.05788	0.51422	0.057561358	R2x1	1	57.561358	16.37045022	16.37045	0.9532	17.17420291	***21.46775364***	R2x1	***20.2912***	*used as final amount/gram*
R2x5	242.333	34.5302	1.4511	0.20677	0.038661148	R2x5	5	193.30574	54.97615246	54.976152	0.9532	57.67535927	72.09419909	R2x5	68.1431	
R2x25	261	43.5546	1.56287	0.26081	0.042824547	R2x25	25	1070.613675	304.4825292	304.48253	0.9532	319.4319442	399.2899302	R2x25	377.407	
R2x125	232.333	59.9361	1.39122	0.3589	0.036207876	R2x125	125	4525.9845	1287.189992	1287.19	0.9532	1350.388158	1687.985197	R2x125	1595.48	
R2x625	218.333	34.2101	1.30739	0.20485	0.032412852	R2x625	625	20258.0325	5761.384443	5761.3844	0.9532	6044.255605	7555.319507	R2x625	7141.25	

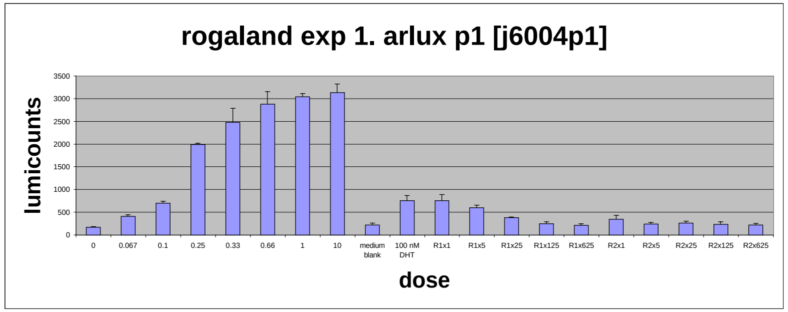


plate2

			induction	equivalenten R1881 (nM)
0	167	42.2177	1	0.2528
0.067	347	49.7896	2.07784	0.29814
0.1	588.667	44.411	3.52495	0.26593
0.25	1868	396.493	11.1856	2.37421
0.33	2242	318.382	13.4251	1.90648
0.66	2564.33	342.862	15.3553	2.05307
1	2948	260.697	17.6527	1.56106
10	2460	162.923	14.7305	0.97559

nM R1881 equivalent in medium

0.09941633 100 nM DHT

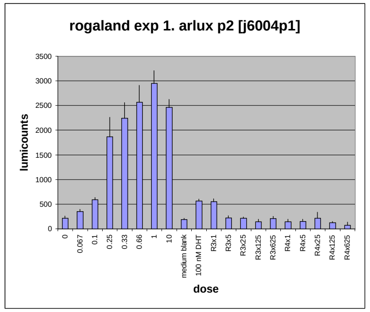
DHT/R1881 1005.870967

equivalenten/gram sediment

						nM R1881 equivalents in medium		dilution factor relative to highest concentration	nM R1881/liter extract (*1000)	ug R1881/l extrac	ng/ml extract		gramsediment	ng R1881/gram sed (uncorrected)	ng R1881/gram sed (corrected for metoh filtervolume)		ug DHT gram sediment	
medium blanl	187	28.6182	1.11976	0.17137	x		medium blanl											
100 nM DHT	565.667	38.553	3.38723	0.23086		0.09941633	100 nM DHT											
R3x1	551.333	59.079	3.3014	0.35377		0.097752589	R3x1	1	97.752589	27.80083631	27.800836		0.9758	28.49030161	35.61287701	R3x1	35.822	*used as final amount/gram*
R3x5	221	45.9674	1.32335	0.27525		0.037488339	R3x5	5	187.441695	53.30841806	53.308418		0.9758	54.63047557	68.28809446	R3x5	68.689	
R3x25	217	20.7846	1.2994	0.12446		0.035620363	R3x25	25	890.509075	253.2607809	253.26078		0.9758	259.5416898	324.4271123	R3x25	326.332	
R3x125	143	51.643	0.85629	0.30924	x		R3x125	125	#VALUE!	#VALUE!	#VALUE!		0.9758	#VALUE!	#VALUE!	R3x125	#VALUE!	
R3x625	204.333	45.4459	1.22355	0.27213		0.028244136	R3x625	625	17652.585	5020.395174	5020.3952		0.9758	5144.901797	6431.127247	R3x625	6468.88	
R4x1	142.333	49.0951	0.8523	0.29398	x		R4x1	1	#VALUE!	#VALUE!	0	x		#VALUE!	#VALUE!	R4x1	#VALUE!	
R4x5	147	48.8774	0.88024	0.29268	x		R4x5	5	#VALUE!	#VALUE!	#VALUE!	x		#VALUE!	#VALUE!	R4x5	#VALUE!	
R4x25	217	117.222	1.2994	0.70193		0.035620363	R4x25	25	890.509075	253.2607809	253.26078	x		#VALUE!	#VALUE!	R4x25	#VALUE!	
R4x125	122.667	25.4231	0.73453	0.15223	x		R4x125	125	#VALUE!	#VALUE!	#VALUE!	x		#VALUE!	#VALUE!	R4x125	#VALUE!	
R4x625	72.3333	62.6924	0.43313	0.3754	x		R4x625	625	#VALUE!	#VALUE!	#VALUE!	x		#VALUE!	#VALUE!	R4x625	#VALUE!	

1 ul sample added to 1 ml medium and subsequent dilutions were made in medium

R4 =MeOH blank



Analysis of 2 sediment samples using BDS' DR-CALUX® bioassay

Auteurs: Dr.Ir. H.T. Besselink
Prof.Dr. A. Brouwer

Rapport: BDS-229-142/rap1

Datum: 28 September 2001

Analysis of 2 sediment samples using BDS' DR-CALUX® bioassay

Requested by Rogaland Research
P.O. Box 8046
4068 Stavanger
Norway
Tel: (+47) 51 87 53 27 / (+47) 51 87 50 00
Attn: Grethe Kjeilen

BioDetection Systems b.v. (BDS)
De Boelelaan 1115
1081 HV Amsterdam
Tel.: +31 (0)20 6614444 / +31 (0)20 4449505
Fax: +31 (0)20 4449553
E-mail: calux@biodetectionsystems.com

BDS warrant the results contained in this report to Rogaland Research only. BDS shall incur no third party liability whatsoever arising from the findings in this report and will not be held responsible for any consequential loss that may arise from the report.

Introduction

On the 27th of August 2001, BDS b.v. received 2 sediment samples from Rogaland Research to be analysed for dioxin and dioxin-like content using BDS' DR-CALUX® assay. The **D**ioxin **R**esponsive – **C**hemically **A**ctivated **LU**ciferase e**X**pression (**DR-CALUX®**) assay comprises a genetically modified H4IIE rat hepatoma cell-line, incorporating the firefly luciferase gene coupled to dioxin responsive elements (DREs) as a reporter gene for the presence of dioxins and dioxin-like compounds. Cells that are exposed to dioxins or dioxin-like chemicals not only express proteins and enzymes that are under normal circumstances associated to the DRE, but also luciferase. By addition of the appropriate substrate for luciferase, light is emitted. The amount of light produced is proportional to the amount of ligand-AhR binding, which is related to 2,3,7,8-TCDD toxic equivalents (TEQs).

Sample delivery

The two samples were delivered in aluminum foil. Samples were delivered at ambient temperature and stored by BDS at <4°C prior to analysis. For internal processing and for control of chain of custody, samples received a BDS-coding (see Table 1).

Sample Processing

DR-CALUX® analysis	Freeze-drying: Prior to freeze-drying (1 hour at -20°C followed by 24 hour freeze-drying at -50°C), samples were homogenized. After freeze-drying the samples were homogenized once more.
	ASE-extraction and clean up: Samples were extracted by means of ASE-extraction (hexane/acetone (9:1)). Extracts were evaporated and redissolved in hexane. Next, the samples were treated with a TBA-solution to remove sulfur and cleaned on an acid silica column. The cleaned extracts were evaporated and dissolved in 50 µl DMSO after which the DR-CALUX® activity was determined (24 hour exposure).

Presentation of results

Table 1: sample codes.
Table 2: amount of extracted sediment.
Table 3: DR-CALUX® results, expressed as pg 2,3,7,8-TCDD-TEQs per gram dried sediment (24 hour).
Figure 1: the calibration curve of the DR-CALUX® is shown for 2,3,7,8 TCDD.

Results

- In the procedure blank no dioxin and/or dioxin-like compounds were present after 24 hours exposure.
- In sample V9 33-43, 59 pg 2,3,7,8 TCDD-TEQ per gram dried sediment was present and in SW2 40-50, 9.2 pg 2,3,7,8 TCDD-TEQ per gram dried sediment was present.

Table 1 Description and coding of samples

Rogaland Research code	BDS code	Matrix
V9 33-43	M-142-1047	Sediment
SW2 40-50	M-142-1049	Sediment
Reference material BDS	M-142-1050	
Procedure blank	M-142-1046	Sea sand (procedure blank)

Table 2 Amount of extracted sediment

Rogaland Research code	Amount of extracted sediment (g)
V9 33-43	9.0247
SW2 40-50	5.5470
Reference material BDS	2.0275

Table 3 DR-CALUX® results

	24 hour exposure	
Rogaland Research code	TCDD-TEQ (pg TCDD-TEQ per gram dried sediment)	Standard Deviations
V9 33-43	59	1.2
SW2 40-50	9.2	0.3

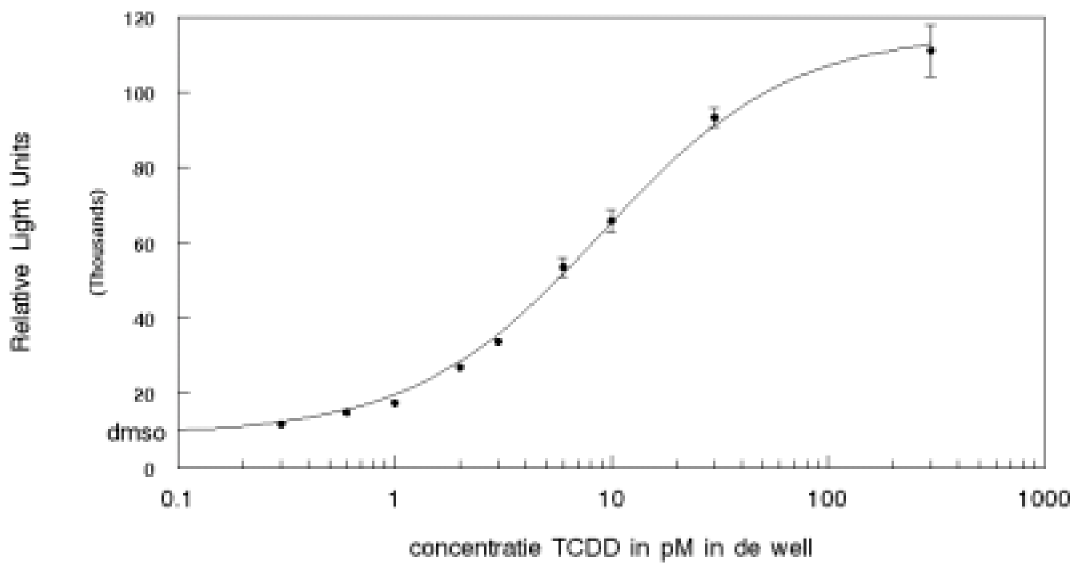


Figure 1 TCDD calibration curve

Appendix 11

Pictures from the operation of the sampling tools

Appendix 11

Large Box-corer (0.25 m^2)

The large box-corer being retrieved.

The box-corer being aliened in the rack onboard the ship. The rack was specially designed to efficient collect bulk material for the other tasks in this UKOOA project.

Emptying the box-corer into the plastic boxes where the bulk material was collected.

Emptying the box-corer into the plastic boxes specially designed by SINTEF to obtain undisturbed samples for erosion experiment

Removing the box to be able to take sub cores from the box-corer.

Digging out the subcores from the box

When the box has to be removed considerely more time is needed for the operation. This type of box-corer (0.25 m^2) seams to be very efficient for use in cuttings piles. **If cores between 30-60 cm or bulk material is needed this is the coise.**

Van Veen Grab (0.1 m^2)

The van Veen Grab on the sciving table for the Benthos samples

The van Veen with a sample. The van Veen Grab worked excellent in the cuttings pile. **To get samples up to 10 cm thick for any type of purpose this is the simplest and most efficient tool to use**

Vibro-corer

The base if the vibrocorer with CPT. A number of different types of vibro-corer are available. This is advanced type and heavy (2 ton) It did work, however it the ideal tool for coring in cuttings piles. **However same kind if vibro-corer seams to be the only useful tool available for achieving cores in cuttings piles**.

Launching the vibro corer with the ships large offshore crane.

Gravity corer tested in the cutting pile at both Ekofisk 2/4A and Beryl A

In clay or soft sediment 3-4 m cores are easy to achieve. In the cuttings piles the longest core we achieved was 60 cm, consequently only marginally better than with the large Box-Corer. **From our experience it is not considered as a useful tool in cuttings piles**

Appendix 12

SFT classification system of sediments

Appendix 12

SFT Classification system for coastal and fjord sediments

SFT Classification sysem (from Molvær m. fl. 1997). Note the decimal divider is a comma(,)

Parametre		Class				
		I Minor or uncontaminated	II Moderate polluted	III Marked polluted	IV Strongly polluted	V Very strongly pollutedt
Metals in sediment (dry weight)	Arsen (mg As/kg)	**<20**	**20-80**	**80-400**	**400-1000**	**>1000**
	Bly (mg Pb/kg	**<30**	**30-120**	**120-600**	**600-1500**	**>1500**
	Fluorid (mg F/kg)	**<800**	**800-3000**	**3000-8000**	**8000-20000**	**>20000**
	Kadmium (mg Cd/kg)	**<0,25**	**0,25-1**	**1-5**	**5-10**	**>10**
	Kobber (mg Cu/kg)	**<35**	**35-150**	**150-700**	**700-1500**	**>1500**
	Krom (mg Cr/kg)	**<70**	**70-300**	**300-1500**	**1500-5000**	**>5000**
	Kvikksølv (mg Hg/kg)	**<0,15**	**0,15-0,6**	**0,6-3**	**3-5**	**>5**
	Nikkel (mg Ni/kg)	**<30**	**30-130**	**130-600**	**600-1500**	**>1500**
	Sink (mg Zn/kg)	**<150**	**150-700**	**700-3000**	**3000-10000**	**>10000**
	Sølv (mg Ag/kg)	**<0,3**	**0,3-1,3**	**1,3-5**	**5-10**	**>10**
	TBT [1)] (µg/kg)	**<1**	**1-5**	**5-20**	**20-100**	**>100**
Organivc conta-minants (dry weight)	∑PAH [2)] (µg/kg)	**<300**	**300-2000**	**2000-6000**	**6000-20000**	**>20000**
	B(a)P [3)] (µg/kg)	**<10**	**10-50**	**50-200**	**200-500**	**>500**
	HCB [4)] (µg/kg)	**<0,5**	**0,5-2,5**	**2,5-10**	**10-50**	**>50**
	∑PCB$_7$ [5)] (µg/kg)	**<5**	**5-25**	**25-00**	**100-300**	**>300**
	EPOCl [6)] (µg/kg)	**<100**	**100-500**	**500-2000**	**2000-15000**	**>15000**
	TE$_{PCDF/D}$ [7)] (ng/kg)	**<0,01**	**0,01-0,03**	**0,03-0,10**	**0,10-0,5**	**>0,5**
	∑ DDT [8)] (µg/kg)	**<0,5**	**0,5-2,5**	**2,5-10**	**10-50**	**>50**

2 Sum EPA 16 PAH compounds with naphtalene subtracted

5 Sum Duth 7 PCB congenes

From

Molvær, J., J. Knutzen, J. Magnusson, B. Rygg, J. Skei & J. Sørensen 1997. Klassifisering av miljøkvalitet i fjorder og kystfarvann. SFT Veiledning 97:03. Statens Forurensningstilsyn, TA-1467/1997, Oslo. 36 s.

Appendix 13

Mineralogy

Crystalline fractions and total composition by XRD and XRF

Appendix 13

XRF Major Elements

Client : Rogaland Research

Field : Beryl

Sample number	Core	Slice (cm)	Na_2O %	Mg0 %	Al_2O_3 %	SiO_2 %	P_2O_5 %	SO_3 %	Cl %	K_2O %	CaO %	TiO_2 %	MnO %	Fe_2O_3 %	BaO %	LOI %
422-1	V1-1	0-10	1.06	1.39	5.00	32.04	0.11	14.00	0.96	0.93	7.19	0.11	0.12	6.02	22.15	9.10
422-2	V1-1	10-22	0.77	1.29	4.26	32.64	0.08	14.31	1.02	0.87	8.07	0.20	0.12	5.74	21.27	9.20
422-3	V1-1	22-28	0.82	1.18	4.63	34.80	0.07	14.75	0.84	1.02	5.33	0.24	0.10	4.11	24.56	7.62
422-4	V1-1	28-36	1.04	1.34	7.04	37.77	0.08	15.32	0.91	1.23	2.25	0.12	0.07	4.78	18.28	10.55
422-5	V1-1	36-40	0.99	1.36	5.00	33.86	0.08	17.44	1.11	0.96	3.56	0.14	0.08	4.47	23.71	7.80
422-6	V1-1	40-48	0.68	0.92	2.33	22.93	0.14	23.90	0.92	0.65	3.93	0.15	0.09	3.84	32.74	7.50
422-7	V1-1	48-56	0.67	0.80	3.09	21.17	0.13	21.00	0.46	0.75	6.75	0.21	0.15	4.65	33.22	7.86
422-8	V1-1	58-60	0.69	0.80	2.40	21.34	0.11	21.31	0.57	0.70	7.96	0.18	0.15	4.41	32.05	8.09
422-9	V1-1	60-68	0.61	1.00	2.77	33.48	0.06	19.87	0.50	0.87	4.21	0.24	0.11	3.82	28.07	5.20
422-10	V1-1	68-76	0.81	1.86	5.27	36.45	0.08	14.17	0.51	1.06	7.44	0.22	0.16	6.81	15.77	10.00
422-11	V1-2	0-15	0.77	1.46	4.97	33.87	0.08	16.80	1.04	0.79	5.44	0.23	0.17	4.98	19.36	11.00
422-12	V1-2	15-30	0.93	1.10	3.39	21.62	0.13	19.96	1.14	0.71	7.33	0.10	0.20	4.63	28.80	10.90
422-13	V1-2	30-45	0.51	1.02	2.54	22.64	0.17	20.08	0.63	0.72	8.02	0.11	0.17	4.80	31.07	8.40
422-14	V1-2	45-60	0.51	0.94	1.65	23.42	0.17	21.84	0.63	0.65	7.53	0.12	0.16	4.39	31.17	7.75
422-15	V1-2	60-65	0.59	1.25	5.62	26.17	0.18	19.68	0.65	0.88	3.06	0.17	0.10	5.53	19.64	17.37
422-16	V1-2	65-75	0.41	1.50	1.81	37.42	0.10	17.07	1.03	0.70	9.57	0.19	0.09	4.03	18.96	7.62
422-17	V1-2	75-85	0.38	0.75	1.68	18.29	0.10	11.39	1.34	0.19	33.05	0.06	0.08	3.91	10.40	18.48
422-18	V1-2	85-90	0.50	2.56	1.38	29.06	0.09	17.97	1.11	0.42	13.52	0.14	0.16	4.72	17.38	11.66
422-34	V4	0-10	0.99	1.23	4.91	39.71	0.08	14.75	1.19	1.10	5.03	0.15	0.08	4.13	17.57	9.73
422-35	V4	10-18	0.81	0.99	3.75	32.27	0.05	17.35	1.36	0.99	5.20	0.12	0.09	4.99	21.80	10.91
422-36	V4	18-24	1.41	1.29	5.21	49.12	0.09	12.07	0.91	1.30	2.64	0.15	0.07	4.38	13.87	7.78
422-37	V4	24-30	1.22	0.33	4.12	86.97	0.02	0.22	0.68	1.44	1.55	0.19	0.01	0.72	0.05	2.57
422-38	V4	30-40	1.29	0.38	4.39	85.75	0.03	0.51	0.63	1.44	1.83	0.24	0.01	0.88	0.09	2.79

XRF Major Elements

Client : Rogaland Research

$BaSO_4$ **in matrix**

Field : Beryl

Sample number	Core	Slice (cm)	Na_2O %	Mg0 %	Al_2O_3 %	SiO_2 %	P_2O_5 %	S %	Cl %	K_2O %	CaO %	TiO_2 %	MnO %	Fe_2O_3 %	$BaSO_4$ %	LOI %
422-1	V1-1	0-10	1.06	1.39	5.00	32.04	0.11	2.43	0.96	0.93	7.19	0.11	0.12	6.02	33.72	9.10
422-2	V1-1	10-22	0.77	1.29	4.26	32.64	0.08	3.20	1.02	0.87	8.07	0.20	0.12	5.74	32.38	9.20
422-3	V1-1	22-28	0.82	1.18	4.63	34.80	0.07	1.92	0.84	1.02	5.33	0.24	0.10	4.11	37.39	7.62
422-4	V1-1	28-36	1.04	1.34	7.04	37.77	0.08	5.77	0.91	1.23	2.25	0.12	0.07	4.78	27.82	10.55
422-5	V1-1	36-40	0.99	1.36	5.00	33.86	0.08	5.06	1.11	0.96	3.56	0.14	0.08	4.47	36.09	7.80
422-6	V1-1	40-48	0.68	0.92	2.33	22.93	0.14	6.80	0.92	0.65	3.93	0.15	0.09	3.84	49.84	7.50
422-7	V1-1	48-56	0.67	0.80	3.09	21.17	0.13	3.65	0.46	0.75	6.75	0.21	0.15	4.65	50.56	7.86
422-8	V1-1	58-60	0.69	0.80	2.40	21.34	0.11	4.58	0.57	0.70	7.96	0.18	0.15	4.41	48.78	8.09
422-9	V1-1	60-68	0.61	1.00	2.77	33.48	0.06	5.21	0.50	0.87	4.21	0.24	0.11	3.82	42.73	5.20
422-10	V1-1	68-76	0.81	1.86	5.27	36.45	0.08	5.93	0.51	1.06	7.44	0.22	0.16	6.81	24.01	10.00
422-11	V1-2	0-15	0.77	1.46	4.97	33.87	0.08	6.69	1.04	0.79	5.44	0.23	0.17	4.98	29.46	11.00
422-12	V1-2	15-30	0.93	1.10	3.39	21.62	0.13	4.92	1.14	0.71	7.33	0.10	0.20	4.63	43.84	10.90
422-13	V1-2	30-45	0.51	1.02	2.54	22.64	0.17	3.86	0.63	0.72	8.02	0.11	0.17	4.80	47.29	8.40
422-14	V1-2	45-60	0.51	0.94	1.65	23.42	0.17	5.56	0.63	0.65	7.53	0.12	0.16	4.39	47.45	7.75
422-15	V1-2	60-65	0.59	1.25	5.62	26.17	0.18	9.43	0.65	0.88	3.06	0.17	0.10	5.53	29.89	17.37
422-16	V1-2	65-75	0.41	1.50	1.81	37.42	0.10	7.17	1.03	0.70	9.57	0.19	0.09	4.03	28.87	7.62
422-17	V1-2	75-85	0.38	0.75	1.68	18.29	0.10	5.96	1.34	0.19	33.05	0.06	0.08	3.91	15.83	18.48
422-18	V1-2	85-90	0.50	2.56	1.38	29.06	0.09	8.89	1.11	0.42	13.52	0.14	0.16	4.72	26.46	11.66
422-34	V4	0-10	0.99	1.23	4.91	39.71	0.08	5.57	1.19	1.10	5.03	0.15	0.08	4.13	26.75	9.73
422-35	V4	10-18	0.81	0.99	3.75	32.27	0.05	5.97	1.36	0.99	5.20	0.12	0.09	4.99	33.18	10.91
422-36	V4	18-24	1.41	1.29	5.21	49.12	0.09	4.83	0.91	1.30	2.64	0.15	0.07	4.38	21.12	7.78
422-37	V4	24-30	1.22	0.33	4.12	86.97	0.02	0.20	0.68	1.44	1.55	0.19	0.01	0.72	0.07	2.57
422-38	V4	30-40	1.29	0.38	4.39	85.75	0.03	0.46	0.63	1.44	1.83	0.24	0.01	0.88	0.14	2.79

XRF Trace Elements

Client : Rogaland Research

Field : Beryl

Sample number	Core	Slice (cm)	**V** ppm	**Cr** ppm	**Ni** ppm	**Cu** ppm	**Zn** ppm	**Ga** ppm	**Rb** ppm	**Sr** ppm	**Y** ppm	**Zr** ppm	**Nb** ppm	**Sn** ppm	**Cs** ppm	**La** ppm	**Ce** ppm	**Pb** ppm	**Th** ppm	**U** ppm
422-1	V1-1	0-10	70	14	35	106	542	20	21	3516	9	72	8	< 5	< 5	< 15	< 15	257	7	< 5
422-2	V1-1	10-22	54	12	33	74	502	15	17	2448	< 1	71	7	< 5	< 5	< 15	< 15	227	4	< 5
422-3	V1-1	22-28	76	14	29	51	405	15	24	3174	10	115	9	< 5	< 5	< 15	< 15	166	5	< 5
422-4	V1-1	28-36	73	15	33	59	282	18	47	2397	15	158	8	< 5	< 5	< 15	< 15	126	8	< 5
422-5	V1-1	36-40	82	15	30	73	465	19	22	3399	11	138	9	< 5	< 5	< 15	< 15	235	5	< 5
422-6	V1-1	40-48	109	17	20	86	505	16	3	5786	5	71	12	< 5	< 5	< 15	< 15	433	6	< 5
422-7	V1-1	48-56	104	17	22	62	374	18	5	5979	4	42	11	< 5	< 5	< 15	< 15	676	5	< 5
422-8	V1-1	58-60	107	16	23	61	316	17	< 1	6152	9	30	10	< 5	< 5	< 15	< 15	734	4	< 5
422-9	V1-1	60-68	91	16	25	52	288	15	13	4981	5	54	9	< 5	< 5	< 15	< 15	620	4	< 5
422-10	V1-1	68-76	65	15	36	137	458	22	30	4004	7	81	7	< 5	< 5	< 15	< 15	775	8	< 5
422-11	V1-2	0-15	73	14	38	94	732	24	12	4625	7	126	8	< 5	< 5	< 15	< 15	697	8	< 5
422-12	V1-2	15-30	95	15	25	65	574	18	3	5968	6	30	10	< 5	< 5	< 15	< 15	483	5	< 5
422-13	V1-2	30-45	97	16	30	48	668	18	< 1	7085	4	30	9	< 5	< 5	< 15	< 15	460	6	< 5
422-14	V1-2	45-60	102	17	27	48	612	16	< 1	7129	3	29	10	< 5	< 5	< 15	< 15	404	8	< 5
422-15	V1-2	60-65	83	16	50	78	1057	26	21	6000	16	119	8	< 5	< 5	< 15	< 15	551	11	6
422-16	V1-2	65-75	77	16	22	76	404	14	6	4901	4	72	7	< 5	< 5	< 15	< 15	593	6	< 5
422-17	V1-2	75-85	65	18	16	71	390	11	< 1	3934	5	< 10	5	< 5	< 5	< 15	< 15	361	4	< 5
422-18	V1-2	85-90	80	17	29	111	478	17	< 1	5081	2	67	7	< 5	< 5	< 15	< 15	1019	4	< 5
422-34	V4	0-10	67	14	21	131	419	18	27	3892	9	183	8	< 5	< 5	< 15	< 15	179	7	< 5
422-35	V4	10-18	84	15	23	115	527	17	19	4385	8	112	9	< 5	< 5	< 15	< 15	214	8	< 5
422-36	V4	18-24	49	12	44	156	515	20	30	3776	11	250	6	< 5	< 5	< 15	< 15	227	8	< 5
422-37	V4	24-30	24	10	2	4	11	4	38	109	5	179	4	< 5	< 5	7	16	9	2	< 1
422-38	V4	30-40	45	5	4	4	13	5	40	131	7	282	6	< 5	< 5	14	22	10	1	< 1

X-ray Diffraction Analysis **Client : Rogaland Research**

Size Fraction : Whole Rock **Field : Beryl**

Sample no.	Core	Slice (cm)	Illite/Smectite	Illite+Mica	Kaolinite	Chlorite	Barite	Quartz	K Feldspar	Plagioclase	Calcite	Dolomite	Siderite	Brucite	?Amphibole	Zeolite	Pyrite	Total
422-1	V1-1	0-10	2.7	5.3	4.0	1.3	32.7	26.8	2.9	2.1	13.3	2.3	0.0	0.0	0.0	0.0	6.6	100
422-2	V1-1	10-22	0.7	3.7	3.7	1.5	35.4	32.6	2.4	2.1	10.1	2.5	0.0	0.0	0.0	0.0	5.3	100
422-3	V1-1	22-28	4.2	7.4	4.9	1.3	31.3	31.6	2.0	3.4	7.8	2.5	0.0	0.0	0.0	0.0	3.7	100
422-4	V1-1	28-36	7.9	7.4	4.4	1.2	31.4	30.4	2.5	3.1	4.7	2.0	0.0	0.0	0.0	0.0	5.1	100
422-5	V1-1	36-40	4.4	6.8	4.7	1.6	34.0	28.5	5.0	2.3	4.7	1.7	0.0	0.0	0.0	0.0	6.3	100
422-6	V1-1	40-48	1.3	4.6	3.8	1.3	44.2	23.1	3.4	2.4	5.5	3.5	0.0	0.0	0.0	0.0	6.8	100
422-7	V1-1	48-56	1.8	6.3	4.5	1.3	45.9	17.4	2.6	2.0	12.3	1.8	0.0	0.0	0.0	0.0	4.3	100
422-8	V1-1	58-60	1.8	5.2	3.8	1.7	44.0	20.0	1.7	1.4	10.7	3.0	0.0	0.0	0.0	0.0	6.7	100
422-9	V1-1	60-68	3.3	4.8	2.0	1.0	32.4	42.1	1.7	1.3	6.9	2.2	0.0	0.0	0.0	0.0	2.4	100
422-10	V1-1	68-76	3.0	4.9	1.9	1.1	26.4	34.9	1.5	1.7	13.7	2.9	0.0	0.0	0.0	0.0	7.9	100
422-11	V1-2	0-15	0.0	TR	5.6	2.6	33.0	40.4	1.9	1.5	8.9	2.1	0.0	0.0	0.0	0.0	4.1	100
422-12	V1-2	15-30	0.0	2.8	5.1	2.1	44.4	20.0	1.7	1.1	12.8	3.0	0.0	0.0	0.0	0.0	7.0	100
422-13	V1-2	30-45	0.0	4.8	4.3	2.4	36.0	24.6	1.8	2.5	11.8	5.8	0.0	0.0	0.0	0.0	6.0	100
422-14	V1-2	45-60	TR	3.7	4.0	2.1	38.1	26.8	1.6	2.0	8.6	3.3	0.0	0.0	0.0	0.0	10.0	100
422-15	V1-2	60-65	3.7	6.2	5.2	1.0	34.3	23.3	1.5	2.4	3.2	5.4	0.0	0.0	0.0	0.0	13.8	100
422-16	V1-2	65-75	0.0	0.0	4.2	1.8	21.4	54.7	1.5	1.2	5.6	3.6	0.0	0.0	0.0	0.0	6.1	100
422-17	V1-2	75-85	0.0	0.0	0.0	0.0	35.1	18.4	5.7	1.6	28.1	3.9	0.0	0.0	0.0	0.0	7.1	100
422-18	V1-2	85-90	0.0	0.0	0.0	0.0	30.4	41.2	2.6	1.3	17.6	1.9	0.0	0.0	0.0	0.0	5.1	100
422-34	V4	0-10	2.7	7.5	3.7	0.9	22.9	40.6	2.0	2.1	9.6	2.9	0.0	0.0	0.0	0.0	5.0	100
422-35	V4	10-18	1.6	6.9	4.1	1.0	30.5	32.7	2.4	1.6	7.2	2.9	5.7	0.0	0.0	0.0	3.4	100
422-36	V4	18-24	3.4	4.9	3.0	1.3	17.9	52.3	7.7	2.4	3.1	1.1	0.0	0.0	0.0	0.0	2.9	100
422-37	V4	24-30	TR	2.8	0.9	0.5	1.1	83.8	2.5	2.1	2.0	1.6	0.0	0.0	0.0	2.1	0.7	100
422-38	V4	30-40	TR	3.3	1.3	0.7	1.8	76.7	6.2	3.7	3.2	1.1	0.0	0.0	1.3	0.0	0.8	100

X-Ray Diffraction Analysis **Client: Rogaland Research**

Size Fraction : <2 micron clay **Field : Beryl**

Sample	Core	Slice (cm)	Wt. %	Illite/smectite				Illite			Kaolinite			Chlorite			Barite		Quartz		Calcite	
number			<2um	% A	% B	Order	%Illite	% A	% B	Crys	% A	% B	Crys	% A	% B	Crys	% A	% B	% A	% B	% A	% B
422-1	V1-1	0-10	10.79	19.6	2.1	RI	50-60	39.9	4.3	P	21.3	2.3	M	9.7	1.0	P	2.1	0.2	2.9	0.3	4.6	0.5
422-2	V1-1	10-22	8.04	4.9	0.4	RI	50-60	36.6	2.9	VP	34.7	2.8	P	17.9	1.4	P	1.6	0.1	1.8	0.1	2.5	0.2
422-3	V1-1	22-28	13.85	29.2	4.0	RI	40	32.2	4.5	P	18.6	2.6	M	8.8	1.2	P	2.1	0.3	4.2	0.6	4.9	0.7
422-4	V1-1	28-36	18.41	39.5	7.3	RI	40	28.8	5.3	P	15.3	2.8	M	4.9	0.9	P	1.6	0.3	4.9	0.9	4.9	0.9
422-5	V1-1	36-40	12.83	27.9	3.6	RI	50-60	31.0	4.0	P	22.7	2.9	M	12.3	1.6	P	1.7	0.2	2.5	0.3	1.9	0.2
422-6	V1-1	40-48	9.27	12.2	1.1	RI	50-60	45.2	4.2	VP	28.2	2.6	M	7.0	0.7	P	3.2	0.3	2.1	0.2	2.1	0.2
422-7	V1-1	48-56	14.13	10.0	1.4	RI	50-60	42.5	6.0	P	23.2	3.3	M	7.3	1.0	P	4.4	0.6	2.3	0.3	10.3	1.5
422-8	V1-1	58-60	12.10	13.5	1.6	RI	50-60	38.8	4.7	P	21.0	2.5	M	11.6	1.4	P	1.5	0.2	2.2	0.3	11.5	1.4
422-9	V1-1	60-68	10.43	25.6	2.7	RI	40	38.1	4.0	P	19.2	2.0	M	6.3	0.7	P	4.9	0.5	4.1	0.4	1.8	0.2
422-10	V1-1	68-76	9.06	28.7	2.6	RI	50-60	41.6	3.8	P	15.7	1.4	M	5.5	0.5	P	1.5	0.1	2.6	0.2	4.5	0.4
422-11	V1-2	0-15	7.60	0.0	0.0			TR	TR	VP	61.2	4.7	M	31.9	2.4	M	2.3	0.2	2.2	0.2	2.5	0.2
422-12	V1-2	15-30	8.84	0.0	0.0			22.0	1.9	VP	48.8	4.3	M	21.6	1.9	P	3.8	0.3	1.9	0.2	2.0	0.2
422-13	V1-2	30-45	12.00	0.0	0.0			36.2	4.3	P	34.8	4.2	M	17.4	2.1	P	2.2	0.3	2.0	0.2	7.5	0.9
422-14	V1-2	45-60	8.96	TR	TR	RI	50-60	32.1	2.9	VP	34.7	3.1	M	21.0	1.9	P	2.1	0.2	2.2	0.2	8.0	0.7
422-15	V1-2	60-65	11.21	18.9	2.1	RI	50-60	34.2	3.8	P	29.7	3.3	M	8.8	1.0	P	1.4	0.2	4.6	0.5	2.4	0.3
422-16	V1-2	65-75	5.47	0.0	0.0			0.0	0.0		68.6	3.7	P	26.9	1.5	VP	1.4	0.1	1.1	0.1	2.1	0.1
422-17	V1-2	75-85	0.86	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0		38.4	0.3	15.5	0.1	46.1	0.4
422-18	V1-2	85-90	1.50	0.0	0.0			0.0	0.0		0.0	0.0		0.0	0.0		35.9	0.5	16.6	0.3	47.5	0.7
422-34	V4	0-10	12.78	12.0	1.5	RI	40-50	41.2	5.3	P	27.5	3.5	M	7.1	0.9	P	2.8	0.4	3.2	0.4	6.2	0.8
422-35	V4	10-18	11.68	6.5	0.8	RI	40-50	50.4	5.9	P	23.7	2.8	M	8.1	0.9	P	2.6	0.3	3.3	0.4	5.3	0.6
422-36	V4	18-24	10.18	28.0	2.9	RI	40-50	31.2	3.2	P	22.0	2.3	M	10.6	1.1	P	2.3	0.2	2.6	0.3	2.7	0.3
422-37	V4	24-30	4.12	TR	TR	RI	40-50	64.9	2.7	M	17.6	0.7	M	12.7	0.5	M	0.0	0.0	2.6	0.1	2.2	0.1
422-38	V4	30-40	4.71	TR	TR	RI	40-50	60.6	2.9	M	18.0	0.8	P	15.6	0.7	P	0.0	0.0	2.4	0.1	3.5	0.2

A = Weight % relevant size fraction
B = Weight % bulk sample

Mixed-layer Ordering:
R I = Randomly Interstratified (R0)
O = Ordered Interstratification (R1)
LR = Long-range Ordering (R3)

Crystallinity:
VW = Very Well Crystallised
W = Well Crystallised
M = Moderately Crystallised
P = Poorly Crystallised
VP = Very Poorly Crystallised

XRF Major Elements

Client : Rogaland Research

Field : Ekofisk

Sample number	Core	Slice (cm)	Na_2O %	Mg0 %	Al_2O_3 %	SiO_2 %	P_2O_5 %	SO_3 %	Cl %	K_2O %	CaO %	TiO_2 %	MnO %	Fe_2O_3 %	BaO %	LOI %
422-43	V9	0-5	1.13	1.86	5.33	29.33	0.12	15.30	1.05	0.99	5.02	0.20	0.27	6.37	16.21	17.8
422-44	V9	5-11	0.96	1.37	4.35	27.06	0.12	17.88	0.81	0.96	5.76	0.16	0.30	4.97	24.47	11.5
422-45	V9	11-15	0.98	1.80	8.97	33.14	0.12	12.43	0.92	1.62	3.86	0.16	0.22	4.77	15.52	15.5
422-46	V9	15-22	1.09	3.14	7.11	46.83	0.08	7.43	0.66	1.33	5.35	0.25	0.23	5.69	9.64	10.9
422-47	V9	22-23	0.69	1.79	3.41	72.96	0.04	4.01	0.48	0.82	4.53	0.27	0.10	3.03	1.50	6.4
422-48	V9	33-36	1.00	2.33	6.80	63.35	0.07	4.47	0.57	1.39	2.39	0.26	0.09	4.48	4.64	8.1
422-49	V9	36-38	0.79	2.15	3.89	79.00	0.03	2.85	0.45	0.97	1.27	0.19	0.06	2.70	1.58	4.1
422-50	V9	38-43	0.99	2.32	5.13	64.14	0.05	6.19	0.62	1.18	2.71	0.13	0.08	3.67	5.60	7.1
422-51	V9	43-53	0.82	0.27	3.00	88.04	0.02	1.75	0.49	1.07	0.81	0.24	0.01	1.00	0.15	2.4
422-52	V9	53-68	0.79	0.28	2.92	89.26	0.04	0.81	0.43	1.15	1.46	0.28	0.01	0.69	0.03	1.9
422-57	SW3	0-7	1.18	1.45	5.77	29.19	0.12	13.95	1.20	1.29	7.20	0.25	0.27	6.32	19.25	12.6
422-58	SW3	7-13	1.19	1.79	8.40	35.20	0.08	12.95	0.96	1.59	4.02	0.26	0.39	4.90	14.26	14.1
422-59	SW3	13-15	1.52	2.56	11.09	42.25	0.07	7.23	1.30	1.98	1.95	0.38	0.14	4.78	6.89	17.9
422-60	VC2-1	0-9	1.57	3.81	11.94	44.58	0.12	3.73	1.42	2.09	6.47	0.58	0.12	5.83	2.30	15.4
422-61	VC2-1	9-12	1.08	2.72	8.21	34.43	0.07	6.10	1.40	1.29	15.95	0.36	0.19	5.50	6.32	16.1
422-62	VC2-1	12-15	1.29	2.07	11.63	41.47	0.11	6.62	1.08	1.84	3.60	0.38	0.26	5.84	7.97	15.8
422-63	VC2-1	15-30	1.13	1.75	10.51	39.38	0.12	10.52	0.94	1.60	2.72	0.25	0.20	5.35	10.10	15.9
422-64	VC2-1	30-41	1.10	1.79	10.42	39.85	0.10	11.03	0.82	1.64	2.18	0.25	0.23	5.59	10.26	15.3
422-65	VC2-1	44-50	1.20	1.83	12.68	44.21	0.10	5.48	0.79	1.95	1.86	0.45	0.19	5.29	6.12	18.0
422-66	VC2-1	50-56	1.51	2.61	14.15	45.73	0.12	3.88	0.80	2.44	2.93	0.61	0.14	6.03	3.98	15.3
422-67	VC2-1	58-68	1.35	11.94	5.40	25.26	0.05	5.75	2.35	0.63	16.92	0.28	0.09	4.70	0.71	24.6
422-68	VC2-1	68-77	1.41	4.25	6.48	31.13	0.01	8.62	2.16	1.19	11.74	0.28	0.15	5.48	6.77	20.1
422-69	VC2-1	77-89	1.36	2.65	11.37	54.01	0.09	2.30	1.05	2.29	3.75	0.56	0.09	6.18	1.58	12.6
422-70	VC2-1	89-100	0.84	0.30	3.04	87.70	0.02	2.03	0.71	1.14	0.64	0.24	0.01	0.93	0.02	2.3
422-71	VC2-2	0-13	0.79	0.29	2.99	87.06	0.02	2.49	0.62	1.10	1.07	0.23	0.01	1.04	0.08	2.3
422-72	VC2-2	13-35	0.79	0.29	3.07	87.15	0.03	1.21	0.63	1.19	2.11	0.29	0.01	0.77	0.02	2.3
422-73	VC2-2	35-60	0.81	0.37	3.35	88.35	0.04	0.25	0.52	1.37	1.76	0.26	0.01	0.61	0.02	2.4
422-74	VC2-2	60-80	0.65	0.29	3.10	89.46	0.03	0.13	0.43	0.43	1.27	1.57	0.27	0.01	0.65	1.9

XRF Major Elements

Client : Rogaland Research

$BaSO_4$ **in matrix**

Field : Ekofisk

Sample number	Core	Slice (cm)	Na_2O %	Mg0 %	Al_2O_3 %	SiO_2 %	P_2O_5 %	S %	Cl %	K_2O %	CaO %	TiO_2 %	MnO %	Fe_2O_3 %	$BaSO_4$ %	LOI %
422-43	V9	0-5	1.13	1.86	5.33	29.33	0.12	6.84	1.05	0.99	5.02	0.20	0.27	6.37	24.67	17.8
422-44	V9	5-11	0.96	1.37	4.35	27.06	0.12	5.10	0.81	0.96	5.76	0.16	0.30	4.97	37.25	11.5
422-45	V9	11-15	0.98	1.80	8.97	33.14	0.12	4.33	0.92	1.62	3.86	0.16	0.22	4.77	23.62	15.5
422-46	V9	15-22	1.09	3.14	7.11	46.83	0.08	2.40	0.66	1.33	5.35	0.25	0.23	5.69	14.67	10.9
422-47	V9	22-23	0.69	1.79	3.41	72.96	0.04	3.23	0.48	0.82	4.53	0.27	0.10	3.03	2.28	6.4
422-48	V9	33-36	1.00	2.33	6.80	63.35	0.07	2.04	0.57	1.39	2.39	0.26	0.09	4.48	7.07	8.1
422-49	V9	36-38	0.79	2.15	3.89	79.00	0.03	2.02	0.45	0.97	1.27	0.19	0.06	2.70	2.40	4.1
422-50	V9	38-43	0.99	2.32	5.13	64.14	0.05	3.26	0.62	1.18	2.71	0.13	0.08	3.67	8.53	7.1
422-51	V9	43-53	0.82	0.27	3.00	88.04	0.02	1.67	0.49	1.07	0.81	0.24	0.01	1.00	0.23	2.4
422-52	V9	53-68	0.79	0.28	2.92	89.26	0.04	0.79	0.43	1.15	1.46	0.28	0.01	0.69	0.04	1.9
422-57	SW3	0-7	1.18	1.45	5.77	29.19	0.12	3.90	1.20	1.29	7.20	0.25	0.27	6.32	29.31	12.6
422-58	SW3	7-13	1.19	1.79	8.40	35.20	0.08	5.50	0.96	1.59	4.02	0.26	0.39	4.90	21.71	14.1
422-59	SW3	13-15	1.52	2.56	11.09	42.25	0.07	3.63	1.30	1.98	1.95	0.38	0.14	4.78	10.48	17.9
422-60	VC2-1	0-9	1.57	3.81	11.94	44.58	0.12	2.53	1.42	2.09	6.47	0.58	0.12	5.83	3.50	15.4
422-61	VC2-1	9-12	1.08	2.72	8.21	34.43	0.07	2.80	1.40	1.29	15.95	0.36	0.19	5.50	9.63	16.1
422-62	VC2-1	12-15	1.29	2.07	11.63	41.47	0.11	2.46	1.08	1.84	3.60	0.38	0.26	5.84	12.13	15.8
422-63	VC2-1	15-30	1.13	1.75	10.51	39.38	0.12	5.24	0.94	1.60	2.72	0.25	0.20	5.35	15.38	15.9
422-64	VC2-1	30-41	1.10	1.79	10.42	39.85	0.10	5.67	0.82	1.64	2.18	0.25	0.23	5.59	15.62	15.3
422-65	VC2-1	44-50	1.20	1.83	12.68	44.21	0.10	2.28	0.79	1.95	1.86	0.45	0.19	5.29	9.32	18.0
422-66	VC2-1	50-56	1.51	2.61	14.15	45.73	0.12	1.80	0.80	2.44	2.93	0.61	0.14	6.03	6.05	15.3
422-67	VC2-1	58-68	1.35	11.94	5.40	25.26	0.05	5.37	2.35	0.63	16.92	0.28	0.09	4.70	1.09	24.6
422-68	VC2-1	68-77	1.41	4.25	6.48	31.13	0.01	5.08	2.16	1.19	11.74	0.28	0.15	5.48	10.31	20.1
422-69	VC2-1	77-89	1.36	2.65	11.37	54.01	0.09	1.48	1.05	2.29	3.75	0.56	0.09	6.18	2.40	12.6
422-70	VC2-1	89-100	0.84	0.30	3.04	87.70	0.02	2.02	0.71	1.14	0.64	0.24	0.01	0.93	0.03	2.3
422-71	VC2-2	0-13	0.79	0.29	2.99	87.06	0.02	2.45	0.62	1.10	1.07	0.23	0.01	1.04	0.13	2.3
422-72	VC2-2	13-35	0.79	0.29	3.07	87.15	0.03	1.20	0.63	1.19	2.11	0.29	0.01	0.77	0.04	2.3
422-73	VC2-2	35-60	0.81	0.37	3.35	88.35	0.04	0.24	0.52	1.37	1.76	0.26	0.01	0.61	0.03	2.4
422-74	VC2-2	60-80	0.65	0.29	3.10	89.46	0.03	0.03	0.43	0.43	1.27	1.57	0.27	0.01	0.75	1.9

XRF Trace Elements

Client : Rogaland Research

Field : Ekofisk

Sample number	Core	Slice (cm)	**V** ppm	**Cr** ppm	**Ni** ppm	**Cu** ppm	**Zn** ppm	**Ga** ppm	**Rb** ppm	**Sr** ppm	**Y** ppm	**Zr** ppm	**Nb** ppm	**Sn** ppm	**Cs** ppm	**La** ppm	**Ce** ppm	**Pb** ppm	**Th** ppm	**U** ppm
422-43	V9	0-5	64	14	24	102	139	12	25	5138	11	74	7	< 5	< 5	< 15	< 15	83	9	< 5
422-44	V9	5-11	84	15	24	97	844	21	26	5038	10	73	8	< 5	< 5	< 15	< 15	244	9	< 5
422-45	V9	11-15	56	13	46	88	605	26	72	3451	16	130	7	< 5	< 5	< 15	< 15	226	13	7
422-46	V9	15-22	30	10	32	82	990	25	44	2474	11	133	4	< 5	< 5	< 15	< 15	223	8	< 5
422-47	V9	22-23	7	11	31	48	431	10	25	786	7	240	2	< 5	< 5	< 15	< 15	154	3	1
422-48	V9	33-36	14	9	48	148	648	20	55	1156	8	193	5	< 5	< 5	< 15	< 15	400	6	3
422-49	V9	36-38	6	15	84	33	874	17	35	405	5	199	3	< 5	< 5	< 15	< 15	166	3	3
422-50	V9	38-43	22	11	50	91	801	24	42	1389	6	224	5	< 5	< 5	< 15	< 15	529	6	4
422-51	V9	43-53	8	16	4	6	20	4	32	91	6	420	4	< 5	< 5	16	26	20	2	1
422-52	V9	53-68	8	4	1	4	8	3	30	71	7	551	4	< 5	< 5	8	17	7	3	2
422-57	SW3	0-7	67	14	50	108	251	15	39	4881	12	63	8	< 5	< 5	< 15	< 15	107	12	< 5
422-58	SW3	7-13	57	13	58	96	586	27	65	3276	14	130	10	< 5	< 5	< 15	< 15	233	11	< 5
422-59	SW3	13-15	24	10	49	52	359	22	79	1839	14	113	4	< 5	< 5	< 15	< 15	103	13	< 5
422-60	VC2-1	0-9	9	8	31	42	138	18	94	847	17	188	12	< 5	< 5	< 15	< 15	49	12	3
422-61	VC2-1	9-12	25	11	42	67	300	14	43	2069	12	80	4	< 5	< 5	< 15	< 15	115	10	2
422-62	VC2-1	12-15	26	10	52	61	127	19	71	2352	15	104	4	< 5	< 5	< 15	< 15	51	14	3
422-63	VC2-1	15-30	46	11	70	72	170	22	78	3682	16	116	5	< 5	< 5	< 15	< 15	77	19	< 5
422-64	VC2-1	30-41	42	11	66	99	366	26	81	2999	20	156	8	< 5	< 5	< 15	< 15	128	15	< 5
422-65	VC2-1	44-50	19	10	58	52	260	22	85	1636	15	117	6	< 5	< 5	< 15	< 15	97	14	5
422-66	VC2-1	50-56	15	9	41	53	299	23	113	1141	19	176	14	< 5	< 5	< 15	< 15	96	14	5
422-67	VC2-1	58-68	3	29	18	49	95	9	28	425	12	74	6	< 5	< 5	< 15	< 15	24	7	< 1
422-68	VC2-1	68-77	23	9	32	76	435	17	44	2010	12	109	5	< 5	< 5	< 15	< 15	114	10	< 5
422-69	VC2-1	77-89	6	27	35	71	403	22	104	569	15	217	10	< 5	< 5	< 15	< 15	239	11	< 3
422-70	VC2-1	89-100	18	6	3	7	10	4	32	59	5	330	4	< 5	< 5	4	12	7	2	1
422-71	VC2-2	0-13	17	8	2	6	10	3	30	72	5	386	4	< 5	< 5	6	15	7	2	2
422-72	VC2-2	13-35	10	4	1	4	6	3	28	87	6	556	4	< 5	< 5	9	22	6	4	< 1
422-73	VC2-2	35-60	6	4	2	6	8	3	35	66	6	334	4	< 5	< 5	5	14	7	2	1
422-74	VC2-2	60-80	8	3	1	6	7	4	33	61	7	439	4	< 5	< 5	8	17	6	2	1

X-ray Diffraction Analysis **Client : Rogaland Research**

Size Fraction : Whole Rock **Field : Ekofisk**

Sample no.	Core	Slice (cm)	Illite/Smectite	Illite+Mica	Kaolinite	Chlorite	Barite	Quartz	K Feldspar	Plagioclase	Calcite	Dolomite	Siderite	Brucite	?Amphibole	Zeolite	Pyrite	Total
422-43	V9	0-5	10.6	10.1	3.2	2.0	27.4	28.8	2.5	1.5	6.5	2.6	0.0	0.0	0.0	0.0	4.8	100
422-44	V9	5-11	7.3	9.8	3.5	1.8	33.8	21.2	2.0	2.0	10.0	1.1	0.0	0.0	0.0	0.0	7.4	100
422-45	V9	11-15	14.3	9.8	5.0	2.4	26.3	24.9	1.0	1.8	7.3	1.7	0.0	0.0	0.0	0.0	5.5	100
422-46	V9	15-22	7.5	8.0	3.9	1.4	17.6	41.5	2.4	1.2	8.8	1.5	0.0	0.0	0.0	0.0	6.3	100
422-47	V9	22-23	2.7	3.2	1.5	0.7	4.2	74.4	4.6	4.0	2.7	0.6	0.0	0.0	0.0	0.0	1.4	100
422-48	V9	33-36	8.7	7.4	2.7	1.3	7.9	62.2	2.2	1.6	2.0	1.2	0.0	0.0	0.0	0.0	2.7	100
422-49	V9	36-38	5.6	3.6	2.1	0.7	2.6	78.0	2.9	1.3	1.4	0.8	0.0	0.0	0.0	0.0	1.0	100
422-50	V9	38-43	6.5	5.9	3.2	1.1	7.3	65.6	2.3	1.6	3.6	0.9	0.0	0.0	0.0	0.0	2.0	100
422-51	V9	43-53	1.0	3.8	1.1	1.0	1.6	81.6	4.9	2.1	0.9	0.7	0.0	0.0	0.0	0.0	1.3	100
422-52	V9	53-68	1.0	3.8	0.9	1.0	1.9	80.9	5.4	2.1	1.5	0.9	0.0	0.0	0.0	0.0	0.4	100
422-57	SW3	0-7	7.3	10.4	4.5	2.1	29.7	19.7	1.6	1.3	15.3	2.2	0.0	0.0	0.0	0.0	5.9	100
422-58	SW3	7-13	12.4	9.2	4.5	2.5	27.0	23.9	2.3	1.5	8.6	1.4	0.0	0.0	0.0	0.0	6.8	100
422-59	SW3	13-15	14.2	14.6	6.7	3.2	16.3	26.4	3.9	2.1	5.0	1.3	0.0	0.0	0.0	0.0	6.3	100
422-60	VC2-1	0-9	9.3	12.1	5.7	2.8	7.5	38.9	2.9	2.7	12.6	1.5	0.0	0.0	0.0	0.0	4.1	100
422-61	VC2-1	9-12	9.3	8.7	5.2	2.2	17.7	22.7	2.4	4.6	19.6	2.3	0.0	0.0	0.0	0.0	5.1	100
422-62	VC2-1	12-15	21.2	11.9	7.7	4.0	16.1	23.0	2.0	2.5	5.5	1.3	0.0	0.0	0.0	0.0	4.9	100
422-63	VC2-1	15-30	20.1	15.8	6.5	3.9	17.3	20.6	2.3	1.5	6.2	1.6	0.0	0.0	0.0	0.0	4.1	100
422-64	VC2-1	30-41	16.4	14.5	6.0	3.6	15.9	22.3	3.0	2.3	4.8	1.6	0.0	0.0	0.0	1.9	7.7	100
422-65	VC2-1	44-50	20.3	15.2	7.3	4.6	12.4	25.7	2.6	2.4	4.8	1.3	0.0	0.0	0.0	0.0	3.4	100
422-66	VC2-1	50-56	8.1	20.1	7.3	4.0	10.2	34.2	3.8	3.2	4.8	1.9	0.0	0.0	0.0	0.0	2.3	100
422-67	VC2-1	58-68	0.0	3.7	8.8	3.7	6.5	17.6	3.5	1.8	22.7	2.1	0.0	18.9	5.0	0.0	5.7	100
422-68	VC2-1	68-77	2.7	6.7	8.1	5.1	22.3	28.9	1.9	1.5	15.1	0.0	0.0	0.0	0.0	0.0	7.8	100
422-69	VC2-1	77-89	10.4	15.0	6.6	4.2	2.8	44.4	2.4	3.0	5.1	1.5	2.5	0.0	0.0	0.0	1.9	100
422-70	VC2-1	89-100	TR	4.2	0.8	0.9	1.8	77.2	9.7	2.4	0.8	1.6	0.0	0.0	0.0	0.0	0.7	100
422-71	VC2-2	0-13	0.0	5.7	1.1	0.9	1.5	77.9	7.3	1.8	0.7	0.5	1.3	0.0	0.0	0.0	1.3	100
422-72	VC2-2	13-35	0.0	4.0	0.9	0.8	1.4	85.4	2.9	2.0	1.2	0.7	0.0	0.0	0.0	0.0	0.7	100
422-73	VC2-2	35-60	0.0	4.3	1.1	0.8	1.5	81.0	3.2	2.1	4.0	1.4	0.0	0.0	0.0	0.0	0.6	100
422-74	VC2-2	60-80	TR	4.5	1.3	0.8	1.9	81.3	4.0	2.8	1.9	0.9	0.0	0.0	0.0	0.0	0.6	100

X-Ray Diffraction Analysis **Client: Rogaland Research**

Size Fraction : <2 micron clay **Field : Ekofisk**

Sample	Core	Slice (cm)	Wt. %	Illite/smectite				Illite			Kaolinite			Chlorite			Barite		Quartz		Calcite	
number			<2um	% A	% B	Order	%Illite	% A	% B	Crys	% A	% B	Crys	% A	% B	Crys	% A	% B	% A	% B	% A	% B
422-43	V9	0-5	27.41	38.7	10.6	RI	50-60	36.1	9.9	P	10.8	3.0	M	7.2	2.0	P	0.0	0.0	7.2	2.0	0.0	0.0
422-44	V9	5-11	22.42	30.0	6.7	RI	50-60	39.4	8.8	P	14.9	3.4	M	7.9	1.8	P	2.3	0.5	5.4	1.2	0.0	0.0
422-45	V9	11-15	31.90	41.2	13.2	RI	50-60	30.4	9.7	M	15.6	5.0	M	7.4	2.3	P	1.9	0.6	3.5	1.1	0.0	0.0
422-46	V9	15-22	20.27	35.6	7.2	RI	40-50	37.2	7.6	M	16.8	3.4	M	6.6	1.3	P	0.0	0.0	3.8	0.8	0.0	0.0
422-47	V9	22-23	7.25	35.4	2.6	RI	40-50	39.8	2.9	P	13.8	1.0	M	6.4	0.5	P	1.8	0.1	2.7	0.2	0.0	0.0
422-48	V9	33-36	18.90	40.0	7.6	RI	40-50	36.3	6.9	M	13.8	2.6	M	6.5	1.2	P	0.0	0.0	3.4	0.6	0.0	0.0
422-49	V9	36-38	11.65	44.4	5.2	RI	40-50	30.7	3.6	P	15.2	1.8	M	5.9	0.7	P	0.0	0.0	3.7	0.4	0.0	0.0
422-50	V9	38-43	15.27	37.6	5.7	RI	40-50	35.7	5.5	P	16.4	2.5	M	7.3	1.1	P	0.0	0.0	3.1	0.5	0.0	0.0
422-51	V9	43-53	6.94	13.8	1.0	RI	50-60	52.5	3.6	M	15.7	1.1	P	14.9	1.0	P	0.0	0.0	3.2	0.2	0.0	0.0
422-52	V9	53-68	6.45	11.9	0.8	RI	50-60	56.9	3.7	P	12.2	0.8	P	13.9	0.9	P	0.0	0.0	5.2	0.3	0.0	0.0
422-57	SW3	0-7	25.10	28.5	7.2	RI	40-50	39.7	10.0	P	15.4	3.9	M	6.8	1.7	P	2.4	0.6	4.6	1.1	2.6	0.6
422-58	SW3	7-13	29.73	41.0	12.2	RI	40-50	29.7	8.8	P	12.4	3.7	M	7.9	2.4	M	1.9	0.6	4.8	1.4	2.3	0.7
422-59	SW3	13-15	39.78	35.5	14.1	RI	40-50	36.5	14.5	P	16.3	6.5	M	7.4	2.9	P	0.0	0.0	4.3	1.7	0.0	0.0
422-60	VC2-1	0-9	28.34	29.4	8.3	RI	40-50	40.5	11.5	P	17.0	4.8	M	9.0	2.6	P	0.0	0.0	2.6	0.7	1.5	0.4
422-61	VC2-1	9-12	23.90	37.1	8.9	RI	40-50	33.3	8.0	P	17.4	4.2	M	7.2	1.7	P	0.0	0.0	3.2	0.8	1.9	0.4
422-62	VC2-1	12-15	45.18	46.4	20.9	RI	50-60	24.9	11.3	P	16.8	7.6	M	8.2	3.7	P	0.0	0.0	3.7	1.7	0.0	0.0
422-63	VC2-1	15-30	46.10	42.6	19.7	RI	40-50	32.9	15.2	P	13.7	6.3	M	7.7	3.6	P	0.0	0.0	3.1	1.4	0.0	0.0
422-64	VC2-1	30-41	41.73	38.6	16.1	RI	50-60	34.5	14.4	P	14.0	5.9	M	8.2	3.4	P	0.0	0.0	4.6	1.9	0.0	0.0
422-65	VC2-1	44-50	47.82	41.8	20.0	RI	50-60	30.3	14.5	P	14.9	7.1	M	8.9	4.2	P	0.0	0.0	4.1	2.0	0.0	0.0
422-66	VC2-1	50-56	39.60	19.3	7.6	RI	50-60	50.2	19.9	M	17.1	6.8	M	9.2	3.6	P	0.0	0.0	4.2	1.7	0.0	0.0
422-67	VC2-1	58-68	13.45	0.0	0.0			18.5	2.5	VP	56.7	7.6	P	23.1	3.1	VP	0.0	0.0	0.6	0.1	1.2	0.2
422-68	VC2-1	68-77	19.06	9.6	1.8	RI	60-70	28.8	5.5	P	37.0	7.1	P	22.9	4.4	P	0.0	0.0	1.6	0.3	0.0	0.0
422-69	VC2-1	77-89	35.78	27.4	9.8	RI	60-70	40.8	14.6	P	17.7	6.3	M	11.4	4.1	P	0.0	0.0	2.6	0.9	0.0	0.0
422-70	VC2-1	89-100	5.61	TR	TR	RI	60-70	67.4	3.8	P	13.4	0.8	P	16.3	0.9	P	0.0	0.0	2.9	0.2	0.0	0.0
422-71	VC2-2	0-13	7.03	0.0	0.0			71.1	5.0	P	15.6	1.1	P	11.2	0.8	P	0.0	0.0	2.0	0.1	0.0	0.0
422-72	VC2-2	13-35	5.63	0.0	0.0			67.8	3.8	P	13.9	0.8	P	13.6	0.8	P	0.0	0.0	4.7	0.3	0.0	0.0
422-73	VC2-2	35-60	6.30	0.0	0.0			68.0	4.3	P	16.4	1.0	P	11.3	0.7	P	0.0	0.0	4.3	0.3	0.0	0.0
422-74	VC2-2	60-80	6.30	TR	TR	RI	60-70	68.0	4.3	P	16.4	1.0	P	11.3	0.7	P	0.0	0.0	4.3	0.3	0.0	0.0