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IKU REPORT

TITLE

Organic geochemical analysis of samples from Nordflaket 1994

Data Report

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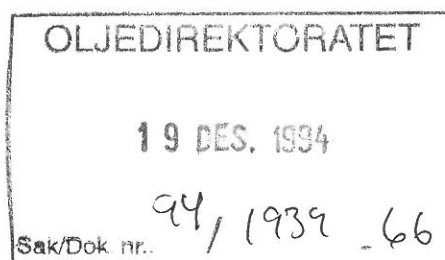
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SUMMARY

This data report presents the results of the organic geochemical analysis of 40 headspace/occluded gas samples and the follow-up analysis of 5 samples from core 7418/01-U-01 collected at Nordflaket in 1994.



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Preface

This data report presents the results of the organic geochemical analyses of samples collected during the survey at Nordflaket in July/August 1994.

Headspace and occluded gas analysis were performed on 40 samples from five wells. The selection was as follows:

Well	Number of samples
7418/01-U-01	10
7517/12-U-01	9
7616/11-U-01	6
7617/11-U-02	12
7618/10-U-01	3

In addition six samples from well 7418/01-U-01 were analysed to characterize the hydrocarbons observed. Since one of the samples was a reference sample, only five samples were analysed.

The following samples were analysed:

IKU No.	Depth (m)
E-3815	71.44
E-3818	74.62
E-3819	74.67
E-3817	74.70
E-3820	74.73

Whole oil gas chromatography was performed on 4 of the samples. One sample, IKU No. E-3815 (71.44 m), did not contain any oil, nor any traces or smell of oil. In the other samples, small drops of oil were observed in the aluminium foil which covered the core sample. The oil was injected just minutes after the sample was removed from the freezer where the samples were stored at -80°C.

The analyses were carried out in accordance with "The Norwegian Industry Guide to Organic Geochemical Analyses". The $\delta^{13}\text{C}$ isotope analysis on the chromatographic fractions was performed by Institute of Energy Technology (IFE).

Table 1a Concentration of C1-C5+ hydrocarbons in headspace gas

IKU No.	Depth	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET- NESS	iC4/ nC4
	(m)	(µl/kg dry rock)								(%)	
7418/01-U-01											
E3760	15.89	219	0	0	0	0	2	219	0	-1	
E3772	28.97	3019	0	3	1	0	8	3023	4	0	-1
E3784	39.36	7768	1	0	1	1	9	7771	3	0	1.00
E3795	49.11	14442	2	5	21	22	44	14492	50	0	0.95
E3807	63.46	7310	1	0	5	5	9	7321	11	0	1.00
E3824	80.61	31623	9	7	16	13	17	31668	45	0	1.23
E3833	88.52	4111	1	0	0	0	0	4112	1	0	-1
E3844	96.48	60749	3	0	0	0	0	60752	3	0	-1
E3854	107.53	51446	3	0	4	3	2	51456	10	0	1.33
E3862	120.11	46946	4	12	6	4	2	46972	26	0	1.50
7517/12-U-01											
E3393	114.87	25707	1	0	0	0	0	25708	1	0	-1
E3402	126.56	7718	0	0	0	0	0	7718	0	-1	
E3406	132.85	33475	2	0	0	0	1	33477	2	0	-1
E3418	142.74	30851	2	0	0	0	0	30853	2	0	-1
E3431	153.97	14698	1	5	0	0	0	14704	6	0	-1
E3434	158.22	23646	5	3	0	0	0	23654	8	0	-1
E3450	172.32	29570	2	0	0	0	0	29572	2	0	-1
E3462	185.39	38139	10	2	0	0	0	38151	12	0	-1
E3468	194.21	31981	5	3	2	1	0	31992	11	0	2.00
7616/11-U-01											
E3687	13.15	4700	3	3	2	2	1	4710	10	0	1.00
E3695	23.76	6818	186	30	0	0	0	7034	216	3	-1
E3701	32.48	46723	4	1	1	0	0	46729	6	0	-1
E3717	43.17	17467	64	35	4	4	2	17574	107	1	1.00
E3721	53.69	3917	8	4	2	3	0	3934	17	0	0.67
E3729	62.94	2850	1	1	0	0	0	2852	2	0	-1
7617/11-U-02											
E3534	19.30	2	0	0	0	0	0	2	0	-1	
E3541	30.18	173	0	0	0	0	0	173	0	-1	
E3561	45.00	360	0	0	0	0	0	360	0	-1	
E3582	61.63	26405	2	0	0	0	0	26407	2	0	-1
E3592	72.20	1769	3	2	1	1	1	1776	7	0	1.00
E3606	84.42	1737	14	10	1	1	1	1763	26	1	1.00
E3617	93.34	1886	20	8	1	1	1	1916	30	2	1.00
E3627	105.00	13192	2	1	0	0	0	13195	3	0	-1
E3653	121.24	2649	13	3	0	0	0	2665	16	1	-1
E3662	132.95	21657	56	12	1	1	0	21727	70	0	1.00
E3671	141.54	61003	6	0	0	0	0	61009	6	0	-1
E3676	150.45	34206	53	9	1	0	0	34269	63	0	-1
7618/10-U-01											
E3476	13.16	117	1	3	0	0	0	121	4	3	-1
E3483	22.10	35190	8	0	0	0	0	35198	8	0	-1
E3486	24.21	74186	9	0	0	0	0	74195	9	0	-1

Legend: -1 Data are not available or cannot be calculated

Table 1b Concentration of C1-C5+ hydrocarbons in occluded gas

IKU No.	Depth	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS	iC4/nC4
	(m)	(µl/kg dry rock)								(%)	
7418/01-U-01											
E3760	15.89	396	50	32	0	14	3706	492	96	20	0.00
E3772	28.97	582	24	12	0	7	1247	625	43	7	0.00
E3784	39.36	-1	-1	N/A	-1						
E3795	49.11	4926	19	70	481	721	3557	6217	1291	21	0.67
E3807	63.46	9815	44	46	519	805	3728	11229	1414	13	0.64
E3824	80.61	9330	51	186	454	647	856	10668	1338	13	0.70
E3833	88.52	10570	47	19	8	9	44	10653	83	1	0.89
E3844	96.48	4710	17	10	0	0	34	4737	27	1	-1
E3854	107.53	3609	26	15	99	141	439	3890	281	7	0.70
E3862	120.11	9731	35	341	274	340	467	10721	990	9	0.81
7517/12-U-01											
E3393	114.87	11161	168	65	0	21	68	11415	254	2	0.00
E3402	126.56	6267	231	90	0	15	25	6603	336	5	0.00
E3406	132.85	13841	32	8	0	1	7	13882	41	0	0.00
E3418	142.74	6974	25	7	0	0	12	7006	32	0	-1
E3431	153.97	12430	36	13	0	0	5	12479	49	0	-1
E3434	158.22	2854	52	23	0	6	17	2935	81	3	0.00
E3450	172.32	9882	33	11	0	3	8	9929	47	0	0.00
E3462	185.39	23134	50	12	0	2	11	23198	64	0	0.00
E3468	194.21	9264	33	10	17	9	263	9333	69	1	1.89
7616/11-U-01											
E3687	13.15	44809	105	201	102	207	359	45424	615	1	0.49
E3695	23.76	10601	1742	1053	105	222	347	13723	3122	23	0.47
E3701	32.48	85075	118	63	153	29	231	85438	363	0	5.28
E3717	43.17	66005	2248	4204	658	1055	778	74170	8165	11	0.62
E3721	53.69	22966	205	230	76	151	476	23628	662	3	0.50
E3729	62.94	23908	52	30	9	21	626	24020	112	0	0.43
7617/11-U-02											
E3534	19.30	1193	62	18	24	8	30	1305	112	9	3.00
E3541	30.18	2315	90	30	9	4	14	2448	133	5	2.25
E3561	45.00	48456	116	22	3	0	16	48597	141	0	-1
E3582	61.63	40743	152	24	5	2	1	40926	183	0	2.50
E3592	72.20	18751	254	332	231	124	159	19692	941	5	1.86
E3606	84.42	71712	2199	2187	316	118	39	76532	4820	6	2.68
E3617	93.34	23125	1183	1114	159	68	49	25649	2524	10	2.34
E3627	105.00	164929	202	30	10	1	7	165172	243	0	10.00
E3653	121.24	193890	4116	1725	180	38	25	199949	6059	3	4.74
E3662	132.95	97536	1794	752	59	13	3	100154	2618	3	4.54
E3671	141.54	119287	219	26	7	3	87	119542	255	0	2.33
E3676	150.45	105698	2421	1029	82	22	15	109252	3554	3	3.73
7618/10-U-01											
E3476	13.16	1982	47	12	0	0	2	2041	59	3	-1
E3483	22.10	310977	216	19	0	0	0	311212	235	0	-1
E3486	24.21	158491	137	11	4	0	1	158643	152	0	-1

Legend: -1 Data are not available or cannot be calculated

Table 1c Concentration of C1-C5+ hydrocarbons - summation.

IKU No.	Depth (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
(µl/kg dry rock)											
7418/01-U-01											
E3760	15.89	615	50	32	0	14	3708	711	96	13	0.00
E3772	28.97	3601	24	15	1	7	1255	3648	47	1	0.14
E3784	39.36	7768	1	0	1	1	9	7771	3	0	1.00
E3795	49.11	19368	21	75	502	743	3601	20709	1341	6	0.68
E3807	63.46	17125	45	46	524	810	3737	18550	1425	7	0.65
E3824	80.61	40953	60	193	470	660	873	42336	1383	3	0.71
E3833	88.52	14681	48	19	8	9	44	14765	84	0	0.89
E3844	96.48	65459	20	10	0	0	34	65489	30	0	-1.00
E3854	107.53	55055	29	15	103	144	441	55346	291	0	0.72
E3862	120.11	56677	39	353	280	344	469	57693	1016	1	0.81
7517/12-U-01											
E3393	114.87	36868	169	65	0	21	68	37123	255	0	0.00
E3402	126.56	13985	231	90	0	15	25	14321	336	2	0.00
E3406	132.85	47316	34	8	0	1	8	47359	43	0	0.00
E3418	142.74	37825	27	7	0	0	12	37859	34	0	-1.00
E3431	153.97	27128	37	18	0	0	5	27183	55	0	-1.00
E3434	158.22	26500	57	26	0	6	17	26589	89	0	0.00
E3450	172.32	39452	35	11	0	3	8	39501	49	0	0.00
E3462	185.39	61273	60	14	0	2	11	61349	76	0	0.00
E3468	194.21	41245	38	13	19	10	263	41325	80	0	1.90
7616/11-U-01											
E3687	13.15	49509	108	204	104	209	360	50134	625	1	0.50
E3695	23.76	17419	1928	1083	105	222	347	20757	3338	16	0.47
E3701	32.48	131798	122	64	154	29	231	132167	369	0	5.31
E3717	43.17	83472	2312	4239	662	1059	780	91744	8272	9	0.63
E3721	53.69	26883	213	234	78	154	476	27562	679	2	0.51
E3729	62.94	26758	53	31	9	21	626	26872	114	0	0.43
7617/11-U-02											
E3534	19.30	1195	62	18	24	8	30	1307	112	8	3.00
E3541	30.18	2488	90	30	9	4	14	2621	133	5	2.25
E3561	45.00	48816	116	22	3	0	16	48957	141	0	-1.00
E3582	61.63	67148	154	24	5	2	1	67333	185	0	2.50
E3592	72.20	20520	257	334	232	125	160	21468	948	4	1.86
E3606	84.42	73449	2213	2197	317	119	40	78295	4846	6	2.66
E3617	93.34	25011	1203	1122	160	69	50	27565	2554	9	2.32
E3627	105.00	178121	204	31	10	1	7	178367	246	0	10.00
E3653	121.24	196539	4129	1728	180	38	25	202614	6075	3	4.74
E3662	132.95	119193	1850	764	60	14	3	121881	2688	2	4.29
E3671	141.54	180290	225	26	7	3	87	180551	261	0	2.33
E3676	150.45	139904	2474	1038	83	22	15	143521	3617	2	3.77
7618/10-U-01											
E3476	13.16	2099	48	15	0	0	2	2162	63	2	-1.00
E3483	22.10	346167	224	19	0	0	0	346410	243	0	-1.00
E3486	24.21	232677	146	11	4	0	1	232838	161	0	-1.00

Legend: -1 Data are not available or cannot be calculated

Table 2 Weight and composition of EOM.

IKU no.	Depth (m)	Rock (g)	EOM (mg)	EOM (mg/g rock)	SAT/EOM (%)	ARO/EOM (%)	POL/EOM (%)	ASF/EOM (%)	HC/EOM (%)	Non-HC/EOM (%)	
7418/01-U-01											
E-3815	71.44	50.6	25.1	0.5	34.19	26.34	3.21	28.29	60.53	31.5	1)
E-3818	74.62	51	143.9	2.82	70.84	20.52	0.61	4.59	91.36	5.2	
E-3819	74.67	48.3	118.3	2.45	62.6	21.44	0.74	9.97	84.04	10.71	
E-3817	74.70	40.8	71.5	1.75	61.46	20.87	0.74	11.19	82.33	11.93	
E-3820	74.73	40.4	109.5	2.71	67.27	20.41	0.63	6.48	87.68	7.11	

1) Sum of HC % and non-HC % are relatively far from 100% due to low sample weight.

Table 3 Concentration of EOM and chromatographic fractions.

IKU no.	Depth (m)	TOC (%)	EOM (mg/g TOC)	SAT (mg/g TOC)	ARO (mg/g TOC)	POL (mg/g TOC)	ASF (mg/g TOC)	SAT/ARO *100	HC/Non-HC *100
7418/01-U-01									
E-3815	71.44	0.68	73.53	24.94	19.22	2.34	20.63	130	192
E-3818	74.62	0.57	494.74	350.66	101.58	2.96	22.7	345	1757
E-3819	74.67	1.06	231.13	144.66	49.54	1.7	23.05	292	785
E-3817	74.70	0.63	277.78	170.96	58.05	2.06	31.12	294	690
E-3820	74.73	0.61	444.26	298.92	90.68	2.79	28.81	330	1233

Table 4 Ratios derived from gas chromatograms of saturated hydrocarbons

IKU No.	Depth	CPI	Pr	Ph	A	Pr	n-C17
			A= ---- n-C17	B= ---- n-C18	---- B	--- Ph	n-C17+n-C27
(m)							
7418/01-U-01							
E3815	71.44	1.2	0.6	0.2	3.1	3.9	0.9
E3818	74.62	1.1	0.6	0.2	3.2	3.4	0.9
E3819	74.67	1.1	0.6	0.2	3.5	3.8	0.9
E3817	74.70	1.2	0.6	0.2	3.2	3.3	0.9
E3820	74.73	1.1	0.6	0.2	3.5	3.9	0.9

Legend:

$$\text{CPI} = \frac{1}{2} * \left(\frac{\text{C25+C27+C29+C31}}{\text{C24+C26+C28+C30}} + \frac{\text{C25+C27+C29+C31}}{\text{C26+C28+C30+C32}} \right)$$

Table 5 Ratios derived from gas chromatograms and mass fragmentograms of aromatic hydrocarbons.

IKU No.	Depth (m)	MPI 1	F1	F2	MPI 1	F1	F2
			from GC			from GC/MS	
E-3815	71.44	0.40	0.38	0.18	0.45	0.45	0.25
E-3818	74.62	-1	-1	-1	0.50	0.44	0.24
E-3819	74.67	-1	-1	-1	0.46	0.44	0.24
E-3817	74.70	-1	-1	-1	0.49	0.45	0.24
E-3820	74.73	-1	-1	-1	0.46	0.44	0.24

-1: - Data are not available or cannot be calculated.

$$\text{MPI 1} = 1.5 * \left(\frac{2\text{-MP}+3\text{-MP}}{\text{P}+1\text{-MP}+0\text{-MP}} \right)$$

$$\text{F1} = \frac{3\text{-MP}+2\text{-MP}}{3\text{-MP}+2\text{-MP}+9\text{-MP}+1\text{-MP}}$$

$$\text{F2} = \frac{2\text{-MP}}{3\text{-MP}+2\text{-MP}+9\text{-MP}+1\text{-MP}}$$

Ratios are based on peak areas.

Table 6 Internal distribution of $14\alpha(H)$, $17\alpha(H)$, $20R$ and $14\beta(H)$, $17\beta(H)$, $20R$ + $20S$, $C27$, $C28$ and $C29$ regular steranes.

IKU No.	Depth (m)	from m/z 217 1)			from m/z 218 2)		
		C27	C28	C29	C27	C28	C29
		(%)	(%)	(%)	(%)	(%)	(%)
7418/01-U-01							
E3815	71.44	17.8	15.3	66.9	15.5	34.0	50.4
E3818	74.62	31.4	22.0	46.6	27.9	36.2	35.9
E3819	74.67	26.1	20.1	53.8	28.9	36.4	34.7
E3817	74.70	26.4	19.5	54.0	27.9	36.3	35.8
E3820	74.73	30.1	21.4	48.5	27.0	33.7	39.3

Legend:

¹⁾ distribution of peaks $27\alpha\alpha R$, $28\alpha\alpha R$, $29\alpha\alpha R$ in m/z 217.

²⁾ distribution of peaks $(27\beta\beta R+27\beta\beta S)$, $(28\beta\beta R+28\beta\beta S)$, $(29\beta\beta R+29\beta\beta S)$ in m/z 218.

Ratios are based on peak heights.

Table 7 Molecular ratios from terpane and sterane mass fragmentograms. Maturity-dependent ratios.

IKU No.	Depth (m)	$\alpha\beta/\alpha\beta+\beta\alpha$	%22S	%22S	%22S	%20S	% $\beta\beta$	% $\beta\beta$
		hopanes	hopanes	hopanes	hopanes	steranes	steranes	steranes
		1)	2)	3)	4)	5)	6)	7)
7418/01-U-01								
E3815	71.44	0.86	44	40	39	7	32	19
E3818	74.62	0.87	50	57	54	20	45	29
E3819	74.67	0.88	51	53	50	16	45	29
E3817	74.70	0.87	50	54	51	16	38	23
E3820	74.73	0.87	50	54	52	19	45	29

Legend:

1) $100 * 30\alpha\beta/(30\alpha\beta+30\beta\alpha)$ in m/z 191.

2) $100 * 31\alpha\beta S/(31\alpha\beta S+31\alpha\beta R)$ in m/z 191.

3) $100 * 32\alpha\beta S/(32\alpha\beta S+32\alpha\beta R)$ in m/z 191.

4) $100 * \text{average of } 31\alpha\beta S/(31\alpha\beta S+31\alpha\beta R), \dots, 35\alpha\beta S/(35\alpha\beta S+35\alpha\beta R)$ in m/z 191.

5) $100 * 29\alpha\alpha S/(29\alpha\alpha S+29\alpha\alpha R)$ in m/z 217.

6) $100 * 2 * (29\beta\beta R+29\beta\beta S)/(29\alpha\alpha S+29\alpha\alpha R+2(29\beta\beta R+29\beta\beta S))$ in m/z 217.

7) $100 * (29\beta\beta R+29\beta\beta S)/(29\alpha\alpha S+29\alpha\alpha R+29\beta\beta R+29\beta\beta S)$ in m/z 217.

Ratios are based on peak heights.

Table 8 *Molecular ratios from terpane and sterane mass fragmentograms.
Maturity and source-dependent ratios.*

IKU No.	Depth (m)	Tricyclic terpanes 1)	Tm/Ts terpanes 2)	30d/30αβ terpanes 3)	28 bisnorhopanes 4)	%C27 diasteranes 5)
7418/01-U-01						
E3815	71.44	0.01	1.58	0.04	10.11	0.22
E3818	74.62	0.01	0.89	0.08	0.26	0.56
E3819	74.67	0.01	0.87	0.07	0.26	0.55
E3817	74.70	0.01	0.99	0.07	0.31	0.52
E3820	74.73	0.01	1.03	0.08	0.27	0.52

Legend:

- 1) (24/3)/30αβ in m/z 191.
- 2) 27Tm/27Ts in m/z 191.
- 3) 30d/30αβ in m/z 191.
- 4) 28αβ/30αβ in m/z 191.
- 5) 100 * 27dβS/(27dβS+27ααR) in m/z 217.

Ratios are based on peak heights.

Table 9 Molecular ratios from mass fragmentograms of aromatic steroid hydrocarbons.

IKU No.:	Cracking ratios			Aromatisation ratios		
	Depth	20/20+27	20/20+28	21/21+28	27TA/	28TA/
	(m)	TA 1)	TA 2)	MA 3)	27TA+28MA 4)	28TA+29MA 5)
		(%)	(%)	(%)	(%)	(%)
7418/01-U-01						
E-3815	71.44	54	76	33	16	14
E-3818	74.62	20	38	38	31	27
E-3819	74.67	29	53	40	28	24
E-3817	74.70	22	41	35	28	25
E-3820	74.73	22	42	58	73	-1

Legend:

- 1) $100 * C_{20TA} / (C_{20TA} + (C_{26TA} + C_{27TA}))$ in m/z 231
(Mackenzie et al. 1981, main text).
- 2) $100 * C_{20TA} / (C_{20TA} + C_{28TA})$ in m/z 231
(Mackenzie et al. 1981, note added in proof).
- 3) $100 * C_{21MA} / (C_{21MA} + (C_{28MA} + C_{29MA}))$ in m/z 253
(Mackenzie et al. 1981, note added in proof).
- 4) $100 * (C_{26TA} + C_{27TA}) / ((C_{26TA} + C_{27TA}) + (C_{28MA} + C_{29MA}))$ in m/z 231 and 253
(Mackenzie et al. 1981, main text).
- 5) $100 * C_{28TA} / (C_{28TA} + C_{29MA} + ((C_{28MA} + C_{29MA}) * (C_{28TA} / (C_{28TA} + C_{27TA}))))$
in m/z 231 and 253 (Mackenzie et al. 1981, note added in proof).

-1: - Data are not available.

TA: - tri-aromatic steroid

MA: - mono-aromatic steroid.

Ratios are based on peak heights.

Table 10 Carbon isotope data of chromatographic fractions.

IKU No.	Depth	SAT	ARO	POL	ASPH
		$\delta^{13}C$	$\delta^{13}C$	$\delta^{13}C$	$\delta^{13}C$
	(m)	o/ooPDB	o/ooPDB	o/ooPDB	o/ooPDB
7418/01-U-01					
E-3815	71.44	-29.2	-28.5	-29.4	-27.6
E-3818	74.62	-29.4	-28.4	-29.4	-28.1
E-3819	74.67	-29.4	-28.6	-28.8	-27.4
E-3817	74.70	-29.2	-28.2	-28.8	-27.8
E-3820	74.73	-29.2	-28.2	-28.9	-27.4

Table 11

Whole oil peak data

(GC)

Sample E-3818, 74.62 m was injected two times. The oil was re-analysed, because of column overload during the first injection. Peak data from both injections are presented.

Injection Report

Acquired on 3-NOV-1994 at 14:34

Sample Name : E-3818,74.62m,Whole oil
Sample Id : E3818
Sample Type : Sample Amount=1.00000
Bottle No : 1

PEAK INFORMATION

Peak	RT mins	Hght uV	Area uVs	Peak name
5	3.277	8590	23799	2,2DMC4
11	5.800	146949	471647	n-C6
13	6.648	71852	205023	MCyC5
17	8.029	59039	302765	CyC6
19	8.952	228116	1058336	2MC6+2,3DMC5
22	9.365	213271	1219553	3MC6
23	9.509	74949	330561	1T3DMCyC5
24	9.653	131801	507537	1T2DMCyC5
29	10.635	420833	1640298	n-C7
34	11.173	679282	1098795	MCyC6
73	15.715	725370	2895057	n-C8
122	20.557	944785	1894759	n-C9
158	25.000	939606	10573773	n-C10
185	29.120	923378	11019882	n-C11
208	32.944	808021	9937759	n-C12
230	36.533	761401	8652439	n-C13
251	39.923	718090	7841726	n-C14
272	43.112	651530	7193198	n-C15
290	46.123	603098	6338304	n-C16
308	49.008	497834	5925554	n-C17
309	49.248	435486	3673544	Pristane
324	51.723	516146	5182065	n-C18
325	51.947	162640	950266	Phytane
340	54.320	483846	4705656	n-C19
358	56.781	425739	3836669	n-C20
374	59.136	374892	3039472	n-C21
390	61.389	330129	2430844	n-C22
407	63.563	299615	2108720	n-C23
423	65.640	255003	1614750	n-C24
441	67.637	216111	1244930	n-C25
457	69.547	153722	705293	n-C26
469	71.397	110759	457715	n-C27
484	73.176	65728	268309	n-C28
495	74.907	44218	168342	n-C29
509	76.587	21501	89946	n-C30
520	78.213	35199	125742	n-C31

Totals

Unknowns	35162468	167149792
Quantified	13538530	109733032
Grand Total	48701000	276882816

Injection Report

Acquired on 3-NOV-1994 at 17:54

Sample Name : E-3818,74.62m,Whole oil,2.injection
Sample Id : E3818
Sample Type : Sample Amount=1.00000
Bottle No : 1

PEAK INFORMATION

Peak	RT mins	Hght uV	Area uVs	Peak name
7	5.731	5093	9388	n-C6
8	6.595	2489	4835	MCyC5
11	7.968	2803	7525	CyC6
14	8.877	14390	29260	2MC6+2,3DMC5
15	9.261	14041	31257	3MC6
16	9.312	4623	9207	1C3DMCyC5
17	9.437	4016	8922	1T3DMCyC5
18	9.573	7663	15313	1T2DMCyC5
20	10.528	48889	103798	n-C7
21	11.019	47803	109625	MCyC6
48	15.523	137956	358580	n-C8
82	20.267	230484	769407	n-C9
122	24.699	295244	1270221	n-C10
156	28.813	325798	1558900	n-C11
189	32.648	308815	1471414	n-C12
219	36.243	276301	1365502	n-C13
248	39.629	255352	1226040	n-C14
273	42.819	227782	1110891	n-C15
301	45.837	201648	906619	n-C16
323	48.701	172481	771593	n-C17
324	48.965	107950	562818	Pristane
345	51.427	155823	654212	n-C18
347	51.720	29693	167843	Phytane
369	54.029	138117	599902	n-C19
386	56.509	120303	482243	n-C20
404	58.885	107224	414698	n-C21
423	61.157	94382	349559	n-C22
437	63.347	85119	316807	n-C23
452	65.435	69080	240740	n-C24
469	67.456	59797	198795	n-C25
484	69.395	41644	130354	n-C26
496	71.269	30168	96672	n-C27
509	73.077	17854	61296	n-C28
520	74.832	12728	44383	n-C29
529	76.523	6283	26943	n-C30
539	78.147	8282	31528	n-C31

Totals

Unknowns	6241007	26004852
Quantified	3668117	15517089
Grand Total	9909124	41521940

Injection Report

Acquired on 4-NOV-1994 at 08:56

Sample Name : E-3819,74.67m,Whole oil
Sample Id : E3819
Sample Type : Sample Amount=1.00000
Bottle No : 1

PEAK INFORMATION

Peak	RT mins	Hght uV	Area uVs	Peak name
4	3.253	1719	2922	2,2DMC4
9	5.765	38568	71439	n-C6
10	6.621	19832	36689	MCyC5
13	7.995	17172	50102	CyC6
16	8.904	66184	154809	2MC6+2,3DMC5
17	9.285	65522	169158	3MC6
18	9.339	24808	46654	1C3DMCyC5
19	9.459	19071	46213	1T3DMCyC5
20	9.592	37373	83572	1T2DMCyC5
22	10.560	184183	383900	n-C7
24	11.059	222616	487934	MCyC6
52	15.571	257052	874975	n-C8
89	20.301	330478	670400	n-C9
130	24.715	305218	1376420	n-C10
165	28.816	291963	1365054	n-C11
200	32.640	254804	1154407	n-C12
230	36.232	230387	1014009	n-C13
259	39.613	208455	884747	n-C14
283	42.808	189760	796905	n-C15
309	45.827	164355	672087	n-C16
328	48.696	144135	591035	n-C17
329	48.952	68105	331291	Pristane
350	51.421	129530	514451	n-C18
352	51.720	16737	89473	Phytane
372	54.024	116457	457729	n-C19
390	56.509	106100	382916	n-C20
406	58.885	92694	325280	n-C21
419	61.160	79806	269920	n-C22
434	63.347	69060	235511	n-C23
448	65.437	55320	181911	n-C24
462	67.459	47716	156697	n-C25
474	69.397	34142	104175	n-C26
486	71.275	26839	80989	n-C27
499	73.085	15403	52528	n-C28
509	74.835	10448	32704	n-C29
518	76.525	5038	16576	n-C30
528	78.160	5007	21375	n-C31

Totals

Unknowns	6513390	23570322
Quantified	3952059	14186957
Grand Total	10465449	37757280

Injection Report

Acquired on 3-NOV-1994 at 12:37

Sample Name : E-3817,74.70m,Whole oil
Sample Id : E3817
Sample Type : Sample Amount=1.00000
Bottle No : 1

PEAK INFORMATION

Peak	RT mins	Hght uV	Area uVs	Peak name
7	10.541	2790	5441	n-C7
8	11.037	3000	7089	MCyC6
28	15.501	15356	35529	n-C8
60	20.208	28415	63536	n-C9
95	24.611	33063	84397	n-C10
122	28.707	33181	89925	n-C11
148	32.539	31390	84517	n-C12
172	36.133	29443	82098	n-C13
195	39.517	27988	79481	n-C14
213	42.715	25383	74651	n-C15
224	45.741	23836	66984	n-C16
235	48.613	20611	59750	n-C17
236	48.883	8082	39071	Pristane
245	51.349	18123	52907	n-C18
246	51.677	1885	10739	Phytane
255	53.955	14556	41257	n-C19
261	56.437	10491	30497	n-C20
265	58.816	7062	20962	n-C21
269	61.099	4794	14410	n-C22
270	63.288	3561	10568	n-C23
271	65.387	2434	7247	n-C24
272	67.411	1854	5502	n-C25
273	69.360	1247	3610	n-C26
274	71.237	907	2760	n-C27
275	73.053	549	1707	n-C28
276	74.811	439	1266	n-C29
277	76.512	231	653	n-C30
278	78.144	287	1067	n-C31

Totals

Unknowns	346605	1108100
Quantified	350958	977621
Grand Total	697563	2085721

Injection Report

Acquired on 4-NOV-1994 at 10:56

Sample Name : E-3820,74.73m,Whole oil
Sample Id : E3820
Sample Type : Sample Amount=1.00000
Bottle No : 1

PEAK INFORMATION

Peak	RT mins	Hght uV	Area uVs	Peak name
3	5.771	1167	2312	n-C6
4	6.616	722	1457	MCyC5
7	7.992	1579	4797	CyC6
10	8.896	13942	29655	2MC6+2,3DMC5
11	9.280	16066	34986	3MC6
12	9.333	4423	9296	1C3DMCyC5
13	9.456	4710	9030	1T3DMCyC5
14	9.592	7741	16819	1T2DMCyC5
16	10.547	52363	117747	n-C7
17	11.037	57944	140415	MCyC6
45	15.547	158627	495248	n-C8
80	20.285	221222	753274	n-C9
120	24.691	234326	907863	n-C10
154	28.795	229448	940213	n-C11
188	32.624	209703	836337	n-C12
218	36.219	193149	771766	n-C13
246	39.603	176386	701741	n-C14
270	42.800	161999	646680	n-C15
297	45.821	146846	560517	n-C16
317	48.691	124151	490975	n-C17
318	48.952	69977	331707	Pristane
338	51.419	114931	424889	n-C18
340	51.733	17270	93725	Phytane
360	54.024	104436	379170	n-C19
377	56.507	89156	317517	n-C20
393	58.880	76812	267117	n-C21
411	61.160	67562	226593	n-C22
425	63.344	59726	200231	n-C23
441	65.437	48829	156186	n-C24
456	67.459	40531	133246	n-C25
469	69.403	27166	87625	n-C26
479	71.280	21445	68247	n-C27
490	73.085	12682	43928	n-C28
501	74.843	8241	27272	n-C29
510	76.533	4059	14259	n-C30
520	78.163	4746	19608	n-C31

Totals

Unknowns	4309199	16113993
Quantified	2784083	10262445
Grand Total	7093282	26376438

Table 12

**Saturated hydrocarbon
peak data**

(GC)

Injection Report

Acquired on 25-NOV-1994 at 09:57

VAX MULTICHROM

Analyst Name : Kristin
Lims Id :
Comment : VARIAN 3400, DB-1(30m*0.25mm),Kol.id.4463141
Method Title : standard metode for sat-prøver
Sample Name : E-3815,71.44m,Saturated hydrocarbons
Sample Id : E3815
Sample Type : Sample Amount=0.00000
Bottle No : 1

PEAK INFORMATION

RT mins	Hght uV	Area uVs	Peak name
4.971	593	1166	n-C11
7.451	7073	17383	n-C12
10.357	80285	288537	n-C13
13.427	160908	789362	n-C14
16.451	182433	1030711	n-C15
19.352	161522	912014	n-C16
22.139	139904	753507	n-C17
22.376	75801	428653	Pristane
24.800	113393	594181	n-C18
25.064	19827	109034	Phytane
27.344	92429	478024	n-C19
29.765	81353	352438	n-C20
32.104	72484	305449	n-C21
34.344	62161	243892	n-C22
36.493	52228	214063	n-C23
38.552	42401	156228	n-C24
40.547	36806	133627	n-C25
42.467	28135	93756	n-C26
44.341	27993	97037	n-C27
46.133	16776	56850	n-C28
47.883	20014	83884	n-C29
49.539	9996	70375	n-C30
51.179	10841	42328	n-C31
52.768	7704	28542	n-C32
54.301	6070	22440	n-C33
55.800	2548	15503	n-C34
57.264	2950	11423	n-C35

Totals

Unknowns	1091843	4783654
	1514626	7330410
	2606469	12114064

Injection Report

Acquired on 25-NOV-1994 at 13:08

VAX MULTICHROM

Analyst Name : Kristin
Lims Id :
Comment : VARIAN 3400, DB-1(30m*0.25mm),Kol.id.4463141
Method Title : standard metode for sat-prøver
Sample Name : E-3818,74.62m,Saturated hydrocarbons
Sample Id : E3818
Sample Type : Sample Amount=0.00000
Bottle No : 3

PEAK INFORMATION

RT mins	Hght uV	Area uVs	Peak name
4.968	30099	58118	n-C11
7.475	89848	264640	n-C12
10.371	124633	499474	n-C13
13.405	143721	701492	n-C14
16.424	164446	892313	n-C15
19.339	167749	950706	n-C16
22.144	153456	950253	n-C17
22.384	102017	583960	Pristane
24.819	150365	896798	n-C18
25.067	31016	169814	Phytane
27.368	136153	844361	n-C19
29.800	120496	668656	n-C20
32.128	104467	545106	n-C21
34.352	90453	439849	n-C22
36.504	78269	362014	n-C23
38.571	64967	274706	n-C24
40.557	53385	212459	n-C25
42.475	39542	143269	n-C26
44.325	32013	115883	n-C27
46.117	20697	67389	n-C28
47.851	16382	59823	n-C29
49.525	8345	44911	n-C30
51.155	6258	24013	n-C31
52.747	5016	17752	n-C32
54.283	2513	10131	n-C33
55.771	1403	7267	n-C34
57.235	830	3369	n-C35

Totals

Unknowns	1443105	6347387
	1938540	9808527
	3381645	16155914

Injection Report

Acquired on 25-NOV-1994 at 14:26

VAX MULTICHROM

Analyst Name : Kristin
Lims Id :
Comment : VARIAN 3400, DB-1(30m*0.25mm),Kol.id.4463141
Method Title : standard metode for sat-prøver
Sample Name : E-3819,74.67m,Saturated hydrocarbons
Sample Id : E3819
Sample Type : Sample Amount=0.00000
Bottle No : 4

PEAK INFORMATION

RT mins	Hght uV	Area uVs	Peak name
4.981	33065	63194	n-C11
7.488	95463	280486	n-C12
10.379	117520	466113	n-C13
13.405	130373	576607	n-C14
16.411	130426	659053	n-C15
19.315	124445	631616	n-C16
22.115	115847	594726	n-C17
22.355	66994	357899	Pristane
24.787	107521	545999	n-C18
25.056	18306	94717	Phytane
27.336	103675	523098	n-C19
29.779	88299	413369	n-C20
32.112	83298	375801	n-C21
34.344	73328	314979	n-C22
36.488	60985	271378	n-C23
38.560	50747	207531	n-C24
40.555	44604	168642	n-C25
42.477	32858	114502	n-C26
44.333	26940	94029	n-C27
46.123	16484	55359	n-C28
47.853	13730	50348	n-C29
49.528	7640	37735	n-C30
51.157	5103	19242	n-C31
52.752	4088	15003	n-C32
54.288	2179	8916	n-C33
55.781	1219	5556	n-C34
57.245	951	3777	n-C35

Totals

Unknowns	1148644	4733044
	1556086	6949675
	2704731	11682719

Injection Report

Acquired on 25-NOV-1994 at 11:33

VAX MULTICHROM

Analyst Name : Kristin
Lims Id :
Comment : VARIAN 3400, DB-1(30m*0.25mm),Kol.id.4463141
Method Title : standard metode for sat-prøver
Sample Name : E-3817,74.70m,Saturated hydrocarbons
Sample Id : E3817
Sample Type : Sample Amount=0.00000
Bottle No : 2

PEAK INFORMATION

RT mins	Hght uV	Area uVs	Peak name
4.981	19034	37978	n-C11
7.491	90825	277849	n-C12
10.392	131939	558303	n-C13
13.419	145107	734735	n-C14
16.435	157558	877564	n-C15
19.341	154915	891529	n-C16
22.152	141803	885023	n-C17
22.389	92783	521014	Pristane
24.824	138259	838891	n-C18
25.080	27812	156509	Phytane
27.384	132868	809341	n-C19
29.824	125656	705068	n-C20
32.160	109210	602749	n-C21
34.389	100869	500733	n-C22
36.531	87144	426270	n-C23
38.595	69974	315970	n-C24
40.581	59999	248828	n-C25
42.493	44340	163996	n-C26
44.349	35788	131721	n-C27
46.131	22045	74868	n-C28
47.867	18084	69583	n-C29
49.539	9801	50383	n-C30
51.165	6855	25840	n-C31
52.757	5540	20282	n-C32
54.296	2964	11900	n-C33
55.789	1644	8049	n-C34
57.253	1182	4789	n-C35

Totals

Unknowns	1444208	6435048
	1933998	9949764
	3378206	16384812

Injection Report

Acquired on 25-NOV-1994 at 15:58

VAX MULTICHROM

Analyst Name : Kristin
Lims Id :
Comment : VARIAN 3400, DB-1(30m*0.25mm),Kol.id.4463141
Method Title : standard metode for sat-prøver
Sample Name : E-3820,74.73m,Saturated hydrocarbons
Sample Id : E3820
Sample Type : Sample Amount=0.00000
Bottle No : 5

PEAK INFORMATION

RT mins	Hght uV	Area uVs	Peak name
4.979	47832	93548	n-C11
7.488	109559	346399	n-C12
10.376	128696	522914	n-C13
13.397	130196	588295	n-C14
16.397	125818	617143	n-C15
19.299	117248	574944	n-C16
22.091	104878	513348	n-C17
22.339	58756	308572	Pristane
24.765	95112	462529	n-C18
25.043	14868	78645	Phytane
27.320	88583	444477	n-C19
29.760	77658	351401	n-C20
32.091	74524	321332	n-C21
34.331	66448	274032	n-C22
36.477	58553	236169	n-C23
38.552	47526	182668	n-C24
40.555	41574	148165	n-C25
42.475	29393	101295	n-C26
44.328	23764	83475	n-C27
46.123	14852	49867	n-C28
47.864	12124	42840	n-C29
49.536	6718	38175	n-C30
51.160	4673	17255	n-C31
52.755	3845	13461	n-C32
54.283	1833	7723	n-C33
55.784	1040	4670	n-C34
57.245	686	2138	n-C35

Totals

Unknowns	1109804	4338086
	1486759	6425481
	2596563	10763566

Table 13

**Saturated biomarker
peak data**

(m/z 191, 217, 218)

E-3815SAT 71.44 m

RT	QM	AREA	HEIGHT	ID
32.113	191	3723904	233776	34/3
33.630	191	7031415	243047	24/3
37.625	191	3840623	185219	25/3
40.586	191	16032609	847682	24/4
51.999	191	33164674	1918928	27Ts
53.267	191	58786472	3028934	27Tm
56.503	191	57977524	2779154	28αβ
58.068	191	190899888	10078952	29αβ
58.261	191	89227008	4454425	29Ts
58.973	191	15117570	854016	30d
59.551	191	99326736	3949630	29βα
60.854	191	447074080	24285312	30αβ
61.993	191	74533520	4061780	30βα
64.049	191	102167976	5523392	31αβS
64.435	191	125049440	6919706	31αβR
66.631	191	26451358	1341558	32αβS
67.151	191	41448312	2046275	32αβR
69.593	191	16871742	773651	33αβS
70.305	191	23760304	1059377	33αβR
72.642	191	8721502	338680	34αβS
73.535	191	11524912	522528	34αβR
75.644	191	3860363	165464	35αβS
76.713	191	9532964	319757	35αβR
28.549	217	13542647	728157	21α
32.686	217	7891583	290218	22α
45.270	217	13198292	712232	27dβS
46.563	217	11665466	613688	27dβR
47.442	217	4647635	258464	27dαR
48.116	217	4327303	230648	27dαS
48.301	217	5034011	324337	28dβS
48.525	217	5407496	304813	28dβS
49.879	217	14066678	375463	28dβR
50.714	217	24759356	764510	27ααS+28dαR
50.959	217	2471800	171474	
51.111	217	22042114	1013697	27dβS+27ββR
51.269	217	1343309	112306	28dαS+27ββS
51.952	217	51237080	2589867	27ααR
52.274	217	3772887	204172	
52.636	217	15242764	586928	29dβR
53.214	217	13167751	278756	29dαR
53.851	217	10819156	264201	28ααS
54.411	217	27283378	1114463	29dαS+28ββR
54.762	217	11260934	383969	28ββS
55.574	217	71516816	2220731	28ααR
56.684	217	22434292	709792	29ααS
57.449	217	67939944	2198004	29ββR
57.712	217	6404821	298225	29ββS

E-3815SAT 71.44 m continued

58.646	217	203557152	9711570	29 $\alpha\alpha$ R
60.842	217	4734198	221786	30 $\alpha\alpha$ R
61.158	217	16260701	739092	
50.953	218	4350039	270775	27 $\beta\beta$ R
51.281	218	3232743	194710	27 $\beta\beta$ S
54.411	218	14009159	652133	28 $\beta\beta$ R
54.738	218	9485177	366705	28 $\beta\beta$ S
57.449	218	19452270	871217	29 $\beta\beta$ R
57.501	218	12356105	639612	29 $\beta\beta$ S

E-3818SAT 74.62 m

RT	QM	AREA	HEIGHT	ID
32.327	191	12785184	747060	23/3
33.787	191	13363780	489166	24/3
37.791	191	8055302	370504	25/3
40.760	191	39907376	2160780	24/4
52.126	191	106772200	6483250	27Ts
53.384	191	102932160	5770349	27Tm
56.607	191	193754432	10300875	28αβ
58.167	191	370594464	17591914	29αβ
58.333	191	155873488	7920595	29Ts
59.038	191	50763896	2979709	30d
59.619	191	148421632	6025956	29βα
60.938	191	727879936	38926484	30αβ
62.038	191	92509712	5625191	30βα
64.094	191	175591568	10102988	31αβS
64.472	191	162426784	10136906	31αβR
66.662	191	71164648	3868559	32αβS
67.176	191	55679844	2932310	32αβR
69.604	191	33961104	1607593	33αβS
70.322	191	25669014	1245490	33αβR
72.653	191	13478152	589964	34αβS
73.530	191	9665995	443497	34αβR
75.638	191	3760147	173528	35αβS
76.727	191	4373406	169992	35αβR
28.746	217	32103202	1786026	21α
32.897	217	10996401	698907	22α
45.401	217	45800084	2727559	27dβS
46.683	217	28461284	1465412	27dβR
47.566	217	12001246	638025	27dαR
48.227	217	11546563	656876	27dαS
48.401	217	18228706	1074256	28dβS
48.629	217	21003894	1040679	28dβS
49.980	217	32570040	1005325	28dβR
51.062	217	9618580	573105	27ααS+28dαR
51.221	217	32819520	1400700	27dβS+27ββR
51.384	217	8202306	481283	28dαS+27ββS
52.051	217	45415348	2143049	27ααR
52.380	217	10221977	419800	
52.696	217	21870602	744864	29dβR
53.588	217	17160340	391027	29dαR
54.096	217	14466668	344268	28ααS
54.492	217	30329340	1475933	29dαS+28ββR
54.852	217	24301098	816977	28ββS
55.681	217	47954604	1502955	28ααR
56.782	217	28835808	813628	29ααS
57.443	217	14480117	650259	29ββR
57.516	217	29178130	996380	29ββS
58.687	217	66923516	3186745	29ααR

E-3818SAT 74.62 m continued

59.019	217	7185285	343671	30ααS
60.932	217	7388627	359284	30ααR
61.205	217	7381288	350905	
51.062	218	14001120	823270	27ββR
51.384	218	9931513	607219	27ββS
54.492	218	20241358	1059968	28ββR
54.827	218	18951244	801336	28ββS
57.369	218	21187338	896990	29ββR
57.629	218	24957126	947340	29ββS

E-3819SAT 74.67 m

RT	QM	AREA	HEIGHT	ID
32.251	191	12032104	741254	23/3
33.706	191	14555028	474517	24/3
37.730	191	9113909	363285	25/3
40.697	191	39595504	2031136	24/4
52.082	191	100865472	5712984	27Ts
53.332	191	97978784	4991860	27Tm
56.568	191	175303584	8754339	28αβ
58.121	191	341057600	16550678	29αβ
58.308	191	138166544	6401247	29Ts
59.009	191	42585912	2403306	30d
59.593	191	133903864	5378730	29βα
60.902	191	654288128	34153552	30αβ
62.012	191	84529960	4651394	30βα
64.074	191	157316560	8370434	31αβS
64.442	191	150272560	7954355	31αβR
66.649	191	61351976	3046812	32αβS
67.169	191	53535904	2690220	32αβR
69.599	191	29035730	1311054	33αβS
70.312	191	24661062	1131964	33αβR
72.657	191	10922421	474309	34αβS
73.536	191	8965168	416362	34αβR
75.645	191	3150808	147677	35αβS
76.724	191	5576308	209717	35αβR
28.688	217	33413696	1695553	21α
32.818	217	12576249	672306	22α
45.347	217	41967228	2338511	27dβS
46.638	217	26172884	1230671	27dβR
47.526	217	11141157	565719	27dαR
48.180	217	10826447	544078	27dαS
48.355	217	15884672	910569	28dβS
48.595	217	17099136	879238	28dβS
49.938	217	28510260	798635	28dβR
50.645	217	30192106	815351	27ααS+28dαR
51.019	217	7598256	466499	
51.182	217	32449660	1320646	27dβS+27ββR
51.340	217	5466720	352538	28dαS+27ββS
52.012	217	41879796	1926053	27ααR
52.654	217	19570520	657045	29dβR
53.542	217	17997756	345218	29dαR
53.898	217	14217120	301066	28ααS
54.441	217	28732864	1281332	29dαS+28ββR
54.798	217	23427014	696420	28ββS
55.633	217	49533572	1483912	28ααR
56.743	217	27459196	779635	29ααS
57.485	217	43103080	978693	29ββR+29ββS
58.665	217	86341520	3974021	29ααR
58.992	217	4895594	239222	30ααS

E-3819SAT 74.67 m continued

60.896	217	7018769	313563	30 $\alpha\alpha$ R
61.188	217	8799406	376909	
51.019	218	14045205	721974	27 $\beta\beta$ R
51.340	218	10083942	528949	27 $\beta\beta$ S
54.447	218	17863084	873083	28 $\beta\beta$ R
54.786	218	17143942	700805	28 $\beta\beta$ S
57.345	218	17539102	732899	29 $\beta\beta$ R
57.590	218	20757076	766432	29 $\beta\beta$ S

E-3817SAT 74.70 m

RT	QM	AREA	HEIGHT	ID
32.371	191	16852348	1098108	23/3
33.837	191	17982978	667454	24/3
37.832	191	9170090	457202	25/3
40.815	191	52782104	2922960	24/4
52.190	191	141928320	7436288	27Ts
53.440	191	143139024	7378026	27Tm
56.676	191	304047584	15147106	28αβ
58.224	191	489547648	22356068	29αβ
58.399	191	205080384	10412131	29Ts
59.106	191	63096560	3621517	30d
59.690	191	201194848	8130895	29βα
60.993	191	1012650752	48404868	30αβ
62.103	191	140947232	7518260	30βα
64.153	191	247074832	13045477	31αβS
64.521	191	240133184	12941762	31αβR
66.700	191	98277232	5065546	32αβS
67.219	191	79616160	4332632	32αβR
69.637	191	47119640	2312171	33αβS
70.350	191	40262876	1907052	33αβR
72.681	191	20543120	914707	34αβS
73.569	191	17378970	787127	34αβR
75.677	191	6436915	301127	35αβS
76.746	191	9057922	384976	35αβR
28.804	217	46422316	2516175	21α
32.940	217	15798919	969106	22α
45.467	217	58272076	3297858	27dβS
46.740	217	34854372	1807160	27dβR
47.619	217	13929401	801976	27dαR
48.278	217	11103877	722862	27dαS
48.465	217	19561998	1225590	28dβS
48.693	217	20850948	1116028	28dβS
50.044	217	38205632	1177749	28dβR
50.756	217	39965936	1109741	27ααS+28dαR
51.136	217	11221240	670945	
51.265	217	42822760	1871579	27dβS+27ββR
51.438	217	7712778	519046	28dαS+27ββS
52.114	217	67816376	3046135	27ααR
52.412	217	18015708	601271	
52.774	217	30777216	1009056	29dβR
53.995	217	20192692	439483	28ααS
54.550	217	41746184	1822139	29dαS+28ββR
54.889	217	34301872	1029496	28ββS
55.718	217	69474736	2251104	28ααR
56.816	217	40262052	1159976	29ααS
57.471	217	17175168	877349	29ββR
57.587	217	46924380	1422369	29ββS
57.844	217	5776296	266383	

E-3817SAT 74.70 m continued

58.744	217	123617008	6224313	29 $\alpha\alpha$ R
59.059	217	7806133	417991	30 $\alpha\alpha$ S
60.993	217	10587951	470318	30 $\alpha\alpha$ R
61.256	217	12895202	584807	
51.130	218	17347194	984274	27 $\beta\beta$ R
51.438	218	11524806	768352	27 $\beta\beta$ S
54.550	218	26329020	1260500	28 $\beta\beta$ R
54.883	218	24127280	1021030	28 $\beta\beta$ S
57.441	218	25735692	1064311	29 $\beta\beta$ R
57.675	218	31874030	1186038	29 $\beta\beta$ S

E-3820SAT 74.73 m

RT	QM	AREA	HEIGHT	ID
32.287	191	10206919	639585	23/3
33.767	191	11203602	408452	24/3
37.773	191	6601358	291931	25/3
40.761	191	33091542	1910070	24/4
52.138	191	84219256	4905622	27Ts
53.392	191	87311096	5059043	27Tm
56.622	191	156153824	8068413	28αβ
58.168	191	313604352	14392800	29αβ
58.354	191	113511648	6821460	29Ts
59.058	191	38516816	2348427	30d
59.645	191	112287640	4800653	29βα
60.950	191	587858944	30419152	30αβ
62.068	191	83484472	4643917	30βα
64.118	191	145590784	8133794	31αβS
64.488	191	139032432	8012860	31αβR
66.676	191	59420148	3078709	32αβS
67.194	191	47500340	2588363	32αβR
69.618	191	28434410	1366615	33αβS
70.338	191	22992750	1153666	33αβR
72.638	191	11786941	538173	34αβS
73.554	191	9189770	450948	34αβR
75.660	191	4397686	195741	35αβS
76.723	191	5394992	208067	35αβR
28.709	217	27775778	1461674	21α
32.852	217	8687251	590167	22α
45.392	217	35252600	2022172	27dβS
46.679	217	22292774	1161520	27dβR
47.575	217	8248418	480614	27dαR
48.224	217	8007013	480064	27dαS
48.417	217	13323903	779761	28dβS
48.651	217	14564392	798160	28dβS
49.982	217	23280194	715646	28dβR
50.701	217	26096524	732234	27ααS+28dαR
51.080	217	6894137	441524	
51.236	217	23309538	1097069	27dβS+27ββR
51.401	217	6939483	374213	28dαS+27ββS
52.070	217	37189960	1836013	27ααR
52.372	217	9281534	361296	
52.738	217	17840202	638555	29dβR
53.332	217	13472059	280835	29dαR
54.099	217	10246839	250406	28ααS
54.500	217	23744436	1124842	29dαS+28ββR
54.848	217	14684040	587376	28ββS
55.652	217	41012920	1302469	28ααR
56.801	217	23865320	684649	29ααS
57.524	217	33850340	764011	29ββR+29ββS
58.704	217	60878180	2951666	29ααR

E-3820SAT 74.73 m continued

59.039	217	4733351	266593	30ααS
60.937	217	6409156	307383	30ααR
61.221	217	7746831	333730	
51.074	218	10773357	621865	27ββR
51.394	218	9599249	502068	27ββS
54.500	218	15359407	785438	28ββR
57.309	218	11751809	618536	28ββS
57.449	218	21119526	884251	29ββR
57.642	218	20501278	752292	29ββS

Table 14

**Aromatic biomarker
peak data**

(m/z 231, 253)

E-3815ARO 71.44 m

RT	QM	AREA	HEIGHT	ID
40.818	231	9945531	619987	a1
43.161	231	8030269	499265	b1
53.208	231	4235330	185365	c1
55.578	231	13077314	536820	d1
57.574	231	6884905	182826	e1
58.569	231	7465657	239722	f1
61.059	231	5900152	190698	g1
25.830	253	9228152	493619	A1
28.844	253	7140571	450969	B1
42.888	253	2458704	162917	C1
43.188	253	3538688	227405	C1
45.431	253	5739245	327099	D1
45.591	253	3157145	158429	D1
45.958	253	6029685	352263	E1
46.099	253	6659292	342071	F1
46.472	253	7992466	352704	F1
48.235	253	9053234	414798	G1
48.715	253	35223452	1011856	G1
49.924	253	23547028	1184997	H1
50.631	253	6787724	321550	H1
51.199	253	6254746	225192	H1
51.372	253	9892264	451688	H1
53.856	253	7412066	297662	I1
13.017	178	525423872	64568196	P
16.324	192	109910424	11372928	3-MP
16.458	192	139228064	14418371	2-MP
17.011	192	169725648	16332624	9-MP
17.160	192	134013544	13770336	1-MP

E-3818ARO 74.62 m

RT	QM	AREA	HEIGHT	ID
40.875	231	17269956	1013102	a1
43.218	231	9424016	565575	b1
53.324	231	25598058	1218320	c1
55.681	231	107352912	4163393	d1
57.683	231	63457520	1703873	e1
58.665	231	66054020	2249547	f1
61.128	231	54863476	1676017	g1
25.855	253	60302360	2856124	A1
28.859	253	53607968	3184495	B1
42.951	253	18493100	1054347	C1
43.251	253	38536912	2263902	C1
45.481	253	51625412	2731105	D1
45.661	253	26033676	1590311	D1
46.021	253	28508320	1759376	E1
46.168	253	87497080	4295796	F1
46.983	253	26176220	823713	F1
48.298	253	78975832	3682003	G1
48.665	253	150424544	4600380	G1
50.026	253	18738428	804864	H1
50.707	253	31458958	1547411	H1
51.295	253	61775104	2158813	H1
51.402	253	48295456	2122338	H1
53.938	253	42508348	1507893	I1
12.997	178	159463040	17878744	P
16.322	192	42178340	4152640	3-MP
16.455	192	49287916	4723638	2-MP
17.010	192	66235400	5966811	9-MP
17.157	192	50613928	4553724	1-MP

E-3819ARO 74.67 m

RT	QM	AREA	HEIGHT	ID
40.802	231	14873809	981586	a1
43.151	231	8968251	621623	b1
53.221	231	13613376	708849	c1
55.584	231	55380876	2383352	d1
57.587	231	30163190	934270	e1
58.575	231	33229796	1141734	f1
61.051	231	26165984	858770	g1
25.795	253	31382746	1535068	A1
28.819	253	29627562	1696350	B1
42.874	253	7818151	480410	C1
43.177	253	17590582	1146293	C1
45.409	253	21911064	1262400	D1
45.585	253	10830608	741798	D1
45.934	253	15417580	877360	E1
46.094	253	33731492	1986449	E1
46.476	253	7215268	391690	F1
46.886	253	12666183	385195	F1
48.218	253	35797088	1867518	G1
48.584	253	73018472	2258962	G1
49.930	253	40532944	2026139	H1
50.631	253	16017340	768099	H1
51.205	253	27788408	987166	H1
51.332	253	21985730	999446	H1
53.842	253	18502864	684984	I1
12.991	178	308869600	35610148	P
16.295	192	70703192	6989676	3-MP
16.436	192	85208496	8347759	2-MP
16.983	192	110530112	10066340	9-MP
17.130	192	83300032	7941154	1-MP

E-3820ARO 74.73 m

RT	QM	AREA	HEIGHT	ID
40.782	231	12767697	847182	a1
43.117	231	8004534	539801	b1
53.194	231	15026305	824263	c1
55.566	231	62541752	2972220	d1
57.605	231	36235604	1205196	e1
58.560	231	36975704	1484726	f1
61.071	231	31416990	1183358	g1
25.755	253	9590994	510172	A1
28.779	253	9179198	496045	B1
46.270	253	2645087	171935	E1
46.420	253	3817114	229165	F1
48.704	253	6812504	370738	G1
49.899	253	16249242	870287	H1
12.964	178	193569584	22668136	P
16.262	192	46090256	4610015	3-MP
16.396	192	53176644	5283451	2-MP
16.936	192	71556136	6454543	9-MP
17.097	192	53961436	5189020	1-MP

Figure 1

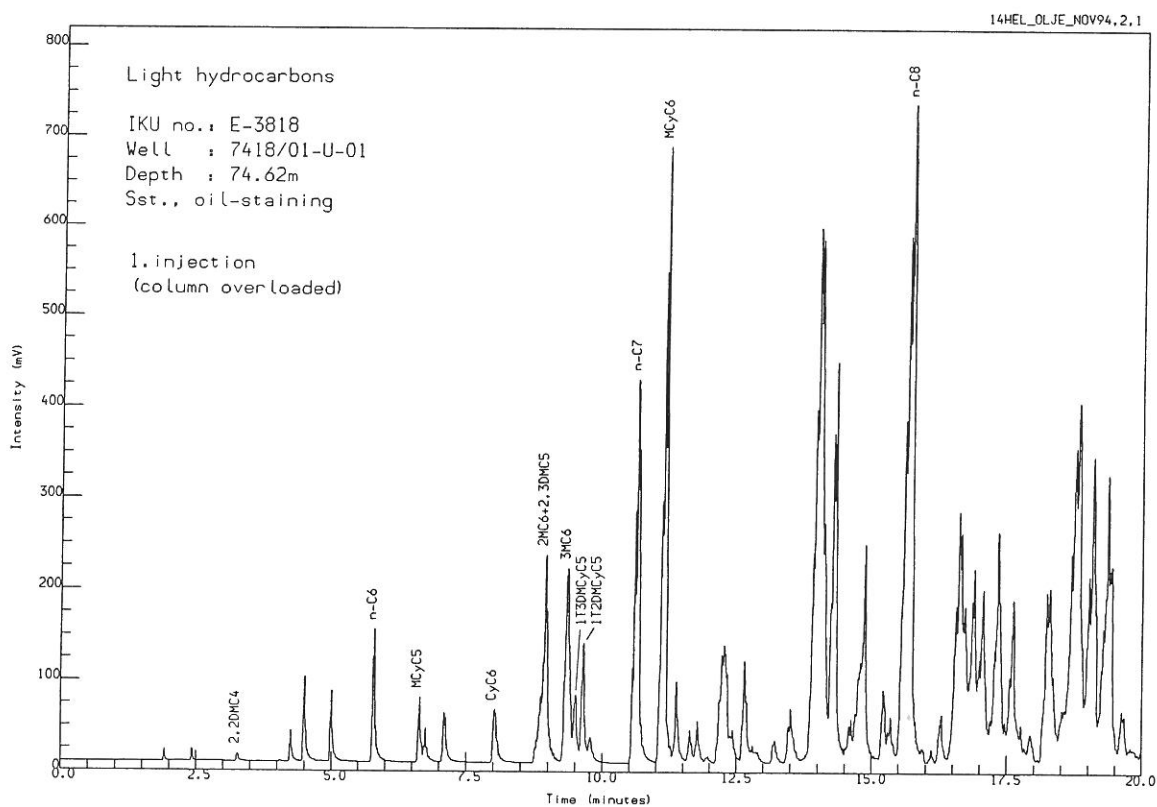
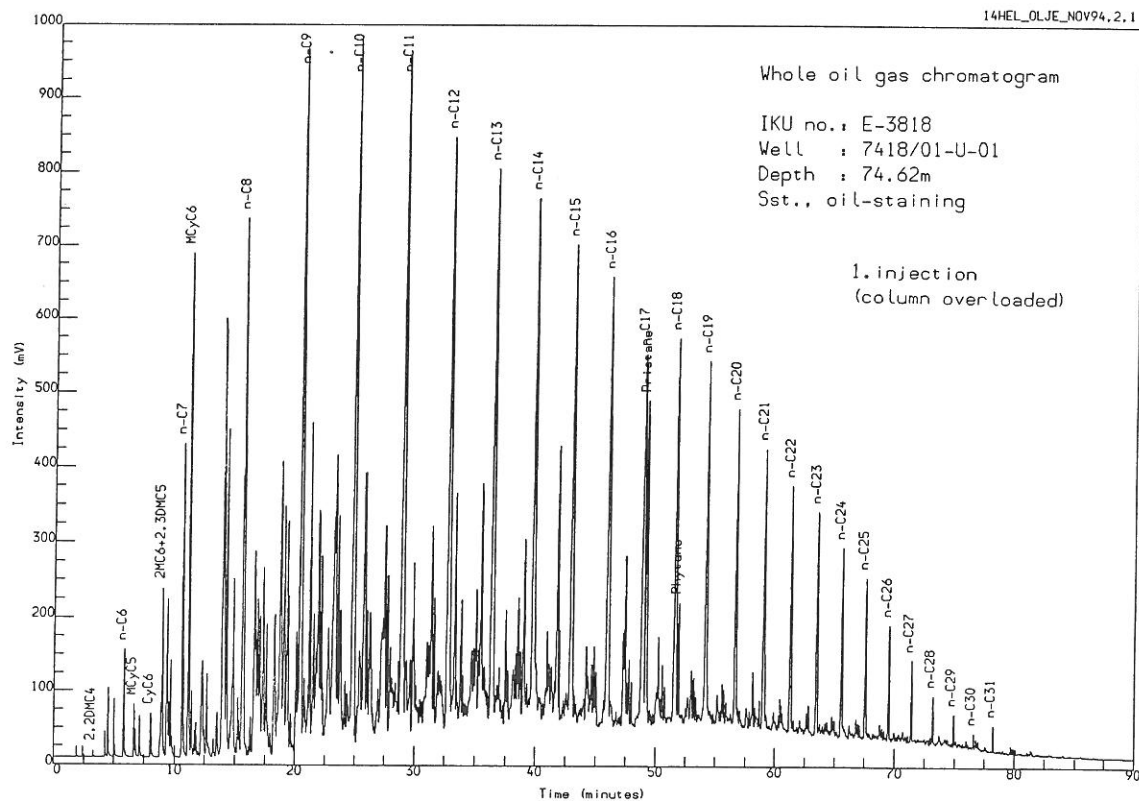
Gas Chromatograms

of

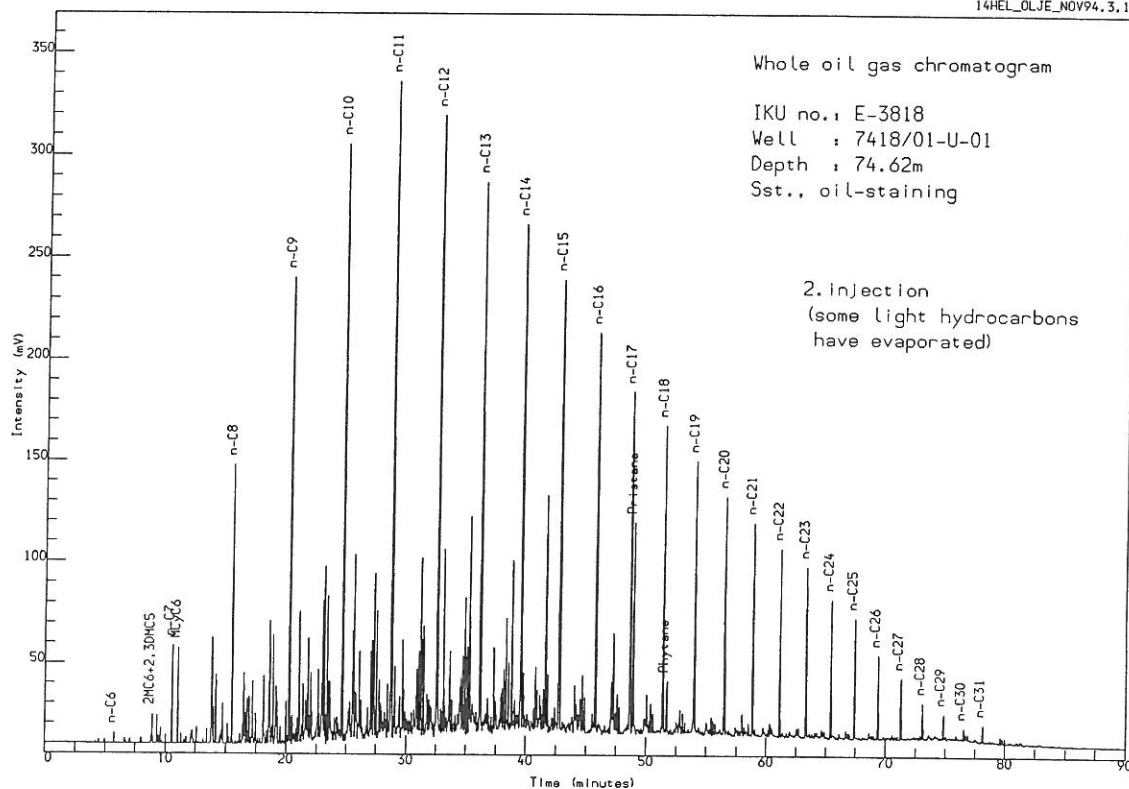
Whole oil and Light Hydrocarbons

Peak code	Peak identity
n-C ₁₅	n-alkanes
2,2 DMC ₄	2,2 - dimethylbutane
M CyC ₅	methylcyclopentane
CyC ₆	cyclohexane
2 MC ₆	2 - methylhexane
2,3 DMC ₅	2,3 - dimethylpentane
3MC ₆	3 - methylhexane
1C3DMCyC ₅	1-cis-3-dimethylcyclopentane
1T3DMCyC ₅	1-trans-3-dimethylcyclopentane
1T2DMCyC ₅	1-trans-2-dimethylcyclopentane
MCyC ₆	methylcyclohexane

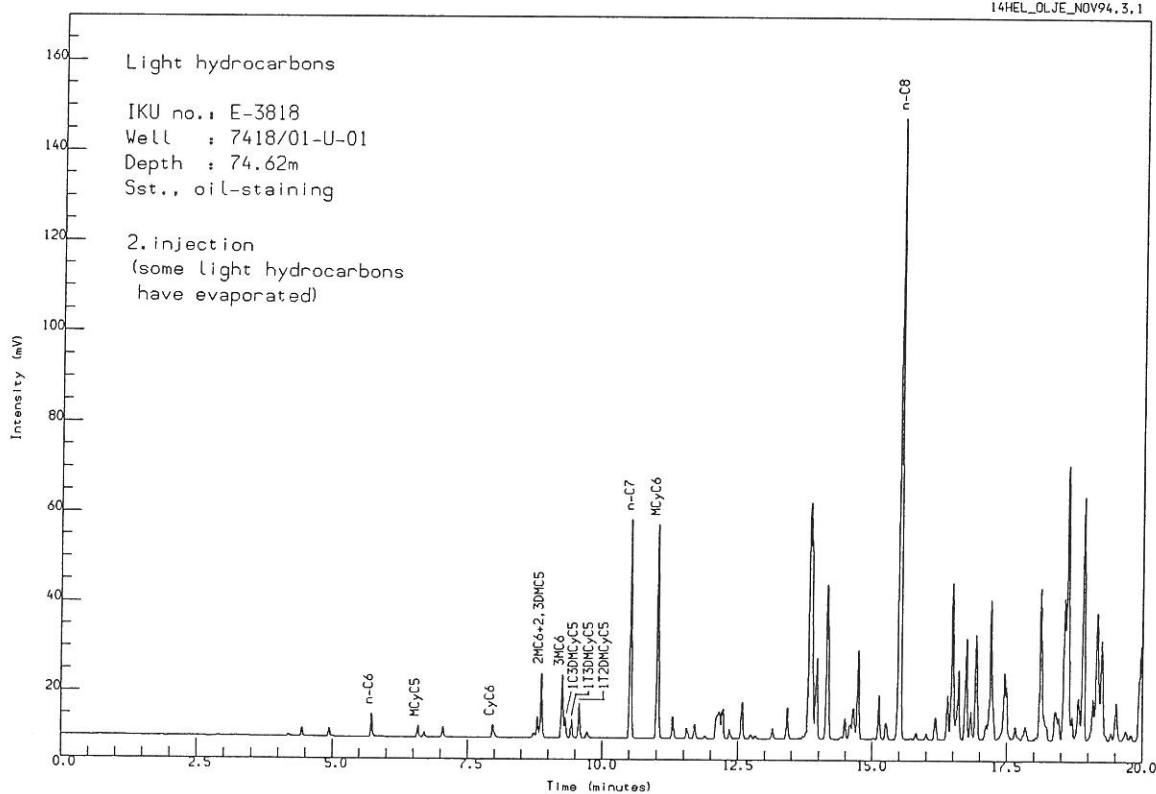
Sample E-3818, 74.62 m was injected two times. The oil was reanalysed because of column during the first injection. Both chromatograms are presented.



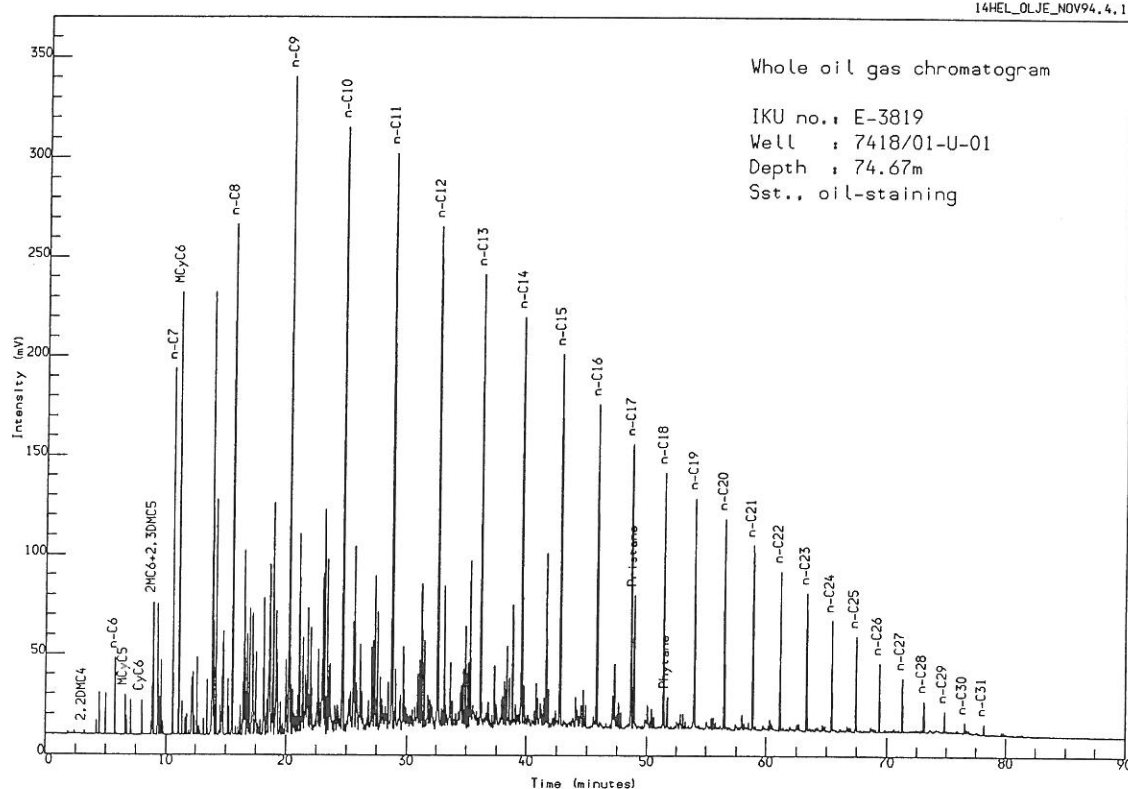
14HEL_OLJE_NOV94.3.1



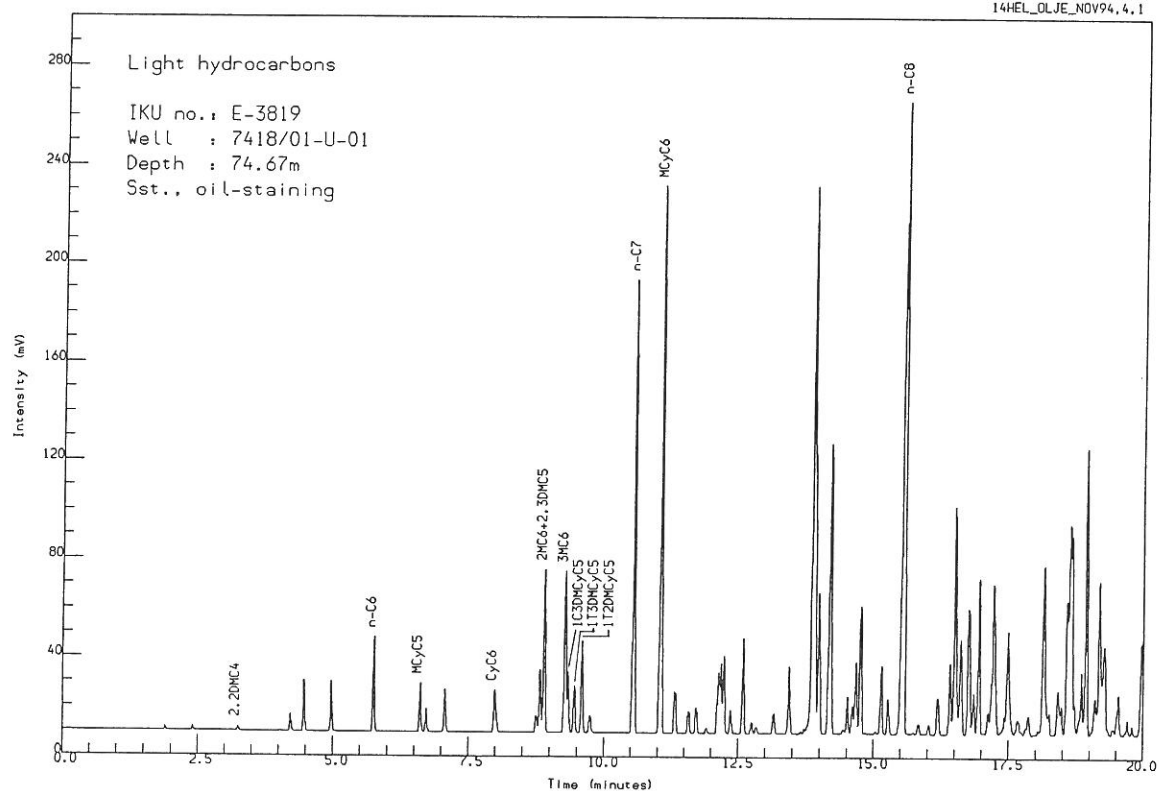
14HEL_OLJE_NOV94.3.1



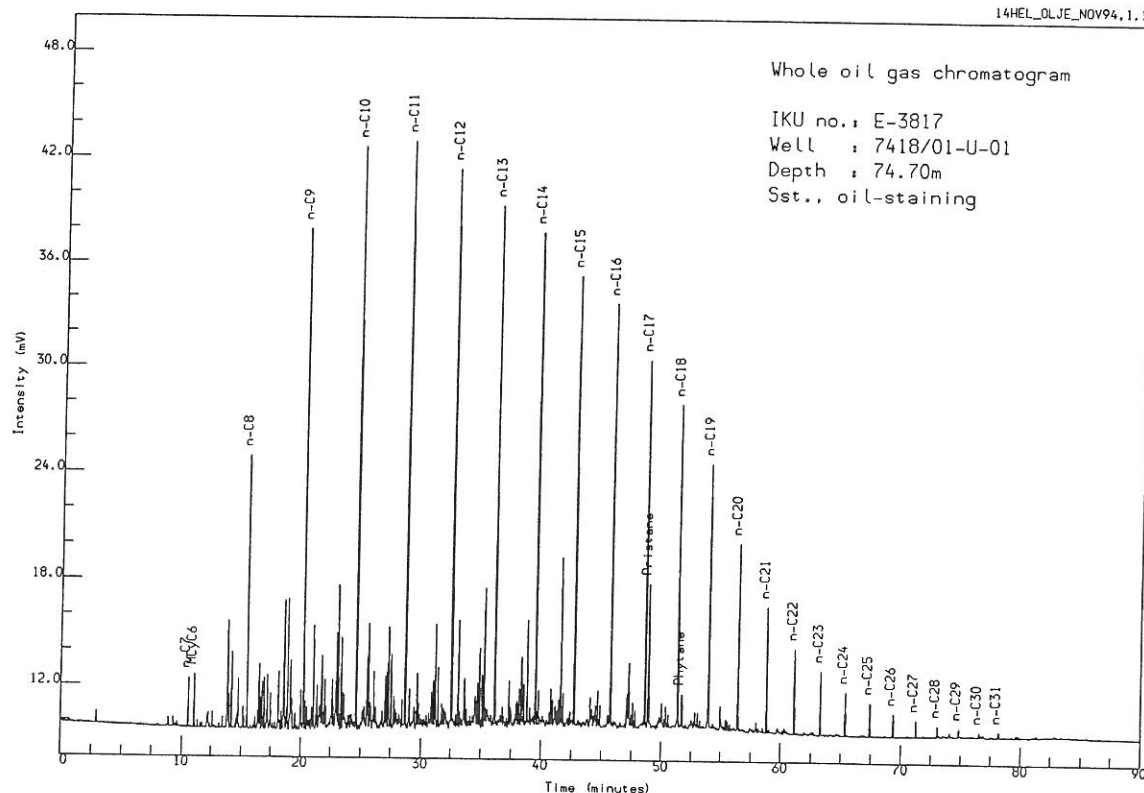
14HEL_OLJE_NOV94.4.1



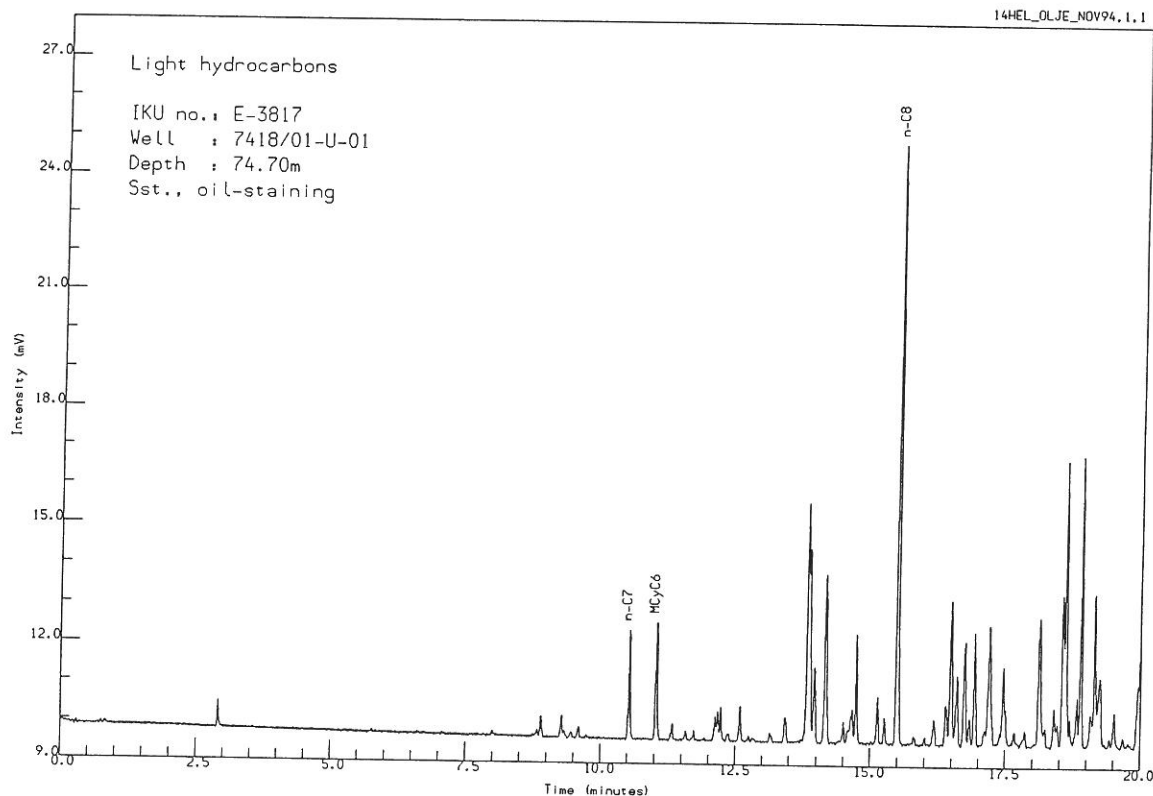
14HEL_OLJE_NOV94.4.1



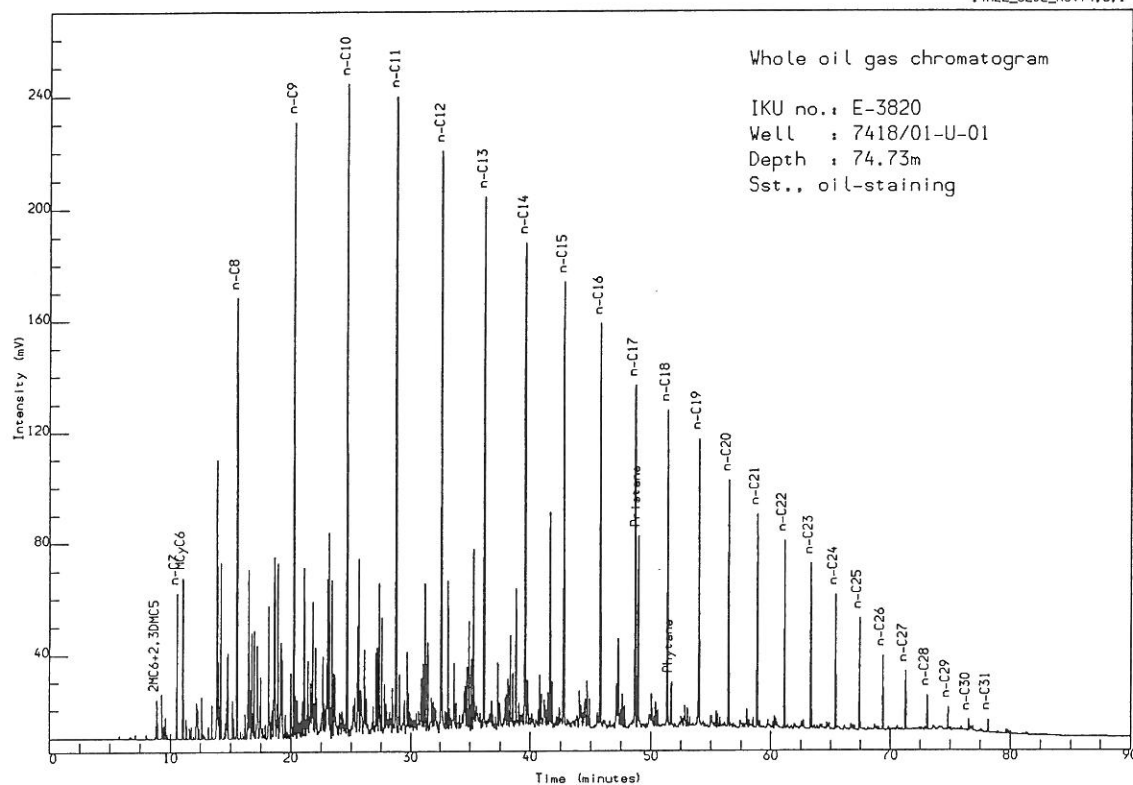
14HEL_OLJE_NOV94.1.1



14HEL_OLJE_NOV94.1.1



14HEL_OLJE_NOV94.5.1



14HEL_OLJE_NOV94.5.1

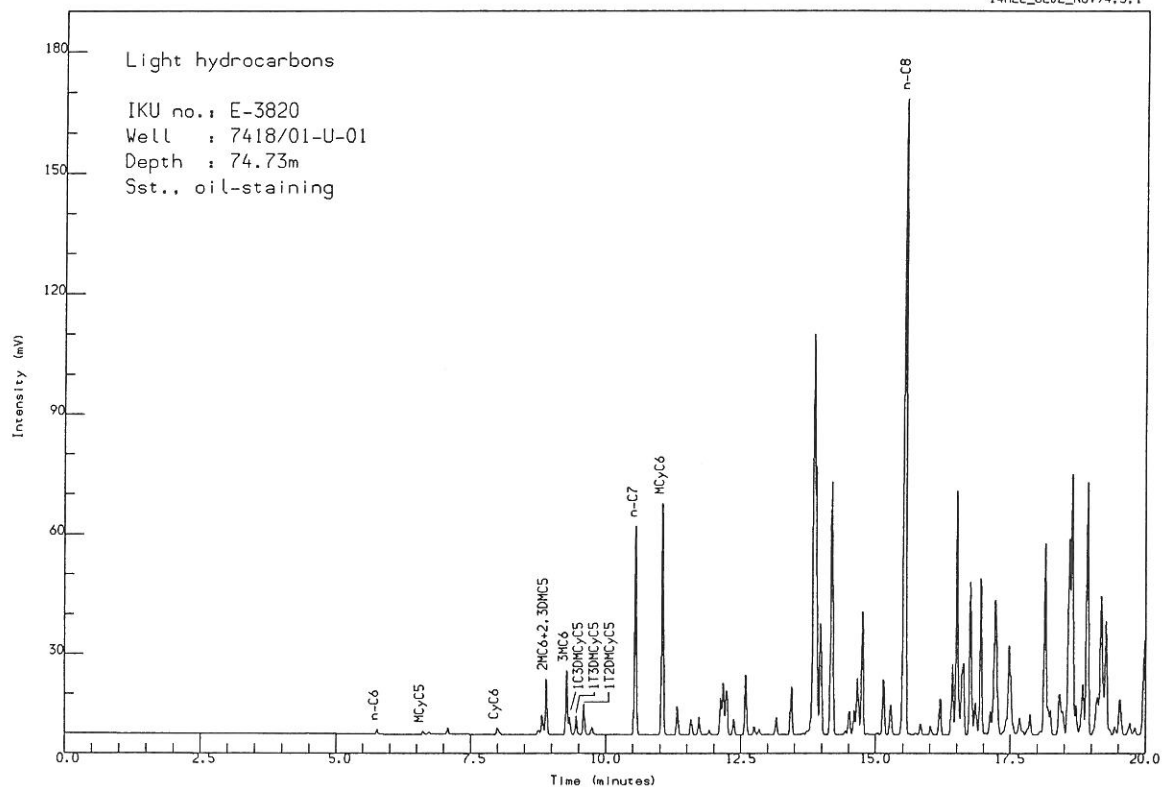


Figure 2

Gas Chromatograms

of

Saturated Hydrocarbons

Peak code	Peak identity
<u>n-C₁₅</u>	<u>n-alkanes</u>

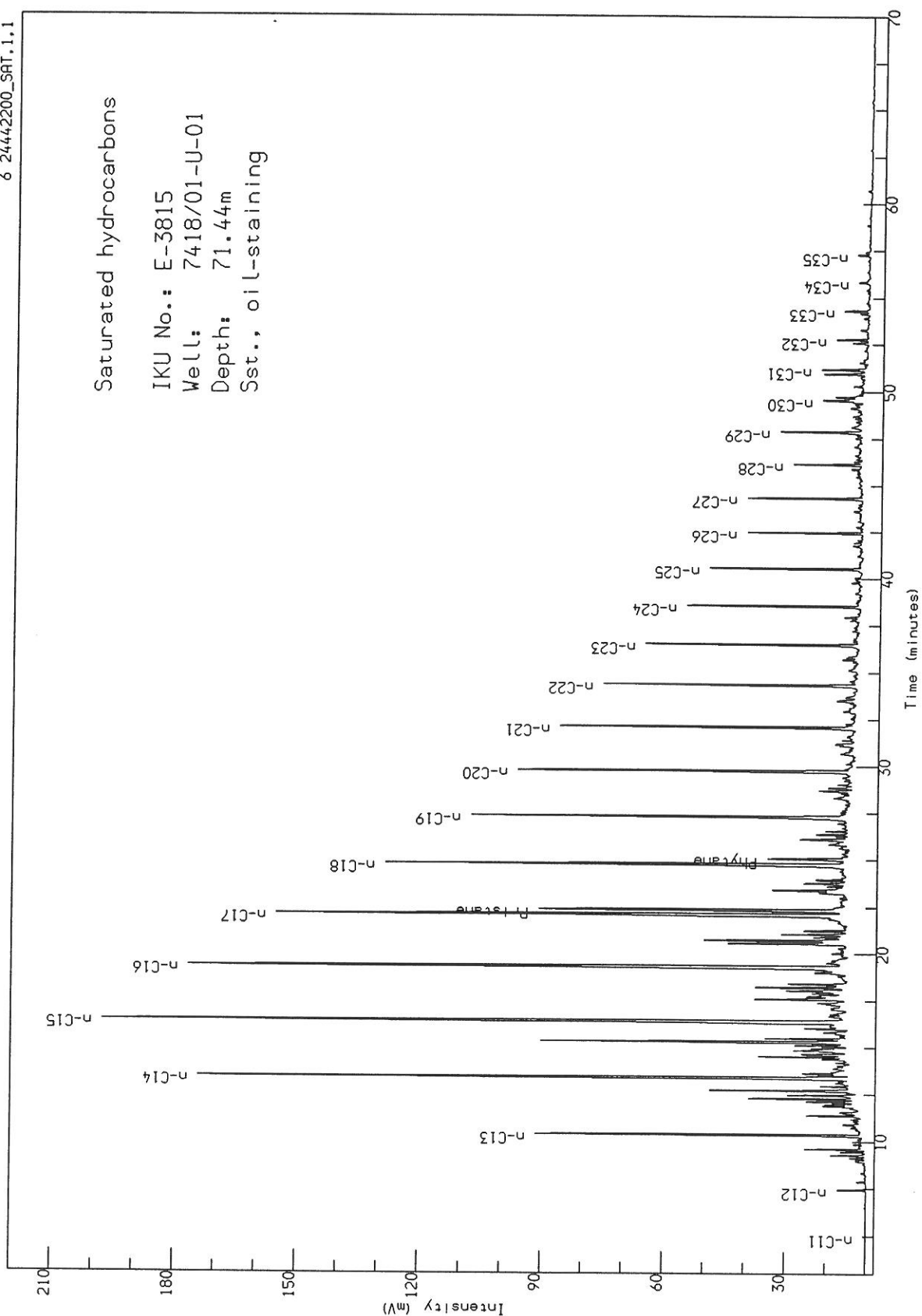
Saturated hydrocarbons

IKU No.: E-3815

Well: 7418/01-U-01

Depth: 71.44m

Sst., oil-staining



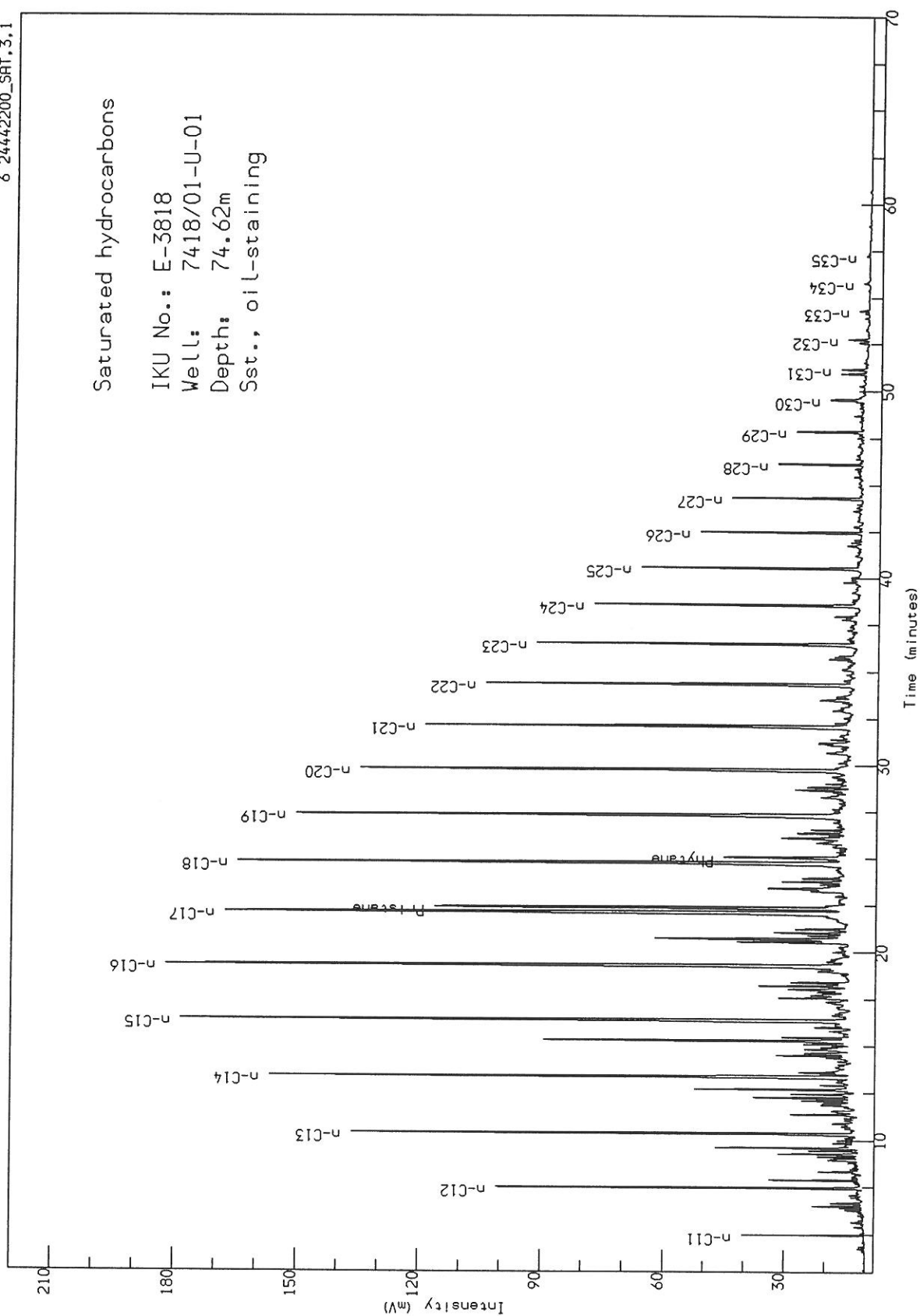
Saturated hydrocarbons

IKU No.: E-3818

Well: 7418/01-U-01

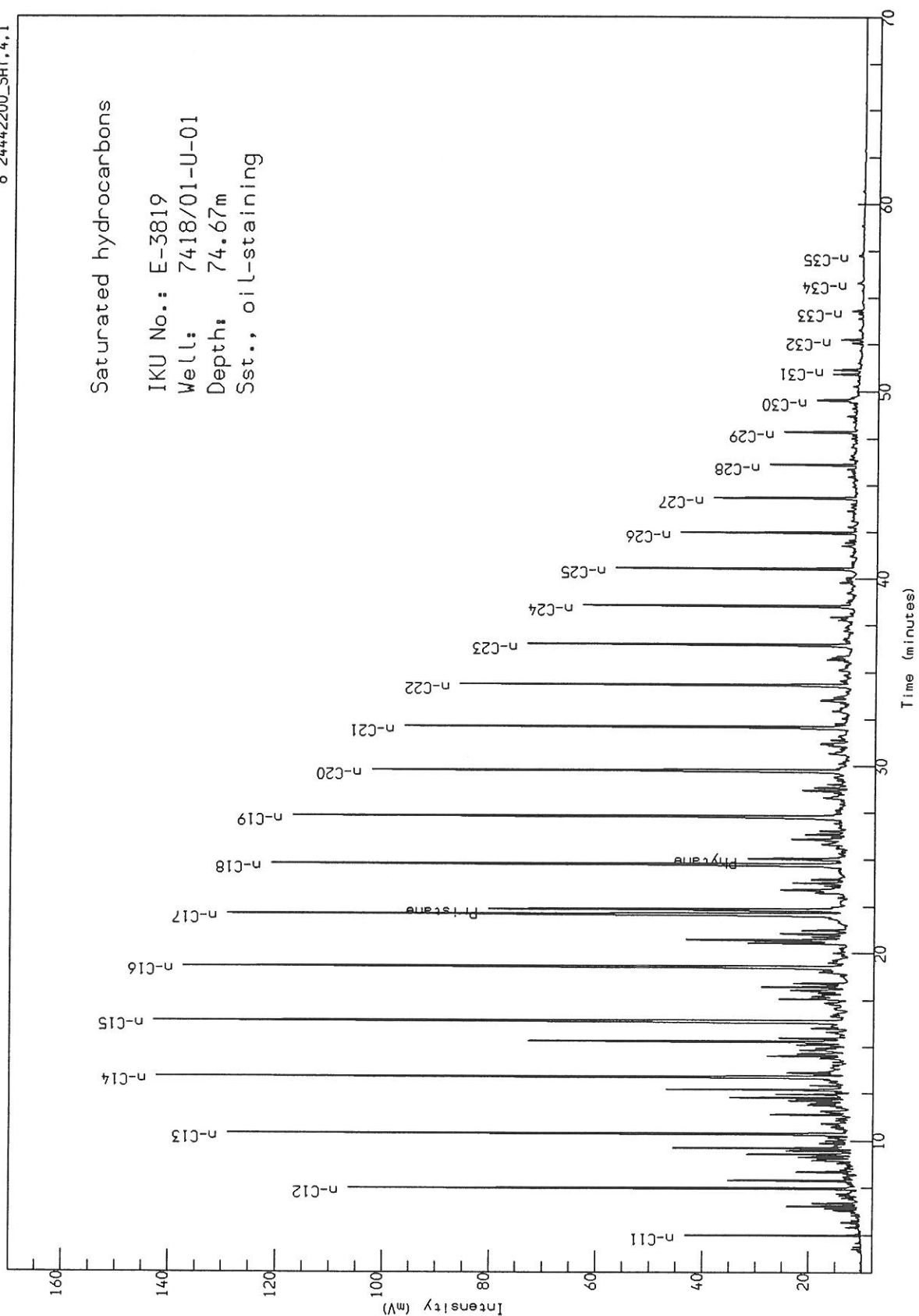
Depth: 74.62m

Sst., oil-staining

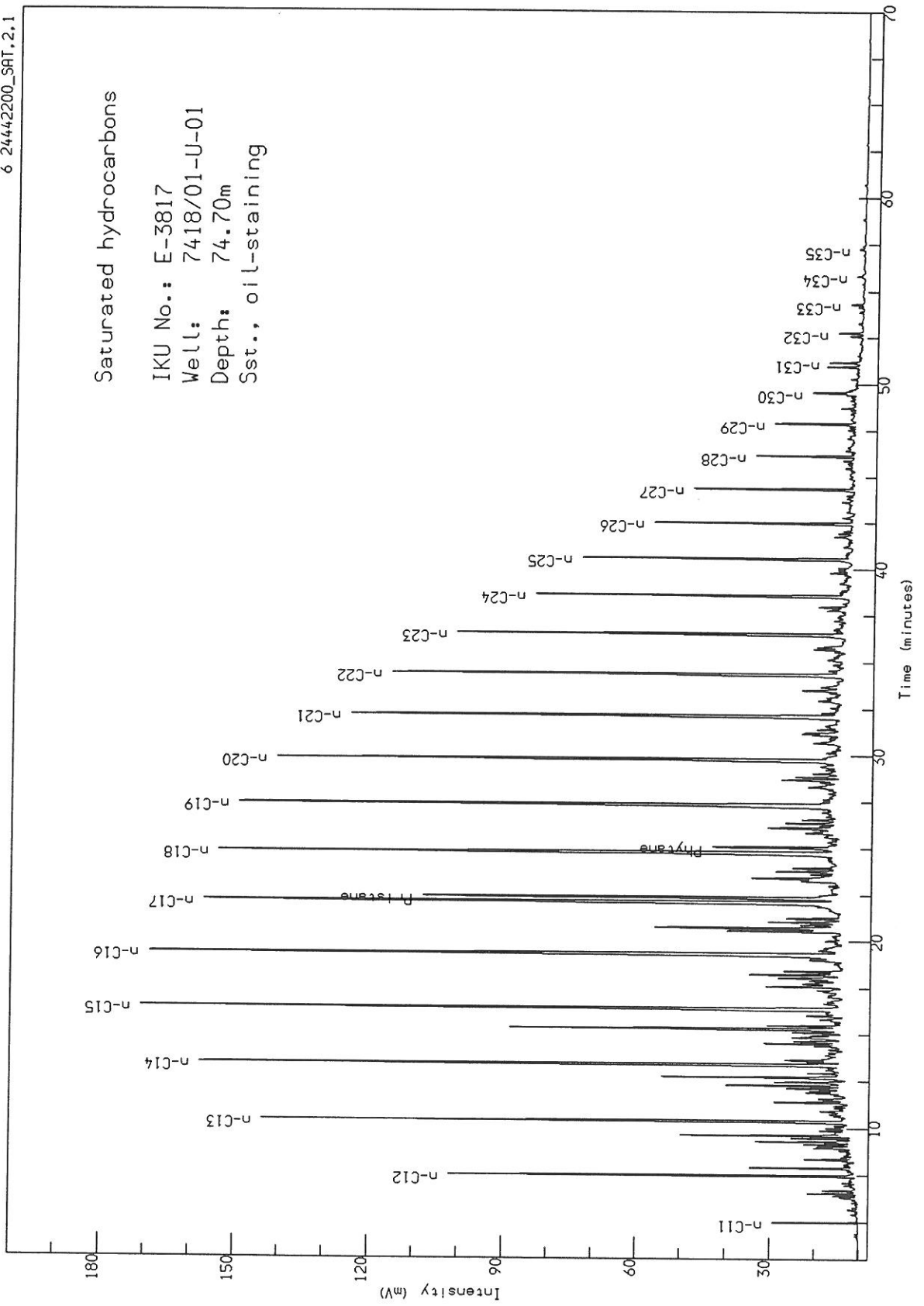


Saturated hydrocarbons

IKU No.: E-3819
 Well: 7418/01-U-01
 Depth: 74.67m
 Sst., oil-staining



Saturated hydrocarbons
IKU No.: E-3817
Well: 7418/01-U-01
Depth: 74.70m
Sst., oil-staining



Saturated hydrocarbons

IKU No.: E-3820
 Well: 7418/01-U-01
 Depth: 74.73m
 Sst., oil-staining

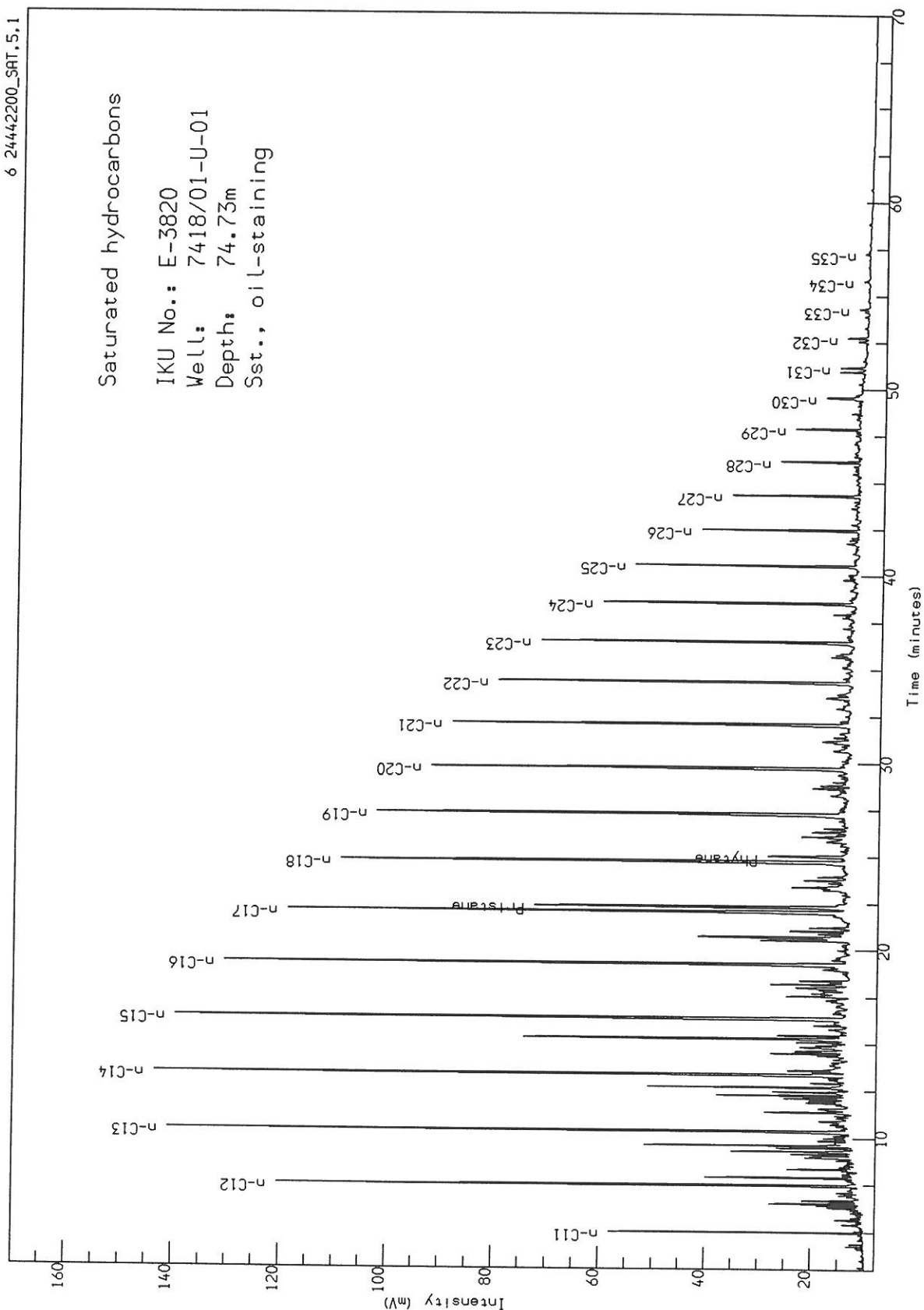


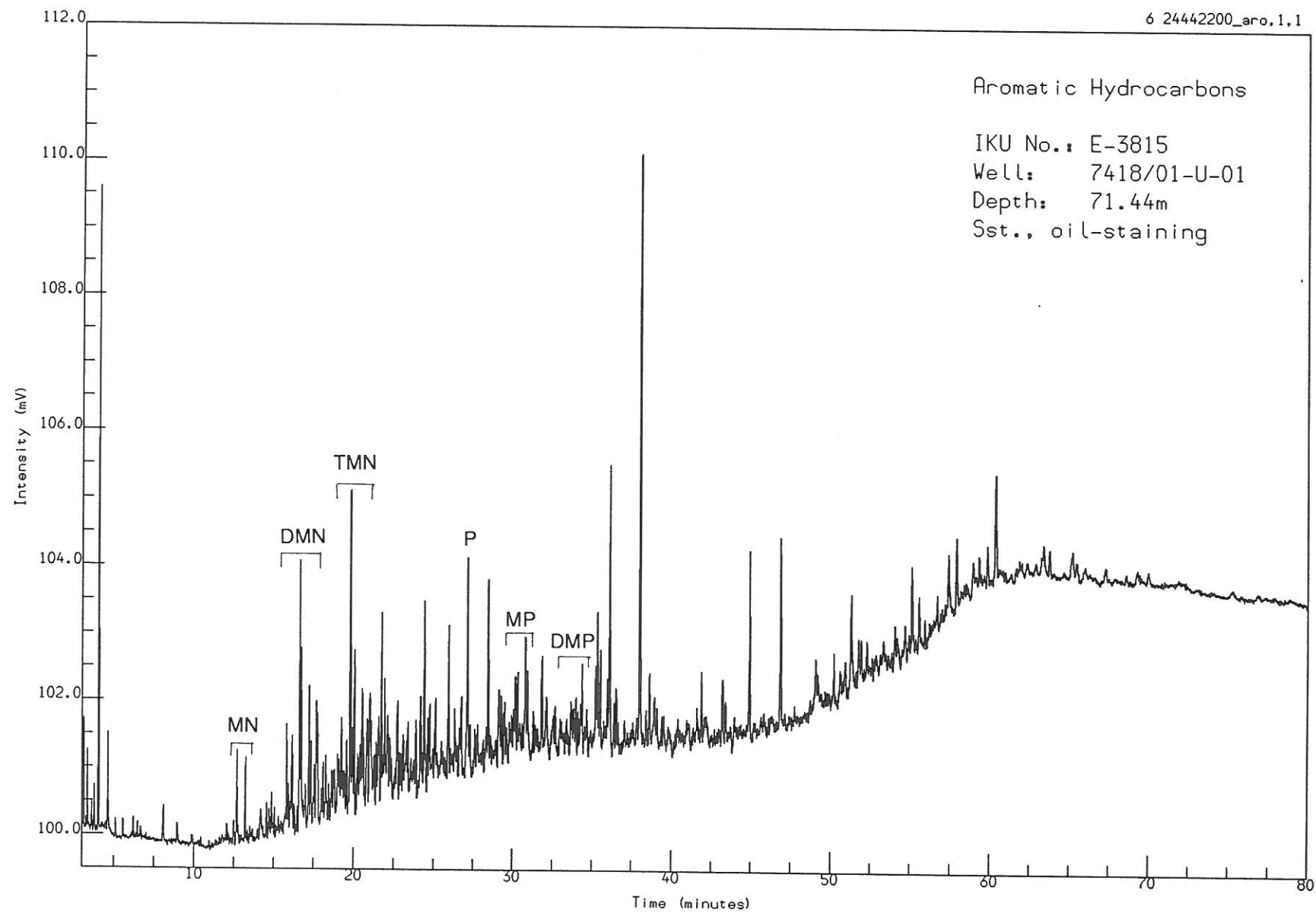
Figure 3

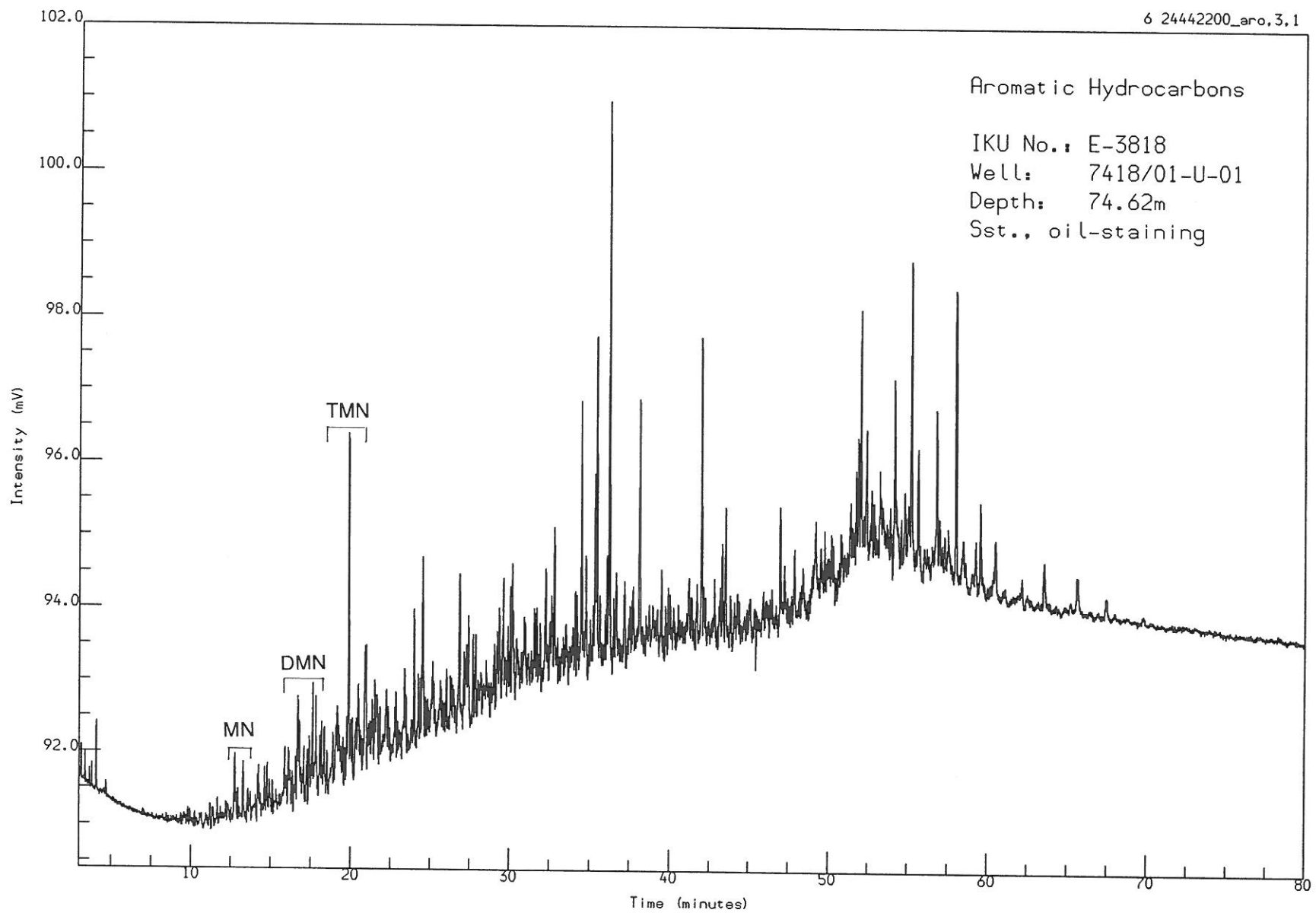
Gas Chromatograms

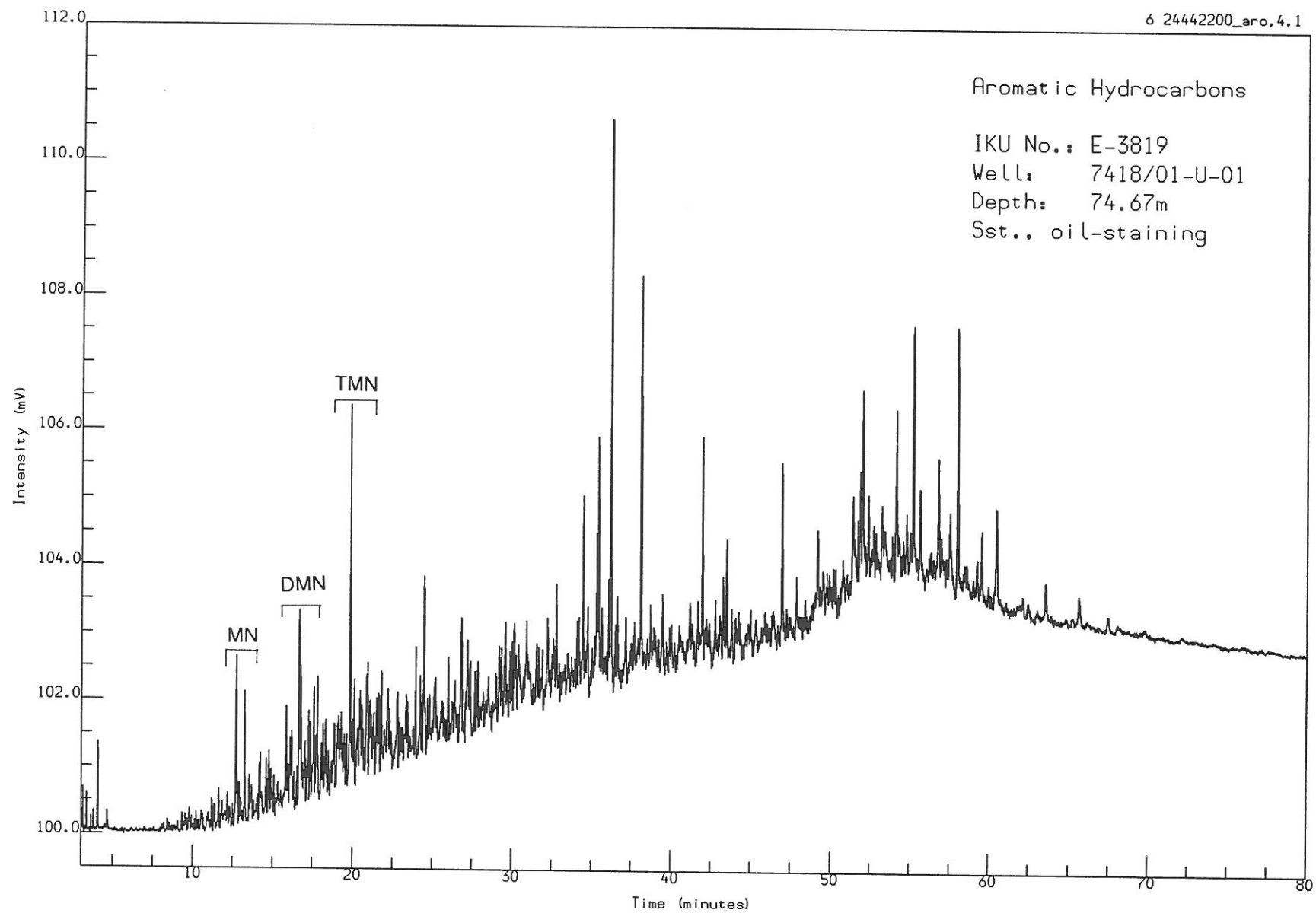
of

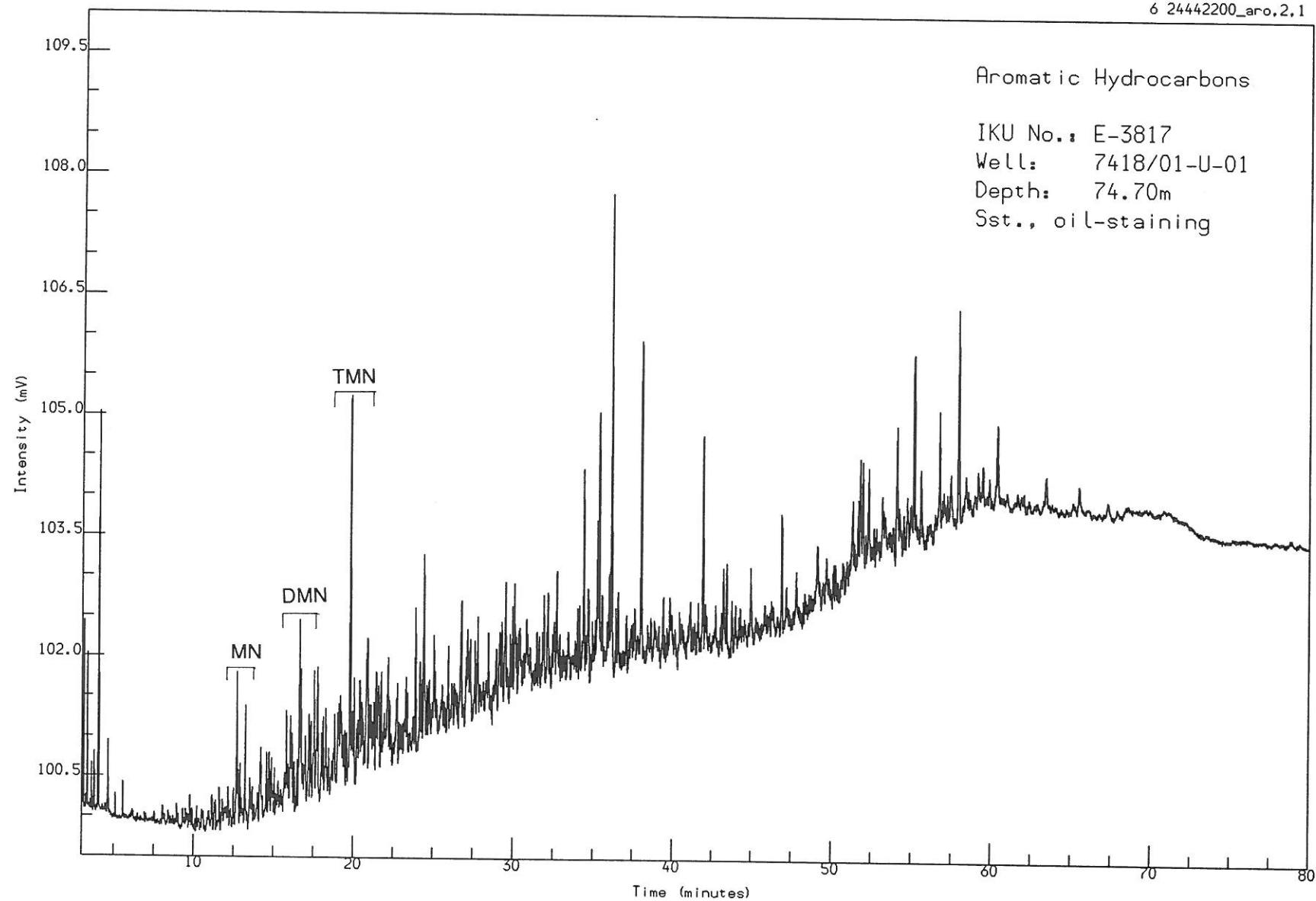
Aromatic Hydrocarbons

Peak code	Peak identity
MN	Methyl-naphthalene
DMN	Dimethyl-naphthalene
TMN	Trimethyl-naphthalene
P	Phenanthrene
MP	Methyl-phenanthrene
DMP	Dimethyl-phenanthrene









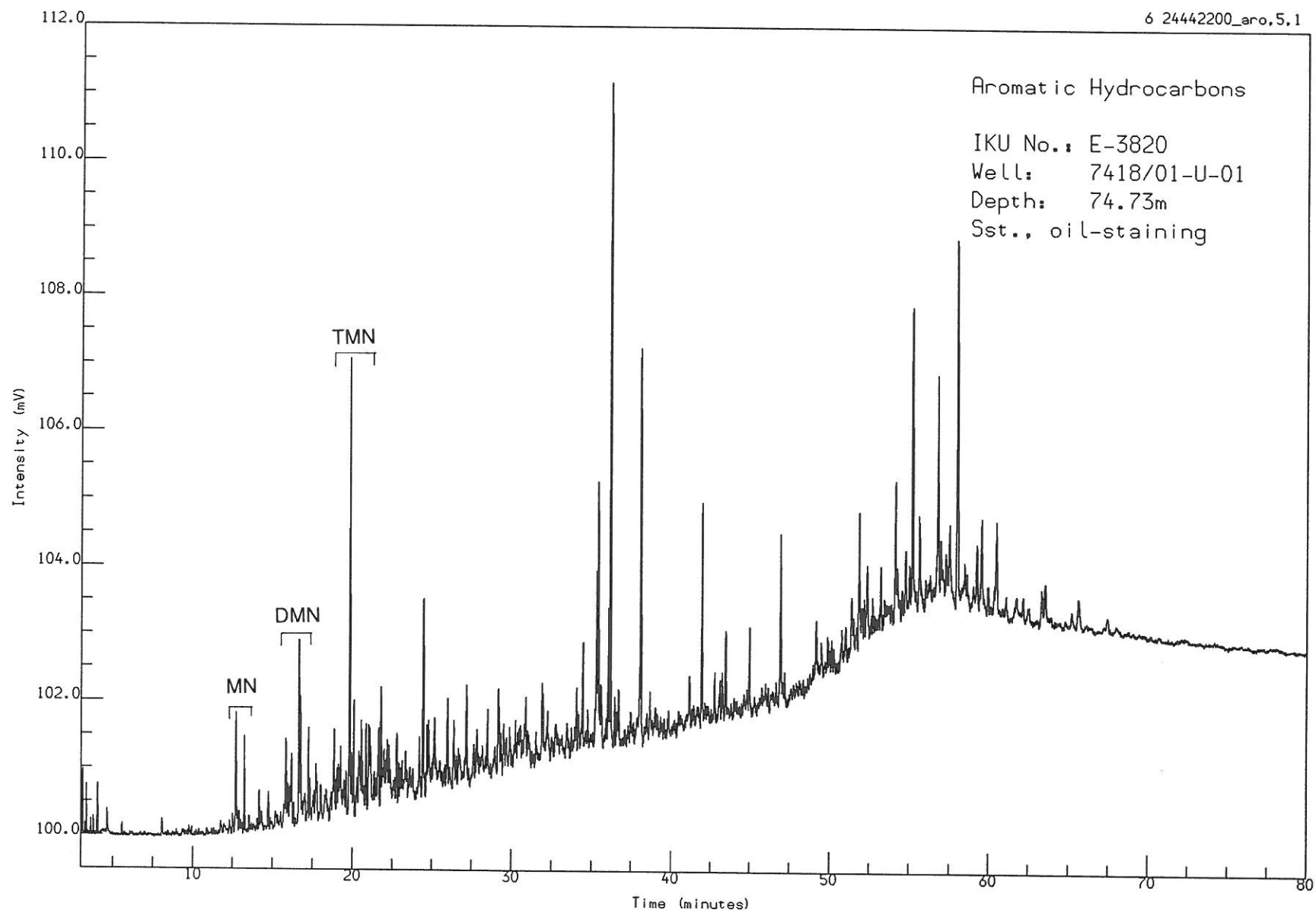


Figure 4

GC-MS Fragmentograms

of

Saturated Hydrocarbons

(m/z 177, 191, 205, 217, 218, 231, 259)

Key for m/z 191 and m/z 177 (terpanes):

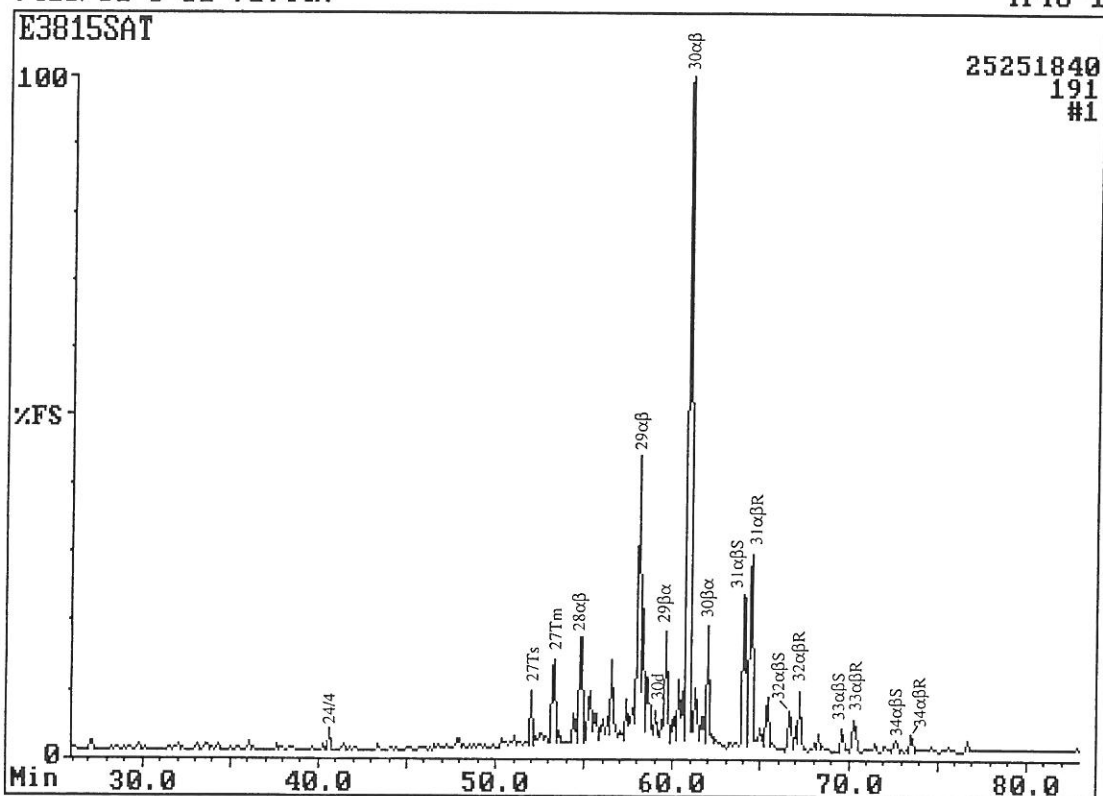
Peak code	Identification
23/3	C ₂₃ tricyclic terpane
24/3	C ₂₄ tricyclic terpane
25/3	C ₂₅ tricyclic terpane (17R, 17S)
24/4	C ₂₄ tetracyclic terpane
26/3	C ₂₆ tricyclic terpane (17R, 17S)
27T _s	18α(H)-22, 29, 30-trisnorneohopane, Ts
27T _m	17α(H)-22, 29, 30-trisnorhopane, Tm
28αβ	17α(H), 21β(H)-28, 30-bisnorhopane
29αβ	17α(H), 21β(H)-30-norhopane
29Ts	18α(H)-30-norneohopane
30d	15α-methyl-17α(H)-27-norhopane (TtX)
29βα	17β(H), 21α(H)-30-norhopane (=normoretane)
30αβ	17α(H), 21β(H)-30-hopane
30βα	17β(H), 21α(H)-30-hopane (=moretane)
31αβS	17α(H), 21β(H)-30-homohopane (22S)
31αβR	17α(H), 21β(H)-30-homohopane (22R)
32αβS	17α(H), 21β(H)-bishomohopane (22S)
32αβR	17α(H), 21β(H)-bishomohopane (22R)
33αβS	17α(H), 21β(H)-trishomohopane (22S)
33αβR	17α(H), 21β(H)-trishomohopane (22R)
34αβS	17α(H), 21β(H)-tetrakishomohopane (22S)
34αβR	17α(H), 21β(H)-tetrakishomohopane (22R)
35αβS	17α(H), 21β(H)-pentakishomohopane (22S)
35αβR	17α(H), 21β(H)-pentakishomohopane (22R)

Key for m/z 217 and m/z 218 (steranes):

Peak code	Identification
27dβS	13β(H), 17α(H)-diasterane (20S)
27dβR	13β(H), 17α(H)-diasterane (20R)
27dαS	13α(H), 17β(H)-diasterane (20S)
27dαR	13α(H), 17β(H)-diasterane (20R)
28dβR	13β(H), 17α(H)-diasterane (20R)
28dαS	13α(H), 17β(H)-diasterane (20S)
27ααS	14α(H), 17α(H)-sterane (20S)
29dβS	13β(H), 17α(H)-diasterane (20S)
27ββR	14β(H), 17β(H)-sterane (20R)
27ββS	14β(H), 17β(H)-sterane (20S)
28dαR	13α(H), 17β(H)-diasterane (20R)
27ααR	14α(H), 17α(H)-sterane (20R)
29dβR	13β(H), 17α(H)-diasterane (20R)
29dαR	13α(H), 17β(H)-diasterane (20R)
28ββR	14β(H), 17β(H)-sterane (20R)
28ββS	14β(H), 17β(H)-sterane (20S)
28ααR	14α(H), 17α(H)-sterane (20R)
29ααS	14α(H), 17α(H)-sterane (20S)
29ββR	14β(H), 17β(H)-sterane (20R) + unknown sterane
29ββS	14β(H), 17β(H)-sterane (20S)
29ααR	14α(H), 17α(H)-sterane (20R)

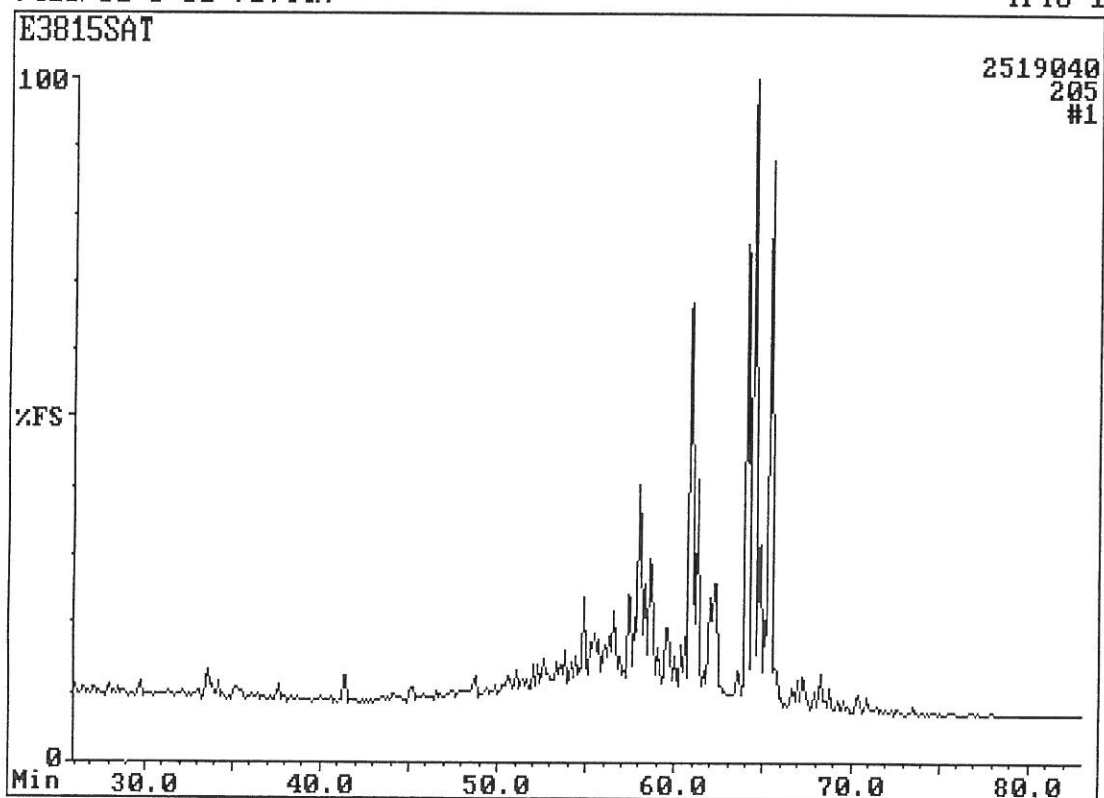
Fisons Instruments TRI0-1000 LAB BASE Data System
 7418/01-U-01 71.44m

Trio-1



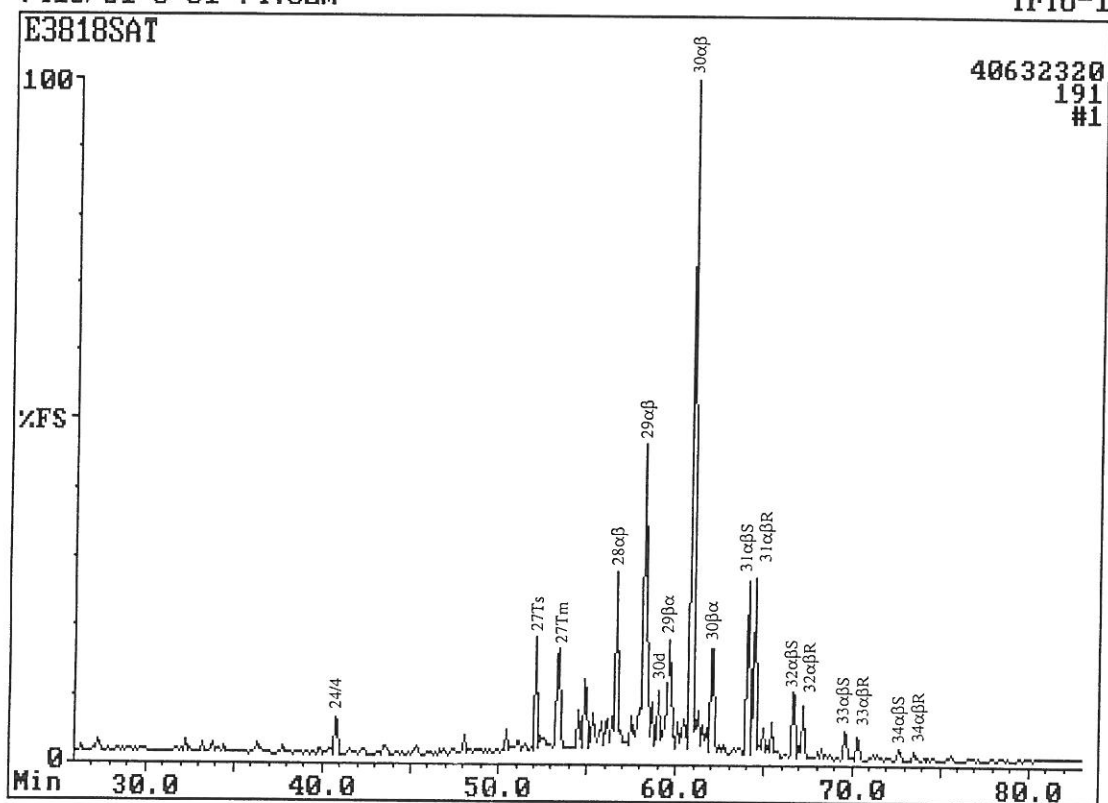
Fisons Instruments
 7418/01-U-01 71.44m

TRI0-1000 LAB BASE Data System
 Trio-1



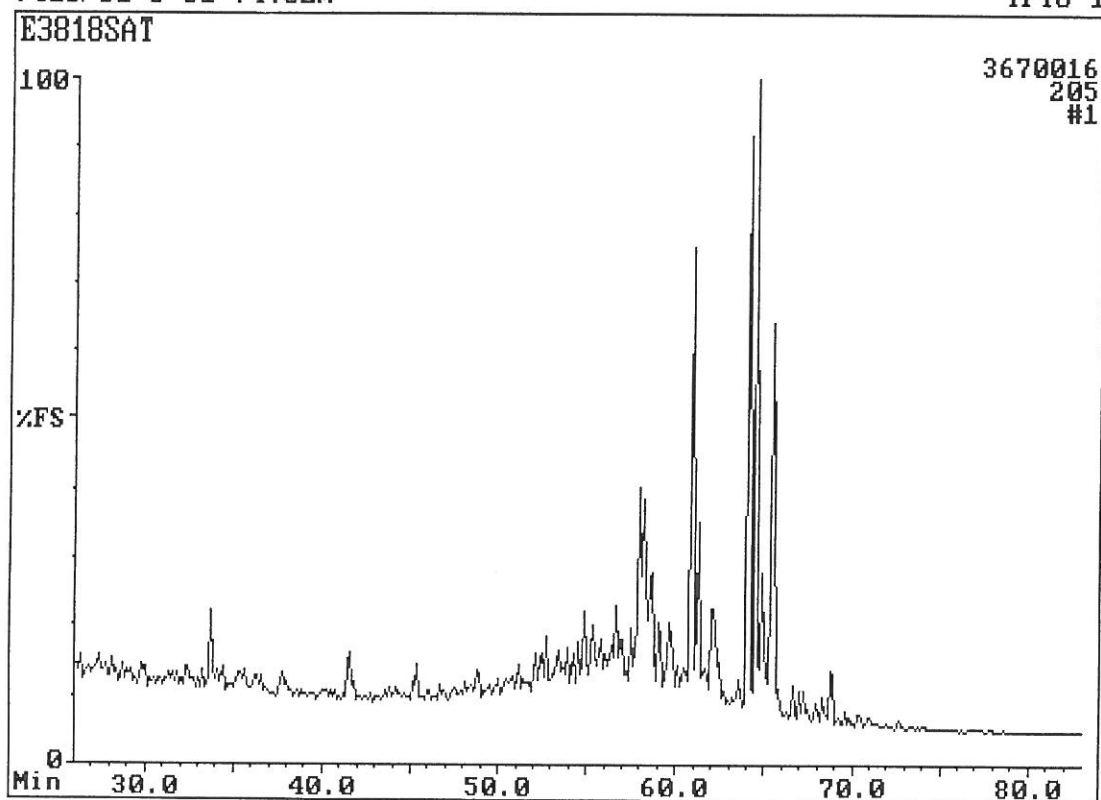
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



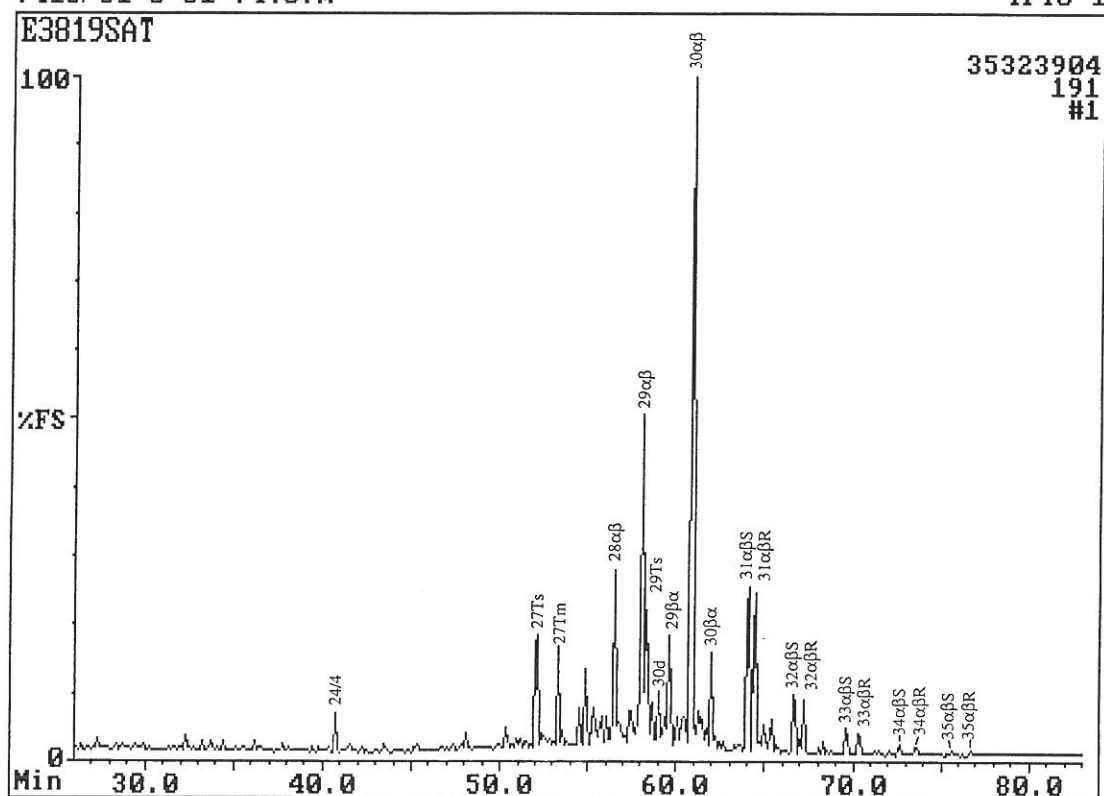
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



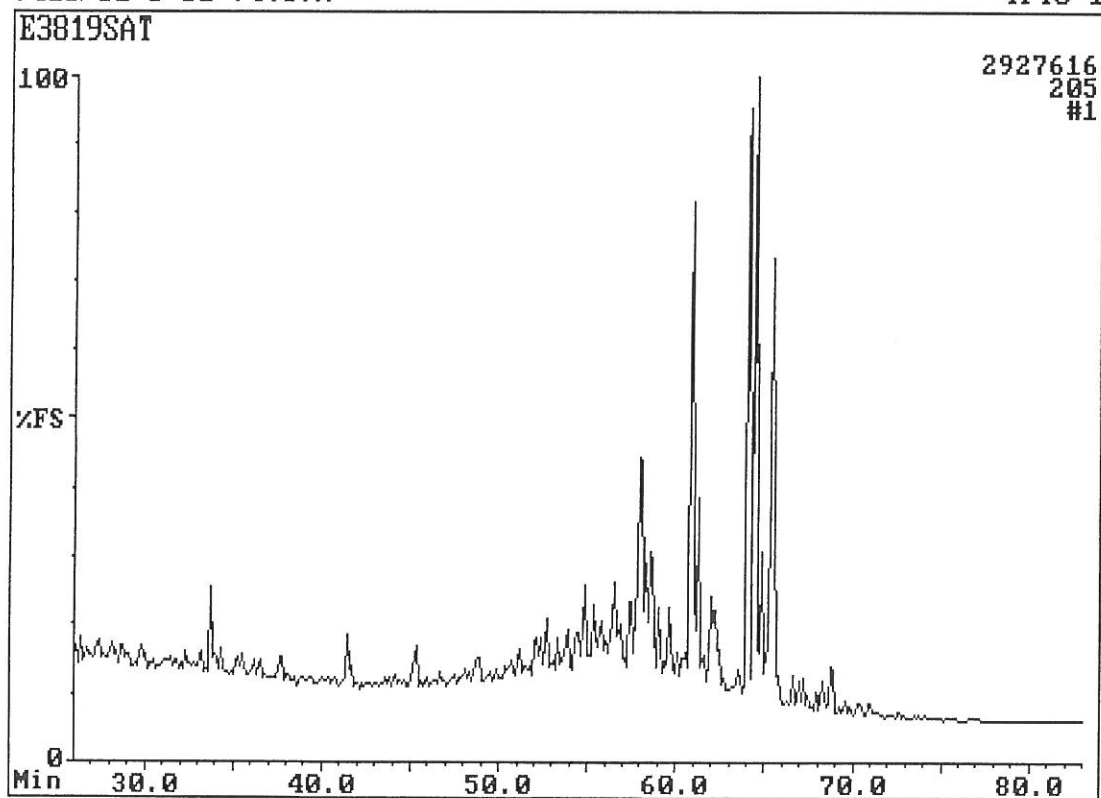
Fisons Instruments
7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



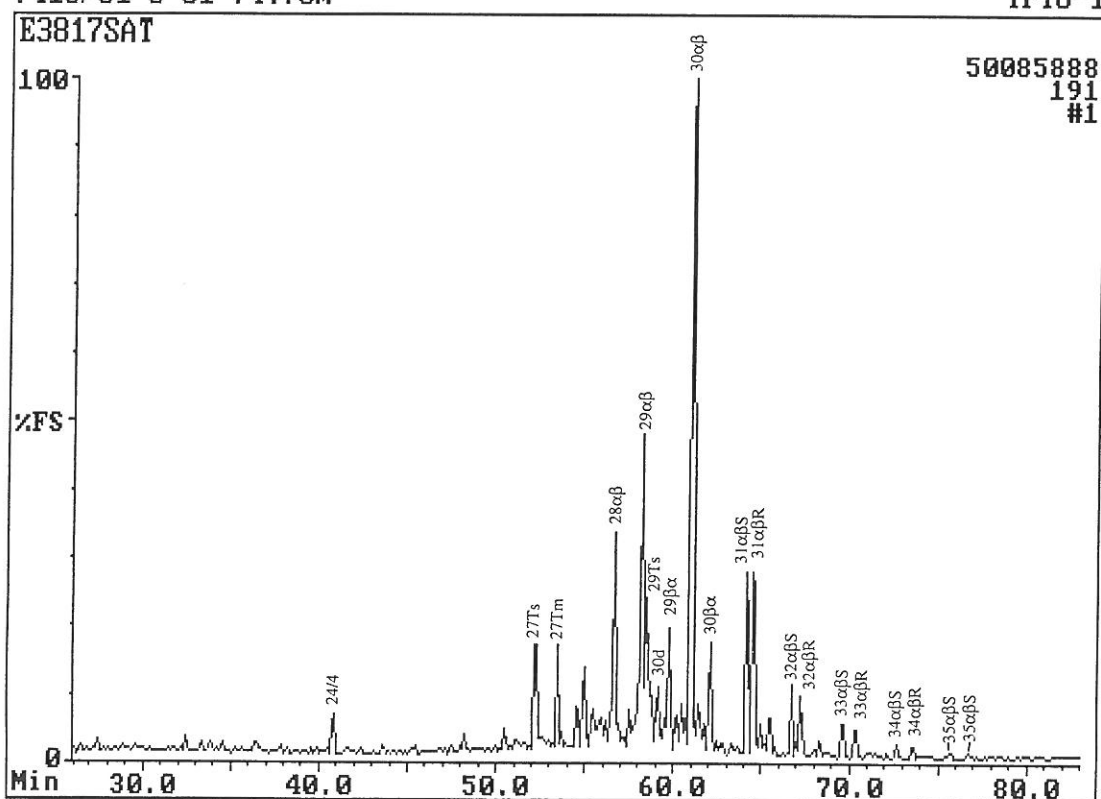
Fisons Instruments
7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



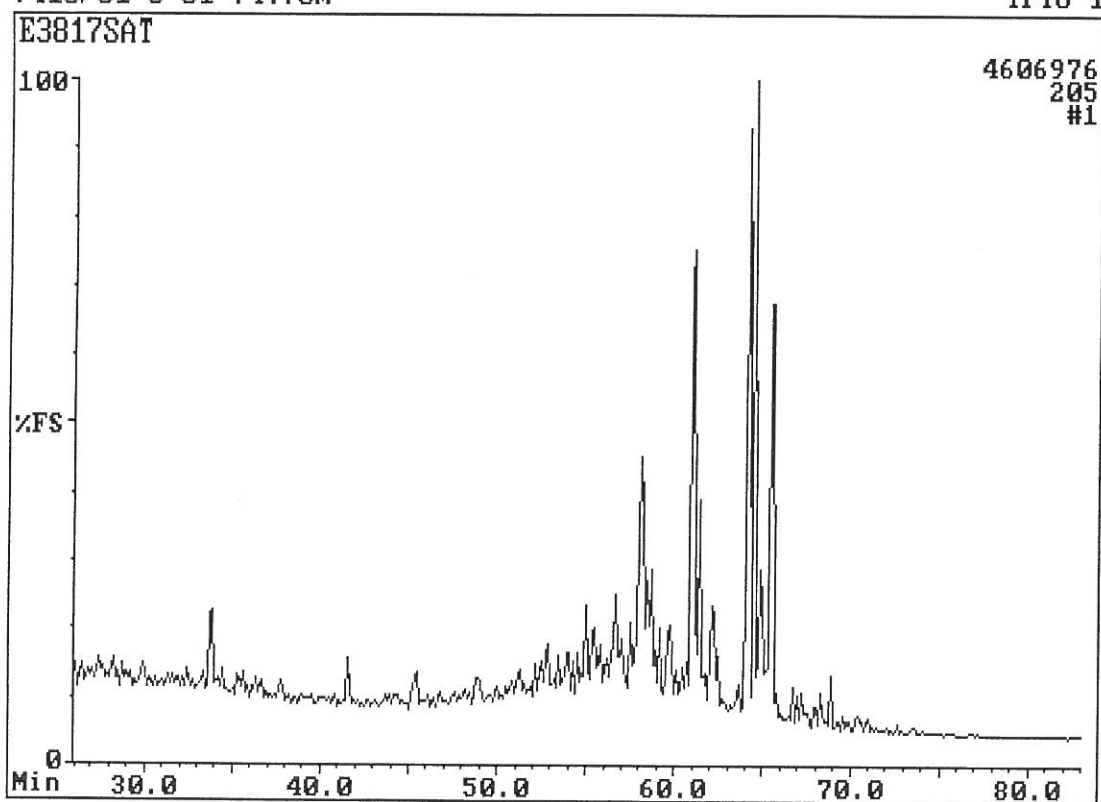
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



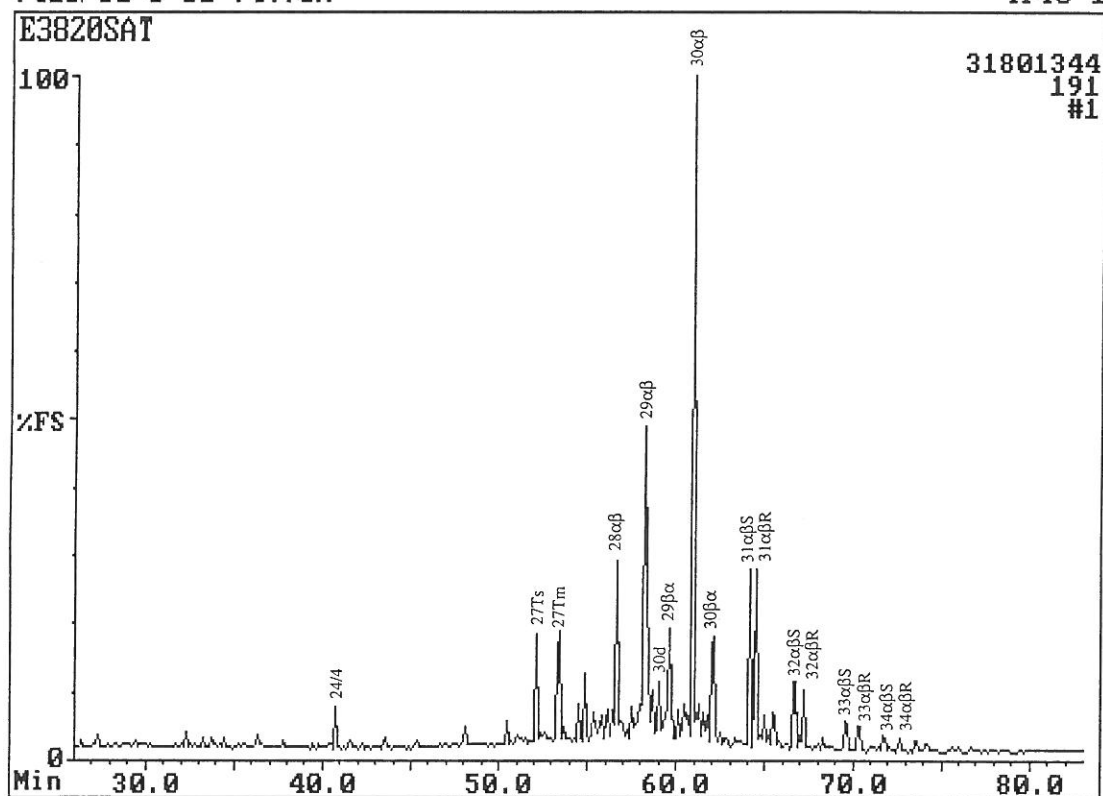
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



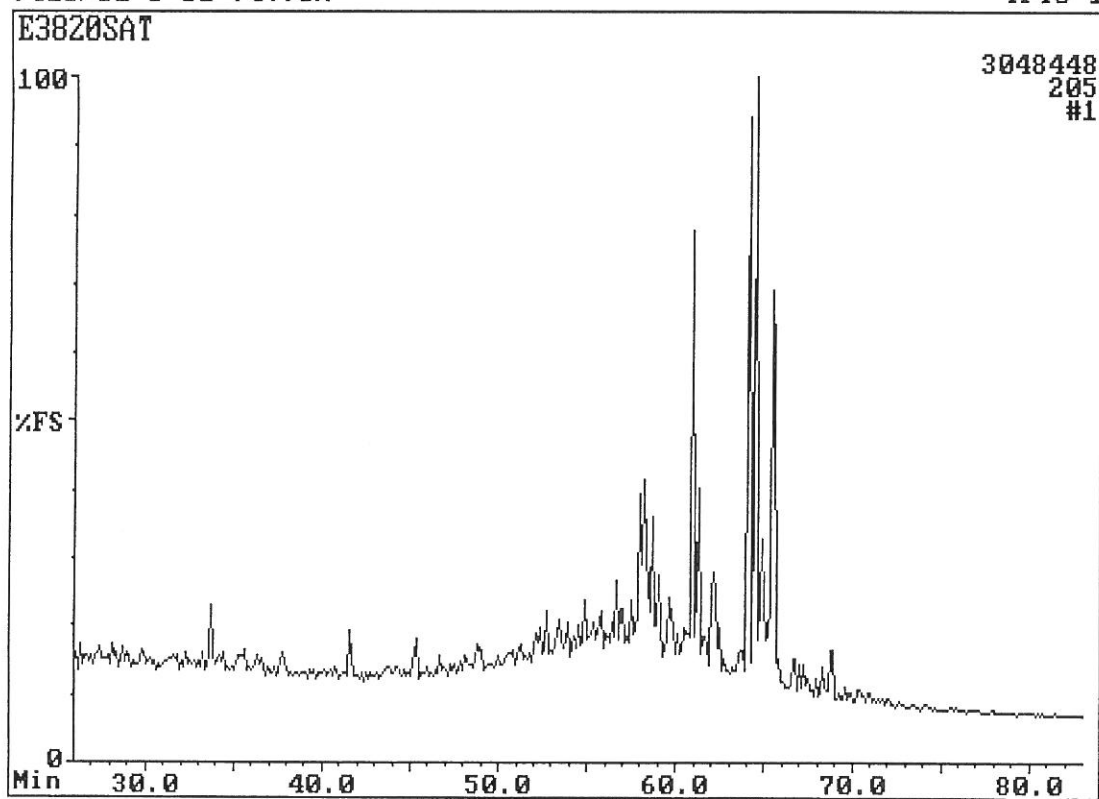
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



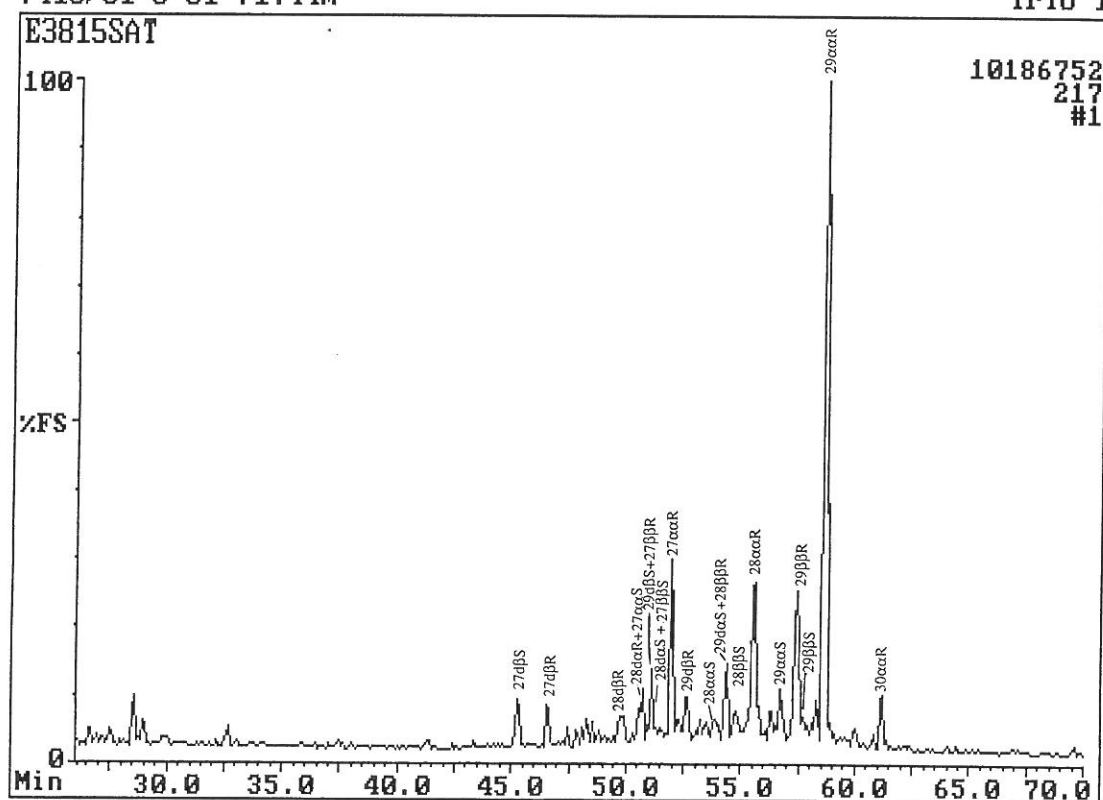
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



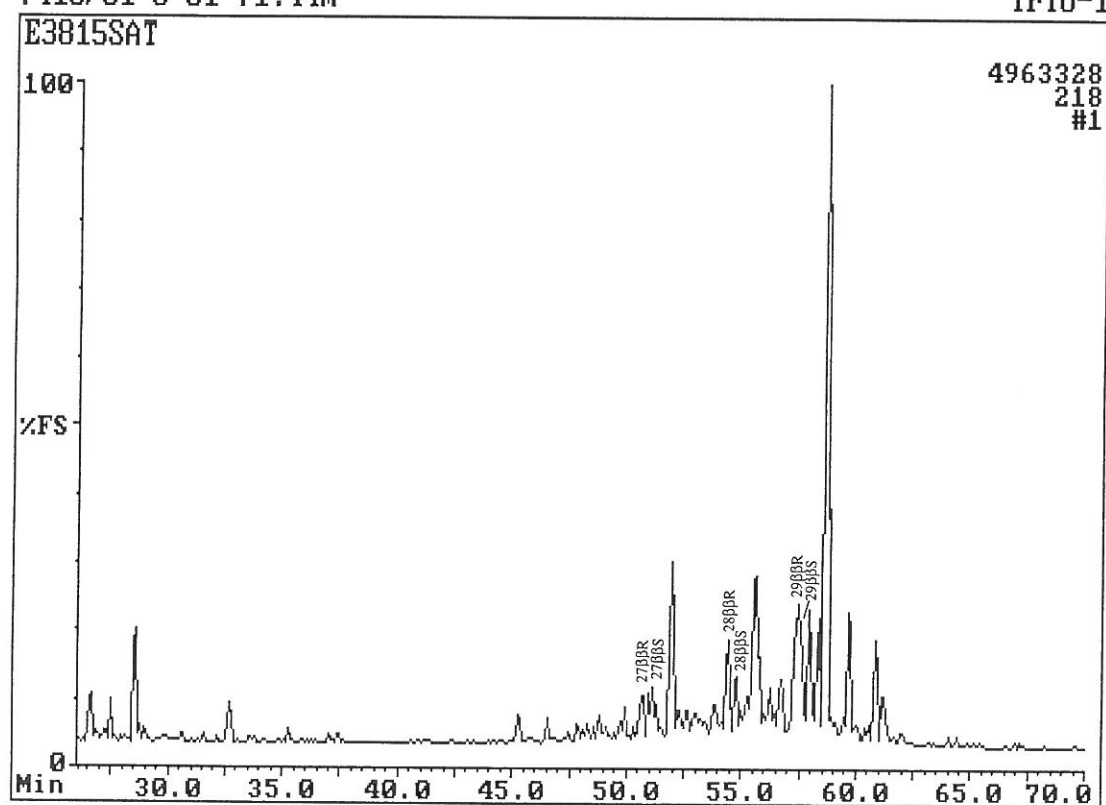
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



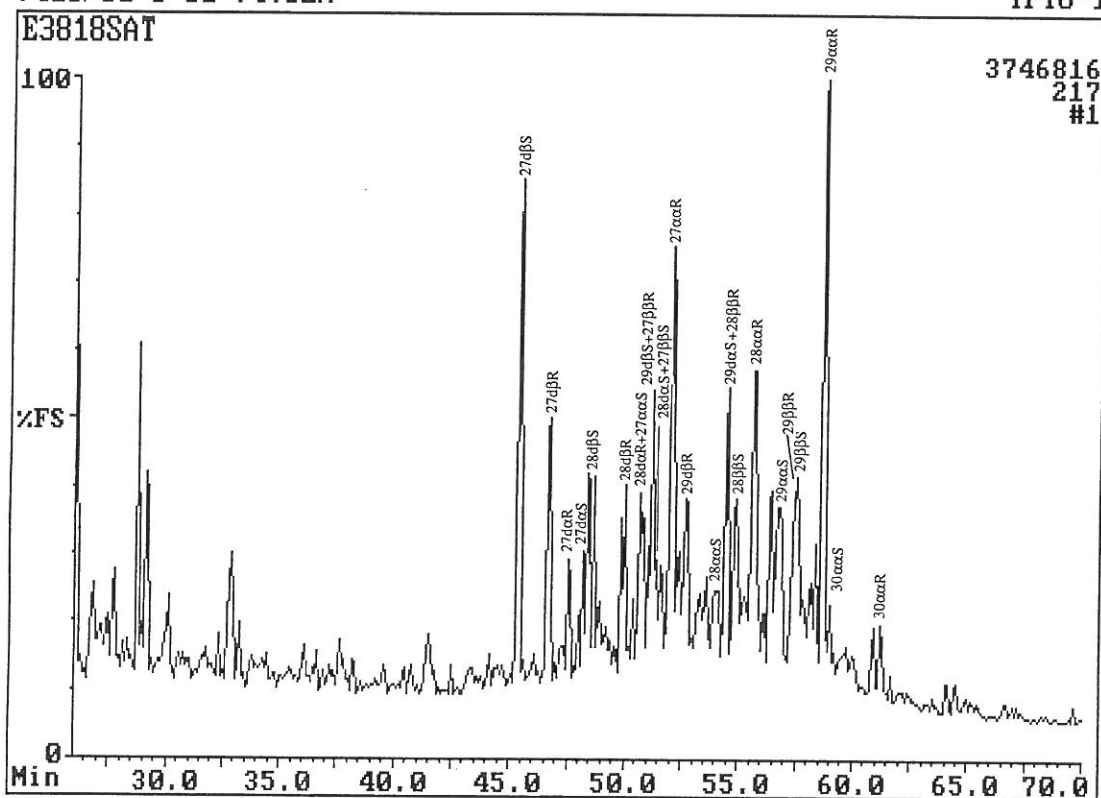
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



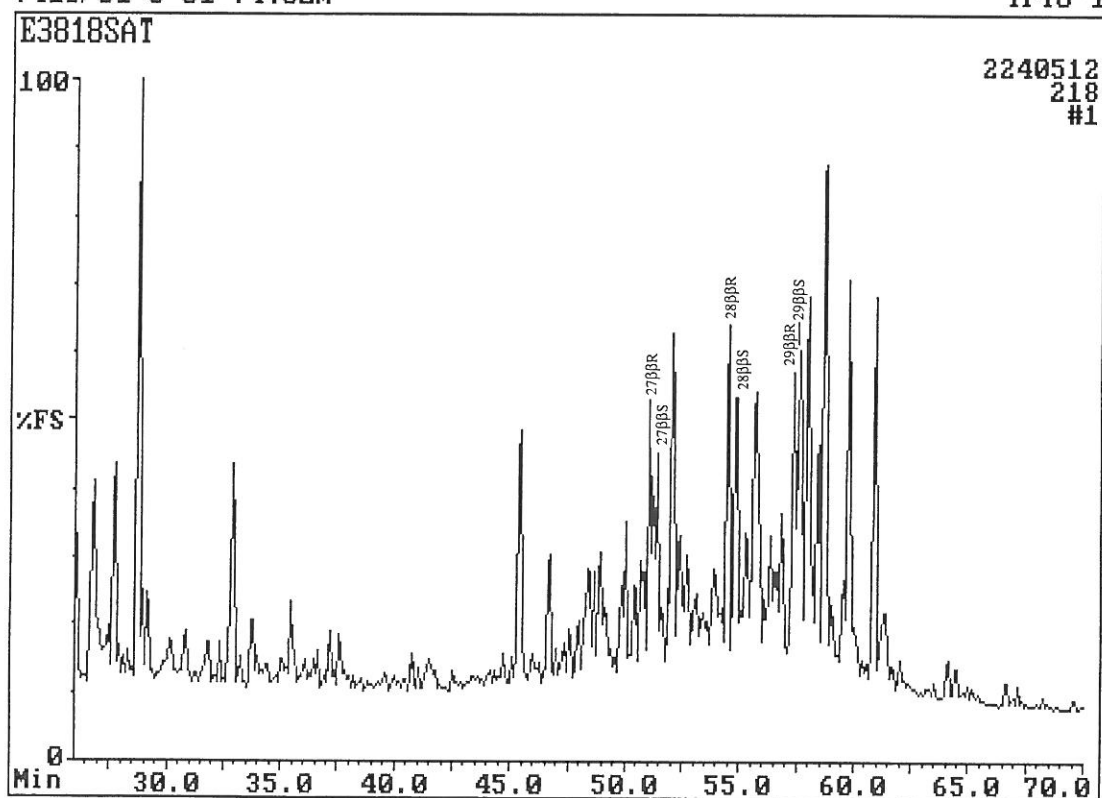
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



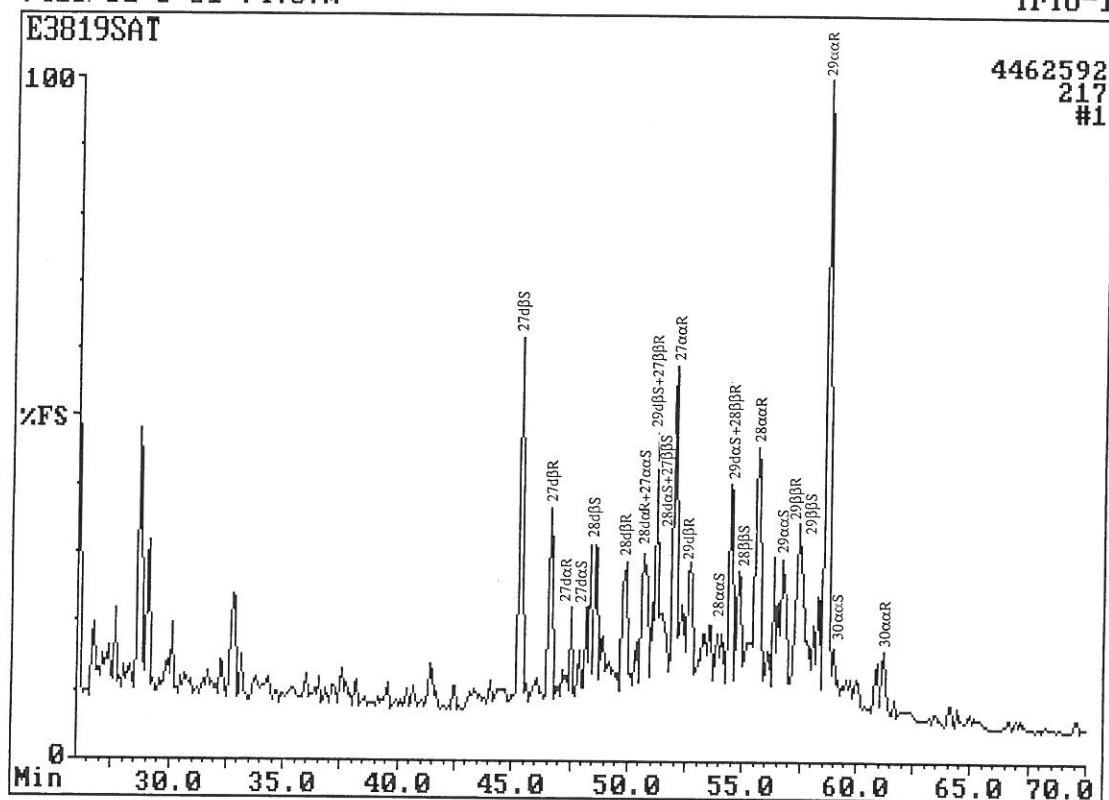
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



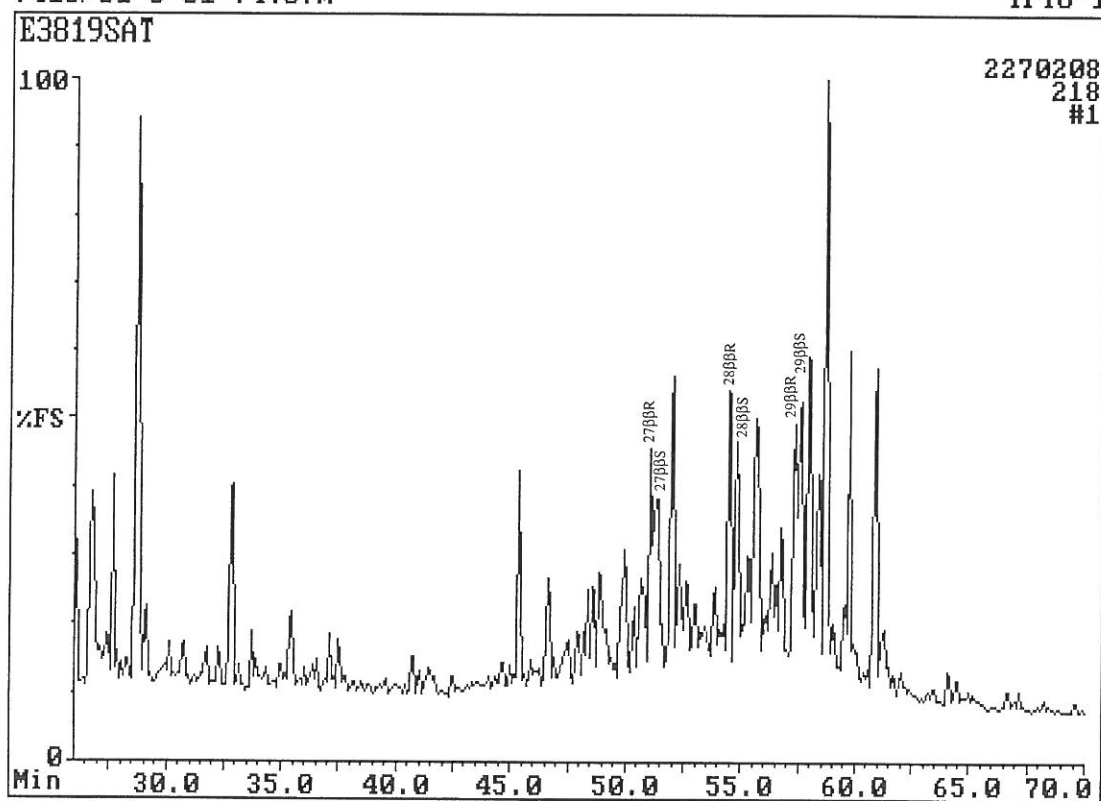
Fisons Instruments
 7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
 Trio-1



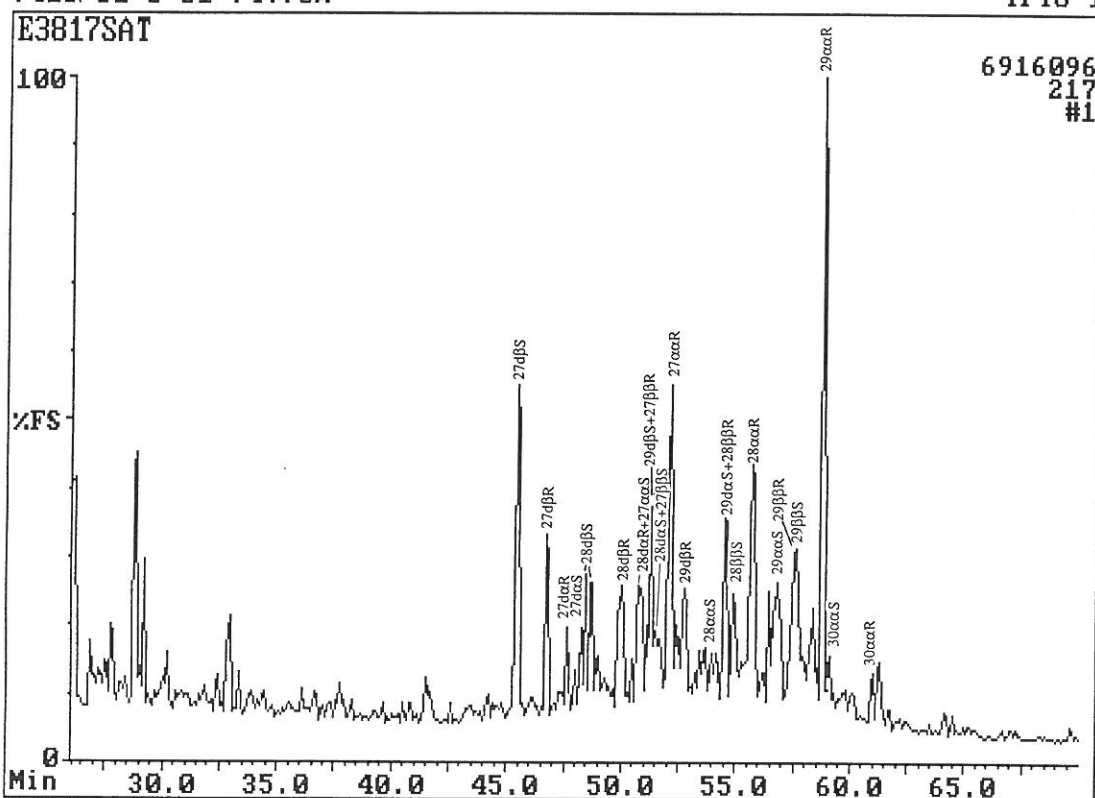
Fisons Instruments
 7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
 Trio-1



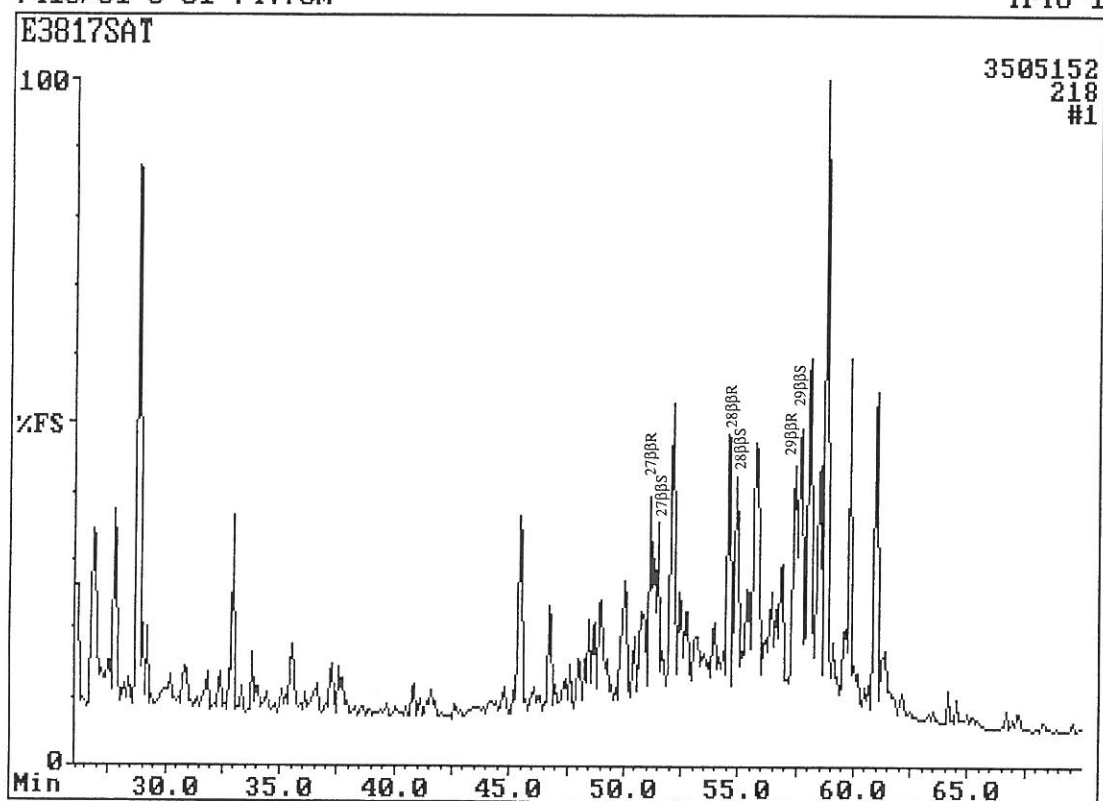
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1

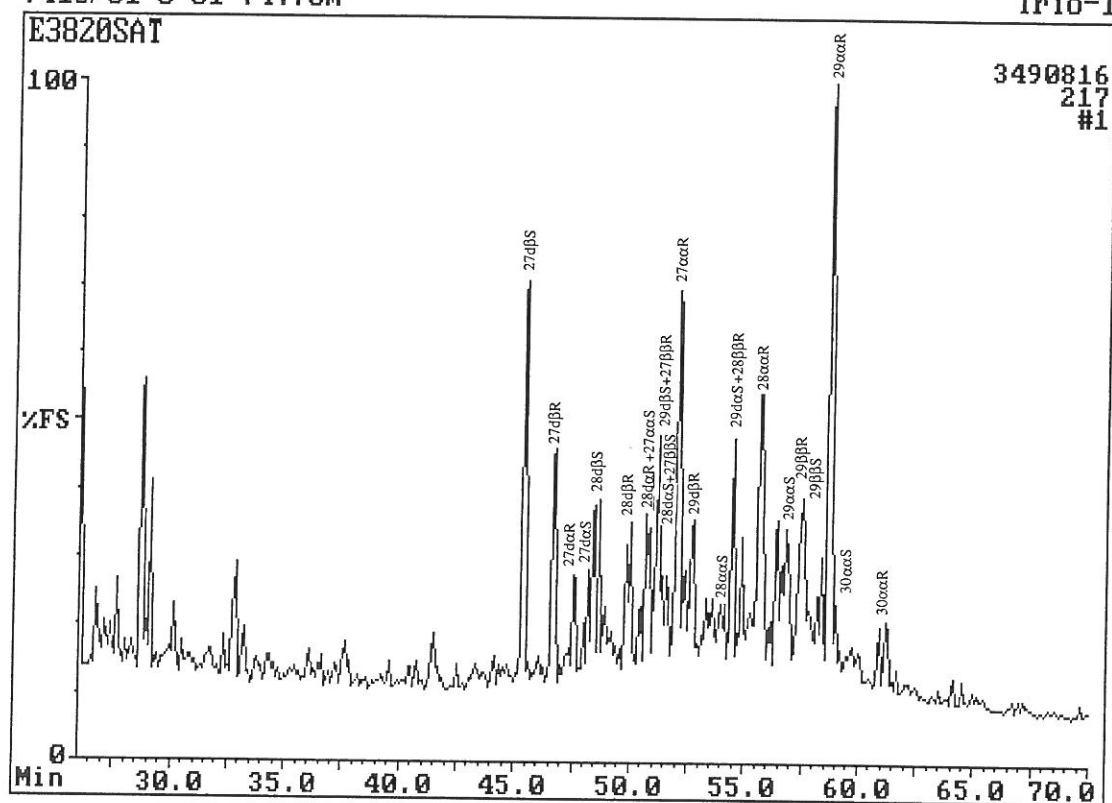


Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1

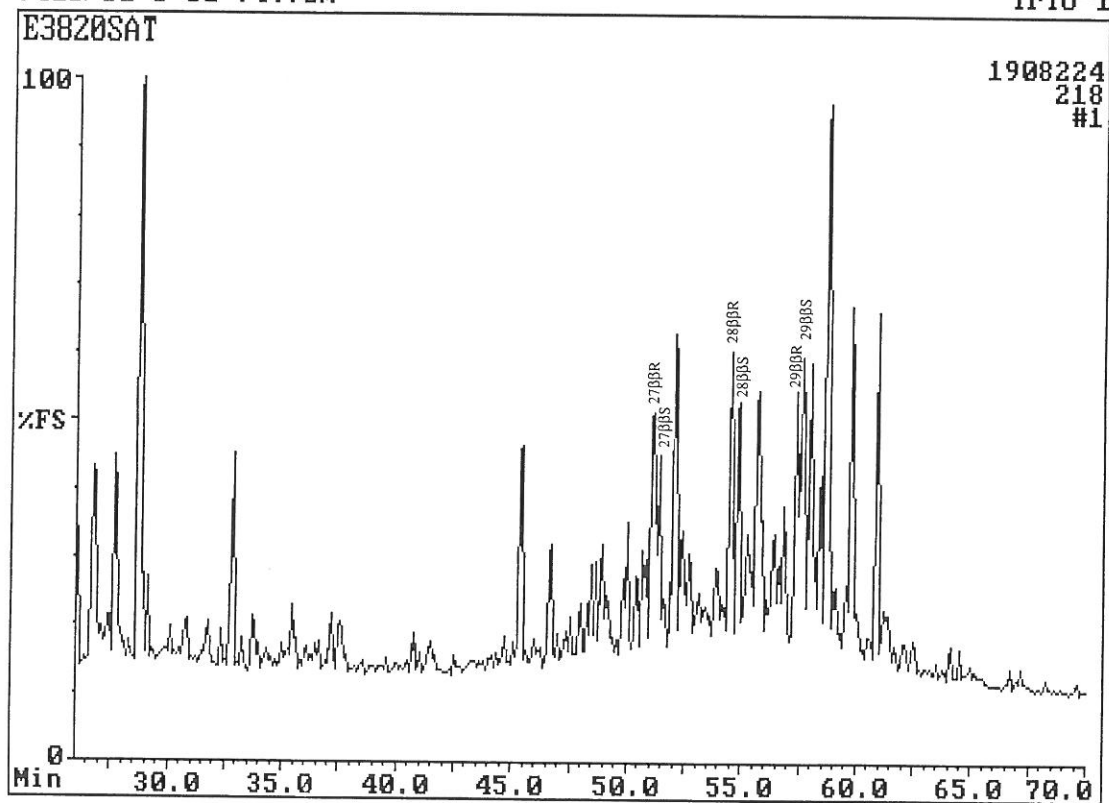


Trio-1



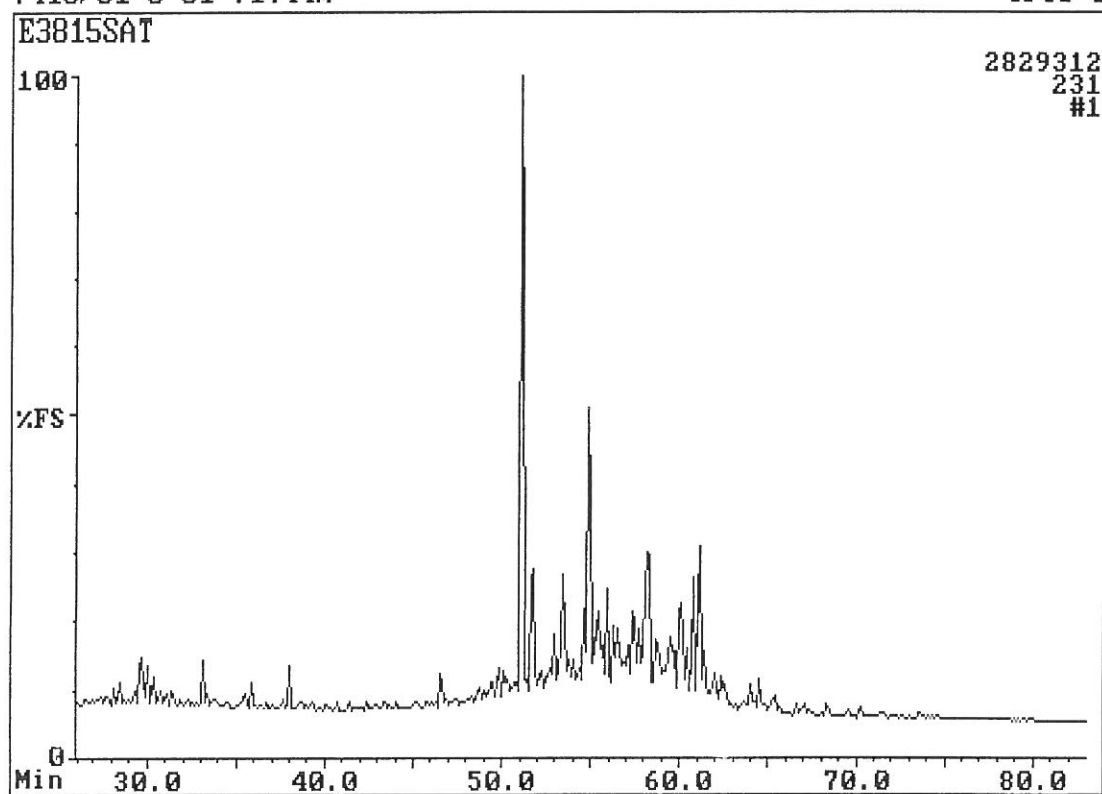
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



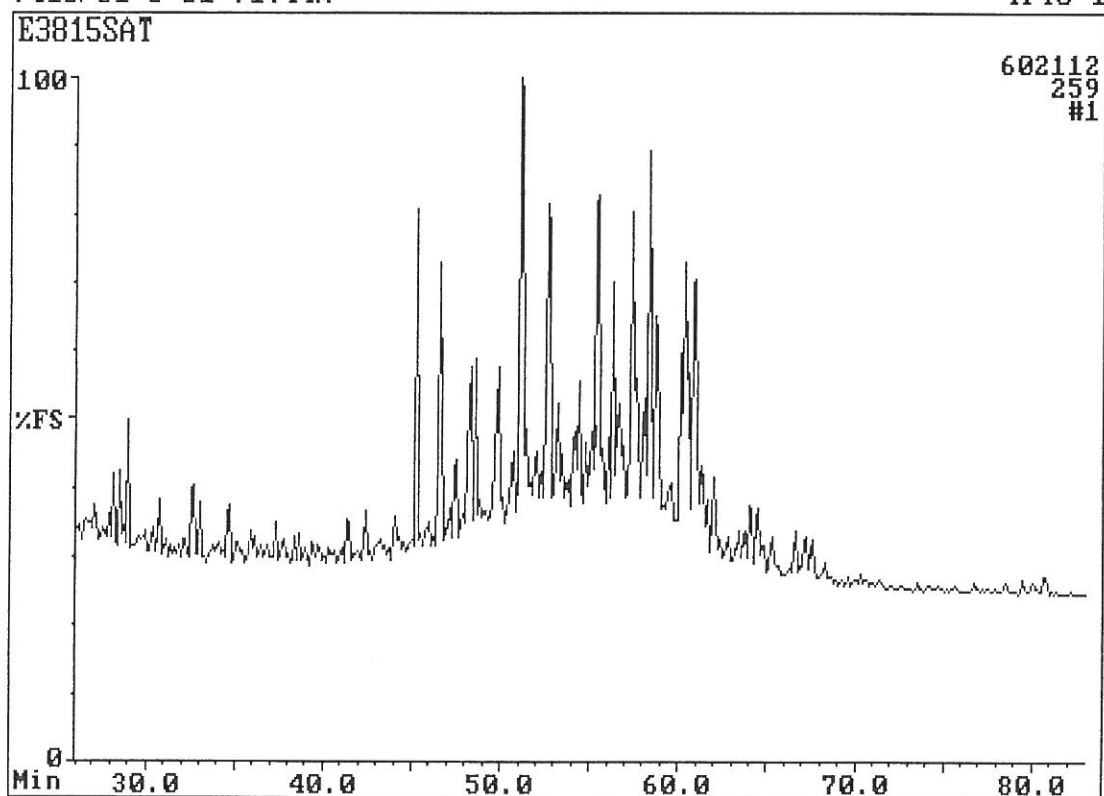
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



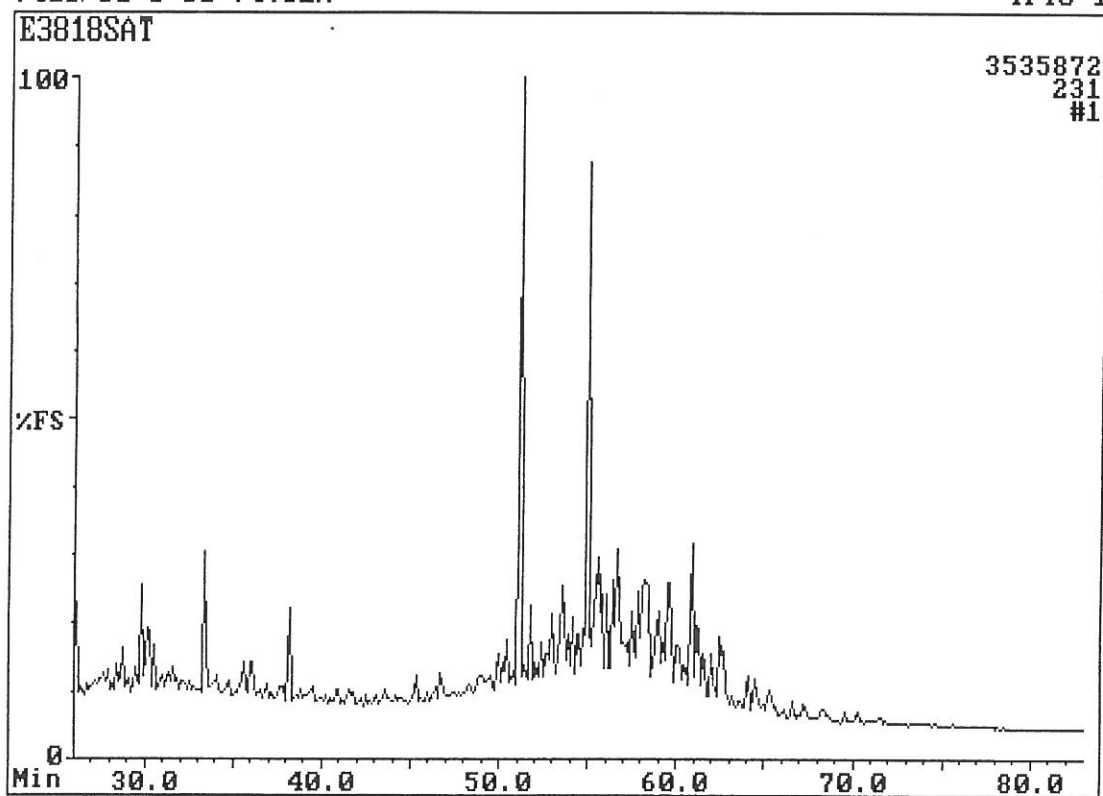
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



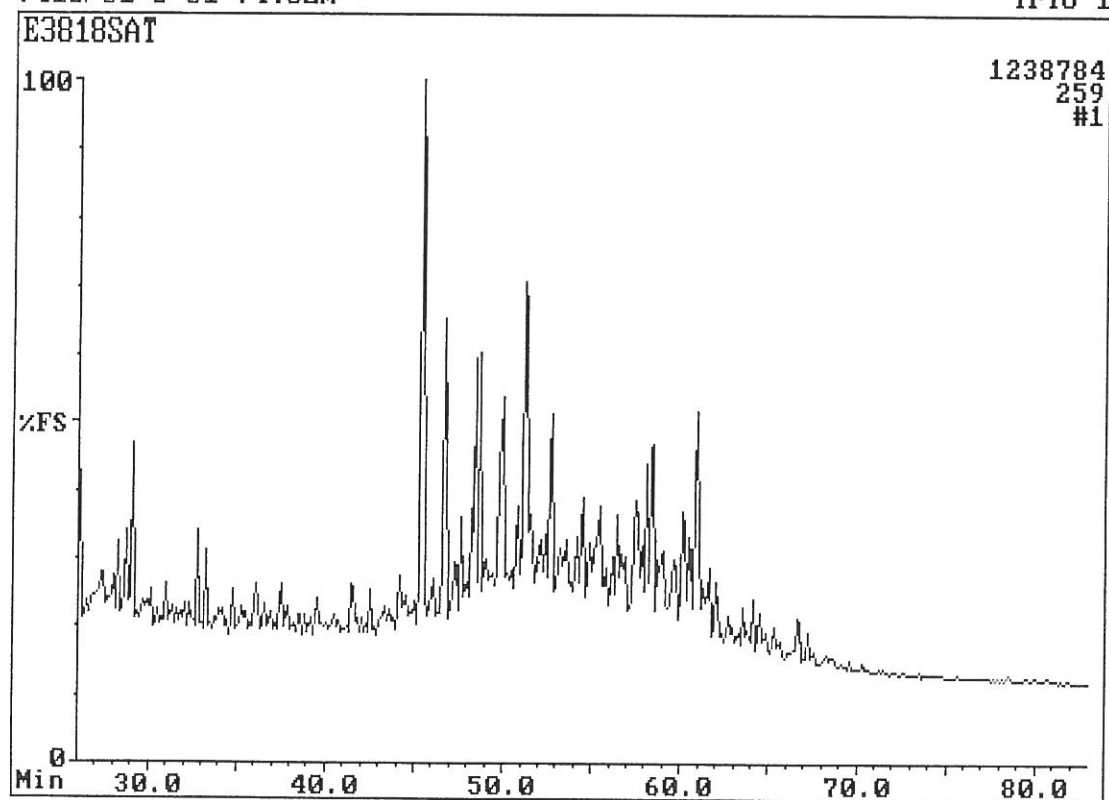
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7418/01-U-01 74.62m

Trio-1



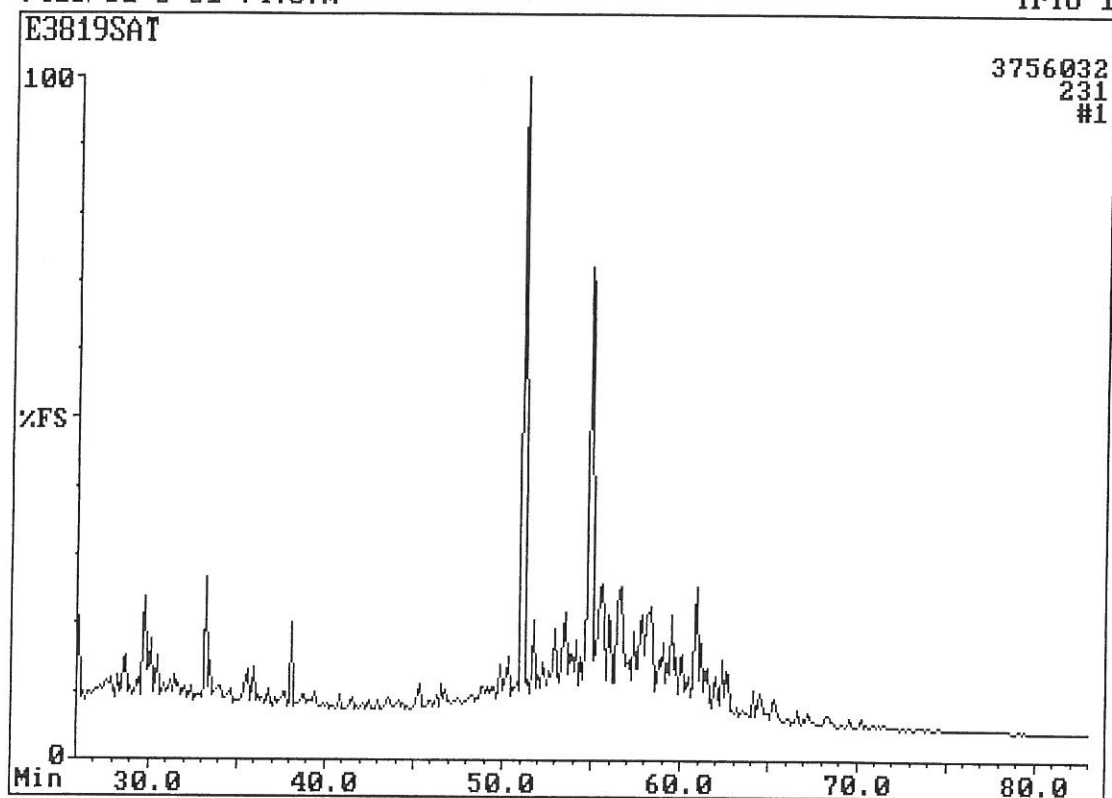
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



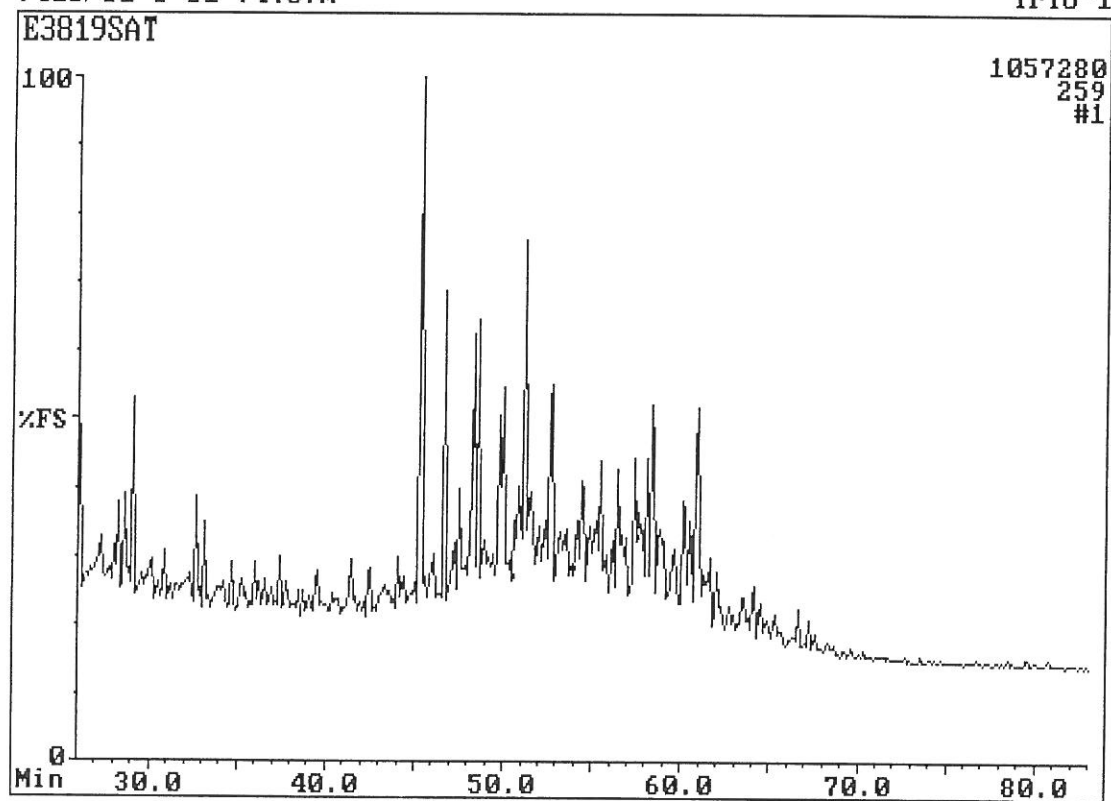
Fisons Instruments
 7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
 Trio-1



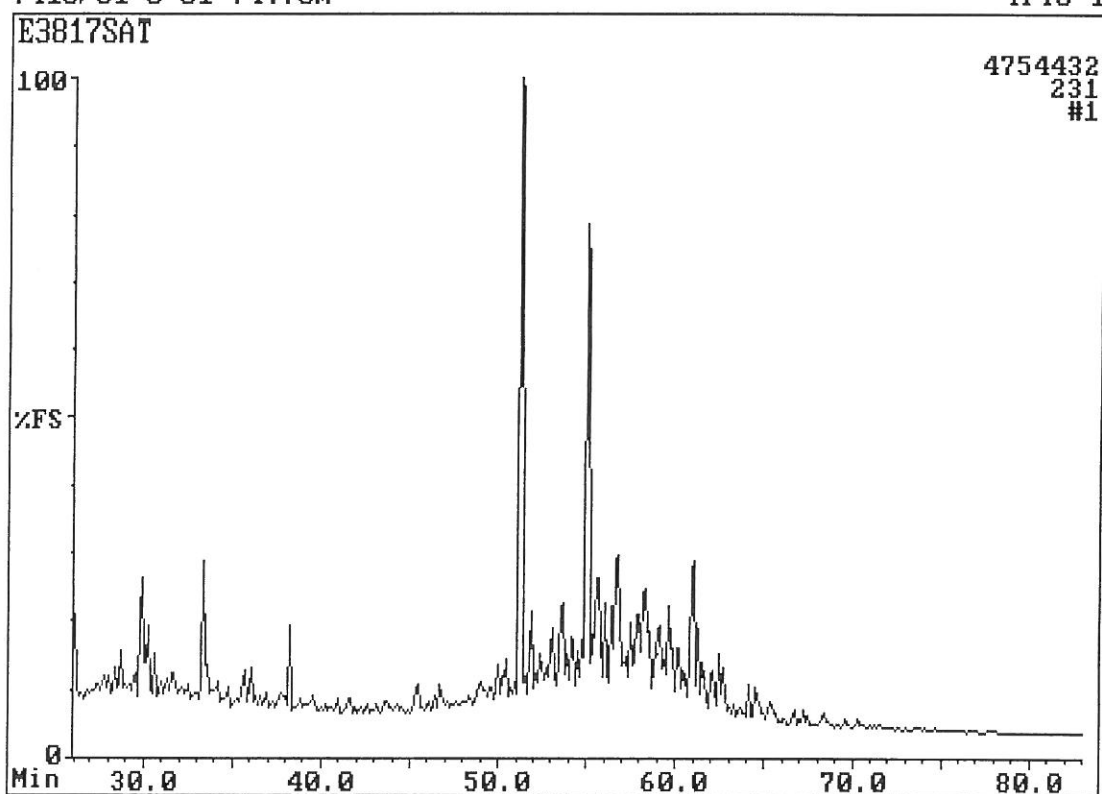
Fisons Instruments
 7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
 Trio-1



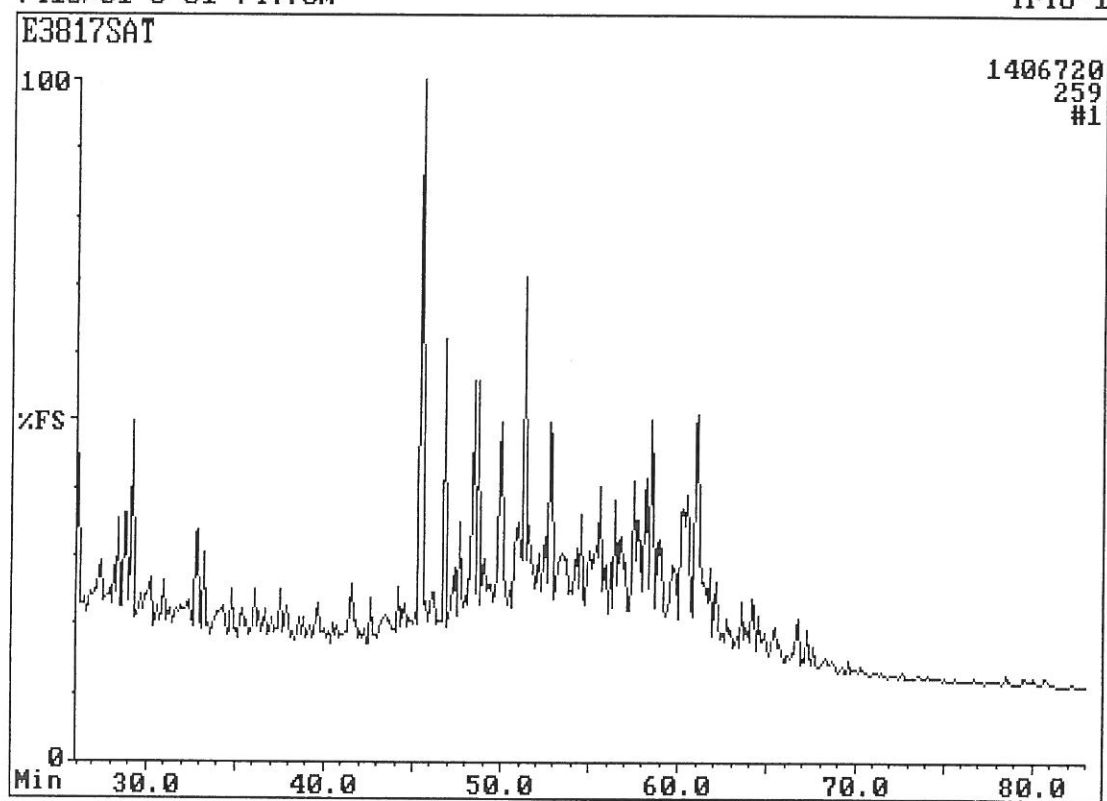
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



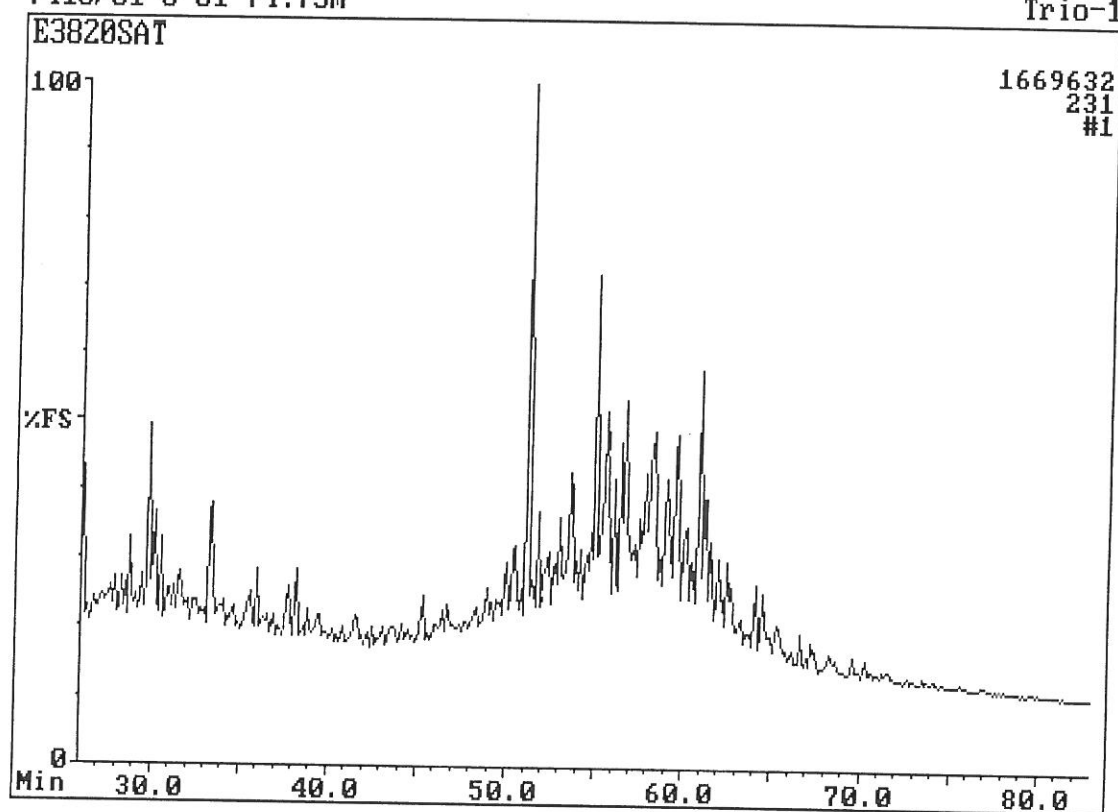
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



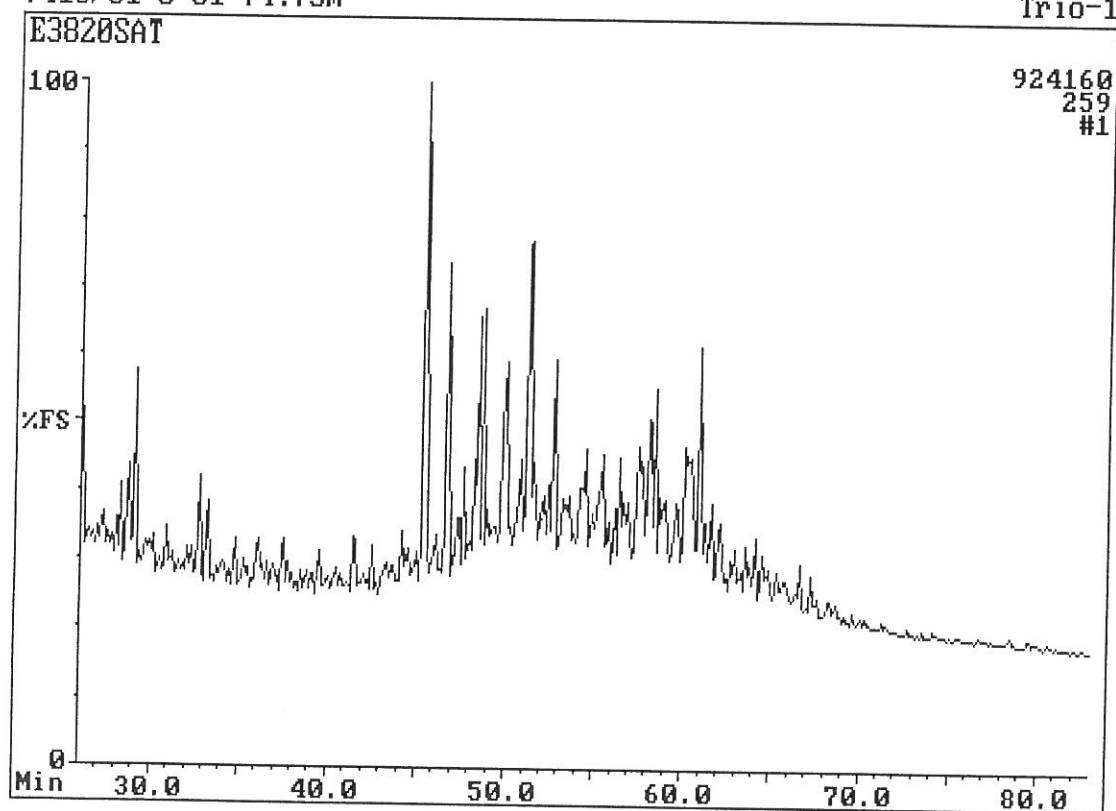
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



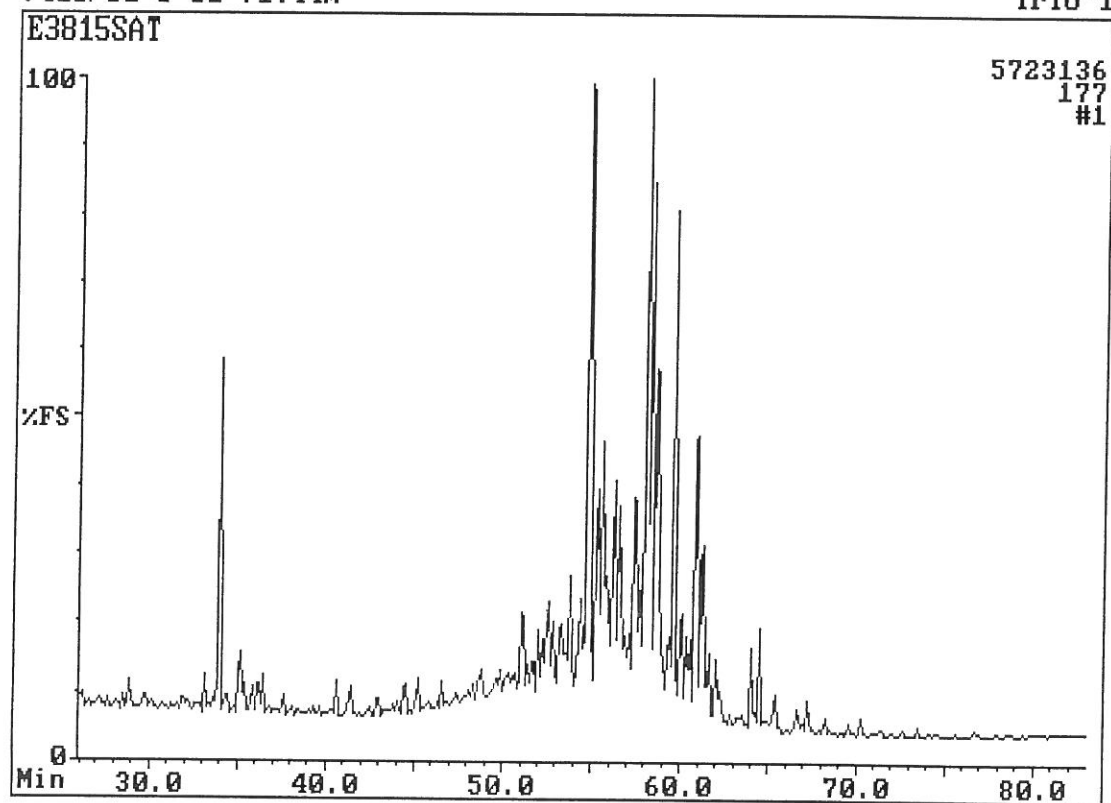
Fisons Instruments TRI0-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



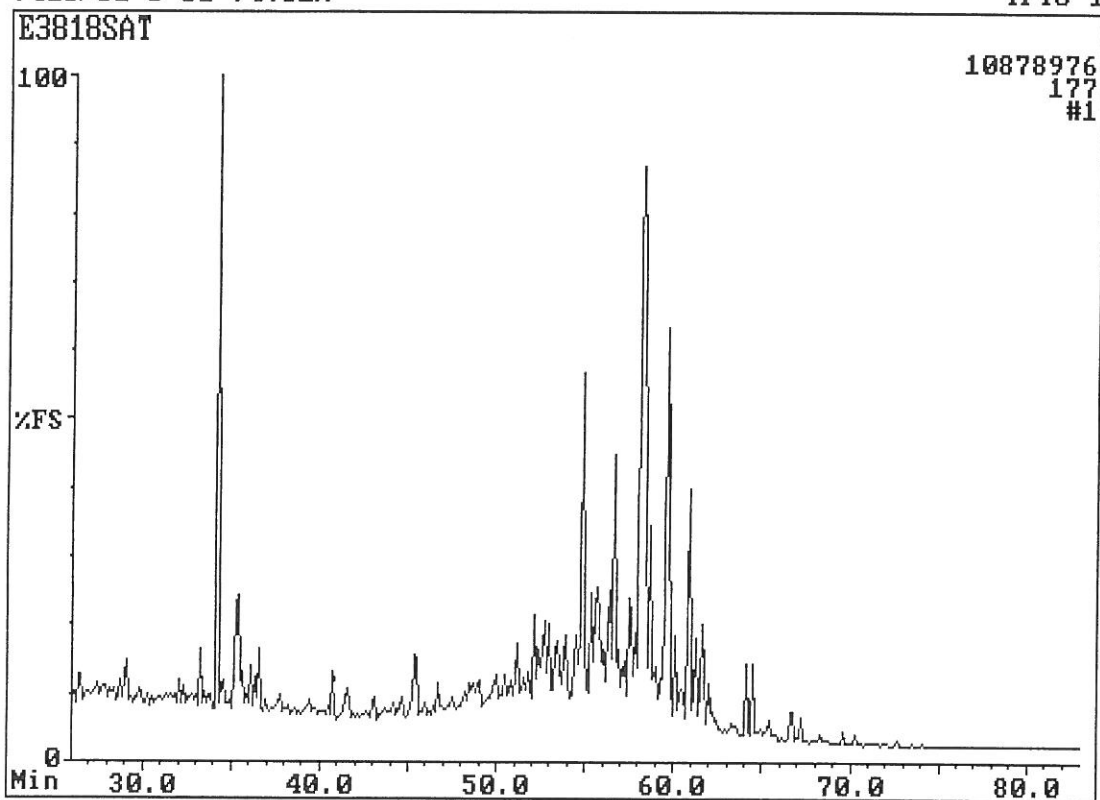
Fisons Instruments
7418/01-U-01 71.44m

TRIO-1000 LAB BASE Data System
Trio-1



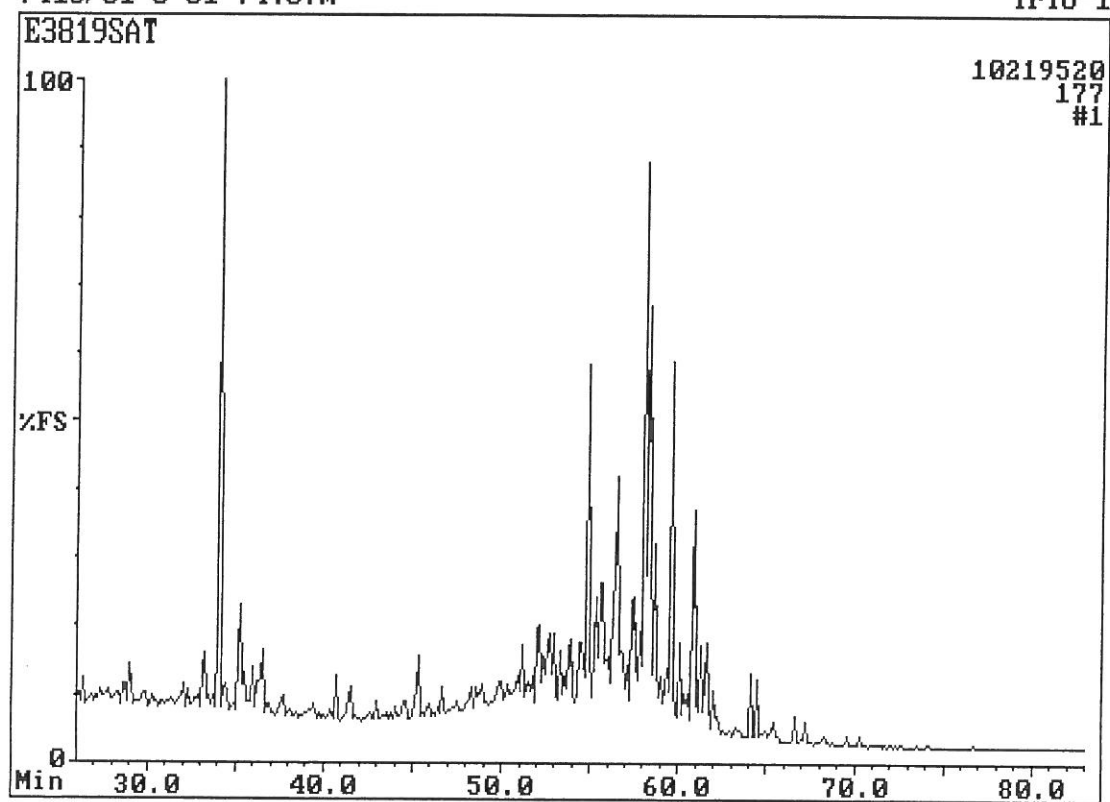
Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.62m

Trio-1



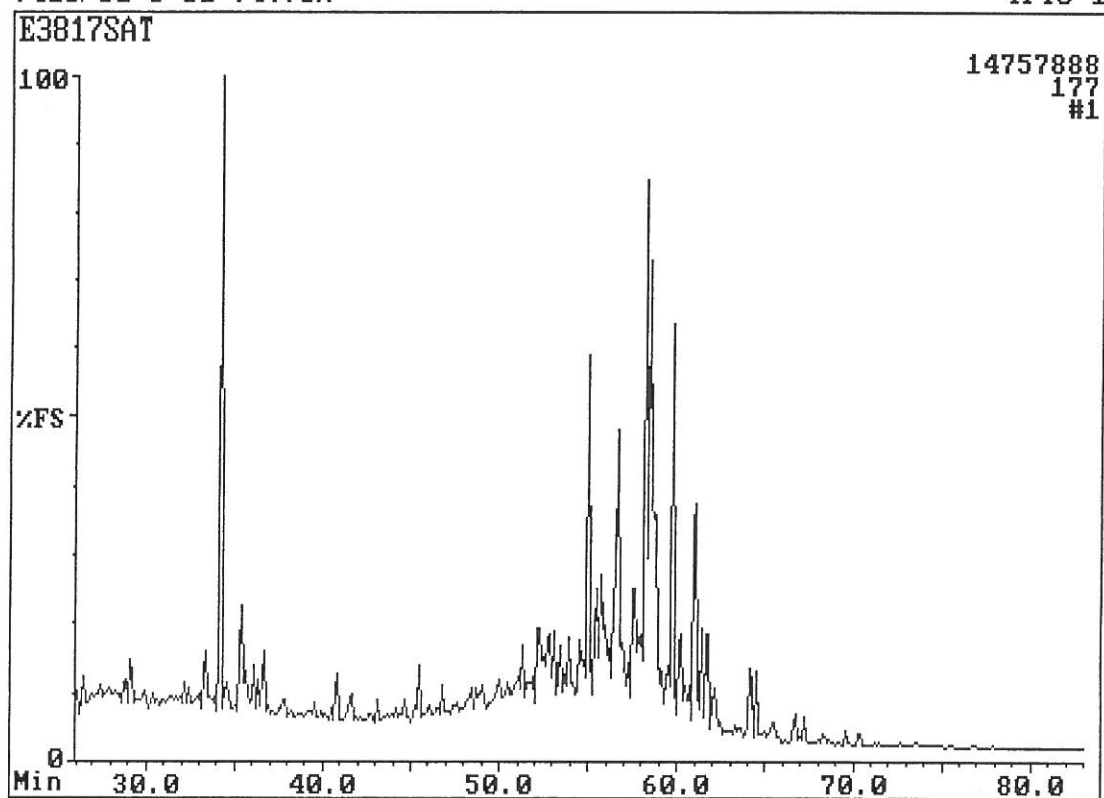
Fisons Instruments
7418/01-U-01 74.67m

TRIO-1000 LAB BASE Data System
Trio-1



Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.70m

Trio-1



Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1

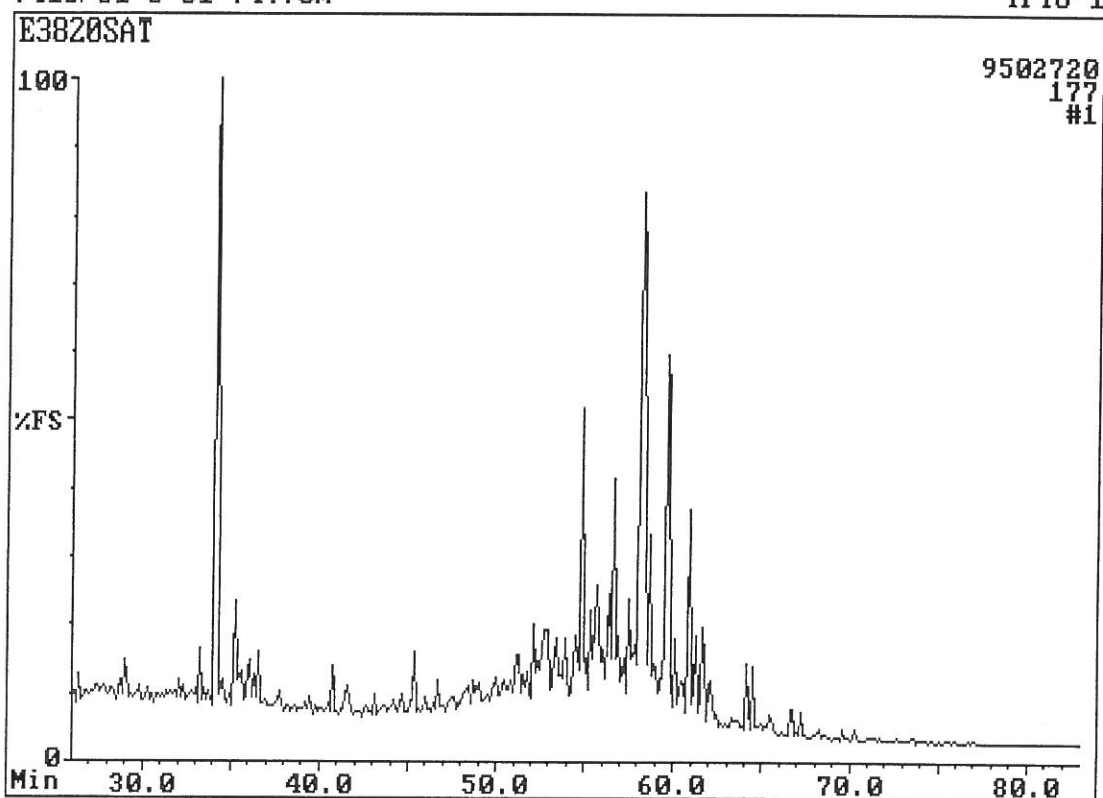


Figure 5

GC-MS Fragmentograms

of

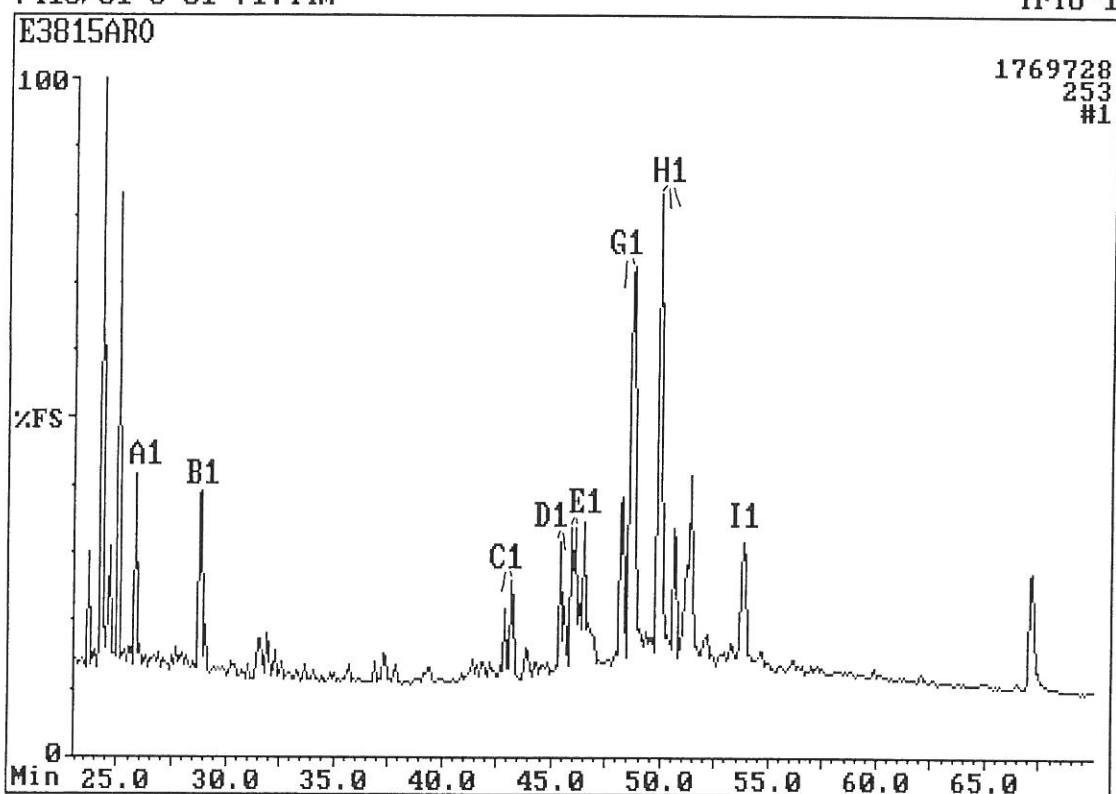
Aromatic Hydrocarbons

(m/z 142, 156, 178, 184, 192, 198, 231, 253)

Peak code	Identification
Key for m/z 231 (tri-aromatic steroids):	
a1	C ₂₀ tri-aromatic steroid
b1	C ₂₁ tri-aromatic steroid
c1	C ₂₆ tri-aromatic steroid
d1	C ₂₆ +C ₂₇ tri-aromatic steroids
e1	C ₂₈ tri-aromatic steroid
f1	C ₂₇ tri-aromatic steroid
g1	C ₂₈ tri-aromatic steroid
Key for m/z 253 (mono-aromatic steroids):	
A1	C ₂₁ mono-aromatic steroid
B1	C ₂₂ mono-aromatic steroid
C1	C ₂₇ mono-aromatic steroid
D1	C ₂₇ mono-aromatic steroid
E1	C ₂₈ mono-aromatic steroid
F1	C ₂₇ +C ₂₈ mono-aromatic steroids
G1	C ₂₈ +C ₂₉ mono-aromatic steroids
H1	C ₂₈ +C ₂₉ mono-aromatic steroids
I1	C ₂₉ mono-aromatic steroid

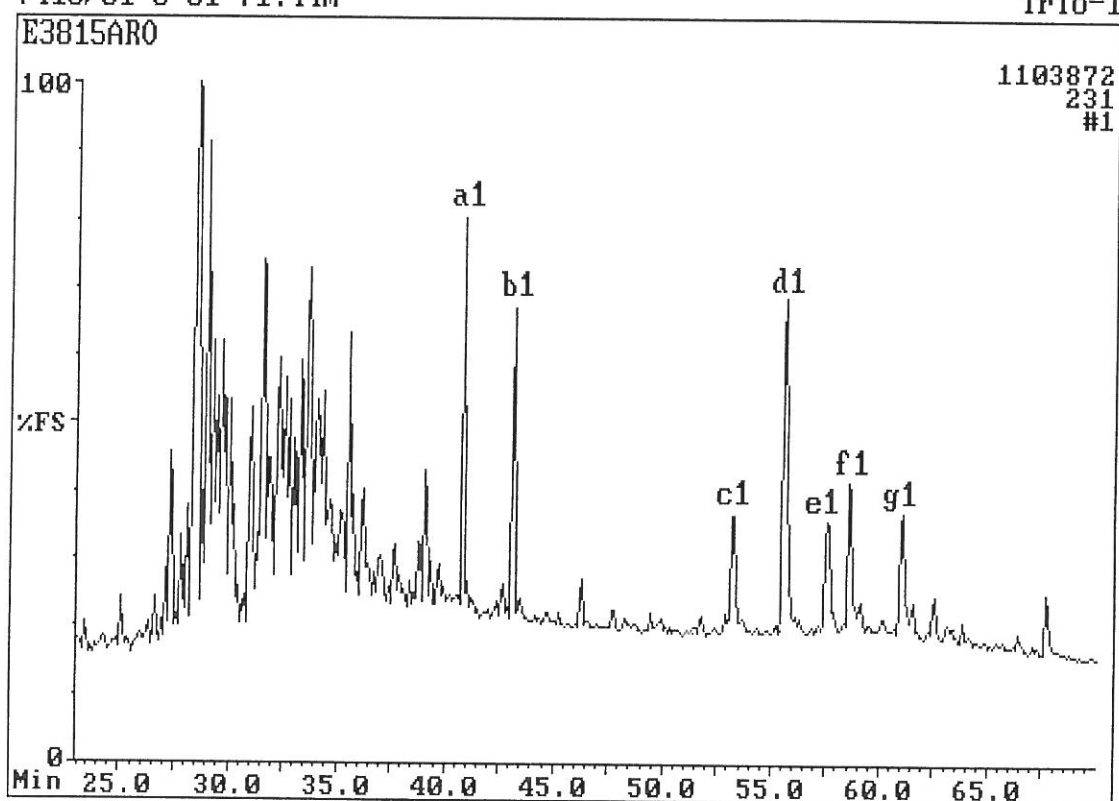
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7418/01-U-01 71.44m

Trio-1



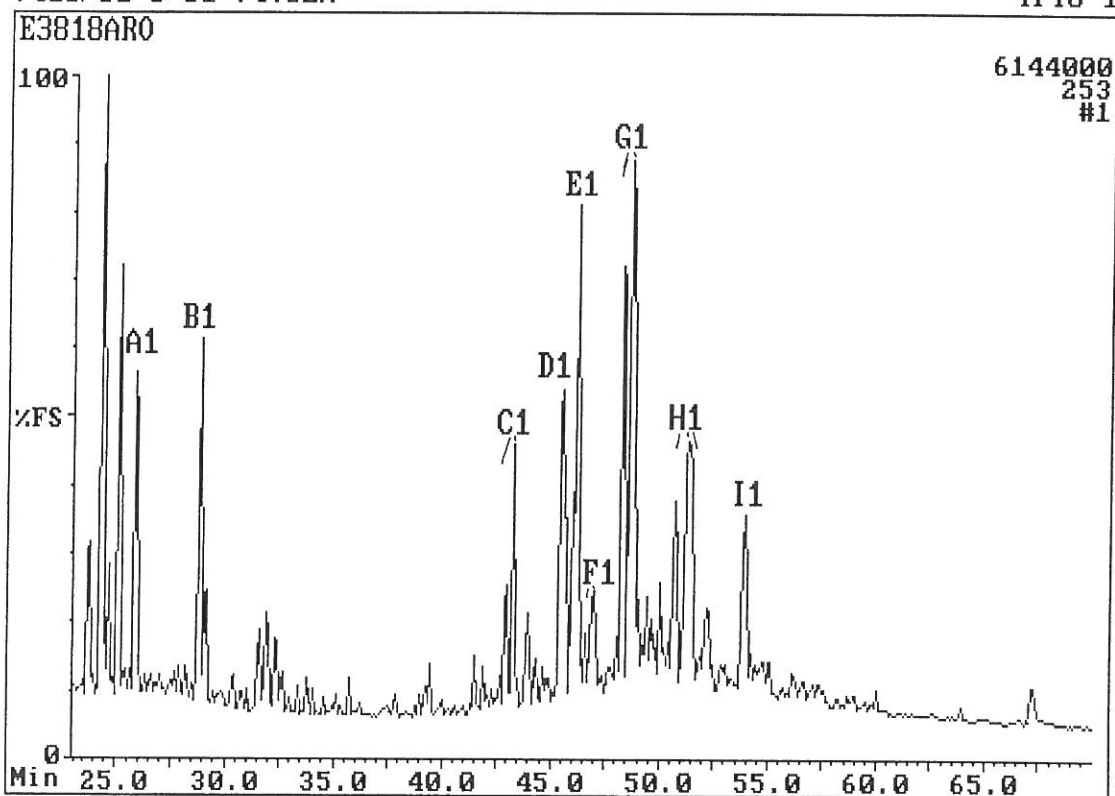
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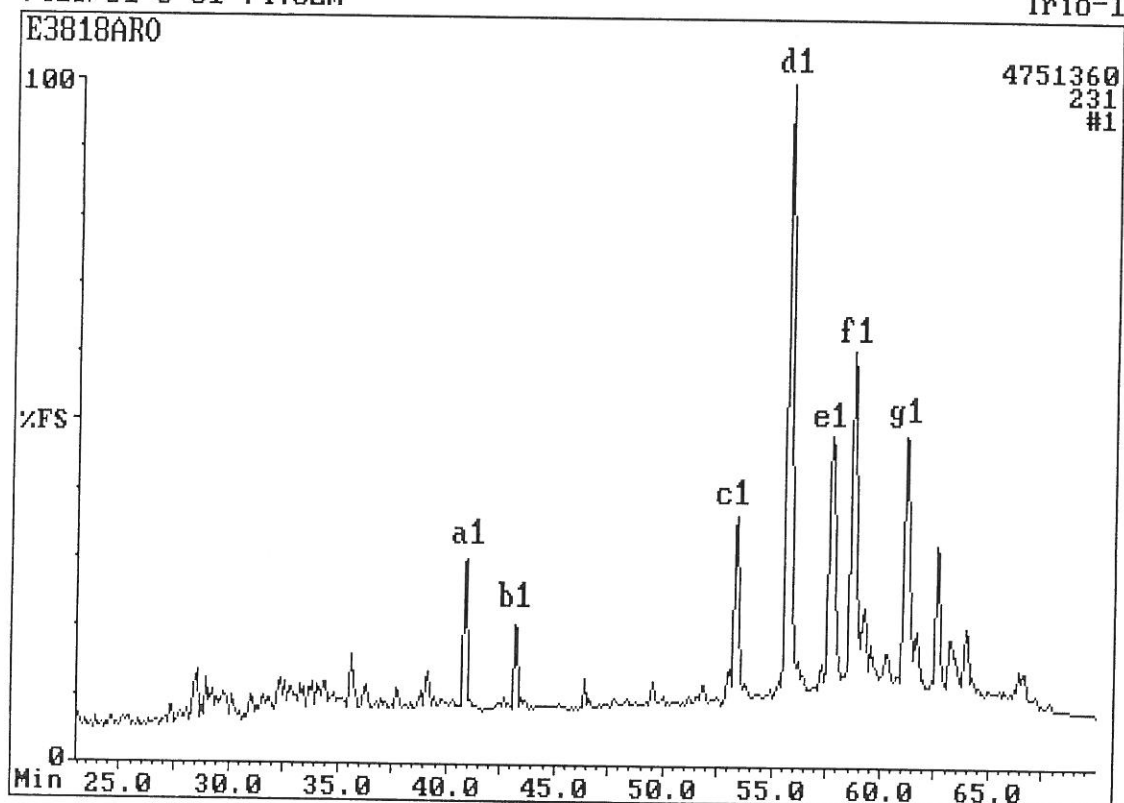
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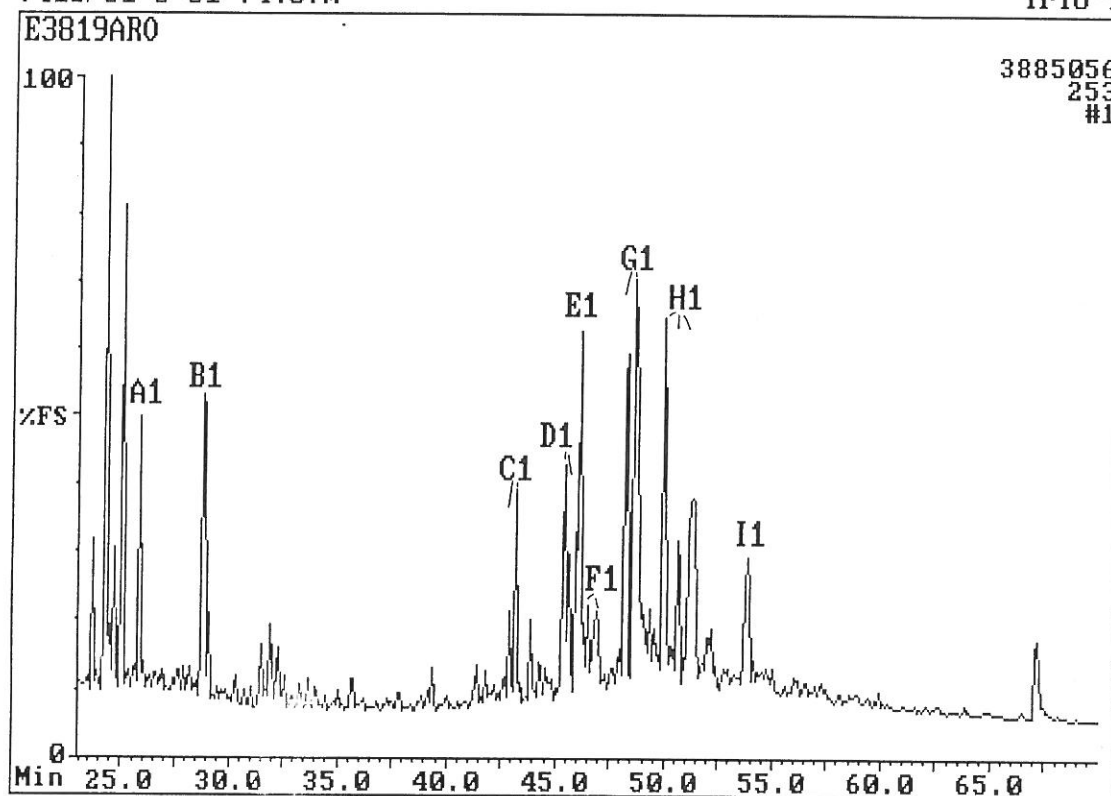
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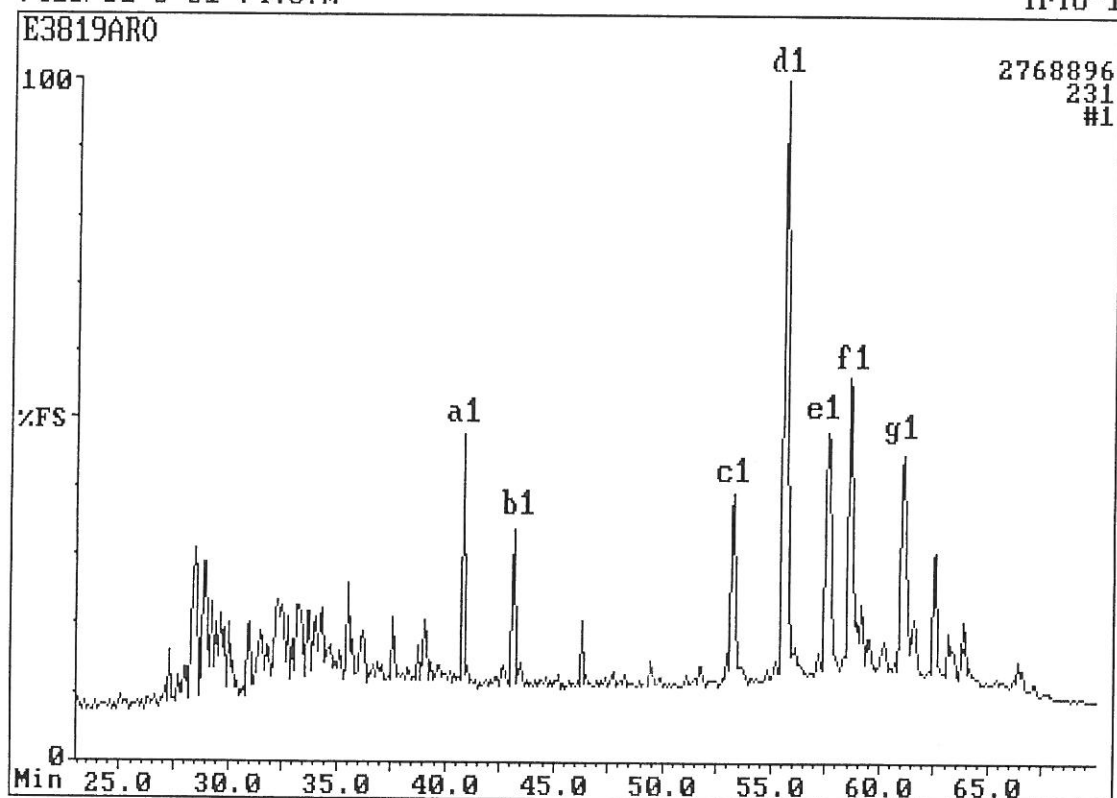
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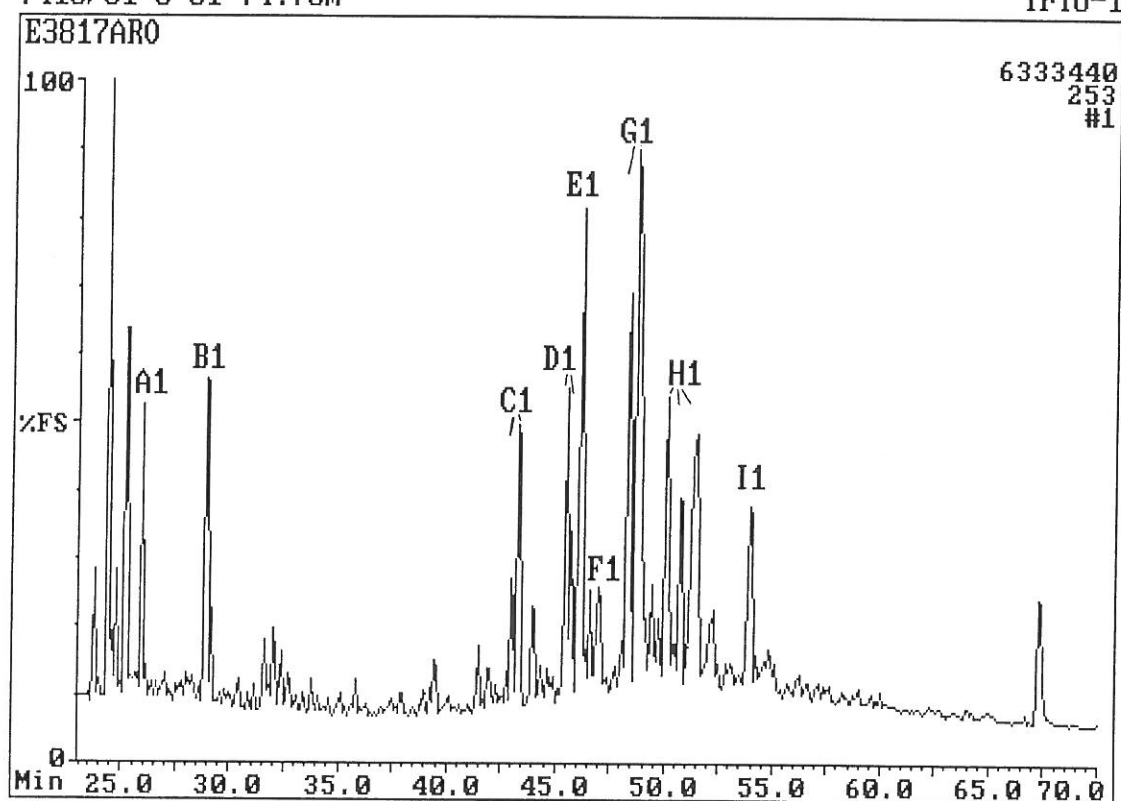
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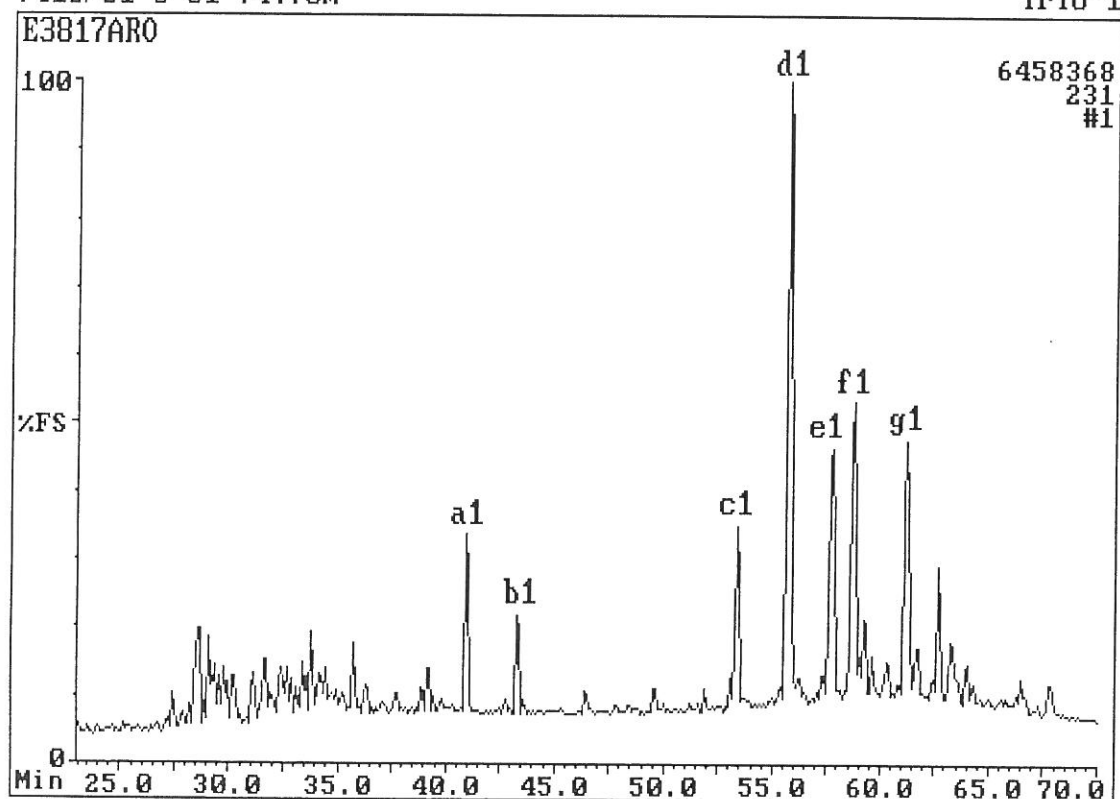
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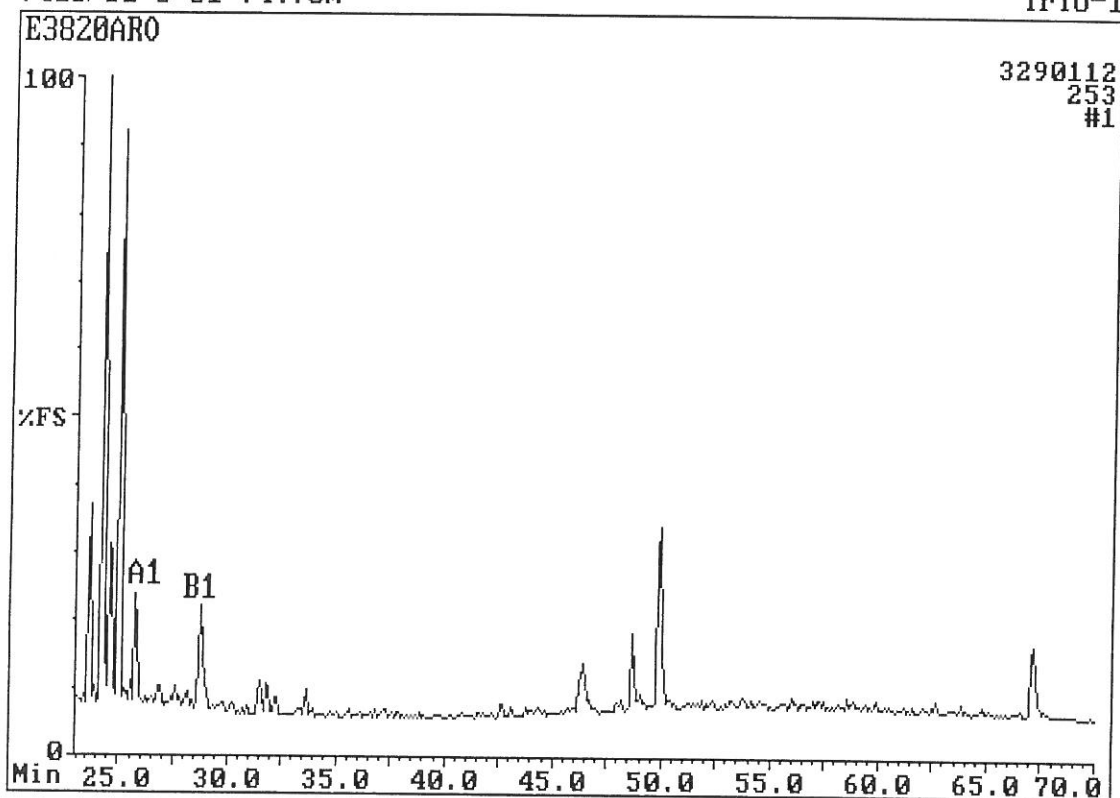
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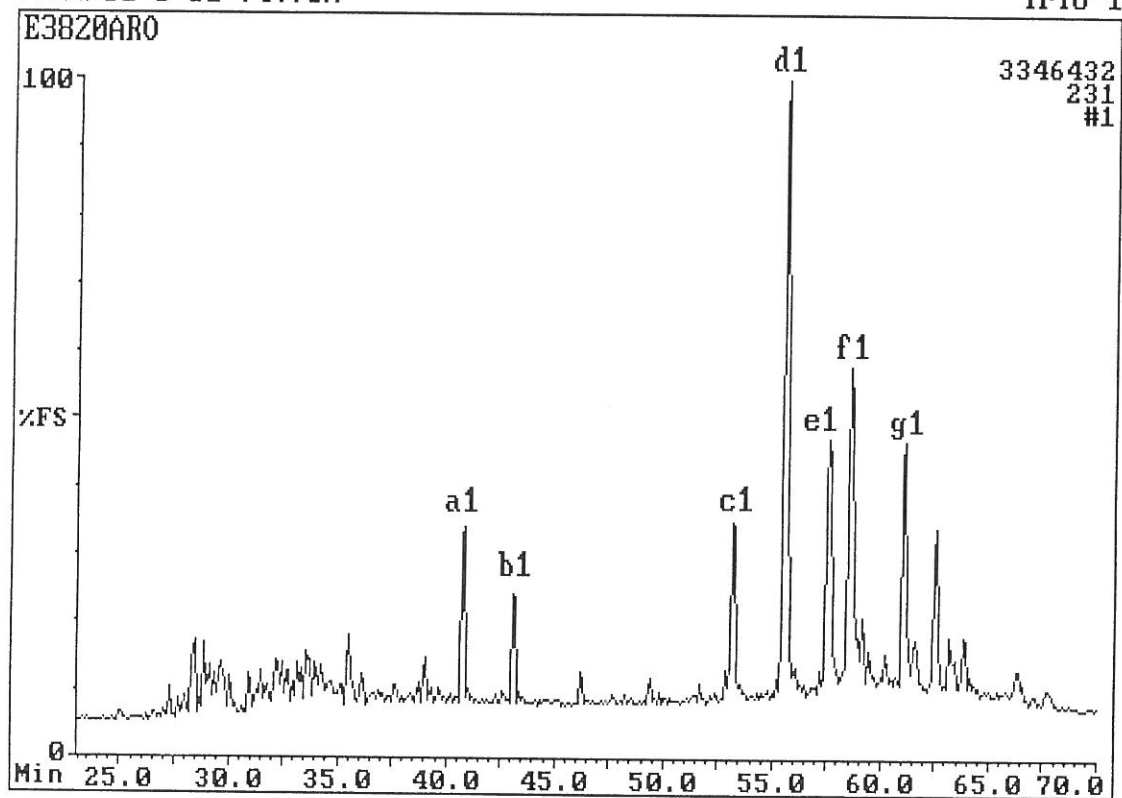
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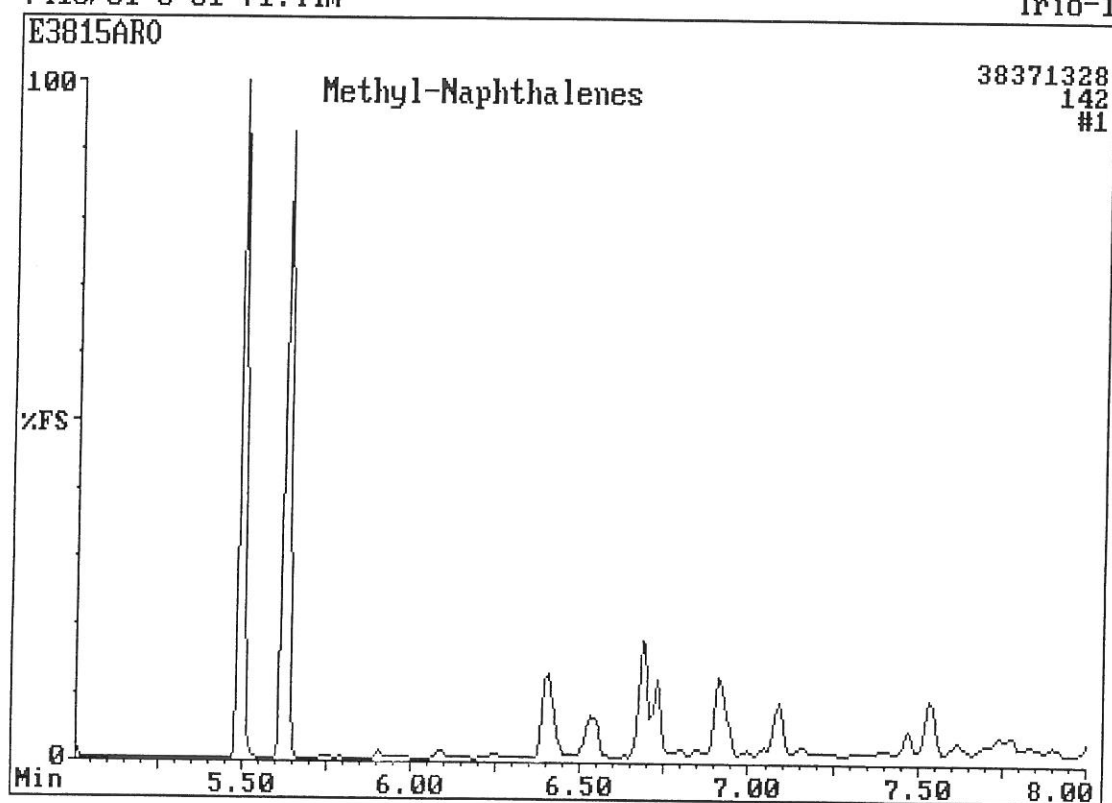
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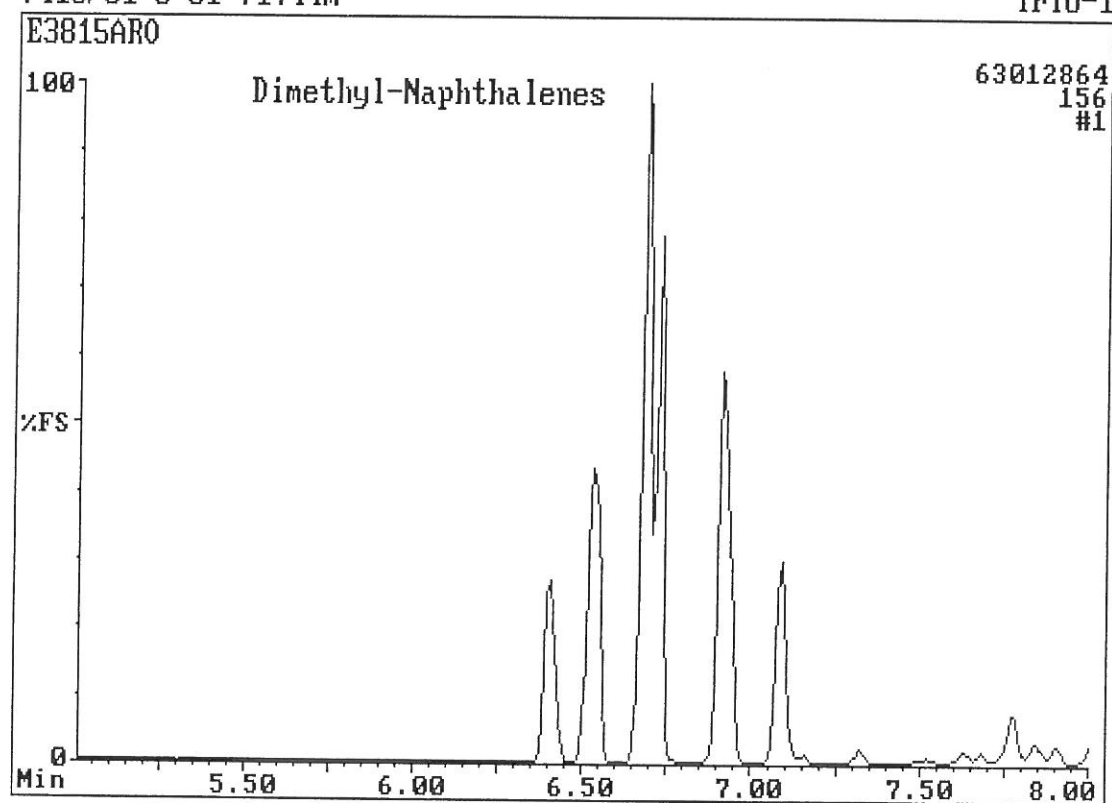
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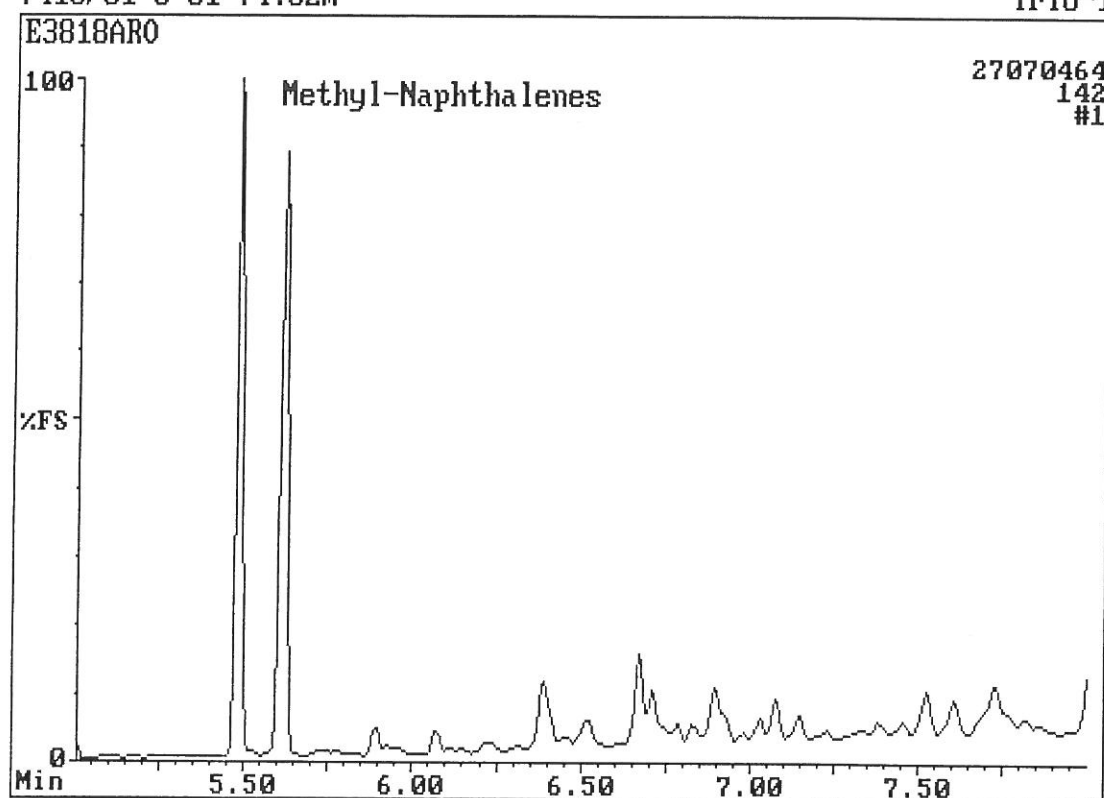
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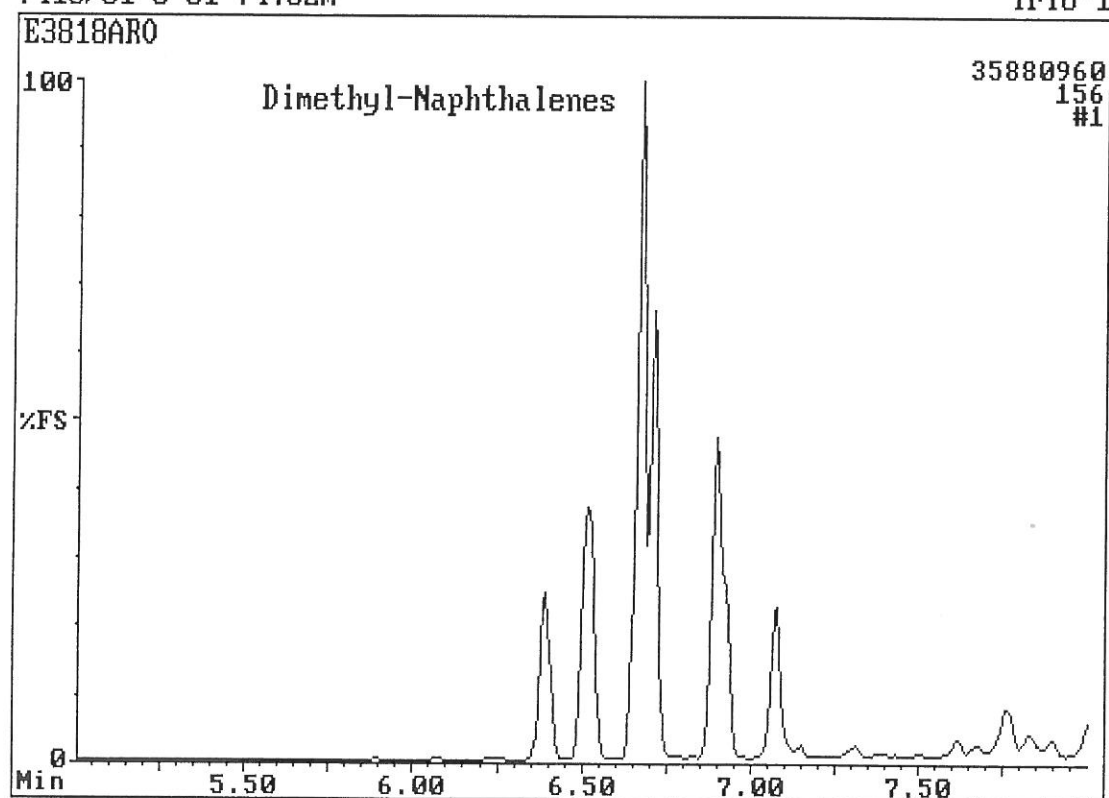
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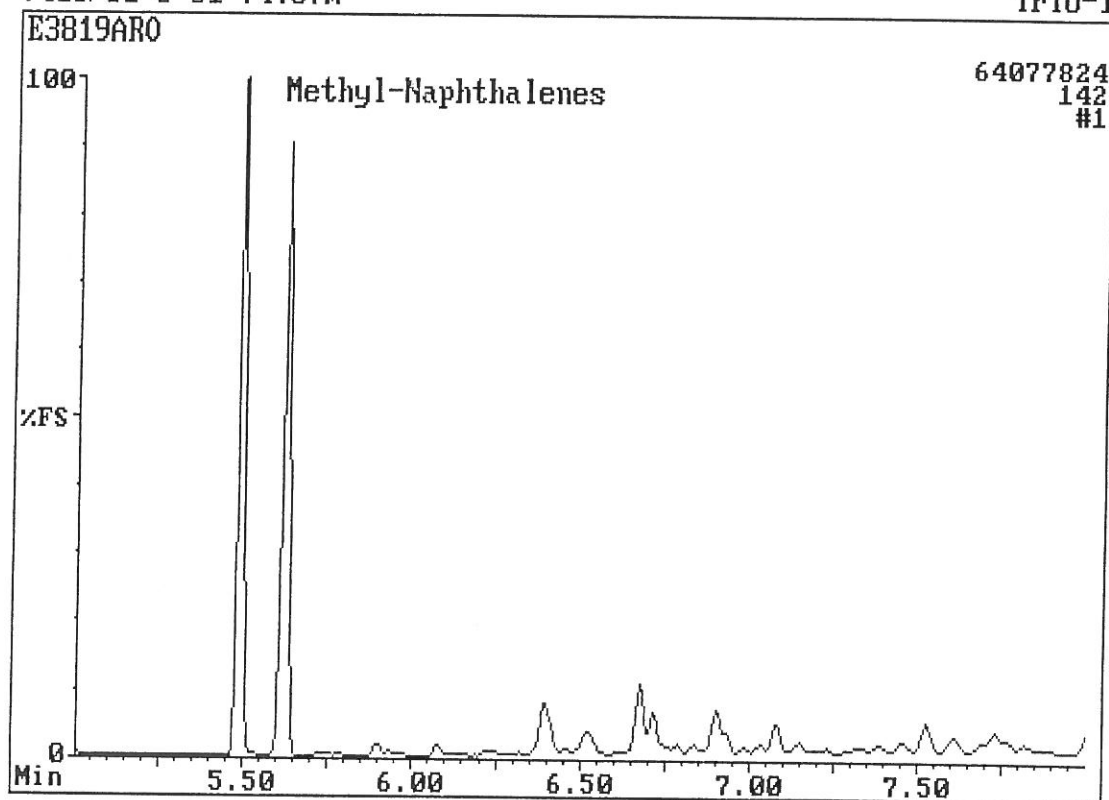
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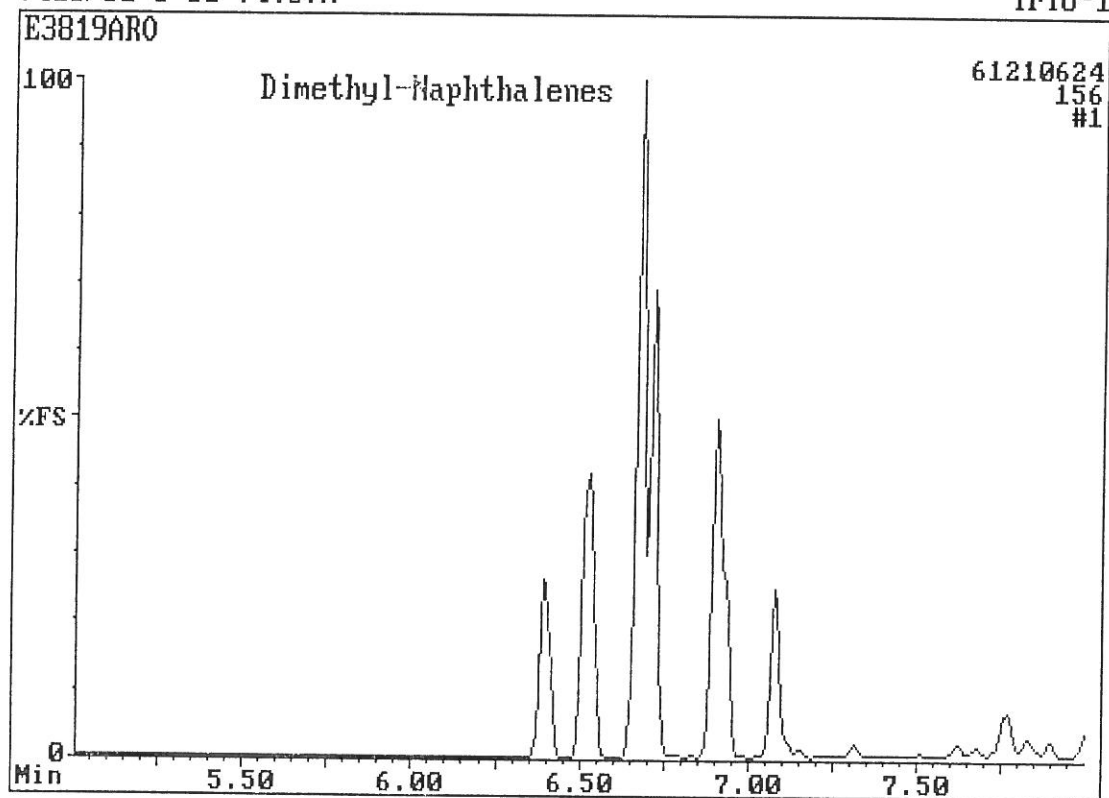
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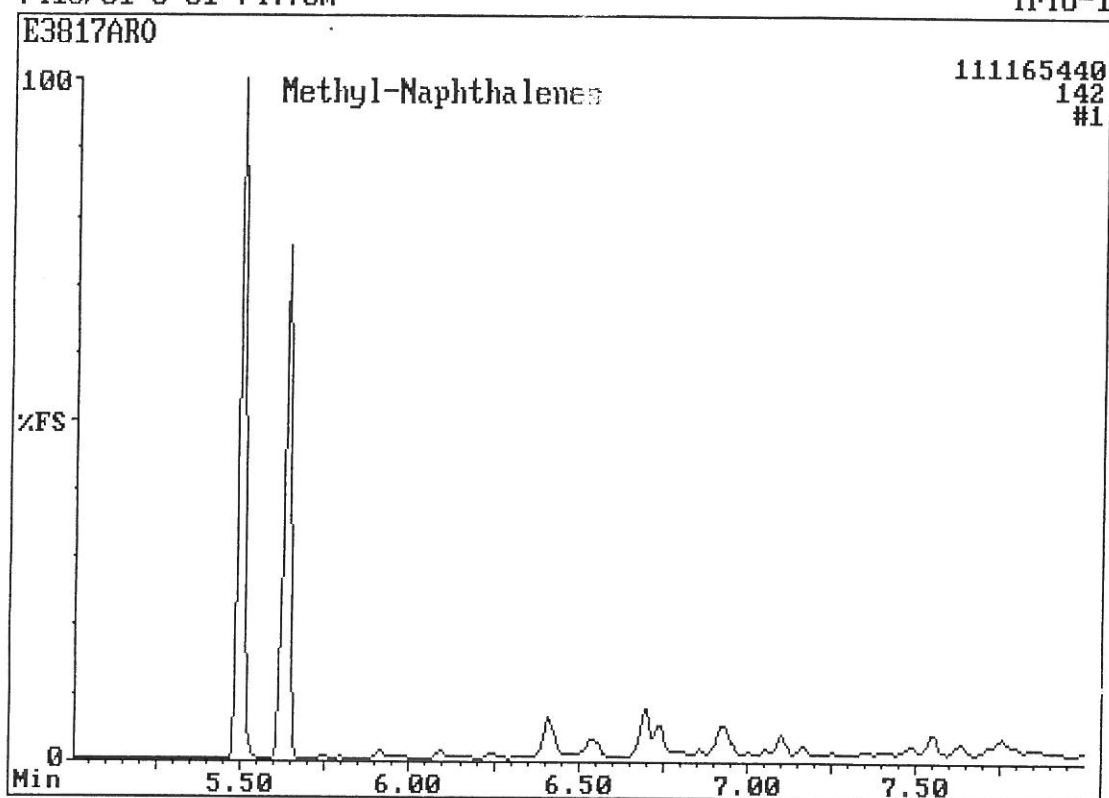
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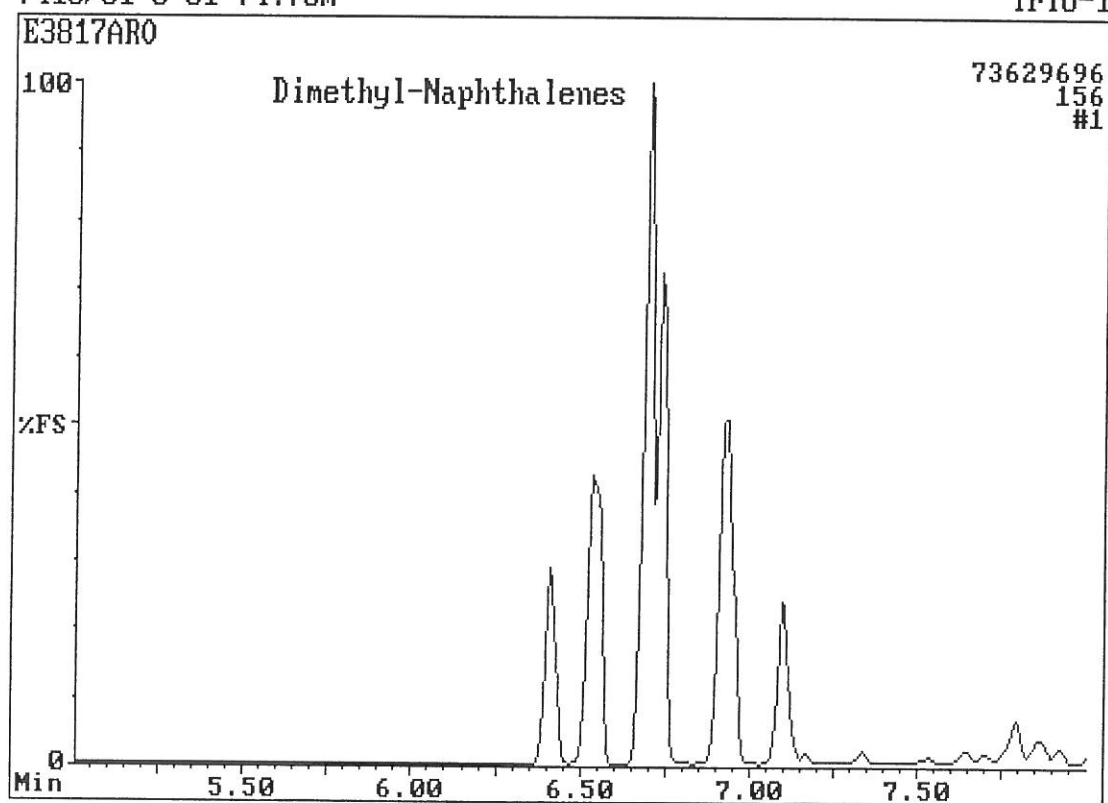
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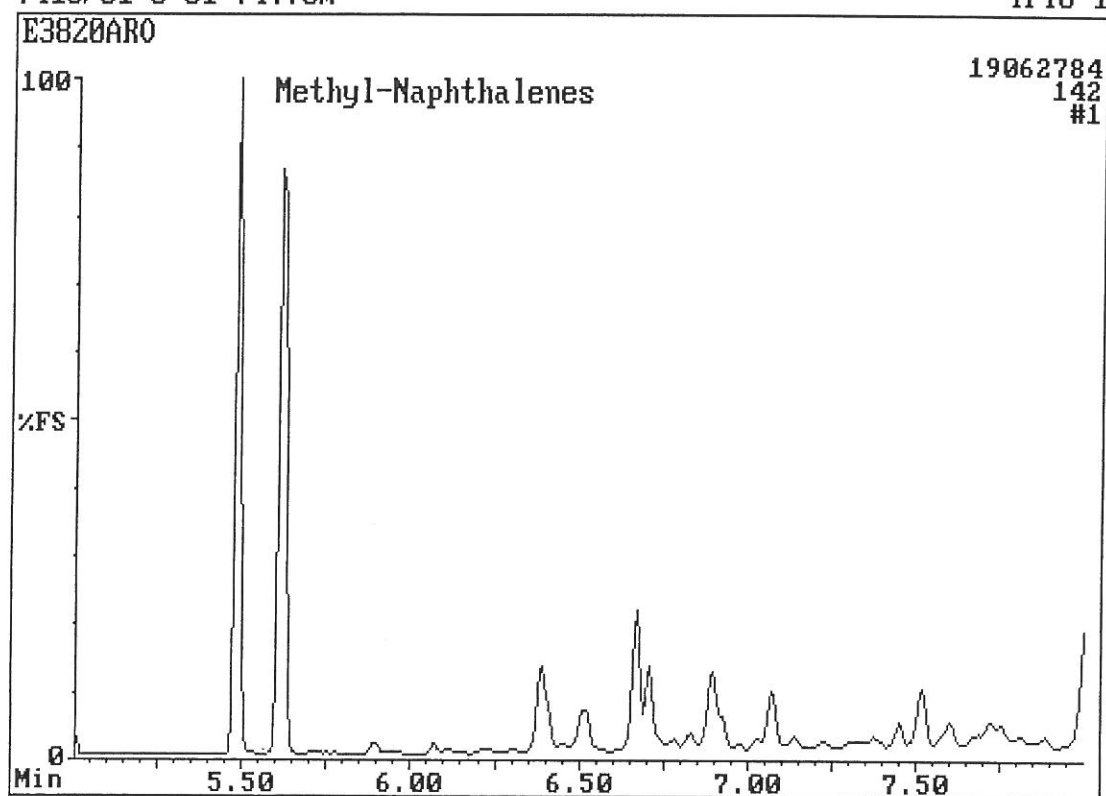
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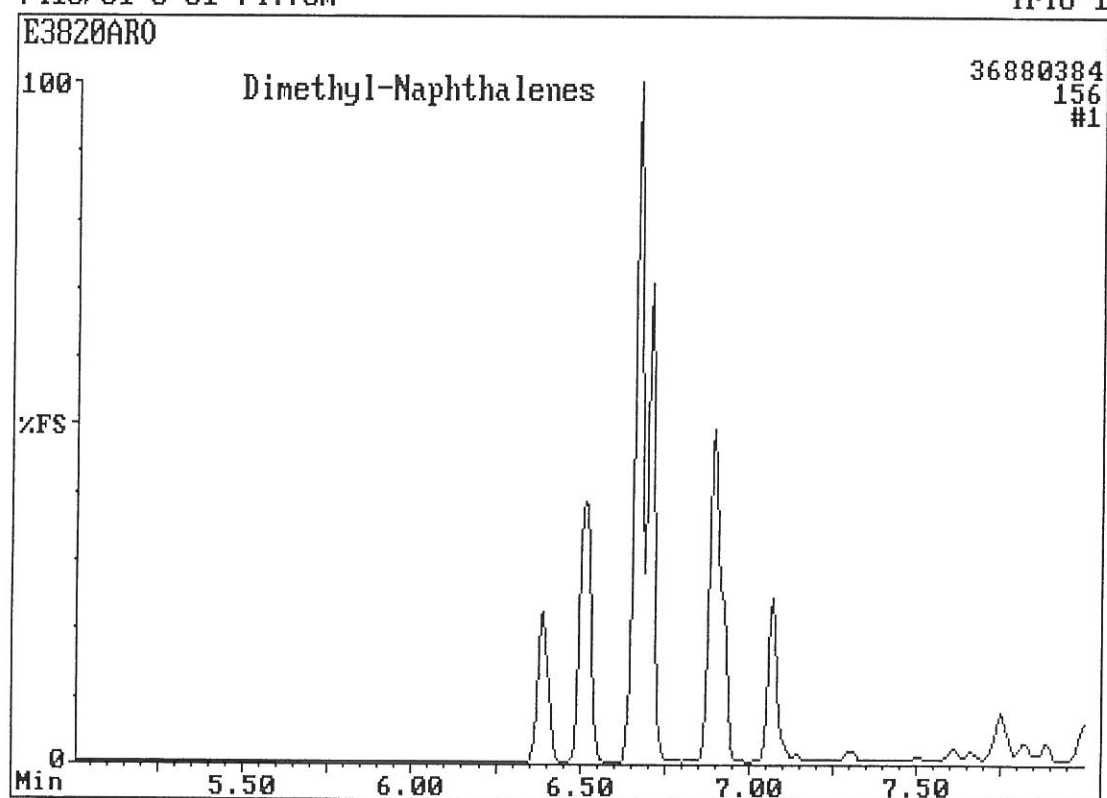
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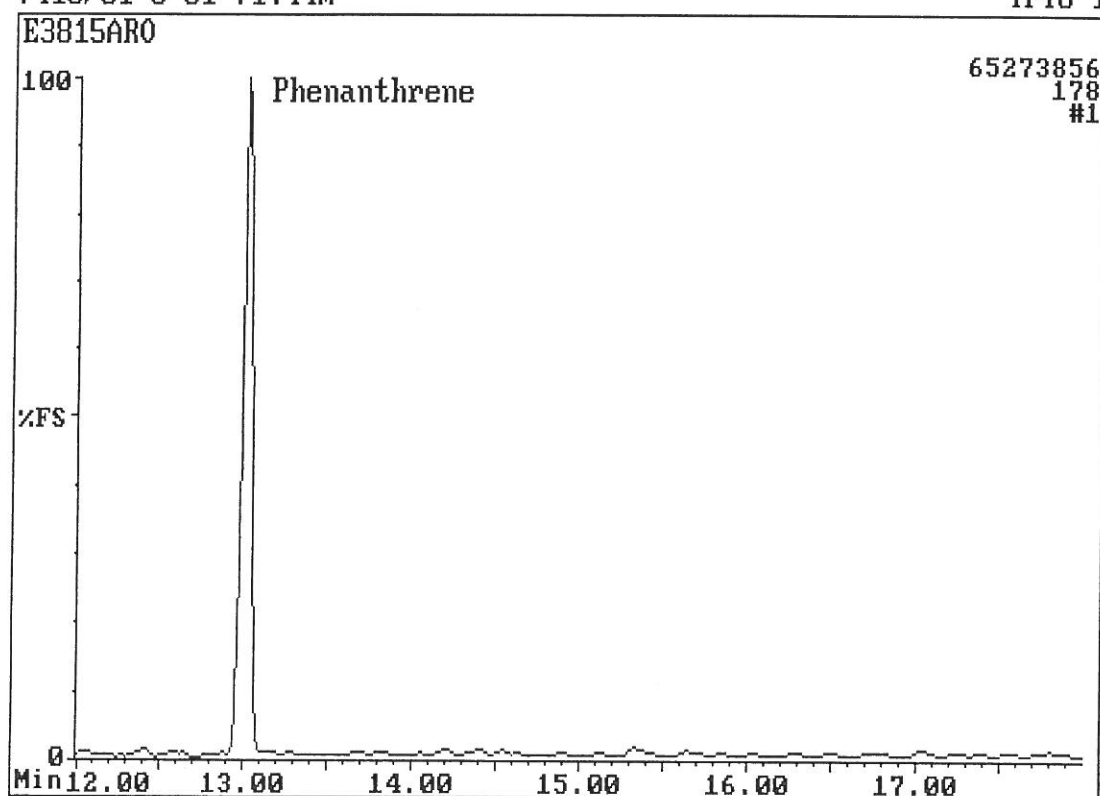
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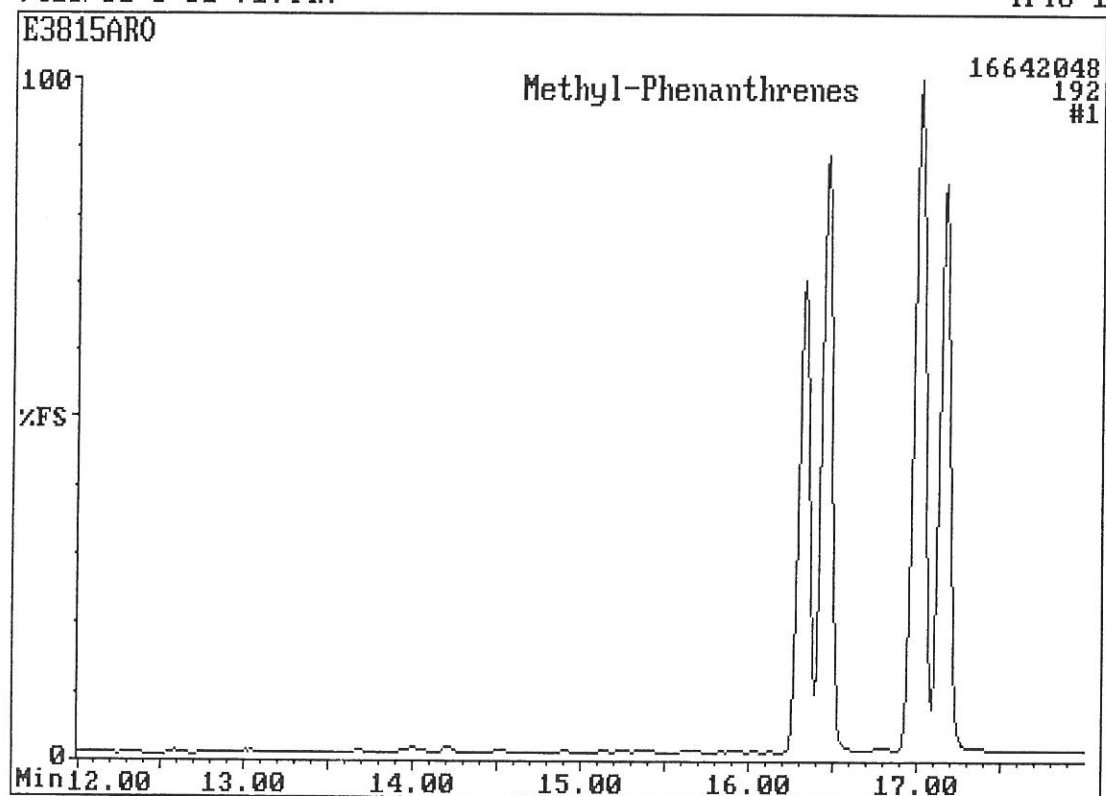
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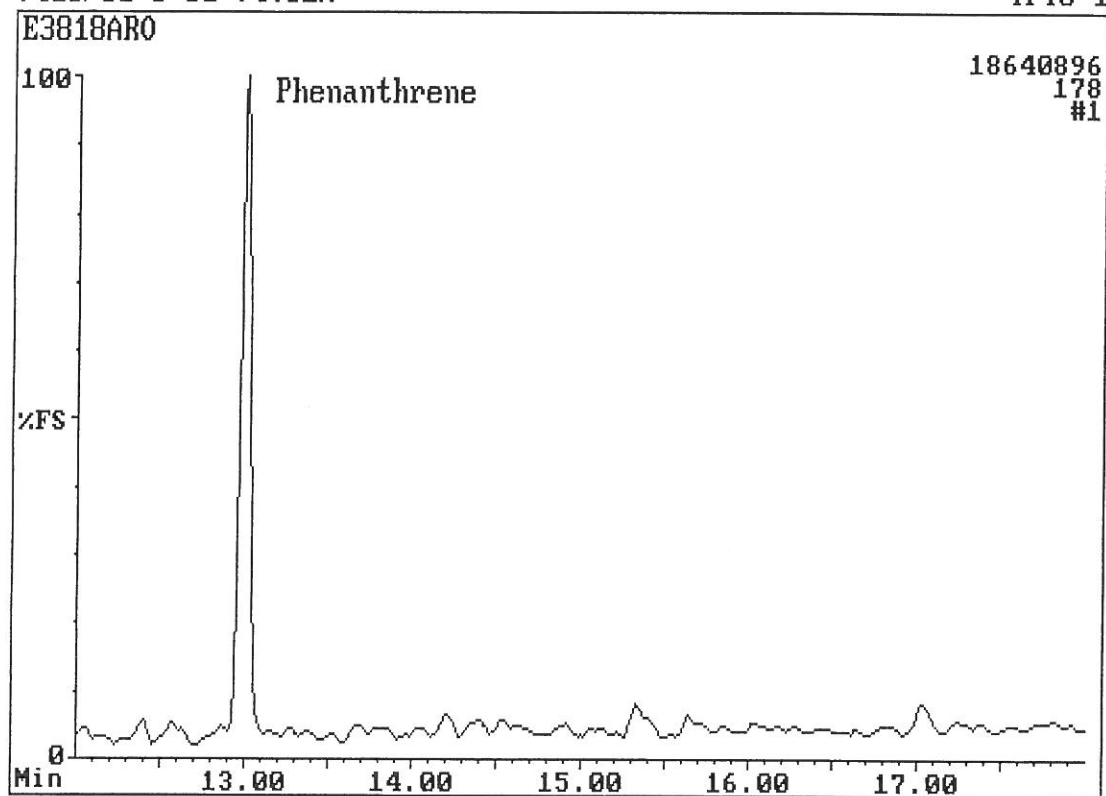
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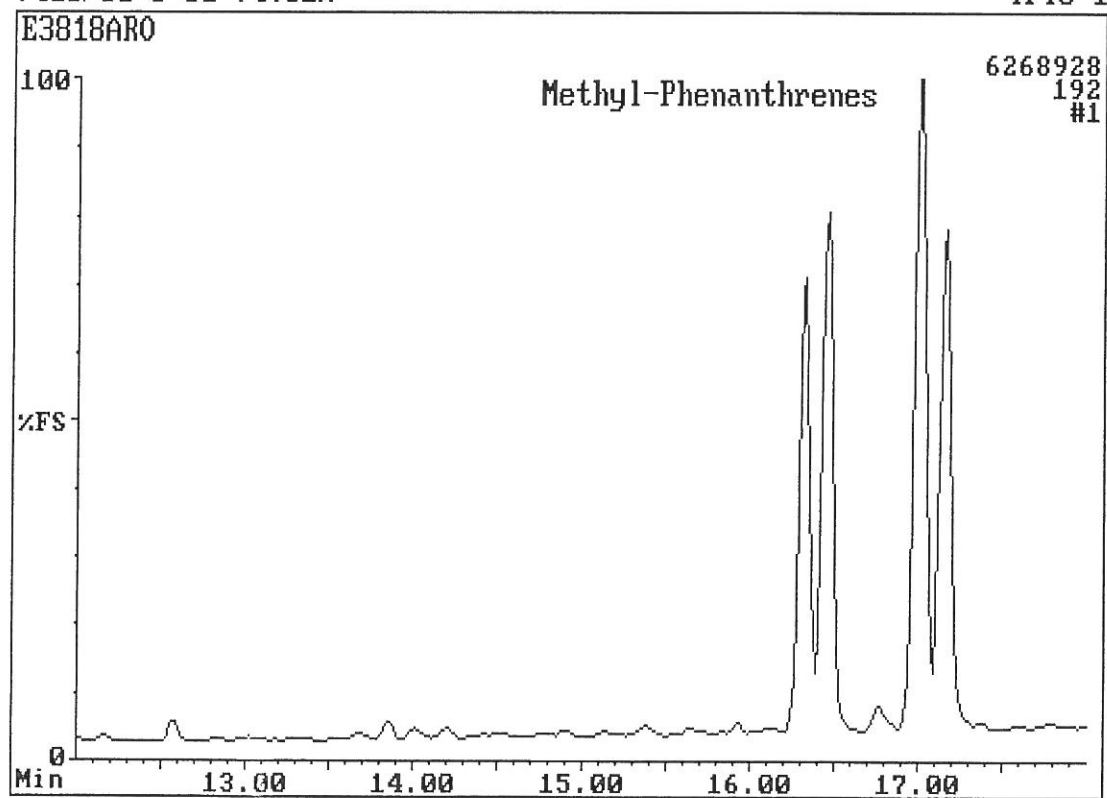
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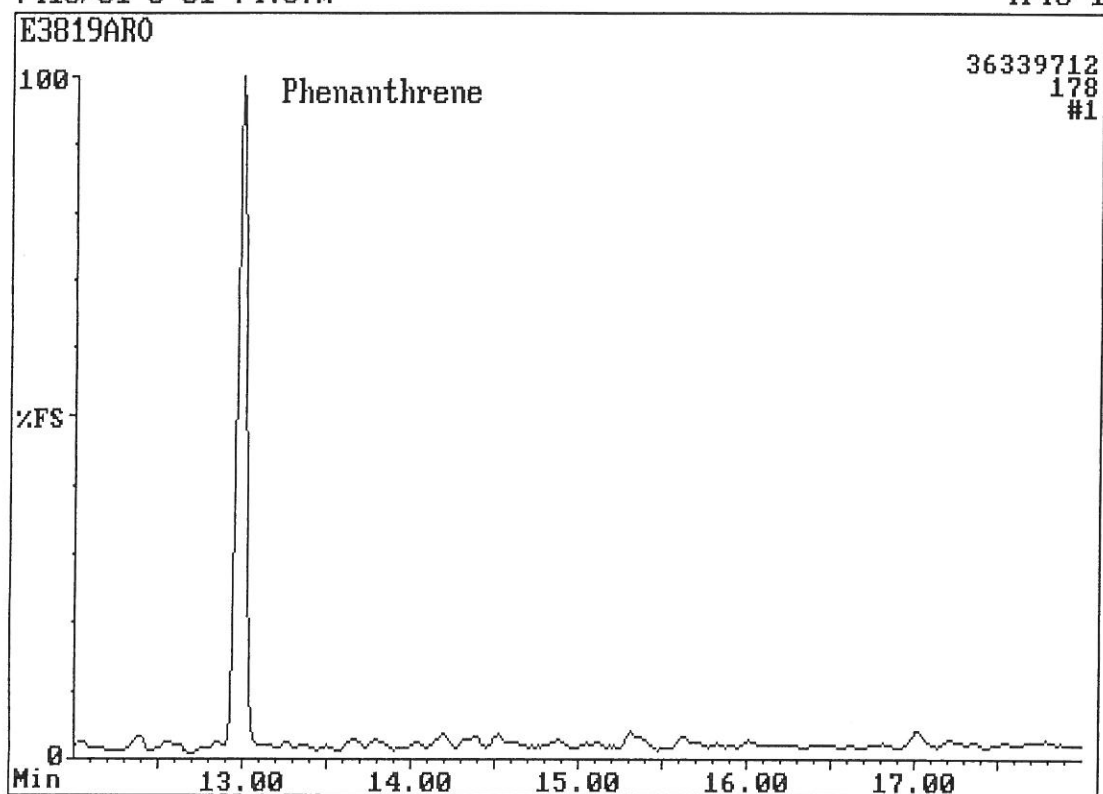
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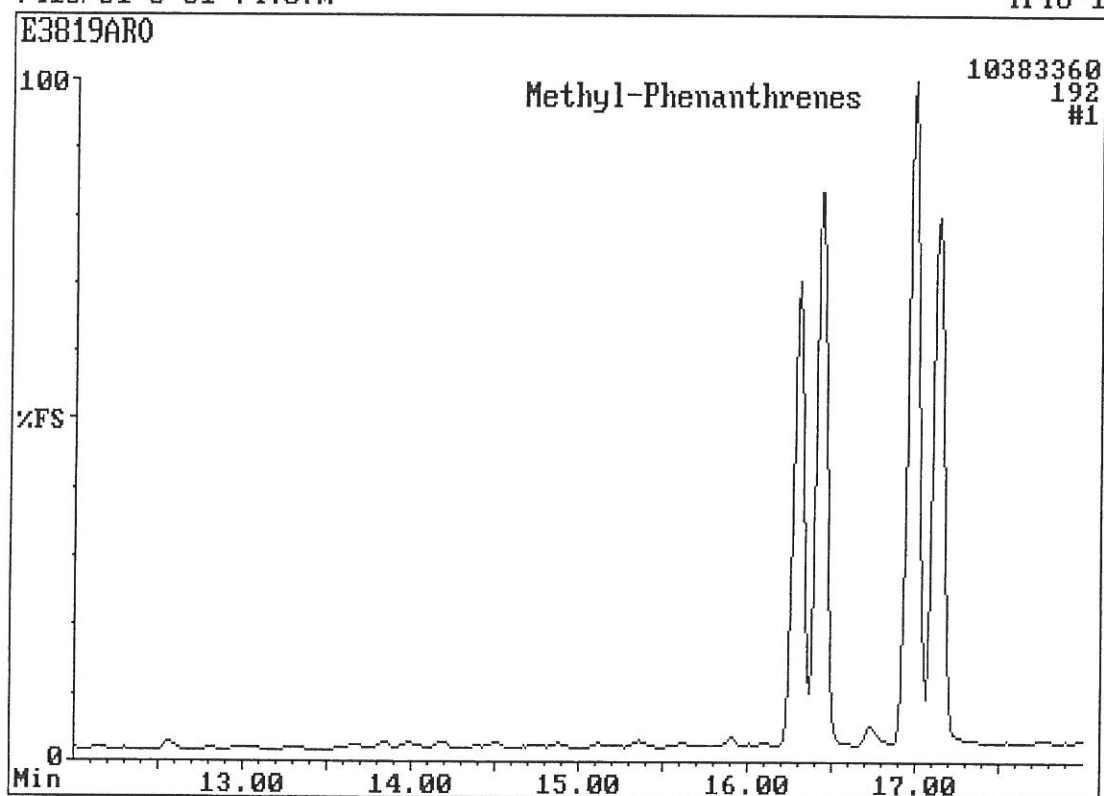
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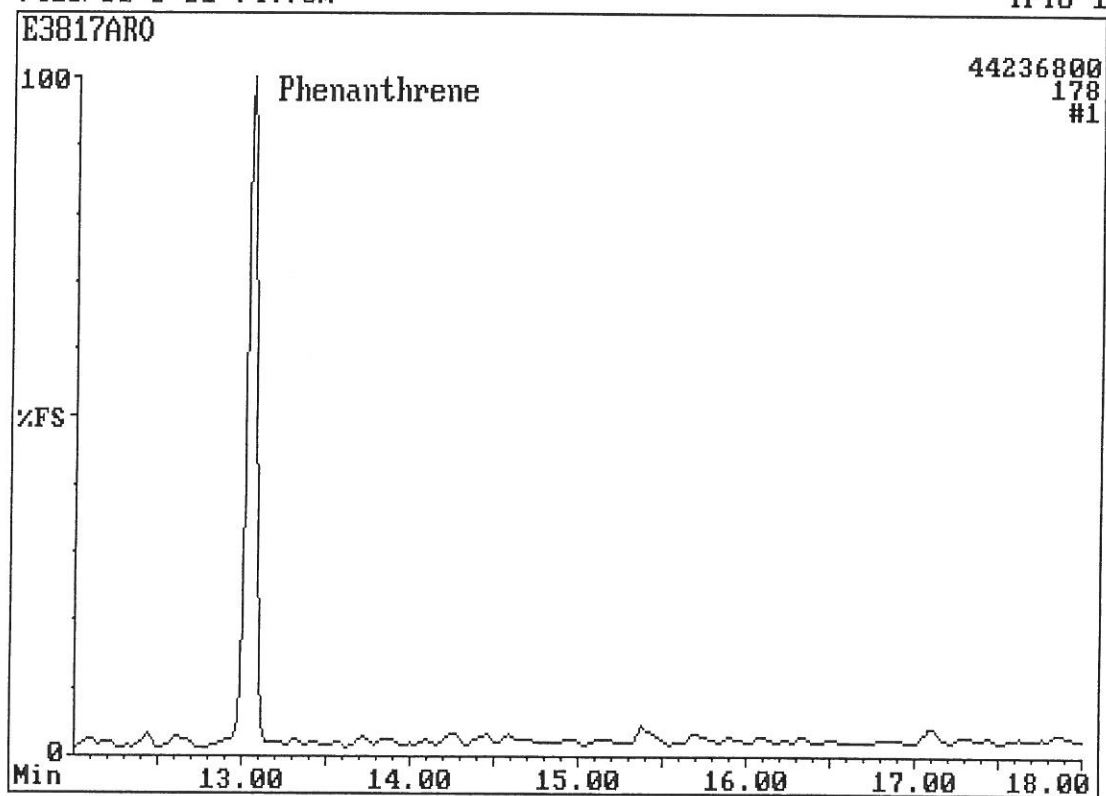
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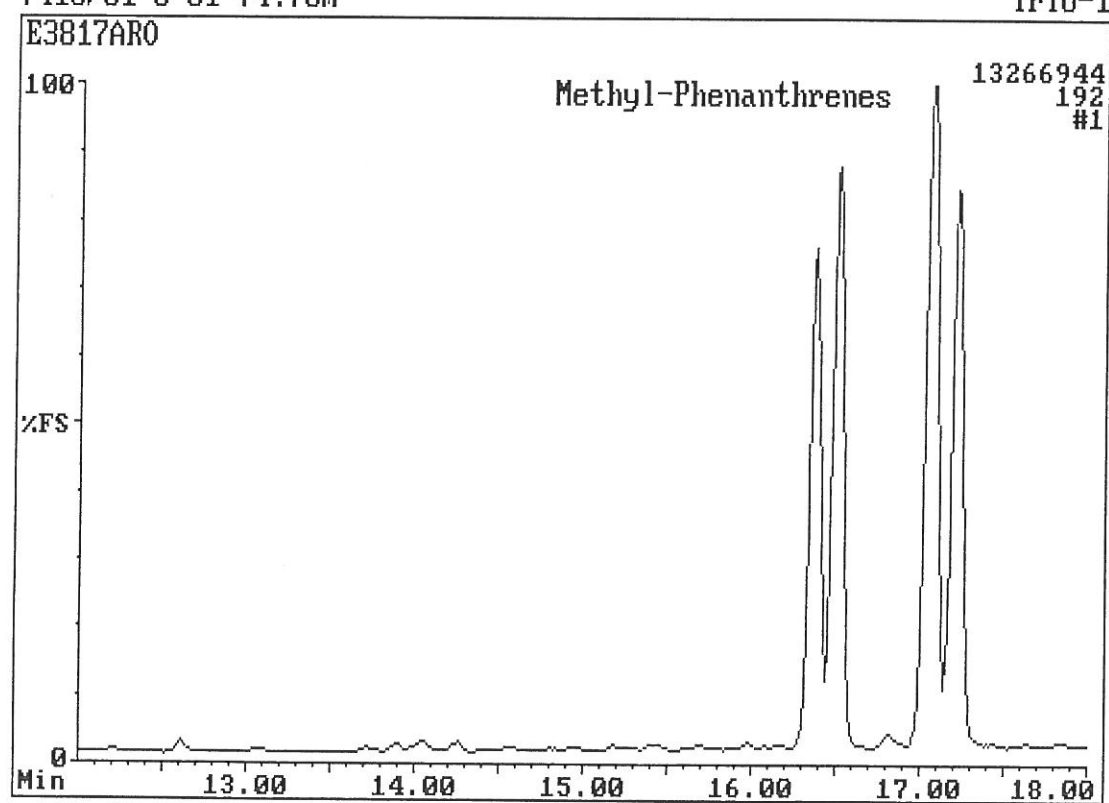
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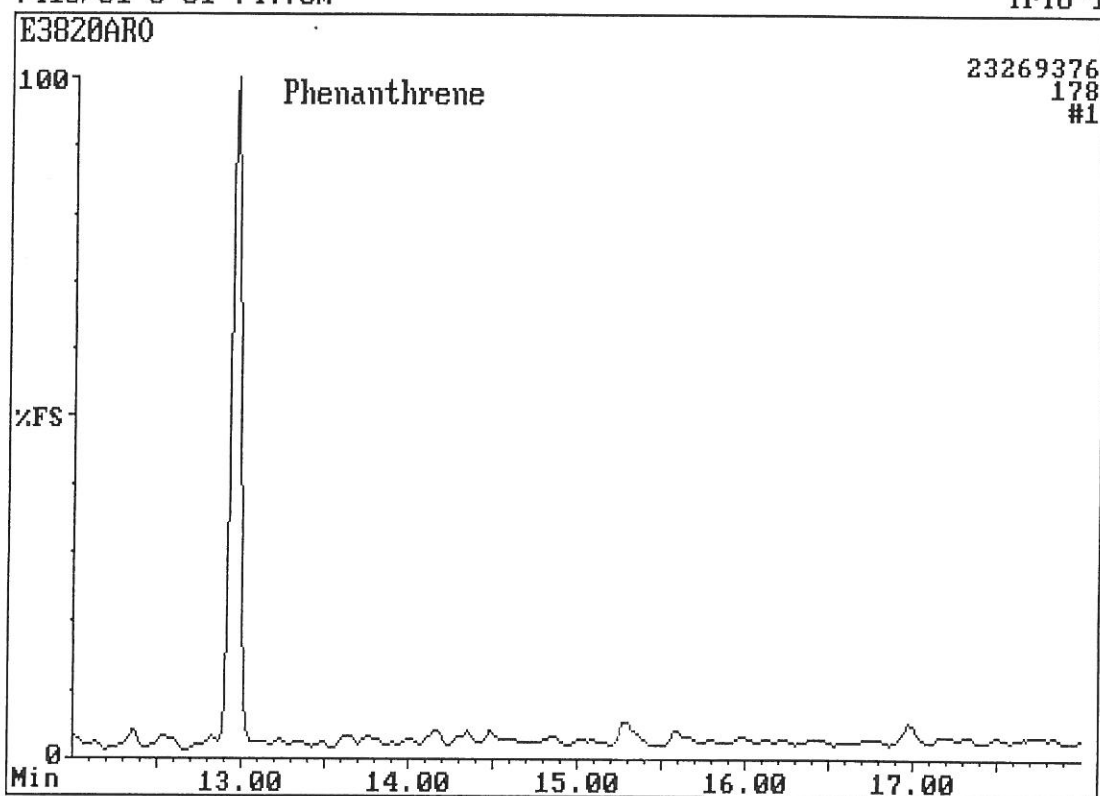
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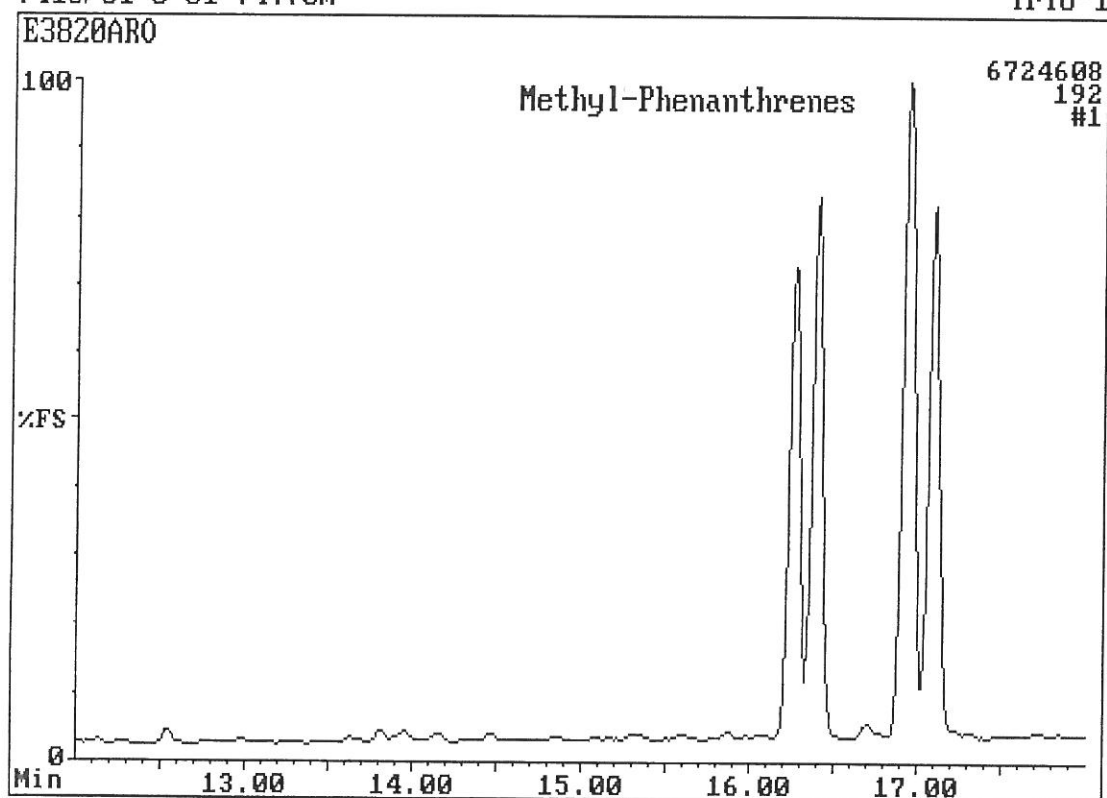
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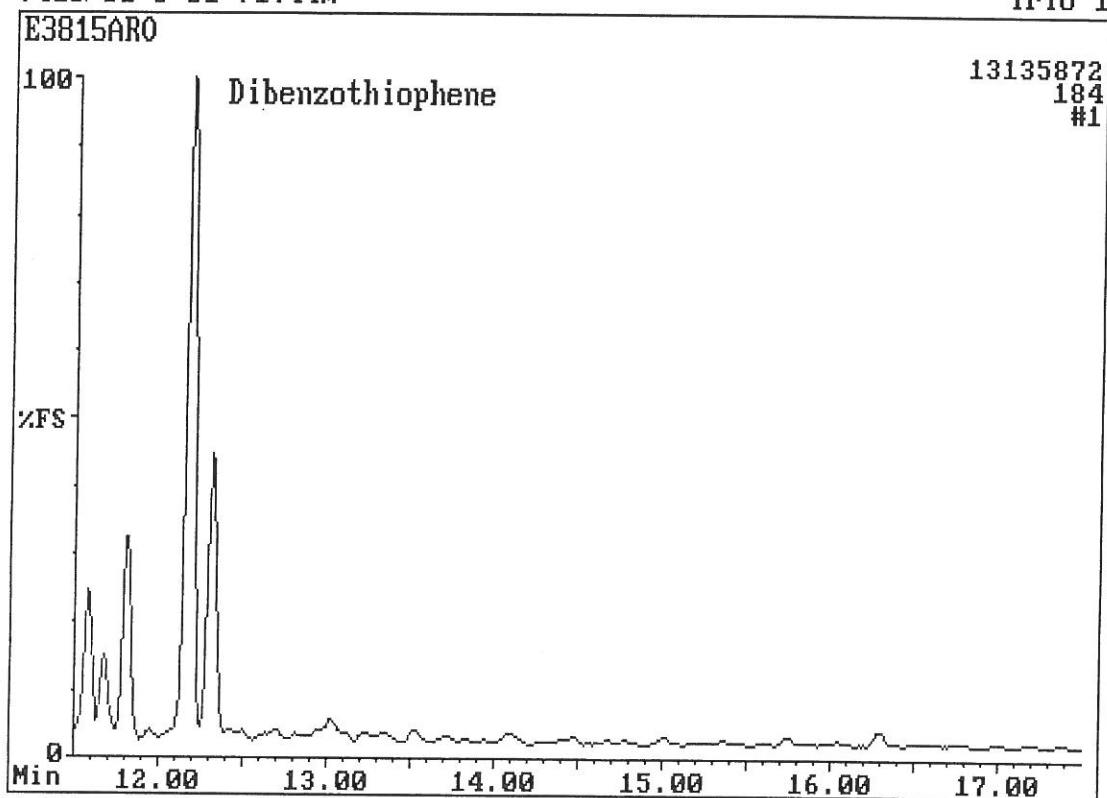
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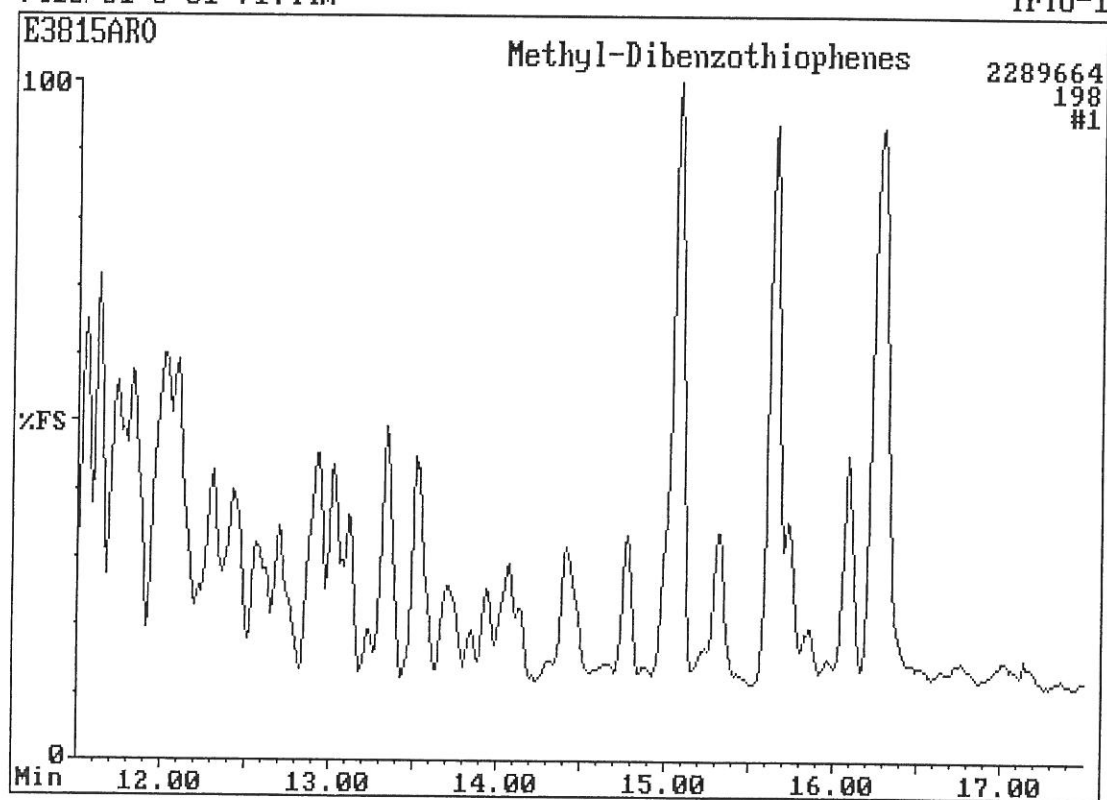
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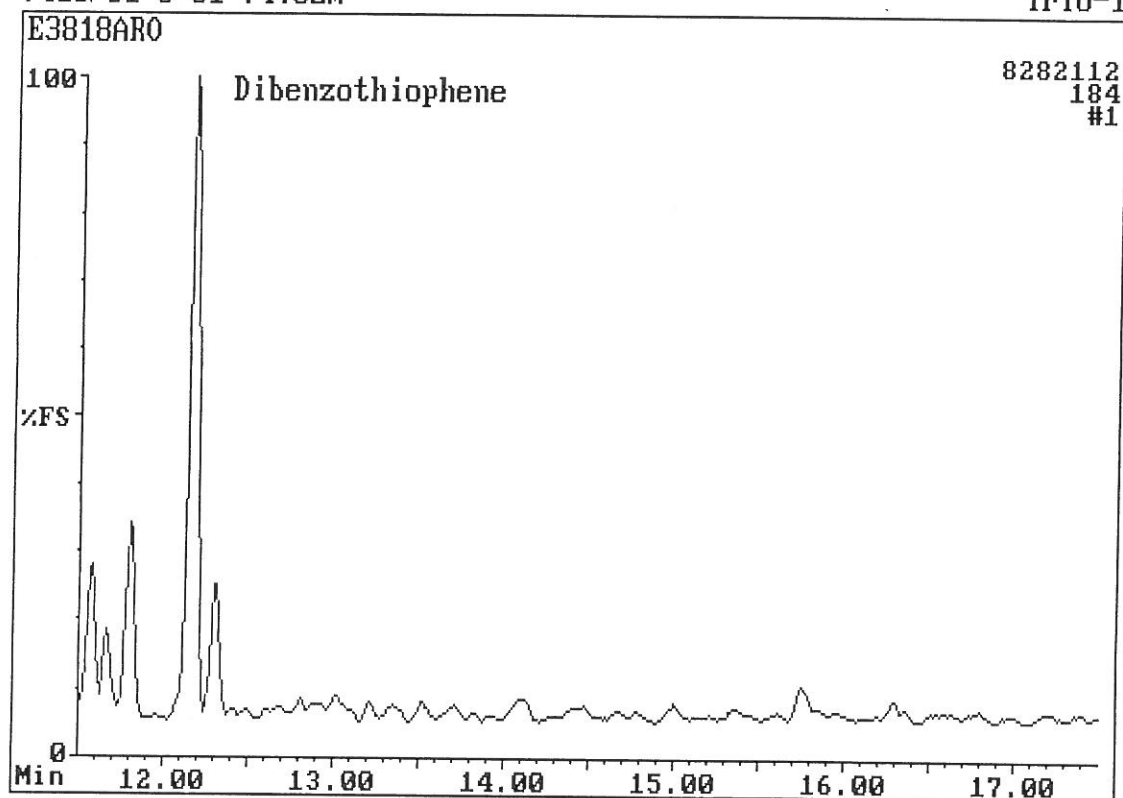
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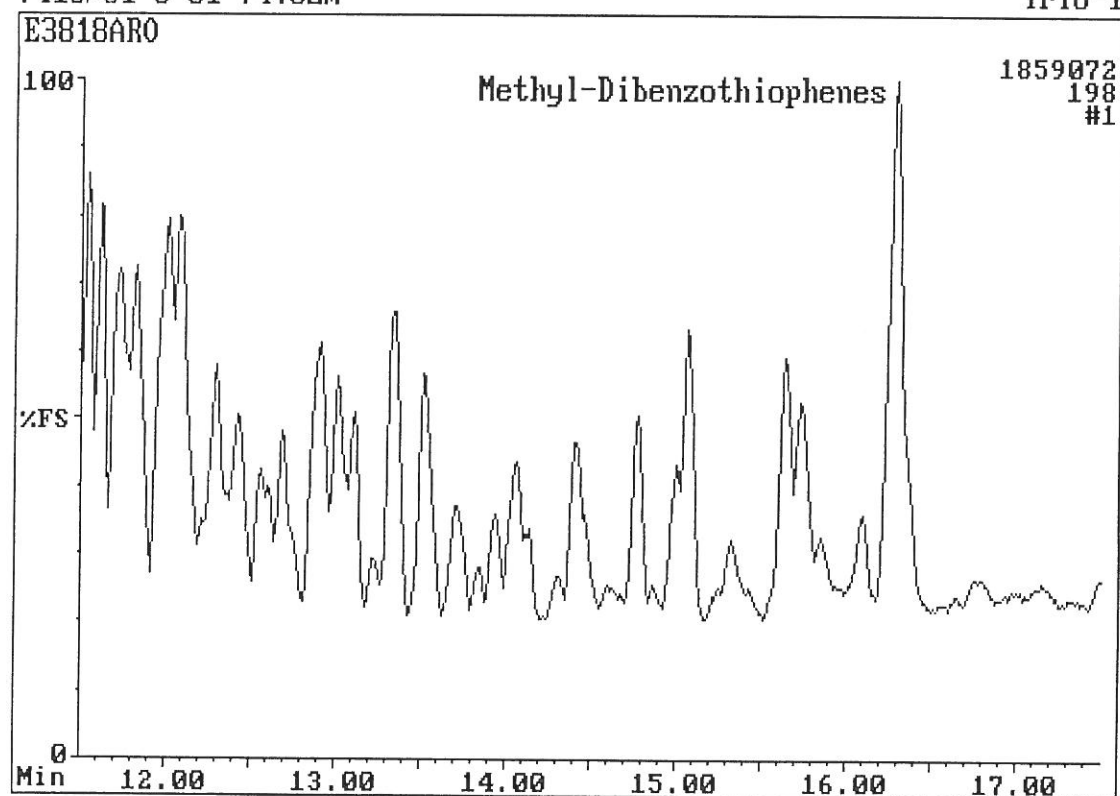
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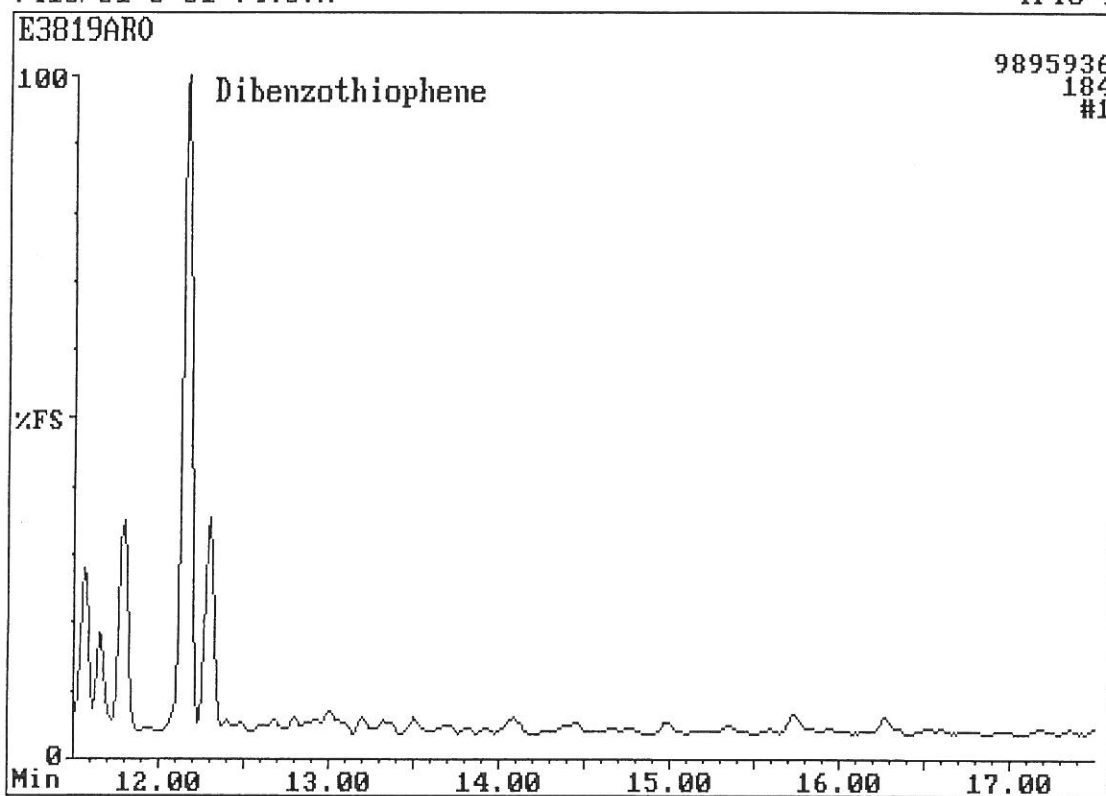
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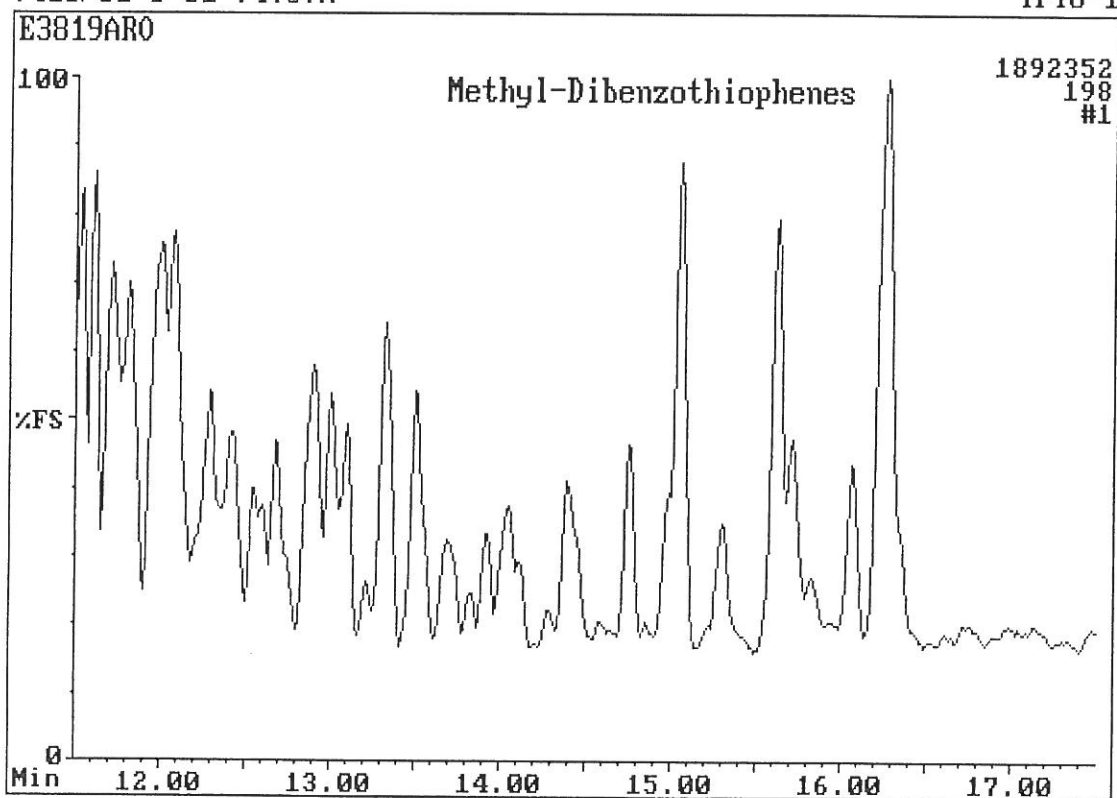
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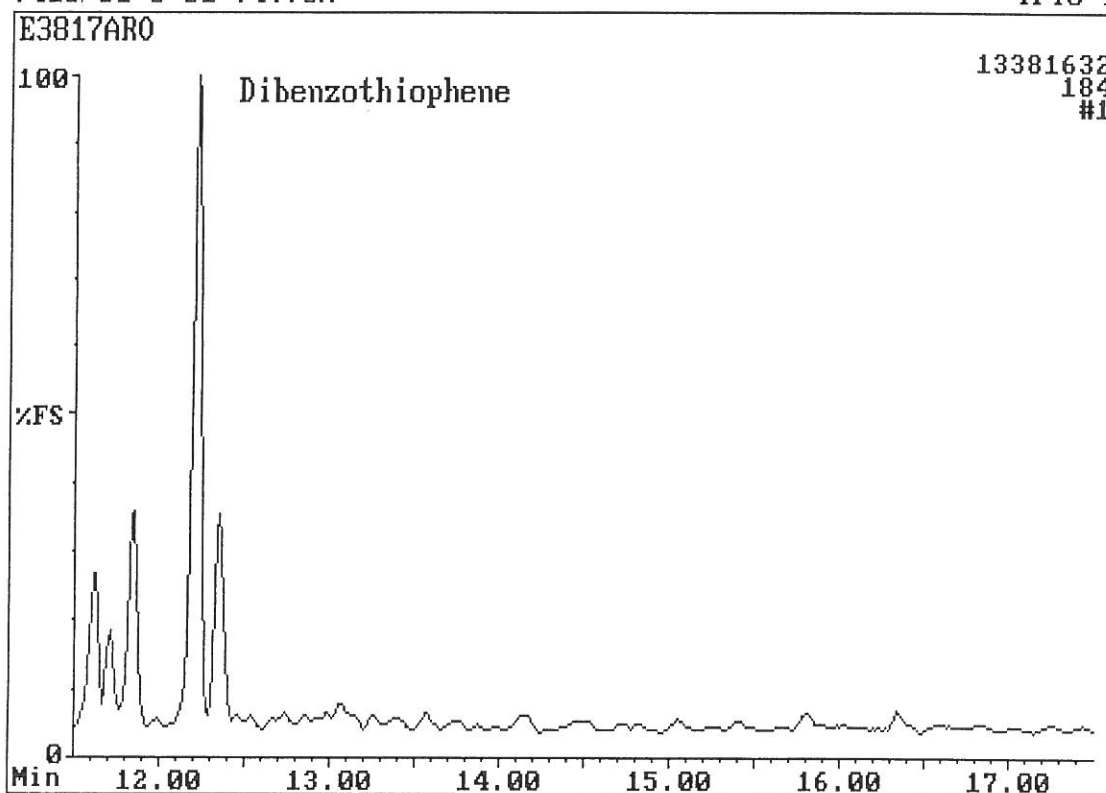
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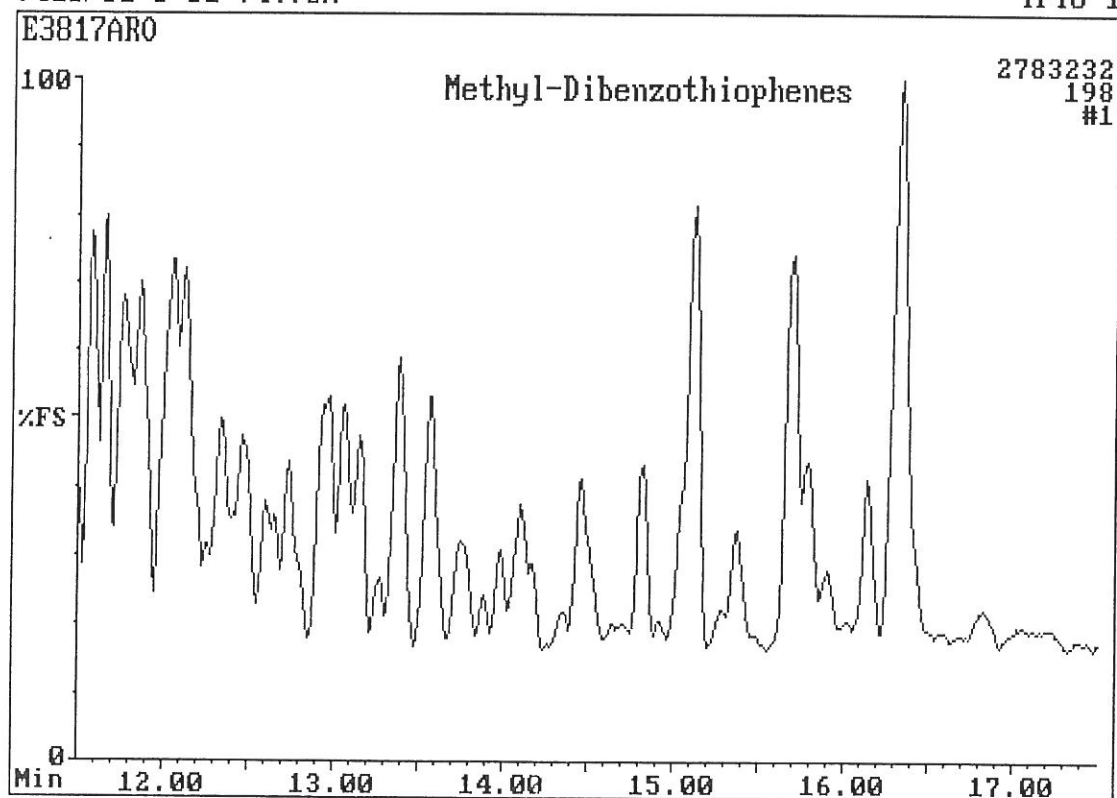
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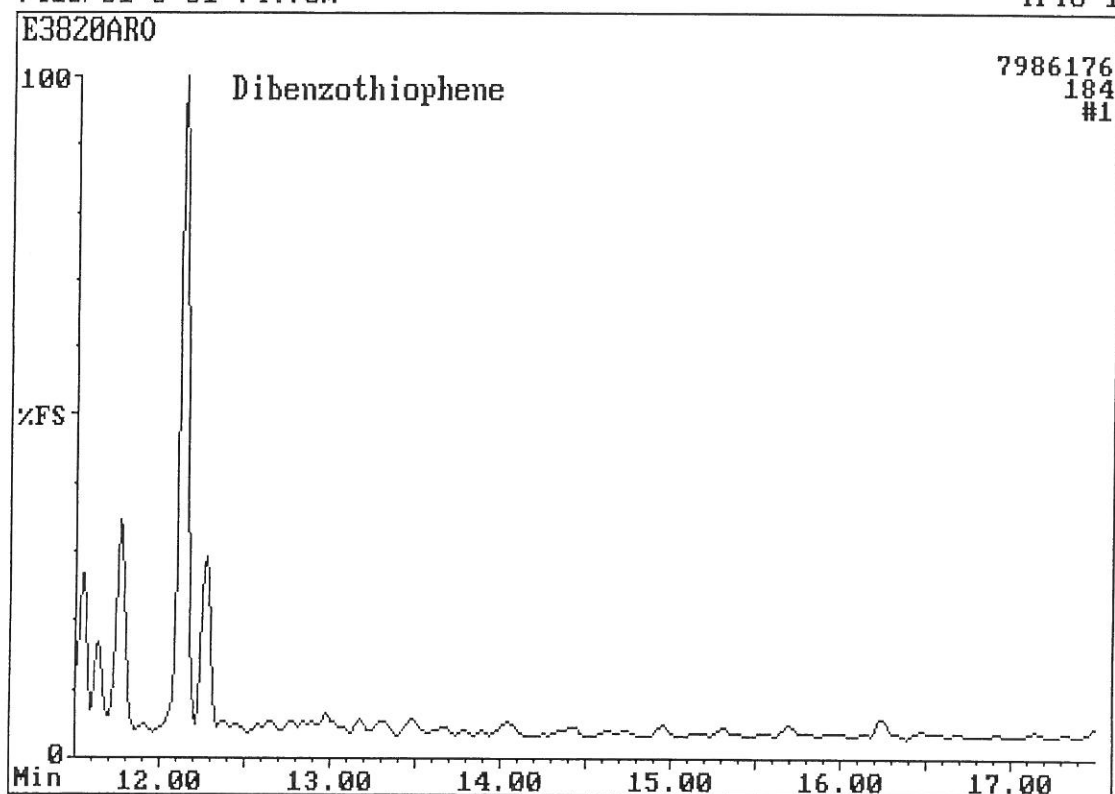
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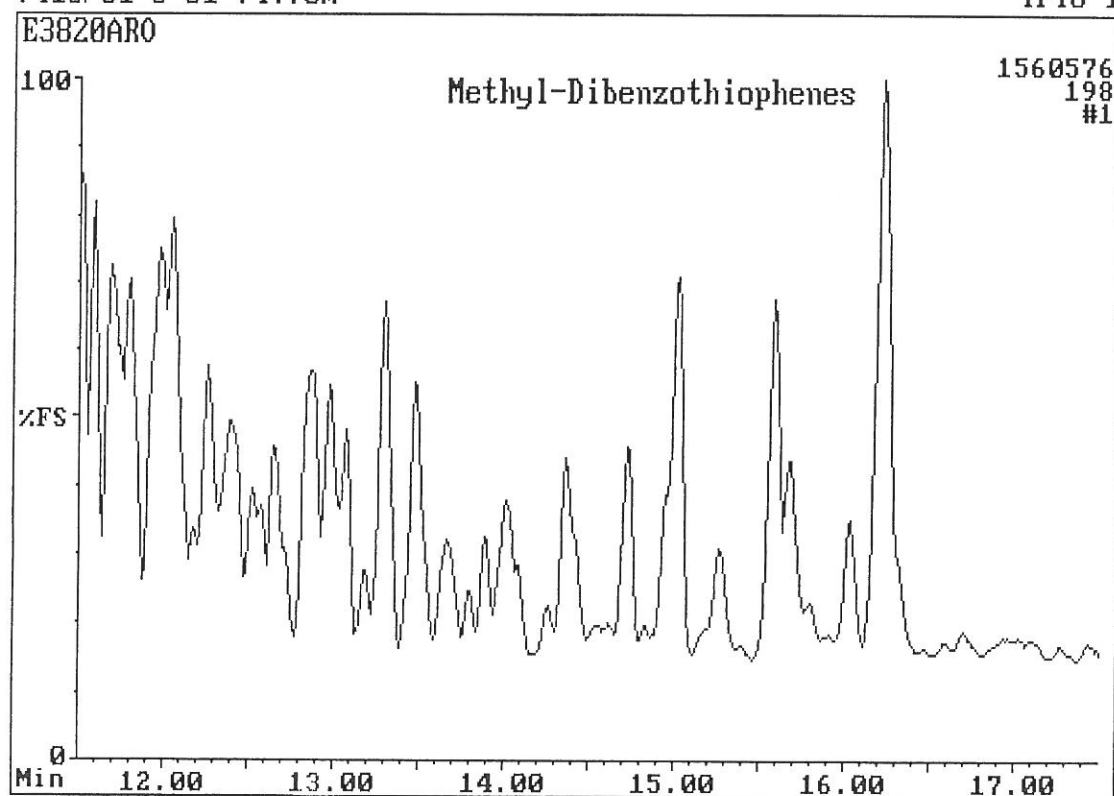
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Fisons Instruments TRIO-1000 LAB BASE Data System
7418/01-U-01 74.73m

Trio-1



Analytical Procedures

Gas analyses

Headspace gas:

A septum was attached to the can and a sample of the headspace gas was taken for analysis of C₁, C₂, C₃, i-C₄, nC₄ and C₅₊ hydrocarbons.

This analysis was performed on Carlo Erba Fractovap 2150 gas chromatographs equipped with 2 m c 1/8" stainless steel columns filled with Porapak Q on Chromosorb using nitrogen as carrier gas. An oven temperature of 150°C was used. After elution of n-butane, the column was back-flushed and C₅₊ compounds were recorded as two peaks. A standard gas sample containing methane, ethane, propane, n-butane, n-pentane and n-hexane (1000 ppm each) was used for quantification.

The can was then opened and headspace volume, water volume, and sample weight were measured. The canned samples were washed with luke-warm water (30-35°C) and were then dried at 40°C.

Occluded gas:

Prior to drying, an aliquot of the sample was crushed in water for 10 minutes using a gas-tight ball mill. The evolved gas was analysed as described for headspace gas. The standard gas sample contained 100 ppm hydrocarbons.

Total Organic Carbon

Bulk samples were crushed in a disk mill. Aliquots of the samples were then weighed into Leco crucibles, treated three times with 10% (vol) HCl, and heated to 60°C in order to remove carbonate. Finally they were washed four times with distilled water in order to remove any traces of HCl. The crucibles were then dried for 24 hours on a hot plate. The total organic carbon (TOC) content of the dried samples was determined using a CS 244 carbon/sulphur analyser.

The instrument was calibrated using a synthetic carbon standard with 5.02% carbon. Standard and parallel runs were carried out at least every 10th measurement.

Extractable Organic Matter

Powdered rock was extracted by Soxhlet technique with boiling dichloromethane (DCM) containing 7%(v/v) methanol as solvent in a Soxhlet apparatus for 24 hours.

DCM of organic geochemical grade was used and blank analyses indicated that the occurrence of contaminating hydrocarbons was negligible. Activated copper fillings were used in order to remove any free sulfur from the samples.

After extraction, the solvent was evaporated off using a Büchi Rotavapor and the amount of extracted organic matter (EOM) was determined.

Asphaltene precipitation

The EOM or stabilised oil was diluted in DCM containing 7% (v/v) methanol (1:3 mg/ μ l) and the asphaltenes were precipitated using excess n-pentane (40:1 pentane: (DCM+EOM)). The asphaltene fraction was filtered and dissolved in DCM and weighed after drying at room temperature until a constant weight was achieved.

TLC-FID (Iatroscan)

The malthene fraction was diluted with DCM:MeOH(93:7 v/v) and ca. 20 μ g of the solution were applied to a precleaned and activated Chromarod (type SIII). Three replicates of each sample were analysed. The rods were fully developed with n-hexane (10-11 cm), then dried and redeveloped to half-rod height (5.5 cm) in toluene, and finally developed in DCM:MeOH (93:7 v/v, 2.5 cm).

The rods were passed through the flame-ionisation detector (FID) of a Iatroscan TH-10 (H_2 = 160 ml/min; air = 2 l/min; scan speed = 0.38 cm/sec (gear no. 30)). The FID response was recorded and integrated using a VG Multichrom lab data system. The relative response factors of the saturated and aromatic hydrocarbons and resins were determined by using an external standard ("Oil I" from Statoil's Round Robin 1991), which contains 65.9% saturated hydrocarbons, 33.0% aromatic hydrocarbons and 1.1% polar compounds. The following relative response factors (area / weight %) were used: 0.94 for SAT, 0.72 for ARO and 13.1 for the polar compounds (RESIN1 and RESIN2).

Liquid chromatographic separation

The remaining maltenes were separated into saturated, aromatic and non-hydrocarbon fractions using an MPLC system with n-hexane as eluant (Radke et al. 1980). The various fractions were concentrated using a Büchi Rotavapor. Then they were transferred to glass vials. The remaining solvent was removed.

Gas chromatographic analysis

The whole oil was analysed on a Hewlett Packard 5890 gas chromatograph equipped with a 30 m DB-1 fused silica column (0.25 mm i.d.). Hydrogen was used as a carrier gas with 12 psi inlet pressure. Injections were performed in split mode (split ratio 1:10). The temperature program used was -20°C (2 min.) - 4°C/min. - 300°C.

The saturated hydrocarbon fractions were diluted with n-hexane and analysed on a Varian 3400 gas chromatograph equipped with a 30 m DB-1 fused silica column (0.25 mm i.d.).

The total aromatic fractions were diluted with n-hexane and analysed on a Varian 3400 gas chromatograph, fitted with a DB-5 fused silica column (30 m x 0.25 mm i.d.).

Hydrogen was used as a carrier gas with a flow rate of about 1.5 ml/min. Injections were performed in split mode (split ratio 1:10). The temperature program used was 80°C (2 min.) - 4°C/min. - 300°C.

All data from the GC analyses were processed on a VG Multichrom lab data system.

Gas chromatography - mass spectrometry (GC-MS)

GC-MS analyses were performed on a VG TRIO 1 quadrupol instrument. A Hewlett Packard 5890 Series II GC with a HP7671 Automatic sampler was fitted with a fused silica DB-1 capillary column (30 m x 0.25 mm i.d.). Helium was used as a carrier gas with 20 psi as inlet pressure. The injections were performed in splitless mode (1.00 min.). The temperature program used was 50°C (1 min.) - 35°C/min. - 150°C - 2°C/min. - 310°C (10 min.).

The samples were analysed in multiple ion mode (MID) at a scan cycle time of approximately 2 secs. The mass spectrometer operated at 70eV electron energy with an ion source temperature of 200°C and a source pressure of 10^{-5} torr. Data acquisition was performed using a VG data system.

Peaks were identified by comparison with elution patterns in certain mass chromatograms. Peak ratios were calculated from peak heights in the appropriate mass chromatograms.

Isotope IFE

The $\delta^{13}\text{C}$ isotope analysis was performed by mass spectrometry at the Institute for Energy Technology (IFE) in Oslo according to their method. Their oil standard was analysed together with the samples and the analysis results was within $\pm 0.1\%$. The reference value for the NBS 22 standard is $-29.77 \pm 0.06\%$ PDB.