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July 11, 1996

Ms. Elizabeth Willson
Room 18010
237 4th Avenue S.W.
Calgary, Alberta
T2P 0H6

Dear Ms. Willson:

Enclosed please find the analytical results for the two core samples which you supplied to us from the Kotaneelee area along with an invoice for this data.

The data set includes Rock-Eval/TOC analyses (at no charge) so that you would have an estimate of the relative amount of bitumen in the organic fraction as well as the whole rock. Please note however, that the TOC results are not very reproducible during duplicate runs. We believe that this is due to the operating conditions of a Rock-Eval TOC analyzer (600°C in air) which do not appear to be vigorous enough to provide for complete combustion of these samples. Other analytical results include the weights of the total extract and fractions presented in two different formats. Extract and hydrocarbon "yields" have been normalized to TOC content. Weights and percentage distributions do not sum to 100% or the initial weight because of losses during handling. These losses may be due to irreversible adsorption of asphaltenes on the chromatography column or losses of volatiles (usually saturates) during solvent evaporation. You may wish to recalculate normalized distributions based on the recovered fractions. Please note that the sample weight (grams) has been truncated to the nearest gram in the report format. You should also be aware that the aromatic fraction of at least one of the samples was a lovely magenta colour. In other cases when we have observed similar phenomena, it has been due to contamination of the core sample by grease pencil or crayon, with the colour being one or more of the dyes eluting in the aromatic fraction. The saturate fraction chromatograms show a very large even/odd n-alkane predominance and this is likely also due to waxes from grease pencil or crayon used to mark the core.

The saturate fraction gas chromatograms (Varian 3700 coupled to a PE/Nelson data system) are also provided in two formats: a colour output from a plotter and a printer version.

The latter also includes peak area and height information along with expected retention times for n-alkanes and selected isoprenoids. The GC-MS data were generated using a VG 70SQ mass spectrometer coupled to a Hewlett Packard 5890 GC. Traces for $m/z = 177, 191, 205, 217, 218, 231,$ and 259 have been included.

If you have any questions or comments, I would be pleased to hear from you. I can be reached at the Survey by phone at 403-292-7035, FAX at 403-292-7159 or via the internet at snowdon@gsc.emr.ca.

Regards,

A handwritten signature in cursive script, appearing to read "Lloyd R. Snowdon". The signature is written in black ink and is positioned above the typed name.

Lloyd R. Snowdon
Head, Energy and Environment Subdivision

ESSO Kotaneelee Core Samples											
DEPTH	QTY	TMAX	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
12987	100.1	592	0.10	0.57	0.73	0.15	0.78	0.05	10.56	5	6
12987	99.5	591	0.12	0.59	0.73	0.17	0.80	0.05	5.14	11	14
12792	100.3	593	0.03	0.19	1.17	0.14	0.16	0.01	4.39	4	26
12792	100.3	594	0.02	0.18	1.20	0.10	0.15	0.01	6.02	2	19

Data file:

/VARIAN/MISC535

Report:

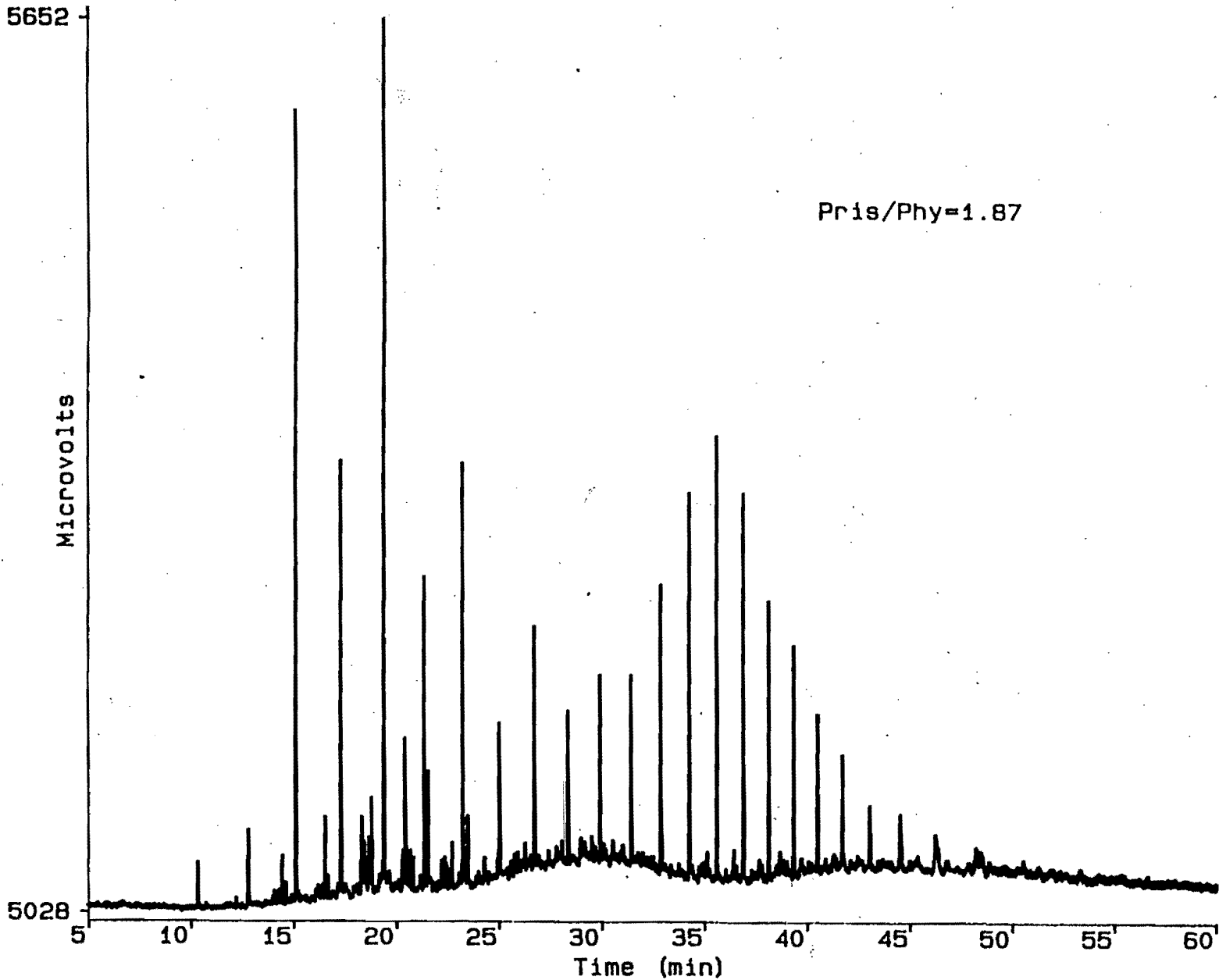
None

Acquired:

Thu Jul 4, 1996 2:23:20 pm

Time range:

5.00-60.00



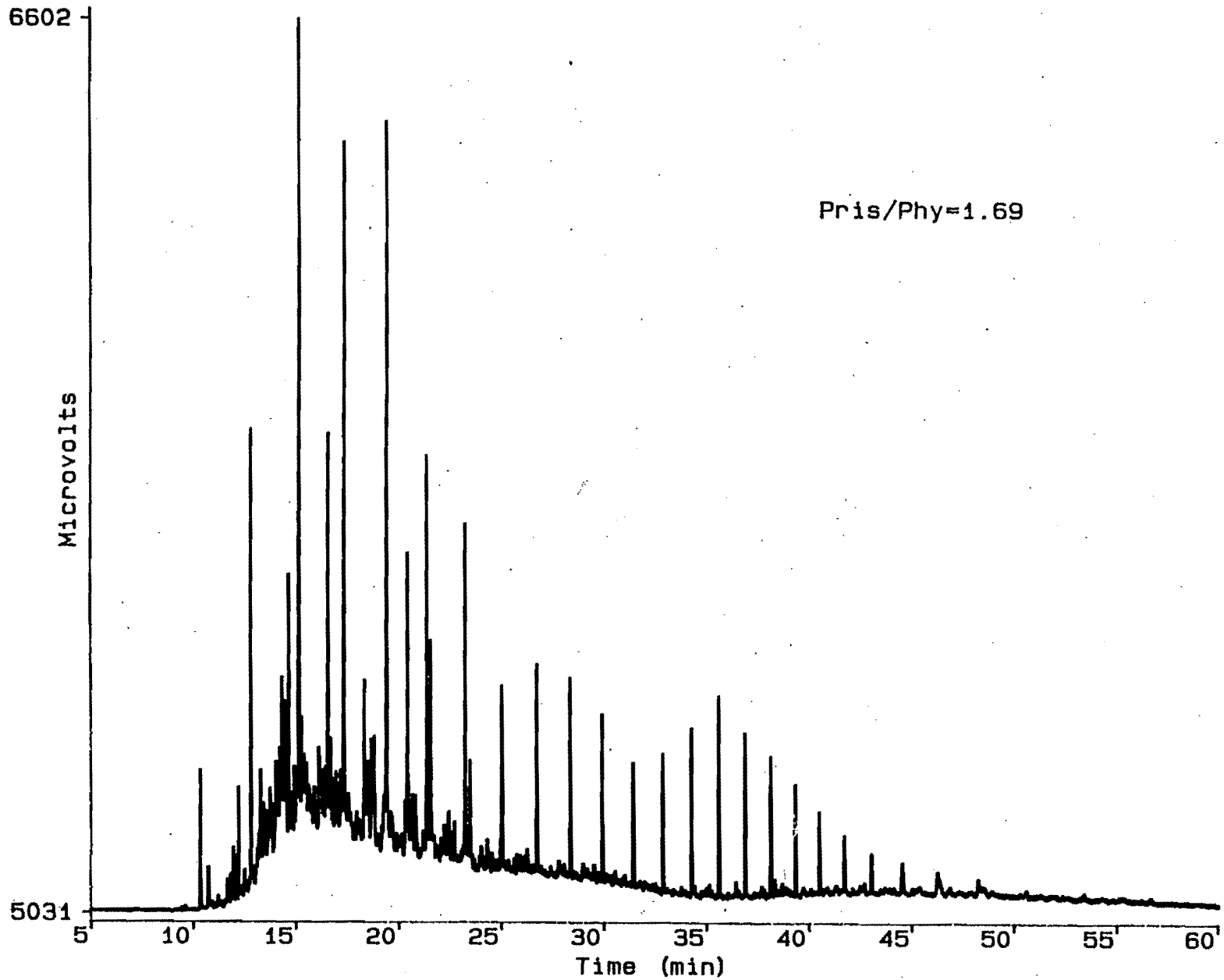
#8534 KOTANEELEE SAMPLE a E-37 12792'

Data file: /VARIAN/MISC536

Report: 16637

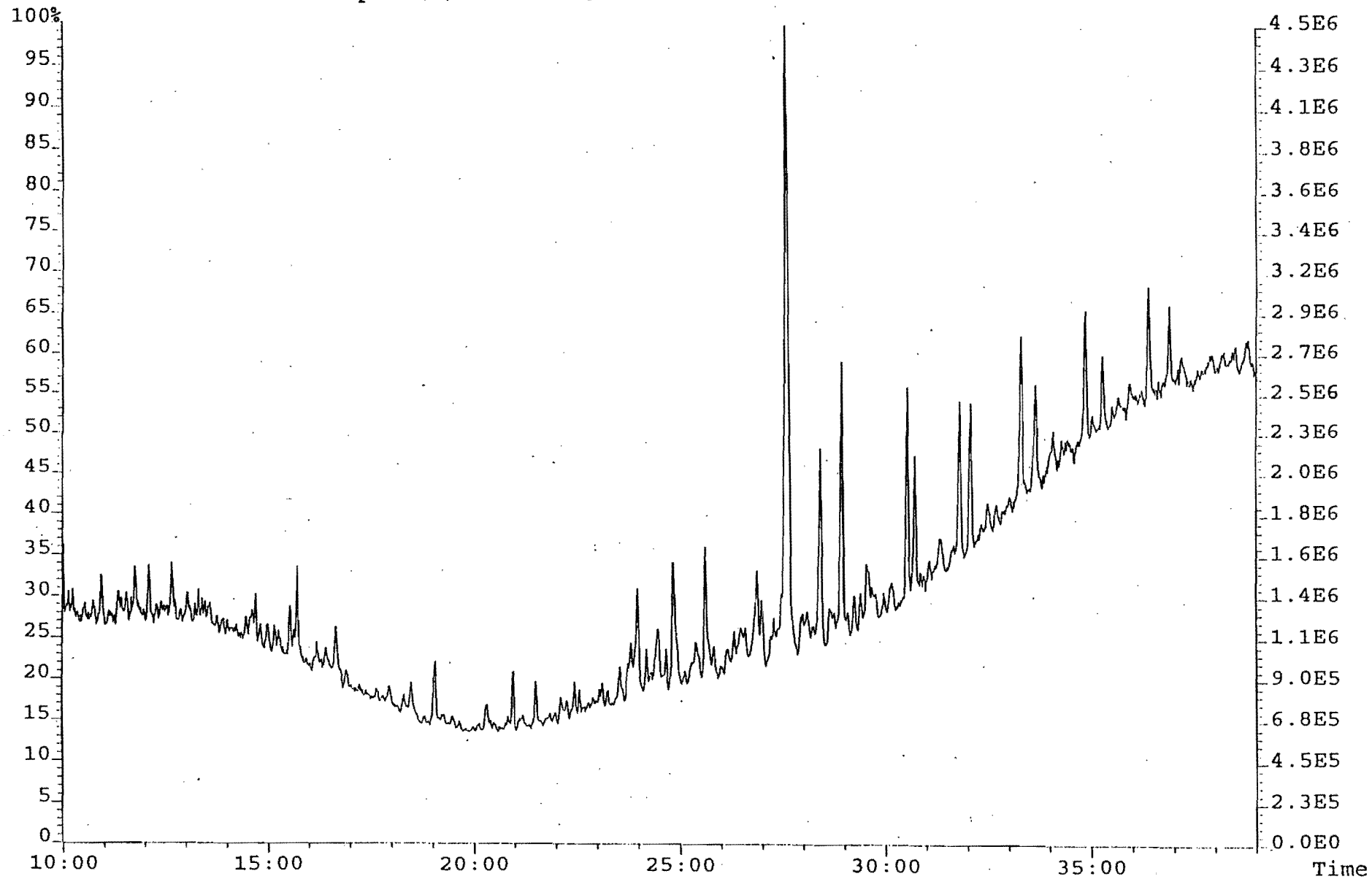
Acquired: Mon Jul 8, 1996 7:36:30 am

Time range: 5.00-60.00



#8535 KOTANEELEE SAMPLE e YTE-37 13163'

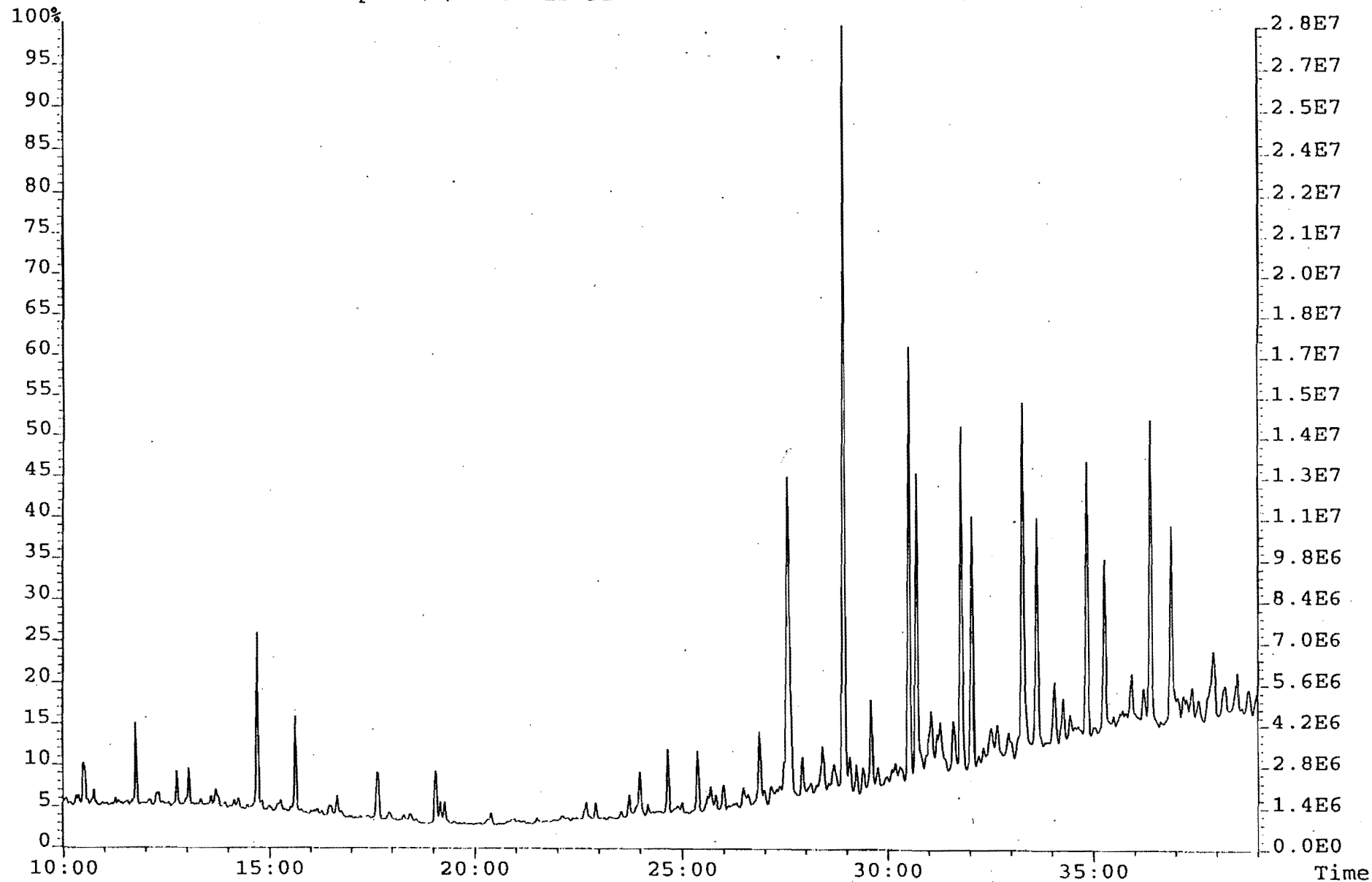
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177.1638 Exp:BIOMARK
File Text:Kotanee Lee Sample (a) E-37 12792'



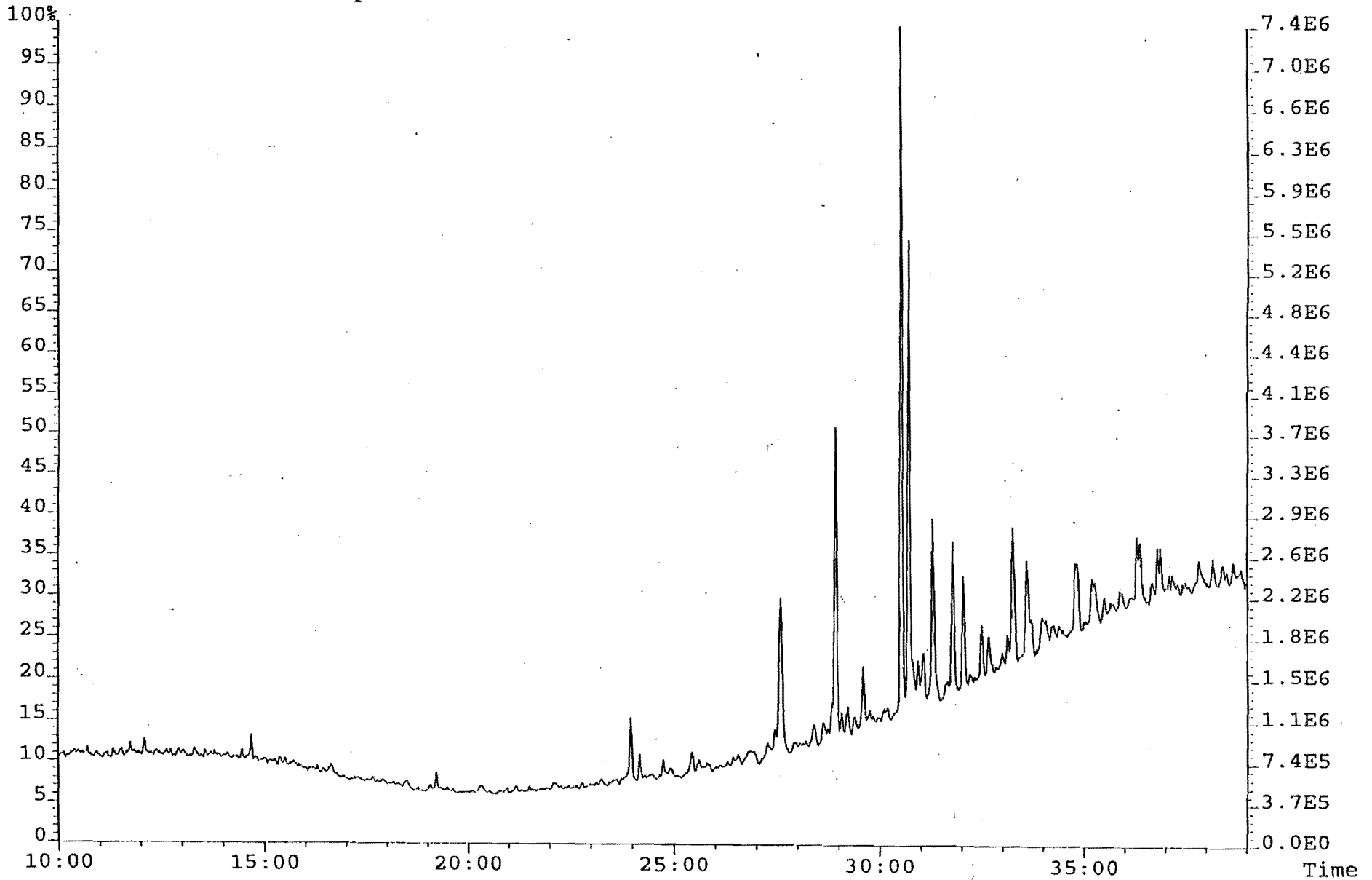
File:8534 #1-3665 Acq:10-JUL-1996 10:44:10 Septum EI+ Voltage SIR 70SQ

191.1794 Exp:BIOMARK

File Text:Kotanee Lee Sample (a) E-37 12792'



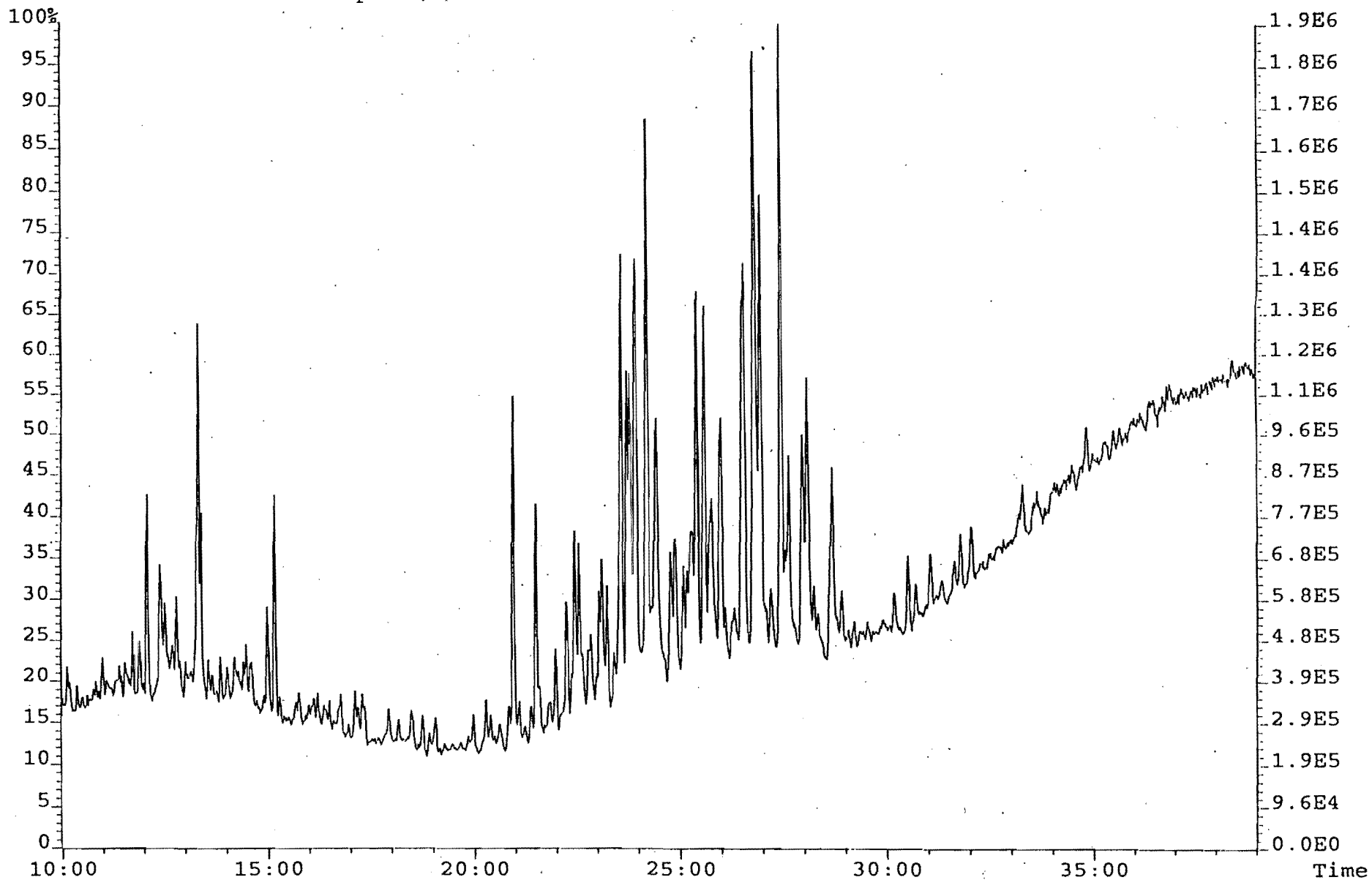
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205.1950 Exp:BIOMARK
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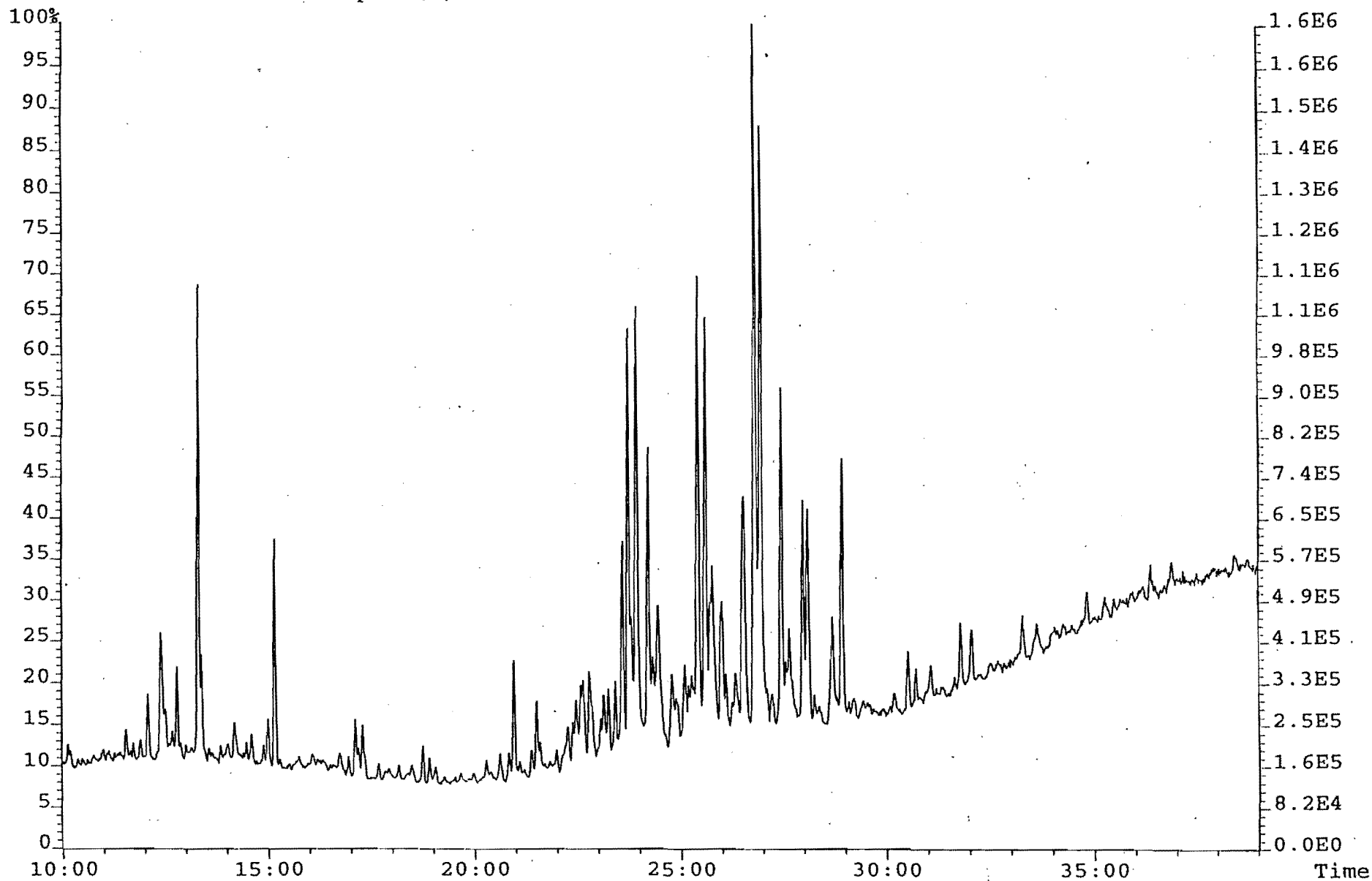
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217.1950 Exp:BIOMARK

File Text:Kotanee Lee Sample (a) E-37 12792'



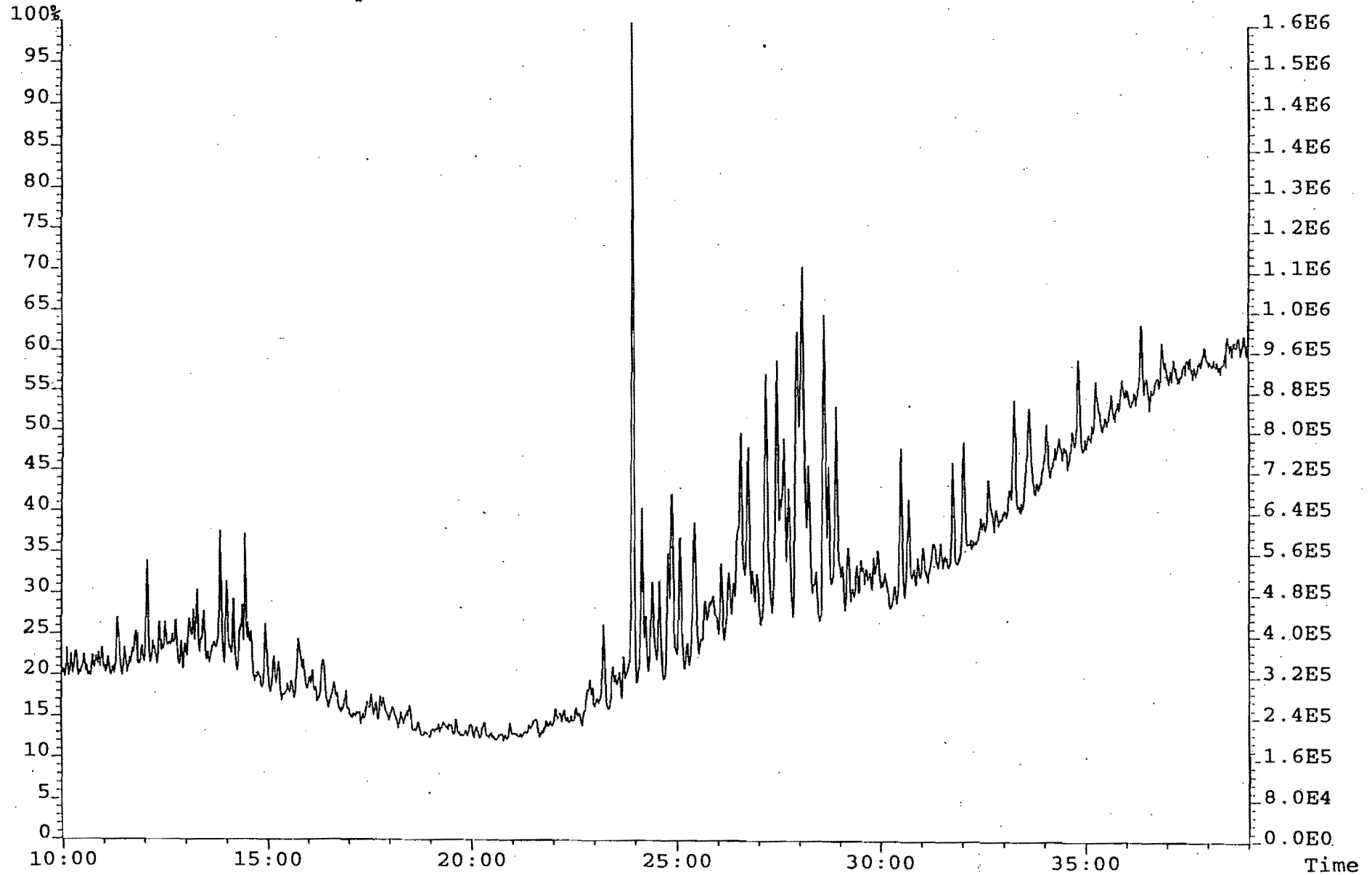
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218.2028 Exp:BIOMARK
File Text:Kotanee Lee Sample (a) E-37 12792'



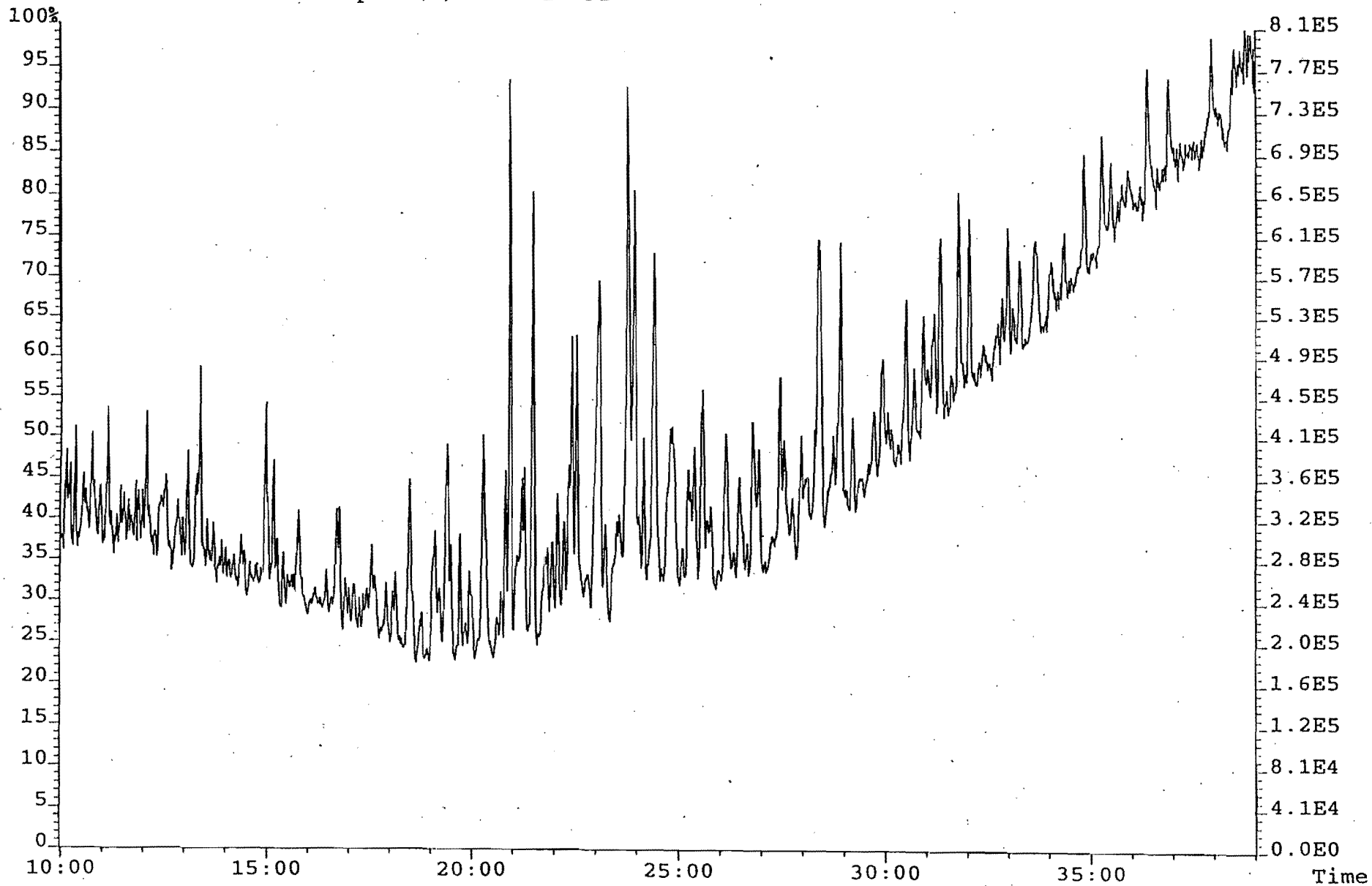
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231.2106 Exp:BIOMARK

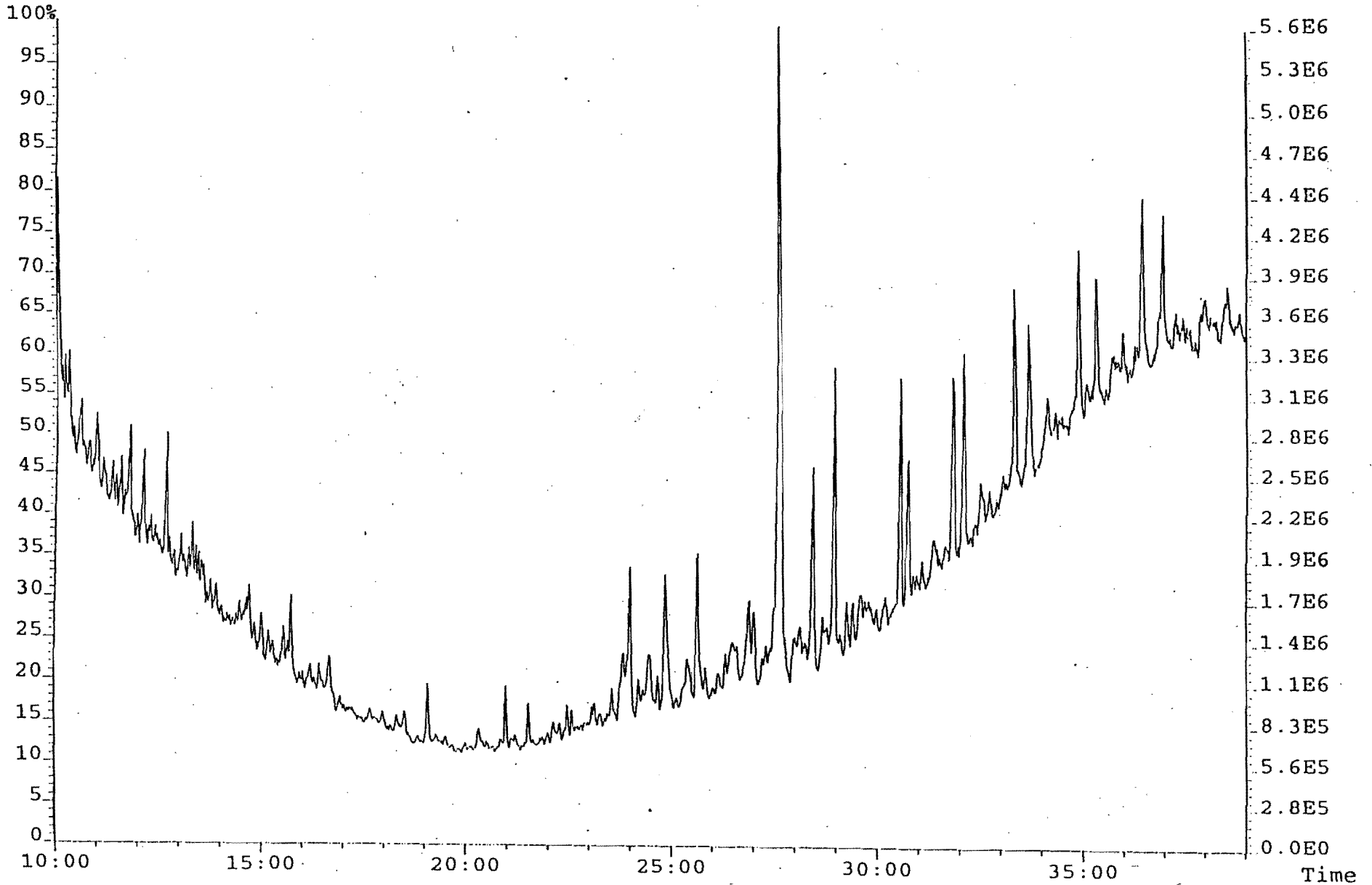
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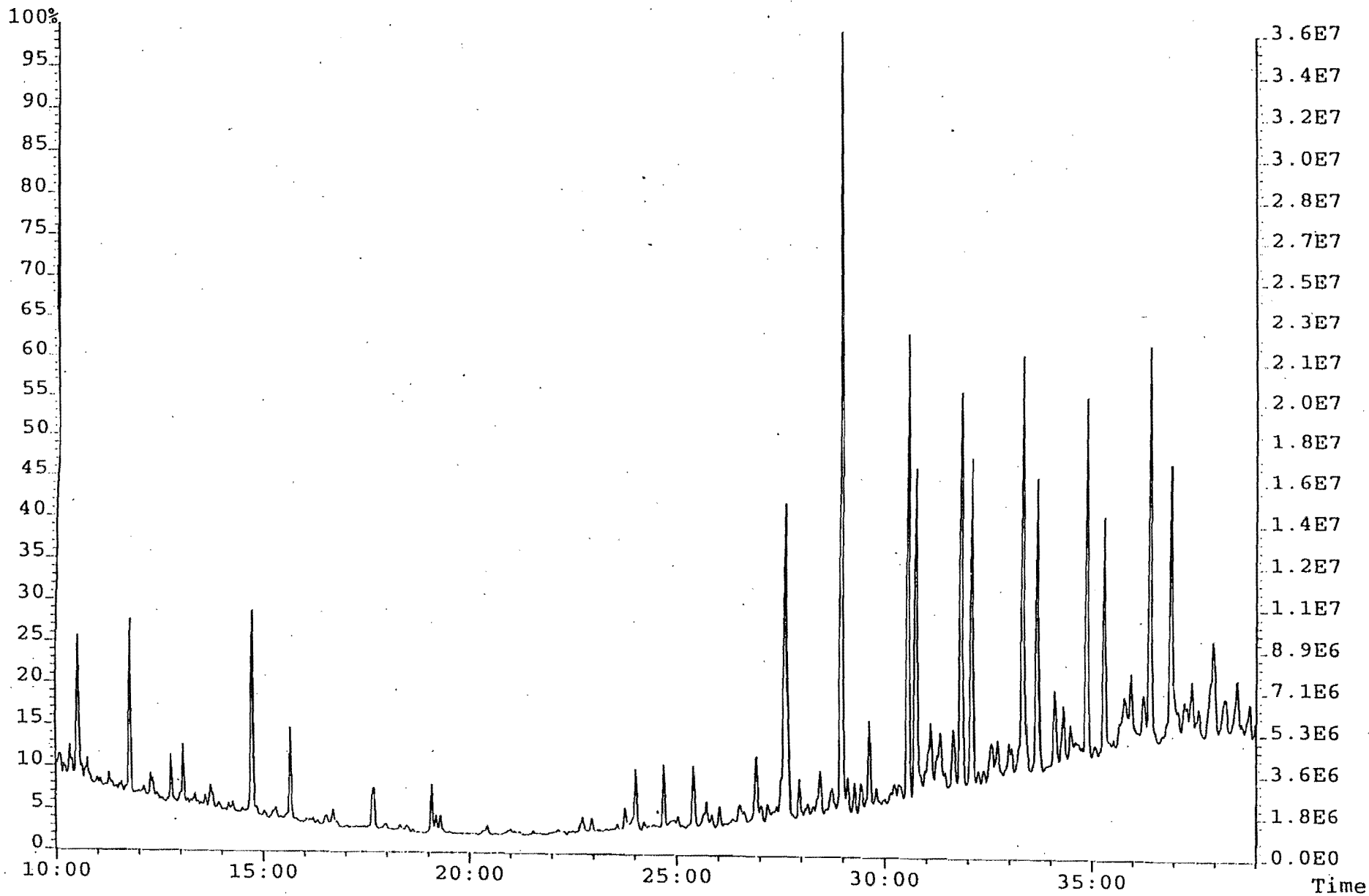
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File Text:Kotanee Lee Sample (a) E-37 12792'



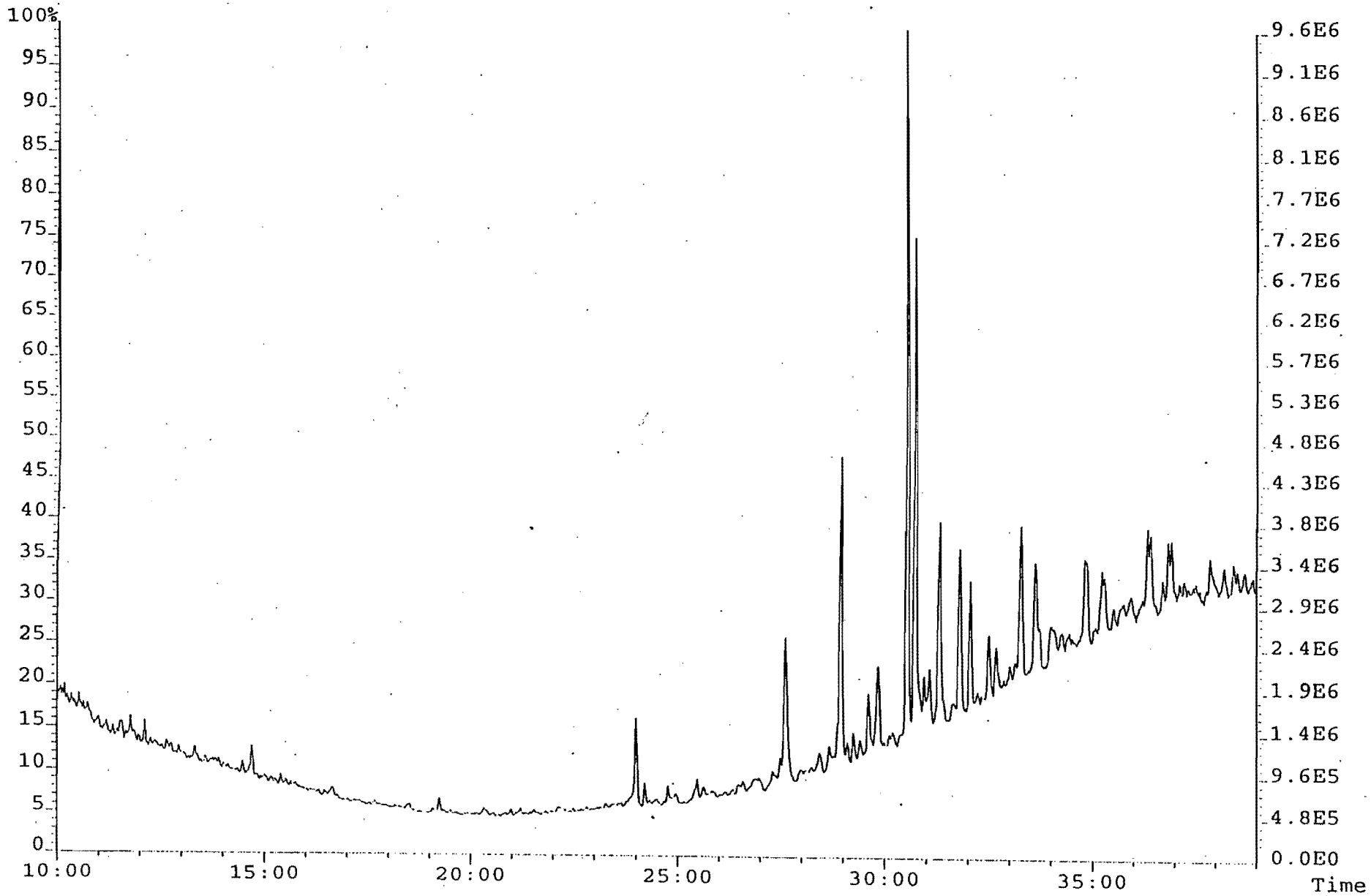
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Sample#1 File Text:Kotanee Lee Sample (e) YTE-37 13163' Exp:BIOMARK
177.1638



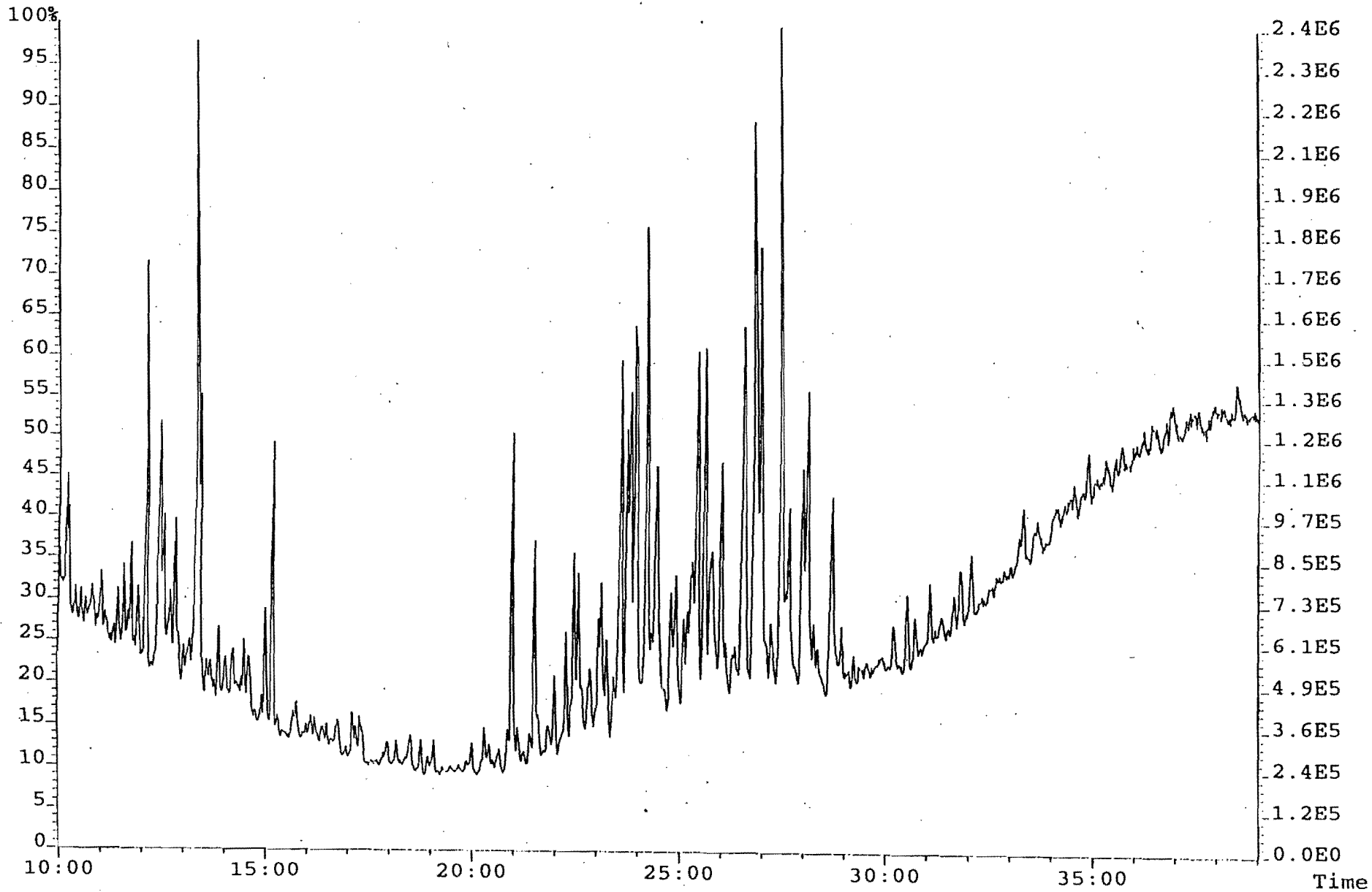
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Sample#1 File Text:Kotanee Lee Sample (e) YTE-37 13163' Exp:BIOMARK
191.1794



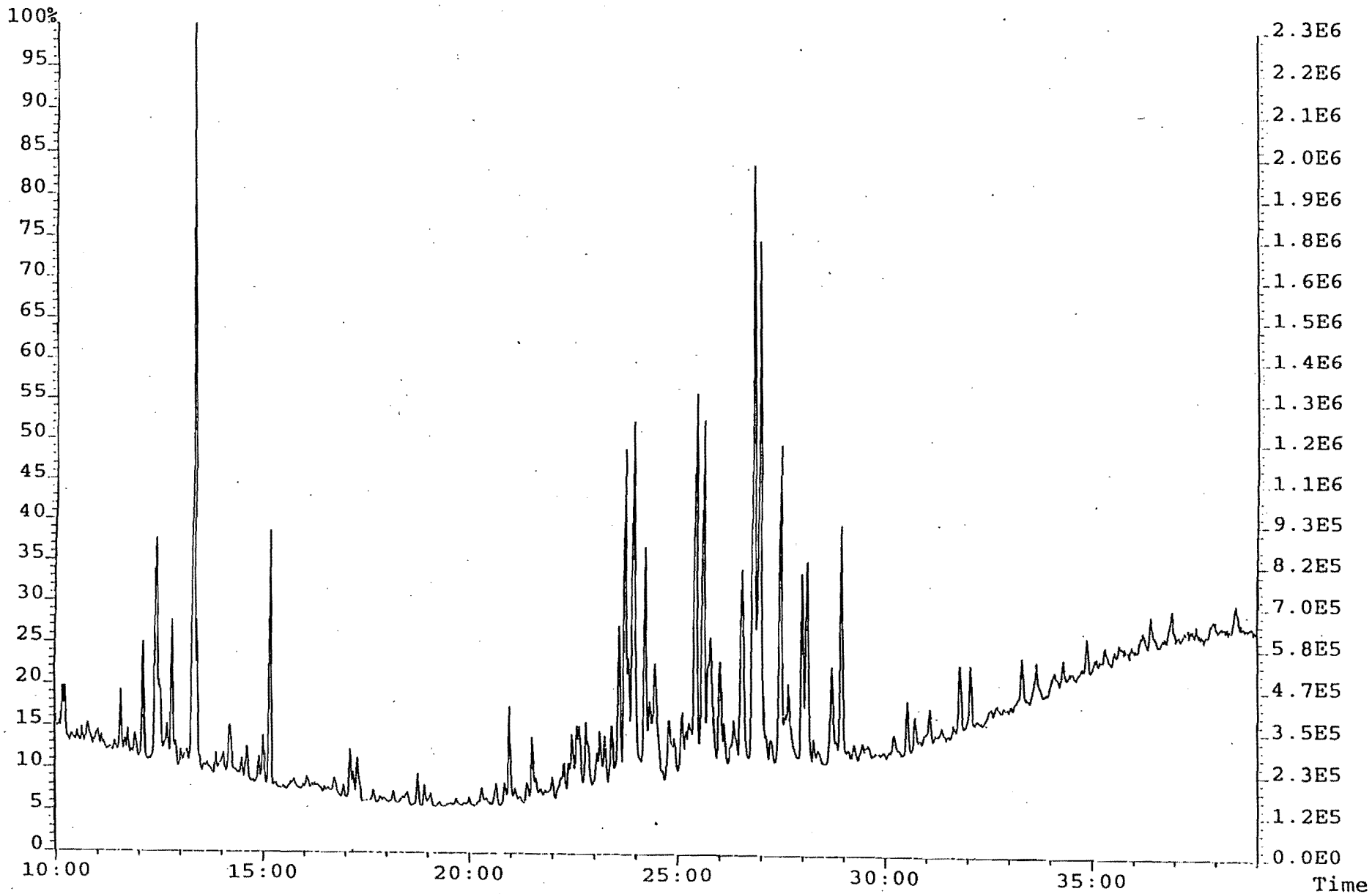
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Sample#1 File Text:Kotaneé Lee Sample (e) YTE-37 13163' Exp:BIOMARK
205.1950



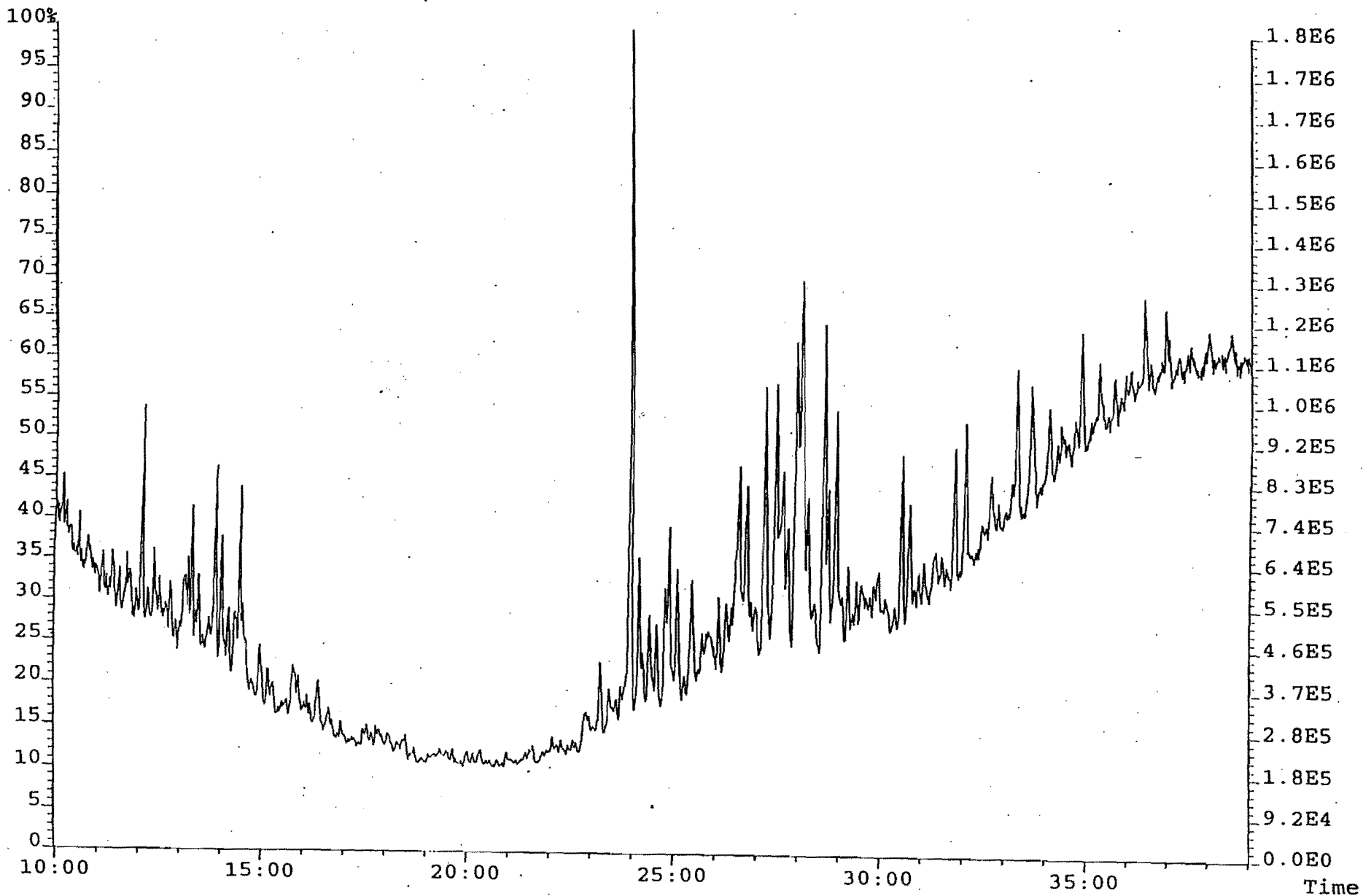
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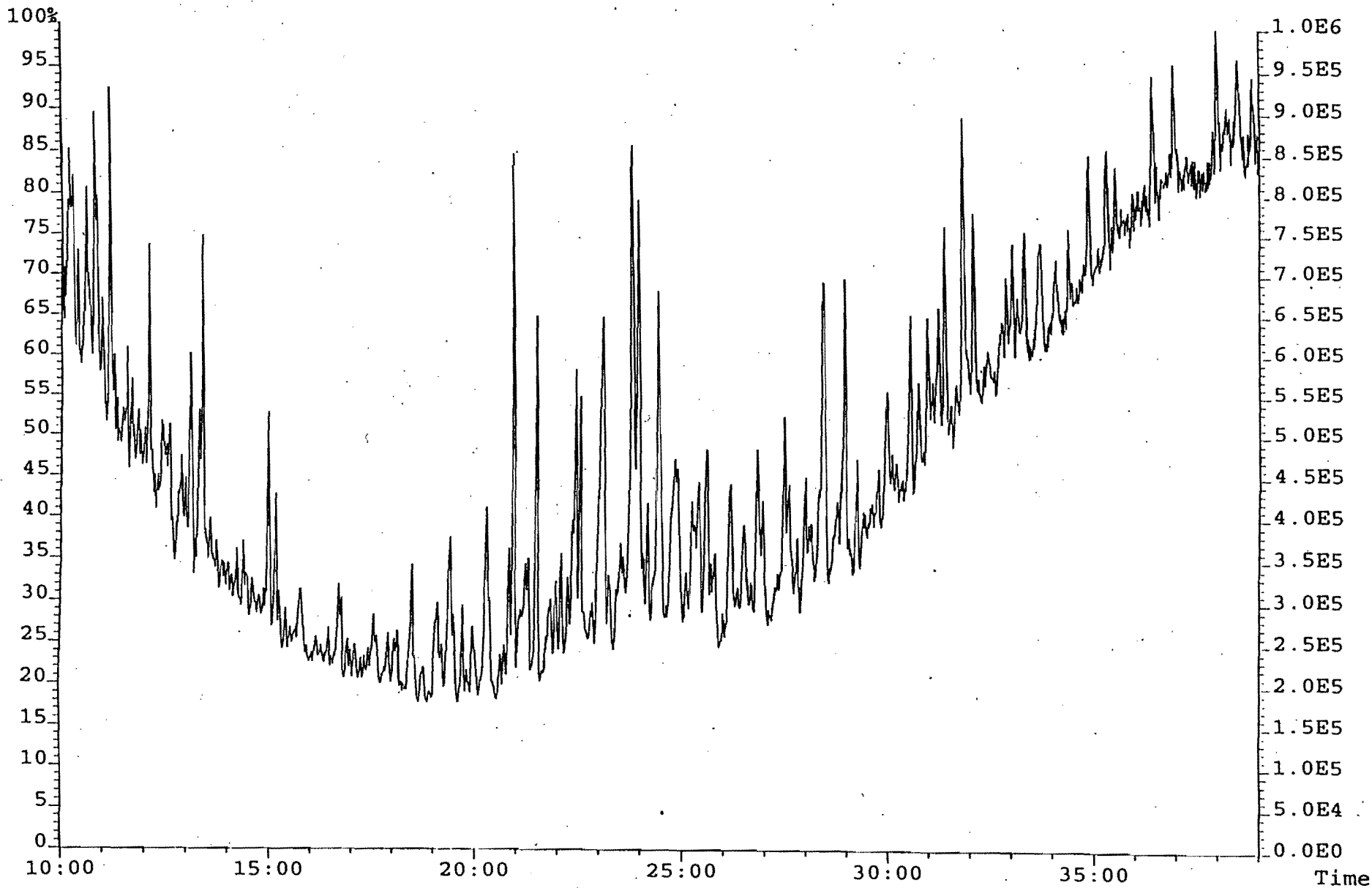
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Sample#1 File Text:Kotanee Lee Sample (e) YTE-37 13163' Exp:BIOMARK
218.2028



File:8535 #1-3665 Acq:10-JUL-1996 12:13:03 Septum EI+ Voltage SIR 70SQ
Sample#1 File Text:Kotanee Lee Sample (e) YTE-37 13163' Exp:BIOMARK
231.2106



File:8535 #1-3665 Acq:10-JUL-1996 12:13:03 Septum EI+ Voltage SIR 70SQ
Sample#1 File Text:Kotanee Lee Sample (e) YTE-37.13163' Exp:BIOMARK
259.2262



Date.....Mon Jul 8, 1996 8:46:35 am
 Report number.....16637
 Raw file...../VARIAN/MISC536
 Method file...../VARIAN/SATS
 Last method update..Tue Apr 23, 1996 9:19:07 am

Device.....NAI 840 A/D, Channel 3
 Device report.....3604

Acq. date.....Mon Jul 8, 1996 7:36:30 am
 Acq. run time.....70.00 min
 Acq. sample rate....3 pt(s)/sec

Sample name.....#8535 KOTANEELEE SAMPLE e YTE-37 13163'
 Notes.....ESSO

Author.....MARG
 Instrument.....NEW VARIAN 3700
 Column type.....FUSED SILICA
 length.....30 m
 diameter.....*
 Stationary phase....DB1
 Mobile phase.....*
 Detector.....FID
 Notes.....DEC 1, 1993 . NEW COLUMN

Anal. run time.....69.991 min Delay time.....5.000 min
 Area reject.....100 count(s) No. peaks found.....255
 Noise threshold.....2 microvolts Area threshold.....20 counts
 Start peak width....5.00 sec(s) Area/Pk.Ht.....A
 Min. window.....10.00 sec % window.....0.00
 Analysis type.....AREA% A/D range.....1.0 volt(s)

TIMED EVENTS TABLE

R.T.(min)	Event codes
0.01	IP
3.00	-IP

MISSING PEAKS LIST

R.T.(min)	Peak name	Group	Ref	Std
6.38	C10			

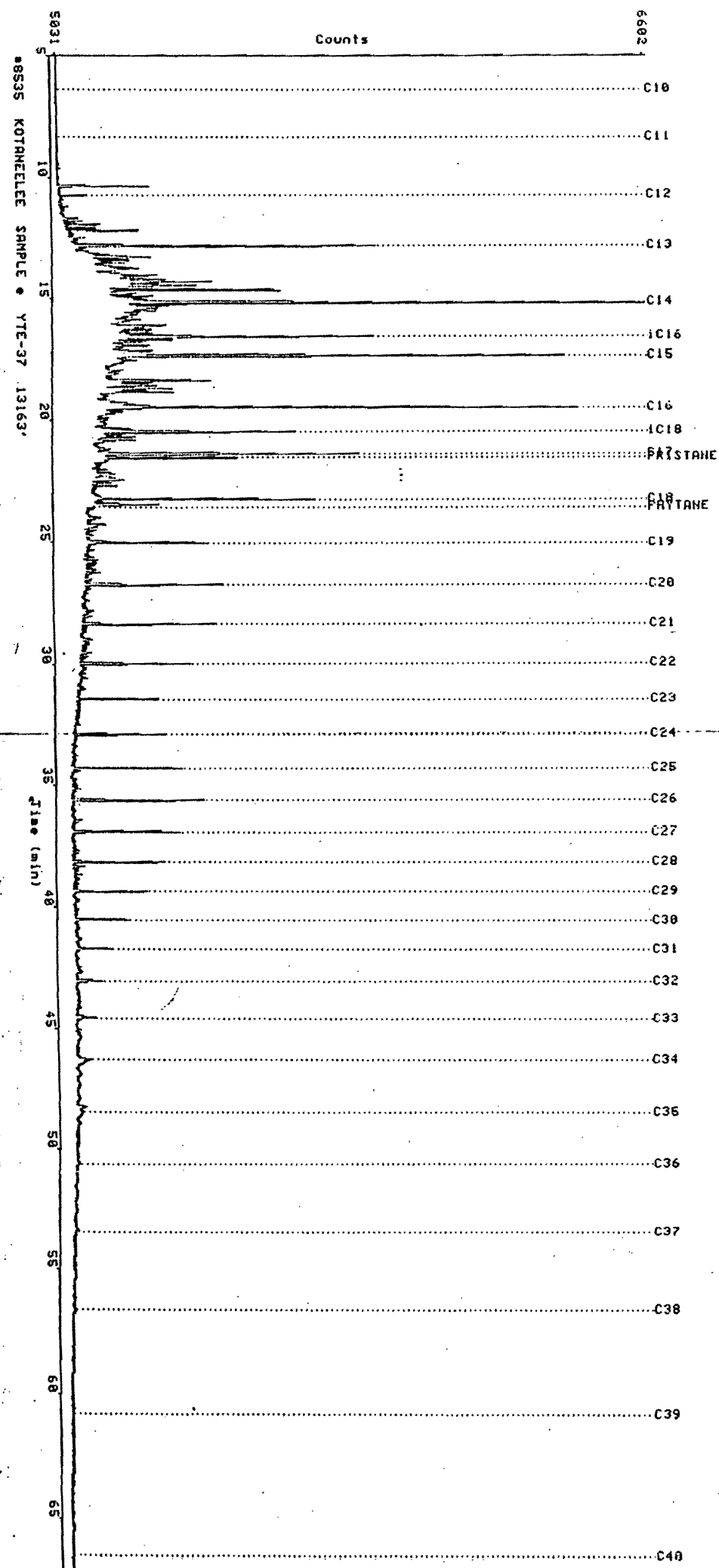
AREA PERCENT REPORT

Peak	R. T. (min)	Peak Area	Peak Ht	Area%	Ref Std	BL R	Peak Name
1	10.343	533	240	1.002		BB	
2	10.730	153	69	0.288		BB	C12
3	11.670	106	36	0.199		BU	
4	11.825	132	51	0.248		BU	
5	11.938	251	96	0.472		UB	
6	12.097	166	75	0.312		BB	
7	12.204	434	192	0.816		BE	
8	12.498	114	39	0.214		BB	
9	12.825	2101	797	3.949	R1	BE	C13
10	13.184	122	52	0.229		UU	
11	13.274	526	155	0.989		UB	
12	13.408	337	95	0.633		BU	
13	13.528	254	79	0.481		UB	
14	13.683	171	41	0.321		BU	
15	13.736	332	111	0.624		UU	
16	13.805	321	83	0.603		UB	
17	14.021	438	134	0.823		UU	
18	14.095	263	90	0.494		UU	
19	14.213	363	120	0.664		UU	
20	14.330	650	224	1.222		UB	
21	14.421	304	142	0.571		BB	
22	14.673	1244	450	2.338		BU	
23	14.737	192	67	0.361		UU	
24	14.817	114	56	0.214		UB	
25	14.921	279	107	0.524		BU	
26	15.056	333	65	0.626		UU	
27	15.192	5197	1380	9.769	R2	UB	C14
28	15.289	317	143	0.596		BB	
29	15.532	163	69	0.306		BB	
30	15.631	164	35	0.308		BB	
31	15.903	159	55	0.299		BB	
32	16.137	121	35	0.227		BB	
33	16.259	180	57	0.338		BB	
34	16.340	205	79	0.395		BB	
35	16.452	227	90	0.427		BU	
36	16.586	2171	688	4.081	R3	UU	IC16
37	16.714	470	148	0.887		UU	
38	16.817	242	80	0.468		UB	
39	16.938	245	91	0.461		UU	
40	17.198	414	94	0.778		BU	
41	17.377	3920	1191	7.359	R4	UE	C15
42	17.560	148	45	0.278		BB	
43	17.943	132	44	0.248		BU	
44	18.169	1103	274	2.073		BU	
45	18.355	166	110	0.628		UU	
46	18.662	582	140	1.094		UU	
47	18.831	590	178	1.109		UU	
48	18.967	324	118	0.609		UU	
49	18.931	462	155	0.863		UB	
50	19.209	129	33	0.242		BU	
51	19.312	427	84	0.803		UU	
52	19.457	4803	1252	8.474	R5	UE	C16
53	19.697	181	47	0.303		UE	
54	19.817	112	25	0.211		BB	
55	20.039	344	94	0.647		BU	
56	20.467	1252	530	3.669	R6	UE	IC18
57	20.614	244	69	0.459		UE	
58	20.689	310	97	0.583		BB	
59	20.833	185	85	0.348		BB	
60	21.410	2132	686	4.008	6	BE	C17
61	21.589	1144	349	2.150	6	UB	PRISTANE
62	22.066	119	33	0.224		BE	
63	22.386	138	53	0.259		BU	
64	22.462	375	79	0.705		UB	
65	22.734	175	64	0.329		BB	
66	23.280	1649	597	3.100	7	UE	C18
67	23.384	139	37	0.261		UE	
68	23.503	676	186	1.271		UE	
69	23.958	987	315	1.855	R7	BB	C19
70	25.781	1052	364	1.978	7	BB	C20
71	28.387	867	348	1.630	7	BU	C21
72	28.926	117	24	0.220		BU	
73	29.953	779	297	1.464	7	BB	C22
74	31.447	564	215	1.060	7	BB	C23
75	32.890	652	242	1.226	7	BB	C24
76	34.282	812	288	1.523	R8	BB	C25
77	35.823	984	355	1.850	8	BB	C26
78	36.909	862	289	1.620	8	BB	C27
79	38.150	686	235	1.290	8	BB	C28
80	39.353	800	277	1.290	8	BB	C28
		603	194	1.134	9	BB	C29
81	40.517	414	141	0.778	9	BB	C30
82	41.730	311	95	0.585	R9	BB	C31
83	43.055	233	66	0.438	9	BB	C32
84	44.561	222	46	0.417	9	BB	C33
Totals		53198		100.000			

ANALYSIS NOTES

1: WARNING: Peak windows overlap. Check peak identification. (245)

Data file: /VARIAN/MISC536
Report: 16637
Acquired: Mon Jul 8, 1996 7:36:30 am
Time range: 5.00-70.00
Vert. scale/offset: 1.0/0



ESSO

Date.....Thu Jul 4, 1996 3:50:04 pm
 Report number.....16629
 Raw file...../VARIAN/MISC535
 Method file...../VARIAN/SATS
 Last method update..Tue Apr 23, 1996 9:19:07 am

Device.....NAI 840 A/D, Channel 3
 Reprocess number....1

Acq. date.....Thu Jul 4, 1996 2:23:20 pm
 Acq. run time.....70.00 min
 Acq. sample rate....3 pt(s)/sec

Sample name.....#8534 KOTAMEELEE SAMPLE a E-37 12792
 Notes.....EESD

Author.....MARG
 Instrument.....NEW VARIAN 3700
 Column type.....FUSED SILICA
 length.....30 m
 diameter.....*
 Stationary phase....DB1
 Mobile phase.....*
 Detector.....FID
 Notes.....DEC 1, 1995 . NEW COLUMN

Anal. run time.....69.993 min Delay time.....5.000 min
 Area reject.....100 count(s) No. peaks found.....117
 Noise threshold.....2 microvolts Area threshold.....20 counts
 Start peak width....5.00 sec(s) Area/Pl.Ht.....A
 Min. window.....10.00 sec % window.....0.00

Analysis type.....AREA% A/D range.....1.0 volt(s)

TIMED EVENTS TABLE

R.T.(min)	Event codes
0.01	IP
1.00	-IP

MISSING PEAKS LIST

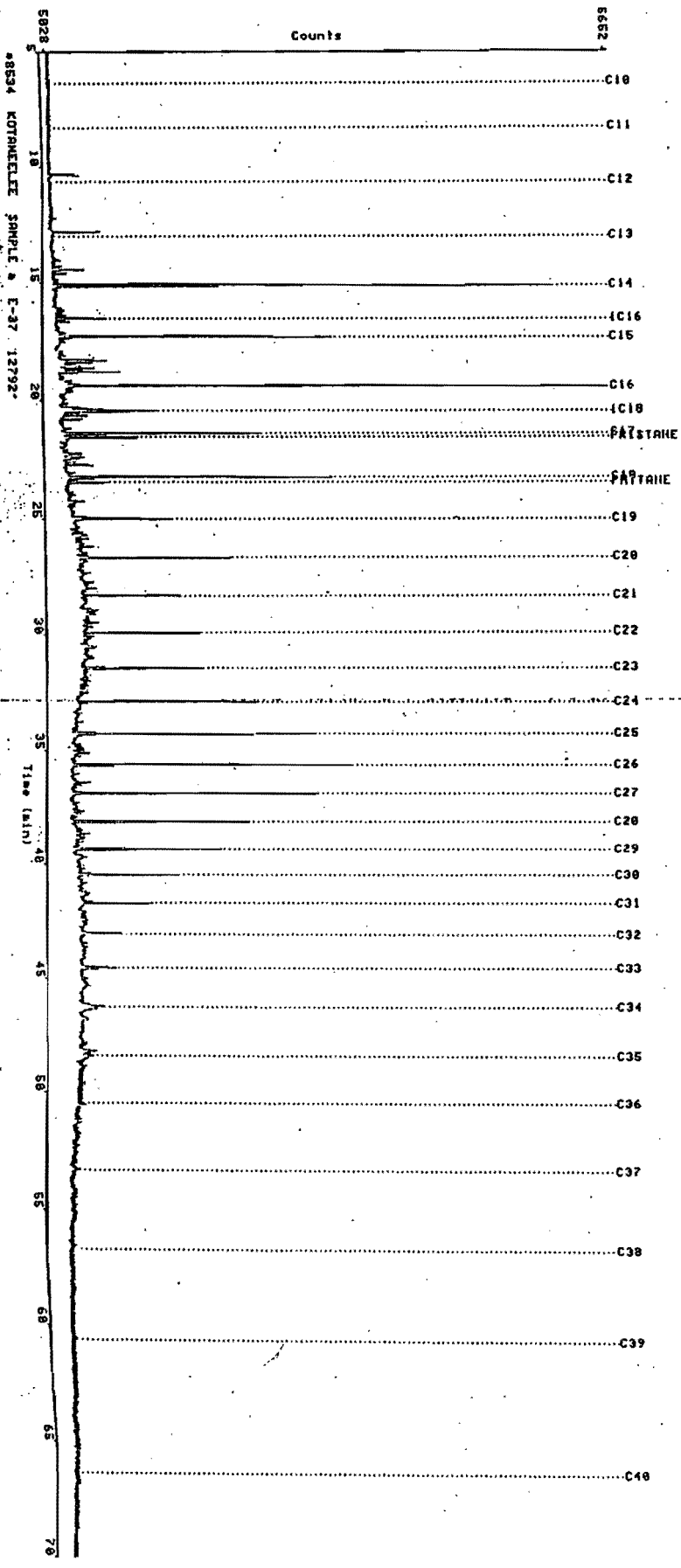
R.T.(min)	Peak name	Group	Ref Std
6.38	C10		
8.33	C11		
10.63	C12		
12.96	C13		R1
36.38	C33		9
36.94	C40		9

Peak	R.T.(min)	Peak Area%	Peak Ht	Area%	Ref Std	BL R	Peak Name
1	12.776	125	53	0.976		BB	
2	15.118	1501	549	11.717	R2	BB	C14
3	16.521	153	56	1.194	R3	BB	iC16
4	17.301	733	303	5.722	R4	BB	C15
5	18.307	211	52	1.647		BU	
6	18.785	143	61	1.116		BB	
7	19.397	1674	599	13.068	R5	BB	C16
8	20.414	237	95	2.240	R6	BB	iC18
9	21.363	519	215	4.052	6	BB	C17
10	21.537	232	80	1.811	6	BB	PRISTANE
11	23.232	746	296	5.824	7	BB	C19
12	23.464	124	45	0.968	7	BB	PHYTANE
13	25.009	339	108	2.643	R7	BB	C19
14	26.724	412	165	3.216	7	BB	C20
15	28.364	280	119	2.186	7	BU	C21
16	29.924	340	132	2.654	7	BB	C22
17	31.427	356	134	2.779	7	BB	C23
18	32.870	533	201	4.161	7	BB	C24
19	34.253	733	267	5.488	R8	BB	C25
20	35.606	835	308	6.440	8	BB	C26
21	36.893	736	268	5.738	8	BB	C27
22	38.133	623	196	4.473	8	BB	C28
23	39.338	499	160	3.739	8	BB	C29
24	40.500	316	109	2.467	8	BB	C30
25	41.710	218	74	1.782	R9	BB	C31
26	43.938	142	40	1.109	9	BB	C32
27	44.517	111	31	0.867	9	BB	C33
Totals		12810		100.000			

ANALYSIS NOTES

- 1: Declared REFERENCE was not found during peak search. (142)
 2: WARNING: Peak windows overlap. Check peak identification. (245)

Date file: /VARIAN/MISC636
Report: 16629
Acquired: Thu Jul 4, 1996 2:23:28 pm
Time range: 5.00-70.00
Vert. scale/offset: 1.0/0



ESSO

WELL NAME	DEPTH	RANGE (M)	% Corg	EXT YLD	HC YLD	ZHC	ZR+A	ZSAT	ZARO	ROCK WT-g	EXT (mg)	SATS (mg)	AROM (mg)	NSO (mg)	ASPH (mg)	PK/PH	H/C	SPL #	PU
KOTANEELEE • YTE37	4012	4012	.71	425.1	57.8	13.6	76.9	7.1	6.5	5	16.9	1.2	1.1	10.8	2.2	1.6		8535	

KOTANEELEE aE-37	3899.00	12792	5.21000	144.843	7.10884	4.90798					1.87000	0.00000						8534	0
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WELL-NAME	DEPTH-RANGE-M	% Corg	EXT YLD	HC YLD	Z HC	ZR+A	Z SAT	Z AROM	ROCK WGT.	EXT (mg)	SATS (mg)	AROM (mg)	NSOs (mg)	ASPH (mg)	SPL #
KOTANEELEE E-37	3899. 3899.00	5.210	144.843	7.10884	4.90798	87.1166	3.68098	1.2269	2.1600	16.30	.6000	.2000	12.30	1.900	8534

KOTANEELEE •YTE37	4012.08	13163	.710000	425.050	57.8471	13.6095				1.69000	0.00000							8535	0
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WELL-NAME	DEPTH-RANGE-M	% Corg	EXT YLD	HC YLD	Z HC	ZR+A	Z SAT	Z AROM	ROCK WGT.	EXT (mg)	SATS (mg)	AROM (mg)	NSOs (mg)	ASPH (mg)	SPL #
KOTANEELEE YTE37	4012. 4012.08	.7100	425.050	57.8471	13.6095	76.9231	7.10059	6.5088	5.6000	16.90	1.200	1.100	10.80	2.200	8535