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Geochemical Report for Well NOCS 34/10-35

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SUMMARY

Source Rocks

The organic carbon-rich Upper Jurassic Draupne and Heather Fm. shales are identified as oil-prone source rocks, with good to rich petroleum potentials. Both formations are classified as type II to type II/III kerogen source rocks, deposited in a marine depositional environment, possibly relatively close to land areas, owing to significant presence of reworked and degraded land plant material. Reworking of liptinitic material indicates that the depositional conditions might have been oxic. Additionally, more mature and probably more land plant dominated source rocks are identified in the carbonaceous Middle Jurassic Cook Fm. claystone and the Lower Jurassic Burton Fm. claystones. However, these source rocks have poor to fair potential for generating mainly gas.

Maturity

The general maturity trend for well NOCS 34/10-35 indicates that the top of the oil window (0.6 % Ro) is reached at approx. 3100 m, using Ro-measurements. Peak oil generation is around 3700 - 3800 m (0.8 % Ro) and the base of the oil window is approx. at 4000 - 4100 m (1.0 % Ro). Application of different maturity parameters, e.g. Ro measurements, the MPI-values and SCI-values, have compatible maturity values. The Draupne and Heather Fm. claystones are well within the oil window maturity range, with vitrinite reflectance values around 0.75 to 0.80 %, suggesting that the source rocks are at peak oil generation or just passed it. The Cook Fm. claystone is highly mature, i.e. probably at the base of the oil window.

Generation

The oil-prone Draupne and Heather Fms. have already generated, are actively generating and most likely have also expelled hydrocarbons in significant amounts, based on the maturity data and rich amounts of free hydrocarbons within the units. From the whole EOM GC analyses and solvent extraction data it is interpreted that the generated oils are classified as being mainly paraffinic, non-waxy oils. The Cook Fm. claystone, possibly a local oil- and gas-prone source rock with limited extension, has probably generated and expelled hydrocarbons, however, in small amounts and probably only contributing locally to the Cook Fm. sandstones.

Migration

Three DST oils and associated DST gas samples have been recovered from the Middle Jurassic Ness Fm. sandstone (DST 3, 3920 - 3929 m) and the Lower Jurassic Cook Fm. sandstone (DST 1 and DST 2, 4015 - 4025 m and 3984 - 3995 m respectively). The API-gravities, ranging 43.1° - 43.6°, are compatible for all the DST oil samples. Additionally, an "oil in mud" sample was recovered from the Upper Cretaceous Shetland Gp. (3495 - 3504 m). All the oils and associated gases have been generated from highly mature marine clastic source rocks, thus excluding the Draupne and Heather Fms. from being the local source for these oils, mainly due to the large differences in maturities. Hence the source rocks, which generated the hydrocarbons encountered in the Middle - Lower Jurassic sandstones are likely to be buried deeper than the Draupne and Heather Fms. claystones in this well. The Upper Cretaceous Shetland Gp. oil show (3530 m), is generated from a mature marine source rock, most likely the Draupne and Heather Fms. encountered in this well, which indicates a short vertical migration.

Chapter 1

INTRODUCTION

The well 34/10-35, analysed on behalf of Statoil, is located in the Norwegian Sector of the North Sea and situated in the northern part of the Gamma Field structure. The water depth at the location is 158 m and the well was drilled to a total depth of 4310 m in the Lower Jurassic Statfjord Fm. All depths given are relative to KB unless otherwise specified. The location of the well is shown in Figure 1.

Both Screening and follow-up analyses were performed in order to evaluate both potential source rock horizons and migrated hydrocarbons. Samples for analyses were selected in agreement with Statoil on a continuous basis. The well was analysed from 2500 to 4283.5 m (range of samples supplied to Geolab Nor). The samples were 23 cuttings samples, 14 conventional cores, 5 side wall cores, 3 oil samples, 1 oil in mud and 3 gas samples. All analyses were conducted by Geolab Nor, except for the vitrinite reflectance measurements, which was performed by Institutt for Energiteknikk (IFE) on request by Statoil and API-gravity measurements, carried out by GECO Petroleum Laboratory (Stavanger). The report is divided into chapters according to the various analytical methods used. Within the chapters the results are mainly discussed in a stratigraphic context.

1.1 General Comments

The cuttings samples were supplied unwashed in bags. These samples were washed, described and the samples were picked before analyses commenced. The

conventional cores were supplied as core-chips which were analysed after cleansing of any superficial contamination. The side-wall cores were cleansed of drill mud before analyses.

1.2 Analytical Program

In accordance with the contract, samples availability and the screening analyses results, the following analytical program was executed for well NOCS 34/10-35 in the section 2500 m to 4283.5 m:

<u>Analysis type</u>	<u>No of sample</u>	<u>Figures</u>	<u>Tables</u>
Washing	23		
Lithology description	42	2	1
TOC	13	2	1,2
Rock-Eval pyrolysis	41	3,4,5	2
API-Gravity, Quantified topping	3		3
Pyrolysis GC (GHM, S ₂)	4	6,7a-b	4
Soxhlet Extraction of organic matter	13		
MPLC separation	17		5a-d
Whole Oil/Whole Extract GC	17	8a-c	5e
Saturated hydrocarbon GC	17	9a-c	6
Aromatic hydrocarbon GC	17	10a-d	7
Vitrinite reflectance	26	11a-b	
Visual kerogen microscopy	4	12	8,9
Isotope composition C ₁₅ + fractions	10	13,14	10a-b
Isotope composition kerogen concentrates	4	14	10a
GC - MS of saturated HC	17	15a-q	11a-d
Gaseous Hydrocarbon GC	3		12a-c
Gaseous Hydrocarbon $\delta^{13}\text{C}$ Isotopes	3	16a-b	13

1.3 Stratigraphy

The following is the stratigraphy of the well NOCS 34/10-35 as supplied by Statoil.

Lithostratigraphic	Age (m)	Top RBK (m)	Thickness
Nordland Gp.	Tertiary	158	804
Utsira Fm.	Tertiary	754	208
Hordaland Gp.	Tertiary	962	909.5
Rogaland Gp.	Tertiary	1871.5	222.5
Balder Fm.	Tertiary	1871.5	66
Lista Fm.	Tertiary	1937.5	159.5
Shetland Gp.	U. Cretaceous	2097	1538
Cromer Knoll Gp.	L. Cretaceous	3635	156
Viking Gp.	U. Jurassic	3791	121.5
Draupne Fm.	U. Jurassic	3791	85
Heather Fm.	U. Jurassic	3876	36.5
Brent Gp.	M. Jurassic	3912.5	29
Ness Fm.	M. Jurassic	3912.5	29
Dunlin Gp.	L. Jurassic	3941.5	297
Drake Fm.	L. Jurassic	3941.5	23
Cook Fm.	L. Jurassic	3964.5	83.5
Burton Fm.	L. Jurassic	4048	68
Amundsen Fm.	L. Jurassic	4116	122.5
Statfjord Fm.	L. Jurassic	4238.5	71.5 +
Target Depth (TD)		4310	

Chapter 2

SCREENING ANALYSES

A total of 42 samples, covering the depth interval 2500 - 4283.50 m, was supplied by Statoil for screening analyses. The cuttings samples were washed and all samples lithologically described (Table 1). Thirteen samples, considered to represent potential source rocks were analysed by LECO Carbon Analyser. A total of 41 samples was analysed by Rock-Eval (Table 2). Figure 2 is a lithological column with relevant stratigraphic information and TOC values. Figures 3 and 4 show the production index and Tmax plotted as a function of depth respectively, while figure 5 shows a hydrogen index/Tmax crossplot.

2.1 Lithology, TOC and Rock-Eval

2.1.1 Source Rock Potential

The samples from the Upper Cretaceous Shetland Gp. (2097 - 3635 m) and the Lower Cretaceous Cromer Knoll Gp. (3635 - 3791 m) contain mainly light to medium grey claystones. The samples frequently contain light grey siltstones and the sample from 3530 m contain prominent amounts yellowish grey to light grey marl. Thirteen samples were analysed by Rock-Eval. Most samples have low S_1 -yields (< 0.30 mg HC/g rock), indicating poor contents of free hydrocarbons. The Shetland Gp. samples are not considered to have any source rock potential. One marl sample, 3530 m, has a good S_1 -yield (4.54 mg HC/g rock), however, believed to represent migrated hydrocarbons.

The cuttings samples from the Upper Jurassic Draupne Fm. (3791 - 3876 m) were in general highly contaminated, but the prominent lithology is considered to resemble that of the side-wall cores being dusky yellowish brown to brownish black shales. The TOC contents of the shales are rich to very rich (2.80 - 5.53 %). The hydrogen indices range 118 - 154 mg HC/g TOC and oxygen indices ranging 7 - 16 mg CO₂/g TOC suggesting organic matter of type II/III kerogen having a relatively high maturity (see later chapters). The samples are thought to have a fair to good potential (6.8 - 14.1 mg HC/g rock) for generation of mixed oil and gas.

As the samples from the Draupne Fm., also the cuttings samples from the Heather Fm. (3876 - 3912.50 m) are highly contaminated, but the dominant lithology is described as medium to dark grey and dusky yellowish brown shales. These shales have good to rich contents of organic matter (1.15 - 3.62 % TOC). The hydrogen indices range 54 - 244 mg HC/g TOC while the oxygen indices ranging 9 - 43 mg CO₂/g TOC suggesting both type II (the samples from 3885 and 3891 m) and type III kerogen (3882.50 and 3894.50 m) having good potential (7.0 - 12.1 mg HC/g rock) for generation of oil and poor to fair potential (1.2 - 2.8 mg HC/g rock) for gas generation respectively.

Three grey to pale yellowish brown fine grained/silty and hard sandstones were analysed from the Brent Gp. (Ness Fm. 3912.50 - 3941.5 m). None of these samples are considered to have any potential for generation of hydrocarbons.

The prominent lithology of the samples from the Cook Fm. (3964.50 - 4048 m) is greyish white to brownish grey coarse grained hard sandstone with no potential for generation of hydrocarbons. The lowermost sample of the formation (4021.93 m) is a claystone (showing clear lamination) and has a good content of TOC (1.33 %), hydrogen index of 147 mg HC/g TOC and oxygen index of 17 mg CO₂/g TOC indicating organic matter of type II/III kerogen with a fair potential (2.5 mg HC/g rock) for generation of mixed oil and gas.

The greyish and brownish siltstones and claystones from the Burton Fm. (4048 - 4116 m) have fair to good content of organic carbon (0.99 - 1.59 %). The hydrogen indices are 83 and 112 mg HC/g TOC while the oxygen indices are 36 and 22 mg CO₂/g TOC respectively for the two samples suggesting type III (the siltstone from 4063.54 m) and type II/III kerogen (the shale from 4110 m) with poor to fair potential (1.2 - 2.5 mg HC/g rock) for generation of gas probably mixed with small amounts of oil.

None of the light greyish white to light grey coarse grained sandstones from the Lower Jurassic Statfjord Fm. (4238.5 - 4310 m, TD) are considered to have any potential for generation of hydrocarbons.

2.1.2 Maturity

As can be seen from Figure 4, a thermal maturity depth trend based on T_{max} is established for the analysed section of the well. The data suggest the well to be immature down to about 3300 m and early mature down to approximately 3500 m where the oil window is entered (T_{max} of 435°C corresponding roughly to 0.6 % Ro). The peak oil generation maturity (T_{max} of 440°C for type II kerogen, comparable roughly to 0.8 % Ro) is considered to occur around 3750 - 3800 m (just above the Draupne Fm.) while the base of the oil window (1.0 % Ro) is located at approximately 4050 - 4100 m.

2.1.3 Generation

Following the above discussions regarding the potential source rocks, the Draupne and Heather Fms. have a maturity slightly past the peak oil generation stage (~ 0.8 % Ro) and are tentatively suggested to have generated, and probably still actively

generating hydrocarbons. The samples from these formations, containing mainly types II and II/III kerogen, have high S_1 -yields, in the range 2.17 - 6.59 mg HC/g rock for the Draupne Fm. and 0.56 - 3.39 mg HC/g rock for the Heather Fm. indicating the presence of a certain amounts of in-situ generated hydrocarbons. This is also supported by the production indices (Figure 3), ranging 0.27 - 0.45.

The three samples from the Cook and Burton Fms., thought to have a poor to fair potential for gas generation, have maturities close to the base of the oil window (1.0 % Ro). The units have S_1 -yields in the range 0.41 - 0.76 mg HC/g rock and generally low production indices (0.21 - 0.33). These data suggest most of the hydrocarbons of these samples to have been generated.

2.1.4 Migrated Hydrocarbons

Free hydrocarbons thought to be due to migration are detected in the samples from the Brent Gp. and the upper part of the Dunlin Gp. The production indices of these samples are typically in the range 0.36 - 0.81 and the S_1 -yields range 0.53 - 1.33 mg HC/g rock. These data are thought to be compatible with the presence of small amounts of migrated hydrocarbons.

Small amounts of migrated hydrocarbons can also be traced in the lowermost section of the Shetland Gp. and the Cromer Knoll Gp.. These shales have production indices in the range 0.45 - 0.76 but in general S_1 -yields < 1 mg HC/g rock. However, the marl sample from 3530 m containing significant amounts of free hydrocarbons, has a good S_1 -yield (4.54 mg HC/g rock). The presence of migrated hydrocarbons is also supported by the high PI-value (0.76). The sample was chosen for further detailed analyses.

To confirm whether these free hydrocarbons can be correlated to the actual source

rock described in the well (Draupne and Heather Fms.) follow-up analyses was required. See later chapters, i.e. Solvent Extraction - GC (3.2) and GC - MS (3.6) for detailed discussion of the origin of these hydrocarbons.

2.2 Oil Gravity

Table 3 shows the oil gravities for the three oils DST 1 (4015 - 4025 m), DST 2 (3984 - 3995 m) and DST 3 (3920 - 3929 m). The 34/10-35 oils have relatively uniform specific gravities, ranging from 0.8082 g/cc to 8104 g/cc, equivalent to API gravities ranging from 43.1° to 43.6°. Thus the oils are classified as light oils.

Chapter 3

DETAILED GEOCHEMICAL ANALYSES

3.1 GHM - Pyrolysis Gas Chromatography

A total of 4 samples, one from the Shetland Gp., two from the Draupne Fm. and one from the Heather Fm. was analysed by pyrolysis gas chromatography. The pyrolysis data are listed in Table 4 and plotted in pyrolysis products triangles in Figures 7a and b. Exemplary pyrograms are shown in Figure 6, while all four pyrograms are located in Appendix 2.

The pyrogram of the Marl from the Shetland Gp. shows a strong front end biased distribution, with only small amounts of $C_{10}+$ compounds. The prominent compounds are the aliphatic hydrocarbons while monoaromatic hydrocarbons (i.e. benzene, toluene and xylene) only are found in smaller amounts and phenolic compounds only traced. The patterns observed (note the prominent amounts of alkenes) and the relative amounts of n-octene, m+p-xylene and phenol (Larter 1985) suggest the organic matter in this sample to be of an asphaltenic type without any source rock potential, but rather representing the heavy asphaltenic fraction of a migrated oil.

Two dark shales were pyrolysed from the Draupne Fm. The pyrograms of these samples are dominated by alkene/alkane homologous series up to about C_{25} , with only small amounts of aromatic hydrocarbons. Phenolic compounds are also identified, albeit in very small amounts. The patterns observed in the pyrograms (Figure 6), and in plotting the relative amounts of n-octene, m+p-xylene and phenol (Larter 1985) suggest the organic matter in these samples to be "past peak oil generation stage" mature ($\approx 0.90\%$ Ro) type II kerogen, believed to still remain some of its potential as

a source rock for generation of light oil.

The pyrogram of the shale from the Heather Fm. resemble those of the Draupne Fm. showing similar patterns and is plotted close to the Draupne Fm. samples in the pyrolysis products triangles (Figures 7a and b) and similar conclusions are made.

3.2 Solvent Extraction and Chromatography

A total of thirteen samples was solvent extracted and separated by MPLC and the saturated and aromatic hydrocarbon fractions analysed by gas chromatography after the EOM samples had been analysed by gas chromatography. In addition, three oils and the Shetland Gp. "oil in mud" sample were analysed as whole oils by gas chromatography and also separated by MPLC and the saturated and aromatic hydrocarbon fractions further analysed by gas chromatography. Extraction data are listed in Tables 5a-d, while the saturated and aromatic hydrocarbon data are presented in Tables 6 and 7 respectively. The quantified whole oil C₂ - C₉ compounds are found in Table 5e. The extraction data and the saturated hydrocarbon data are presented as depth plots in Enclosure 2 and 3 respectively. Exemplary whole oil chromatograms are shown in Figures 8a-c, saturated hydrocarbon chromatograms in Figures 9a-c, while the exemplary aromatic hydrocarbon gas chromatograms are shown in Figures 10a-d. All chromatograms are presented in Appendix 3.

3.2.1 Extraction

One marl from the Shetland Gp. was solvent extracted and separated by MPLC. The content of Extractable Organic Matter (EOM) in this sample is rich (5155 ppm) and as is the content of Extractable Hydrocarbons (EHC), 4212 ppm. The ratio of saturated to aromatic hydrocarbons is 2.23 and the hydrocarbon to non-hydrocarbon ratio is 4.46. Normalised against TOC the sample has rich contents of both EOM (781 mg EOM/g TOC) and EHC (638 mg EHC/g TOC). These data suggest rich amounts of an aliphatic rich (residual?) oil.

The two shales from the Upper Jurassic Draupne Fm. have rich contents of both EOM (4504 - 4730 ppm) and EHC (3097 - 3299 ppm). The saturated to aromatic

hydrocarbon ratio range 1.48 - 1.54 and the non-hydrocarbons are about half as abundant as the hydrocarbons (hydrocarbons/non-hydrocarbons = 2.2 - 2.3). When normalised against TOC the contents of EOM are fair to good, ranging 68 - 181 mg EOM/g TOC, while the EHC contents are good to rich, ranging 46 - 126 mg EHC/g TOC. These data show that the samples from the Draupne Fm. still have a good potential for generation of hydrocarbons.

Two shales were extracted from the Heather Fm. Both samples have rich contents of both EOM (4775 - 6632 ppm) and EHC (2815 - 4333 ppm). The saturated to aromatic hydrocarbon ratios are 1.47 and 2.09 for the two samples respectively, while the hydrocarbon/non-hydrocarbon ratios are 1.8 and 1.4 which is lower than observed for the Draupne Fm. The TOC normalised contents of EOM are good (160 - 187 mg EOM/g TOC), while the TOC normalised contents of EHC are rich (65 - 66 mg EHC/g TOC). These data suggest that the samples from the Heather Fm. have in general good potential for generation of hydrocarbons.

The two sandstones from the Brent Gp. (Ness Fm.) have good to rich contents of EOM (1206 - 2345 ppm) and rich contents of EHC (840 - 1227 ppm). The saturated to aromatic hydrocarbon ratio varies between 1.88 and 3.58 and also the hydrocarbon/non-hydrocarbon ratio show big variations between the two samples, 2.3 and 1.1 respectively. Normalised against TOC the samples have good to rich contents of EOM (173 - 431 mg EOM/g TOC) and rich contents of EHC (90 - 300 mg EHC/g TOC). These data are thought to represent the presence of migrated hydrocarbons.

The Cook Fm. sandstones (2) and shale (1) have fair to rich contents of EOM (972 - 2103 ppm) and rich contents of EHC (750 - 1293 ppm). When normalised against TOC the EOM contents are good to rich (108 - 500 mg EOM/g TOC), while the content of EHC is rich for all three samples (66 - 308 mg EHC/g TOC). The sandstones have in general very high saturated to aromatic hydrocarbon ratios (3.4 - 4.9), while the shale shows a somewhat lower ratio (1.90) and the hydrocarbon to

non-hydrocarbon ratios ranging 1.6 - 3.4. Based on these data the samples are tentatively suggested to contain certain amounts of migrated aliphatic rich hydrocarbons. See also later discussions.

The Lower Jurassic Statfjord Fm. sandstones have poor contents of both EOM and EHC, ranging 220 - 421 ppm and 53 - 61 ppm respectively. All three samples have saturated to aromatic hydrocarbon ratios of 1.5 and very low hydrocarbon/non-hydrocarbon ratios, ranging 0.14 - 0.38. The TOC normalised data indicate good to rich contents of EOM (146 - 206 mg EOM/g TOC) and good contents of EHC (23 - 40 mg EHC/g TOC). The latter data are believed to be influenced by the very low content of organic matter in the samples (0.15 - 0.23 % TOC). Based on the extraction and group separation data the Statfjord Fm. samples are thought to contain only small amounts of heavy (residual?) oil or asphaltenes.

3.2.2 Whole Oil Gas Chromatography

The whole extracts from all solvent extracted rock samples were analysed by gas chromatography. In addition, three oil samples (DST 1, 2 and 3) and one "oil in mud" sample were analysed. In the following discussions these oils are included in the discussions of their respective stratigraphic belongings.

The Shetland Gp. "oil in mud" sample (3495 - 3504 m) is more comparable to an whole extract gas chromatogram due to the loss of the light hydrocarbons ($C_1 - C_{10}$). The hydrocarbon distribution is dominated by n-alkanes ranging $C_{11} - C_{33}$. Isoprenoids are present - pristane and phytane have lower peak intensities than the corresponding nC_{17} and nC_{18} . The pristane/phytane ratio, approx. 1.40, is indicative of a marine source, possibly with some terrestrial landplant input. The FPD chromatogram has no sulphur containing compounds detected in it. The extract of the Shetland Gp. marl has

an FID chromatogram showing the presence of a wide range of hydrocarbons in the C_{12} - C_{33} range, mainly n-alkanes, with a maximum in the distribution at about nC_{24} . A wide hump of peaks can be observed in the nC_{20} - nC_{30} range in the chromatogram. The FPD chromatogram shows that the sample is almost barren of sulphur aromatic compounds. The patterns observed from these chromatograms indicate an aliphatic-rich, probably residual oil. See also later chapters for further details.

The FID chromatograms of the two shales from the Draupne Fm. show chromatograms with quite similar patterns with a wide distribution of hydrocarbons in the range nC_{11} - nC_{33} , and mainly n-alkanes with a maximum around nC_{13} - nC_{15} . The pristane/phytane ratios are 1.5 for both samples (Figure 8a). The FPD chromatograms show that the upper sample (3831 m) is almost barren of sulphur compounds, while the lower sample (3852 m) show the presence of somewhat higher concentrations of these compounds. The patterns observed are thought to be consistent with the extraction data discussed in chapter 3.2.1 indicating the Draupne Fm. presented in this well still has a good potential for generation of hydrocarbons.

Extracts of two dark shales were analysed from the Heather Fm. The FID chromatograms are to a high extent quite similar to those observed for the overlying Draupne Fm., having a wide distribution of hydrocarbons, mainly n-alkanes in the nC_{11} - nC_{33} range with a maximum around nC_{13} . As for the Draupne Fm. samples, the FPD chromatograms of the Heather Fm shales show that these samples contain small amounts of sulphur aromatic hydrocarbons. Based on these observations the Heather Fm. is thought to still have a good potential for generation of hydrocarbons.

One oil (DST 3) and two extracts were analysed from the Brent Gp. (Ness Fm.). The DST 3 oil has an FID chromatogram showing a wide distribution of hydrocarbons, consisting mainly of n-alkanes up to about nC_{30} , and moderate amounts of isoprenoids (pristane/ nC_{17} = 0.6) and aromatic hydrocarbons (Figure 8b). The FPD chromatogram shows that the sample is barren of sulphur compounds. The patterns observed from

the whole oil chromatograms indicate the oil to be a mature oil (comparable to about 0.8 - 0.9 % Ro) of a marine source rock origin. The FID chromatograms of both sandstone samples show hydrocarbons in the nC_{13} - nC_{33} range, however the distribution patterns are quite different. The upper sample (3931.71 m) shows a distribution of compounds in the nC_{16} - nC_{25} range with similar peak heights. The lower sample (3933.16 m) shows a progressively decreasing compound concentration with increasing carbon number. The pristane/phytane ratios of these samples are 1.7 and 2.3 respectively. The FPD chromatograms show that both samples are barren of sulphur aromatic hydrocarbons. The patterns observed indicate two different sources of the extracts, but the differences observed may also be due to local variations in porosity and permeability of the reservoir rock.

Extracts from two sandstones and one shale and two oils (DST 1 and DST 2) were analysed from the Cook Fm. The two oils show quite similar FID chromatograms, containing n-alkanes up to nC_{30} . Both aromatic and aliphatic hydrocarbons are prominent in the FID chromatograms of the two oils, while isoprenoids are detected in moderate amounts (pristane/ nC_{17} = 0.5 - 0.7). However, the DST 1 oil seems to be somewhat more aliphatic rich than DST 2. As for the DST 3 oil the FPD chromatograms show that the DST 1 and 2 oils are barren of sulphur compounds. The pattern observed suggests a mature oil. See also later discussion for further details. The sandstones from the Cook Fm. have FID chromatograms quite similar to that of the 3931.71 m sandstone of the Ness Fm. showing a wide distribution of hydrocarbons in the nC_{13} - nC_{33} range, mainly n-alkanes with a distribution pattern showing only small variations in the concentration of the compounds in the nC_{16} - nC_{25} range with and pristane to phytane ratios around 1.6 (Figure 8c). In the FPD chromatograms of these sandstones only one strong unidentified compound (elemental sulphur?) appears, showing that the samples are almost barren of sulphur compounds. The FID chromatogram of the shale also shows a wide distribution of hydrocarbons in the nC_{13} - nC_{33} range, mainly n-alkanes with a maximum at nC_{15} , and a weak bimodal distribution. The FPD chromatogram of the shale resembles those of the sandstones.

These chromatographic data suggest mainly presence of well mature aliphatic rich migrated hydrocarbons, probably derived from a marine source rock with a prominent terrestrial influence.

The three sandstones from the Statfjord Fm. all show FID chromatograms where only small amounts of hydrocarbons, mainly aliphatic hydrocarbons, are present. The FPD chromatograms show only one or two unidentified compounds, possibly elemental sulphur, indicating that the samples are almost barren of sulphur aromatic hydrocarbons. For more detailed discussion of the nature and origin of these hydrocarbons the reader is referred to later chapters.

3.2.3 Saturated Hydrocarbon Gas Chromatography

The same seventeen samples analysed by whole oil chromatography were also separated and analysed by gas chromatography.

The Shetland Gp. "oil in mud" saturated hydrocarbons have an unimodal n-alkane distribution, dominated by the short chained n-alkanes. The low isoprenoid/n-alkane ratios indicate relatively high maturity. The marl from the Shetland Gp. has a chromatogram showing a wide distribution of hydrocarbons in the nC_{12} - nC_{35} range with a maximum at nC_{15} and with moderate amounts of isoprenoids (pristane/ nC_{17} = 0.69). The distribution patterns observed and the calculated pristane/phytane ratio (1.24) together with the CPI (1.02), suggest well mature (0.8 - 0.9 % Ro) migrated hydrocarbons derived from a marine source rock.

The two shales from the Draupne Fm. have chromatograms with a wide distribution of hydrocarbons in the nC_{12} - nC_{34} range (Figure 9a), similar to that of the Shetland Gp. marl (3530 m), and with moderate amounts of isoprenoids (pristane/ nC_{17} range 0.44 - 0.47). The observed distribution patterns, the calculated pristane/phytane ratios

(1.51 - 1.53) and the CPI values (1.05 - 1.26) suggest in-situ generated hydrocarbons from a marine source rock with minor input of land plant organic matter. Based on these observations the maturity of the hydrocarbons detected is considered to be past the peak oil generation stage (i.e. 0.8 - 0.9 % Ro).

The chromatograms of the two shales from the Heather Fm. resemble those of the overlying Draupne Fm. showing a wide distribution of hydrocarbons in the nC_{12} - nC_{34} range with a maximum at nC_{15} and moderate amounts of isoprenoids (pristane/ nC_{17} range 0.44 - 0.49). The pristane/phytane ratios (1.62 - 1.82) are somewhat higher, indicating a higher input of terrestrial derived organic matter. The CPI values are somewhat lower than observed for the Draupne Fm. The distribution patterns observed and the calculated ratios suggest in-situ generated hydrocarbons from a marine source rock with a moderate input of land plant organic material. The maturity of the hydrocarbons from the Heather Fm. is considered to be around 0.9 % Ro.

The saturated fractions from two sandstones and one oil were analysed from the Brent GP. (Ness Fm.). The chromatogram of the oil (DST 3) shows a progressive decrease in the concentration of n-alkanes with increasing carbon number up to nC_{34} as exemplified by Figure 9b. The pristane/ nC_{17} and pristane/phytane ratios are 0.49 and 2.09 respectively, while the CPI is 1.06. The chromatograms of the sandstone saturated fractions show similar distribution patterns, except in the low-molecular weight end of the chromatogram. The calculated pristane/ nC_{17} (0.50 - 0.52), pristane/phytane (1.93 - 2.09) ratios and CPI values (1.06 - 1.19) resemble those for the oil. The observed distribution patterns and the calculated ratios suggest the oil and the extracts to be derived from the same source, which is suggested to be a marine source rock with a prominent influence of land plant organic matter. The maturity of the hydrocarbons is thought to be comparable to about 0.8 - 0.9 % Ro.

The saturated fractions from two sandstones and one shale and two oils (DST 1 and 2) were analysed from the Cook Fm. The chromatograms of the saturated fractions

resemble those of the Ness Fm., showing wide distributions of hydrocarbons in the nC_{14} - nC_{34} range with a maximum around nC_{18} - nC_{19} and with moderate amounts of isoprenoids (pristane/ nC_{17} range 0.43 - 0.49), exemplified in Figure 9c. The calculated pristane/phytane ratios is 2.10 for the shale and range 1.64 - 1.67 for the sandstones, while the CPI values range 1.08 - 1.17 for all three saturated fractions. The chromatograms of the oils resemble that of the oil from the Ness Fm. (DST 3), showing a wide distribution of hydrocarbons up to nC_{34} with a progressive decrease in concentration with increasing carbon number. The calculated pristane/ nC_{17} , the pristane/phytane ratios and CPI values for the oils are 0.49, 2.05 - 2.11 and 1.12 - 1.15 respectively. As the observed saturated hydrocarbon distribution patterns and the calculated ratios resemble those of the Ness Fm. similar conclusions are made both regarding sourcing and maturity.

The three sandstone saturated hydrocarbon fractions, all from the Lower Jurassic Statfjord Fm. show wide distributions of hydrocarbons in the nC_{14} - nC_{34} range, however with only small amounts of nC_{26} + hydrocarbons and small to moderate amounts of isoprenoids (pristane/ nC_{17} range 0.40 - 0.49) detected. The calculated pristane/phytane ratio is 1.74 for all samples, while all CPI values range 0.87 - 1.49. Based on the calculated ratios and the observed gas chromatographic patterns the extractable hydrocarbons in the Statfjord Fm. are thought to be derived from a marine source rock with a moderate influence of terrestrial organic matter. The hydrocarbons are present in small amounts and are considered to have a relative high maturity (i.e. 0.90 - 0.95 % R_o).

3.2.4 Aromatic Hydrocarbon Gas Chromatography

The Shetland Gp. "oil in mud" sample has an aromatic gas chromatogram which is dominated by methylnaphthalenes compared to methylated phenanthrenes. The MPI values are high, indicating that these hydrocarbons were generated from a highly

mature marine source rock (1.09 % Ro, Table 7). The sulphur containing compounds detected in the FPD-chromatogram, shows that benzothiophenic compounds are present, which supports that the migrated hydrocarbons were generated from a marine source. One marl was analysed from the Shetland Gp. The FID chromatogram shows only small amounts of methylated naphthalenes and traces of phenanthrene and methylphenanthrenes and a big "hump" of unresolved hydrocarbons in the 45 - 70 mins. retention time range. The FPD chromatogram shows that the sample is barren of sulphur compounds. The chromatographic pattern and the calculated maturity based on MPI (Radke & Welte 1983, Radke 1988) suggest a migrated mature (= 0.8 % Ro) aliphatic rich (residual?) oil.

The two shales from the Draupne Fm. have FID chromatograms that differ slightly from each other. The upper sample (3831 m) shows a wide distribution of and approximately equal amounts of methylated naphthalenes and phenanthrenes (Figure 10a), suggesting in-situ generated aromatic hydrocarbons from a marine source rock with a strong influence by terrestrial derived organic matter. The lower sample (3852 m) shows more prominent amounts of methylated naphthalenes relative to the phenanthrene and methylated phenanthrenes, indicating hydrocarbons derived from a mature marine source rock with a low to moderate influence of land plant organic matter. The dominance of methylated naphthalenes is typical for hydrocarbons derived from a mature type II kerogen (Hall et.al. 1985). The calculated MPI (Radke & Welte 1983, Radke 1988) suggests a maturity of about 0.75 - 0.80 % Ro equivalent (Table 6), which is somewhat lower than indicated by other maturity parameters. Sulphur aromatic hydrocarbons are limited to 4-methyldibenzothiophene and very small amounts of dimethyldibenzothiophenes (Figure 10b).

The most prominent peaks in the FID chromatograms of the two shales from the Heather Fm. are those of the methylnaphthalenes and dimethylnaphthalenes followed by smaller amounts of the trimethylnaphthalenes, phenanthrene and the methylphenanthrenes. These patterns indicate hydrocarbons derived from a mature marine

source rock with a moderate influence by land plant organic matter. The FPD chromatograms of these samples resemble those of the overlying Draupne Fm. with a significant amount of 4-methyldibenzothiophene and very small amounts of dimethyldibenzothiophenes. The calculated maturity based on the MPI (Radke & Welle 1983, Radke 1988) suggests a maturity close to the peak oil generation stage (i.e. 0.75 - 0.80 % Ro) which is somewhat lower than indicated by other gas chromatographic observations.

The oil (DST 3) and the two sandstone aromatic fractions from the Ness Fm. have FID chromatograms that differ clearly from each other. The FID aromatic fraction chromatogram of the oil is dominated by methylated naphthalenes and shows the presence of only very small amounts of phenanthrenes (Figure 10c), suggesting a well mature marine oil as methylnaphthalenes are believed to be typical for hydrocarbons derived from mature type II kerogen (Hall *et al.*, 1985). The extracted sandstone from 3931.71 m, which is only 2-3 metres below the test interval for the DST 3-oil, shows an aromatic fraction FID chromatogram where the prominent peaks are those of phenanthrene and the methylated phenanthrenes, while methylated naphthalenes are only detected in small amounts (Figure 10d). This distribution is an indication of hydrocarbons derived from a terrestrial source rock with minor marine influence. In contrast to the oil and the upper sandstone the FID chromatogram of the lower sandstone aromatic fraction (3933.16 m) shows a wide distribution of both methylated naphthalenes and phenanthrenes suggesting a mixed marine/terrestrial source rock. The prominent peak in the FPD chromatograms of all three samples is that of 4-methyldibenzothiophene, while other sulphur aromatic compounds only are traced. These patterns observed suggest a mixed sourcing of the hydrocarbons in the Ness Fm. and the reader is referred to later chapters for further discussions of their origin. The calculated MPI (Radke & Welle 1983, Radke 1988) show that all samples have the same maturity in the range 1.0 - 1.05 % Ro which is in agreement with earlier estimates of the maturity level of these samples.

As for the oil from the Ness Fm. (DST 3), the FID chromatograms of the aromatic fractions from the two oils from the Cook Fm. (DST 1 and 2) show prominent amounts of methylated naphthalenes and only small amounts of phenanthrene and the methylphenanthrenes, suggesting the oils to be generated from a mature marine source rock with a minor influence by terrestrial derived organic matter. The most prominent peaks in the FID chromatograms of the extracted sandstones are those of phenanthrene and the methylphenanthrenes with only small amounts of methylated naphthalenes, suggesting hydrocarbons derived from a terrestrial source rock with minor influence by marine organic matter similar to the upper sandstone of the Ness Fm. (3931.71 m). The extracted shale has an FID chromatogram showing prominent amounts of phenanthrene and methylphenanthrenes, but also methylated naphthalenes appear in prominent amounts. The patterns and calculated ratios suggest hydrocarbons derived from a terrestrial source rock with a strong marine influence, tentatively suggested to be a mixture of migrated and in-situ generated hydrocarbons. The most prominent peak in the FPD chromatograms of the oil aromatic fractions is that of the 4-methyldibenzothiophene, with only very small amounts of dimethyldibenzothiophenes, while the FPD chromatograms of the sandstones and shale aromatic fractions are showing the presence of only elemental sulphur. The calculated maturity of the oils and extractable hydrocarbons of the Cook Fm., based on the MPI (Radke & Welte 1983, Radke 1988), suggests a maturity around 1.1 % Ro.

The FID chromatograms of the sandstones aromatic fractions from the Statfjord Fm. show the presence of only small amounts of phenanthrene and methylphenanthrenes, while methylated naphthalenes only are traced in these samples. The FPD chromatograms show that the samples are barren of sulphur aromatic hydrocarbons. The calculated MPI suggest maturities around 1.0 % Ro, which is slightly less than observed for the overlying Cook Fm. The patterns observed and the calculated ratios (Table 7) suggest these samples to contain small amounts of migrated hydrocarbons derived from a terrestrial source rock.

3.3 Vitrinite Reflectance

The vitrinite reflectance measurements were, by clients request, performed by Institutt for Energiteknikk (IFE).

3.3.1 Maturity

A total of 25 samples was analysed for thermal maturity using vitrinite reflectance. The samples are from the depth interval 1300 - 4300 m, covering the stratigraphic range of Tertiary aged Hordaland Gp. down to the lower Jurassic Statfjord Fm. The crossplot of vitrinite reflectance versus depth is shown in Figures 11a-b.

The thermal maturity depth trend proposed for the well suggests that the well reaches early maturity ($R_o = 0.5\%$) at around 2700 - 2800 m. The top of the oil window ($R_o = 0.6\%$) is estimated to lie at approximately 3100 m, while peak oil generation ($R_o = 0.8\%$) is thought to occur at approximately 3700 m. Accordingly the base of the oil-window ($R_o = 1.0\%$) is expected to occur at around 4000 m.

3.4 Visual Kerogen Microscopy

Four samples from well NOCS 34/10-35 were optically examined, these covering the interval 3792 - 3885 m of Upper Jurassic age. The detailed kerogen compositions are shown in Table 9, while the gross compositions are plotted in a triangular diagram, Figure 12. Thermal maturity data (Spore Colour Index) are included in Table 8.

3.4.1 Kerogen Type

Three samples from the Draupne Fm. were examined, these having quite variable kerogen compositions and textures. The uppermost sample (3795 m) consists practically entirely of what is interpreted to be amorphous liptinite. This is non-fluorescent, which is considered to be not only the result of advanced maturity, but also due to the nature of this organic matter, which may consist either of reworked material or of amorphous matter which has been degraded after deposition (i.e. not preserved). Detrital inertinite and vitrinite occur in only trace amounts. It is difficult to judge the original potential of this kerogen assemblage due to the advanced maturity, but due to the total lack of fluorescence it is considered most likely that the organic matter consisted of degraded or reworked material with little potential for hydrocarbon generation. The present potential is considered practically to be nil, though the hydrogen index (from Rock-Eval) suggests some gas potential. Very abundant whitish fluorescent grains and droplets of possible free hydrocarbons occur in this sample, and it is possible that the labile components of possible staining could have enhanced the hydrogen index.

The next highest sample (3852 m) has a completely different composition, containing roughly equal amounts of liptinite and woody material (semifusinitic inertinite and telinitic vitrinite). The liptinite fraction consists mainly of amorphous matter but includes

abundant spores. Vitrinite and inertinite occur in roughly equi-proportional amounts, though the inertinite assemblage is considered to have a minor potential for gas at present, the original potential possibly being for mixed oil and gas. Traces of bluish-white fluorescent free (?) hydrocarbons were recorded in this sample.

The lowest Draupne Fm. sample (3867 m) consists mainly of very fine grained and amorphous material which is practically non-fluorescent, similar to the uppermost sample, but which probably contains degraded spore material. Spores are otherwise a conspicuous component however. Reworked inertinite and vitrinite occur in minor amounts. Traces of bluish-white fluorescent free (?) hydrocarbons were recorded in this sample.

These samples indicate the Draupne Fm. of this well to be quite variable in organic matter composition, but generally to have a more terrestrial nature than is normally met within the North Sea, as suggested by the local occurrence of abundant woody material and spores. Other observations such as the occurrence of degraded/reworked material, the abundance of detrital grains and the abnormally low contents of pyrite also support more landward, less anoxic depositional conditions. It is tentatively proposed that the Draupne Fm. in the well locality originally had a fair potential mainly for gas, with lesser (relatively (?) heavy) oil. The present potential is minor, for gas only.

One Heather Fm. sample was examined (3885 m), this being composed mainly of liptinite (70 %). The liptinite component consists mainly of non-flourescent fine grained/amorphous matter which probably contains degraded spore and woody material. Spores are also abundant. Inertinite and vitrinite, commonly bitumen stained, occur in accessory to moderately abundant amounts. This assemblage suggests the Heather Fm. to have had a fair to good potential for mixed oil and gas, i.e. quite possibly better than that of the Draupne Fm. at this locality.

3.4.2 Maturity

Since only four samples over a short interval were analysed, a maturity gradient cannot be proposed for the well. The SCI data suggest the Draupne and Heather Fms. samples examined to have a maturity ranging from around peak oil generation (for type II kerogen) to the base of the oil window, SCI 7.0 - 8.0, i.e. an equivalent Ro of approximately 0.8 - 1.0 %.

3.5 Carbon Isotope Analysis of C₁₅+ Fractions and Kerogen Concentrates

Three oils (DST 1, 2 and 3), one "oil in mud" and six extract samples (total extract, saturated hydrocarbons, aromatic hydrocarbons, NSO compound fraction and the asphaltene fraction), mainly from the Jurassic section, were analysed for stable carbon isotope composition. In addition, the $\delta^{13}\text{C}$ isotope compositions for four kerogen concentrates were determined. The data are listed in Tables 10a-b and plotted in Figures 13 and 14. Figure 13 shows a crossplot of the $\delta^{13}\text{C}$ isotope values of saturated versus aromatic hydrocarbons and Figure 14 shows the Galimov plots of the $\delta^{13}\text{C}$ isotope values of the various fractions, i.e. the total extracts and the MPLC separated fractions of the samples and the kerogen concentrates.

The isotope data for the extracted marl from the Shetland Gp. and the "oil in mud" sample differ greatly from each other. The samples have calculated CV values (Sofer, 1984) indicating the hydrocarbons in the marl to be of a low to moderate mature marine source rock (Figure 13), and the oil to be a highly mature terrestrial origin. As can be seen from Figure 13 the marl plots close to the samples from the Draupne and Heather Fms., while the oil plots near by the oils from the Ness and Cook Fms. The kerogen $\delta^{13}\text{C}$ -value for the marl is isotopically significantly heavier (-27.51 ‰) than the extract-values, i.e. about 3 ‰. This suggests that the extract is not genetically related to the kerogen.

The data for the Draupne and Heather Fms. have calculated CV values (Sofer, 1984) suggesting mixed marine/terrestrial organic matter source rocks, (Figure 13). The maturity level of these samples is thought to be moderate, i.e. in the pre-peak oil generation level. The kerogen concentrates have similar $\delta^{13}\text{C}$ -values (-28.09, -28.37 and -27.61 ‰) with the Heather Fm. sample, being slightly heavier compared to the Draupne Fm. The kerogen concentrate $\delta^{13}\text{C}$ -values are isotopically heavier by about

1.5 to 3.0 % compared to the total extract and associated fractions (3831 m, Table 10a).

The isotope composition of the Ness Fm. oil and oil shows have values indicating a high maturity and suggests terrestrial origin for these samples. Figure 13 show that these samples plots close to the oils from the Cook Fm. The variation in carbon isotope composition of the fractions can be seen from Figure 14.

The data for the Cook Fm. oils and oil shows show fairly big variations between the fractions (Figure 14). The data indicate that the hydrocarbons are derived from one single source, suggested to be a terrestrial source rock. The Cook and Ness Fm. oils and oil shows have saturated and aromatic hydrocarbon $\delta^{13}\text{C}$ -values plotting close together, indicating that the samples are genetically related. However, the Cook Fm. oils have in general somewhat lower isotopic values for the aromatic hydrocarbon fraction than their extracts and the Ness Fm. samples. Based on the isotope data the maturity of these samples is considered to be close to the base of the oil window (i.e. 0.95 - 1.0 % R_o).

From the isotope data it is apparent that the relative large differences in $\delta^{13}\text{C}$ -values, when Viking Gp. extracts are compared with Ness and Cook Fms. oil shows and oils, indicate that there is no genetic relationship between those two sets of data, seen clearly in Figure 13. However, the Shetland Gp. oil show is likely to have been generated from the Draupne and Heather Fms. source rocks.

3.6 Gas Chromatography - Mass Spectrometry

A total of seventeen saturated hydrocarbon samples, including the three oils (DST 1, DST 2, DST 3), the single Upper Cretaceous Shetland Gp. "oil in mud" sample, the eight oil shows extracted from seven sandstones and one marl sample and the five potential source rock samples from the Viking Gp. and the Cook Fm. The saturated hydrocarbons were analysed using the M/Z 177, 191 and 205 fragmentograms, representing terpanes and the M/Z 217, 218, 231 and 259 fragmentograms, representing regular steranes and diasteranes. The potential source rocks and oils/oil shows are treated in different sections. Additionally, the GC-MS interpretation of the NOCS 34/10-35 oils and oil shows from the correlation study between this well and the NOCS 34/10-23 oil and oil shows, presented in an earlier geochemical report, are brought into this chapter. The GC-MS data are presented in Tables 11a-d. Representative fragmentograms related to topics discussed in the text are shown in the Figures 15a-q.

3.6.1 Potential Source Rock

Terpanes:

The Viking Gp. demethylated triterpane series seem to have the C_{29} $\alpha\beta$ hopane (peak C) and the C_{29} neohopane present as dominant peaks (Figure 15a). The C_{31} - to C_{35} extended hopanes are present, however with low peak intensities in all samples. The C_{27} - C_{29} diasteranes are present in all the samples.

The four Viking Gp. M/Z 191 fragmentograms (3831 - 3894 m) show considerable $\alpha\beta$ hopane peak intensities. The C_{31} - C_{35} extended hopane distributions (peaks G/H to J1/J2), showing homologous series with significant intensities, are typical (Figure 15b)

for the Viking Gp. fragmentograms. The tricyclic terpanes (peaks N, O, P, Q, R, S) are abundant peaks, possibly reflecting relatively high maturity. The extended hopane series are indicative of marine source rocks, possibly deposited under strongly(?) reducing conditions. The T_m/T_s -ratio (B/A, Table 11a) is relatively constant, ranging 0.13 - 0.16. Another maturity parameter, the C_{32} $\alpha\beta$ hopane 22S/(22S+22R)-epimer ratios ranging from 60.89 to 61.89 %, indicates that this ratio has reached thermal equilibrium. The C_{30} diahopane/ $\alpha\beta$ hopane ratio (X/E) is relatively low (0.20 - 0.29) compared to the more mature Cook Fm. claystone (X/E: 1.67), indicating that this latter sample either has been stained by migrated hydrocarbons or is significantly more mature than the Viking Gp. samples. The C_{29} neohopane, eluting between the C_{29} $\alpha\beta$ norhopane (peak C) and the C_{30} $\alpha\beta$ diahopane (peak X), are prominent peaks in the Viking Gp. and Cook Fm. fragmentograms. The C_{29} neohopane is considered to originate from thermally induced alterations, with an increased abundance with increased maturity. Thus the significant presence of this compound is together with the low T_m/T_s -ratios indicative of high thermal maturities for both Viking Gp. and Cook Fm. samples, tentatively suggested to be equivalent to $R_o \geq 0.9$ % (Waples and Machihara, 1991). The Cook Fm. M/Z 191 fragmentogram has (Figure 15c), contrary to the Viking Gp. sample fragmentograms, only weak C_{27+} $\alpha\beta$ hopane intensities, particularly for the C_{31} - C_{35} extended hopanes. The Cook Fm. M/Z 191 fragmentogram has a triterpane distribution and peak intensities quite similar to those of the Ness and Cook Fm. oils. The trisnorneohopane (T_s), the C_{30} $\alpha\beta$ diahopane (X) are present as the dominant C_{27+} peaks, together with the tricyclic terpanes (Figure 15c), supporting the higher thermal maturity compared to the Viking Gp. samples.

Steranes:

The regular steranes and diasteranes are identified by the M/Z 217, 218, 231 and 259 fragmentograms. The Viking Gp. M/Z 217 fragmentograms generally have prominent contents of C_{27} - C_{29} diasteranes and C_{20} - C_{22} short side-chain steranes compared to

the $\beta\beta$ steranes, indicative of mature marine source rocks (Figure 15d). The C_{27}/C_{29} diasterane ratios, given by ratio 4 in Table 11b, are relatively uniform, ranging 1.24 - 1.36, i.e. indicative of a slight C_{27} - over C_{29} diasterane predominance. The M/Z 218 fragmentograms ($\beta\beta$ steranes) have subequal distributions of the C_{27} -, C_{28} - and C_{29} - compounds (Figure 15e). The dominant C_{27} $\beta\beta$ 20R sterane peak relative to the 20S peak, is probably due to the contribution from the C_{29} 20S $\beta\alpha$ diasterane. The Cook Fm. M/Z 217 fragmentogram has, similar to the Viking Gp. M/Z 217 fragmentograms, a dominance of the C_{20} - C_{22} short side-chain steranes. However, the dominant C_{27} - C_{29} diasteranes have a slightly different distribution compared to the Viking Gp. fragmentograms, in that there is a subequal C_{27}/C_{29} distribution (ratio 4 in Table 11b: 1.01). The Cook Fm. M/Z 259 fragmentogram, has in contrary to the dominant Viking Gp. C_{27} diasteranes, subequal C_{27} and C_{29} diasterane contributions, indicating a more mixed marine/terrestrial source. The sterane maturity parameter, the C_{29} $\beta\beta$ 20S/(20S + 20R) epimer percentage (50.70 %) is clearly different (and discrepant) compared to the Viking Gp. regular steranes (56.43 - 64.33 %). Possibly the calculated percentage is unreliable owing to the low peak intensities. Additionally, the M/Z 218 fragmentogram bears some resemblance with the Ness and Cook Fm. oils, indicating some genetic relationship, either as staining of the Cook Fm. claystone by migrated hydrocarbons or that the Cook Fm. claystone has functioned as a local source giving a contribution to the oils encountered in the Ness and Cook Fms.

3.6.2 Migrated Hydrocarbons

Terpanes:

The oils have very similar M/Z 177 fragmentograms in which C_{27} + triterpanes are very minor components and lower molecular weight compounds predominate (Figure 15f). The C_{29} $\alpha\beta$ hopanes and C_{29} neohopane are the dominant C_{27} + compounds.

The Ness and Cook Fm. oil shows have similar M/Z 177 fragmentograms compared to the oils (Figure 15g). The Shetland Gp. marl from 3530 m and two of the Statfjord Fm. oil shows have more C_{27+} compounds than the oils, particularly the C_{27} diasteranes and C_{29} hopanes are prominent (e.g. Figures 15h and i). The distribution of compounds seen in the M/Z 177 fragmentograms of all the oils and oil shows is typical of mature marine (and some lacustrine) source rocks (with $C_{27} > C_{29}$ diasteranes and diasterane:hopane with a ratio of 1:1). The higher content of C_{27+} steranes and hopanes in the Shetland Gp. marl and the Statfjord Fm. sandstones could be due to lower maturity source for the oil shows in these rocks than the oils and oil shows in the Ness and Cook Fms.

The M/Z 191 fragmentograms show that there are clear differences between the oils and associated Ness Fm. oil shows, the Cook Fm. shows, the Statfjord Fm. shows and the Shetland Gp. marl oil show. All the oils and the analysed Ness Fm. oil shows (Figures 15j and 15k) are characterised by a low content of C_{27+} hopanes in which the $\alpha\beta$ hopanes are relatively minor components. The dominant hopanes are the C_{27} neohopane (peak A), the C_{30} $\alpha\beta$ hopane (peak E) and the C_{30} diahopane (peak X). Tricyclic terpanes from C_{21} to C_{26} are also prominent. In contrast, the Cook Fm. shows (Figure 15l) have more of the $\alpha\beta$ hopane series, although the C_{27} neohopane (peak A) is still prominent. The C_{21} - C_{26} tricyclic terpanes, and C_{28} - C_{30} tricyclic terpanes are also more abundant and the ratio of the C_{29} to C_{30} $\alpha\beta$ hopane (peaks C/E) is much higher than in the oils. This is also the case for the Statfjord Fm. oil shows (Figure 15m), where, in addition, T_m/T_g is much higher and the C_{30} diahopane to C_{30} $\alpha\beta$ hopane ratio (peaks X/E) is lower. This is taken to indicate that the Statfjord Fm. oil shows are less mature than the Cook and Ness Fm. oil shows and oils. There is also the possibility of a different source for the Statfjord and Cook Fm. shows compared to the Ness Fm. shows. This is in contrast to the Cook Fm. DST oils which are virtually identical to the Ness Fm. oil and the "oil in mud" sample from the Shetland Gp. The differences between the Cook Fm. oils and Cook Fm. oil shows indicate there could be vertical heterogeneities in the reservoir hydrocarbons in the Cook Fm.

The oil show in the marl from the Shetland Gp. is different to the oils and other shows by having lower T_m/T_s -ratio and higher C_{30} diahopane/ C_{30} $\alpha\beta$ hopane (X/E) ratio compared to the Statfjord Fm. oil shows.

All the oils and oil shows are probably derived from marine anoxic source rocks, based on the distribution of the C_{31} - C_{35} $\alpha\beta$ hopanes. The high C_{29}/C_{30} $\alpha\beta$ hopane ratio (C/E) and very abundant tricyclic terpanes in the Cook Fm. and particularly in the Statfjord Fm. shows could suggest another source, possibly another marine source or lacustrine.

Steranes:

The regular sterane and diasterane compositions (M/Z 217 fragmentograms) of the oils and the Ness and Cook Fms. oil shows are typical of highly mature clastic marine source rocks, due to that they are dominated by C_{20} - C_{22} short side-chain steranes and C_{27} - C_{29} diasteranes (Figure 15n). The Statfjord Fm. and Shetland Gp. marl oil shows (Figures 15p and q) have slightly lower C_{20} - C_{22} compound intensities and more of the regular steranes (i.e. $\alpha\beta\beta$ and $\alpha\alpha\alpha$ steranes). However, all the oils and oil shows have similar distributions of the C_{27} -, C_{28} - and C_{29} -compounds, most often seen in marine source rocks. The observed differences in sterane distribution of the oils and Ness and Cook Fm. oil shows compared to the Statfjord Fm. and Shetland Gp. oil shows are probably due to lower maturity of the latter.

3.6.3 GC - MS Summary

The Draupne and Heather Fms. triterpane and sterane fragmentograms all indicate that the marine source rocks possibly with a terrestrial organic material input have reached a high thermal maturity, possibly at the base of the oil window, i.e. equivalent

to $R_o \geq 0.9$ %. From the presented triterpane and sterane data it is apparent, that the Viking Gp. triterpanes and steranes cannot be correlated with the Ness and Cook Fm. oils and oil shows. The M/Z 191 fragmentograms are not compatible, mainly due to the very low intensities of $C_{27}+$ hopanes in the latter group of samples and the significant variations in X/E and Z/E ratios, which are significantly higher for the oils and oil shows. Thus a thermally induced difference is suggested. Regarding a source related correlation, the C_{27}/C_{29} -diasterane ratios are compatible, indicating marine origins for both sets of samples, however with slightly higher relative C_{29} diasterane contributions for the oil shows. The slightly lower Cook Fm. oil C_{27}/C_{29} -ratios might indicate differences in source compared to the Cook Fm. oil shows and the Ness Fm. oils and oil shows. Additionally, the Cook Fm. oils and the Ness/Cook Fm. oil shows have diasterane distributions (M/Z 259 fragmentograms), which have relatively higher C_{29} diasterane contributions, indicating contribution from terrestrial organic material compared to Viking Gp. M/Z 259 fragmentograms.

The highly mature Cook Fm. claystone, with triterpane and sterane distributions and intensities partly compatible to the Cook and Ness Fms. oils, might have contributed to the hydrocarbons present in the Cook Fm., possibly as a local highly mature mixed marine/terrestrial source contributing together with other source rocks.

The Statfjord Fm. oil shows, interpreted to originate from a marine source are different to the Ness Fm. and Cook Fm. oils and oil shows, in that they are of lower maturities. Additionally, the Statfjord Fm. triterpane and sterane fragmentograms show variations in peak intensities and distributions, indicating oil show heterogeneities, which could be related to both differences in maturity and/or source.

The Shetland Gp. "oil in mud" sample, interpreted to have been generated from a highly mature marine source, is most compatible with the Ness and Cook oils and oil shows. However, the Shetland Gp. oil show is not compatible with the "oil in mud" sample, mainly due to differences in maturities. The Shetland Gp. oil show is the

sample, which bears the closest resemblance to the Draupne and Heather Fms. fragmentograms, both in terms of source and maturity correlation. The similarities include the C_{31} - to C_{35} extended hopane homologous series, the compatible C_{30} $\alpha\beta$ dihopane/ C_{30} $\alpha\beta$ hopane ratios (peaks X/E) and the abundant C_{29} neohopane peak intensities and the bisnorhopane/ C_{30} $\alpha\beta$ hopane ratios (peaks Z/E). The Shetland Gp. oil show is probably slightly less mature than the Draupne and Heather Fms. in-situ generated saturated hydrocarbons, mainly due to lower ratios (X/E, Z/E). Thus the Shetland Gp. oil show is probably generated from the Viking Gp., through a short vertical migration.

3.7 Gas Composition and Isotope Composition of Gases

Three pressurised gas samples, DST 1 (4015 - 4025 m), DST 2 (3984 - 3995 m) and DST 3 (3920 - 3929 m), are all gas samples taken from the same depth intervals as the DST oil samples. The gases were analysed using gas chromatography to detect the C_1 - C_7 gases. Additionally, the $\delta^{13}C$ -compositions for the C_1 - C_4 gases were analysed. The C_1 - C_7 gas analysis results are presented in Tables 12a-c and the $\delta^{13}C$ -values are listed in Table 13 and shown in the Figures 16a-b. The gaseous hydrocarbon chromatograms are included in Appendix 5.

The gas compositions vary slightly in C_1 - C_7 compositions, with the methane content varying from about 75 % (DST 3) to about 80 % and 82 % for DST 1 and DST 2 respectively. Thus, the wetness varies relatively more, with DST 3 having a C_2+ content at about 25 %, whereas DST 1 and DST 2 have C_2+ contents totalling 20 % and 18 % of the total gas contents, respectively.

A crossplot of the $\delta^{13}C$ compositions of methane versus ethane (Schoell, 1983) are indicative of that the gases are thermally generated and associated with oils from a mature marine source rock. Plotting the $\delta^{13}C_{\text{methane}}$ against the C_2+ percentage in Figure 16b (James, 1983), suggests that the gases are associated with condensate.

Compared to the DST oil $\delta^{13}C$ -values (Table 10a) the DST gas samples have $\delta^{13}C_1$ isotopic values approx. 10 to 12 ‰ lighter, which also supports that the gases are genetically associated with the oils.

Chapter 4

CONCLUSIONS

4.1 Source Rock Potential

The mature organic rich Upper Jurassic Draupne and Heather Fms., with type II, mixed with type II/III to type III kerogen (3791 - 3912.5 m) are the most prominent source rocks. The Draupne and Heather Fms. already have generated hydrocarbons. The organic rich to very rich Draupne Fm. has a fair to good residual potential for mixed oil- and gas generation. The Heather Fm. is considered to be a more varied source rock with good to rich organic carbon contents and variations in kerogen type from type II to type III. Some intervals have good potential for oil generation. Other intervals in the Heather Fm. consisting of type III kerogen source rocks, have poor to fair potential for gas generation. The pyrolysis-GC analyses support the generation potential for paraffinic oil generation for both the Draupne and Heather Fms. The visual kerogen analyses indicate, that the amorphous liptinitic material has been reworked/degraded to some extent. Additionally, reworked inertinite and vitrinite suggest a significant land plant input. The Heather Fm. appears to have a relatively higher land plant input compared to Draupne Fm. Hence, the visual kerogen data suggest less anoxic and more landward depositional conditions than commonly seen for the Draupne and Heather Fms. This is somewhat contrary to the saturated hydrocarbon GC-MS analyses, which suggest the source rocks to be marine, possibly deposited under reducing conditions. The highly mature type III to type II/III carbonaceous Lower Jurassic Burton and Cook Fm. claystones have poor to fair remaining generation potentials, mainly for gas. Detailed analyses, including aromatic hydrocarbon GC and saturated hydrocarbon GC-MS analyses indicate, that the Cook Fm. claystone might consist of mixed marine/terrestrial organic material. However,

there is some uncertainty concerning the organic facies, due to possible effects from staining by migrated hydrocarbons. Therefore the Cook Fm. claystone could be biased more towards a terrestrial source rock, than the detailed analyses suggest. No detailed analyses were performed for the Burton Fm. claystone samples, making kerogen typing based solely on Rock-Eval data uncertain.

4.2 Maturity

The overall maturity profile for the well, based on vitrinite reflectance and Tmax from Rock-Eval analyses, indicates that the onset of hydrocarbon generation is at approx. 3500 m (Tmax: 435°C), whereas the Ro-measurements (0.6 % Ro) suggest the depth to be shallower, i.e. at 3100 m. The vitrinite reflectance data is considered to be the most reliable maturity assessment, owing to the relatively good data coverage and fairly consistent data (e.g. Figure 11b). The peak oil generation (equivalent to 0.8 % Ro) is estimated to be at a depth around 3750 - 3800 m. Both the Tmax-values and Ro-measurements show compatible values. The base of oil generation (1.0 % Ro) is estimated to be around 4000 - 4100 m. Using the maturity assessment indicates that the Draupne and Heather Fms. have just passed peak oil generation but are still within the oil generating phase. The Cook and Burton Fms. claystones are close to the base of the oil window or just passed it, however, with some potential left for gas generation. Other maturity parameters, such as the MPI indices, indicate that the Draupne and Heather Fms. have maturities equivalent to ~ 0.8 % Ro, slightly lower than the previously mentioned maturity assessment. The saturated hydrocarbon GC-MS maturity assessments, although uncertain for highly mature samples, suggest that the derived maturity is higher than 0.75 % Ro, possibly as high as 0.90 % Ro. The SCI-data, although only based on four samples from the Draupne and Heather Fms. also suggest that these source rocks are mature to highly mature (SCI: 7.0 - 8.0, equivalent to 0.8 - 1.0 % Ro). The Cook Fm. claystone, at 4021.93 m is highly mature

when the MPI-value is used, i.e. close to 1.0 % Ro, which is in agreement with Ro-values at that depth.

4.3 Generation

From the above mentioned conclusions concerning source rock potential and maturity assessment it follows that the Draupne and Heather Fms. have generated and are actively generating and expelling hydrocarbons at this maturity stage. This is confirmed by the rich free hydrocarbon yields (S_1 from Rock-Eval), associated high PI-values and the rich EHC-contents, with a saturated to aromatic hydrocarbon ratio of 1.5 to 2.0. The generated hydrocarbons are mainly paraffinic with little waxyness, suggesting that the generated oils at this maturity stage are relatively light oils, derived from the predominantly marine source rocks. Regarding the Cook Fm. claystone and the Burton Fm. claystones, it is tentatively concluded here that these source rocks have generated oil and gas. The Cook Fm. claystone, apparently a lithologic unit of limited vertical extension, is considered to be a local source, which might have generated and expelled hydrocarbons to the local reservoir sections, i.e. first of all the Cook Fm. sandstones, but possibly also the Ness Fm. and the Statfjord Fm. More detailed knowledge regarding vertical and lateral extension of the mud rock facies are required in order to estimate the volumetric significance of hydrocarbons generated from the Cook Fm. claystone. The limited geochemical data from the Burton Fm. claystones suggest this potential source rock to have a poor to fair remaining potential for generation of wet gas.

4.4 Migration

Migrated hydrocarbons are first of all present in the Ness and Cook Fm. sandstones, where three DST oils and associated DST gas samples were recovered. The DST oils and gas samples have been subjected to detailed analyses, together with oil shows from the Ness/Cook Fms. Additionally oil shows from the Statfjord Fm. sandstones and the Shetland Gp. marl were analysed in detail. The Ness and Cook Fm. oils are light oils, with API-gravities ranging 43.1° to 43.6°, consisting of highly mature mainly paraffinic non-waxy oils. The three whole oil gas chromatograms have similar hydrocarbon compositions. The Ness and Cook Fm. oil and oil shows are probably generated from highly mature clastic marine source rocks, owing to the calculated Rc-values derived from the aromatic hydrocarbon GC (FID) analyses and the saturated hydrocarbon GC-MS analyses. The Rc-values range from about 1.05 to 1.15 % Ro, with the Ness Fm. oil and oil shows having slightly lower maturities than the Cook Fm. oils and oil shows. The C_{15+} $\delta^{13}C$ -values indicate that the source(s) for the Ness and Cook Fm. oil and oil shows are terrestrial. The three DST gases are classified as associated gases, either generated from oil window mature marine source rocks or from highly mature source rocks, i.e. associated with condensate. The Shetland Gp. "oil in mud" C_{15+} saturated and aromatic hydrocarbon $\delta^{13}C$ -values are similar to those of the Ness and Cook Fm. oils and oil shows, indicating a genetic relationship between these oils and oil shows. The GC-MS data, however, point towards highly mature marine source rocks rather than terrestrial source rocks. A source rock - oil correlation between the Draupne and Heather Fms. and the previously mentioned oils indicate that the first-mentioned source rocks cannot have generated and expelled the hydrocarbons encountered in the Ness and Cook Fms., based on the large differences in maturities. Possibly a deeper buried and more mature equivalent to the Draupne and Heather Fms. might have generated the oils and gases encountered in the Ness and Cook Fms. This model requires lateral migration over some distance. The Statfjord Fm. oil shows, probably generated from a mature marine source are less

mature compared to the Ness and Cook Fm. oil and oil shows. Similar to the Ness and Cook Fms., the oil shows in the Statfjord Fm. are significantly more mature compared to the Draupne and Heather Fm. source rocks. However, aromatic hydrocarbon GC FID, the isotope and GC-MS data for the Shetland Gp. marl oil show are very similar to those of the Draupne and Heather Fm. source rocks, indicating a genetic relationship.

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Biomarkers for geologists - A practical guide to the application of steranes and triterpanes in petroleum geology. AAPG Methods in Exploration, No. 9, pp. 91.

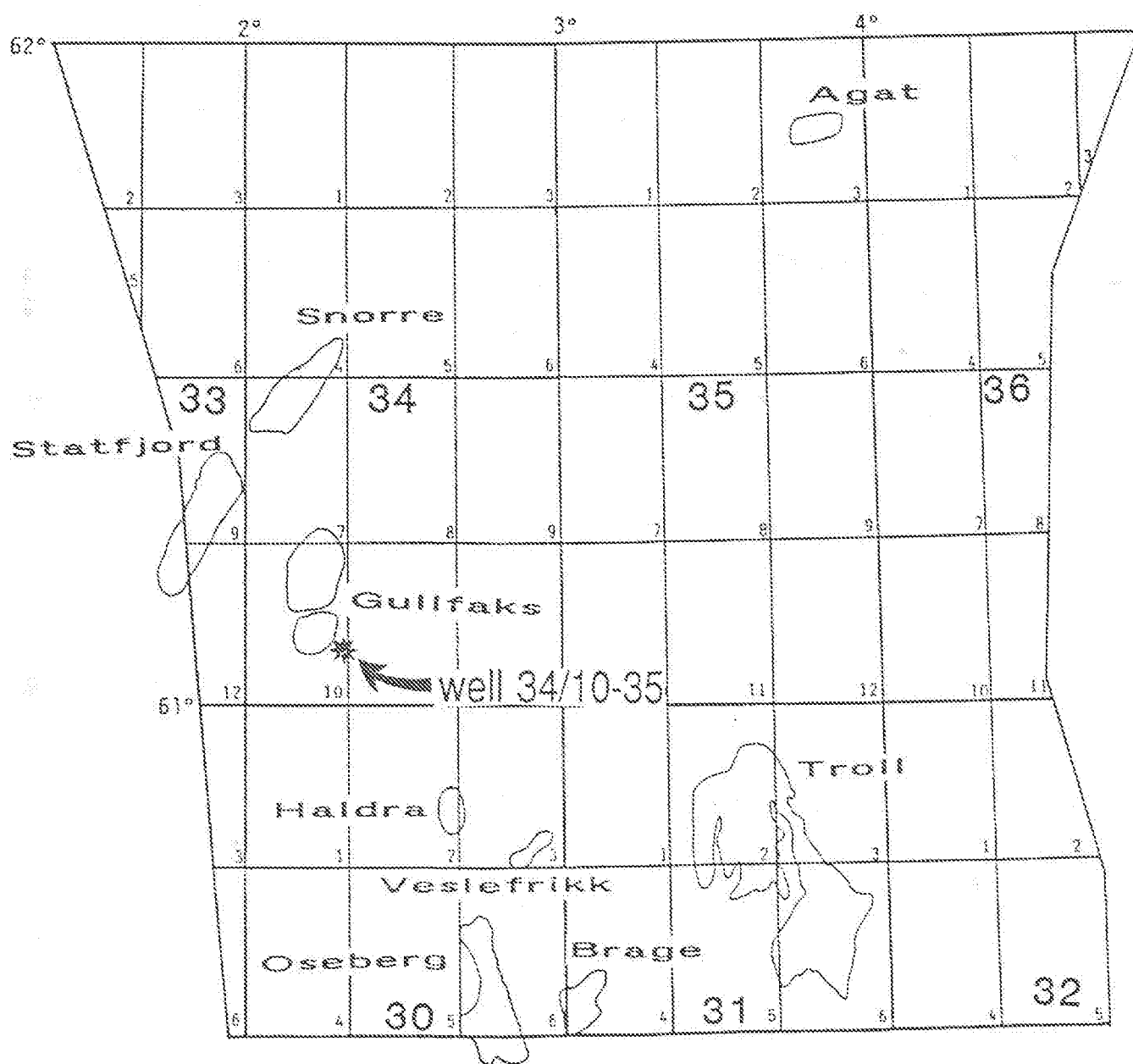


Figure 1. location map showing well 34/10-35.

Figure: 2

Client: STATOIL

TOC Data for Well NOCS 34/10-35

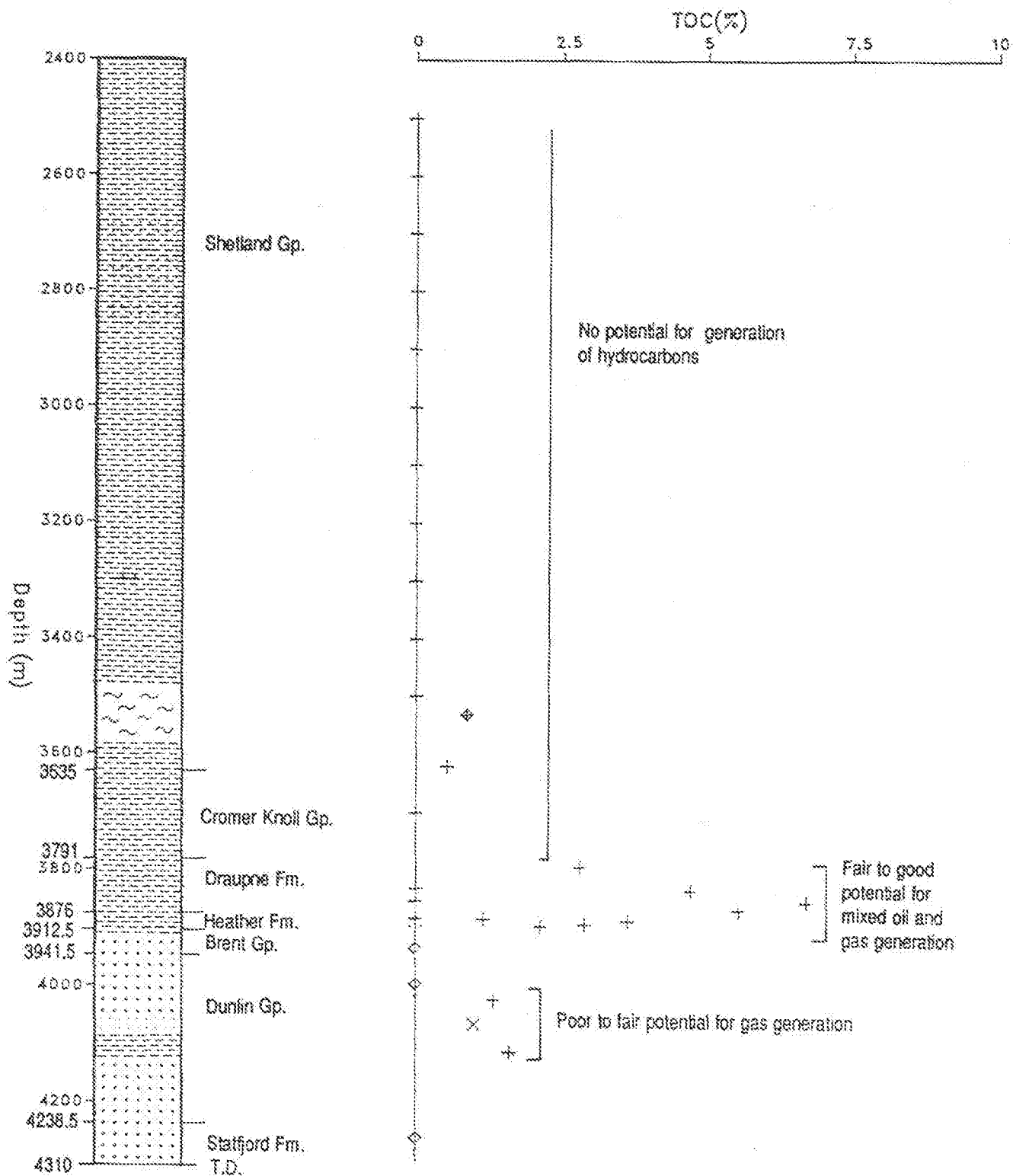


Figure: 3

Client: STATOIL

Production Index Data for Well NOCS 34/10-35

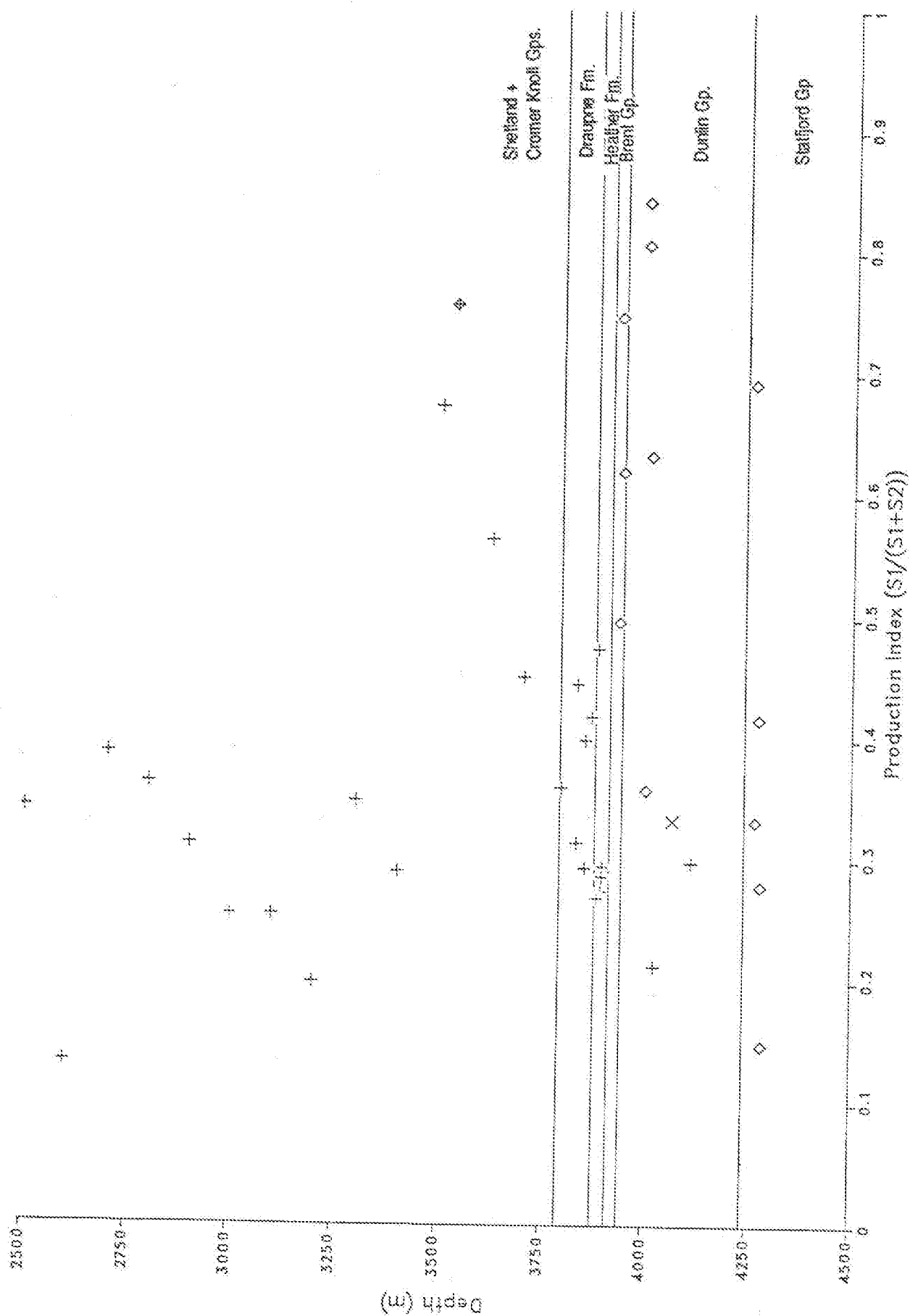


Figure: 4

Client: STATOIL

Tmax Data for Well NOCS 34/10-35

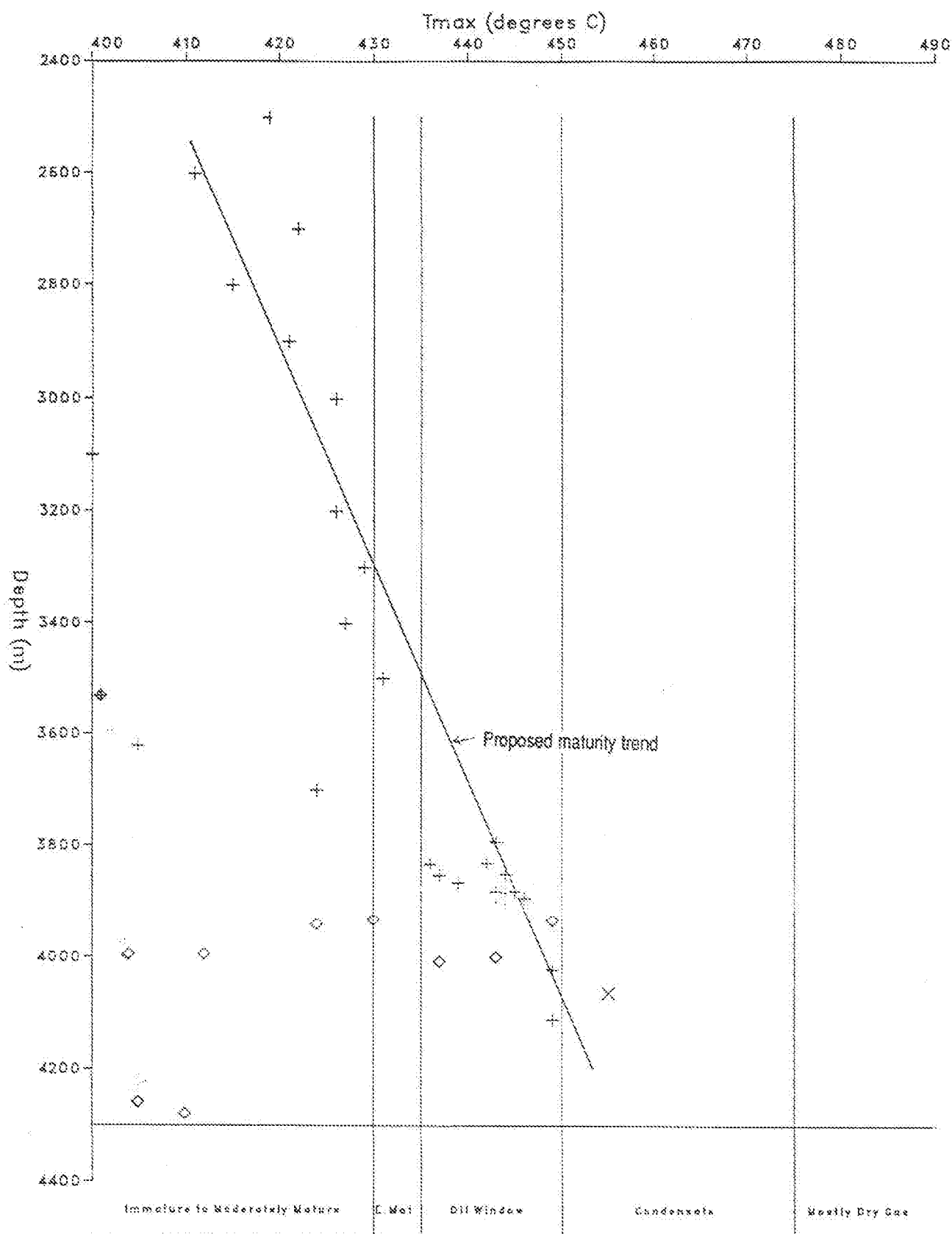
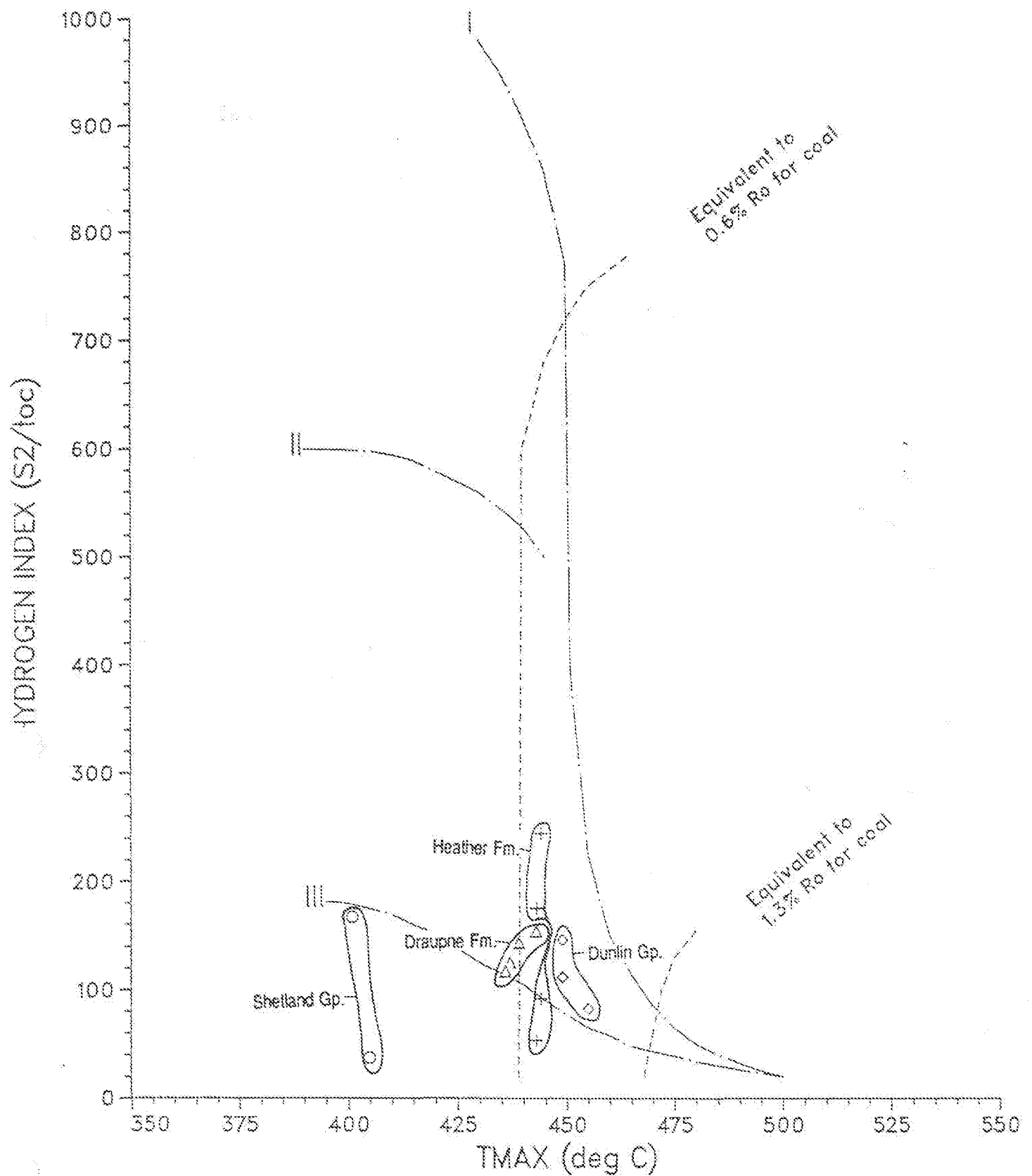
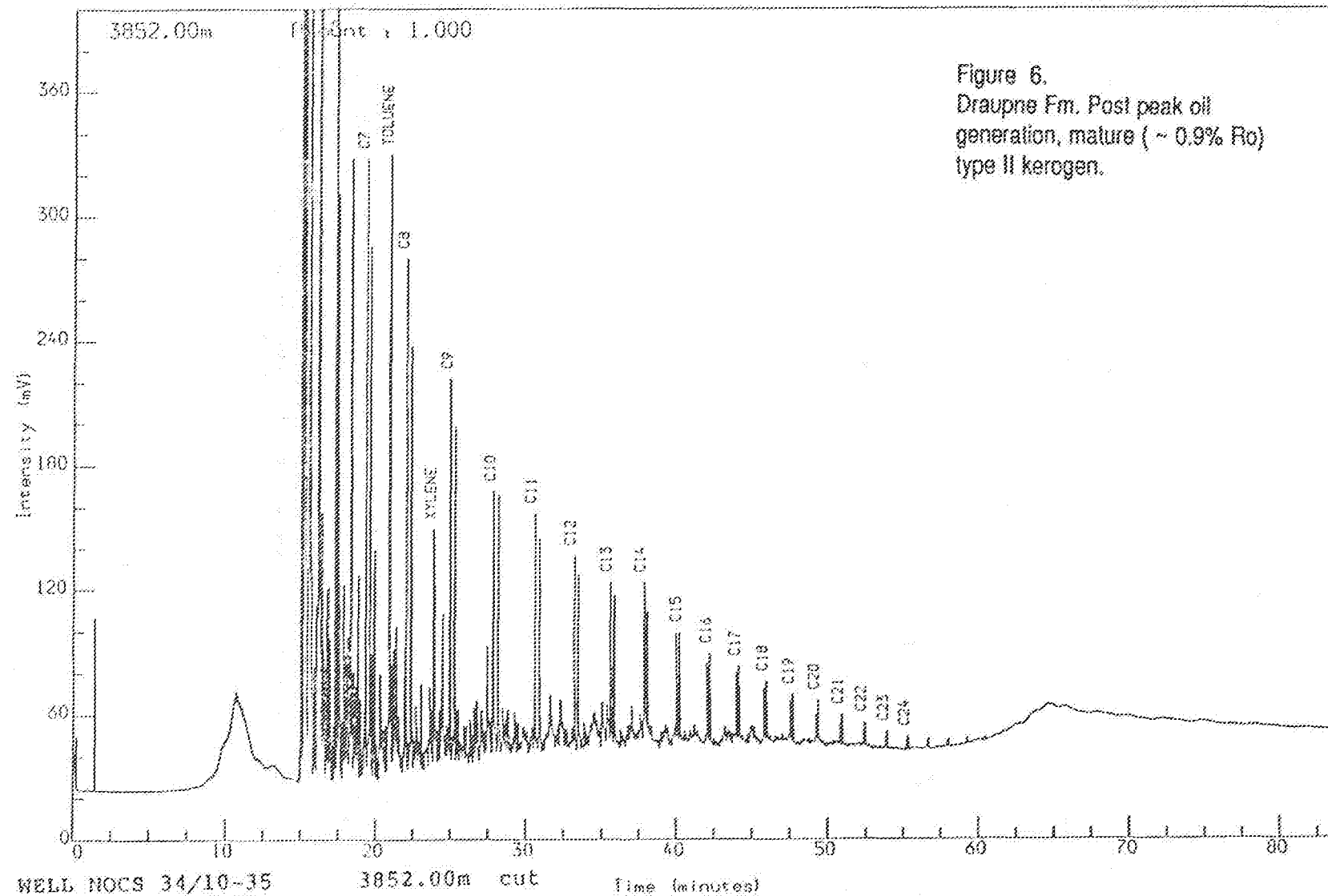


Figure 5 : Hydrogen Index v.s. Tmax values
Well NOCS 34/10-35





Reported on 15-SEP-1992 at 10.17

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Figure 7 : Pyrolysis GC Composition

Well NOCS 34/10-35

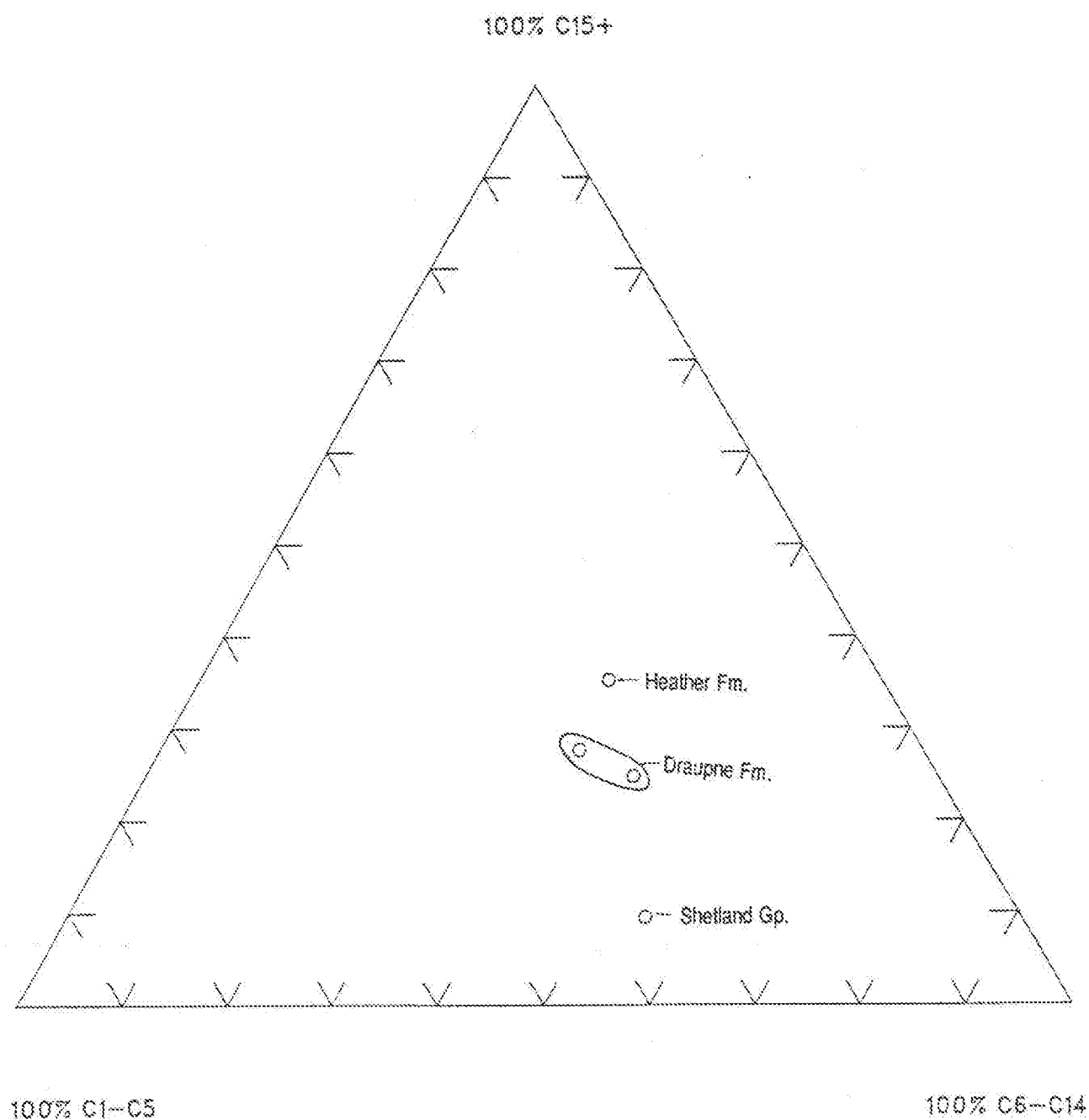
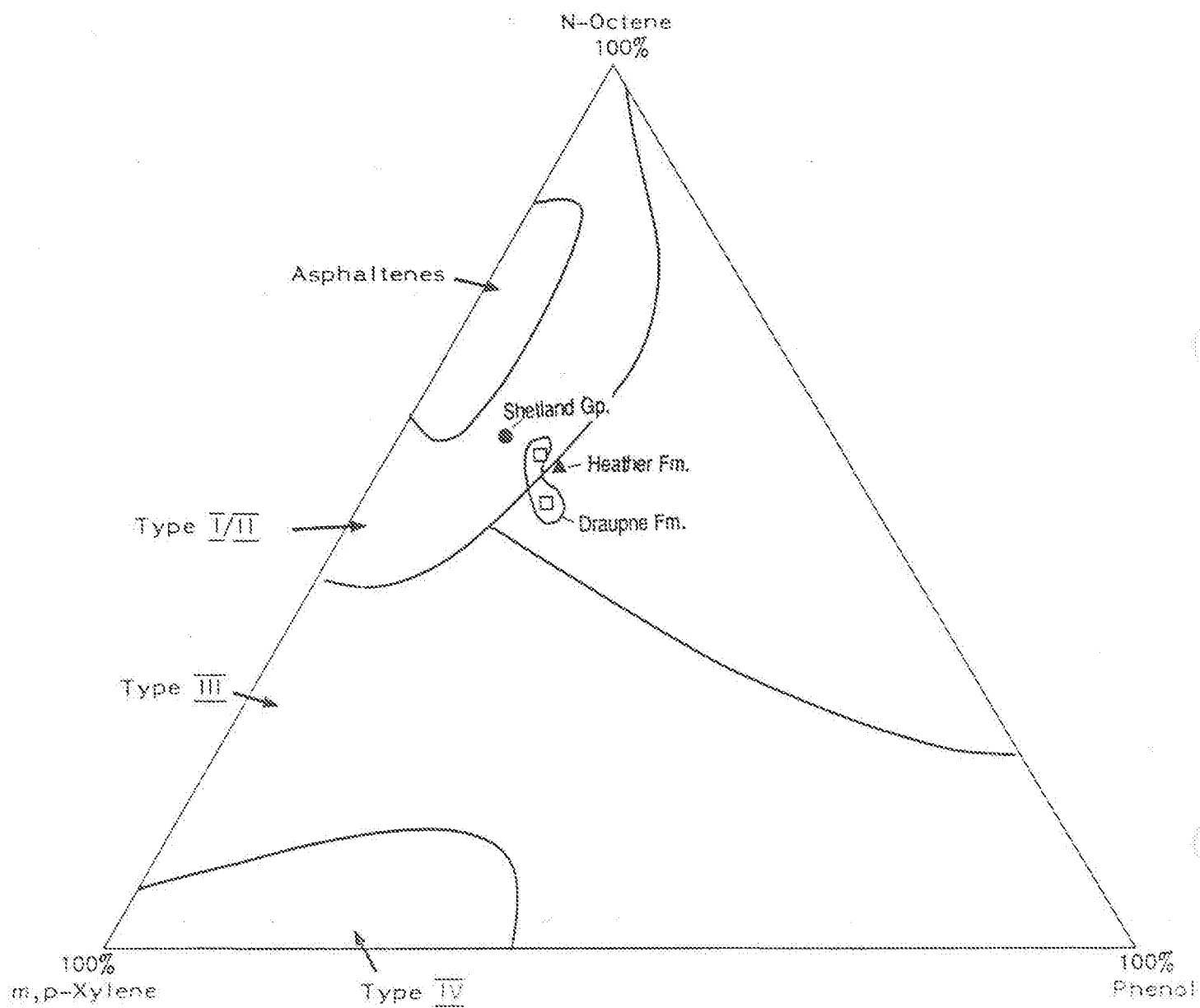
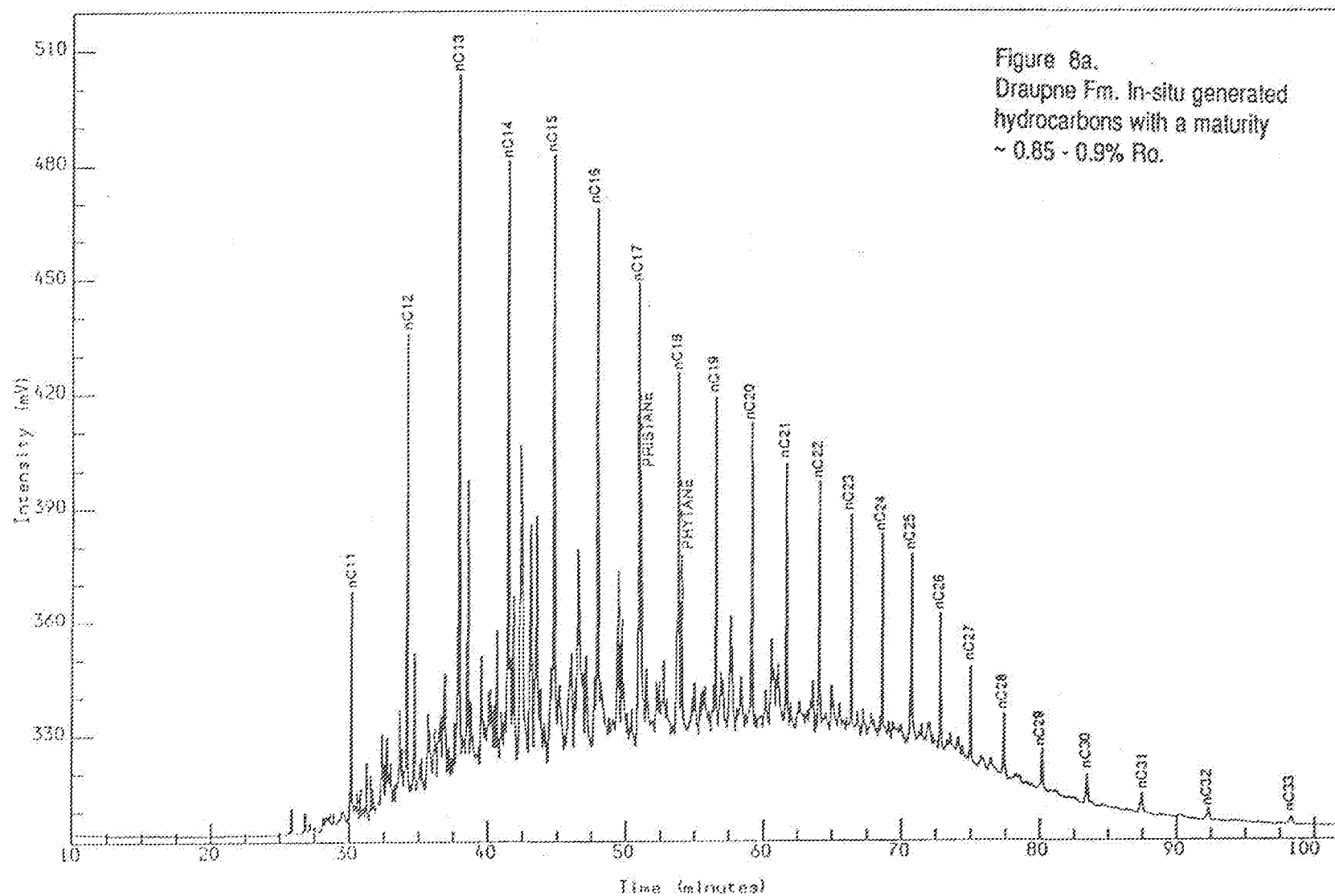


Figure 7b.



Analysis Name : [526265] 31 W03852.1.1.

Multichrom



WELL NDCS 34/10-35 3952.00m
WHOLE EDM GC (FID)

Reported on 18-SEP-1992 at 12:08

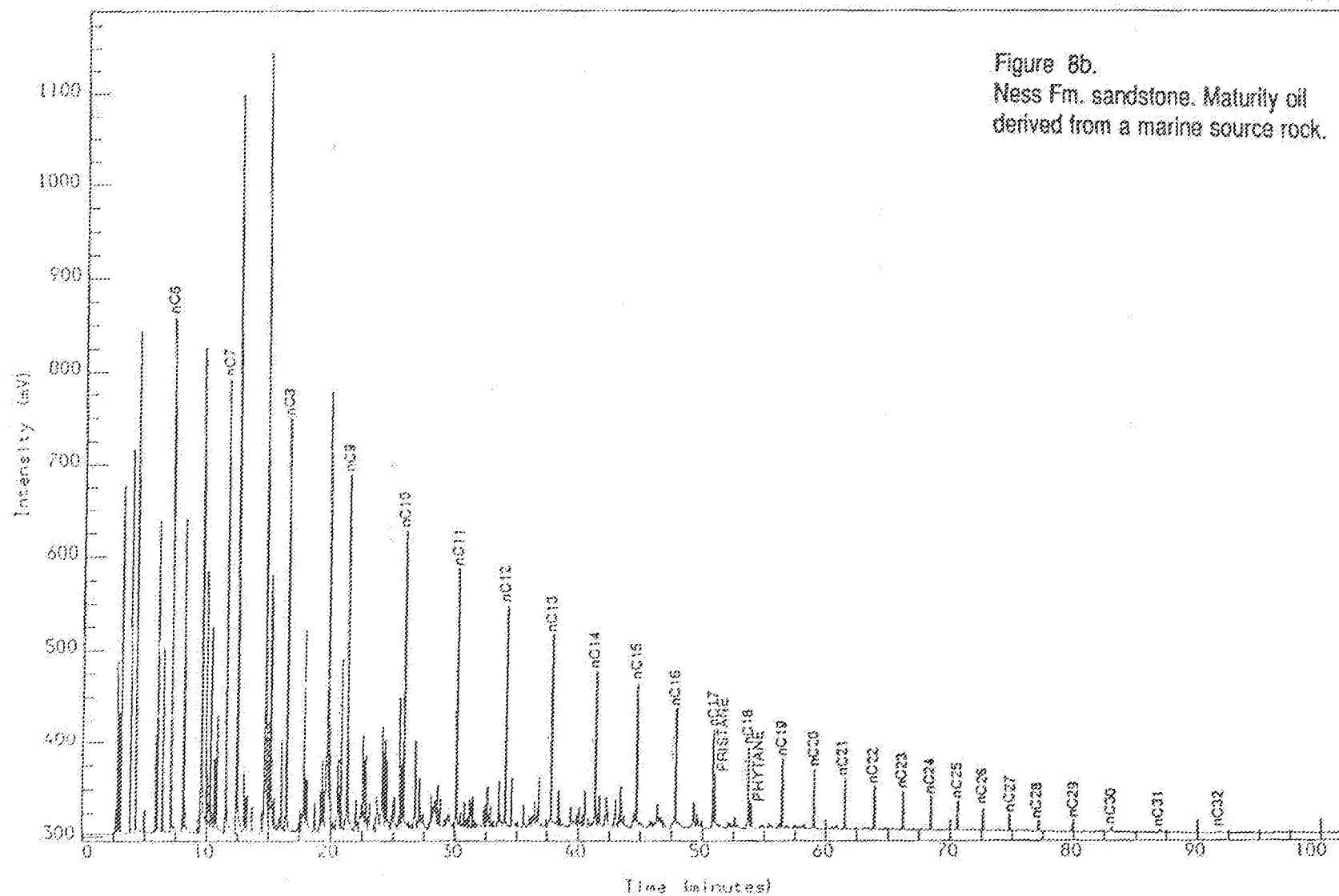
Schlumberger

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GEOLAB NOR

Analysis Name : [526265] 31 W03410351.1.1.

Multichrom



WELL NOCS 34/10-35 DST.1
WHOLE OIL GC (FID)

Reported on 25-SEP-1992 at 09:06

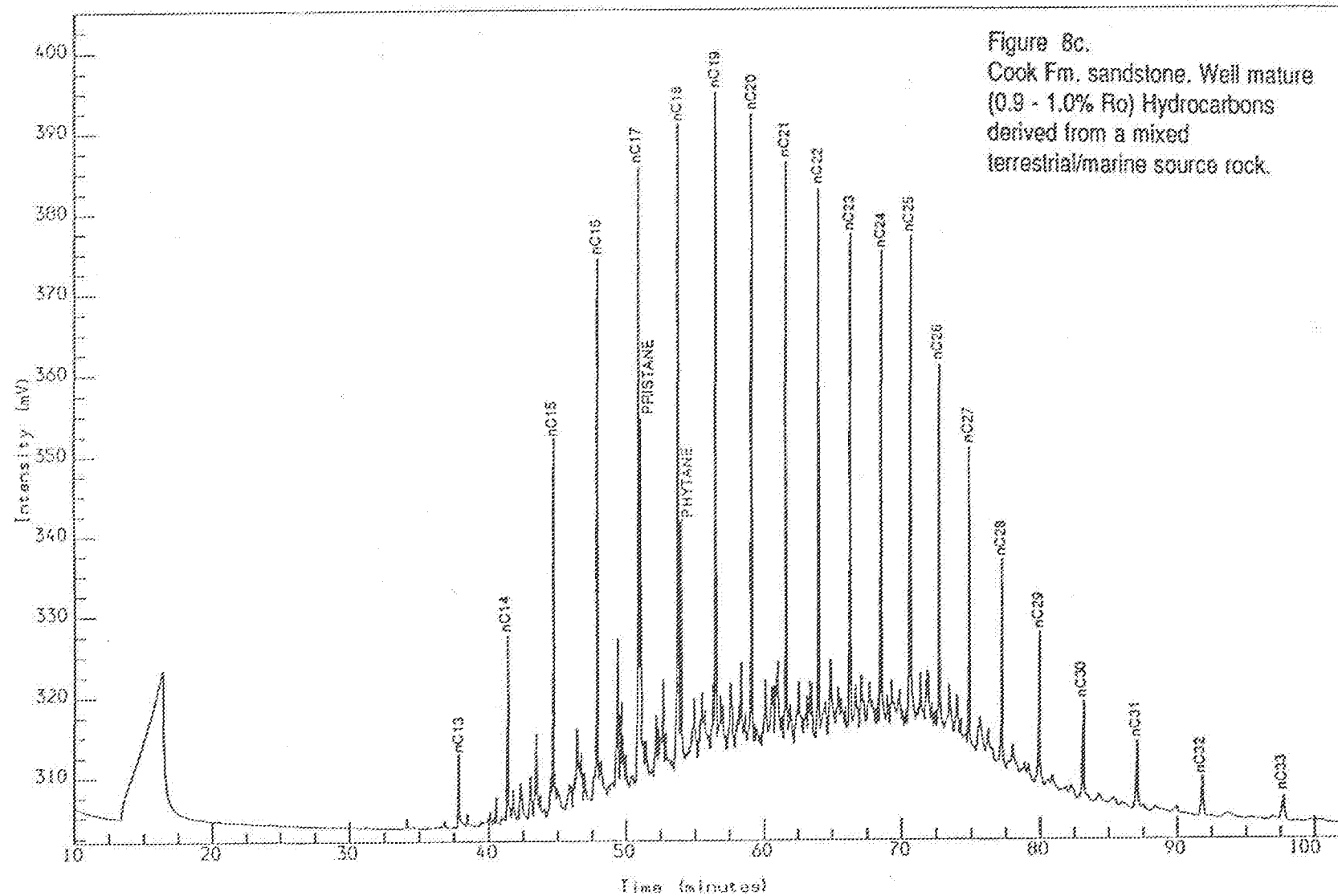
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GECO-PRAKIA

GEOLAB/NOR

Analysis Name : [526265] 31 W0399405,1.1.

Multichrom



WELL NOCS 34/10-35 3994.05m
WHOLE EOH GC (FID)

Reported on 23-SEP-1992 at 13.29

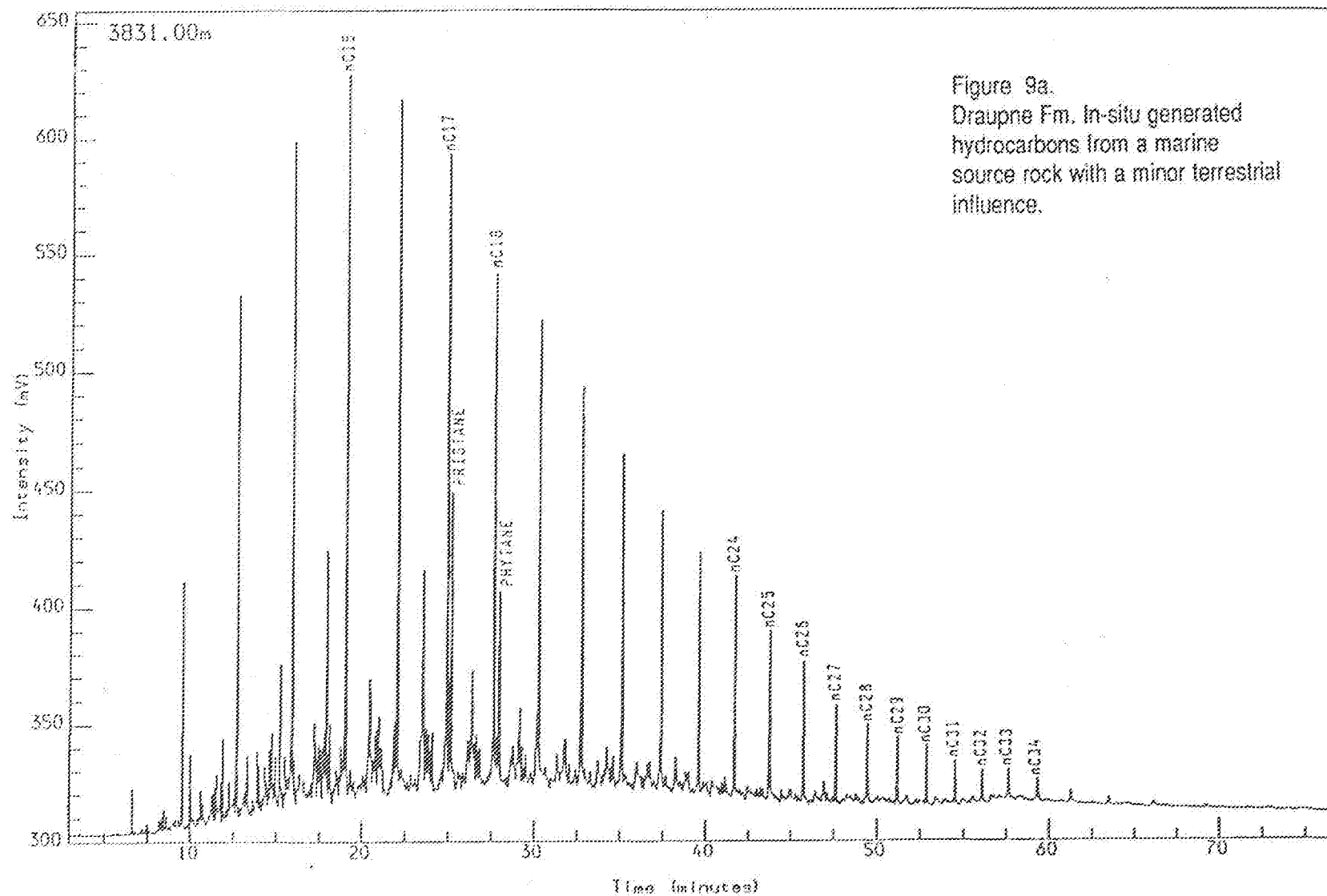
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GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403581L.4.1.

Multichrom



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SATURATED GC
Sh/Clst: m gy to drk gy

Reported on 31-AUG-1992 at 00:05

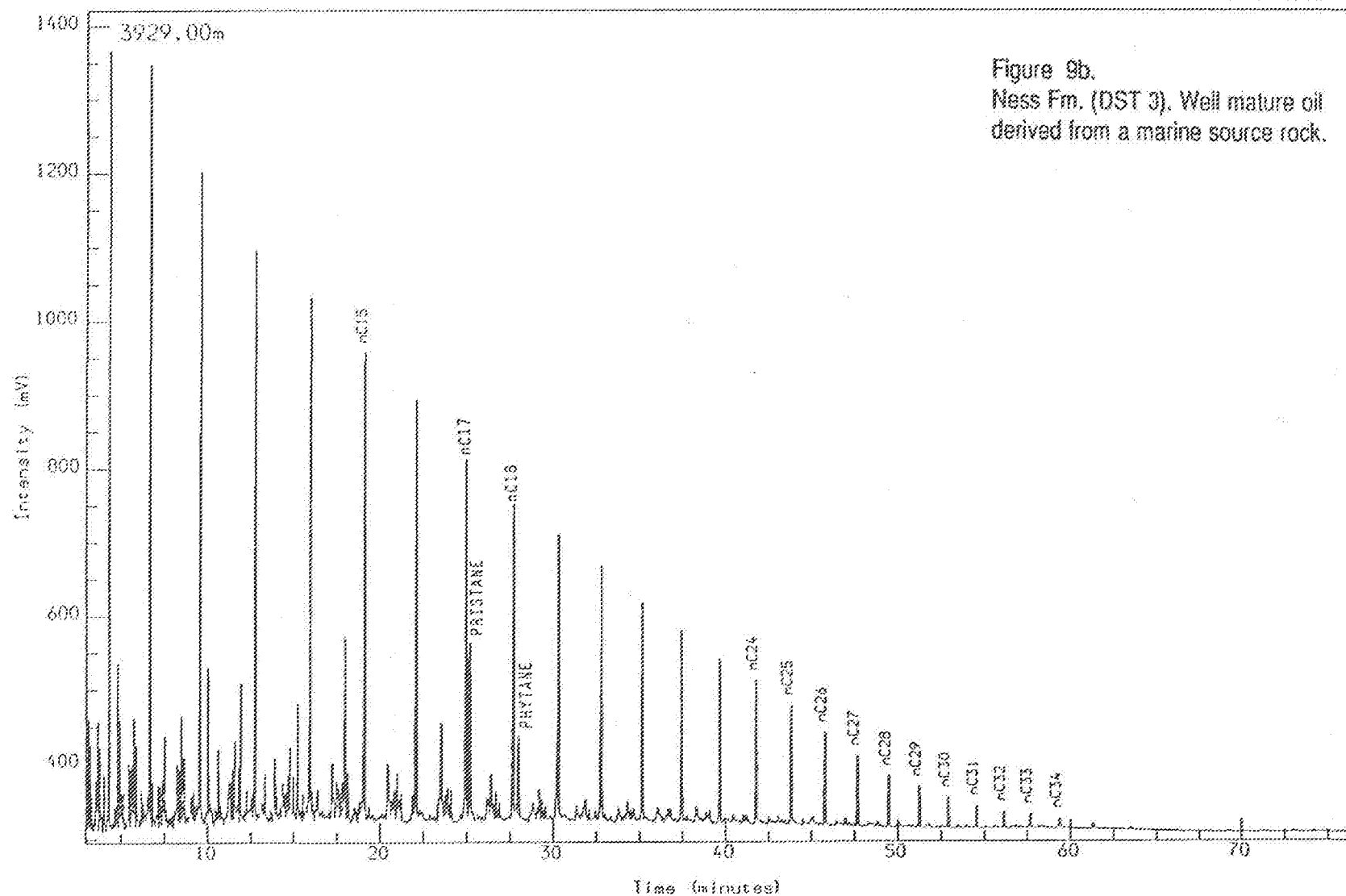
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GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SH4700610B,3.1.

Multichrom



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Reported on 31-AUG-1992 at 10:01

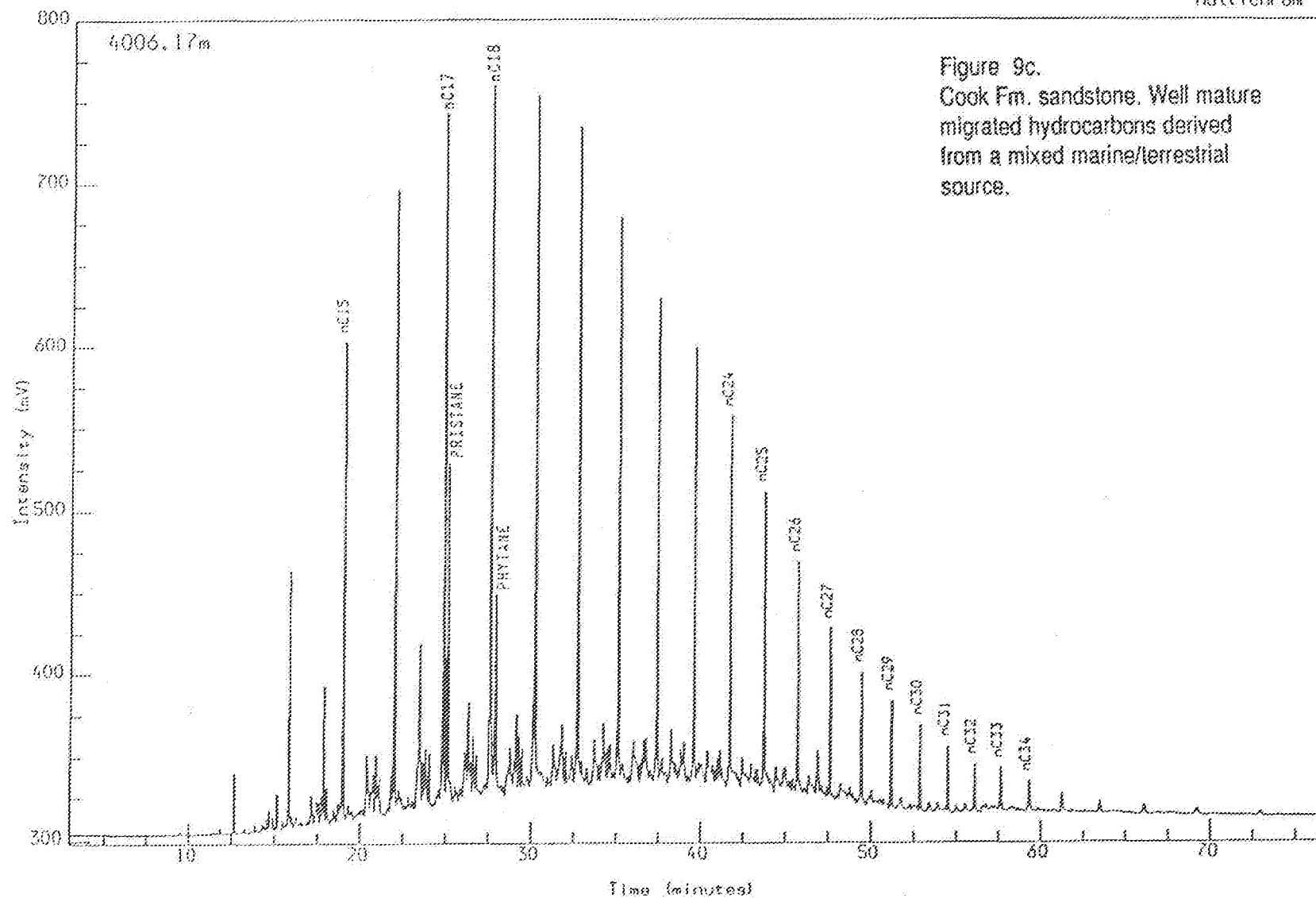
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GECO-PRAKIA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403581L,9,1.

Multichrom



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SATURATED GC
S/Sst: gy w to brn gy to dsk brn

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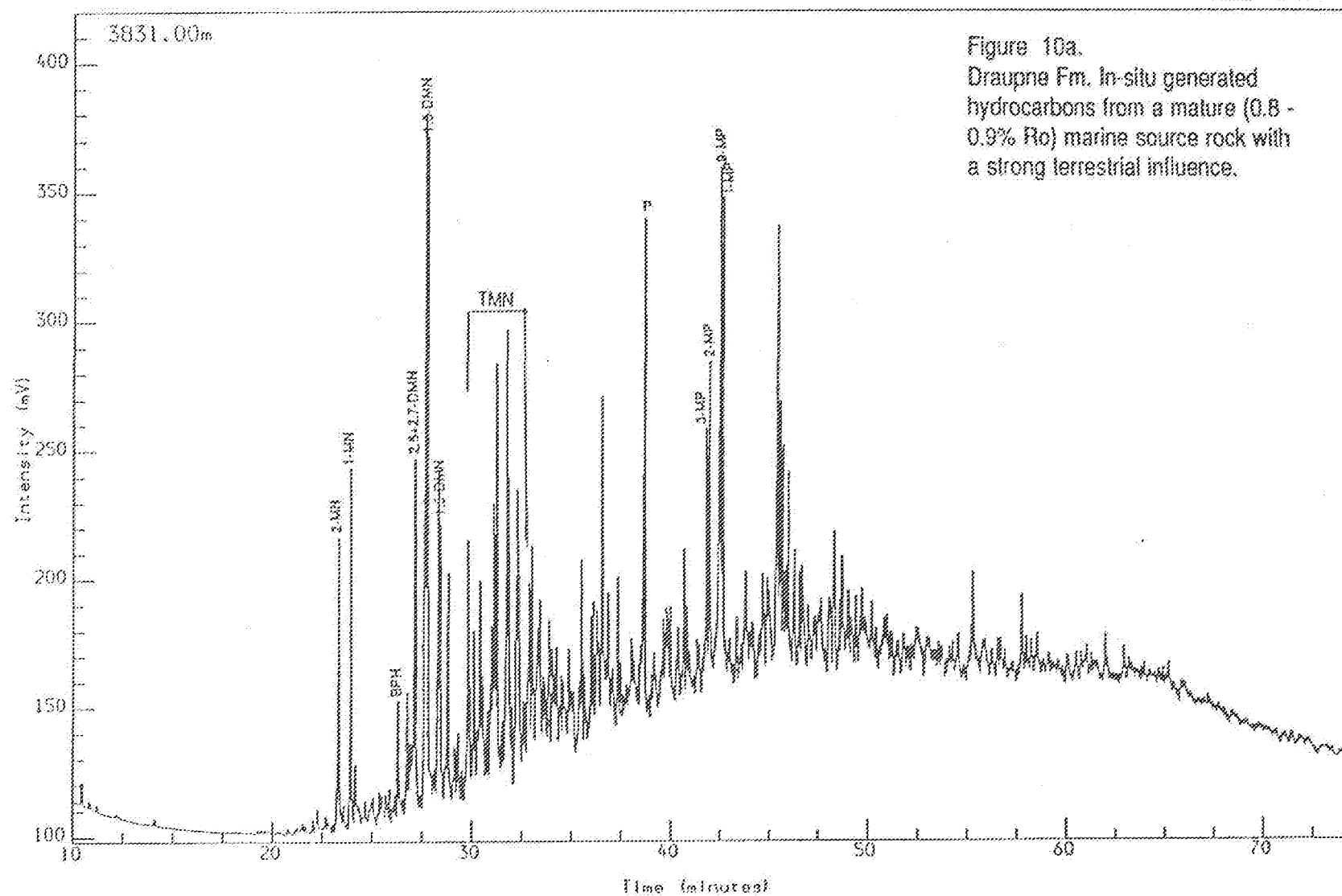
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GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 RG3403581L,4,1.

Multichrom



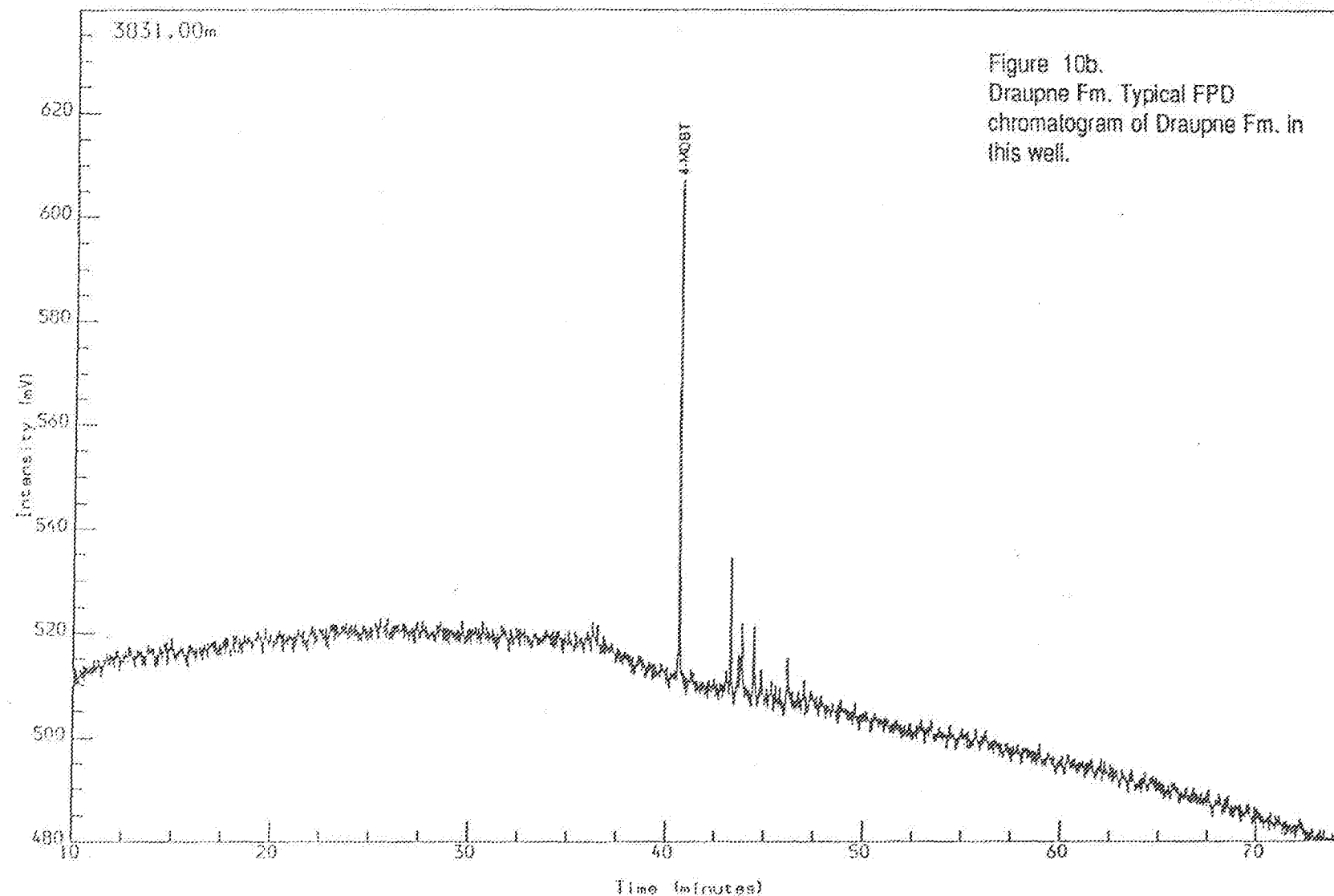
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AROMATIC GC (FID)
Sh/Clst: m gy to drk gy

Reported on 31-AUG-1992 at 05:10

Schlumberger

GECO-PRAKLA

GEOLAB NOR



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AROMATIC GC (FPD)
Sb/Clst: m gy to drk gy

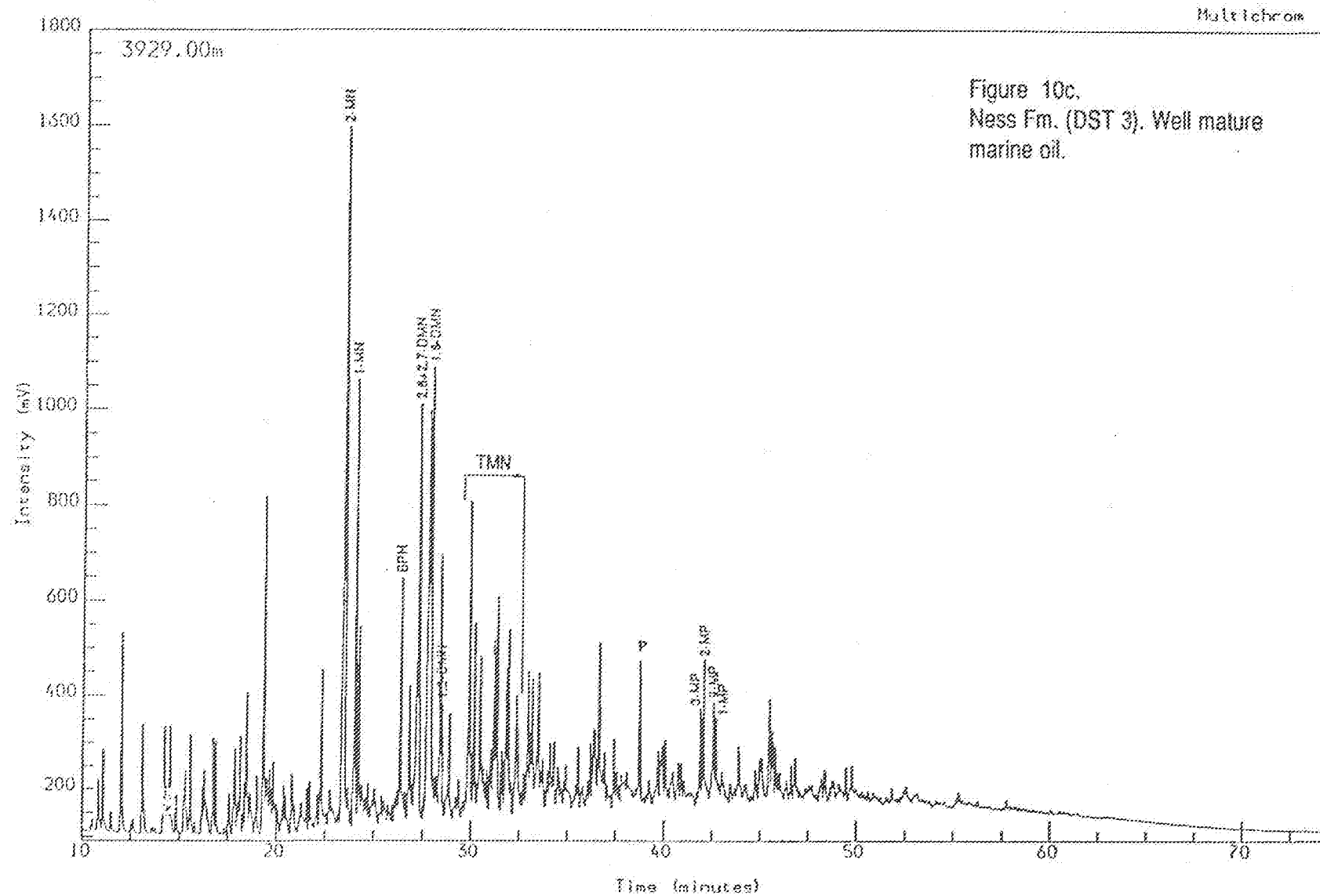
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GECO-PRAKLA

GEOLAB/NOR

Analysis Name : [526265] 29 AH4700610B.3.1.



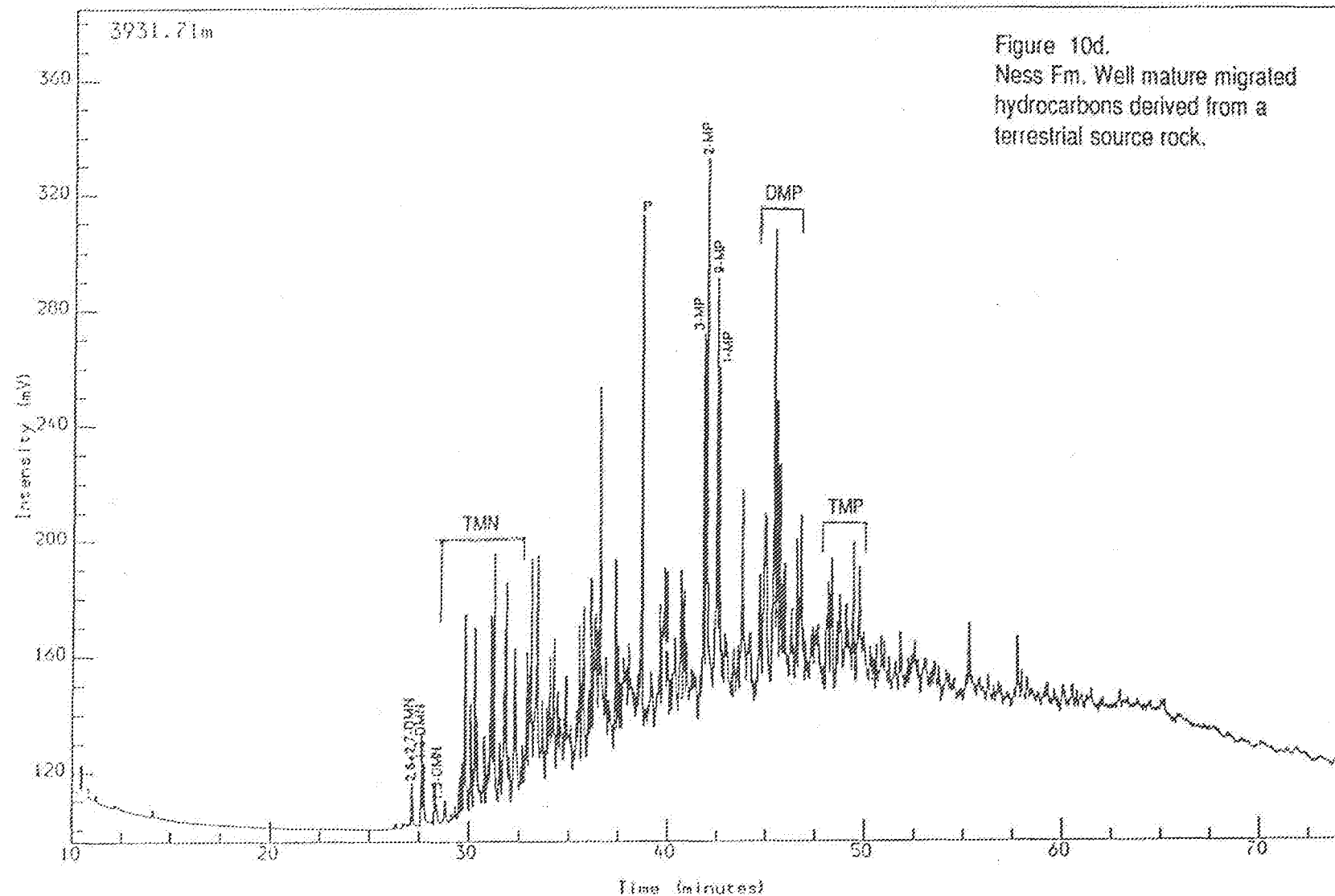
WELL NDCS 34/10-35 3920-3929m
AROMATIC GC (FID)

Reported on 31-AUG-1992 at 10:11

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35
AROMATIC GC (FID)
S/Sst: pl y bcn

3931.71m ccp

Reported on 31-AUG-1992 at 05:15

Schlumberger

GECO-PRAKLA

GEOLAB NOR

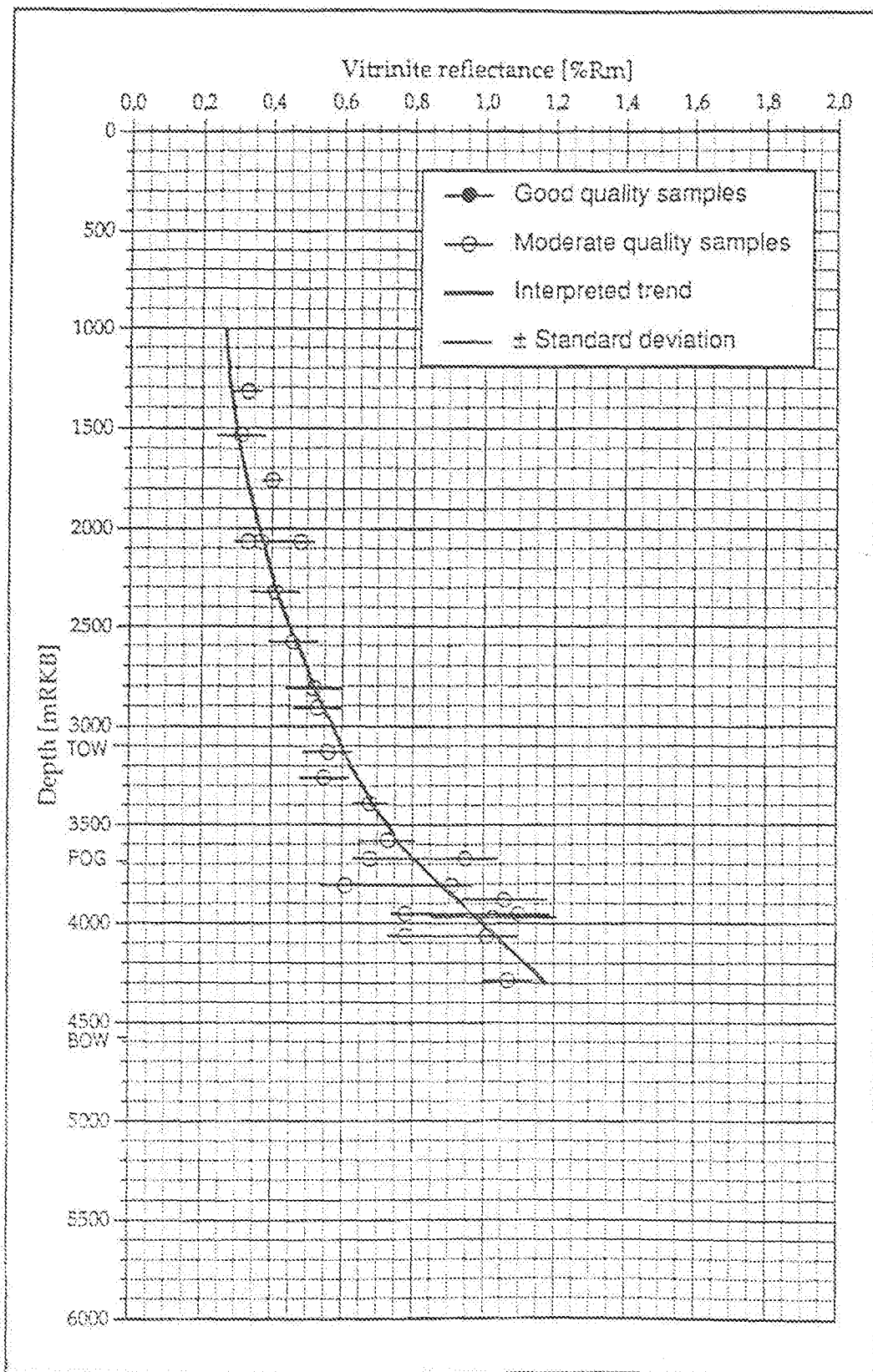


Figure 11a. vitrinite reflectance (linear scale) versus depth, well 34/10-35.

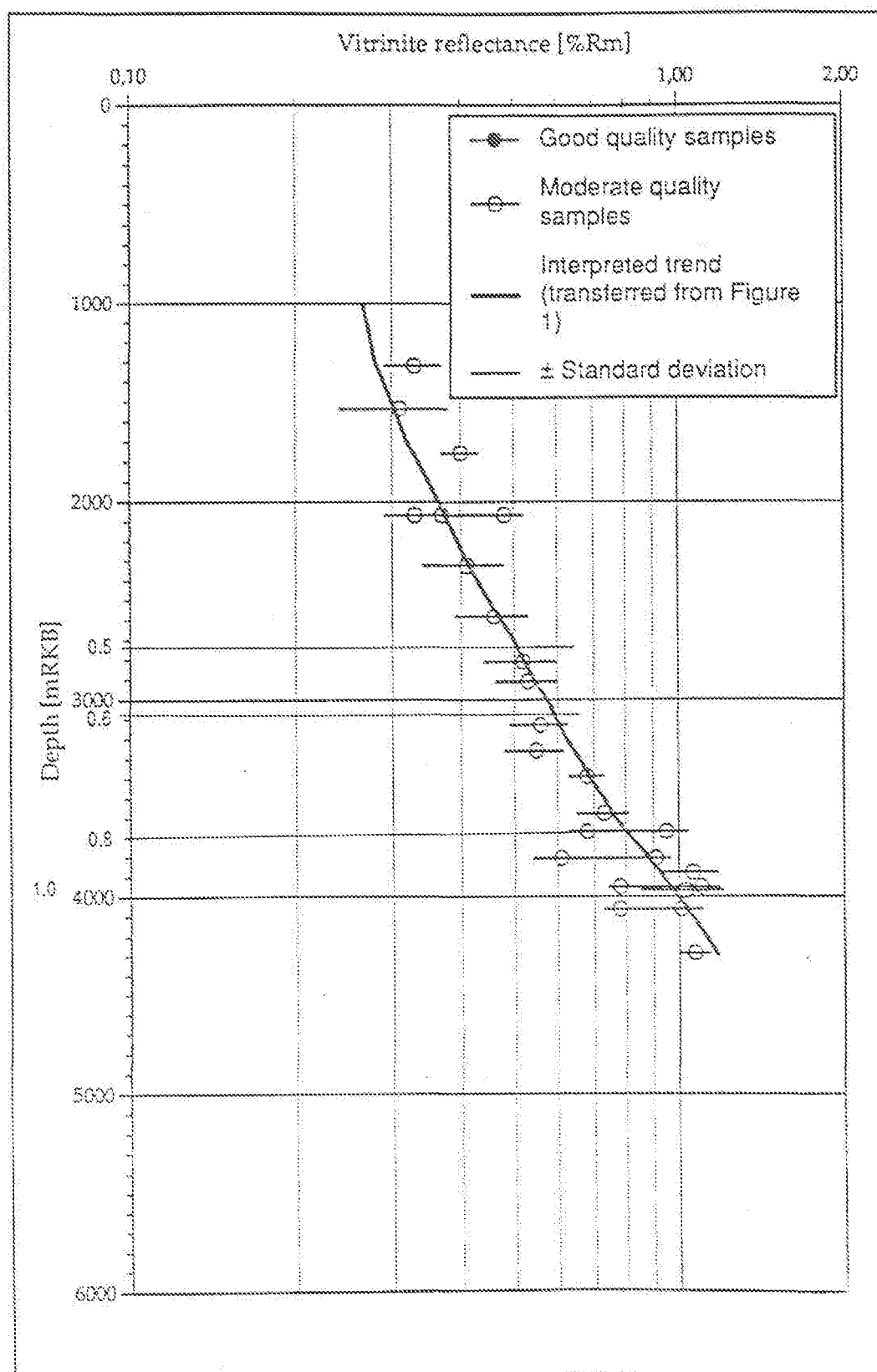


Figure 11b. Vitrinite reflectance (log scale) versus depth, well 34/10-35.

Figure 12: Kerogen Composition and Potential Hydrocarbon Products
Well NOCS 34/10-35

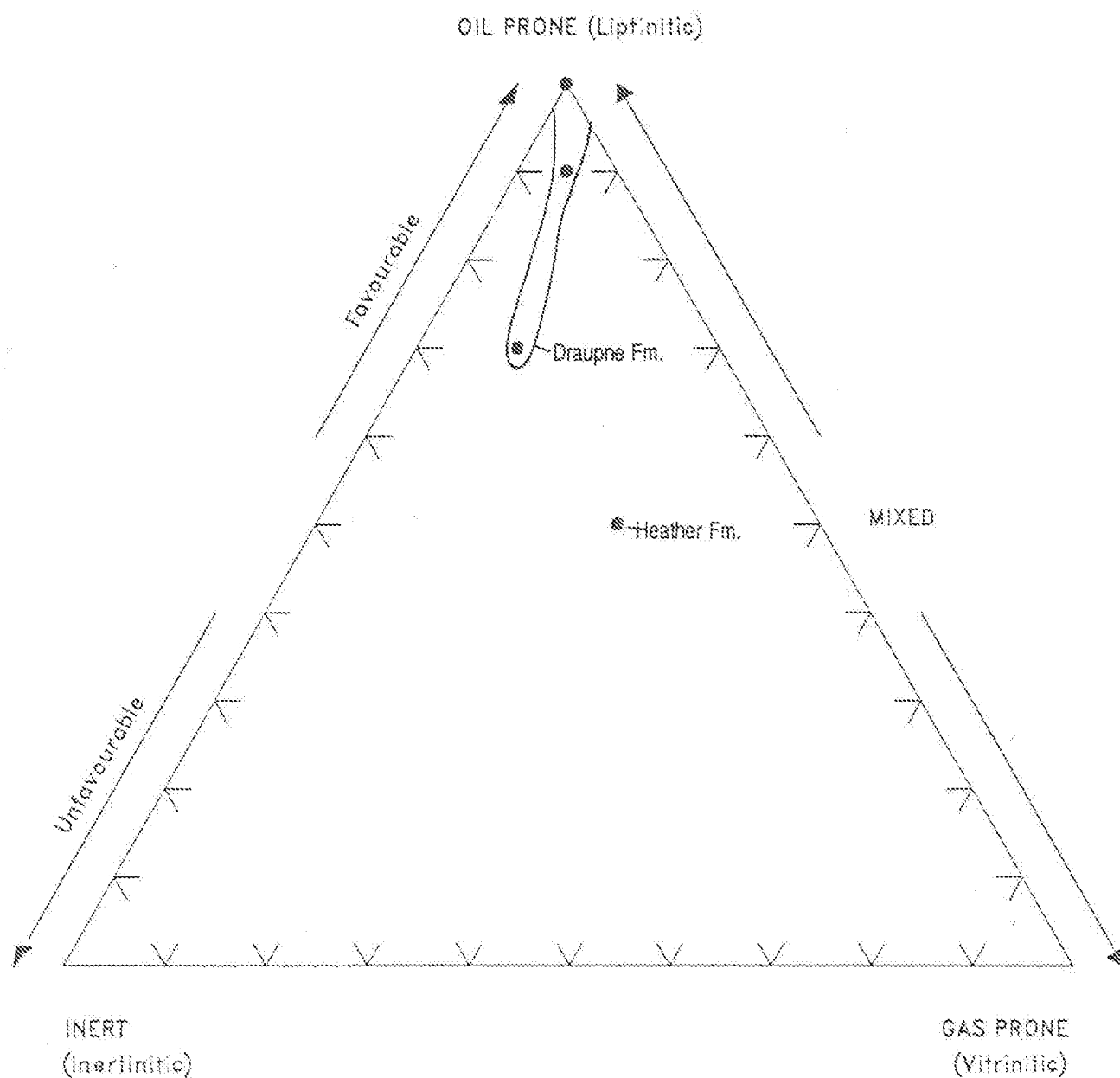


Figure 13: Aromatic v.s. saturate isotope values

Well NOCS 34/10-35

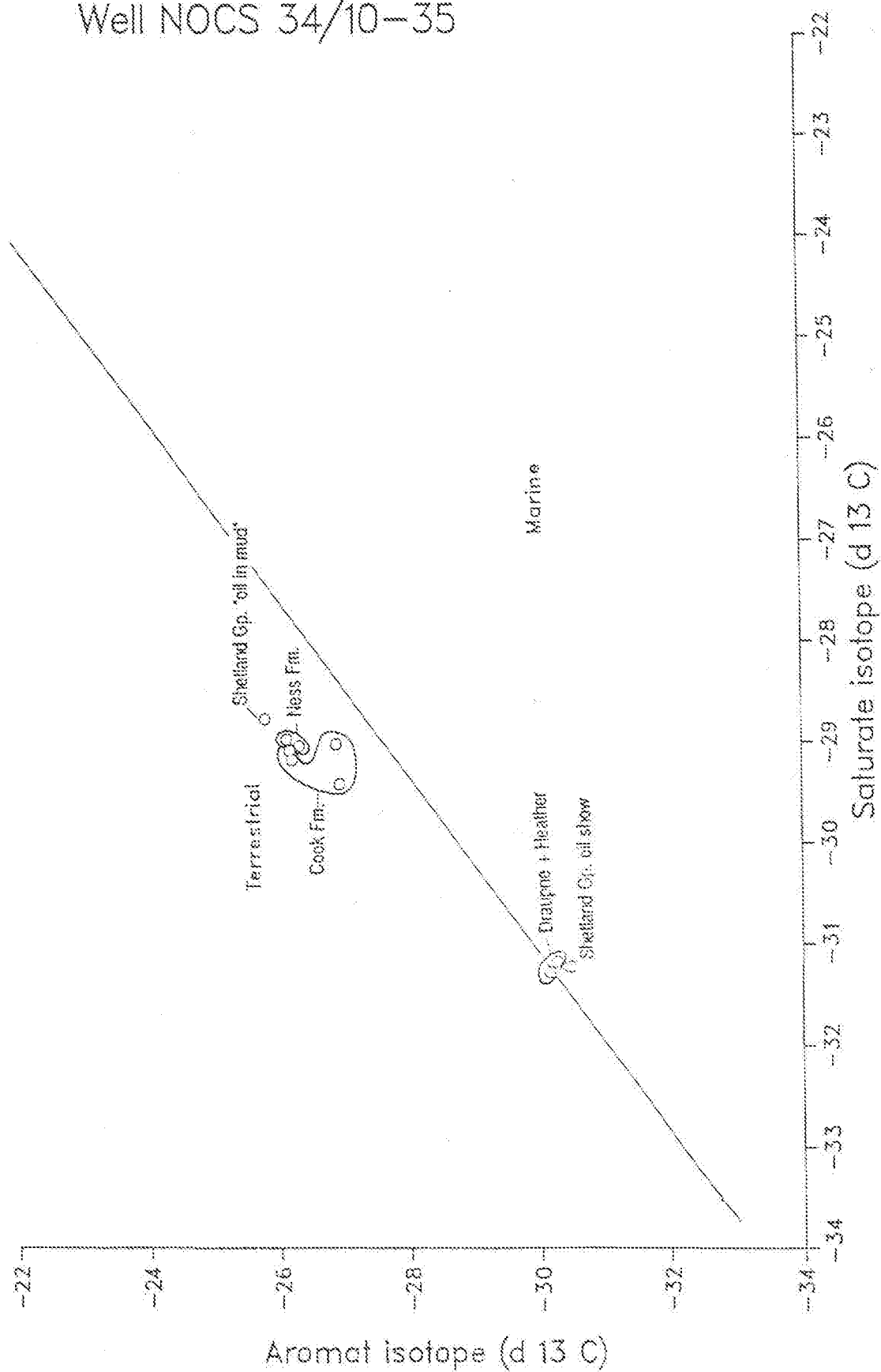


Figure 14: $^{13}\text{C}/^{12}\text{C}$ isotope ratios. Galimov plot.
Well NOCS 34/10-35

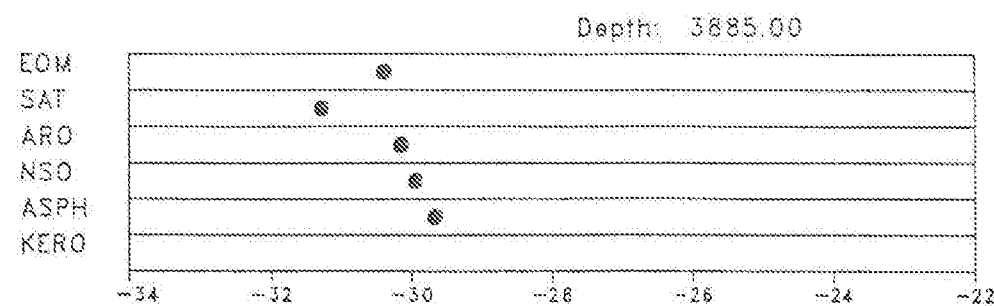
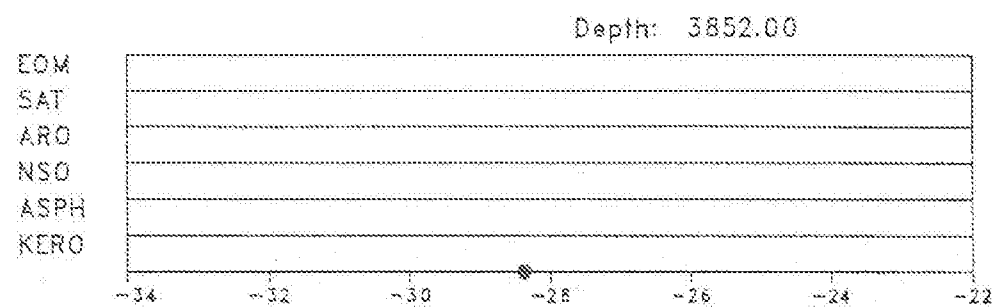
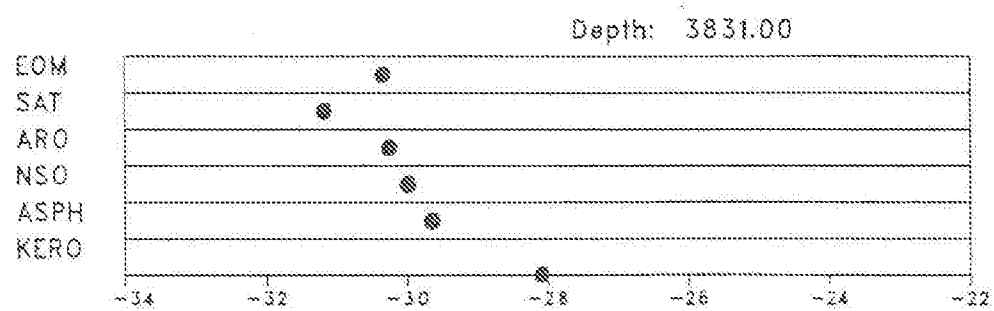
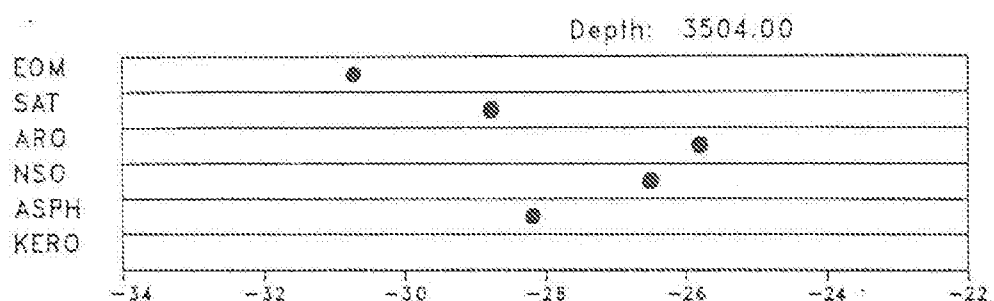


Figure 14: $^{13}\text{C}/^{12}\text{C}$ isotope ratios. Galimov plot.
Well NOCS 34/10-35

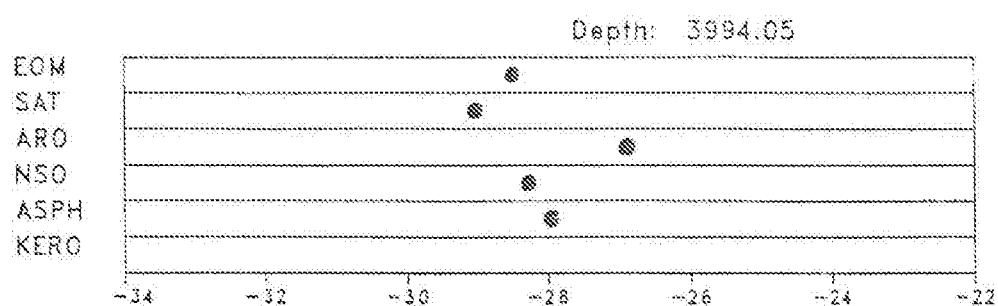
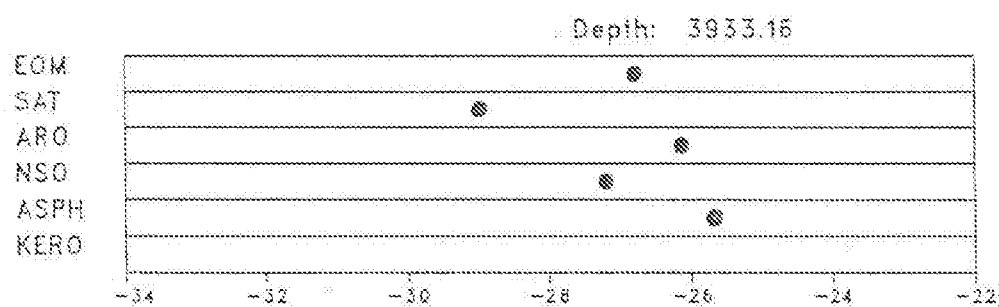
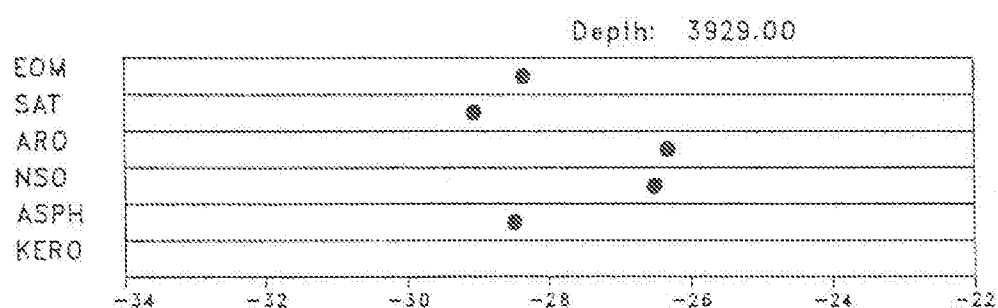
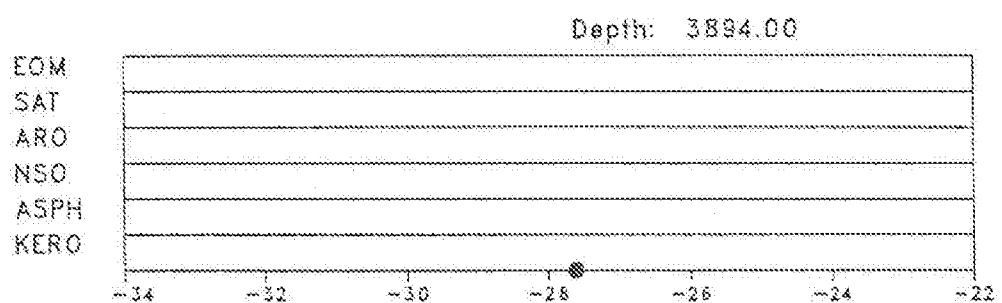
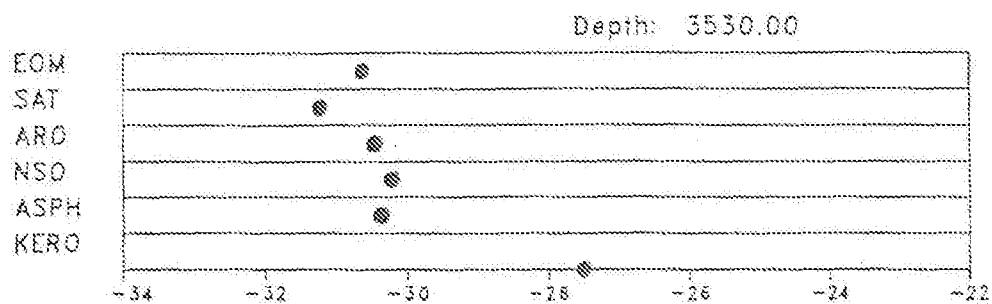
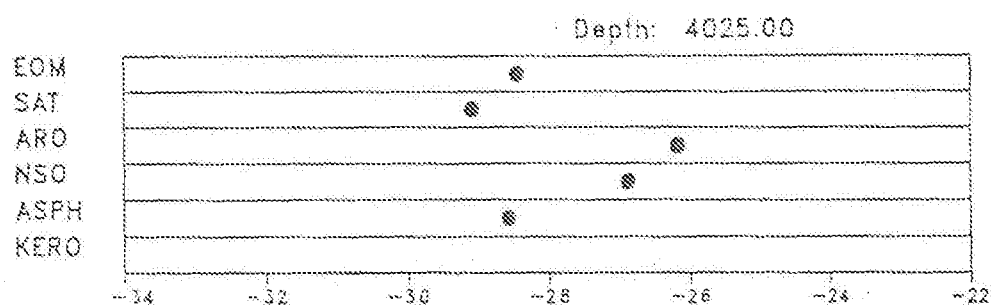
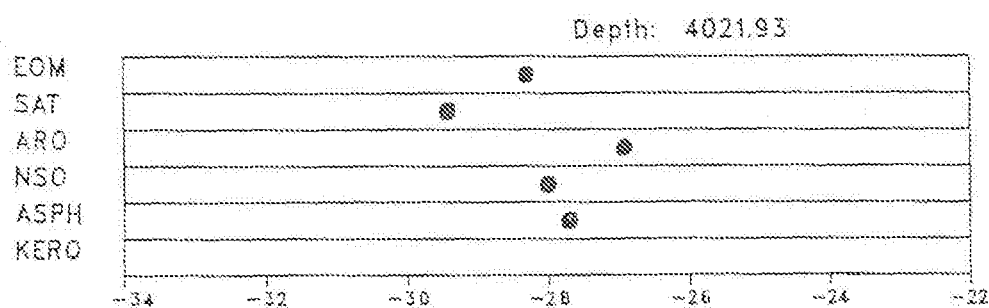
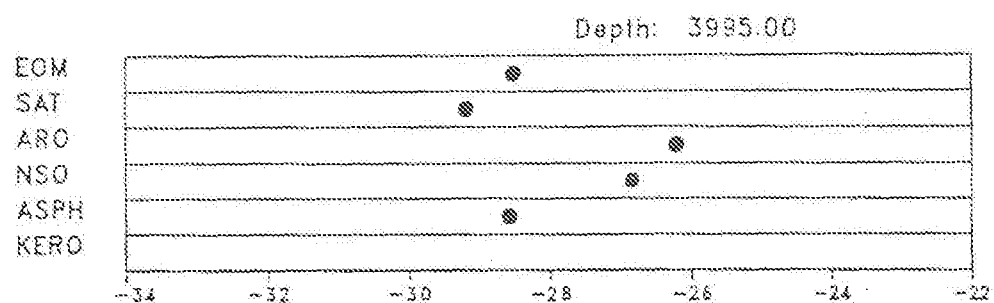
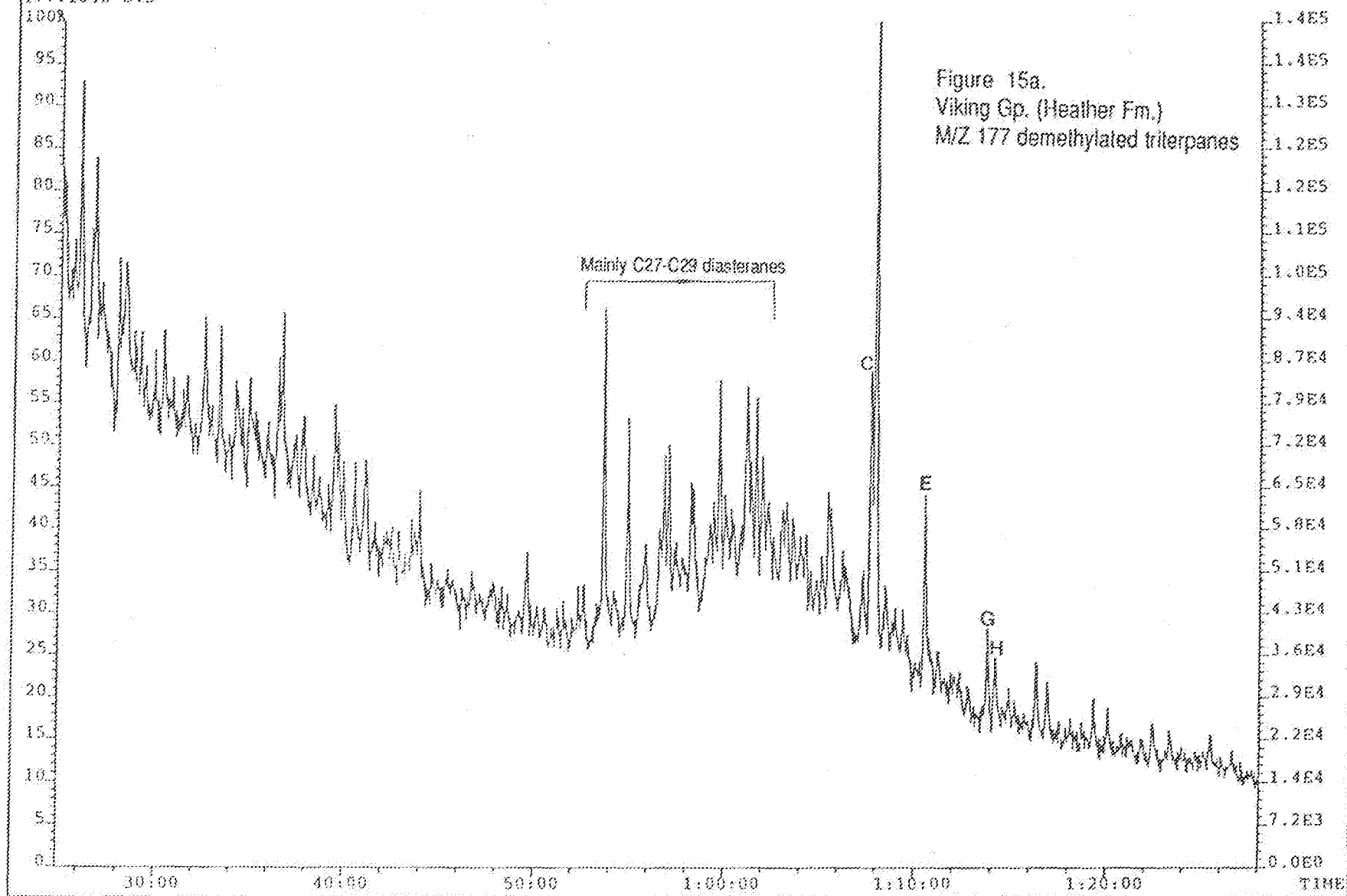


Figure 14: $^{13}\text{C}/^{12}\text{C}$ isotope ratios. Galimov plot.
Well NOCS 34/10-35



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177.1642 9:5

Exp:SAT1



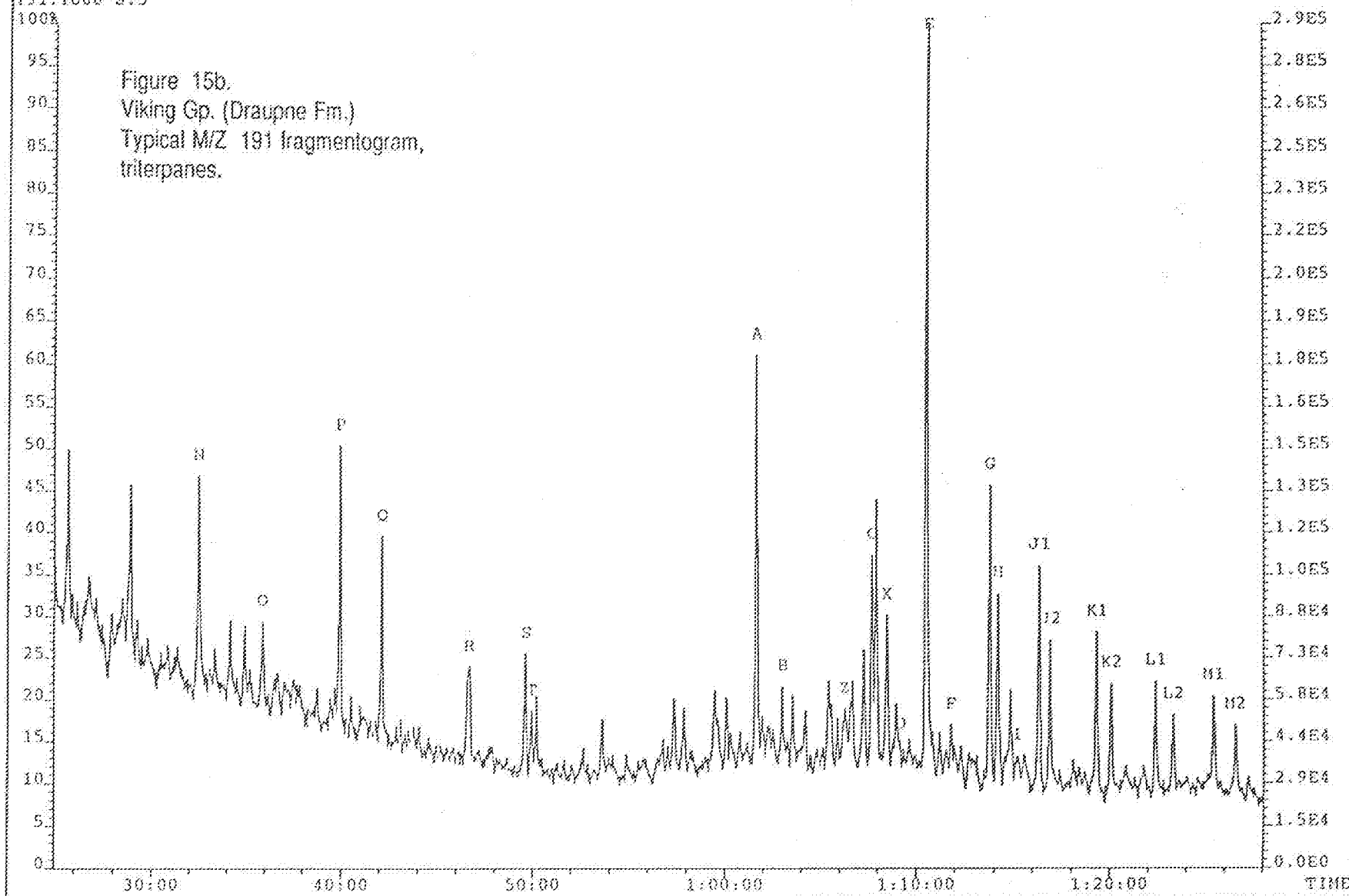
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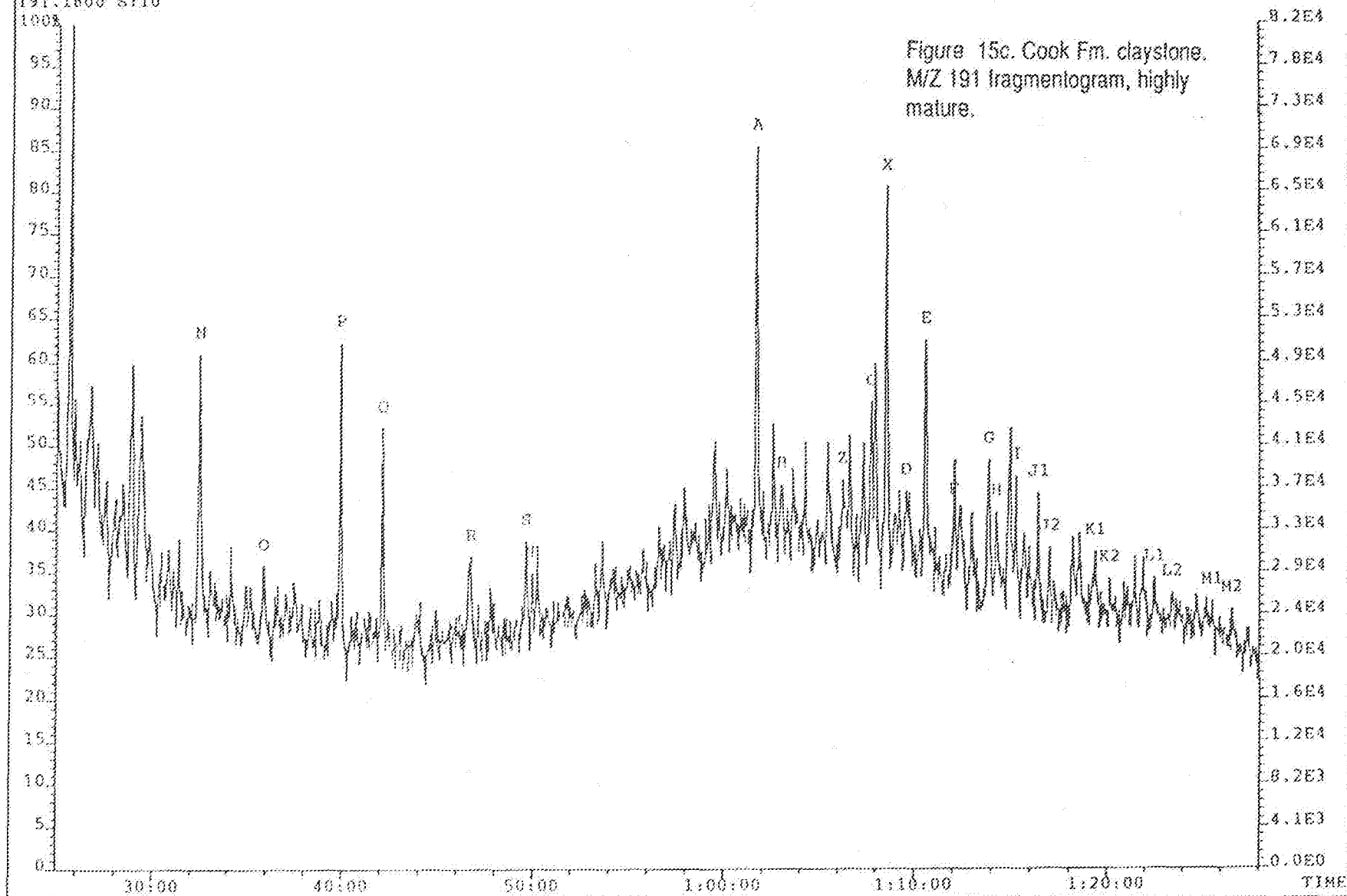
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 191.1800 S:5

Exp:SAT1



File:STATSAT2 W1-4739 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
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Exp:SAT1



Schlumberger

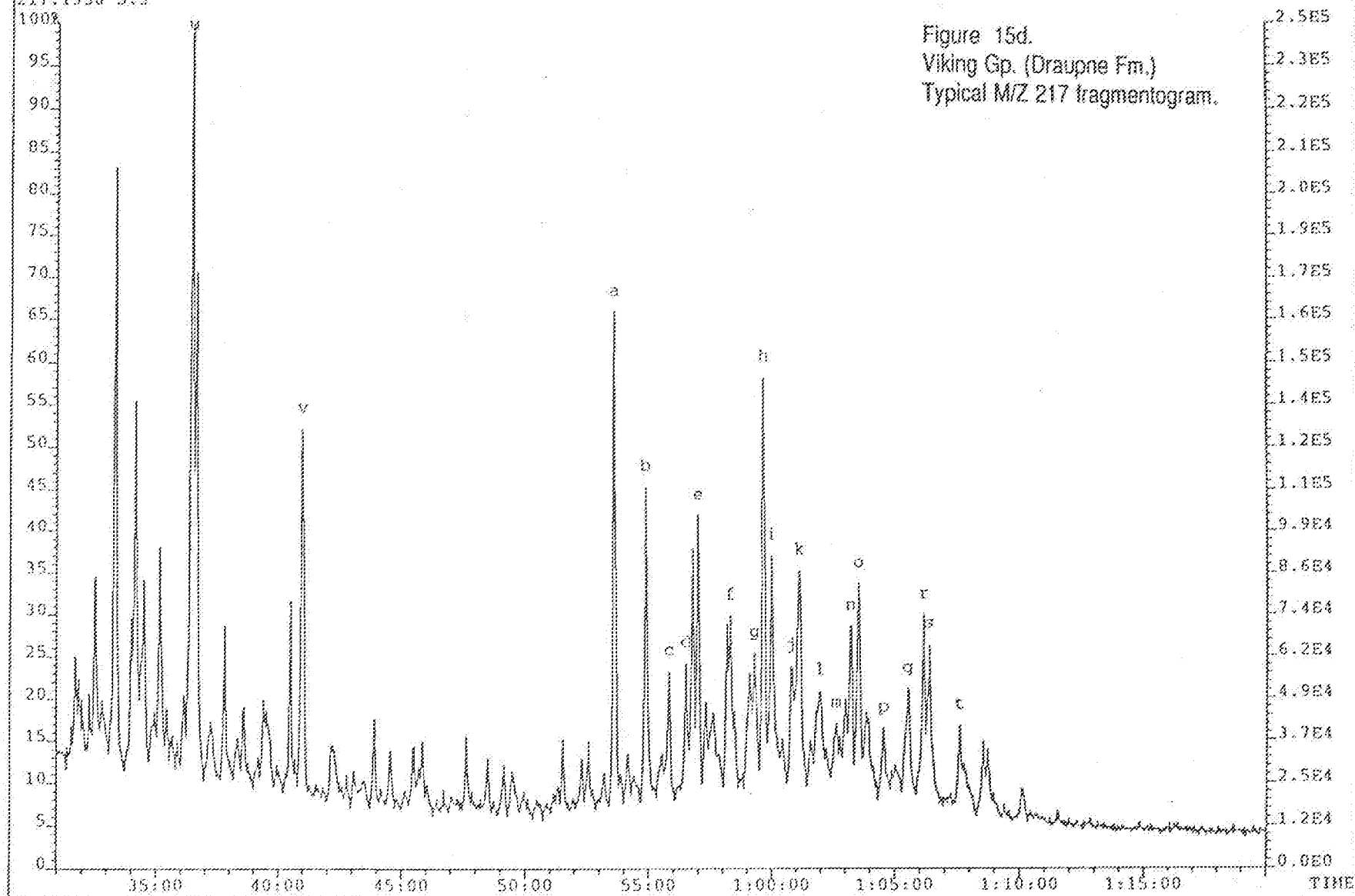
GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1997,14:11:15 E14 Magnet SIR
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Exp:SAT1

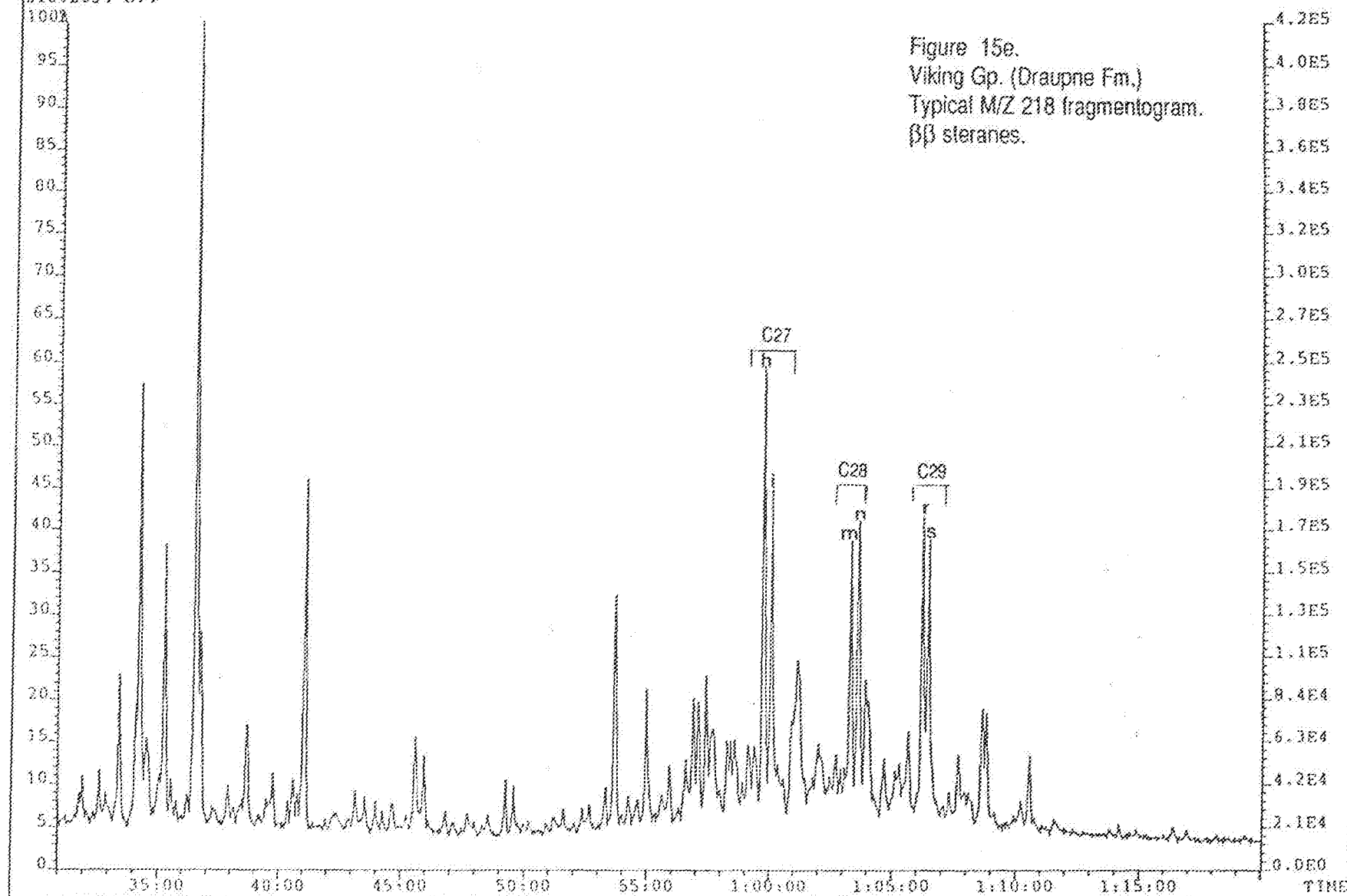
Figure 15d.
 Viking Gp. (Draupne Fm.)
 Typical M/Z 217 fragmentogram.



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210.2034 S:4

Exp:SAT1

Figure 15e.
Viking Gp. (Draupne Fm.)
Typical M/Z 218 fragmentogram.
 $\beta\beta$ steranes.



Schlumberger

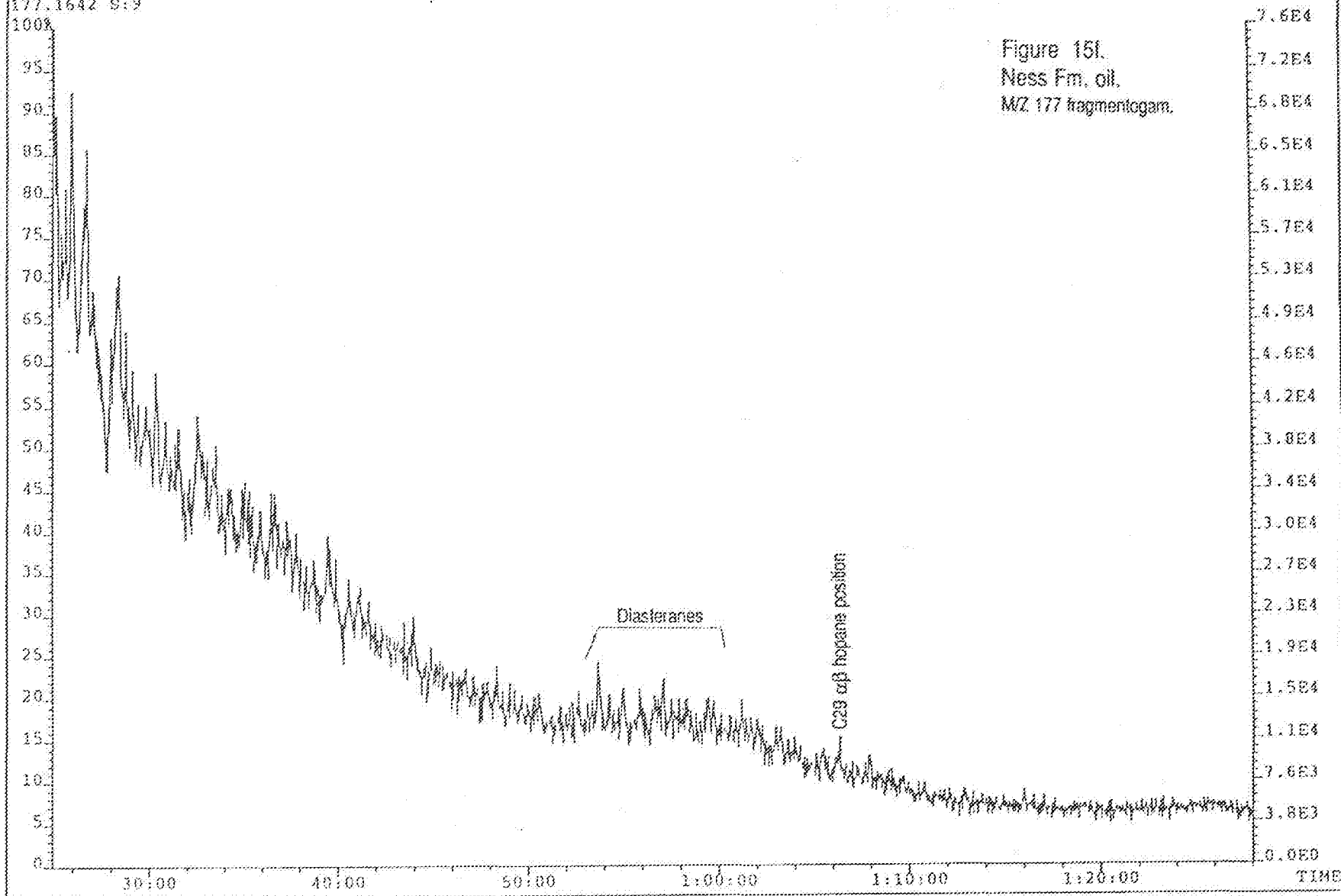
GECO-PRAXIA

GEOLAB NOR

FILE: STASAT11 FI-3740 Acq: 23-SEP-1992 13:30F MI: Magnet SIR
 Sample#9 Text: WELL 34/10-35, DSTB, 3920-29H, SATURATED FRACTION FROM OIL.
 177.1642 9:9

Exp: SAT1

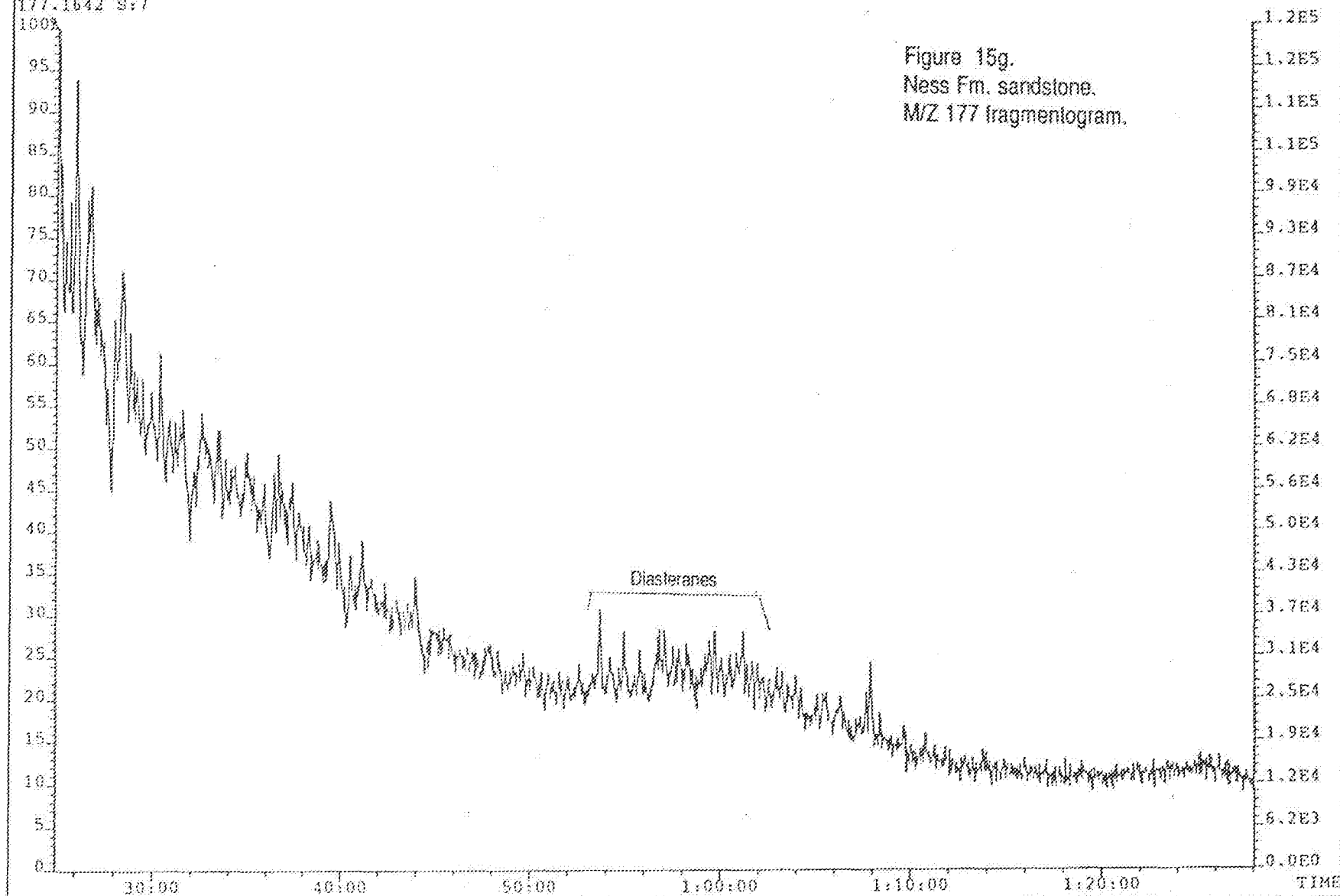
Figure 15f.
 Ness Fm. oil.
 M/Z 177 fragmentogram.



File:STATSAT2 #1-4719 Acq:22-SEP-1992 04:23:15 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933,16H, SATURATED FRACTION
177.1642 S:7

Exp:SAT1

Figure 15g.
Ness Fm. sandstone.
M/Z 177 fragmentogram.



Schlumberger

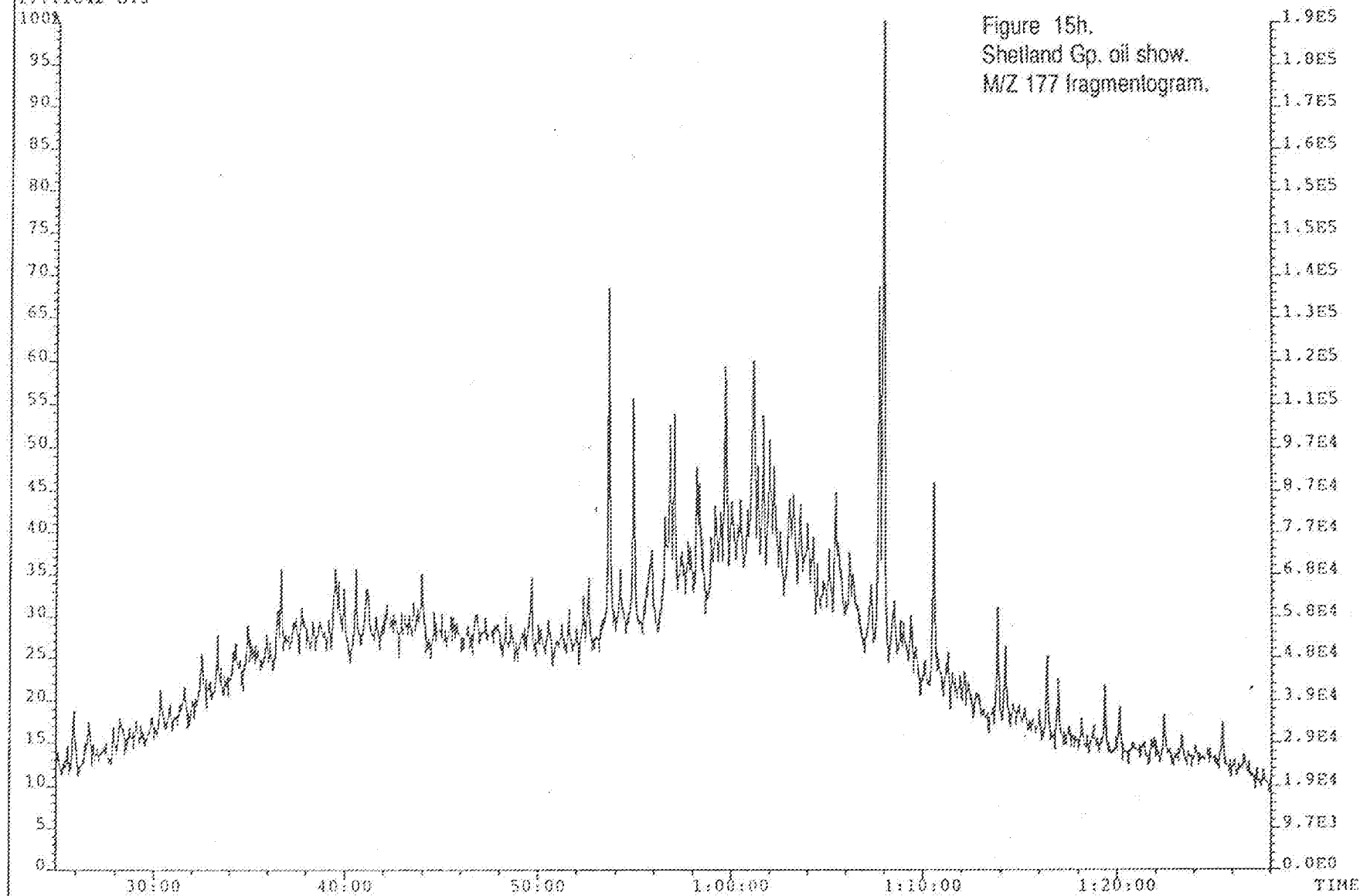
GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet 918
Sample#3 Test:WELL 34/10-35, 3539M, SATURATED FRACTION
177.1642 S:3

Exp:SAT1

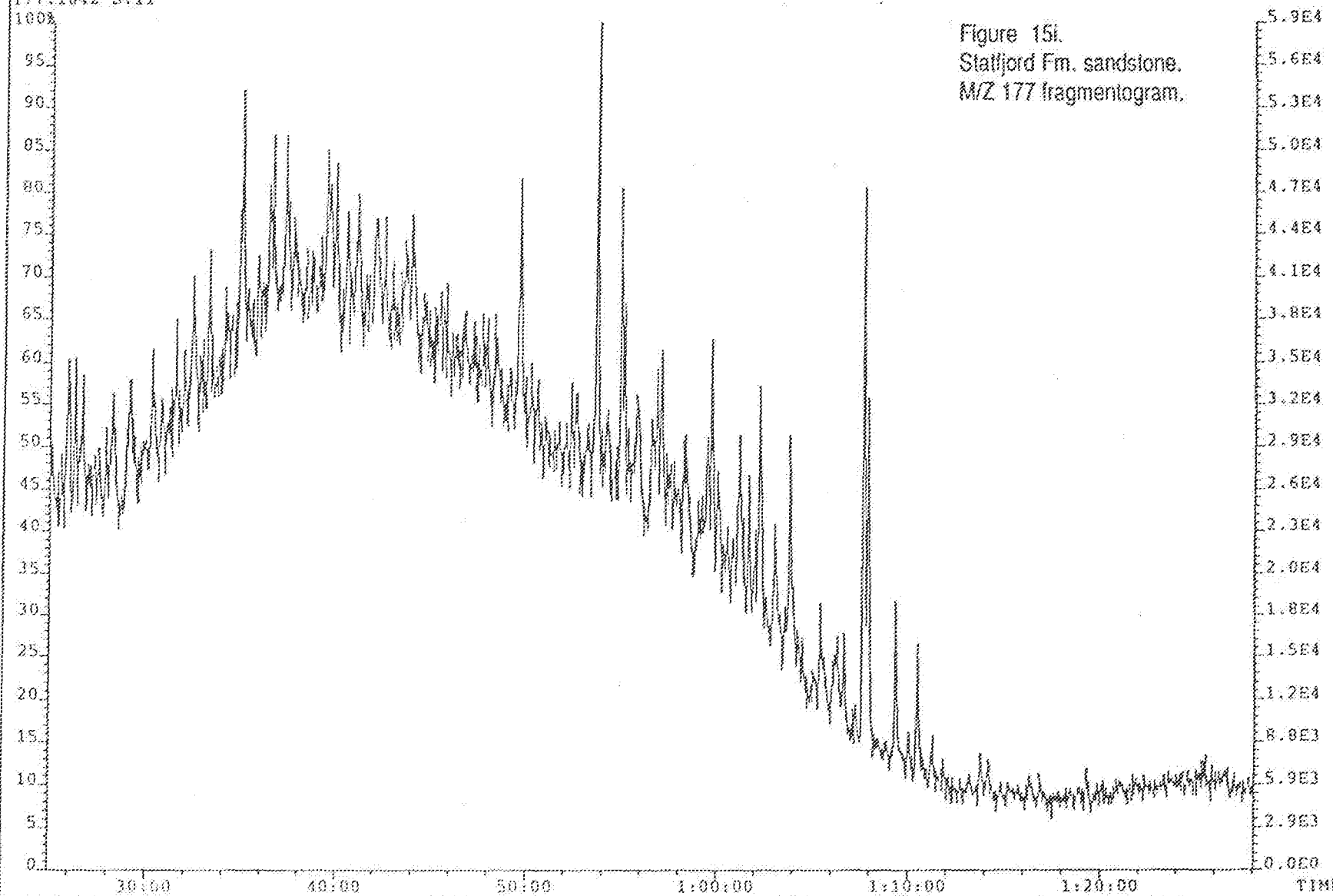
Figure 15h.
Shetland Gp. oil show.
M/Z 177 fragmentogram.



File:STATSAT2 #1-4741 Acq:22-SEP-1992 14:23:15 EIP Magnet SIM
Sample#11 Text:WELL 34/10-35, 4257.47M, SATURATED FRACTION
177.1642 S:11

Exp: SAT1

Figure 15i.
Statfjord Fm. sandstone.
M/Z 177 fragmentogram.



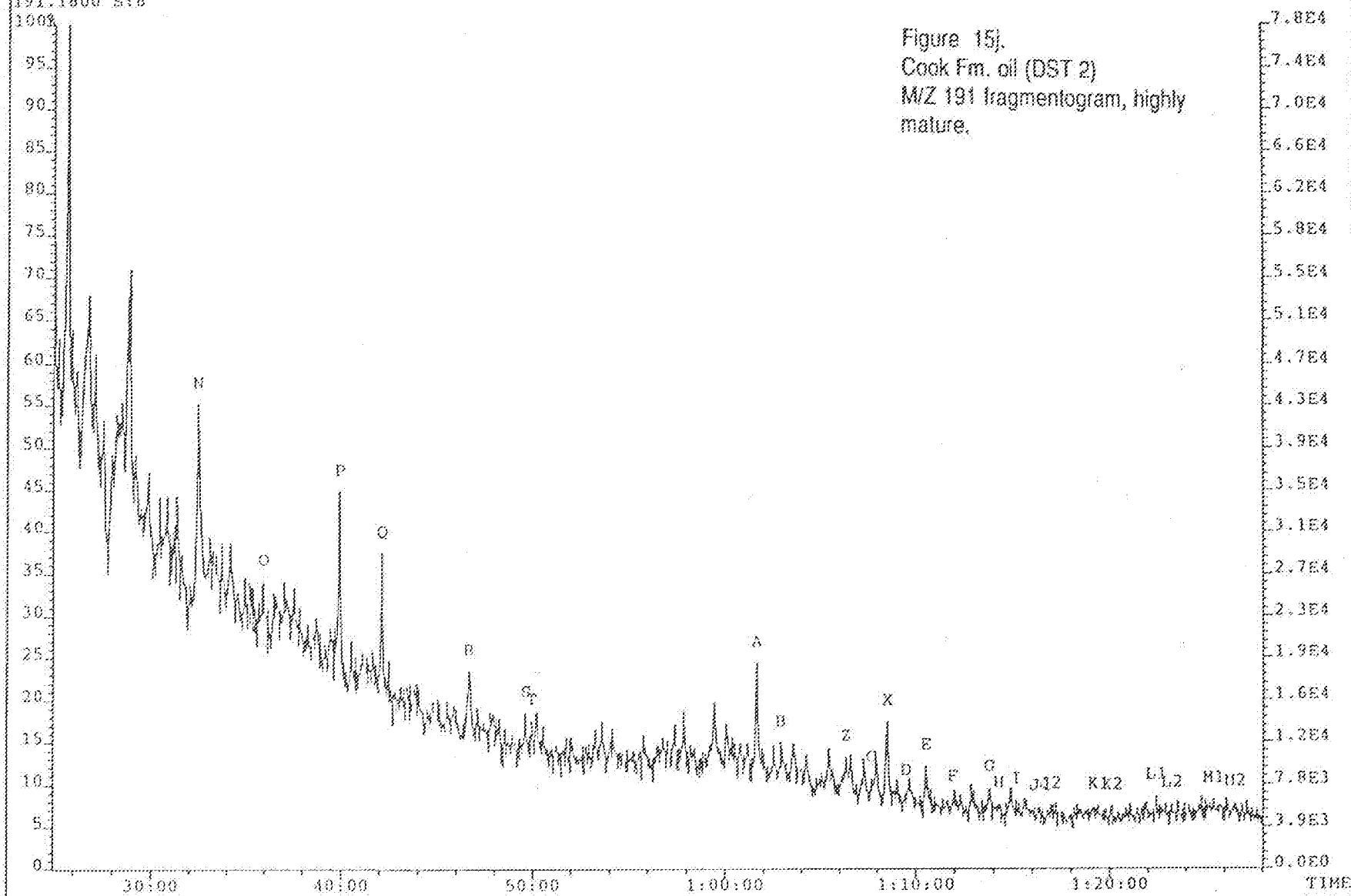
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 RI-4740 Acq:23-SEP-1992 13:38:02 E1: Magnet 31R
Sample#0 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL
191.1800 S:0

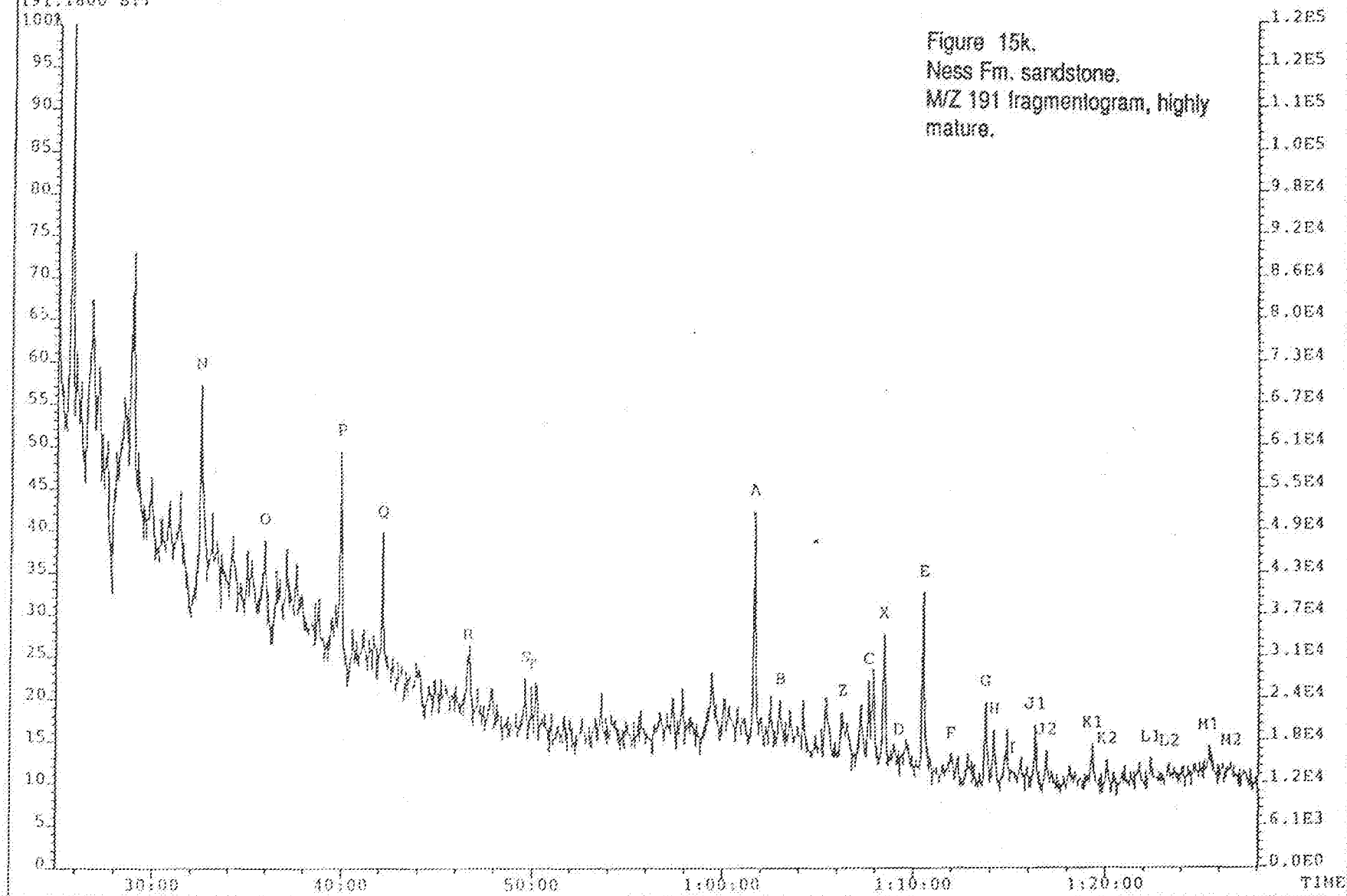
EXP: SAT1



File:STATSAT2 #1-4739 Acq:12-SEP-1997,14:23:15 E14 Magnet 61R
 Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
 191.1800 S:7

Exp:SAT1

Figure 15k.
 Ness Fm. sandstone.
 M/Z 191 fragmentogram, highly
 mature.



Schlumberger

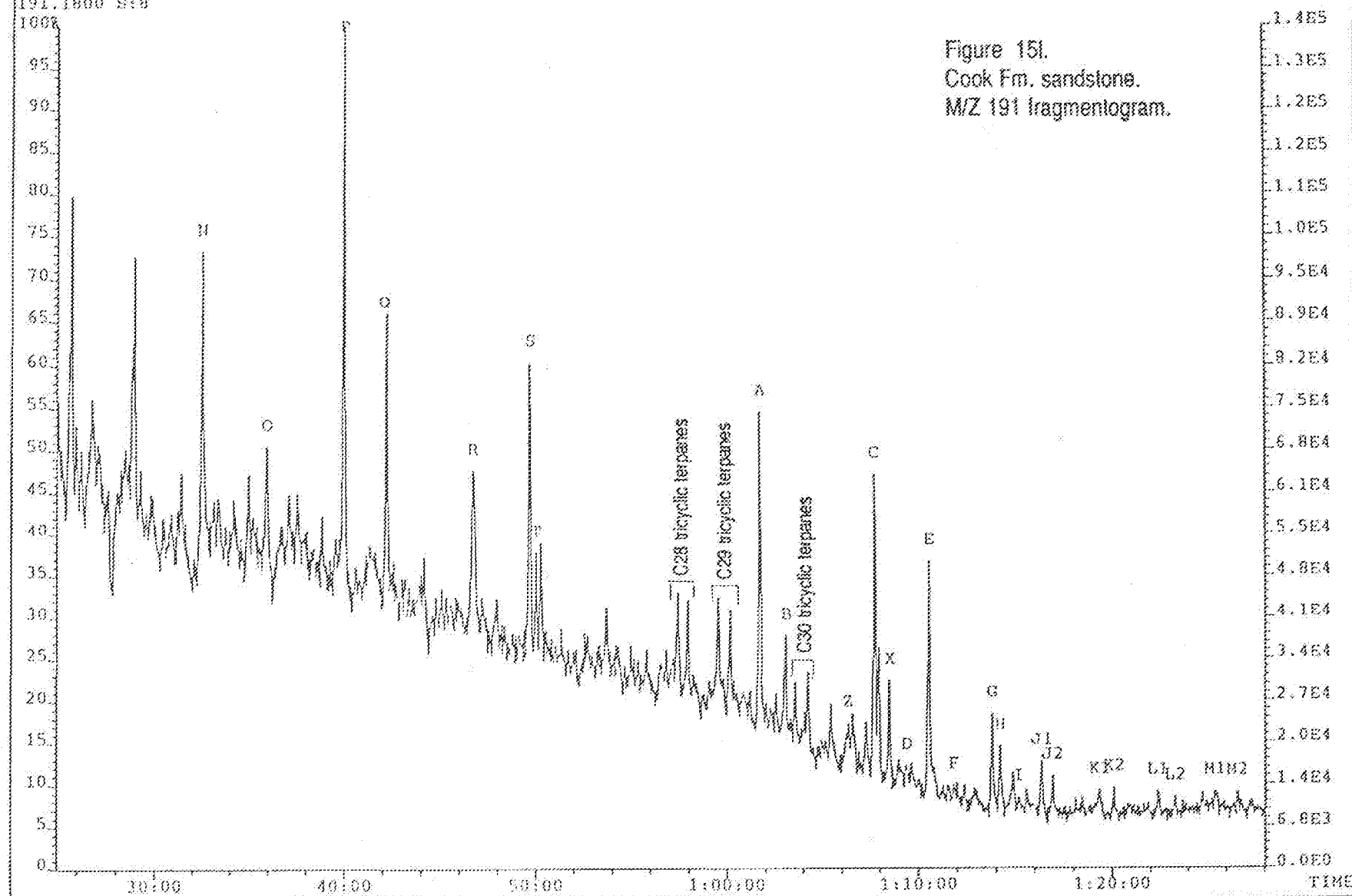
GECO-PRAKLA

GEOLAB NOR

File:STATSAT2.WI-4719 Acq:22-SEP-1992,14:23:15 EI: Magnet SIN
 Sample#8 Text:WELL 34/10-35, 3994.05M, SATURATED FRACTION
 191.1800 S:0

Exp:SAT1

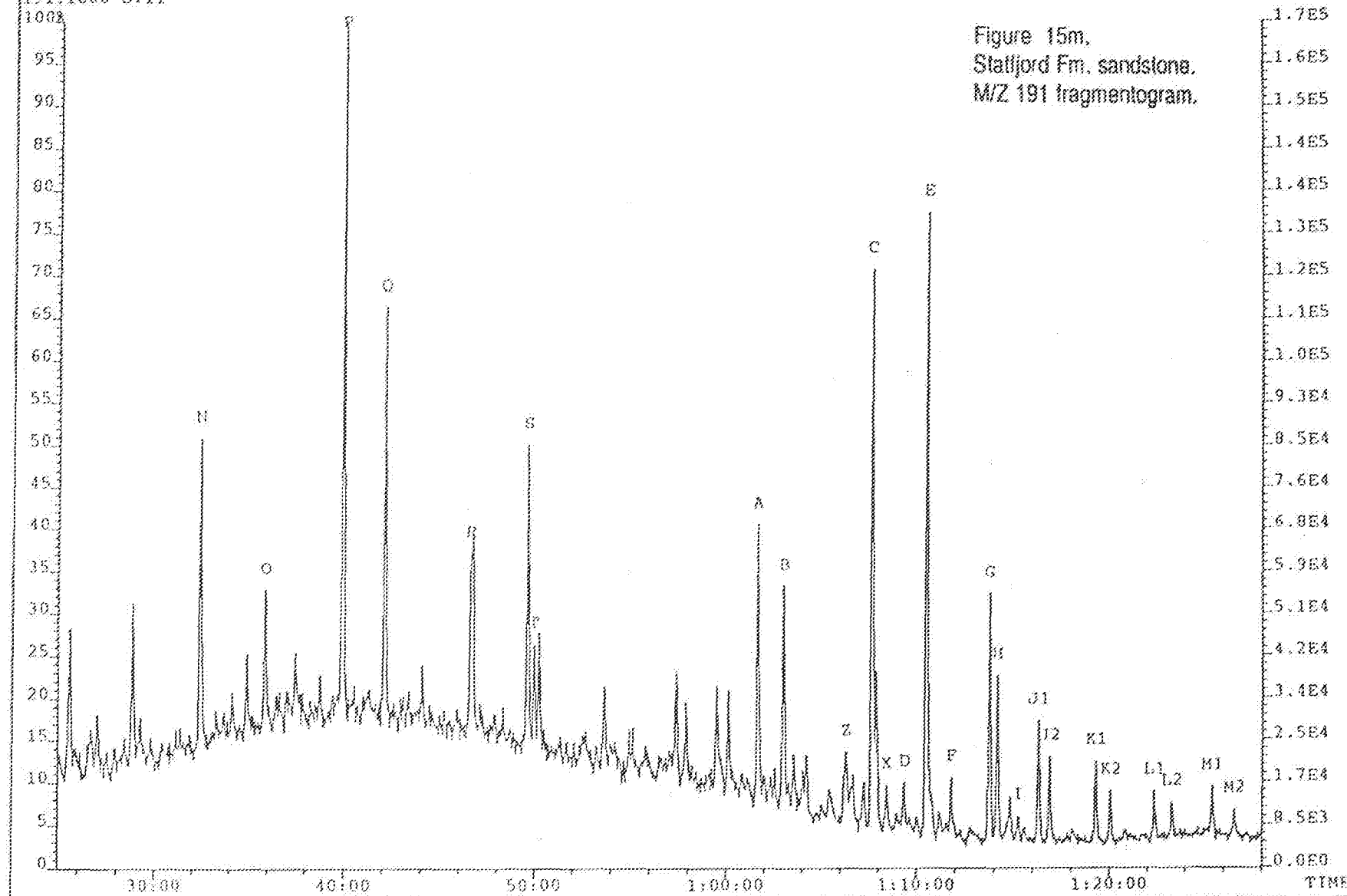
Figure 15I.
 Cook Fm. sandstone.
 M/Z 191 fragmentogram.



File:STATSAT2 #1-4741 Acq:22-SEP-1992,14:23:15 E1+ Magnet SIR
 Sample#11 Text:WELL 34/10-35, 4257.47M, SATURATED FRACTION
 191.1800 S:11

Exp:9AT1

Figure 15m.
 Statfjord Fm. sandstone.
 M/Z 191 fragmentogram.



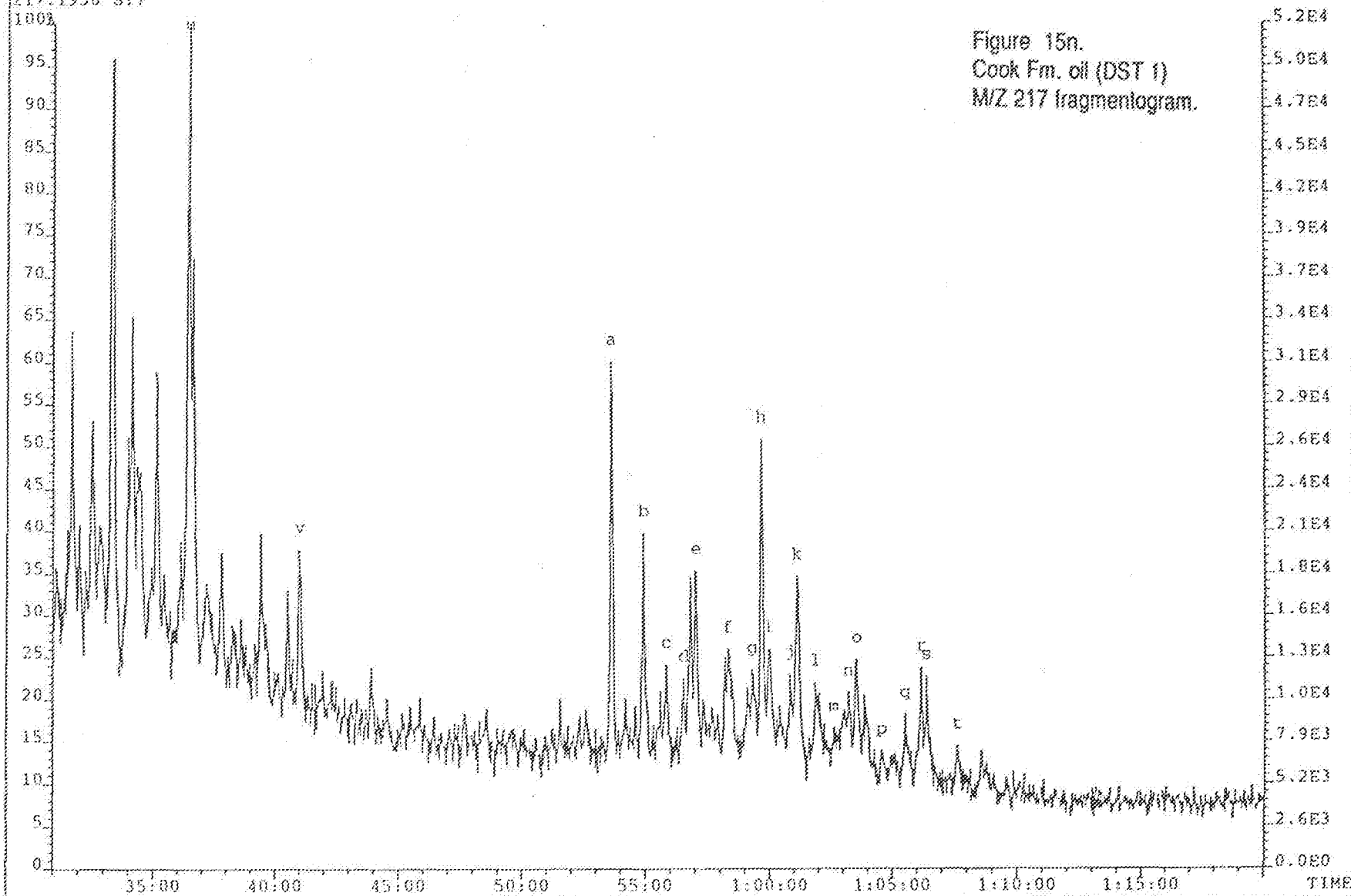
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 13:30:02 EI+ Magnet SIR
 Sample#7 Text:WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL
 217.1956 S:7

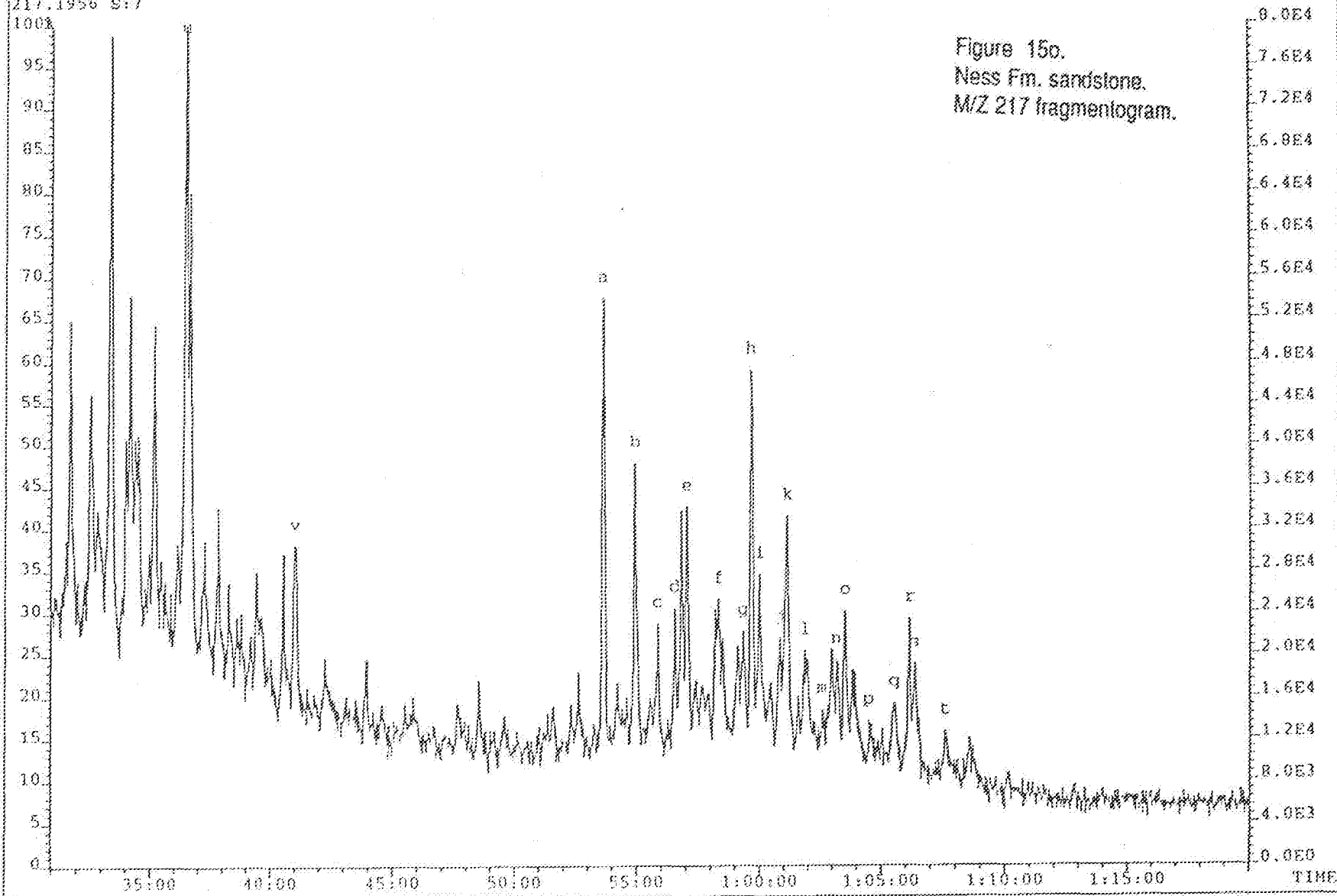
Exp:SAT1



File: STASAT2 HI-4739 Acq: 22-SEP-1992 14:23:15 EI+ Magnet SIR
 Sample#7 Text: WELL 34/10-35, 3933.15H, SATURATED FRACTION
 217.1956 9:7

Exp: SAT1

Figure 15o.
 Ness Fm. sandstone.
 M/Z 217 fragmentogram.



Schlumberger

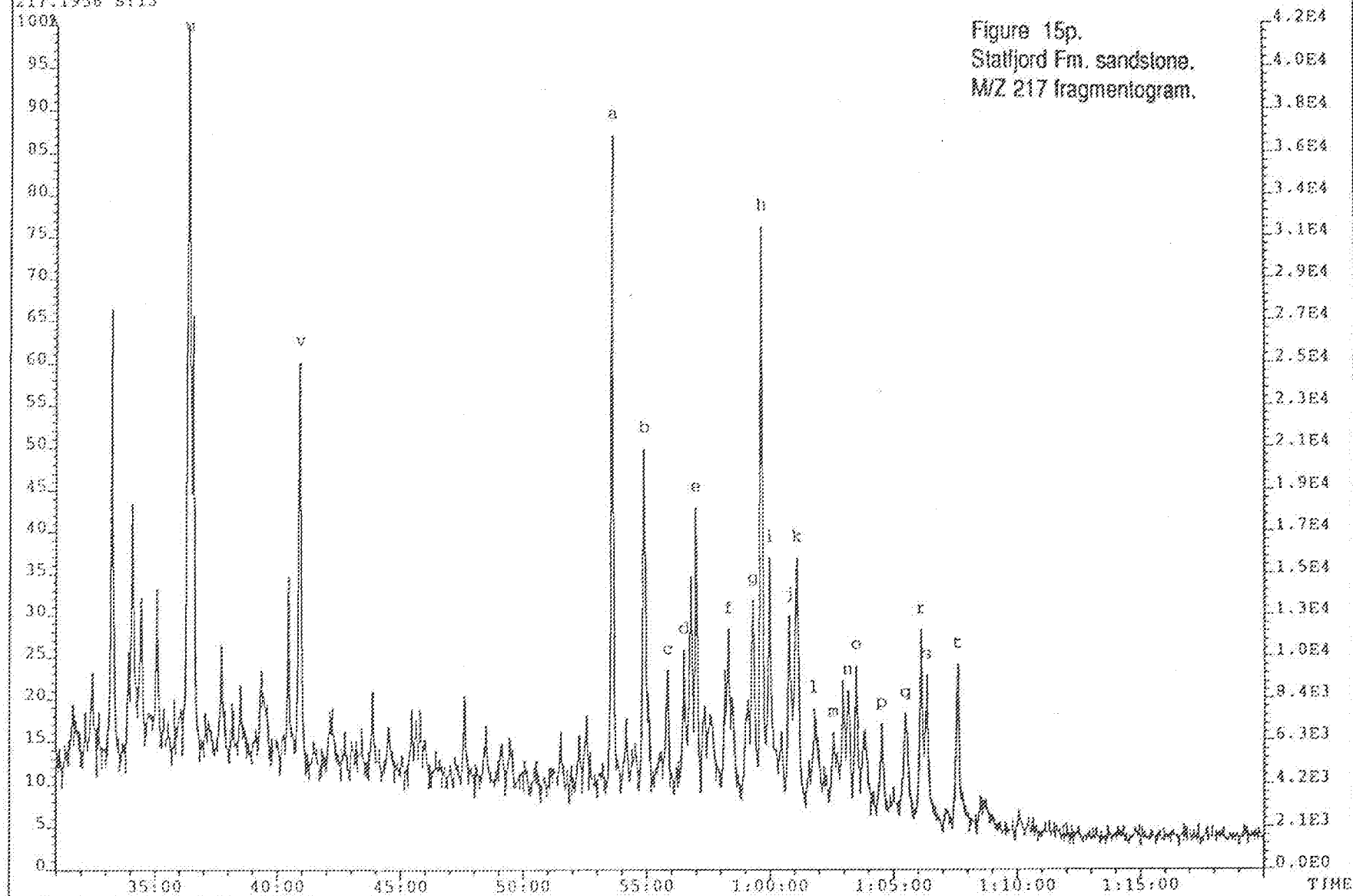
GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-1740 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIN
 Sample#13 Text:WELL 34/10-35, 4281.46M, SATURATED FRACTION
 E17.1956 S:13

Exp:SAT1

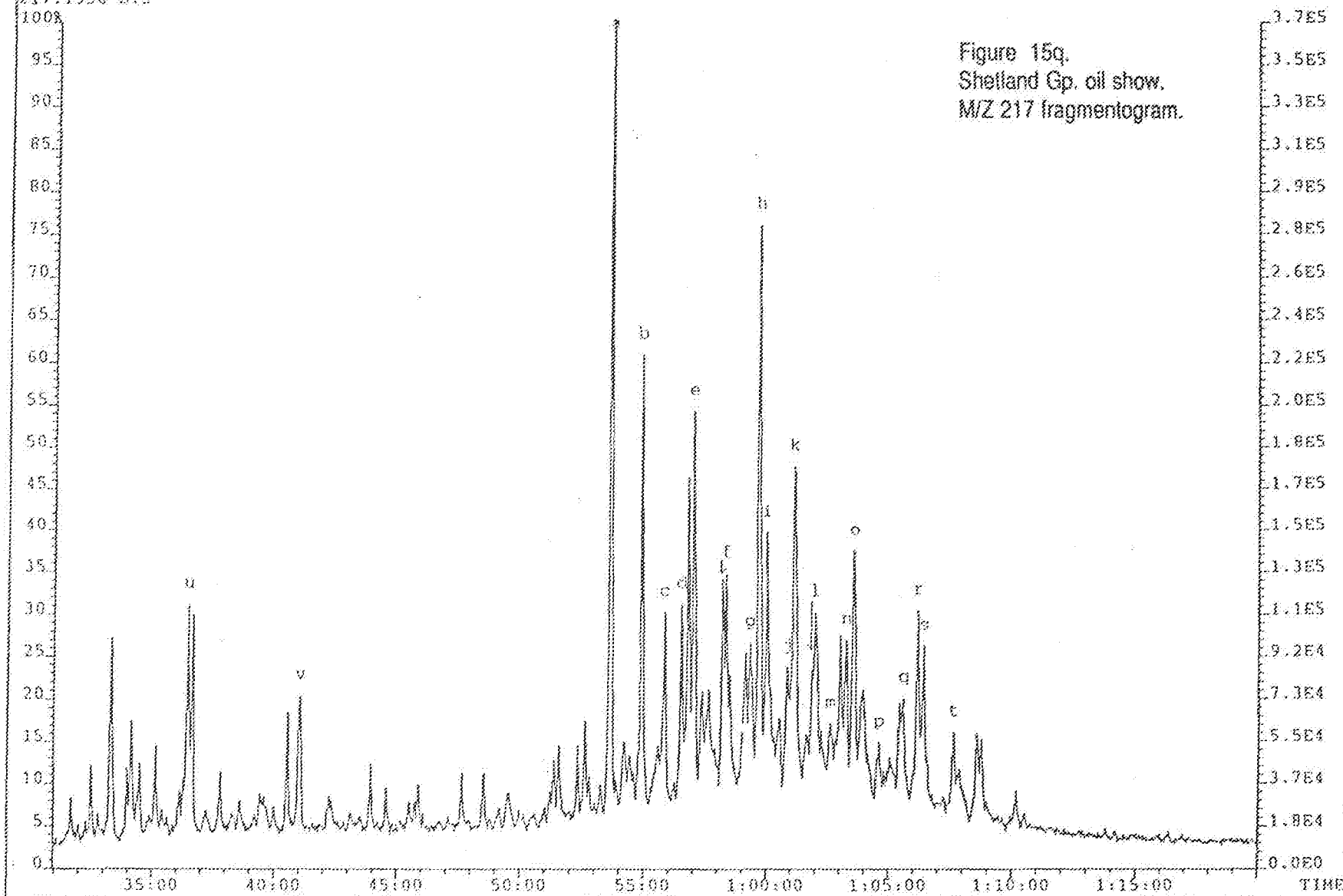
Figure 15p.
 Statfjord Fm. sandstone.
 M/Z 217 fragmentogram.



File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
 Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
 217.1956 9:3

Exp: SAT1

Figure 15q.
 Shetland Gp. oil show.
 M/Z 217 fragmentogram.



Schlumberger

GECO-PRAXIA

GEOLAB NOR

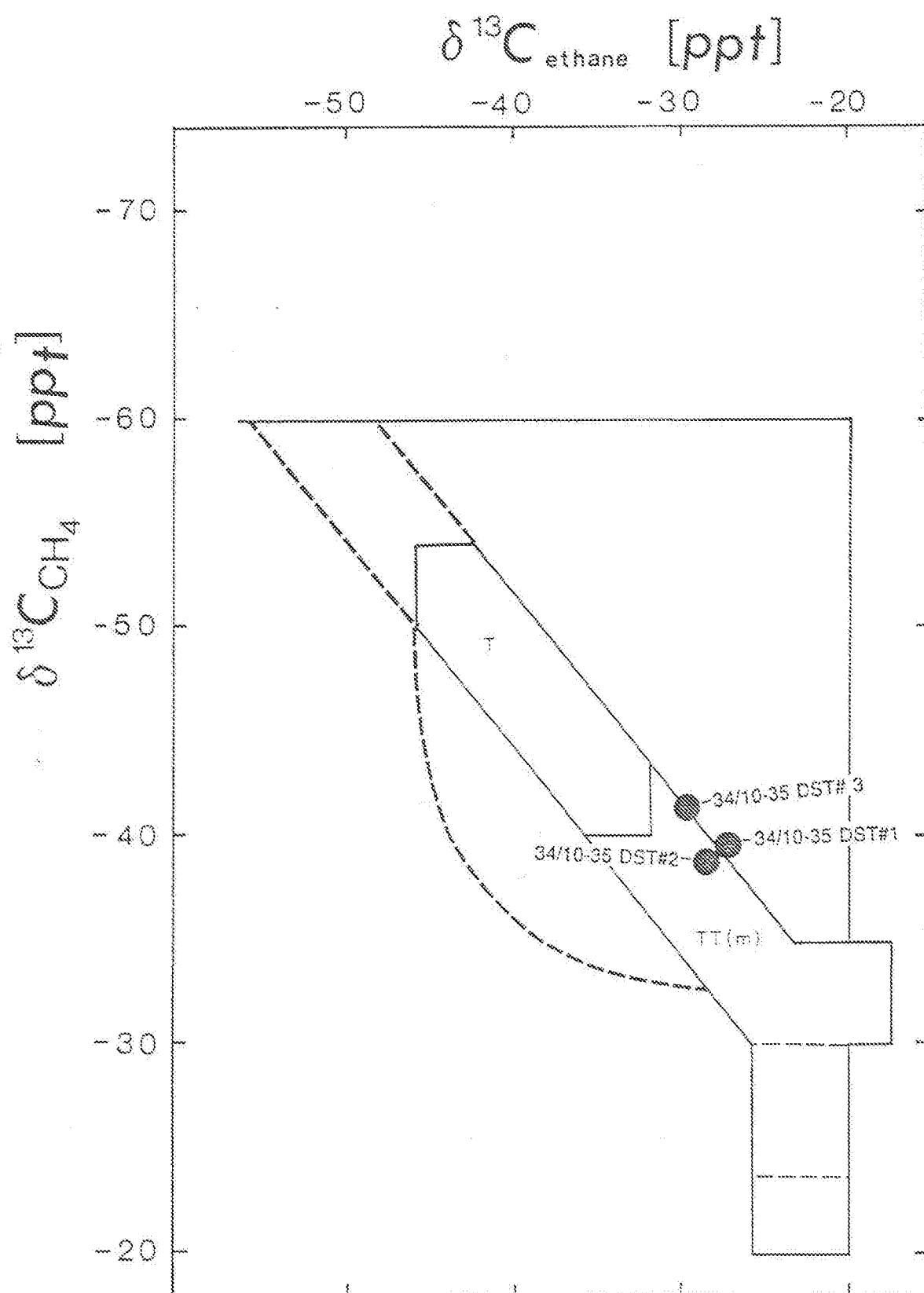


Figure 16a.

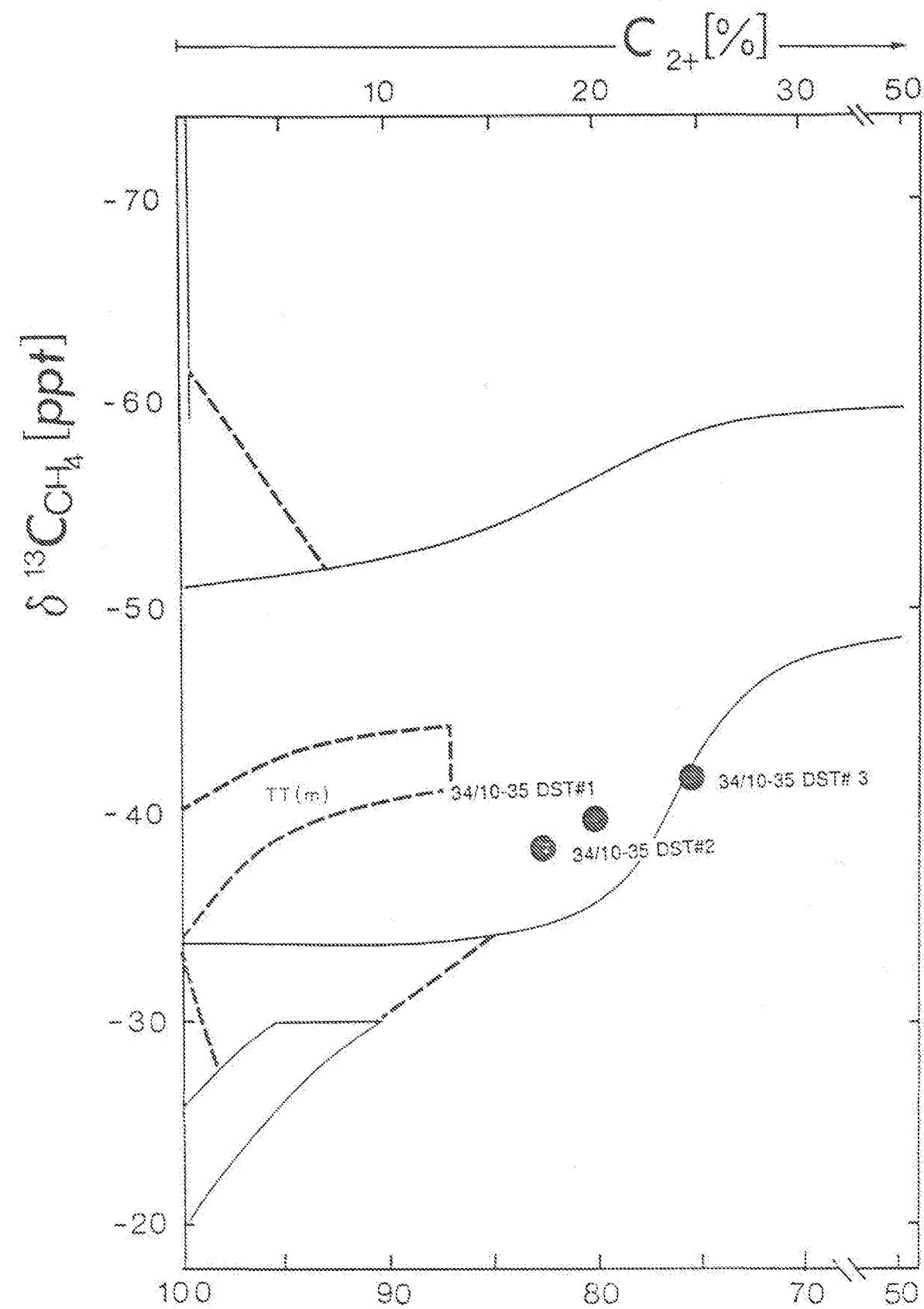


Figure 16 b.

INTERPRETATION LIMITS
ABBREVIATIONS
EXPERIMENTAL PROCEDURES
ANALYTICAL METHODS

Interpretation Limits

All analyses and interpretation in this report have been performed by Geolab Nor, unless specifically stated otherwise. The interpretation is based on the analytical results in this report, information supplied and quoted by the client, and general public knowledge of the area in which the well is located. The interpretation is right to the best of Geolab Nor's knowledge, but as Geolab Nor does not have access to either all geological nor geochemical information of the area of the well, Geolab Nor's interpretation must be used at the client's own risk.

The following interpretation limits have been used in this report. These limits have been established by Geolab Nor, on the basis of its experience and in conjunction with other published data and must not be regarded as absolute.

Comparison of Maturity Parameters

Vitrinite % Ro	Tmax II III		Fluorescence colour	SCI	TAI	MPH1
0.2			Green	1		
0.2-0.3			Green-Yellow	2		
0.3		425	Yellow	3		
0.4	420		Yellow-Orange	4	1+	
0.5	430	435	Light Orange	5		0.17
0.6	435	440	Moderate Orange	6	2	0.33
0.7						
0.7-0.8			Dark Orange			
0.8	440			7		0.67
0.9	445				2+	
0.9-1.0			Dark Orange- Red Orange			
1.0	450	460		8	3-	1.00
1.1						
1.1-1.2			Very Dark Orange- Red			
1.3			Spore Extinction	9	3+	1.50
1.5						1.33
1.5-2.0			Algal Extinction	10		
2.0						0.50

Comparison of GC-MS Parameters

Applicable only for marine type II kerogen with low terrestrial input. For definition of J1, J2, D, F, C, E, q, t, r and s, see GC-MS definitions.

Vitrinite	%	%	%	%
% Ro	J1/(J1+J2)	(D+F)/(C+E)	q/(q+t)	(r+s)/(q+t+r+s)
0.5	45	25	20	0.37
0.6	55	15		
0.6-0.7			50	
0.7-0.9				0.60

Comparison of Aromatic Hydrocarbon Maturity Parameters

Vitrinite		
% Ro	MNR	4/1 MDBT
0.6		2.0
0.7	1.0	
0.8		10.0
1.3	2.0	

Maturity Interpretations

Vitrinite % Ro	Generation	Expulsion
<0.5	Immature	
0.5	Oil threshold, early mature	Early Condensate (sometimes)
0.6	Start main oil generation, top oil window	
0.6-0.7		Start liquid expulsion from rich source rocks
0.7	Start peak oil generation, gas generation threshold from coal	
0.7-0.8	Peak oil generation	
0.8	End peak oil generation	
0.9	Late mature	
1.0	Base oil window	Start condensate expulsion from lean source rocks
1.3	Base condensate window, oil floor	Start gas expulsion
1.5	Peak gas generation coal	
2.0	Wet gas floor	

Maturities Interpretation (Simplified)

Vitrinite % Ro	Generation
0.2-0.5	Immature
0.5-0.6	Oil threshold
0.6-1.0	Oil window
1.0-1.3	Condensate window
1.3-2.0	Gas window

The term "condensate" is an engineering term. This engineering meaning of the word is not implied here. The term is used for historical reasons (in geochemistry) and is interpreted as:

Condensate window = Liquid preservation window, i.e. maturity range in which oil has started to crack to gas but where still some of the hydrocarbons are in the liquid hydrocarbon range (under surface conditions and temperatures).

Source Rock Richness

Petroleum*

TOC %	Potential	EOM(ppm)	EOM/TOC#	HC(ppm)	HC/TOC#	Level
0.0-0.3	<2	<500	<50	<100	<10	Poor
0.3-1.0	2-6	500-1000	50-100	100-200	10-20	Fair
1.0-2.0	6-15	1000-2000	100-200	200-500	20-50	Good
2.0-5.0	15-25	>2000	>200	>500	>50	Rich
>5.0	>25	>>2000	>>200	>>500	>>50	Very Rich

NOTE * = mg HC/g rock

= mg EOM or HC/g TOC

Gas Richness (Headspace + Occluded gas (µl gas/kg dry sediment))

C1-C4	C5+	Level
>10000	>10000	Rich
3000-10000	3000-10000	Good
1000-3000	1000-3000	Fair
<1000	<1000	Poor

Kerogen Typing based on Rock-Eval Pyrolysis of Whole Rock

Ro <0.5%		Ro =0.8-1.0%		Interpretation	
HI	OI	HI	OI	Kero. Type	HC Species
>700	10-40	200-250	10-20	I	Paraffinic Oil
350-700	20-60	250-250	10-20	II	Oil
200-350	40-80	100-150	20-40	II/III	Oil/Gas
100-200	50-150	50-150	20-60	III	Gas-condensate
0-100	20-200	<50	20-100	IV	No potential

Kerogen Typing based on Visual Kerogen

Kerogen Components	Kerogen Type	Classification
Liptinite 100 %	I - II*	Oil-prone
Liptinite 50 %	II/III*	Oil- and gas-prone
Vitrinite 100 %	III	Gas-prone
Inertinite 100 %	IV	Inert

* Assuming a low content of reworked liptinite. The interpretation table represents only end-points. Continued mixing can occur. See also visual kerogen triangular plot.

Kerogen Typing based on GHM Pyrolysis - Source Rocks

n-octene + m,p-xylene + phenol = 100 %

<u>Compound</u>	<u>Kerogen type</u>	<u>Interpretation</u>
n-octene > 60 %	I-II + Asph*	Oil-prone + asphaltenes
n-octene > 20 % < 60 %	III	Gas-prone
n-octene < 20 %	IV	Inert

* If asphaltene from oil or extract, not from coal
See also octene/xylene/phenol triangular plot

Kerogen Typing based on GHM Pyrolysis - Source Rocks

<u>Range of hydrocarbons</u>	<u>Interpretation of pyrolysis products</u>
------------------------------	---

C1 ~100 %	Dry gas only
C2-C5 ~100 %	Wet gas only
C1-C5 > 50 %	Predominantly gas
C6-C14 > 50 %	Light oil/condensate
C15+ ~40-50 %	Predominantly oil

Hydrocarbon Typing based on GHM Pyrolysis - Oil Shows

<u>Range of hydrocarbons</u>	<u>Interpretation of pyrolysis products</u>
------------------------------	---

C15+ ~100 %	Heavy oil/residual oil
C15+ > 50 %	Some heavy oil/residual oil

See also pyrolysate composition triangle, in the report.

Source Rock Depositional Environment based on saturated HC GC - General Indicators

<u>Pristane/phytane</u>	<u>Source rock interpretation</u>
<1	Marine, hypersaline, saline lacustrine
1 - 3	Marine or lacustrine with variable land-plant input
>3	Predominant land-plant input or non-marine

<u>CPI, pre-peak oil generation</u>	<u>Source rock interpretation</u>
<1	Marine, saline lacustrine evaporites
1 - 2	Mixed marine/terrestrial source rock or freshwater/lacustrine
>2	Mainly terrestrial source rock

Source Rock Depositional Environment and Maturities based on Stable carbon Isotope Data

Most of the interpretation of stable carbon isotope data are based on cross-plotting and a visual examination of the plotted data. The interpretation limits are shown in the figures, when used.

Abbreviations

List of abbreviations used for lithology description
(sorted alphabetically)

ang	= angular
bar	= Baryte (mud additive)
bit	= bituminous
bl	= blue/blueish
blk	= black
br	= brittle
brn	= brown/brownish
Ca	= Carbonate (limestone/chalk/dolomite/siderite)
calc	= calcareous
carb	= carbonaceous
cem	= cement used as additive (under "cont") or to describe cemented S/Sst
Chert	= Chert
chk	= Chalk/chalky
cly	= clayey/shaly
cngl	= conglomeratic
Coal	= Coal
Coal-ad	= Coal-like additive (e.g. chromlignosulfonate)
Congl	= Conglomerat
Cont	= Contamination(s)
crs	= coarse grained
dd	= dried drilling mud
dol	= Dolomite/dolomitic
drk	= dark (colour)
dsk	= dusk/dusky (colour)
evap	= Salt/Gypsum/Halite (natural "Other" or as additive "Cont")
f	= fine grained
fe	= ferruginous
fib	= fibres (mud additive/contamination)
fis	= fissile
fos	= fossiliferous
glauc	= glauconite/glauconitic
gn	= green/greenish
gy	= grey/greyish
hd	= hard
ign	= Igneous (material derived from igneous source)
Kaolin	= Kaolin(ite)
kin	= kaolinitic
l	= loose
lam	= laminated/laminae
lt	= light (colour)
m	= medium (colour or grain size)
Marl	= Marl (calcareous claystone/mudstone)
mic	= micaceous
Mica-ad	= Mica used as mud additive

mrl	= marly
No Mat.	= No material left over after washing
ns	= nutshells (mud additive)
ol	= olive
ool	= Oolite/oolitic
or	= orange
Other	= Other lithology/mineral, specified after this word
pi	= pink/pinkish
pl	= pale (colour)
prp	= paint/rust/plastic contaminations/additives
pu	= purple
pyr	= Pyrite/pyritic
red	= red/reddish
rnd	= round/rounded
s	= sandy
sft	= soft
S/Sst	= Sand and/or sandstone
Sh/Clst	= Shale and/or claystone
sid	= Siderite/sideritic
sil	= siliceous/cherty
silt	= silty
Siltst	= siltstone
st	= stained (with natural oil or oil-like additive)
tar-ad	= Tar-like additive (e.g. "Black Magic")
trbfgs	= turbodrilled fragments
Tuff	= Tuff
tuff	= tuffaceous
v col	= various colours
w	= white
wx	= waxy
y	= yellow/yellowish

Experimental

Gas Analysis

The analysis is performed using a Varian gas chromatograph with a 50 m Plot fused silica $\text{Al}_2\text{O}_3/\text{KCL}$ column, 0.5 ml loop injector and flame ionization detector. Helium is used as carrier gas and the column is run from 50°C to 200°C, at a rate of 8°C/min. Final hold time is 10 min.

Two cm^3 of DST gas are removed from each pressurised cylinder for chromatographic analysis of the C_1 to C_7 range of hydrocarbons.

Total Organic Carbon (TOC) and Total Carbon Analysis

This analysis is performed using a LECO CS244 Carbon Analyser.

Hand-picked lithologies from cuttings samples are crushed with a mortar and pestle and approximately 200 mg (50 mg for coals) are accurately weighed into LECO crucibles. The samples are then treated three times with 10 % hydrochloric acid to remove oxidized (carbonate) carbon, and washed four times with distilled water. The samples are dried on a hotplate at 60 - 70°C before analysis of total organic carbon. Total carbon is also analysed on the same instrument using approximately 200 mg of untreated crushed whole rock. Oxidized (carbonate) carbon is calculated by weight difference.

Total organic carbon can also be analysed on the Rock-Eval II Pyrolyser during the normal run of the instrument.

Rock-Eval Pyrolysis

This analysis is performed by using a Rock-Eval II Pyrolyser. Approximately 100 mg crushed whole rock is analysed. The sample is first heated at 300°C for three min in an atmosphere of helium to release the free hydrocarbons present (S1 peak) and then

pyrolysed by increasing the temperature from 300°C to 600°C (temp. gradient 25°C/min) (S2 peak). Both the S1 and S2 yields are measured using a flame ionization detector (FID). In the temperature interval between 300°C and 390°C, the released gases are split and a proportion passed through a carbon dioxide trap, which is connected to a thermal conductivity detector (TCD). The value obtained from the TCD corresponds to the amount of oxygen contained in the kerogen of the sample and is reported as the S3 peak.

The Rock-Eval II Pyrolyser also analyses the TOC of each sample during the normal run of the instrument.

Thermal Extraction/Pyrolysis Gas Chromatography

The instrument used for this analysis is a Varian 3400 Gas Chromatograph interfaced to a pyrolysis oven (the pyrolyser). Up to 15 mg of whole rock sample is loaded on the pyrolyser and heated isothermally, at 300°C, for 4 min, during which time thermal extraction of the free hydrocarbons occurs (equivalent to the S1 peak of the Rock-Eval). The released gases pass to a 25 m OV1 column with a liquid nitrogen-cooled trap.

After 4 min the pyrolysis oven is temperature programmed up to 530°C, at a rate of 37°C/min, causing bound hydrocarbons to be released from the kerogen (equivalent to the S2 peak of the Rock-Eval). The released gases pass to a 25 m OV1 column with a liquid nitrogen-cooled trap.

The temperature program of the gas chromatograph oven, in which the columns are housed is -10°C to 290°C at a rate of 6°C/min.

Both the columns are linked to a FID.

Solvent Extraction of Organic Matter (EOM)

The samples are extracted using a Tecator Soxtec HT-System. Carefully weighed samples are taken in a pre-extracted thimble. Some activated copper is added to the extraction cup and dichloromethane/methanol (93/7) is used as an extraction solvent. The samples are boiled for 1 hour and then rinsed for 2 hours. If the samples contain more than 10 % TOC, then the whole procedure is repeated once. The resulting solution is filtered and the solvent removed by rotary evaporation (200 mb, 30°C). The amount of EOM is gravimetrically established.

Removal of Asphaltenes

The EOM is dissolved in tetrahydrofuran in a flask and n-pentane is added to precipitate the asphaltenes. The solution is then stored in the dark and at ambient temperature for at least 8 hours. The solution is then filtered (Baker 10-spe system) and the precipitated asphaltenes returned to the original flask by dissolution in dichloromethane. The solvent is removed by rotary evaporation at 200 mB and 30°C.

Chromatographic Separation of deasphalted EOM

Chromatographic separation is performed using an MPLC system developed by the company. The EOM (minus asphaltenes) is injected into the MPLC and separated using hexane as an eluent. The saturated and aromatic hydrocarbon fractions are collected and the solvent removed using a rotary evaporator at 30°C. The fractions are then transferred to small pre-weighed vials and evaporated to dryness in a stream of nitrogen. The vials are re-weighed to obtain the weights of both the saturated and the aromatic fractions. The weight of the NSO fraction which is retained on the column, is obtained by weight difference.

Gas Chromatographic Analyses

Saturated hydrocarbon fractions:

The instrument used for this analysis is a PERKIN ELMER 8320 Gas Chromatograph equipped with an FID detector and an OV1 column. The carrier gas is helium and the temperature program runs from 80°C to 300°C at a rate of 4°C/min. Final hold time is 20 mins. The saturated hydrocarbon fraction is diluted by 1:30 and a 1 microlitre aliquot of this is injected into the instrument.

Aromatic hydrocarbon fractions:

The instrument used is a Varian 3400 Gas Chromatograph with a 25 m SE 54 capillary column, split injector and a column splitter leading to FID and FPD detectors, which allows simultaneous analysis of co-eluting hydrocarbons and sulphur compounds. The carrier gas is helium and the temperature program runs from 40°C to 290°C at a rate of 4°C/min. Final hold time is 10 mins. The aromatic hydrocarbon fraction is diluted by 1:30 and a 1 microlitre aliquot of this is injected into the instrument.

Whole Oil/Whole Extract

Whole oil chromatograms are determined on a Perkin Elmer Sigma 2000 gas chromatograph fitted with a split injector, 25 m SE54 capillary column and effluent splitter connected to FID and FPD detectors allowing simultaneous determination of hydrocarbons and sulphur compounds. Approximately 0.1 microlitres of whole oil are injected and the temperature program on the chromatograph runs from -10°C to 300°C at 4°C/min.

Visual Kerogen Microscopy

Kerogen concentrates are obtained from samples prepared by HCl and HF digestion followed by zinc bromide flotation to remove pyrite and other heavy mineral residues. The cleaned concentrates are mounted on slides by smearing, these being analysed microscopically in transmitted white light and UV light (530 nm barrier filter) to determine the Spore Colour or Thermal Alteration Indices (SCI or TAI) and the colour and intensity of spore fluorescence. The spore colour index, backed by spore fluorescence, is used as an alternative maturity parameter to verify the results obtained from vitrinite reflectance.

Fluorescence Colour	Colour Index	Corresp. Vitrinite Reflectance
Green	1	0.2 %
Green/yellow	2	0.2-0.3 %
Yellow	3	0.3 %
Yellow/orange	4	0.4 %
Light orange	5	0.5 %
Moderate-orange	6	0.6 %
Dark orange	7	0.8 %
Dark orange/red	8	1.0 %
Spore fluorescence extinction	9	1.3 %

NB. This table only provides a rudimentary correlation as vitrinite reflectance and spore fluorescence colour are both independently affected by factors such as depositional environment and catenetic history.

Combined Gas Chromatography - Mass Spectrometry (GC-MS)

The GC-MS analyses are performed on a VG TS250 system interfaced to a Hewlett Packard 5890 gas chromatograph. The GC is fitted with a fused silica SE54 capillary column (40 m x 0.22 mm i.d.) directly into the ion source. Helium (12 psi) is used as carrier gas and the injections are performed in splitless mode. The GC oven is programmed from 45°C to 150°C at 35°C/min, at which point the programme rate is 2°C/min up to 310°C where the column is held isothermally for 15 min. For the aromatic hydrocarbons, the GC oven is programmed from 50°C to 310°C at 5°C/min. and held isothermally at 310°C for 15 min. The mass spectrometer is operated in electron impact (EI) mode at 70 eV electron energy, a trap current of 500 uA and a source temperature of 220°C. The instrument resolution used is 2500 (10 % value).

The data system used is a VG PDP11/73 for acquiring data, and a Vax station 3100 for peak processing the data. The samples are analysed in multiple ion detection

mode (MID) at a scan cycle time of approximately 1.1 sec.

Calculation of peak ratios is performed from peak heights in the appropriate mass fragmentograms.

Saturated Fractions

Terpanes

The most commonly used fragment ions for detection of terpanes are M/Z 163 for detection of 25,28,30 trisnormoretane or 25,28,30 trisnorhopane, M/Z 177 for detection of demethylated hopanes or moretanes, M/Z 191 for detection of tricyclic, tetracyclic and pentacyclic terpanes and M/Z 205 for methylated hopanes or moretanes. The molecular ions M/Z 370 and 384 are also recorded for identification of C₂₇ and C₂₈ triterpanes respectively.

Steranes

The most commonly used fragment ions for detection of steranes are M/Z 149 to distinguish between 5 α and 5 β steranes, M/Z 189 and 259 for detection of rearranged steranes, M/Z 217 for detection of rearranged and normal steranes and M/Z 218 for detection of 14 β (H) 17 β (H) steranes.

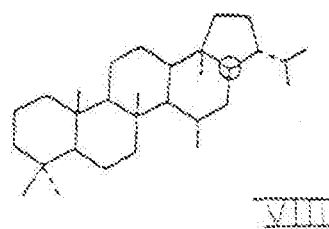
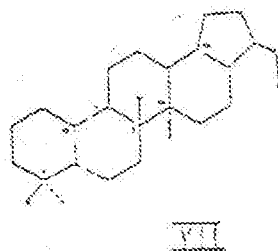
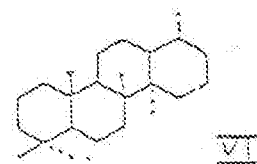
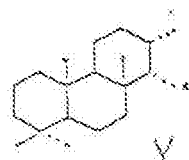
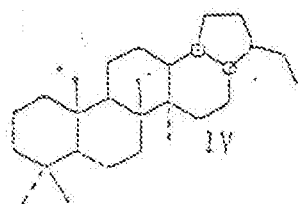
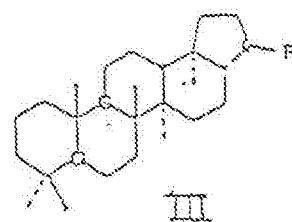
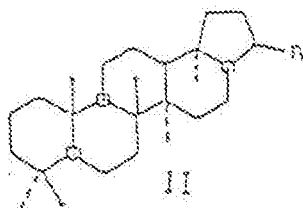
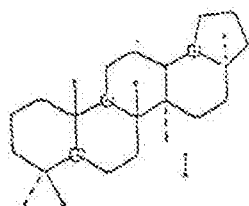
The M/Z 231 fragment ion is used to detect possible aromatic contamination of the saturated fraction. It is also used for detection of methyl steranes.

Mass Fragmentograms representing Terpanes
(M/Z 163, 177, 191, 205, 370, 384, 398, 412 and 426)

Peak Identification: (α and β refer to hydrogen atoms at C-17 and C-21 respectively unless indicated otherwise)

A.	16 α trisnorneohopane (T_s)	$C_{27}H_{44}$	(I)
B.	17 α trisnorhopane (T_m)	$C_{27}H_{46}$	(II, R=H)
Z.	Bisnorhopane	$C_{28}H_{48}$	(IV)
C.	$\alpha\beta$ norhopane	$C_{29}H_{50}$	(II, R= C_2H_5)
D.	$\beta\alpha$ norhopane	$C_{29}H_{50}$	(III, R= C_2H_5)
E.	$\alpha\beta$ hopane	$C_{30}H_{52}$	(II, R=i- C_3H_7)
F.	$\beta\alpha$ hopane	$C_{30}H_{52}$	(III, R=i- C_3H_7)
G.	22S $\alpha\beta$ homohopane	$C_{31}H_{54}$	(II, R=i- C_4H_9)
H.	22R $\alpha\beta$ homohopane	$C_{31}H_{54}$	(II, R=i- C_4H_9)
I.	$\beta\alpha$ homohopane	$C_{31}H_{54}$	(III, R=i- C_4H_9)
J.	22S $\alpha\beta$ bishomohopane	$C_{32}H_{56}$	(II, R=i- C_5H_{11})
	22R $\alpha\beta$ bishomohopane	$C_{32}H_{56}$	(II, R=i- C_5H_{11})
K.	22S $\alpha\beta$ trishomohopane	$C_{33}H_{58}$	(II, R=i- C_6H_{13})
	22R $\alpha\beta$ trishomohopane	$C_{33}H_{58}$	(II, R=i- C_6H_{13})
L.	22S $\alpha\beta$ tetrakishomohopane	$C_{34}H_{60}$	(II, R=i- C_7H_{15})
	22E $\alpha\beta$ tetrakishomohopane	$C_{34}H_{60}$	(II, R=i- C_7H_{15})
M.	22S $\alpha\beta$ pentakishomohopane	$C_{35}H_{62}$	(II, R=i- C_8H_{17})
	22E $\alpha\beta$ pentakishomohopane	$C_{35}H_{62}$	(II, R=i- C_8H_{17})
P.	Tricyclic terpane	$C_{23}H_{42}$	(V, R=i- C_4H_9)
Q.	Tricyclic terpane	$C_{24}H_{44}$	(V, R=i- C_5H_{11})
R.	Tricyclic terpane (17R, 17S)	$C_{26}H_{46}$	(V, R=i- C_6H_{13})
S.	Tetracyclic terpane	$C_{24}H_{42}$	(VI)
T.	Tricyclic terpane (17R, 17S)	$C_{26}H_{48}$	(V, R=i- C_7H_{15})
N.	Tricyclic terpane	$C_{21}H_{38}$	(V, R= C_2H_5)
O.	Tricyclic terpane	$C_{22}H_{40}$	(V, R= C_3H_7)
Y.	25,28,30-trisnorhopane/moretane	$C_{27}H_{46}$	(VII)
X.	$\alpha\beta$ diahopane	$C_{30}H_{52}$	(VIII)

STRUCTURES REPRESENTING TERPANES



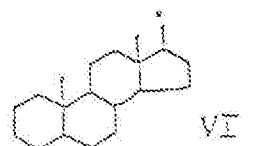
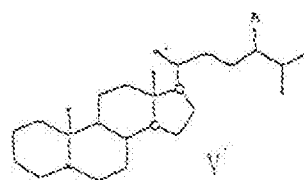
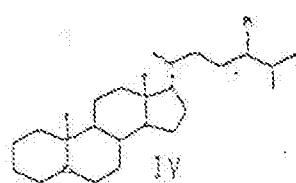
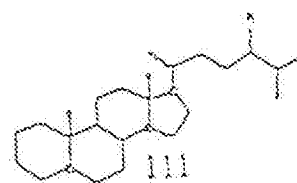
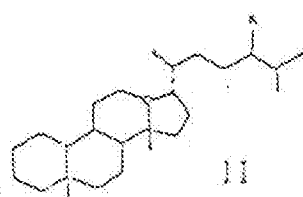
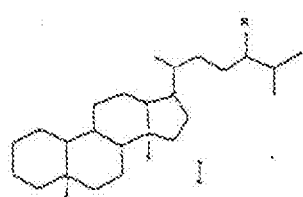
Mass Fragmentograms representing Steranes

(M/Z 149, 189, 217, 218, 259, 372, 386, 400 and 414)

Peak Identifications: α and β refer to hydrogen atoms at C-5, C-14 and C-17 in regular steranes and at C-13 and C-17 in diasteranes).

a.	20S $\beta\alpha$ diacholestane	$C_{27}H_{48}$	(I, R=H)
b.	20R $\beta\alpha$ diacholestane	$C_{27}H_{48}$	(I, R=H)
c.	20S $\alpha\beta$ diacholestane	$C_{27}H_{48}$	(II, R=H)
d.	20R $\alpha\beta$ diacholestane	$C_{27}H_{48}$	(II, R=H)
e.	20S $\beta\alpha$ 24-methyl-diacholestane	$C_{28}H_{50}$	(I, R=CH ₃)
f.	20R $\beta\alpha$ 24-methyl-diacholestane	$C_{28}H_{50}$	(I, R=CH ₃)
g.	20S $\alpha\beta$ 24-methyl-diacholestane	$C_{28}H_{50}$	(II, R=CH ₃)
	+ 20S $\alpha\alpha\alpha$ cholestane	$C_{27}H_{48}$	(III, R=H)
h.	20S $\beta\alpha$ 24-ethyl-diacholestane	$C_{29}H_{52}$	(II, R=C ₂ H ₅)
	+ 20R $\alpha\beta\beta$ cholestane	$C_{27}H_{48}$	(IV, R=H)
i.	20S $\alpha\beta\beta$ cholestane	$C_{27}H_{48}$	(IV, R=H)
	+ 20R $\alpha\beta$ 24-methyl-diacholestane	$C_{28}H_{50}$	(II, R=CH ₃)
j.	20R $\alpha\alpha\alpha$ cholestane	$C_{27}H_{48}$	(III, R=H)
k.	20R $\beta\alpha$ 24-ethyl-diacholestane	$C_{29}H_{52}$	(I, R=C ₂ H ₅)
l.	20R $\alpha\beta$ 24-ethyl-diacholestane	$C_{29}H_{52}$	(II, R=C ₂ H ₅)
m.	20S $\alpha\alpha\alpha$ 24-methyl-cholestane	$C_{28}H_{50}$	(III, R=CH ₃)
n.	20R $\alpha\beta\beta$ 24-methyl-cholestane	$C_{28}H_{50}$	(IV, R=CH ₃)
	+ 20R $\alpha\beta$ 24-ethyl-diacholestane	$C_{29}H_{52}$	(II, R=C ₂ H ₅)
o.	20S $\alpha\beta\beta$ 24-methyl-cholestane	$C_{28}H_{50}$	(IV, R=CH ₃)
p.	20R $\alpha\alpha\alpha$ 24-methyl-cholestane	$C_{28}H_{50}$	(III, R=CH ₃)
q.	20S $\alpha\alpha\alpha$ 24-ethyl-cholestane	$C_{29}H_{52}$	(III, R=C ₂ H ₅)
r.	20R $\alpha\beta\beta$ 24-ethyl-cholestane	$C_{29}H_{52}$	(IV, R=C ₂ H ₅)
s.	20S $\alpha\beta\beta$ 24-ethyl-cholestane	$C_{29}H_{52}$	(IV, R=C ₂ H ₅)
t.	20R $\alpha\alpha\alpha$ 24-ethyl-cholestane	$C_{29}H_{52}$	(III, R=C ₂ H ₅)
u.	5 α sterane	$C_{27}H_{46}$	(VI, R=C ₂ H ₅)
v.	5 α sterane	$C_{28}H_{48}$	(VI, R=C ₃ H ₇)

STRUCTURES REPRESENTING STERANES



Stable Carbon Isotope Ratio Mass Spectrometry

Carbon isotope analysis is performed on a dual inlet VG SIRA 10 instrument. The combustion of the samples is performed by a Carlo Erba EA 1108 element analyser directly connected to the inlet system of the mass spectrometer.

The combustion temperature is 1020°C and the carrier gas used was Helium. After the combustion H₂O and CO₂ are trapped in individual cool traps. The CO₂ gas is then heated up before admission into the mass spectrometer. The whole operation is controlled by an IBM PC50 computer system.

δ-values

The isotope ratios are given as δ-values in ‰ versus the PDB-standard:

$$\delta^{13}\text{C} = (R_{\text{sample}} - R_{\text{standard}} / R_{\text{standard}}) \times 1000$$
$$R = {}^{13}\text{C}/{}^{12}\text{C}$$

The PDB-standard (a marine chalk of the Pee Dee-formation, USA) was created by Craig 1957. All results of ¹³C/¹²C-analysis of organic matter today are calculated (Craig correction) against this international standard.

Reproducibility

The precision of the combustion system and the mass spectrometer is controlled by determination of an international calibrated standard, NBS22 oil and a house standard carbon. Replicate analyses are also performed on samples.

EXPERIMENTAL

Combined Gas Chromatography - Isotope Ratio Mass Spectrometry (GC-IRMS) for Gas

For the gas analyses the GC is fitted with a fused silica column of 25 metres length, 0.32 mm I.D., coated with PORAPLOT Q stationary phase leading directly into the combustion furnace. The GC is started at -40°C and held isothermally for 2.0 minutes, and then programmed to 140°C at 8°C/min and then to 200°C at 15°C/min and held isothermally for 5 min. Helium is used as a carrier gas and the injections are performed in splitless/split mode depending on the concentration of gas.

Inside the GC oven, a valve is used to direct the column effluent between the FID and the IRMS. At the exit from the GC oven, make-up carrier gas (helium) is added to the flow from the capillary column. This ensures that the full performance of the GC separation is preserved by maintaining the linear velocity of the carrier gas in the interface and the combustion furnace. The furnace is made of capillary-bore quartz tubing packed with platinised copper oxide. The furnace temperature is set to 750°C for gas analysis. Before the gas enters the mass spectrometer, water is removed in a cold trap using liquid N₂.

For calculation purposes a CO₂ reference gas is automatically introduced into the IRMS in series of pulses before and after the array of chromatogram peaks of interest.

The IRMS is operated at 100 ev electron energy, having a trap current of 400 ua.

δ-values

The isotope ratios are given as δ-values in ‰ versus the PDB-standard:

$$\delta^{13}\text{C} = (R_{\text{sample}} - R_{\text{standard}}/R_{\text{standard}}) \times 1000$$

$$R = {}^{13}\text{C}/{}^{12}\text{C}$$

The PDB standard (a marine chalk of the Pee Dee-formation, USA) was created by Craig 1957. All results of ${}^{13}\text{C}/{}^{12}\text{C}$ -analyses of organic matter today are calculated (Craig correction) against this international standard.

Reproducibility

The reference gas used on the GC-IRMS is calibrated against the NBS 22 oil (international calibrated standard). A house standard (alkane-mixture) is used daily. Double analysis on samples are also done.

APPENDIX 1:

TABLES

- 1 -

Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2500.00			Shet	U. Cretaceous		0038
			90 Sh/Clst:	m gy, calc		0038-1L
			5 S/Sst	: gy w to lt gy, slt, f		0038-2L
			5 Cont	: prp		0038-3L
			tr Marl	: lt or gy		0038-4L
2600.00			Shet	U. Cretaceous		0039
			95 Sh/Clst:	m gy, calc		0039-1L
			5 Sh/Clst:	pl brn		0039-3L
			tr Cont	: prp		0039-2L
2700.00			Shet	U. Cretaceous		0040
			60 Sh/Clst:	m gy		0040-1L
			25 Sltst	: lt gy to m gy		0040-4L
			5 Cont	: prp		0040-2L
			5 Sh/Clst:	pl brn		0040-3L
			5 S/Sst	: gy w to lt gy, f, crs, l		0040-5L
2800.00			Shet	U. Cretaceous		0041
			70 Sh/Clst:	m gy		0041-1L
			25 Sltst	: lt gy to m gy		0041-4L
			5 Ca	: lt or gy		0041-5L
			tr Cont	: prp		0041-2L
			tr Sh/Clst:	pl brn		0041-3L
2900.00			Shet	U. Cretaceous		0042
			70 Sh/Clst:	m gy		0042-1L
			20 Sltst	: lt gy to m gy		0042-4L
			5 Cont	: prp		0042-2L
			5 Ca	: lt or gy		0042-5L
			tr Sh/Clst:	pl brn		0042-3L

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Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3000.00			Shet	U. Cretaceous		0043
			80	Sh/Clst: m gy, slt		0043-1L
			10	Cont : prp		0043-2L
			10	Slstst : lt gy to m gy		0043-4L
			tr	Sh/Clst: pl brn		0043-3L
			tr	Ca : w to lt or gy, fos		0043-5L
3100.00			Shet	U. Cretaceous		0044
			75	Sh/Clst: lt gy to m gy, calc, slt		0044-1L
			15	Cont : prp, fib		0044-2L
			5	Slstst : lt gy		0044-3L
			5	Ca : w to lt or gy, fos		0044-4L
3200.00			Shet	U. Cretaceous		0045
			80	Sh/Clst: lt gy to m gy, calc, slt		0045-1L
			10	Cont : prp, fib		0045-2L
			5	Slstst : lt gy		0045-3L
			5	Sh/Clst: m brn to pl brn		0045-5L
			tr	Ca : w to lt or gy, fos		0045-4L
3300.00			Shet	U. Cretaceous		0046
			50	Sh/Clst: lt gy to m gy, calc, slt		0046-1L
			30	Ca : w to lt or gy, mrl		0046-4L
			20	Cont : prp, fib		0046-2L
			tr	Slstst : lt gy		0046-3L
			tr	Sh/Clst: m brn to pl brn		0046-5L
3400.00			Shet	U. Cretaceous		0047
			80	Sh/Clst: lt gy to m gy, calc		0047-1L
			15	Cont : prp, fib		0047-2L
			5	Ca : w to lt or gy, mrl		0047-3L
			tr	Sh/Clst: m brn to pl brn		0047-4L

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Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3498.00			Shet	U. Cretaceous		0048
			95	Sh/Clst: lt gy to m gy, calc		0048-1L
			5	Cont : prp		0048-2L
3530.00			Shet	U. Cretaceous		0049
	0.87		85	Marl : y gy to lt gy, hd		0049-1L
			10	Sh/Clst: m gy		0049-2L
			5	Cont : prp		0049-3L
3620.00			Shet	U. Cretaceous		0050
	0.53		60	Sh/Clst: m gy		0050-1L
			35	Sltst : gy w to lt gy, s, l, glauc		0050-2L
			5	Cont : prp		0050-3L
3700.00			Crom	L. Cretaceous		0051
			70	Sh/Clst: m gy to drk gy		0051-1L
			30	Cont : prp, dd		0051-2L
3792.00			Viki Drau	U. Jurassic		0052
			100	Cont : prp		0052-1L
			tr	Sh/Clst: lt gy to m gy		0052-2L
			tr	Marl : lt or gy		0052-3L
3792.90	swc		Viki Drau	U. Jurassic		0033
	2.80		100	Sh/Clst: brn blk		0033-1L

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Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3831.00				Viki Drau U. Jurassic		0053
			100	Cont : prp, bar		0053-1L
			tr	Sh/Clst: m gy to drk gy		0053-2L
3832.50	swc			Viki Drau U. Jurassic		0034
		4.71	100	Sh/Clst: drk gy to brn blk		0034-1L
3852.00				Viki Drau U. Jurassic		0054
			70	Sh/Clst: drk gy to brn blk		0054-2L
			30	Cont : prp		0054-1L
			tr	Marl : w to lt or gy		0054-3L
3852.50	swc			Viki Drau U. Jurassic		0035
		6.71	100	Sh/Clst: drk gy to brn blk		0035-1L
3867.00				Viki Drau U. Jurassic		0055
			70	Cont : prp		0055-1L
		5.53	30	Sh/Clst: drk gy to brn blk		0055-2L
			tr	Marl : w to lt or gy		0055-3L
3882.00				Viki Heat U. Jurassic		0056
			85	Cont : prp, bar		0056-1L
			15	Sh/Clst: drk gy to brn blk		0056-2L
3882.50	swc			Viki Heat U. Jurassic		0036
		1.15	100	Sh/Clst: dsk brn to dsk y brn		0036-1L

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Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3885.00				Viki Heat U. Jurassic		0057
	3.62		50	Sh/Clst: m gy to drk gy		0057-2L
			40	Cont : prp, bar		0057-1L
			10	Marl : or gy to lt gy		0057-3L
3891.00				Viki Heat U. Jurassic		0058
			100	Cont : prp, bar		0058-1L
	2.88		tr	Sh/Clst: m gy to drk gy		0058-2L
3894.00				Viki Heat U. Jurassic		0059
			60	Cont : prp, bar		0059-1L
			40	Sh/Clst: m gy to drk gy		0059-2L
			tr	Marl : lt or gy		0059-3L
3894.50	swc			Viki Heat U. Jurassic		0037
	2.12		100	Sh/Clst: dsk brn to dsk y brn		0037-1L
3931.71	ccp			Brnt Ness M. Jurassic		0019
			100	S/Sst : pl y brn, f, mic, hd		0019-1L
3933.16	ccp			Brnt Ness M. Jurassic		0020
			100	S/Sst : gy w to pl y brn, f, slt, hd		0020-1L
3939.36	ccp			Brnt Ness M. Jurassic		0021
			100	S/Sst : lt or gy to pl y brn, f, slt, hd		0021-1L

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Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3993.79	ccp			Dunl Cook L. Jurassic		0022
			100	S/Sst : gy w to lt brn gy to brn gy, crs, hd		0022-1L
3994.05	ccp			Dunl Cook L. Jurassic		0023
			100	S/Sst : gy w to lt brn gy to brn gy, crs, hd		0023-1L
3998.74	ccp			Dunl Cook L. Jurassic		0024
			100	S/Sst : gy w to lt brn gy to brn gy, crs, f, hd		0024-1L
4006.17	ccp			Dunl Cook L. Jurassic		0025
			100	S/Sst : gy w to brn gy to dsk brn, crs, f, cly, hd		0025-1L
4021.93	ccp			Dunl Cook L. Jurassic		0026
			50	S/Sst : lt gy to lt brn gy, f, mic, hd, lam		0026-1L
1.33			50	Sh/Clst: brn gy, mic, lam		0026-2L
4063.54	ccp			Dunl Burt L. Jurassic		0027
			0.99	100 Sltst : m gy to lt brn gy to brn gy, cly, hd		0027-1L

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Table 1 : Lithology description for well NOCS 34/10-35

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4110.00				Brnt Burt M. Jurassic		0060
		1.59	70 Cont 30 Sh/Clst:	: prp lt gy to m gy to drk gy		0060-1L 0060-2L
4257.47	ccp			Stat L. Jurassic		0028
			100 S/Sst	: lt gy w to lt brn gy, crs		0028-1L
4263.52	ccp			Stat L. Jurassic		0029
			100 S/Sst	: lt gy w to lt brn gy, crs, hd		0029-1L
4270.75	ccp			Stat L. Jurassic		0031
			100 S/Sst	: lt gy w to lt gy, crs, cncl		0031-1L
4277.89	ccp			Stat L. Jurassic		0030
			100 S/Sst	: lt gy w to lt gy to lt brn gy, crs, cncl, hd		0030-1L
			tr Coal	: blk, wx		0030-2L
4283.48	ccp			Stat L. Jurassic		0032
			100 S/Sst	: lt gy w to lt gy, crs, cncl		0032-1L

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2500.00	cut	Sh/Clst: m gy	0.12	0.23	0.61	0.38	-	-	-	0.3	0.34	419	0038-1L
2600.00	cut	Sh/Clst: m gy	0.04	0.26	0.47	0.55	-	-	-	0.3	0.13	411	0039-1L
2700.00	cut	Sh/Clst: m gy	0.19	0.30	0.33	0.91	-	-	-	0.5	0.39	422	0040-1L
2800.00	cut	Sh/Clst: m gy	0.16	0.28	0.29	0.97	-	-	-	0.4	0.36	415	0041-1L
2900.00	cut	Sh/Clst: m gy	0.16	0.35	0.38	0.92	-	-	-	0.5	0.31	421	0042-1L
3000.00	cut	Sh/Clst: m gy	0.12	0.35	0.33	1.06	-	-	-	0.5	0.26	426	0043-1L
3100.00	cut	Sh/Clst: lt gy to m gy	0.11	0.32	0.46	0.70	-	-	-	0.4	0.26	400	0044-1L
3200.00	cut	Sh/Clst: lt gy to m gy	0.07	0.28	0.39	0.72	-	-	-	0.3	0.20	426	0045-1L
3300.00	cut	Sh/Clst: lt gy to m gy	0.22	0.41	0.78	0.53	-	-	-	0.6	0.35	429	0046-1L
3400.00	cut	Sh/Clst: lt gy to m gy	0.14	0.34	0.51	0.67	-	-	-	0.5	0.29	427	0047-1L
3498.00	cut	Sh/Clst: lt gy to m gy	0.95	0.46	0.36	1.28	-	-	-	1.4	0.67	431	0048-1L
3530.00	cut	Marl : y gy to lt gy	4.54	1.46	0.42	3.48	0.87	168	48	6.0	0.76	401	0049-1L
3620.00	cut	Sh/Clst: m gy	0.26	0.20	0.16	1.25	0.53	38	30	0.5	0.57	405	0050-1L
3700.00	cut	Sh/Clst: m gy to drk gy	0.14	0.17	0.19	0.89	-	-	-	0.3	0.45	424	0051-1L
3792.90	swc	Sh/Clst: brn blk	2.44	4.32	0.20	21.60	2.80	154	7	6.8	0.36	443	0033-1L

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Table 2 : Rock-Eval table for well NOCS 34/10-35

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3831.00	cut	Sh/Clst: m gy to drk gy	2.17	4.71	0.21	22.43	-	-	-	6.9	0.32	442	0053-2L
3832.50	swc	Sh/Clst: drk gy to brn blk	4.46	5.55	0.54	10.28	4.71	118	11	10.0	0.45	436	0034-1L
3852.00	cut	Sh/Clst: drk gy to brn blk	6.59	15.76	0.68	23.18	-	-	-	22.4	0.29	444	0054-2L
3852.50	swc	Sh/Clst: drk gy to brn blk	5.62	8.44	0.46	18.35	6.71	126	7	14.1	0.40	437	0035-1L
3867.00	cut	Sh/Clst: drk gy to brn blk	5.73	7.95	0.89	8.93	5.53	144	16	13.7	0.42	439	0055-2L
3882.00	cut	Sh/Clst: drk gy to brn blk	3.39	9.16	0.89	10.29	-	-	-	12.6	0.27	445	0056-2L
3882.50	swc	Sh/Clst: dsk brn to dsk y brn	0.56	0.62	0.50	1.24	1.15	54	43	1.2	0.47	443	0036-1L
3885.00	cut	Sh/Clst: m gy to drk gy	3.28	8.85	0.34	26.03	3.62	244	9	12.1	0.27	444	0057-2L
3891.00	cut	Sh/Clst: m gy to drk gy	1.92	5.05	0.44	11.48	2.88	175	15	7.0	0.28	443	0058-2L
3894.00	cut	Sh/Clst: m gy to drk gy	1.97	4.87	0.53	9.19	-	-	-	6.8	0.29	446	0059-2L
3894.50	swc	Sh/Clst: dsk brn to dsk y brn	0.82	1.95	0.48	4.06	2.12	92	23	2.8	0.30	444	0037-1L
3931.71	ccp	S/Sst : pl y brn	0.56	0.19	0.55	0.35	-	-	-	0.8	0.75	430	0019-1L
3933.16	ccp	S/Sst : gy w to pl y brn	0.80	0.81	0.58	1.40	-	-	-	1.6	0.50	449	0020-1L
3939.36	ccp	S/Sst : lt or gy to pl y brn	0.62	0.38	0.60	0.63	-	-	-	1.0	0.62	424	0021-1L
3993.79	ccp	S/Sst : gy w to lt brn gy to brn gy	0.69	0.13	0.33	0.39	-	-	-	0.8	0.84	404	0022-1L

Table 2 : Rock-Eval table for well NOCS 34/10-35

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3994.05	ccp	S/Sst : gy w to lt brn gy to brn gy	1.33	0.32	0.33	0.97	-	-	-	1.7	0.81	412	0023-1L
3998.74	ccp	S/Sst : gy w to lt brn gy to brn gy	0.99	1.77	0.20	8.85	-	-	-	2.8	0.36	443	0024-1L
4006.17	ccp	S/Sst : gy w to brn gy to dsk brn	0.69	0.40	0.25	1.60	-	-	-	1.1	0.63	437	0025-1L
4021.93	ccp	Sh/Clst: brn gy	0.53	1.95	0.22	8.86	1.33	147	17	2.5	0.21	449	0026-2L
4063.54	ccp	Sltst : m gy to lt brn gy to brn gy	0.41	0.82	0.36	2.28	0.99	83	36	1.2	0.33	455	0027-1L
4110.00	cut	Sh/Clst: lt gy to m gy to drk gy	0.76	1.78	0.35	5.09	1.59	112	22	2.5	0.30	449	0060-2L
4257.47	ccp	S/Sst : lt gy w to lt brn gy	0.09	0.04	0.21	0.19	-	-	-	0.1	0.69	405	0028-1L
4263.52	ccp	S/Sst : lt gy w to lt brn gy	0.06	0.12	0.15	0.80	-	-	-	0.2	0.33	397	0029-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	0.05	0.07	0.13	0.54	-	-	-	0.1	0.42	375	0031-1L
4277.89	ccp	S/Sst : lt gy w to lt gy to lt brn gy	0.07	0.18	0.10	1.80	-	-	-	0.3	0.28	410	0030-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	0.07	0.40	0.04	10.00	-	-	-	0.5	0.15	396	0032-1L

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Table 3 : WEIGHT AND API GRAVITY FOR WELL NOCS 34/10-35

Oil		Whole Oil (g)	Light (g)	Topped (g)	API
34/10-35	DST 1	1.8473	0.5287	1.3186	43.58
35/10-35	DST 2	1.2722	0.3901	0.8821	43.11
34/10-35	DST 3	1.5988	0.3554	1.2434	43.52

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3530.00	cut Marl	: y gy to lt gy	3.83	31.72	54.94	9.51	1.46	0049-1L
3831.00	cut Sh/Clst:	m gy to drk gy	5.55	23.34	46.30	24.82	4.71	0053-2L
3852.00	cut Sh/Clst:	drk gy to brn blk	7.08	25.47	39.80	27.65	15.76	0054-2L
3885.00	cut Sh/Clst:	m gy to drk gy	5.22	20.69	38.83	35.26	8.85	0057-2L

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Table 5 a: Weight of EOM and Chromatographic Fraction for well NOCS 34/10-35

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
3504.00	oil	in mud	-	81.6	63.5	13.7	2.9	1.5	77.2	4.4	-	0061-0B
3530.00	cut Marl	: y gy to lt gy	10.0	51.4	29.0	13.0	4.1	5.3	42.0	9.4	0.66	0049-1L
3831.00	cut Sh/Clst:	m gy to drk gy	5.9	28.1	11.9	7.7	4.6	3.9	19.6	8.5	2.61	0053-2L
3852.00	cut Sh/Clst:	drk gy to brn blk	9.9	44.5	18.3	12.3	5.8	8.1	30.6	13.9	6.63	0054-2L
3885.00	cut Sh/Clst:	m gy to drk gy	9.8	65.2	25.4	17.2	11.2	11.4	42.6	22.6	3.54	0057-2L
3894.00	cut Sh/Clst:	m gy to drk gy	9.3	44.6	17.8	8.5	10.0	8.3	26.3	18.3	2.98	0059-2L
3929.00	oil	DST 3	-	67.8	52.7	10.7	3.8	0.6	63.4	4.4	-	0062-0B
3931.71	ccp S/Sst	: pl y brn	9.3	11.2	6.1	1.7	1.7	1.7	7.8	3.4	0.28	0019-1L
3933.16	ccp S/Sst	: gy w to pl y brn	8.2	19.3	6.6	3.5	7.0	2.2	10.1	9.2	1.35	0020-1L
3994.05	ccp S/Sst	: gy w to lt brn gy to brn gy	8.3	17.4	8.9	1.8	4.7	2.0	10.7	6.7	0.42	0023-1L
3995.00	oil	DST 2	-	72.1	58.7	10.7	1.8	0.9	69.4	2.7	-	0063-0B
4006.17	ccp S/Sst	: gy w to brn gy to dsk brn	9.5	9.2	5.5	1.6	0.9	1.2	7.1	2.1	0.40	0025-1L
4021.93	ccp Sh/Clst:	brn gy	8.8	13.6	5.5	2.9	3.2	2.0	8.4	5.2	1.43	0026-2L

Depth unit of measure: m

Depth	Typ	Lithology	Rock Extracted (g)	EOM (mg)	Sat (mg)	Aro (mg)	Asph (mg)	NSO (mg)	HC (mg)	Non-HC (mg)	TOC(e) (%)	Sample
4025.00	oil	DST 1	-	59.7	53.6	3.8	1.4	0.9	57.4	2.3	-	0064-0B
4257.47	ccp	S/Sst : lt gy w to lt brn gy	8.2	1.8	0.3	0.2	0.4	0.9	0.5	1.3	0.15	0028-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	9.3	3.9	0.3	0.2	0.7	2.7	0.5	3.4	0.23	0031-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	8.4	2.6	0.3	0.2	0.9	1.2	0.5	2.1	0.15	0032-1L

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Table 5 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 34/10-35

Page: 1

Depth unit of measure: m

Depth	Typ Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3504.00	oil in mud	—	—	—	—	—	—	—	0061-0B
3530.00	cut Marl : y gy to lt gy	5155	2908	1303	411	531	4212	942	0049-1L
3831.00	cut Sh/Clst: m gy to drk gy	4730	2003	1296	774	656	3299	1430	0053-2L
3852.00	cut Sh/Clst: drk gy to brn blk	4504	1852	1244	587	819	3097	1406	0054-2L
3885.00	cut Sh/Clst: m gy to drk gy	6632	2583	1749	1139	1159	4333	2299	0057-2L
3894.00	cut Sh/Clst: m gy to drk gy	4775	1905	910	1070	888	2815	1959	0059-2L
3929.00	oil DST 3	—	—	—	—	—	—	—	0062-0B
3931.71	ccp S/Sst : pl y brn	1206	657	183	183	183	840	366	0019-1L
3933.16	ccp S/Sst : gy w to pl y brn	2345	801	425	850	267	1227	1117	0020-1L
3994.05	ccp S/Sst : gy w to lt brn gy to brn gy	2103	1076	217	568	241	1293	810	0023-1L
3995.00	oil DST 2	—	—	—	—	—	—	—	0063-0B
4006.17	ccp S/Sst : gy w to brn gy to dsk brn	972	581	169	95	126	750	221	0025-1L
4021.93	ccp Sh/Clst: brn gy	1548	626	330	364	227	956	592	0026-2L

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
4025.00	oil	DST 1	--	--	--	--	--	--	--	0064-0B
4257.47	ccp	S/Sst : lt gy w to lt brn gy	220	36	24	48	110	61	158	0028-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	421	32	21	75	291	53	367	0031-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	309	35	23	107	143	59	250	0032-1L

Table 5 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 34/10-35

Page: 1

Depth unit of measure: m

Depth	Typ Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
3504.00	oil in mud	-	-	-	-	-	-	-	0061-0B
3530.00	cut Marl : y gy to lt gy	781.13	440.72	197.56	62.31	80.54	638.28	142.85	0049-1L
3831.00	cut Sh/Clst: m gy to drk gy	181.25	76.76	49.67	29.67	25.16	126.42	54.83	0053-2L
3852.00	cut Sh/Clst: drk gy to brn blk	67.93	27.94	18.78	8.85	12.37	46.71	21.22	0054-2L
3885.00	cut Sh/Clst: m gy to drk gy	187.37	72.99	49.43	32.19	32.76	122.42	64.95	0057-2L
3894.00	cut Sh/Clst: m gy to drk gy	160.24	63.95	30.54	35.93	29.82	94.49	65.75	0059-2L
3929.00	oil DST 3	-	-	-	-	-	-	-	0062-0B
3931.71	ccp S/Sst : pl y brn	431.03	234.76	65.42	65.42	65.42	300.18	130.85	0019-1L
3933.16	ccp S/Sst : gy w to pl y brn	173.71	59.40	31.50	63.00	19.80	90.91	82.80	0020-1L
3994.05	ccp S/Sst : gy w to lt brn gy to brn gy	500.95	256.23	51.82	135.31	57.58	308.06	192.89	0023-1L
3995.00	oil DST 2	-	-	-	-	-	-	-	0063-0B
4006.17	ccp S/Sst : gy w to brn gy to dsk brn	243.13	145.35	42.28	23.78	31.71	187.63	55.50	0025-1L
4021.93	ccp Sh/Clst: brn gy	108.32	43.81	23.10	25.49	15.93	66.90	41.42	0026-2L

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
4025.00	oil	DST 1	-	-	-	-	-	-	-	0064-0B
4257.47	ccp	S/Sst : lt gy w to lt brn gy	146.70	24.45	16.30	32.60	73.35	40.75	105.95	0028-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	183.12	14.09	9.39	32.87	126.77	23.48	159.64	0031-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	206.60	23.84	15.89	71.51	95.35	39.73	166.87	0032-1L

Table 5 d: Composition of material extracted from the rock (%) for well NOCS 34/10-35

Page: 1

Depth unit of measure: m

Depth	Typ	Lithology	Sat	Aro	Asph	NSO	HC	Non-HC	Sat	HC	Sample
			EOM	EOM	EOM	EOM	EOM	EOM	Aro	Non-HC	
3504.00	oil in	mud	77.82	16.79	3.55	1.84	94.61	5.39	463.50	1754.54	0061-0B
3530.00	cut Marl	: y gy to lt gy	56.42	25.29	7.98	10.31	81.71	18.29	223.08	446.81	0049-1L
3831.00	cut Sh/Clst:	m gy to drk gy	42.35	27.40	16.37	13.88	69.75	30.25	154.55	230.59	0053-2L
3852.00	cut Sh/Clst:	drk gy to brn blk	41.12	27.64	13.03	18.20	68.76	31.24	148.78	220.14	0054-2L
3885.00	cut Sh/Clst:	m gy to drk gy	38.96	26.38	17.18	17.48	65.34	34.66	147.67	188.50	0057-2L
3894.00	cut Sh/Clst:	m gy to drk gy	39.91	19.06	22.42	18.61	58.97	41.03	209.41	143.72	0059-2L
3929.00	oil DST	3	77.73	15.78	5.60	0.88	93.51	6.49	492.52	1440.91	0062-0B
3931.71	ccp S/Sst	: pl y brn	54.46	15.18	15.18	15.18	69.64	30.36	358.82	229.41	0019-1L
3933.16	ccp S/Sst	: gy w to pl y brn	34.20	18.13	36.27	11.40	52.33	47.67	188.57	109.78	0020-1L
3994.05	ccp S/Sst	: gy w to lt brn gy to brn gy	51.15	10.34	27.01	11.49	61.49	38.51	494.44	159.70	0023-1L
3995.00	oil DST	2	81.41	14.84	2.50	1.25	96.26	3.74	548.60	2570.37	0063-0B
4006.17	ccp S/Sst	: gy w to brn gy to dsk brn	59.78	17.39	9.78	13.04	77.17	22.83	343.75	338.10	0025-1L
4021.93	ccp Sh/Clst:	brn gy	40.44	21.32	23.53	14.71	61.76	38.24	189.66	161.54	0026-2L

Depth unit of measure: m

Depth	Typ	Lithology	Sat	Aro	Asph	NSO	HC	Non-HC	Sat	HC	Sample
			EOM	EOM	EOM	EOM	EOM	EOM	Aro	Non-HC	
4025.00	oil	DST 1	89.78	6.37	2.35	1.51	96.15	3.85	1410.53	2495.65	0064-0B
4257.47	ccp	S/Sst : lt gy w to lt brn gy	16.67	11.11	22.22	50.00	27.78	72.22	150.00	38.46	0028-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	7.69	5.13	17.95	69.23	12.82	87.18	150.00	14.71	0031-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	11.54	7.69	34.62	46.15	19.23	80.77	150.00	23.81	0032-1L

Table 5e: GC of Whole Oil for SENTOIL WELL A (% of C2 - C9)

Page: 1

Well	Description	iC4	nC4	iC5	nC5	2,3DMC4	CyC5	2,3DMC4 /CyC5	2MC5	3MC5	nC6	Sample
NOCS 34/10-35	DST 3	0.38	1.48	2.26	3.57	-	-	0.91	2.71	1.70	5.65	H47/0062
NOCS 34/10-35	DST 2	0.46	1.50	2.26	3.27	-	-	0.90	2.57	1.70	5.41	H47/0063
NOCS 34/10-35	DST 1	0.58	1.80	2.41	3.50	-	-	0.91	2.62	1.62	5.11	H47/0064

Well	Description	MCyC5	Benz	CyC6	2MC5	3MC6	1,3ciDMCyC5	1,3trDMCyC6	1,2trDMCyC5	Sample
NOCS 34/10-35	DST 3	3.14	7.09	4.00	2.84	2.31	0.82	0.77	1.51	H47/0062
NOCS 34/10-35	DST 2	3.06	6.13	5.17	2.88	2.32	0.83	0.77	1.65	H47/0063
NOCS 34/10-35	DST 1	3.10	6.22	4.86	2.87	2.20	0.82	0.77	1.42	H47/0064

Well	Description	nC7	MCyC6	Tol	2MC7	3MC7+1,2 3MCyC5	nC8	1-cis-2 n-PrCyC5	DMCyC6	1,1,3 TMCyC6	EtBenz	Sample
NOCS 34/10-35	DST 3	7.17	14.45	15.26	4.73	1.14	7.74	-	-	-	-	H47/0062
NOCS 34/10-35	DST 2	6.85	14.51	15.00	4.33	1.45	7.24	-	-	-	-	H47/0063
NOCS 34/10-35	DST 1	6.86	14.41	14.93	1.58	4.32	7.14	-	-	-	-	H47/0064

Depth unit of measure: m

Depth	Typ	Lithology	Pristane	Pristane	Pristane + Phytane	Phytane	CPI	Sample
			nC17	Phytane	nC17 + nC18	nC18		
3504.00	oil	in mud	0.48	2.36	0.36	0.23	1.11	0061-0B
3530.00	cut Marl	: y gy to lt gy	0.69	1.24	0.59	0.50	1.02	0049-1L
3831.00	cut Sh/Clst:	m gy to drk gy	0.47	1.53	0.43	0.38	1.05	0053-2L
3852.00	cut Sh/Clst:	drk gy to brn blk	0.44	1.51	0.41	0.36	1.26	0054-2L
3885.00	cut Sh/Clst:	m gy to drk gy	0.49	1.62	0.43	0.36	0.97	0057-2L
3894.00	cut Sh/Clst:	m gy to drk gy	0.44	1.82	0.38	0.30	1.08	0059-2L
3929.00	oil	DST 3	0.49	2.09	0.39	0.27	1.06	0062-0B
3931.71	ccp S/Sst	: pl y brn	0.52	1.93	0.41	0.28	1.19	0019-1L
3933.16	ccp S/Sst	: gy w to pl y brn	0.50	2.09	0.39	0.26	1.06	0020-1L
3994.05	ccp S/Sst	: gy w to lt brn gy to brn gy	0.48	1.64	0.38	0.28	1.12	0023-1L
3995.00	oil	DST 2	0.49	2.05	0.39	0.28	1.12	0063-0B
4006.17	ccp S/Sst	: gy w to brn gy to drk brn	0.49	1.67	0.38	0.28	1.08	0025-1L
4021.93	ccp Sh/Clst:	brn gy	0.43	2.10	0.35	0.25	1.17	0026-2L

Table 6 : Saturated Hydrocarbon Ratios for well NOCS 34/10-35

Depth unit of measure: m

Depth	Typ	Lithology	Pristane	Pristane	Pristane + Phytane	Phytane	CPI	Sample
			nC17	Phytane	nC17 + nC18	nC18		
4025.00	oil	DST 1	0.49	2.11	0.39	0.27	1.15	0064-08
4257.47	ccp	S/Sst : lt gy w to lt brn gy	0.43	1.74	0.35	0.26	1.49	0028-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	0.40	1.74	0.32	0.24	0.87	0031-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	0.49	1.74	0.37	0.26	1.10	0032-1L

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
3504.00	oil	in mud	1.68	4.26	0.71	1.79	1.15	1.35	1.09	-	-	-	0061-0B
3530.00	cut Marl	: y gy to lt gy	1.00	1.26	-	0.78	0.69	0.78	0.81	-	-	-	0049-1L
3831.00	cut Sh/Clst:	m gy to drk gy	0.82	1.25	0.18	0.68	0.59	0.66	0.75	-	-	-	0053-2L
3852.00	cut Sh/Clst:	drk gy to brn blk	0.94	1.43	0.20	0.77	0.65	0.74	0.79	-	-	-	0054-2L
3885.00	cut Sh/Clst:	m gy to drk gy	0.96	1.31	0.22	0.68	0.60	0.67	0.76	-	-	-	0057-2L
3894.00	cut Sh/Clst:	m gy to drk gy	1.07	1.45	0.30	0.78	0.65	0.76	0.79	-	-	-	0059-2L
3929.00	oil	DST 3	1.57	3.85	0.55	1.69	1.11	1.32	1.07	-	-	-	0062-0B
3931.71	ccp S/Sst	: pl y brn	-	2.09	-	1.65	1.10	1.31	1.06	-	-	-	0019-1L
3933.16	ccp S/Sst	: gy w to pl y brn	1.47	3.70	0.37	1.38	1.02	1.20	1.01	-	51.23	6.25	0020-1L
3994.05	ccp S/Sst	: gy w to lt brn gy to brn gy	-	3.45	0.22	1.78	1.20	1.41	1.12	-	-	-	0023-1L
3995.00	oil	DST 2	1.65	3.96	0.59	1.89	1.19	1.43	1.11	-	-	-	0063-0B
4006.17	ccp S/Sst	: gy w to brn gy to dsk brn	-	2.94	0.18	1.71	1.12	1.29	1.07	-	-	-	0025-1L
4021.93	ccp Sh/Clst:	brn gy	1.22	3.40	0.34	1.32	0.91	1.06	0.95	-	-	-	0026-2L
4025.00	oil	DST 1	1.59	3.80	0.63	1.87	1.23	1.49	1.14	-	-	-	0064-0B

Table 7 : Aromatic Hydrocarbon Ratios for well NOCS 34/10-35

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Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MF	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
4257.47	ccp	S/Sst : lt gy w to lt brn gy	-	-	-	1.02	0.88	0.99	0.93	-	-	-	0028-1L
4270.75	ccp	S/Sst : lt gy w to lt gy	-	-	-	1.80	1.01	1.16	1.01	-	-	-	0031-1L
4283.48	ccp	S/Sst : lt gy w to lt gy	-	-	-	0.69	0.85	0.99	0.91	-	-	-	0032-1L

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
3792.90	swc	Sh/Clst: brn blk	—	—	—	—	7.0(?)	443	0033-1L
3852.00	cut	Sh/Clst: drk gy to brn blk	—	—	—	—	7.5	444	0054-2L
3867.00	cut	Sh/Clst: drk gy to brn blk	—	—	—	—	7.5-8.0	439	0055-2L
3885.00	cut	Sh/Clst: m gy to drk gy	—	—	—	—	7.5-8.0	444	0057-2L

Table 9 : Visual Kerogen Composition Data for well NOCS 34/10-35

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Depth unit of measure: m

Depth	Typ	Lithology	L	A	L	S	C		D		I	S	I	M	S		V	C	V	A
			I	m	i	p	u	R	A	i	A	F	n	c	B	I	T	o	i	m
			P	o	p	/	t	e	l	n	c	E	u	m	t	c	R	e	l	t
			T	r	D	P	i	s	g	o	r	R	s	F	D	r	e	l	D	r
			%	L	t	l	l	n	e	l	t	%	n	s	t	n	o	I	%	n
3792.90	swe	Sh/Clst: brn blk	100	**	*			?	?			TR		*			TR		*	
3852.00	cut	Sh/Clst: drk gy to brn blk	50	**	*							20	**	*			30	**	*	*
3867.00	cut	Sh/Clst: drk gy to brn blk	90	**	*			*				5		*			5		*	
3885.00	cut	Sh/Clst: m gy to drk gy	70	**	*	*	*		*			20	*	**	*		10	*	*	*

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Saturated	Aromatic	NSO	Asphaltenes	Kerogen	Sample
3504.00	oil	in mud	-30.72*	-28.78	-25.80	-26.50	-28.18	-	0061-0
3831.00	cut	Sh/Clst	-30.34	-31.18	-30.25	-29.99	-29.65	-28.09	0053-2
3852.00	cut	Sh/Clst	-	-	-	-	-	-28.37	0054-2
3885.00	cut	Sh/Clst	-30.39	-31.28	-30.15	-29.94	-29.67	-	0057-2
3894.00	cut	Sh/Clst	-	-	-	-	-	-27.61	0059-2
3929.00	oil	DST 3	-28.34	-29.05	-26.32	-26.51	-28.48	-	0062-0
3933.16	ccp	S/Sst	-26.79	-28.98	-26.13	-27.19	-25.68	-	0020-1
3994.05	ccp	S/Sst	-28.49	-29.03	-26.89	-28.27	-27.95	-	0023-1
3995.00	oil	DST 2	-28.52	-29.19	-26.21	-26.85	-28.58	-	0063-0
4021.93	ccp	Sh/Clst	-28.31	-29.43	-26.94	-28.01	-27.72	-	0026-2
4025.00	oil	DST 1	-28.45	-29.10	-26.18	-26.89	-28.57	-	0064-0
3530.00	cut	Marl	-30.63	-31.23	-30.46	-30.22	-30.37	-27.51	0049-1

* Unreliable result due to problematic "oil" sample (mixed oil/formation water)

Table 10B: Tabulation of cv values from carbon isotope data for well NOCS 34/10-35

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Depth unit of measure: m

<u>Depth</u>	<u>Typ</u>	<u>Lithology</u>	<u>Saturated</u>	<u>Aromatic</u>	<u>cv value</u>	<u>Interpretation</u>	<u>Sample</u>
3504.00	oil	ln mud	-28.78	-25.80	3.89	Terrigenous	0061-0
3530.00	cut	Marl	-31.23	-30.46	-0.26	Marine	0049-1
3831.00	cut	Sh/Clst	-31.18	-30.25	0.08	Marine	0053-2
3852.00	cut	Sh/Clst	-	-	-	Marine	0054-2
3885.00	cut	Sh/Clst	-31.28	-30.15	0.56	Terrigenous	0057-2
3894.00	cut	Sh/Clst	-	-	-	Marine	0059-2
3929.00	oil	DST 3	-29.05	-26.32	3.42	Terrigenous	0062-0
3933.16	ccp	S/Sst	-28.98	-26.13	3.66	Terrigenous	0020-1
3994.05	ccp	S/Sst	-29.03	-26.89	2.10	Terrigenous	0023-1
3995.00	oil	DST 2	-29.19	-26.21	4.01	Terrigenous	0063-0
4021.93	ccp	Sh/Clst	-29.43	-26.94	3.00	Terrigenous	0026-2
4025.00	oil	DST 1	-29.10	-26.18	3.85	Terrigenous	0064-0

Table 11A: Variation in Triterpane Distribution (peak height) SIR for Well NOCS 34/10-35

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Depth unit of measure: m

Depth	Lithology	B/A	B/B+A	B		C/E	C/C+E	X/E	Z/E	Z/C	Z/Z+E	Q/E	C+D		J1		Sample
				B+E+F									E/E+F	C+D+E+F	D+F/C+E	J1+J2%	
3504.00	Oil in mud	-	-	-		0.91	0.48	3.40	0.91	1.00	0.48	3.28	1.00	0.48	-	-	0061-0
3831.00	Sh/Clst	0.13	0.12	0.05		0.27	0.21	0.25	0.04	0.15	0.04	0.14	0.94	0.20	0.05	60.89	0053-2
3852.00	Sh/Clst	0.18	0.15	0.08		0.28	0.22	0.20	0.07	0.24	0.06	0.27	0.95	0.21	0.04	61.07	0054-2
3885.00	Sh/Clst	0.13	0.12	0.05		0.24	0.20	0.24	0.04	0.15	0.04	0.15	0.94	0.19	0.05	60.95	0057-2
3894.00	Sh/Clst	0.13	0.12	0.06		0.25	0.20	0.29	0.05	0.18	0.04	0.17	0.94	0.19	0.05	61.85	0059-2
3929.00	DST 3	0.35	0.26	0.40		0.39	0.28	1.08	0.37	0.96	0.27	1.62	1.00	0.28	-	100.00	0062-0
3931.71	S/Sst	0.17	0.15	0.15		0.44	0.31	0.76	0.19	0.43	0.16	0.80	1.00	0.31	-	59.24	0019-1
3933.16	S/Sst	0.19	0.16	0.20		0.42	0.30	0.71	0.24	0.56	0.19	0.74	1.00	0.30	-	63.91	0020-1
3994.05	S/Sst	0.30	0.23	0.29		1.31	0.57	0.45	0.15	0.12	0.13	1.24	1.00	0.57	-	60.58	0023-1
3995.00	DST 2	0.31	0.24	0.43		0.44	0.31	1.75	0.72	1.62	0.42	3.18	1.00	0.31	-	-	0063-0
4006.17	S/Sst	0.40	0.28	0.21		0.88	0.47	0.25	0.13	0.14	0.11	0.69	0.92	0.47	0.09	58.15	0025-1
4021.93	Sh/Clst	0.17	0.15	0.16		0.66	0.40	1.67	0.34	0.51	0.25	0.96	0.66	0.30	0.31	61.89	0026-2
4025.00	DST 1	0.24	0.19	0.37		0.45	0.31	1.71	0.54	1.20	0.35	2.88	1.00	0.31	-	100.00	0064-0
4257.47	S/Sst	0.80	0.44	0.25		0.89	0.47	0.07	0.11	0.12	0.10	0.66	0.92	0.47	0.08	58.54	0028-1

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Table 11A: Variation in Triterpane Distribution (peak height) SIR for Well NOCS 34/10-35

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Depth unit of measure: m

Depth	Lithology	B				C/E	C/C+E	X/E	Z/E	Z/C	Z/Z+E	Q/E	C+D		J1		Sample
		B/A	B/B+A	B+E+F									C+D+E+F	D+F/C+E	J1+J2%		
4270.75	S/Sst	0.60	0.37	0.24	0.92	0.48	0.09	0.08	0.09	0.08	1.48	0.94	0.48	0.06	61.63	0031-1	
4283.48	S/Sst	1.14	0.53	0.25	0.78	0.44	0.05	0.07	0.09	0.06	0.62	0.91	0.44	0.10	63.75	0032-1	
3530.00	Marl	0.16	0.13	0.05	0.31	0.24	0.19	0.03	0.09	0.03	0.12	0.94	0.22	0.05	61.72	0049-1	

Table 11B: Variation in Sterane Distribution (peak height) SIR for Well NOCS 34/10-35

Page: 1

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Ratio10	Sample
3504.00	Oil in mud	0.84	57.51	79.99	1.06	0.78	0.70	0.57	0.67	1.35	4.71	0061-0
3831.00	Sh/Clst	0.84	58.20	79.12	1.33	0.77	0.58	0.43	0.65	1.39	4.53	0053-2
3852.00	Sh/Clst	0.81	56.43	78.71	1.24	0.77	0.69	0.54	0.65	1.30	4.24	0054-2
3885.00	Sh/Clst	0.86	60.29	78.95	1.31	0.76	0.62	0.48	0.65	1.52	4.72	0057-2
3894.00	Sh/Clst	0.85	64.33	77.62	1.36	0.73	0.62	0.48	0.63	1.80	4.86	0059-2
3929.00	DST 3	0.85	47.87	74.57	1.38	0.75	0.70	0.59	0.59	0.92	2.81	0062-0
3931.71	S/Sst	0.83	57.62	78.05	1.35	0.76	0.63	0.52	0.64	1.36	4.20	0019-1
3933.16	S/Sst	0.80	59.56	82.96	1.29	0.80	0.69	0.55	0.71	1.47	6.02	0020-1
3994.05	S/Sst	0.81	52.43	79.40	1.40	0.79	0.65	0.49	0.66	1.10	4.05	0023-1
3995.00	DST 2	0.83	56.54	80.90	1.26	0.79	0.71	0.60	0.68	1.30	4.87	0063-0
4006.17	S/Sst	0.79	53.69	80.28	1.41	0.79	0.60	0.46	0.67	1.16	4.40	0025-1
4021.93	Sh/Clst	0.77	50.70	74.29	1.01	0.74	0.70	0.58	0.59	1.03	2.93	0026-2

Ratio1: $a / a + j$ Ratio2: $q / q + t * 100\%$ Ratio3: $2(r + s) / (q + t + 2(r + s)) * 100\%$ Ratio4: $a + b + c + d / h + k + l + n$ Ratio5: $r + s / r + s + q$ Ratio6: $u + v / u + v + q + r + s + t$ Ratio7: $u + v / u + v + i + m + n + q + r + s + t$ Ratio8: $r + s / q + r + s + t$ Ratio9: q / t Ratio10: $r + s / t$

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Table 11B: Variation in Sterane Distribution (peak height) SIR for Well NOCS 34/10-35

Page: 2

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Ratio10	Sample
4025.00	DST 1	0.84	61.96	79.89	1.25	0.76	0.70	0.59	0.67	1.63	5.22	0064-0
4257.47	S/Sst	0.80	50.42	75.49	1.48	0.75	0.62	0.47	0.61	1.02	3.10	0028-1
4270.75	S/Sst	0.84	47.32	69.30	1.85	0.70	0.78	0.64	0.53	0.90	2.14	0031-1
4283.48	S/Sst	0.78	39.66	71.85	1.21	0.76	0.66	0.53	0.56	0.66	2.12	0032-1
3530.00	Marl	0.87	55.47	80.91	1.48	0.79	0.32	0.20	0.68	1.25	4.76	0049-1

Ratio1: $a / a + j$
Ratio2: $q / q + t * 100\%$
Ratio3: $2(r + s) / (q + t + 2(r + s)) * 100\%$
Ratio4: $a + b + c + d / h + k + l + n$
Ratio5: $r + s / r + s + q$

Ratio6: $u + v / u + v + q + r + s + t$
Ratio7: $u + v / u + v + i + m + n + q + r + s + t$
Ratio8: $r + s / q + r + s + t$
Ratio9: q / t
Ratio10: $r + s / t$

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
		x	d	e	f	g	h	i	j1		
		j2	k1	k2	l1	l2	m1	m2			
3504.00	Oil in mud	7795.2	6876.1	3273.3	2186.5	0.0	9001.0	0.0	1910.7	1906.7	0061-0
		7130.0	0.0	2095.5	0.0	1392.4	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.0			
3831.00	Sh/Clst	164243.3	121820.6	62714.6	81861.7	39636.1	377119.1	49309.3	34422.6	224828.8	0053-2
		210838.9	0.0	840424.3	51040.3	371545.6	248520.7	27952.0	292774.2		
		188041.5	206259.0	135044.3	145520.0	89968.0	122430.4	75913.6			
3852.00	Sh/Clst	97538.5	70000.8	30721.0	42203.4	20472.0	141144.7	24790.4	17435.9	71282.8	0054-2
		52432.0	0.0	258744.8	14293.3	104164.6	67113.6	8305.3	79144.6		
		50445.2	55024.9	37493.0	38363.0	25842.7	31732.2	21651.2			
3885.00	Sh/Clst	92513.4	71821.2	38986.7	47788.0	19966.8	202544.8	26944.8	17415.4	114474.0	0057-2
		112431.3	0.0	467301.3	28522.2	197230.4	123024.8	13109.0	156215.7		
		100072.9	105077.4	68524.6	73082.1	46322.4	57069.2	36742.5			
3894.00	Sh/Clst	78871.1	60185.4	29801.5	45577.8	17590.4	188621.2	24819.0	16142.5	88889.3	0059-2
		102656.0	0.0	354484.1	21836.7	140264.4	91996.9	10484.8	111864.6		
		69012.3	72602.6	51260.7	53088.0	35526.1	40840.9	26439.5			

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Table 11C: Raw GCMS triterpane data (peak height) SIR for Well NOCS 34/10-35

Page: 2

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
		x	d	e	f	g	h	i	j1		
		j2	k1	k2	l1	l2	m1	m2			
3929.00	DST 3	9730.8	8024.0	4098.5	2947.6	2485.9	9231.7	3270.6	1848.5	1924.1	0062-0
		5346.9	0.0	4957.0	0.0	2571.2	1780.4	0.0	1347.6		
		0.0	0.0	0.0	0.0	0.0	0.0	0.0			
3931.71	S/Sst	33467.3	22968.5	12008.9	9275.2	6974.3	29281.6	4976.0	5483.0	12624.0	0019-1
		21772.0	0.0	28631.4	0.0	15668.0	8026.2	0.0	9808.7		
		6749.3	7111.2	4587.9	4827.0	3528.4	5348.0	4756.0			
3933.16	S/Sst	28384.0	19057.8	9921.1	7627.1	7124.0	32652.8	6364.9	6090.1	10895.0	0020-1
		18284.0	0.0	25804.0	0.0	12042.3	7947.5	0.0	8436.0		
		4764.3	5218.1	3460.8	3082.6	0.0	3267.8	0.0			
3994.05	S/Sst	86731.8	46746.8	24008.0	47979.1	16276.0	50989.2	15293.0	5710.8	49592.0	0023-1
		16925.5	0.0	37850.2	0.0	15389.0	10743.0	0.0	9002.7		
		5857.6	3698.5	0.0	4547.9	0.0	2904.0	0.0			
3995.00	DST 2	16152.5	12375.9	5740.3	4347.0	3212.5	9516.4	2972.5	2801.4	1724.6	0063-0
		6788.3	0.0	3889.5	0.0	2207.8	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0	0.0	0.0	0.0			

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
		x	d	e	f	g	h	i	j1		
		j2	k1	k2	l1	l2	m1	m2			
4006.17	S/Sst	85930.6	48607.2	27152.7	44054.4	14640.6	52990.1	21048.5	8981.5	62451.7	0025-1
		17626.5	5519.3	70819.3	6458.7	28738.0	17098.9	4081.0	14467.3		
		10411.0	10184.8	7951.7	5989.6	3890.5	5992.6	4363.6			
4021.93	Sh/Clst	27408.0	21026.1	8154.7	9514.2	7108.0	37724.8	6442.7	7351.8	14394.7	0026-2
		36363.4	0.0	21833.0	11250.0	13101.6	7260.4	10775.4	11321.2		
		6970.2	4228.0	0.0	0.0	0.0	0.0	0.0			
4025.00	DST 1	11480.0	10443.1	4556.4	2419.1	2961.1	8906.6	2123.8	1951.3	1619.4	0064-0
		6188.6	0.0	3626.4	0.0	2641.1	1272.0	0.0	1225.1		
		0.0	0.0	0.0	0.0	0.0	0.0	0.0			
4257.47	S/Sst	138288.0	82220.7	39544.6	59422.0	19236.2	55302.9	44024.5	13707.0	111125.9	0028-1
		8643.8	8935.1	124591.5	10133.5	49125.5	32179.3	4368.0	24204.7		
		17142.6	15402.8	9430.8	9590.5	6395.6	9234.8	4785.3			
4270.75	S/Sst	42283.3	20056.3	7603.6	11965.5	4593.7	7461.0	4441.5	1130.0	12460.5	0031-1
		1158.6	723.0	13520.4	921.6	4481.0	2637.2	0.0	2197.1		
		1367.6	1439.6	1176.5	1263.5	0.0	1103.7	0.0			

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Table 11C: Raw GCMS triterpane data (peak height) SIR for Well NOCS 34/10-35

Page: 4

Depth unit of measure: m

Depth	Lithology	p	q	r	s	t	a	b	z	c	Sample
		x	d	e	f	g	h	i	j1		
		j2	k1	k2	l1	l2	m1	m2			
4283.48	S/Sst	84288.2	46825.5	19485.0	27167.2	9513.1	24601.2	28033.5	4977.6	58559.4	0032-1
		3747.2	6557.3	75001.6	7415.8	26374.7	17007.4	3542.8	12315.9		
		7004.3	6593.6	4136.4	3696.9	2535.8	3391.2	1783.4			
3530.00	Marl	98299.4	76623.0	49919.0	52528.0	28949.5	240201.4	37477.9	17544.5	203625.6	0049-1
		126545.6		0.0	661509.3	43704.0	297702.9	185017.7	19903.0	230044.3	
		142672.0	167049.8	106648.5	122209.6	79513.4	105895.0	62013.9			

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
3504.00	Oil in mud	21636.6	5256.0	15160.5	8103.9	4186.3	2534.3	6682.8	3090.4	2646.8	0061-0
		13954.1	4509.8	2914.5	8523.5	2653.7	1447.4	3140.3	4380.3		
		1829.6	2178.8	4206.4	3366.4	1609.5					
3831.00	Sh/Clst	292760.0	159628.7	377926.4	235392.0	93285.8	95368.9	182701.4	102907.4	73939.1	0053-2
		300576.6	149814.8	70675.1	156691.1	55276.0	32947.5	91123.5	129100.9		
		30752.0	64770.5	118159.6	92770.8	46528.3					
3852.00	Sh/Clst	216366.2	106419.1	141358.8	91172.0	34464.4	36466.8	79141.8	46374.5	34824.6	0054-2
		115279.2	63087.2	33034.2	60792.1	21881.4	17849.4	46425.4	59001.4		
		18929.4	28977.3	52063.0	42873.0	22372.0					
3885.00	Sh/Clst	186811.2	89480.0	199636.0	121486.8	45150.3	44884.1	90228.1	49769.6	40971.2	0057-2
		155787.2	70635.2	33691.2	86922.2	27141.3	19973.3	44885.3	66933.3		
		20300.0	35586.2	60502.6	50181.3	23443.6					
3894.00	Sh/Clst	140095.0	72067.8	165833.6	100149.2	38739.6	36730.7	75273.1	38337.3	31189.4	0059-2
		123637.4	54933.4	28496.2	70500.8	24051.0	12384.7	33412.9	51748.9		
		13200.6	30037.4	44471.8	36503.8	16656.8					

Table 11D: Raw GCMS sterane data (peak height) SIR for Well NOCS 34/10-35

Page: 2

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
3929.00	DST 3	22657.7	6570.0	19938.0	12331.7	4522.0	4075.9	11498.3	4655.3	2735.0	0062-0
		14367.0	4519.0	3570.3	8751.6	2792.8		0.0	3752.7	5546.2	
		1967.6	2387.5	3942.4	3369.9	2599.7					
3931.71	S/Sst	59934.2	16381.3	54924.0	33245.8	10782.7	12671.8	29420.2	14310.3	8492.7	0019-1
		40838.0	14693.9	11490.2	26301.6	7565.4	3749.9	8217.0	14349.9		
		4060.2	9236.0	15984.4	12515.5	6792.8					
3933.16	S/Sst	57523.8	15432.2	42329.7	26617.9	10491.5	12861.5	21482.5	11171.2	8841.3	0020-1
		34110.4	15248.0	10344.5	22051.5	7598.7	3580.2	7738.4	12330.5		
		3872.0	5814.8	14006.2	9758.2	3948.5					
3994.05	S/Sst	75013.0	28124.7	80765.8	46681.0	18089.9	17370.5	36460.0	17197.5	18634.7	0023-1
		56090.7	25882.7	18890.2	32201.9	12776.3	8664.3	15600.3	18784.3		
		6960.7	9941.3	21534.7	15010.2	9018.8					
3995.00	DST 2	40469.6	9722.9	27064.2	16237.2	6724.0	5520.2	13546.4	7036.0	5261.3	0063-0
		22536.7	7924.6	5602.1	11929.3	4513.5		0.0	5200.4	8692.4	
		2659.2	3680.7	6894.3	6889.4	2829.7					

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
4006.17	S/Sst	75976.0	31326.2	85304.3	51528.0	20387.4	19939.4	41220.6	18953.2	21507.1	0025-1
		64659.1	29571.1	22855.8	34688.0	11229.9	7115.1	15427.1	23427.1		
		8492.0	12784.1	27148.0	21324.0	11025.6					
4021.93	Sh/Clst	48008.7	12667.3	32825.5	21816.4	7420.0	10449.3	18975.6	10204.0	8365.0	0026-2
		34482.6	11616.4	9857.6	21164.1	10528.0		0.0	5423.8	10311.8	
		3756.8	5489.0	8454.0	7184.4	5337.9					
4025.00	DST 1	37795.5	9284.0	24541.0	13611.3	5416.2	4915.4	11611.4	5684.3	4764.5	0064-0
		19064.5	6080.5	4657.6	10834.1	4439.1	2165.2	4306.5	6342.5		
		1866.2	4180.2	6969.4	6431.0	2566.8					
4257.47	S/Sst	83132.9	45740.2	117452.0	67979.3	24515.2	24356.9	47508.9	21822.9	30553.6	0028-1
		85273.6	38233.6	29885.4	41116.4	12351.4	9741.2	19869.2	22741.2		
		11804.0	15903.4	26692.0	21874.0	15641.5					
4270.75	S/Sst	20277.5	9258.0	14344.7	7720.7	3393.3	2670.8	5780.8	2458.0	3571.4	0031-1
		7945.4	4589.4	2798.3	3903.2	1188.1	1165.6	2197.5	2781.5		
		1094.5	1880.2	2279.4	2206.3	2093.4					

Table 11b: Raw GCMS sterane data (peak height) SIR for Well NOCS 34/10-35

Depth unit of measure: m

Depth	Lithology	u	v	a	b	c	d	e	f	g	Sample
		h	i	j	k	l	m	n	o		
		p	q	r	s	t					
4283.48	S/Sst	36127.1	19814.6	32056.5	16367.0	5965.2	6348.3	13772.0	5593.6	9422.1	0032-1
		27978.1	11478.1	8882.5	11977.7	4753.5	3571.5	5663.5	6863.9		
		4357.4	5008.8	9241.3	6879.5	7622.1					
3530.00	Marl	94913.6	5663.3	340814.9	194222.8	81317.6	80318.0	165342.0	87272.0	56188.7	0049-1
		237436.7	104252.7	50988.1	137446.6	42063.0	19445.8	54153.9	95999.9		
		22109.7	37736.3	79732.8	64468.8	30290.6					

Table 12a: Gaseous Hydrocarbons Data from Nocs 34/10-35

Sample: DST 1

Compound	Area	Time
Methane	14783620	1.82
Ethane	1868262	2.11
Propane	977404	3.13
Isobutane	180598	5.71
Butane	302987	6.10
Neopentane	2392	9.41
Cyclopentane	4150	10.08
2-Methylbutane	104026	10.12
Pentane	93321	10.62
2,2-Dimethylbutane	2470	14.22
Cyclohexane	12723	14.30
Methylcyclopentane	15736	14.56
2-Methylpentane	23588	14.73
3-Methylpentane	13185	14.85
Hexane	28183	15.32
Methylcyclohexane	9221	18.78
2-Methylhexane	6648	19.17
Heptane	5169	19.78
Benzene	6257	20.73

Table 12 b: Gaseous Hydrocarbons Data from Nocs 34/10-35

Sample: DST 2

Compound	Area	Time
Methane	18515302	1.82
Ethane	2142473	2.11
Propane	1105914	3.13
Isobutane	193855	5.73
Butane	315115	6.13
Neopentane	2167	9.47
Cyclopentane	4208	10.15
2-Methylbutane	83381	10.20
Pentane	75102	10.70
2,2-Dimethylbutane	2191	14.30
Cyclohexane	16502	14.37
Methylcyclopentane	20534	14.63
2-Methylpentane	27959	14.81
3-Methylpentane	17216	14.93
Hexane	36411	15.41
Methylcyclohexane	16622	18.90
2-Methylhexane	8086	19.34
Heptane	9104	19.96
Benzene	7581	20.95

Table 12c: Gaseous Hydrocarbons Data from Nocs 34/10-35

Sample: DST 3

Compound	Area	Time
Methane	7219672	1.85
Ethane	1105653	2.14
Propane	657756	3.17
Isobutane	117250	5.76
Butane	225121	6.15
Neopentane	1197	9.46
Cyclopentane	3285	10.14
2-Methylbutane	69681	10.20
Pentane	70915	10.68
2,2-Dimethylbutane	1364	14.29
Cyclohexane	9156	14.36
Methylcyclopentane	12243	14.62
2-Methylpentane	17708	14.80
3-Methylpentane	9608	14.92
Hexane	22531	15.38
Methylcyclohexane	8165	18.86
2-Methylhexane	4786	19.26
Heptane	4060	19.87
Benzene	5851	20.82

Table 13: Isotope GC Analysis of DST Gas for well 34/10-35.

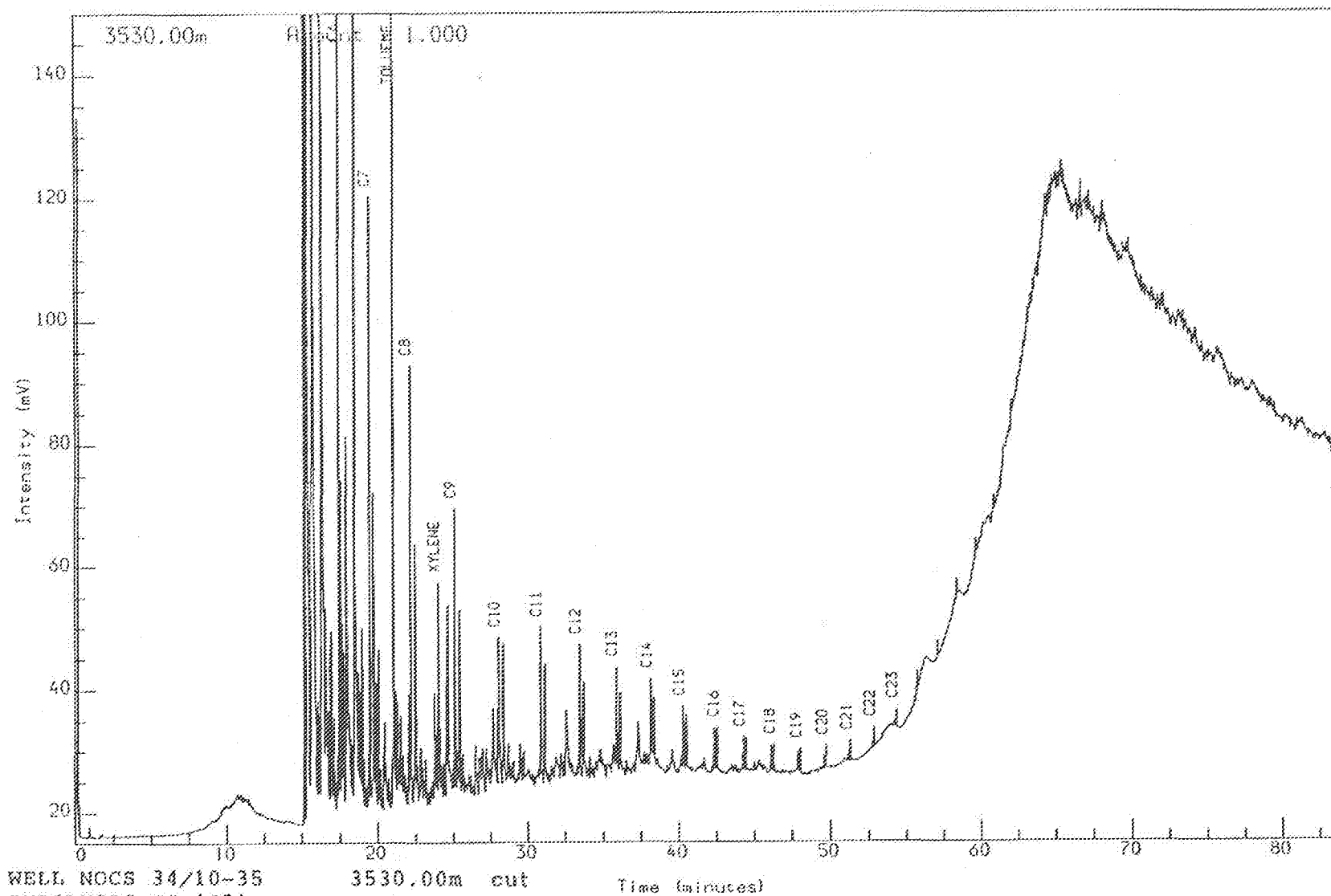
Sample	n-C1	n-C2	n-C3	i-C4	n-C4
DST 1	-39.4	-27.8	-27.2	-26.1	-25.5
DST 2	-38.1	-29.0	-26.2	-26.4	-25.1
DST 3	-40.9	-29.9	-26.7	-26.4	-25.6

APPENDIX 2:

**GHM-PYROLYSIS GAS
CHROMATOGRAPHY PYROGRAMS**

Analysis Name : [526265] 24 PH4700491.1.1.

Multichrom



WELL NOCS 34/10-35
PYROLYSIS GC (S2)
Marl: y gy to lt gy

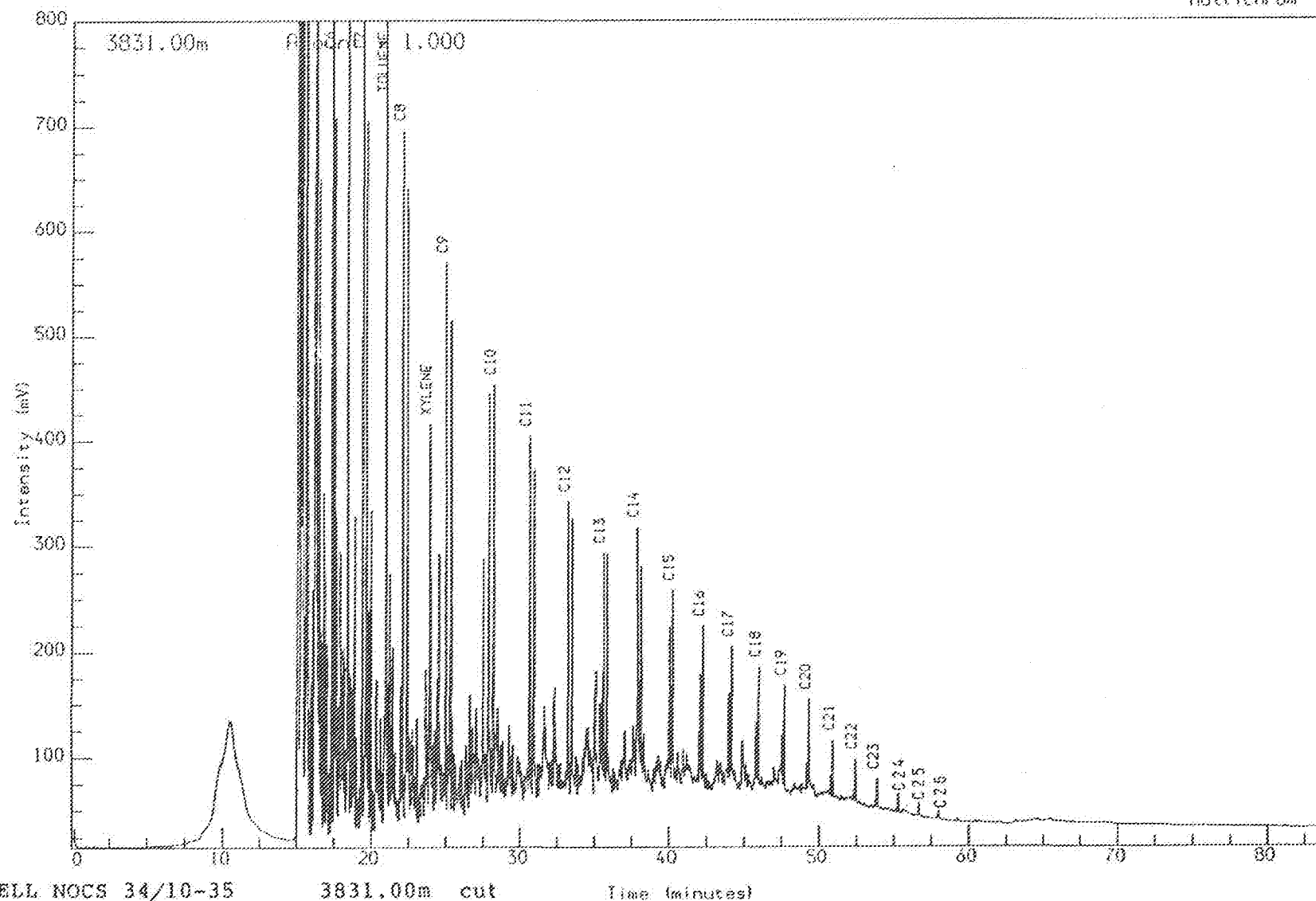
3530.00m cut

Reported on 31-AUG-1992 at 02:36

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WELL NOCS 34/10-35
PYROLYSIS GC (S2)
Sh/C1st: m gy to drk gy

3831.00m cut

Time (minutes)

Reported on 31-AUG-1992 at 02.40

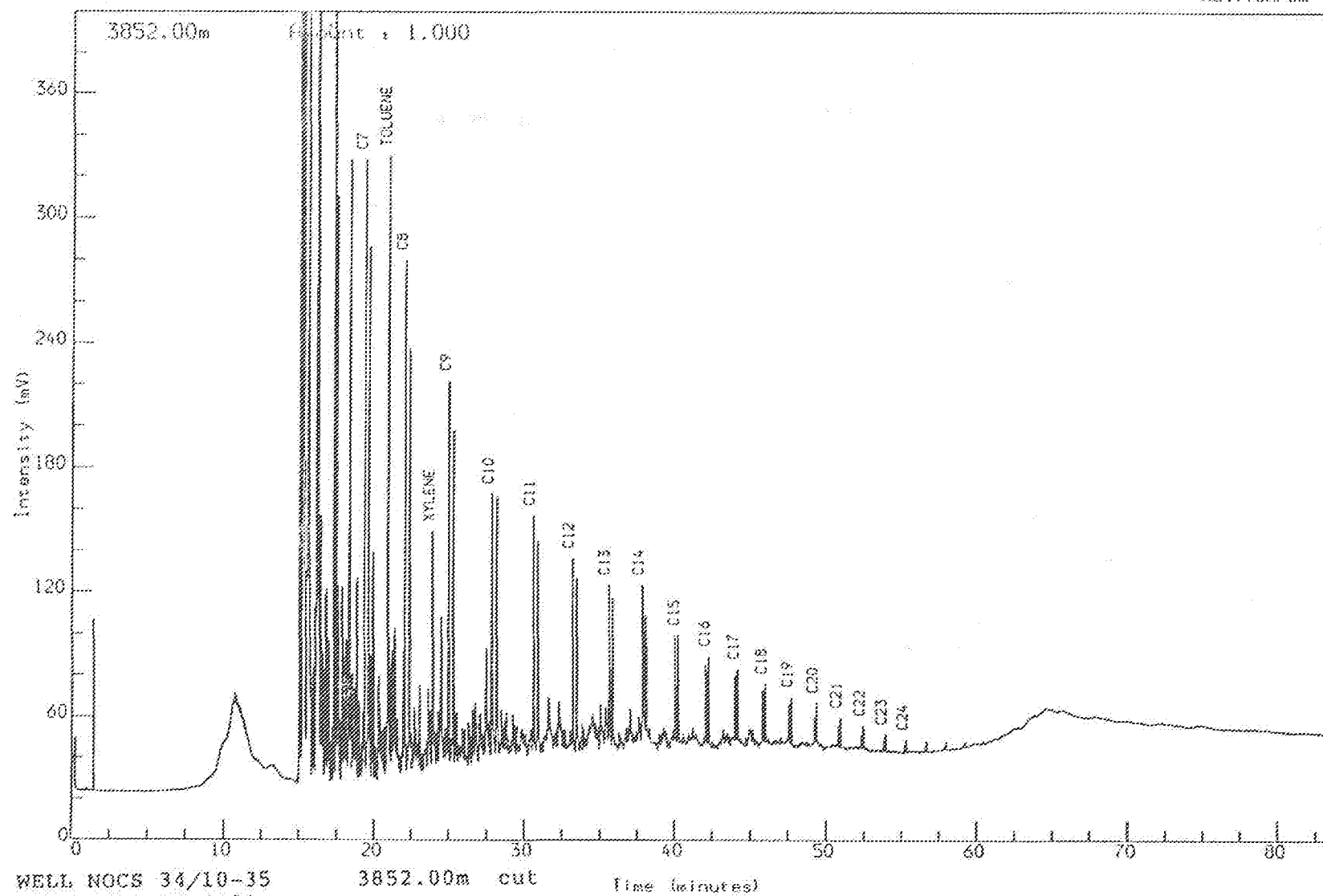
Schlumberger

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GEOLAB NOR

Analysis Name : [526265] 24 PH4700542.1.1.

Multichrom



WELL NOCS 34/10-35

PYROLYSIS GC (S2)

Sh/Clst: drk gy to brn blk

Reported on 15-SEP-1992 at 10.17

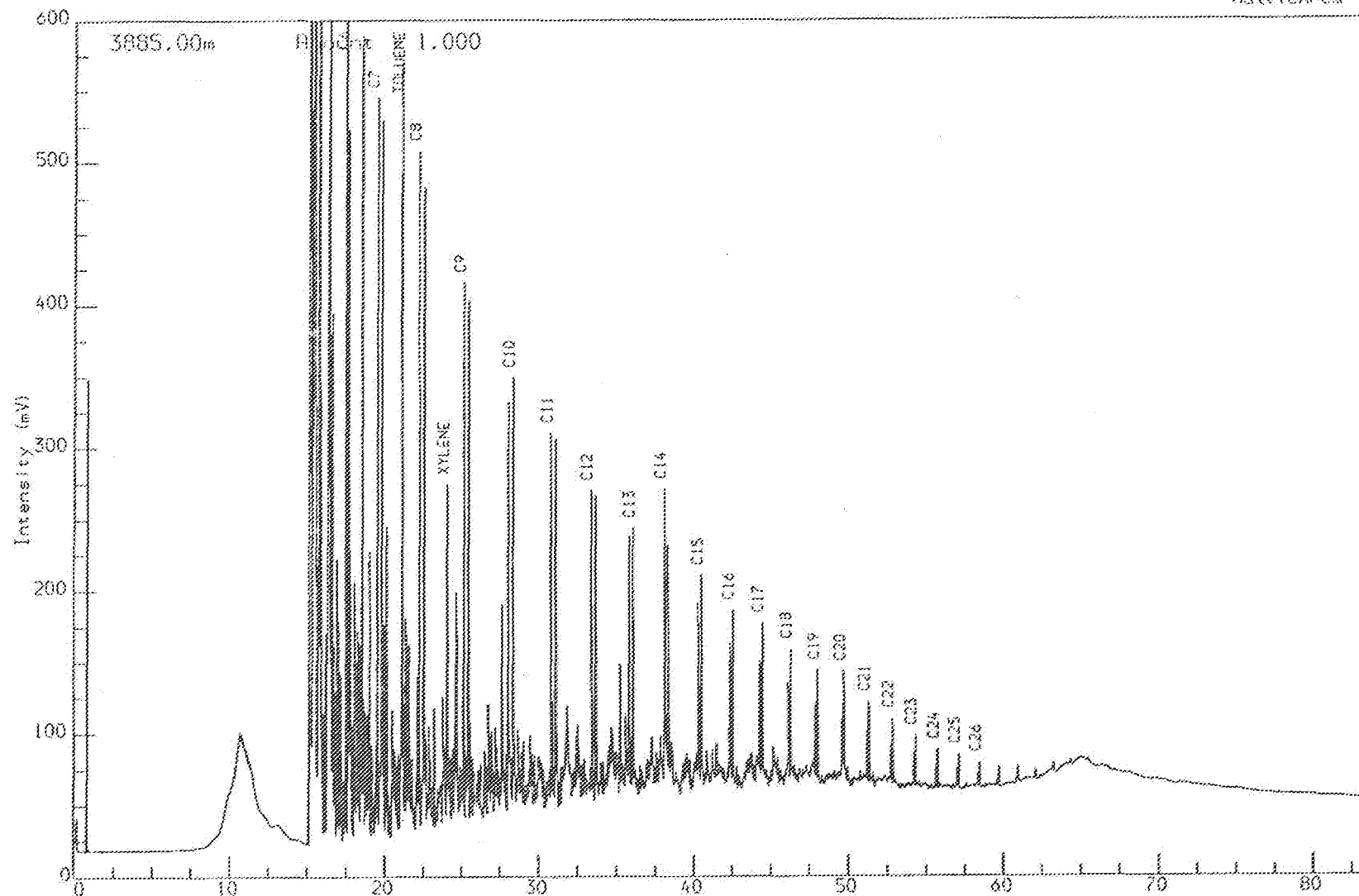
Schlumberger

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GEOLAB NOR

Analysis Name : [526265] 24 PH4700572.1.1.

Multichrom



WELL NOCS 34/10-35

3885.00m cut

Time (minutes)

PYROLYSIS GC (S2)

Sh/C1st: m gy to drk gy

Reported on 15-SEP-1992 at 10.21

Schlumberger

GECO-PRAKLA

GEOLAB NOR

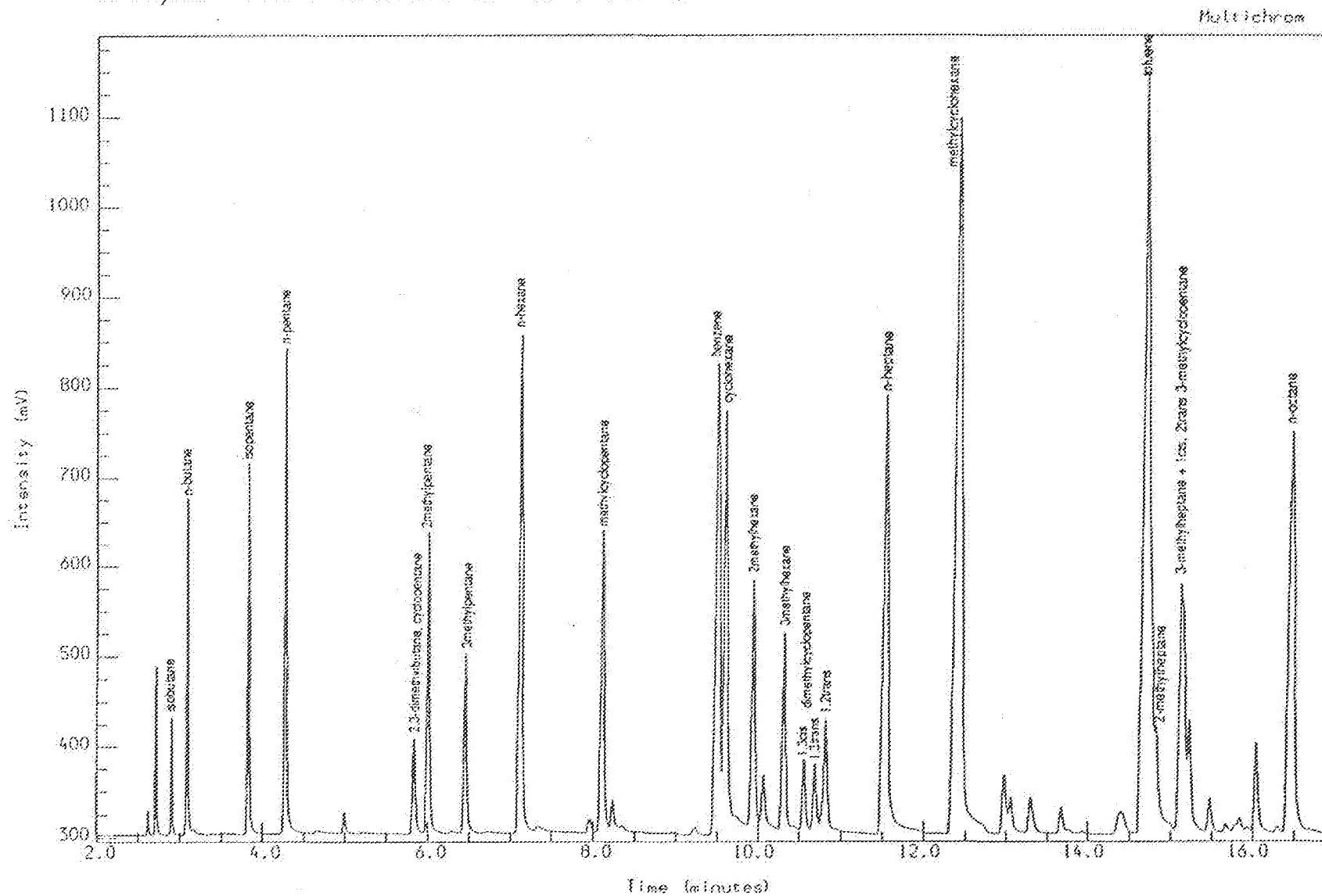
APPENDIX 3:

GAS CHROMATOGRAMS

- I. Whole Oil and Whole Extract Chromatograms (FID and FPD)
- II. Saturated Fraction Chromatograms (FID)
- III. Aromatic Fraction Chromatograms (FID and FPD)

Whole Oil and Whole Extract Chromatograms (FID and FPD)

Analysis Name : [526265] 31 W03410351.1.1.



WELL NOCS 34/10-35 DST. 1
WHOLE OIL GC (FID)

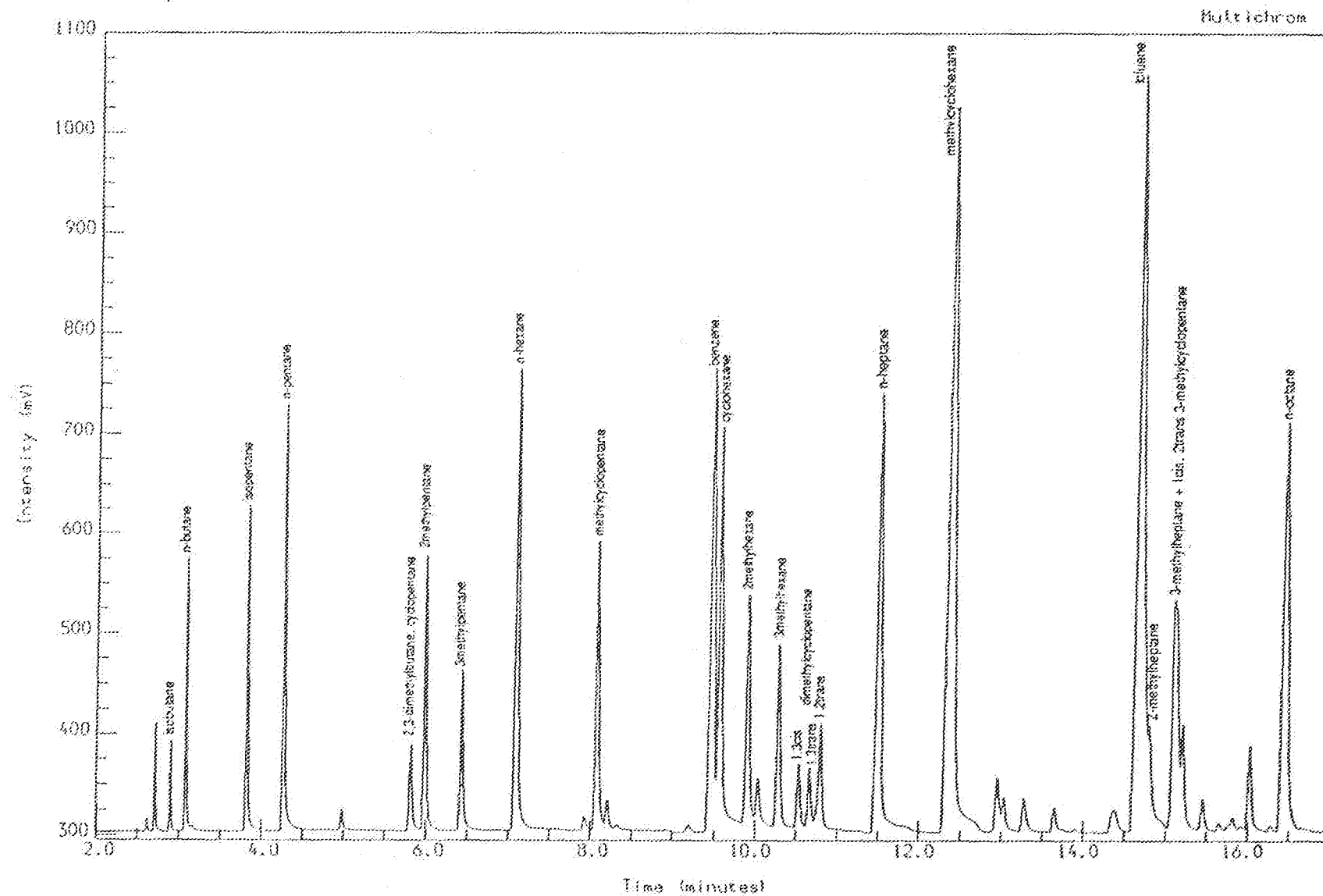
Reported on 28-SEP-1992 at 09:28

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410352.1.1.



WELL NOES 34/10-35 DST.2
WHOLE OIL GC (FID)

Reported on 28-SEP-1992 at 09.28

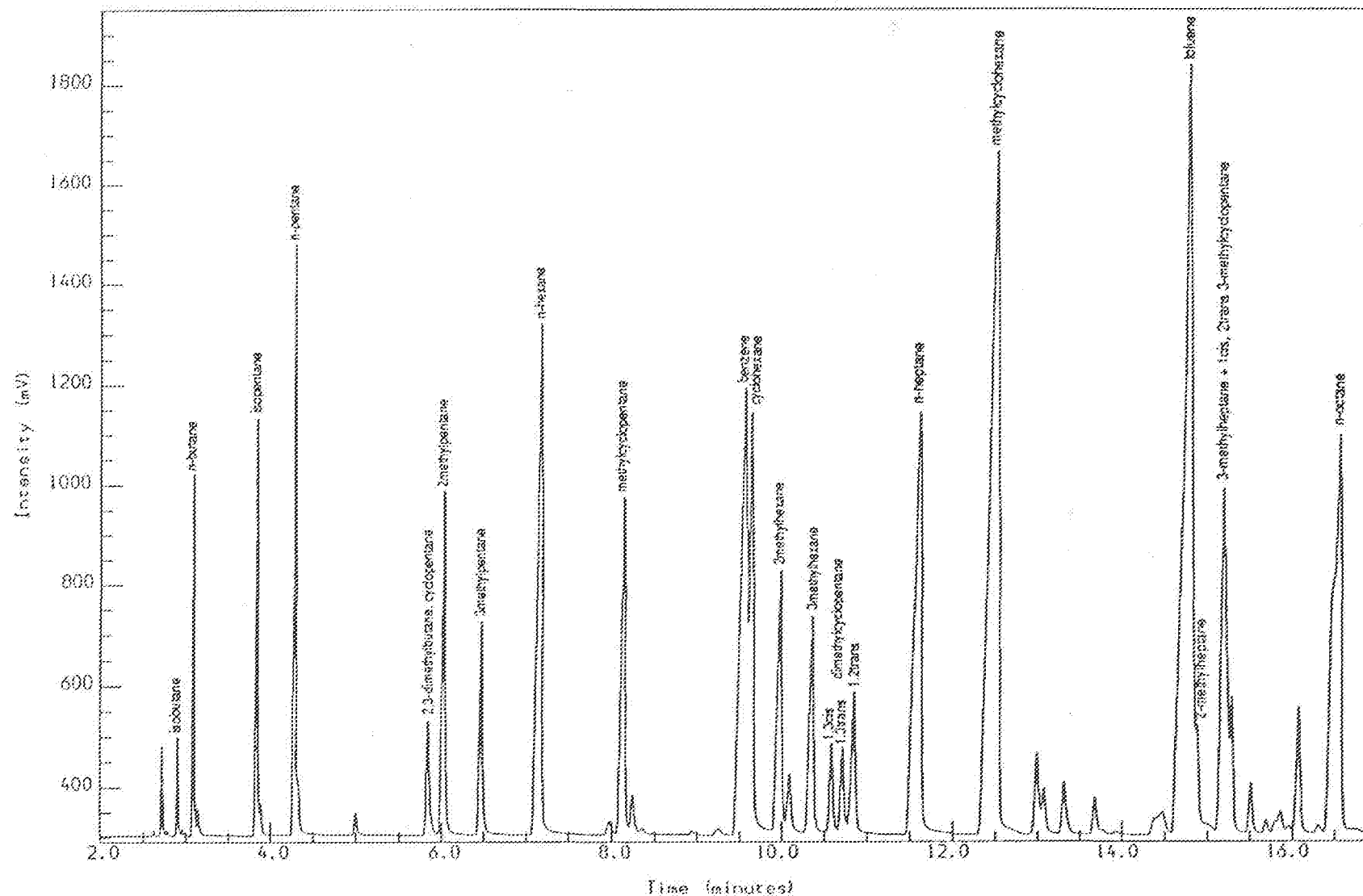
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410353.1.1.

Multichrom



WELL NOES 34/10-35 DST.3
WHOLE OIL GC (FID)

Reported on 28-SEP-1992 at 09.29

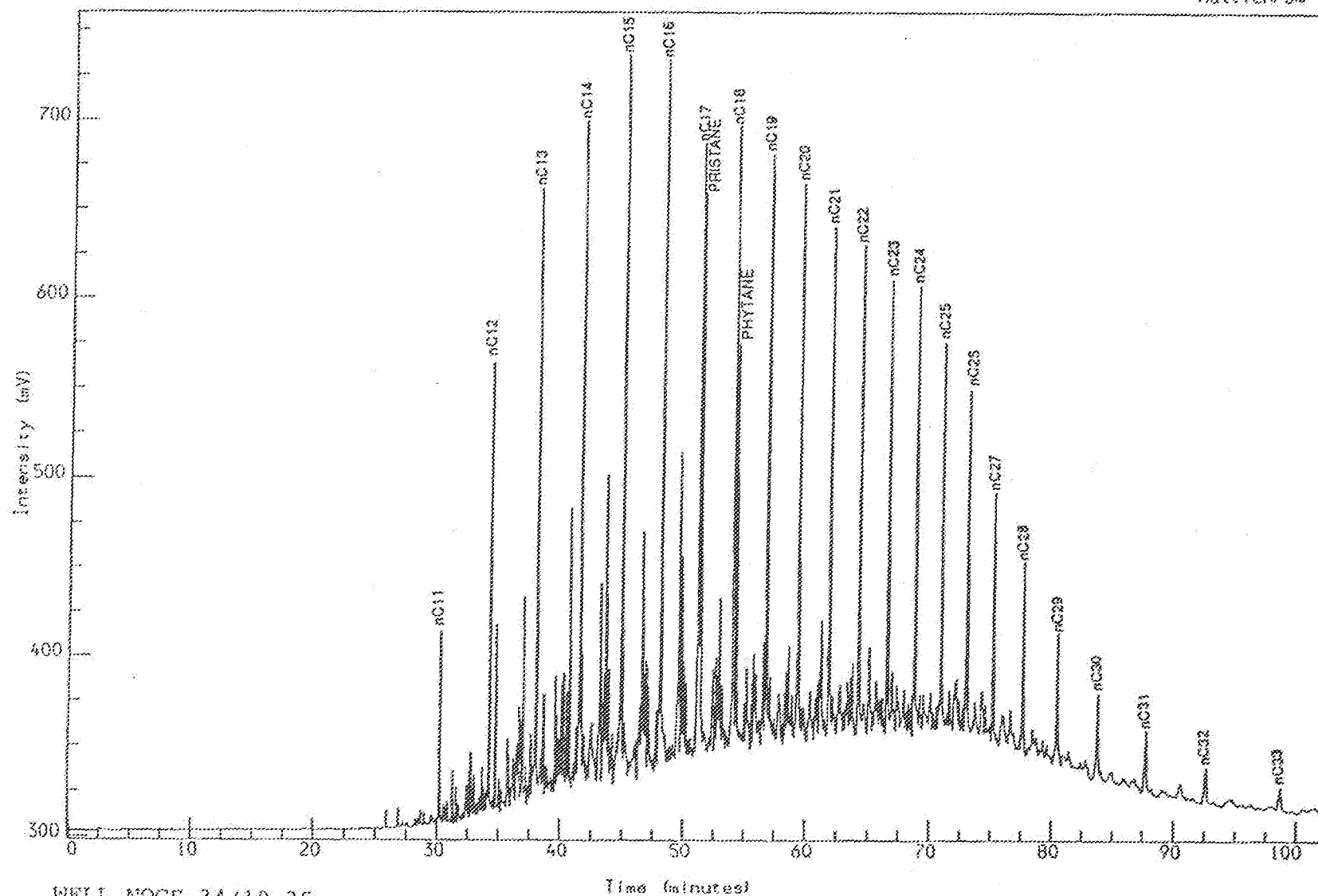
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W0341035.1.1.

Multichrom



WELL NOCS 34/10-35
OIL IN MUD
WHOLE OIL GC (FID)

Reported on 16-SEP-1992 at 09:49

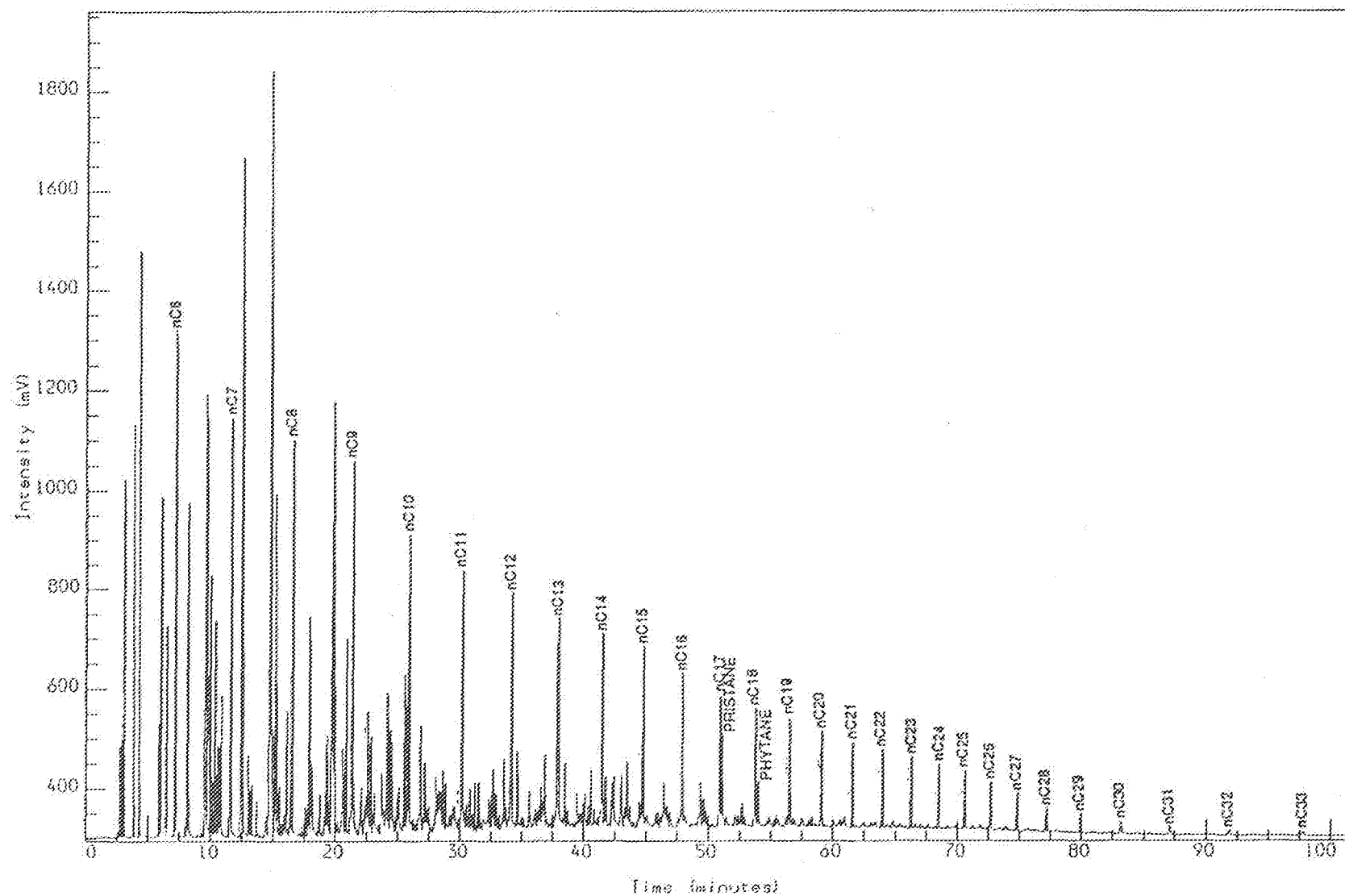
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410353.1.1.

Multichrom



WELL NOCS 34/10-35 DST.3
WHOLE OIL GC (FID)

Reported on 25-SEP-1992 at 13:17

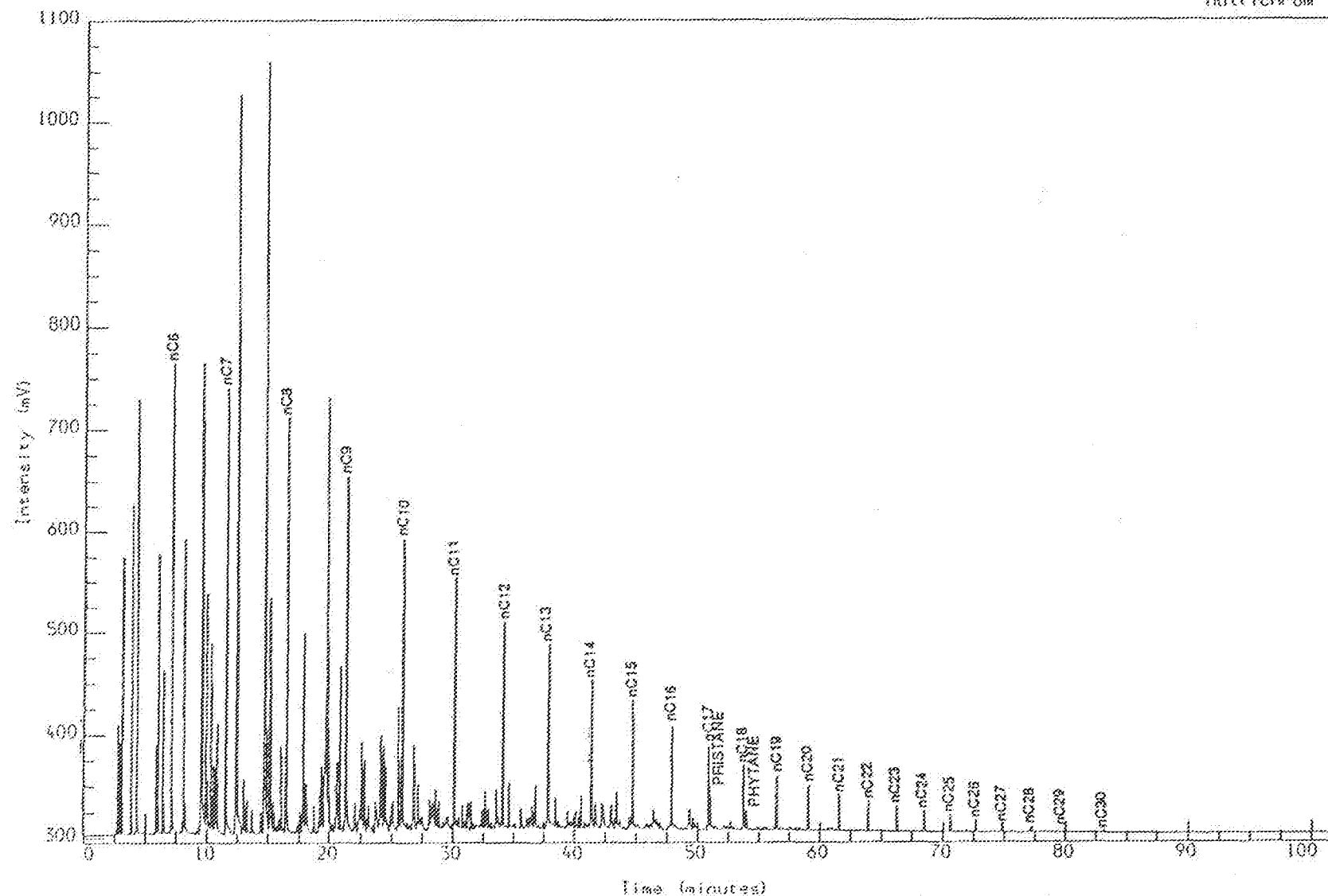
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410352.1.1.

Multichrom



WELL NDCS 34/10-35 DST.2
WHOLE OIL GC (FID)

Reported on 25-SEP-1992 at 11:17

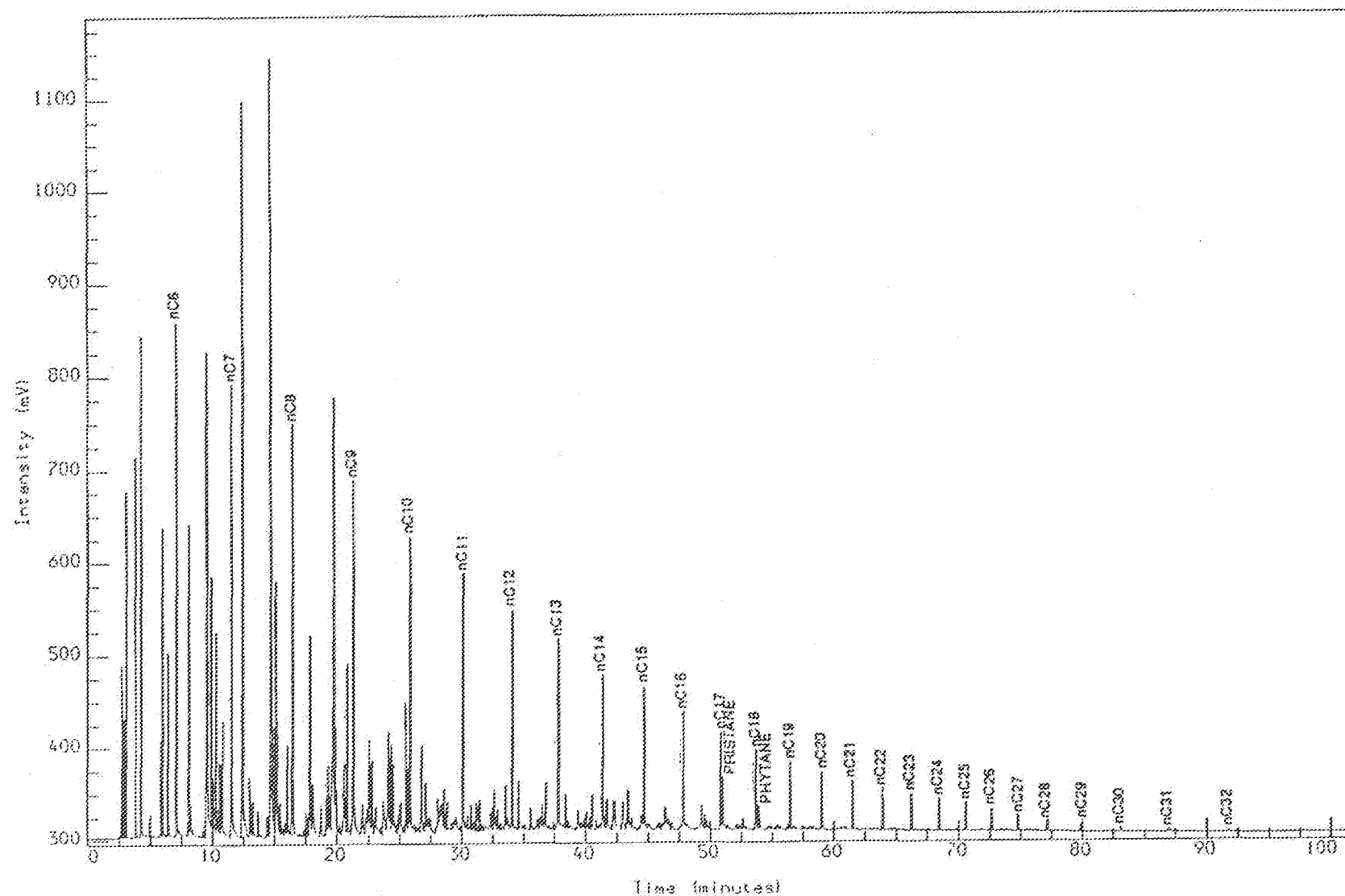
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410351.1.1.

Multichrom



WELL NDCB 34/10-35 DST.1
WHOLE OIL GC (F10)

Reported on 25-SEP-1992 at 09:06

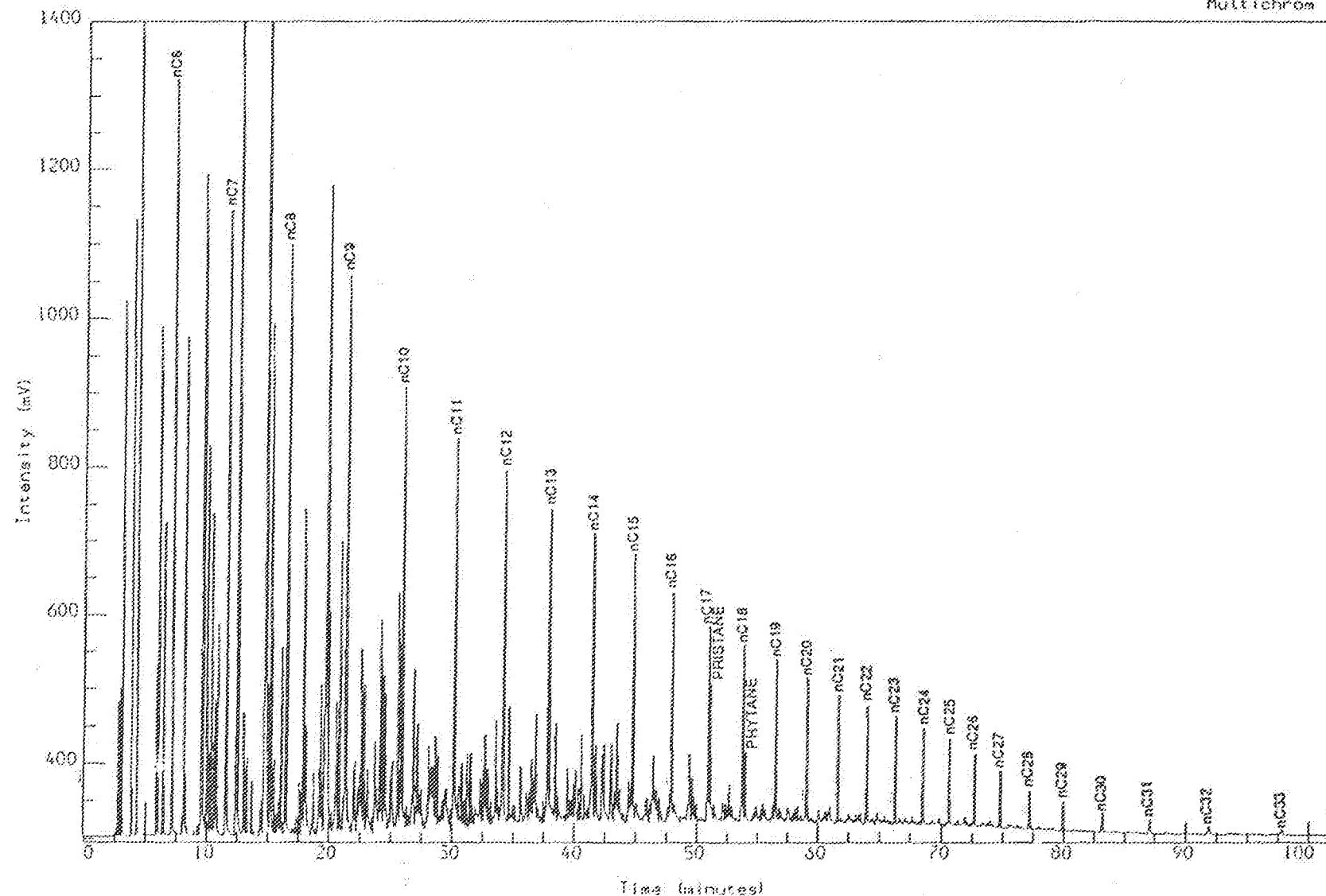
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410353,1,1.

Multichrom



WELL NOC9 34/10-35 DST.3
WHOLE OIL GC (FID)

Reported on 25-SEP-1992 at 15.07

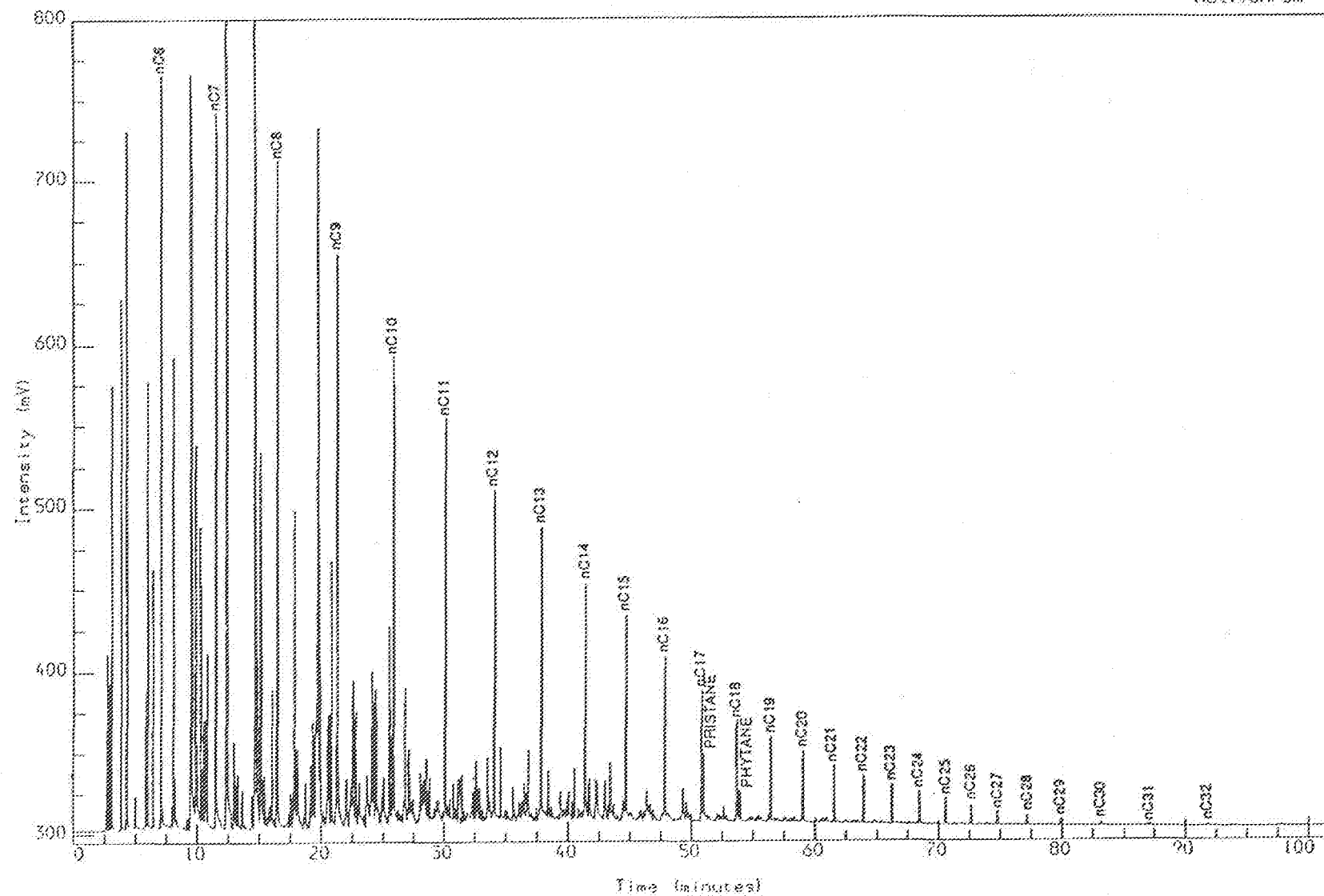
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410352.1.1.

Multichrom



WELL NOCS 34/10-35 DST-2
WHOLE OIL GC (FID)

Reported on 25-SEP-1992 at 15:03

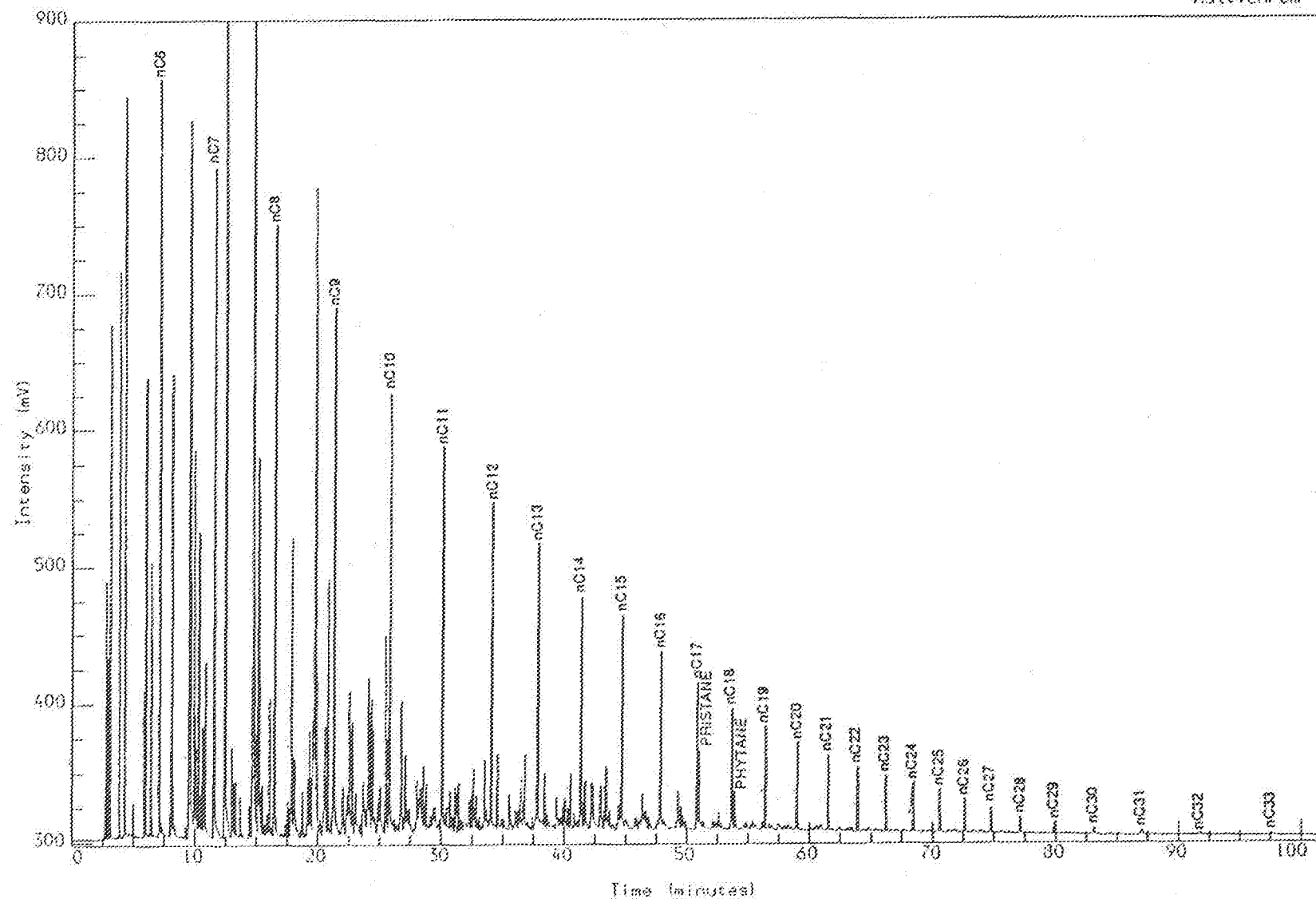
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03410351.1.1.

Multichrom



WELL NOCS 34/10-35 DST.1
WHOLE OIL GC (FID)

Reported on 25-SEP-1992 at 14:59

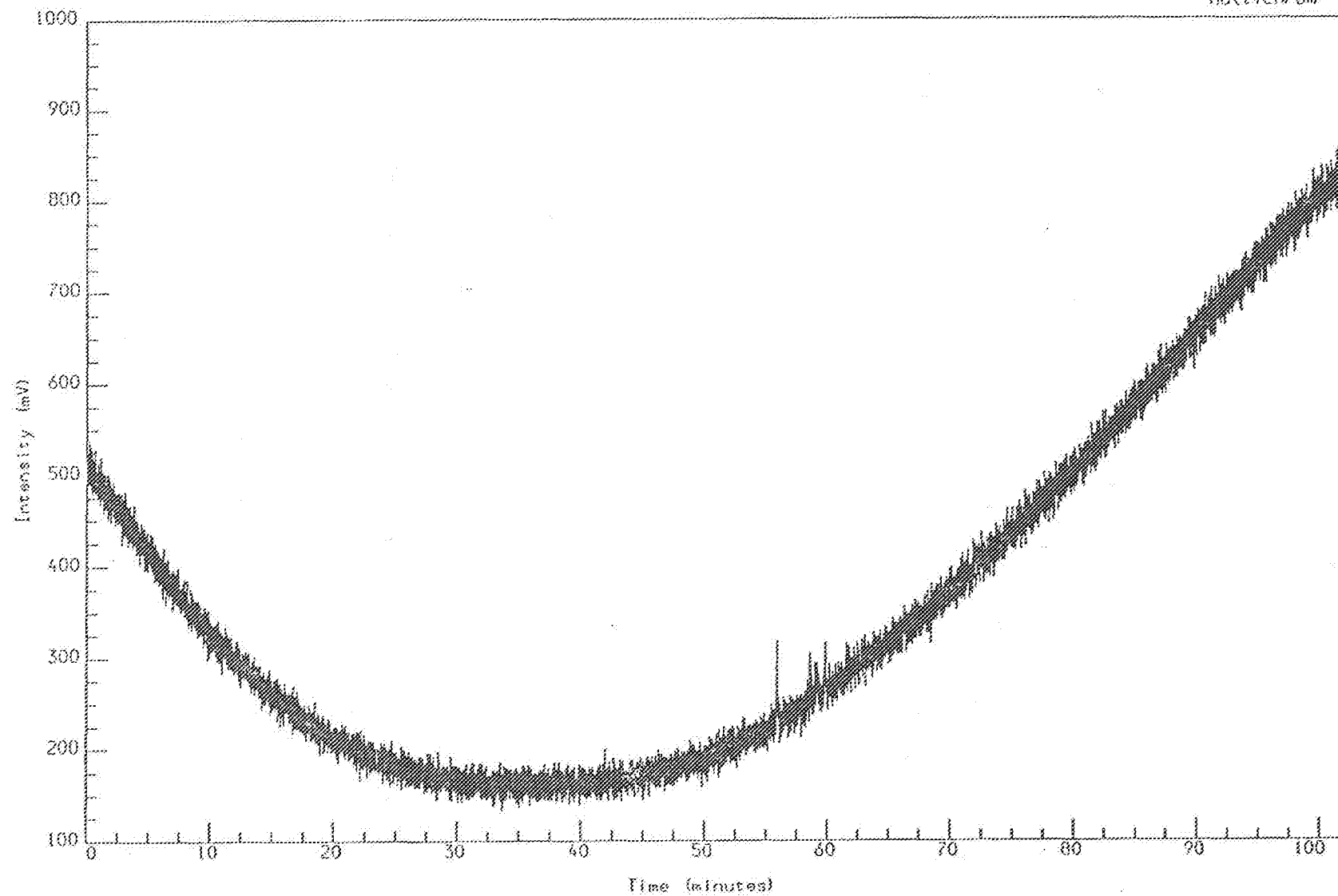
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0341035,1,1.

Multichrom



WELL NOES 34/10-35
WHOLE OIL GC (FPD)

Reported on 16-SEP-1992 at 09.53

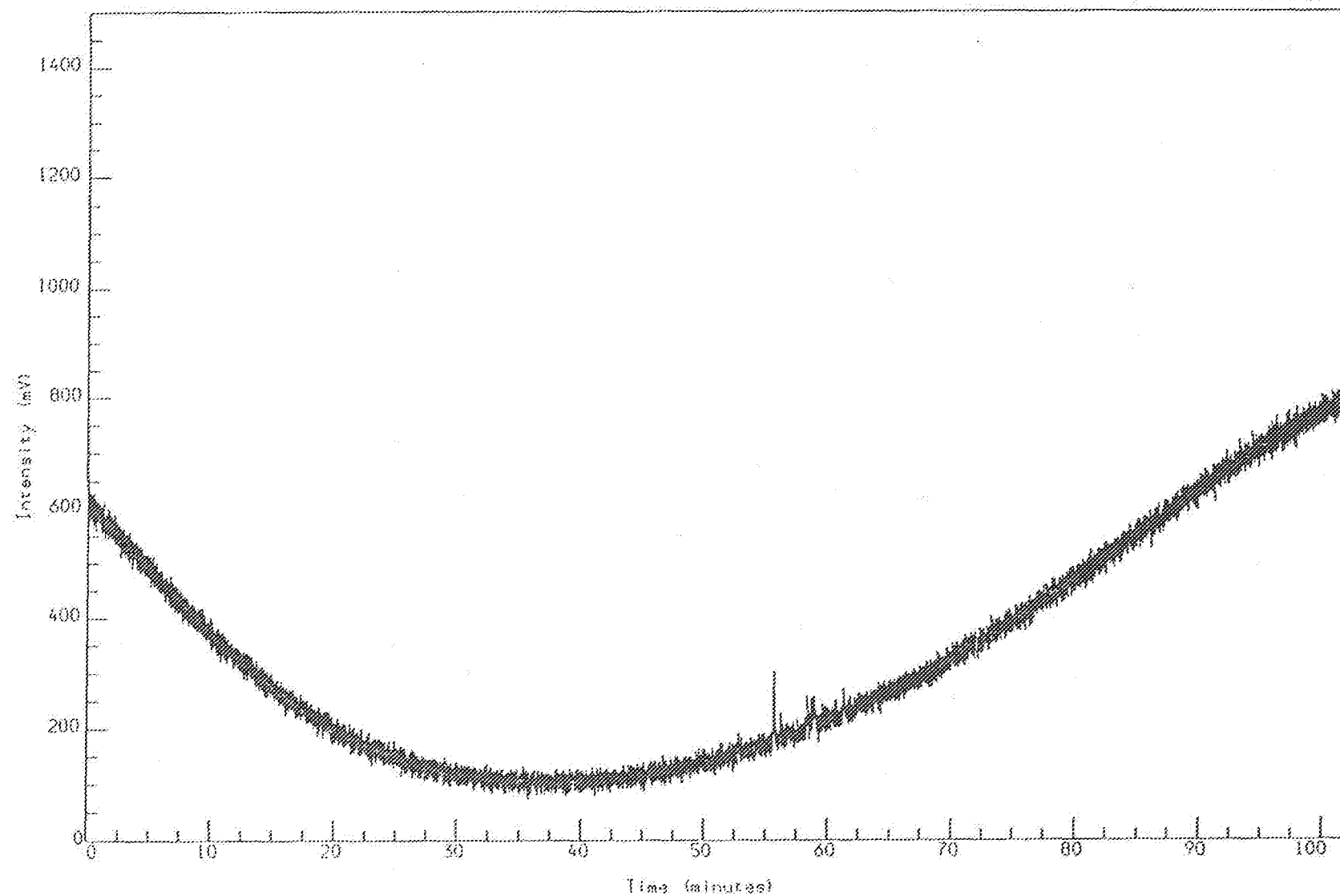
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03410353.1.1.

Multichrom



WELL NDCB 34/10-35 DST.3
WHOLE OIL GC (FPD)

Reported on 25-SEP-1992 at 13:57

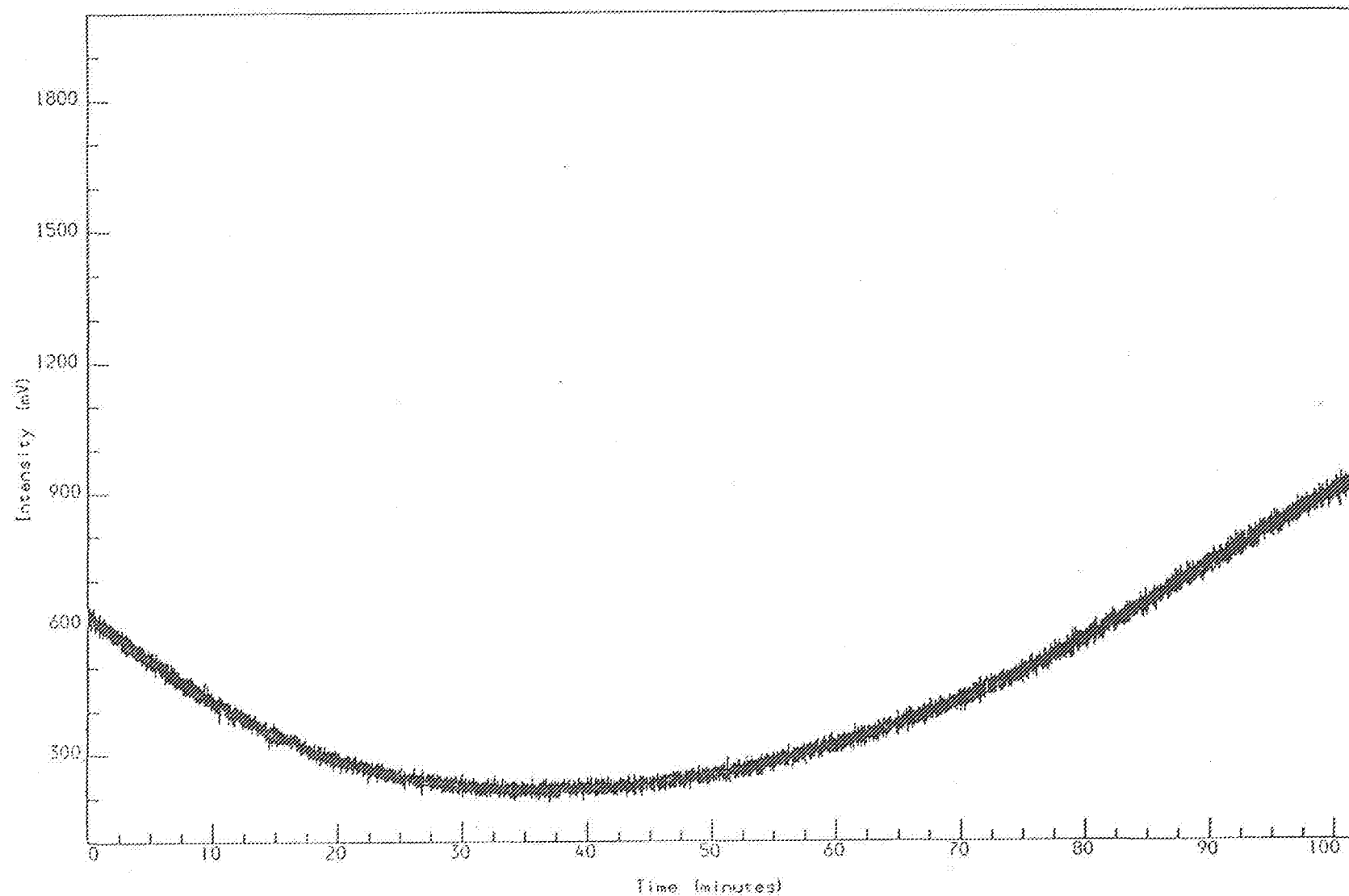
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03410352.1.1.

Multichrom



WELL NOES 34/10-35 DST.2
WHOLE OIL GC (FPD)

Reported on 25-SEP-1992 at 11:22

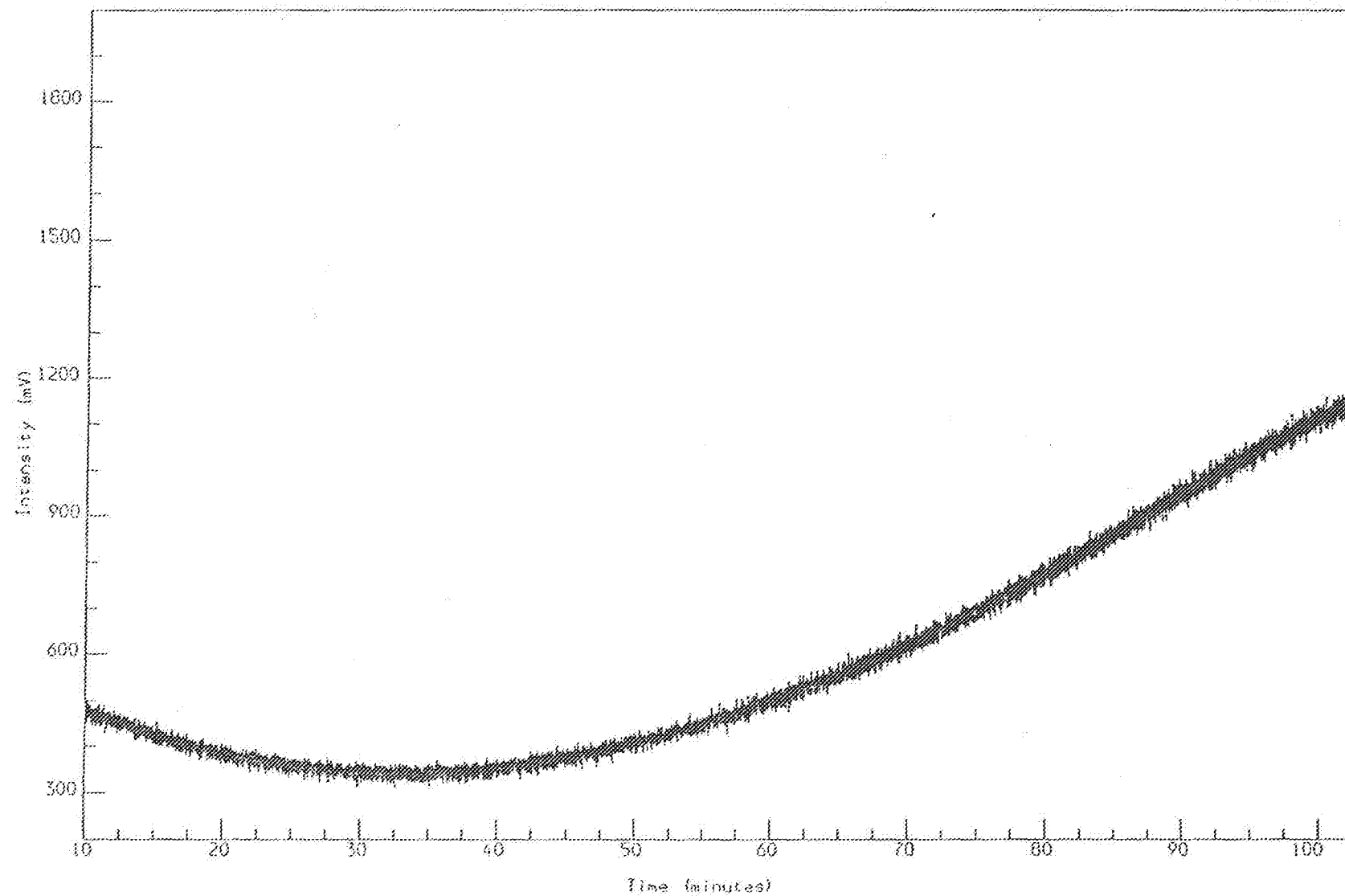
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03410351.1.1.

Multichrom



WELL NDC9 34/10-35 DST.1
WHOLE OIL GC (FPD)

Reported on 25-SEP-1992 at 09:09

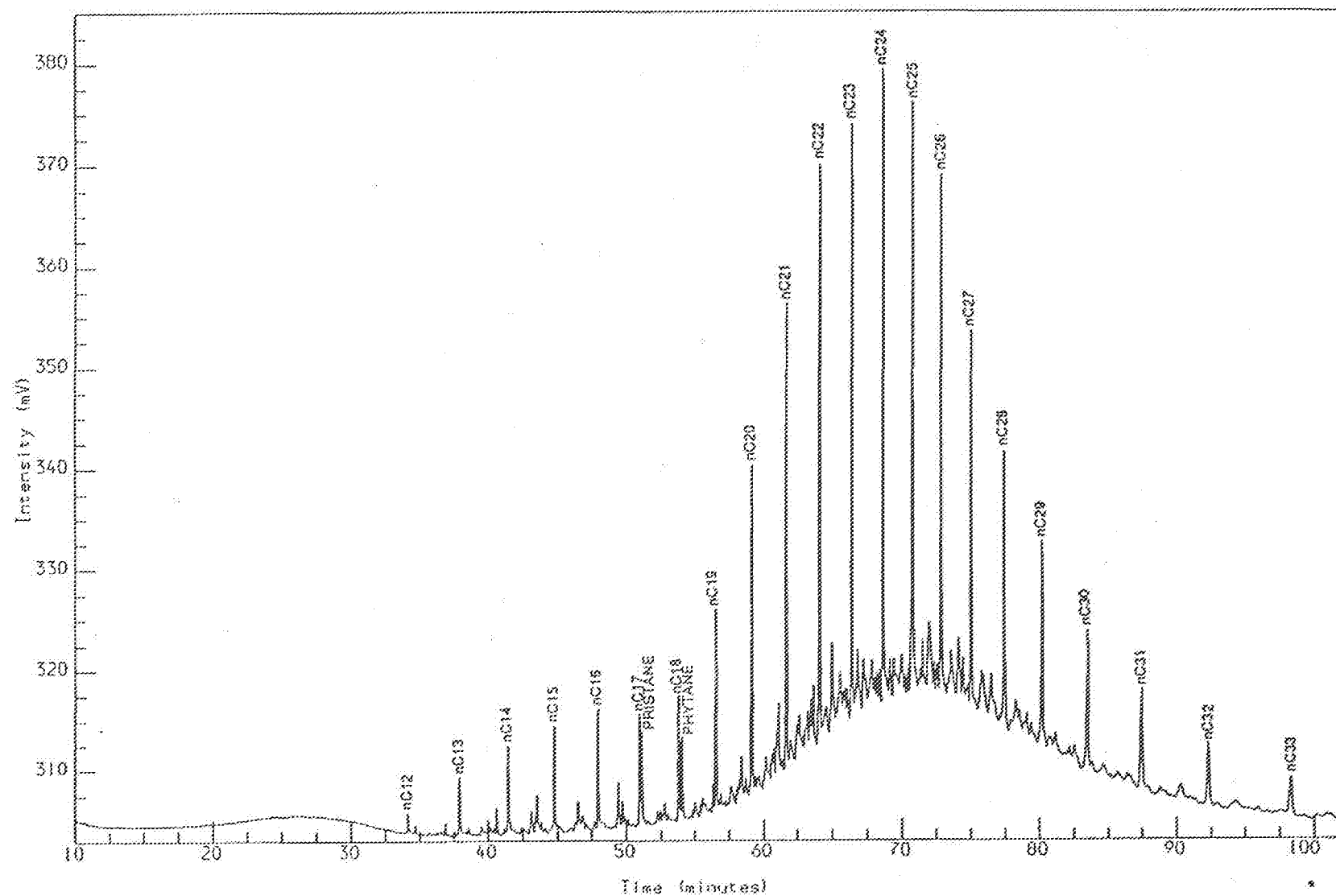
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03530,1,1.

Multichrom



WELL NDCS 34/10-35 3530.00m
WHOLE EDM GC (FID)

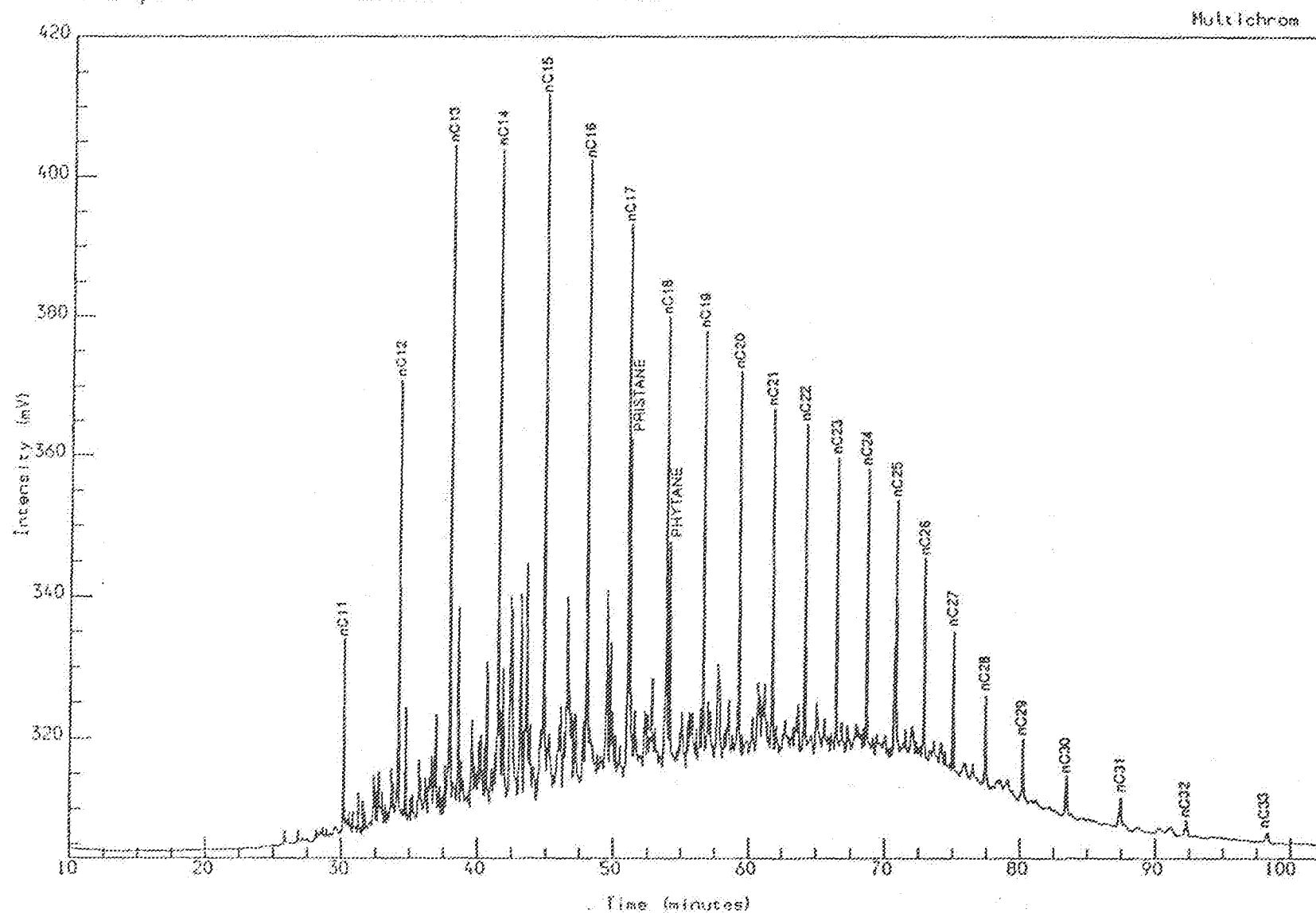
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Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03831.1.1.



WELL NOCS 34/10-35 3831.00m
WHOLE EDM GC (FID)

Reported on 18-SEP-1992 at 10.06

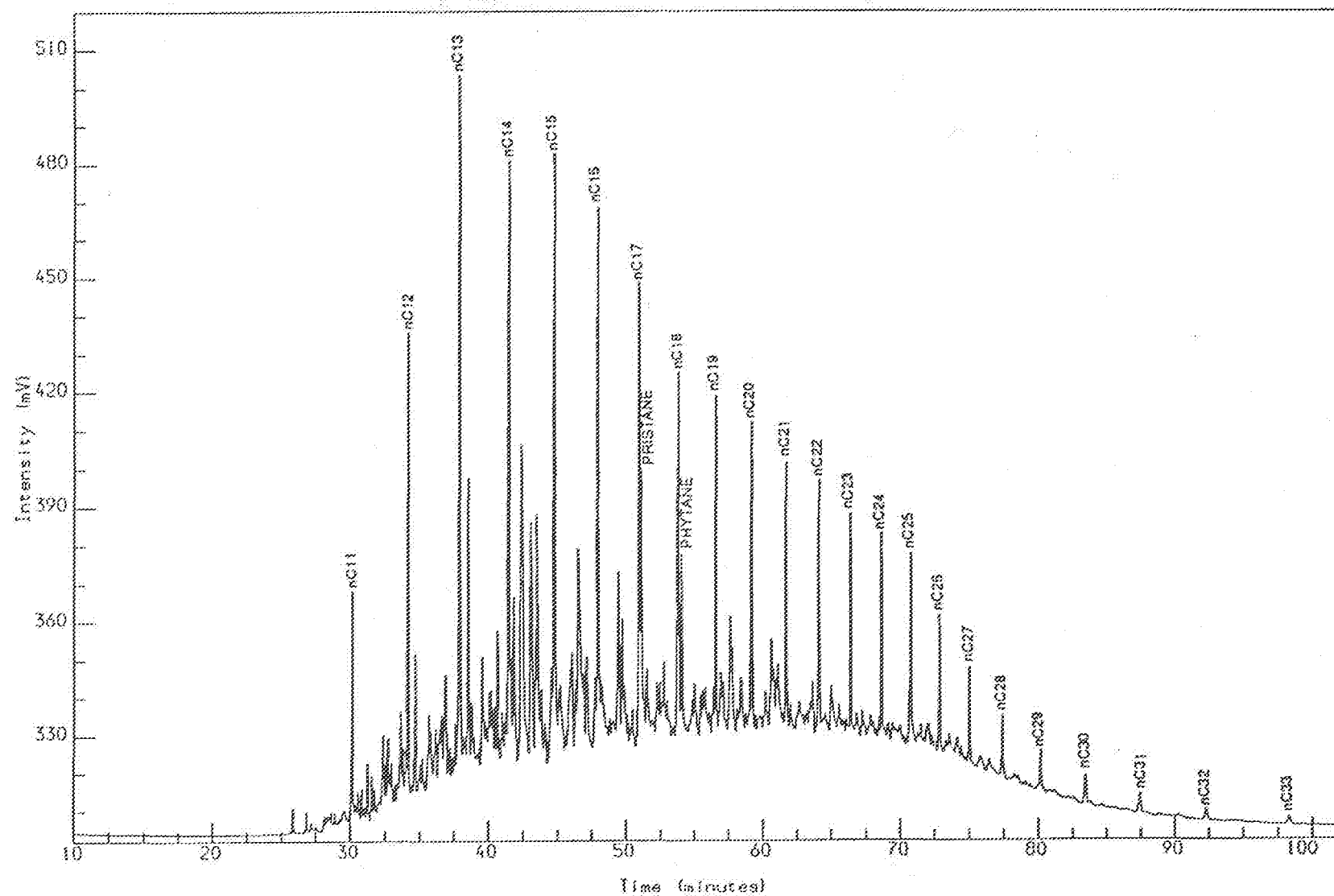
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03852.1.1.

Multichrom



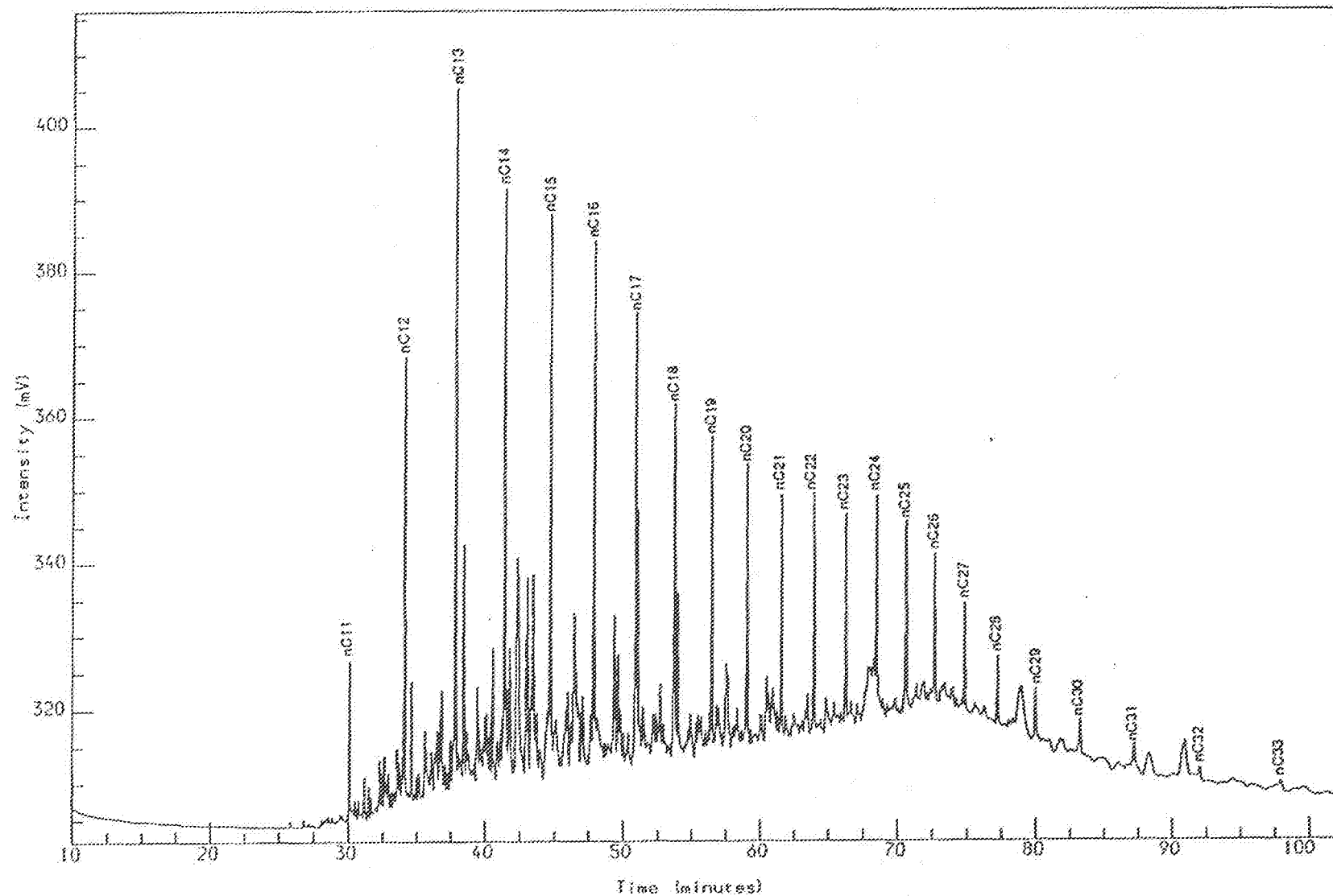
WELL NDCS 34/10-35 3852.00m
WHOLE EDM 6C (FID)

Reported on 18-SEP-1992 at 12:08

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NDCS 34/10-35 3885.00m
WHOLE EOM GC (FID)

Reported on 31-AUG-1992 at 01:25

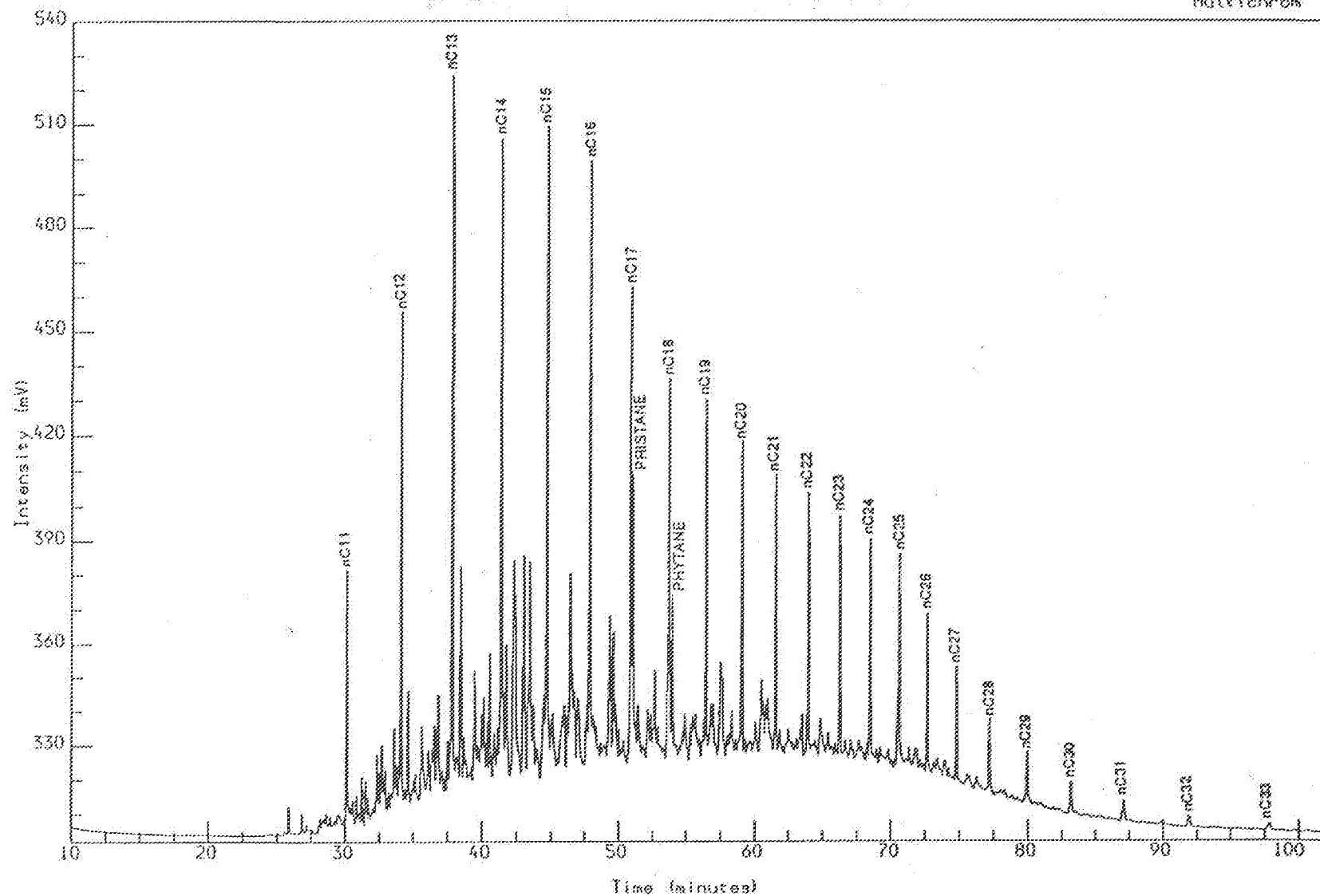
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W03894.1.1.

Multichrom



WELL NOCS 34/10-35 3894.00m
WHOLE EON GC (FID)

Reported on 31-AUG-1992 at 01.26

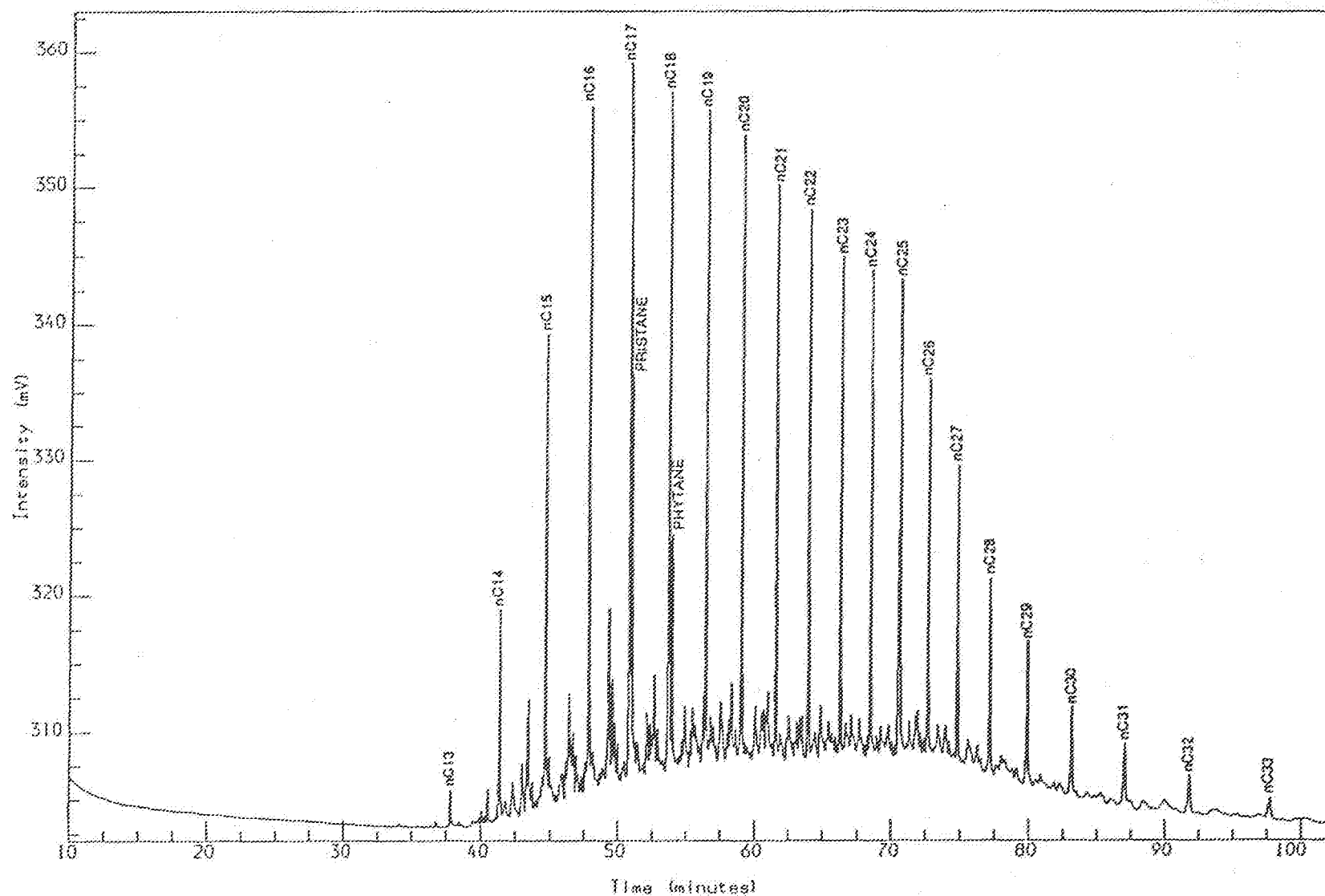
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W0393171,1,1.

Multichrom



WELL NOCS 34/10-35 3931.71m
WHOLE EDM GC (FID)

Reported on 23-SEP-1992 at 09:07

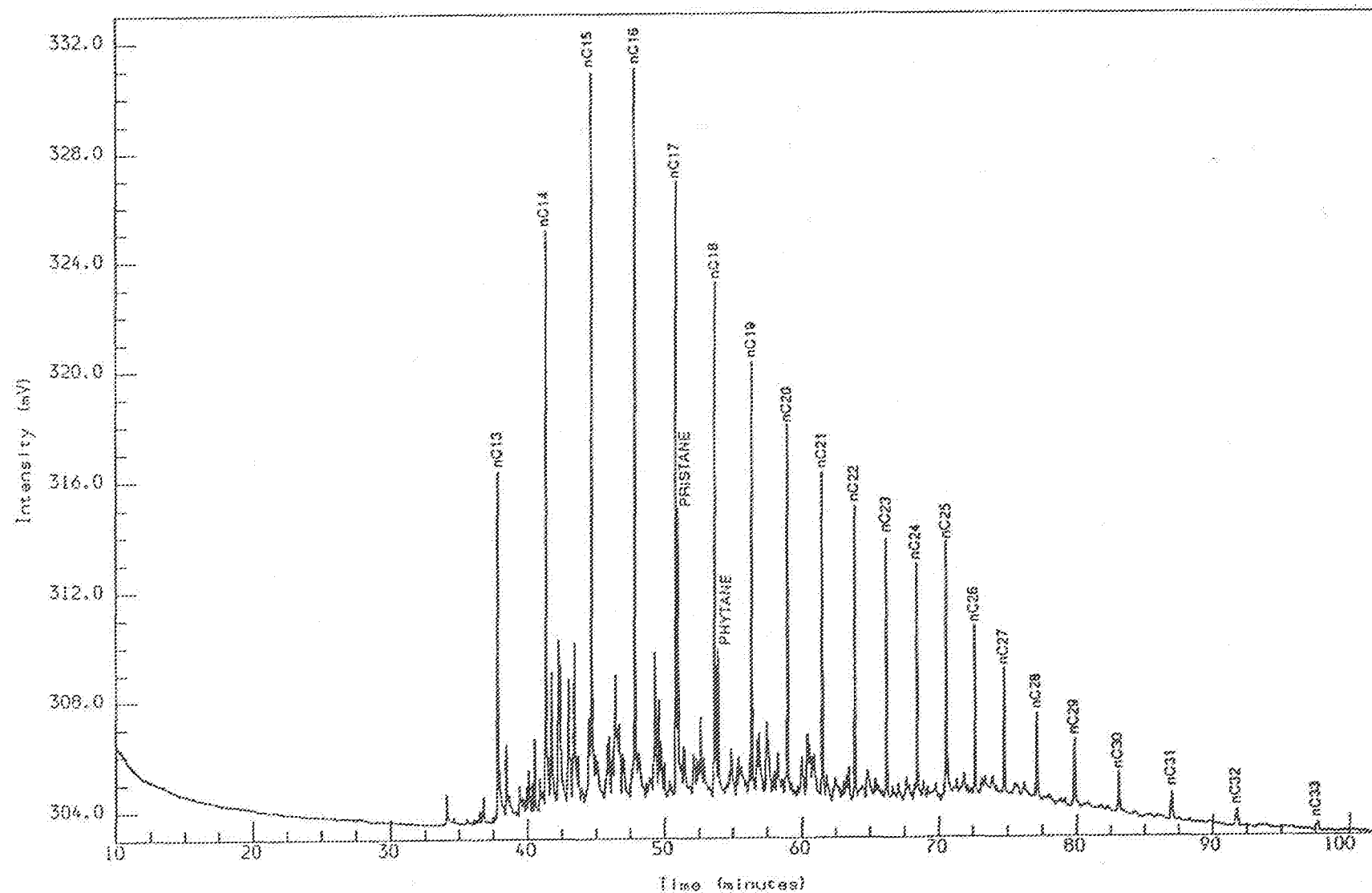
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31.W0393316.1.1.

Multichrom



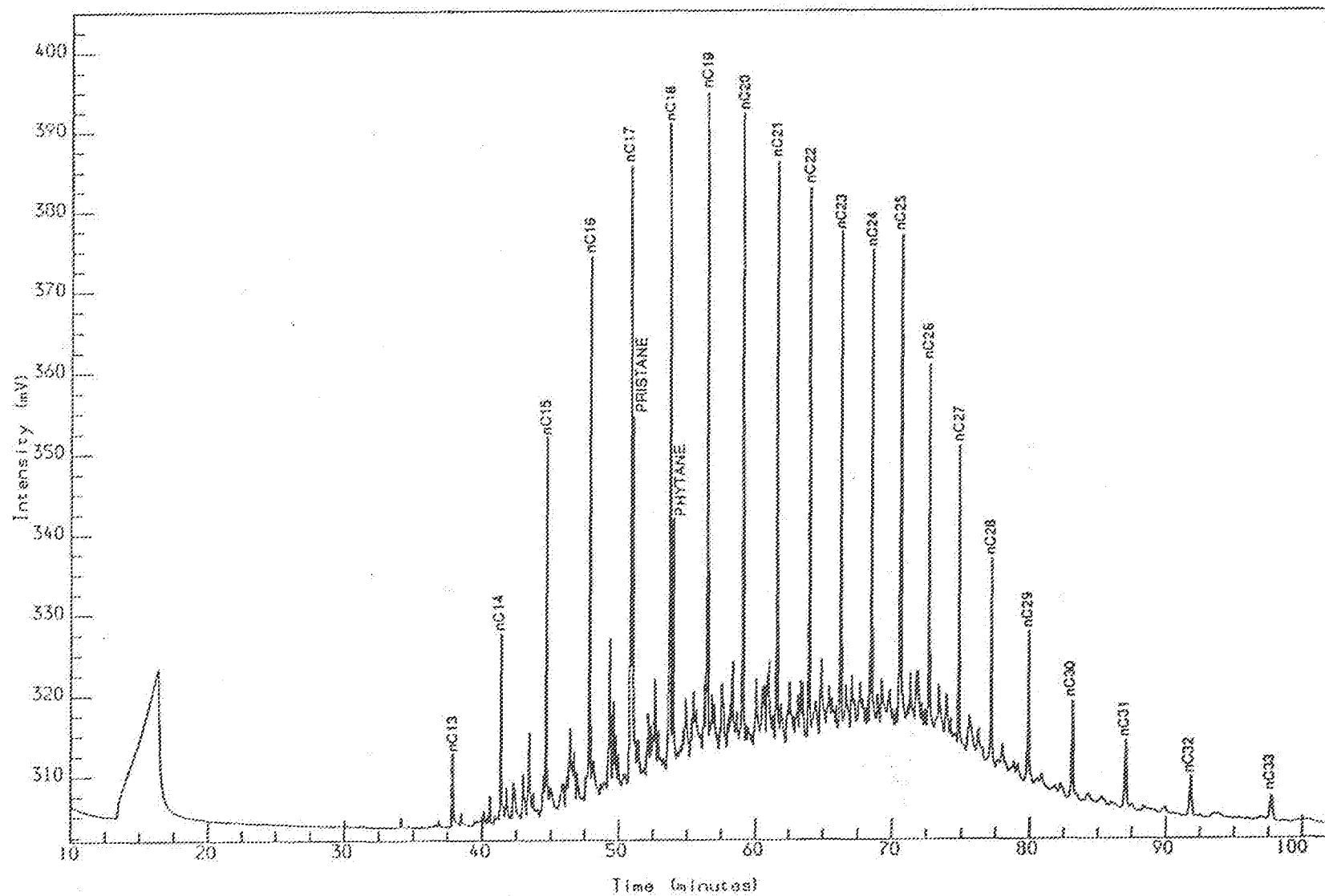
WELL NOCS 34/10-35 3933.16m
WHOLE EOM GC (FID)

Reported on 23-SEP-1992 at 11.21

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NDCS 34/10-35 3994.05m
WHOLE EOM GC (FID)

Reported on 23-SEP-1992 at 13.29

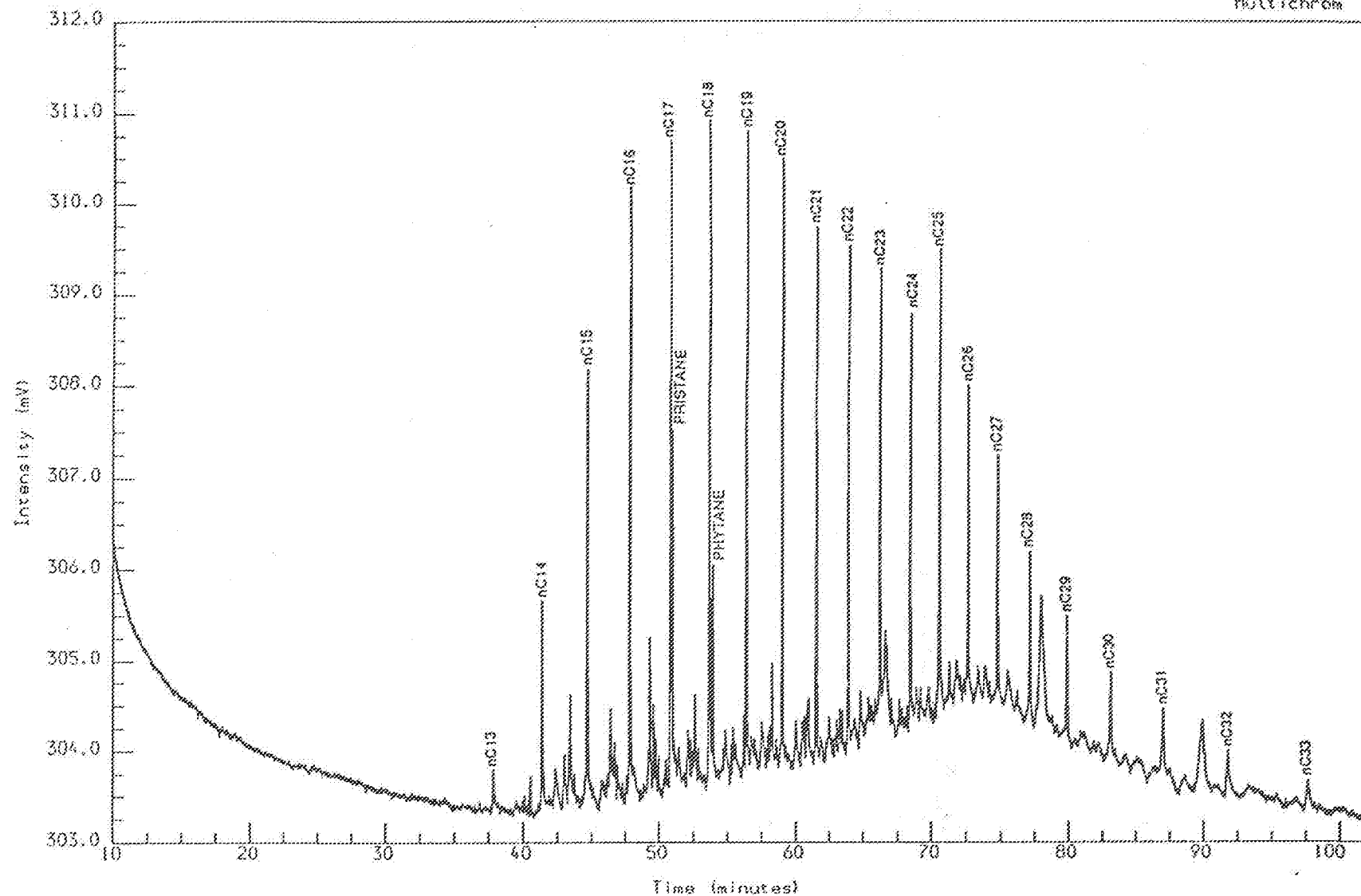
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W0400617,1,1.

Multichrom



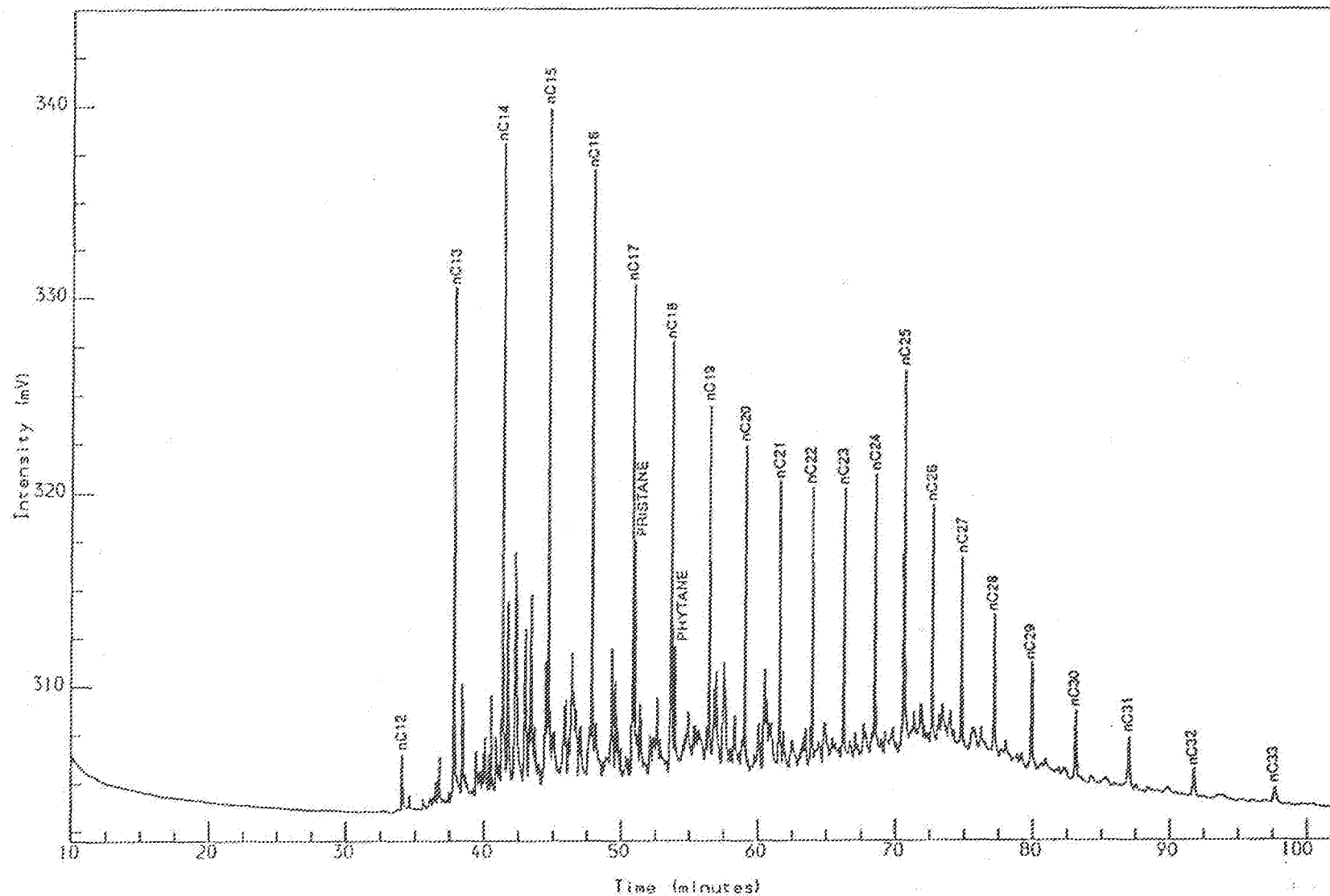
WELL NOCS 34/10-35 4006.17m
WHOLE EOH GC (FID)

Reported on 23-SEP-1992 at 15.33

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35 4021.93m
WHOLE EOM GC (FID)

Reported on 24-SEP-1992 at 07:21

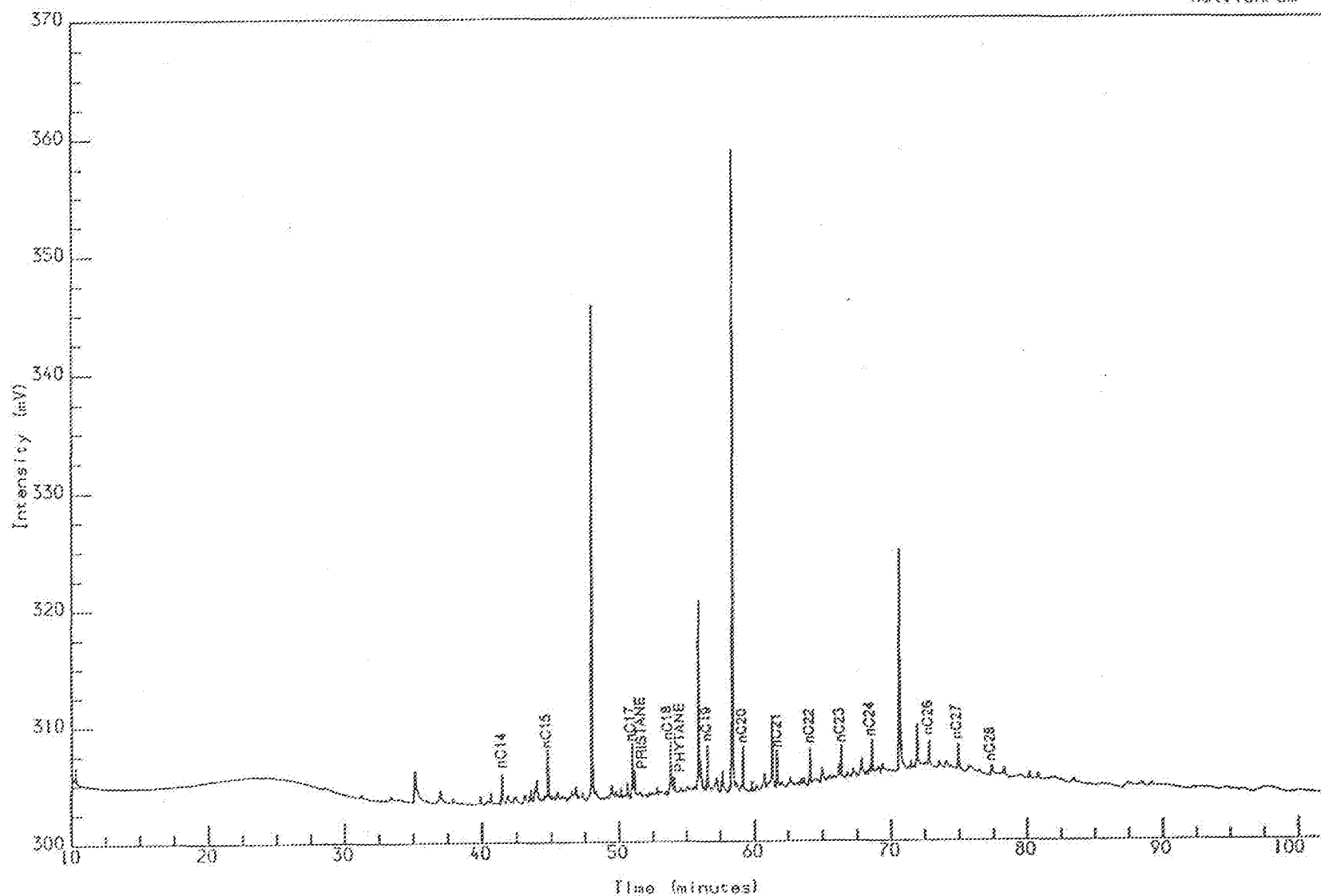
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W0425747.1.1.

Multichrom



WELL NOCS 34/10-35 4257.47m
WHOLE EDM GC (FID)

Reported on 16-SEP-1992 at 12:08

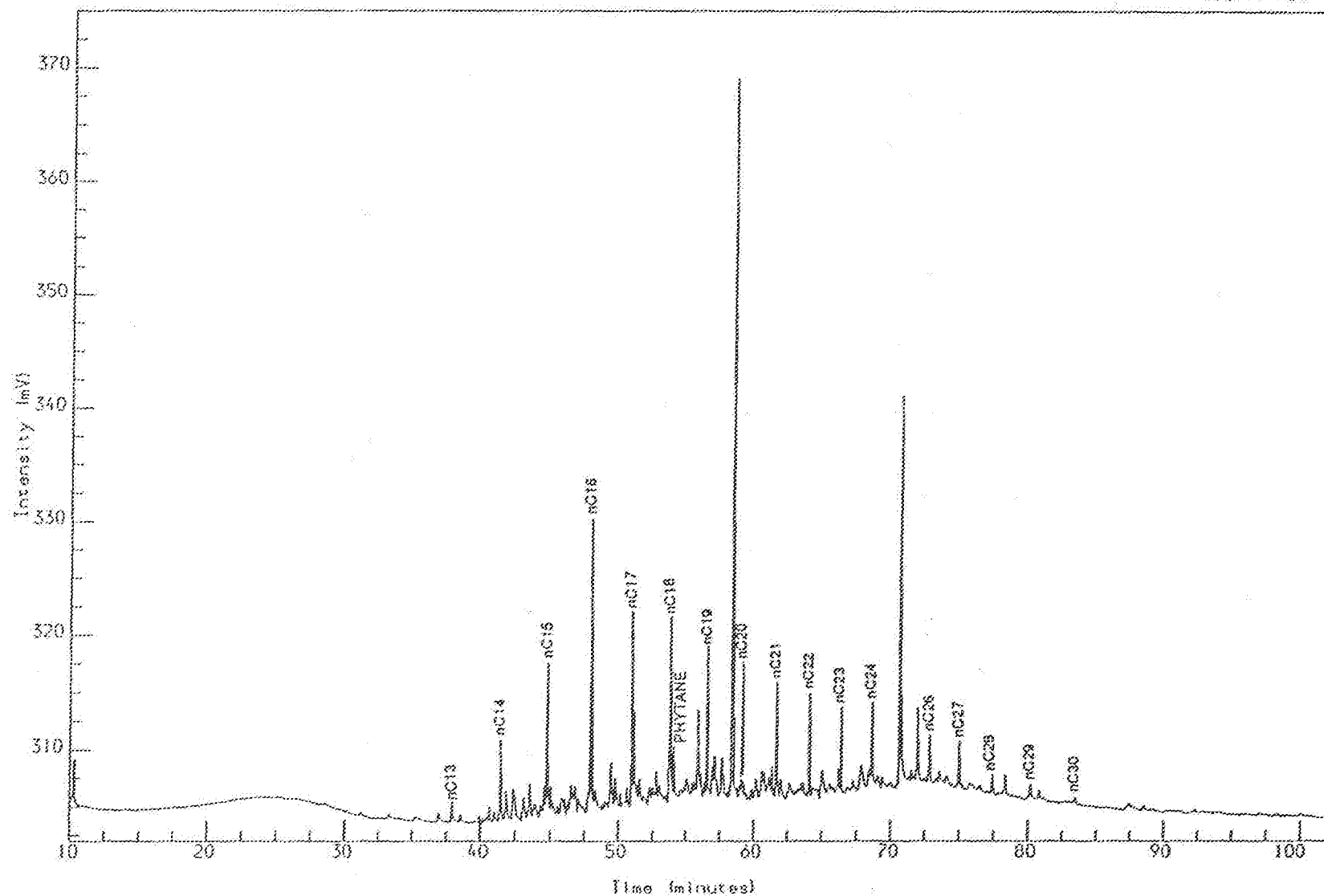
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W0427075.1.1.

Multichrom



WELL NDCS 34/10-35 4270.75m
WHOLE EDH GC (FID)

Reported on 16-SEP-1992 at 14:23

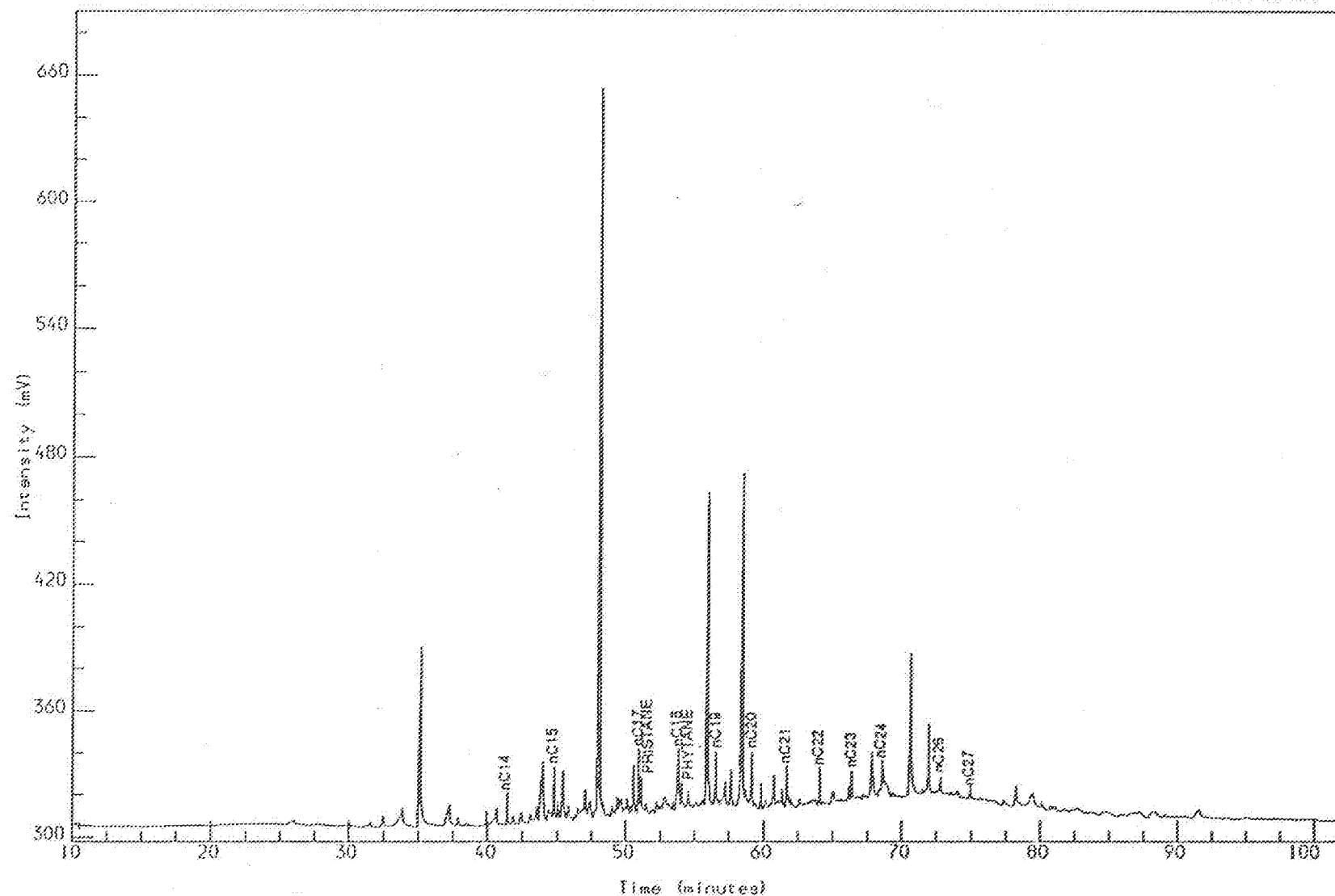
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 31 W0428348,1,1.

Multichrom



WELL NOCS 34/10-35 4283.48m
WHOLE EDM GC (FID)

Reported on 16-SEP-1992 at 09.51

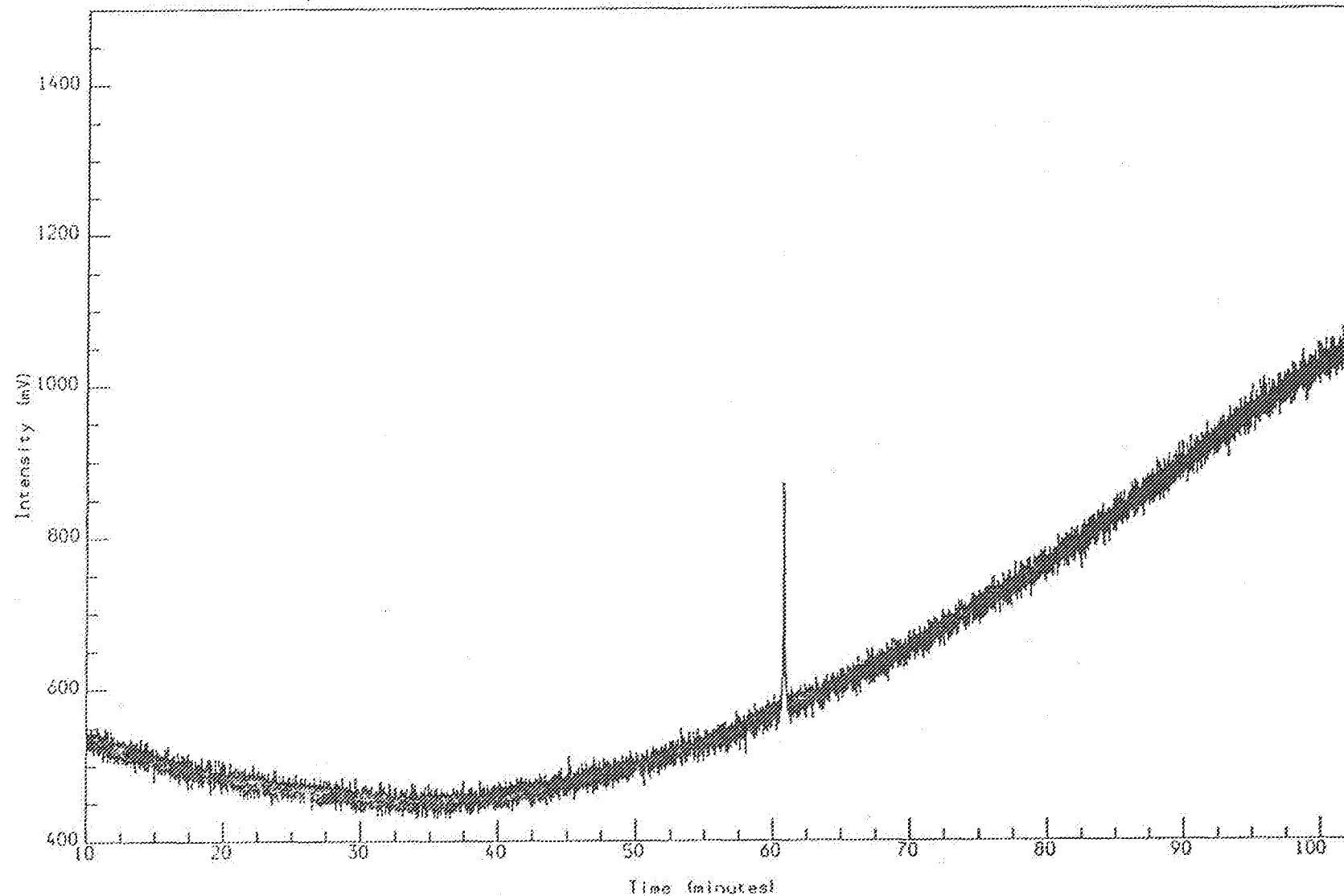
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03530,1,1.

Multichrom



WELL NOCS 34/10-35 3530.00m
WHOLE EDM GC (FPD)

Reported on 17-SEP-1992 at 15:06

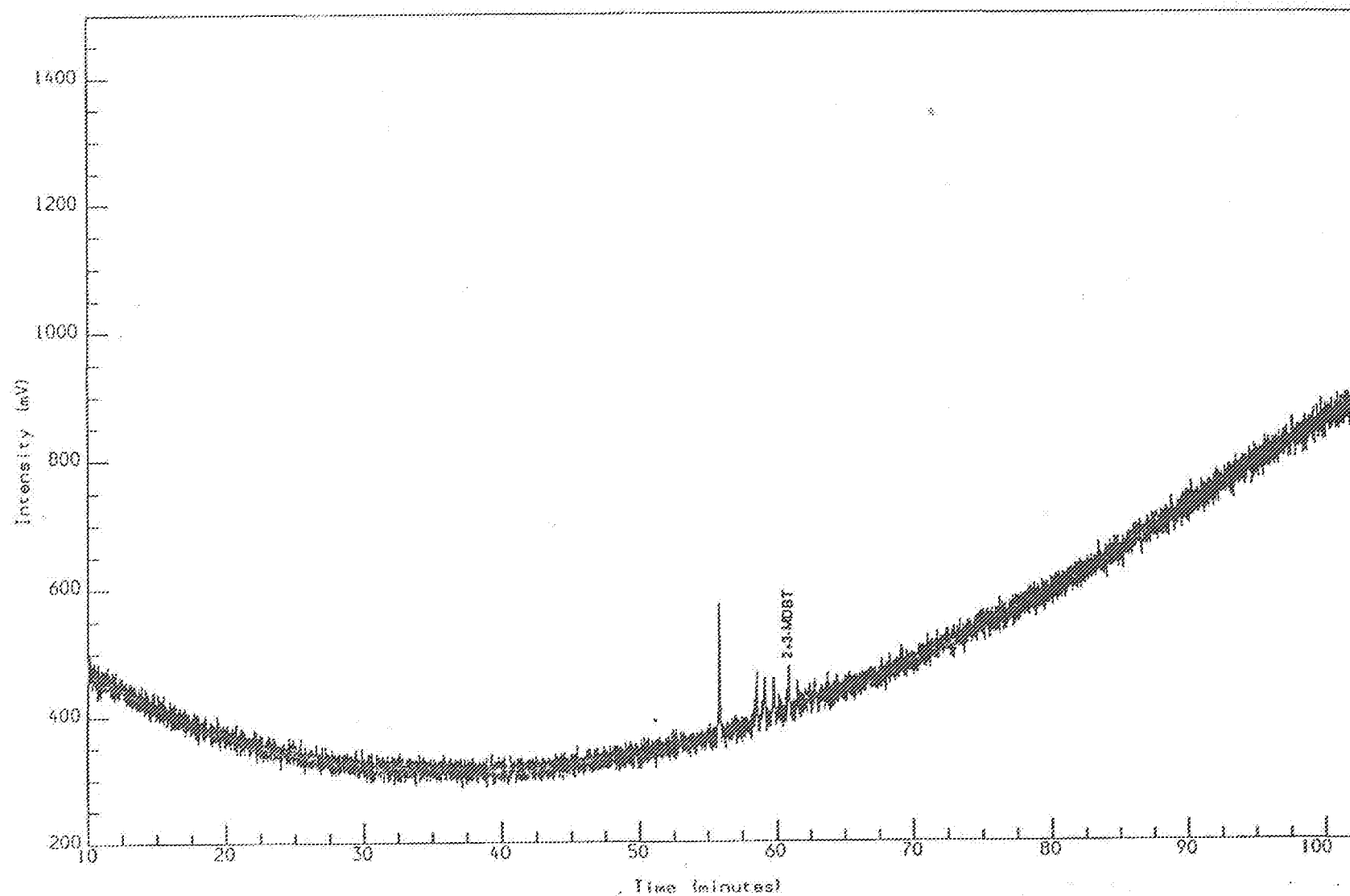
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03831,1.1.

Multichrom



WELL NOCS 34/10-35 3831.00m
WHOLE EOH GC (FPD)

Reported on 18-SEP-1992 at 10.13

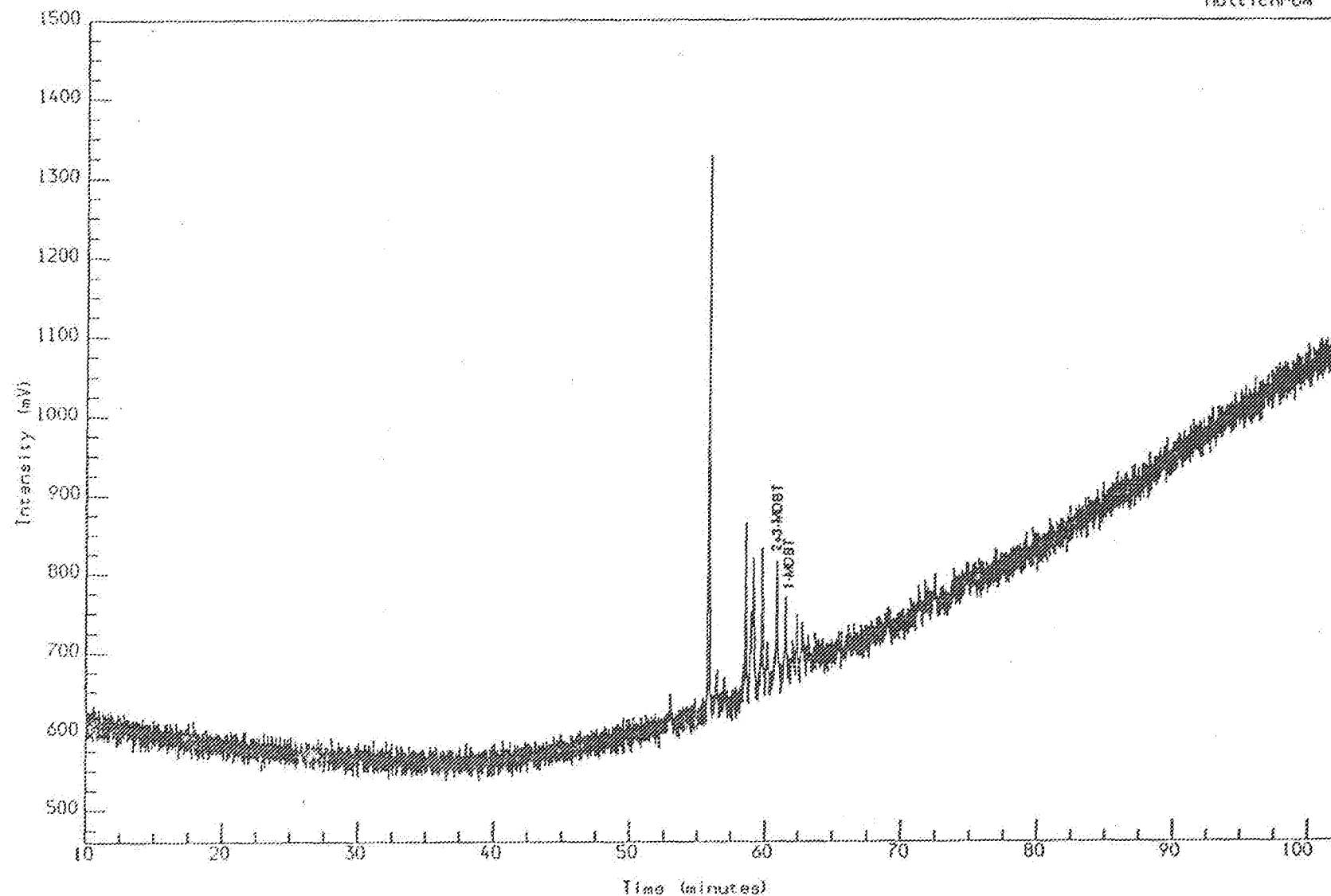
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03852.1.1.

Multichron



WELL NOCS 34/10-35 3852.00m
WHOLE EOM GC (FPD)

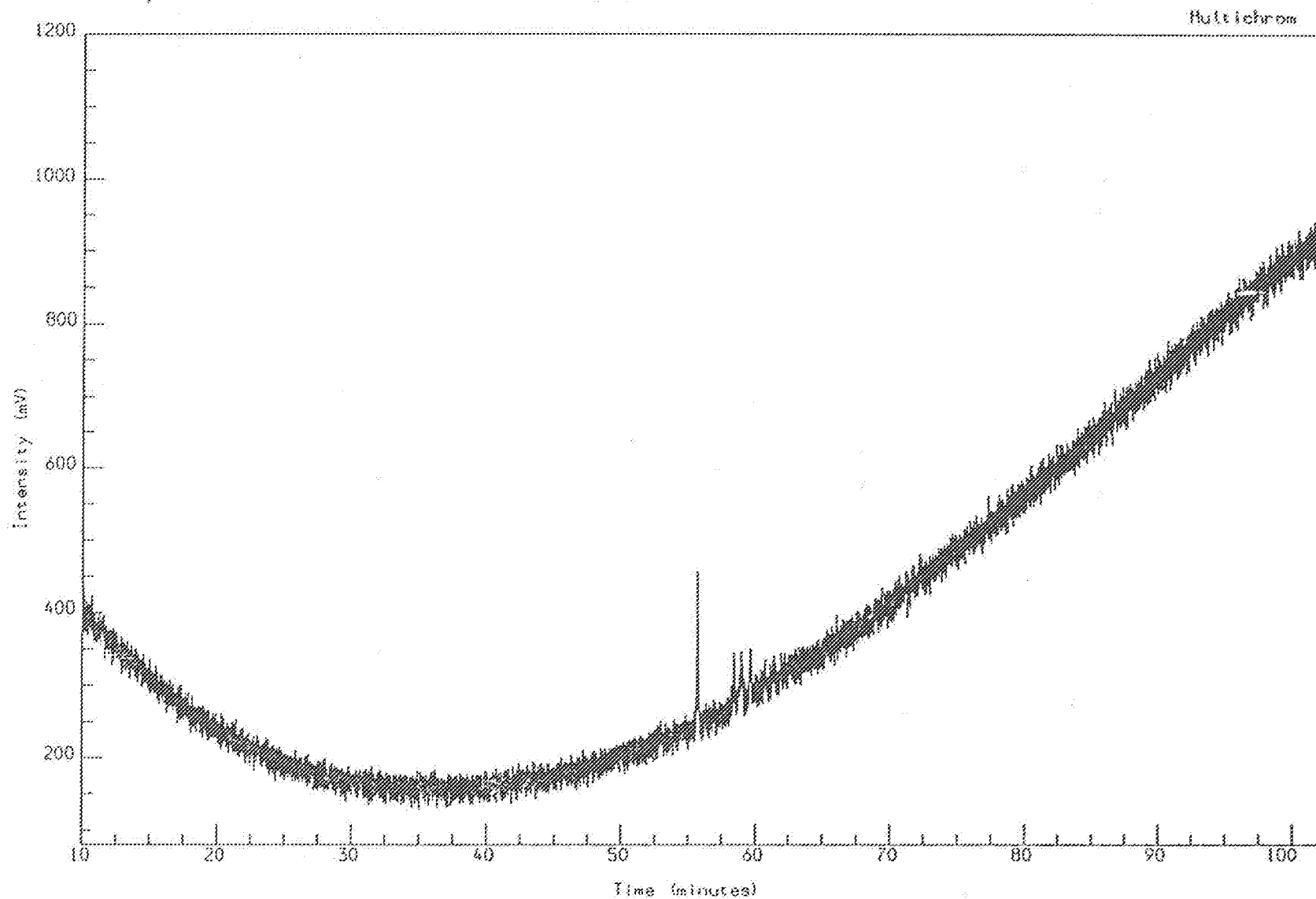
Reported on 18-SEP-1992 at 12:11

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03885,1,1.



WELL NOCS 34/10-35 3885.00m
WHOLE EDM GC (FPD)

Reported on 31-AUG-1992 at 01:28

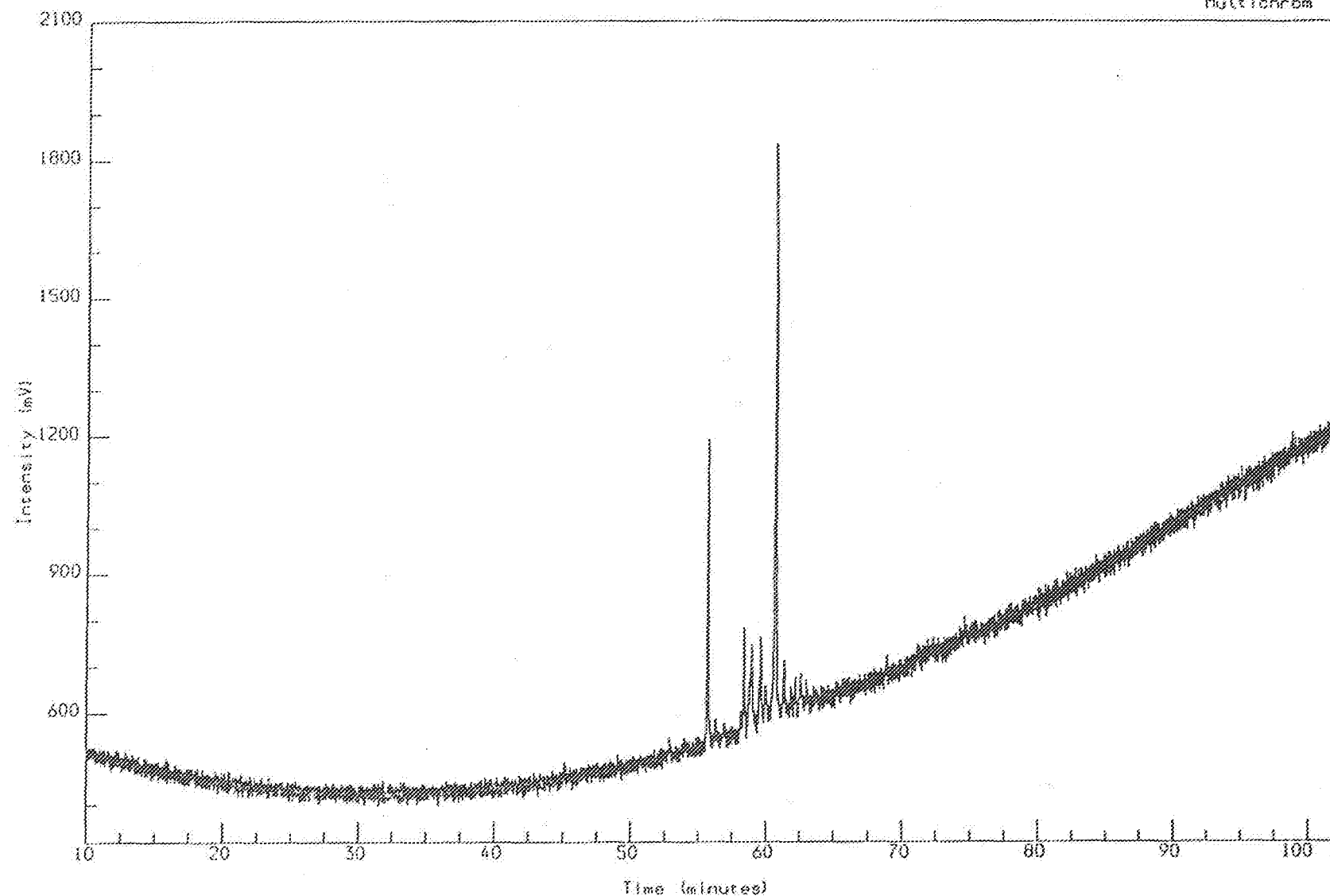
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W03894.1.1.

Multichrom



WELL NOCS 34/10-35 3894.00m
WHOLE EOM GC (FPD)

Reported on 31-AUG-1992 at 01:31

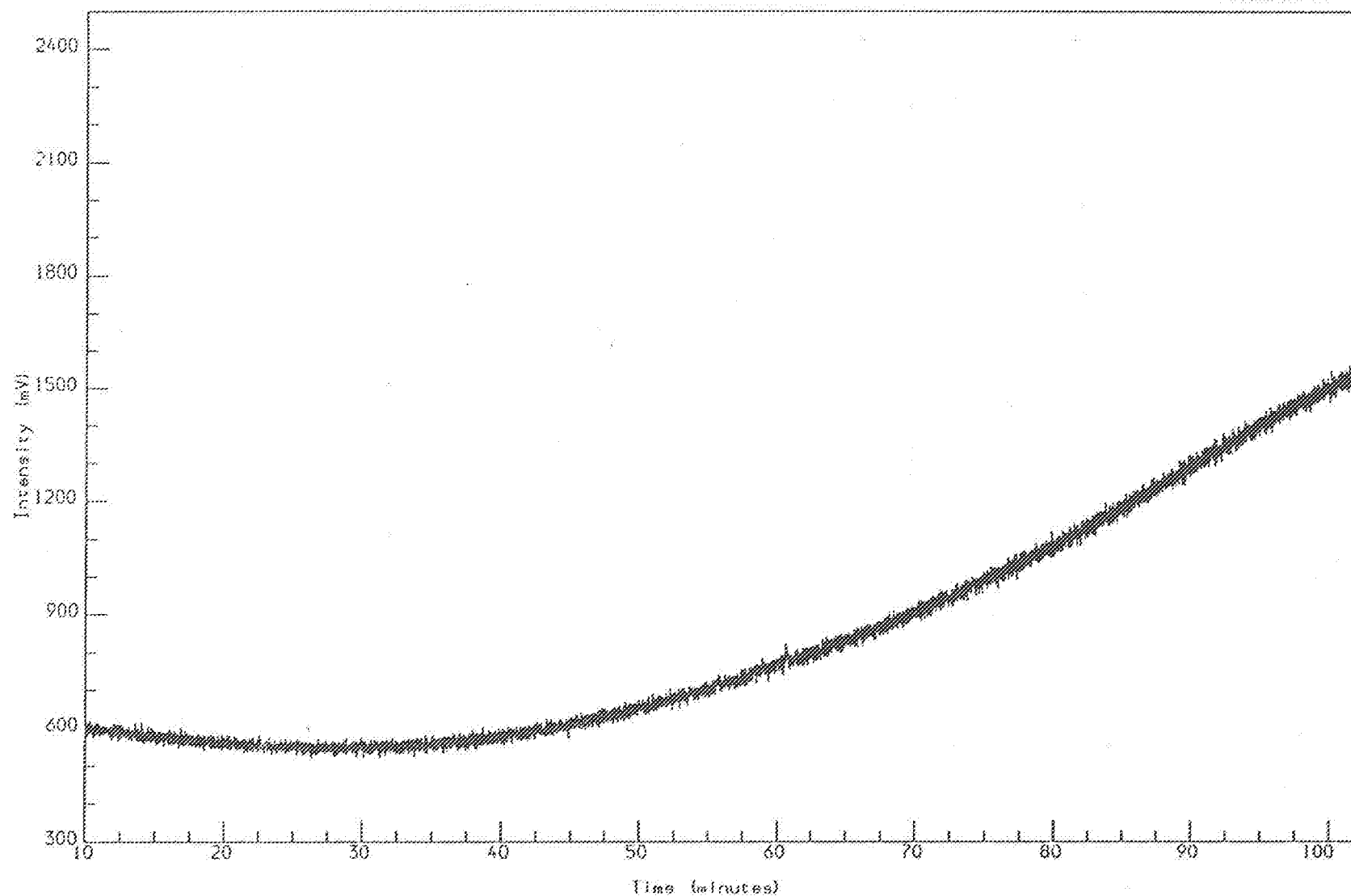
Schlumberger

GECO-PRAXLA

GEOLAB NOR

Analysis Name : [526265] 32 W0393171,1.1.

Multichrom



WELL NOCS 34/10-35 3931.71m
WHOLE EDM GC (FPD)

Reported on 23-SEP-1992 at 09:10

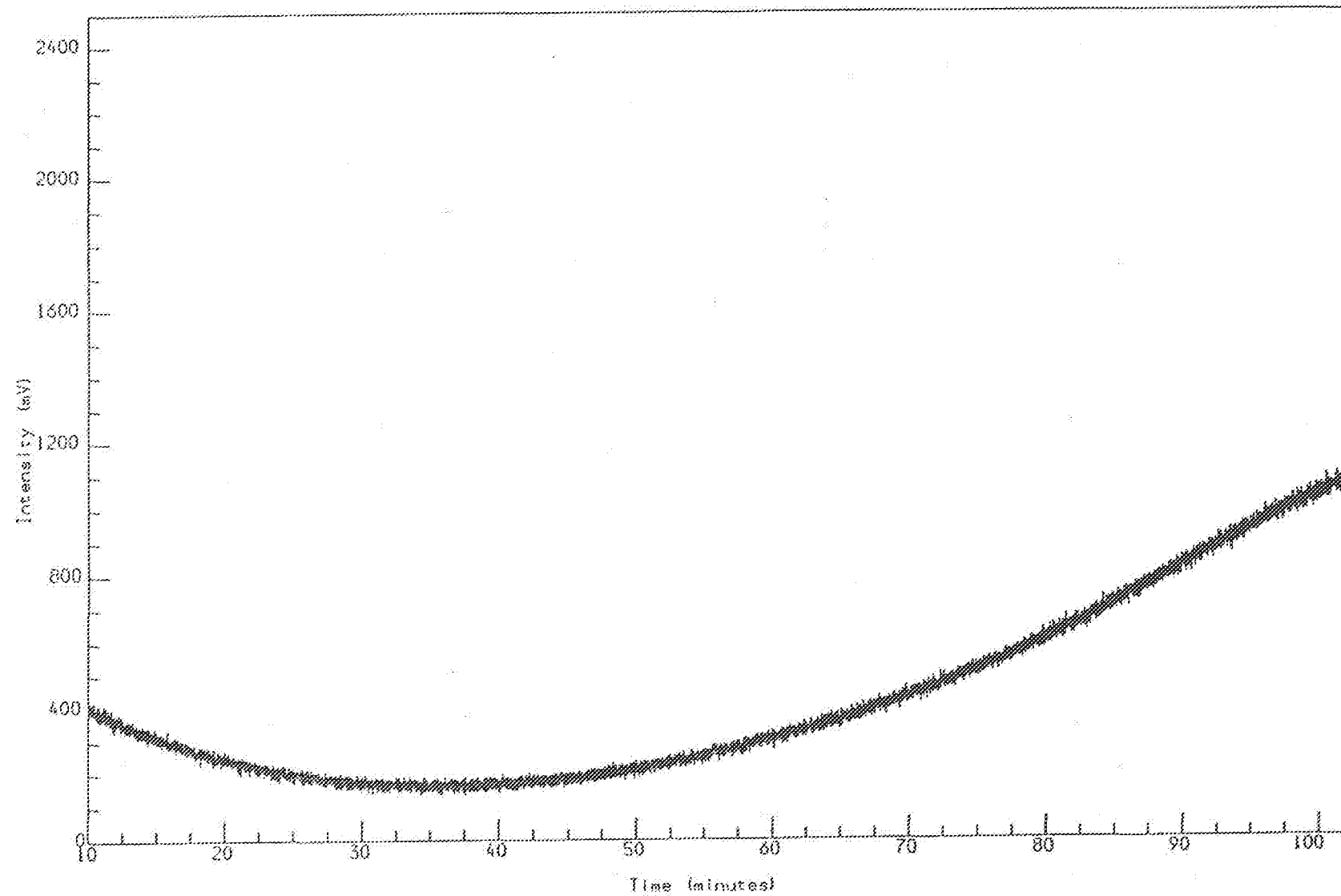
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0393316.1.1.

Multichrom



WELL NOCS 34/10-35 3933.16m
WHOLE EOM GC (FPD)

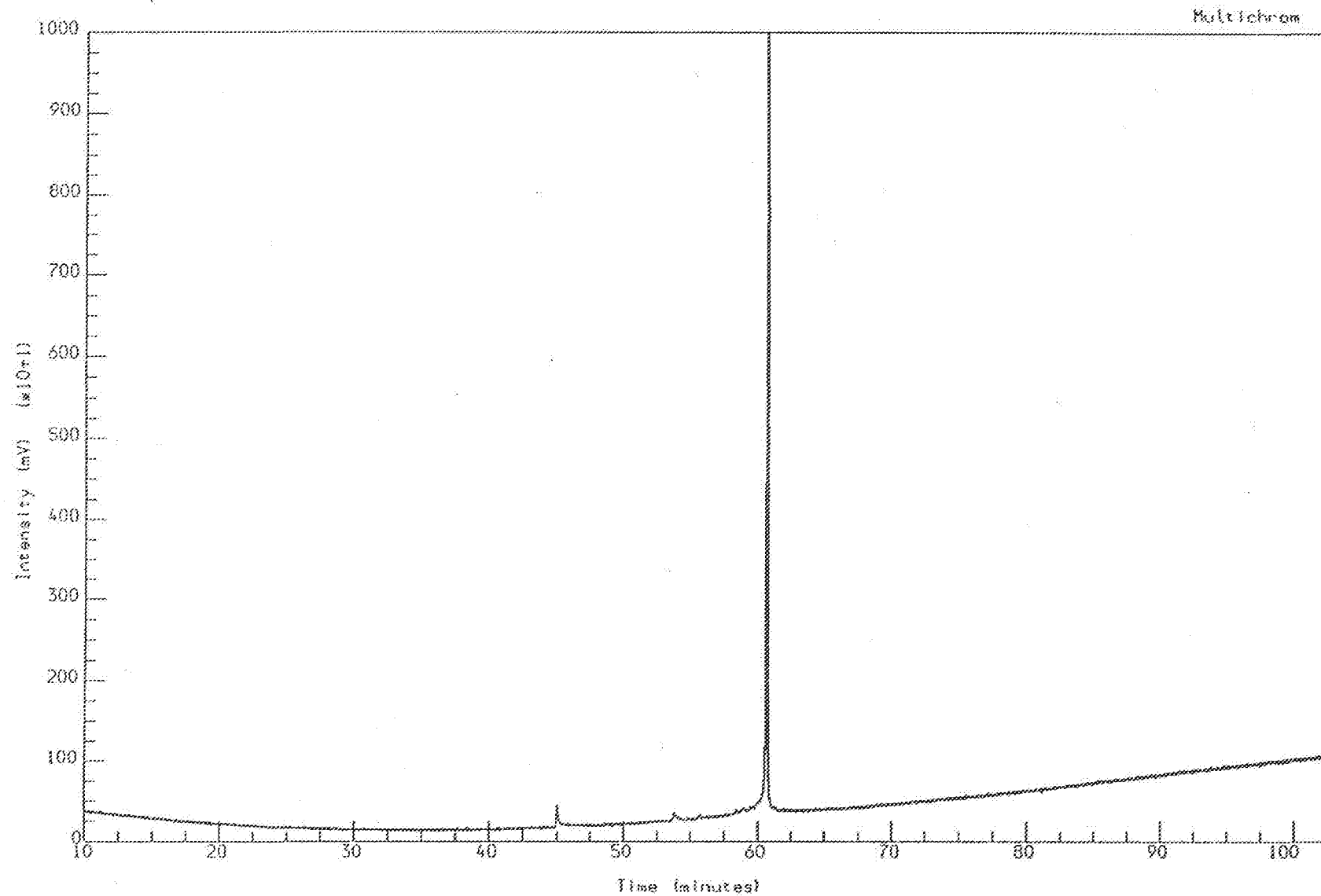
Reported on 23-SEP-1992 at 11:27

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0399405.1.1.



WELL NOCS 34/10-35 3994.05m
WHOLE EON GC (FPD)

Reported on 23-SEP-1992 at 13.33

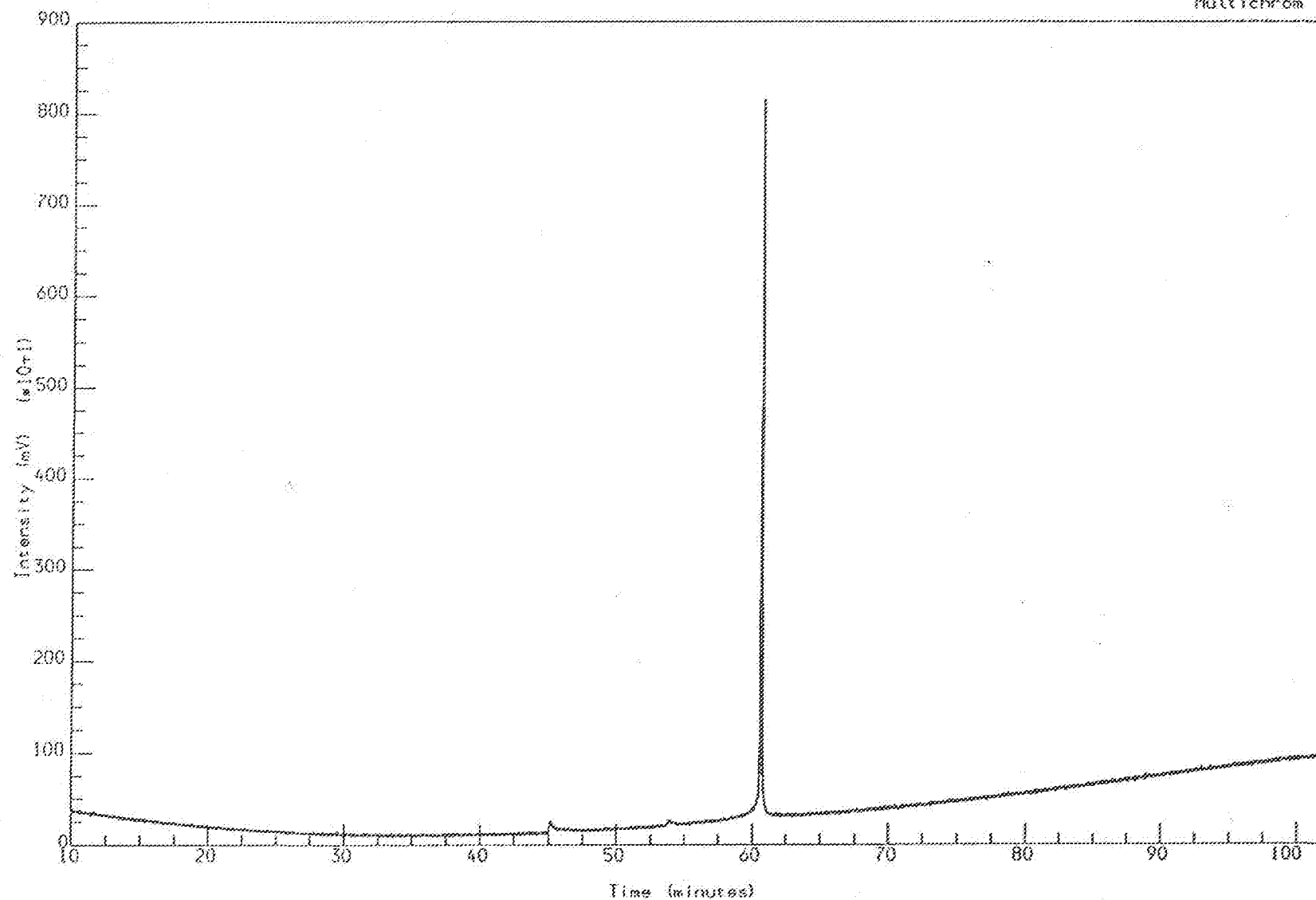
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0400617.1.1.

Multichrom



WELL NDCS 34/10-35 4006.17m
WHOLE EOH GC (FPD)

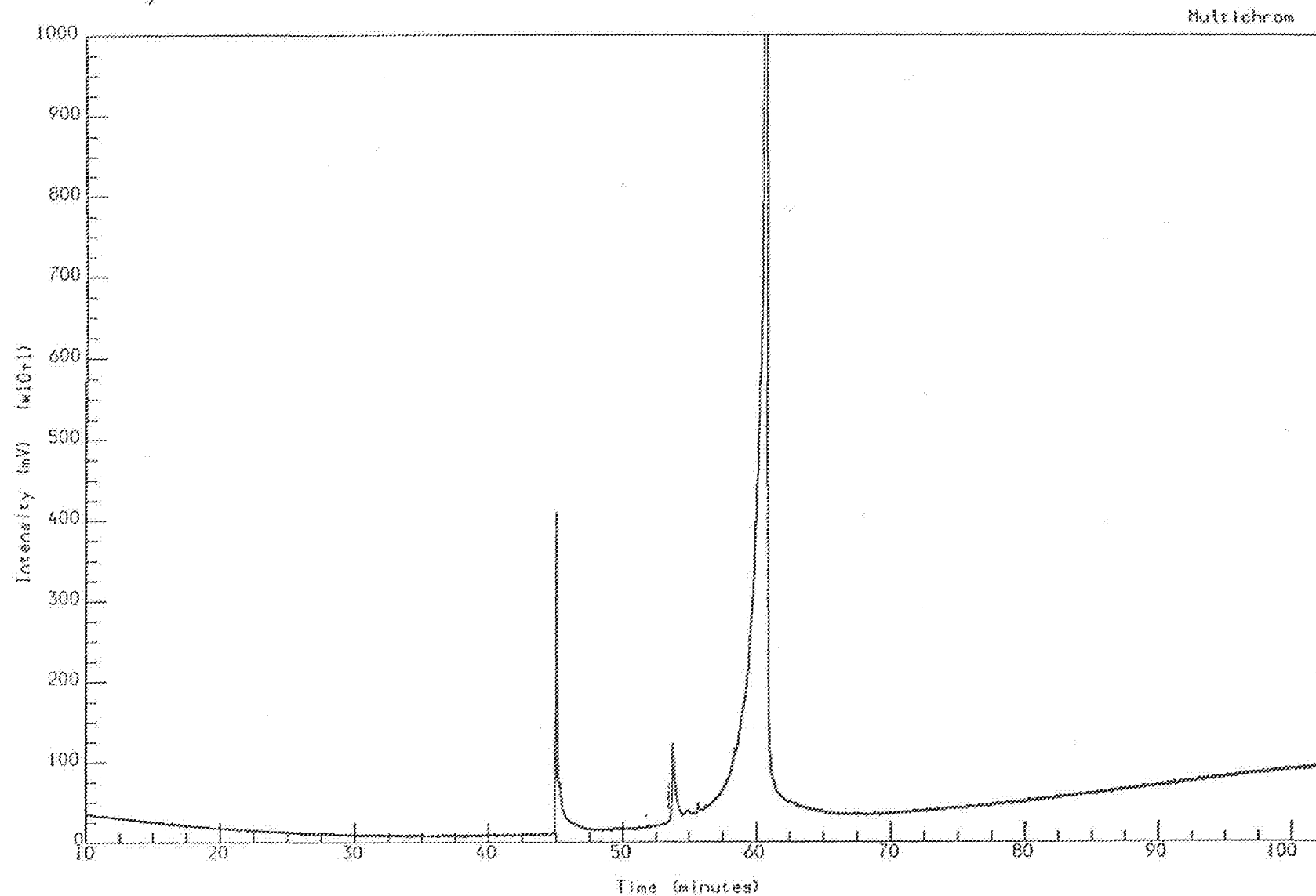
Reported on 23-SEP-1992 at 15:28

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0402193.1.1.



WELL NDCS 34/10-35 4021.93m
WHOLE EDM GC (FPD)

Reported on 24-SEP-1992 at 09:19

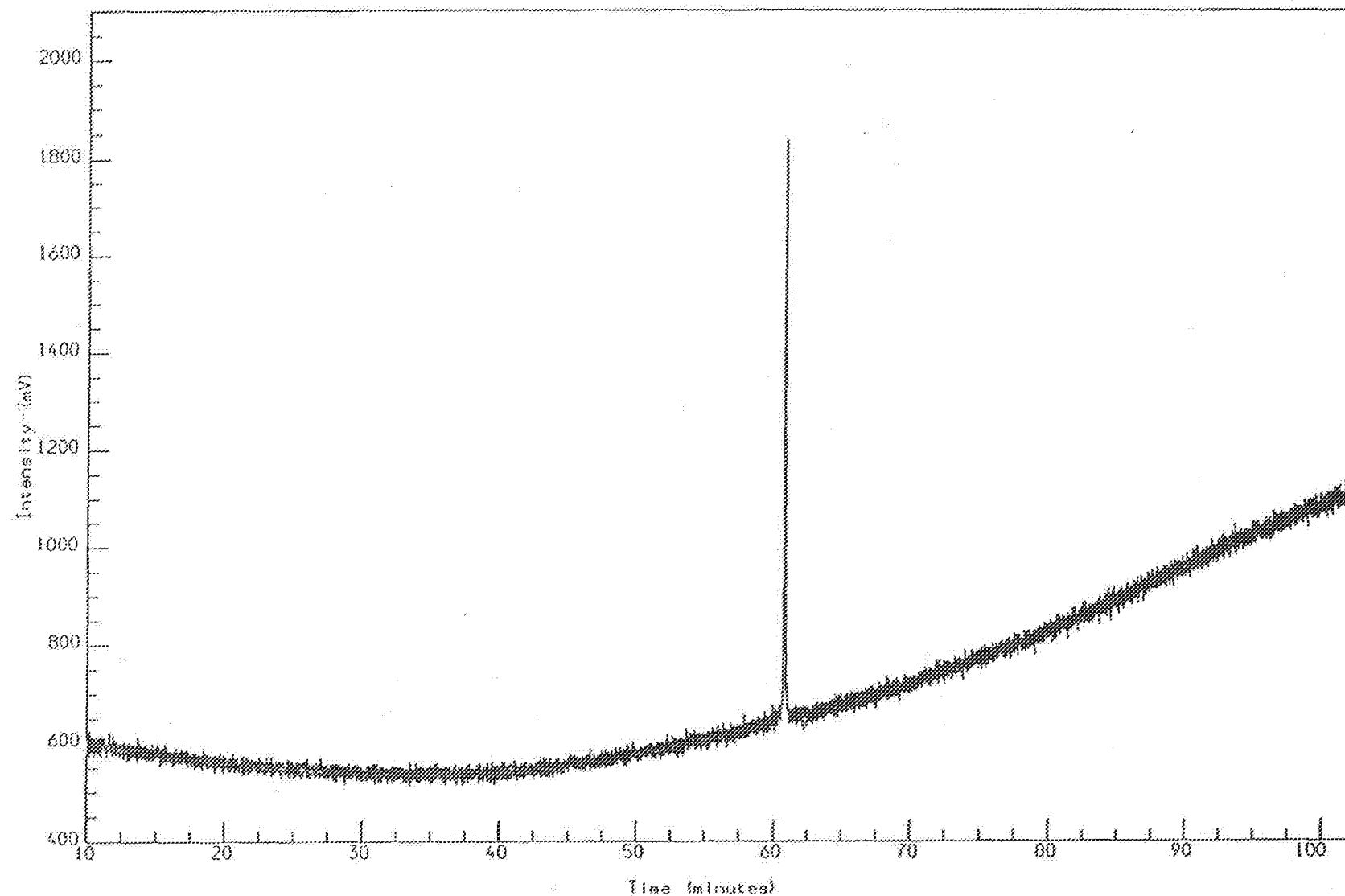
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0425747.1.1.

Multichrom



WELL NOCS 34/10-35 4257.47m
WHOLE EDM BC (FPD)

Reported on 16-SEP-1992 at 12:11

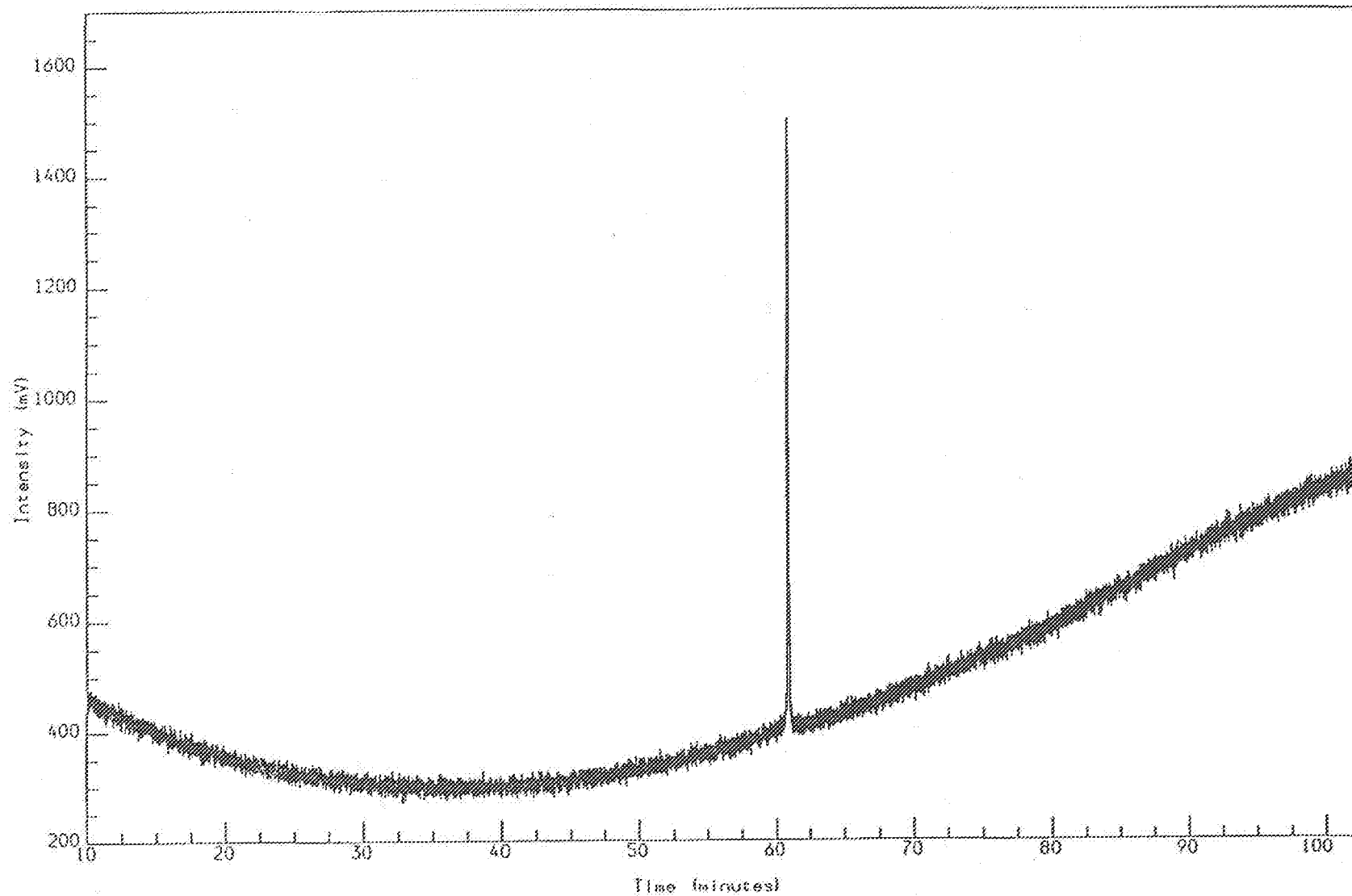
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0427075.1.1.

Multichrom



WELL NOCS 34/10-35 4270.75m
WHOLE EUM GC (FPD)

Reported on 16-SEP-1992 at 14:29

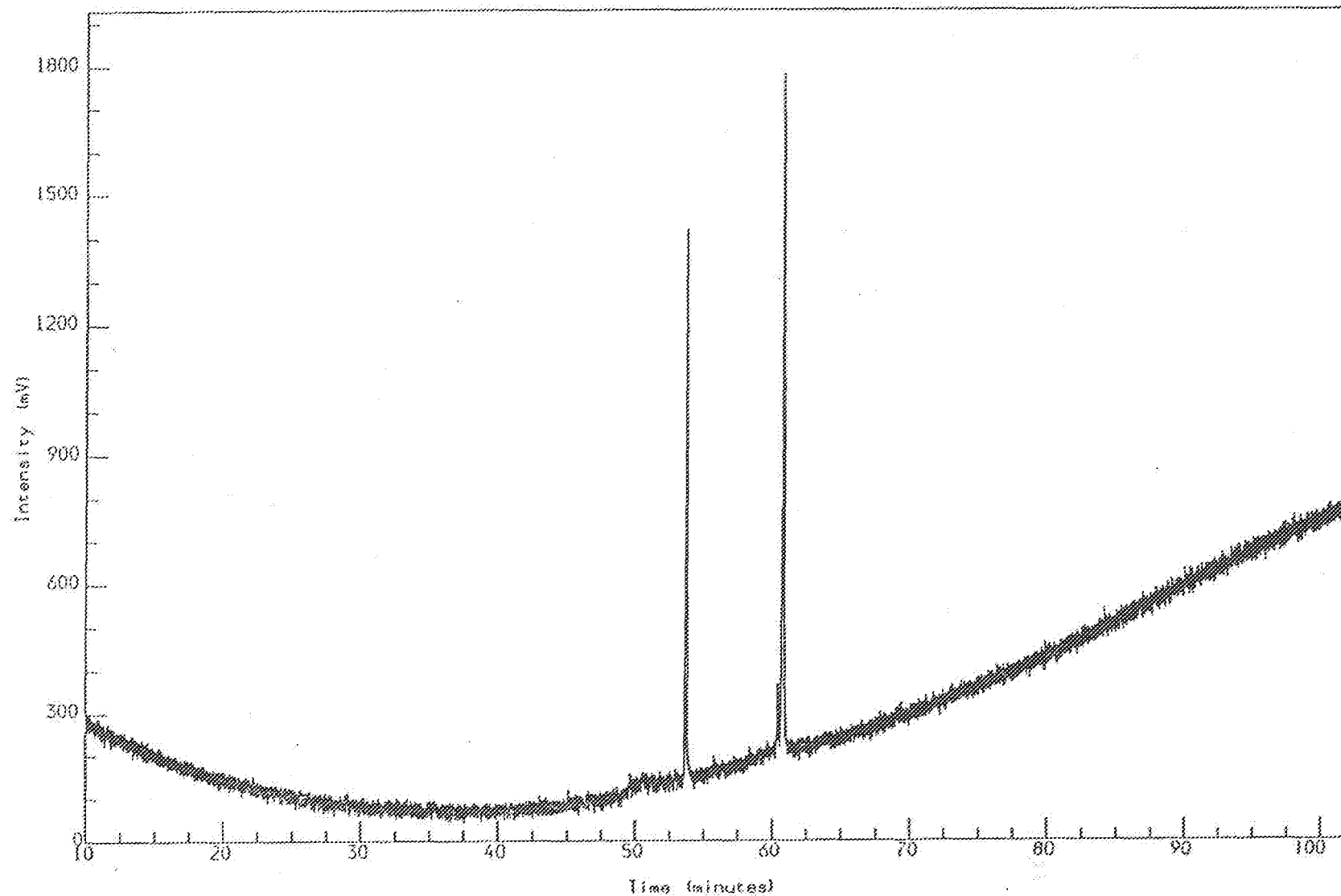
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 32 W0428348.1.1.

Multichrom



WELL NOCS 34/10-35 4283.48m
WHOLE EDM GC (FPD)

Reported on 16-SEP-1992 at 09:57

Schlumberger

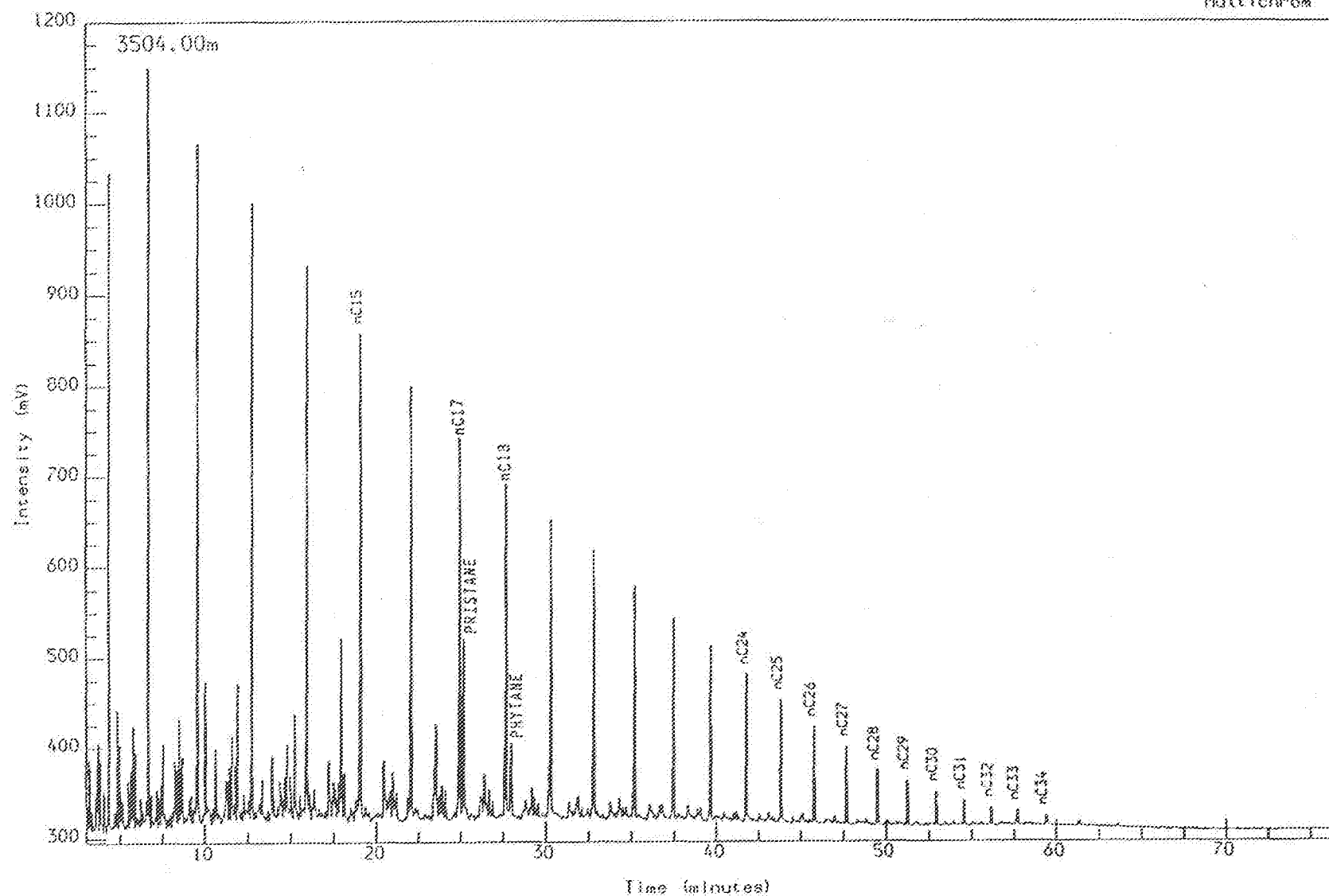
GECO-PRAKLA

GEOLAB NOR

Saturated Fraction Chromatograms (FID)

Analysis Name : [526265] 5 SH4700610B.2.1.

Multichrom



WELL NOCS 34/10-35 3496-3504m
SATURATED GC

Reported on 31-AUG-1992 at 09:59

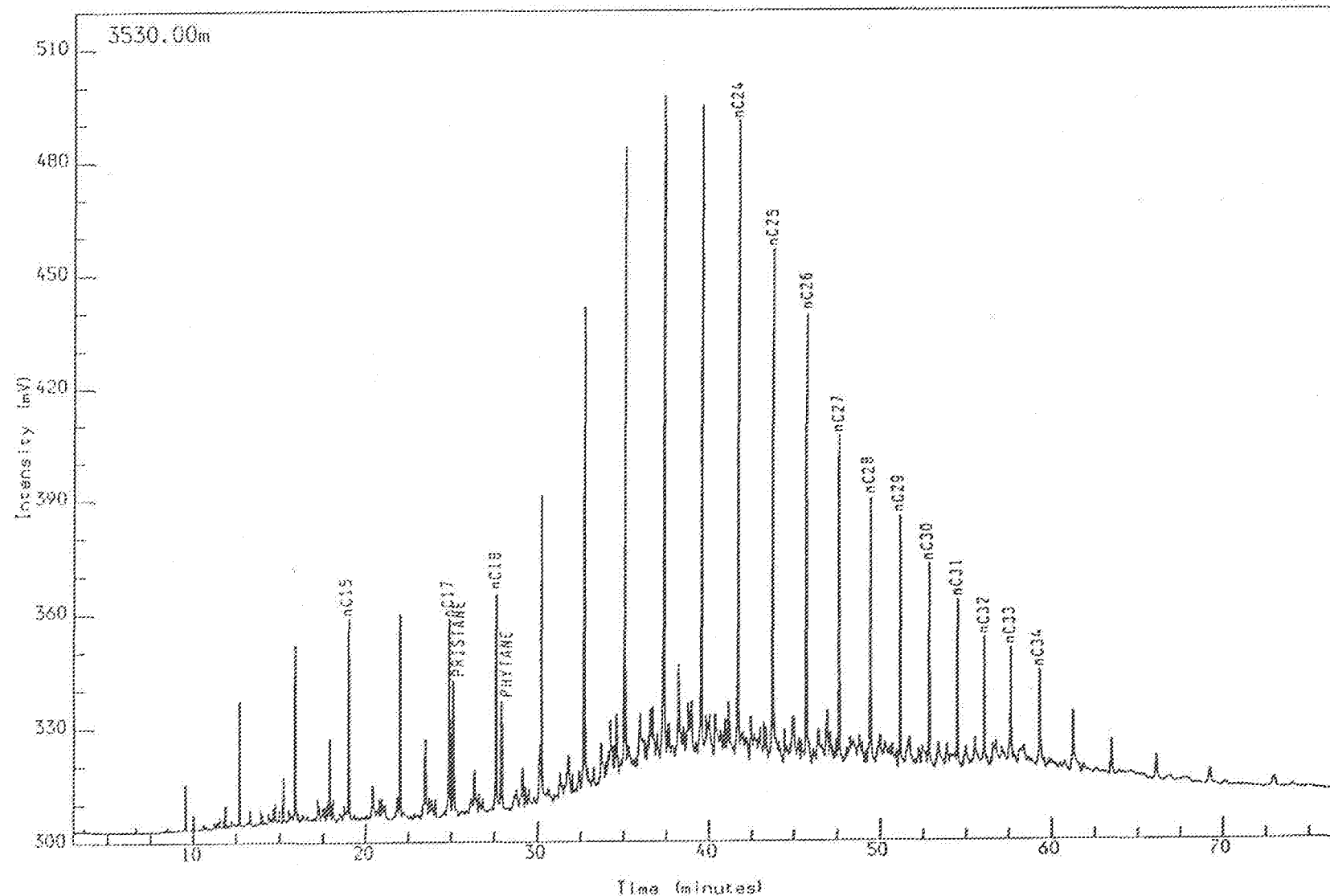
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403581L,3,1.

Multichrom



WELL NOCS 34/10-35
SATURATED GC
Marl: y gy to lt gy

3530.00m cut

Reported on 31-AUG-1992 at 00:01

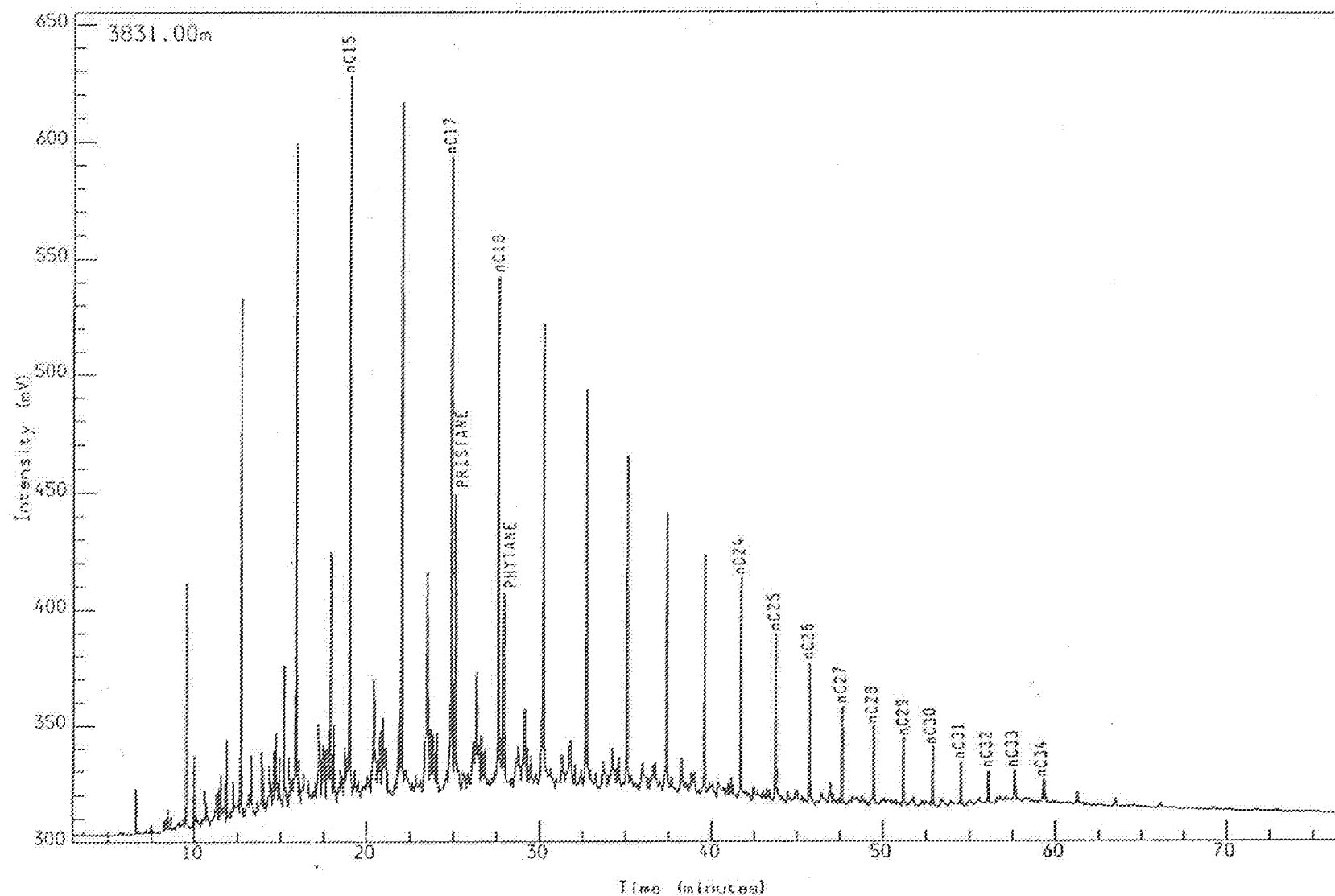
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG340358IL.4.1.

Multichrom



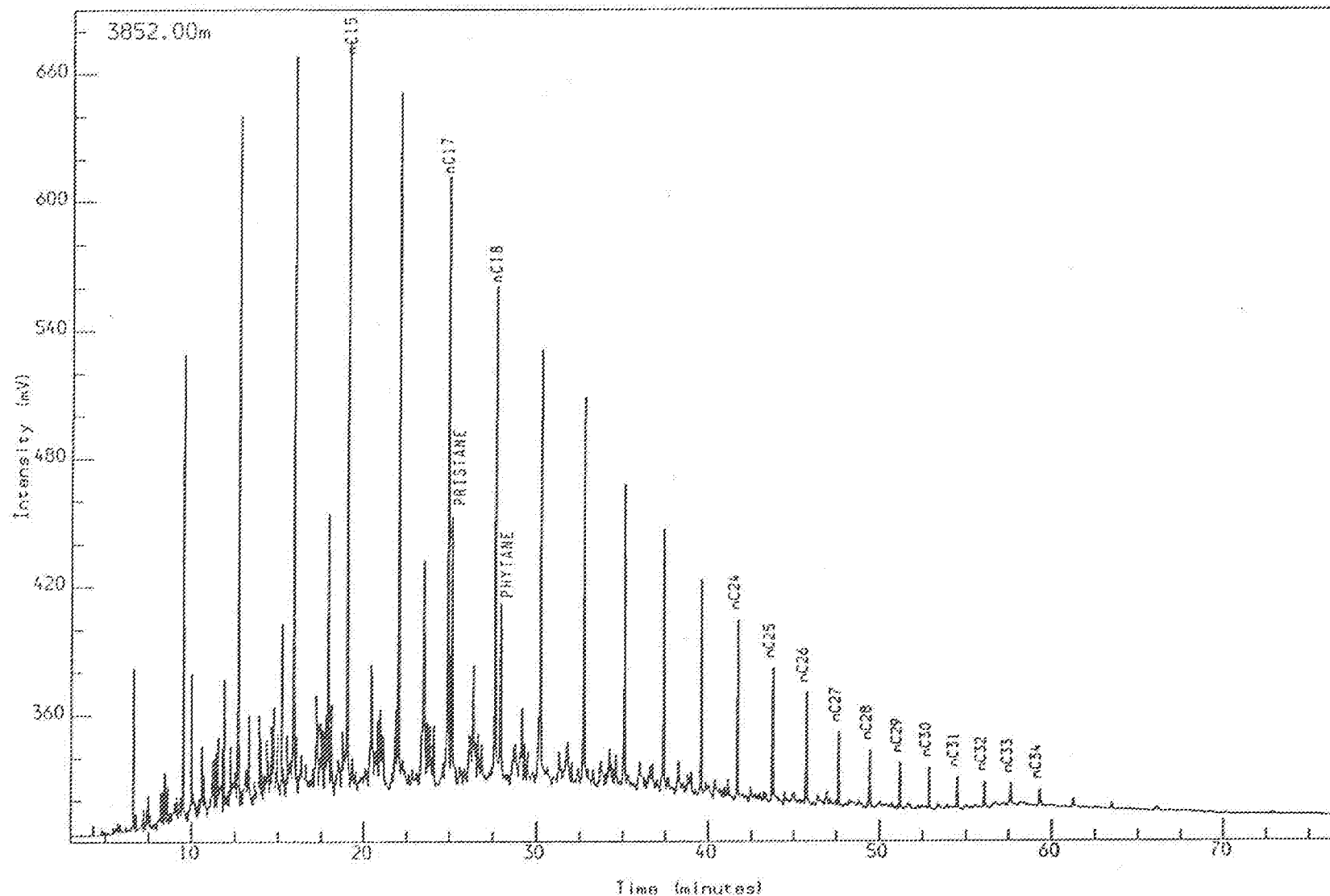
WELL NOCS 34/10-35 3831.00m cut
SATURATED GC
Sh/Clet: m gy to drk gy

Reported on 31-AUG-1992 at 00.05

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35 3852.00m cut
 SATURATED GC
 Sh/Clst: drk gy to brn blk

Reported on 31-AUG-1992 at 00:30

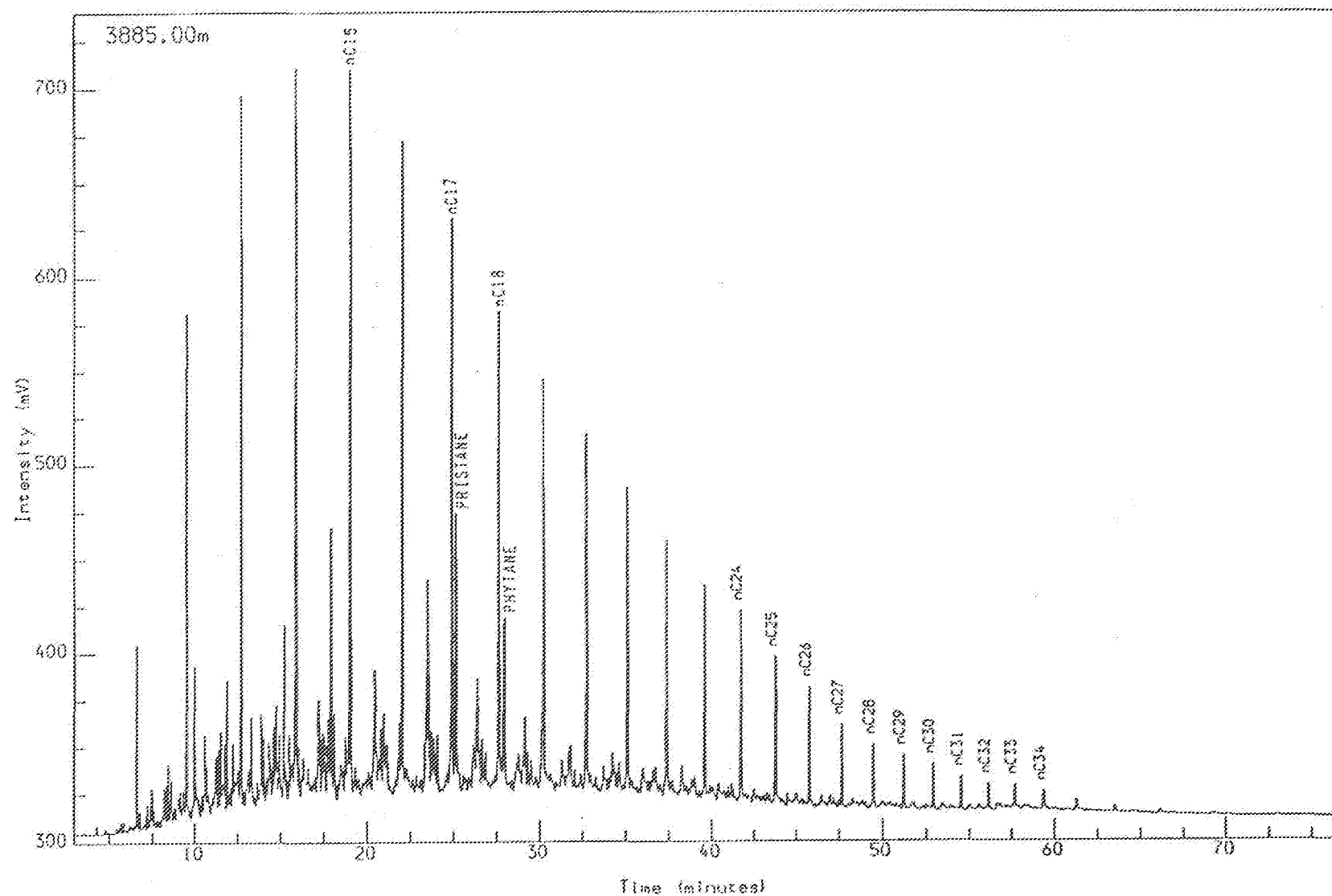
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403591L.3.1.

Multichrom



WELL NOCS 34/10-35 3885.00m cut
SATURATED GC
Sh/Clst: m gy to drk gy

Reported on 23-SEP-1992 at 09.39

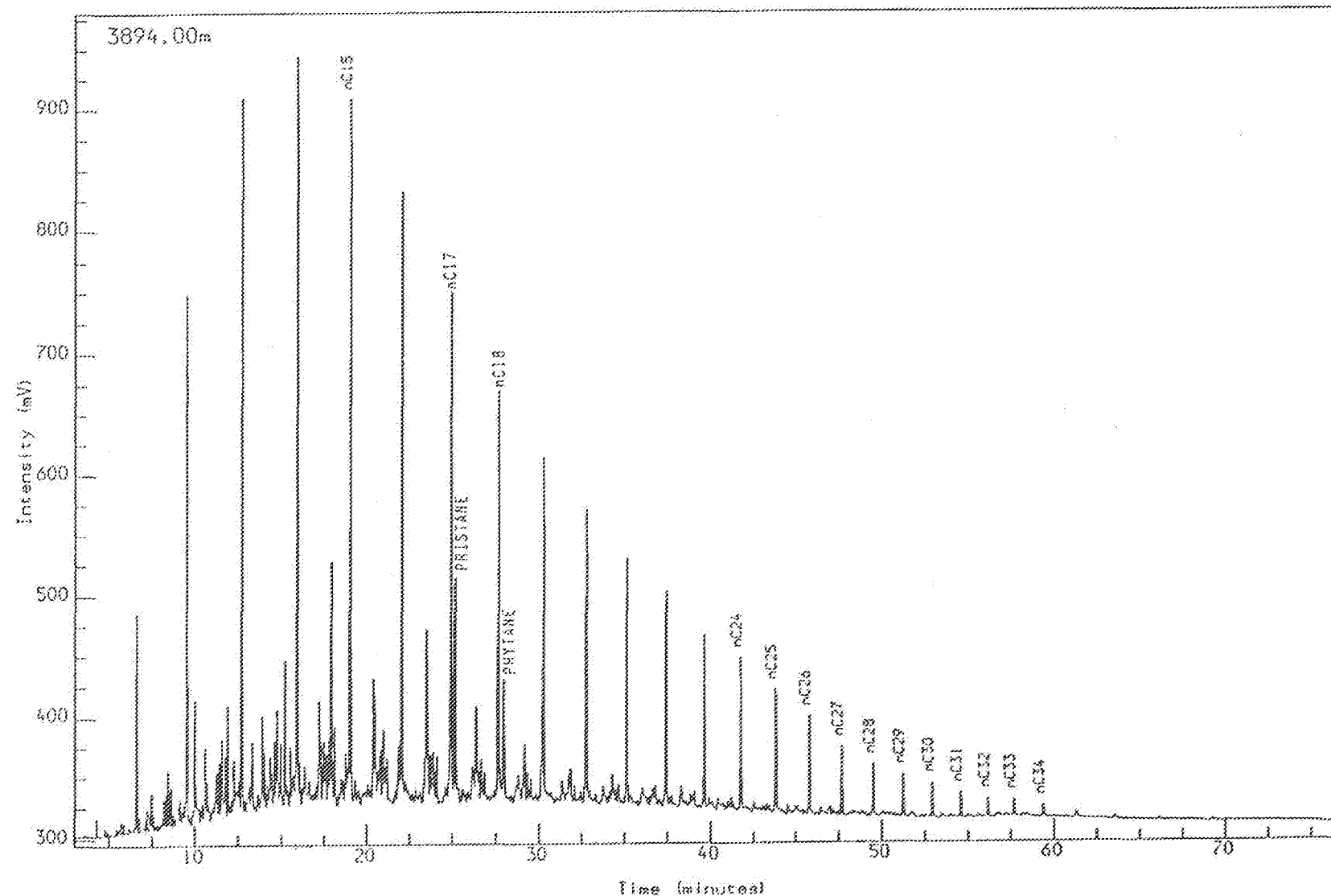
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG340359IL.4.1.

Multichrom



WELL NOCS 34/10-35 3894.00m cut
SATURATED GC
Sh/Clst: m gy to drk gy

Reported on 23-SEP-1992 at 09:41

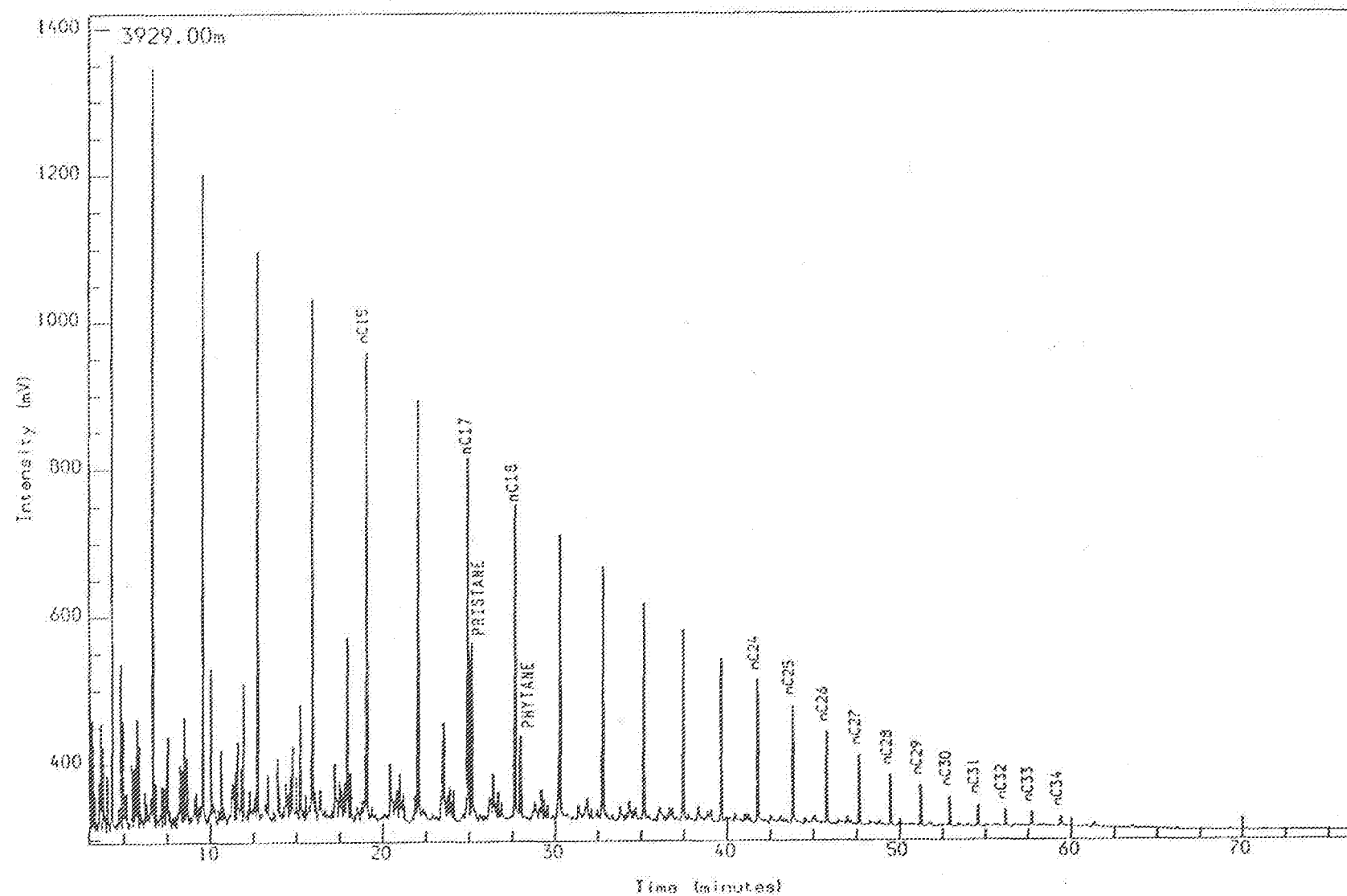
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : (526265) 5 SH4700610B.3.1.

Multichrom



WELL NOCS 34/10-35
SATURATED GC

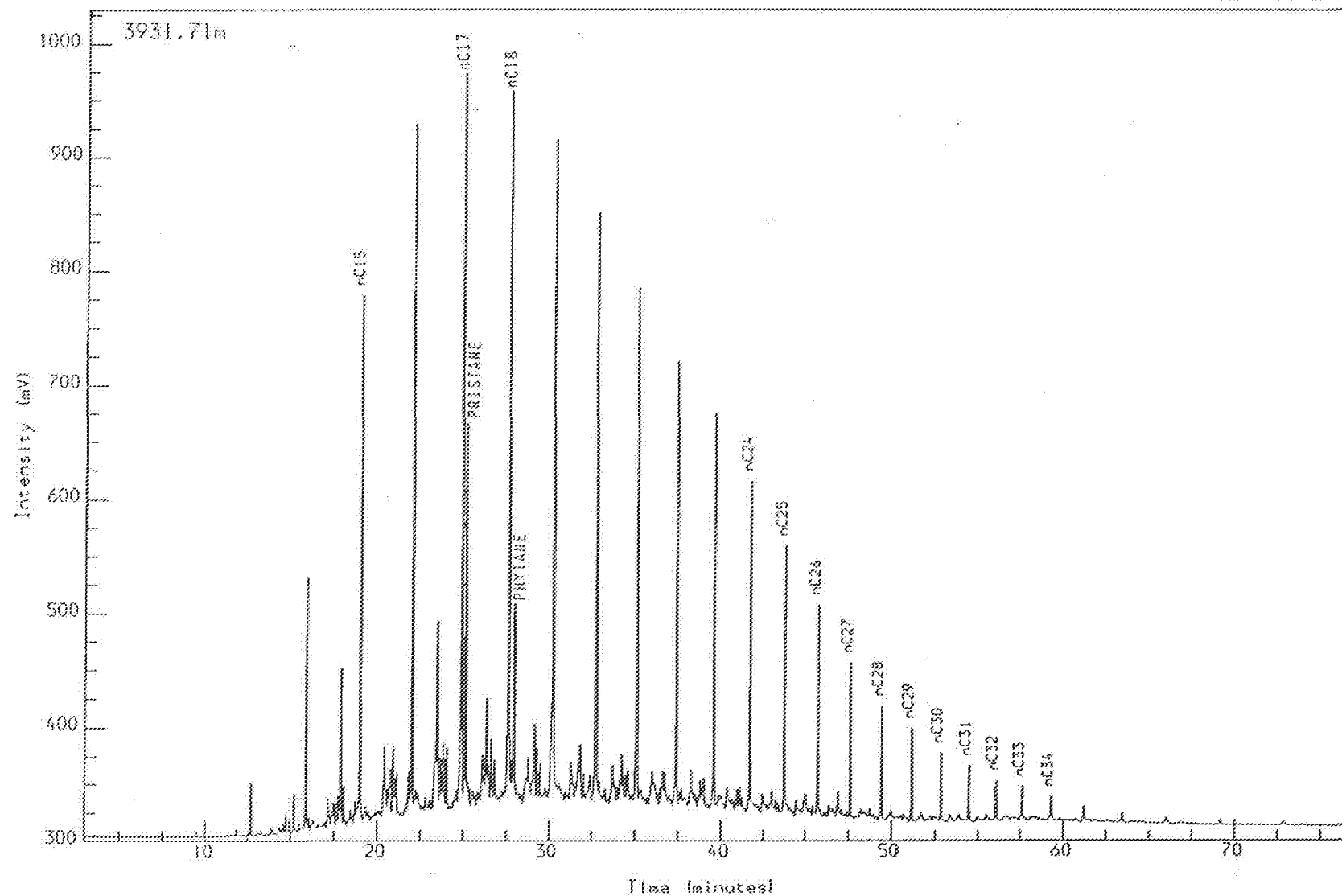
3920-3929m
DST 3

Reported on 31-AUG-1992 at 10:01

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35
SATURATED GC
S/Sst: pl y brn

3931.71m ccp

Reported on 31-AUG-1992 at 00.36

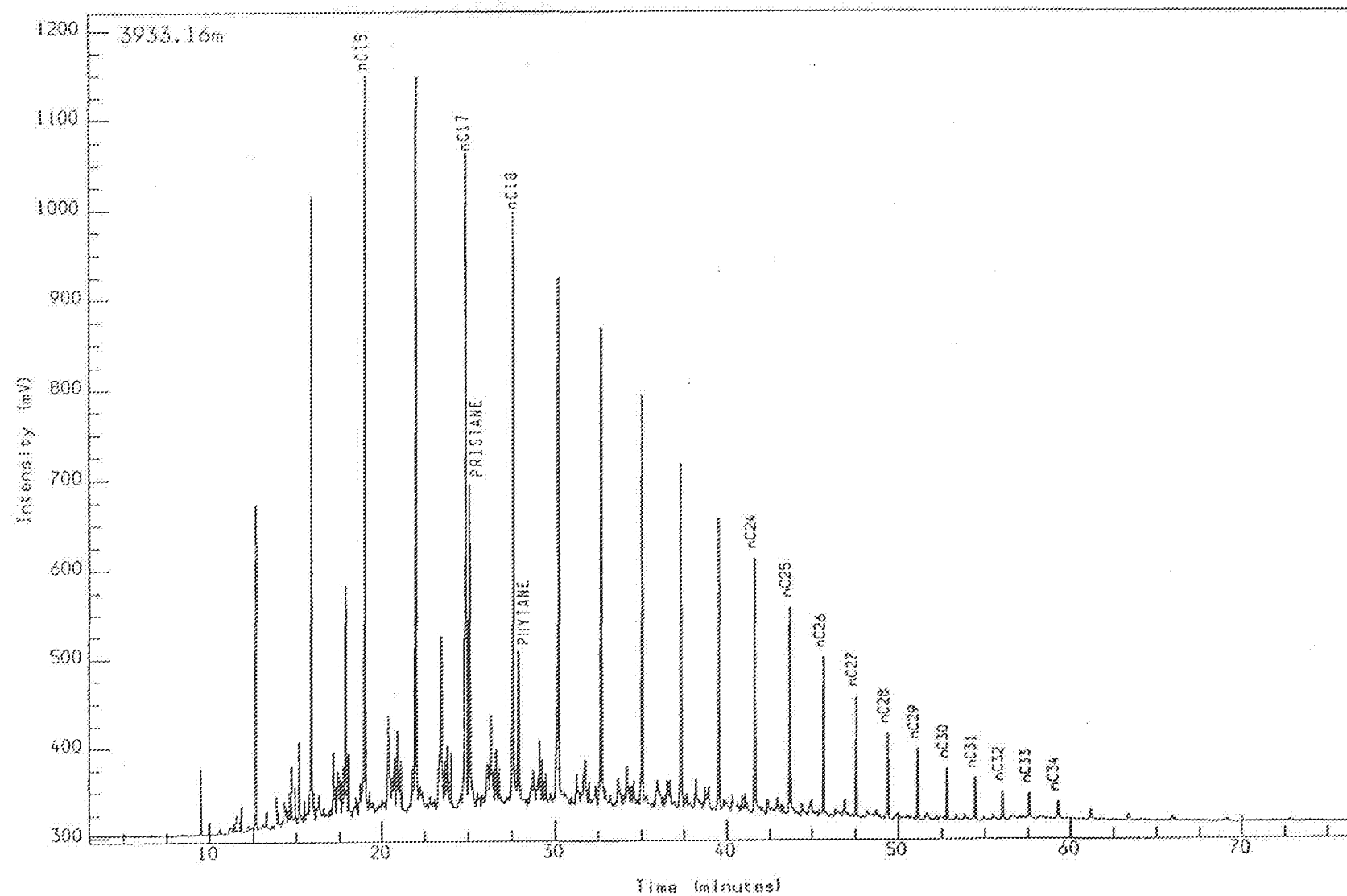
Schulmberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403581L,7,1.

Multichrom



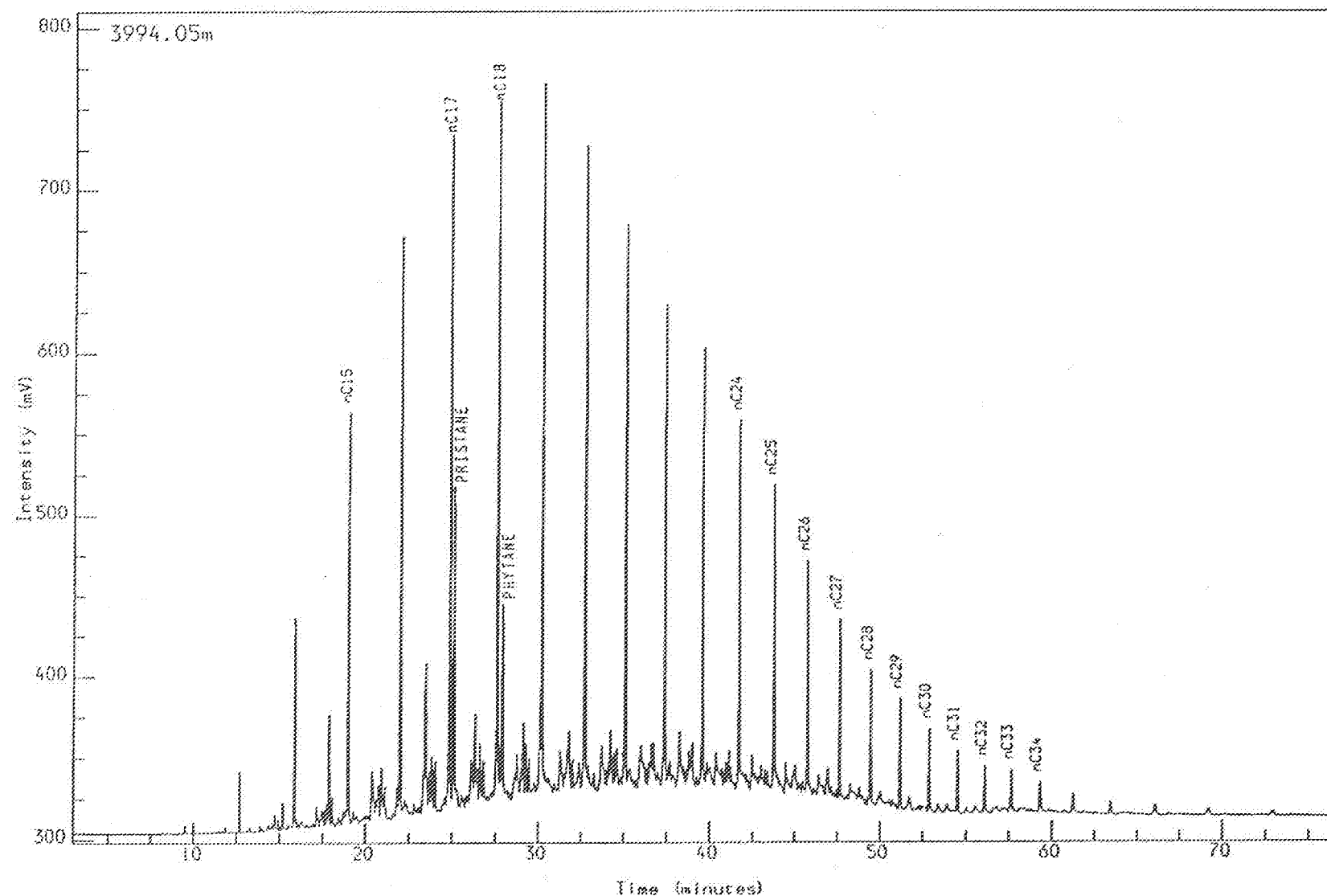
WELL NOCS 34/10-35 3933.16m ccp
SATURATED GC
S/Sst: gy w to pl y brn

Reported on 31-AUG-1992 at 00.46

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35 3994.05m ccp
SATURATED GC
S/Sst: gy w to lt brn gy to brn gy

Reported on 31-AUG-1992 at 00:51

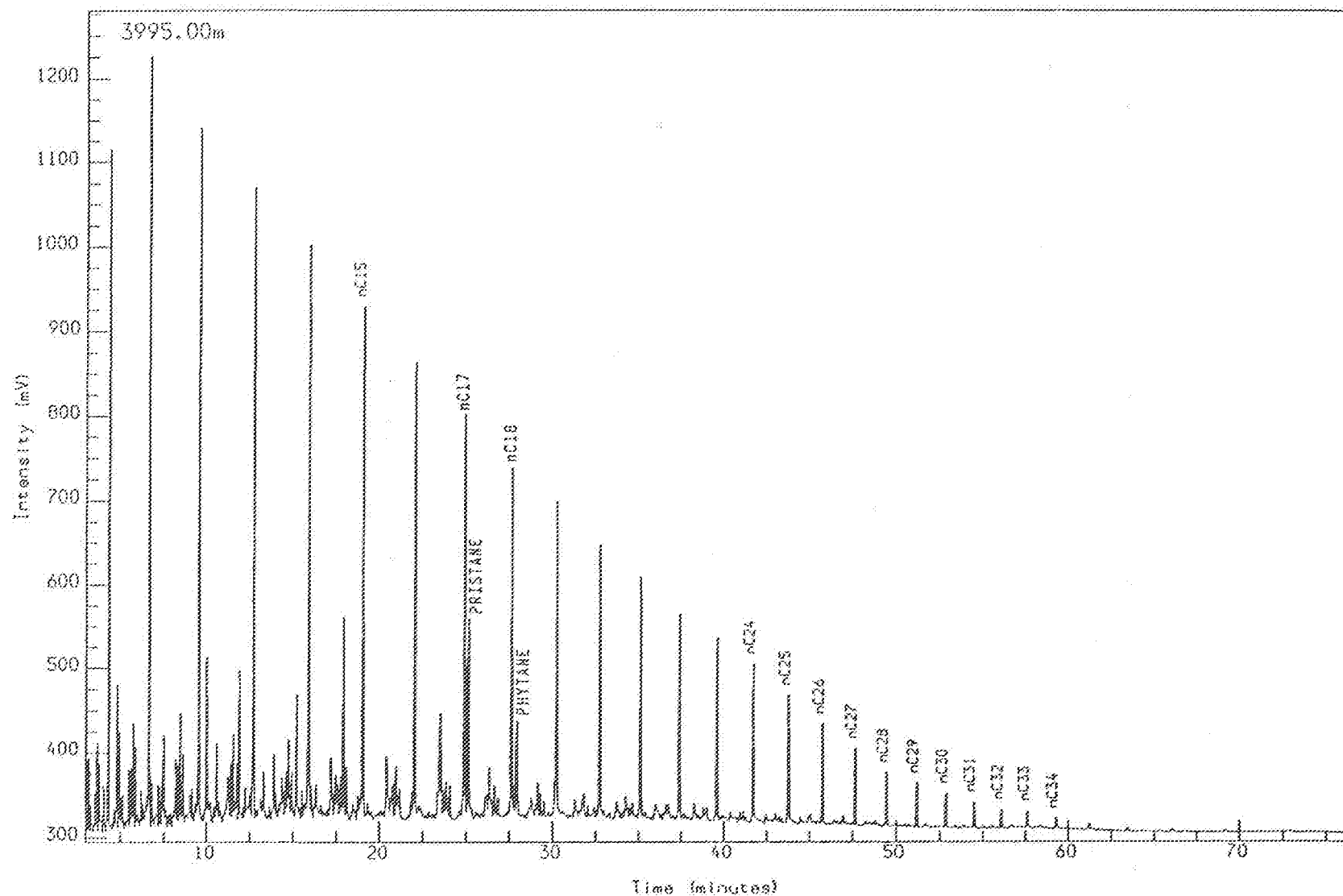
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SH4700610B.4.1.

Multichrom



WELL NOCS 34/10-35 3984-3995m
SATURATED GC DST 2

Reported on 31-AUG-1992 at 10.04

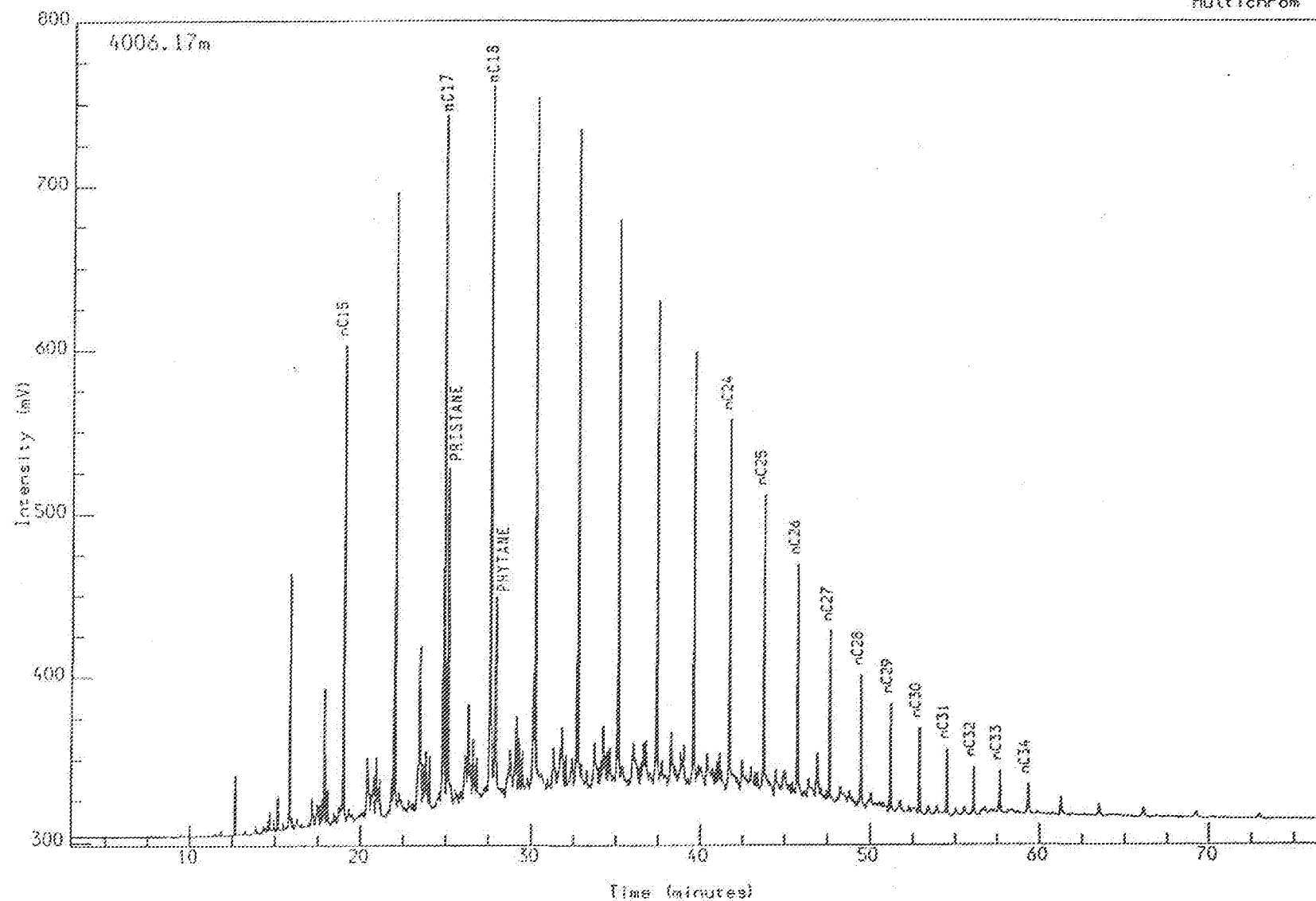
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403581L.9.1.

Multichrom



WELL NOCS 34/10-35 4006.17m ccp
SATURATED GC
S/Sst: gy w to brn gy to dsk brn

Reported on 31-AUG-1992 at 00.54

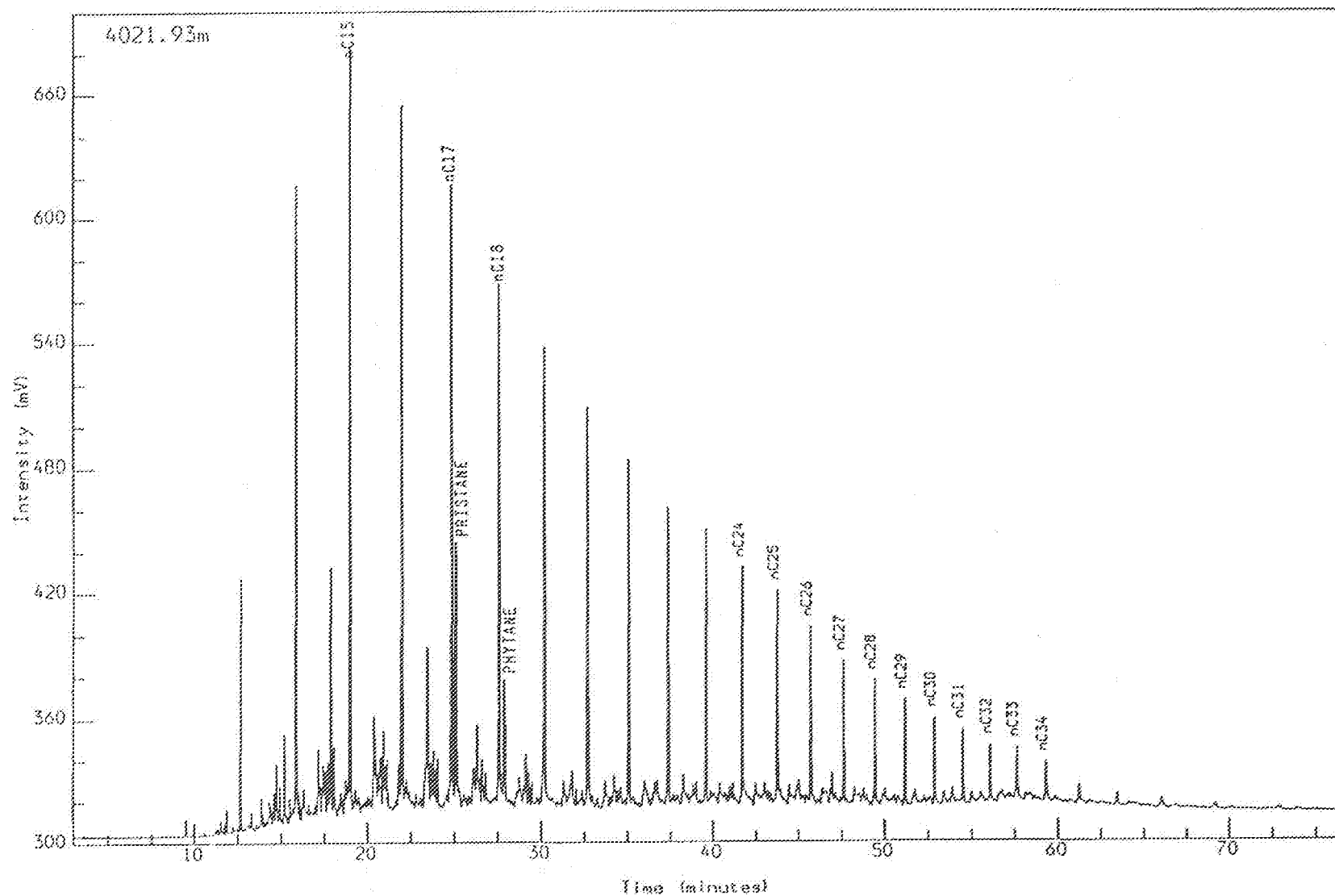
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 563403581L.10.1.

Multichrom



WELL NOCS 34/10-35

4021.93m ccp

Reported on 31-AUG-1992 at 00.57

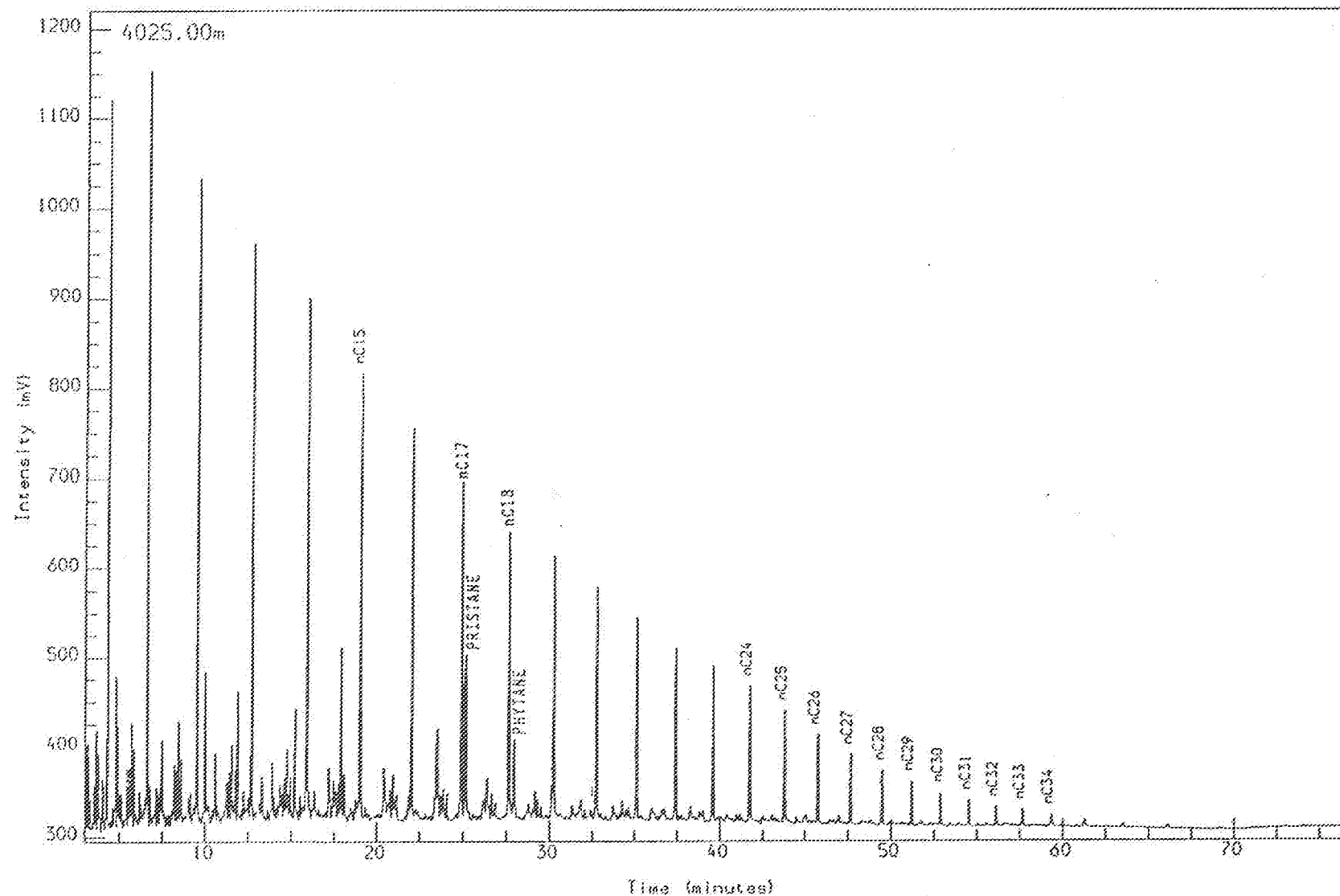
SATURATED GC

Sh/Cist: brn gy

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35 4015-4025m
SATURATED GC DST 1

Reported on 31-AUG-1992 at 10:05

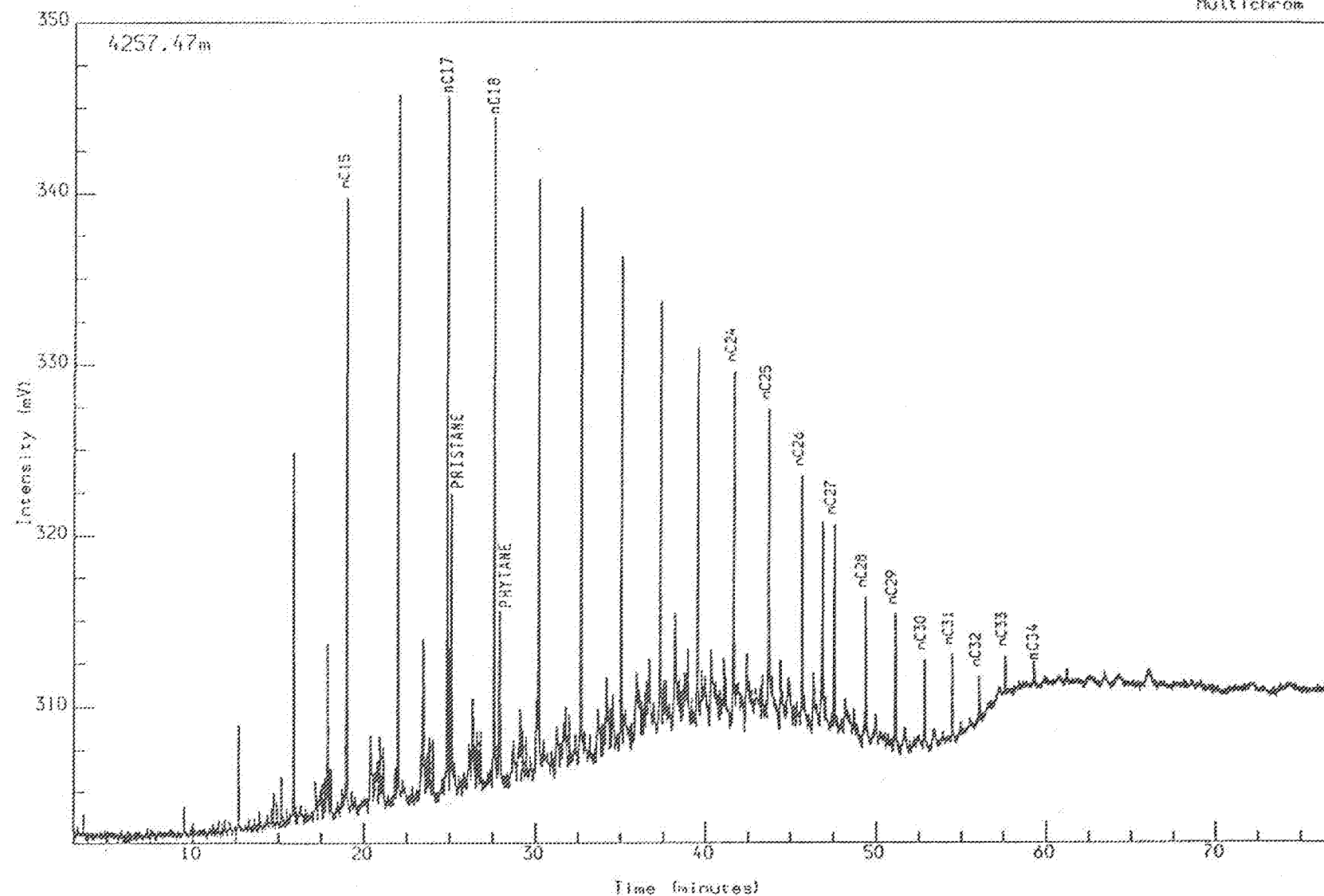
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5 SG3403581L.11.1.

Multichrom



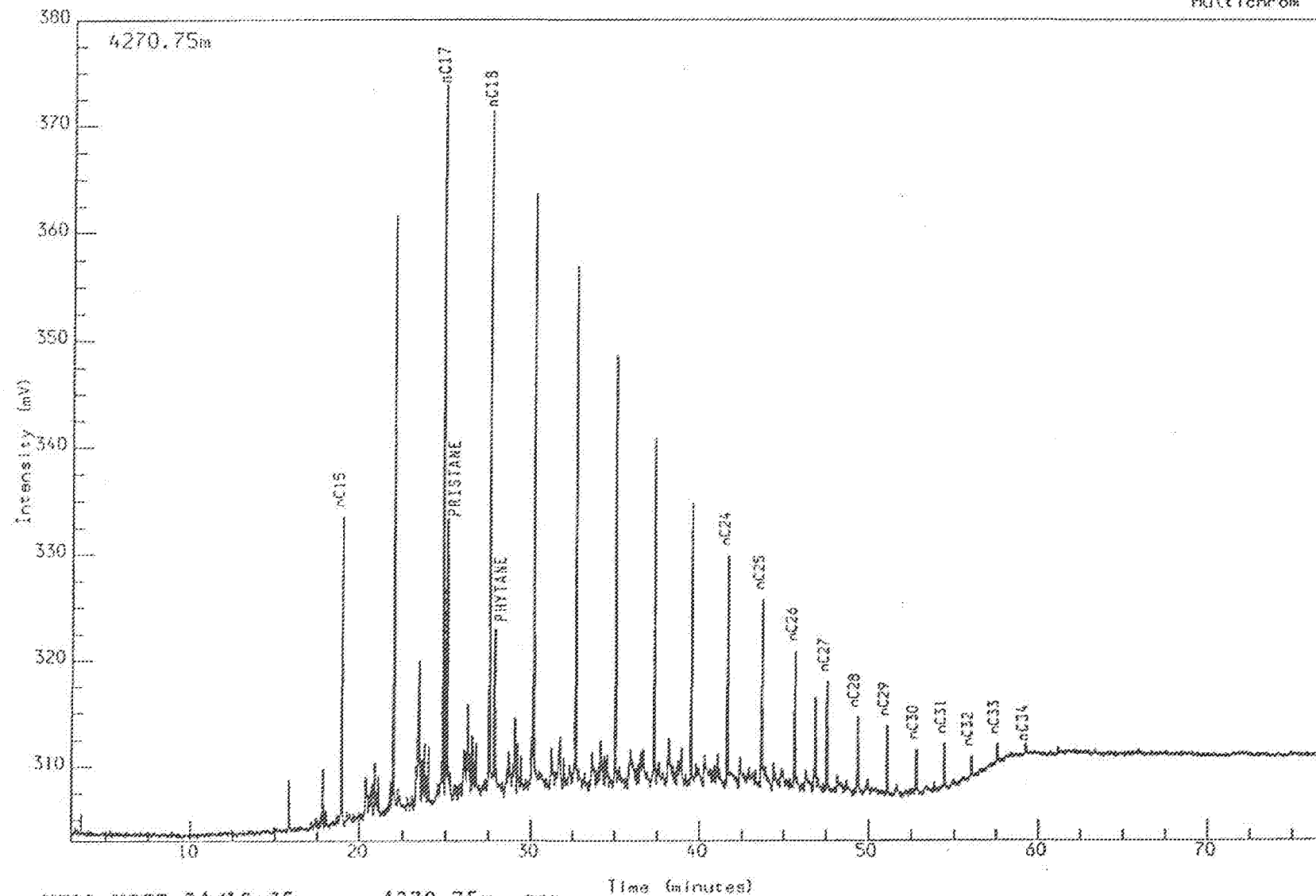
WELL NOCS 34/10-35 4257.47m ccp
SATURATED GC
S/Sat: 1t gy w to 1t brn gy

Reported on 31-AUG-1992 at 00:59

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35 4270.75m ccp
 SATURATED GC
 S/Sst: 1t gy w to 1t gy

Reported on 31-AUG-1992 at 01.02

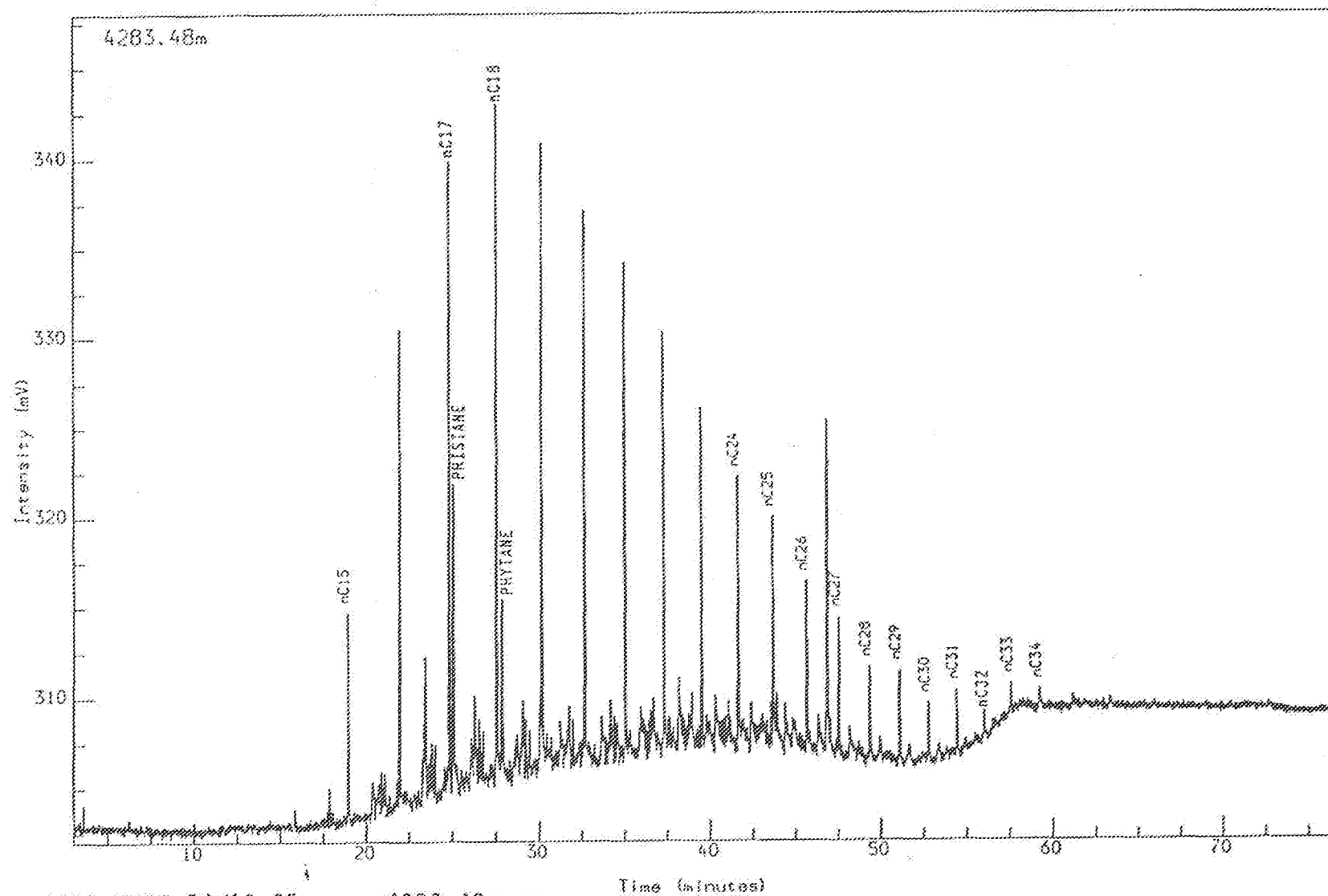
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 5:5G3403581L.13.1.

Multichrom



WELL NOCS 34/10-35 4283.48m ccp
SATURATED GC
S/Sat: lt gy w to lt gy

Reported on 23-SEP-1992 at 12.14

Schlumberger

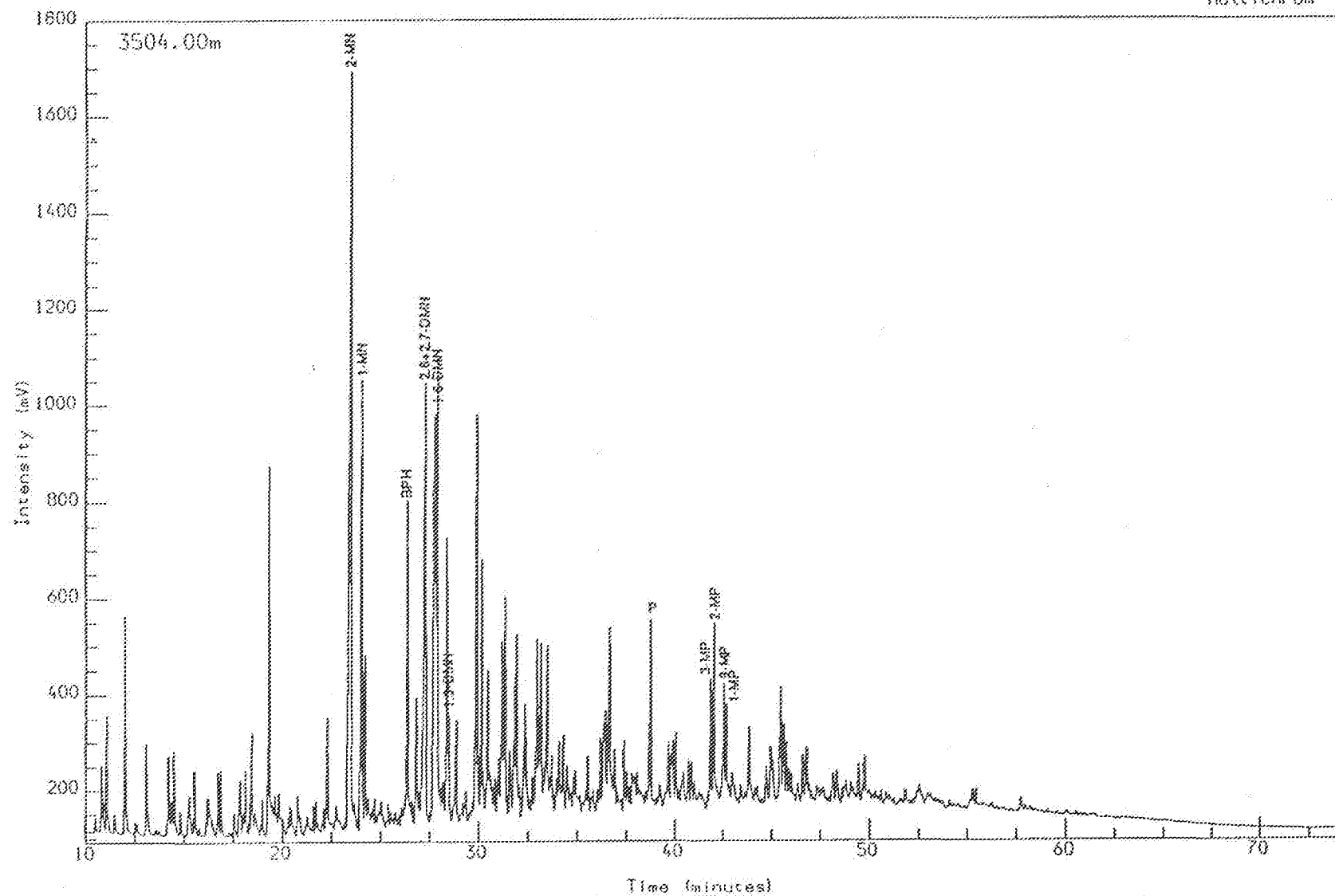
GECO-PRAKLA

GEOLAB NOR

Aromatic Fraction Chromatograms (FID and FPD)

Analysis Name : [526265] 29 AH4700610B,2,1.

Multichrom



WELL NUCS 34/10-35 3496-3504m
AROMATIC GC (FID)

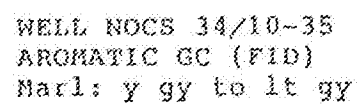
Reported on 31-AUG-1992 at 10:08

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Multichrom

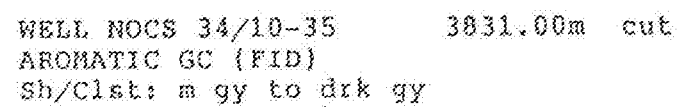


Reported on 31-AUG-1992 at 05:00

GECO-PRAKLA

GEOLAB2NOR

Melt ichrom



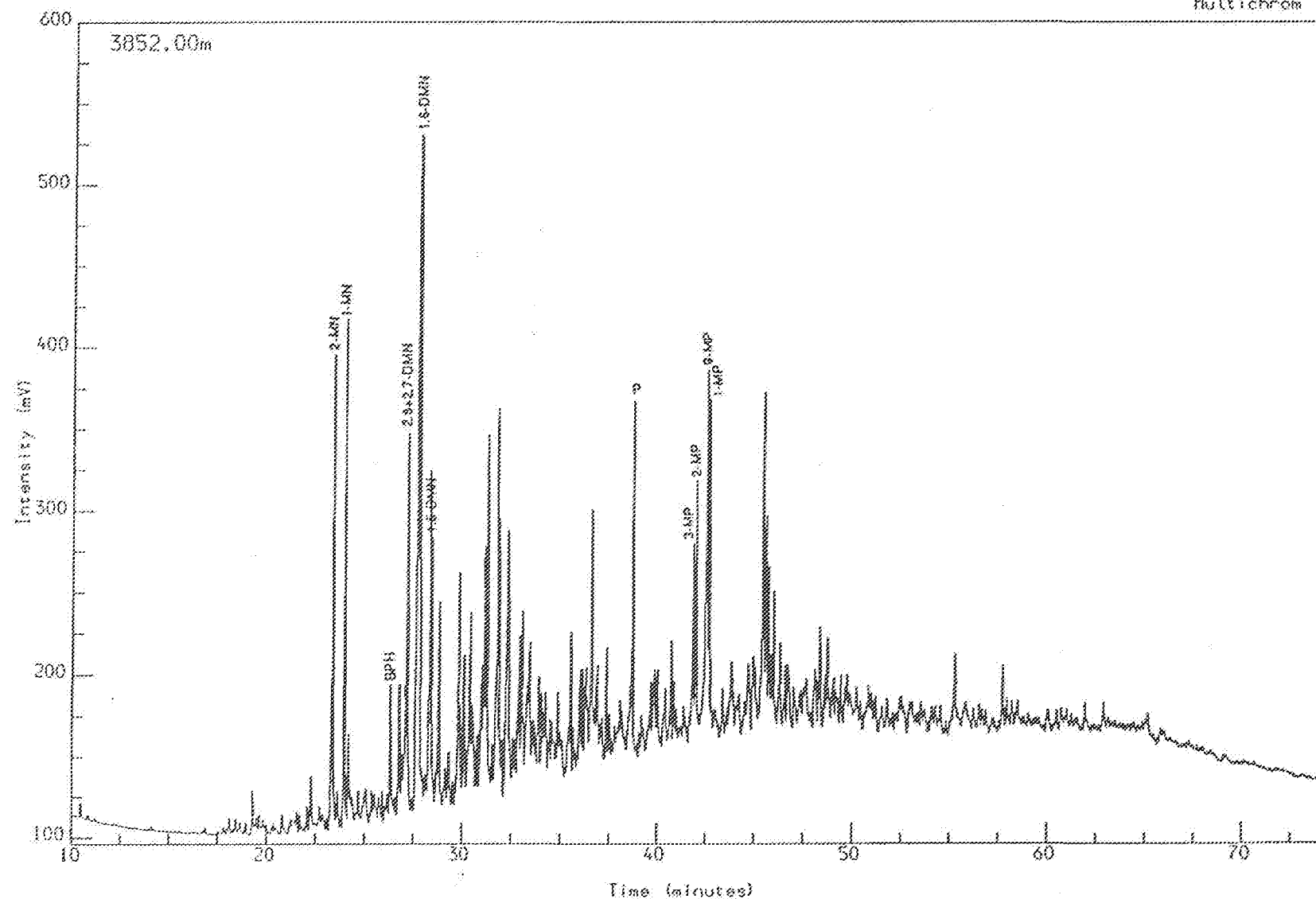
Schlumberger

GECO-PRAKLA

GEOLAB[®]NOR

Analysis Name : [526265] 29 AG3403581L.5.1.

Multichrom



WELL NOCS 34/10-35 3852.00m cut
AROMATIC GC (FID)
Sh/Clst: drk gy to brn blk

Reported on 31-AUG-1992 at 05.13

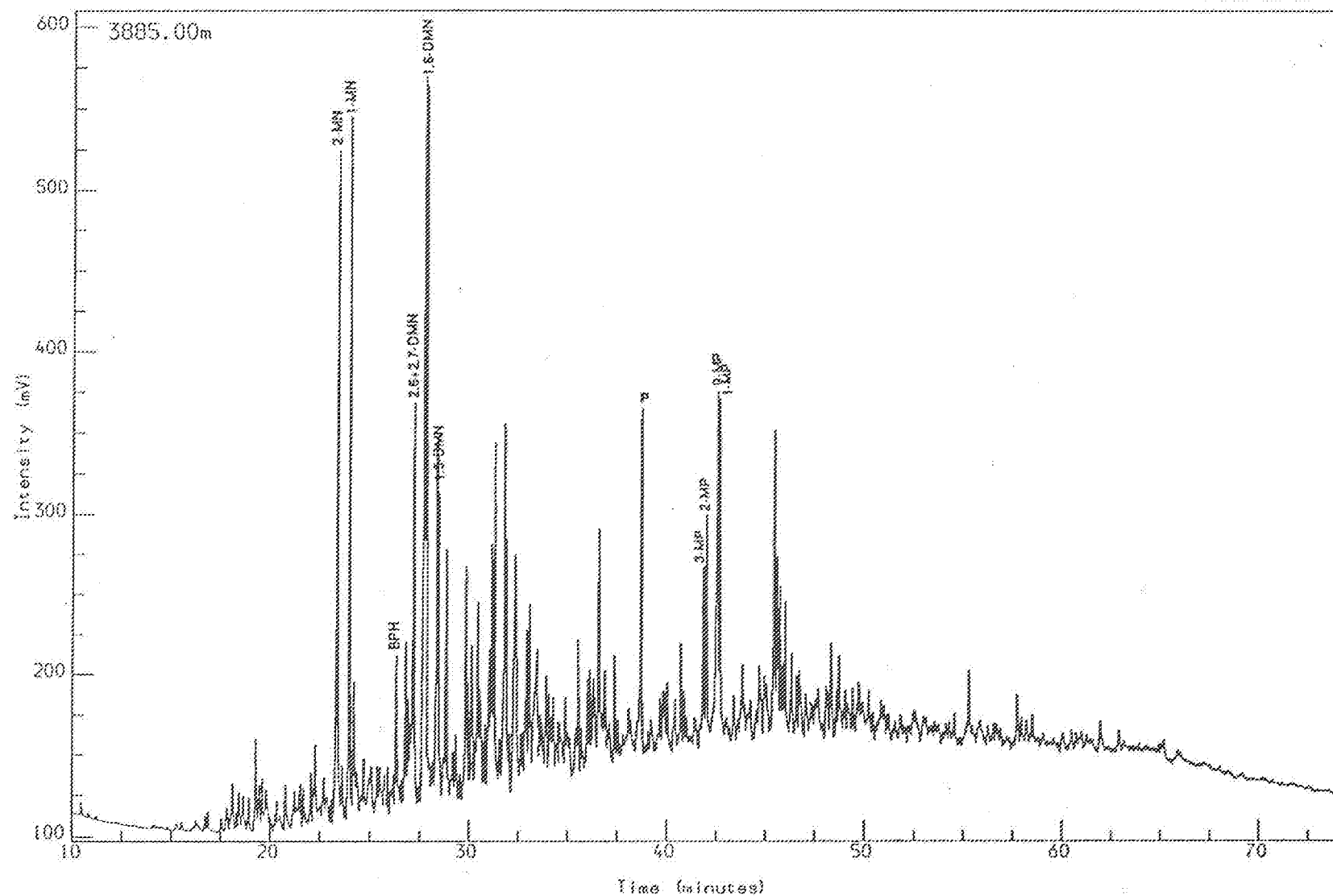
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [S26265] 29 AH4700572L,2,1.

Multichrom



WELL NOCS 34/10-35 3885.00m cut
AROMATIC GC (FID)
Sh/Clst: m gy to drk gy

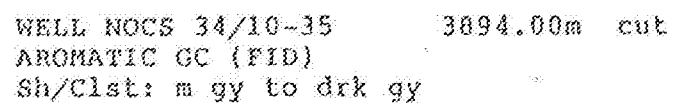
Reported on 23-SEP-1992 at 08.58

Schlumberger

GECO-PRAKLA

GEOLAB NOR

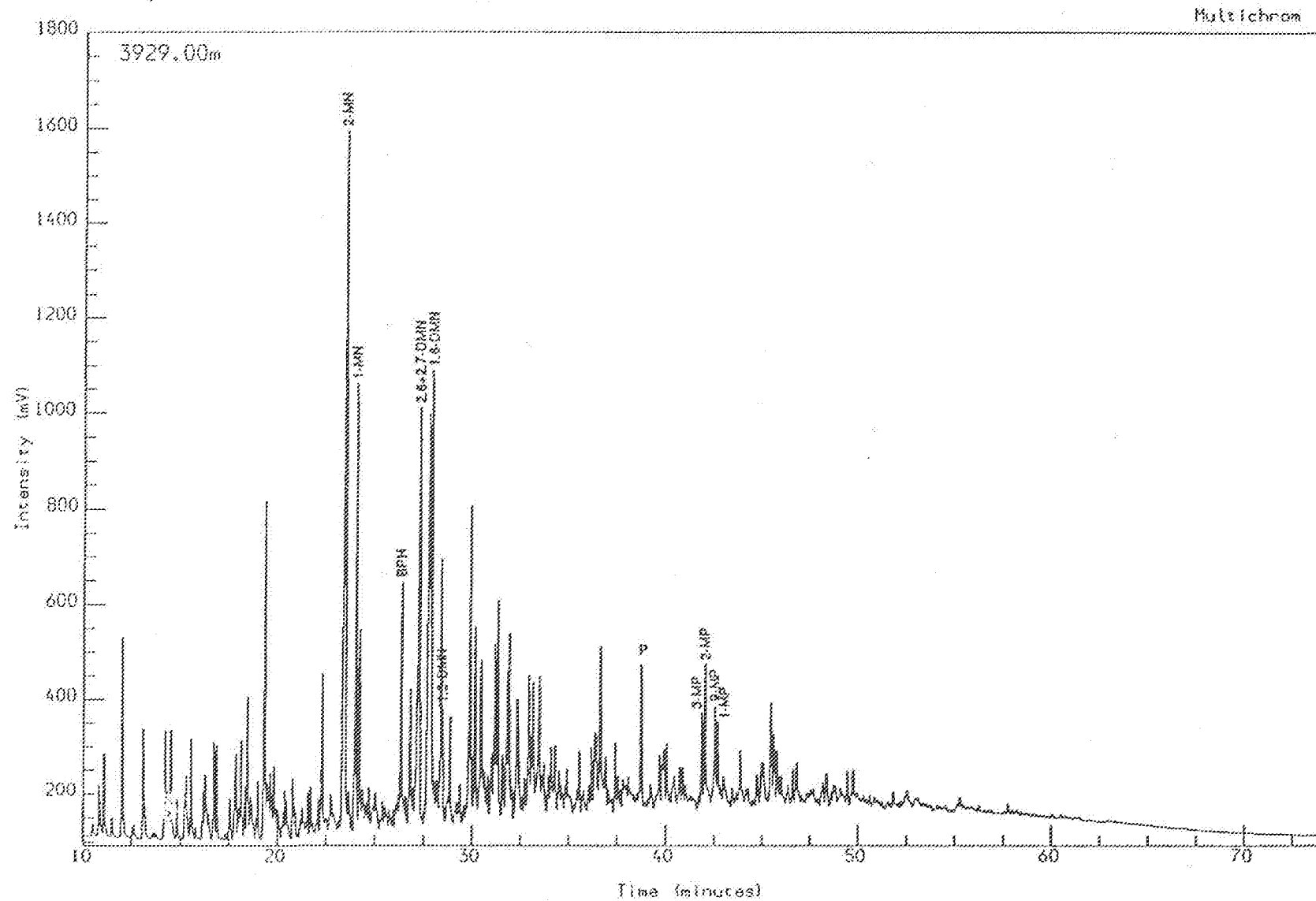
Multichrom



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GEOLAB[®]NOR

Analysis Name : [526265] 29 AH4700610B,3,1.



WELL NOCS 34/10-35 3920-3929m
AROMATIC GC (FID) DST 3

Reported on 31-AUG-1992 at 10:11

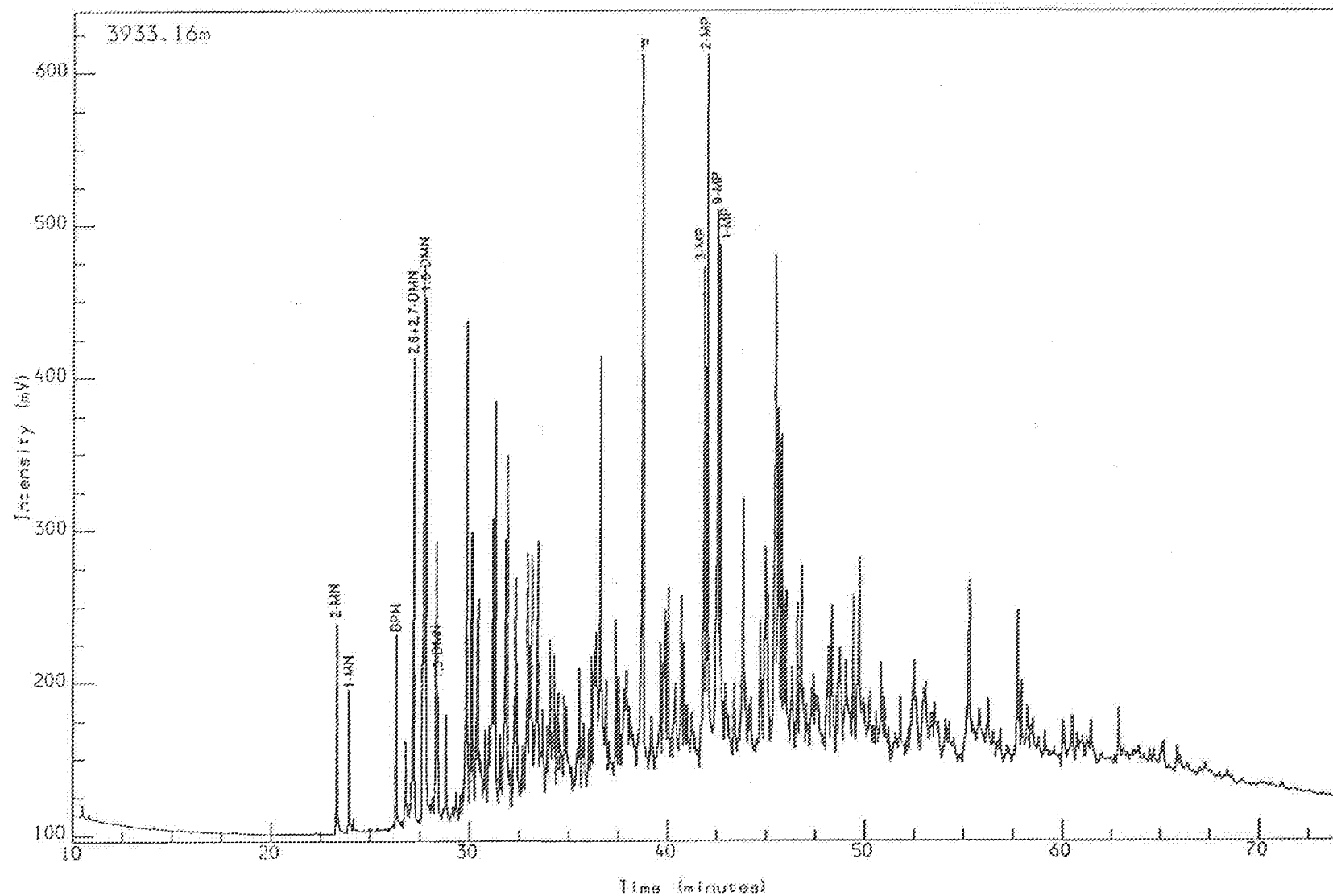
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 AG340358IL.7.1.

Multichrom



WELL NOCS 34/10-35 3933.16m ccp
AROMATIC GC (FID)
S/Sst: gy w to pl y brn

Reported on 31-AUG-1992 at 05.17

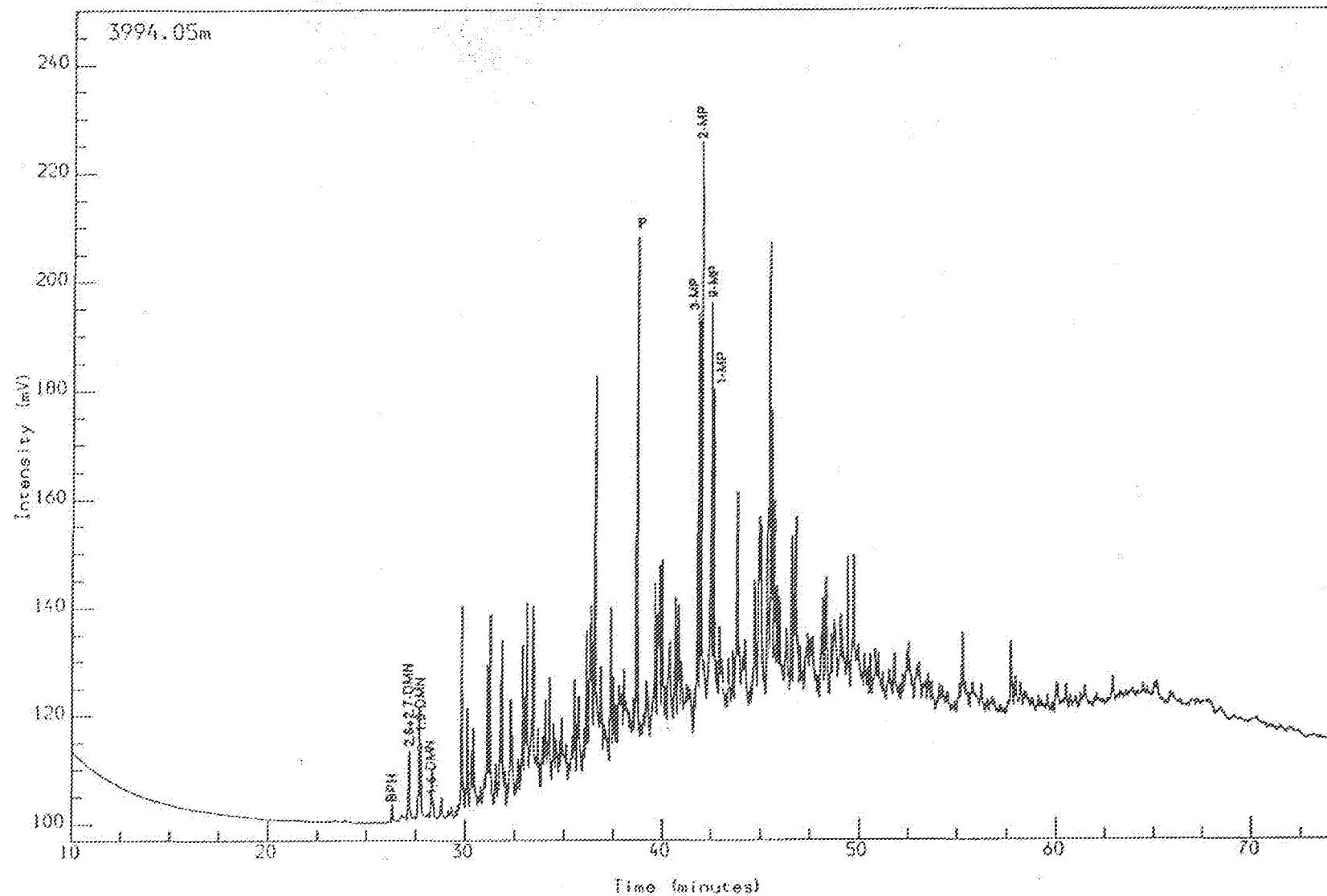
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 AG3403581L,8,1.

Multichrom



WELL NOCS 34/10-35 3994.05m ccp
AROMATIC GC (FID)
S/Sst: gy w to lt brn gy to brn gy

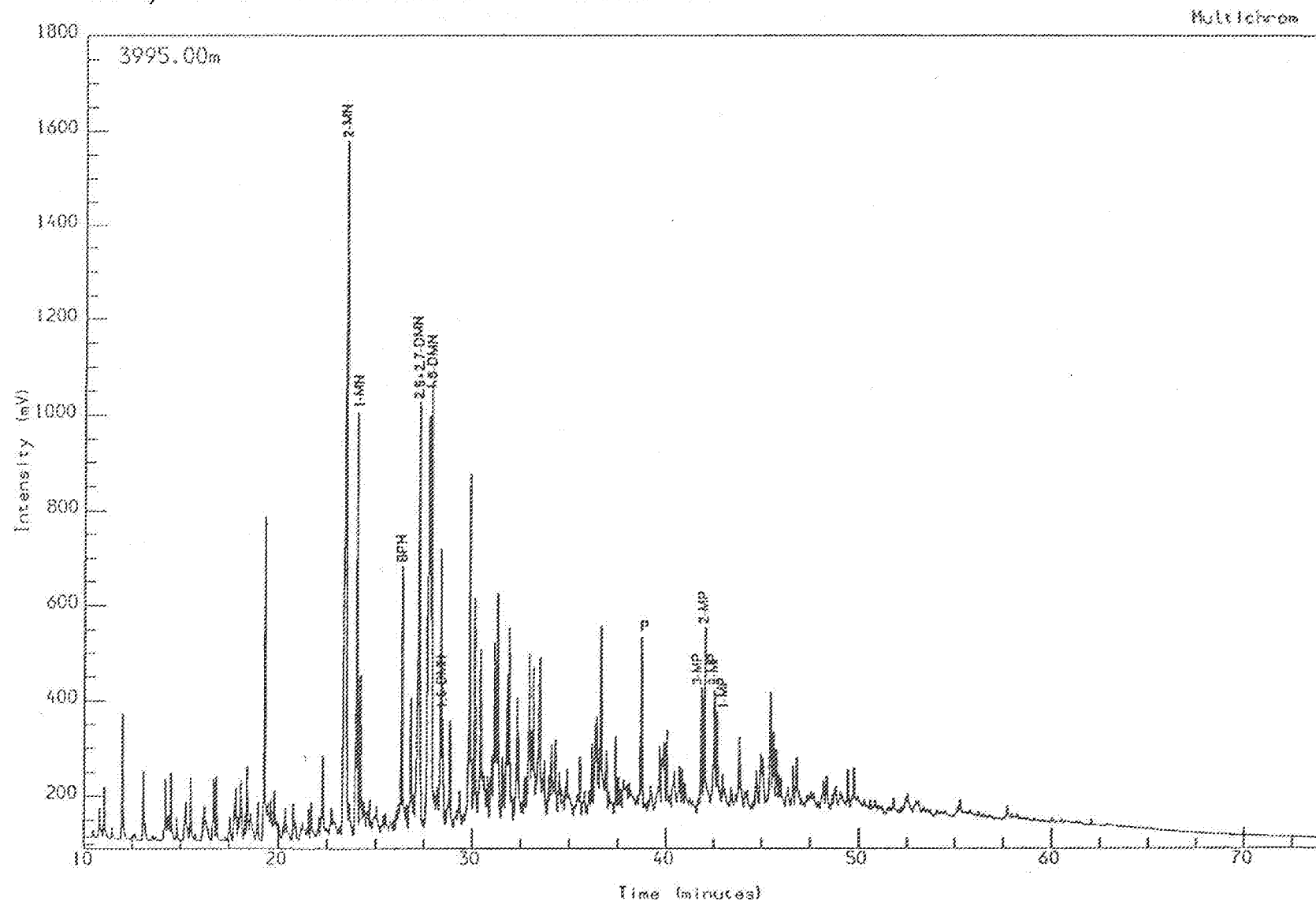
Reported on 31-AUG-1992 at 05.19

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 RH4700610B,4,1.



WELL NOCS 34/10-35 3984-3995m
AROMATIC GC (FID) DST 2

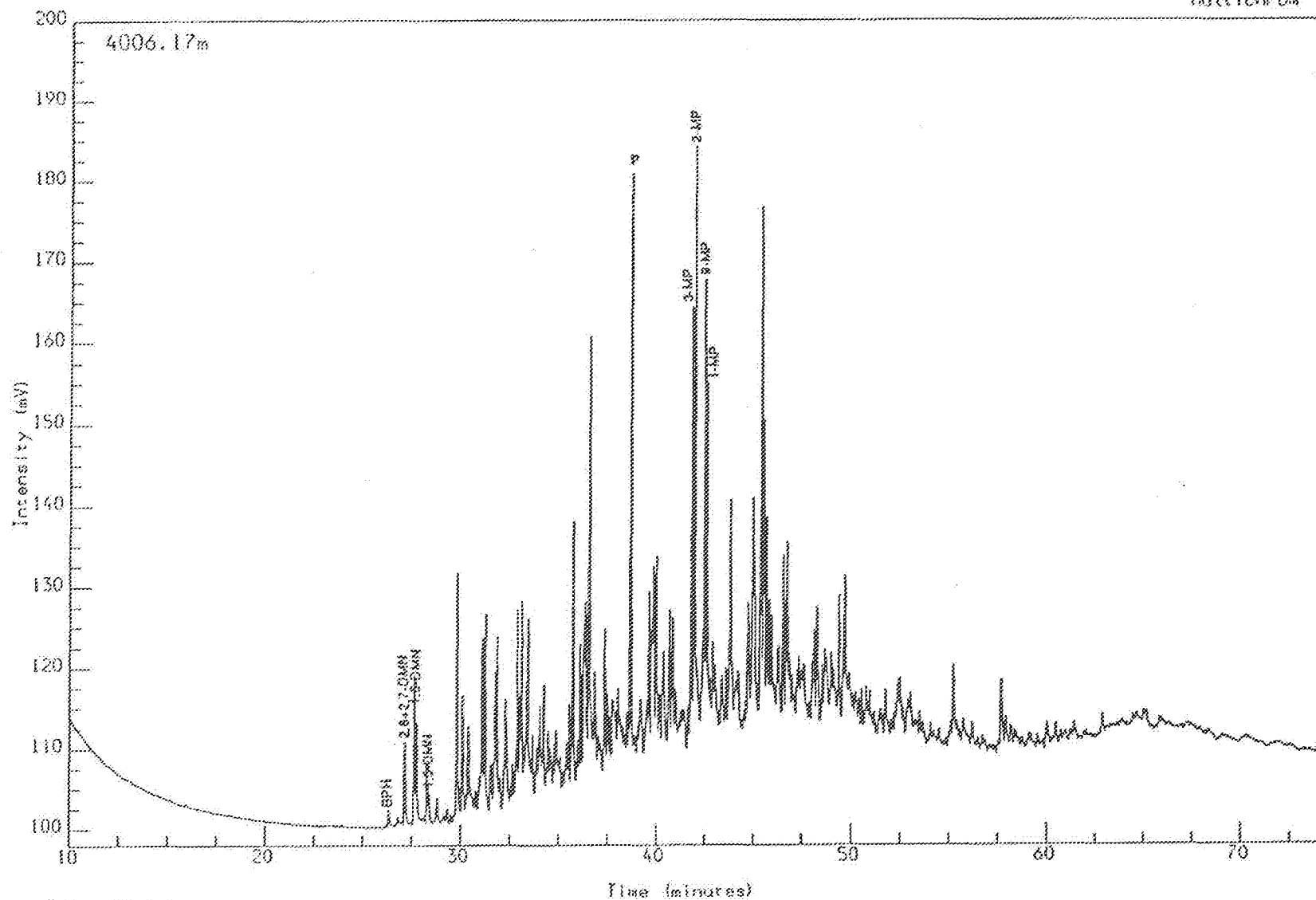
Reported on 31-AUG-1992 at 10.13

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Multichrom



Reported on 31-AUG-1992 at 05:22

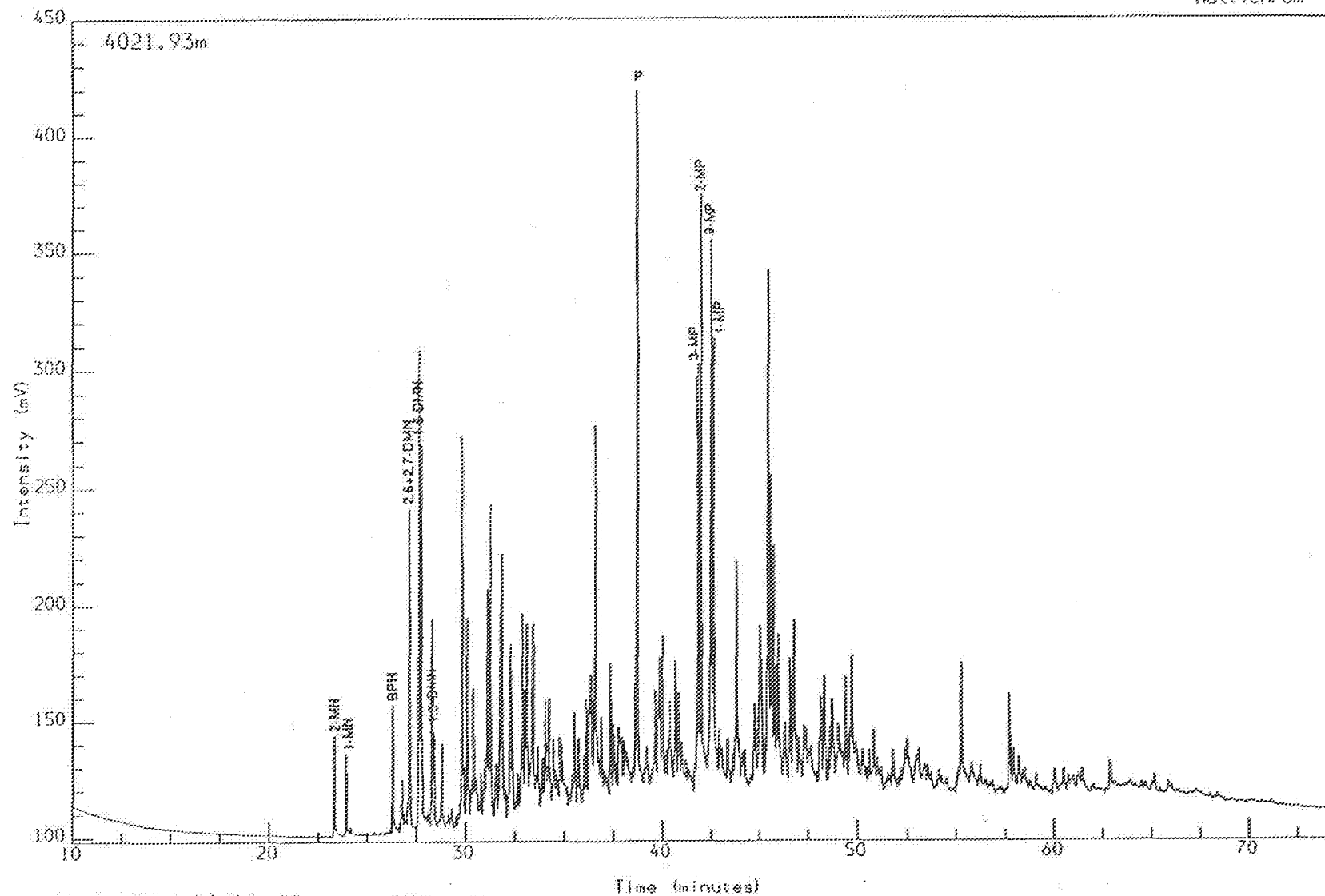
Schlumberger

GECO-PRAKLA

GEOLAB/NOR

Analysis Name : [526265] 29 AG340358IL.10.1.

Multichrom



WELL NOC5 34/10-35

4021.93m ccp

AROMATIC GC (FID)

Sh/Clst: brn gy

Reported on 31-AUG-1992 at 05.24

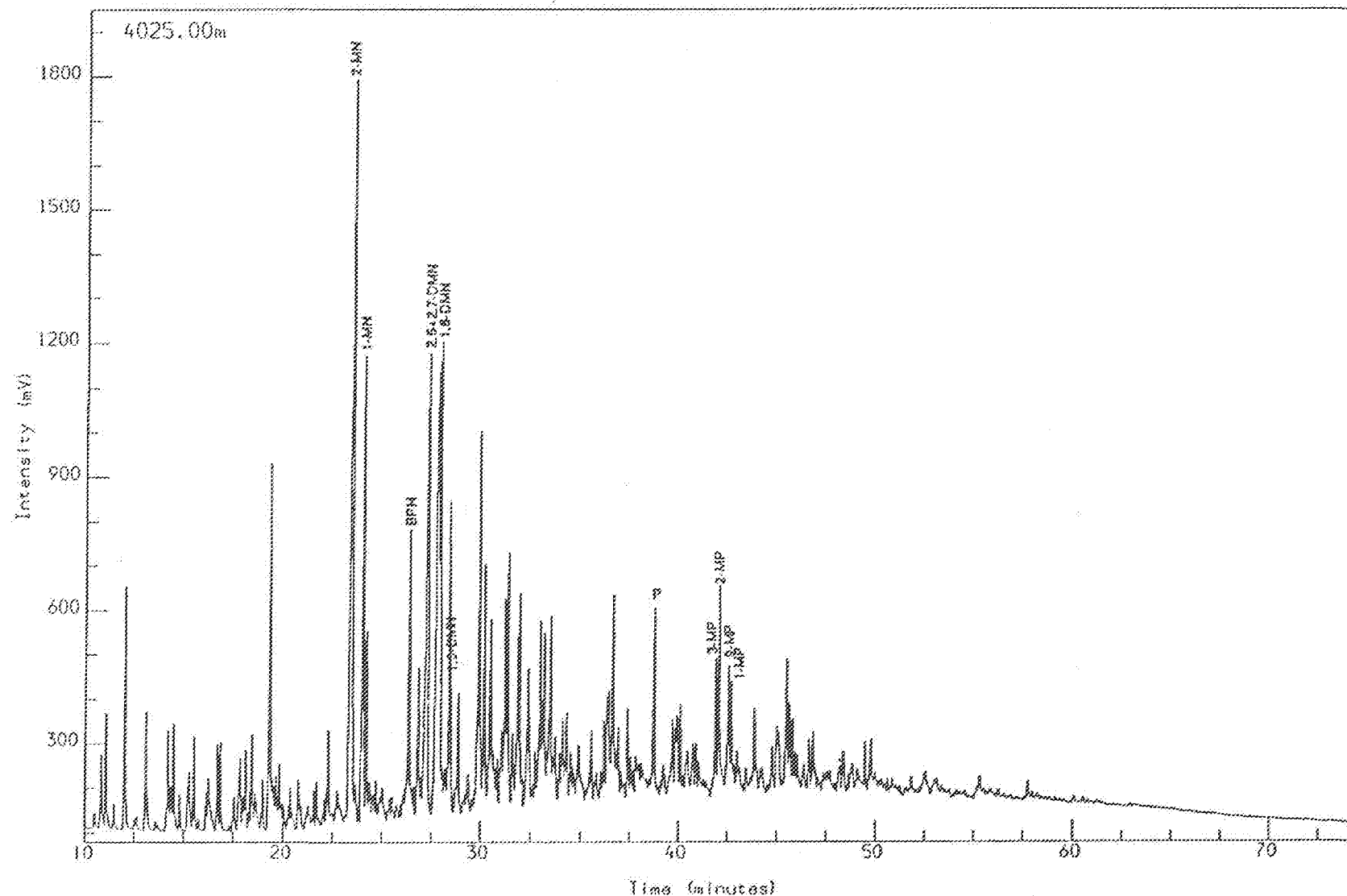
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 AH4700610B.8.1.

Multichrom



WELL NOCS 34/10-35 4015-4025m
AROMATIC GC (FID) DST 3

Reported on 24-SEP-1992 at 15:31

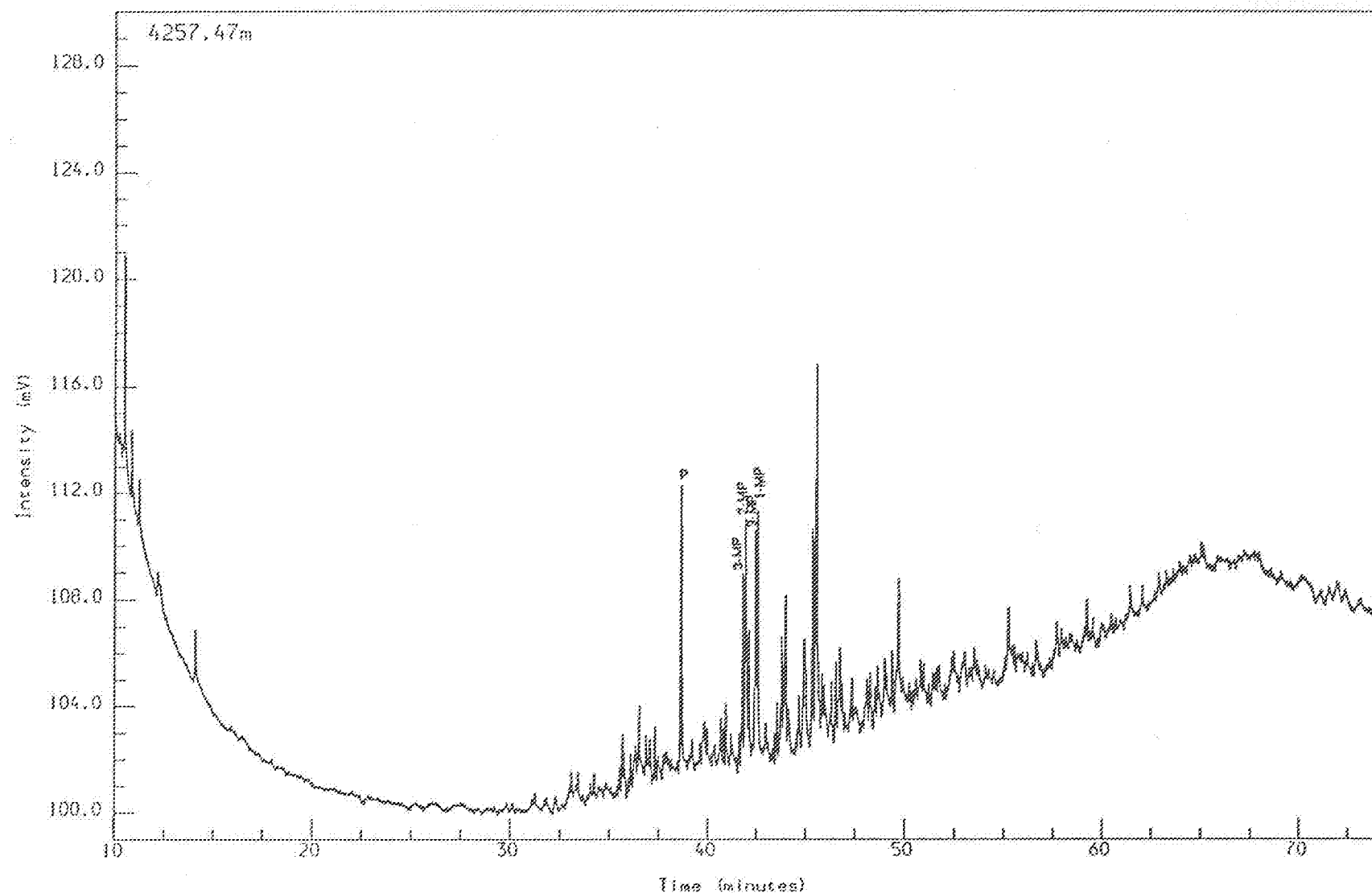
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 AG3403581L.11.1.

Multichrom



WELL NOCS 34/10-35 4257.47m ccp
AROMATIC GC (FID)
S/Sst: lt gy w to lt brn gy

Reported on 31-AUG-1992 at 05:25

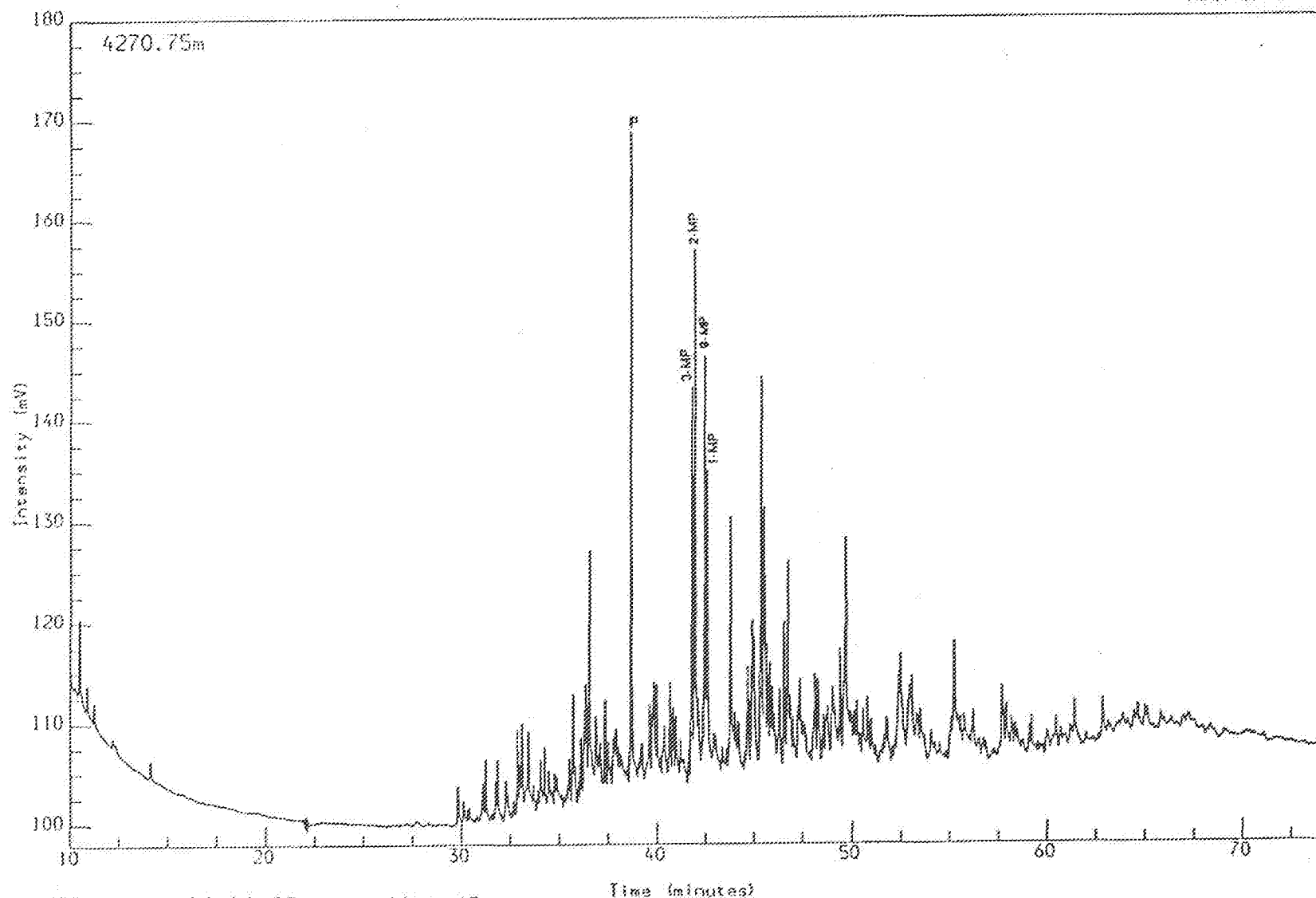
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 29 AG3403581L.12.1.

Multichrom



WELL NOCS 34/10-35 4270.75m ccp
AROMATIC GC (FID)
S/Sat: lt gy w to lt gy

Reported on 31-AUG-1992 at 05:28

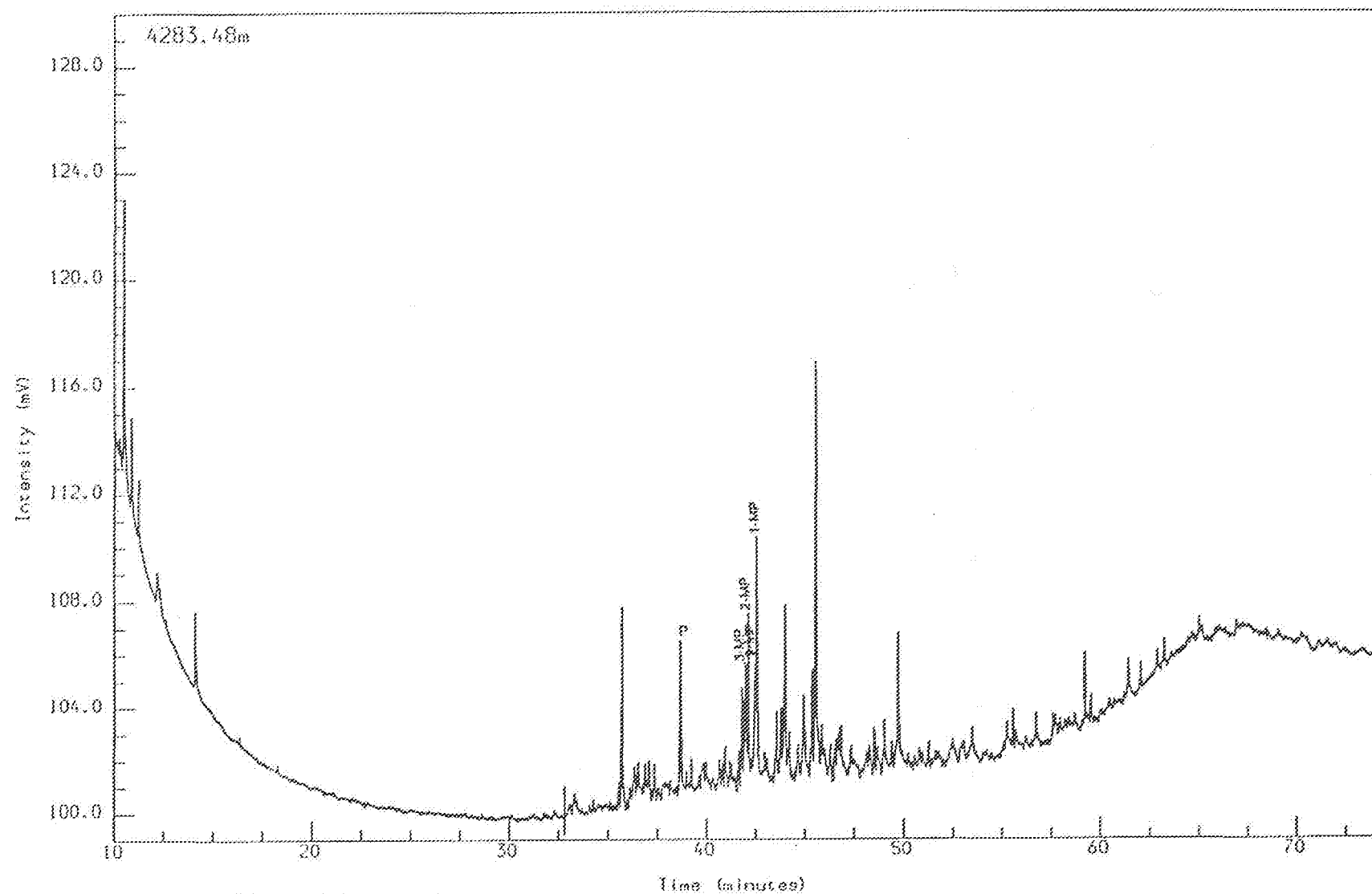
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [S26265] 29 AG3403581L,13,1.

Multichrom



WELL NOCS 34/10-35 4283.48m ccp
AROMATIC GC (FID)
S/Sst: lt gy w to lt gy

Reported on 31-AUG-1992 at 05.30

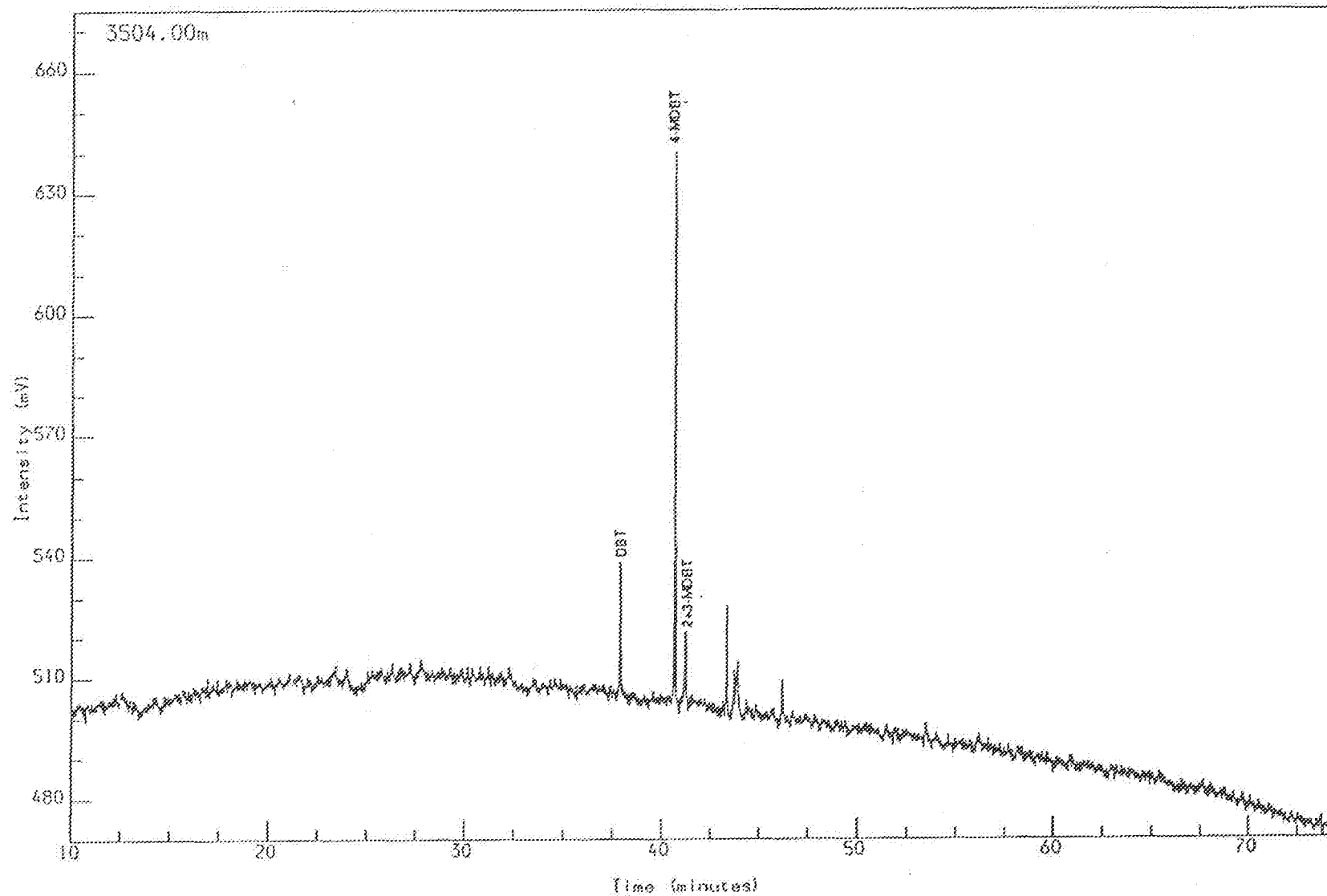
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 RH47006108.2.1.

Multichrom



WELL NOCS 34/10-35 3496-3504m
AROMATIC GC (FPD)

Reported on 31-AUG-1992 at 10.19

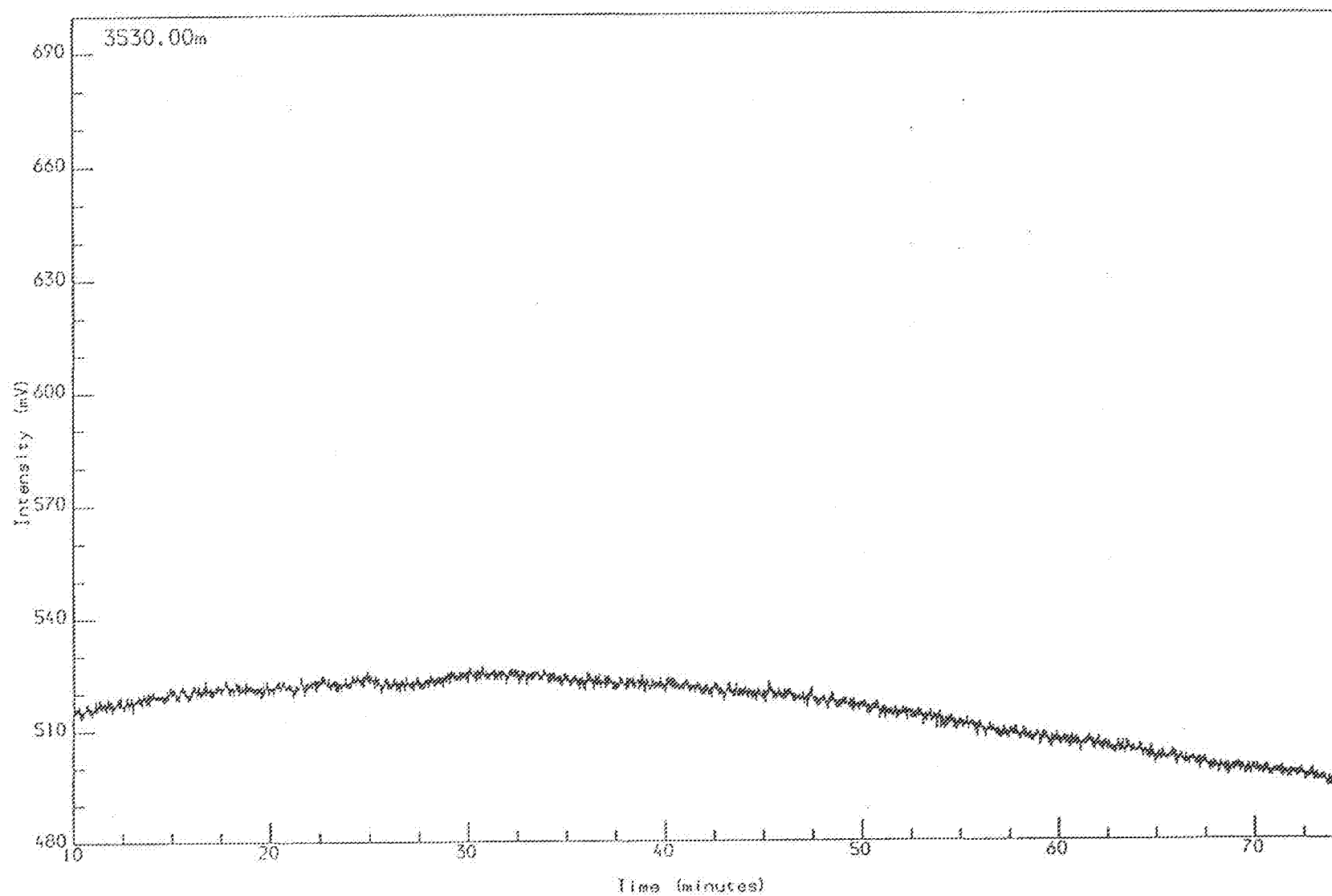
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L,3,1.

Multichrom



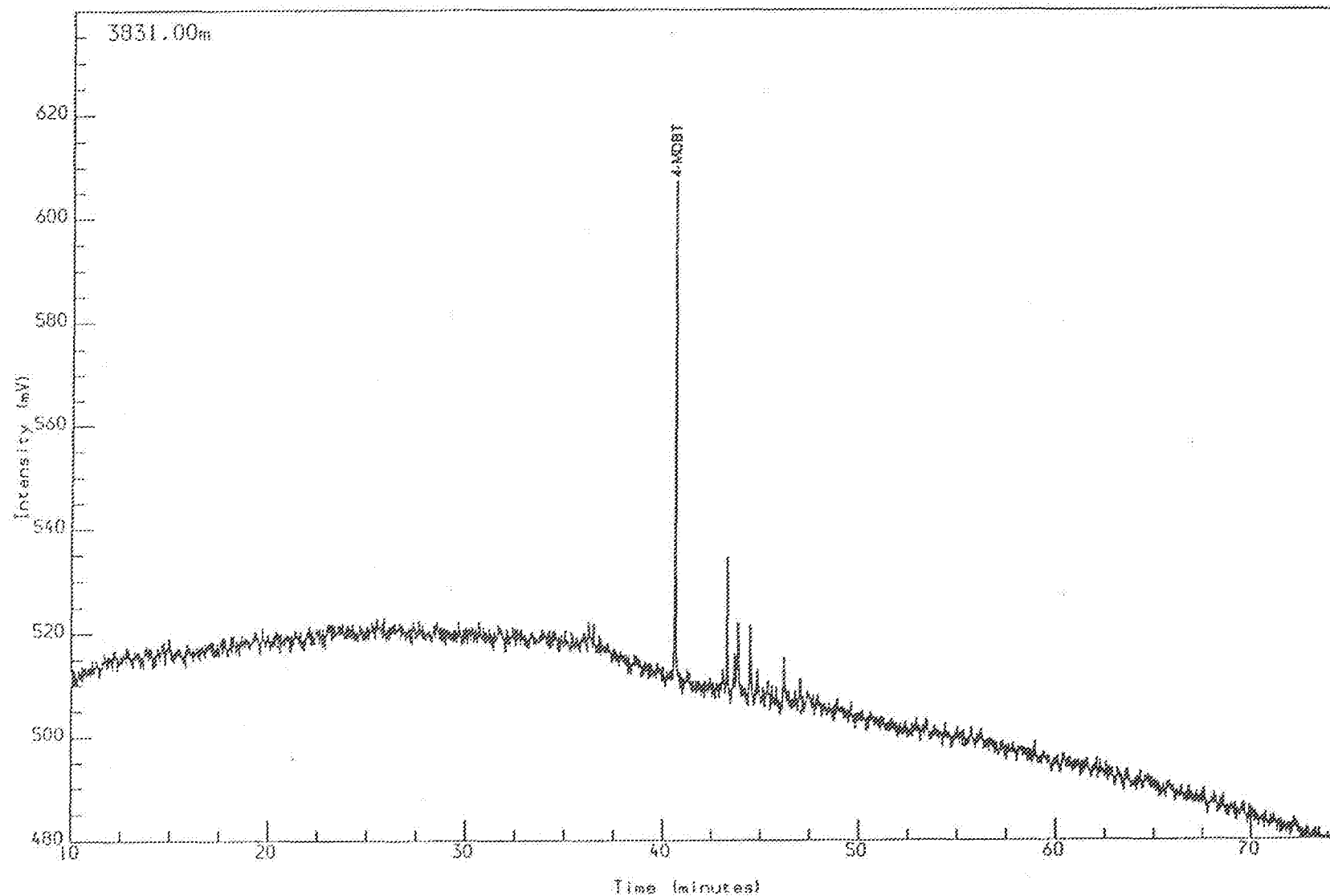
WELL NOCS 34/10-35 3530.00m cut
AROMATIC GC (FPD)
Marl: y gy to lt gy

Reported on 31-AUG-1992 at 05:33

Schlumberger

GECO-PRAKLA

GEOLAB NOR



WELL NOCS 34/10-35 3831.00m cut
 AROMATIC GC (FPD)
 Sh/C1st: m gy to drk gy

Reported on 31-AUG-1992 at 05:35

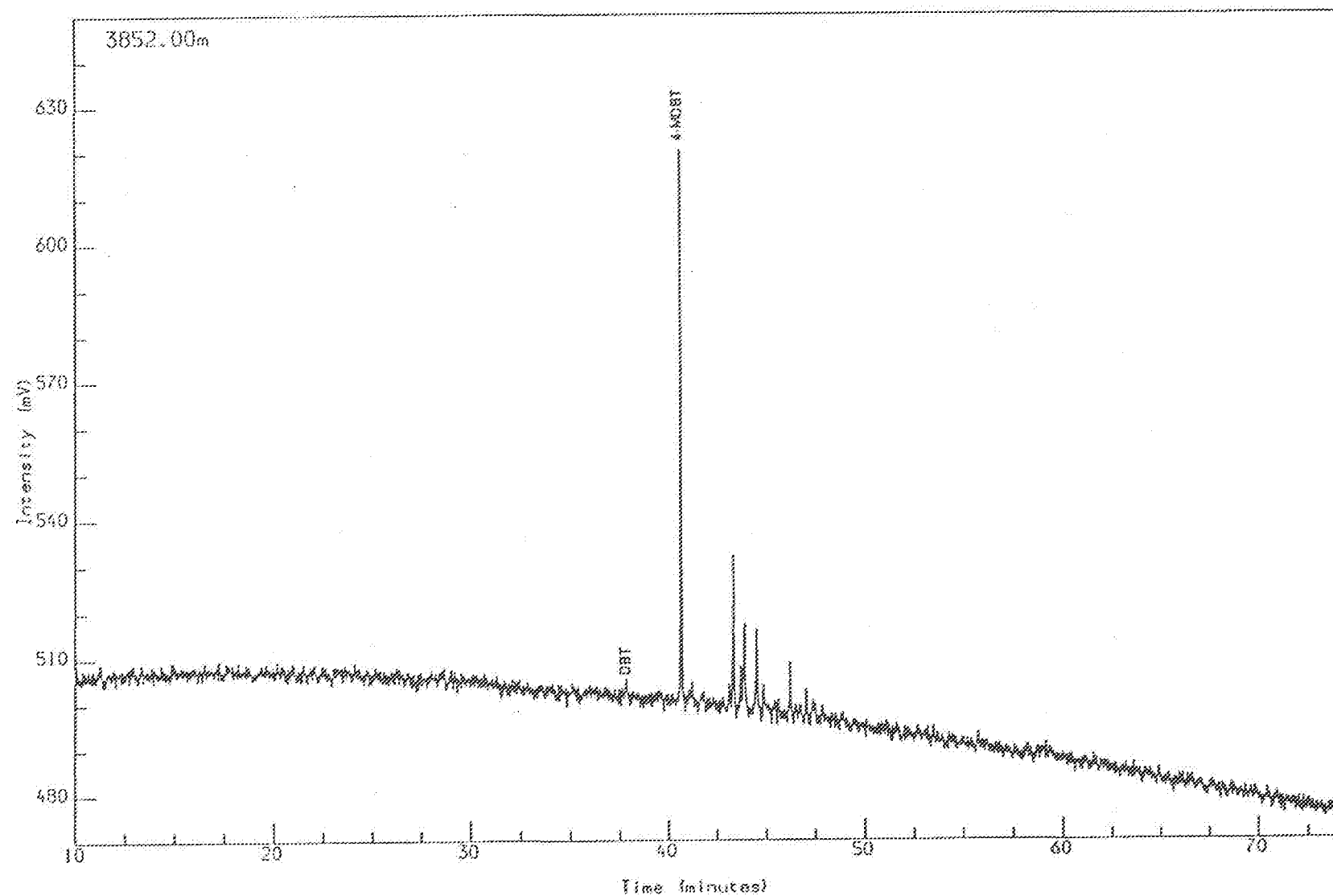
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L,5,1.

Multichrom



WELL NOCS 34/10-35 3852.00m cut
AROMATIC GC (FPD)
Sh/Clst: drk gy to brn blk

Reported on 23-SEP-1992 at 08:29

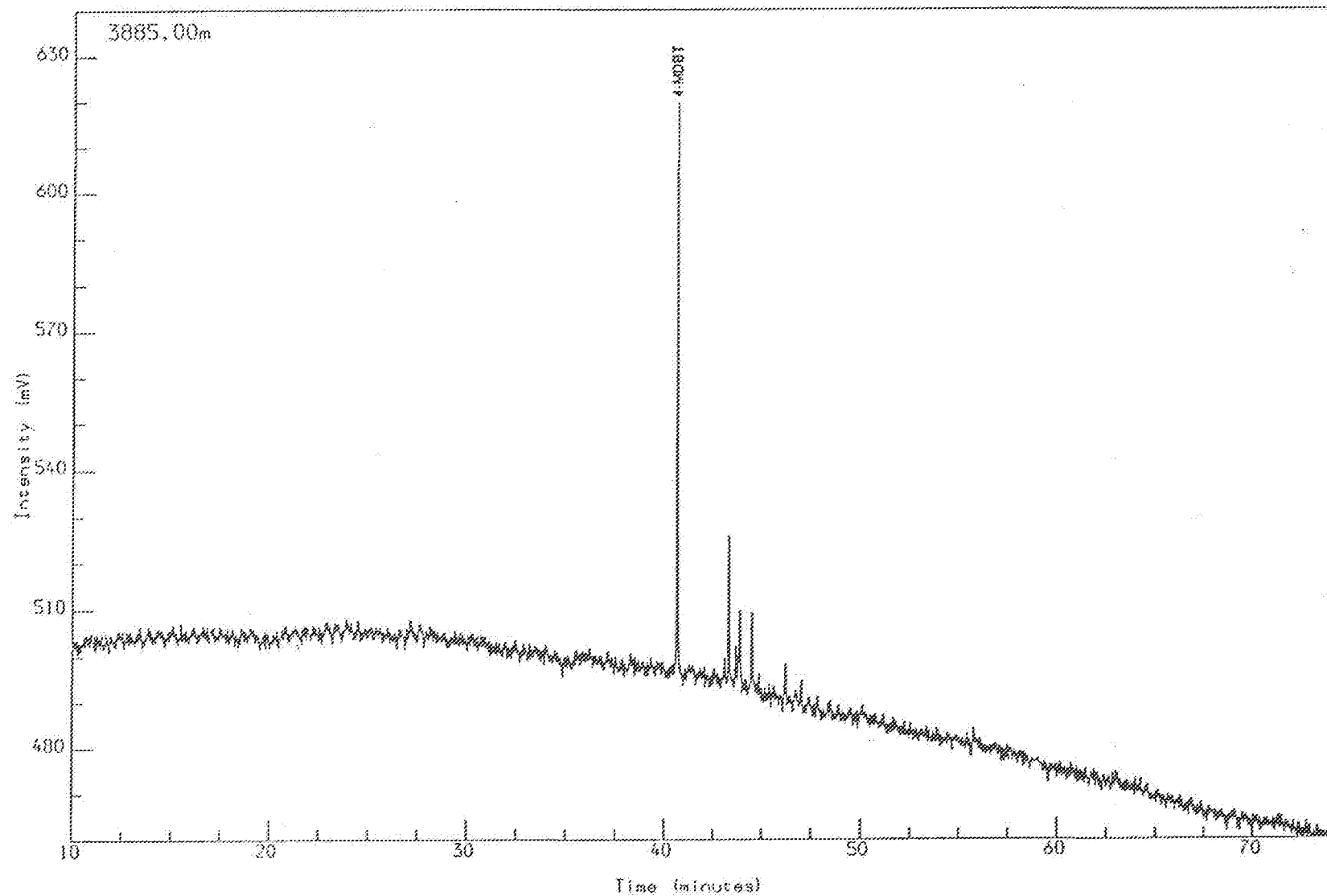
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AH4700572L.2.1.

Multichrom



WELL NOCS 34/10-35 3885.00m cut
AROMATIC GC (FPD)
Sh/Cist: m gy to drk gy

Reported on 23-SEP-1992 at 09:02

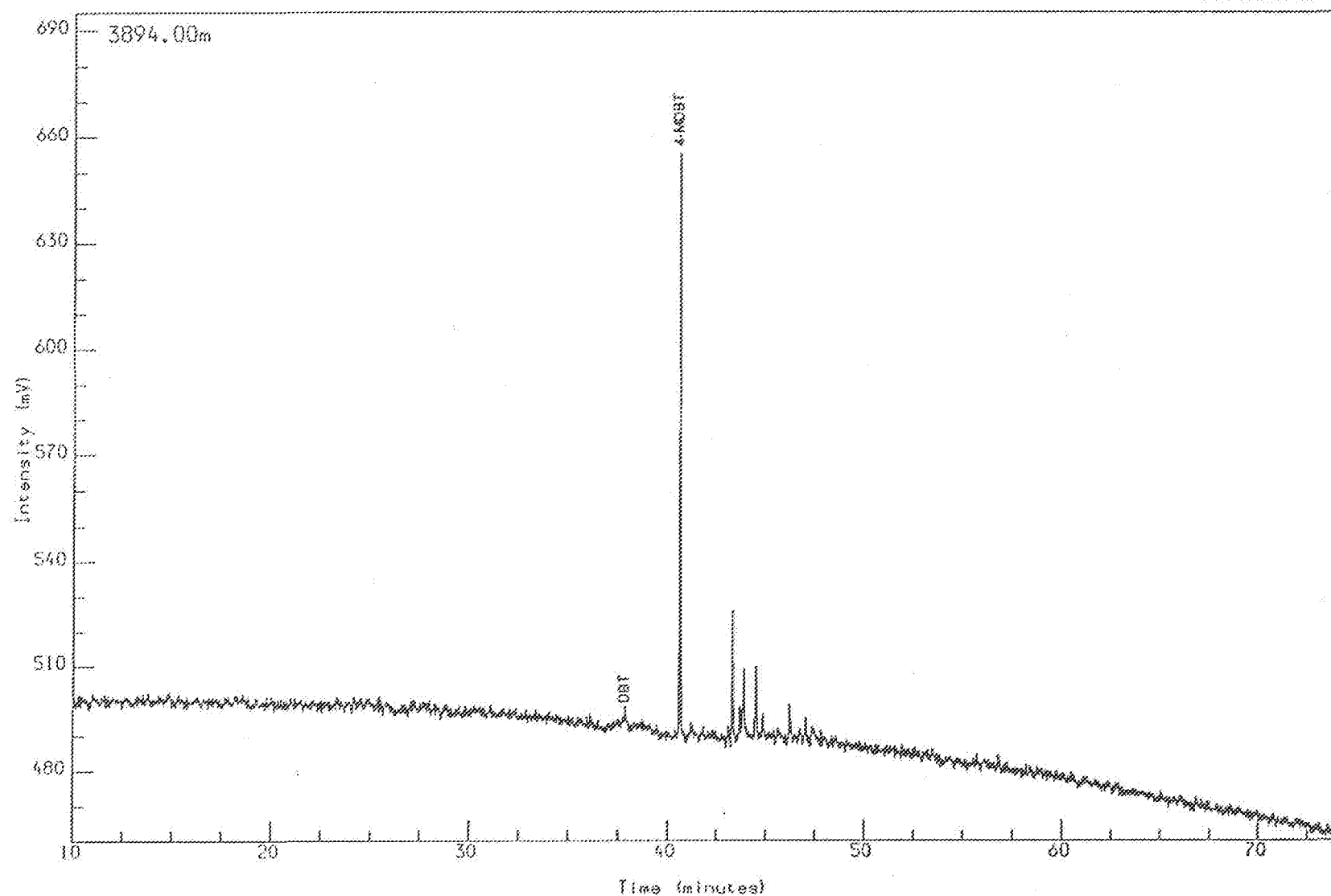
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : (526265) 30 AH4700572L,3,1.

Multichrom



WELL NOCS 34/10-35 3894.00m cut
AROMATIC GC (FPD)
Sh/Clst: m gy to drk gy

Reported on 23-SEP-1992 at 09:05

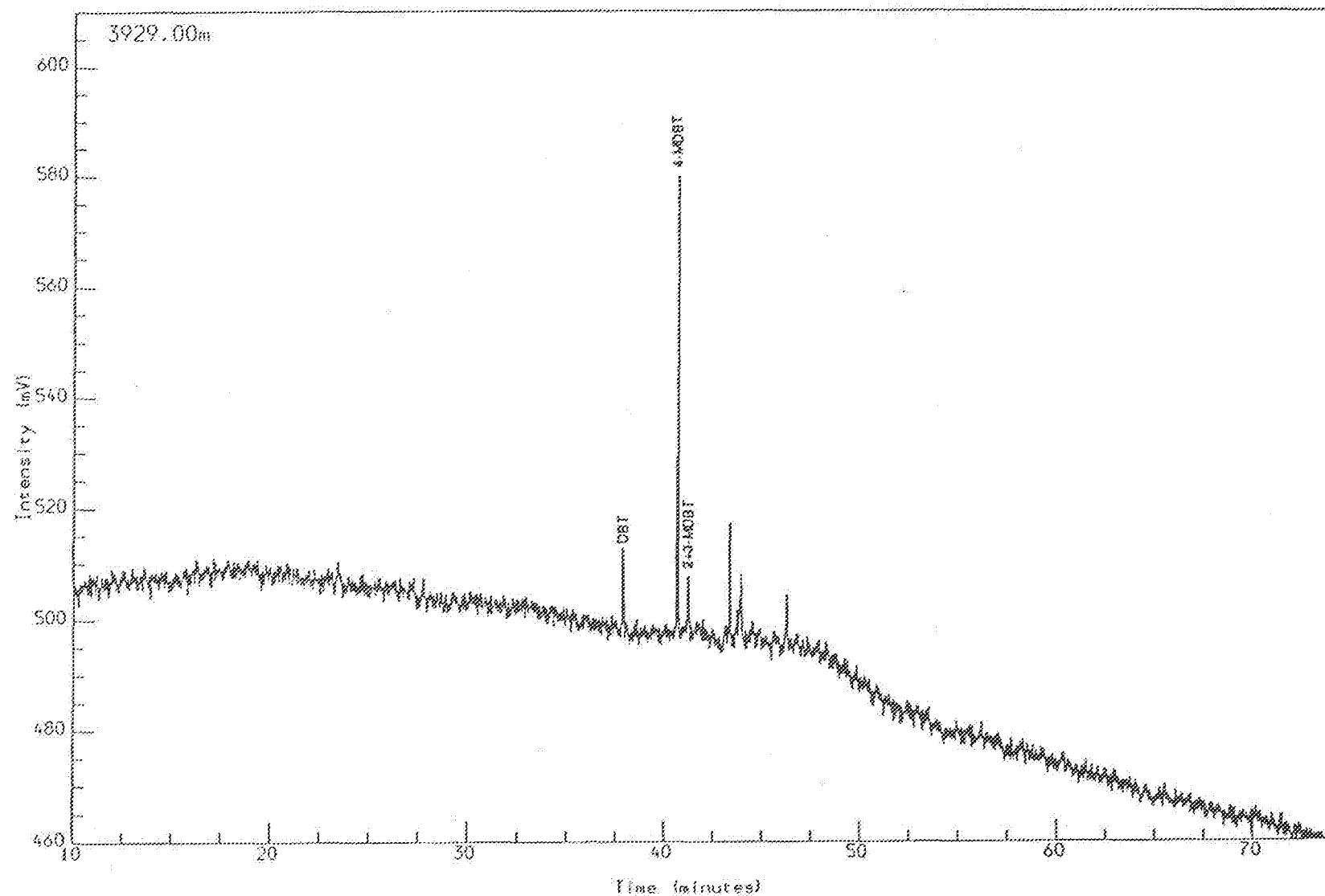
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AH4700610B,3,1.

Multichrom



WELL NOCS 34/10-35 3920-3929m
AROMATIC GC (FPD) DST 3

Reported on 31-AUG-1992 at 10:23

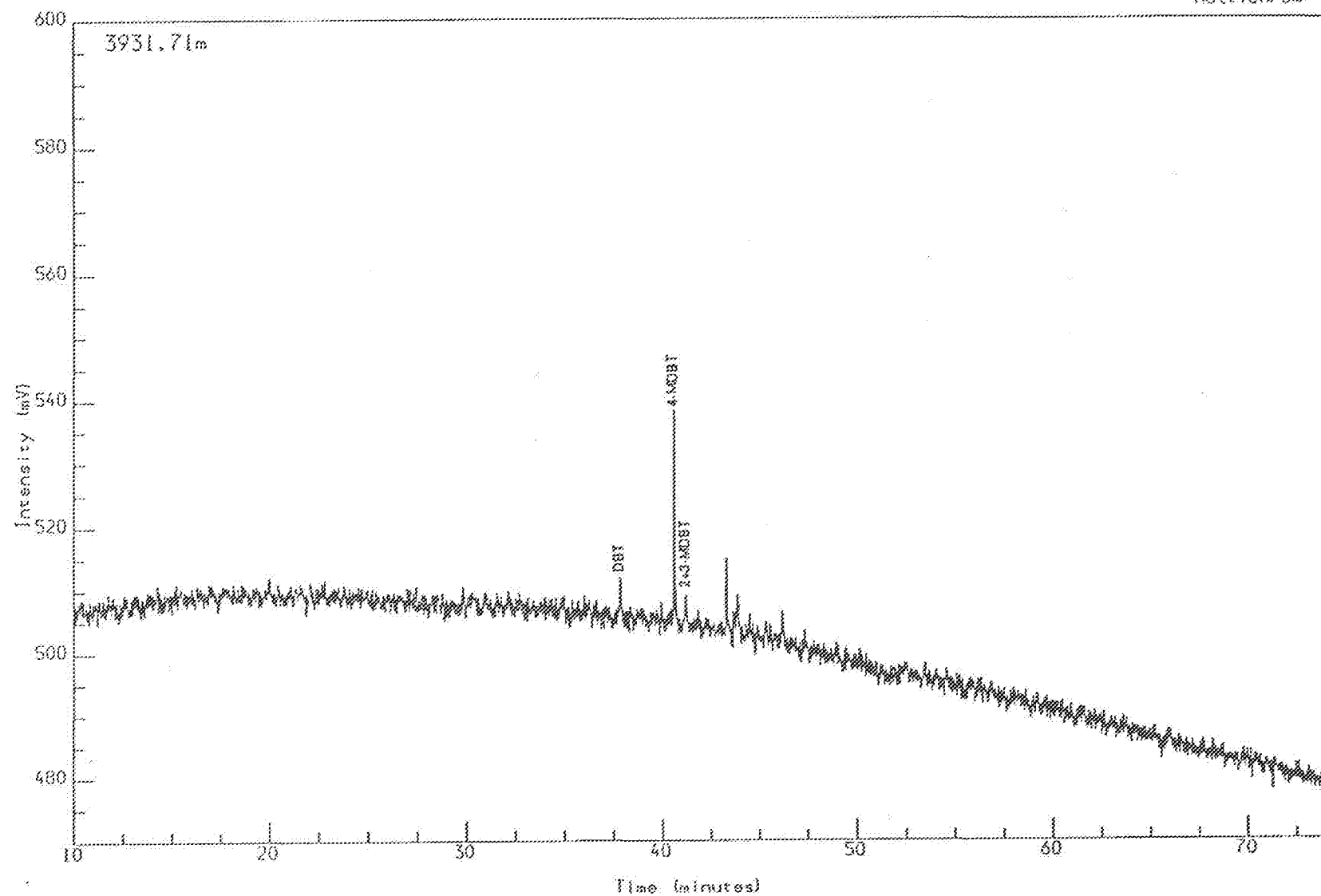
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L,6.1.

Multichron



WELL NOCS 34/10-35
AROMATIC GC (FPD)
S/Sst: pl y brn

3931.71m ccp

Reported on 23-SEP-1992 at 08.32

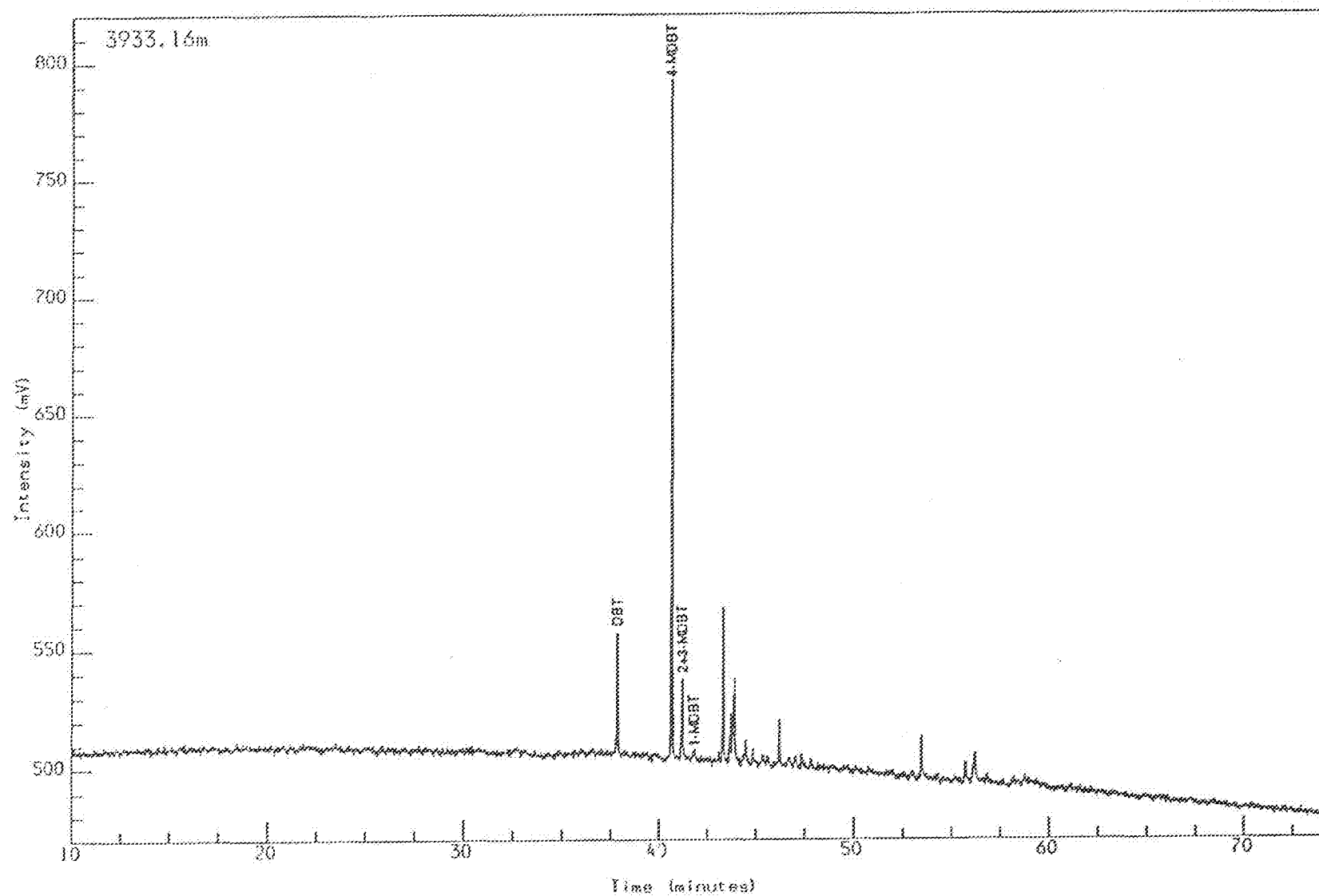
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L.7.1.

Multichrom



WELL NOCS 34/10-35 3933.16m ccp
AROMATIC GC (FPD)
S/Sst: gy w to pl y brn

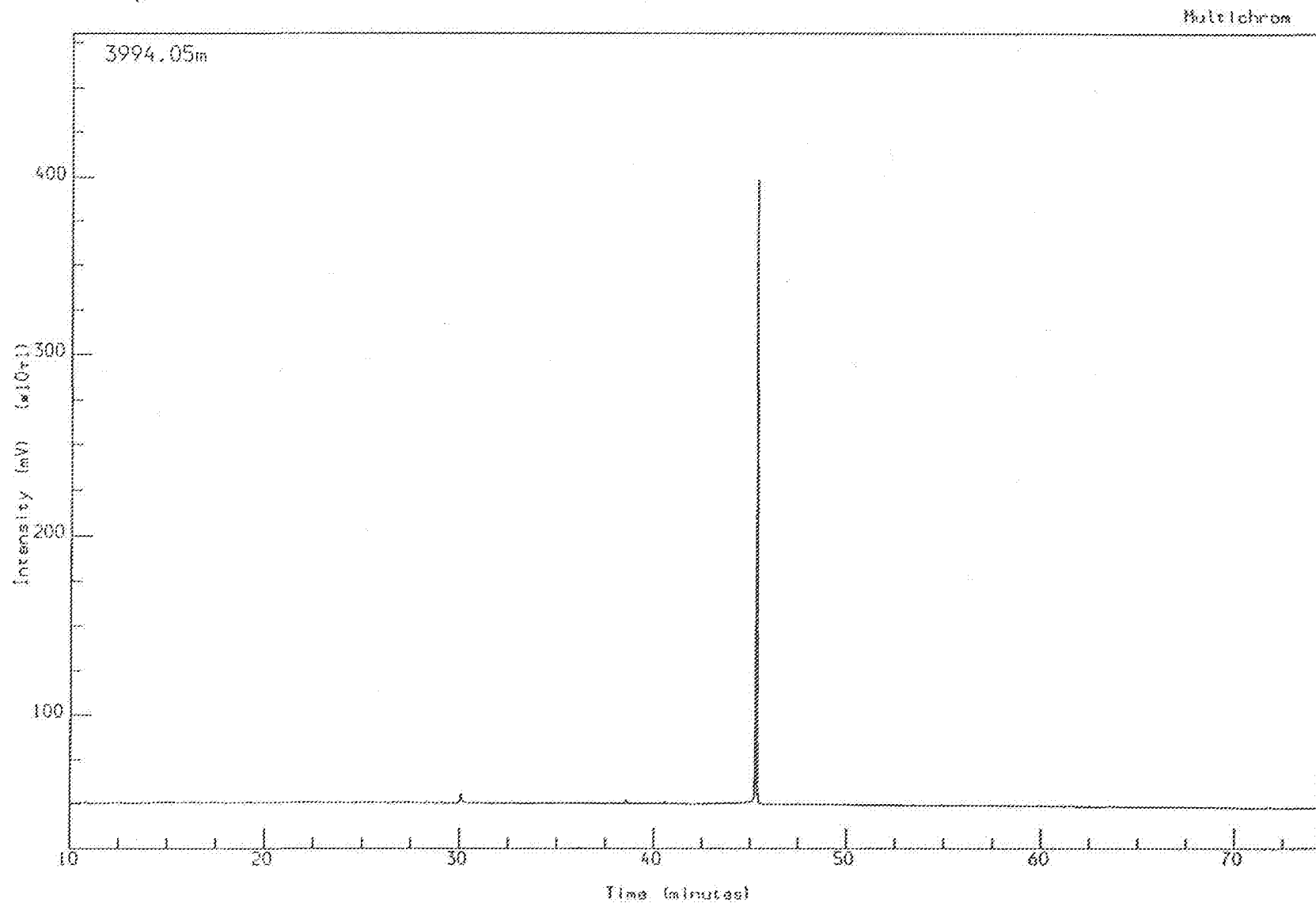
Reported on 23-SEP-1992 at 08.36

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L,8,1.



WELL NOCS 34/10-35 3994.05m ccp
AROMATIC GC (FPD)
S/Sst: gy w to lt brn gy to brn gy

Reported on 23-SEP-1992 at 08.42

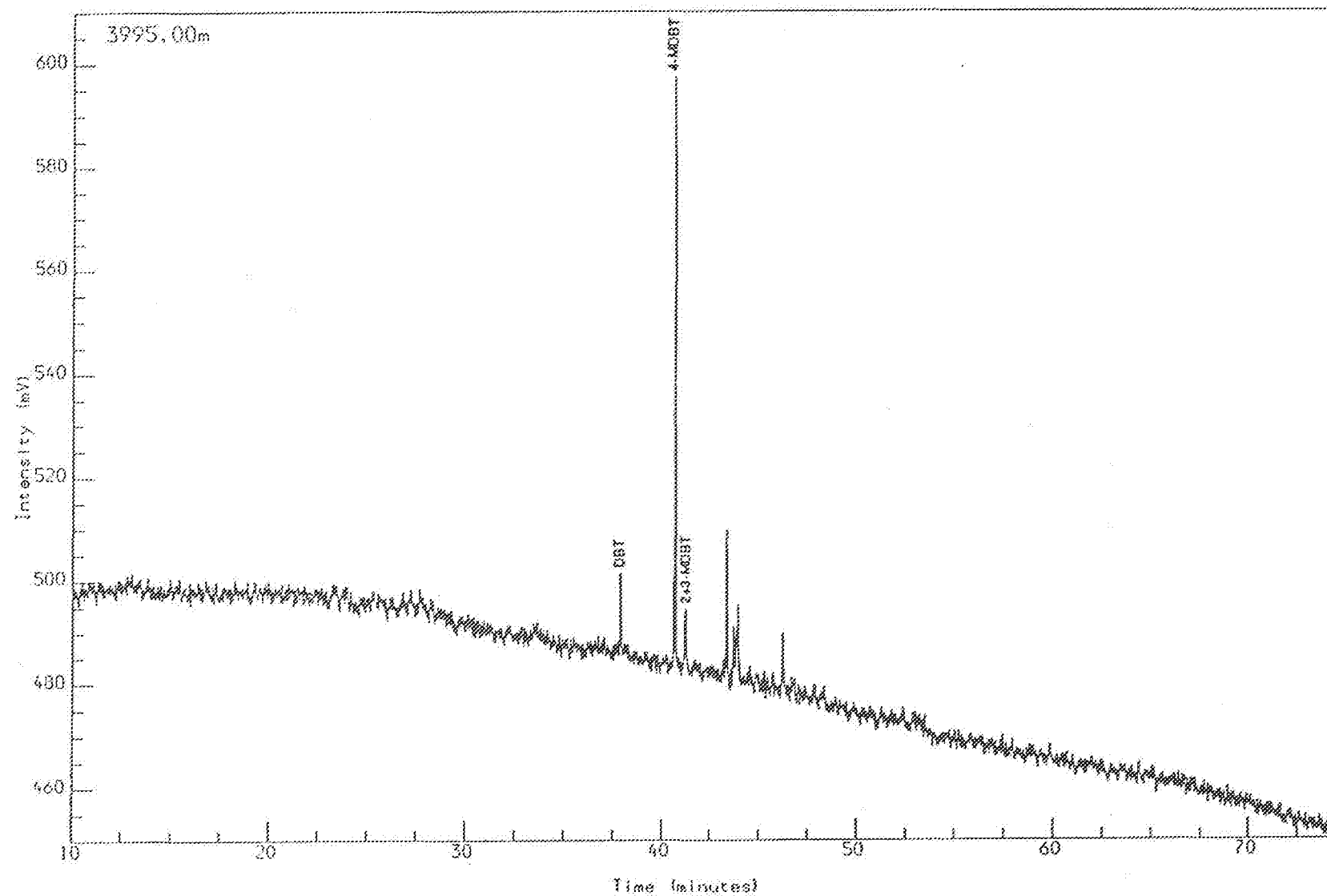
Schlumberger

GECO-PRAKLA

GEOLAB  NOR

Analysis Name : [526265] 30 RH4700610B,4,1.

Multichrom



WELL NOCS 34710-35 3984-3995m
AROMATIC GC (FPD) DST 2

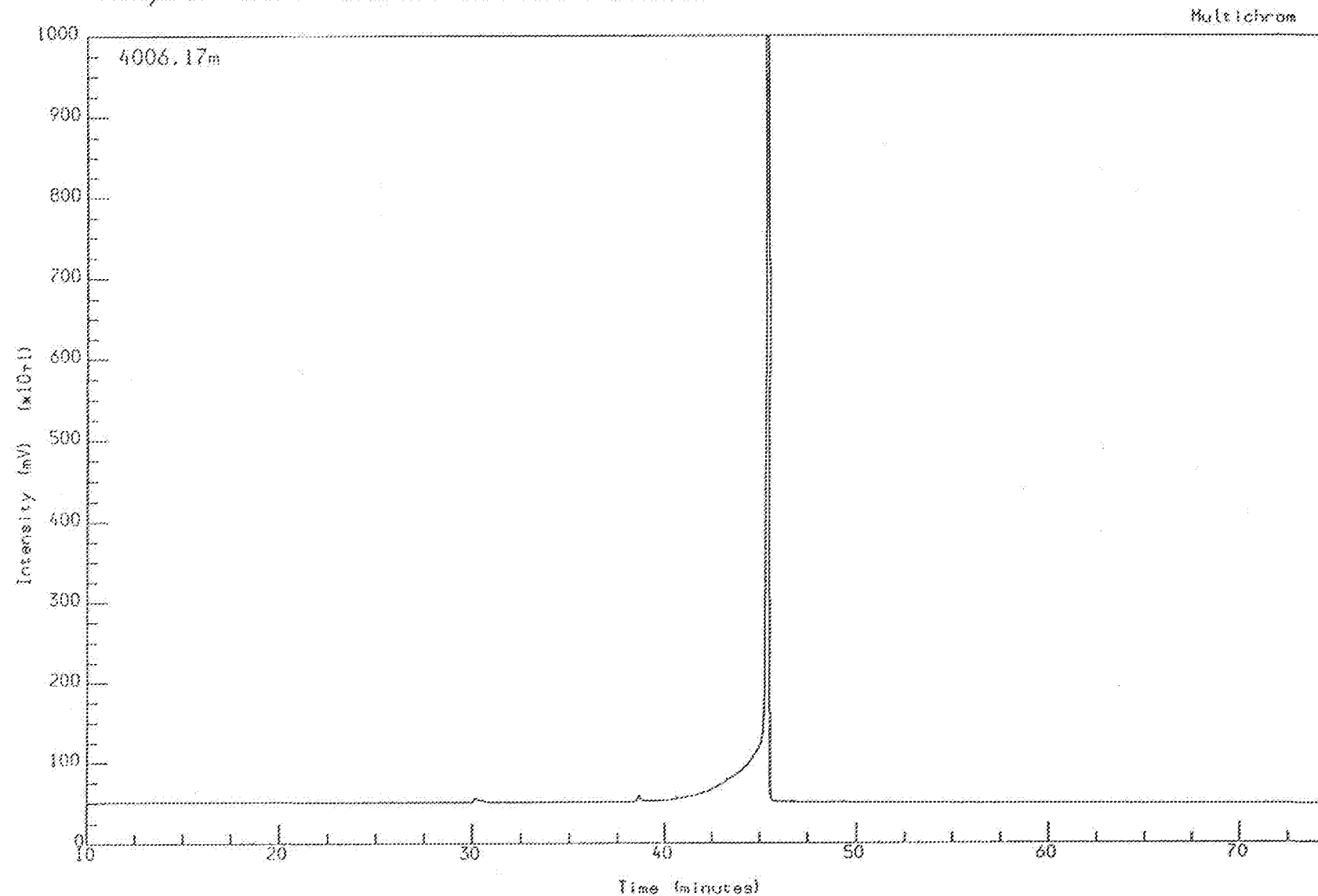
Reported on 31-AUG-1992 at 10:48

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L.9.1.



WELL NOCS 34/10-35 4006.17m ccp
AROMATIC GC (FPD)
S/Sst: gy w to brn gy to dsk brn

Reported on 23-SEP-1992 at 08:45

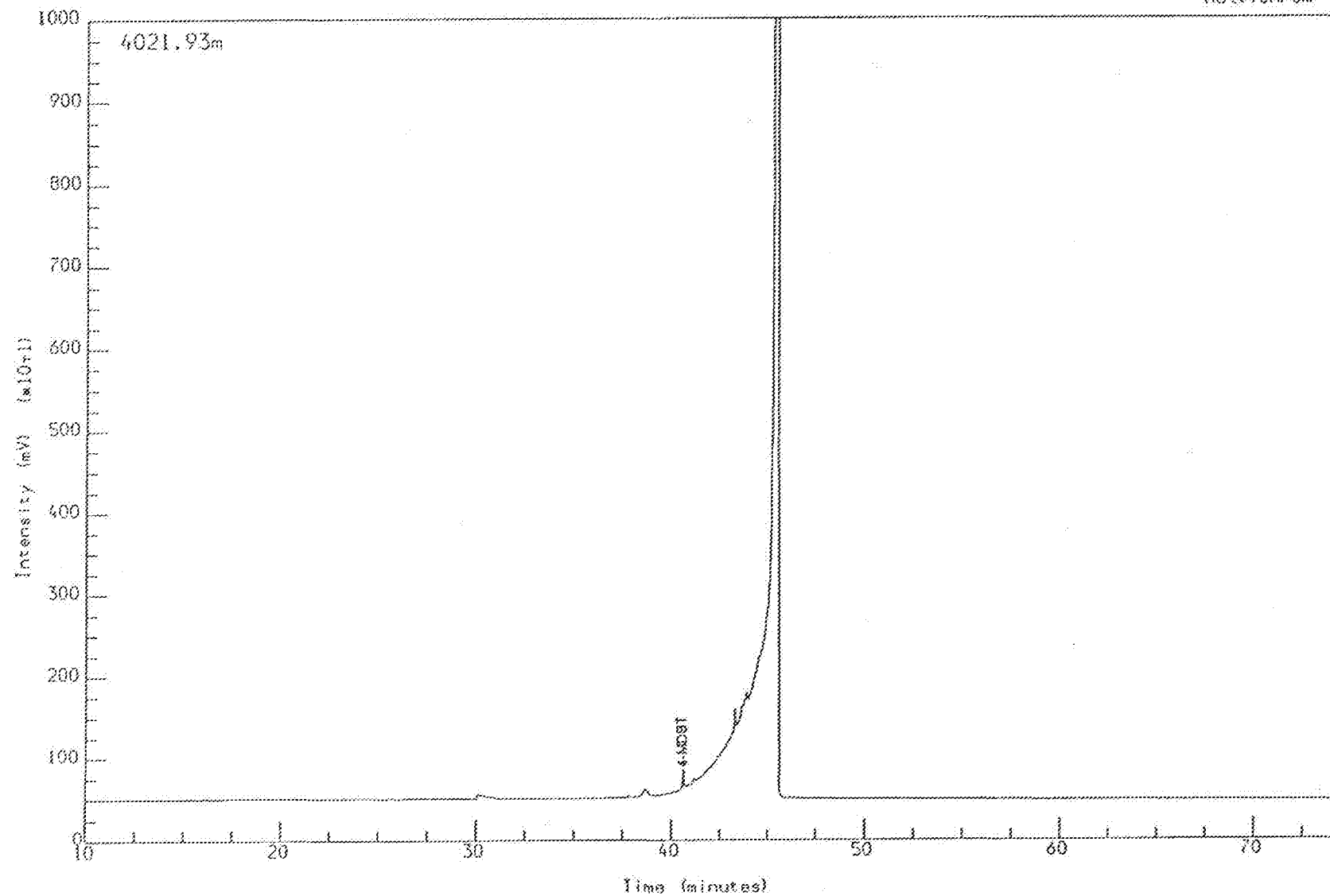
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [S26265] 30 AG3403581L,10,1.

Multichrom



WELL NOCS 34/10-35
AROMATIC GC (FPD)
Sh/Cls: brn gy

4021.93m ccp

Reported on 23-SEP-1992 at 08.46

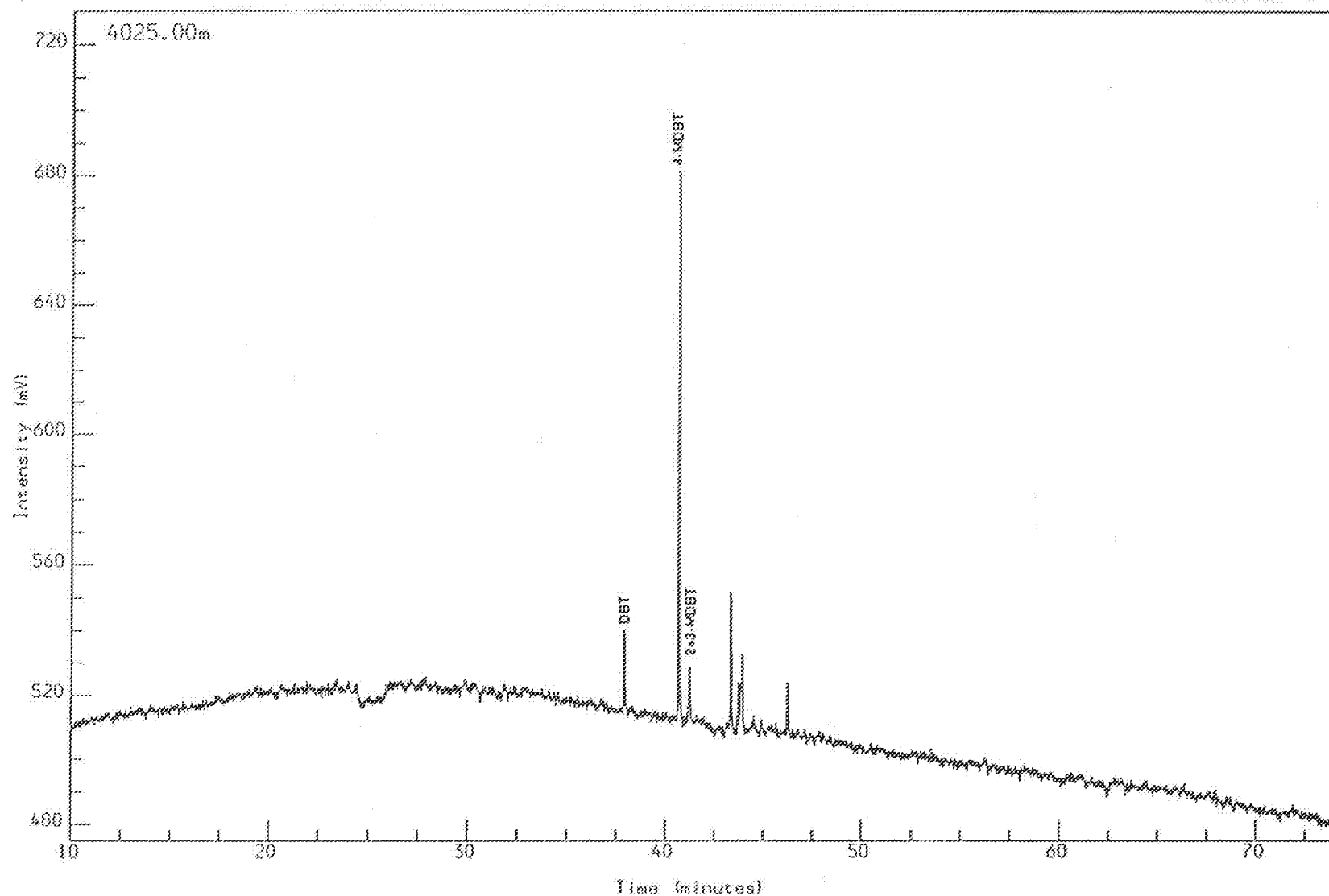
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 RH47006108,8.1.

Multichrom



WELL NDCS 34/10-35 4015-4025m
AROMATIC GC (FPD) DST 1

Reported on 24-SEP-1992 at 15:38

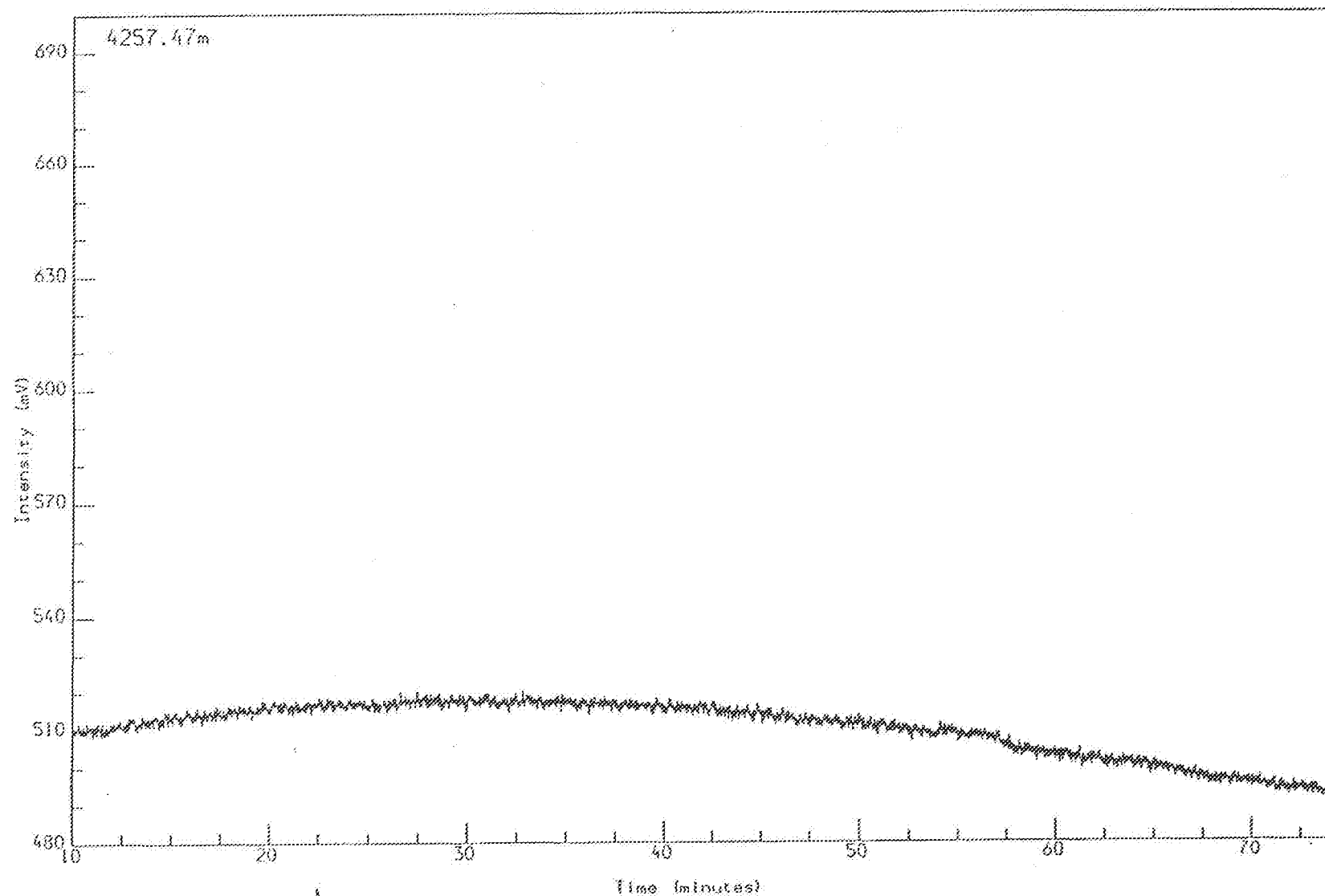
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG3403581L.11.1.

Multichrom



WELL NOCS 34/10-35 4257.47m ccp
AROMATIC GC (FPD)
S/Sst: lt gy w to lt brn gy

Reported on 23-SEP-1992 at 08:47

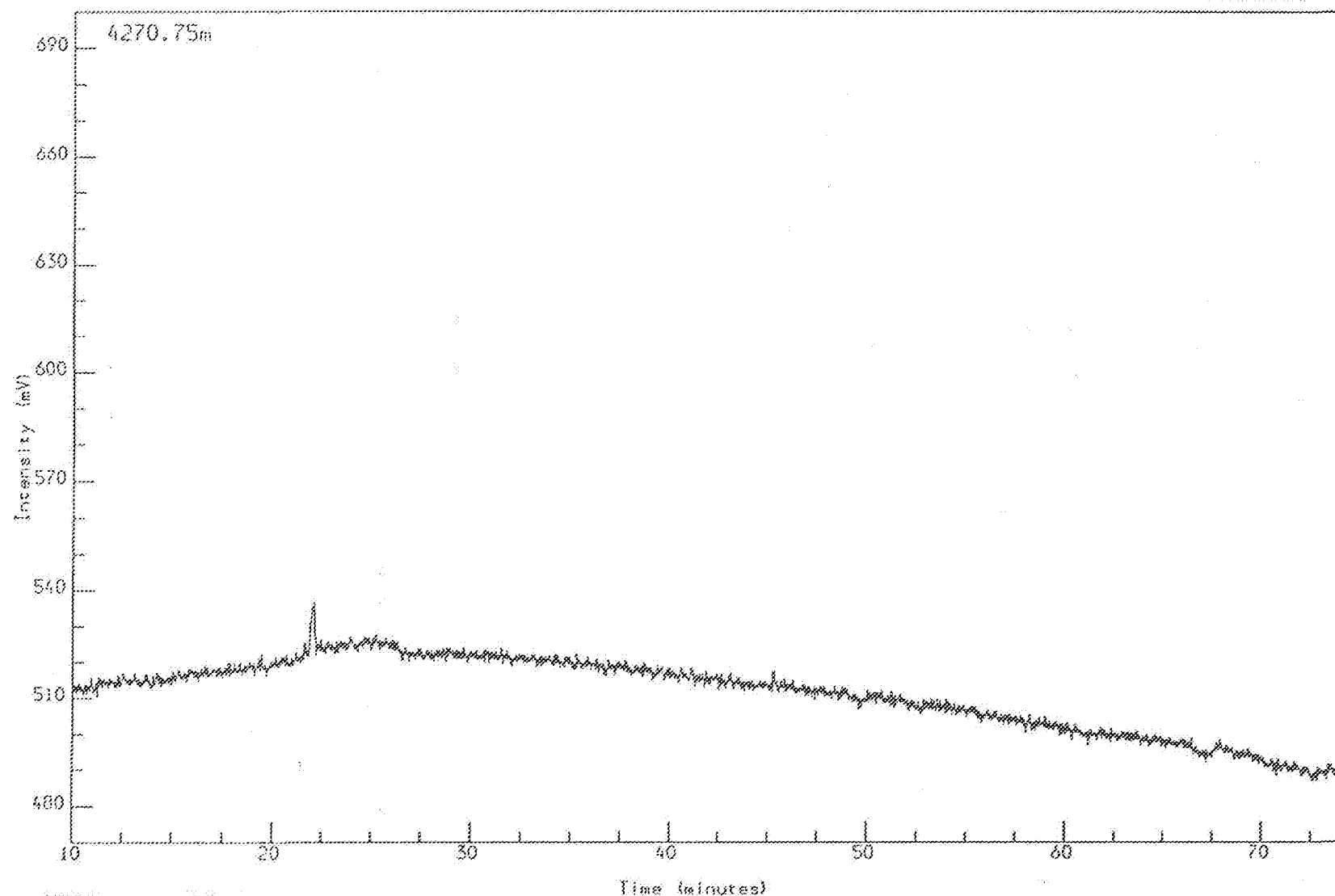
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 30 AG340358[L,12,1.

Multichrom



WELL NOCS 34/10-35 4270.75m ccp
AROMATIC GC (FPD)
S/Sst: 1t gy w to 1t gy

Reported on 23-SEP-1992 at 08.49

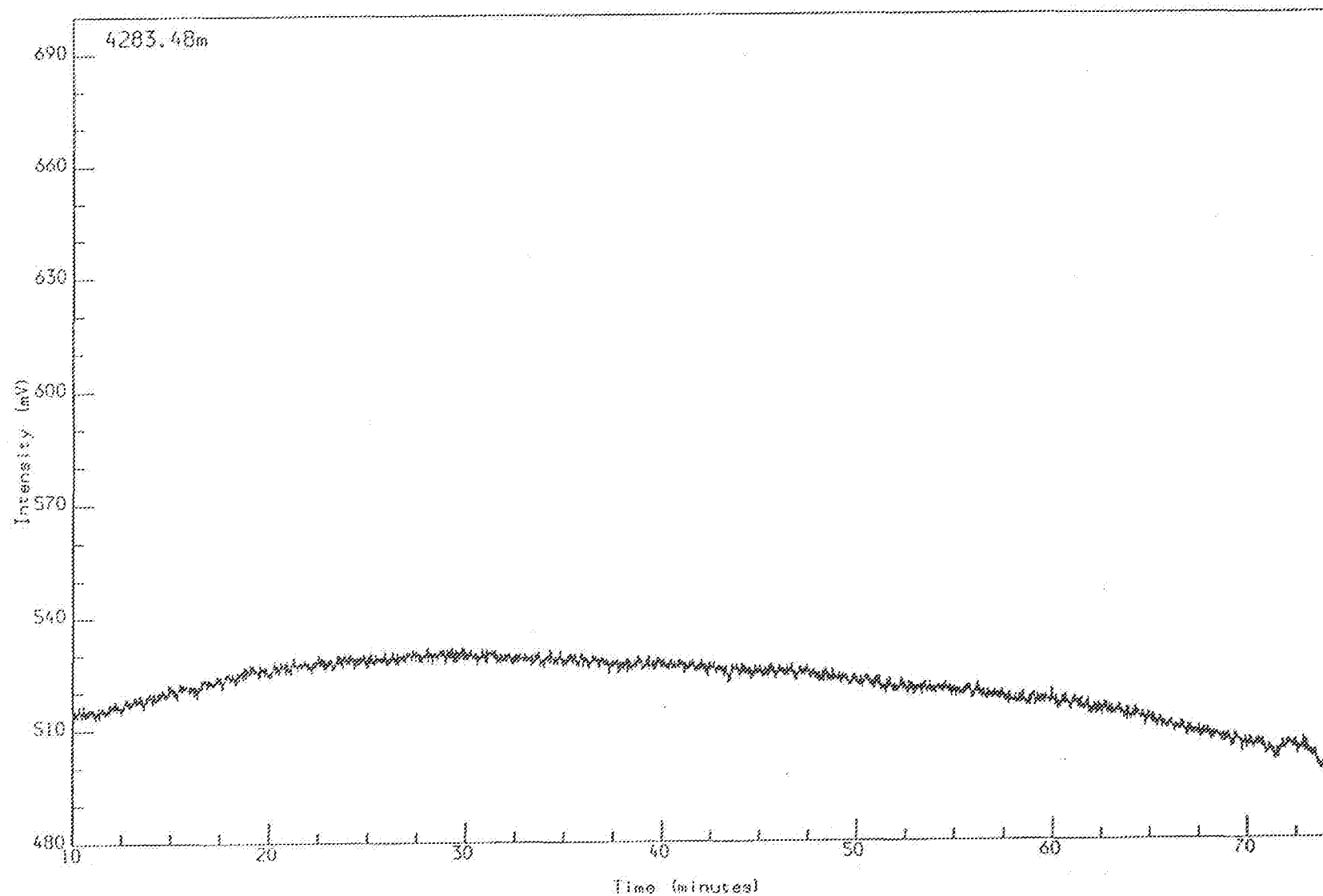
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [S26265] 30 AG3403581L.13.1.

Multichrom



WELL NOCS 34/10-35 4283.48m ccp
AROMATIC GC (FPD)
S/Sst: 1t gy w to 1t gy

Reported on 23-SEP-1992 at 08:52

Schlumberger

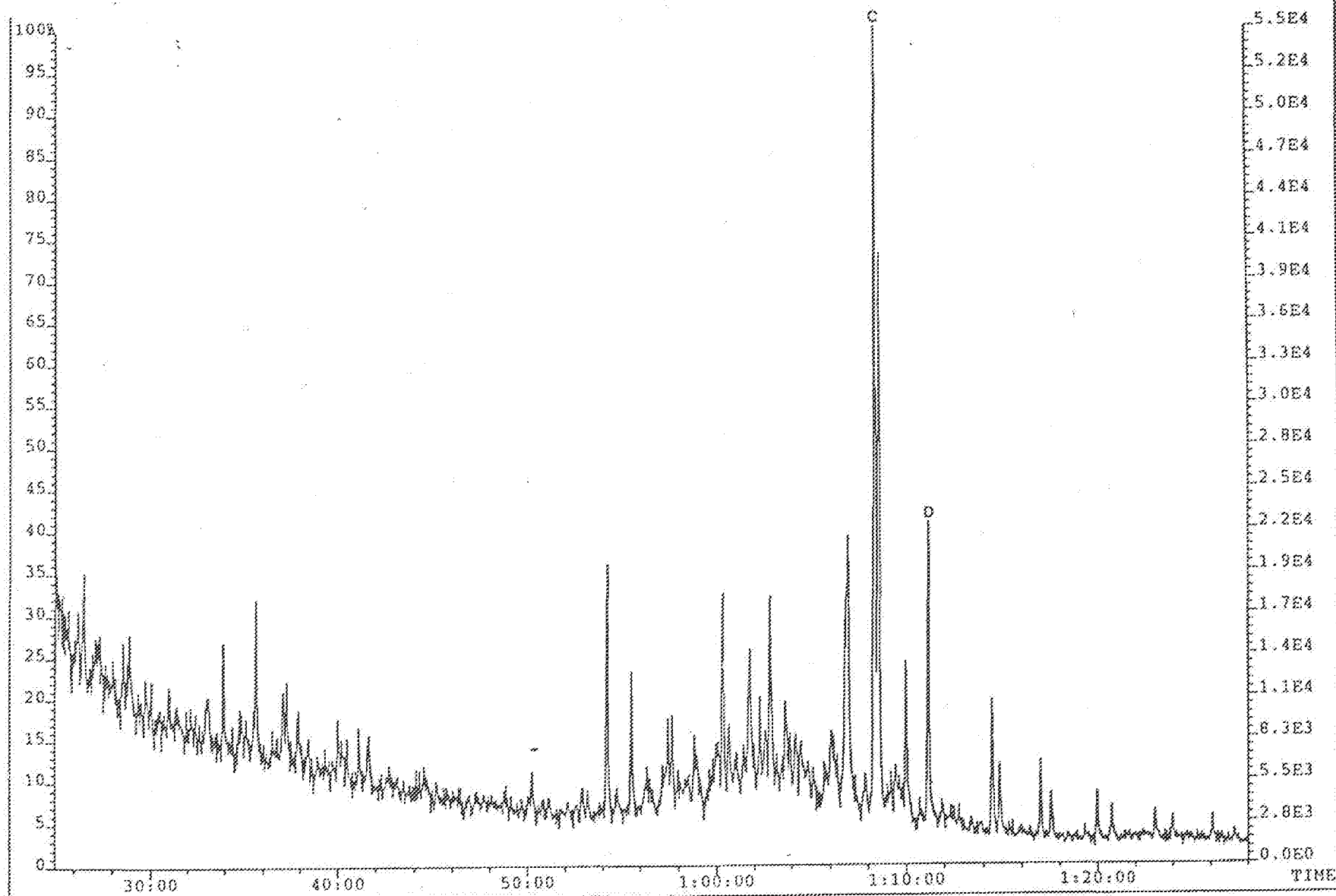
GECO-PRAKLA

GEO LAB NOR

APPENDIX 4:

**GAS CHROMATOGRAPHY-MASS
SPECTROMETRY, FRAGMENTOGRAMS**

EXAMPLE OF PEAK IDENTIFICATION FOR M/Z 177 DEMETHYLATED TRITERPANES

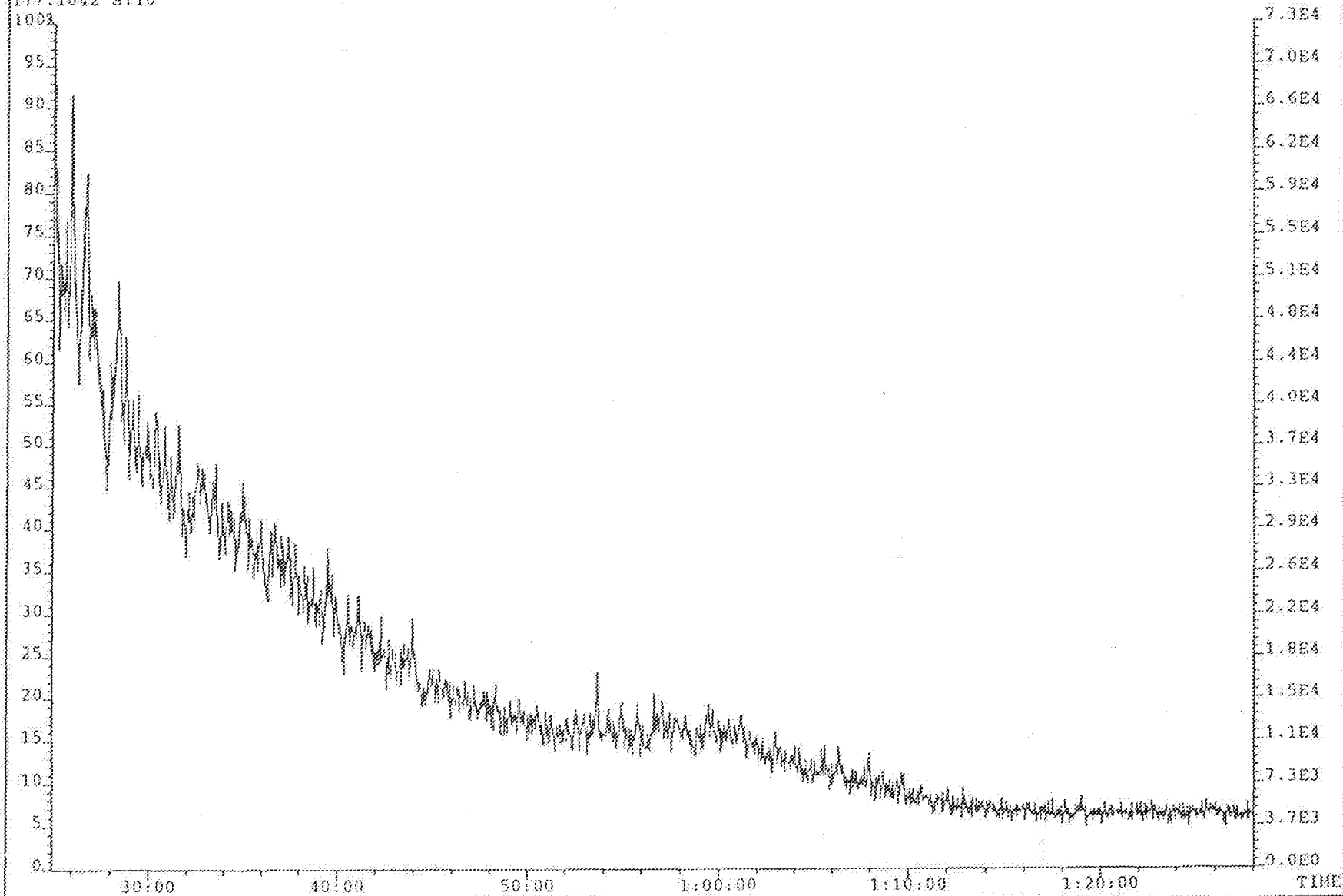


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSATJ #1-4739 Acq:23-SEP-1992 13:30:02 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, OLJE OVER MUD, 3496-3504M, SAT. FRAC. FROM OIL Exp:SAT1
177.1642 S:10



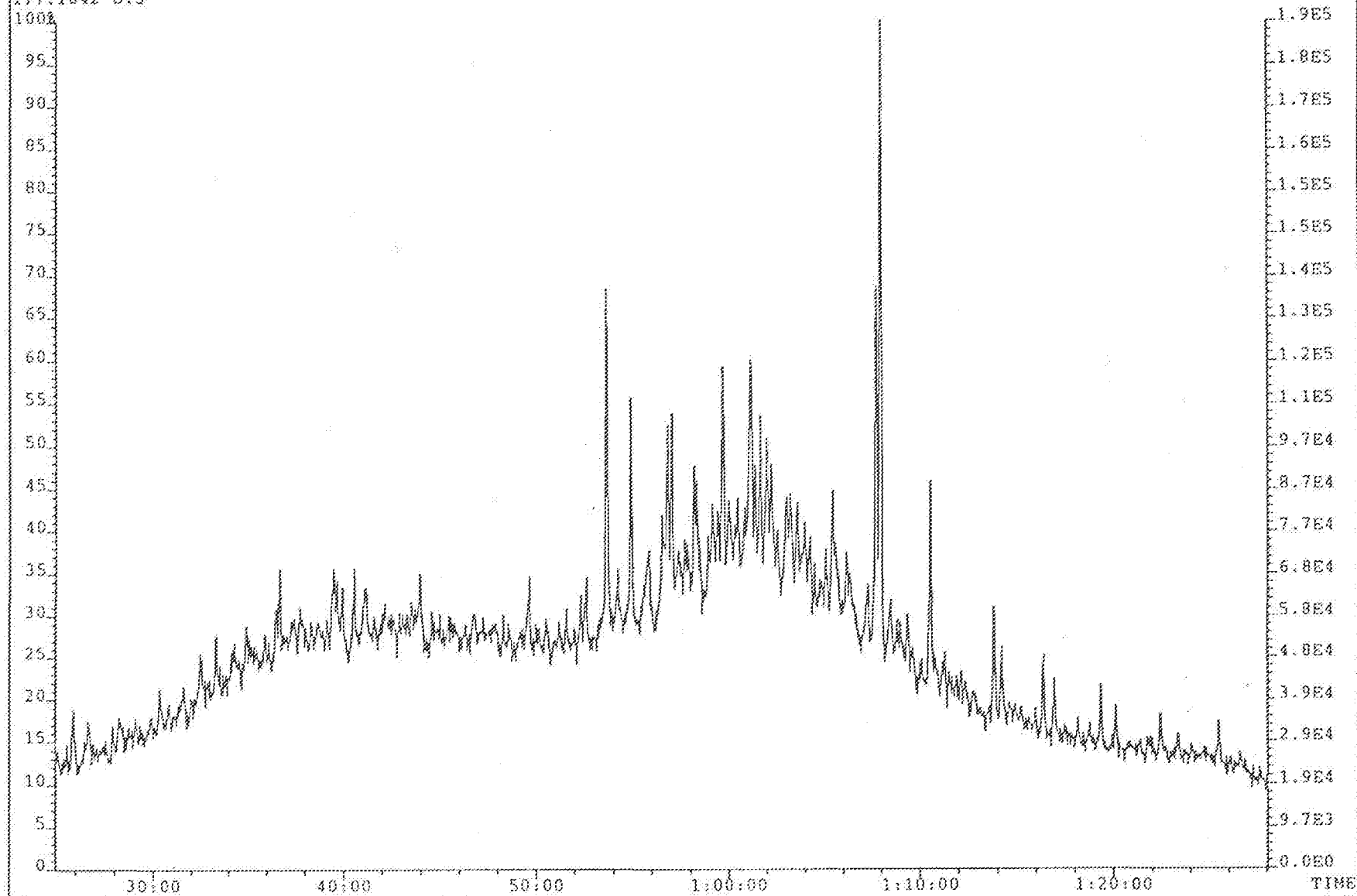
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: SATSAT2 #1-4739 Acq: 22-SEP-1992 14:23:15 BI+ Magnet SIR
Sample#3 Text: WELL 34/10-35, 3510M, SATURATED FRACTION
177.1642 S:3

Exp: SAT1



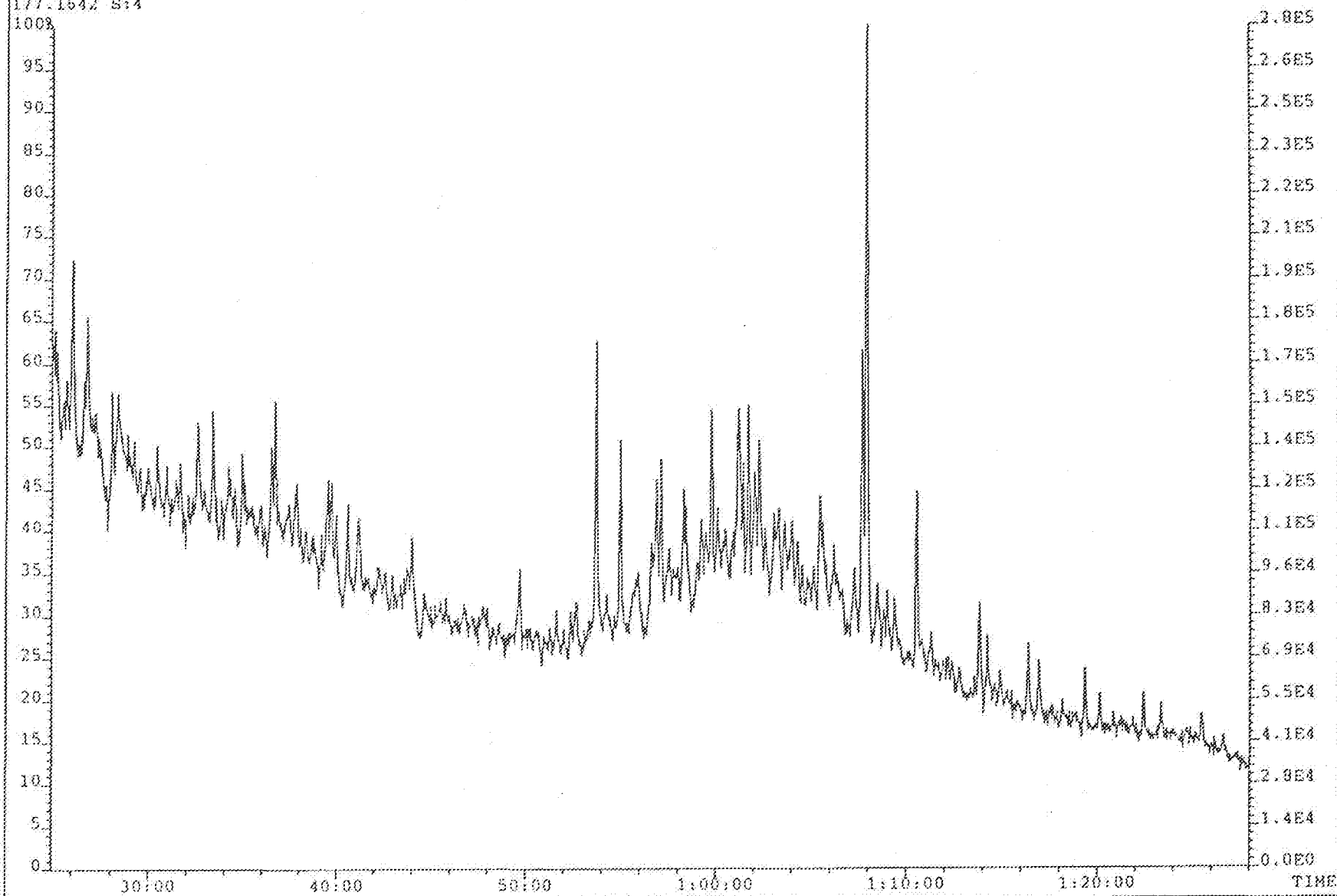
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 14:23:15 EI: Magnet SIR
Sample#4 Text:WELL 34/10-35, 3831M, SATURATED FRACTION
177.1642 S:4

Exp:SAT1



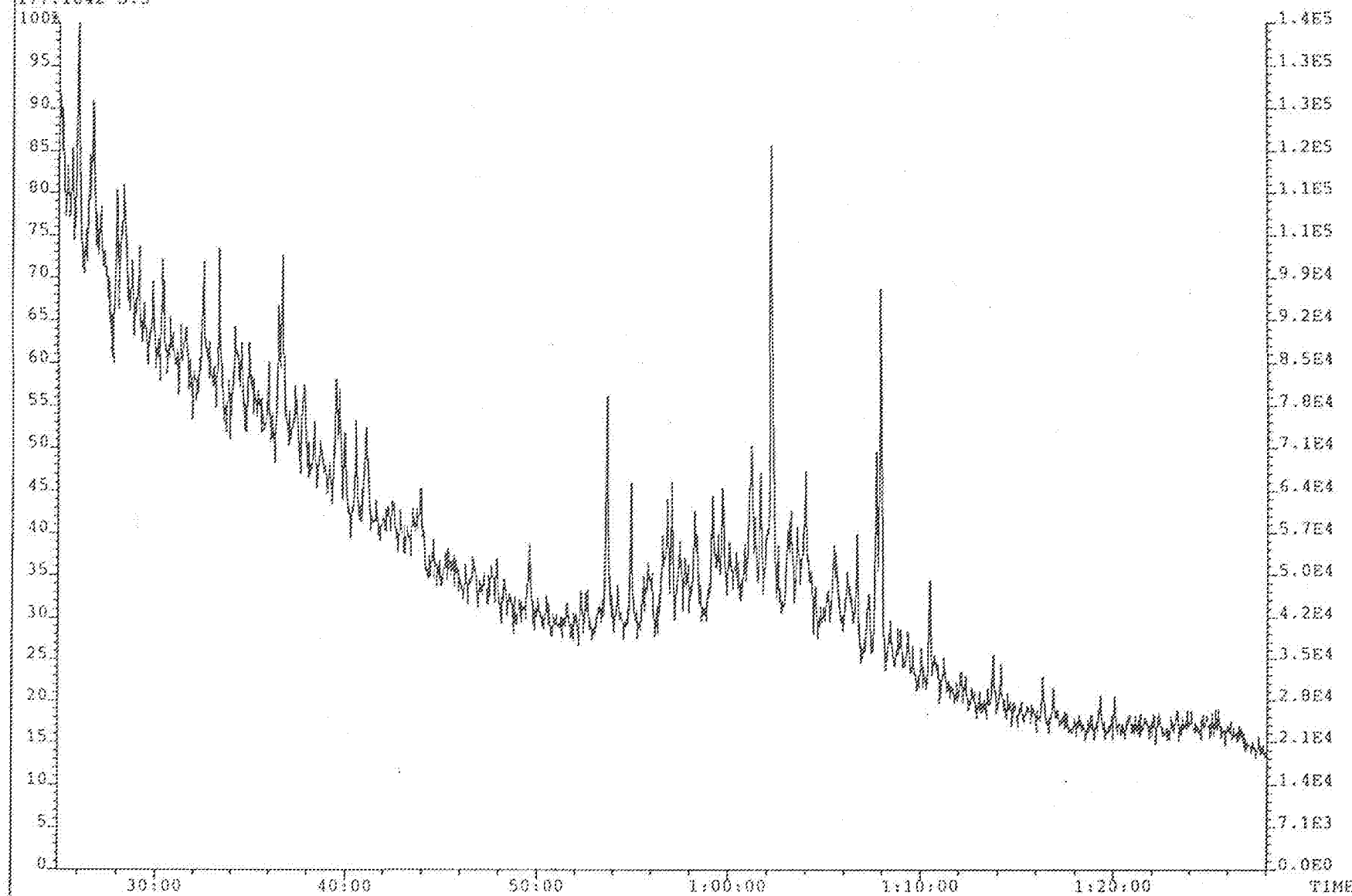
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
177.1642 9:5

Exp: SAT1



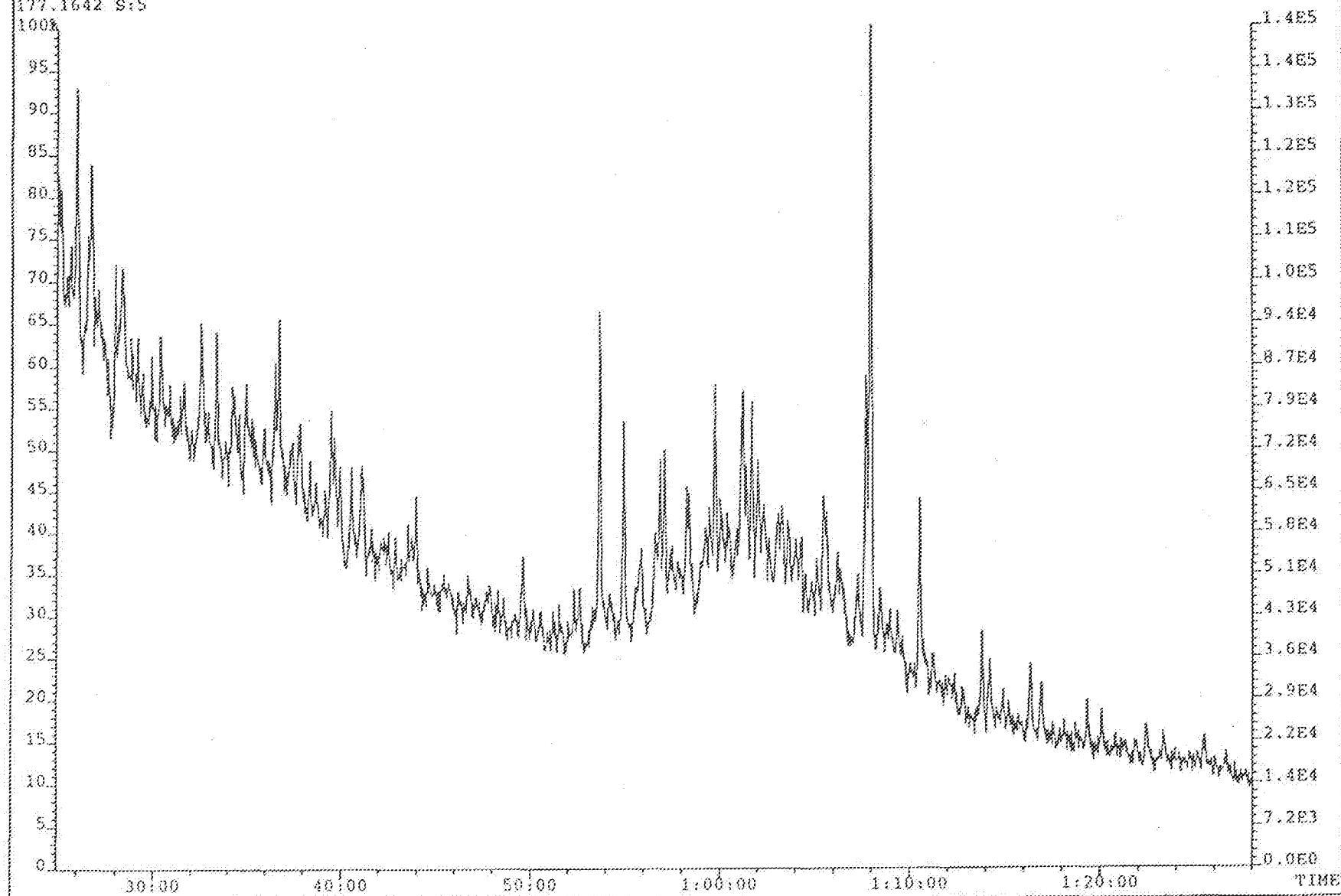
Schlumberger

GECO-PRAKLA

GEOCLAB NOR

File:STATSAT1 #1-4739 Acq:11-SEP-1992,13:30:02 EI* Magnet SIR
Sample#5 Text:WELL 34/10-35, 3885M, SATURATED FRACTION
177.1642 S:5

Exp:SAT1



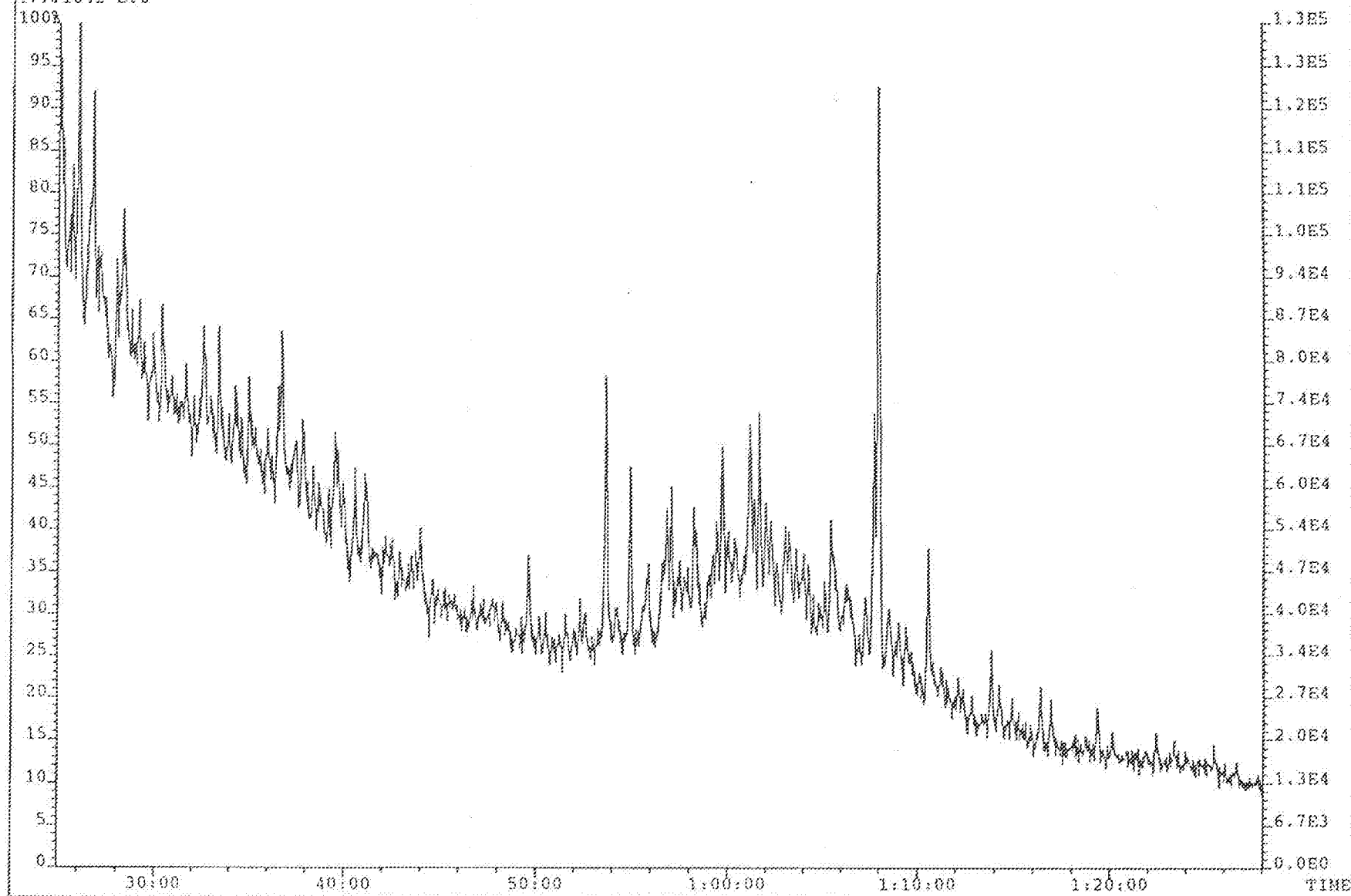
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 11-4/40 Acq:23-SEP-1992 13:10:02 EI: Magnet SIR
Sample#6 Text:WELL 34/10-35, 3894M, SATURATED FRACTION
177.1642 S:6

Exp:9AT1

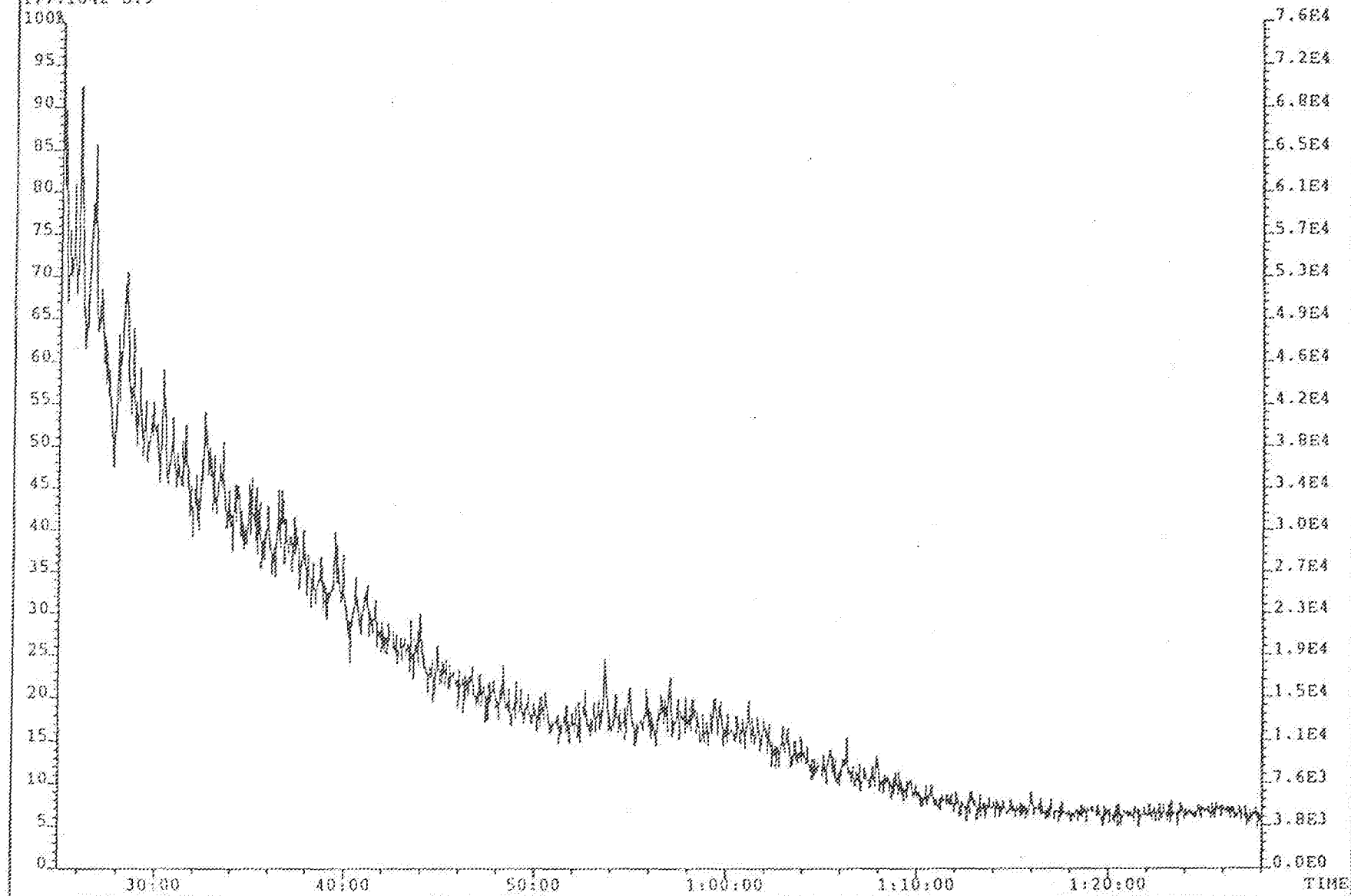


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4740 Acq:23-SEP-1992 13:10:02 E14 Magnet SIR
Sample#9 Text:WELL 34/10-35, DST3, 3920-29M, SATURATED FRACTION FROM OIL Exp:SAT1
177.1642 S:9



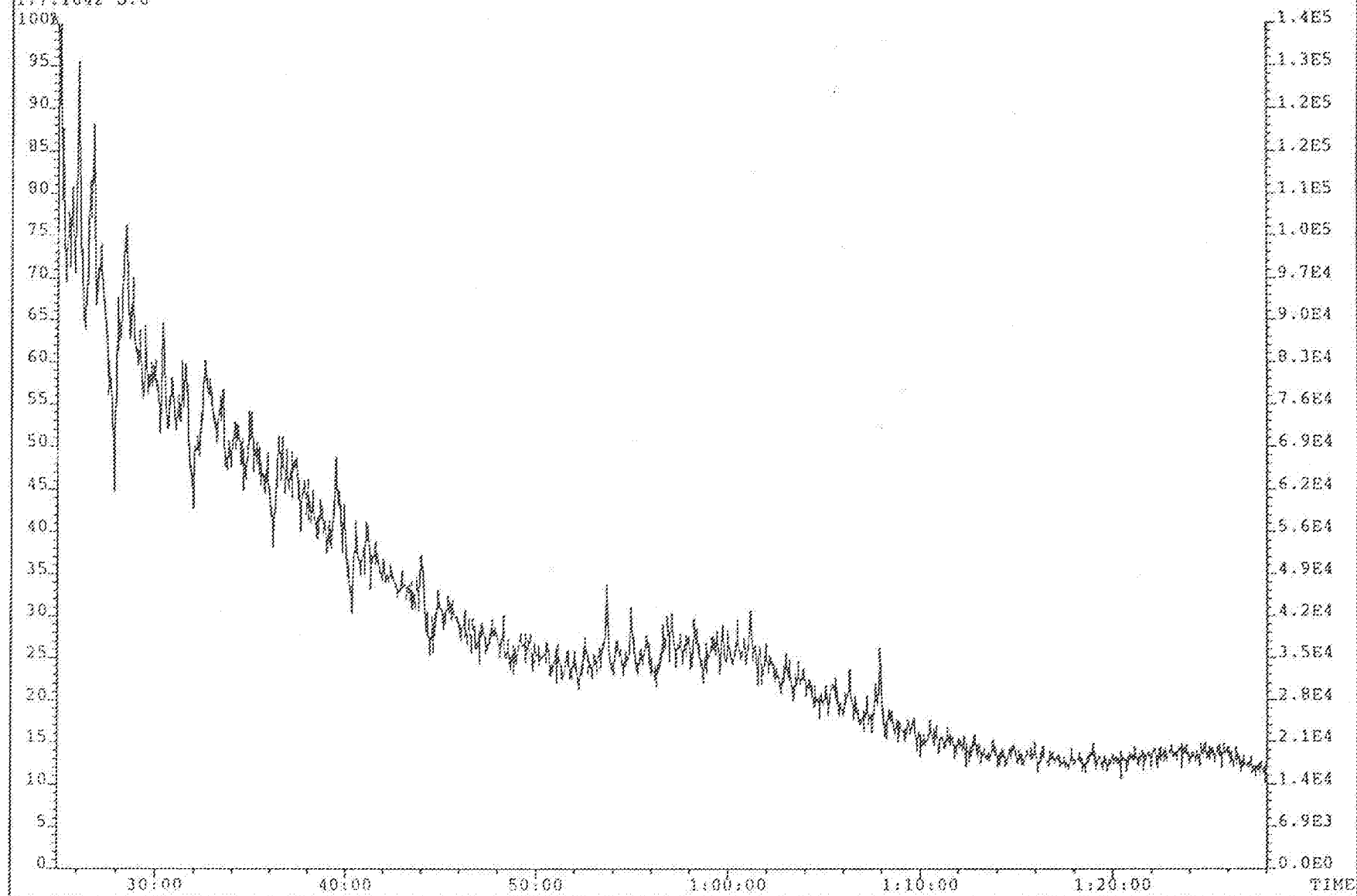
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 04:23:15 EI+ Magnet SIR
Sample#6 Text:WELL 34/10-35, 3931.71M, SATURATED FRACTION
177.1642 S:6

Exp: SAT1



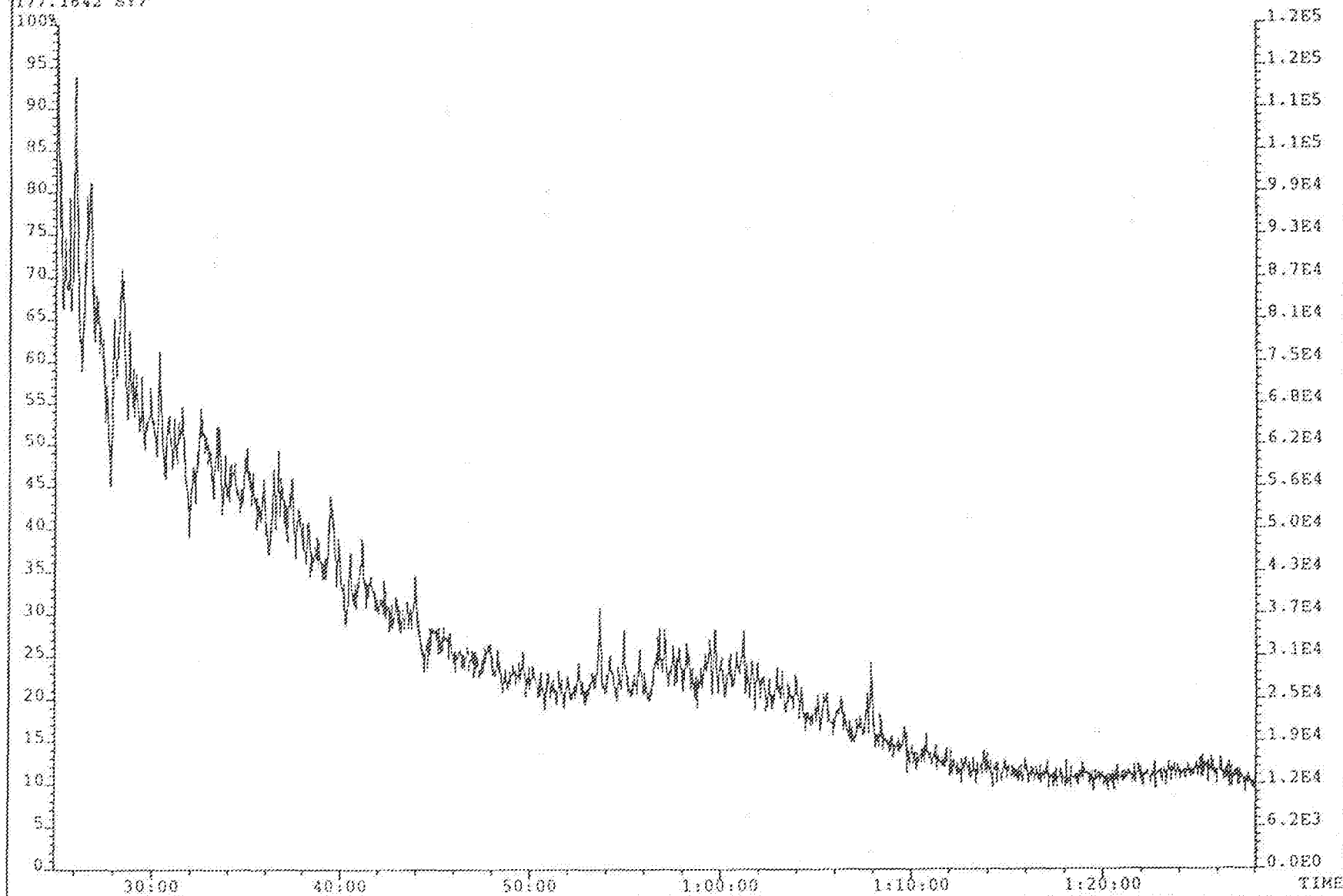
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STATGAT2 #1-4739 Acq: 22-SEP-1992 14:23:15 ET+ Magnet SIR
Sample#7 Text: WELL 34/10-35, 3933.16M, SATURATED FRACTION
177.1642 S:7

Exp: SAT1

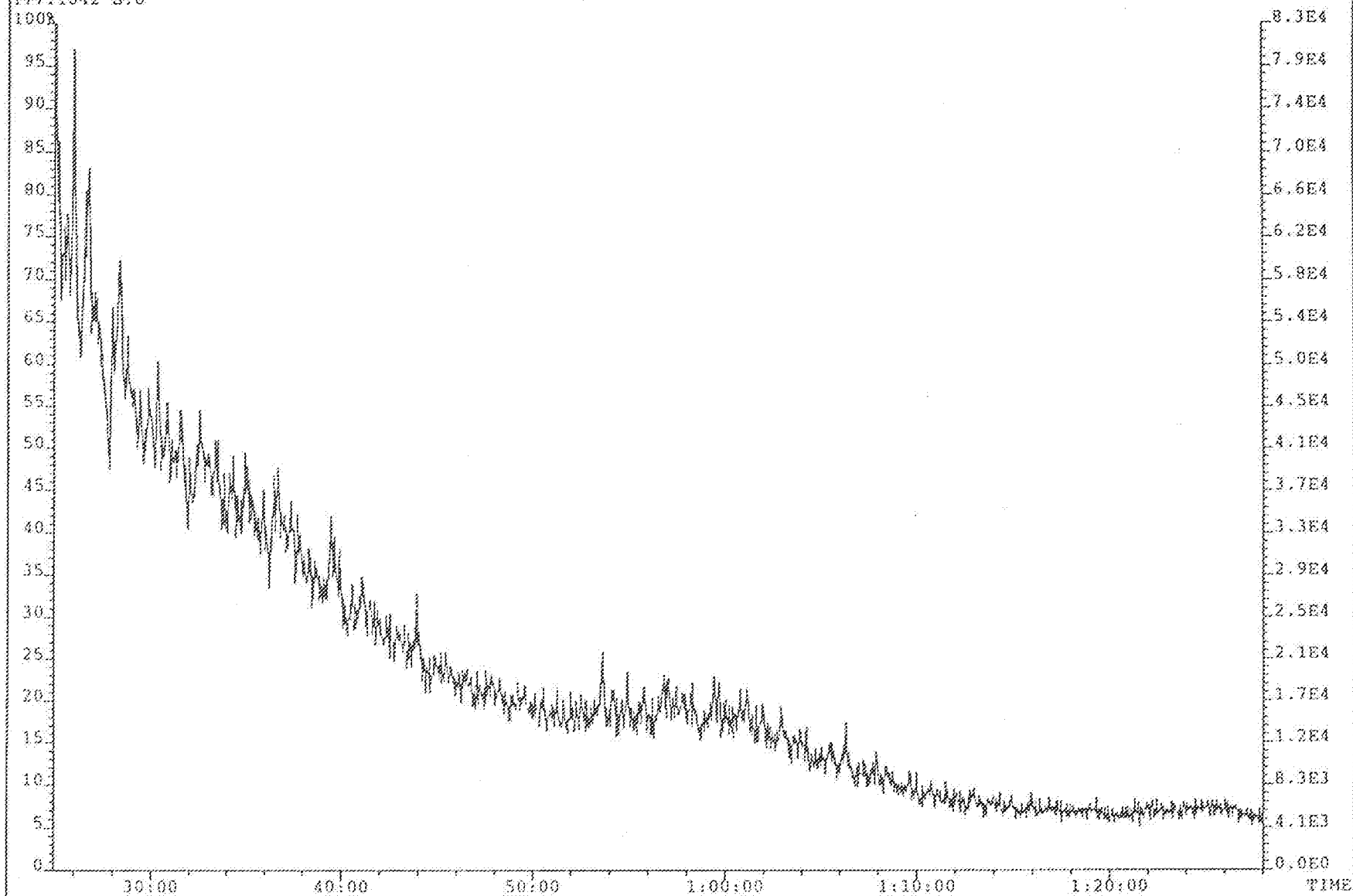


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STARSAT3 #1-4740 Acq: 23-SEP-1992 13:30:02 EI+ Magnet SIR
 Sample#8 Text: WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp: SAT1
 177.1542 S:8



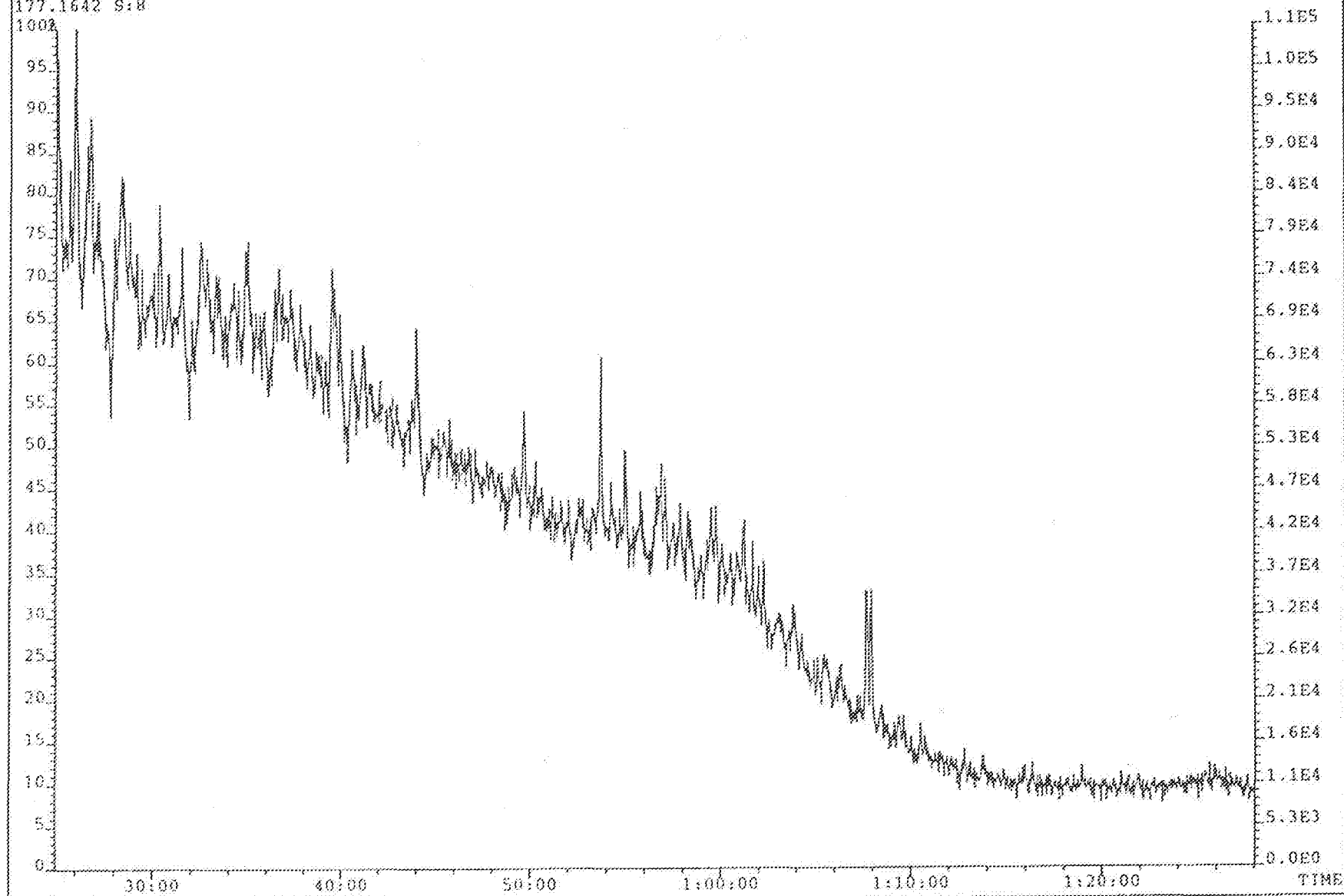
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#8 Text:WELL 34/10-35, 3994.05M, SATURATED FRACTION
177.1642 S:8

Exp:SAT1



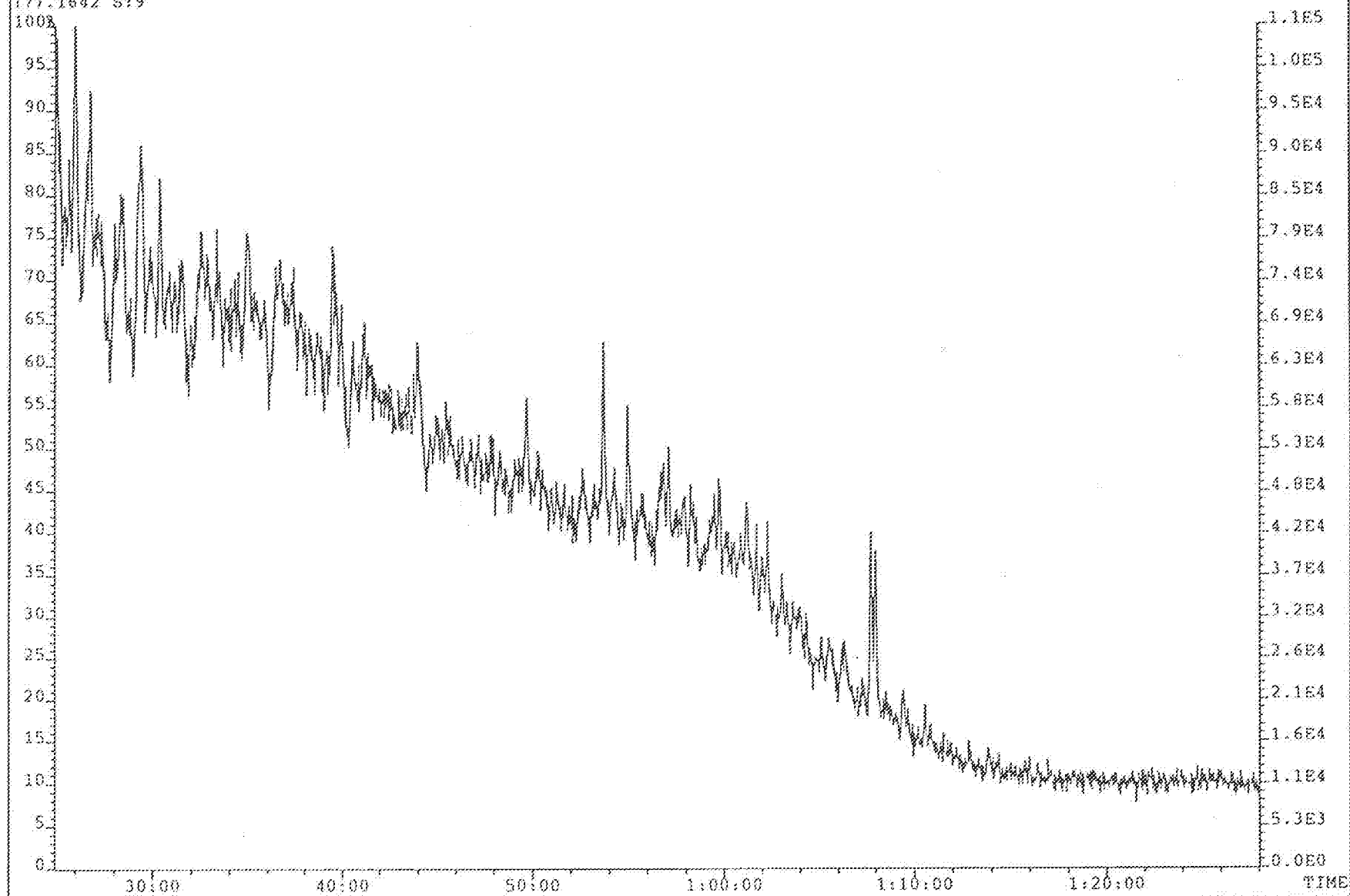
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 W1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#9 Text:WELL 34/10-35, 4006.17M, SATURATED FRACTION
177.1642 S:9

Exp:SAT1



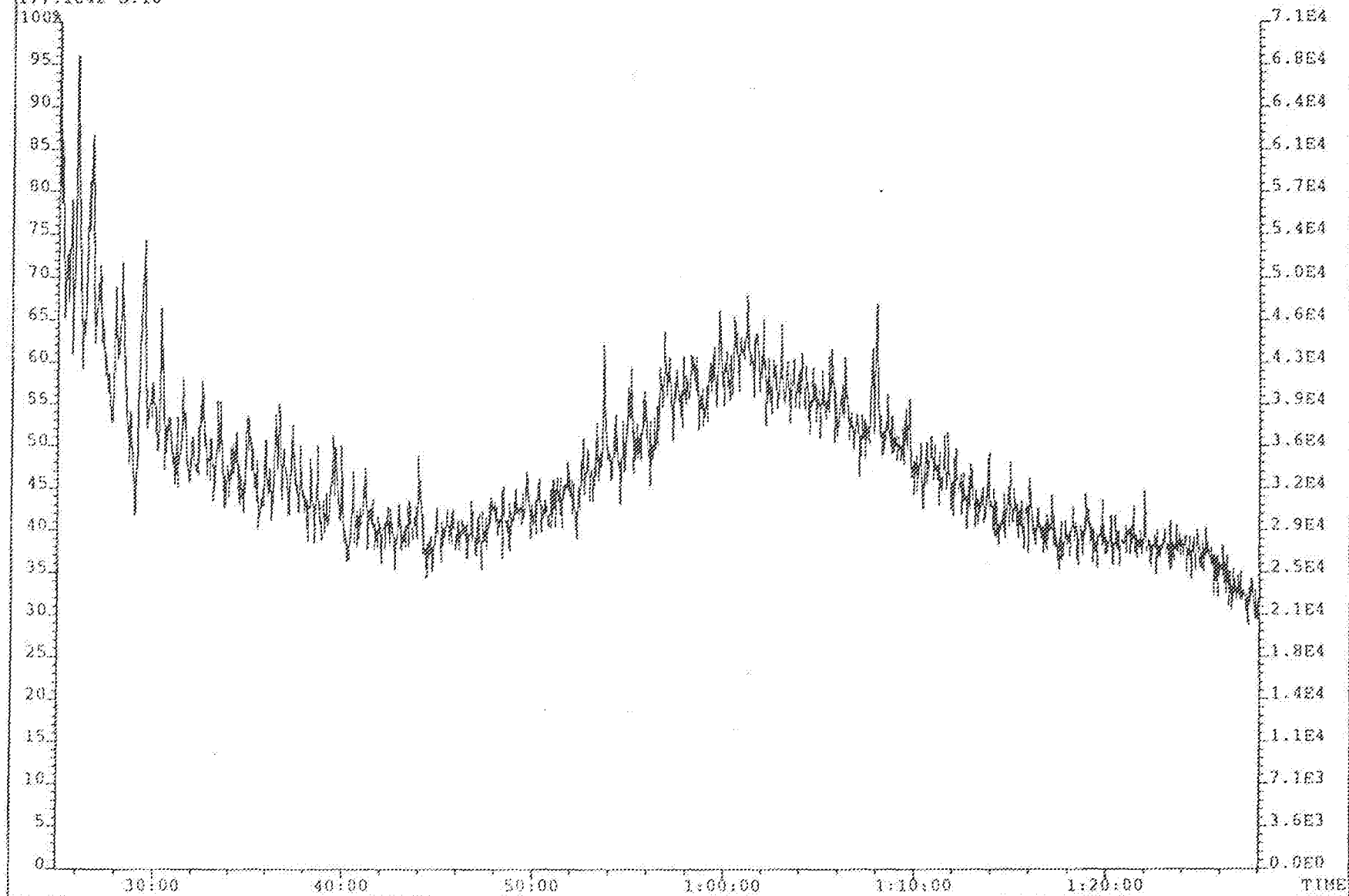
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4739 Acq: 22-SEP-1992 14:23:15 E1+ Magnet SIB
Sample#10 Text: WELL 34/10-35, 4021.93M, SATURATED FRACTION
177.1642 S:10

Exp: SAT1

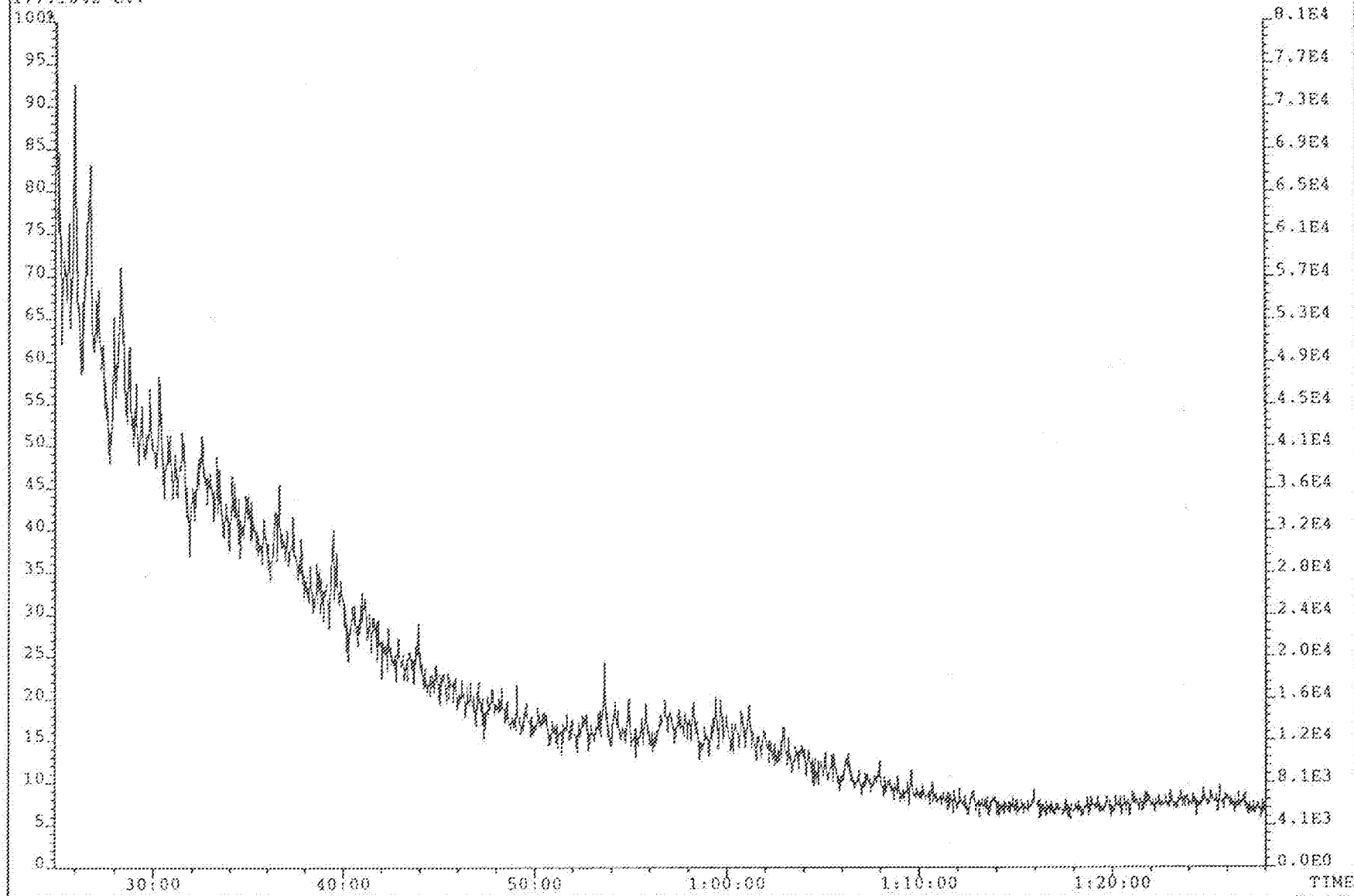


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 13:30:02 ET+ Magnet SIM
Sample#7 Text:WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL Exp:SAT1
177.1642 S:7



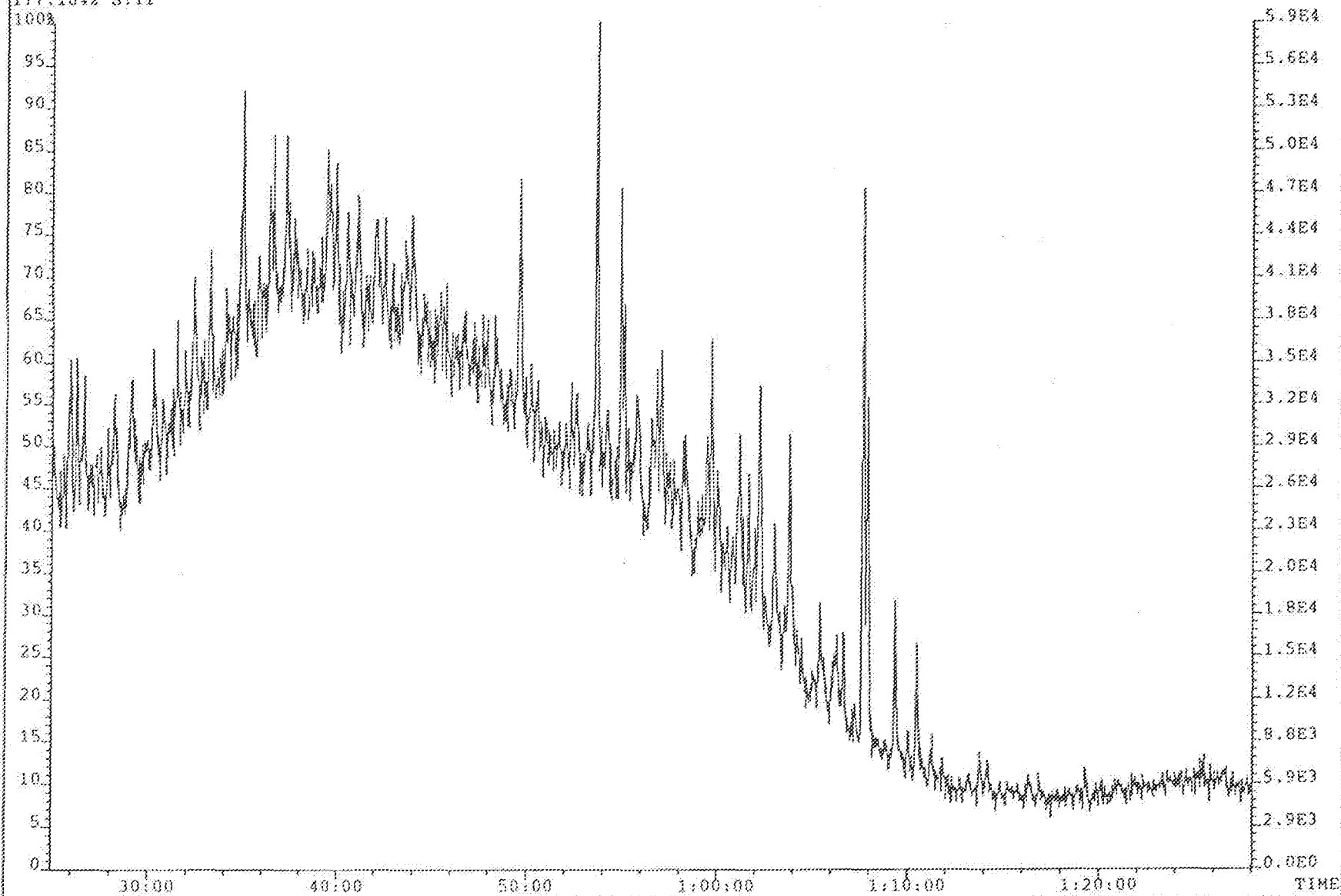
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 04:23:15 ET+ Magnet SIR
Sample#11 Text:WELL 34/10-35, 4257.47M, SATURATED FRACTION
177.1642 S:11

Exp:SAT1



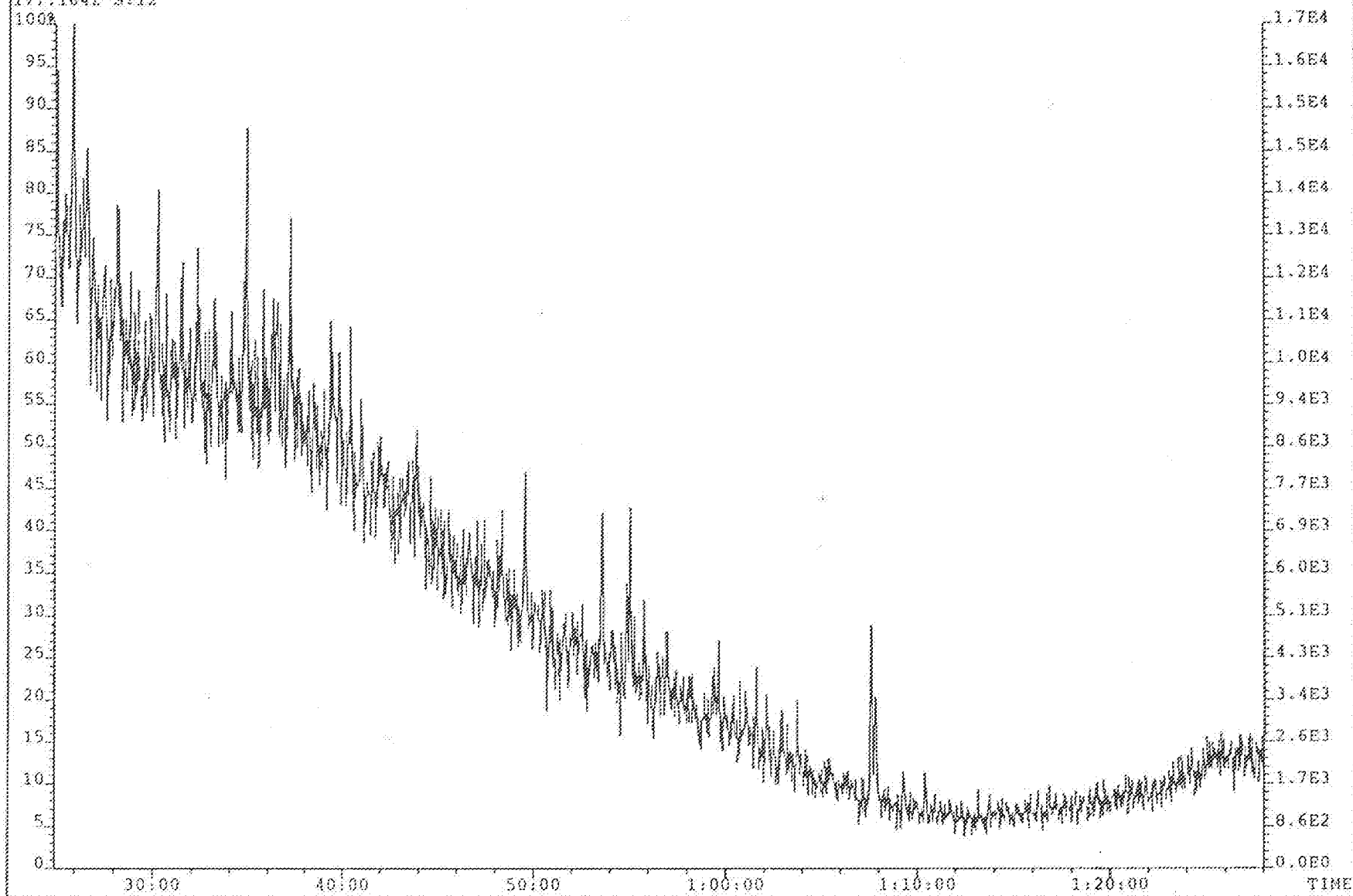
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992:14:23:15 EI4 Magnet SIR
Sample#12 Text:WELL 34/10-35, 4270.75M, SATURATED FRACTION
177.1642 S:12

Exp:SAT1



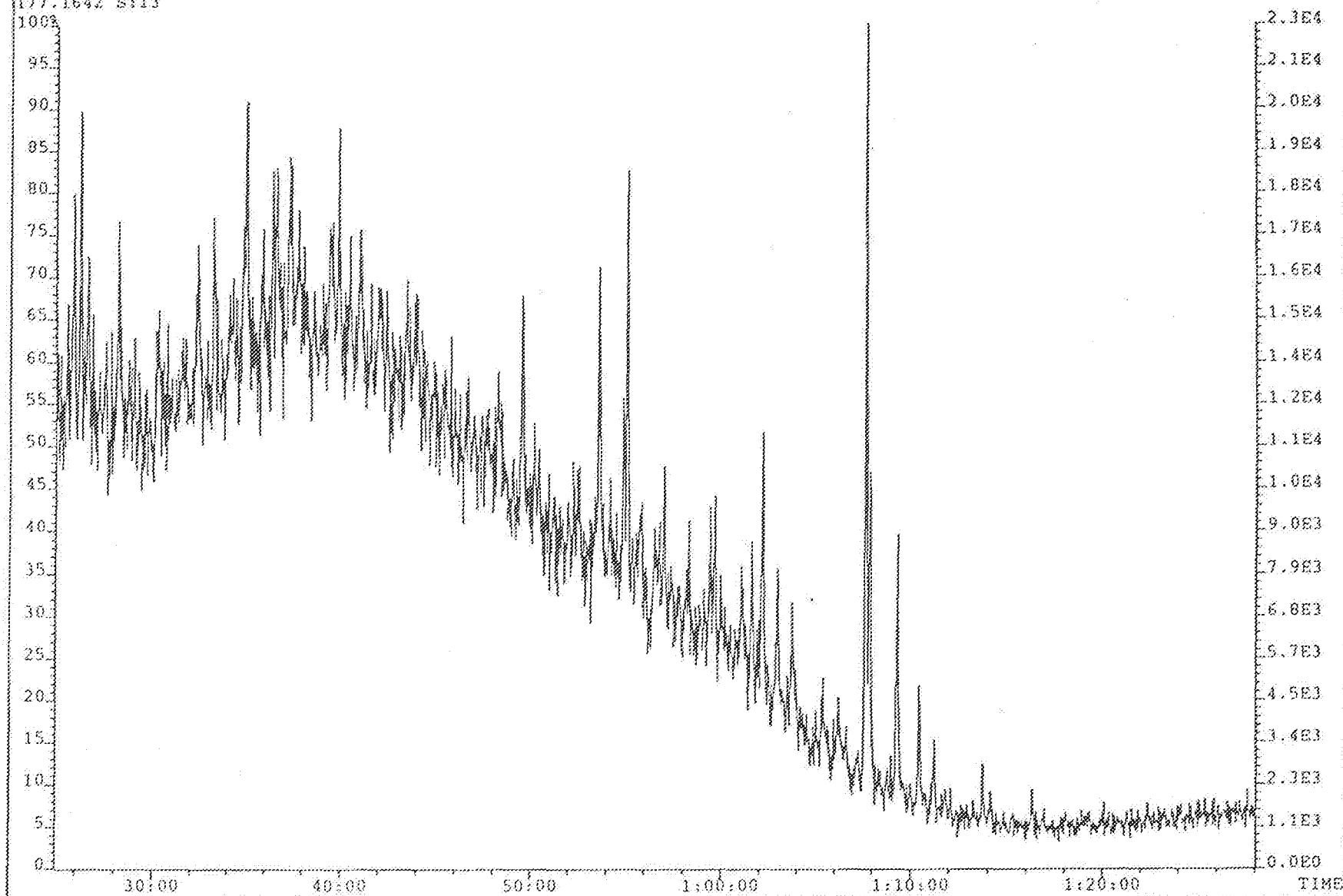
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 W1-4740 Acq: 22-SEP-1992 14:23:15 E1: Magnet SIR
Sample#13 Text: WELL 34/10-35, 4283.48M, SATURATED FRACTION
177.1642 S:13

Exp: SAT1

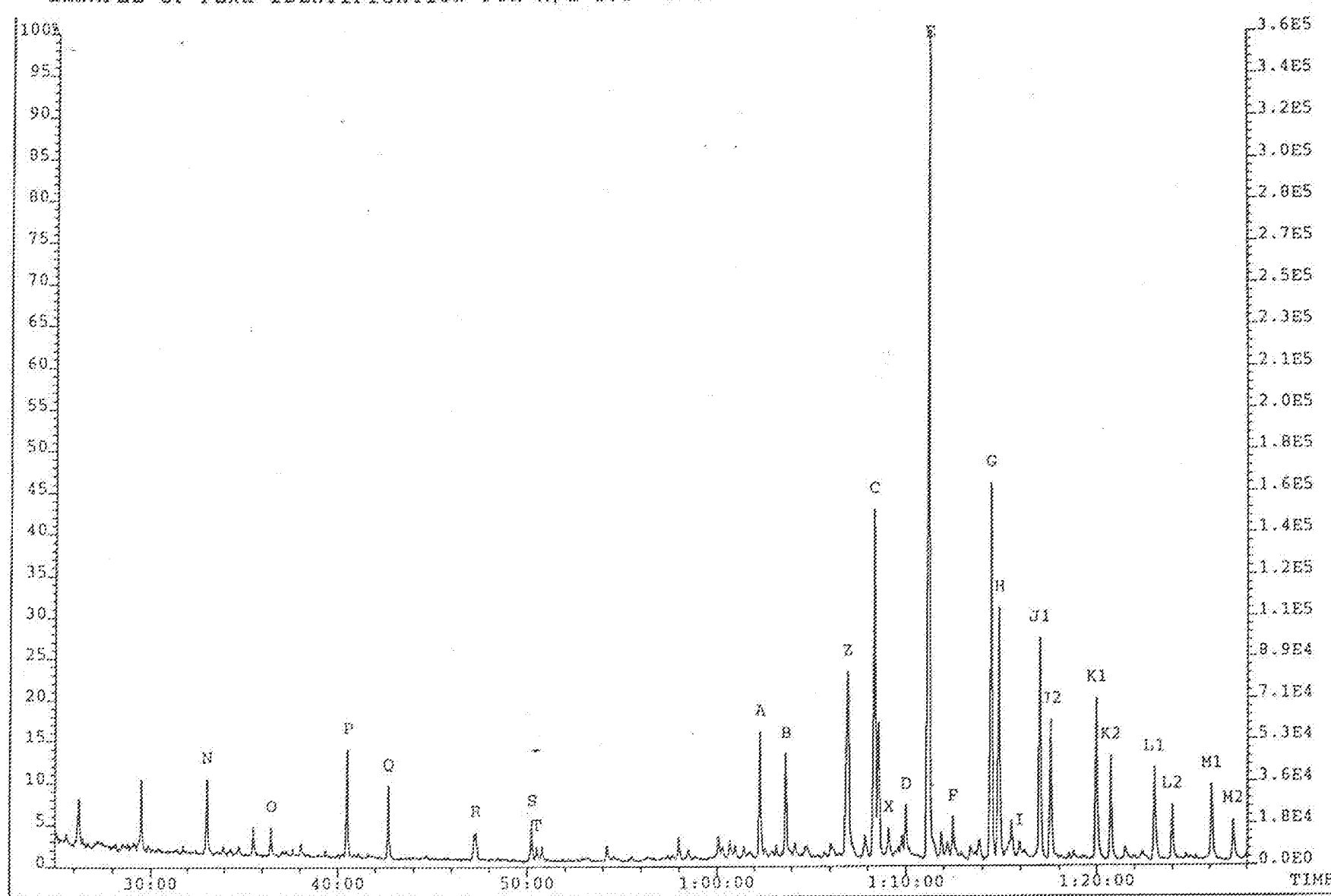


Schlumberger

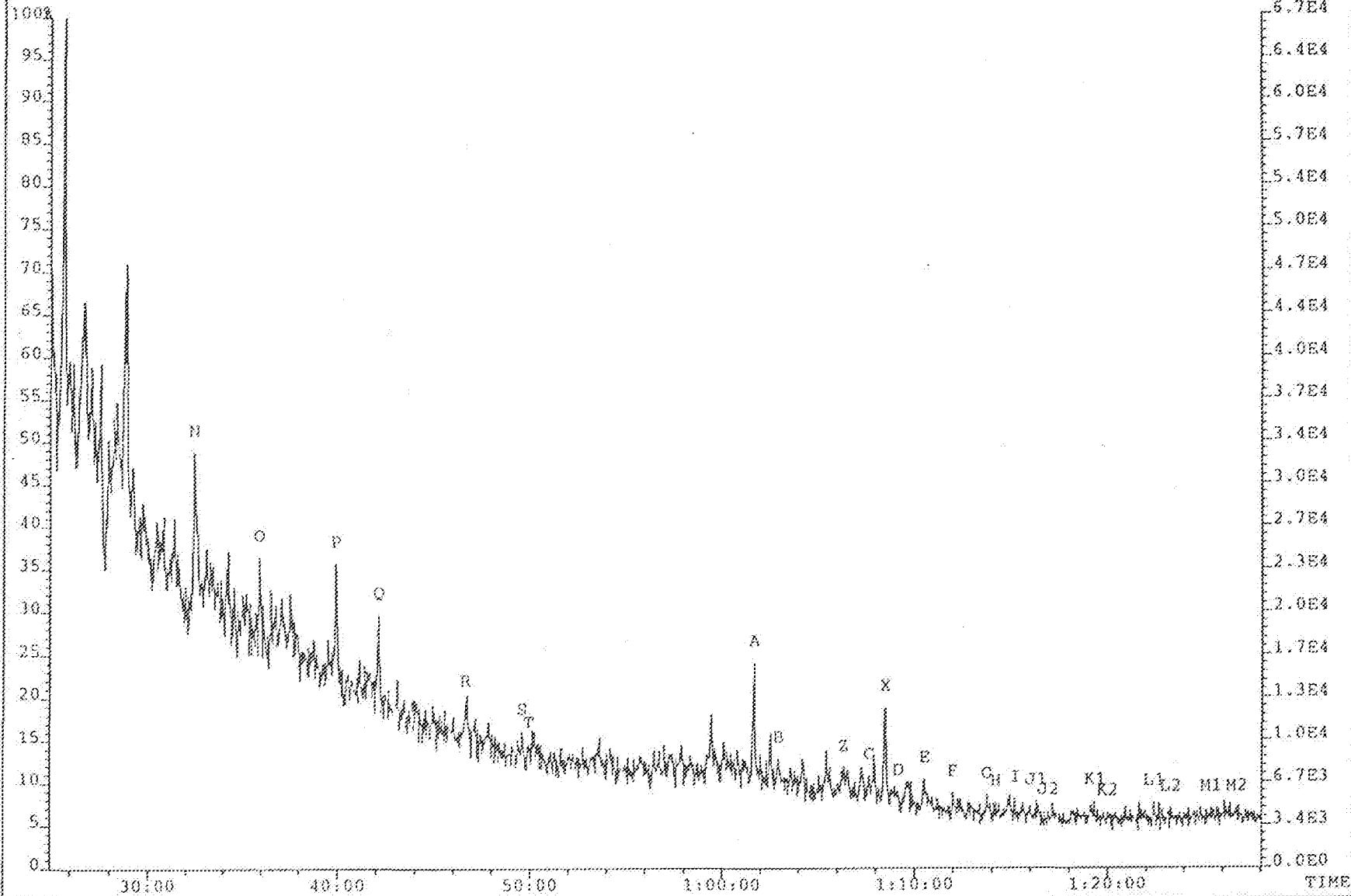
GECO-PRAKLA

GEOLAB NOR

EXAMPLE OF PEAK IDENTIFICATION FOR M/Z 191 - TRITERPANES

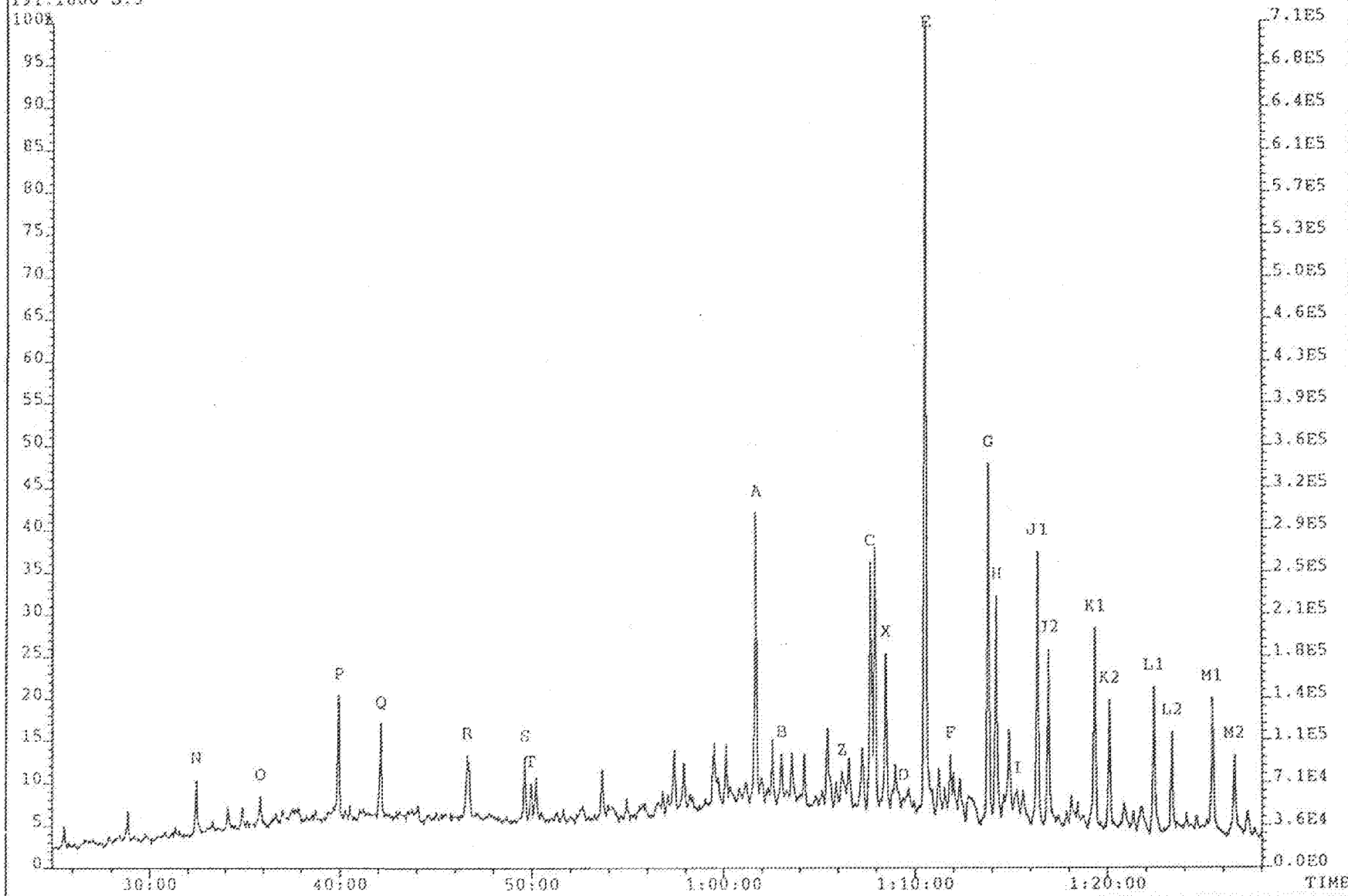


191.1800 S:10



File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
 Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
 191.1800 S:3

Exp:SAT1



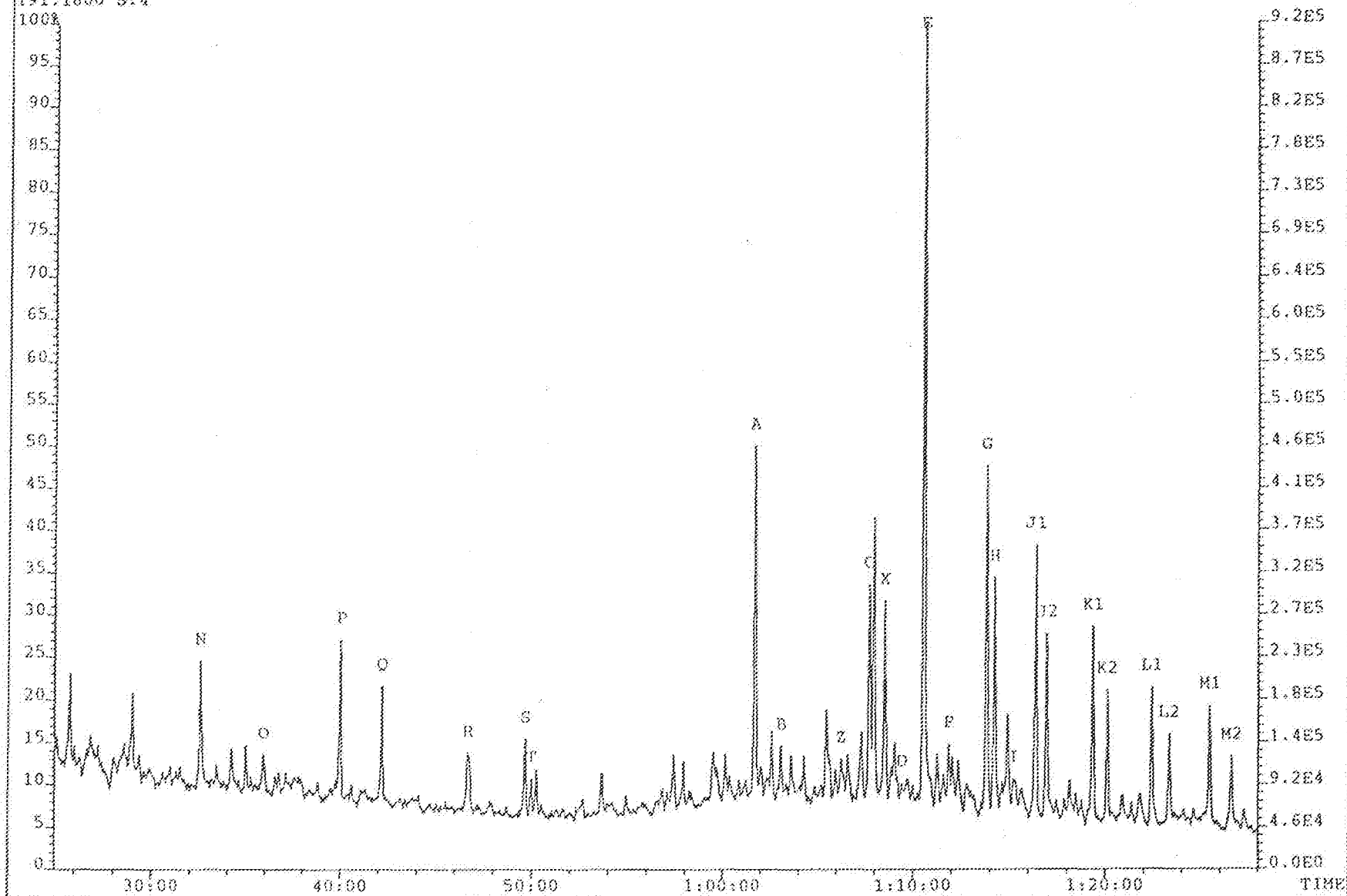
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4740 Acq: 22-SEP-1992 14:23:15 ET+ Magnet SIR
 Sample#4 Text: WELL 34/10-35, 3631M, SATURATED FRACTION
 191.1800 S:4

Exp: SAT1



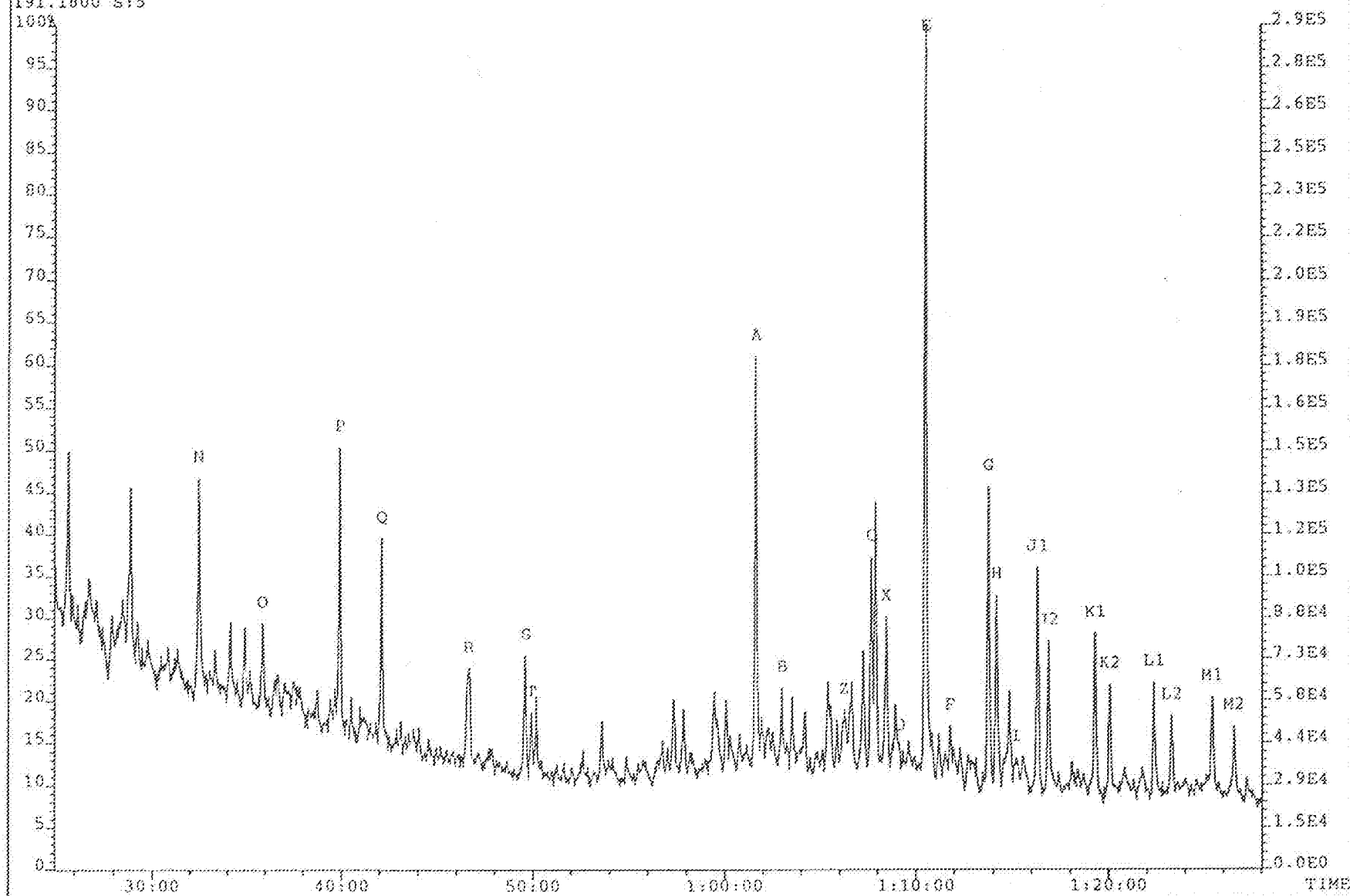
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
 Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
 191.1000 S:5

Exp:SAT1



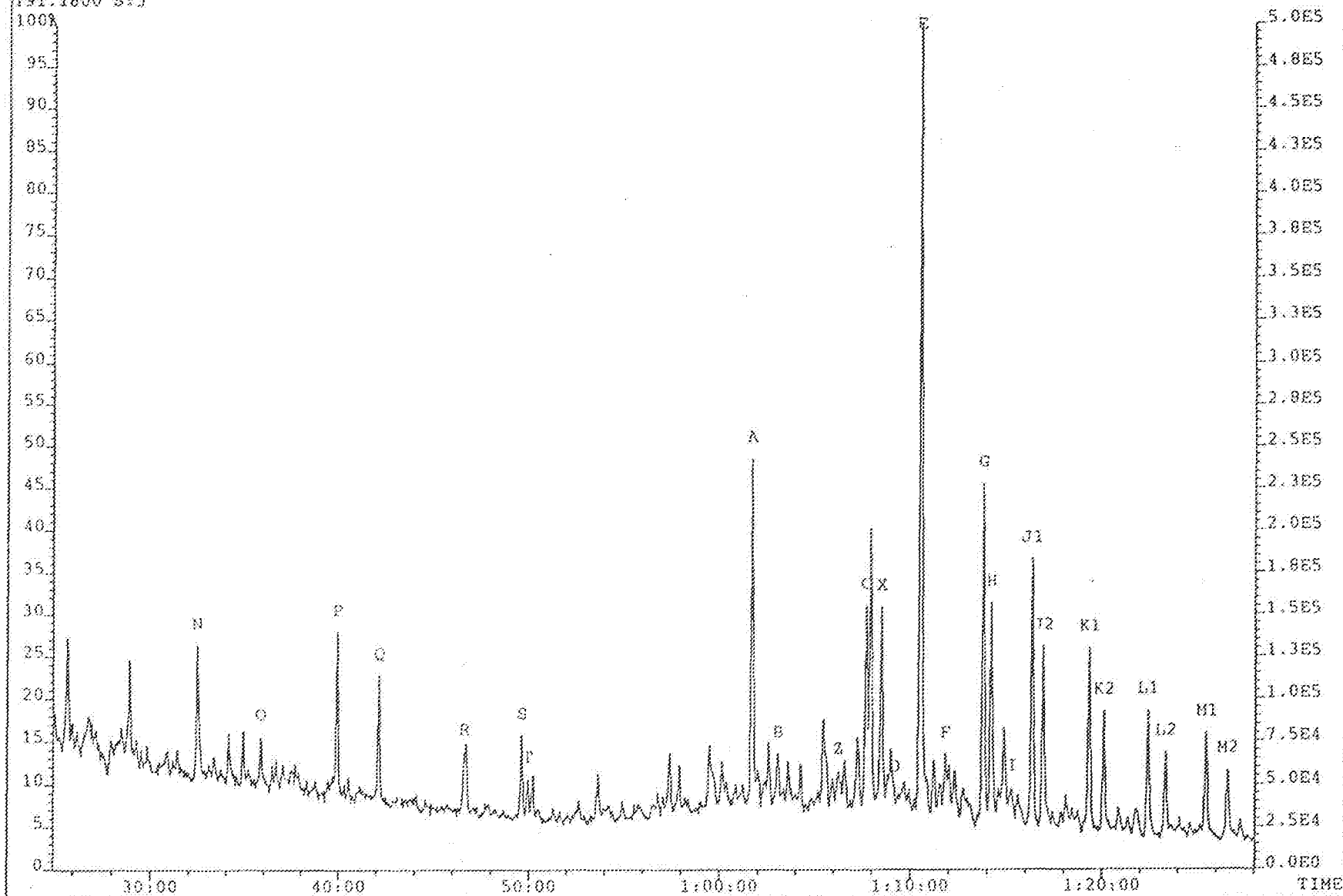
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STATSAT3 #1-4739 Acq: 23-SEP-1992 11:30:02 EI+ Magnet SIB
Sample#5 Text: WELL 34/10-15, 3895M, SATURATED FRACTION
191.1800 S:5

Exp: SAT1



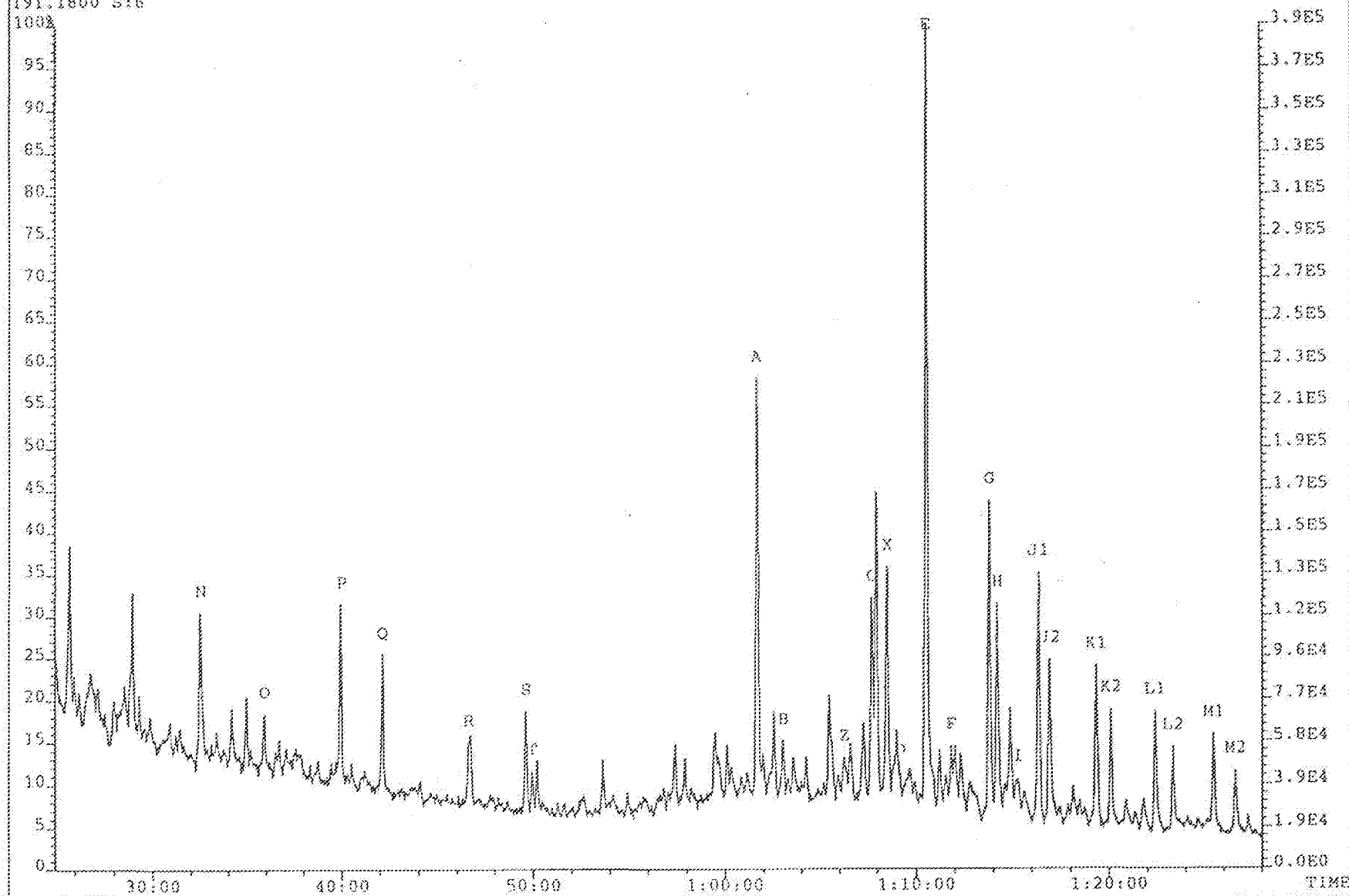
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 13:30:02 ET Magnet SIR
 Sample#6 Text:WELL 34/10-35, 3894M, SATURATED FRACTION
 191.1800 S:6

Exp:9AT1



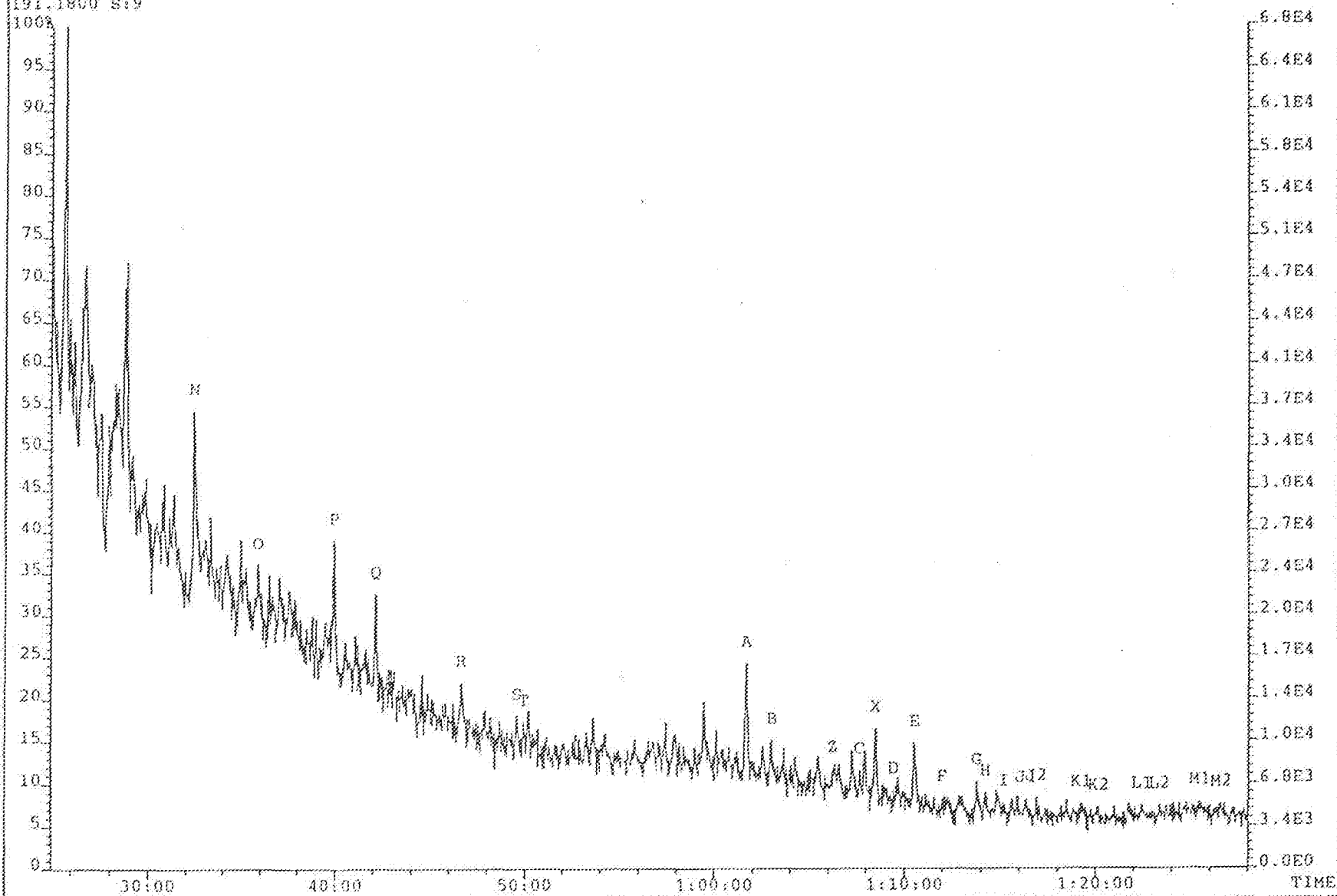
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 01-4740 Acq:13-SEP-1992 11:30:02 El: Magnet SIN
Sample#9 Text:WELL 34/10-35, DST3, 3920-29M, SATURATED FRACTION FROM OIL
191.1800 S:9

Exp:SAT1



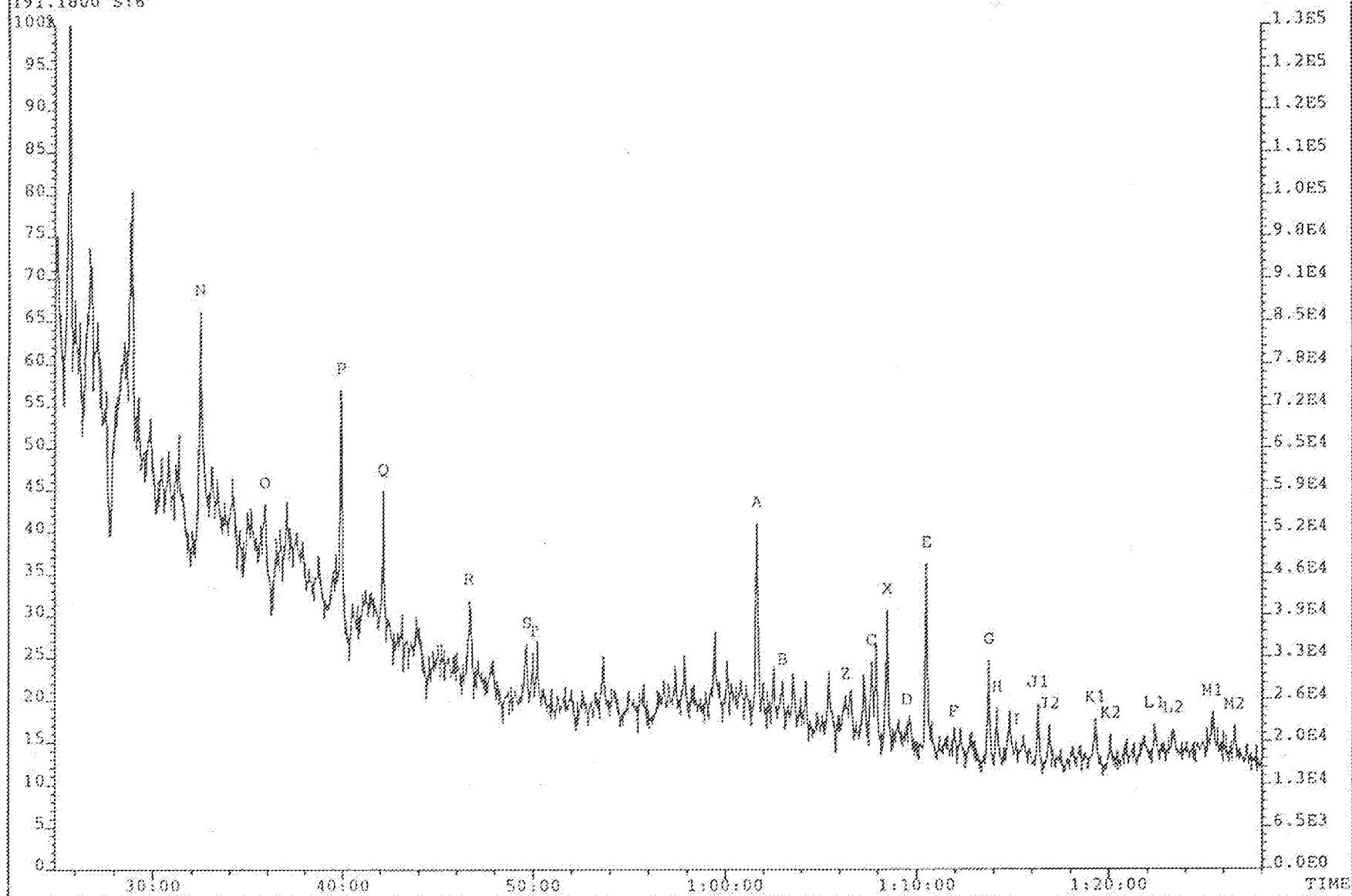
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
 Sample#6 Text:WELL 34/10-35, 3931.71M, SATURATED FRACTION
 191.1800 S:6

Exp:SAT1



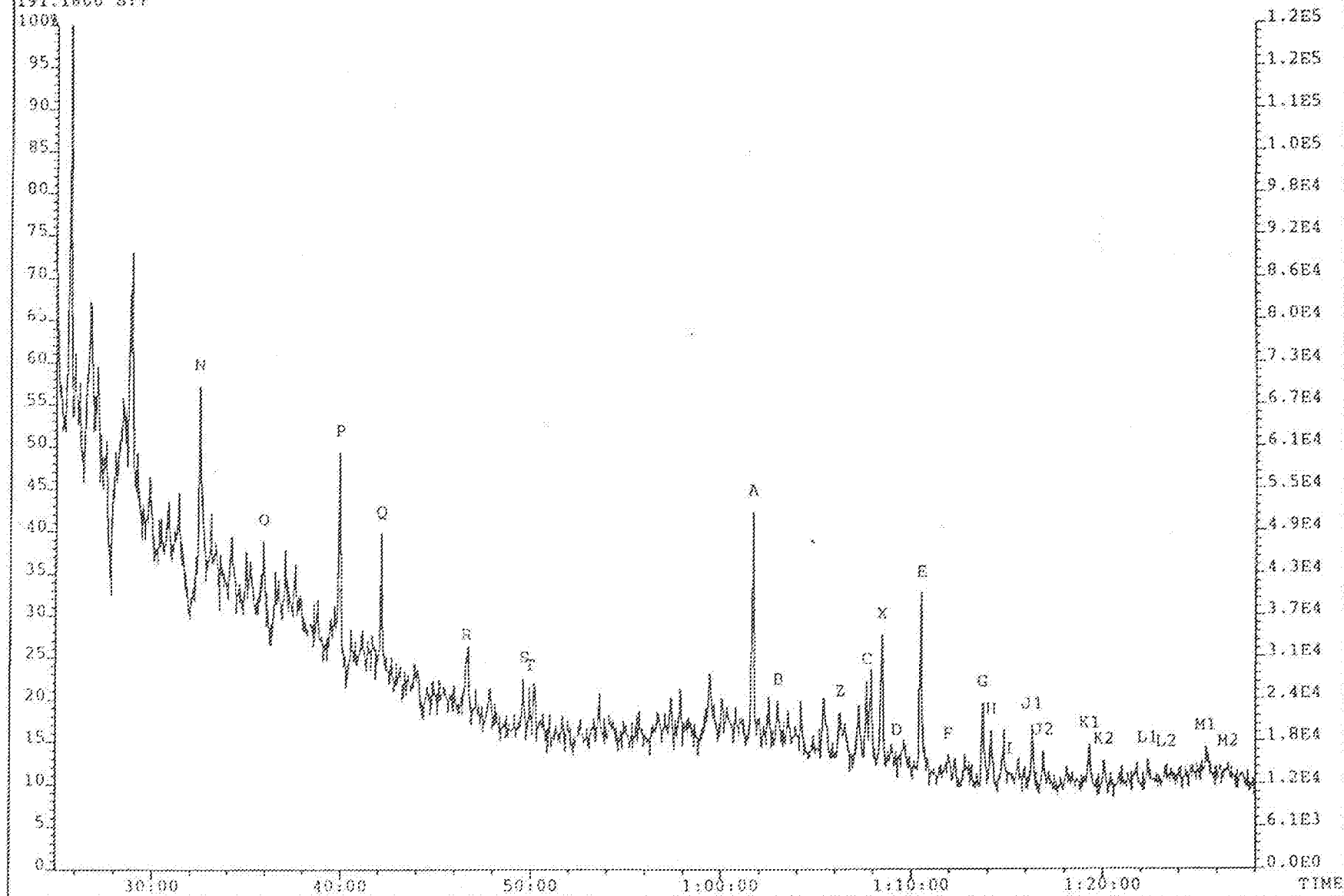
Schumberger

GECO-PRAKLA

GEOLAB NOR

FILE:STATSAT2 #1-4739 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
 Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
 191.1800 S:7

Exp: SAT1



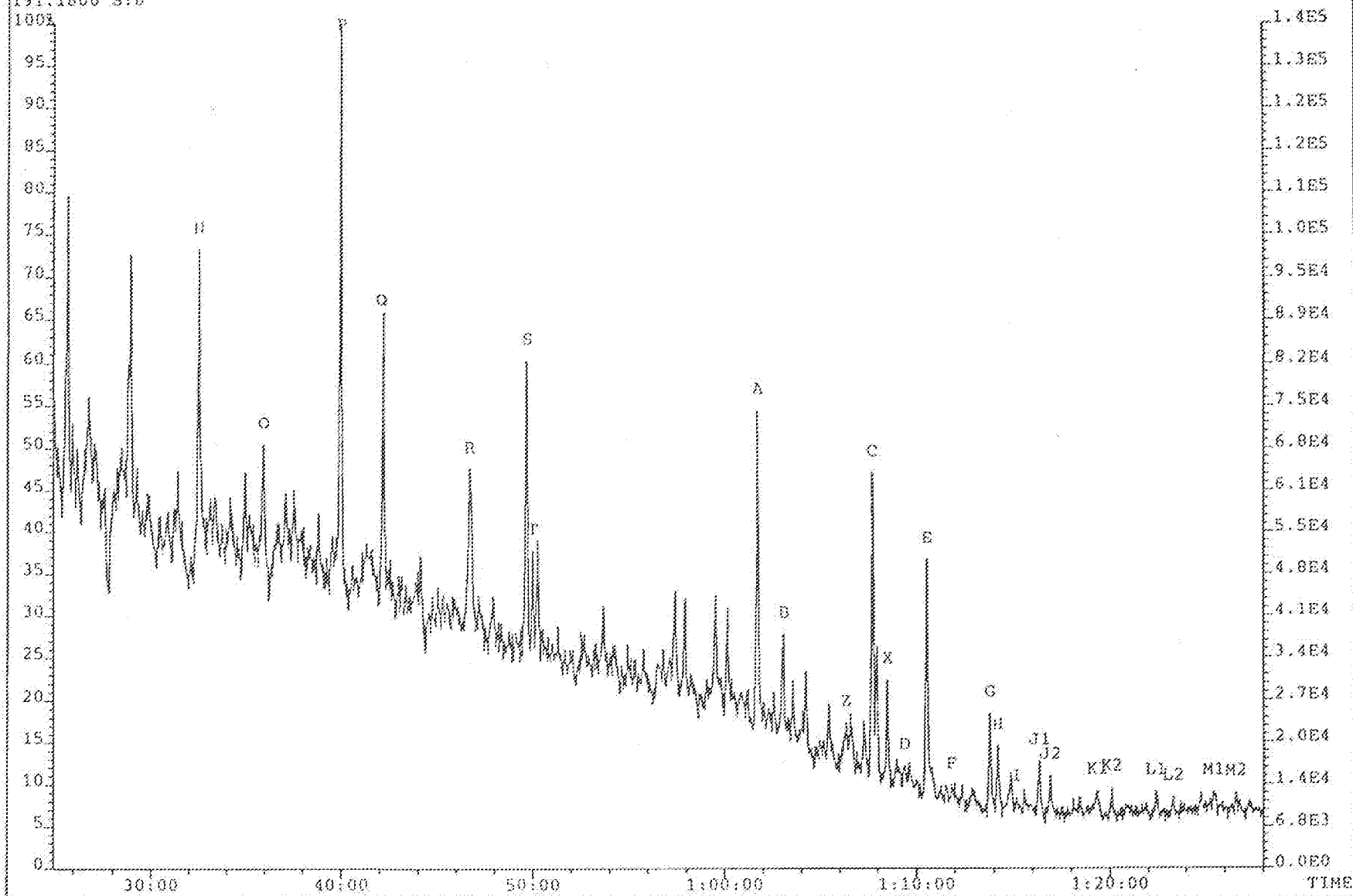
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4739 Acq: 22-SEP-1992, 14:23:15 EI+ Magnet SIR
 Sample#0 Text: WELL 34/10-35, 3994.05M, SATURATED FRACTION
 191.1800 S:8

Exp: SAT1

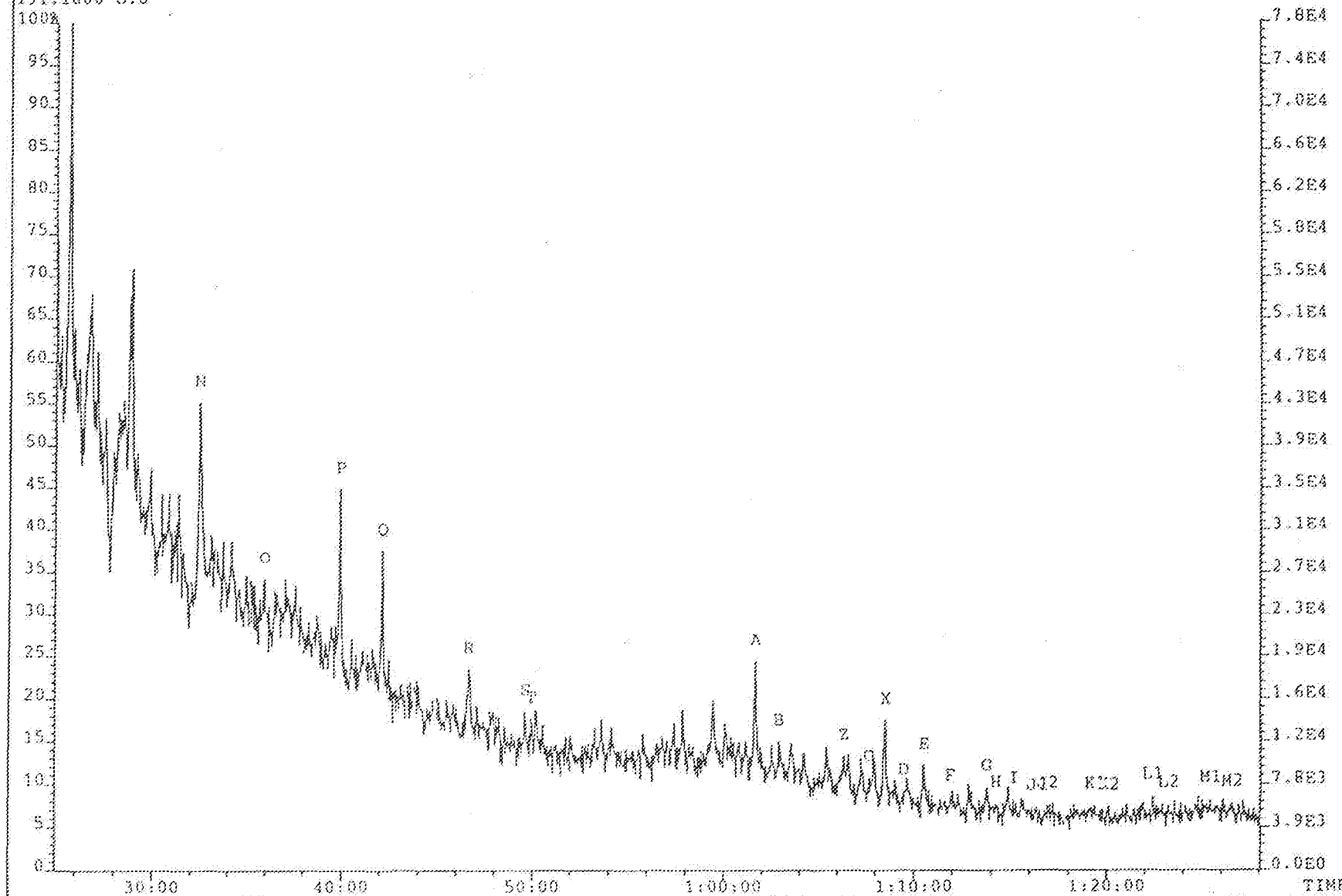


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 W1-4740 Acq:23-SEP-1992 11:10:02 ET: Magnet SIR
 Sample#8 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp:SAT1
 191.1800 S:8



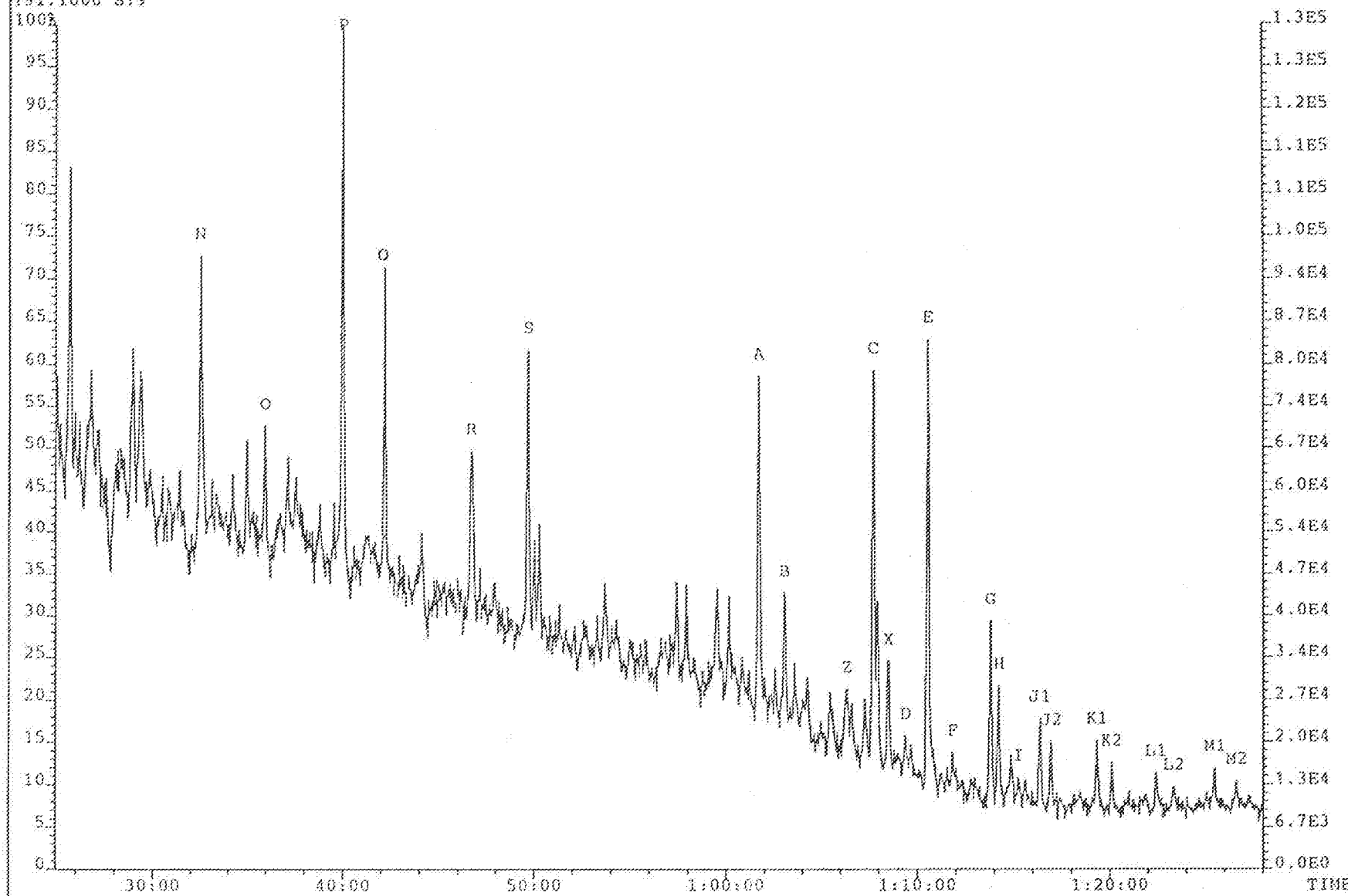
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STATSAT2 #1-4739 Acq: 22-SEP-1992 14:23:15 EI+ Magnet SIR
 Sample#9 Text: WELL 34/10-35, 4006.17M, SATURATED FRACTION
 191.1800 S:9

Exp: SAT1



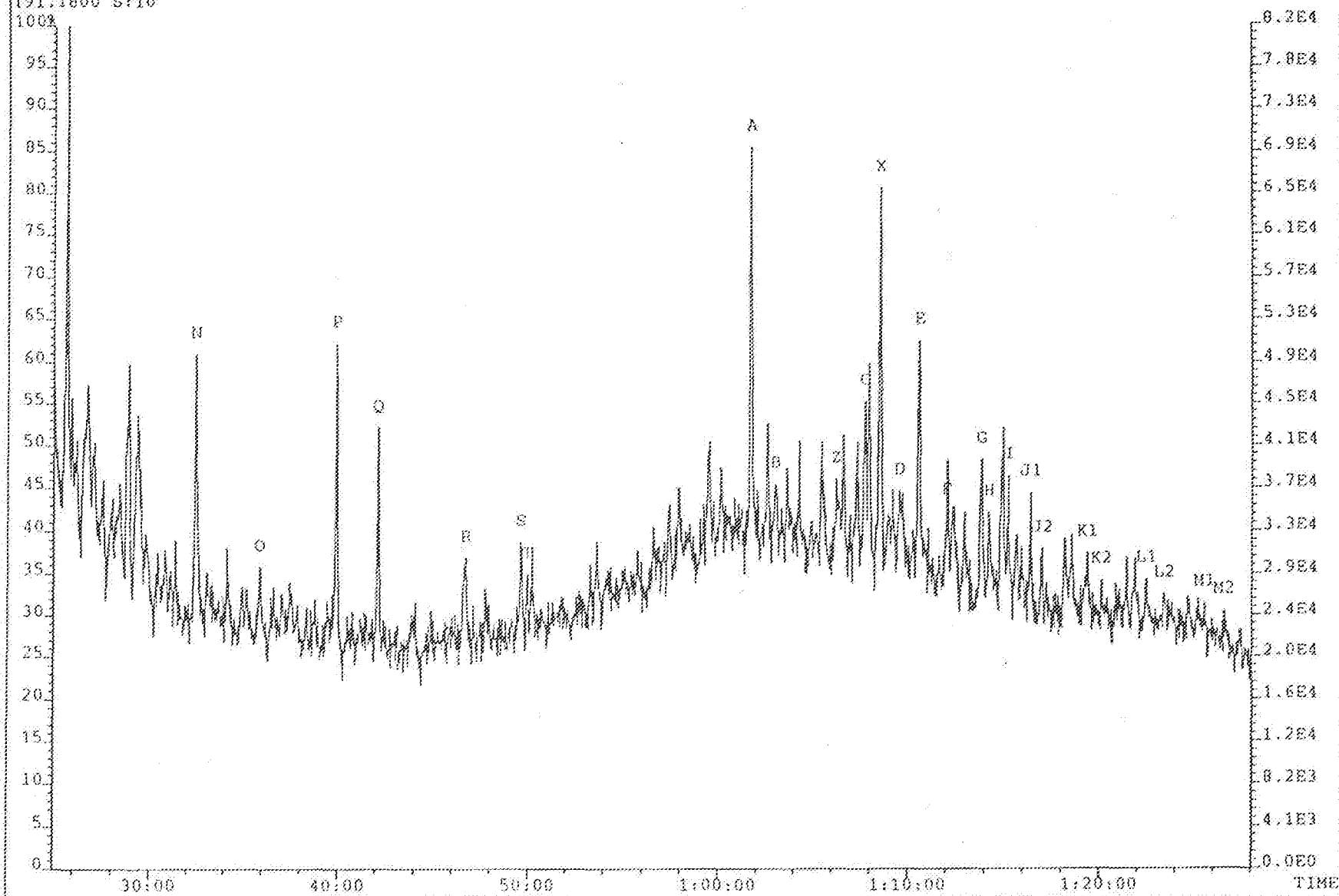
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, 4021.93M, SATURATED FRACTION
191.1800 S:10

Exp:SAT1

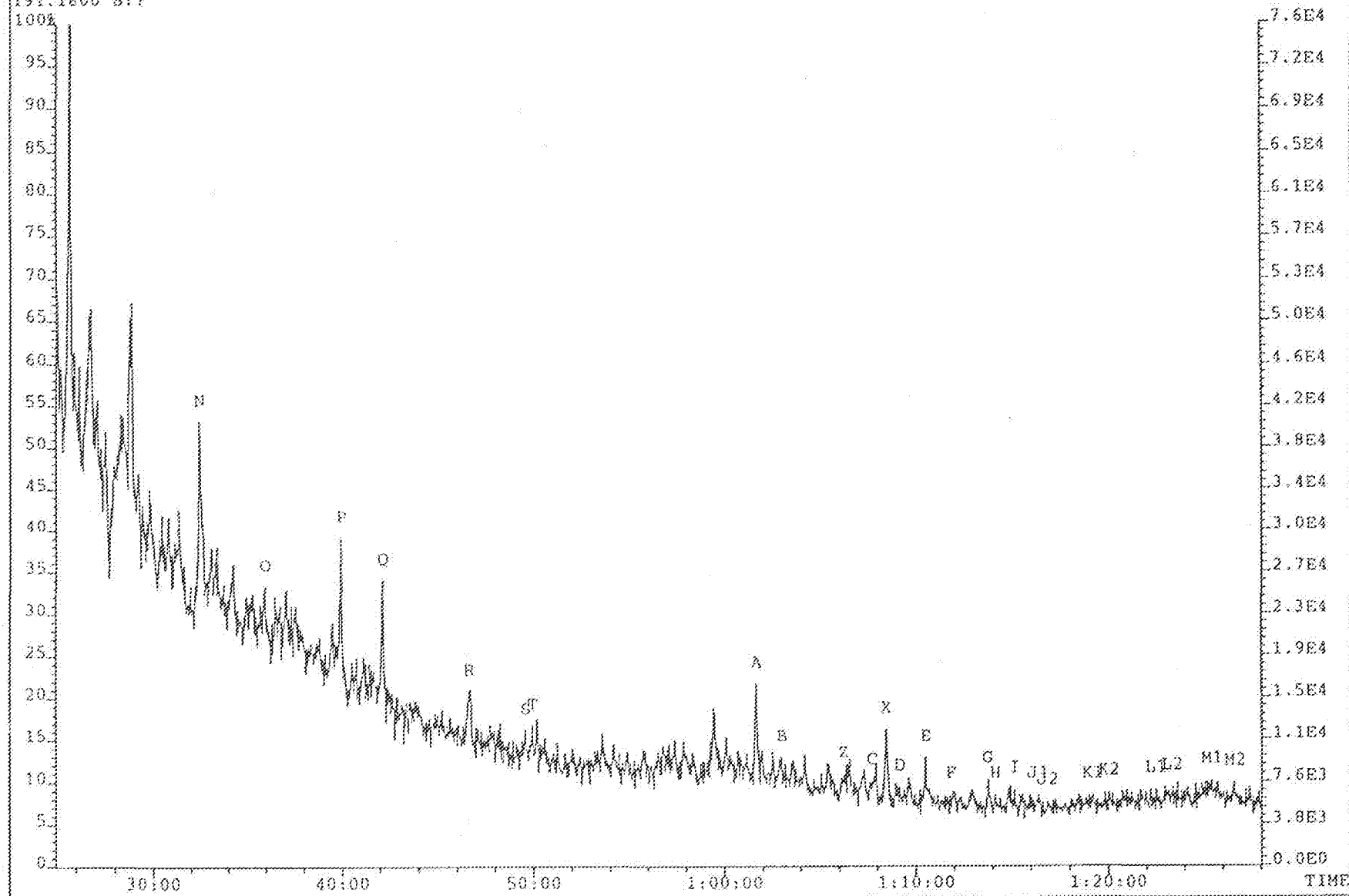


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4740 Acq:23-SEP-1992 03:30:02 B14 Magnet SIN
 Sample#7 Text:WELL 34/10-35, DST1, 3015-25M, SATURATED FRACTION FROM OIL
 191.1800 S:7 Exp:SAT1



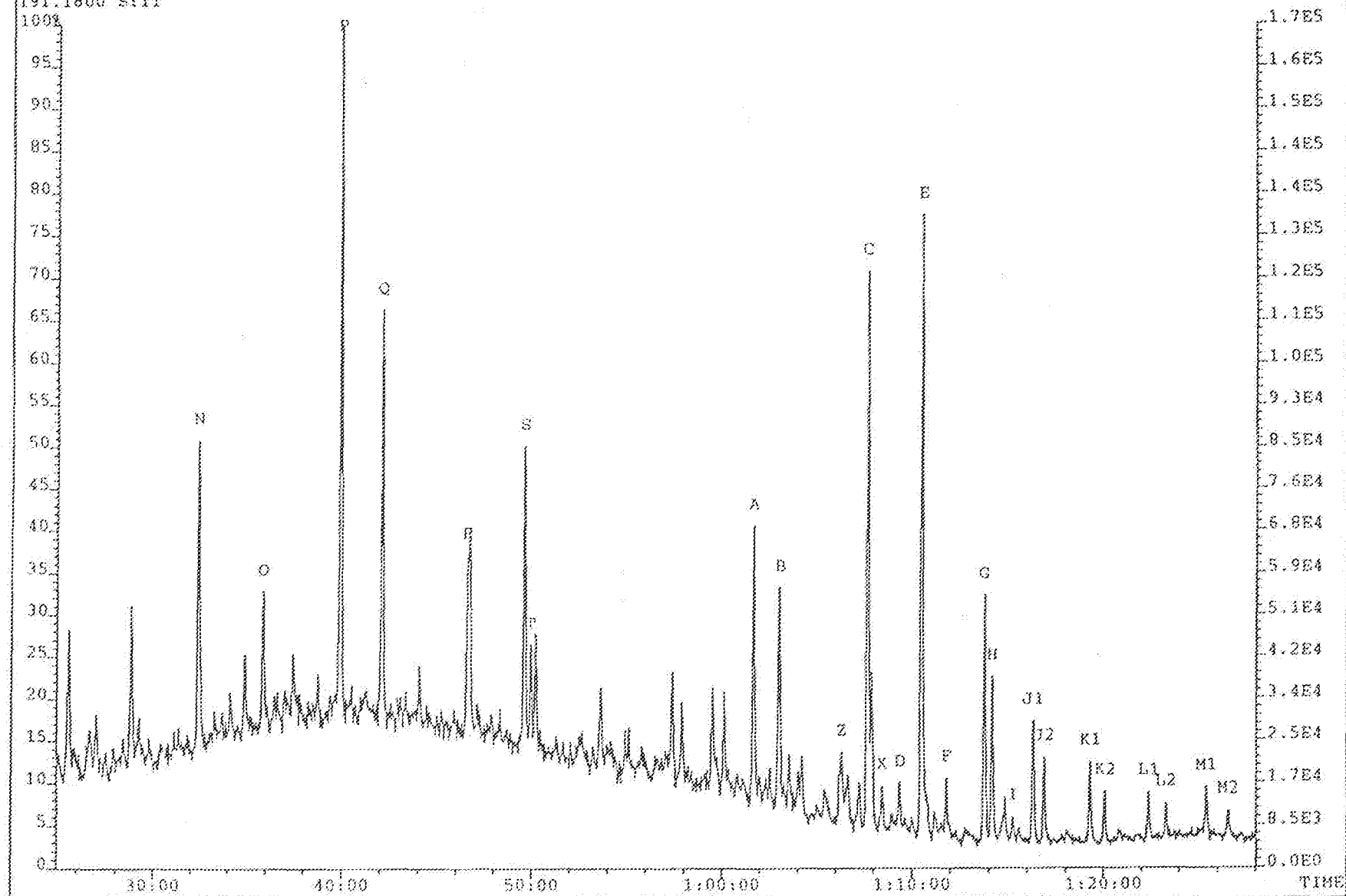
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
 Sample#11 Text:WELL 34/10-35, 4257.47M, SATURATED FRACTION
 191.1800 S:11

Exp:SAT1



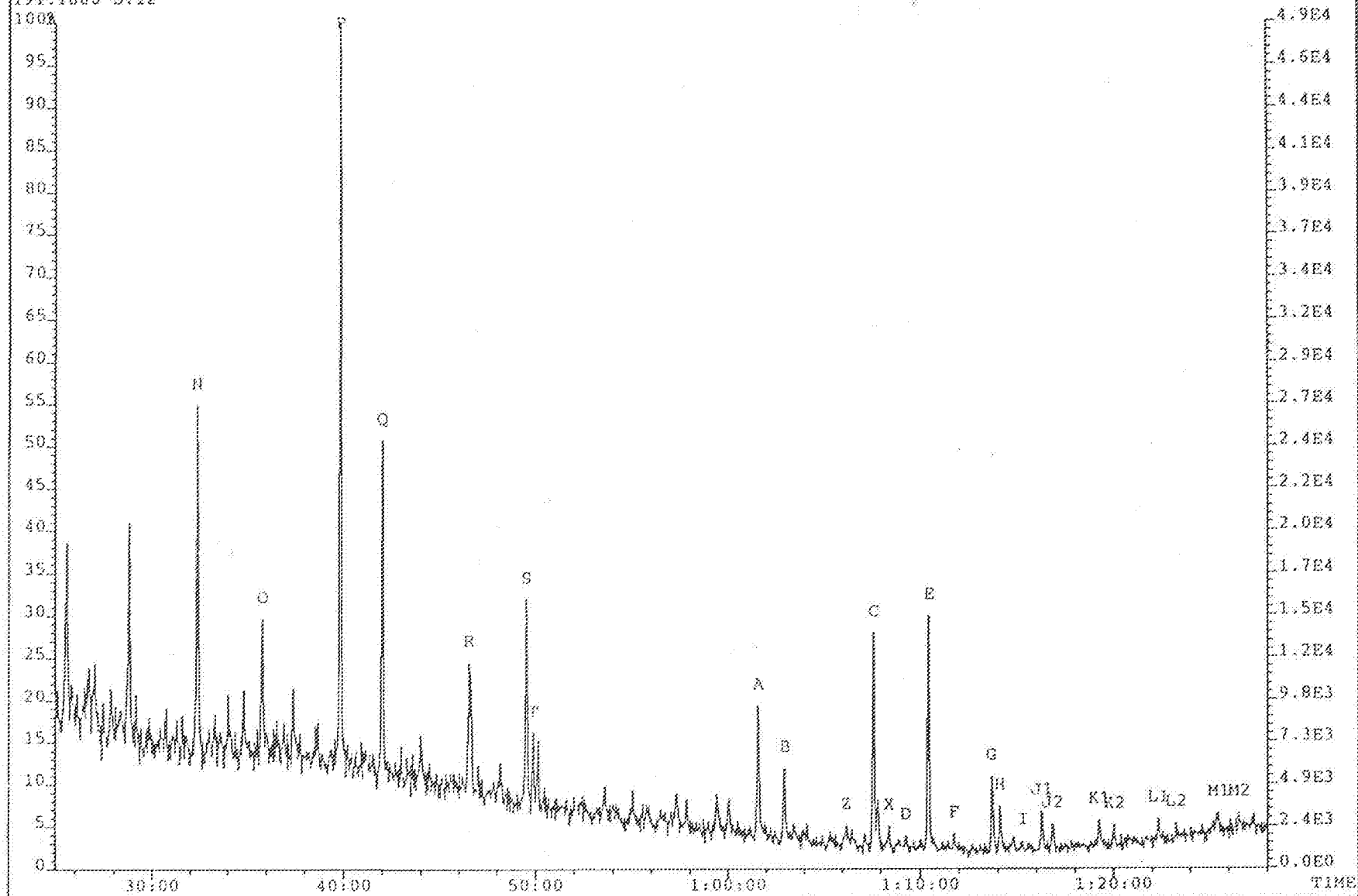
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4741 Acq: 22-SEP-1992 14:23:15 E14 Magnet SIR
 Sample#12 Text: WELL J4/10-35, 4270.75M, SATURATED FRACTION
 191.1800 S:12

Exp: SAT1



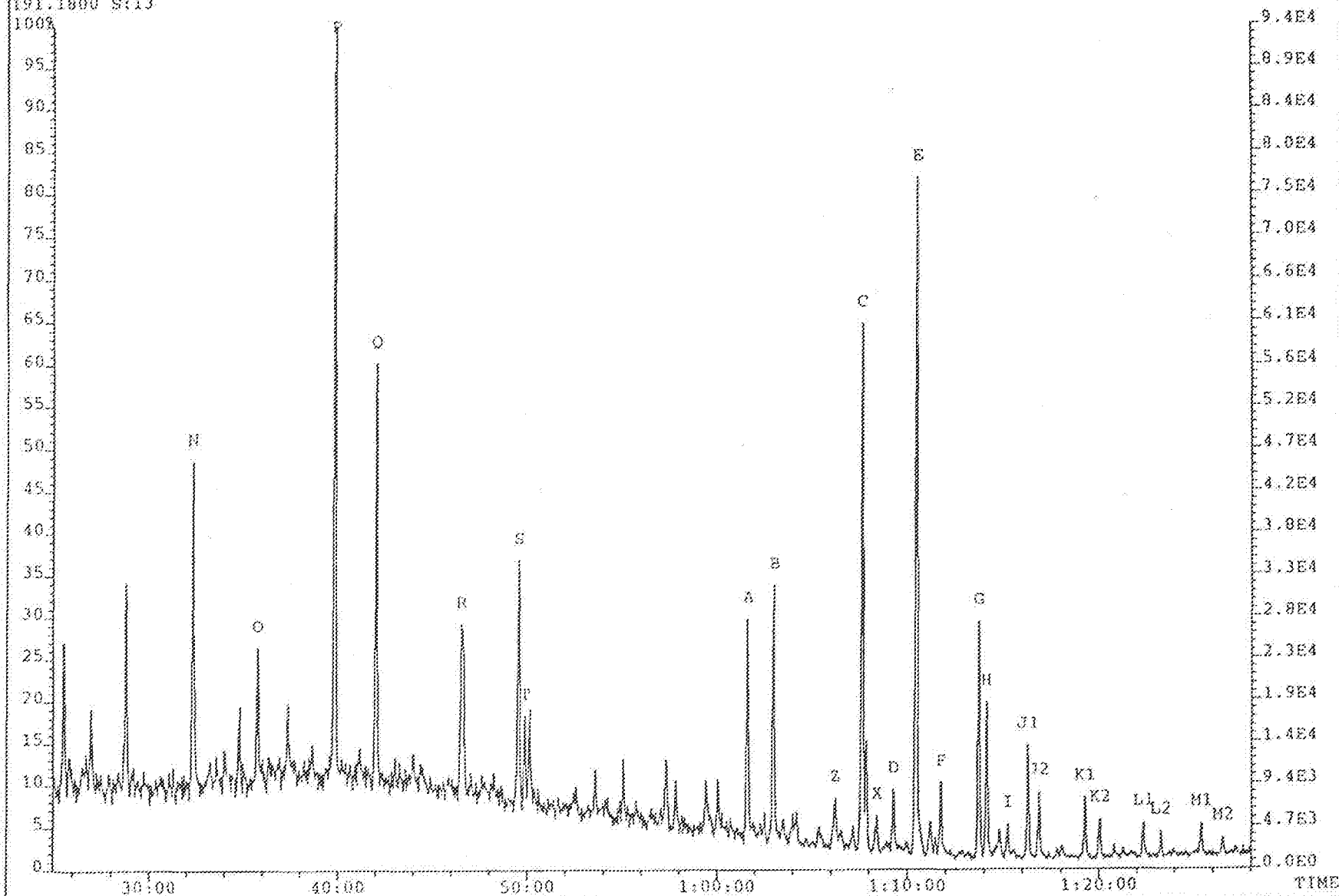
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992,14:21:15 ET+ Magnet SIR
Sample#13 Text:WELL 34/10-35, 4281.49M, SATURATED FRACTION
191.1800 S:13

Exp:9AT1

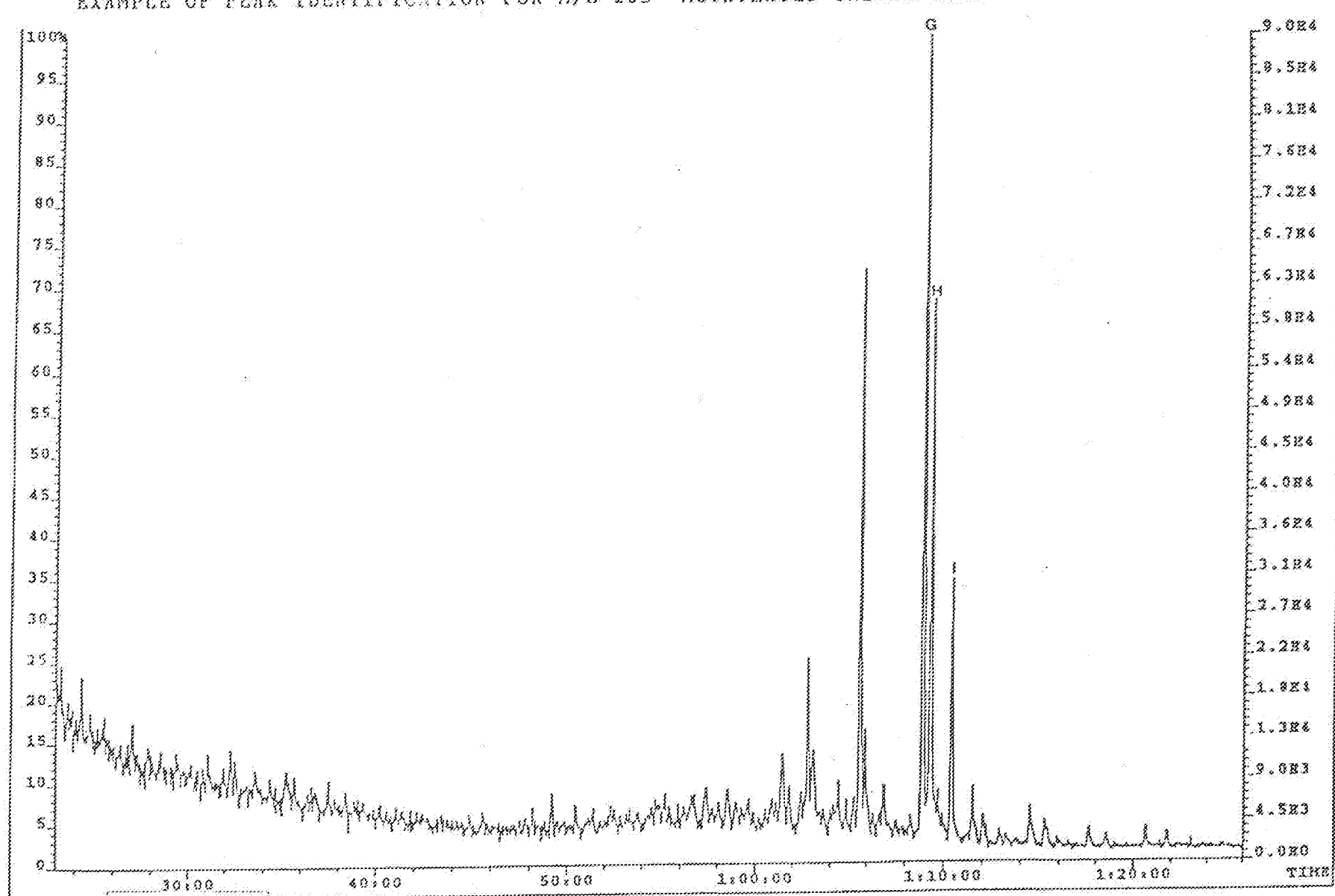


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GEOLAB NOR

EXAMPLE OF PEAK IDENTIFICATION FOR M/Z 205 METHYLATED TRITERPANES

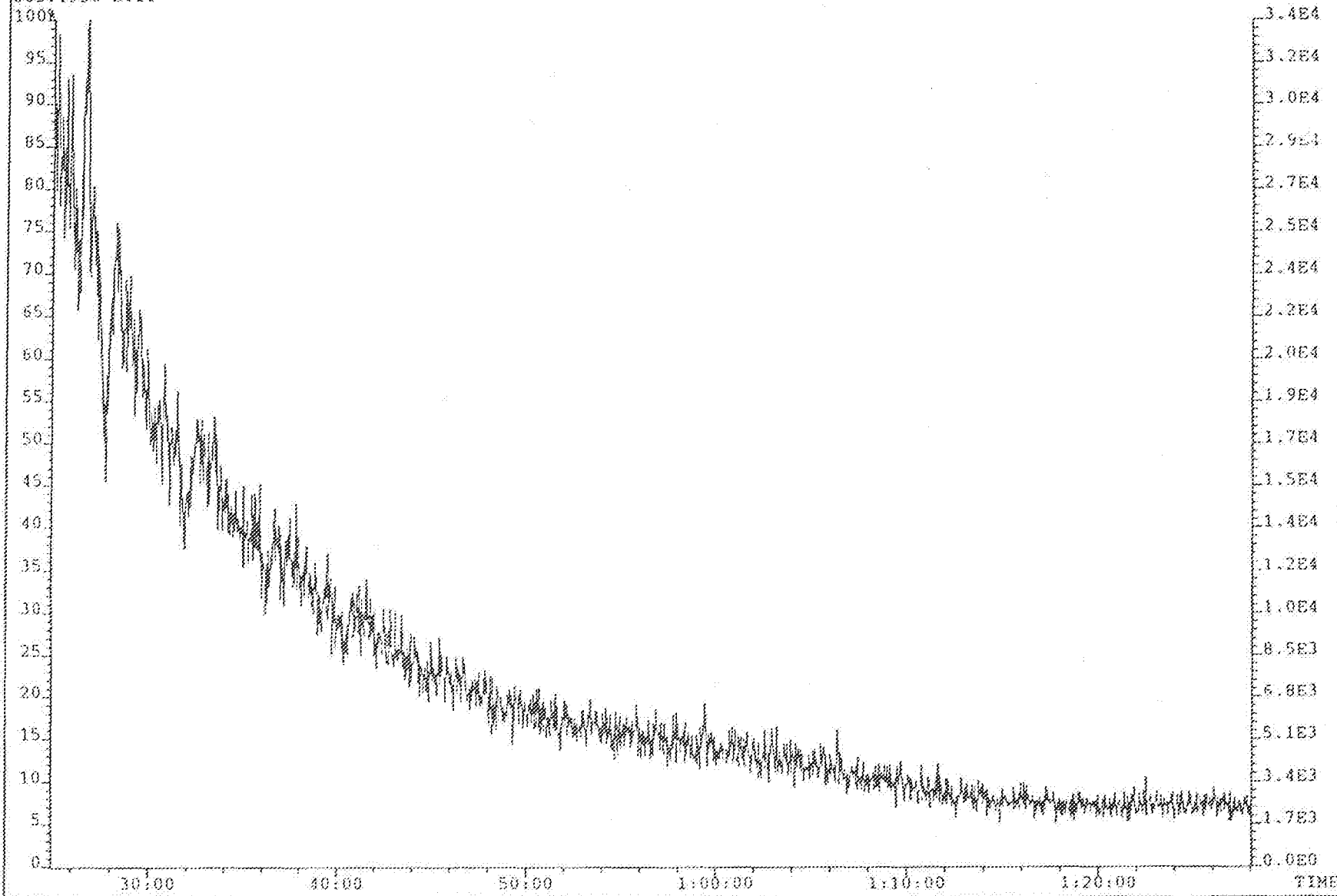


Schlumberger

GECO-PRAKLA

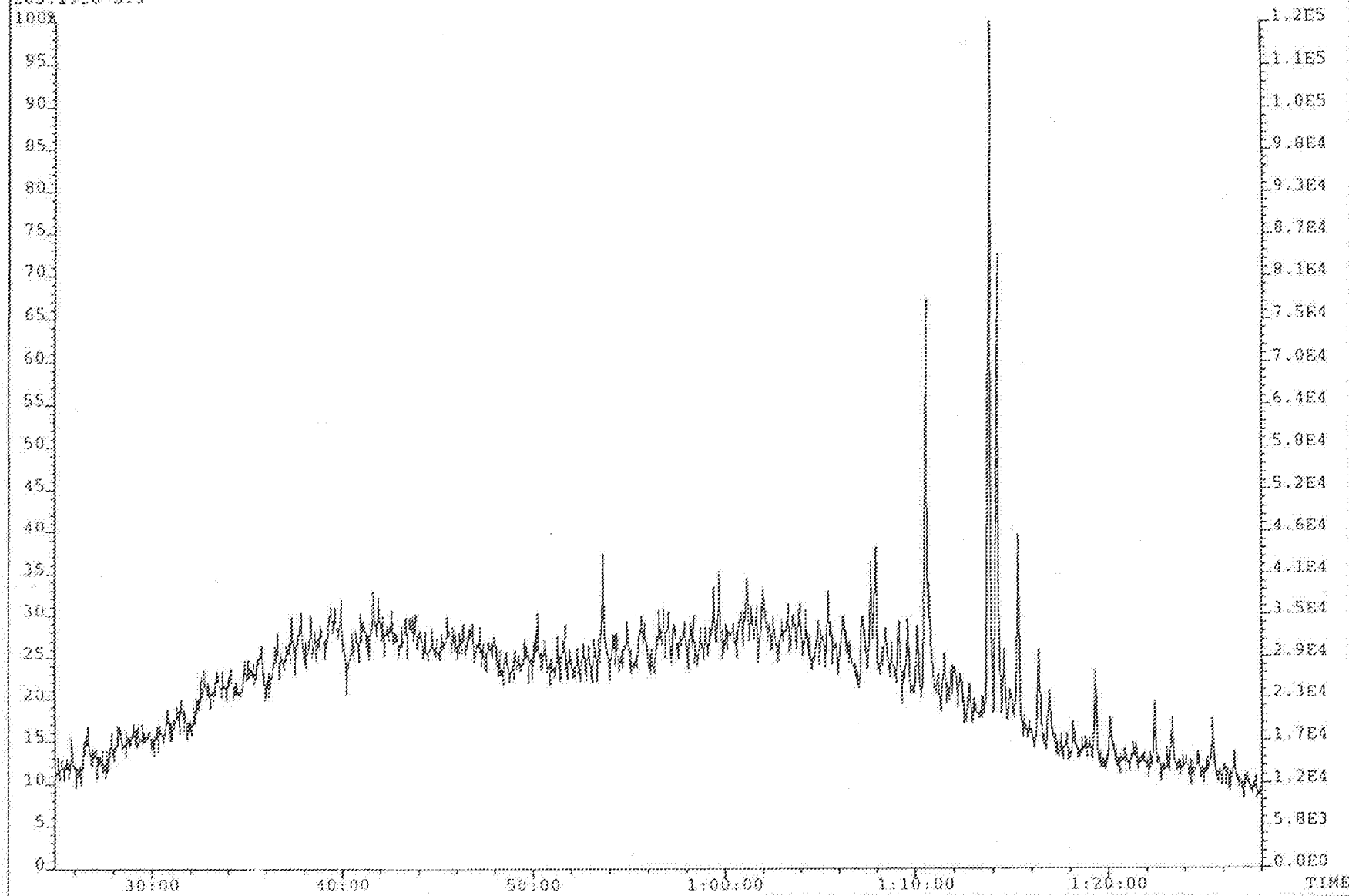
GEOLAB NOR

File:STATSAT3 #1-4739 Acq:23-SEP-1992 12:20:58 E14 Magnet SIR
Sample#10 Text:WELL 34/10-35, OLJE OVER MUD, 3496-3504M, SAT. FRAC. FROM OIL Exp:SAT1
205.1956 S:10



File:STATSAT2 E1-4739 Acq:22-SEP-1992 12:15:05 E1+ Magnet SIR
Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
205.1956 S:3

Exp:SAT1



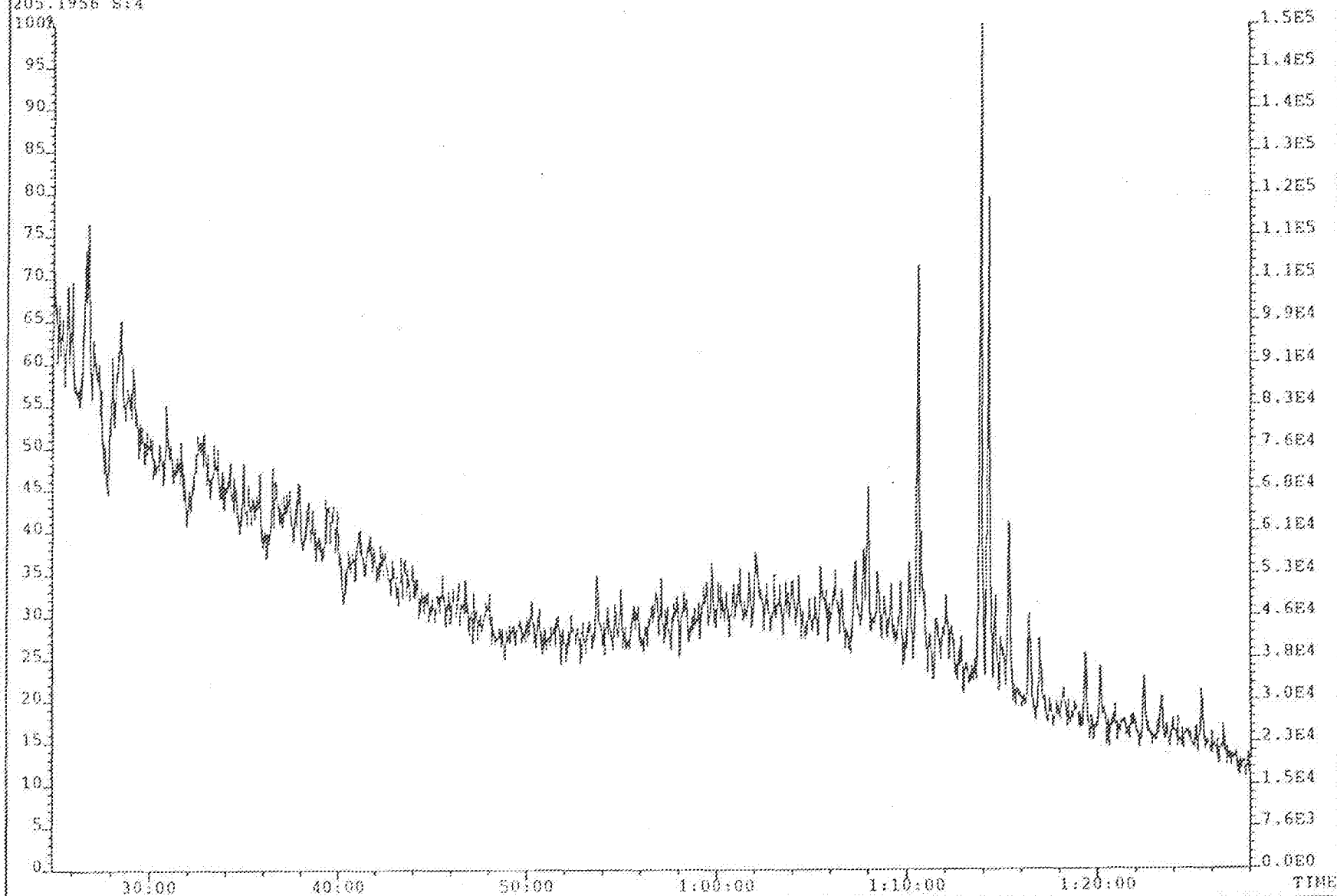
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 12:15:05 EI: Magdoff SIR
Sample#4 Text:WELL 34/10-35, 3831M, SATURATED FRACTION
205.1956 S:4

Exp: SAT1



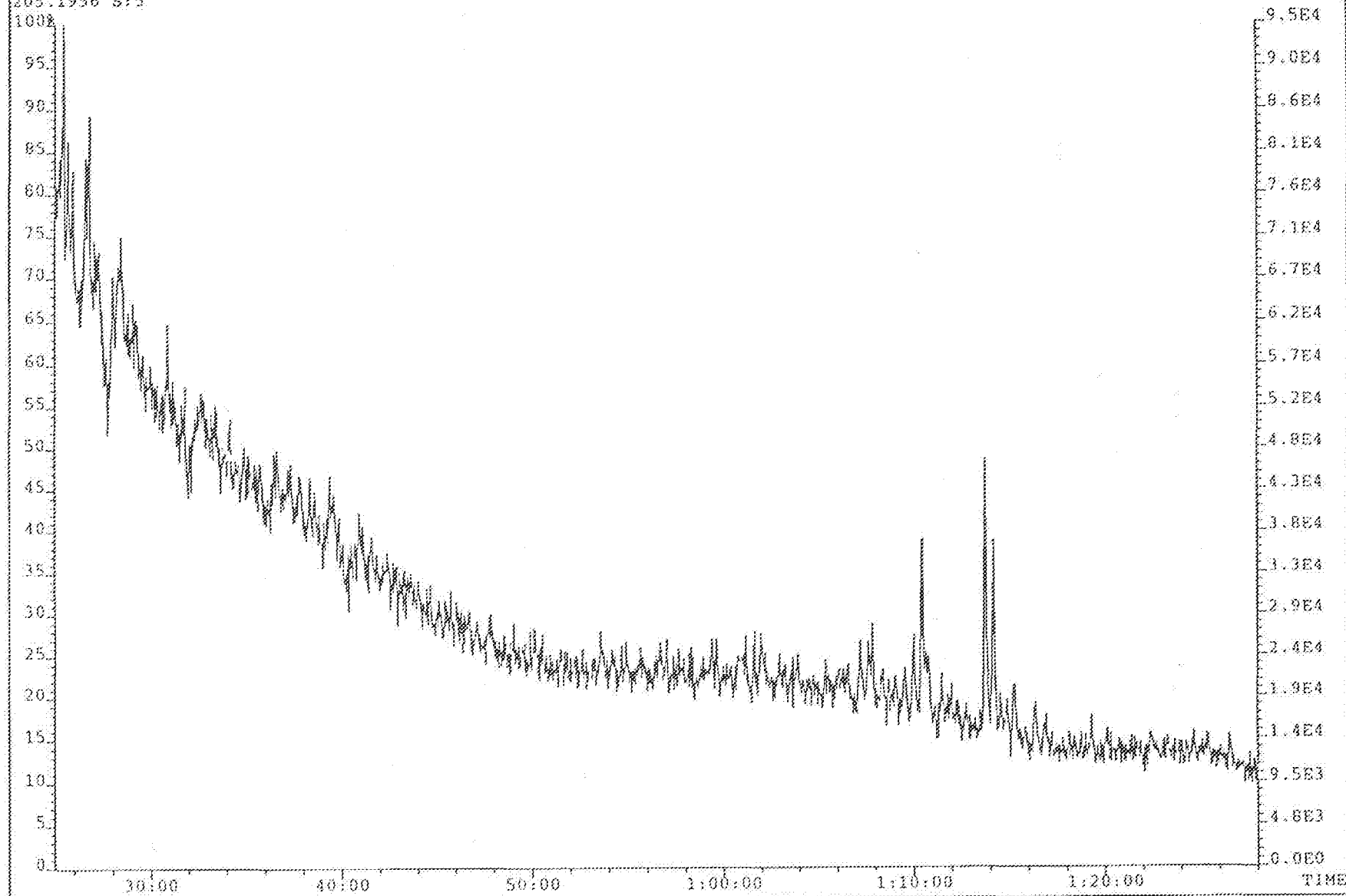
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 41-4740 Acq:22-SEP-1997 12:15:05 EI: Magnet SIR
Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
205.1956 S:5

Exp:SAT1



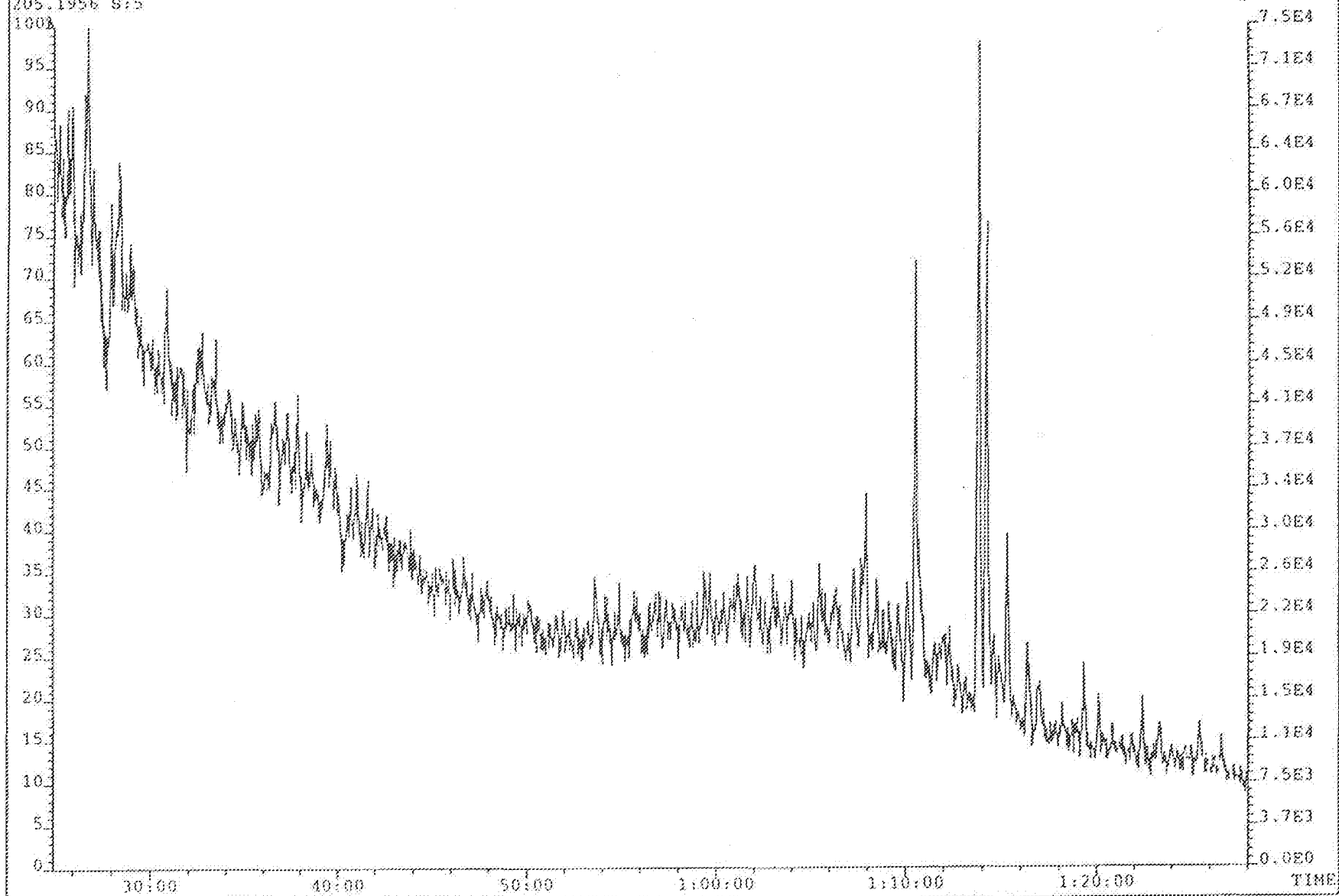
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT3 #1-4739 Acq: 23-SEP-1997 12:20:58 EI+ Magnet SIR
Sample#5 Text: WELL 34/10-35, 3885M, SATURATED FRACTION
205.1956 S:5

Exp: SAT1



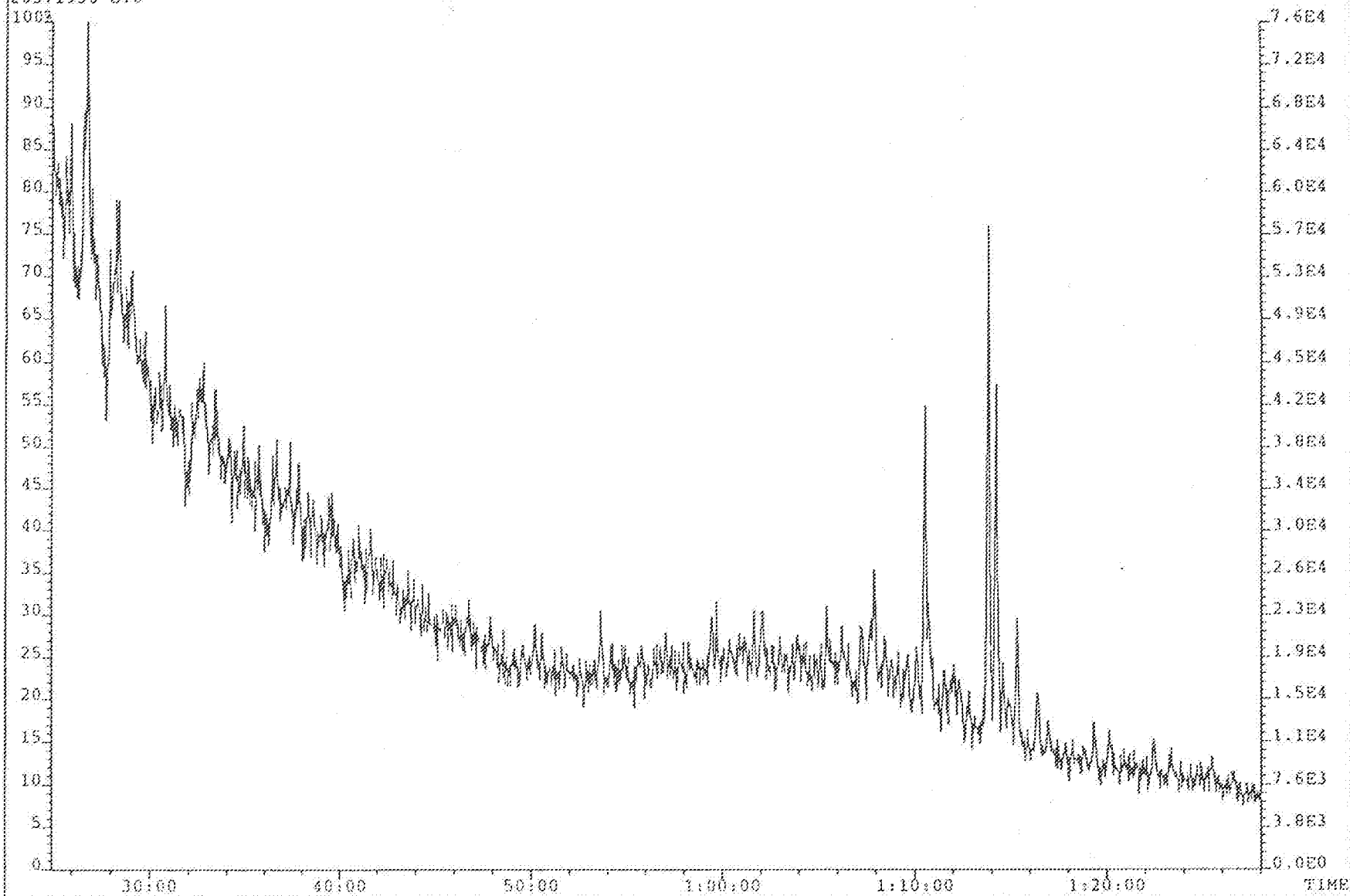
Schlumberger

GECO-FRAKLA

GEOLAB NOR

File: STATSAT1 W1-4740 Acq: 23-SEP-1992 12:20:50 ET+ Magnet SIR
Sample#6 Text: WELL 34/10-35, 3894M, SATURATED FRACTION
205.1956 S:6

Exp: SAT1



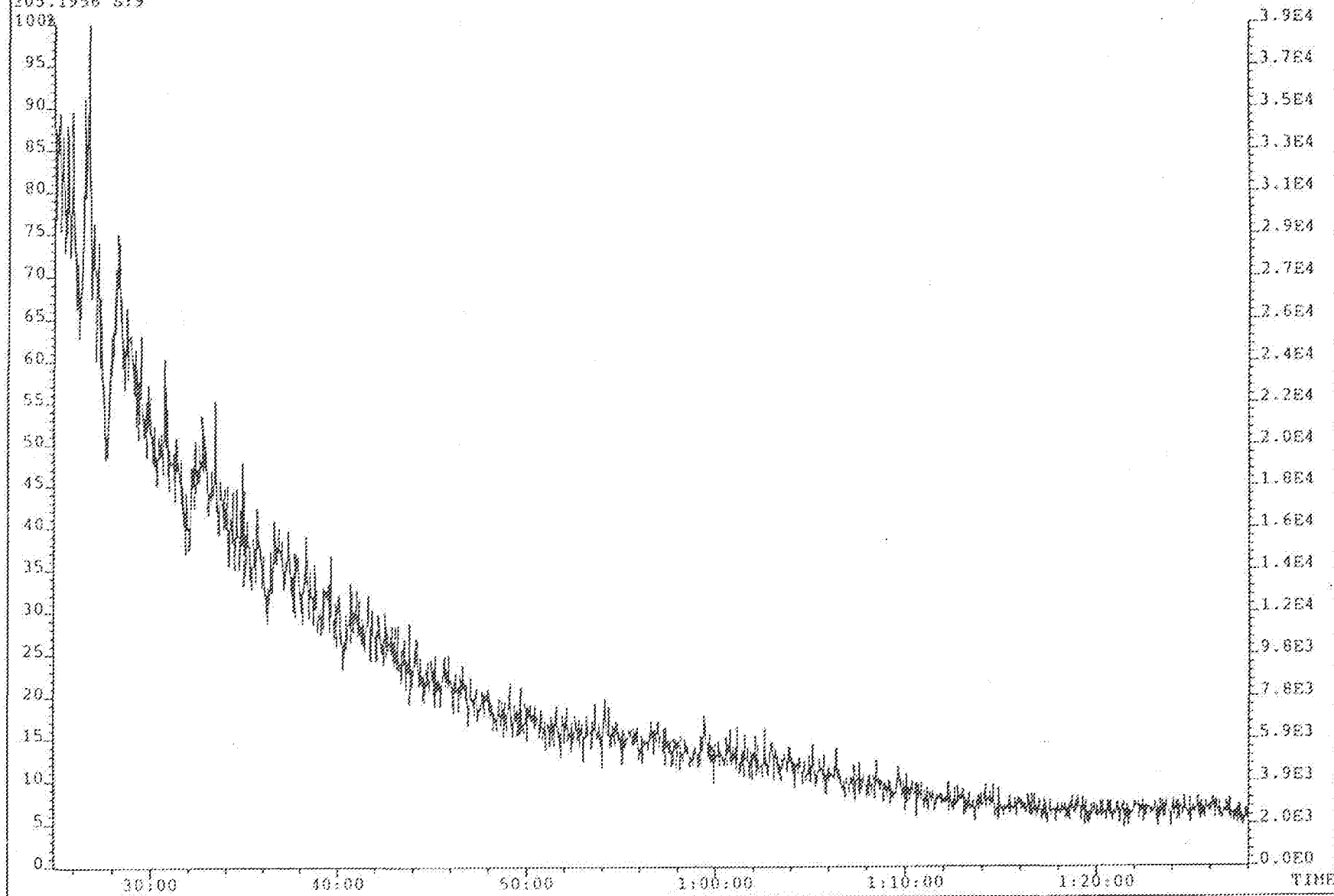
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 W1-4740 Acq:23-SEP-1992 12:20:58 BY: Magnet SIR
Sample#9 Text:WELL 34/10-35, DST3, 3920-29M, SATURATED FRACTION FROM OIL
205.1956 S:9

Exp:SAT1



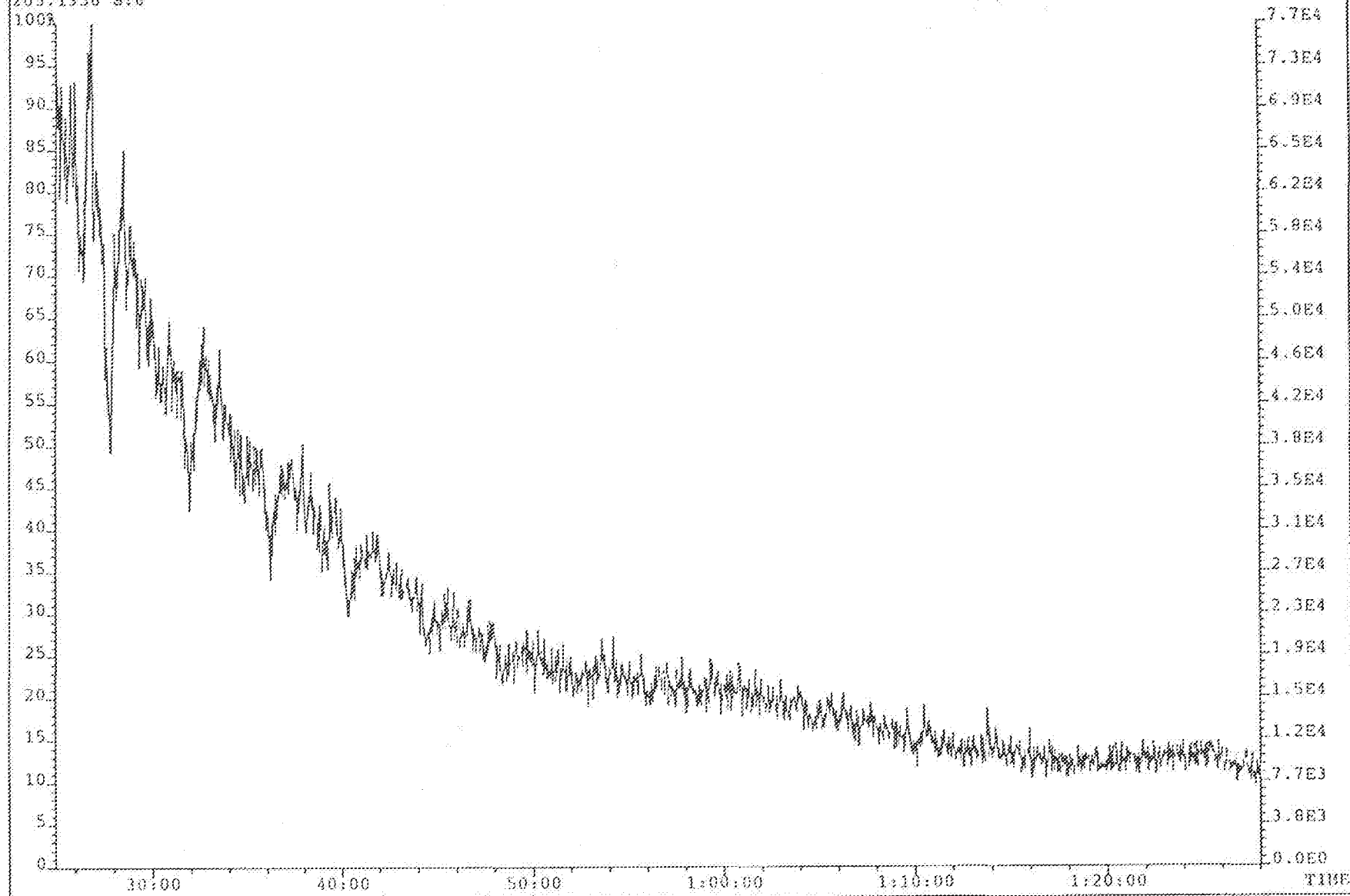
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 W1-4739 Acq:22-SEP-1992 12:15:05 ET: Magnet SIR
Sample#6 Text:WELL 34/10-35, 3931.71M, SATURATED FRACTION
205.1956 S:6

Exp:SAT1



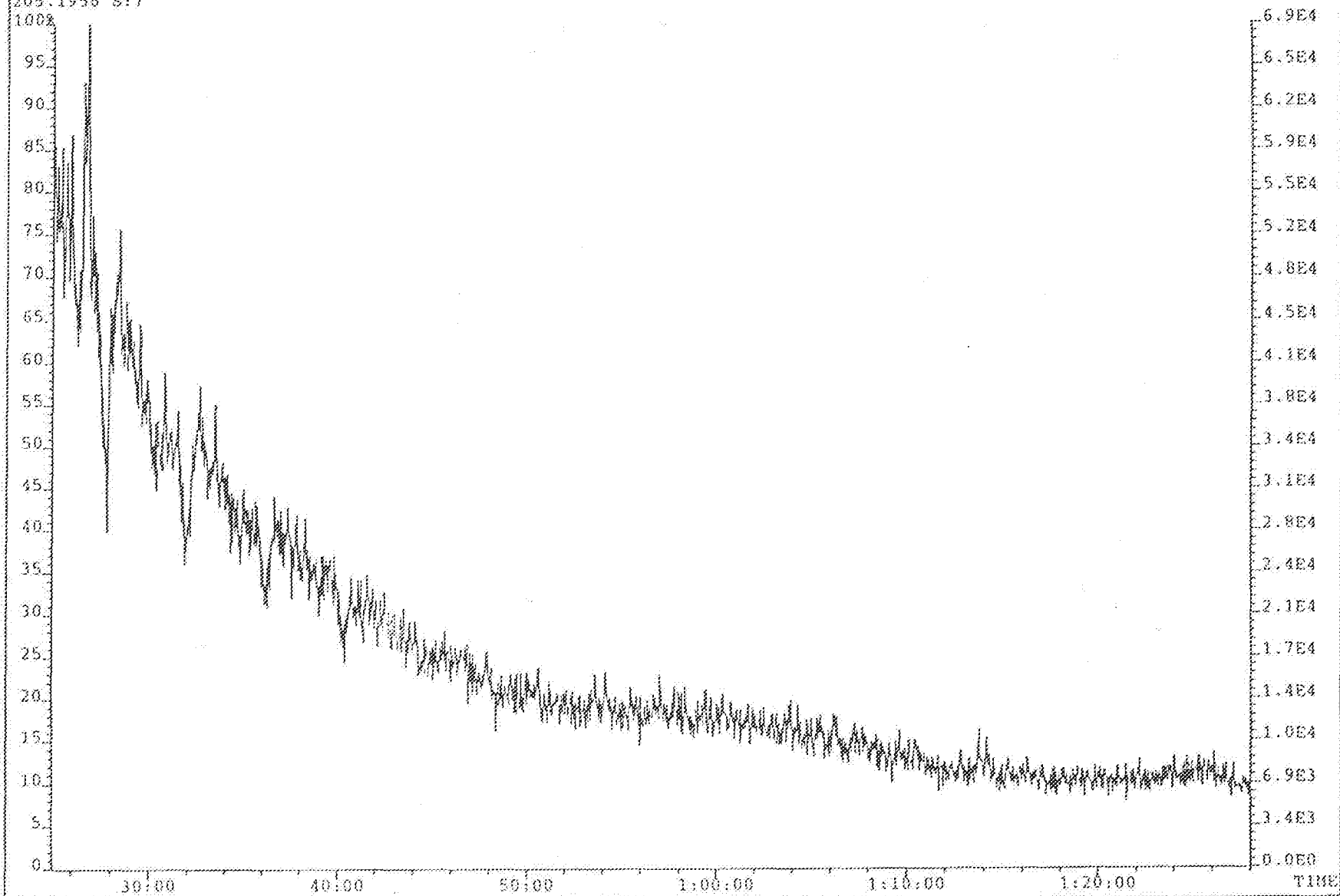
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
205.1956 S:7

Exp: SAT1



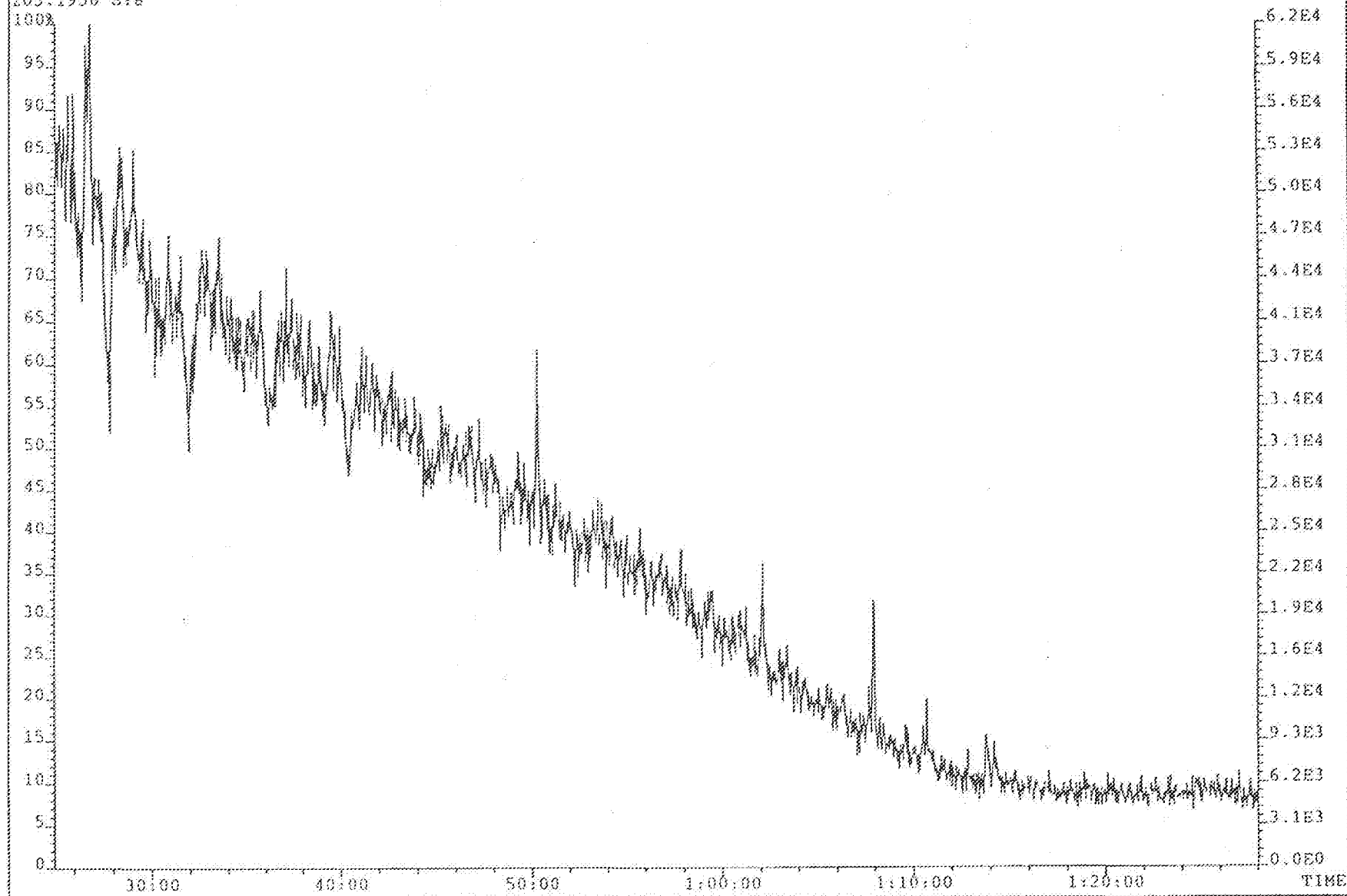
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#8 Text:WELL 34/10-35, 3994.0SM, SATURATED FRACTION
205.1956 S:8

Exp:SAT1

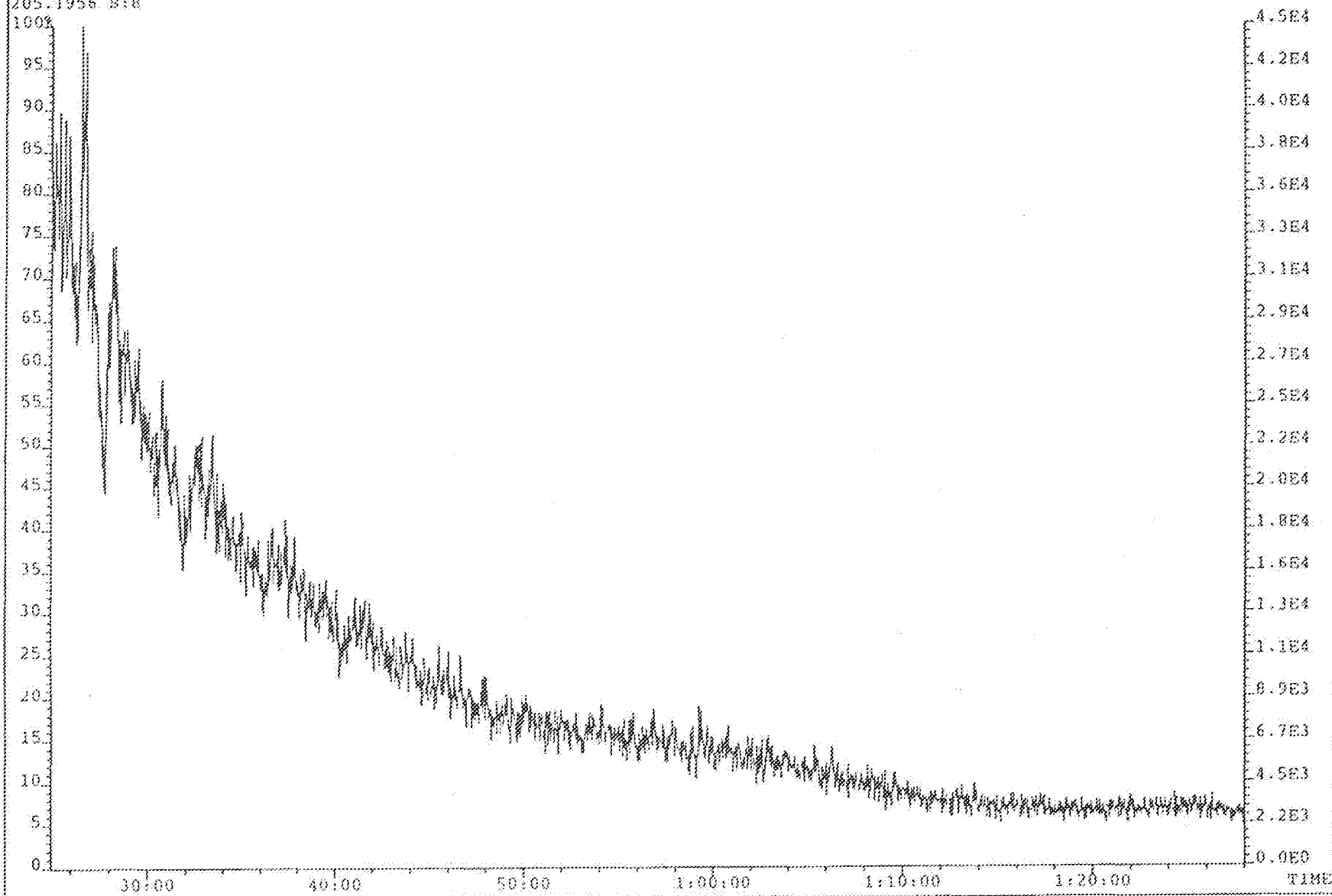


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 RI-4740 Acq:23-SEP-1992 12:20:58 E1+ Magnet SIR
Sample#8 Text:WELL 34/10-35, DST2, 1984-1995M, SATURATED FRACTION FROM OIL Exp:SAT1
205.1956 B:B



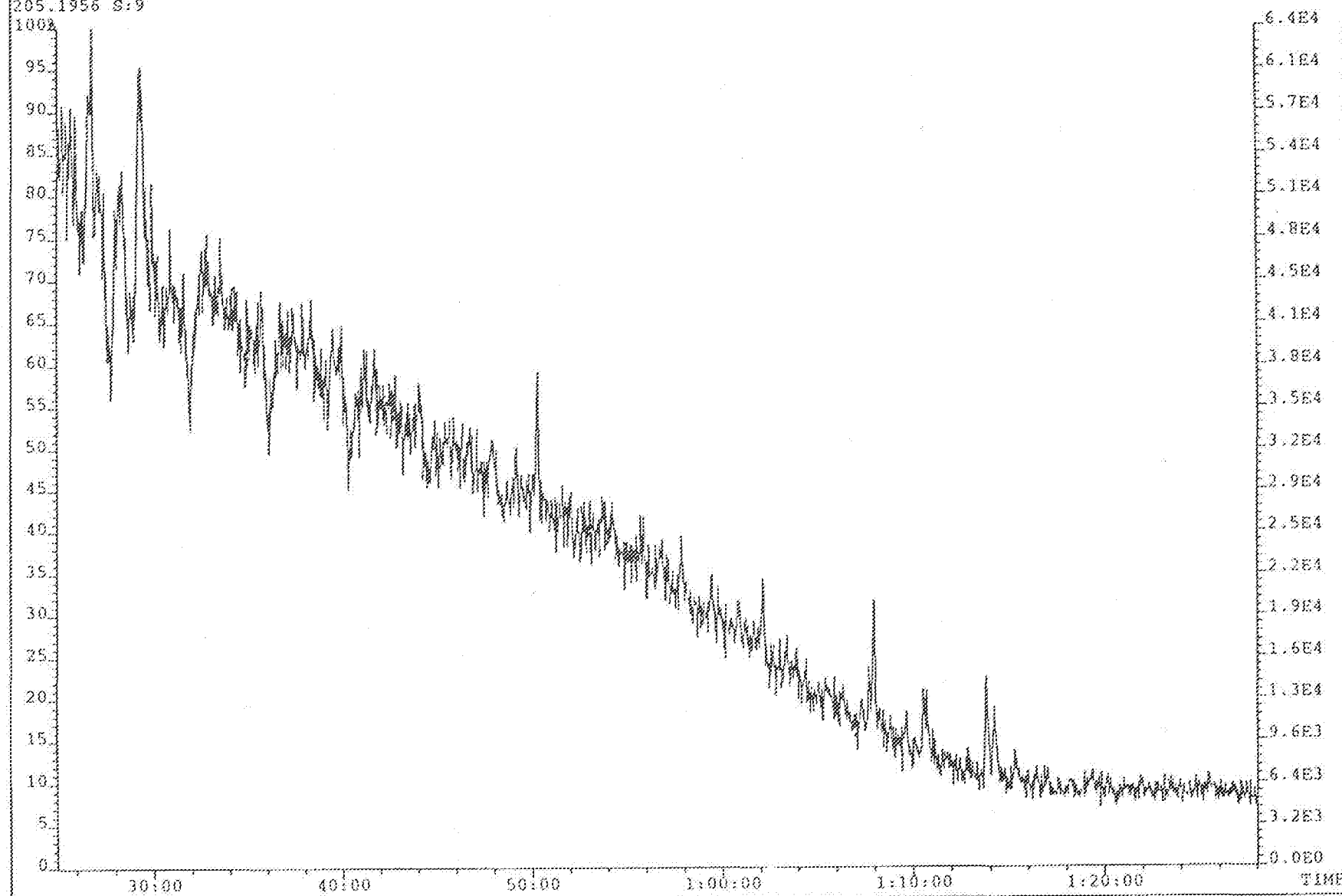
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#9 Text:WELL 14/10-15, 4006.17M, SATURATED FRACTION
205.1956 S:9

Exp:SAT1



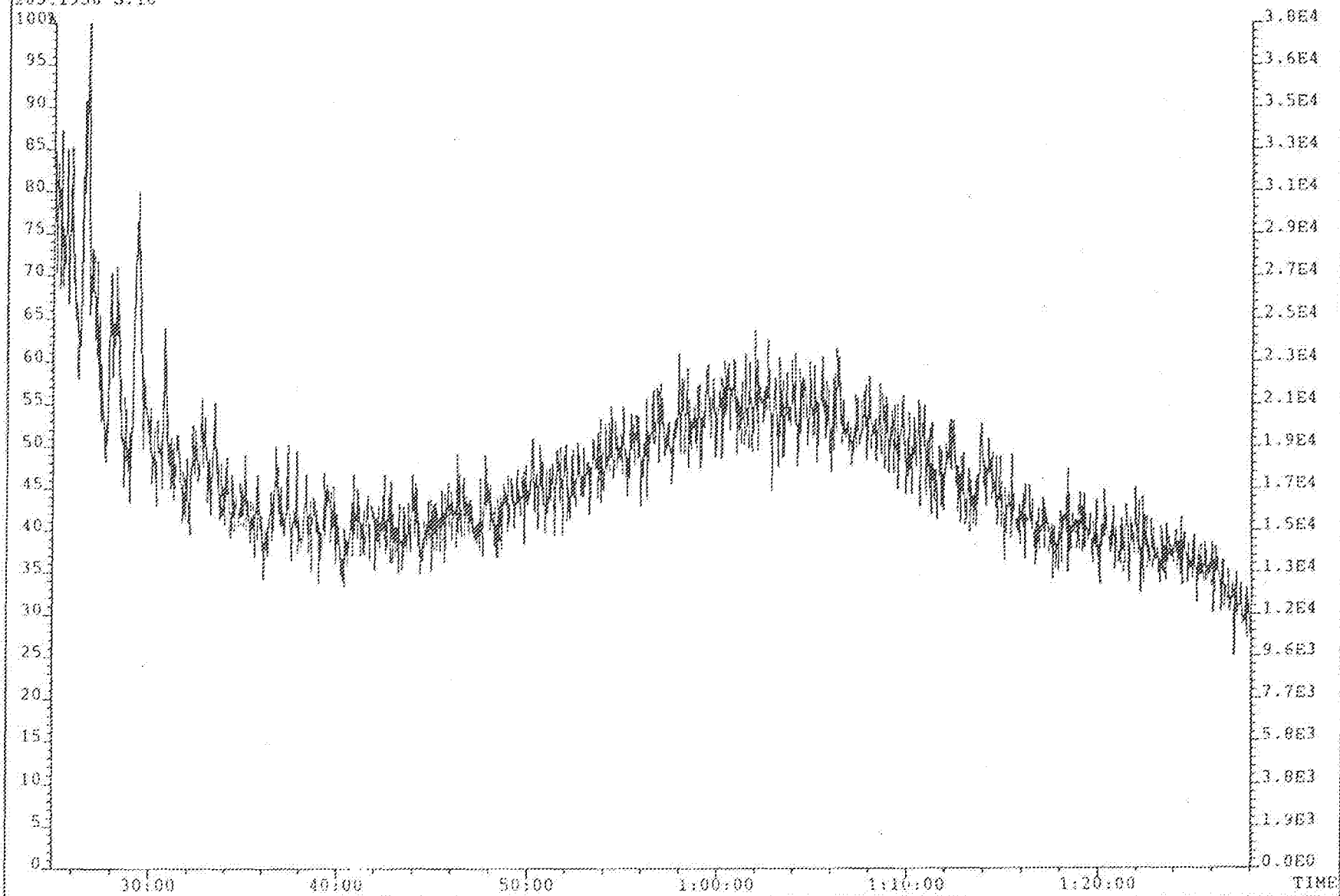
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, 4021.93M, SATURATED FRACTION
205.1956 S:10

Exp:SAT1

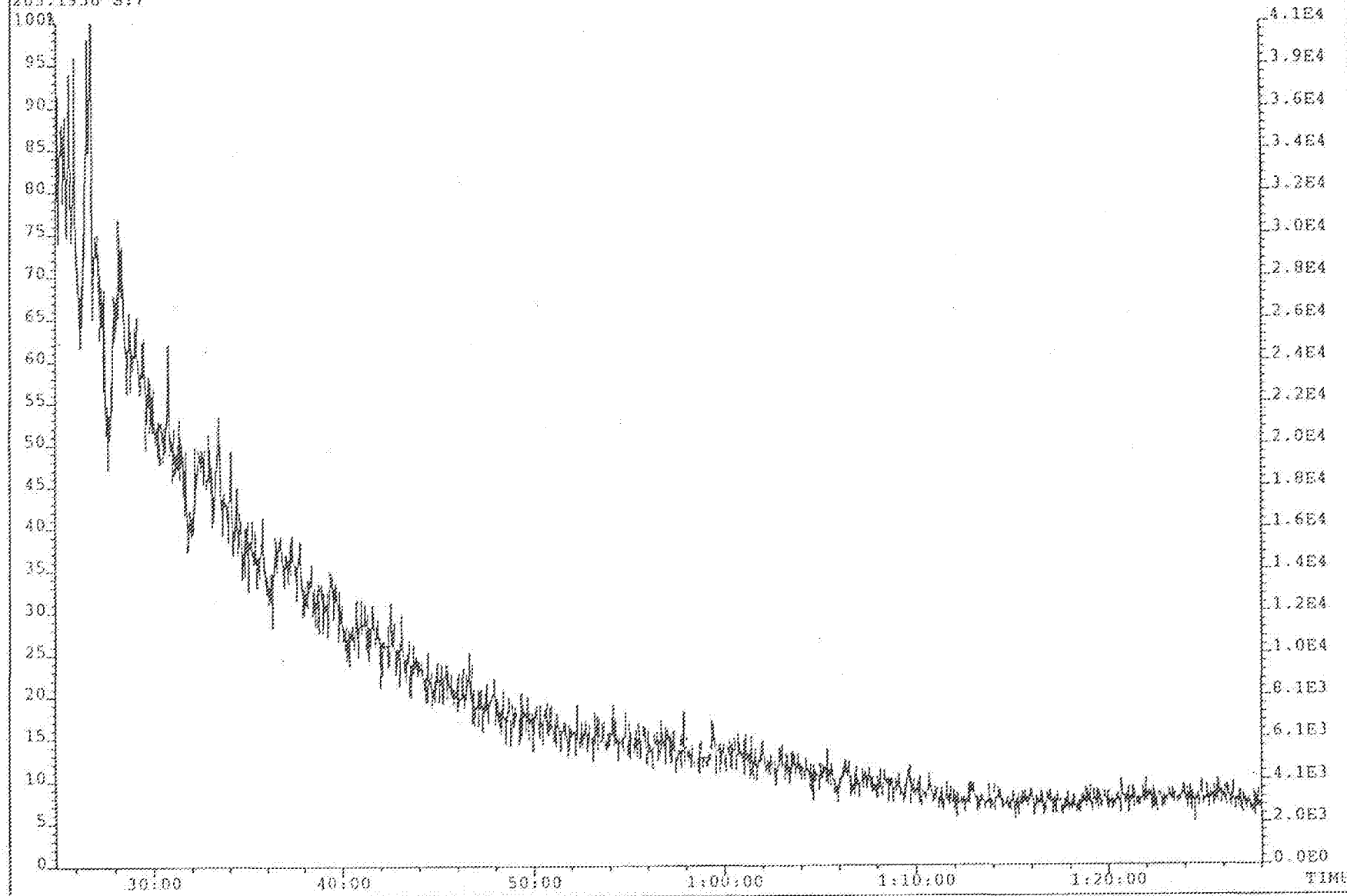


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 W1-4740 Acq:23-SEP-1992 17:20:58 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL Exp:SAT1
205.1956 S:7



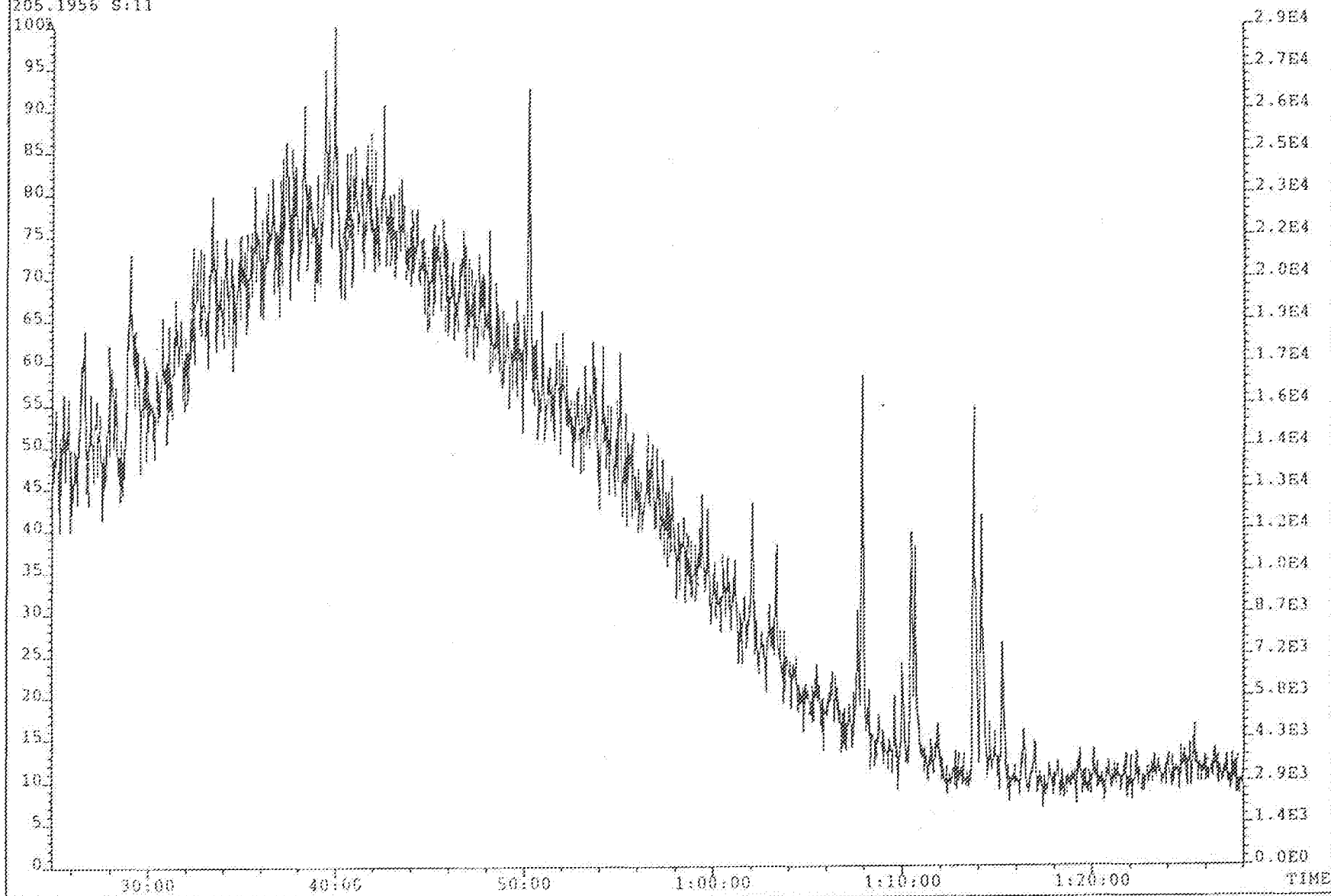
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 12:15:05 ET+ Magnet SIR
Sample#11 Text:WELL 34/10-3S, 4257.47M, SATURATED FRACTION
205.1956 S:11

Exp:SAT1



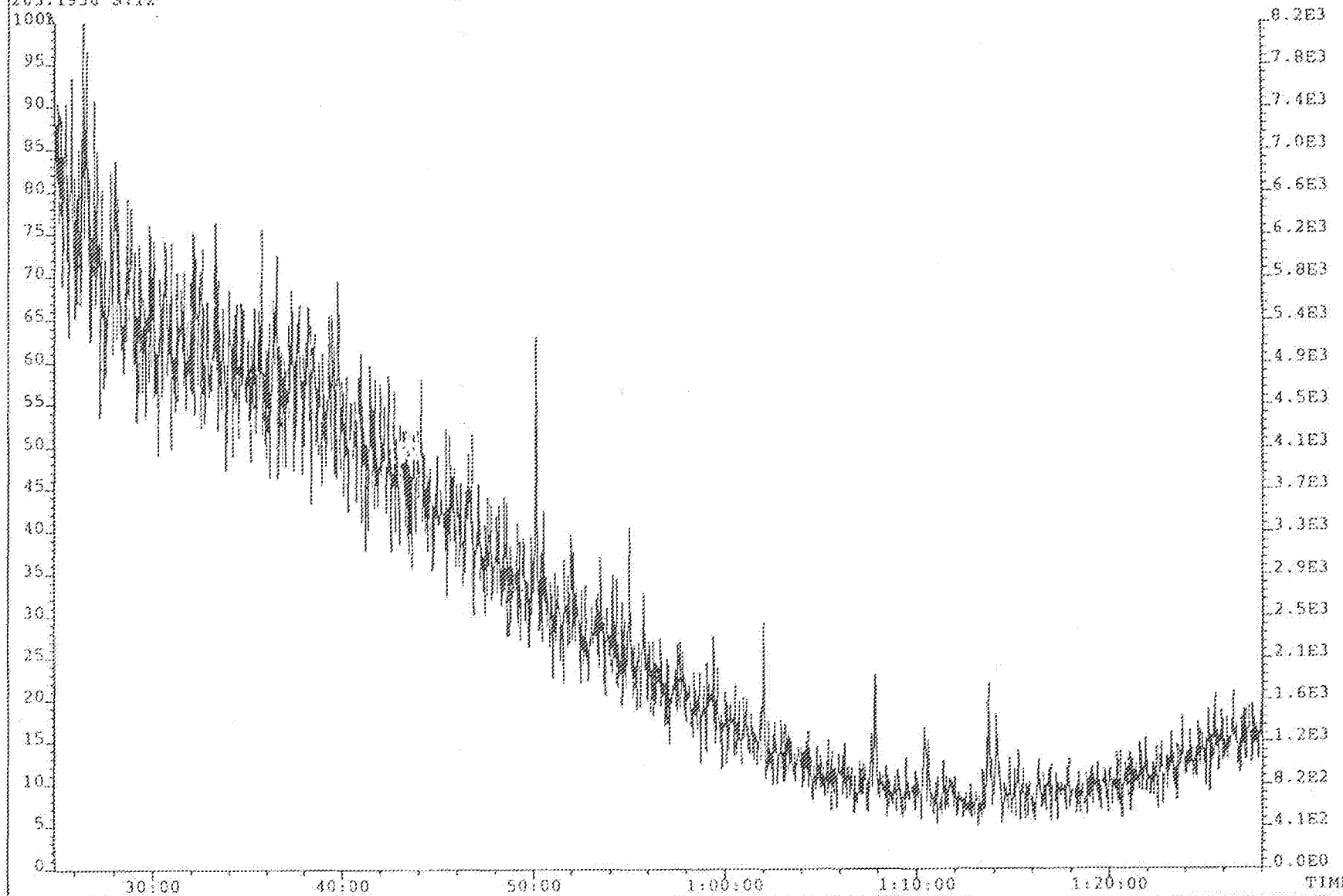
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-3741 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#13 Text:WELL 34/10-35, 4270.9SM, SATURATED FRACTION
205.1956 S:12

Exp:SAT1



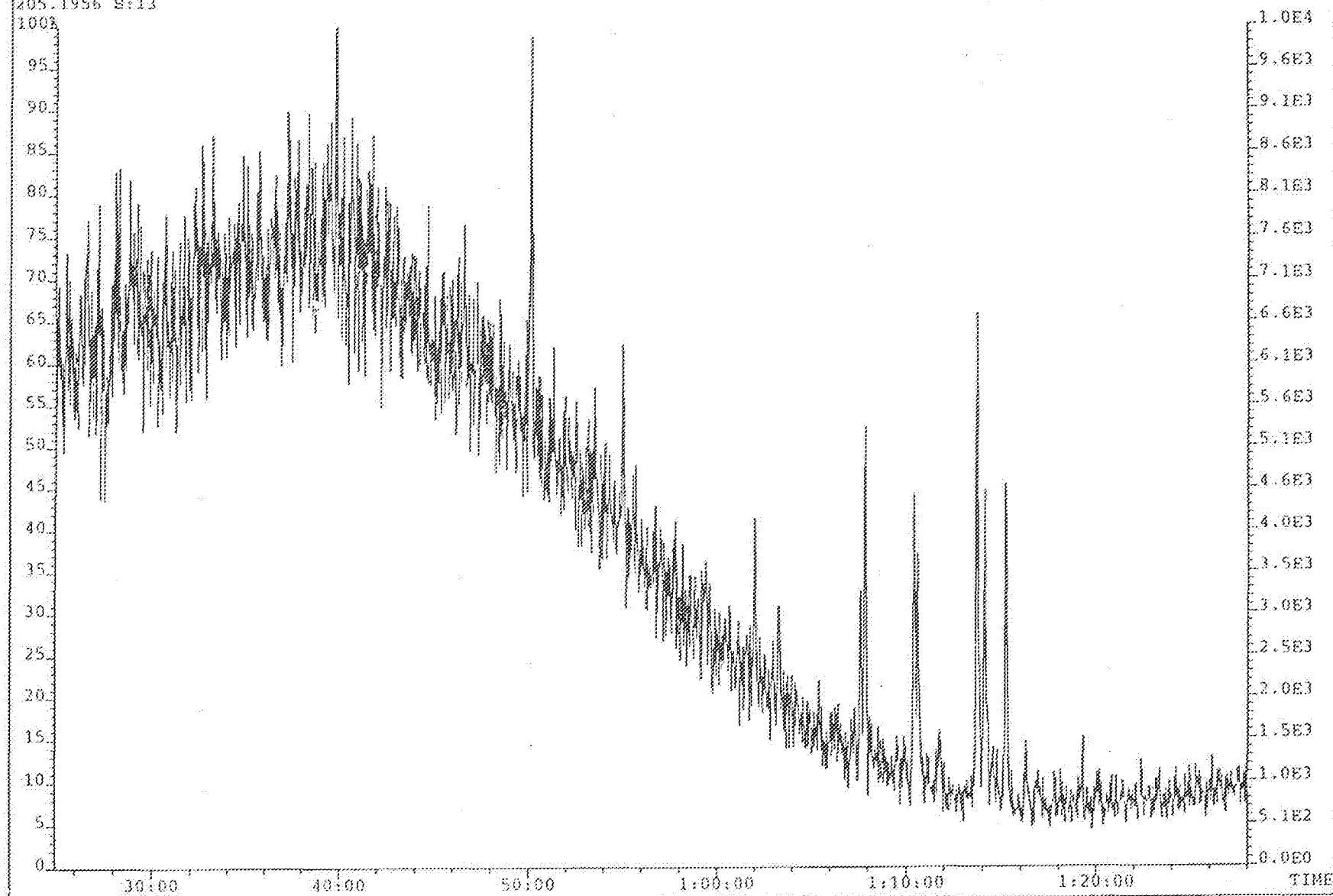
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 W1-4740 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIN
Sample#13 Text:WELL 34/10-15, 4283.46M, SATURATED FRACTION
205.1956 S:13

Exp:SAT1

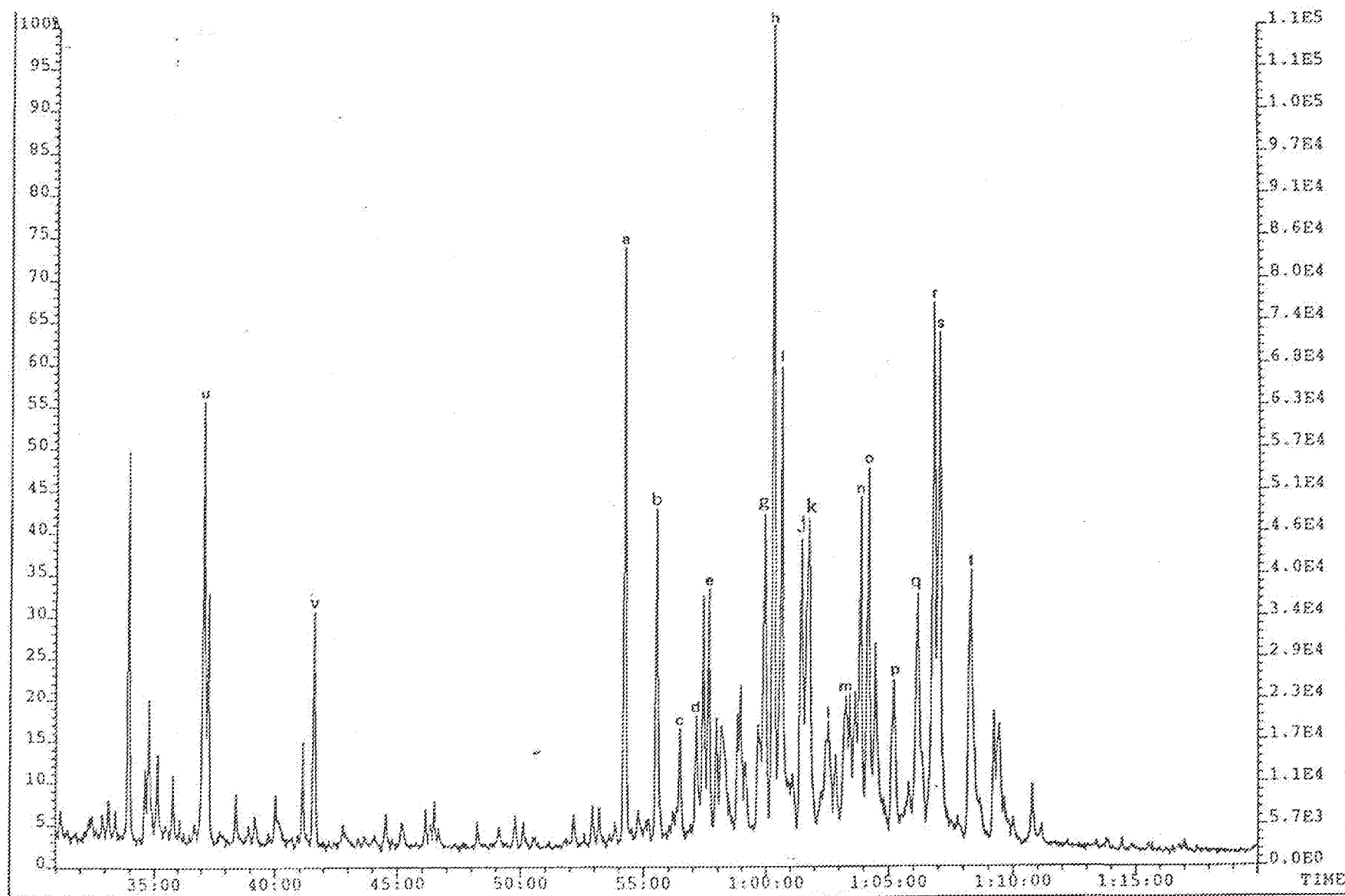


Schlumberger

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GEOLAB NOR

EXAMPLE OF PEAK IDENTIFICATION FOR M/Z 217 STERANES

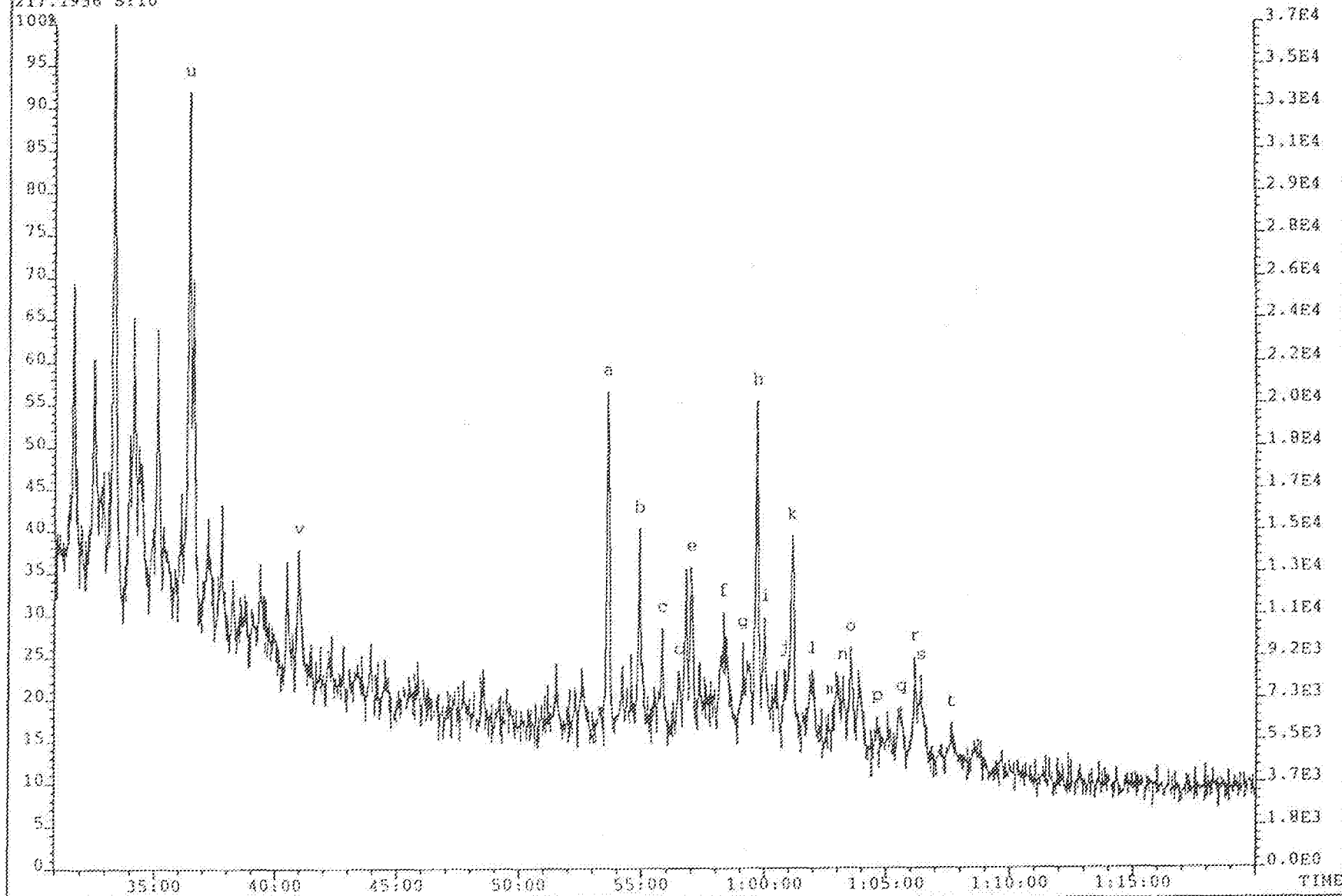


Schlumberger

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GEOLAB NOR

File:STATSAT3 W1-4739 Acq:23-SEP-1992 13:10:02 EI+ Magnet G1R
 Sample#10 Text:WELL 34/10-35, OLJE OVER MUD, 3496-3504M, SAT. FRAC. FROM OIL Exp:SAT1
 217.1956 S:10



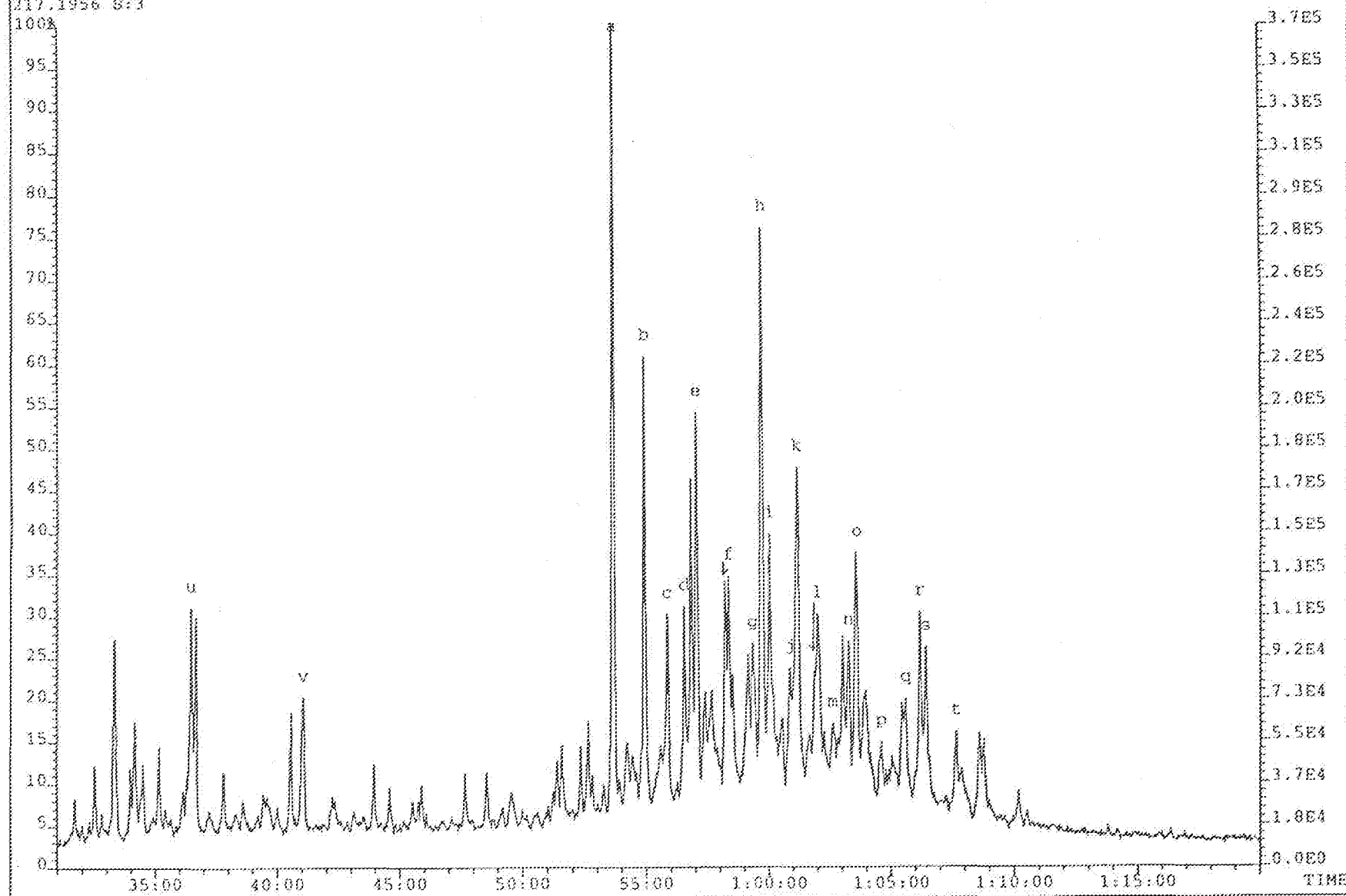
Schlumberger

GECO-PRAKLA

GEOLAB NOR

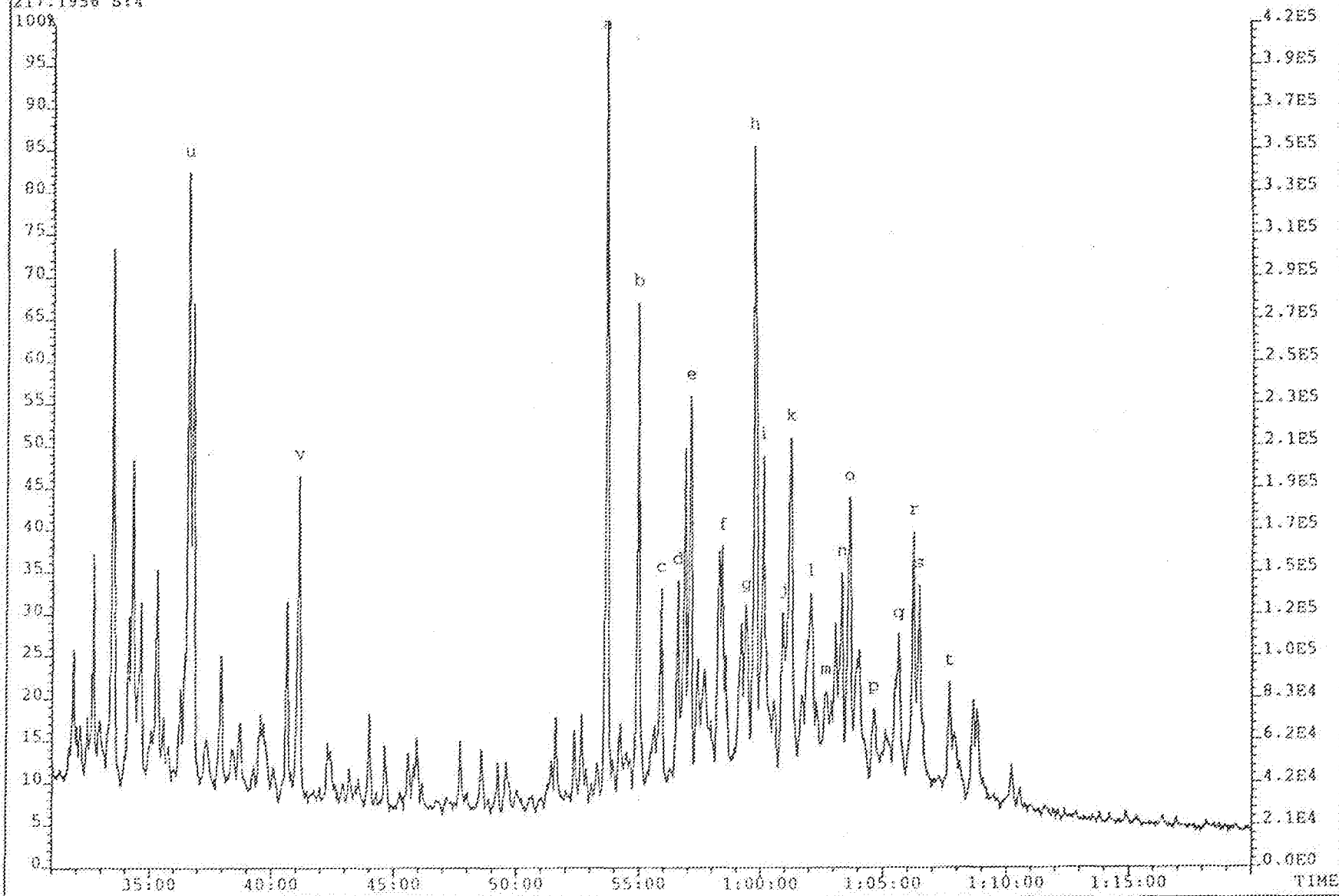
File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:21:15 EI+ Magnet SIR
 Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
 217.1956 3:3

Exp:SAT1



File:STATSAT2 FI-4740 Acq:22-SEP-1992,14:23:15 EI+ Magnet S1H
Sample#4 Text:WELL 34/10-35, 1831M, SATURATED FRACTION
217.1956 S:4

Exp:SAT1



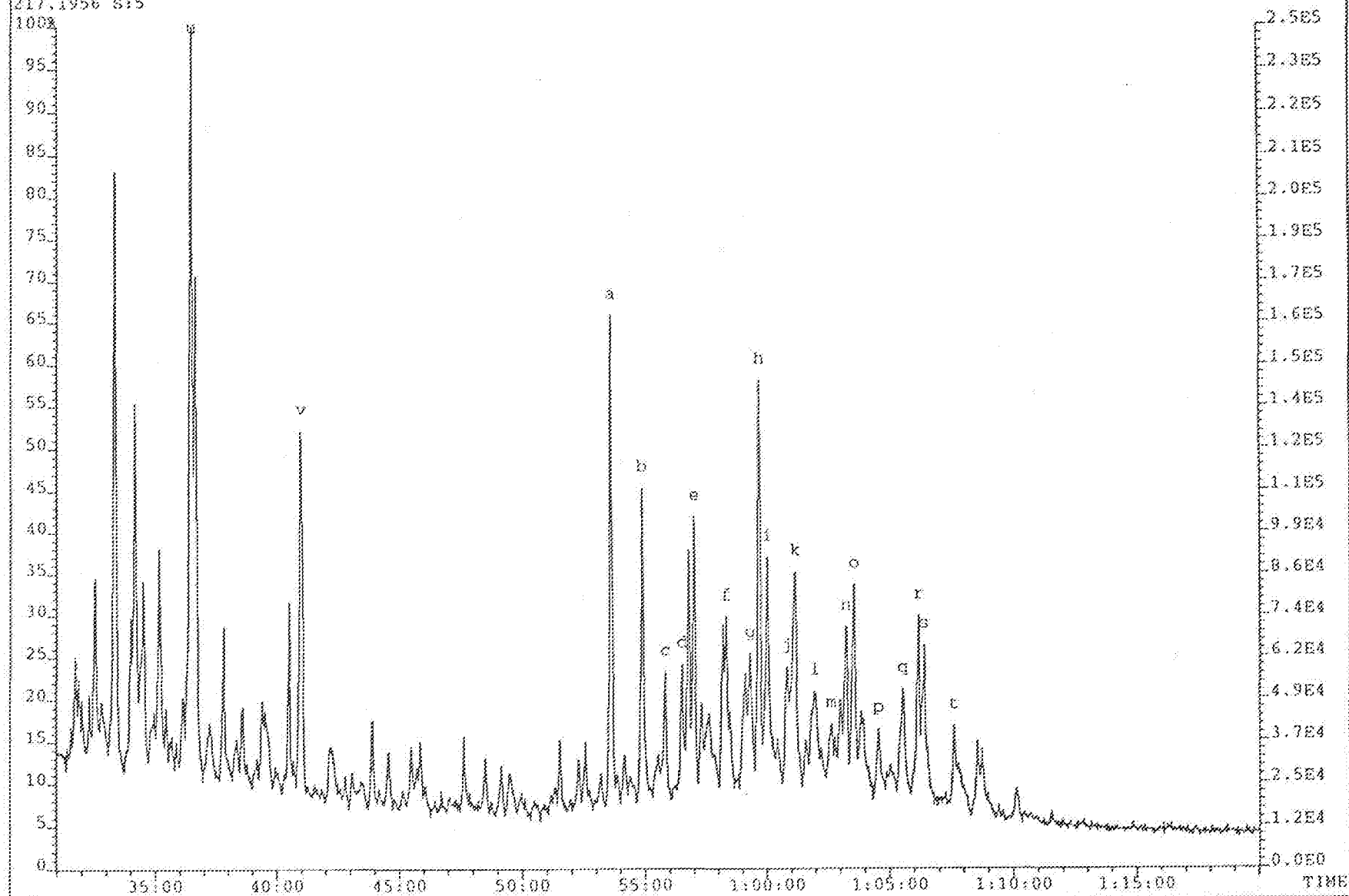
Schlumberger

GECO-PRAKLA

GEOLAB NOR

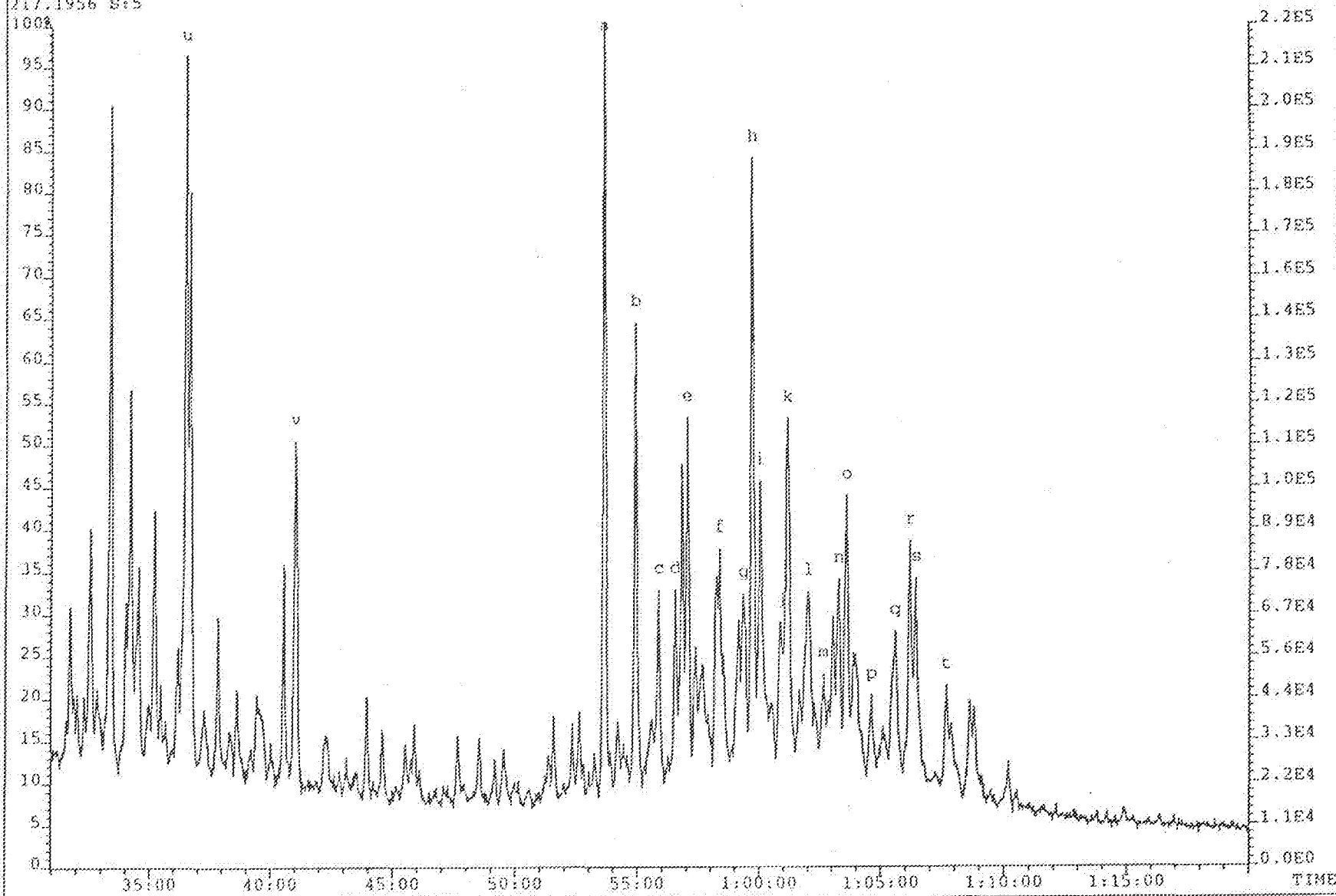
File:STATSAT2 W1-4740 Acq:22-SEP-1992,14:23:15 EI+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
217.1956 S:s

Exp:SAT1



File:STATSAT3 FI-4719 Acq:23-SEP-1992 13:10:02 EIV Magnet SIR
 Sample#5 Text:WELL 34/10-35, 3685M, SATURATED FRACTION
 217.1956 S:5

Exp:SAT1



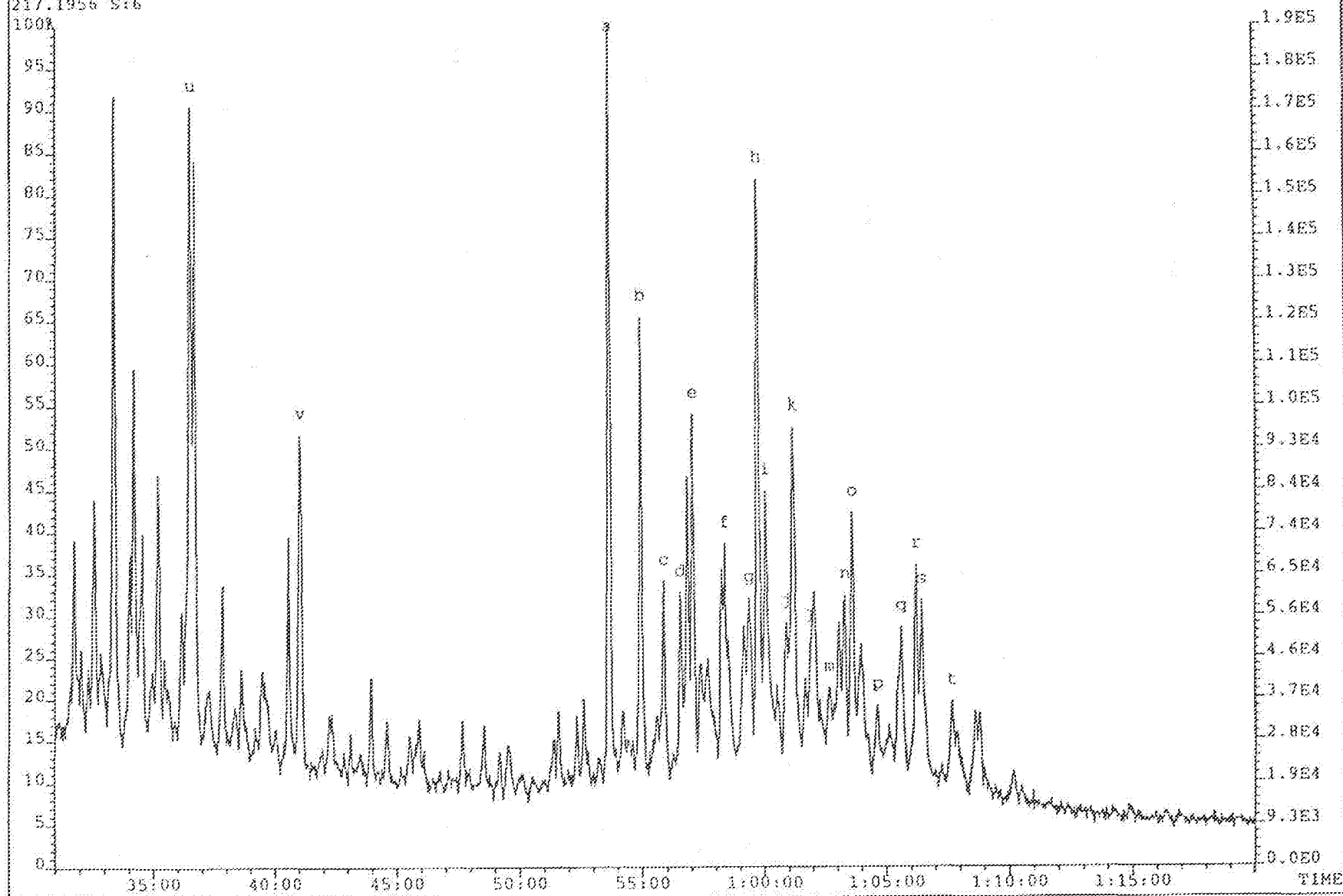
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4740 Acq:23-SEP-1992 13:30:02 EI+ Magnet SIR
 Sample#6 Text:WELL 34/10-35, 3894M, SATURATED FRACTION
 217.1956 S:6

Exp:SAT1



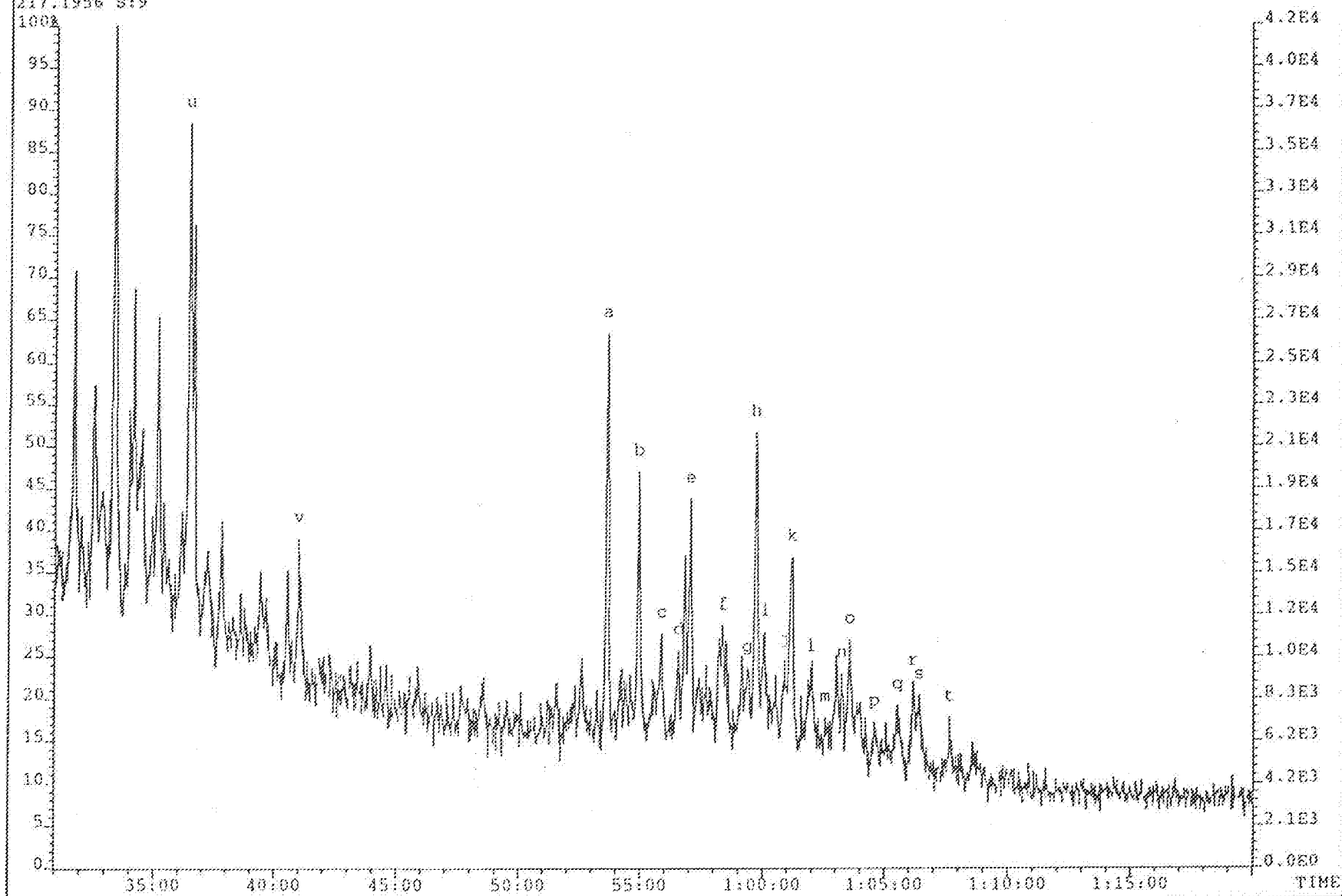
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 13:10:02 EI+ Magnet SIR
Sample#9 Text:WELL 34/10-35, DST3, 3920-79M, SATURATED FRACTION FROM OIL
217.1956 S:9

Exp:SAT1



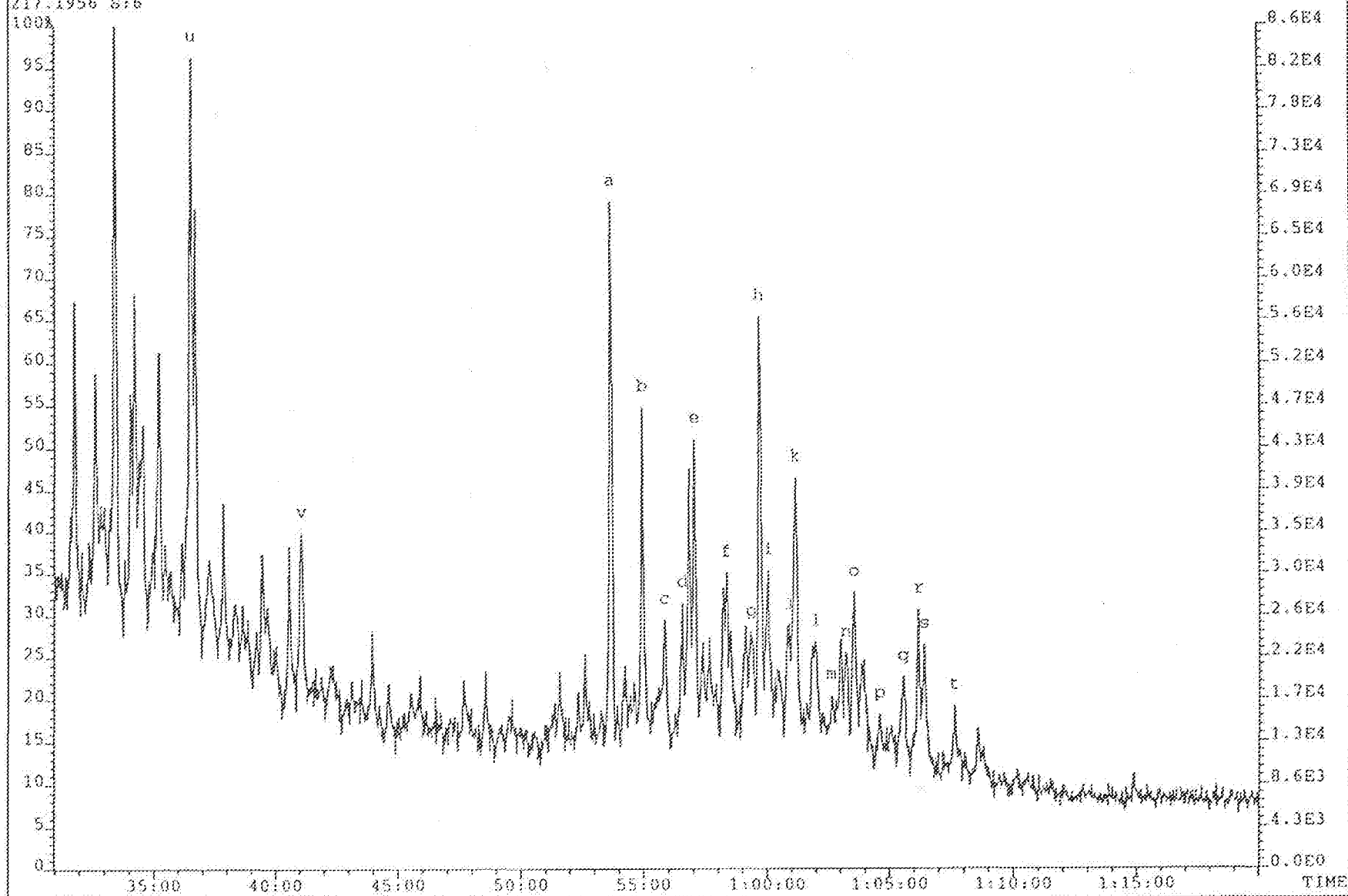
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1997 14:33:15 EI+ Magnet SIN
Sample#6 Text:WELL 34/10-35, 3931.71M, SATURATED FRACTION
217.1956 S:6

Exp:SAT1



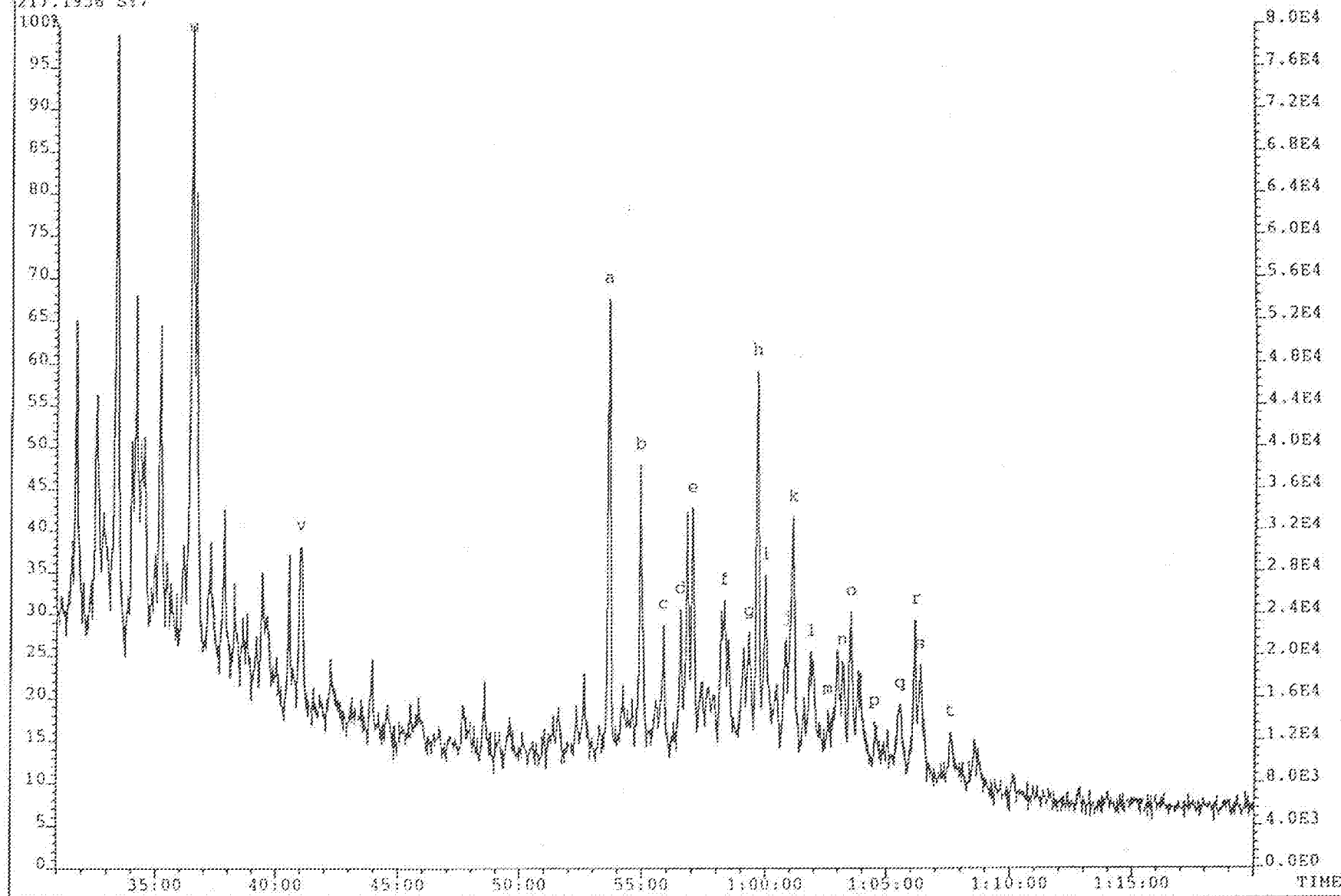
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
217.1956 S:7

Exp:SAT1



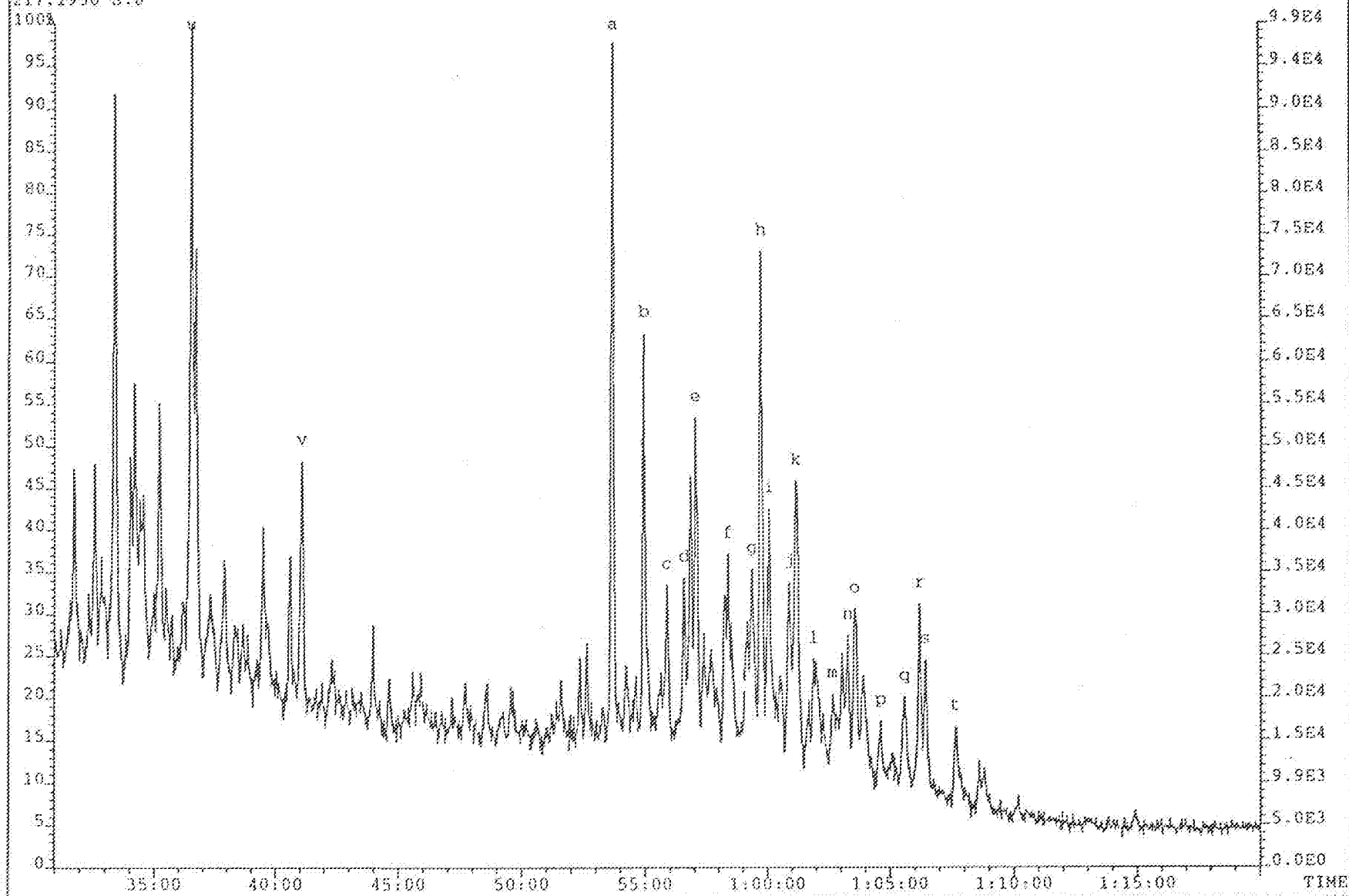
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 10:23:15 E1: Magnet SIR
 Sample#8 Text:WELL 34/10-35, 3994.05M, SATURATED FRACTION
 217.1956 S:8

Exp: SAT1

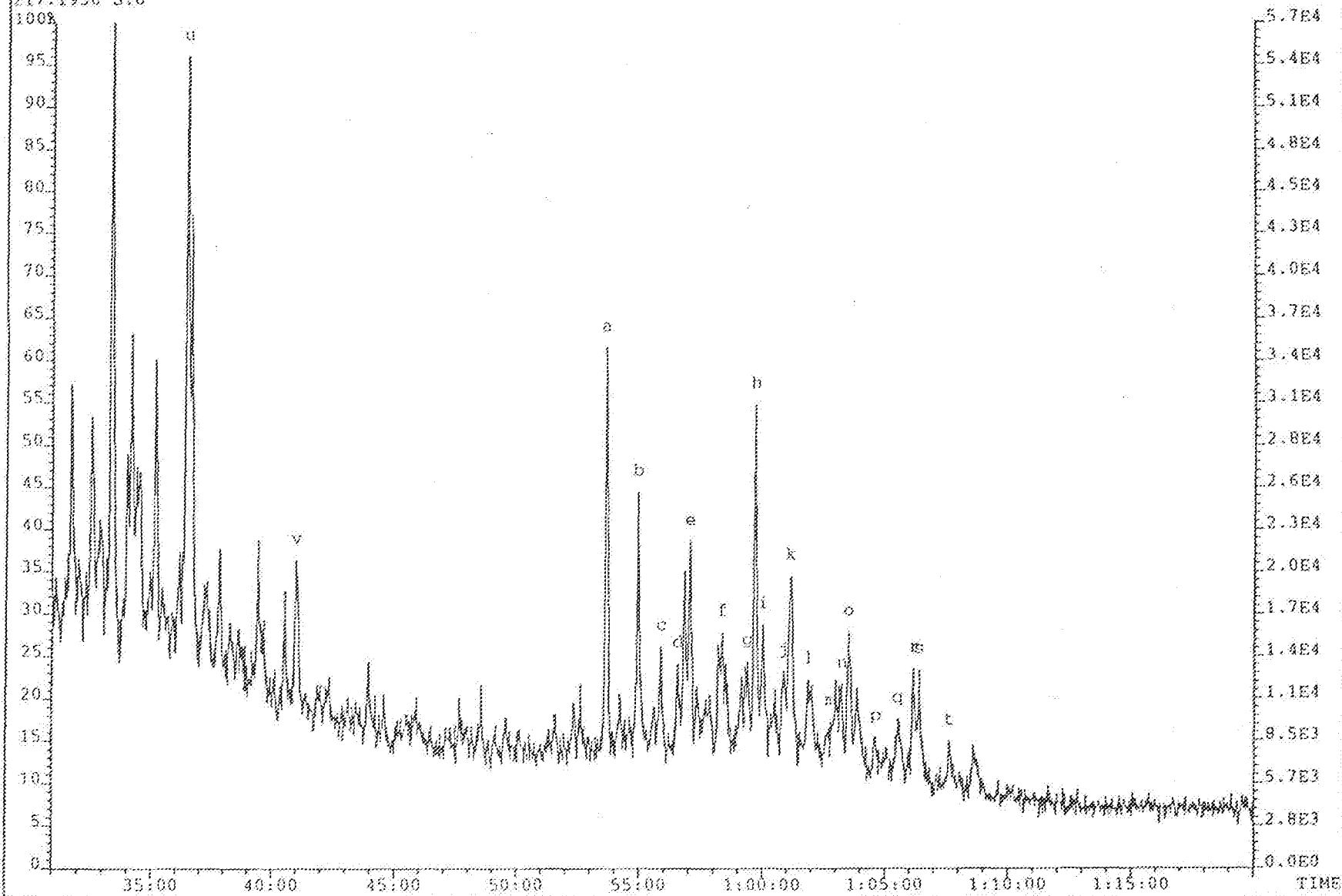


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 03:30:02 EI: Magnet SIR
Sample#8 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp:SAT1
217.1956 S:0



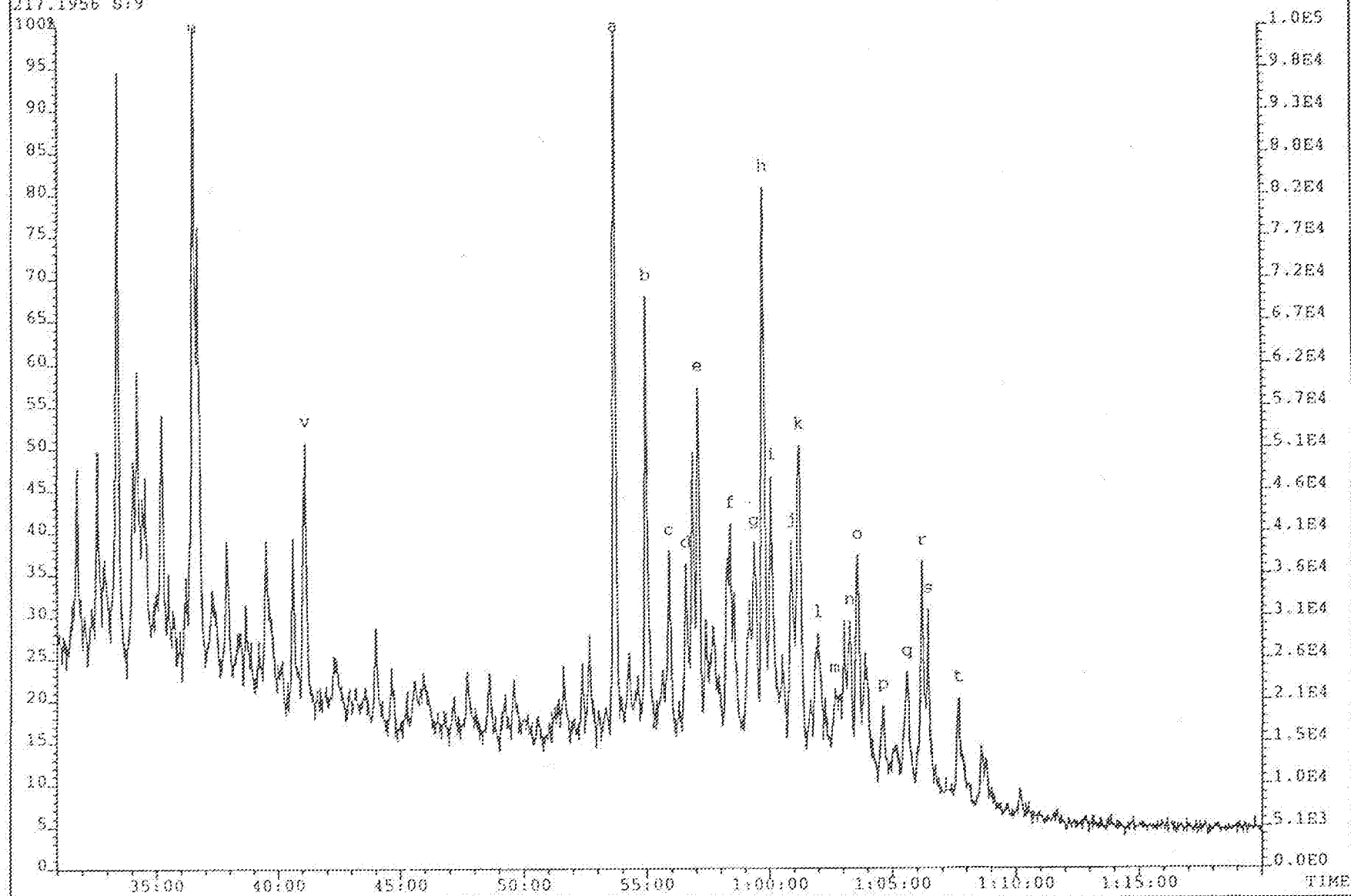
Schlumberger

GECO-PRAKLA

GEOLAB NOR

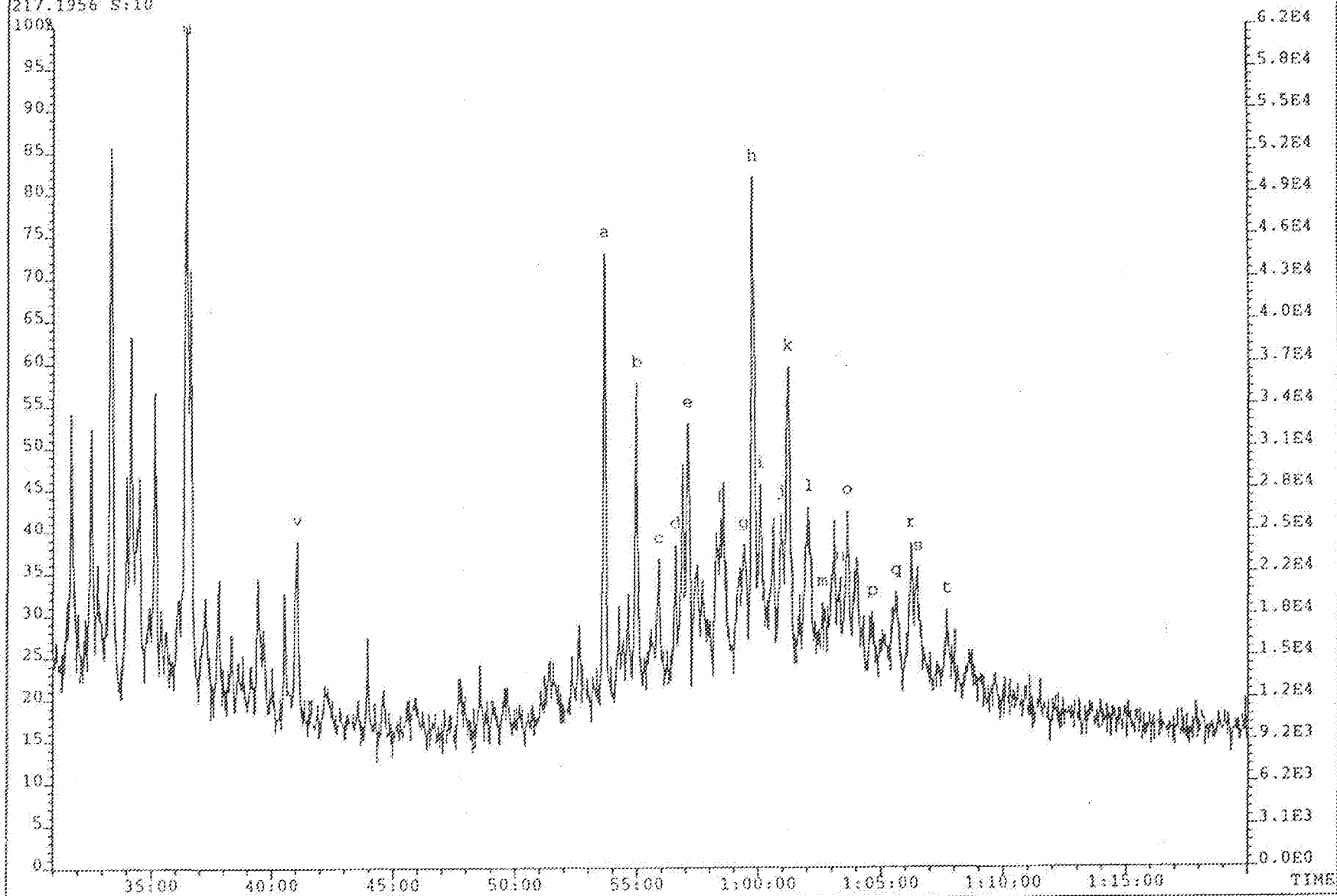
File:STATSAT2 #1-4739 Acq:23-SEP-1992,14:23:15 El: Magnet SIR
 Sample#9 Text:WELL 34/10-35, 4006.17M, SATURATED FRACTION
 217.1956 S:9

Exp:SAT1



File:STATSAT2 #1-4719 Acq:22-SEP-1992 13:23:15 EI+ Magnet SIR
 Sample#10 Text:WELL 34/10-15, 4021.93M, SATURATED FRACTION
 217.1956 S:10

Exp:SAT1

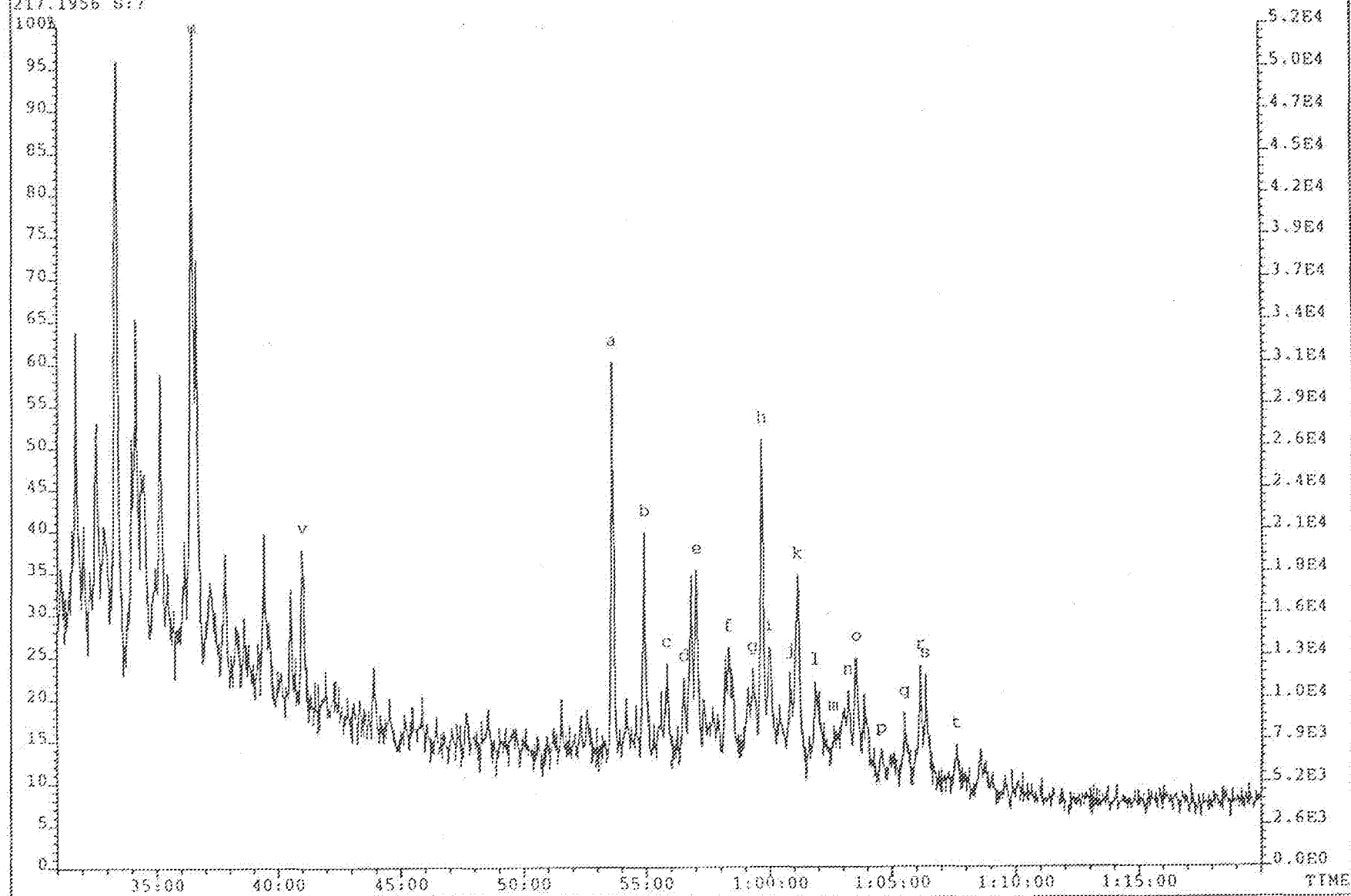


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4740 Acq:23-SEP-1992 13:30:02 EI+ Magnet SIR
 Sample#7 Text:WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL Exp:SAT1
 217.1956 S:7



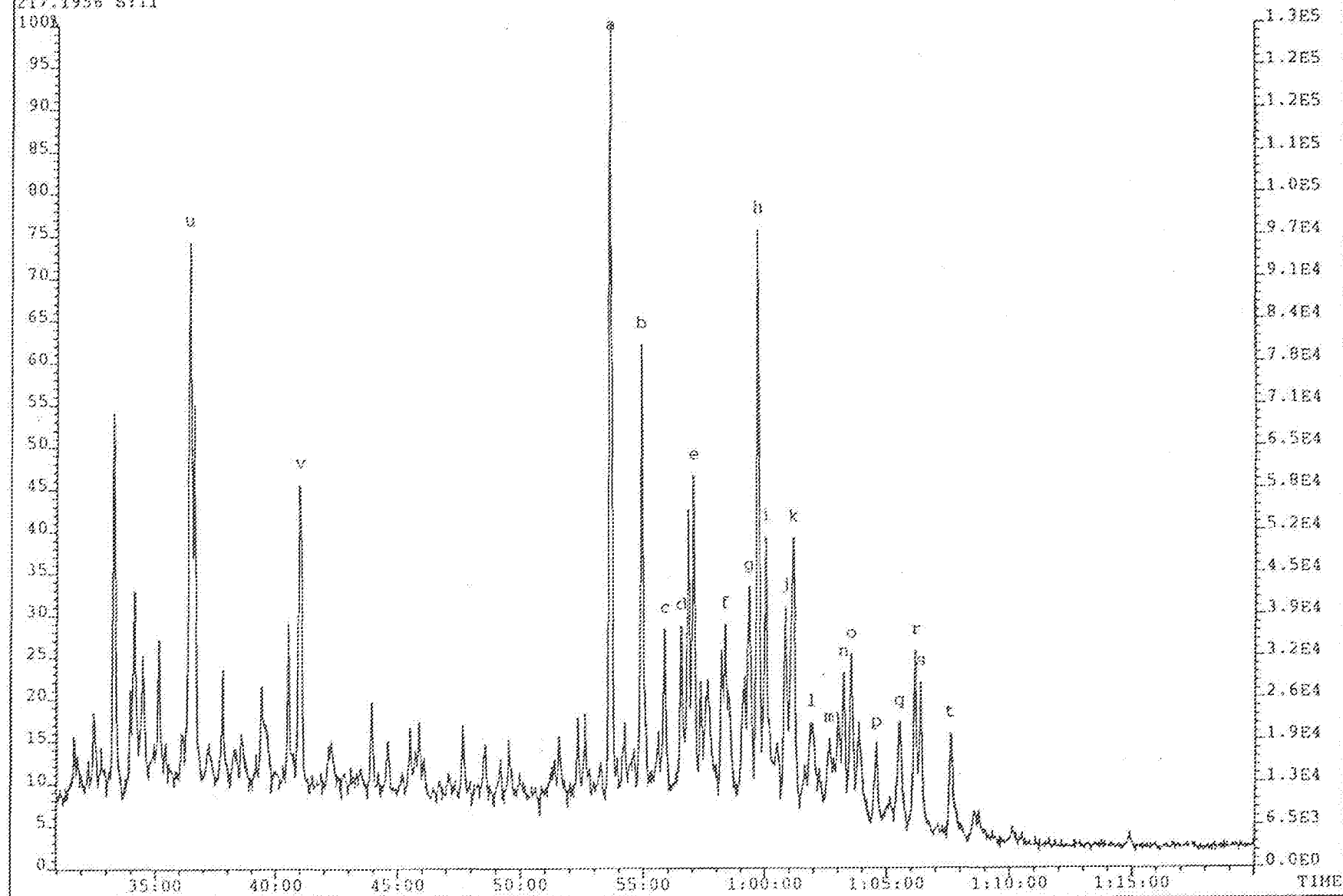
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4741 Acq: 22-SEP-1992, 14:23:15 EI+ Magnet SIR
 Sample#11 Text: WELL 34/10-35, 4257.47M, SATURATED FRACTION
 217.1956 S:11

Exp: SAT1



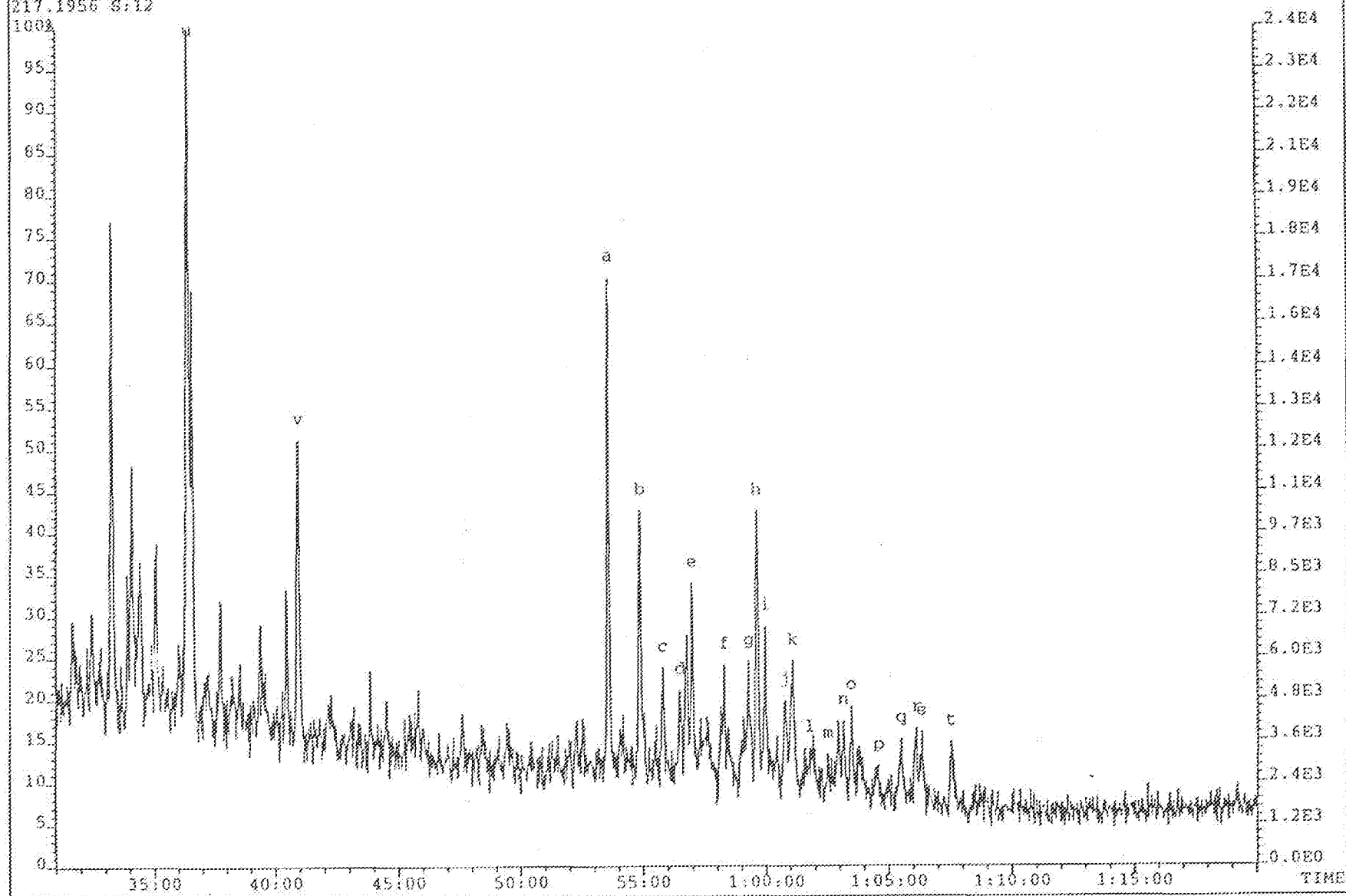
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#12 Text:WELL 34/10-35, 4270.75M. SATURATED FRACTION
217.1956 S:12

Exp:SAT1



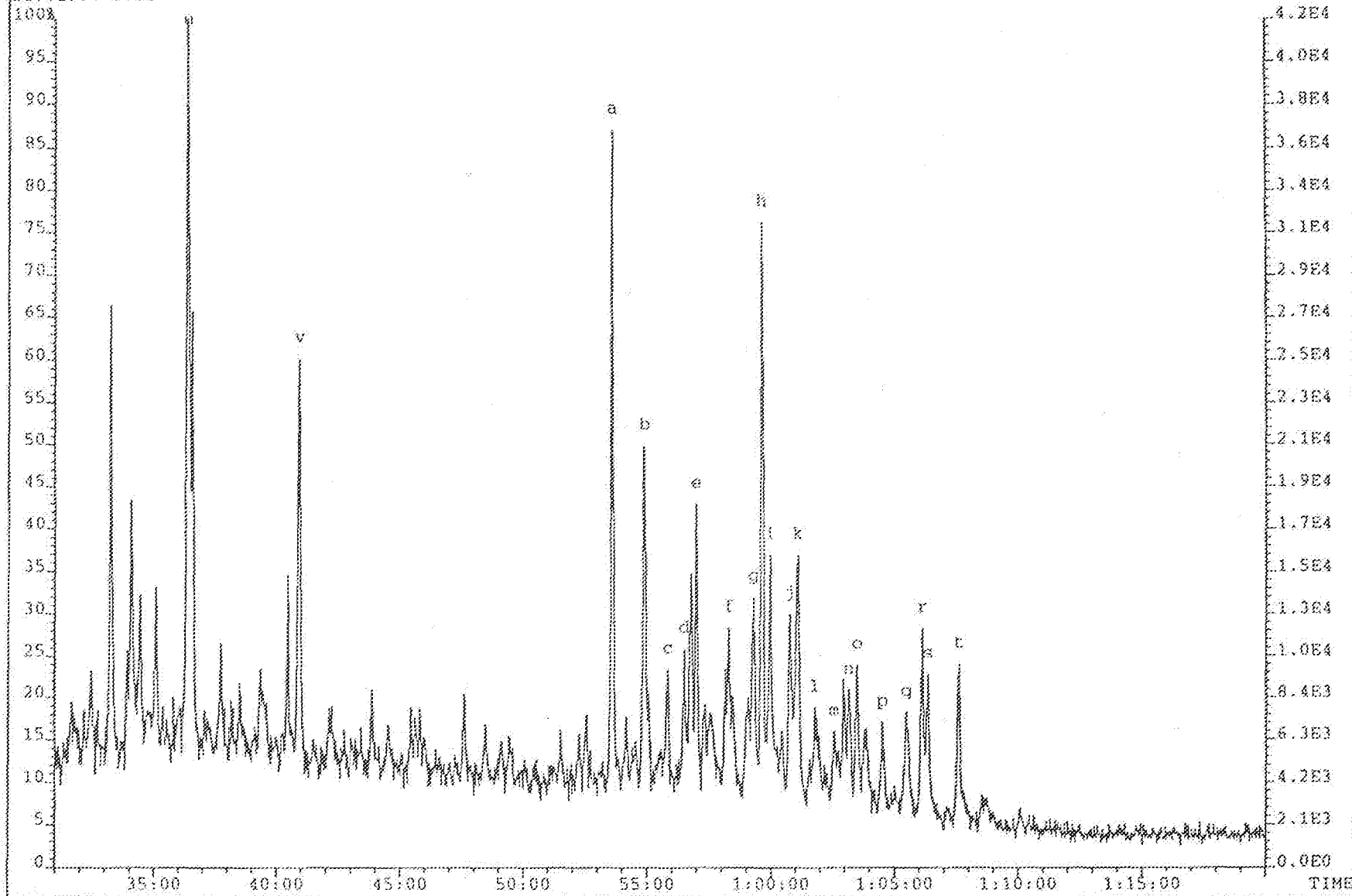
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4740 Acq: 22-SEP-1992 14:21:15 EI: Magnet 918
 Sample#13 Text: WELL 34/10-35, 4283.48M, SATURATED FRACTION
 217.1956 S:13

Exp: SAT1

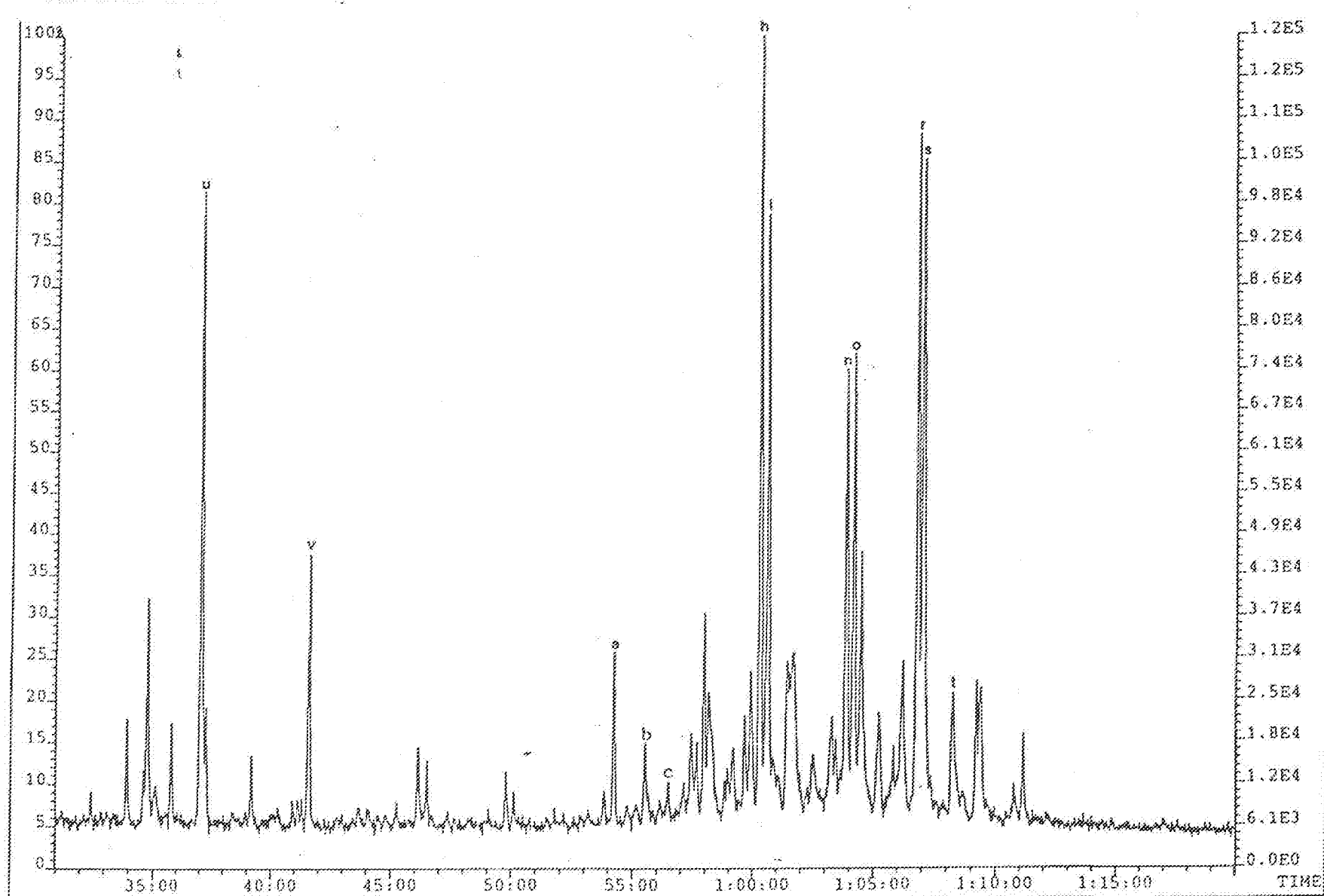


Schlumberger

GECO-PRAKLA

GEOLAB NOR

EXAMPLE OF PEAK IDENTIFICATION FOR M/Z 218. 14beta(H), 17beta(H) STERANES.

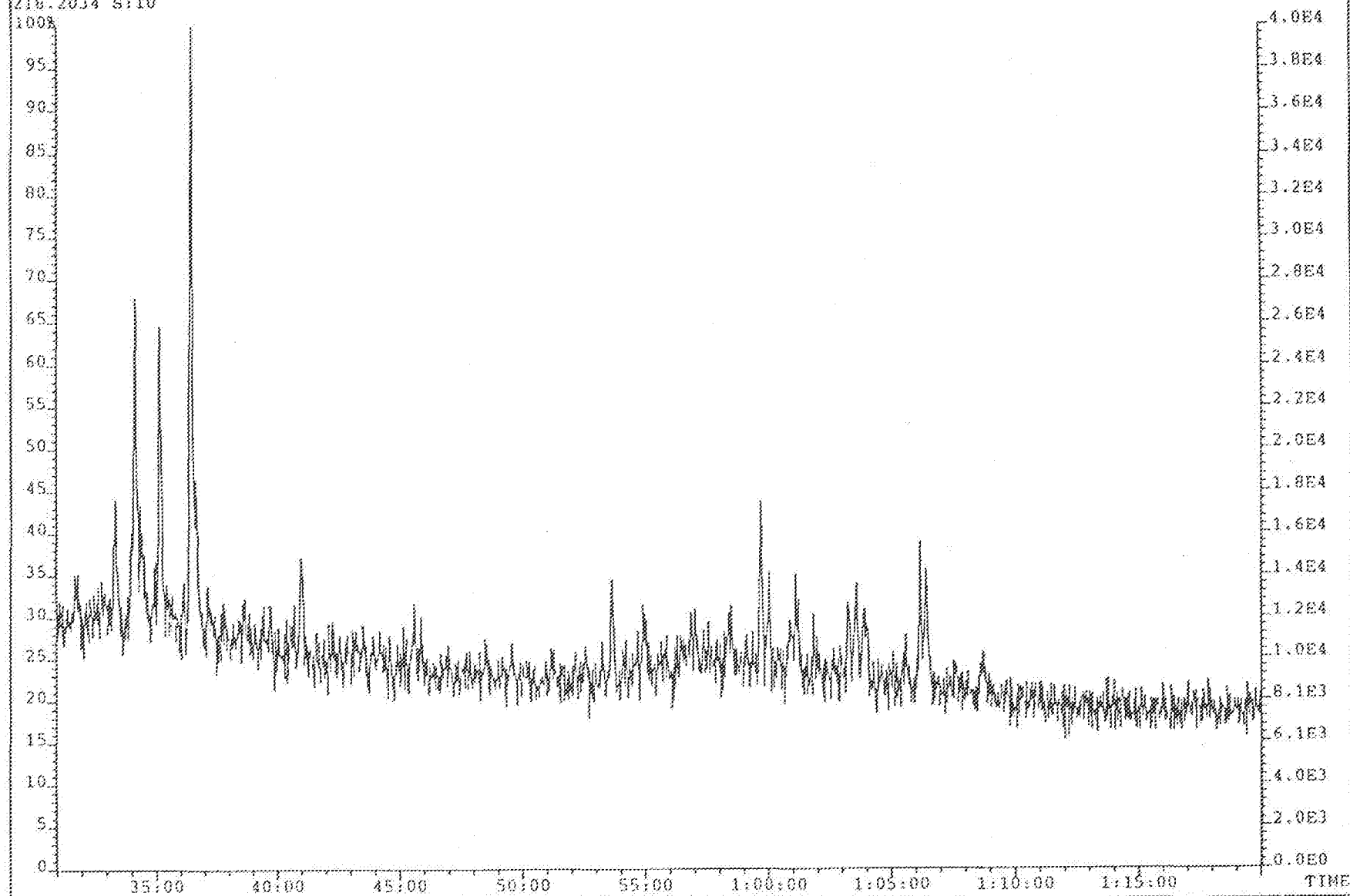


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4739 Acq:23-SEP-1992 11:30:03 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, OLJE OVER MOD, 3496-3504M, SAT. FRAC. FROM OIL Exp:SAT1
218.2034 S:10



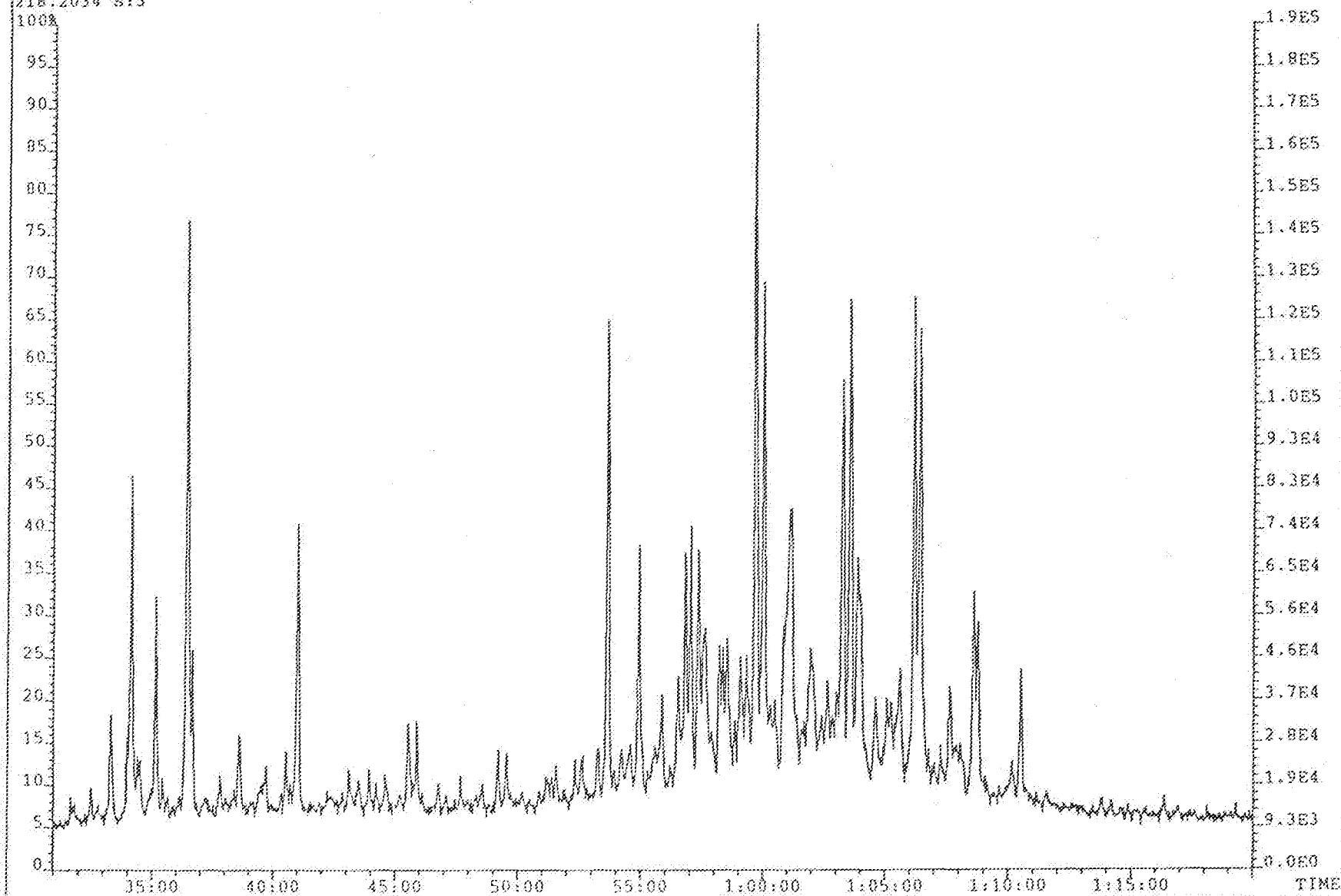
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT 01-4739 Acq:22-SEP-1992 14:21:15 EI+ Magnet SW
Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
218.2034 S:3

Exp:SAT1



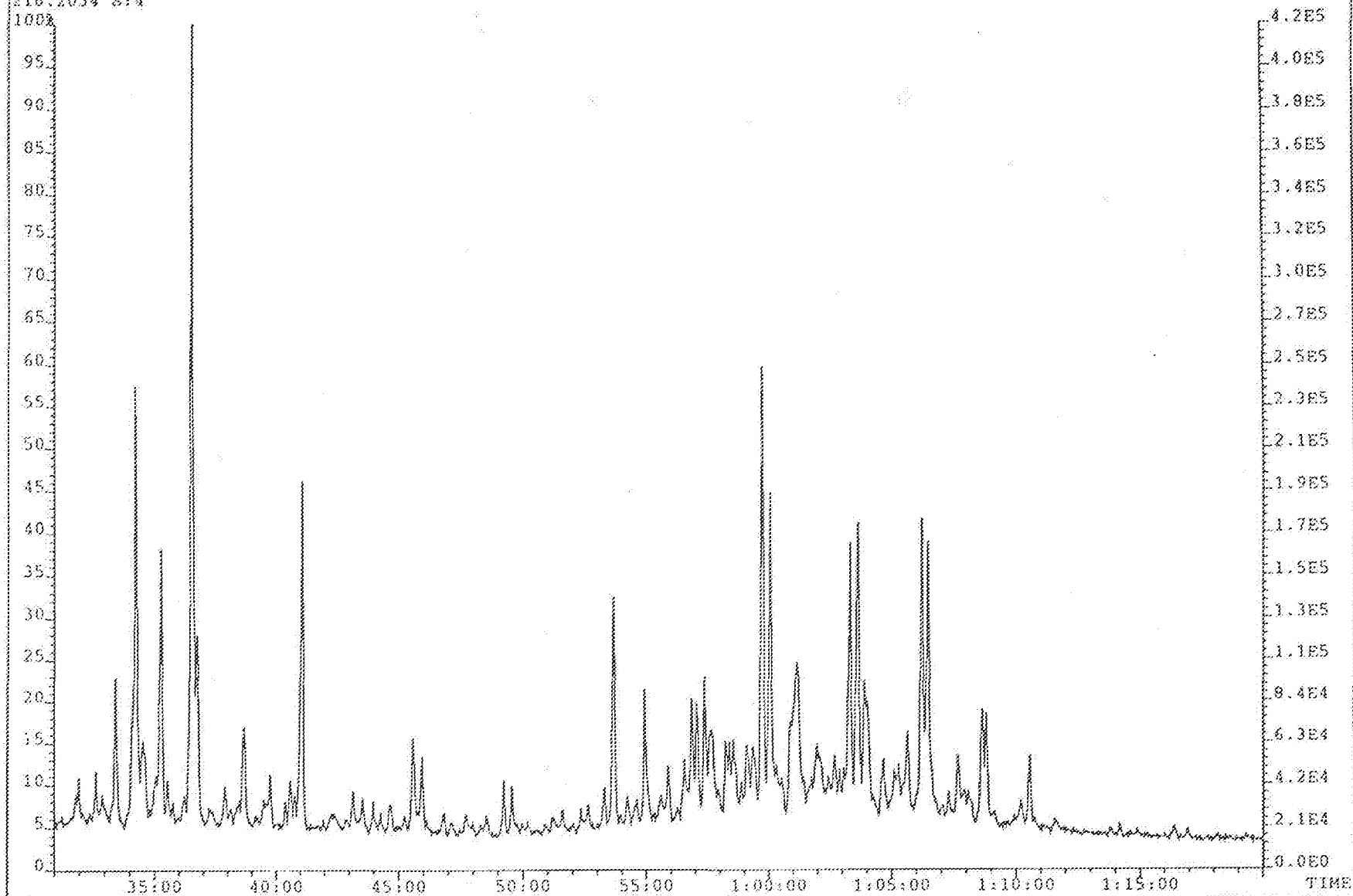
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 14:23:15 EI: Magnet SIR
Sample#4 Text:WELL 34/10-35, 3831M, SATURATED FRACTION
218.2034 S:4

Exp:SAT1



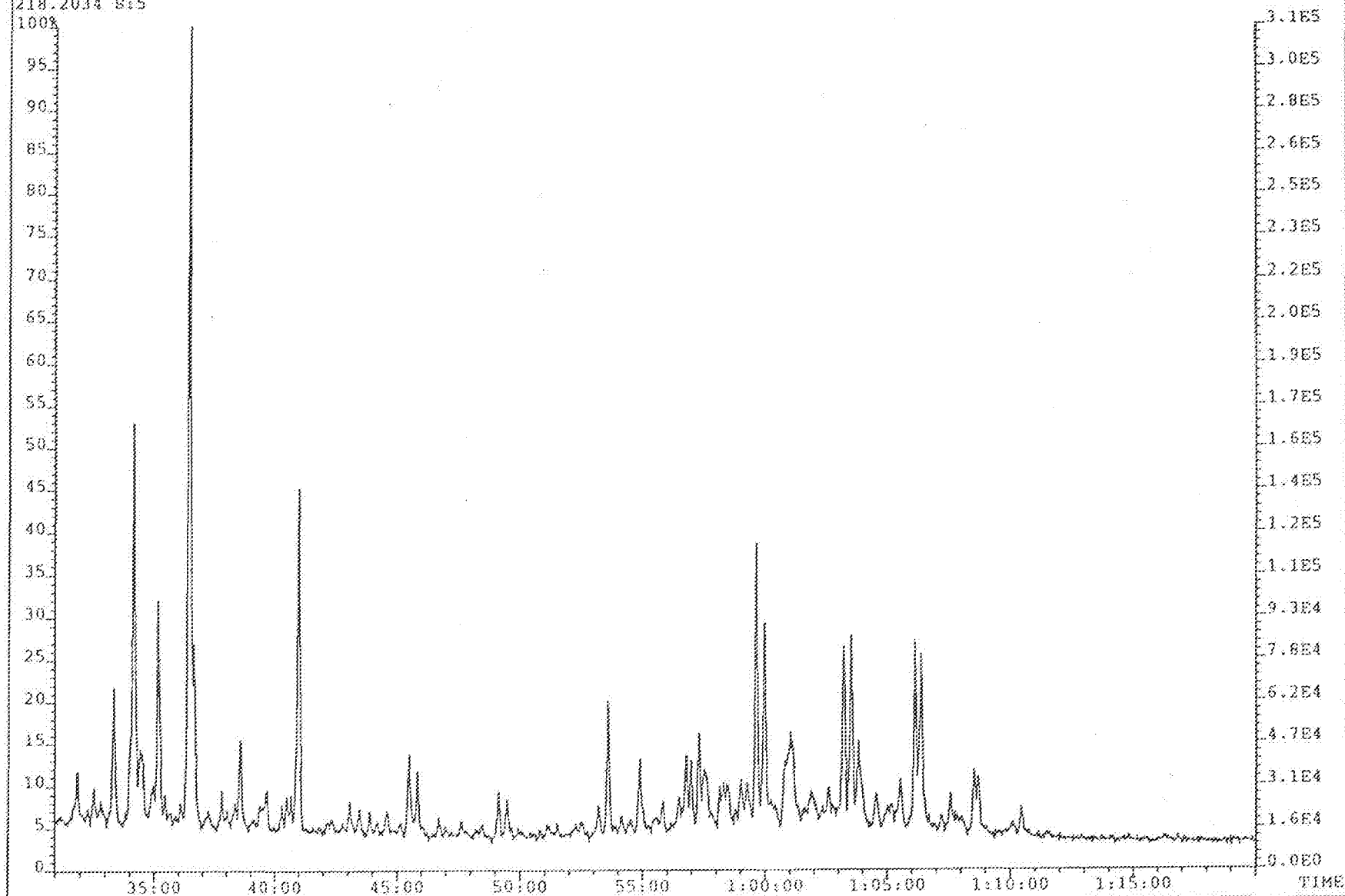
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 H1-4740 Acq:22-SEP-1992 14:21:15 EI+ Magnet 9IR
Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
218.2034 S:5

Exp:SAT1



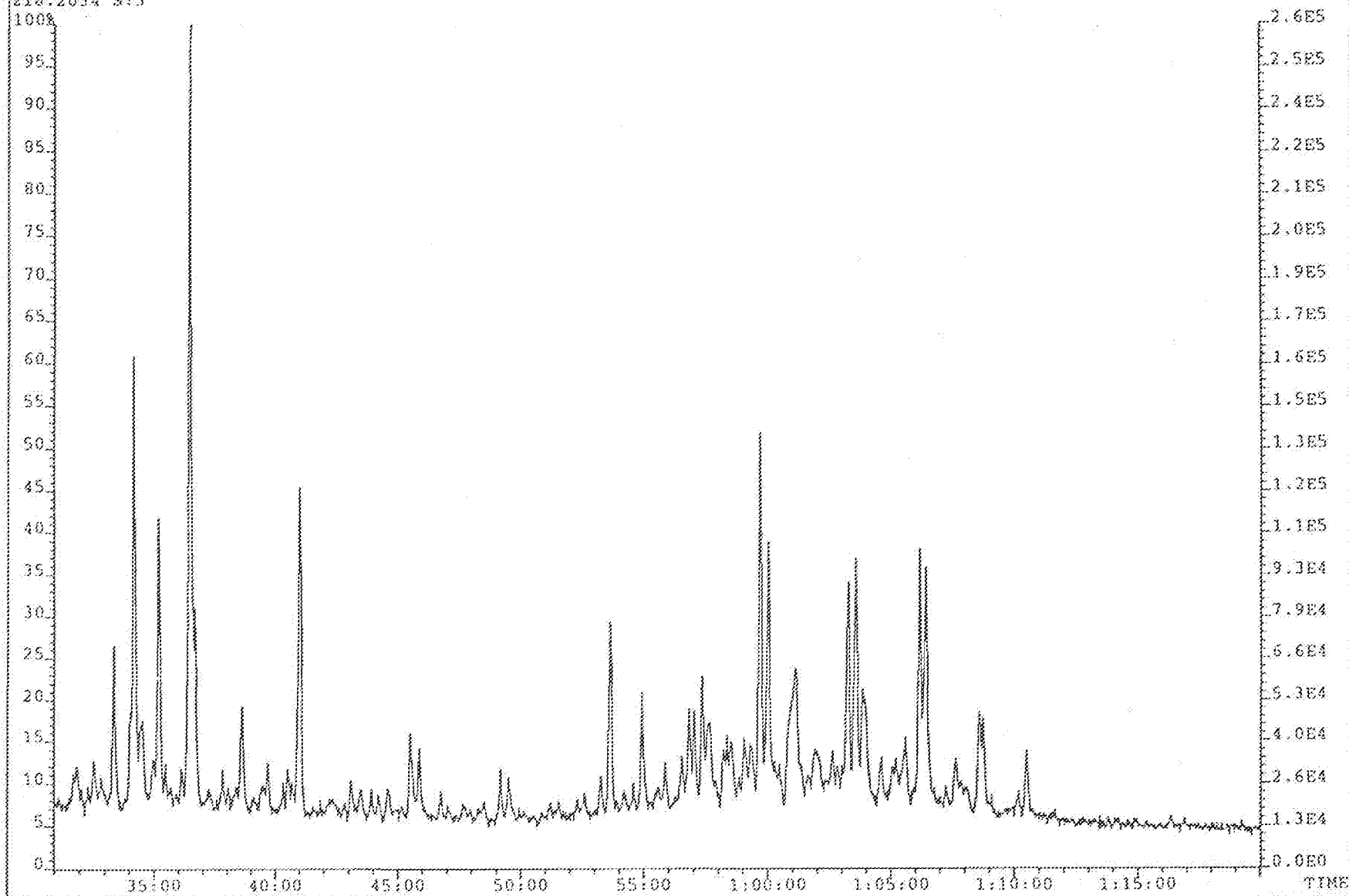
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSATJ #1-4739 Acq:2J-SEP-1992,13:30:02 EI+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3085M, SATURATED FRACTION
218.2034 S:5

Exp:SAT1



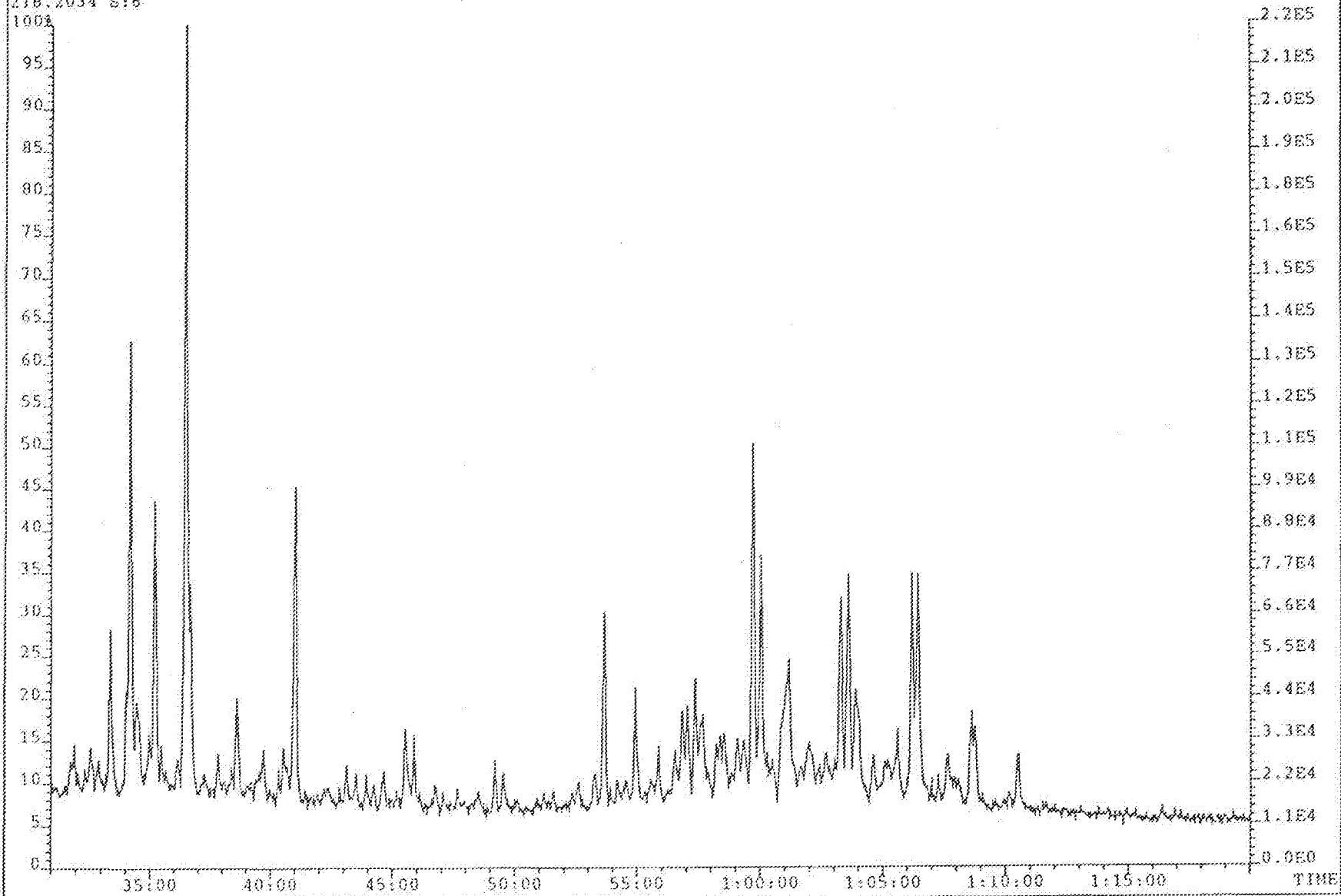
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 13:10:02 EI+ Magnet SIR
Sample#6 Text:WELL 34/10-35, 3894M, SATURATED FRACTION
218.2034 S:6

Exp: SAT1

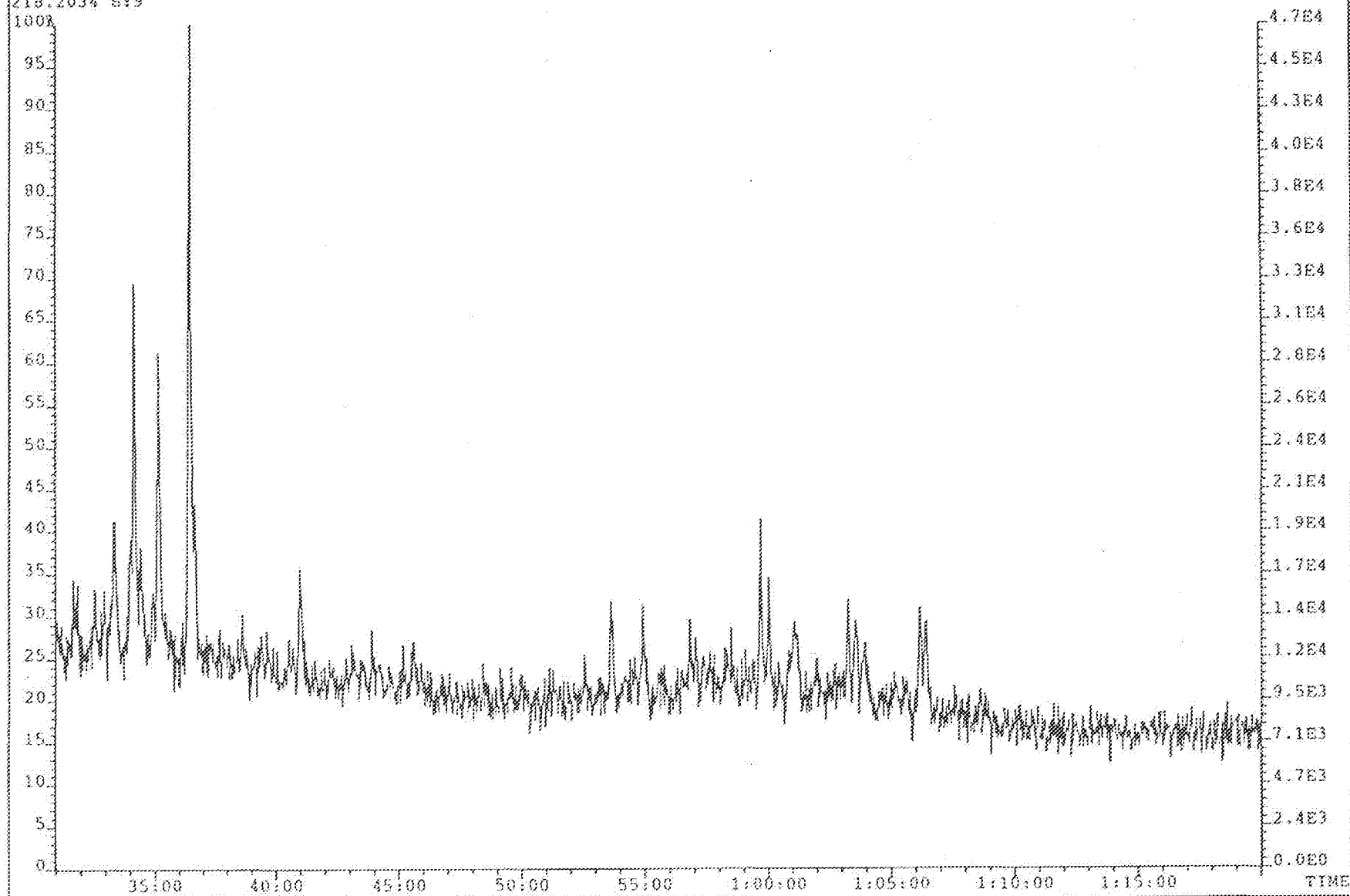


Schlumberger

GECO-PRAKLA

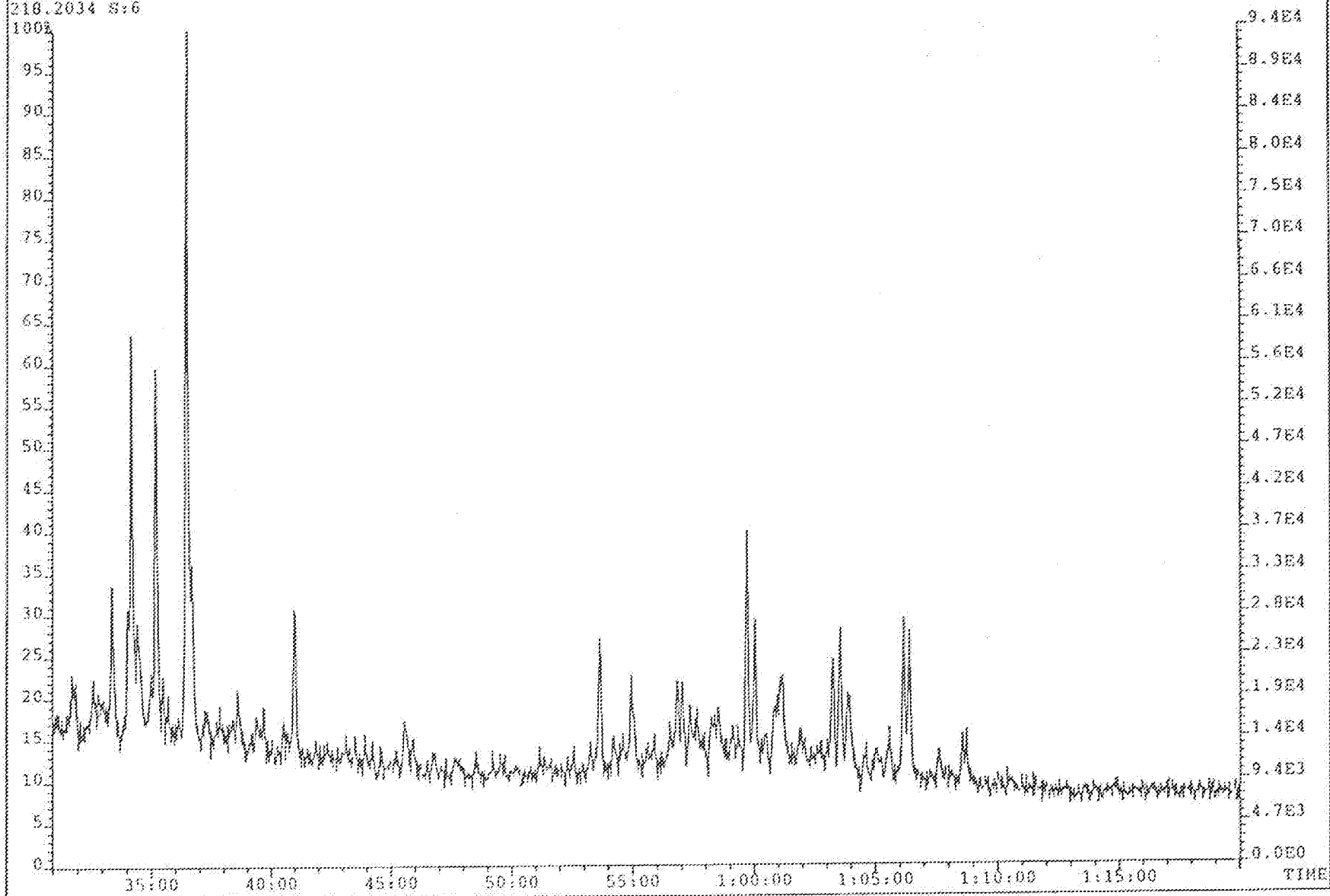
GEOLAB NOR

File:STATSAT1 #1-4740 Acq:23-SEP-1997 11:30:02 EI+ Magnet SIR
Sample#9 Text:WELL 34/10-35, DST3, 3920-290, SATURATED FRACTION FROM OIL Exp:SAT1
218.2034 S:9



File: STASAT2 #1-4739 Acq: 22-SEP-1992 14:23:15 EI+ Magnet SIM
Sample#6 Text: WELL 34/10-35, 3931.71M, SATURATED FRACTION
210.2034 S:6

Exp: SAT1



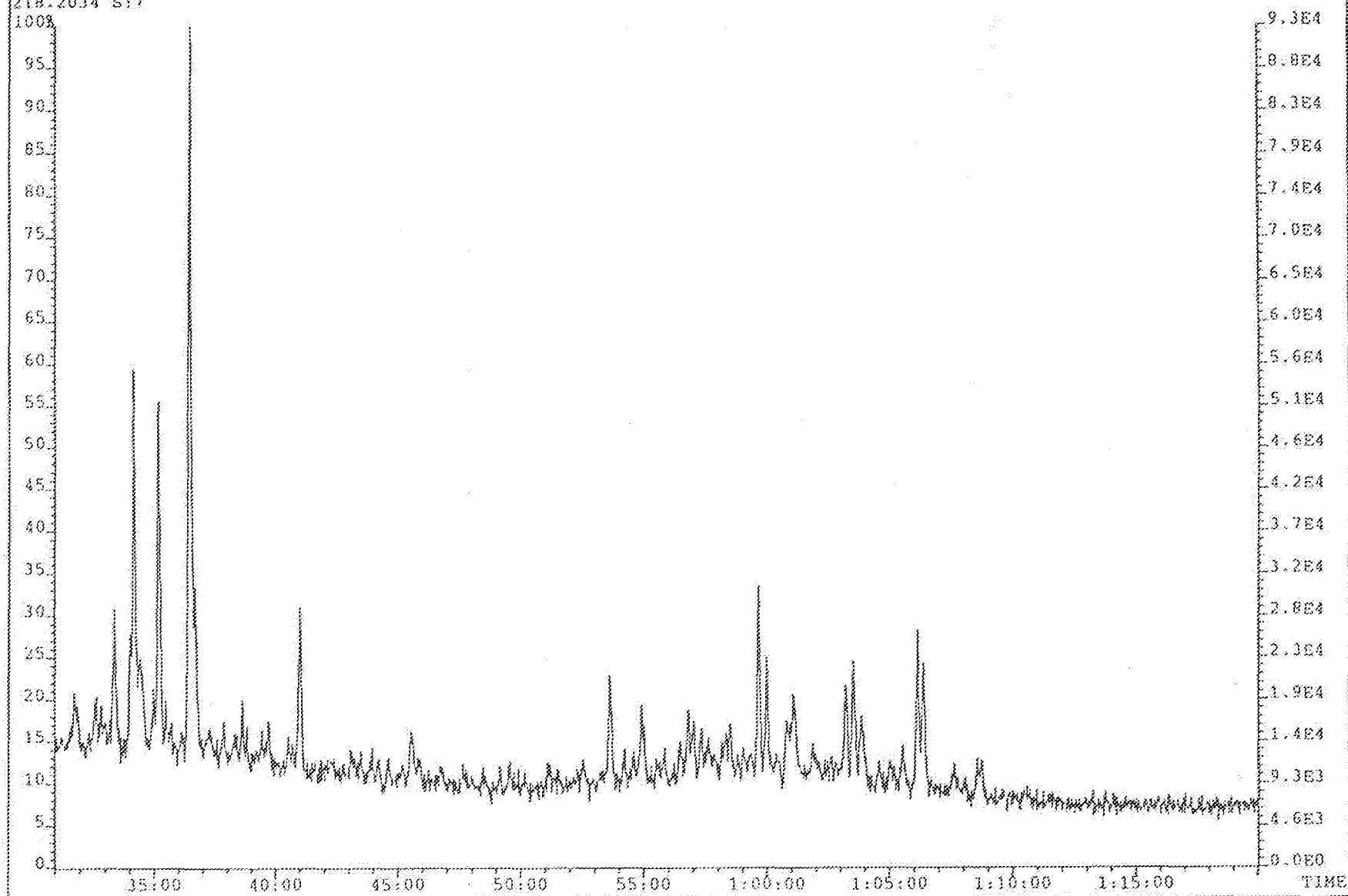
Shumbege

GECO-PRAKIA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 04:21:15 E1: Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
218.2034 S:7

Exp: SAT1



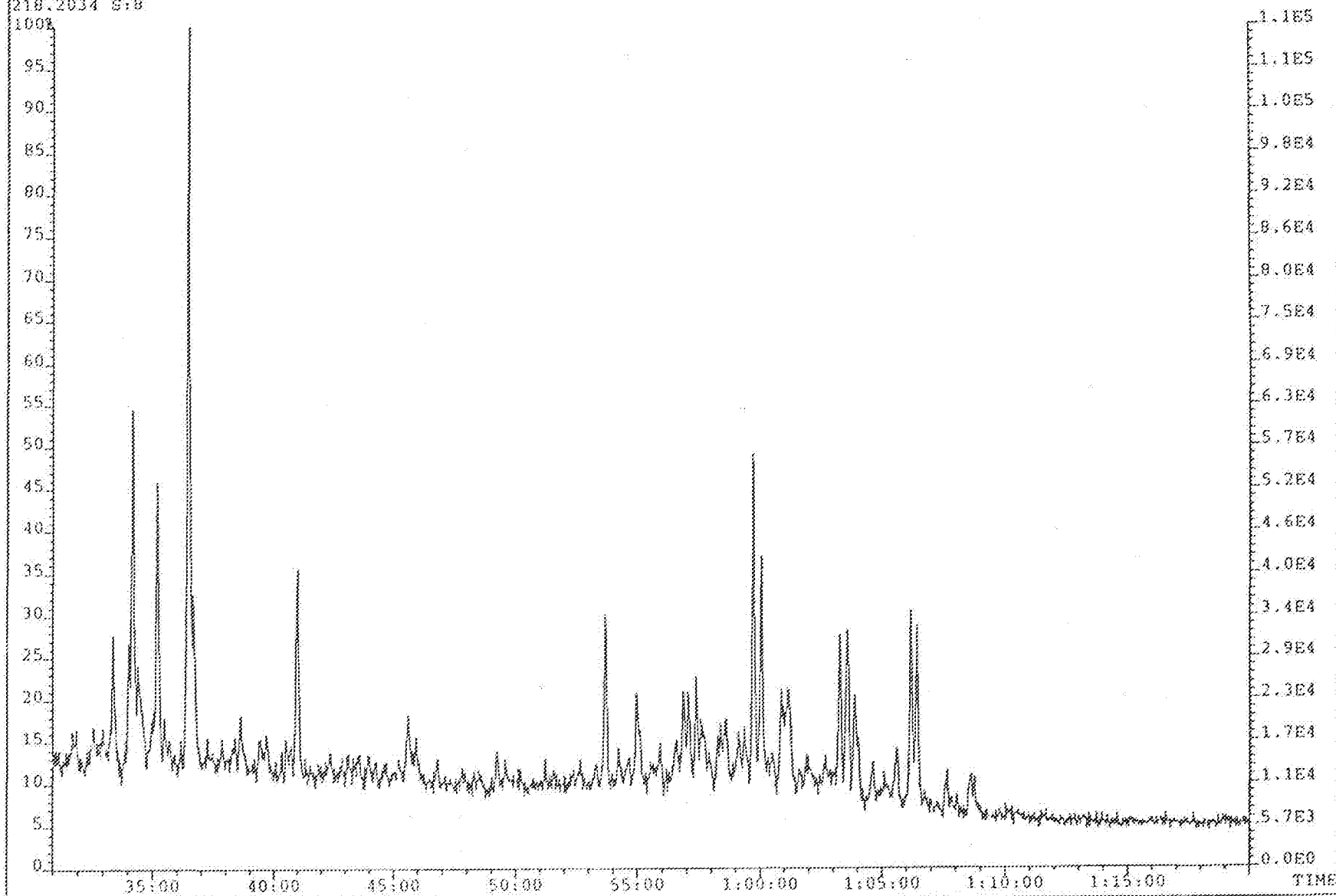
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 04:23:15 EI+ Magnet SIR
Sample#8 Text:WELL 34/10-35, 3994.05M, SATURATED FRACTION
219.2034 S:8

Exp:SAT1

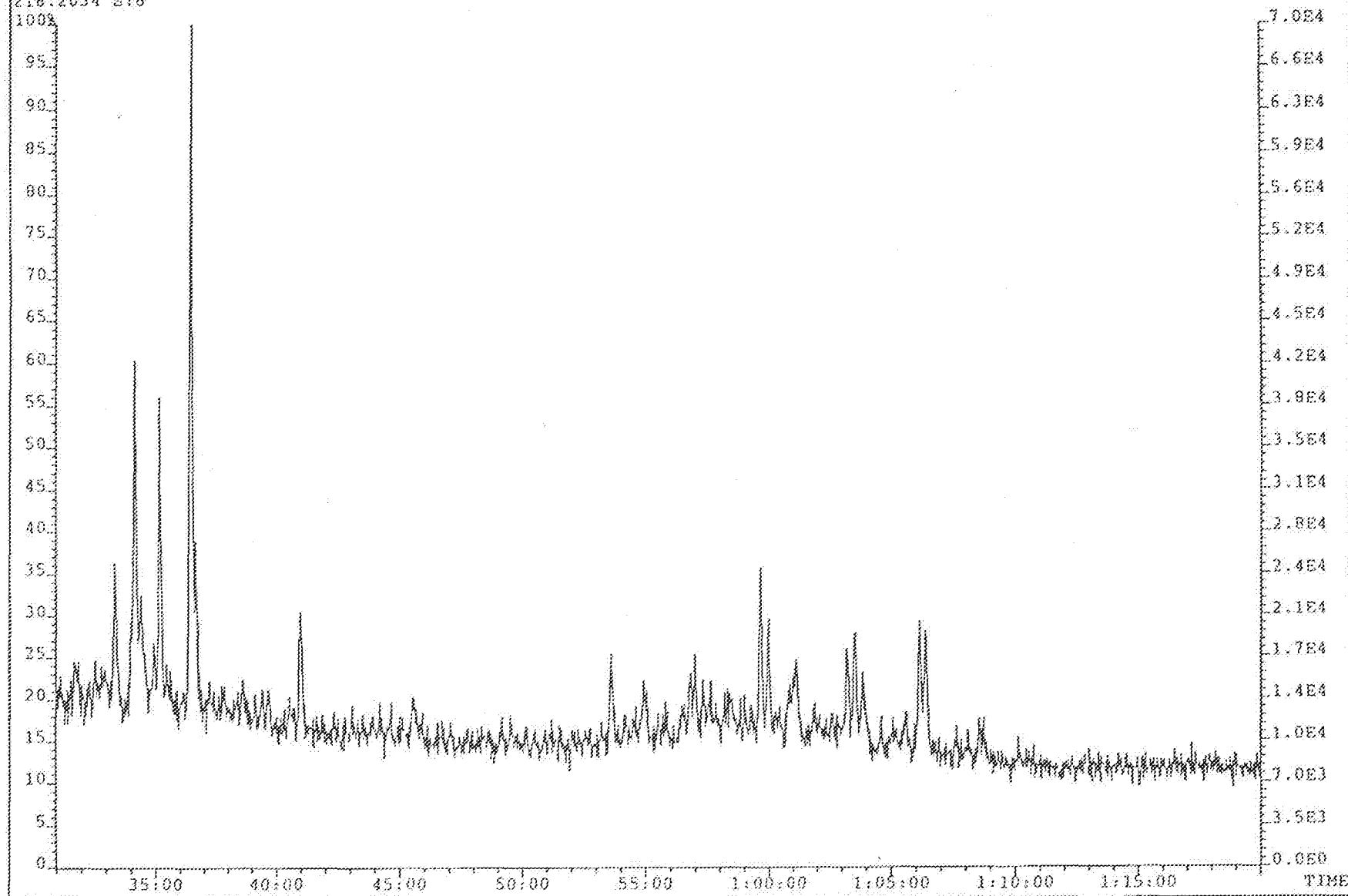


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:21-SEP-1992 13:30:02 EI+ Magnet SIR
Sample#8 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp:SAT1
218.2034 S:0



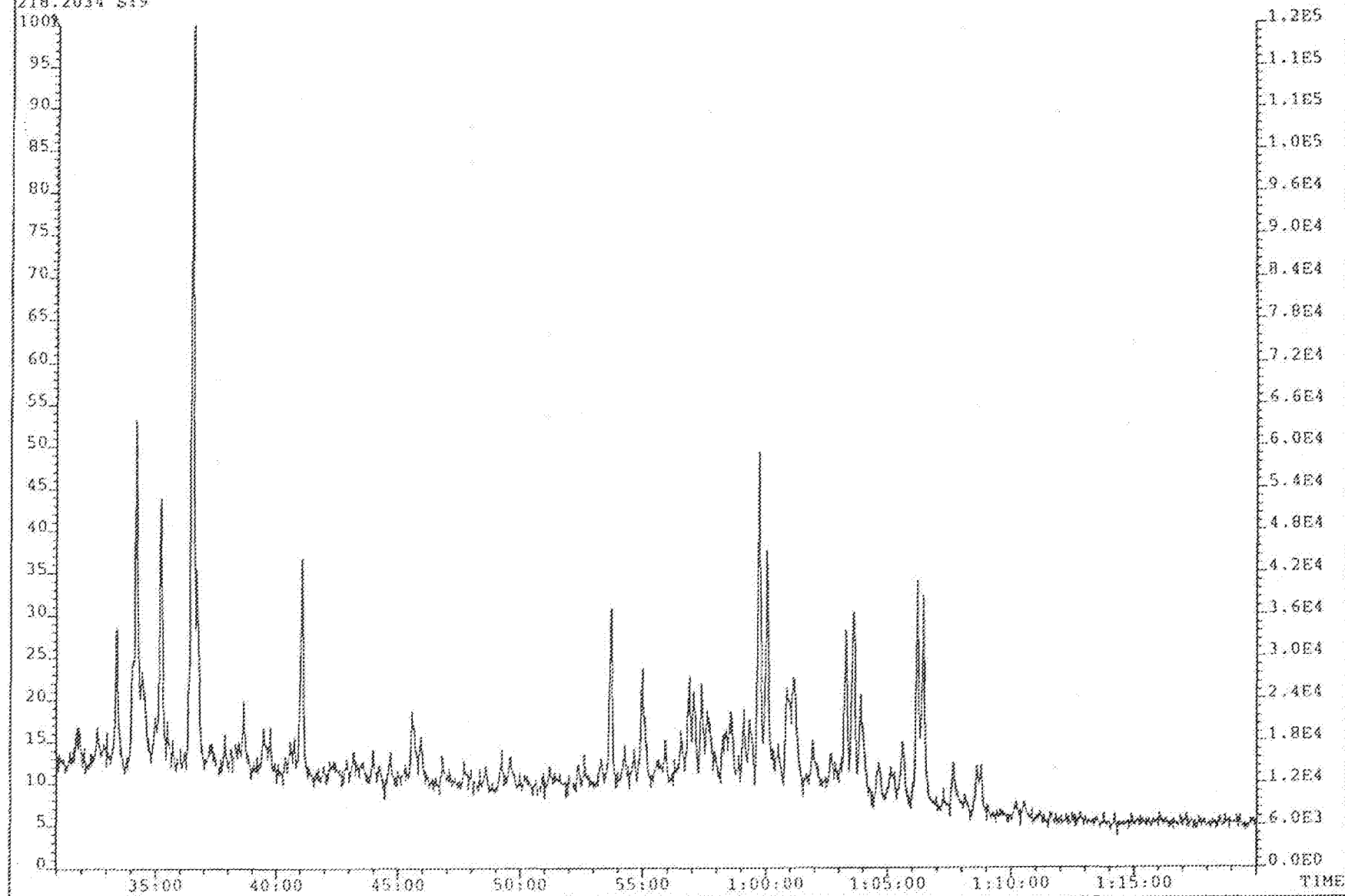
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#9 Text:WELL 34/10-35, 4006.17M, SATURATED FRACTION
218.2034 S:9

Exp:SAP1



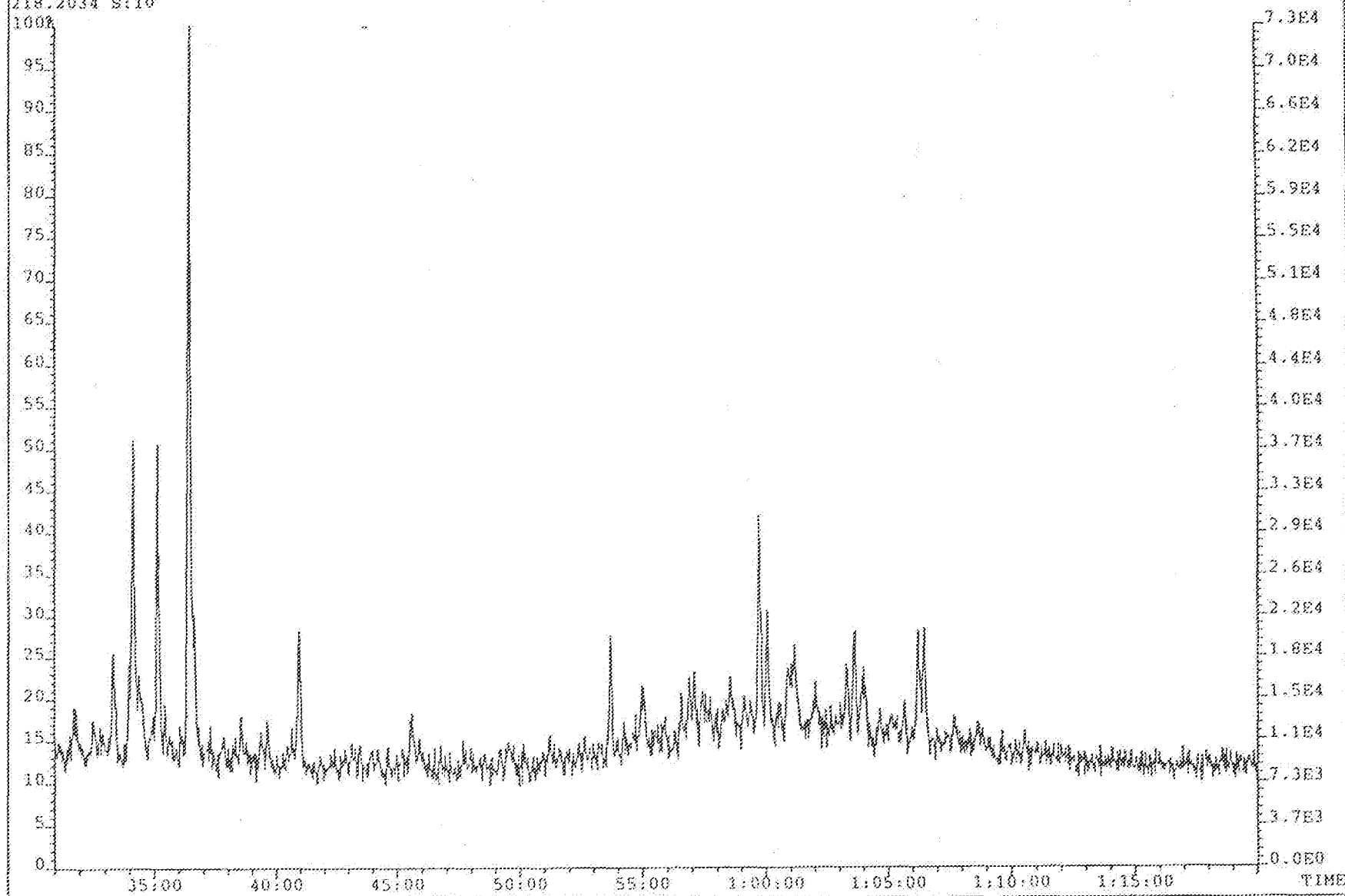
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, 4021.93M, SATURATED FRACTION
218.2034 S:10

Exp:SAT1

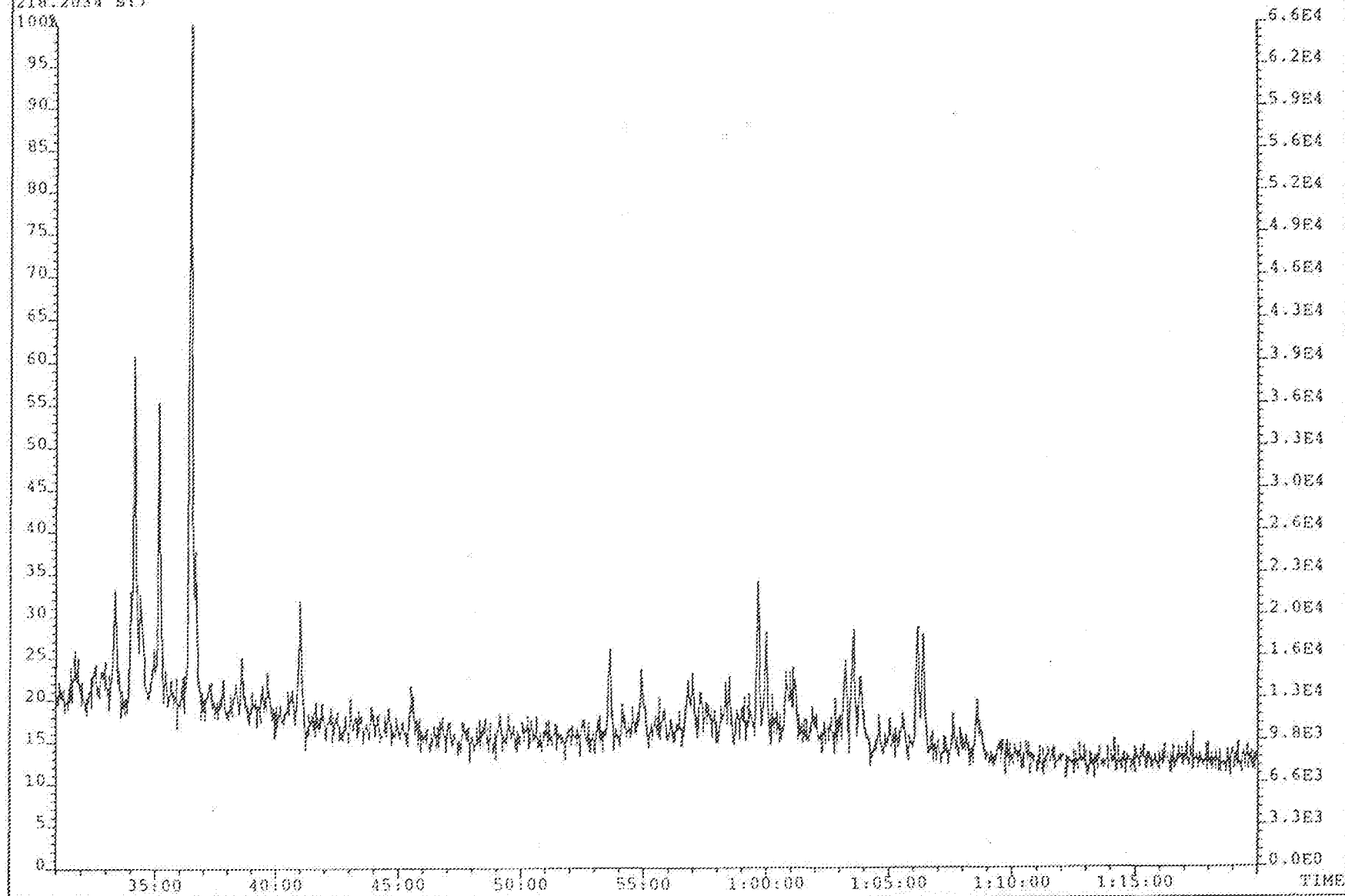


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT1 #1-4740 Acq: 23-SEP-1992, 13:30:02 EI+ Magnet SIN
Sample#7 Text: WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL Exp: SAT1
218.2034 S:7



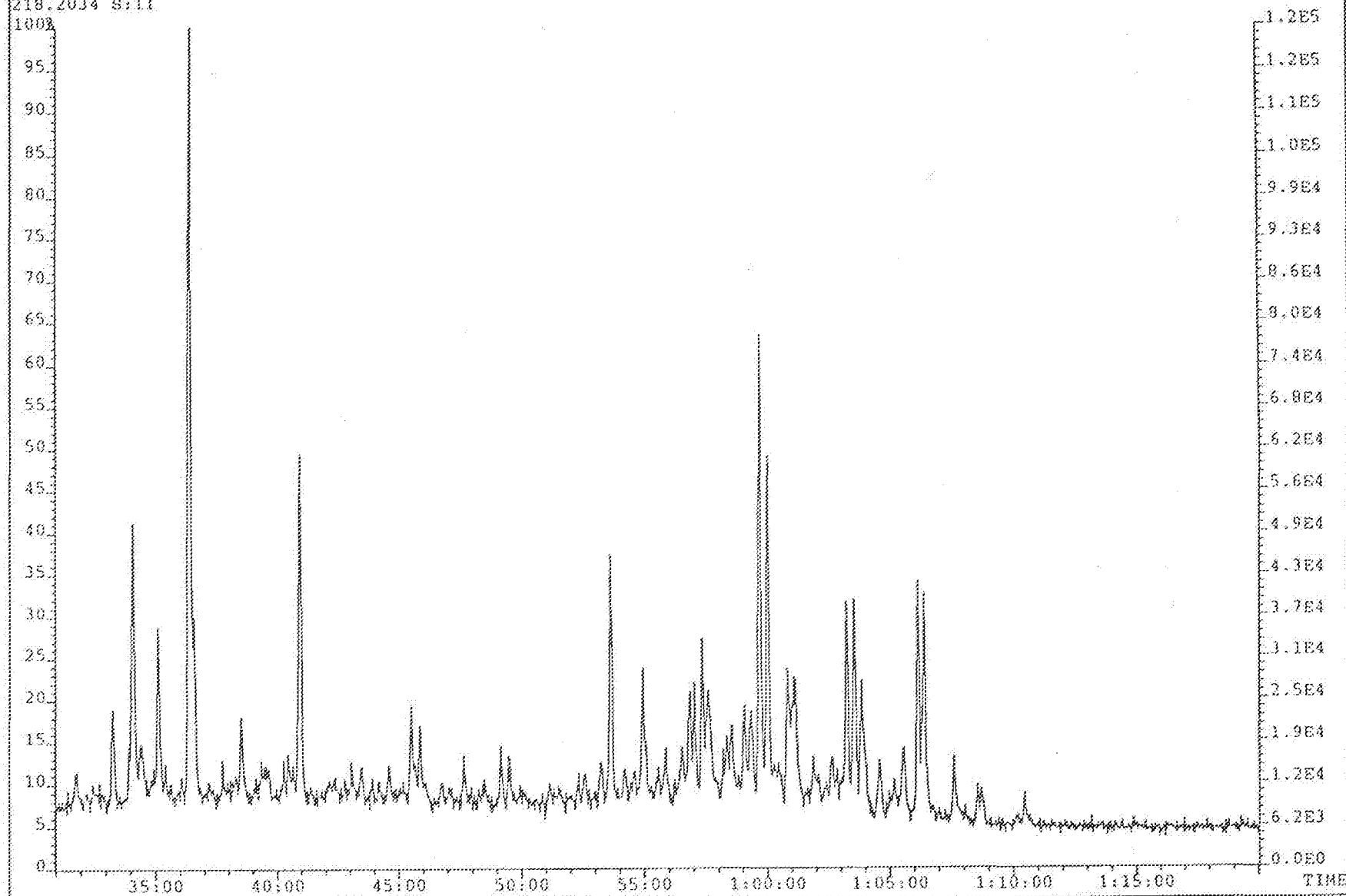
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 81-4741 Acq: 22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#11 Text: WELL 34/10-35, 4257.47M, SATURATED FRACTION
218.2034 S:11

Exp: SAT1



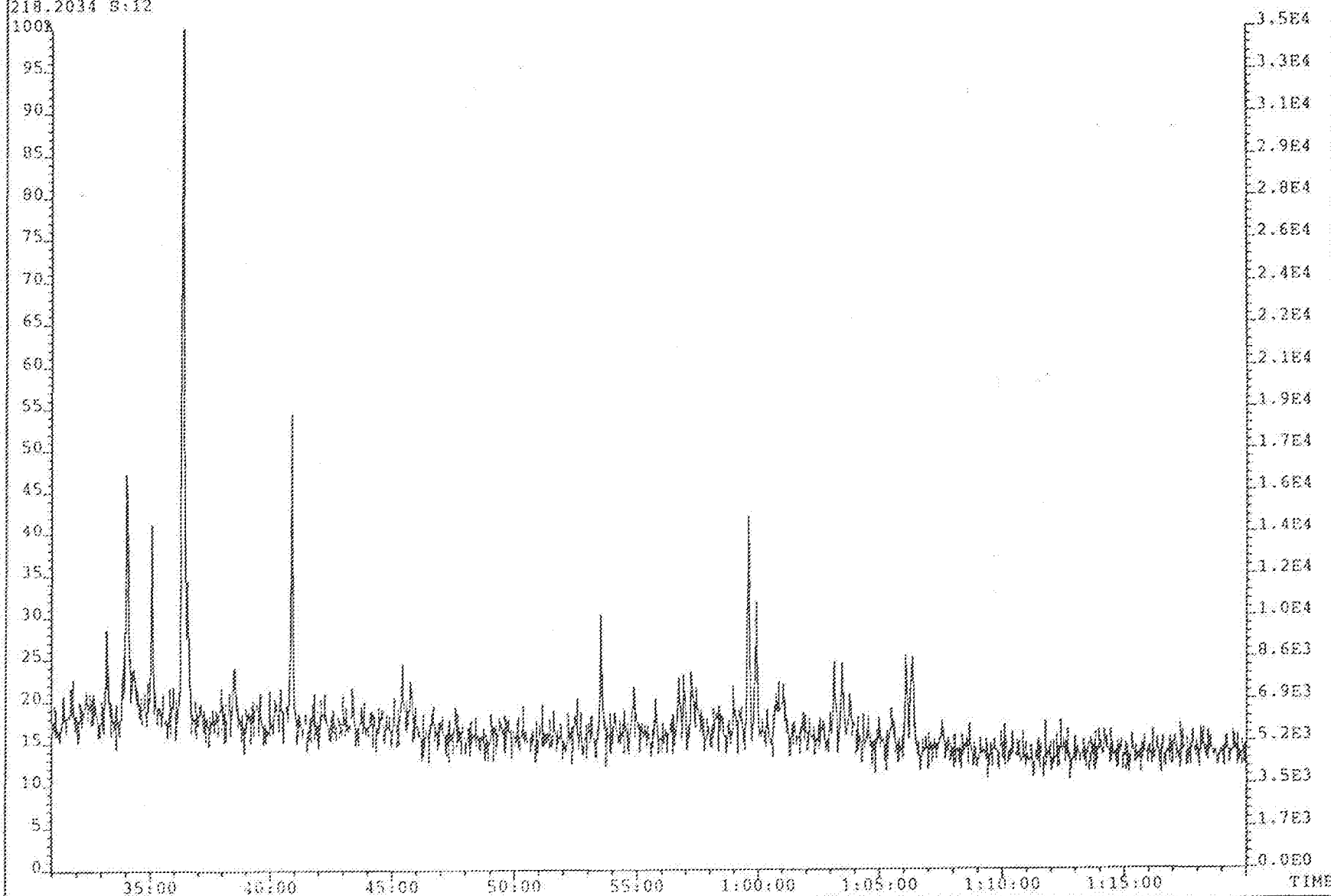
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 13:23:15 EI+ Magnet SIR
Sample#12 Text:WELL 34/10-35, 4270.75M, SATURATED FRACTION
218.2034 S:12

Exp:SAT1



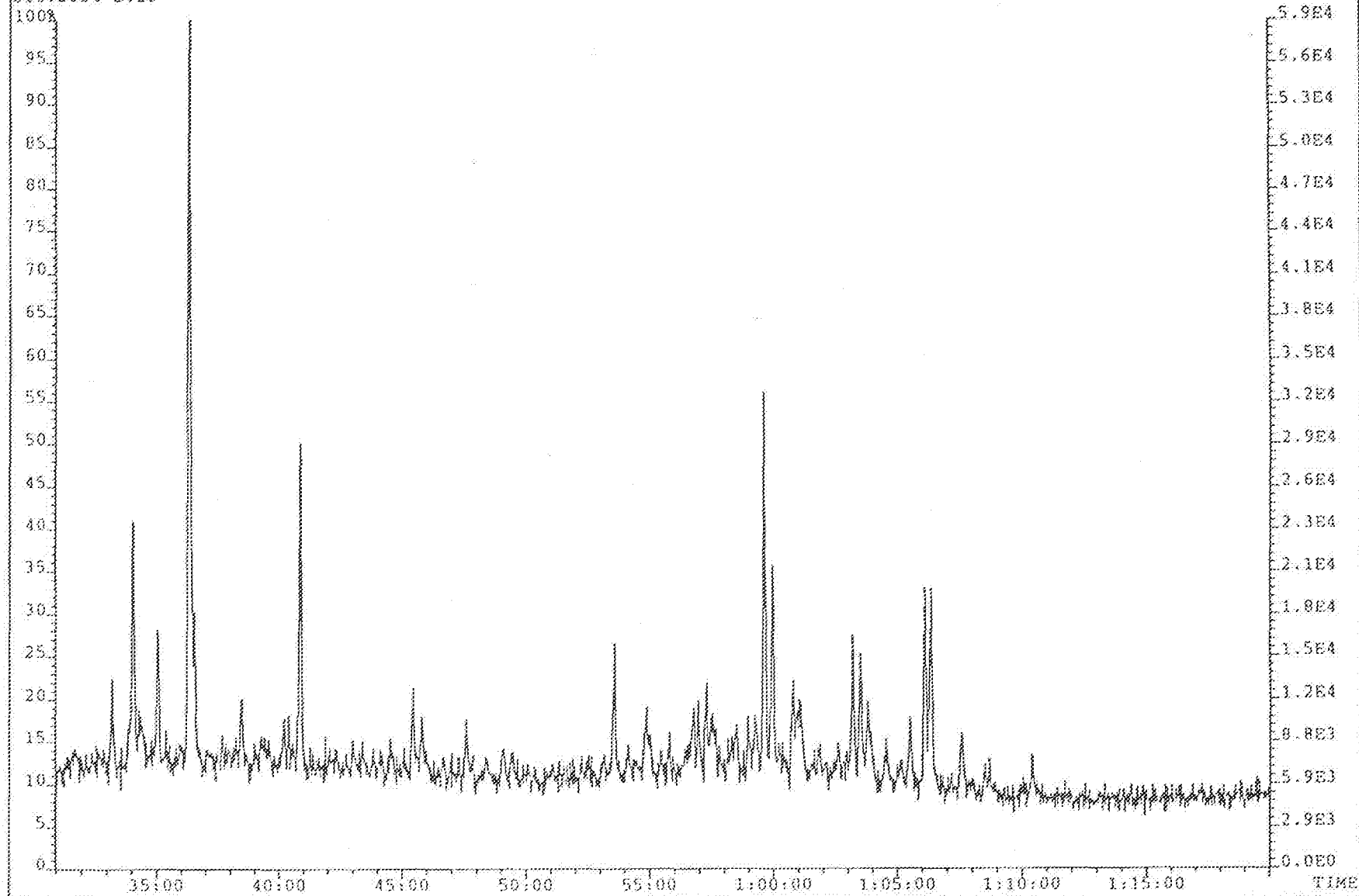
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1997 14:27:15 EI+ Magnet SIR
Sample#13 Text:WELL 34/10-15, 4283.48M, SATURATED FRACTION
218.2034 S:13

Exp:SAT1

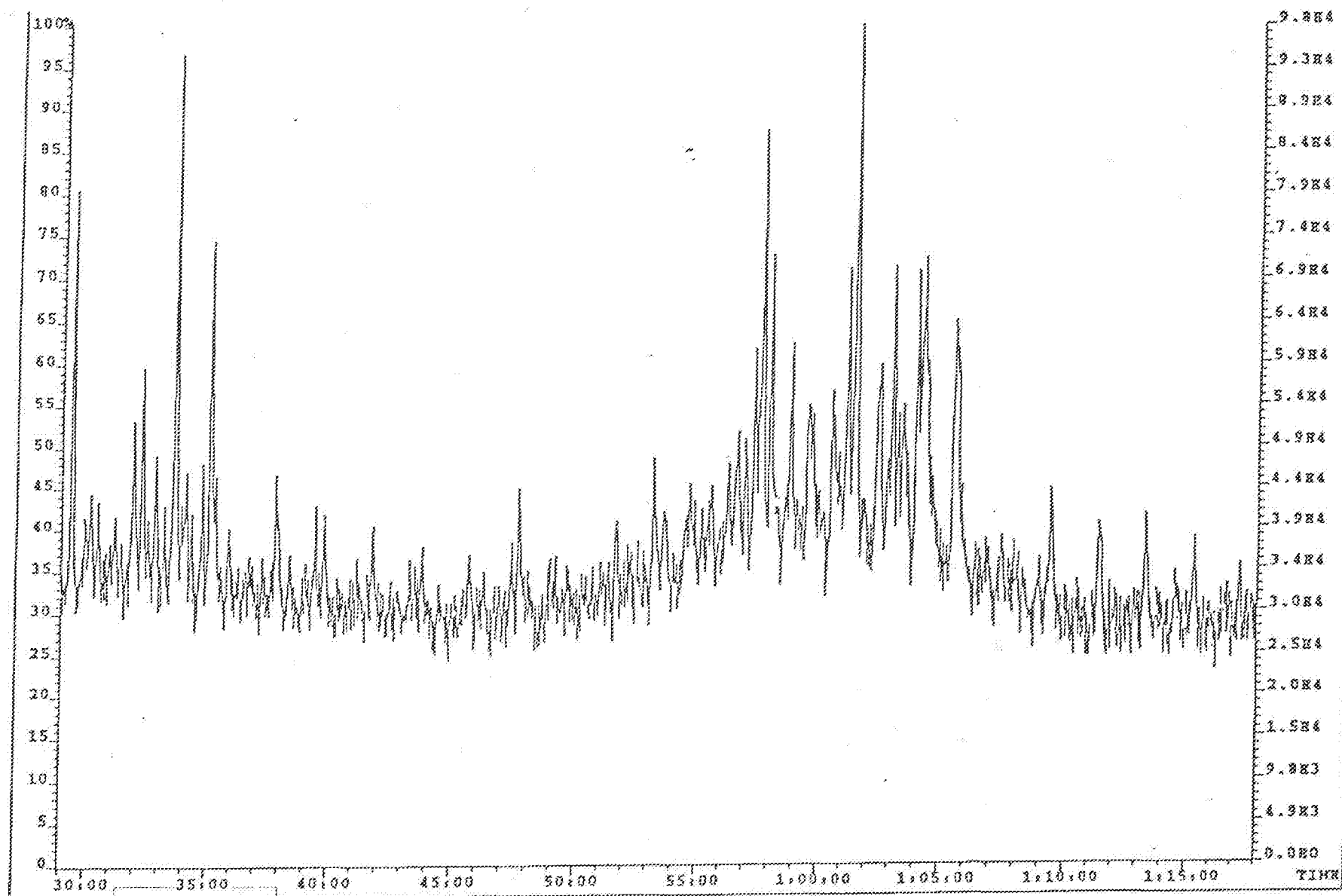


Schlumberger

GECO-PRAKLA

GEOLAB NOR

EXAMPLE OF PEAK IDENTIFICATION FOR H/Z 231 METHYL STERANES

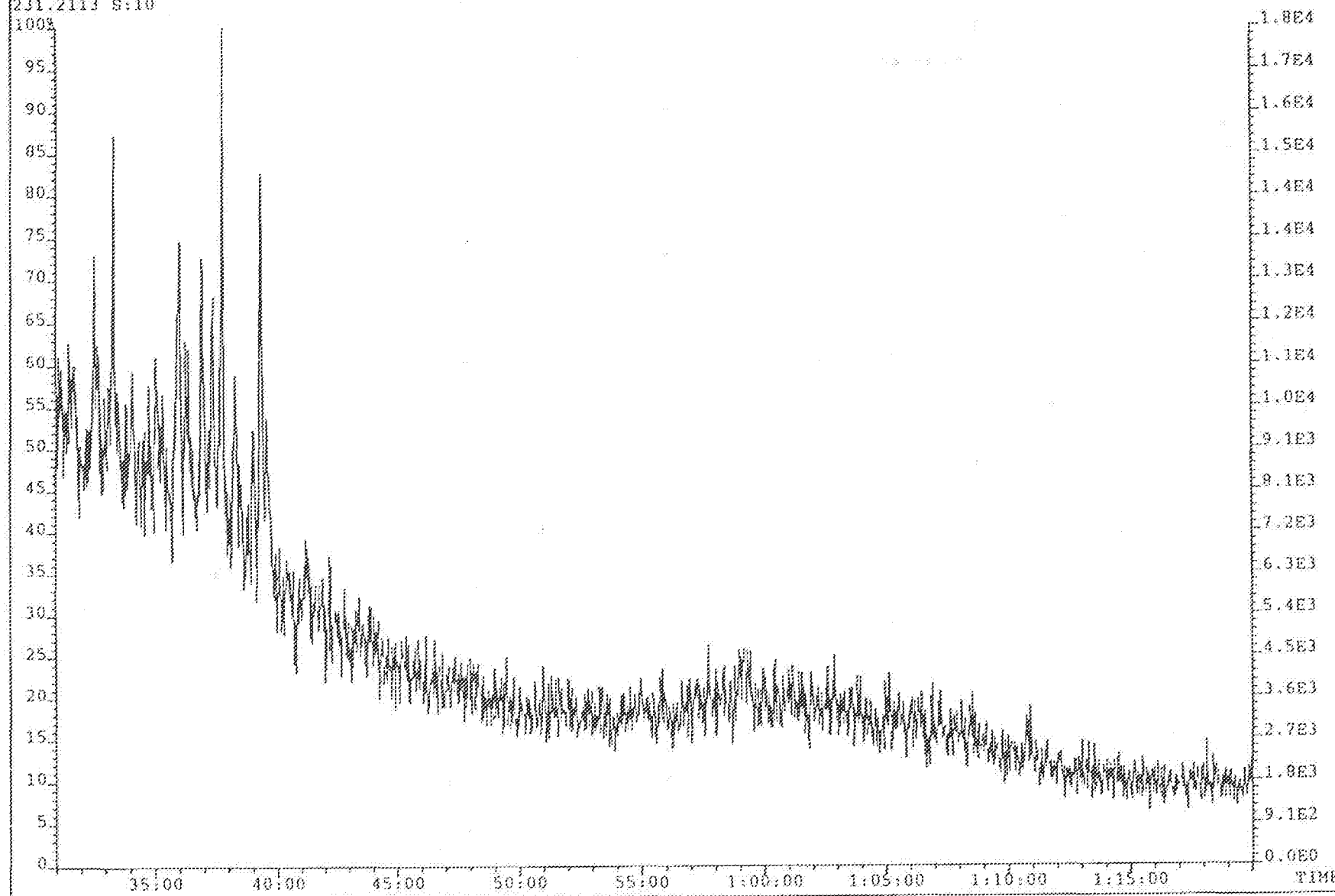


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 HI-4739 Acq:23-SEP-1997 12:20:58 E1+ Magnet SIR
Sample#10 Text:WELL 34/10-35, OLJE OVER MUD, 3496-3504M, SAT. FRAC. FROM OIL Exp:SAT1
231.2113 S:10



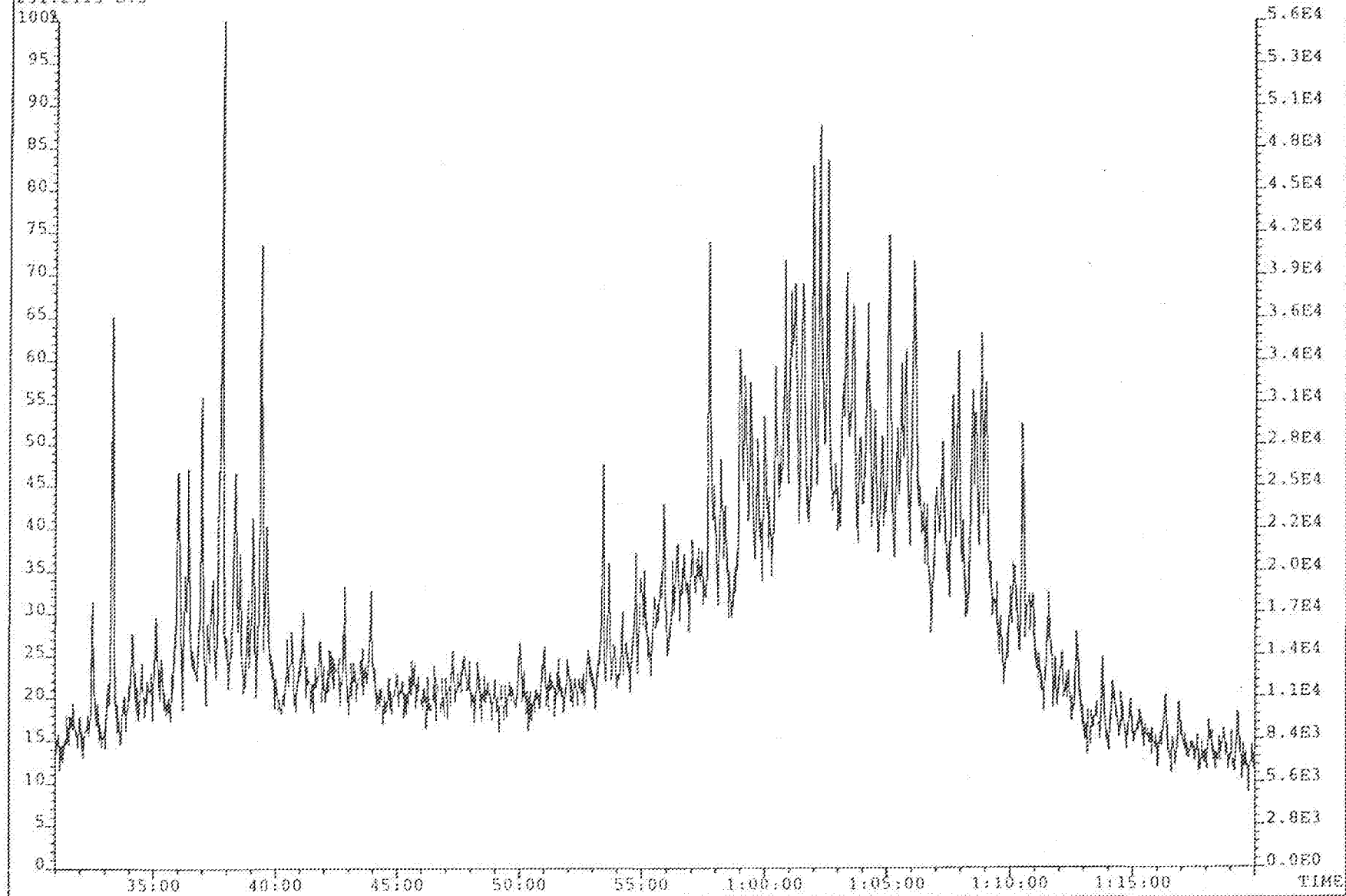
Schlumberger

GECO-FRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 E14 Magnet SIR
Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
211.2111 S.J

Exp:SAT1



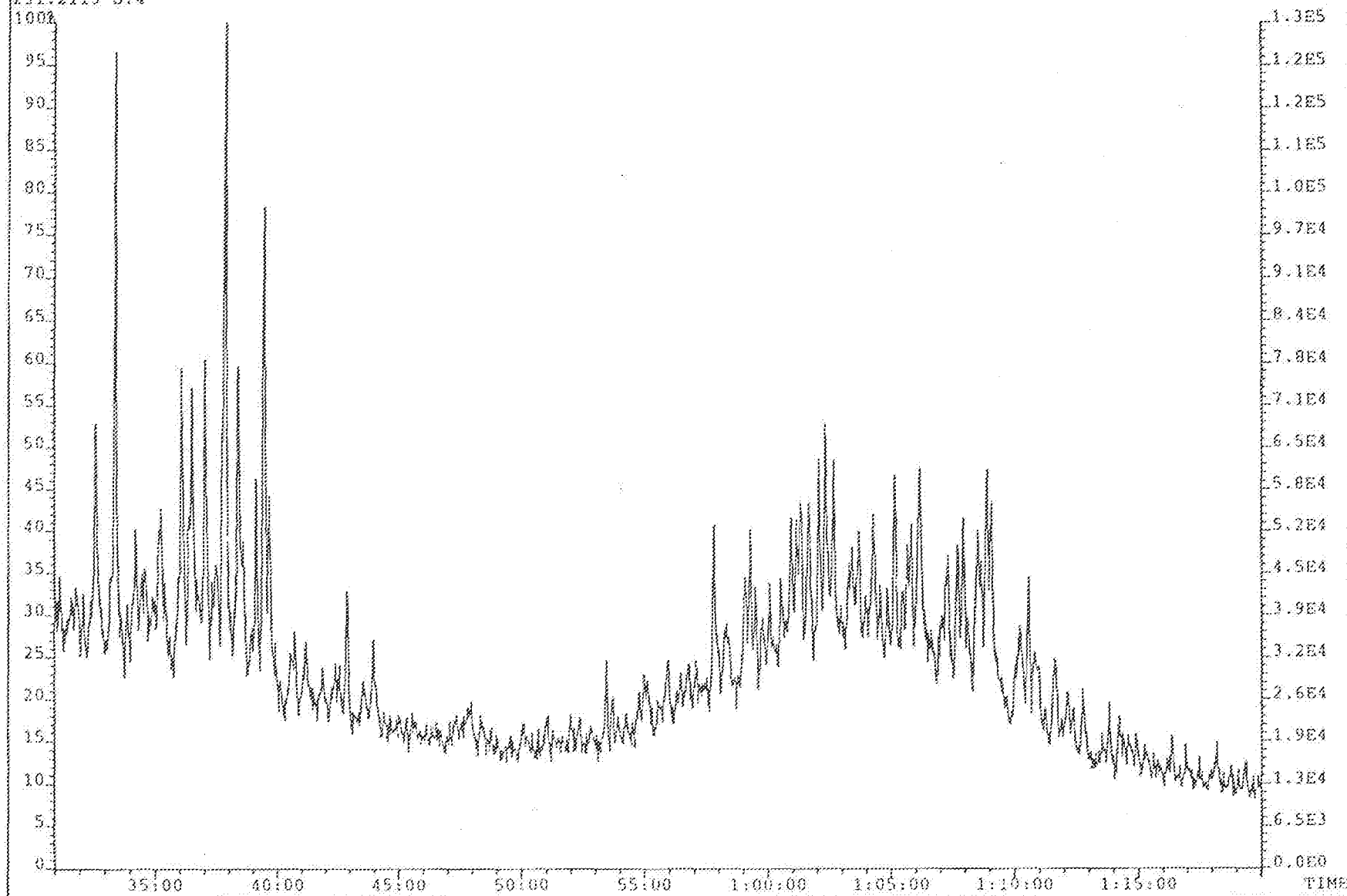
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 11-4740 Acq:22-SEP-1992 12:15:05 El: Magnet SIR
Sample#4 Text:WELL 34/10-35, 3831H, SATURATED FRACTION
231.2113 S:4

Exp:SAT1



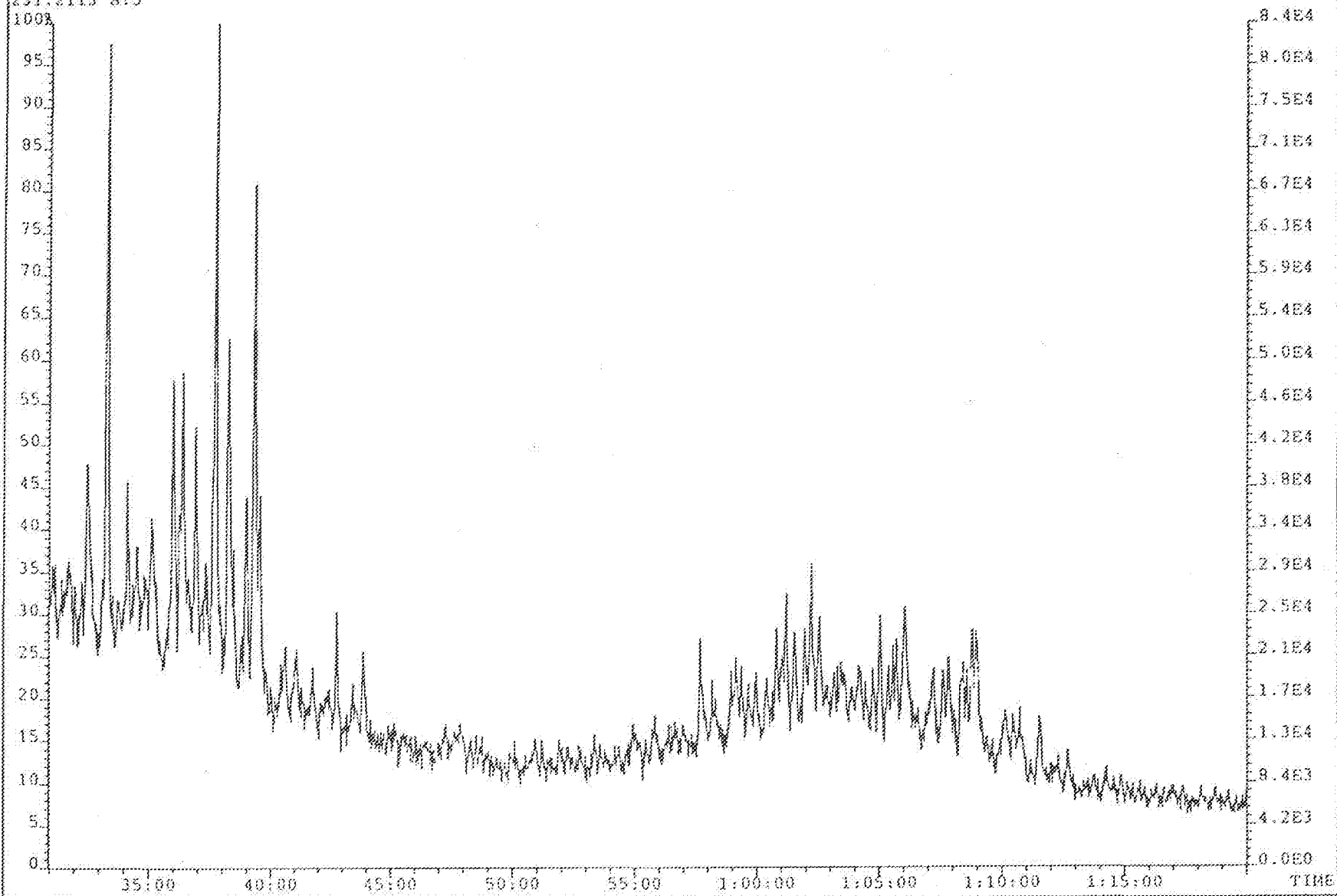
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 12:15:05 E1+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
231.2113 8:5

Exp:SAT1



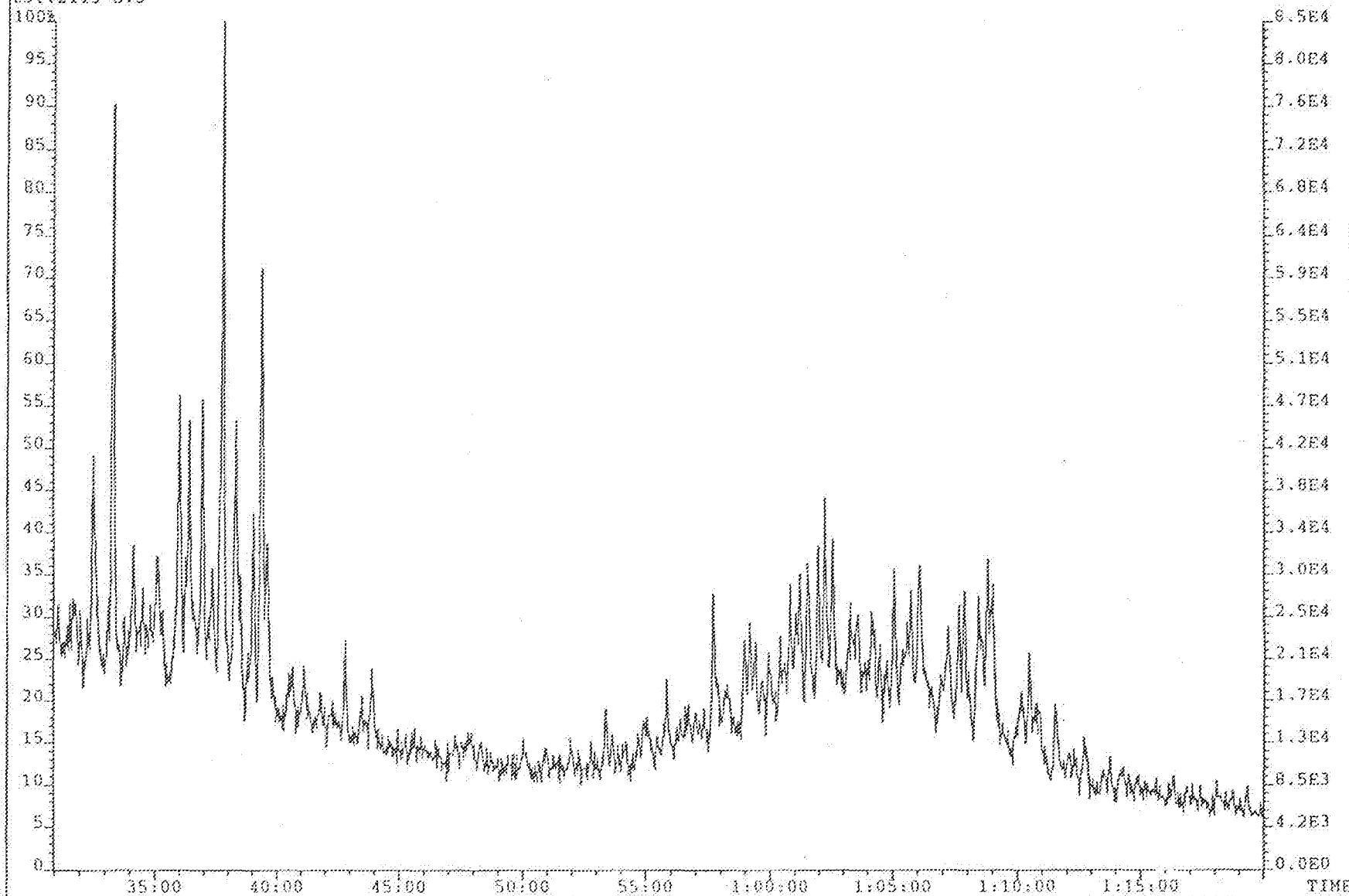
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 W1-4739 Acq:21-SEP-1997 12:20:58 EI+ Magnet SIR
Sample#5 Text:WELL 14/10-35, 3895M, SATURATED FRACTION
231.2113 S:5

Exp:SAT1



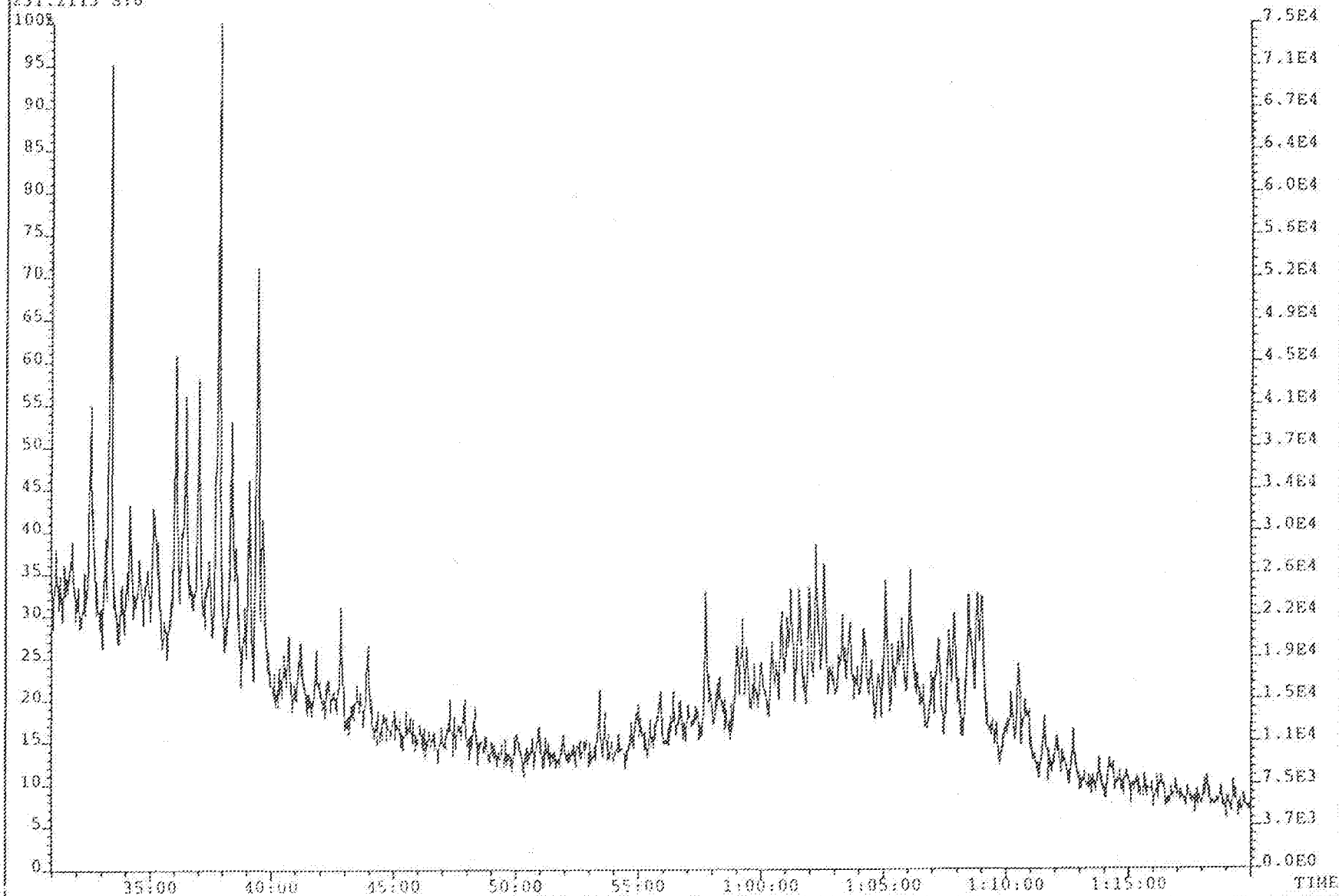
Schlumberger

GECO-PRAKLA

GEOLAB  NOR

File:STATSATJ #1-4740 Acq:23-SEP-1992 12:20:58 EI+ Magnet SIR
Sample#6 Text:WELL 34/10-35, 3894M, SATURATED FRACTION
231.2113 S:6

Exp:SAT1

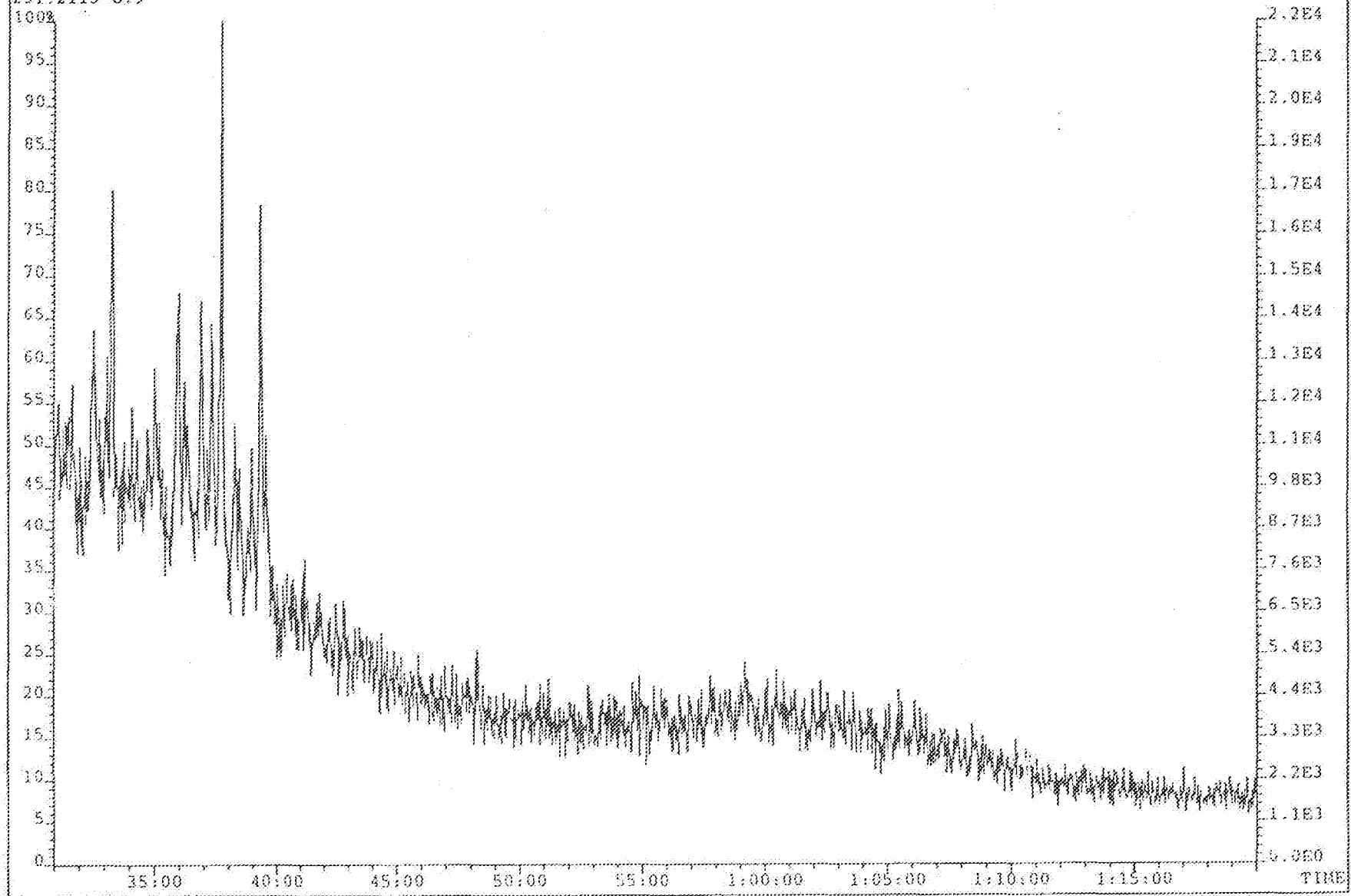


Schlumberger

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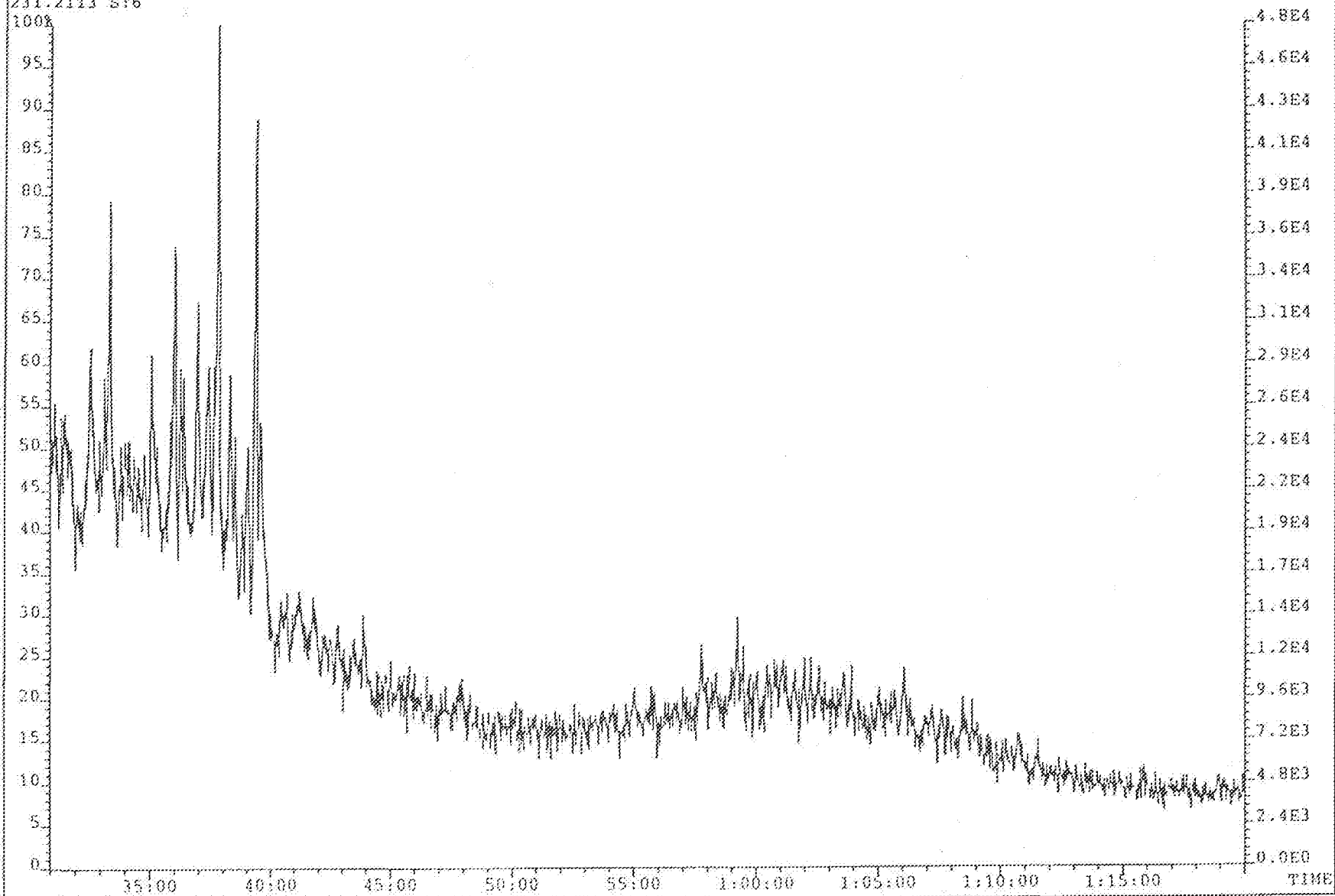
GEOLAB NOR

File: STASATJ #1-4740 Acq: 23-SEP-1992 12:20:58 EI+ Magnet SIR
Sample#9 Text: WELL 34/10-35, DST3, 3920-29M, SATURATED FRACTION FROM OIL Exp: SAT1
231.2113 S:9



File:STATSAT2 #1-1719 Acq:22-SEP-1992 12:15:05 ET* Magnet SIR
Sample#6 Text:WELL 34/10-35, 3931.71M, SATURATED FRACTION
231.2113 S:6

Exp:SAT1



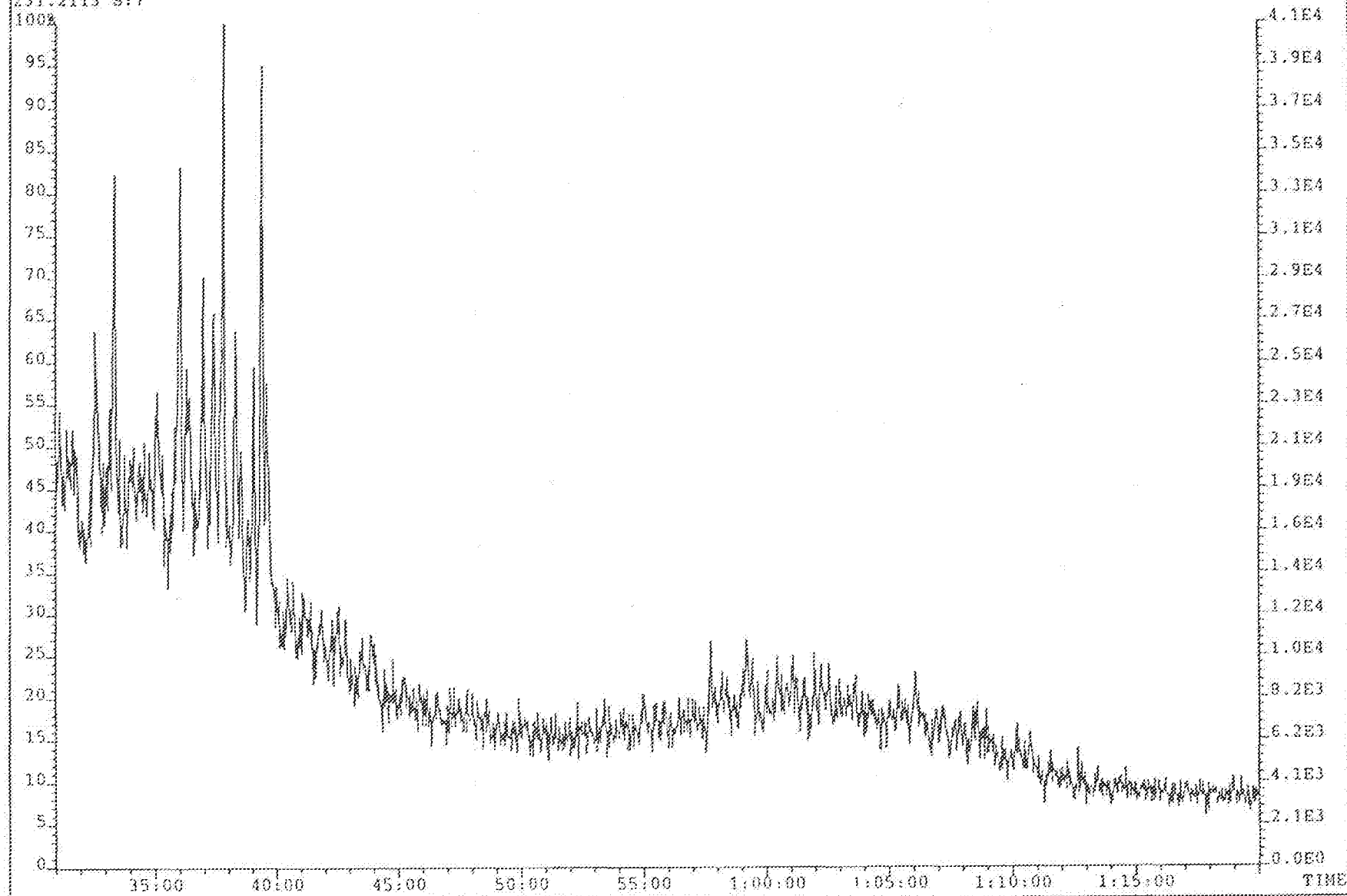
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 41-4739 Acq:22-SEP-1992 12:15:05 E1+ Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933.18M, SATURATED FRACTION
231.2113 S:7

Exp:SAT1



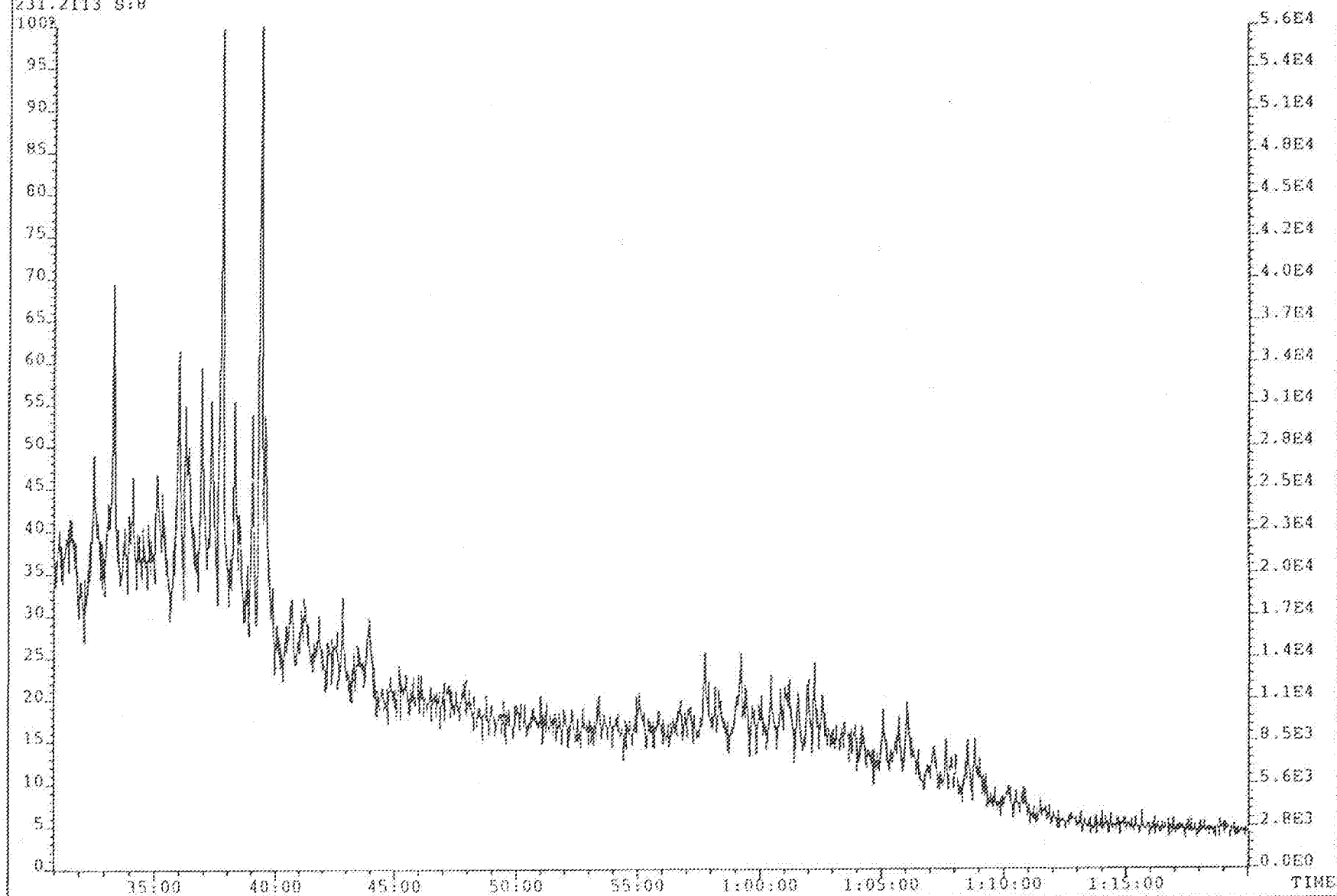
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4739 Acq: 22-SEP-1993 12:15:05 EI+ Magnet SIR
Sample#8 Text: WELL 34/10-35, 3994.05M, SATURATED FRACTION
231.2113 S:0

Exp: SAT1

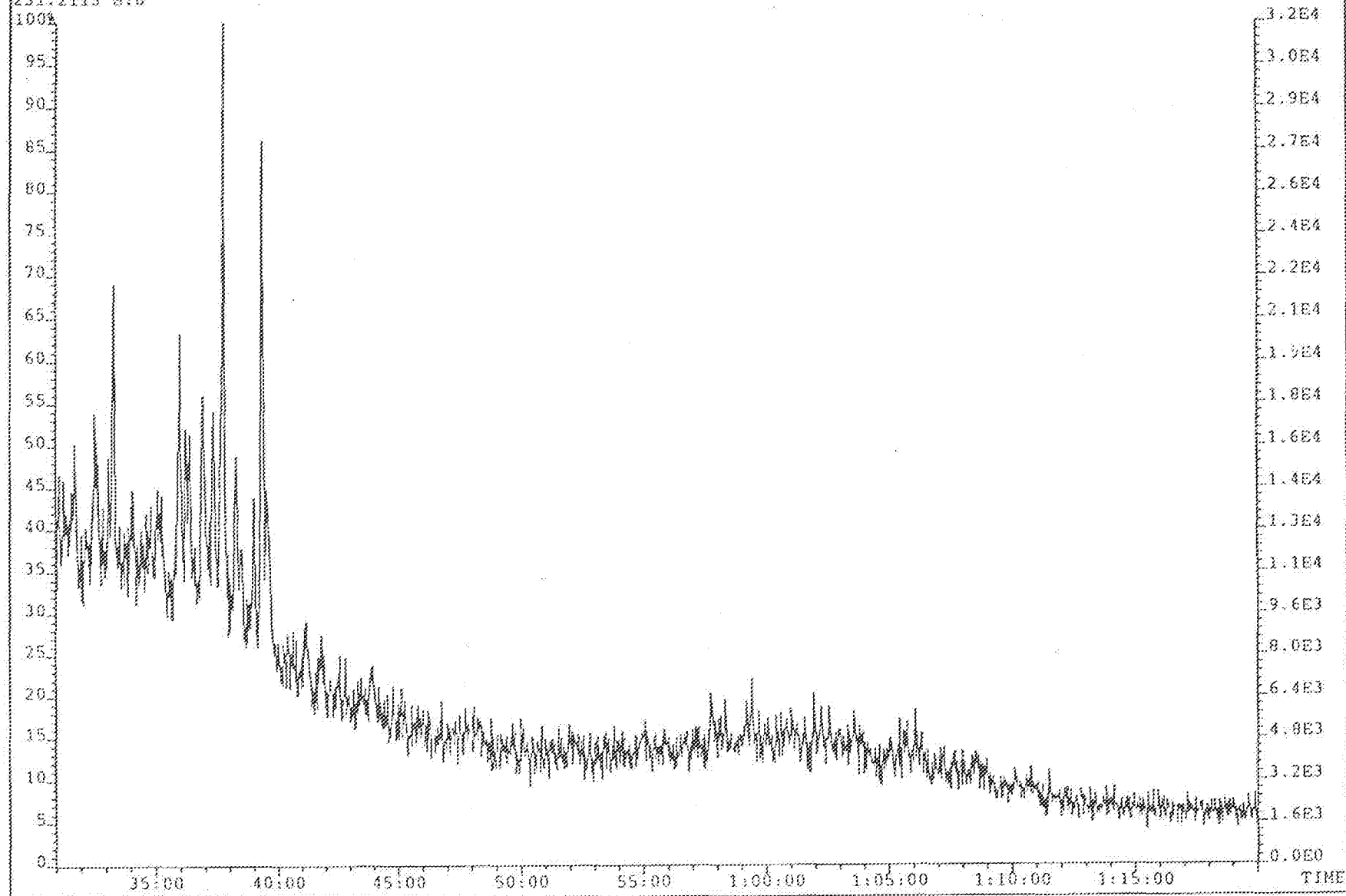


Schlumberger

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GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 12:20:58 EI+ Magnet SYR
Sample#8 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp:SAT1
231.2113 S:8



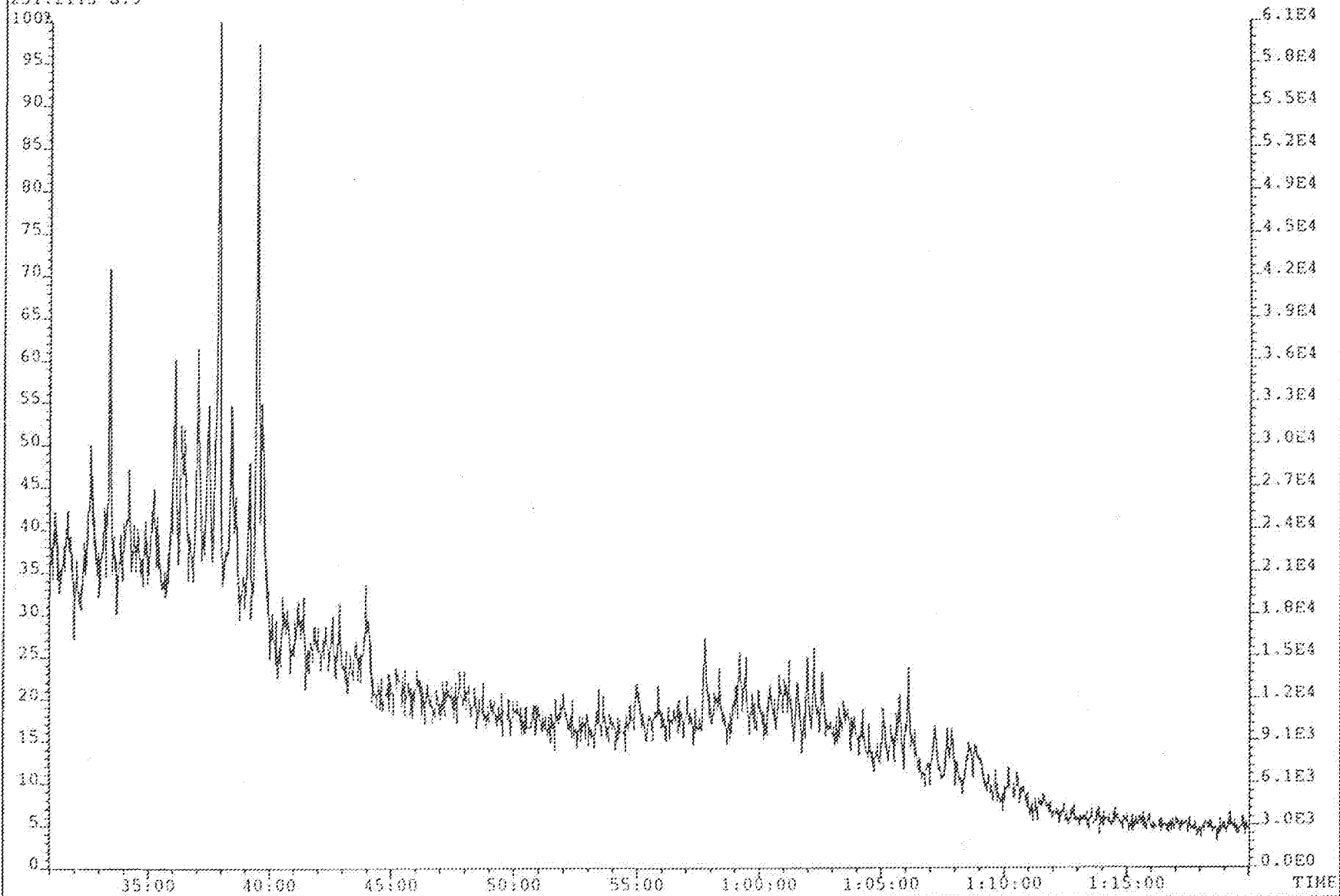
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#9 Text:WELL 34/10-35, 4006.17M, SATURATED FRACTION
231.2113 S:9

Exp:SAT1



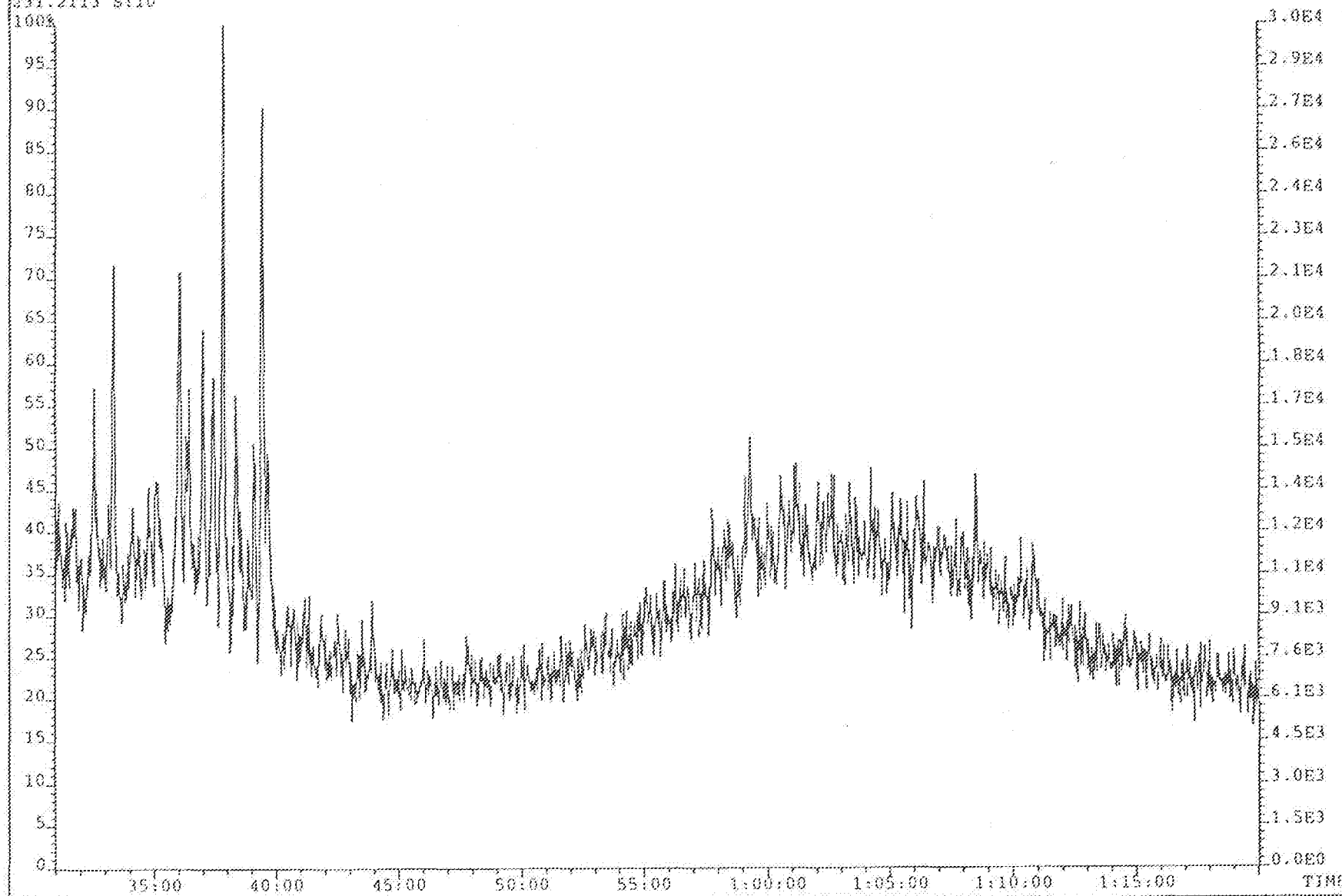
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 12:15:05 EI+ Magnet S18
Sample#10 Text:WELL 34/10-35, 4021-93M, SATURATED FRACTION
331.2113 9:10

Exp:SAT1



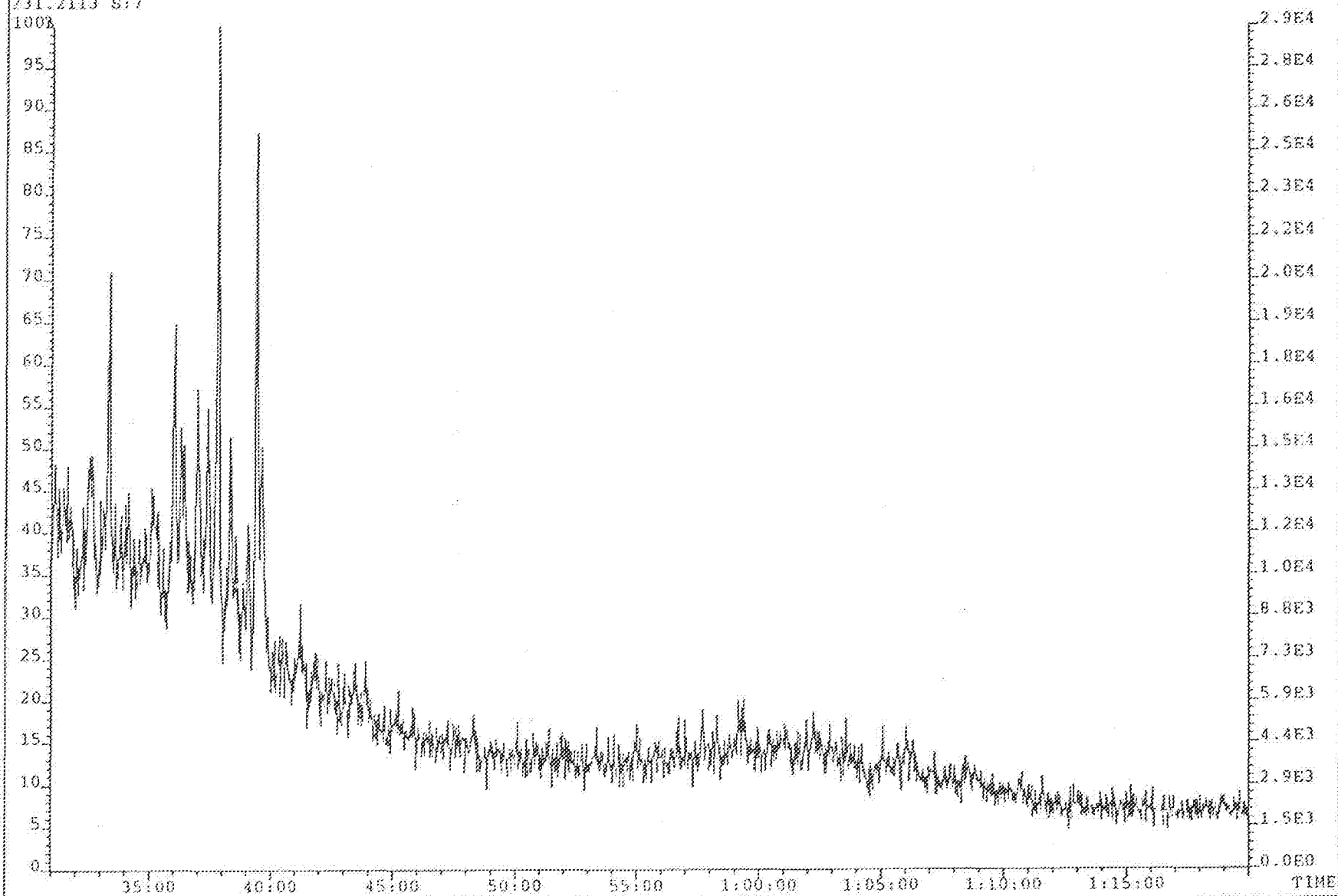
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 T1-4740 Acq:23-SEP-1992 12:20:58 EI+ Magnet SIR
Sample#7 Text:WELL 14/10-35, DST1, 4019-25M, SATURATED FRACTION FROM OIL
731.2113 S:7

Exp:SAT1



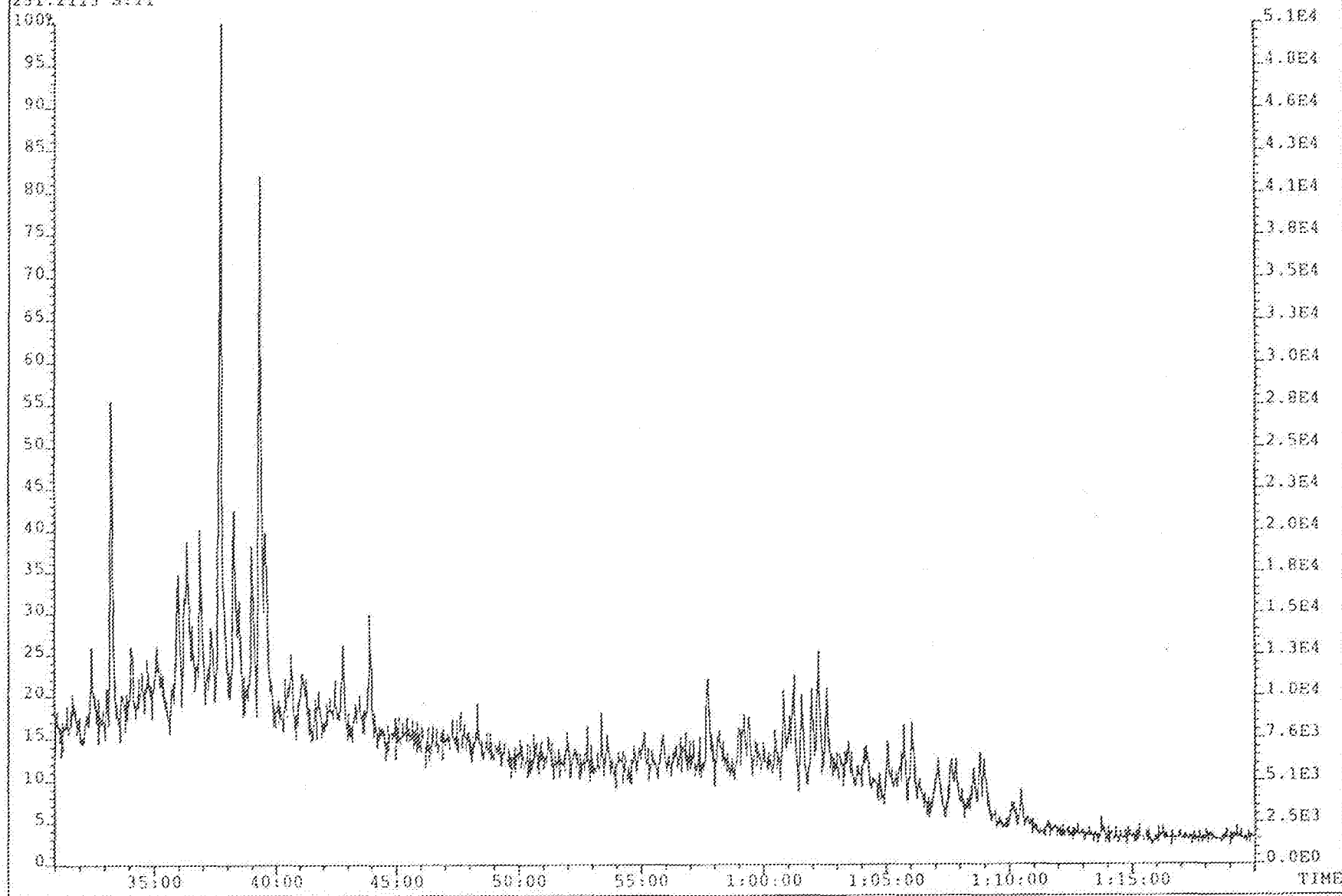
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 W1-4741 Acq:22-SEP-1992 12:15:05 EI+ Magnet SIR
Sample#11 Text:WELL 34/10-35, 4257.47M, SATURATED FRACTION
231.2113 9:11

Exp:SAT1



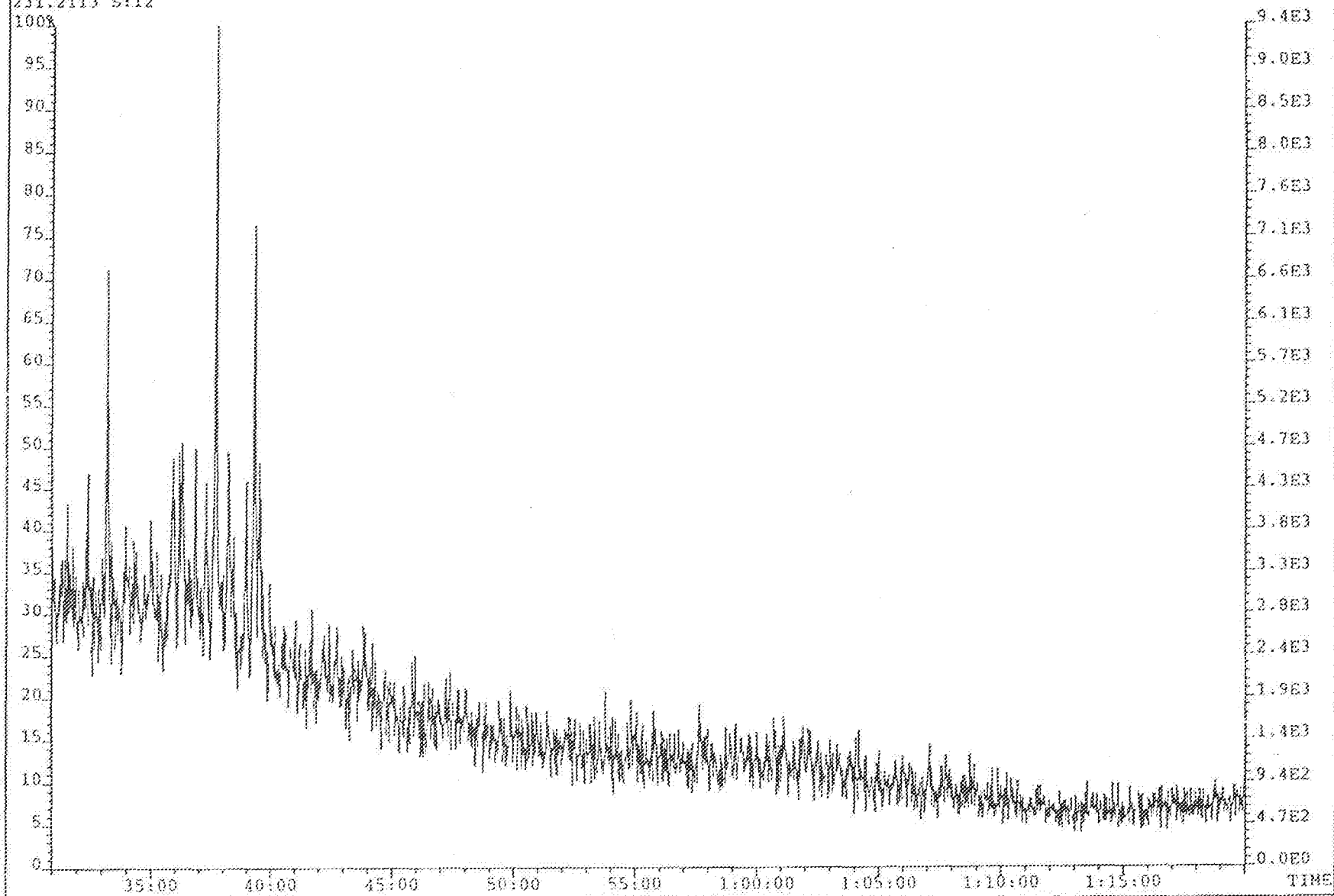
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 12:15:05 EI: Magnet SIR
Sample#12 Text:WELL 34/10-35, 4270.75M, SATURATED FRACTION
231.2113 S:12

Exp:SAT1



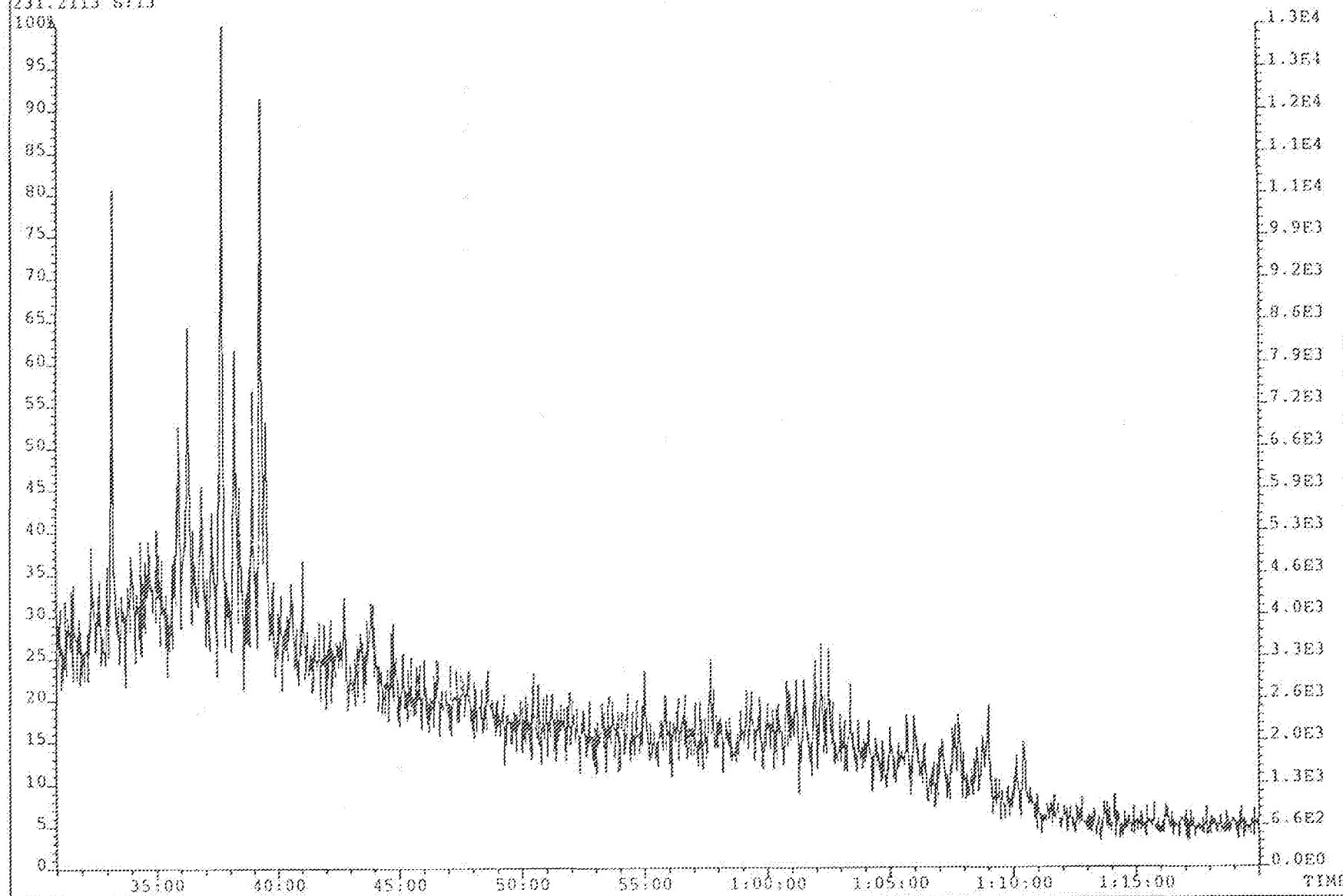
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 81-4740 Acq:22-SEP-1997 12:15:05 Bit Magnet SIR
Sample#13 Text:WELL 34/10-35, 4283.48M, SATURATED FRACTION
231.2113 S:13

Exp:SAT1

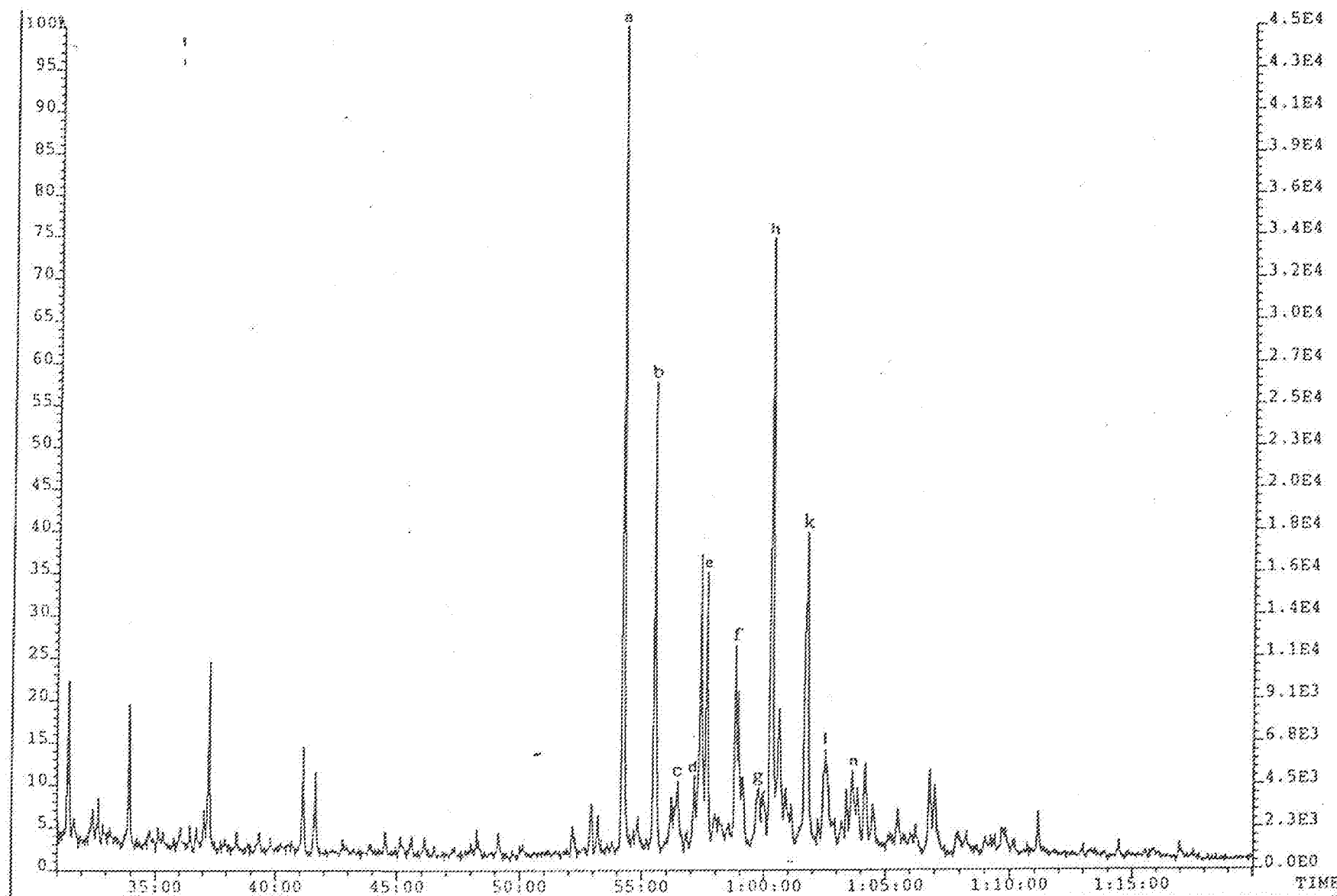


Schlumberger

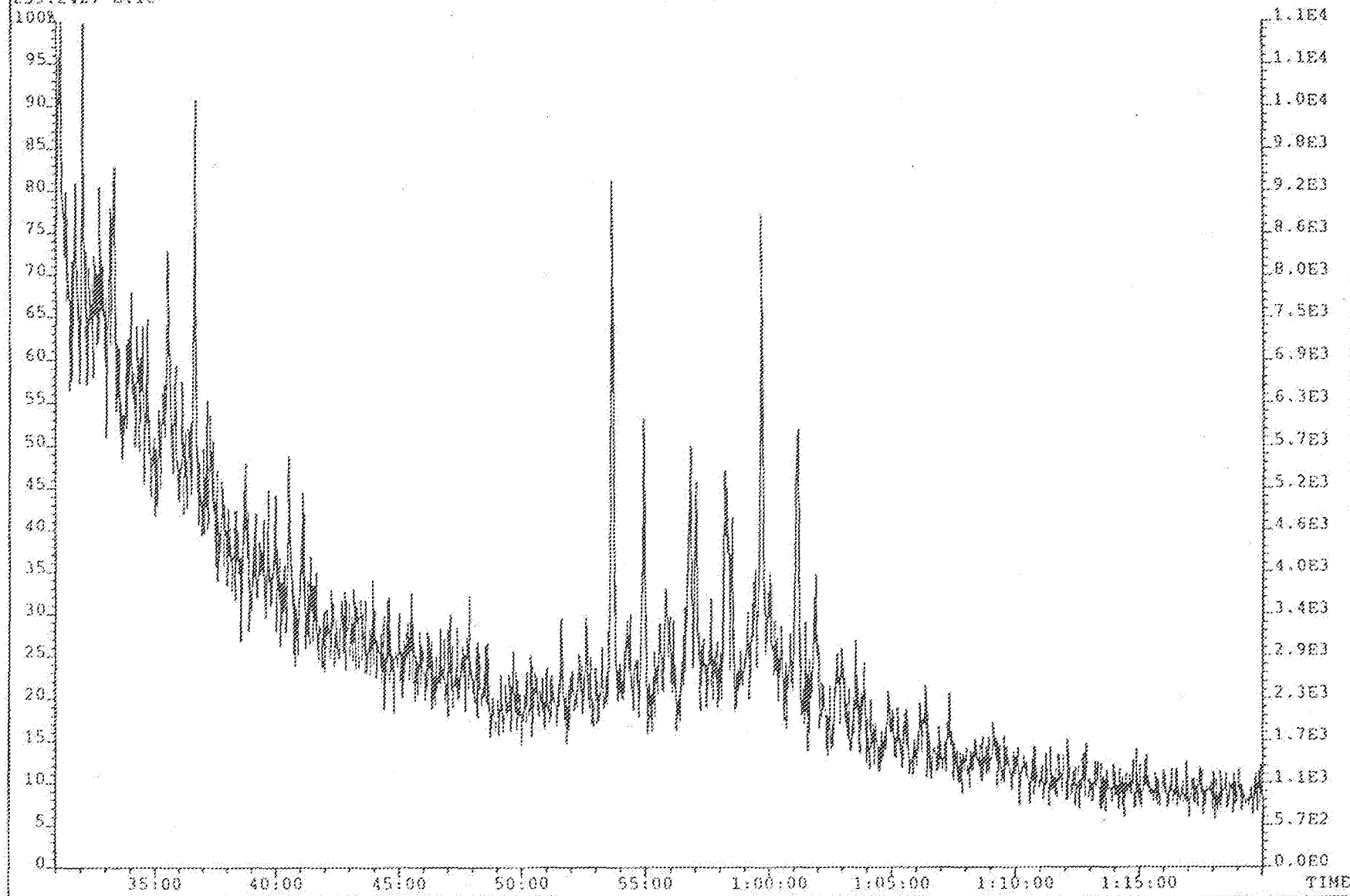
GECO-PRAKLA

GEOLAB NOR

EXAMPLE OF PEAK IDENTIFICATION FOR M/Z 259 REARRANGED STERANES

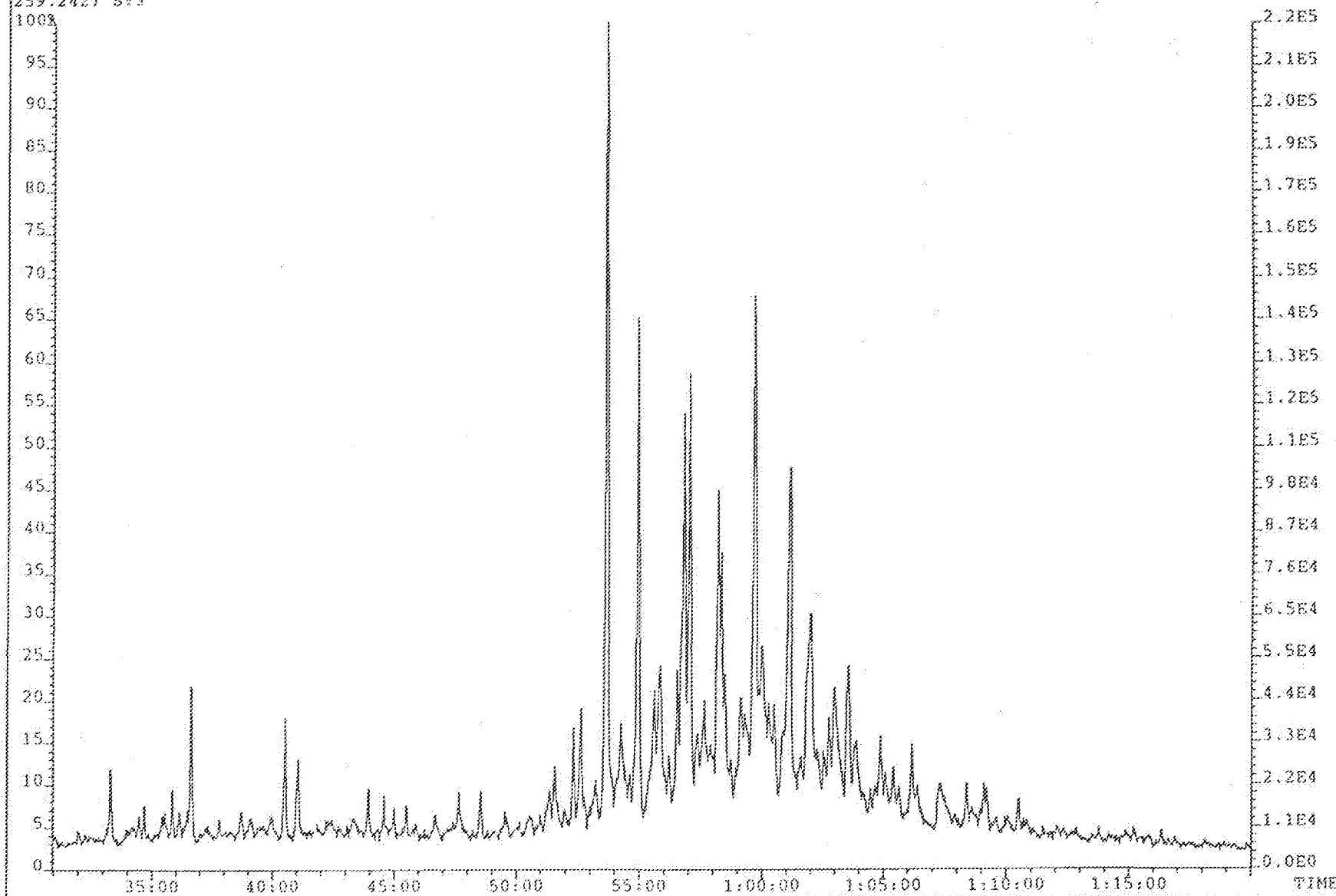


File:STATSAT1 #1-4739 Acq:23-SEP-1997,13:30:02 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, OLJE OVER MOD, 3496-3504M, SAT. FRAC. FROM OIL Exp:SAT1
259.2427 S:10



File:STATSAT2 #1-4739 Acq:22-SEP-1992 04:23:15 EI+ Magnet SIR
Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
259.2427 S:3

Exp:SAT1



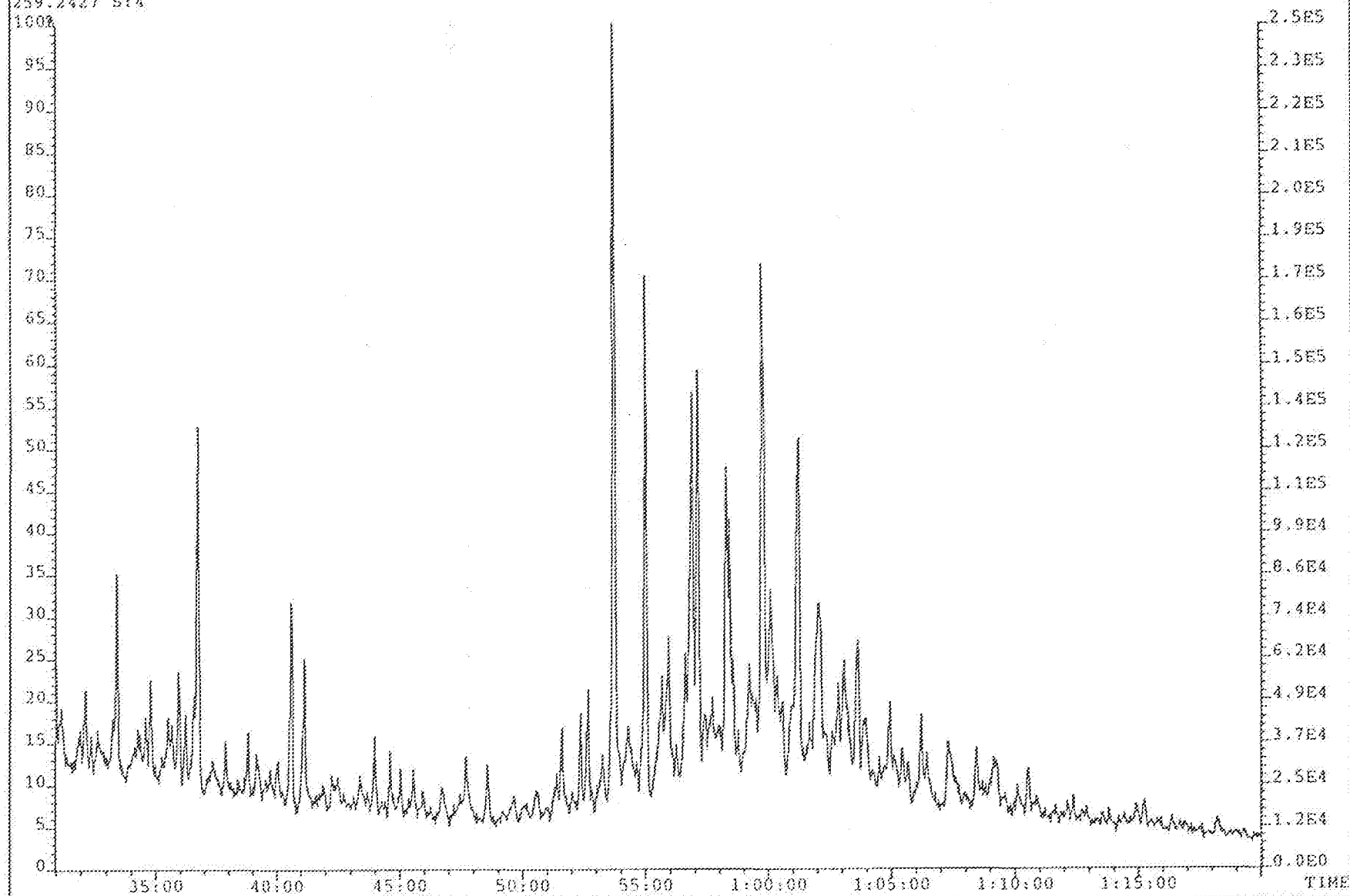
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#4 Text:WELL 34/10-35, 3831M, SATURATED FRACTION
259.2427 S:4

Exp: SAT1



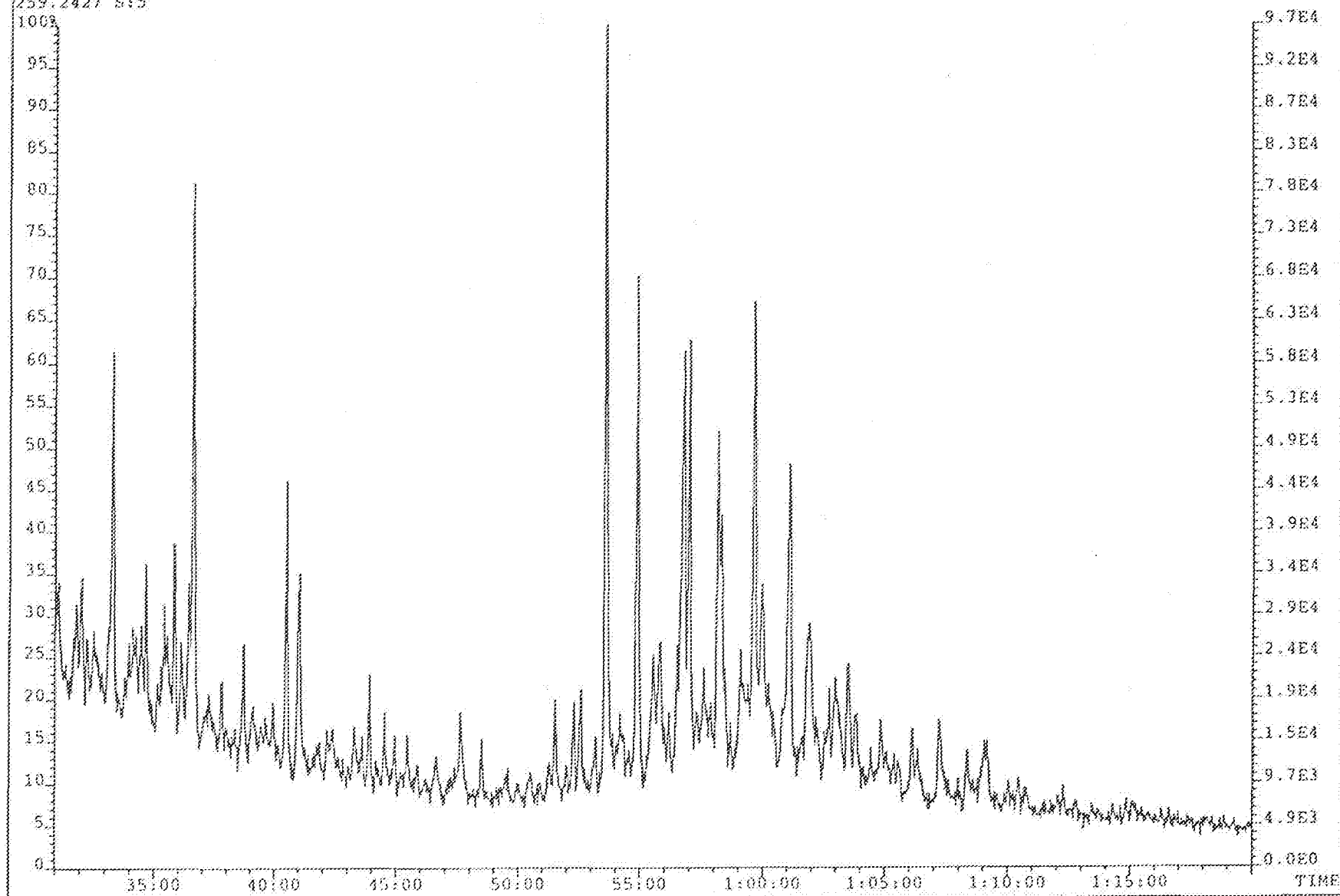
Schumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 11:23:15 Elf-MagneU SIR
Sample#5 Text:WELL 34/10-35, 3952M, SATURATED FRACTION
259.2427 S:5

Exp:SAT1



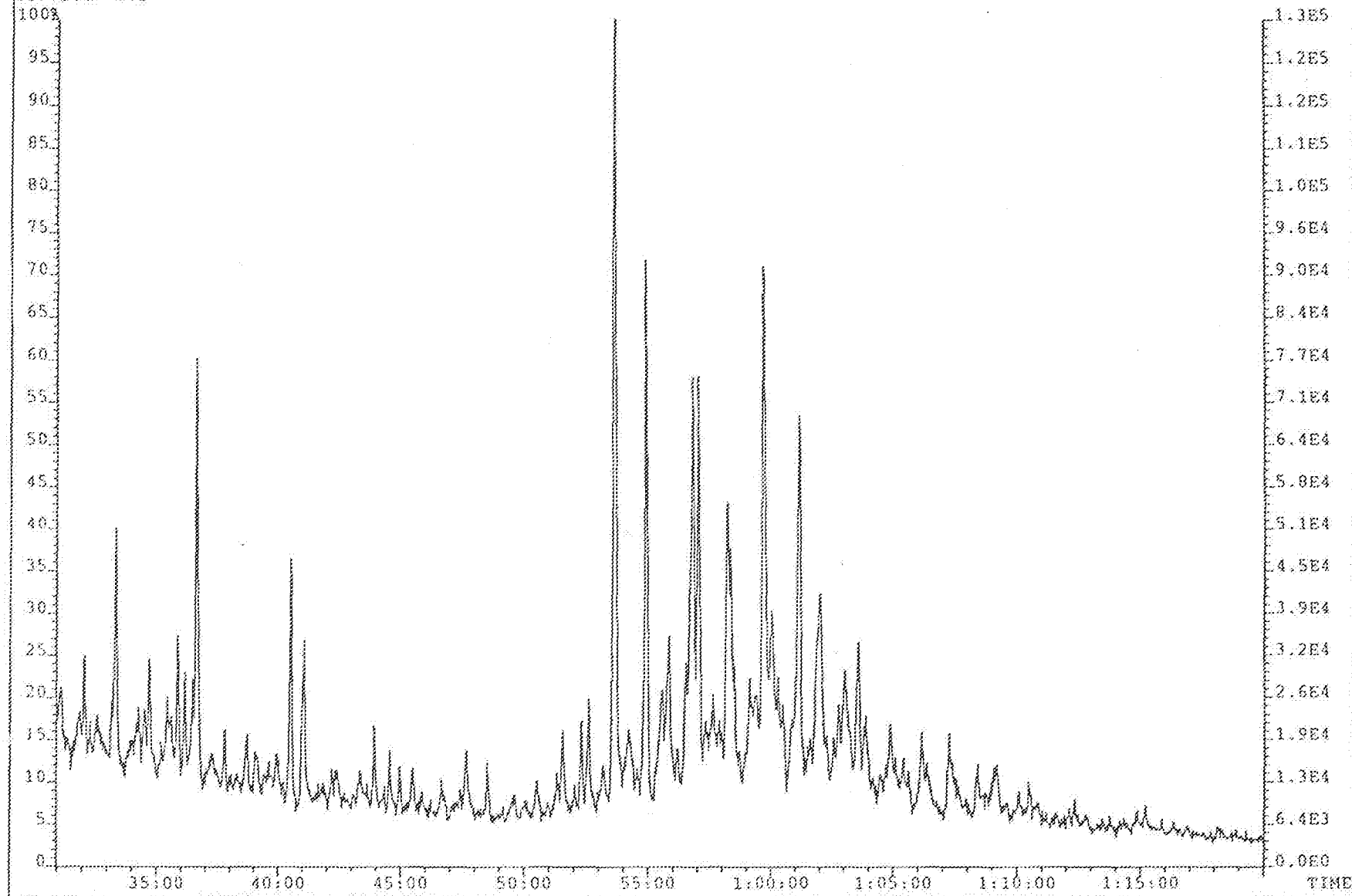
Schlumberger

GECO-PRAKLA

GEOLAB  NOR

File:STATSAT3 W1-4739 Acq:23-SEP-1992 13:10:02 EI+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3885M, SATURATED FRACTION
259.2427 S:5

Exp:SAT1



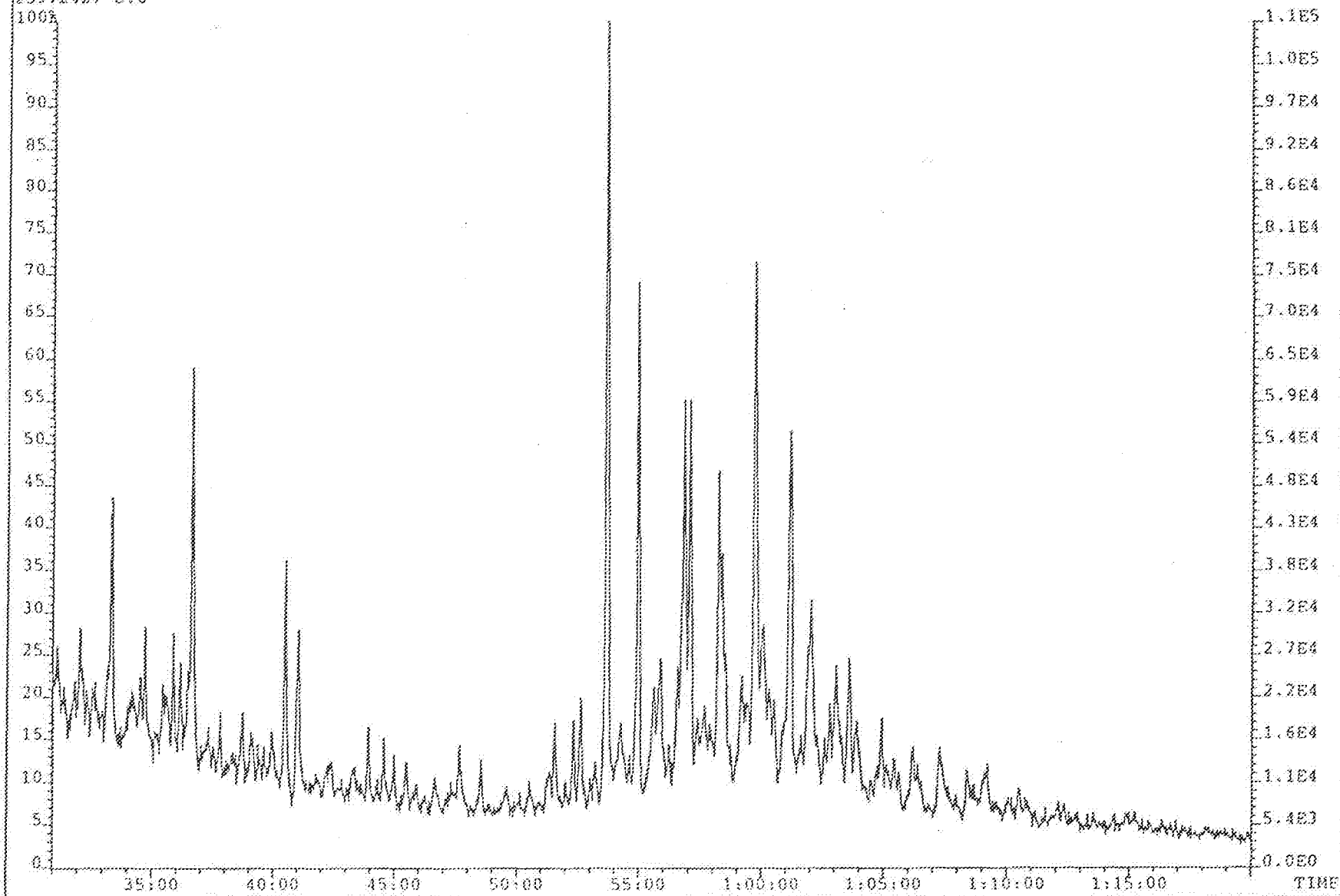
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSATJ #1-4740 Acq:23-SEP-1993 11:10:02 EI+ Magnet SIR
Sample#6 Text:WELL 34/10-35, 3894M, SATURATED FRACTION
259.2427 S:6

Exp:SAT1

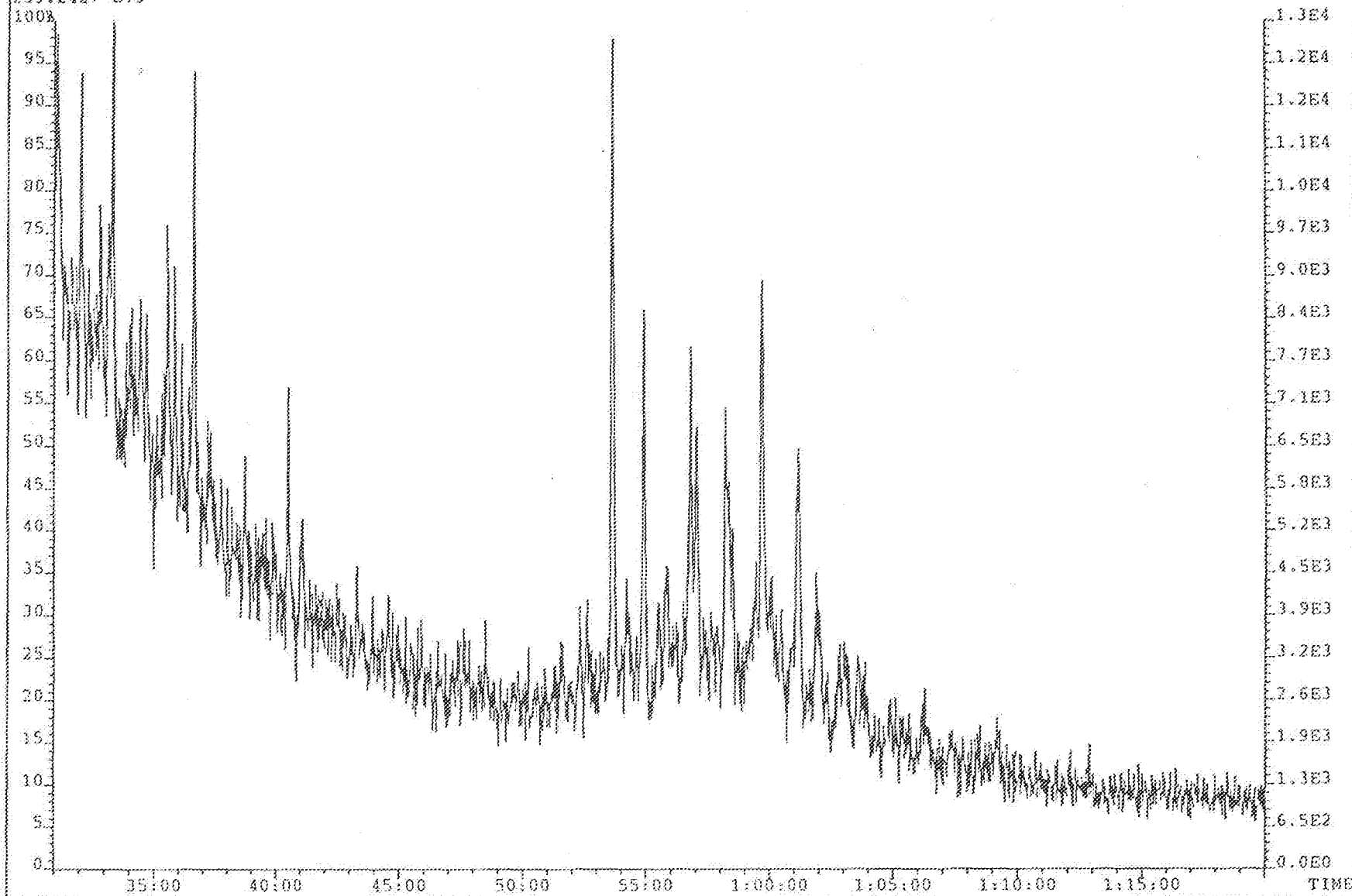


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASATJ #1-4740 Acq: 21-SEP-1992 11:30:02 EI+ Magnet BIN
Sample#9 Text: WELL 34/10-35, DST3, 3920-29M, SATURATED FRACTION FROM OIL Exp: SAT1
259.2427 S:9



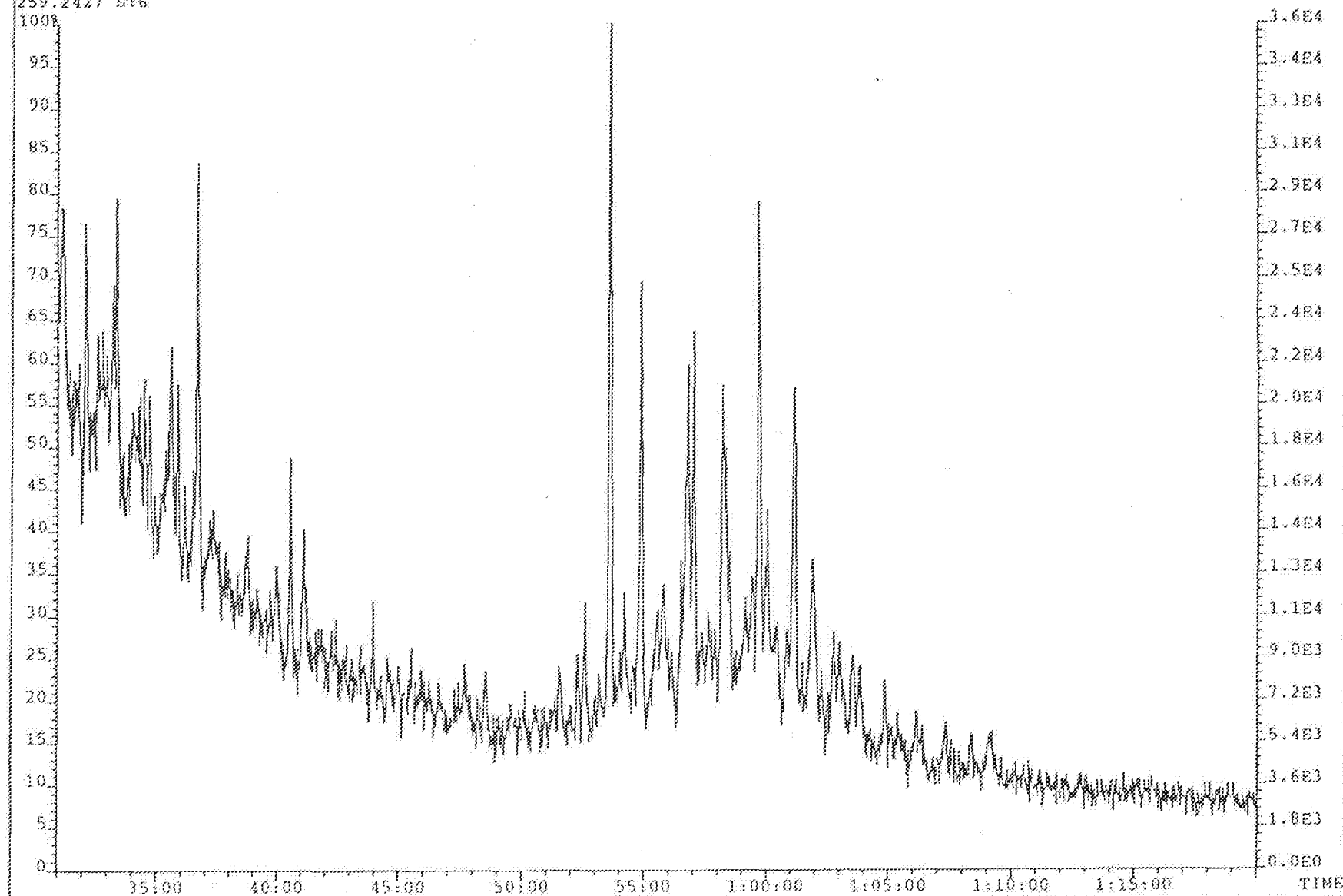
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1997 04:23:15 EI: Magnet SIR
Sample#6 Text:WELL 34/10-35, 3931.71M, SATURATED FRACTION
259.2427 S:6

Exp:SAT1



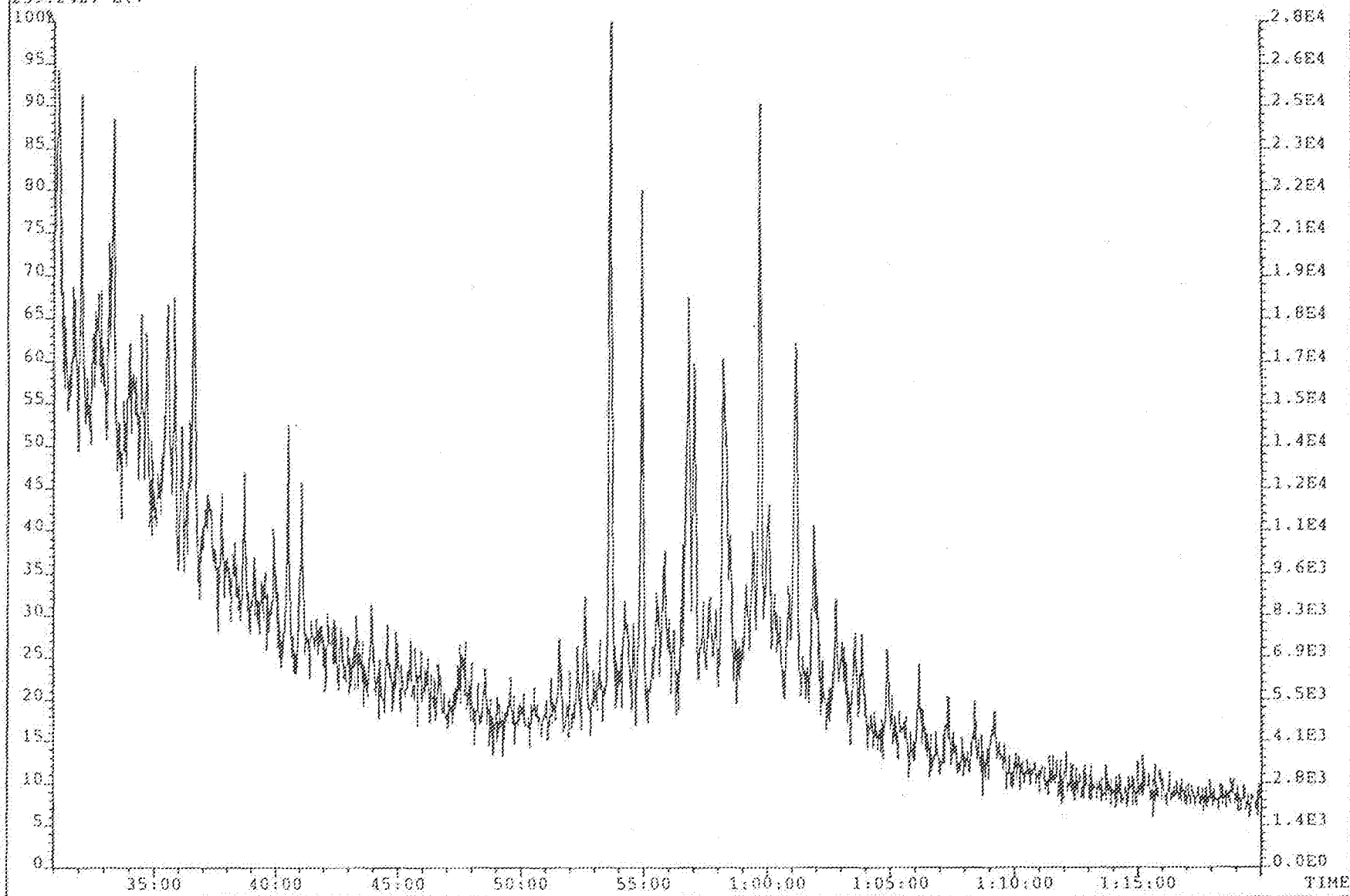
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4/39 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
259.2427 S:7

Exp:SAT1



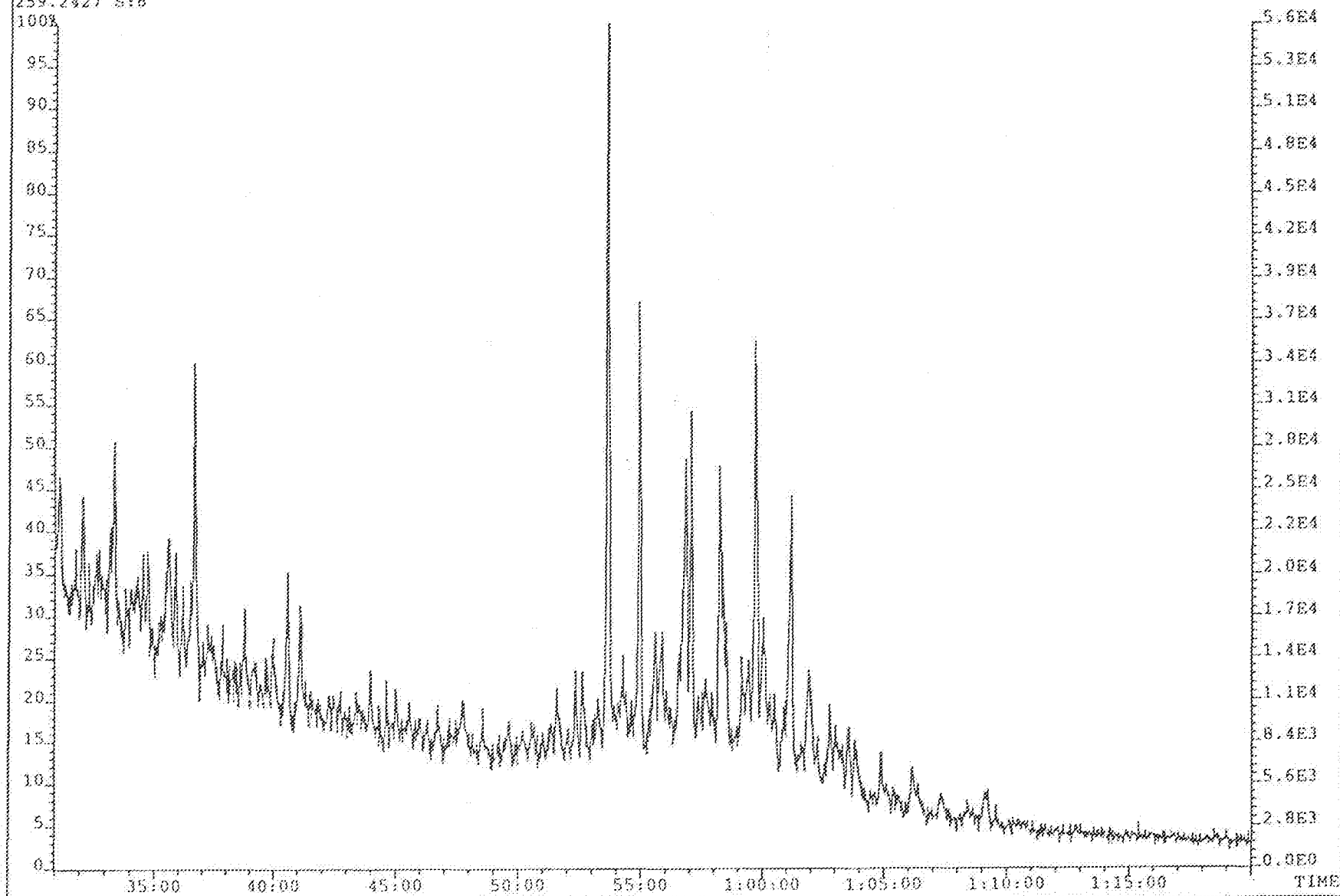
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT1 W1-4739 Acq: 22-SEP-1992 14:23:15 ET Magnet SIR
Sample#8 Text: WELL 34/10-35, 3994.05M, SATURATED FRACTION
259.2427 S:8

Exp: SAT1

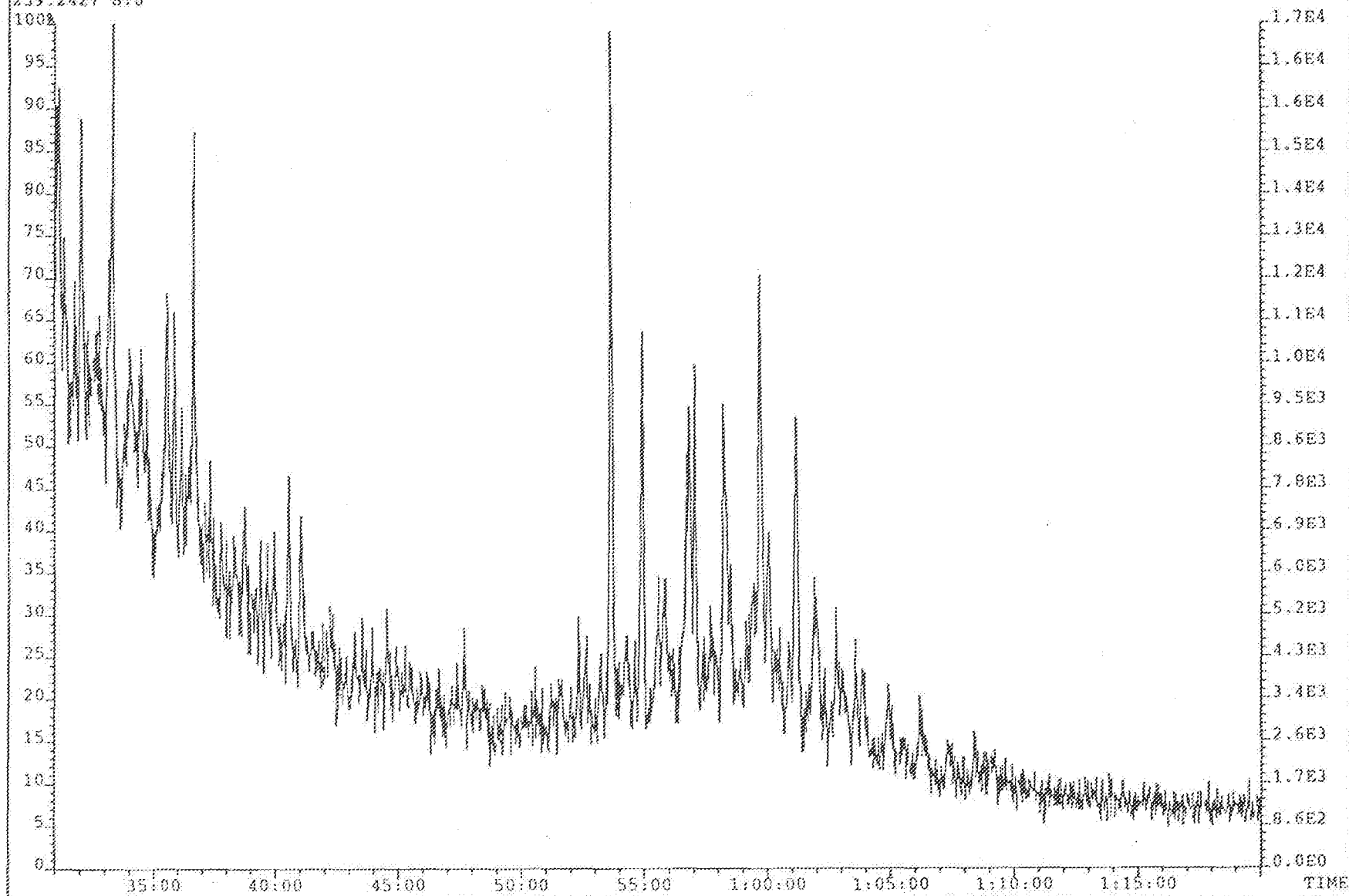


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4748 Acq:21-SEP-1992 11:30:02 EI+ Magnet 9IR
Sample#8 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp:SAT1
259.2427 S:8



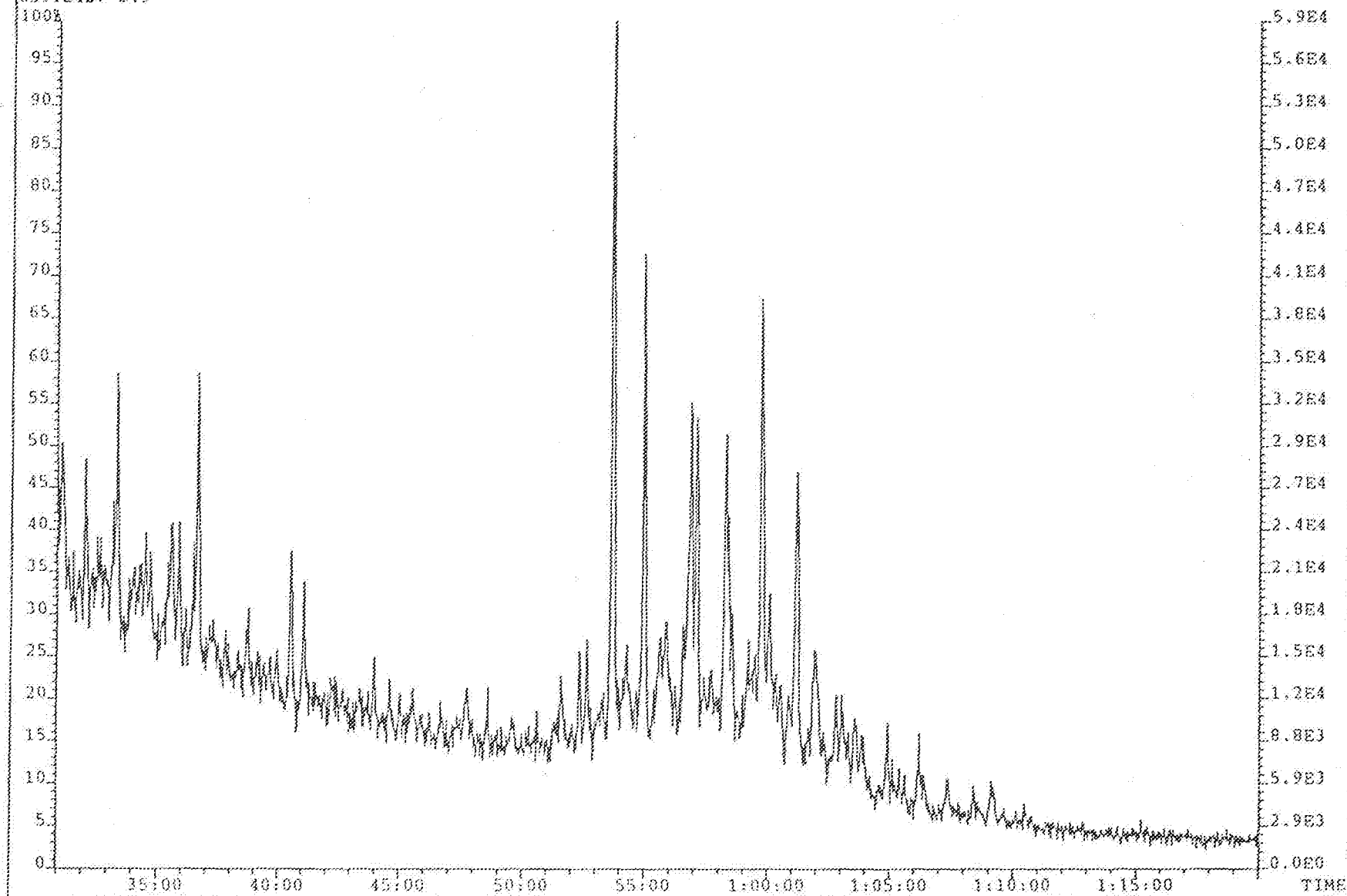
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#9 Text:WELL 34/10-35, 4006.17M, SATURATED FRACTION
259.2427 9:9

Exp:SAT1



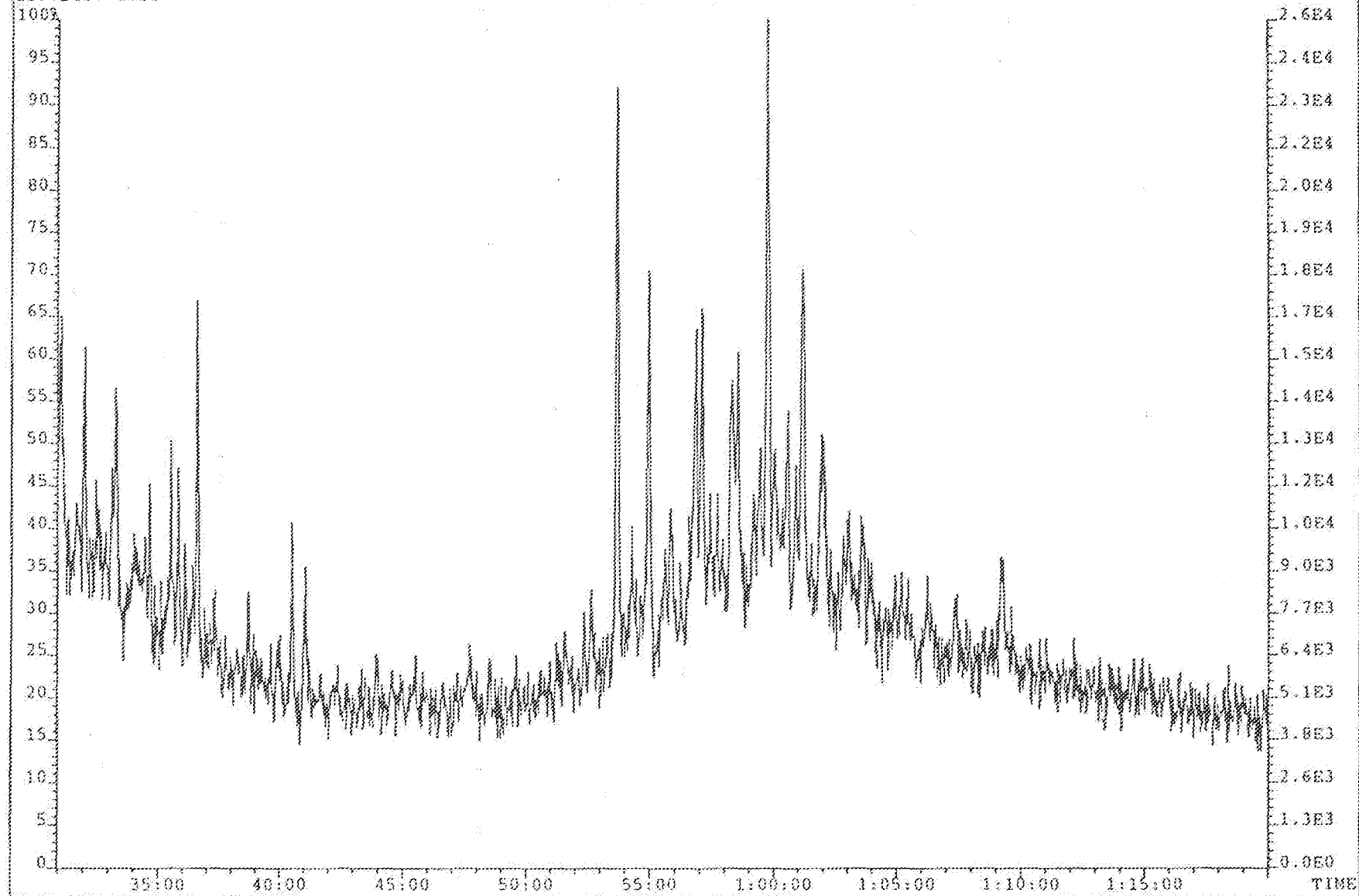
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 W1-4719 Acq:22-SEP-1997 14:23:15 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, 4021.93M, SATURATED FRACTION
259.2427 S:10

Exp:SAT1



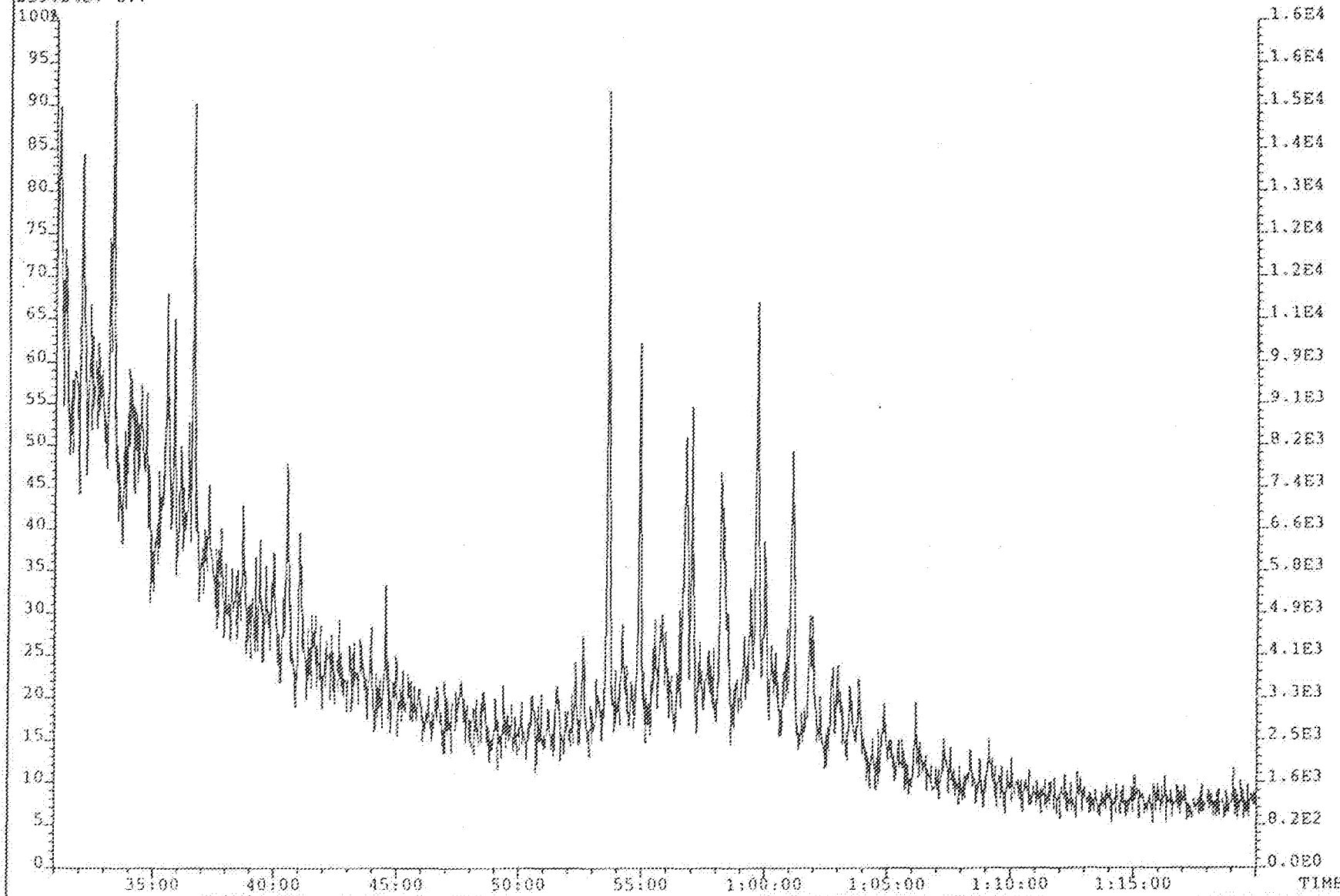
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 W1-4740 Acq:21-SEP-1992 13:30:02 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL
259.2427 S:7

Exp:SAT1



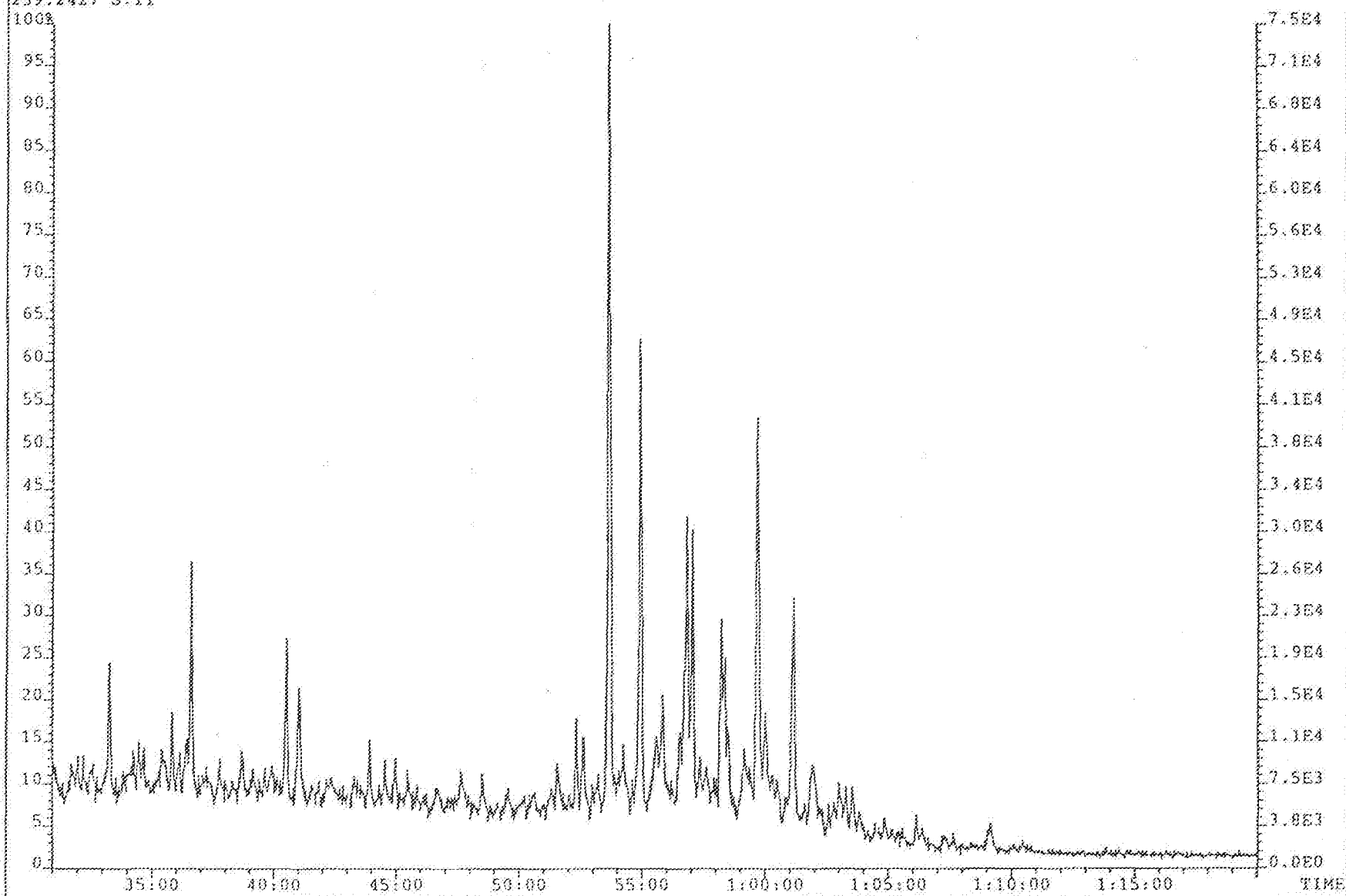
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STASAT2 #1-4741 Acq: 22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#11 Text: WELL 34/10-35, 4257.47M, SATURATED FRACTION
259.2427 S:11

Exp: SAT1



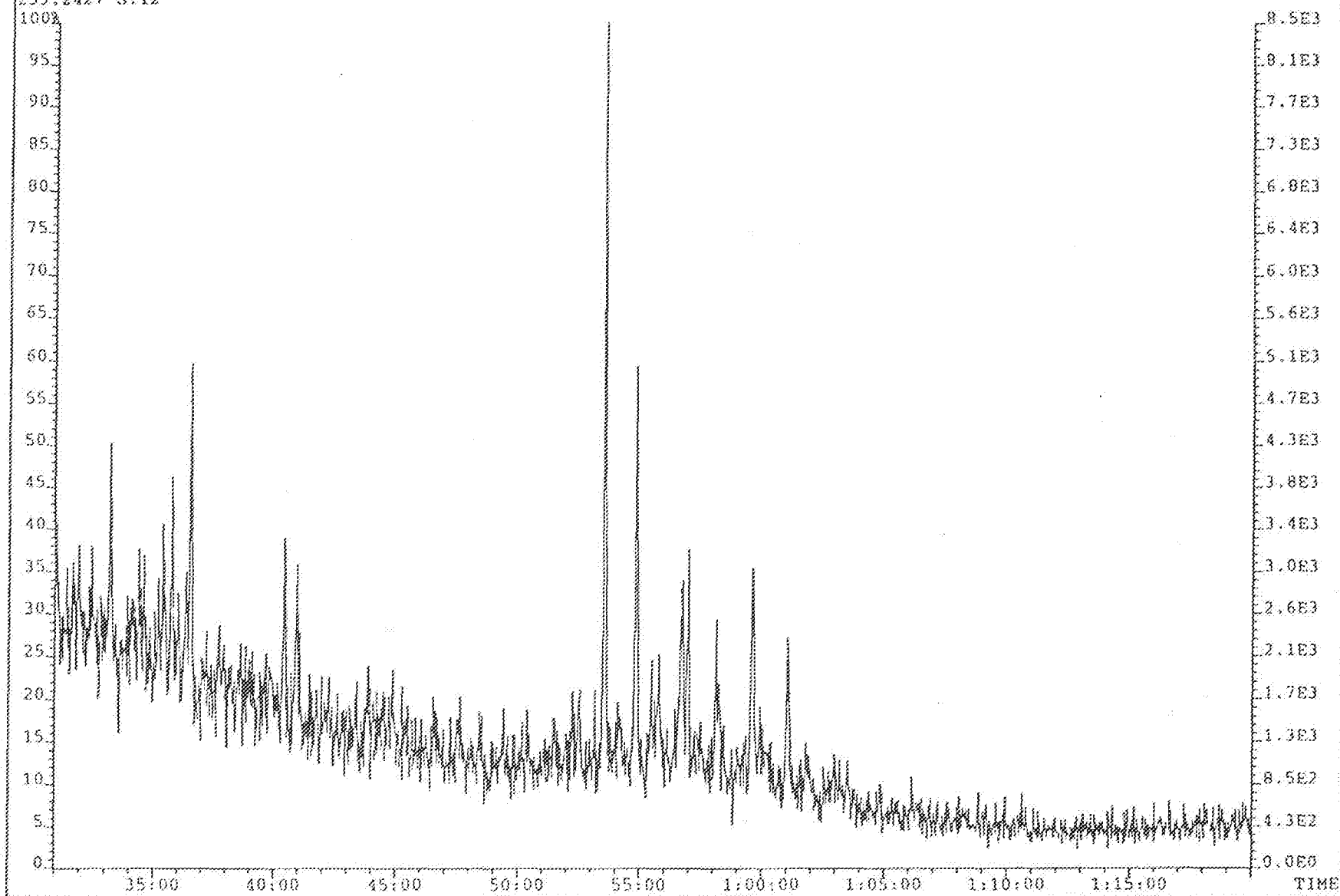
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#12 Text:WELL 34/10-35, 4270.75M, SATURATED FRACTION
259.3427 S:12

Exp:SAT1



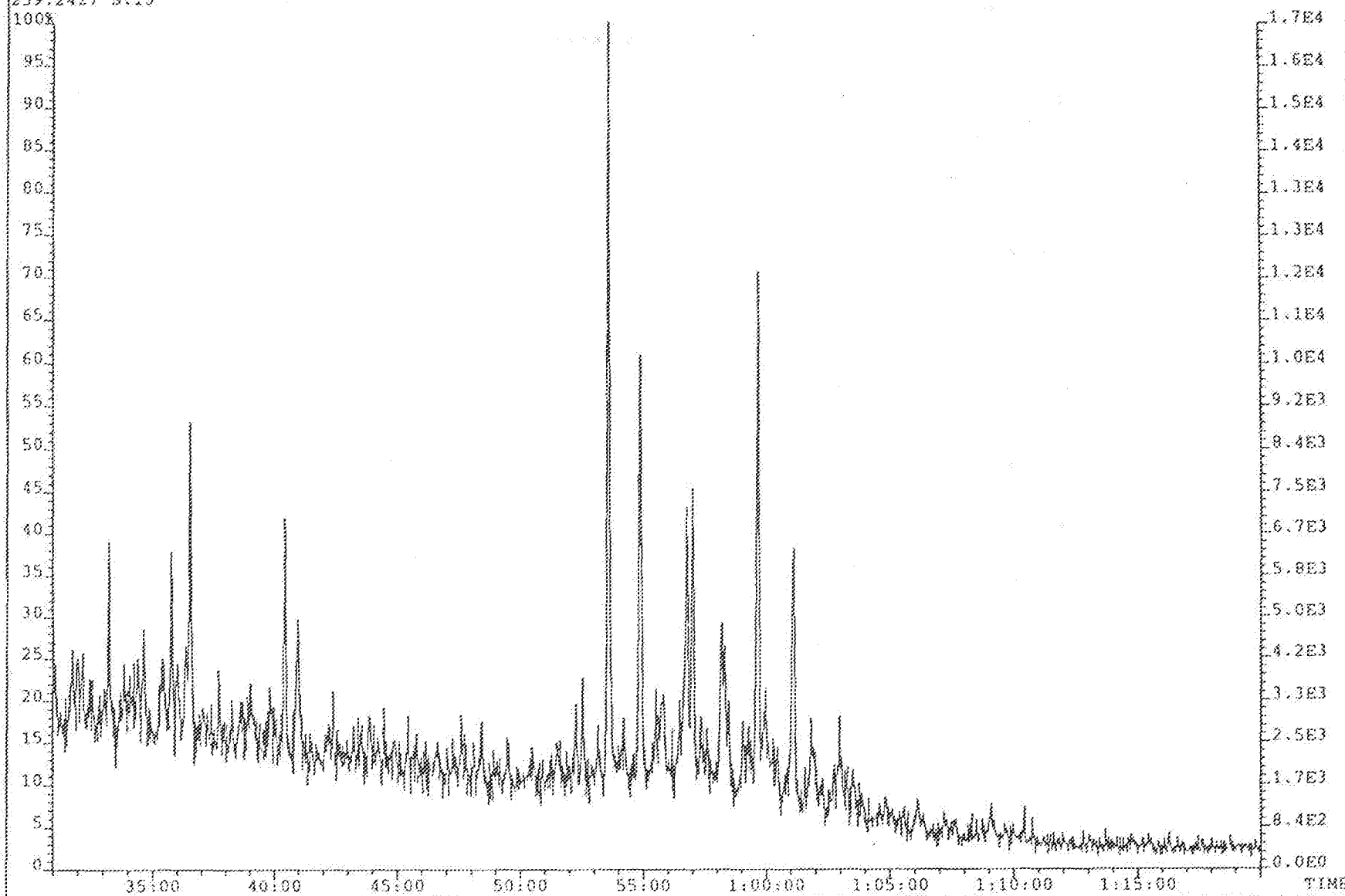
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 04:23:15 E1: Magnet SIN
Sample#13 Text:WELL 34/10-35, 4283.49M, SATURATED FRACTION
259.2427 S:13

Exp:SAT1

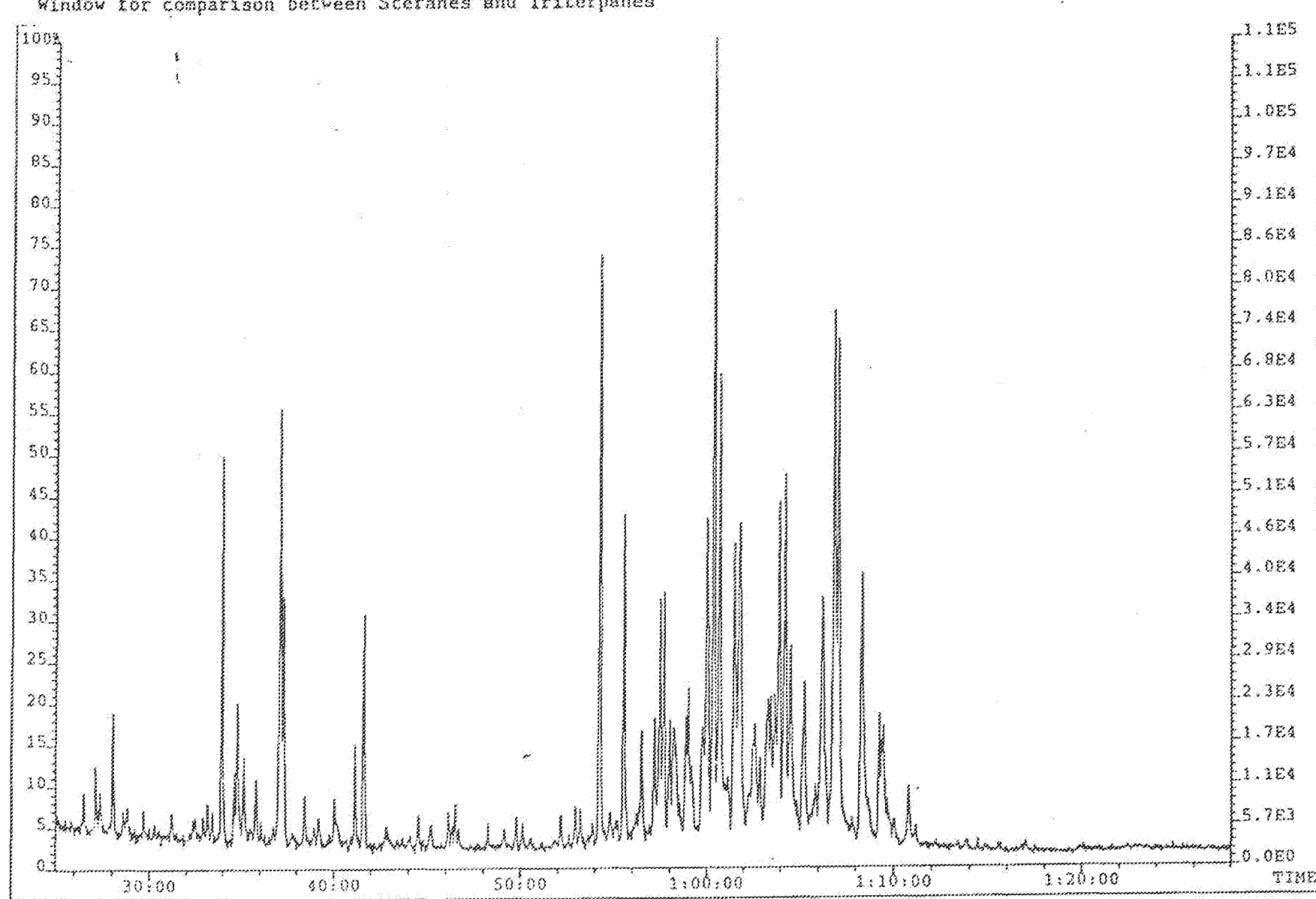


Schlumberger

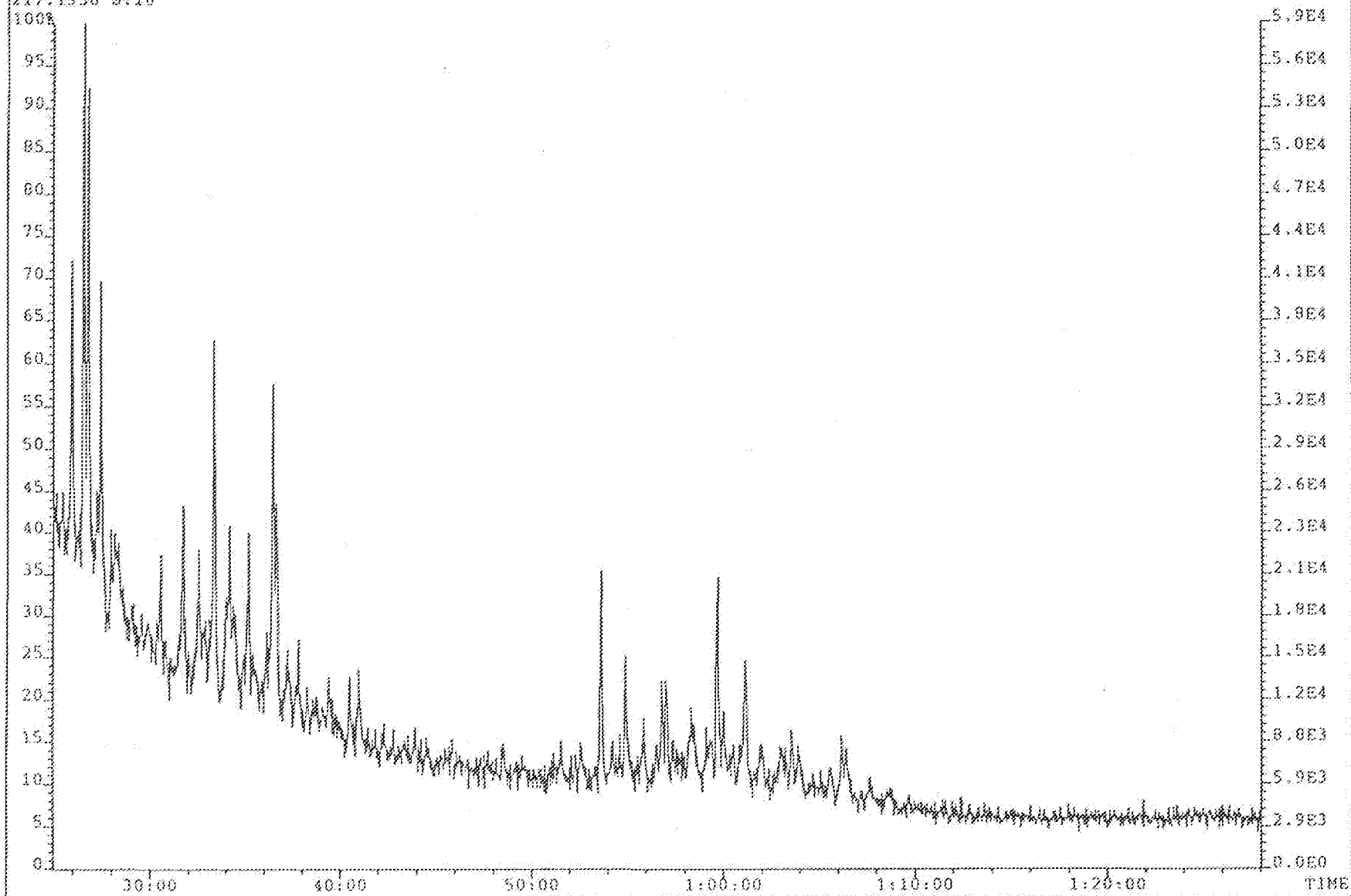
GECO-PRAKLA

GEOLAB NOR

M/Z 217 Fragmentograms, processed using the Triterpane
Window for comparison between Steranes and Triterpanes



File:STATSAT3 #1-4739 Acq:23-SEP-1992 13:30:02 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, OLJE OVER MUD, 3496-3504M, SAT. FRAC. FROM OIL. Exp:SAT1
217.1956 S:10



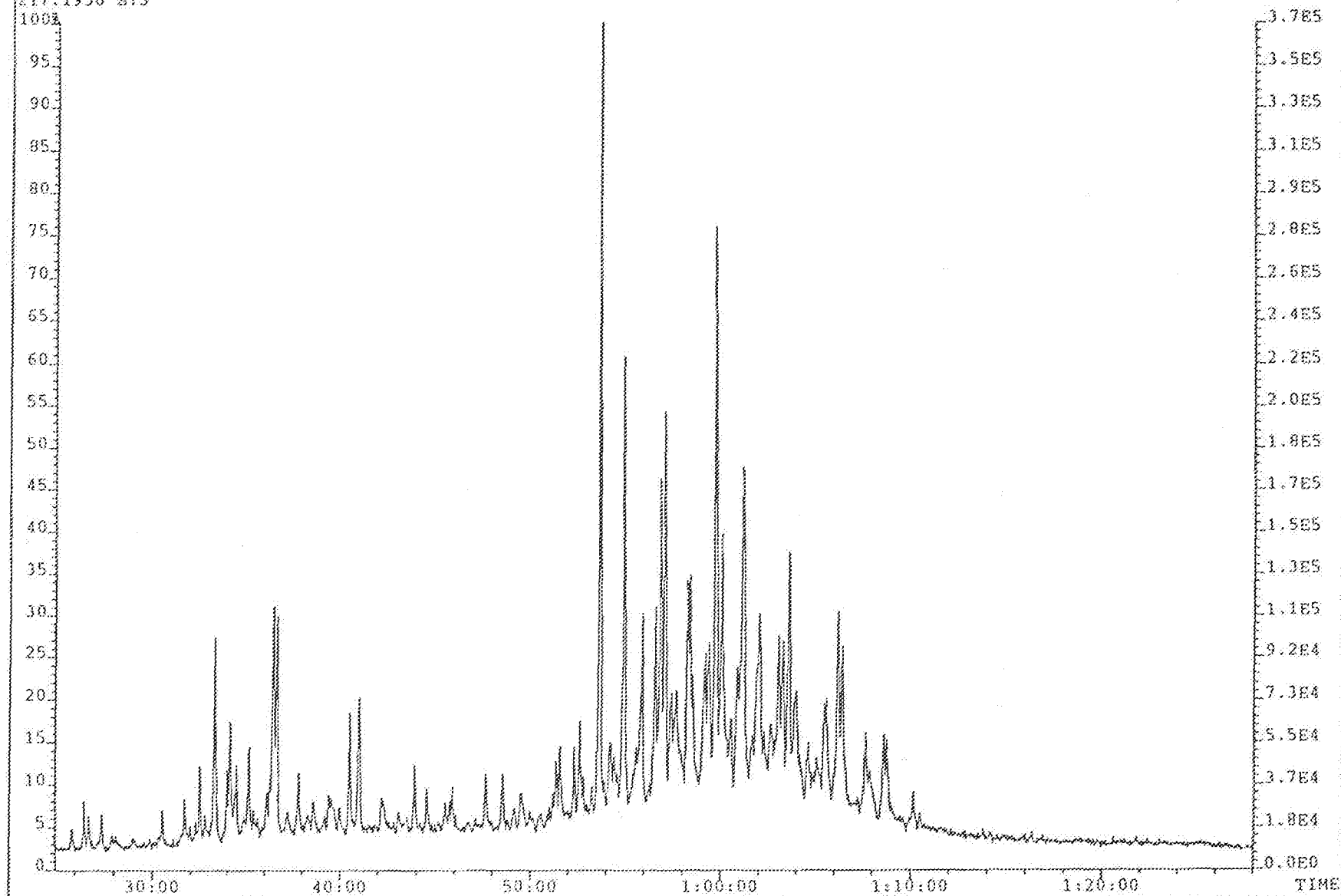
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#3 Text:WELL 34/10-35, 3530M, SATURATED FRACTION
217.1956 S:3

Exp:SAT1



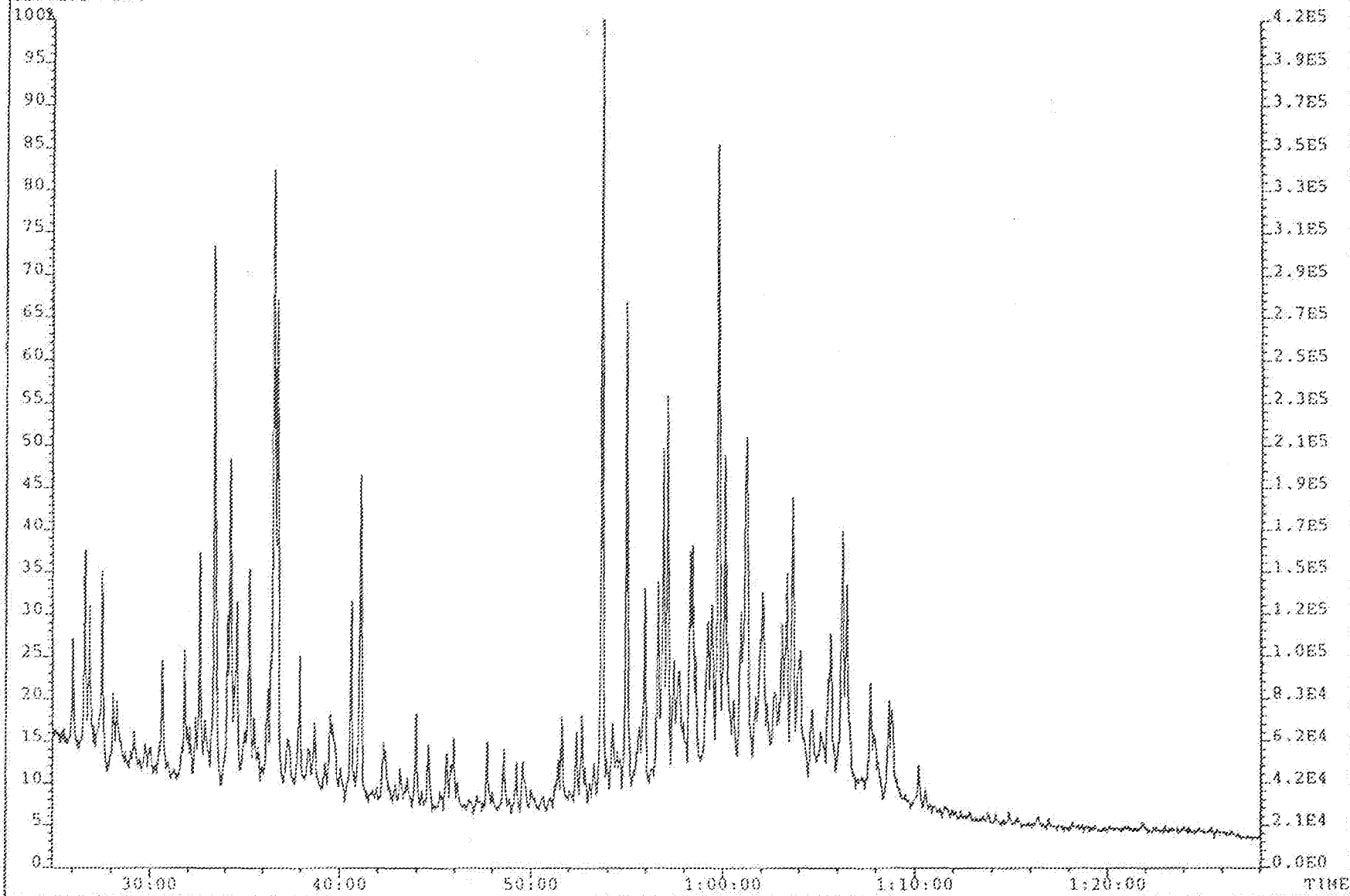
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1997 14:23:15 EI+ Magnet SIA
Sample#4 Text:WELL 34/10-35, 3831M, SATURATED FRACTION
217.1956 S:4

Exp:SAT1



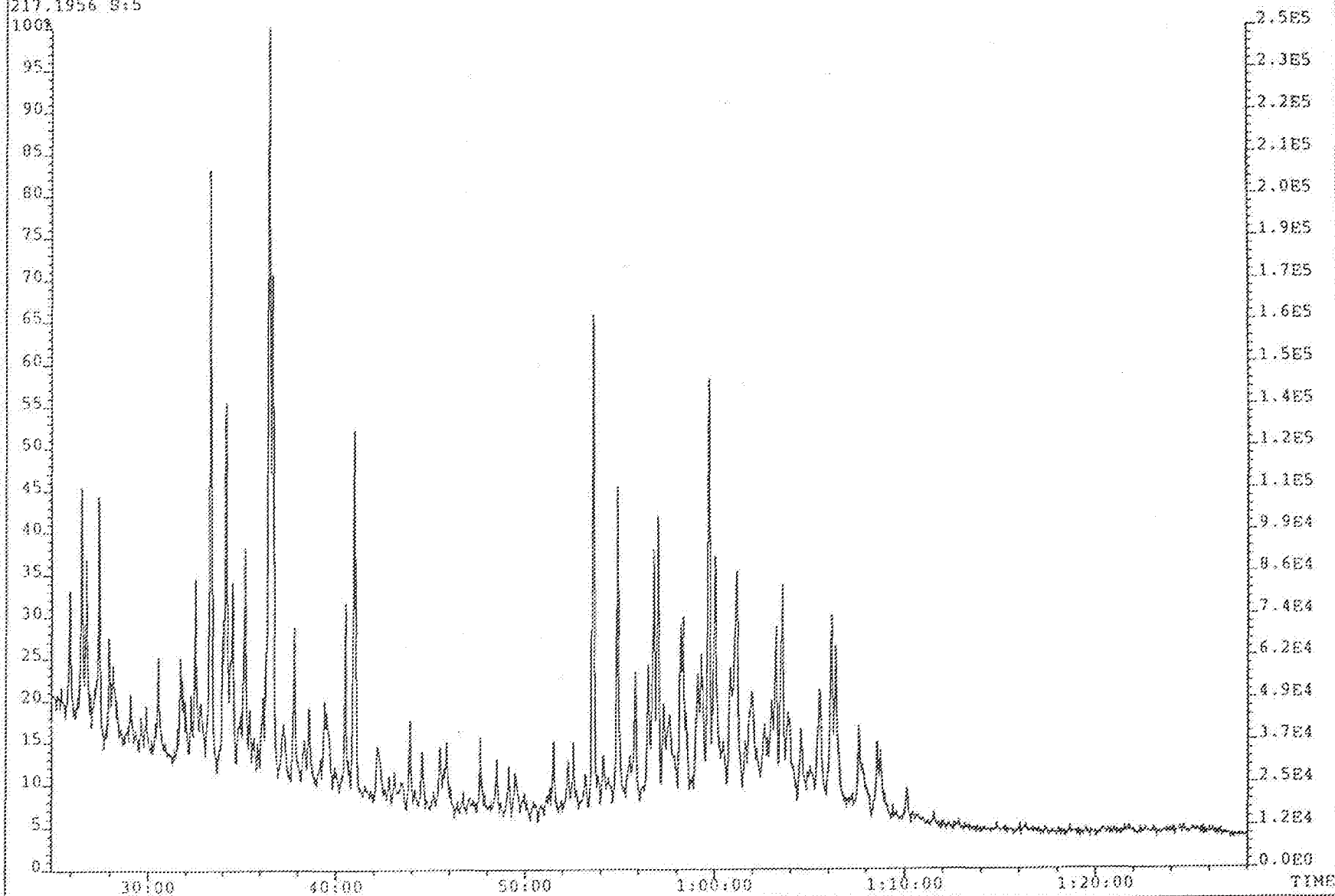
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4740 Acq:22-SEP-1992 04:23:15 EI+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3852M, SATURATED FRACTION
217.1956 S:5

Exp:SAT1



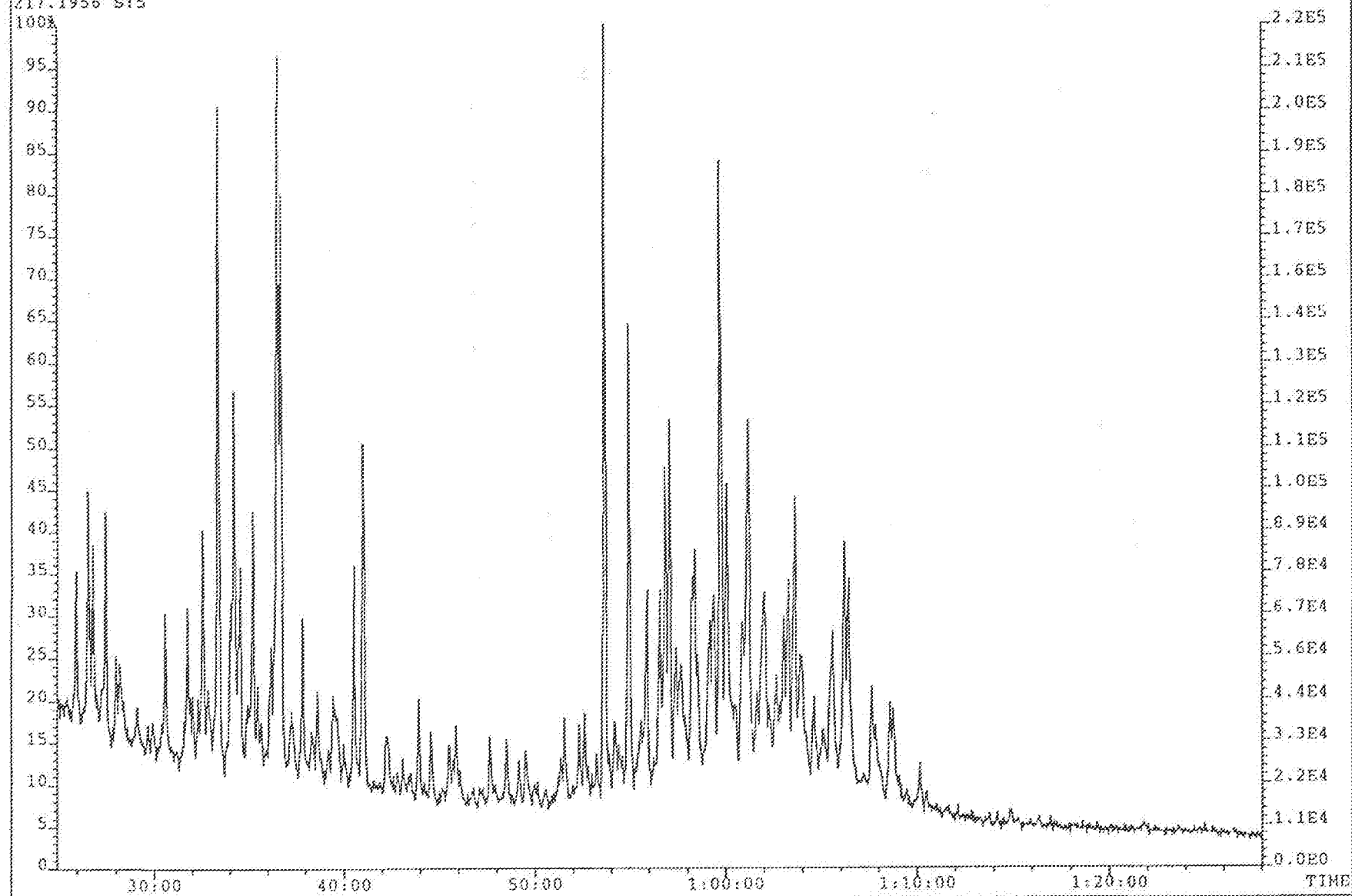
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 H1-4739 Acq:21-SEP-1992 13:30:02 EI+ Magnet SIR
Sample#5 Text:WELL 34/10-35, 3885M, SATURATED FRACTION
217.1956 S:5

Exp:SAT1



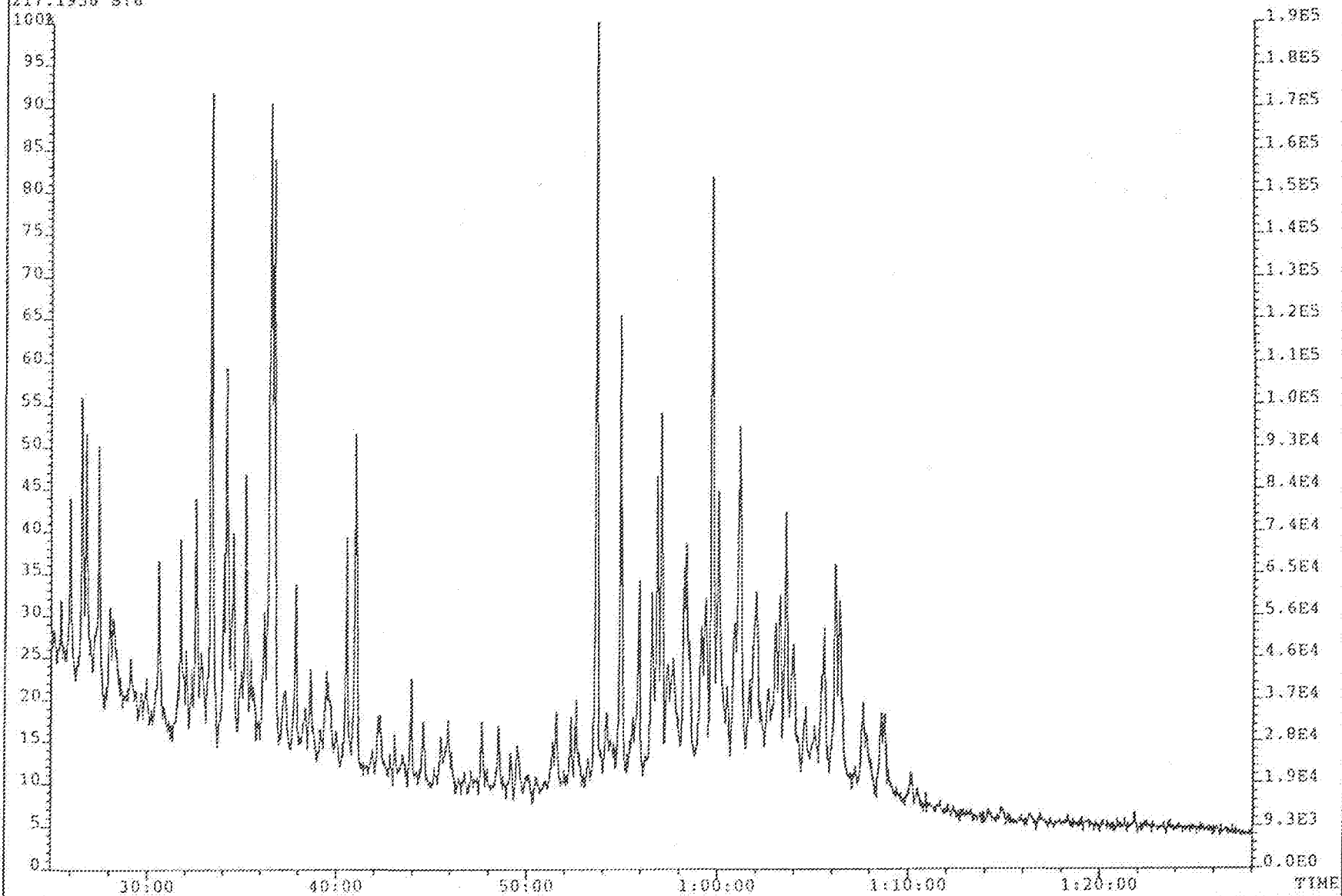
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 W1-4740 Acq:23-SEP-1992 13:30:02 FI: Magnet SIR
Sample#6 Text:WELL 34/10-35, 3694M, SATURATED FRACTION
217.1956 S:6

Exp:SAT1

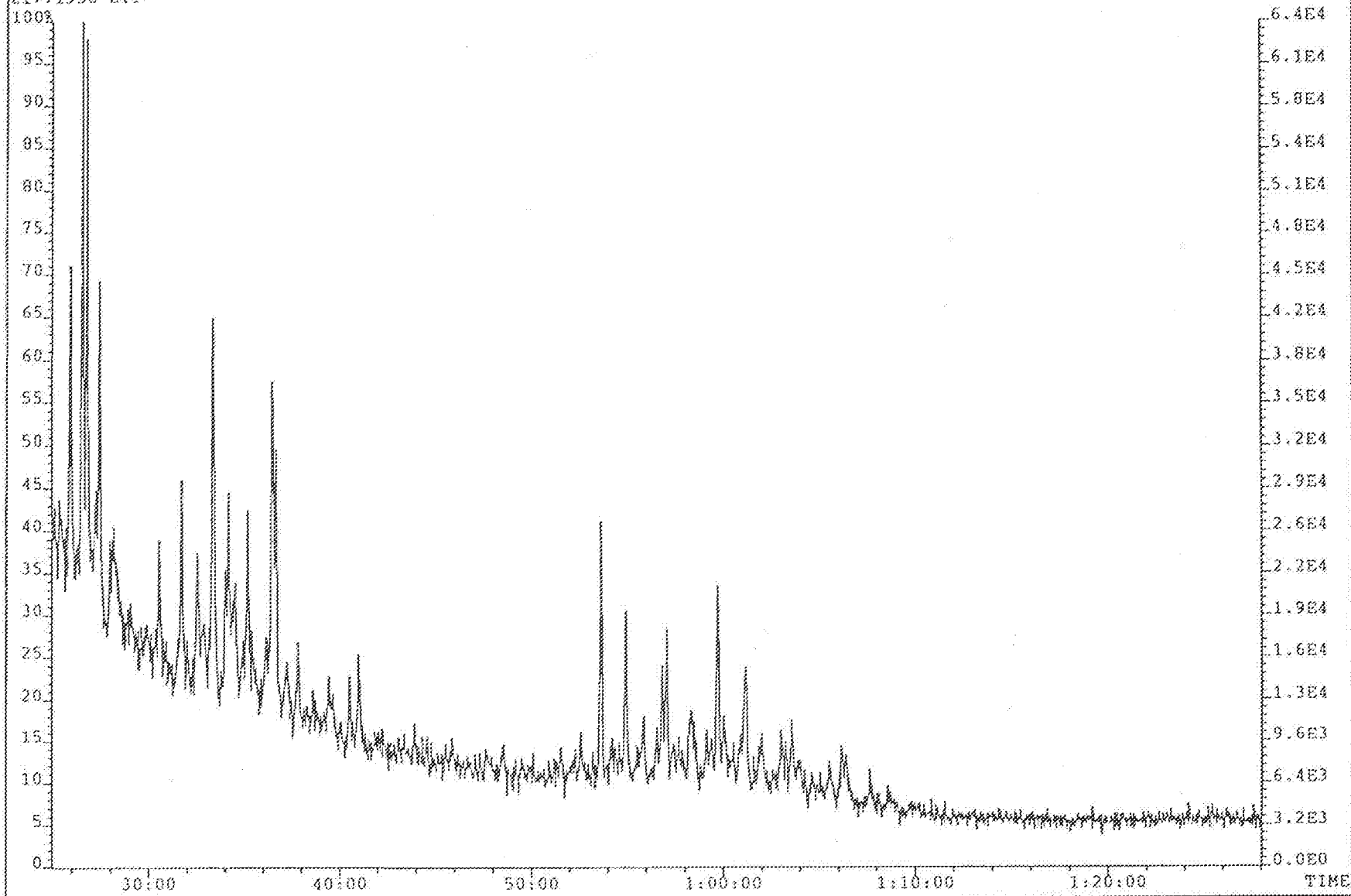


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 HI-4740 ACQ:23-SEP-1992 11:30:07 EI+ Magnet SIR
 Sample#9 Text:WELL 34/10-35, DST3, 3920-29M, SATURATED FRACTION FROM OIL Exp:SAT1
 217.1956 S:9



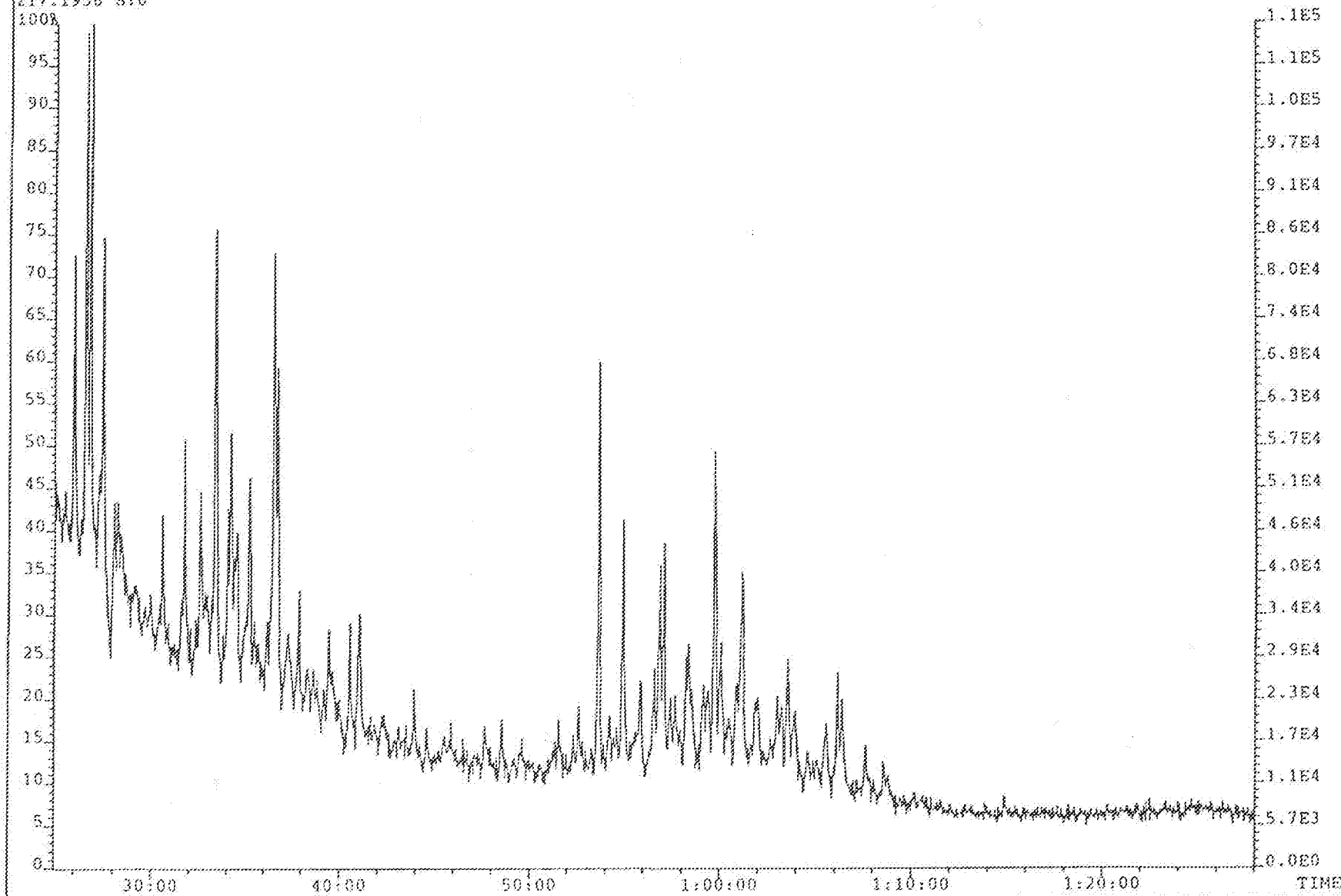
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI: Magnet SIR
Sample#6 Text:WELL 34/10-3S, 3931.71M, SATURATED FRACTION
217.1956 S:6

Exp:SAT1



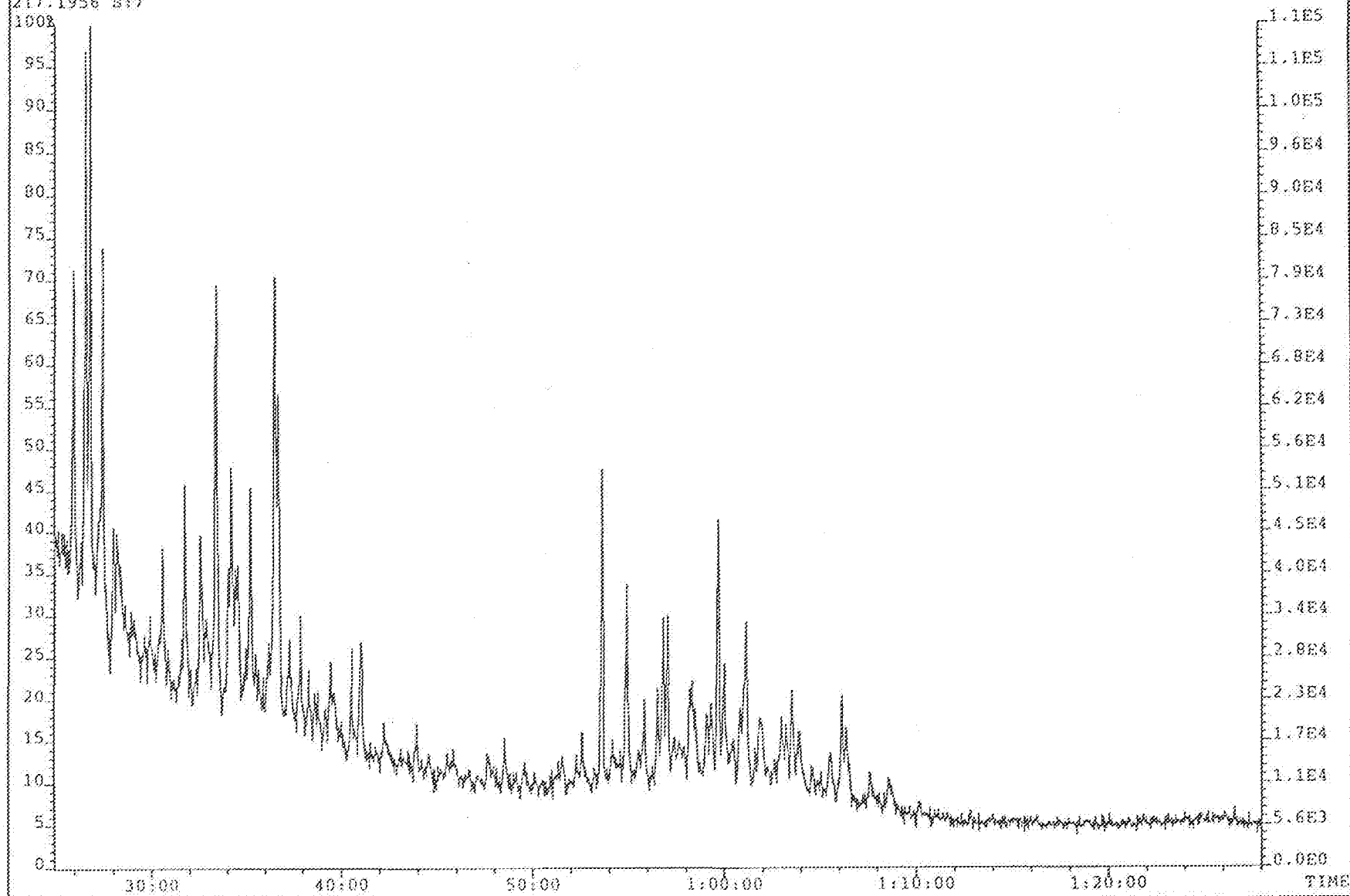
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, 3933.16M, SATURATED FRACTION
217.1956 B:7

Exp: SAT1



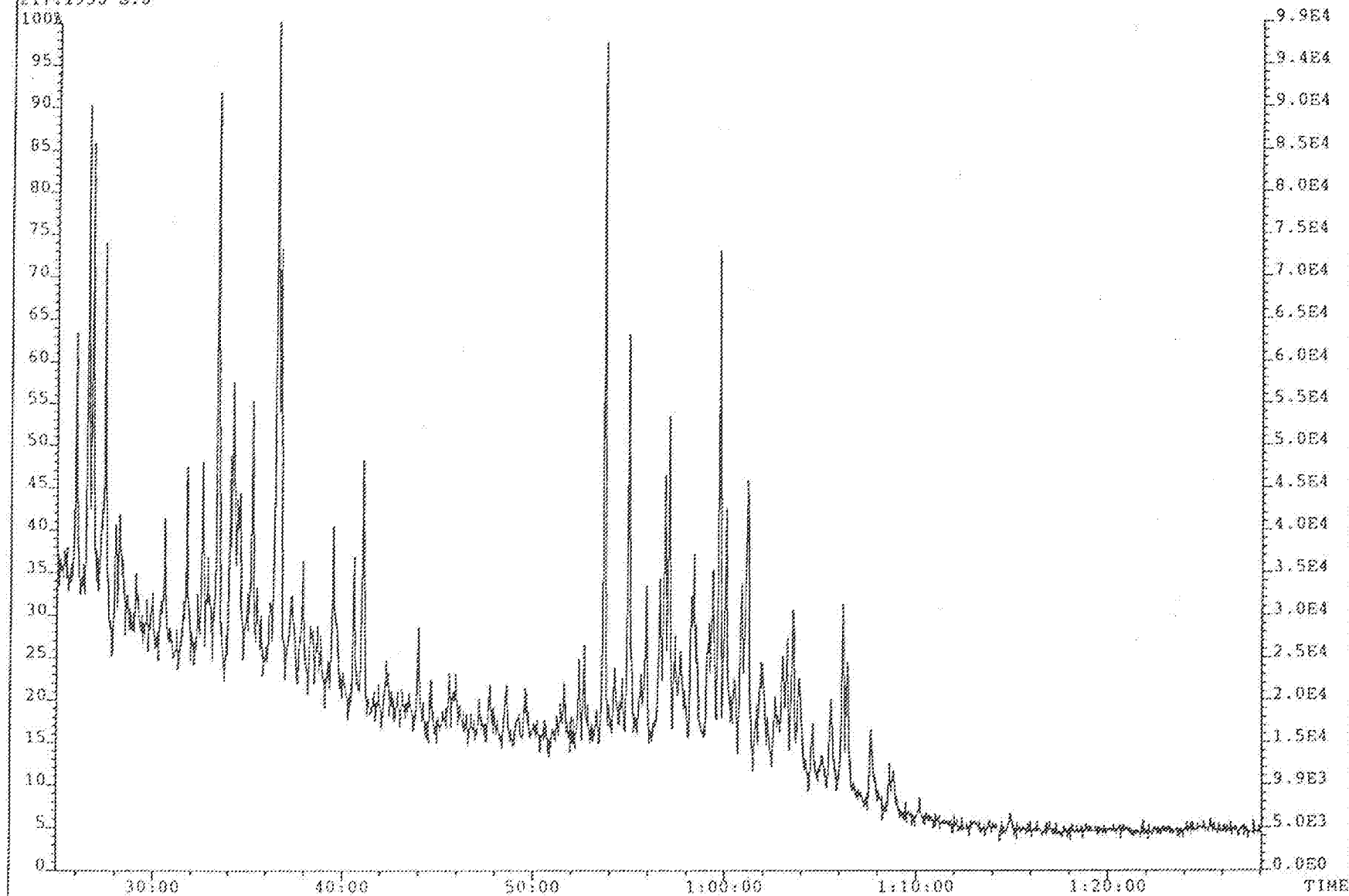
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:22-SEP-1992 14:23:15 ET4 Magnet 918
Sample#8 Text:WELL 34/10-35, 3994.05M, SATURATED FRACTION
217.1956 S:8

Exp:9AT1

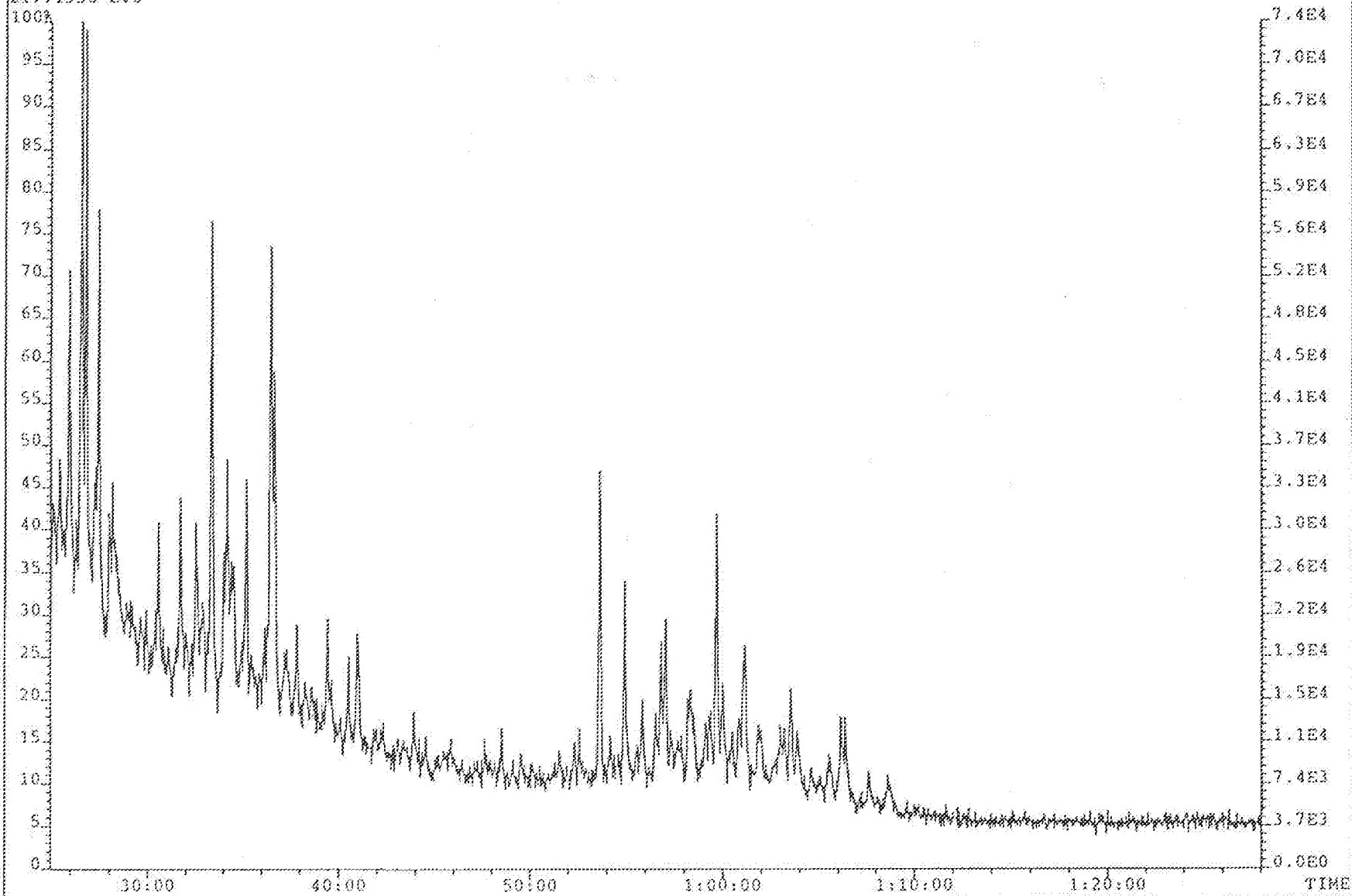


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT1 #1-4740 Acq:23-SEP-1992 13:30:02 EI: Magnet SIR
Sample#8 Text:WELL 34/10-35, DST2, 3984-3995M, SATURATED FRACTION FROM OIL Exp:SAT1
217.1956 S:8



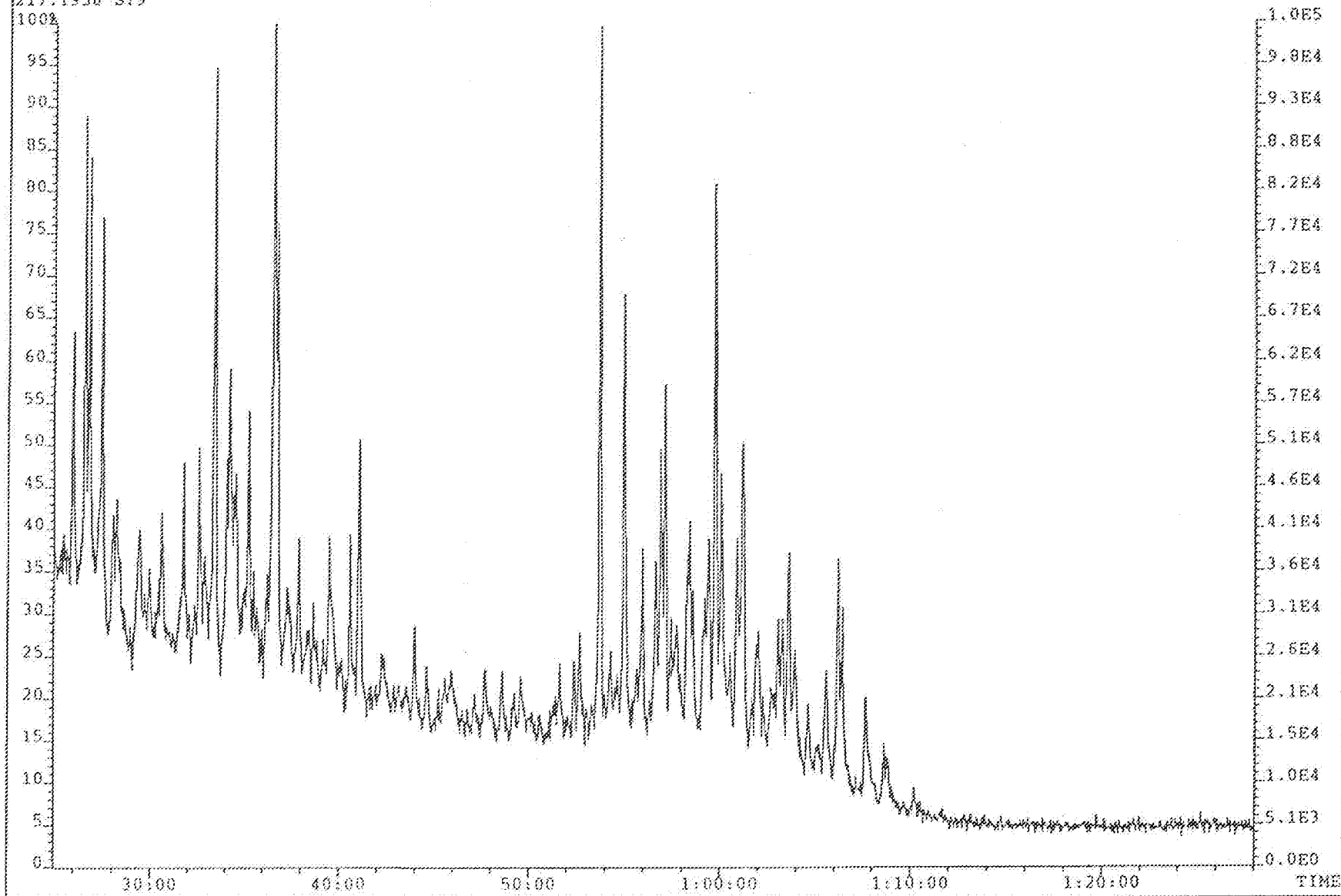
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 H1-4739 Acq:22-SEP-1992 13:23:15 E1: Magnet SIR
Sample#9 Text:WELL 34/10-35, 4006.17M, SATURATED FRACTION
217.1956 S:9

Exp:SAT1



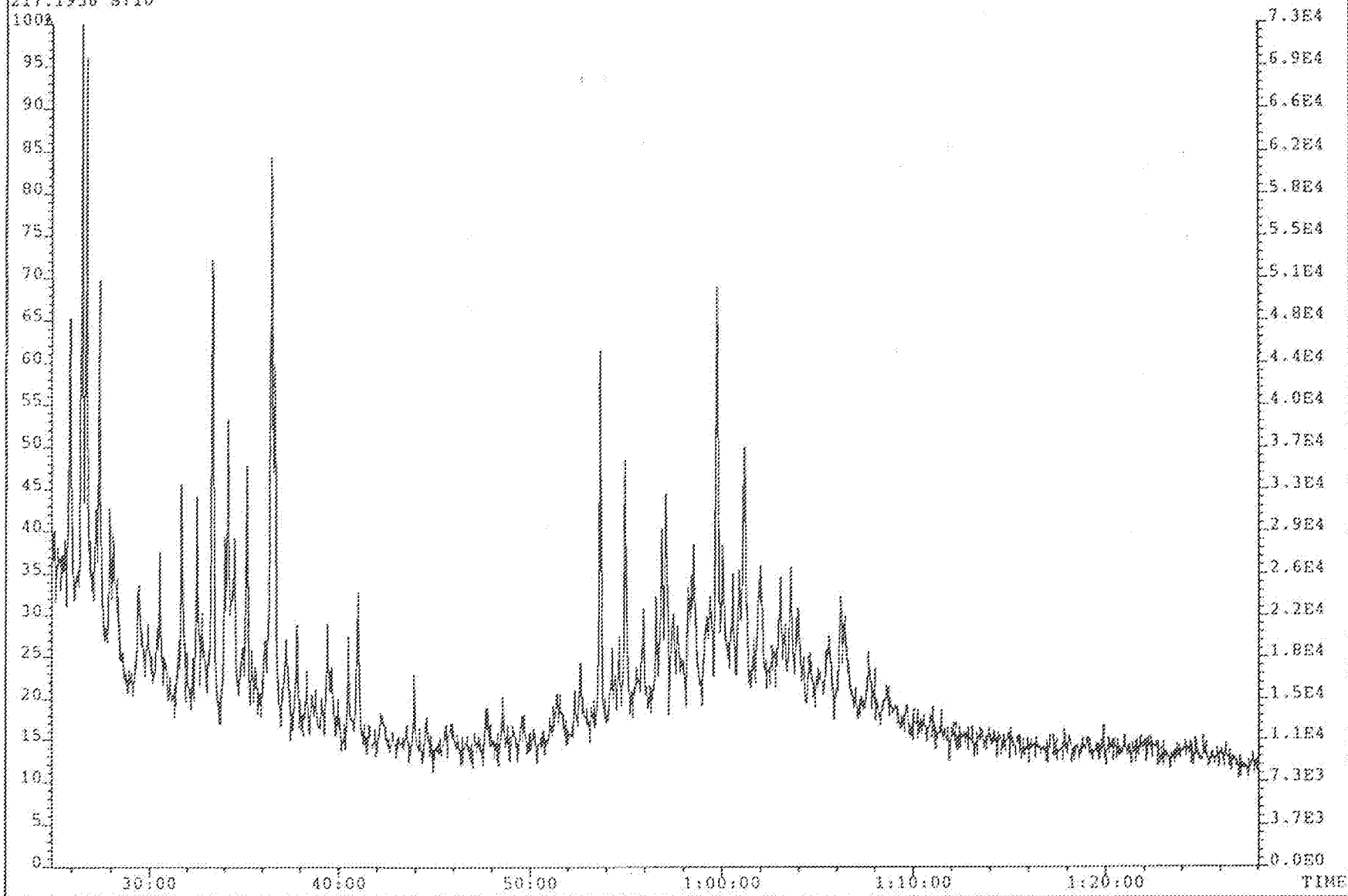
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4739 Acq:21-SEP-1992 14:23:15 EI+ Magnet SIR
Sample#10 Text:WELL 34/10-35, 4021.93M, SATURATED FRACTION
217.1956 S:10

Exp:SAT1

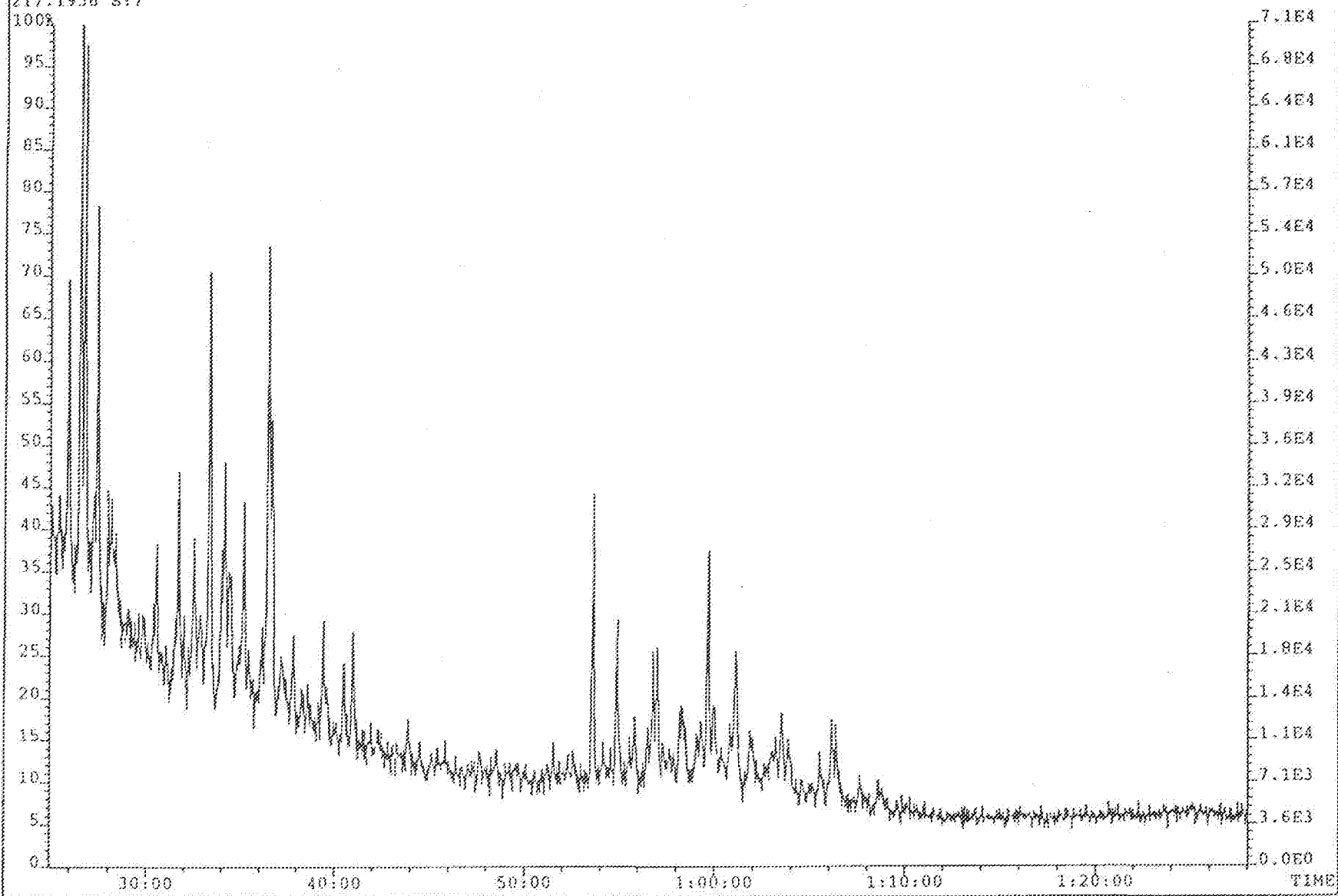


Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT3 #1-4740 Acq:23-SEP-1992 13:30:02 EI+ Magnet SIR
Sample#7 Text:WELL 34/10-35, DST1, 4015-25M, SATURATED FRACTION FROM OIL Exp:SAT1
217.1956 S:7



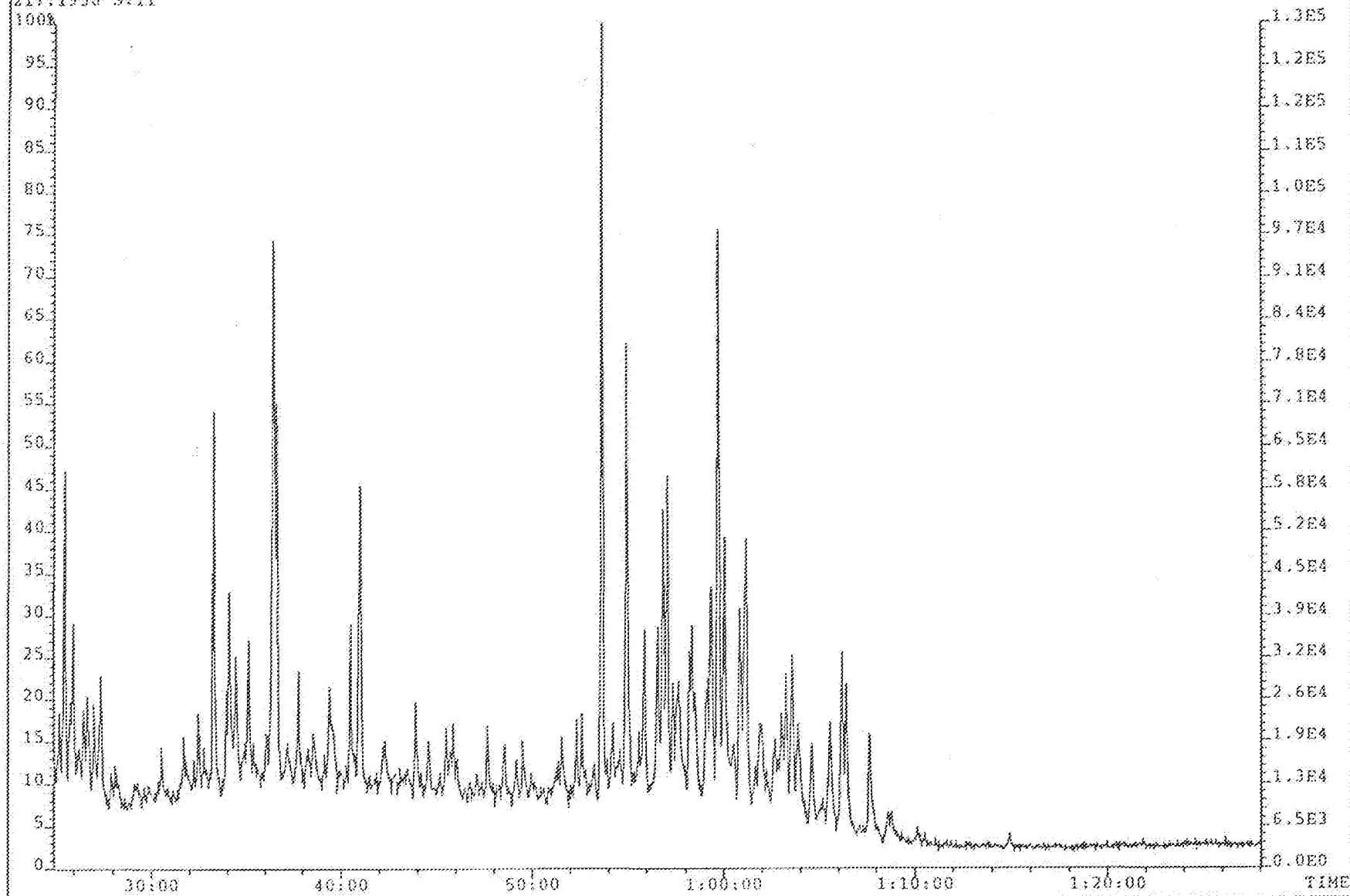
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 N1-4741 Acq:21-SEP-1991 14:23:15 E1+ H3gnst SIR
Sample#11 Text:WELL 34/10-35, 4257.47M, SATURATED FRACTION
217.1956 9:11

Exp: SAT1



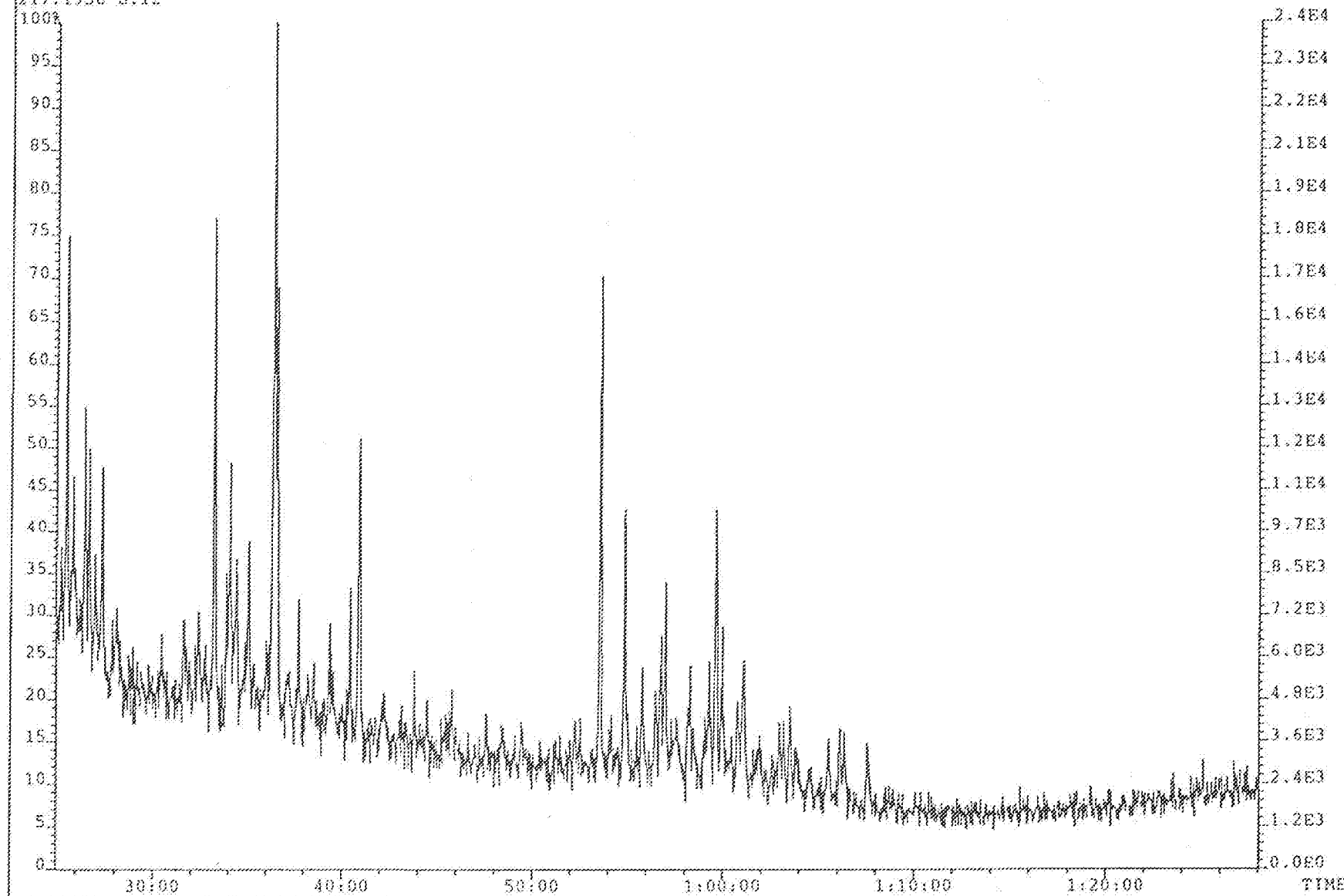
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File:STATSAT2 #1-4741 Acq:22-SEP-1992 14:23:15 El+ Magnet SIR
Sample#12 Text:WELL 34/10-35, 4270.75M, SATURATED FRACTION
217.1956 S:12

Exp:SAT1



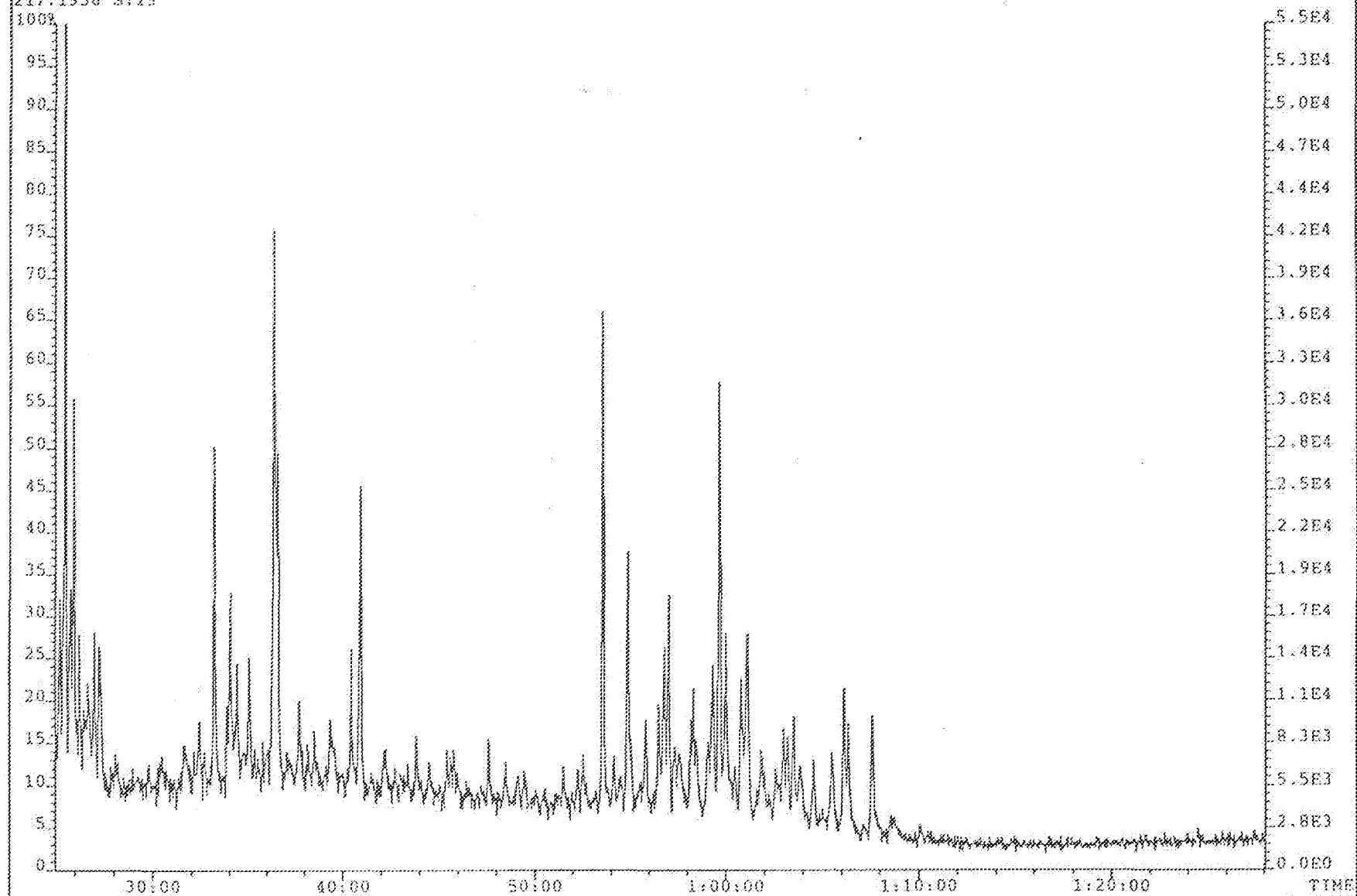
Schlumberger

GECO-PRAKLA

GEOLAB NOR

File: STAISAT2 W-4740 Acq: 22-SEP-1992 14:23:15 EI: Magnet SIR
Sample#13 Text: WELL 34/10-35, 4283.46M, SATURATED FRACTION
217.1956 S:13

Exp: SAT1



Schlumberger

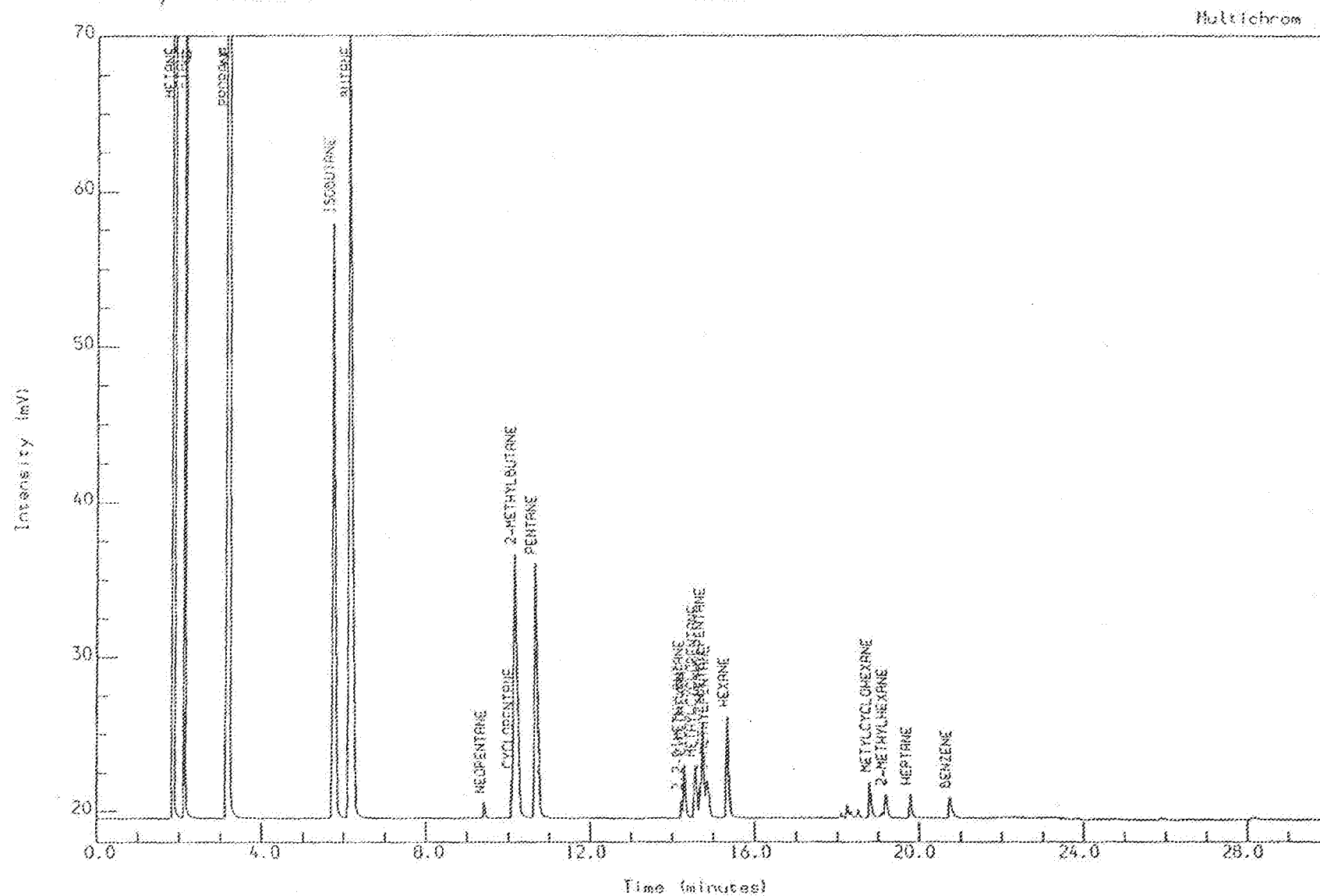
GECO-PRAKLA

GEOLAB NOR

APPENDIX 5:

GASEOUS HYDROCARBON CHROMATOGRAMS

Analysis Name : [526265] 19 SAMPLEDST1.1.1.



WELL NOES 34/10-35 DST 1
BASS GC

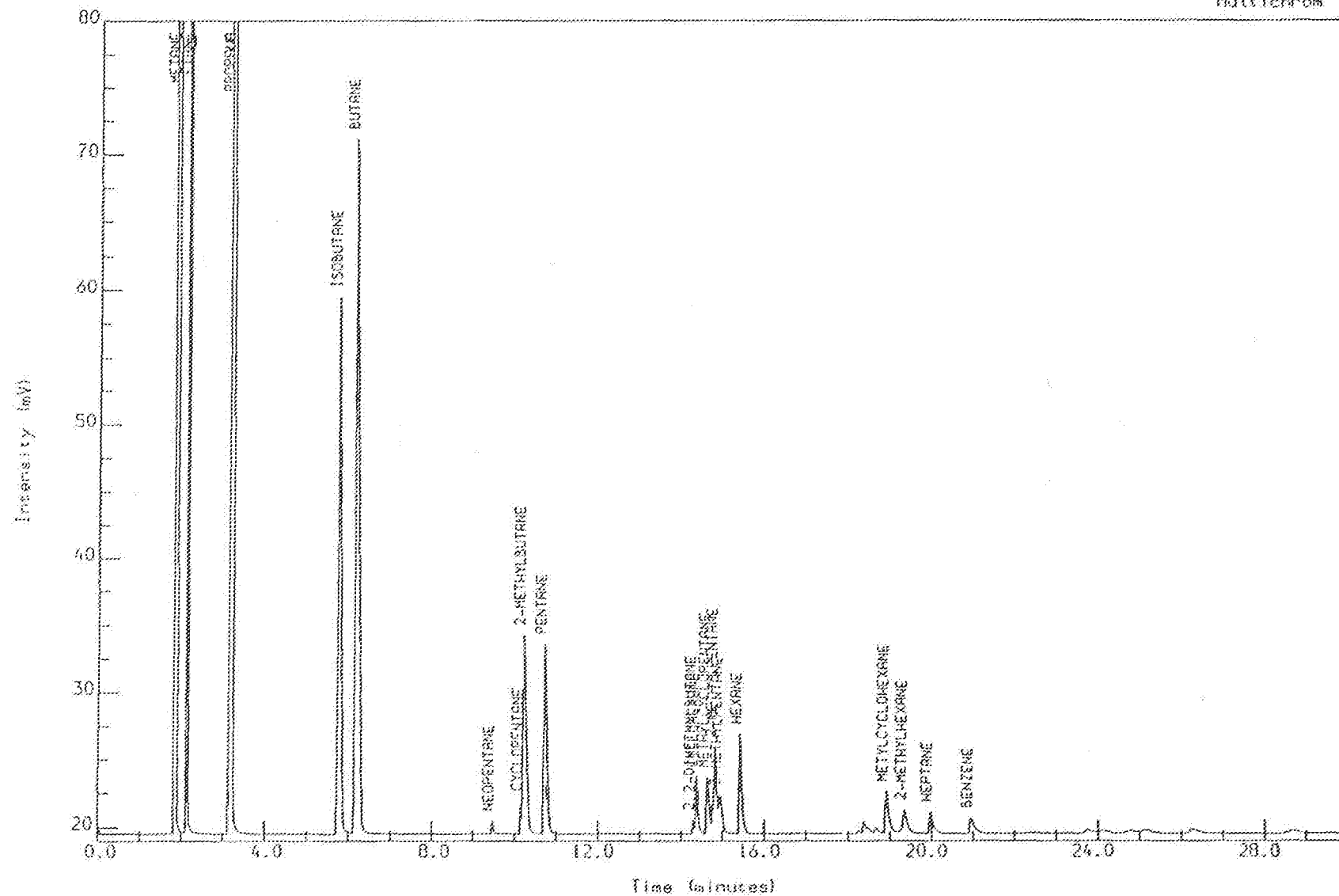
Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 19 SAMPLECDST2.1.1.

Multichrom



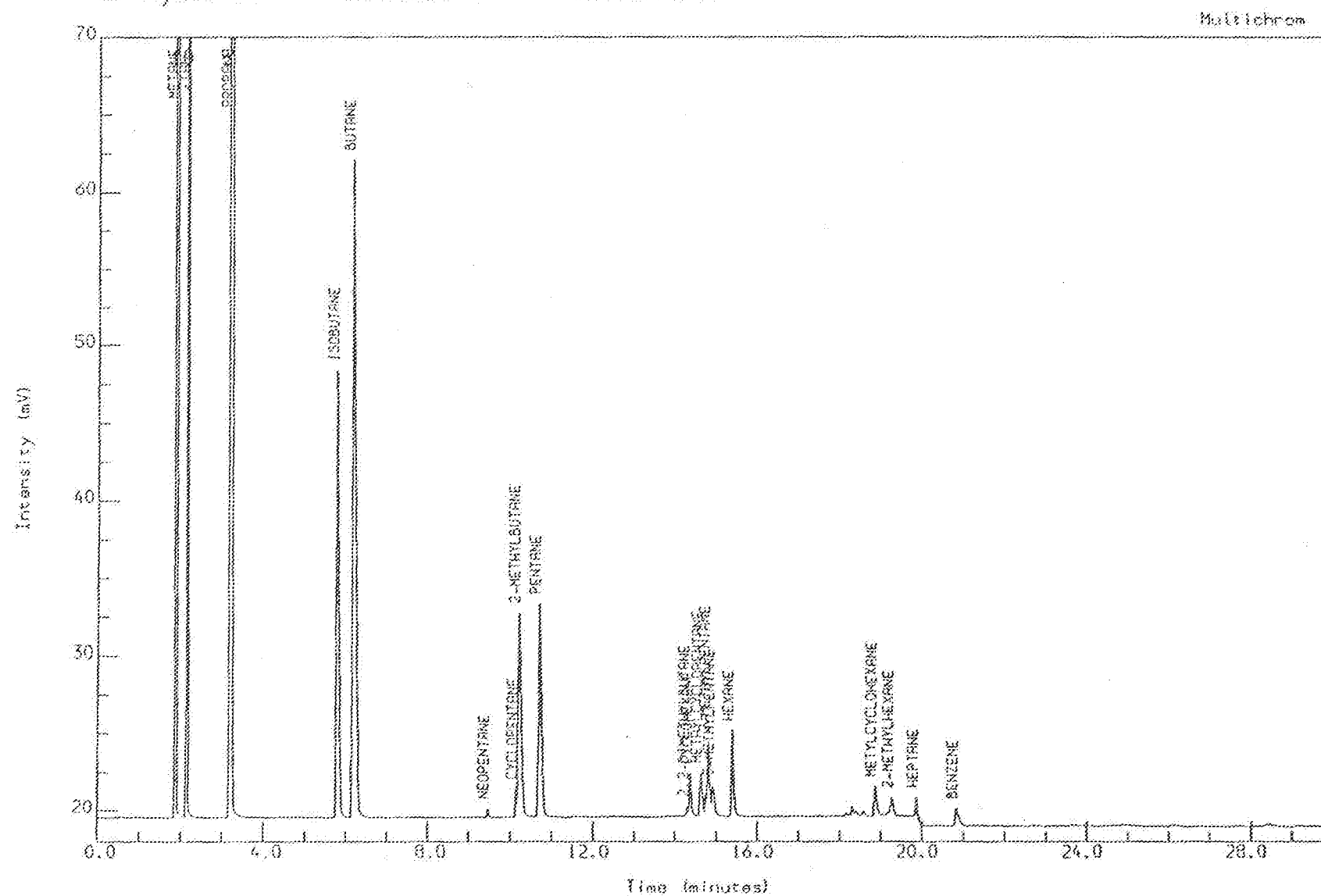
WELL NOCS G4710-35 DST 2
GASS GC

Schlumberger

GECO-PRAKLA

GEOLAB NOR

Analysis Name : [526265] 19 SAMPLEDDST3.1.1.



WELL NOCS 34/10-35 DST 3
GASS GC

Schlumberger

GECO-PRAKLA

GEOLAB NOR