Institutt for kontinentalsokkelundersøkelser
CONTINENTAL SHELF INSTITUTE, NORWAY
Håkon Magnussons gt 1 B • Postboks 1883 • 7001 Trondheim, Norway • Tlf (07) 92 06 11
Telex 55434 IKU N • Telegram «NORSHELF» • Telefax (07) 92 09 24 (Aut.)

IKU

5

Confidential

REPORT TITLE/ TITTEL

Source Rock Analysis of Well 7117/9-2

14 DES. 1983

CLIENT/ OPPDRAGSGIVER

Norsk Hydro A/S

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

Helga Nes

AUTHORS/ FORFATTERE

J. Akernes, F. Bessessen, N. Mills, H. Nes and J.O. Vigran

DATE/ DATO	REPORT NO./ RAPPORT NR.	NO. OF PAGES/ ANT. SIDER	NO. OF ENCLOSURES/ ANT. BILAG
7.12.83	05.0132	70	6

SUMMARY/ SAMMENDRAG

The analysed sequence of the well (Lower Cretaceous) was divided into 3 zones as follows:

Zone A (3000-3340m): Oil window maturity. Dark grey and greyish black to brownish black claystones. No richness parameters determined.

Zone B (3340-3720m): Greyish black to brownish black claystones with poor to fair potential as source rocks for gas. Oil window to condensate window maturity.

Zone C (3720-5010m): Greyish black to brownish black claystones. Maturity within condensate window, condensate to gas window maturity at the bottom. Poor to fair potential as source rocks for gas.

KEY WORDS/ STIKKORD

7117/9-2

Evaluation

Source Rock

CONTENTS

CONTENTS CONTINUED

FIGURES

EXPERIMENTAL PROCEDURES

Headspace Gas Analysis

One ml of the headspace gas from each of the cans was analysed gas chromatographically for light hydrocarbons. The canned samples were washed with temperated water on 4, 2, 1 and 0.125mm sieves to remove drilling mud and thereafter dried at 35°C.

Occluded Gas Analysis

An aliquot of the 1-2mm fraction of each sample before drying was crushed in water using an airtight ball mill, and one ml of the headspace analysed gas chromatographically.

Total Organic Carbon

After lithological description, picked cuttings of various lithologies in each sample were crushed in a centrifugal mill. Aliquots of the samples were then weighed into Leco Crucibles and treated with oht 2N HCl to remove carbonate, and washed four times with distilled water to remove traces of hydrochloric acid. The crucibles were then dried at 60°C for 12 hours. The samples were analysed using a Leco EC 12 carbon analyzer to determine the total organic carbon (TOC). The TOC values and lithological description are given in table 1. Figure 1 shows the plot of the lithology and TOC values.

Rock-Eval Pyrolysis

Crushed sample (100mg) was weighed into a platinum crucible the base and cover of which are made of sintered steel, and analysed on a Rock-Eval pyrolyser.

Vitrinite Reflectance

Vitrinite reflectance measurements, taken at various intervals, were done at IKU. The samples were mounted in Bakelite resin blocks; care being taken during the setting of the plastic to avoid temperatures in excess of 100°C. The samples were then ground, initially on a diamond lap followed by two grades of corundum paper. All grinding and subsequent polish-

ing stages in the preparation were carried out using isopropyl alcohol as lubricant, since water leads to the swelling and disintegration of the clay fraction of the samples.

Polishing of the samples was performed on Selvyt cloths using three grades of alumina, 5/20, 3/50 and Gamma, followed by careful cleaning of the surface.

Reflectance determinations were carried out on a Leitz M.P.V. microphotometer under oil immersion, R.I. 1.518 at a wavelength of 546 nm. The surface of the polished block was searched by the operator for suitable areas of vitrinitic material in the sediment. The reflectance of the organic particle was determined relative to optical glass standards of known reflectance. Where possible, a minimum of twenty individual particles of vitrinite was measured.

The samples were also analysed in UV light, and the colour of the fluorescing material determined. Below, a scale comparing the vitrinite reflectance measurements and the fluorescence measurements is given.

VITRINITE REFLECTANCE R.AVER. 546 NM	0.20 1516	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10
% CARBON CONTENT DAF.	57	62	70	73	76	79	80.5	82.5	84	85.5
LIPTINITE FLUOR NM	725	750	790	820	840		860	890	940	
EXC. 400 nm BAR. 530 nm colour	G	$G/_Y$	Y	$Y/_O$	L.O	M.O.		D.O.	$O/_R$	R
zone	1	2	3	4	5	6		7	8	9

NOTE: Liptinite NM = Numerical measurements of overall spore colour and not peak fluorescence wavelength.

Relationship between liptinite fluorescence colour, vitrinite reflectance and carbon content is variable with depositional environment and catagenic history. The above is only a guide.

Liptinite will often appear to process to deep orange colour and then fade rather than develop or O/R red shade. Termination of fluorescence is also variable.

Processing of Samples and Evaluation of Visual Kerogen

Crushed rock samples were treated with hydrochloric and hydrofluoric acids to remove the minerals. A series of microscopic slides contain strew mounts of the residue:

T-slide represents the total acid insoluble residue.
N-slide represents a screened residue (15 µ mesh).
O-slide contains palynodebris remaining after flotation ($ZnBr_2$) to remove heavy minerals.
X-slides contain oxidized residues, (oxidizing may be required to remove sapropel which embeds palynomorphs, or where high coalification prevents the identification of the various groups).

T and/or O slides are necessary to evaluate kerogen composition/-palynofacies which is closely related to sample lithology.

Screened or oxidized residues are normally required to concentrate the larger fragments, and to study palynomorphs (pollen, spores and dino-flagellates) and cuticles for paleodating and colour evaluation.

So far visual evaluation of kerogen has been undertaken from residues mounted in glycerine jelly, and studied by Leitz Dialux in normal light (halogene) using x10 and x63 objectives. By x63 magnification it is possible to distinguish single particles of diameters about 2 and, if required, to make a more refined classification of the screened residues (particles >15µ).

The colour evaluation is based on colour tones of spores and pollen (preferably) with supporting evidence from colour tones of other types of kerogen (woody material, cuticles and sapropel). These colours are dependant upon the maturity, but are also influenced by the paleo-environment (lithology of the rock, oxidation and decay processes). The colours and the estimated colour index of an individual sample may therefore differ from those of the neighbouring samples. The techniques in visual kerogen studies are adopted from Staplin (1969) and Burgess (1974).

In interpretation of the maturity from the estimated colour indices we follow a general scheme that is calibrated against vitrinite reflectance values (R_o).

Ro	0.45	0.6	0.9	1.0	1.3
colour index	2-	2	2+	3-	3
Maturity intervals	Moderate mature	Mature (oil window)			Condensate window

Extractable Organic Matter

Approximately 50gm of powdered rock was extracted by a ultrasonic probe for 3 minutes using dichloromethane (DCM) as solvent. The DCM used was of organic geochemical grade and blank analyses showed the occurrence of negligible amounts of contaminating hydrocarbons.

Activated copper fillings were used to remove any free sulphur from the samples.

Chromatographic Separation

The extractable organic matter (EOM) was separated into saturated fraction, aromatic fraction and non hydrocarbon fraction using a MPLC system with hexane as eluant (Radke et al., Anal. Chem., 1980). The various fractions were evaporated on a Buchi Rotavapor and transferred to glass vials and dried in stream of nitrogen.

Gas Chromatographic Analysis

The saturated hydrocarbon fractions were each diluted with n-hexane and analysed on a HP 5730A gas chromatograph, fitted with a 25m OV-101 fused silica capillary column. Hydrogen (0.7ml/min) was used as carrier gas.

Lithology and Total Organic Carbon measurements

TABLE NO.: 1.
WELL NO.: 7117/9-2

Sample	Depth (m)	TOC	Lithology
A-7853	3000-3015	2.42	80% Claystone, dark grey - greyish black - brownish black, silty, occasionally grading to siltstone, slightly micro-micaceous, partly micropyritic, occasionally glauconitic, carbonaceous, partly calcareous 15% Sandstone, light grey - white slightly brownish, very fine, silty, argillaceous, slightly micromicaceous, occasionally glauconitic, slightly carbonaceous, calcite/?dolomite cemented 5% Chalk, white, slightly brownish Sm.am. Coal; Marl; Pyrite
A-7860	3105-3120	2.14	85% Claystone, dark grey - greyish black, brownish black, as above 10% Sandstone, as above 5% Chalk, as above Sm.am. As above
A-7866	3195-3210	1.81	85% Claystone, as above 5% Dolomite/?Siderite, medium dark grey - grey, slightly brownish 5% Marl, light grey, slightly brownish 5% Coal (?additives) Sm.am. Chalk, Sandstone (as above)
A-8231	3300-3315	3.58	95% Claystone, as above 3% Dolomite/Siderite, as above Sm.am. Coal; Chalk; Sandstone; Pyrite

Lithology and Total Organic Carbon measurements

TABLE NO.: 1.
WELL NO.: 7117/9-2

Sample	Depth (m)	TOC	Lithology
A-8236	3375-3390	3.24	60% Claystone, greyish black - brownish black, silty, micromicaceous, micropyritic, occasionally very pyritic, carbonaceous, slightly calcareous in parts, slickensides is observed 40% Calcitic Dolostone, white, light brown, glassy, sucrosic/grainy/subcrystalline, pyritic, occasionally argillaceous, containing silica Sm.am. Chalk (white), Coal; Pyrite
A-8244	3495-3510		60% Calcite Dolostone/dolomitic Limestone, white, light brown, microsucrosic/grainy/subcrystalline, pyritic, occasionally argillaceous, silica rich
		3.57	40% Claystone, greyish black, - brownish black, as above Sm.am. As above
A-8395	3600-3615		50% Dolomitic Limestone, white - light brown, microsucrosic/grainy
		3.37	50% Claystone, as above Sm.am. Coal; Pyrite (abundant)
A-8401	3690-3705	3.29	95% Claystone, as above 5% Dolomitic Limestone, as above Sm.am. Coal; Pyrite (abundant)

Lithology and Total Organic Carbon measurements

TABLE NO.: 1.
WELL NO.: 7117/9-2

Sample	Depth (m)	TOC	Lithology
A-8406	3765-3780	3.17	90% Claystone, greyish black - brownish black, silty, micromicaceous, micropyritic, partly very pyritic, non calcareous, partly slickensided 9% Fragments affected by turbo-drilling, greyish black - brownish black, deformed, coky 1% Casing cement, white, slightly brownish, abundant minute black specks Sm.am. Dolomite; Calcite
A-8415	3900-3915	3.07	55% Claystone, as above. Sooty coating on fragments due to turbodrilling 40% Fragments affected by turbodrilling 5% Coal (?additives) Sm.am. Additives; Calcite; Dolomite; Pyrite, Claystone (dark grey, slightly brownish, rounded fragments, disintegrates in 10% HCL, ?Consolidated drilling dust
A-8421	3990-4005	2.97	80% Fragments affected by turbodrilling 20% Claystone, greyish black - brownish black, silty, occasionally very silty, micromicaceous, slightly micropyritic, trace glauconite, slightly calcareous in parts, carbonaceous Sm.am. Calcite (trace); Pyrite; Claystone (dark grey etc. as above)
A-8424	4035-4050	3.25	85% Claystone, greyish black - brownish black, as above 15% Fragments affected by turbodrilling Sm.am. Calcite; Pyrite; Claystone (dark grey etc. as above)

Lithology and Total Organic Carbon measurements

TABLE NO.: 1.
WELL NO.: 7117/9-2

Sample	Depth (m)	TOC	Lithology
A-8428	4095-4110	3.20	60% Claystone, as above 40% Fragments, affected by turbodrilling Sm.am. Calcite; Pyrite; Claystone (dark grey etc. as above)
A-8431	4140-4155	2.90	60% Claystone, as above 40% Fragments affected by turbodrilling Sm.am. Calcite; Pyrite; Claystone (dark grey etc. as above)
A-8434	4185-4200	2.91	90% Fragments affected by turbodrilling 10% Claystone, as above Sm.am. Calcite; Pyrite; Claystone (dark grey etc.)
A-8438	4245-4260	2.98	50% Claystone, as above 50% Fragments affected by turbodrilling Sm.am. Calcite; Pyrite; Coal, Claystone (dark grey etc. as above)
A-8441	4290-4305	2.84	60% Fragments affected by turbodrilling 40% Claystone, as above Sm.am. Calcite; Pyrite; Coal; Claystone (dark grey etc. as above) (common)
A-8446	4365-4380	1.84	80% Claystone, greyish black - brownish black, silty, micromicaceous, slightly micropyritic, non calcareous, carbonaceous 20% Fragments affected by turbodrilling

Lithology and Total Organic Carbon measurements

TABLE NO.: 1.
WELL NO.: 7117/9-2

Sample	Depth (m)	TOC	Lithology
A-8448	4395-4410	2.75	100% Claystone, greyish black - brownish black, silty, occasionally very silty, micromicaceous, partly micropyritic, partly calcareous, carbonaceous Sm.am. Sandstone (very fine, light brown); Calcite; Fragments affected by turbo-drilling
A-8451	4440-4455	2.73	95% Claystone, greyish black - brownish black, as above 5% Fragments affected by turbodrilling Sm.am. Sandstone (as above); Calcite; Coal
A-8454	4485-4500	2.54	95% Claystone, as above 5% Fragments affected by turbodrilling Sm.am. Sandstone (as above); Calcite; Coal
A-8456	4515-4530	2.66	90% Claystone, as above 10% Fragments affected by turbodrilling
A-8461	4590-4605	2.71	100% Claystone, as above Sm.am. Sandstone (as above), Calcite; Coal; Fragments affected by turbodrilling
A-8562	4635-4650	2.70	90% Claystone, as above 10% Fragments affected by turbodrilling Sm.am. Sandstone (as above); Calcite; Coal
A-8565	4680-4695	2.69	50% Claystone, as above 50% Fragments affected by turbodrilling Sm.am. As above

Lithology and Total Organic Carbon measurements

TABLE NO.: 1.
WELL NO.: 7117/9-2

Sample	Depth (m)	TOC	Lithology
A-8569	4740-4755	2.69	70% Claystone, as above 30% Fragments affected by turbodrilling Sm.am. Calcite; Sandstone (as above); Coal
A-8572	4785-4860	2.54	90% Fragments affected by turbodrilling 30% Claystone, as above Sm.am. Calcite; Coal; Sandstone (as above)
A-8576	4845-4860	2.54	90% Fragments affected by turbodrilling 10% Claystone, as above Sm.am. Calcite; Sandstone (as above)
A-8578		2.52	70% Claystone, as above 30% Fragments affected by turbodrilling
A-8582	4935-4950	2.65	60% Fragments affected by turbodrilling 40% Claystone, as above Sm.am. Calcite; Sandstone (as above)
A-8586	4995-5010	2.48	90% Fragments affected by turbodrilling 10% Claystone, as above Sm.am. As above

IKU

TABLE 2.

D A T A F R O M R O C K E V A L P Y R O L Y S I S

IKU No.	DEPTH m/Ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1/(S1+S2)	TEMP. MAX (C)
A 8344	3510	0.44	1.96	0.47	3.57	55	13	2.40	0.18	460
A 8395	3615	0.46	1.65	0.38	3.37	49	11	2.11	0.22	464
A 8401	3705	0.40	1.45	0.36	3.29	44	11	1.85	0.22	463
A 8406	3780	0.40	1.22	0.53	3.17	38	17	1.62	0.25	472
A 8415	3915	1.13	2.04	0.40	3.07	66	13	3.17	0.36	474
A 8421	4005	0.79	1.52	0.33	2.97	51	11	2.31	0.34	473
A 8428	4110	0.56	1.25	0.43	3.20	39	13	1.81	0.31	481
A 8434	4200	0.58	1.07	0.48	2.91	37	16	1.65	0.35	479
A 8441	4305	0.39	0.65	0.42	2.84	23	15	1.04	0.38	501
A 8448	4410	0.34	0.60	0.41	2.75	22	15	0.94	0.36	496
A 8454	4500	0.33	0.60	0.39	2.54	24	15	0.93	0.35	494
A 8461	4605	0.28	0.61	0.23	2.71	23	8	0.89	0.31	509
A 8565	4695	0.42	0.52	0.27	2.65	20	10	0.94	0.45	512
A 8572	4800	0.26	0.39	0.22	2.48	16	9	0.65	0.40	512
A 8578	4890	0.15	0.34	0.08	2.52	13	3	0.49	0.31	514
A 8586	5010	0.24	0.31	0.13	2.48	13	5	0.55	0.44	518

DATE : 24 - 11 - 83.

TABLE 3a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

(KU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
A 7853	3015	2260	786	748	97	165	189	4056	1796	44.28	0.59
A 7860	3105	14890	2972	1901	254	426	647	20443	5553	27.16	0.60
A 7866	3210	16797	2518	1041	100	147	338	20604	3806	18.47	0.68
A 8231	3315	12805	1207	321	38	39	82	14410	1605	11.14	0.97
A 8236	3390	8260	614	130	14	16	32	9034	774	8.57	0.83
A 8244	3510	10448	633	78		8	40	11167	719	6.44	0.00
A 8395	3615	18464	1027	137	15	14		19657	1193	6.07	1.06
A 8401	3705	9241	729	58	6	4		10037	797	7.94	1.40
A 8406	3780	30300	2668	300	44	29	105	33341	3041	9.12	1.50
A 8408	3810	26083	1736	279	50	32	77	28181	2098	7.44	1.55
A 8415	3915	19056	1806	556	98	82	135	21598	2542	11.77	1.19
A 8421	4005	17306	1224	223	47	33	137	18833	1526	8.10	1.45
A 8424	4050	28739	2185	363	80	44	118	31412	2672	8.51	1.82
A 8428	4110	42971	4633	1016	274	132	414	49027	6055	12.35	2.07
A 8431	4155	34503	2484	345	88	37	143	37458	2955	7.89	2.36
A 8434	4200	23442	2194	330	75	34	131	26075	2633	10.10	2.25
A 8438	4260	48321	3253	344	82	29	100	52030	3709	7.13	2.78
A 8441	4305	55351	5501	623	124	52	301	61652	6300	10.22	2.38
A 8444	4350	17564	1278	152	29		44	19023	1459	7.67	
A 8446	4380	23060	1139	90	16	9	29	24366	1305	5.36	1.84
A 8448	4410	44767	2147	171	29			47114	2347	4.98	
A 8451	4455	16377	724	39	6			17146	769	4.49	
A 8454	4500	33183	1237	66	9			34495	1312	3.80	

DATE : 5 - 12 - 83.

IKU

TABLE 3a.:

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
A 8456	4530	40916	1463	83	13		76	42474	1558	3.67	
A 8458	4560	24087	657	28				24773	685	2.77	
A 8461	4605	33064	1067	37	6			34173	1109	3.25	
A 8562	4650	905	192	7				1103	198	17.98	
A 8565	4695	9861	260	10				10131	270	2.66	
A 8569	4755	21893	382	16				22291	398	1.78	
A 8572	4800	5273	108	4				5385	112	2.07	
A 8576	4860	8226	140	6				8380	154	1.84	
A 8578	4890	14173	221	12				14405	233	1.61	
A 8582	4950	1417	168	8				1593	176	11.02	
A 8584	5010	9744	138	10				9892	148	1.49	
A 8579	7905	14729	210	11				14950	221	1.48	

DATE : 5 - 12 - 83.

TABLE 3b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS .

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
A	7853	3015	1066	82	80	19	60	152	1308	241	18.45	0.32
A	7860	3105	1513	699	656	46		112	2915	1402	48.10	
A	7866	3210	10480	2718	2453	222	657	549	16530	6050	36.60	0.34
A	8231	3315	85	57	25				167	82	49.25	
A	8236	3390	24543	15520	5622	547	742	411	46974	22431	47.75	0.74
A	8244	3510	10300	7251	2092	180	268	185	20091	9792	48.74	0.67
A	8395	3615	13138	9238	2247	189	222	111	25034	11896	47.52	0.85
A	8401	3705	42560	22949	3393	257	226		69385	26826	38.66	1.14
A	8406	3780	23868	11764	2270	182	151	94	38276	14388	37.59	1.20
A	8408	3810	1716	1275	210				3200	1485	46.39	
A	8413	3915	13820	8080	2782	361	384	235	25427	11607	45.65	0.94
A	8421	4005	28459	12378	3660	456	283	223	45236	16777	37.09	1.61
A	8424	4050	17998	1360	4016	516	413	192	24502	6504	26.54	1.25
A	8428	4110	16322	11276	3860	632	493	329	32584	16261	49.91	1.28
A	8431	4155	20453	17148	4199	648	457	269	42905	22452	52.33	1.42
A	8434	4200	15142	8571	2693	413	302	195	27121	11979	44.17	1.37
A	8438	4260	25348	15549	3301	562	296	206	45056	19708	43.74	1.90
A	8441	4305	19918	10777	3020	527	355	278	34598	14680	42.43	1.48
A	8444	4350	28769	10719	2142	321	174	129	42125	13356	31.70	1.84
A	8446	4380	60541	14639	1873	242	104	88	77399	16858	21.78	2.32
A	8448	4410	34721	13317	1445	196	90		49770	15049	30.24	2.17
A	8451	4455	35087	18499	1819	255	99		55759	20672	37.07	2.57
A	8454	4500	29570	18975	2025	306	129		51005	21434	42.02	2.38

DATE : 5 - 12 - 83.

IKU

TABLE 3b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS .

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
A 8456	4530	20311	13155	163	207	101		33937	13626	40.15	2.05
A 8458	4560	30174	14977	1268	174	70		46664	16489	35.34	2.46
A 8461	4605	42103	15163	1118	144			58528	16425	28.06	
A 8562	4650	29966	9884	623	73			40546	10580	26.09	
A 8565	4695	12425	3400	204				16030	3604	22.49	
A 8569	4755	49248	8981	531				58761	9512	16.19	
A 8572	4800	49161	10987	584				60732	11571	19.05	
A 8576	4860	45037	8003	489				53530	8493	15.87	
A 8578	4890	35328	3787	325	44			39484	4156	10.53	
A 8582	4950	45298	6199	412	51			51959	6662	12.82	
A 8586	5010	63230	4381	376				67986	4756	7.00	
A 8579	7905	58540	6942	425	50			65958	7418	11.25	

DATE : 5 - 12 - 83.

TABLE 3c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib) .

	IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
A	7853	3015	3326	868	828	116	224	341	5363	2037	37.98	0.52
A	7860	3105	16403	3672	2557	300	426	760	23358	6955	29.77	0.70
A	7866	3210	27278	5236	3494	322	804	887	37134	9856	26.54	0.40
A	8231	3315	12890	1265	346	38	39	82	14577	1687	11.57	0.97
A	8236	3390	32803	16134	5752	561	758	443	56008	23205	41.43	0.74
A	8244	3510	20747	7885	2171	180	276	226	31259	10511	33.63	0.65
A	8395	3615	31602	10265	2384	204	236	111	44691	13089	29.29	0.86
A	8401	3705	51800	23679	3451	263	230		79423	27622	34.78	1.14
A	8406	3780	54188	14452	2571	226	181	200	71617	17429	24.34	1.25
A	8408	3810	27798	3011	489	50	32	77	31381	3583	11.42	1.55
A	8415	3915	32876	9886	3338	459	466	370	47025	14149	30.09	0.98
A	8421	4005	45766	13602	3883	503	315	360	64069	18304	28.57	1.59
A	8424	4050	46738	3745	4378	596	457	310	55914	9176	16.41	1.30
A	8428	4110	59294	15909	4876	906	626	743	81610	22317	27.35	1.45
A	8431	4155	54956	19632	4544	736	494	412	80363	25407	31.61	1.49
A	8434	4200	38584	10765	3022	489	336	325	53196	14612	27.47	1.45
A	8438	4260	73668	18803	3646	643	325	307	97085	23417	24.12	1.98
A	8441	4305	75270	16278	3644	651	407	579	96250	20980	21.80	1.60
A	8444	4350	46334	11996	2295	350	174	173	61148	14814	24.23	2.01
A	8446	4380	83602	15828	1963	258	113	117	101765	18163	17.85	2.28
A	8448	4410	79488	15464	1616	225	90		96884	17396	17.96	2.49
A	8451	4455	51464	19223	1858	261	99		72905	21441	29.41	2.63
A	8454	4500	62754	20213	2090	315	129		85500	22746	26.60	2.44

DATE : 5 - 12 - 83.

TABLE 3c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib) .

IKU no.	DEPTH m/ft	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
A 8456	4530	61226	14618	246	220	101	76	76410	15184	19.87	2.18
A 8458	4560	54262	15634	1296	174	70		71436	17174	24.04	2.46
A 8461	4605	75167	16230	1155	150			92701	17534	18.91	
A 8562	4650	30871	10076	630	73			41649	10778	25.88	
A 8565	4695	22286	3660	214				26160	3874	14.81	
A 8569	4755	71141	9363	547				81051	9910	12.23	
A 8572	4800	54434	11095	587				66116	11682	17.67	
A 8576	4860	53263	8152	495				61910	8647	13.97	
A 8578	4890	49501	4007	337	44			53890	4388	8.14	
A 8582	4950	46715	6367	419	51			53552	6837	12.77	
A 8586	5010	72974	4518	386				77878	4904	6.30	
A 8579	7905	73270	7152	437	50			80908	7639	9.44	

DATE : 5 - 12 - 83.

IKU

TABLE : 4.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
A 8406	3780	18.6	16.7	1.3	2.6	4.0	12.7	3.29
A 8415	3915	9.4	6.8	1.0	1.8	2.8	4.0	2.87
A 8421	4005	24.7	21.7	1.3	3.2	4.6	17.1	2.95
A 8428	4110	17.2	5.5	1.0	1.3	2.3	3.2	2.98
A 8434	4200	5.0	8.2	2.3	2.5	4.8	3.4	3.08
A 8448	4410	20.0	14.8	3.7	4.2	7.9	6.9	2.78
A 8454	4500	30.0	9.6	1.1	2.0	3.1	6.5	2.79
A 8461	4605	35.1	12.2	3.0	2.9	5.9	6.3	2.77
A 8565	4695	20.8	9.5	0.4	1.3	1.7	7.8	2.71
A 8572	4800	15.6	15.1	3.7	3.7	7.4	7.7	2.74
A 8578	4890	14.5	4.8	0.2	1.1	1.3	3.5	2.62
A 8586	5010	14.8	3.7	0.1	1.0	1.1	2.6	2.49

DATE : 30 - 11 - 83.

T A B L E : 5.

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm OF rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
A 8406	3780	898	71	142	213	685
A 8415	3915	723	102	191	294	430
A 8421	4005	879	53	131	185	694
A 8428	4110	319	56	77	132	187
A 8434	4200	1650	459	507	966	684
A 8448	4410	738	186	209	395	343
A 8454	4500	320	36	68	104	216
A 8461	4605	348	85	82	168	180
A 8565	4695	456	17	63	81	376
A 8572	4800	969	239	239	478	492
A 8578	4890	330	17	74	91	240
A 8586	5010	250	7	65	72	179

DATE : 30 - 11 - 83.

T A B L E : 6.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
A 8406	3780	27.3	2.2	4.3	6.5	20.8
A 8415	3915	25.2	3.6	6.7	10.2	15.0
A 8421	4005	29.8	1.8	4.4	6.3	23.5
A 8428	4110	10.7	1.9	2.6	4.4	6.3
A 8434	4200	53.6	14.9	16.5	31.4	22.2
A 8448	4410	26.6	6.7	7.5	14.2	12.3
A 8454	4500	11.5	1.3	2.4	3.7	7.7
A 8461	4605	12.6	3.1	3.0	6.0	6.5
A 8565	4695	16.8	0.6	2.3	3.0	13.9
A 8572	4800	35.4	8.7	8.7	17.4	17.9
A 8578	4890	12.6	0.6	2.8	3.5	9.1
A 8586	5010	10.1	0.3	2.6	2.9	7.2

DATE : 30 - 11 - 83.

IKU

TABLE : 7.

COMPOSITION IN % OF MATERIAL EXTRACTED FROM THE ROCK

IKU-No	DEPTH (m)	Sat / EOM	Aro / EOM	HC / EOM	SAT / Aro	Non HC / EOM	HC / Non HC
A 8406	3780	7.9	15.8	23.7	50.0	76.3	31.1
A 8415	3915	14.1	26.5	40.6	53.3	59.4	68.3
A 8421	4005	6.1	14.9	21.0	40.7	79.0	26.6
A 8428	4110	17.5	24.0	41.5	72.7	58.5	70.8
A 8434	4200	27.8	30.7	58.5	90.5	41.5	141.2
A 8448	4410	25.1	28.4	53.5	88.6	46.5	115.1
A 8454	4500	11.2	21.3	32.5	52.9	67.5	48.1
A 8461	4605	24.6	23.6	48.2	104.2	51.8	93.0
A 8565	4695	3.3	13.9	17.7	27.3	82.3	21.5
A 8572	4800	24.6	24.6	49.3	100.0	50.7	97.1
A 8578	4890	5.0	22.5	27.5	22.2	72.5	37.9
A 8586	5010	2.7	25.9	28.6	10.4	71.4	40.2

DATE : 30 - 11 - 83.

T A B L E 8.

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / n-C17	PRISTANE / PHYTANE	CPI
A 8406	3510	0.3	1.5	1.1
A 8415	3615	0.4	1.8	1.1
A 8421	4005	0.3	2.4	1.0
A 8428	4110	0.3	2.3	1.1
A 8434	4200	0.4	2.2	0.9
A 8448	4410	0.4	1.5	0.7
A 8454	4500	0.4	2.4	1.0
A 8461	4605	0.3	1.7	0.9
A 8565	4695	0.4	1.1	1.0
A 8572	4800	0.4	1.5	0.7
A 8578	4890	0.4	1.9	1.0
A 8586	5010	0.4	2.1	1.0

DATE : 1 - 12 - 83.

TABLE 9.

TABULATION OF MATURITY DATA

IKU No.	DEPTH (m/ft)	VITRINITE REFLECTANCE Ro(%) and Counts	NATURATION INDEX (TAI)	FLUOR-ESCENCE
A 6106	1605	0.30(1) 0.50(22)	2-/2, 2 3-	5
A 7785	2000	0.49(22)	2-/2 2 3-	5/6
A 7798	2205	0.49(5) 0.69(5)	2-/2 2 3-	5/6
A 7819	2500	0.66(11)	2-/2 2 3-	5/6
A 7839	2805	0.81(16)	2-/2 2 3-	6
A 7853	3005	0.74(11) 0.97(2)	2-/2 2 3-	6/7
A 7866	3210	0.87(4)	2-/2 2 3-	6/7
A 8231	3315	1.02(16)	2-/2 2 3-	7
A 8244	3510	0.99(3) 1.29(5)	2-/2 2 3-	6/7
A 8395	3600	1.02(8) 1.31(2)	2-/2 2 3-	6/7
B 632	3677	1.18(9) 1.48(6)	2-/2 2 3-	6/7
A 8406	3780	1.41(16)	2-/2 2 3-	7
A 8415	3915	1.25(11) 1.52(2)	2-/2 2 3-	7
A 8421	4005	0.88(10) 1.34(1)	2-/2 2 3-	6
A 8434	4200	1.25(6) 1.46(2)	2-/2 2 3-	
B 640	4388.10	0.82(1) 1.34(13) 1.73(2)	2-/2 2 3-	
A 8454	4605	1.22(1) 1.67(1)	2-/2 2 3-	6/7
A 8461	4800	1.22(1) 1.67(1)	2-/2 2 3-	
A 8572	4800	1.65(13)	2-/2 2 3-	
B 548	4870	1.52(1) 1.87(9) 2.61(1)	2-/2 2 3-	
A 8586	5010	1.30(1)	2-/2 2 3-	8

DATE : 5 - 12 - 83.

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 7117/9-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
A-8244	3510	W, Cut, P, S/	F-M-L	poor	2-/2, 2, 2+/3-	Strongly fragmented and degraded material as coherent aggregates including very small, as well as large woody fragments. Poorly sorted assemblage but poor preservation prevents confident detailed classification. Greyish.
A-8395	3615	W, Cut, P, S/Am, Cy	F-M-L	poor to fair	2-/2,2,2+/3-,3- and higher values.	As above but less strong degradation and probably relative increase of structured woody fragments (semifusinite) staining of palynomorphs. "Greyish".
A-8401	3705	W, Cut, P, S/Am, Cy	F-M-L	poor	"	As above A-8395, and deeper levels of this well.

ABBREVATIONS

Am	**Amorphous**	**Cy**	**Cysts, algae**	**W**	**Woody material**	**F**	**Fine**
He	**Herbaceous**	**P**	**Pollen grains**	**C**	**Coal**	**M**	**Medium**
Cut	**Cuticles**	**S**	**Spores**	**RI**	**Reworked**	**L**	**Large**

101/v/ah/1

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 7117/9-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
A-8406	3780	W, P, S, Cut/Am, Cy	F-M-L	poor	As above	As above A-8395.
A-8415	3915	W, P, S, Cut/Am, Cy	F-M-L	poor	"	As above A-8395.
A-8421	4005	W, P, S, Cut/Am, Cy	F-M-L	poor	"	As above A-8395.
A-8428	4110	W, S, P, Cut/Am, Cy	F-M-L	poor	"	As above A-8395.
A-8434	4200	W, S, P, Cut/Am, Cy	F-M-L	poor	"	As above A-8395.
A-8441	4305	W, S, P, Cut/Am	F-M-L	poor	"	As above A-8395.
A-8448	4410	W, S, P, Cut/Am	F-M-L	poor	"	As above A-8395.
A-8454	4500	W, S, P, Cut/Am	F-M-L	poor	"	As above A-8395.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

IKU

Visual Kerogen Analysis

TABLE NO.: 10.
WELL NO.: 7117/9-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
A-8461	4605	W, S, P, Cut/Am	F-M-L	poor	As above.	As above A-8395. Increase in "greyness"?
A-8565	4695	W, Cut, S, P/Am	F-M-L	poor	"	As above A-8461.
A-8572	4800	W, P, S, Cut/Am	F-M-L	poor	"	As above A-8461.
A-8578	4890	W, P, S, Cut, Am	F-M-L	poor	"	As above A-8461. ?Increase in opacity.
A-8586	5010	W, P, S, Cut/Am	F-M-L	poor	"	Main composition as for the interval 3510-4890m.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	Rl	Reworked	L	Large

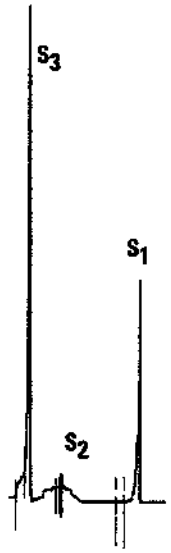
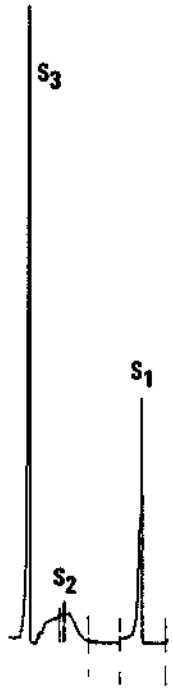


Figure 3. Print-outs from the Rock-Eval analyses.

a)

The S_2-peak is small and flat-topped and an accurate Tmax-value is difficult to measure.



b)

The S_2-peak starts to become broad and flat-topped, and the exact Tmax value starts to be difficult to read.

c)

This shows a good example where an accurate Tmax reading is possible.

FIGURE 9.

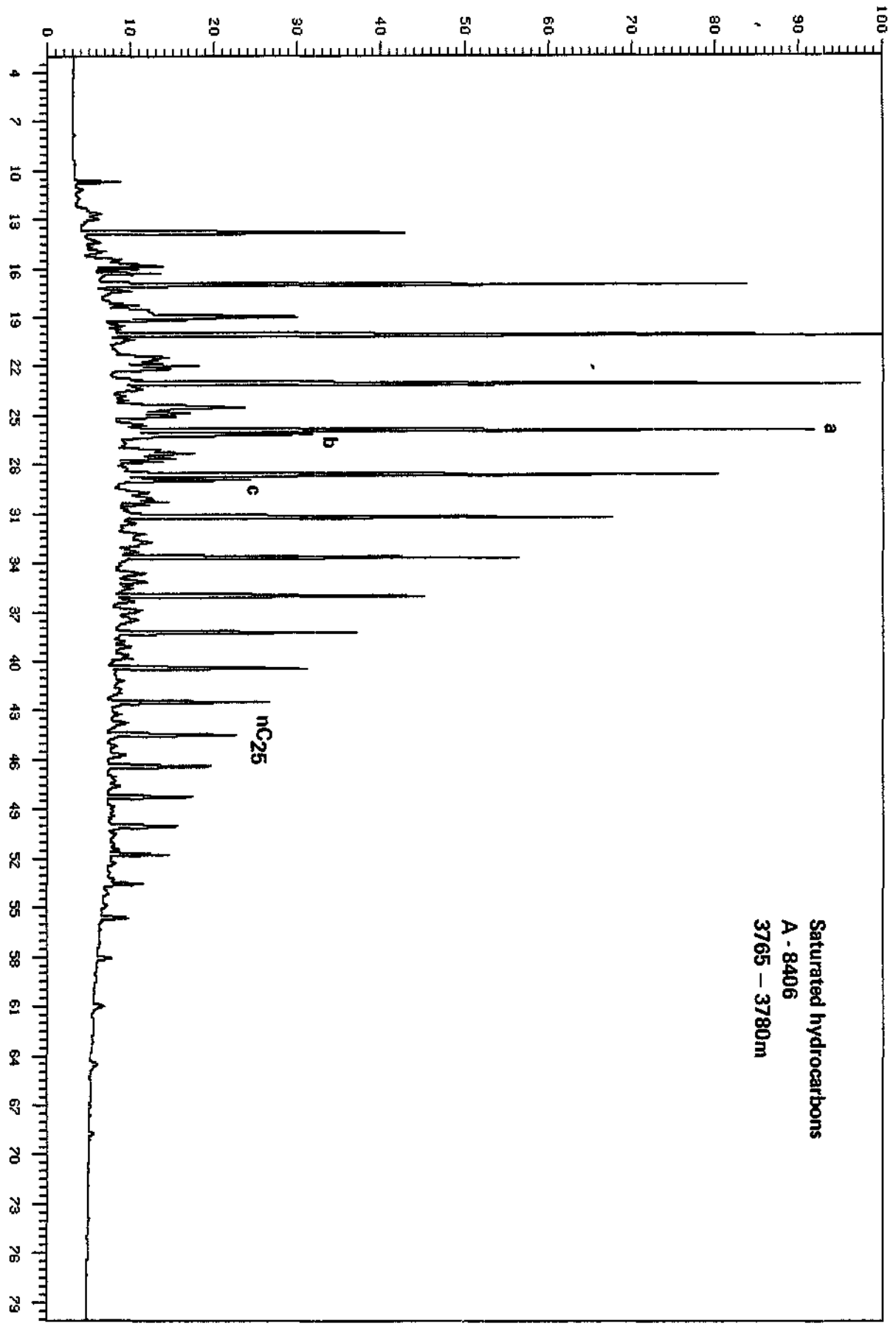
SATURATED HYDROCARBON GAS CHROMATOGRAMS

a - nC_{17}
b - pristane
c - phytane

Printed at 13:02 on 29/Nov/83

RAW DATA PLOT-CHANNEL 3 Box 1 of 1

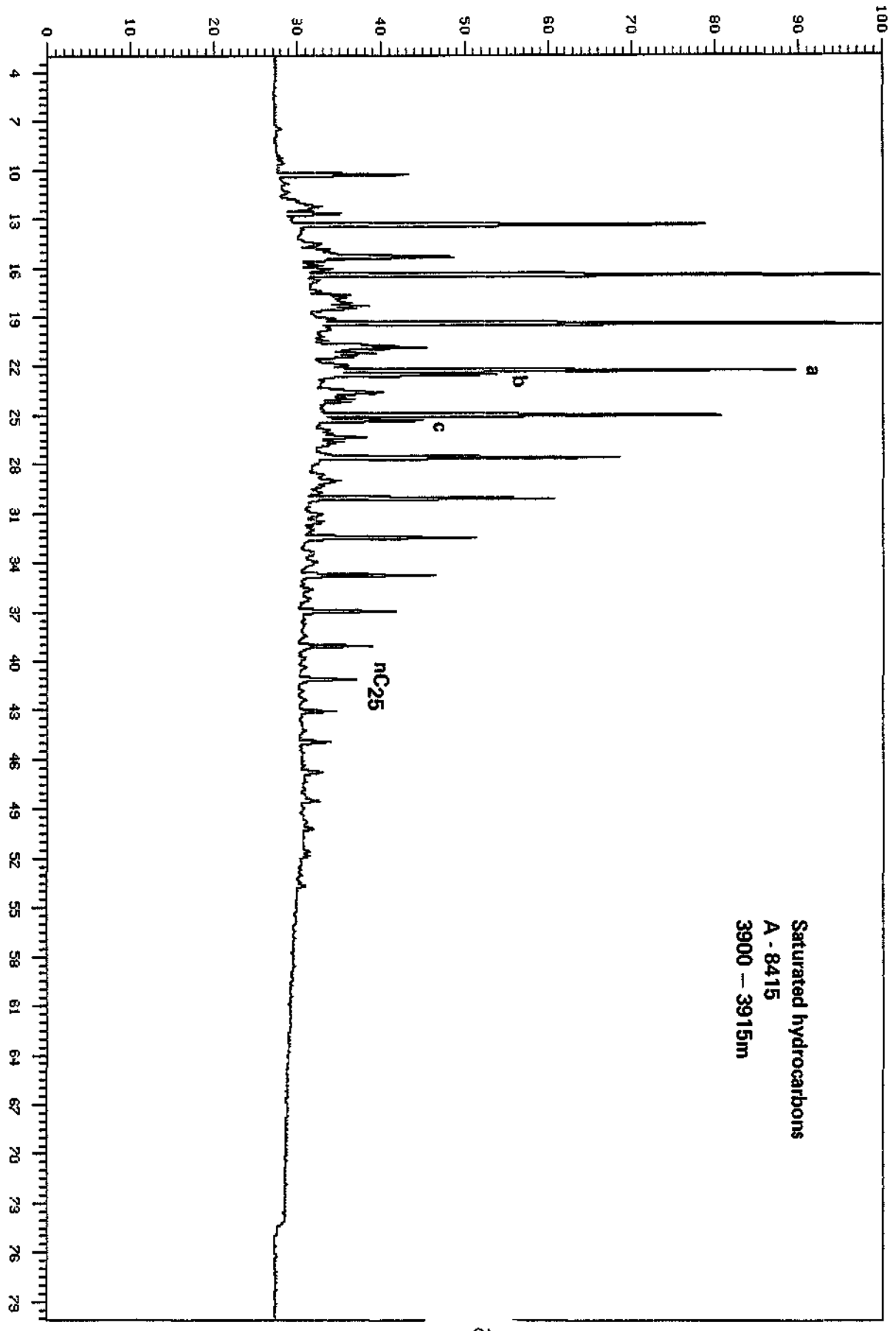
Analysis :050132A8406 Sample #: 1 Injection #: 1
Sample Name :A-8406,SAT,TB Maximum signal (%): 13.47



Printed at 12:41 on 29/Nov/83

RAW DATA PLOT-CHANNEL 2 Box 1 of 1

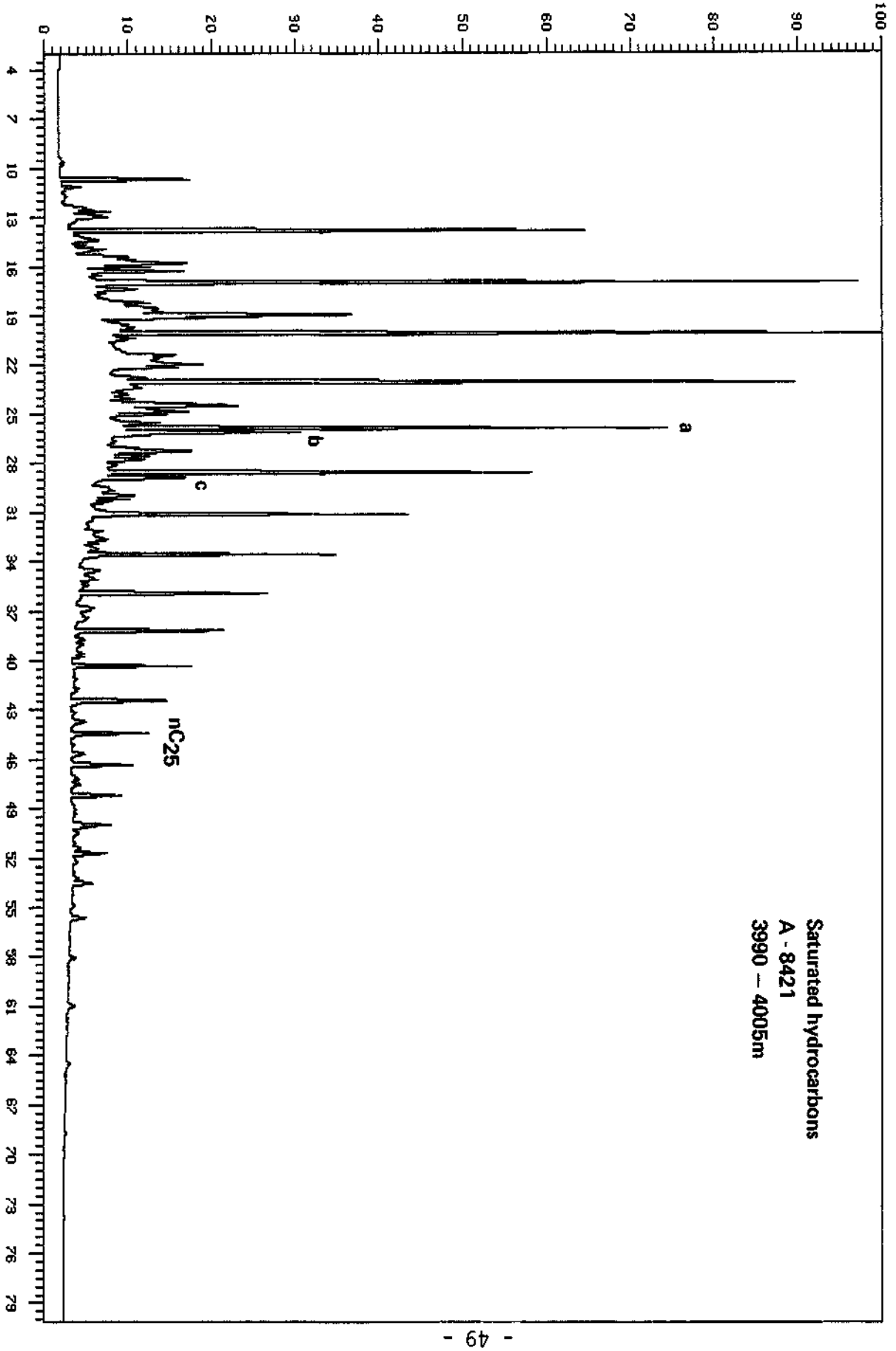
Analysis :050132A8415S Sample #: 1 Injection #: 1
Sample Name :A-8415,SAT,TB Maximum signal (%): 1.32



Printed at 12:59 on 29/Nov/83

RAW DATA PLOT-CHANNEL 3 Box 1 of 1

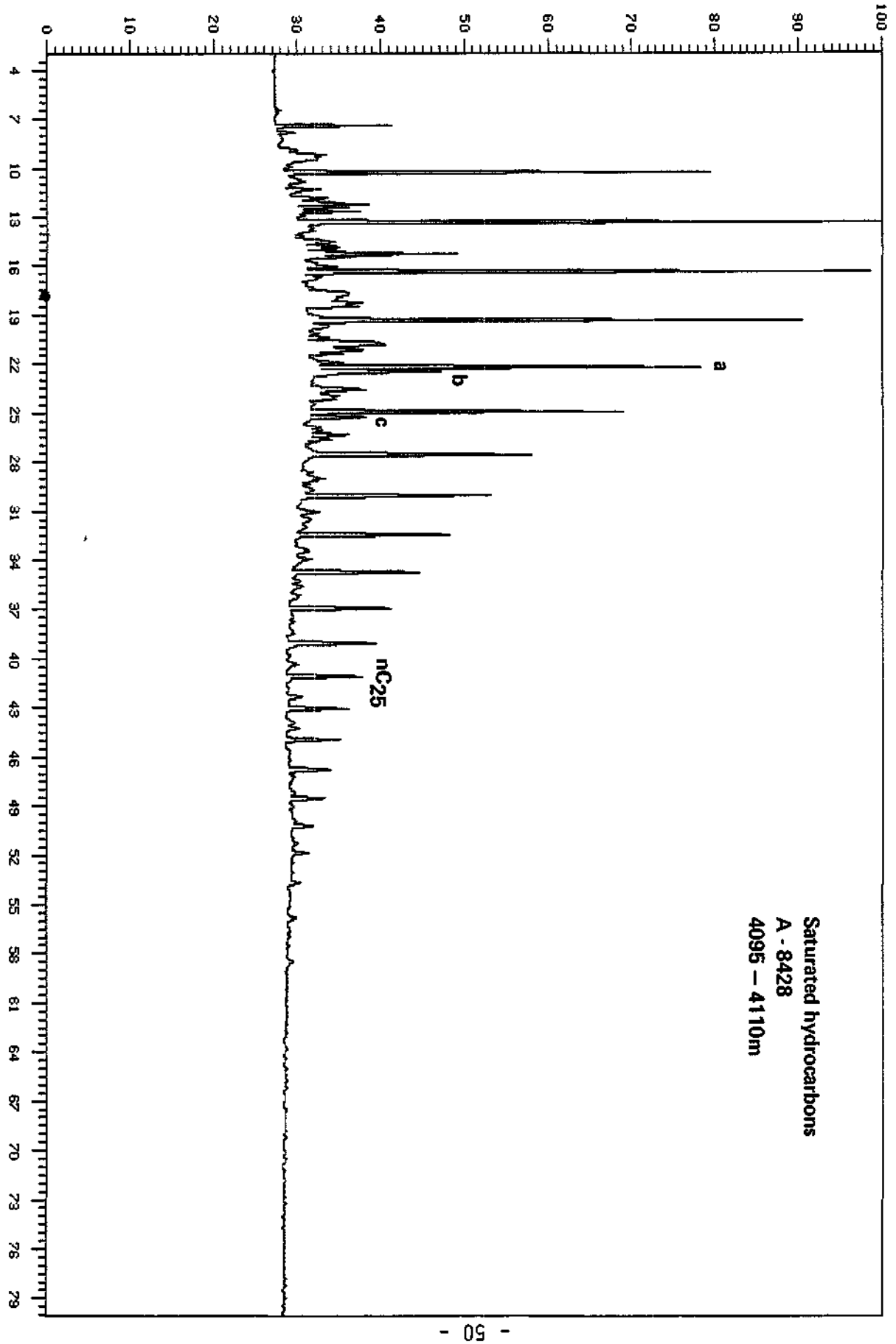
Analysis :050132A8421S Sample #: 1 Injection #: 1
Sample Name :A-8421,SAT,JA Maximum signal (%): 24.32



Printed at 12:25 on 29/Nov/83

RAW DATA PLOT-CHANNEL 2 Box 1 of 1

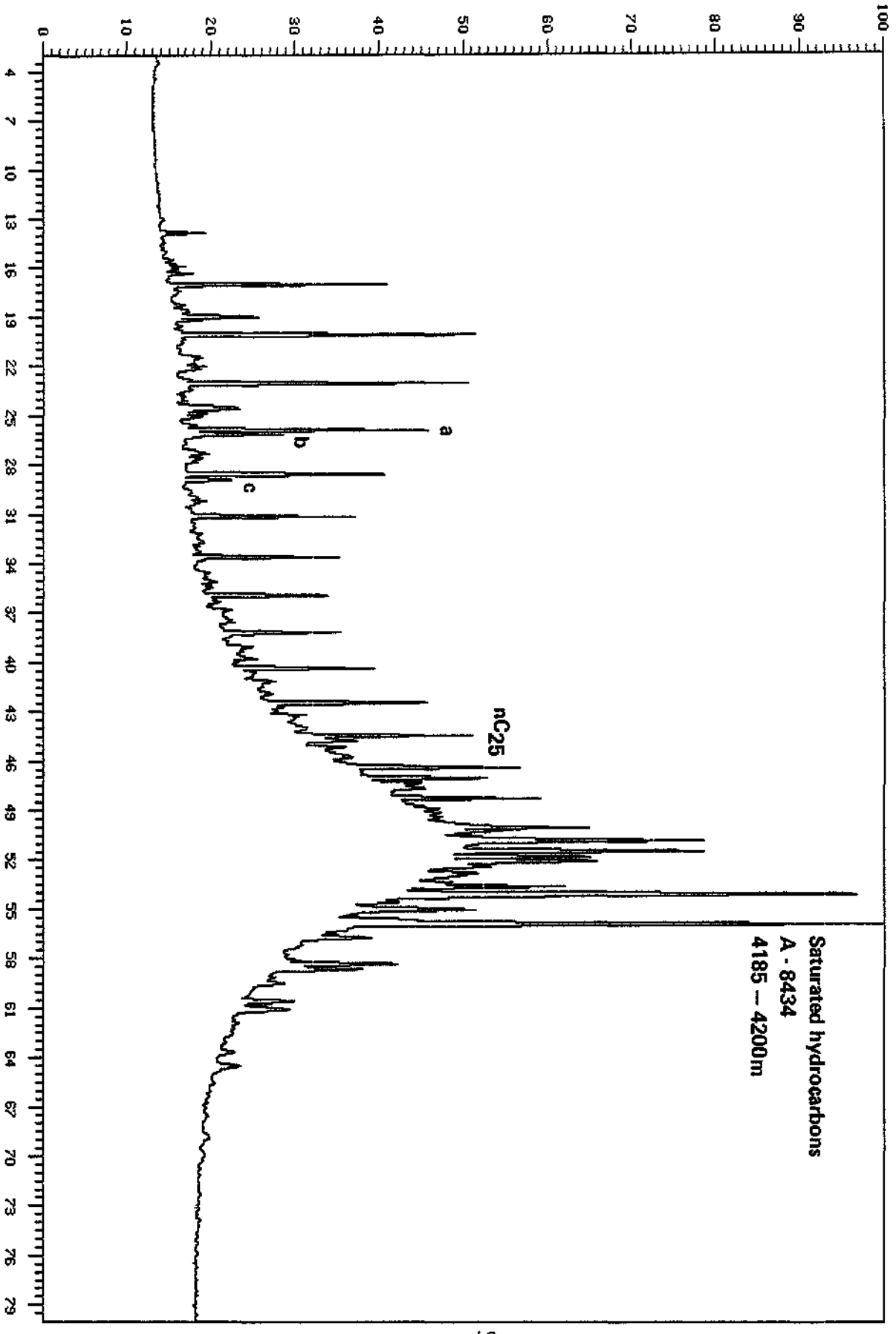
Analysis :050132A8428S Sample #: 1 Injection #: 1
Sample Name :A-8428,SAT,JR Maximum signal (%): 1.31



Printed at 10:52 on 30/Nov/83

RAW DATA PLOT-CHANNEL 3 Box 1 of 1

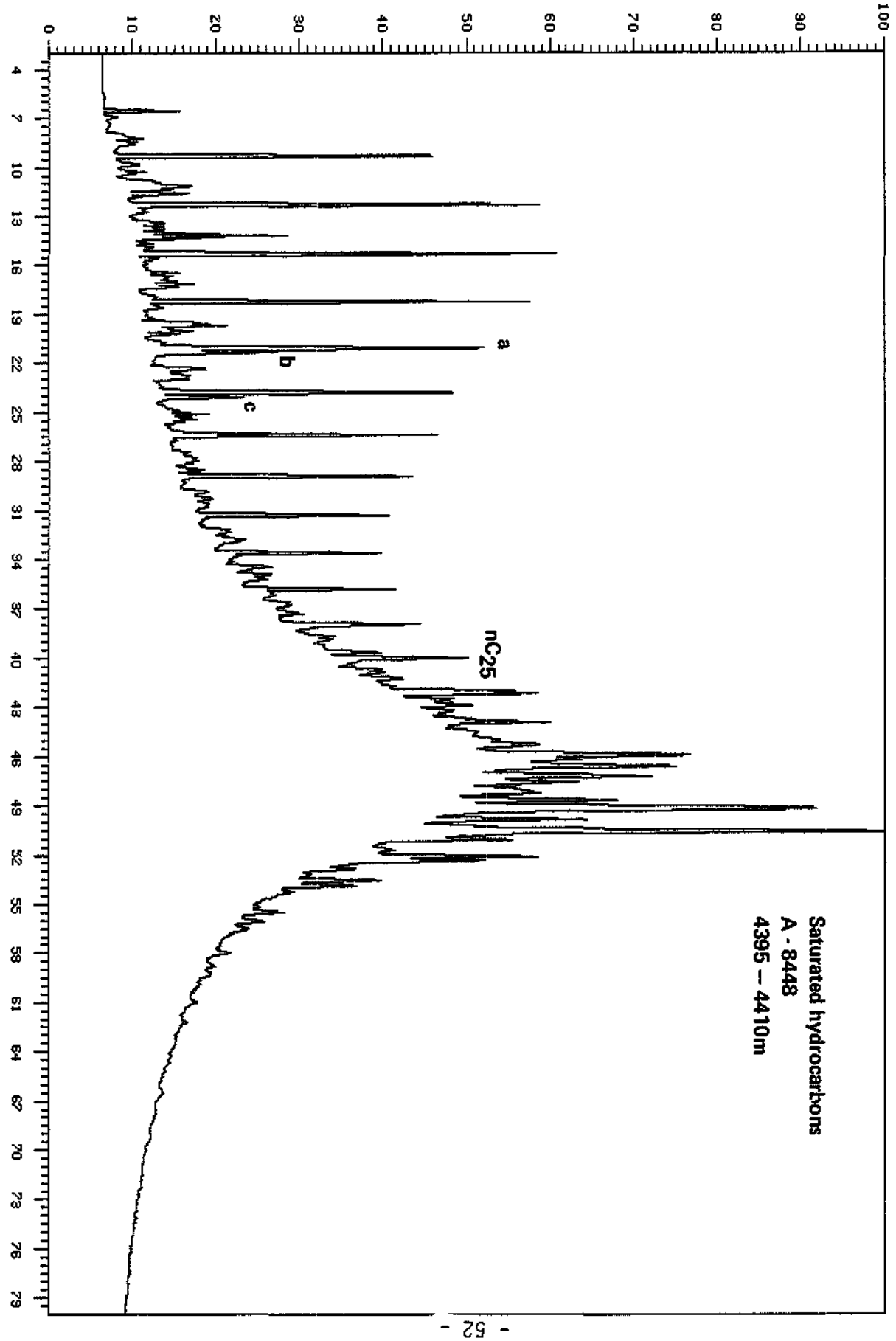
Analysis :050132A8434S Sample #: 1 Injection #: 1
Sample Name :A-8434,SAT,JA Maximum signal (%): 3.38



Printed at 12:28 on 29/Nov/83

RAW DATA PLOT-CHANNEL 2 Box 1 of 1

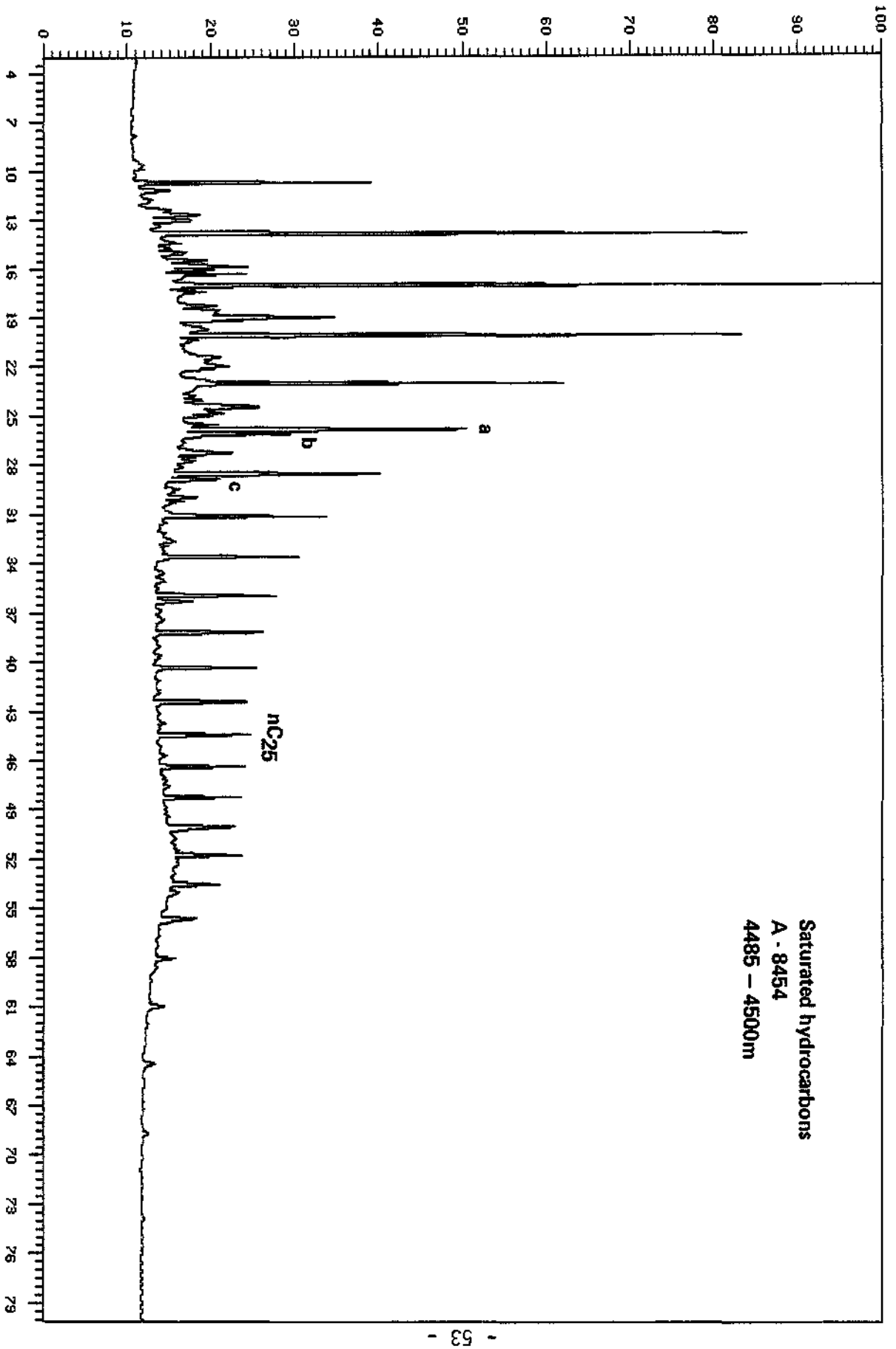
Analysis :050132A8448S Sample #: 1 Injection #: 1
Sample Name :A-8448,SAT,JA Maximum signal (%): 5.64



Printed at 11:00 on 30/Nov/83

RAW DATA PLOT-CHANNEL 3 Box 1 of 1

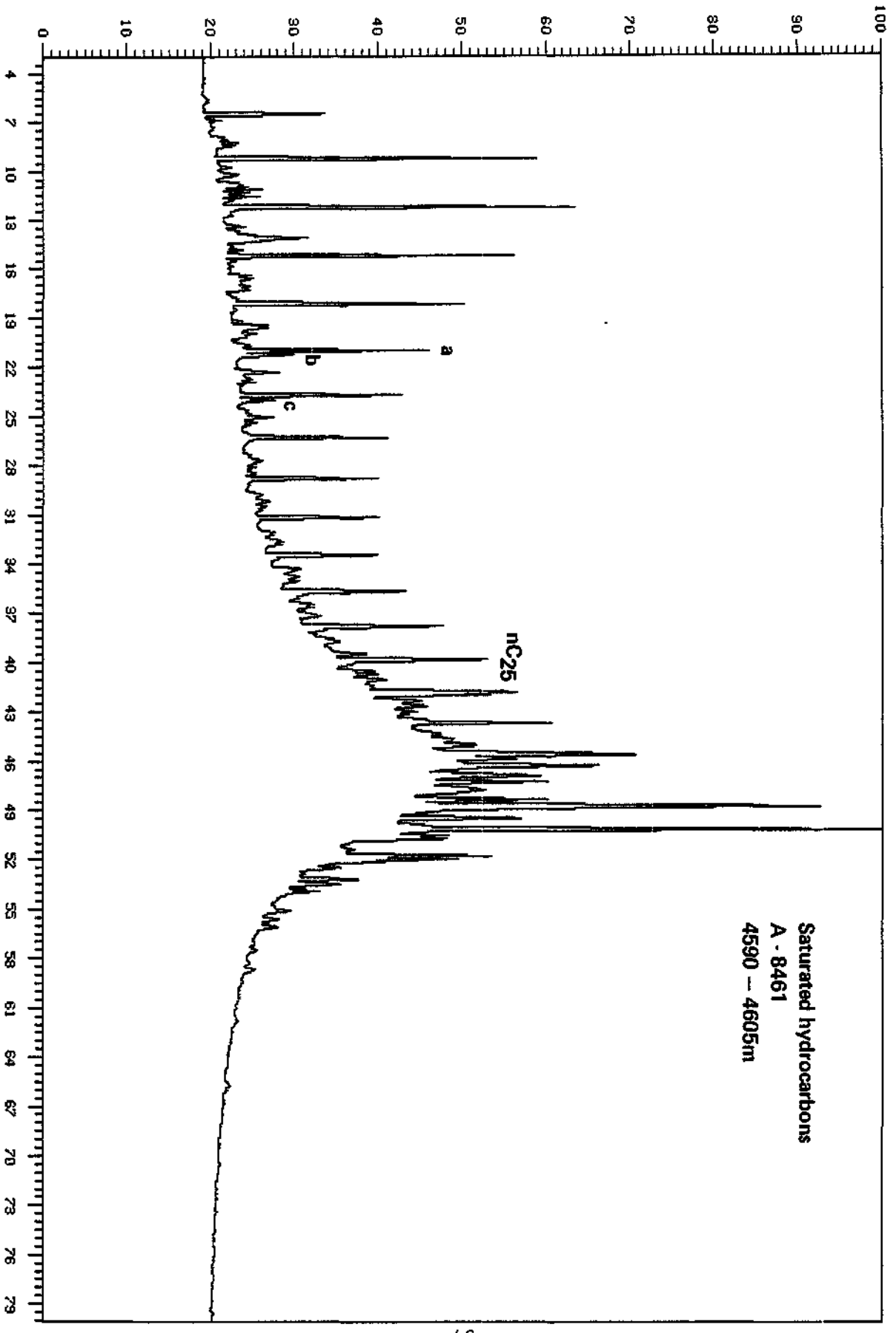
Analysis :050132A8454S Sample #: 1 Injection #: 1
Sample Name :A-8454,SAT,JA Maximum signal (%): 6.43



Printed at 10:05 on 30/Nov/83

RAW DATA PLOT-CHANNEL 2 Box 1 of 1

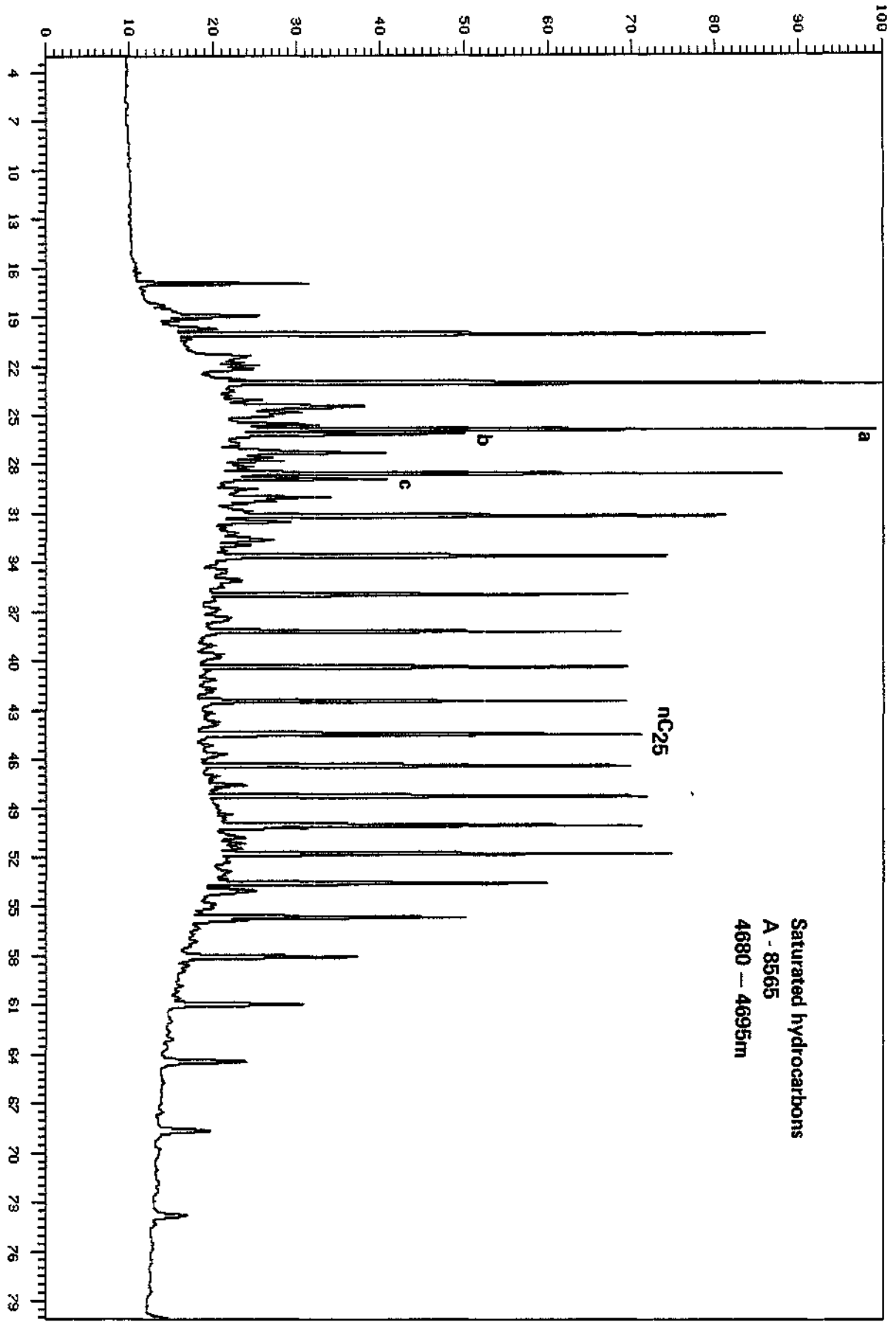
Analysis :050132A8461S Sample #: 1 Injection #: 1
Sample Name :A-8461,SAT,JA Maximum signal (%): 1.93



Printed at 10:36 on 30/Nov/83

RAW DATA PLOT-CHANNEL 3 Box 1 of 1

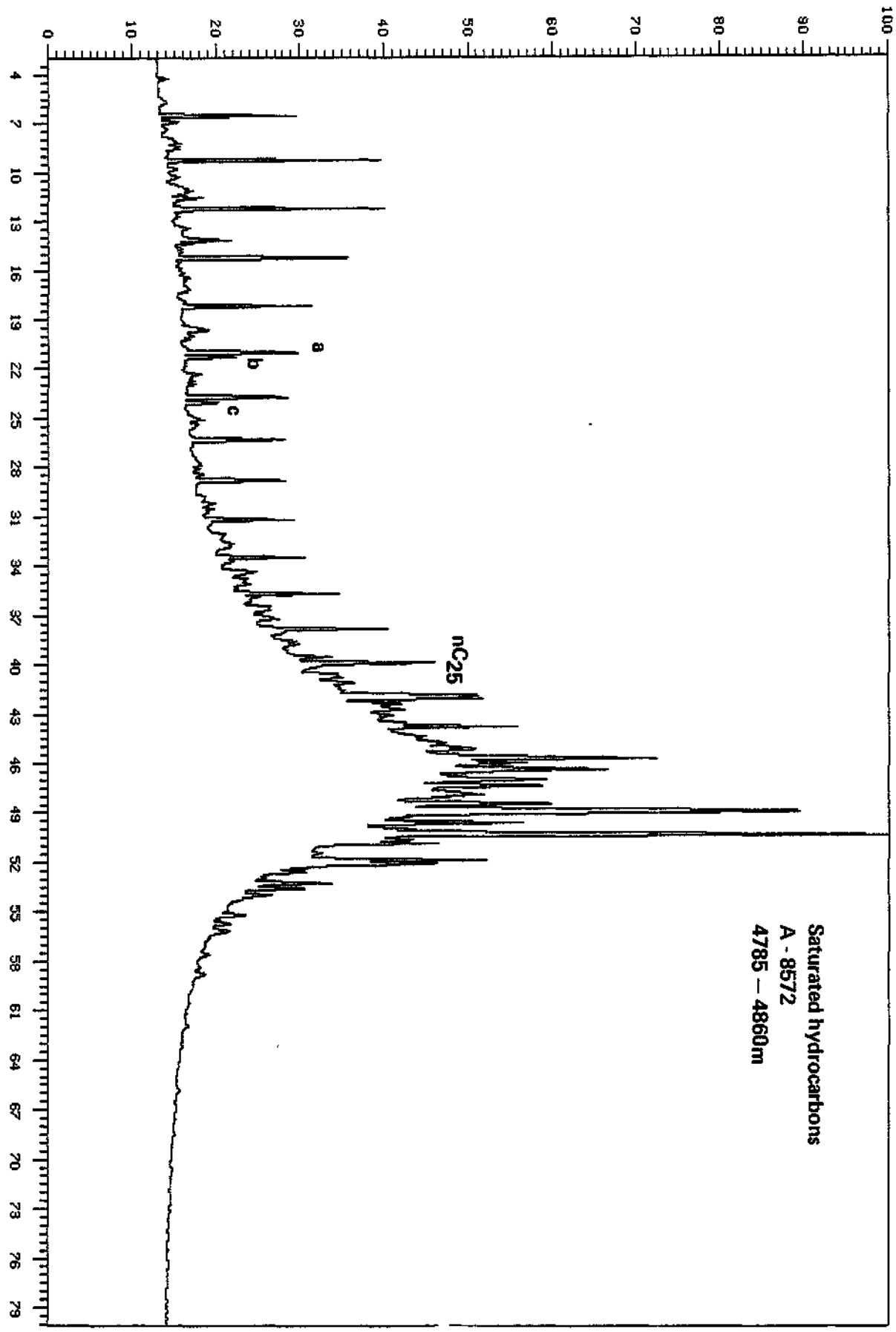
Analysis :050132A8565S Sample #: 1 Injection #: 1
Sample Name :A-8565,SAT,JA Maximum signal (%): 6.23



Printed at 10:02 on 30/Nov/83

RAW DATA PLOT-CHANNEL 2 Box 1 of 1

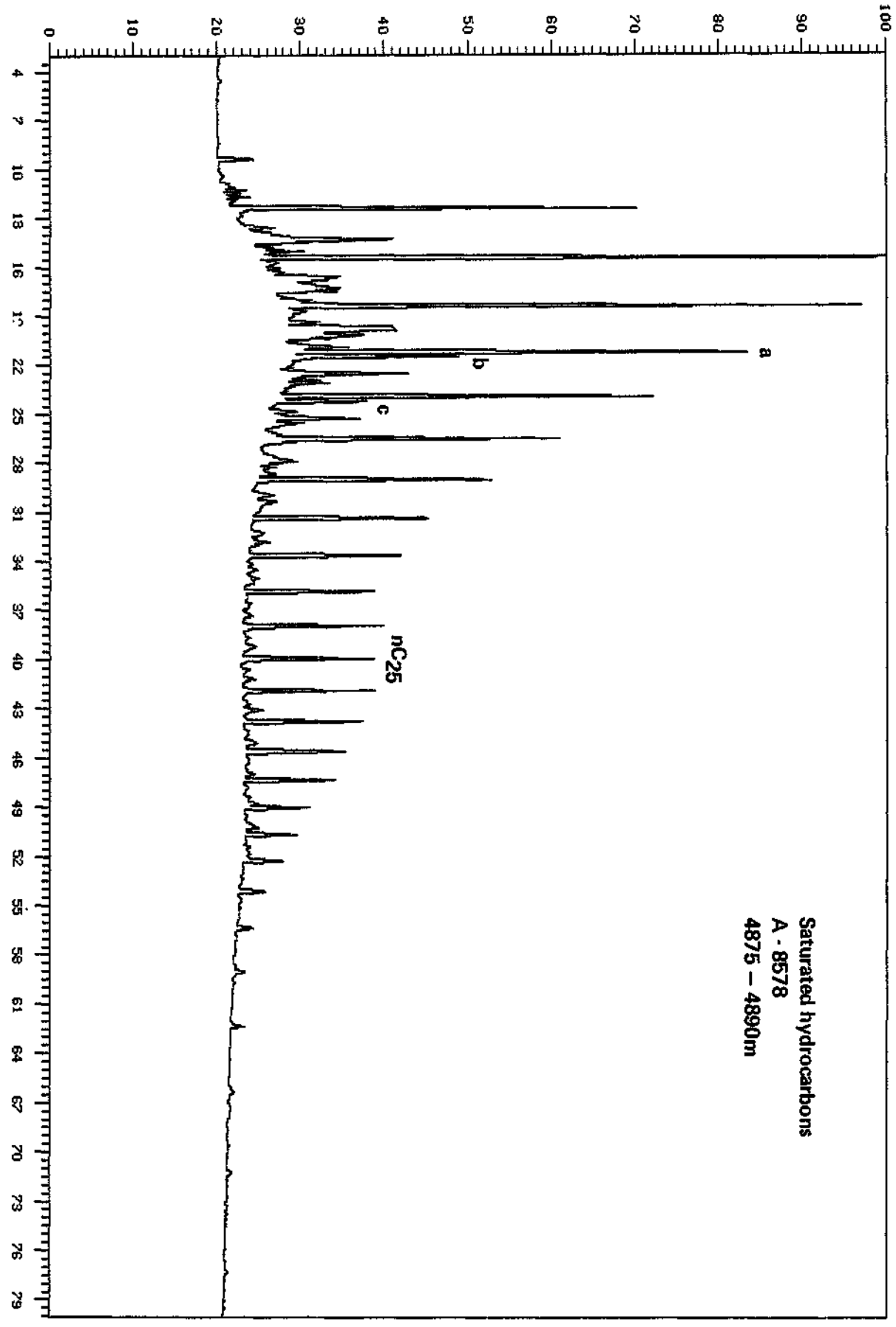
Analysis :050132A8572S Sample #: 1 Injection #: 1
Sample Name :A-8572,SAT,JA Maximum signal (%): 2.81



Printed at 10:00 on 30/Nov/83

RAW DATA PLOT-CHANNEL 2 Box 1 of 1

Analysis :050132A8578S Sample #: 1 Injection #: 1
Sample Name :A-8578,SAT,TV Maximum signal (%): 1.82



Printed at 11:03 on 30/Nov/83

RAW DATA PLOT-CHANNEL 3 Box 1 of 1

Analysis :050132A8586S Sample #: 1 Injection #: 1
Sample Name :A-8586,SAT,TV Maximum signal (%): 11.67

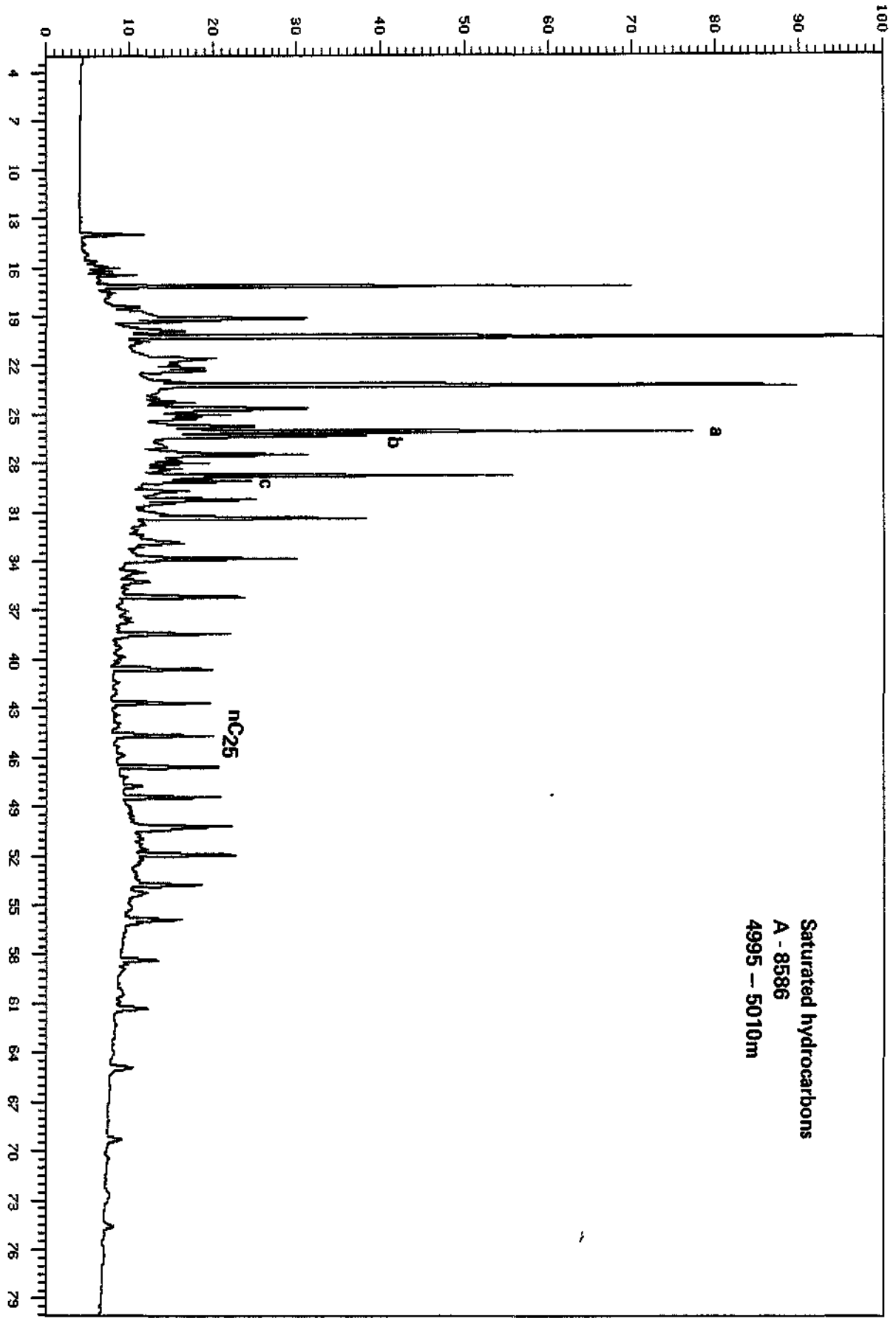


FIGURE 10.

VITRINITE REFLECTANCE HISTOGRAMS

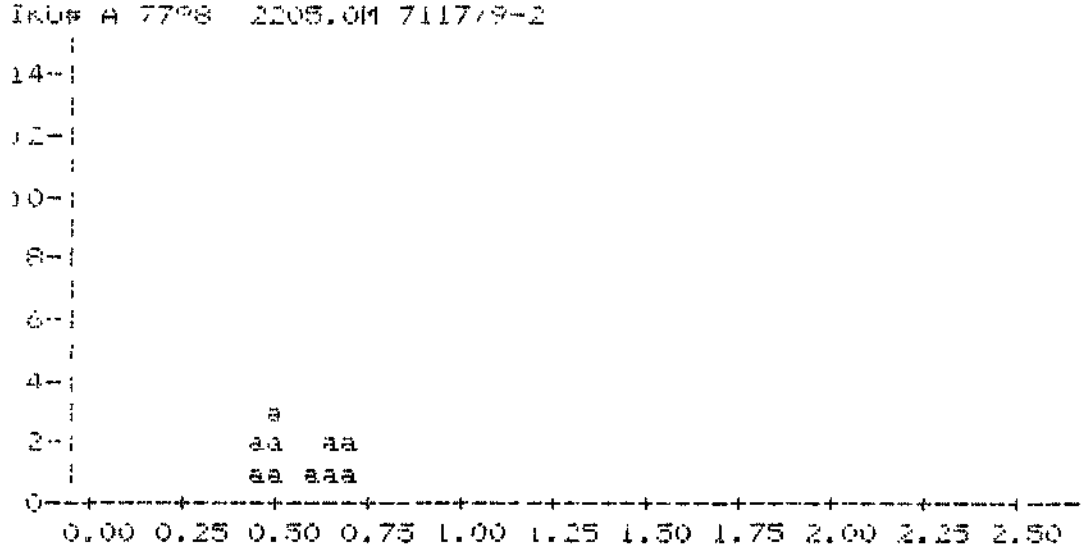
Key:- A = Grey-black-brown claystone. Lower case letter is used when there is some uncertainty about whether the value is representative.

PP = Primary population
Y = Relevant population considered reasonably representative.
N = Not representative (caving, reworked, contaminant, drilling effects).

LOW+ HIGH = Population limits

#VAL. = Number of measurements in that population.

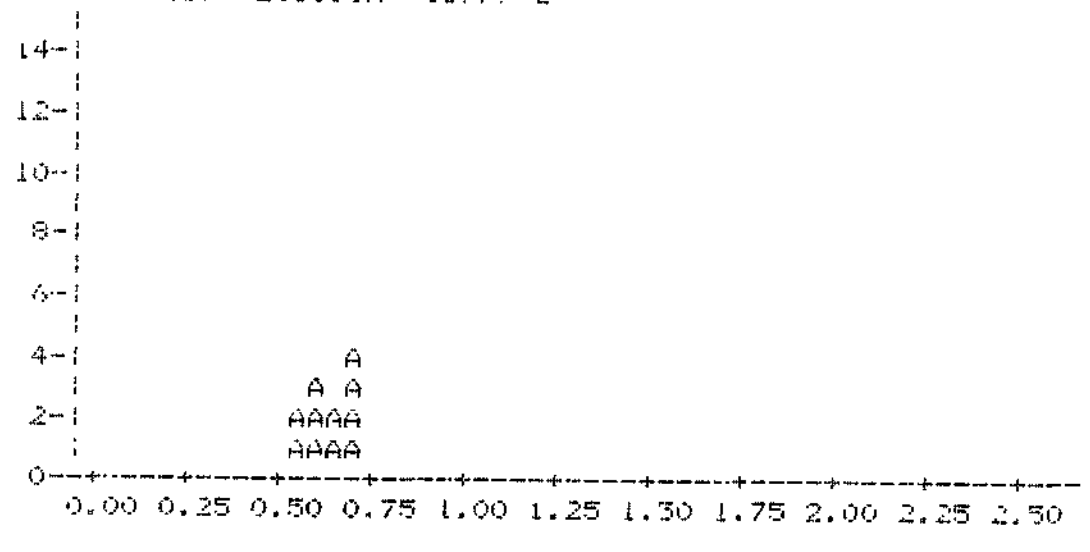
```
IKU# A 6106  1000.0M 7117/9-2
   |
14-|
   |
12-|
   |
10-|
   |
 8-|          A
   |          A
 6-|          A
   |          AA
 4-|         AAA
   |         AAA A
 2-|         AAAAA
   |       A AAAAA
 0-+----+----+----+----+----+----+----+----+----+----+---
   0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV
Y 0.30 0.63 ALL   23 0.49 0.08
           OVERALL 23 0.49 0.08

ORDERED VALUES FOLLOW:

 0.30A 0.40A 0.42A 0.42A 0.43A 0.45A 0.45A 0.46A 0.47A 0.48A 0.48A 0.49A 0.49A
 0.50A 0.51A 0.52A 0.53A 0.54A 0.57A 0.58A 0.60A 0.61A 0.62A


IKU# A 7785  2000.0M 7117/9-2
   |
14-|
   |
12-|
   |
10-|
   |
 8-|
   |
 6-|          A A
   |          AAA
 4-|          AAAA
   |          AAAA
 2-|          AAAA
   |          AAAAA
 0-+----+----+----+----+----+----+----+----+----+----+---
   0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV
Y 0.40 0.65 ALL   22 0.49 0.06
           OVERALL 22 0.49 0.06

ORDERED VALUES FOLLOW:

 0.40A 0.41A 0.43A 0.43A 0.44A 0.44A 0.45A 0.46A 0.47A 0.48A 0.49A 0.50A 0.51A
 0.51A 0.51A 0.51A 0.53A 0.56A 0.58A 0.58A 0.58A 0.61A
```



PP LOW HIGH LIT #VAL MEAN STDV
N 0.45 0.55 ALL 5 0.49 0.03
N 0.60 0.75 ALL 5 0.69 0.03
OVERALL 10 0.59 0.11

ORDERED VALUES FOLLOW:

0.46a 0.47a 0.50a 0.50a 0.54a 0.64a 0.68a 0.67a 0.70a 0.73a



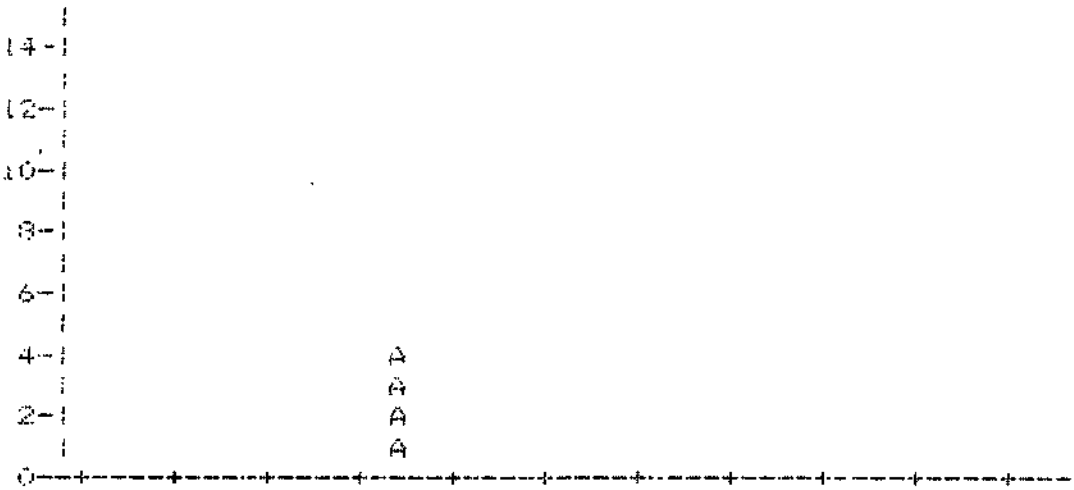
PP LOW HIGH LIT #VAL MEAN STDV
Y 0.55 0.75 ALL 11 0.66 0.06
OVERALL 11 0.66 0.06

ORDERED VALUES FOLLOW:

0.56A 0.58A 0.63A 0.64A 0.64A 0.65A 0.66A 0.71A 0.72A 0.73A 0.74A

```
IKU# A 7839  3005.0M 7117/9-2
   :
14-:
   :
12-:
   :
10-:
   :
 8-:
   :
 6-:
   :
 4-:                A
   :                A   A A
 2-:               AAA A A
   :               AAAAAAA
 0-+----+----+----+----+----+----+----+----+----+----+---
   0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV
/ 0.65 1.00 ALL   16 0.81 0.11
          OVERALL 16 0.81 0.11

ORDERED VALUES FOLLOW:

 0.66A 0.68A 0.70A 0.71A 0.72A 0.72A 0.78A 0.79A 0.80A 0.85A 0.86A 0.88A 0.93A
 0.96A 0.97A 0.99A



 IKU# A 7853  3005.0M 7117/9-2
    :
 14-:
    :
 12-:
    :
 10-:
    :
  8-:
    :
  6-:
    :                 A
  4-:                 A
    :                 A
  2-:               A AA  A
    :               AAAAA  A
  0-+----+----+----+----+----+----+----+----+----+----+---
    0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

 PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.60 0.85 ALL   11 0.74 0.07
 Y 0.90 1.00 ALL    2 0.97 0.02
           OVERALL 13 0.77 0.10

 ORDERED VALUES FOLLOW:

  0.63A 0.65A 0.67A 0.71A 0.75A 0.75A 0.77A 0.77A 0.77A 0.80A 0.84A 0.95A 0.98A
```

IKU# A 7866 3210.0M 7117/9-2

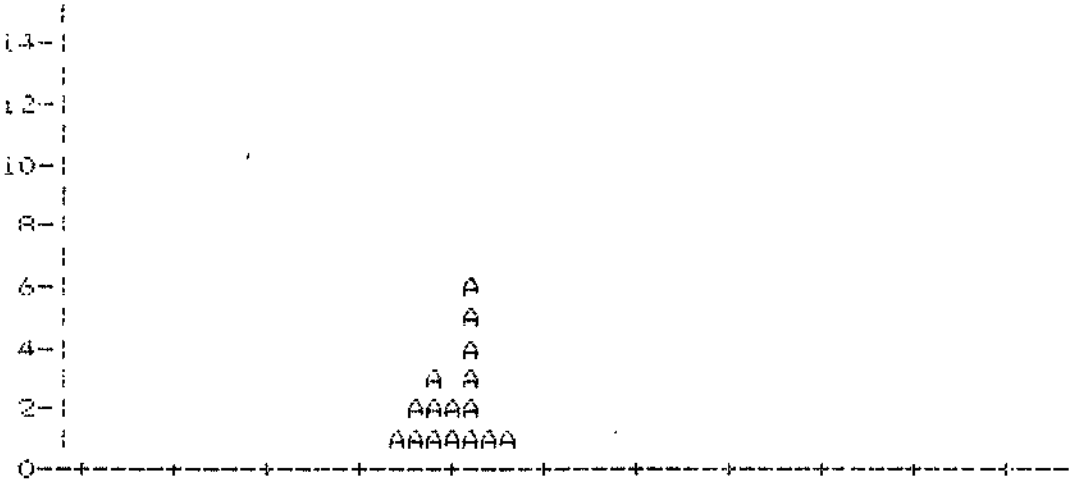


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.85	0.90	ALL	4	0.87	0.02
			OVERALL	4	0.87	0.02

ORDERED VALUES FOLLOW:

0.85A 0.87A 0.88A 0.89A

IKU# A 8231 3315.0M 7117/9-2



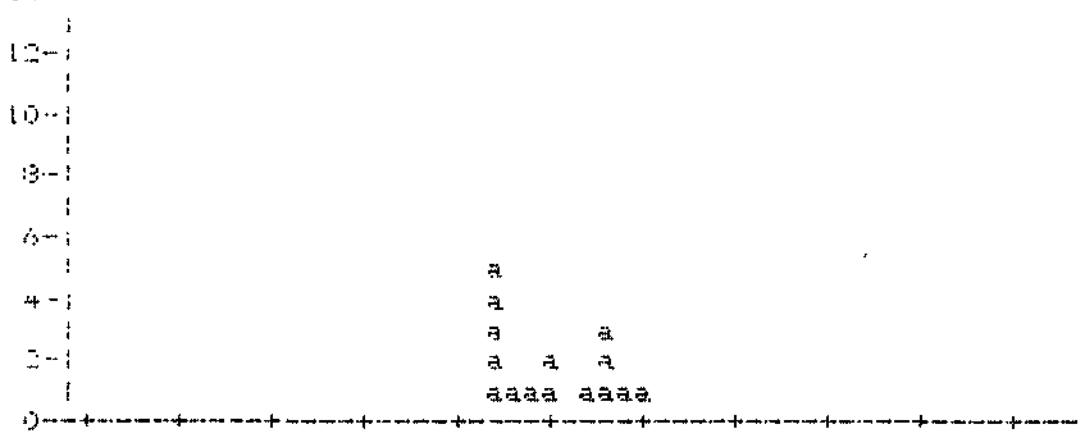
PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.85	1.20	ALL	16	1.02	0.08
			OVERALL	16	1.02	0.08

ORDERED VALUES FOLLOW:

0.88A 0.93A 0.94A 0.95A 0.96A 0.99A 1.00A 1.01A 1.05A 1.06A 1.07A 1.07A 1.09A 1.09A 1.14A 1.16A

```
IKU# A 8244  3510.0M 7117/9-2
    |
14--|
    |
12--|
    |
10--|
    |
 8--|
    |
 6--|
    |
 4--|
    |
 2--|                      A   A A
    |                   A A   A AA
 0--+----+----+----+----+----+----+----+----+----+----+---
   0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV
Y 0.90 1.05 ALL    3 0.99 0.05
Y 1.20 1.40 ALL    5 1.29 0.06
          OVERALL  8 1.18 0.16

ORDERED VALUES FOLLOW:

 0.93A 1.01A 1.03A 1.21A 1.24A 1.30A 1.34A 1.35A



 IKU# A 8395  3600.0M 7117/9-2
    |
14--|
    |
12--|
    |
10--|
    |
 8--|
    |
 6--|
    |
 4--|
    |
 2--|                        a     a
    |                   aaaaaaa   a
 0--+----+----+----+----+----+----+----+----+----+----+---
   0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

 PP LOW HIGH LIT #VAL MEAN STDV
 N 0.85 1.20 ALL    8 1.02 0.09
 N 1.30 1.35 ALL    2 1.32 0.03
          OVERALL 10 1.08 0.15

 ORDERED VALUES FOLLOW:

  0.89a 0.94a 0.97a 1.00a 1.05a 1.05a 1.11a 1.15a 1.30a 1.34a
```

IKU# B 632 3677.0M 7117/9-2



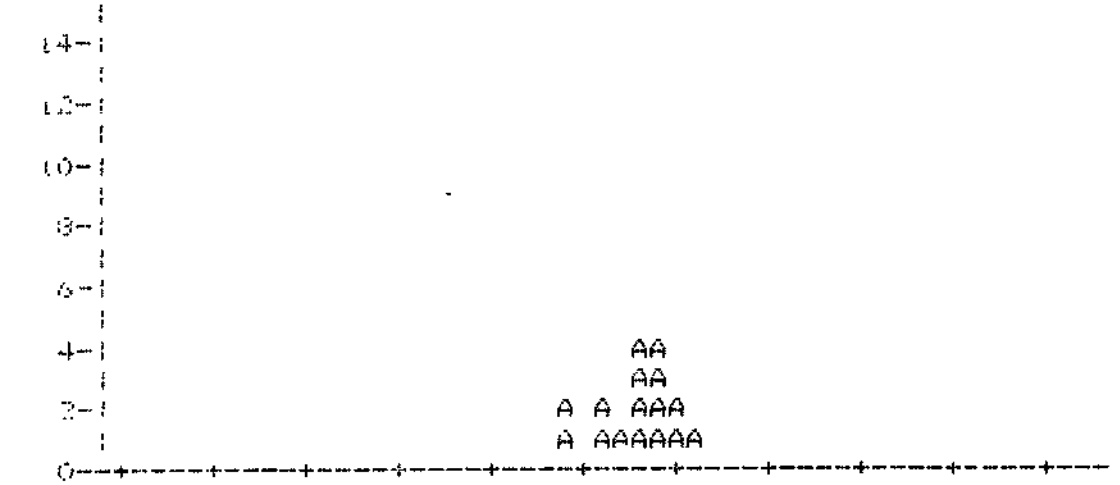
PP LOW HIGH LIT #VAL MEAN STDV

N 1.35 1.55 ALL 6 1.43 0.05
OVERALL 15 1.28 0.14

ORDERED VALUES FOLLOW:

1.13a 1.13a 1.13a 1.14a 1.14a 1.19a 1.23a 1.25a 1.26a 1.37a 1.40a 1.41a 1.42a
1.45a 1.51a

IKU# A 8406 3780.0M 7117/9-2

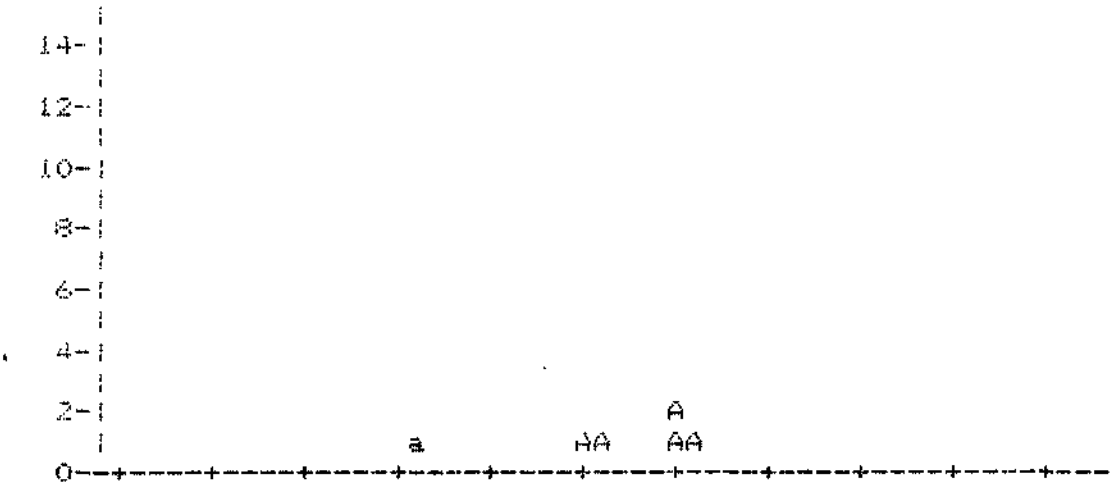


PP LOW HIGH LIT #VAL MEAN STDV
Y 1.30 1.60 ALL 16 1.41 0.09
OVERALL 16 1.41 0.09

ORDERED VALUES FOLLOW:

1.24A 1.24A 1.32A 1.34A 1.38A 1.40A 1.40A 1.42A 1.43A 1.45A 1.45A 1.46A 1.47A
1.50A 1.50A 1.56A

IKU# A 8454 4500.0M 7117/9-2

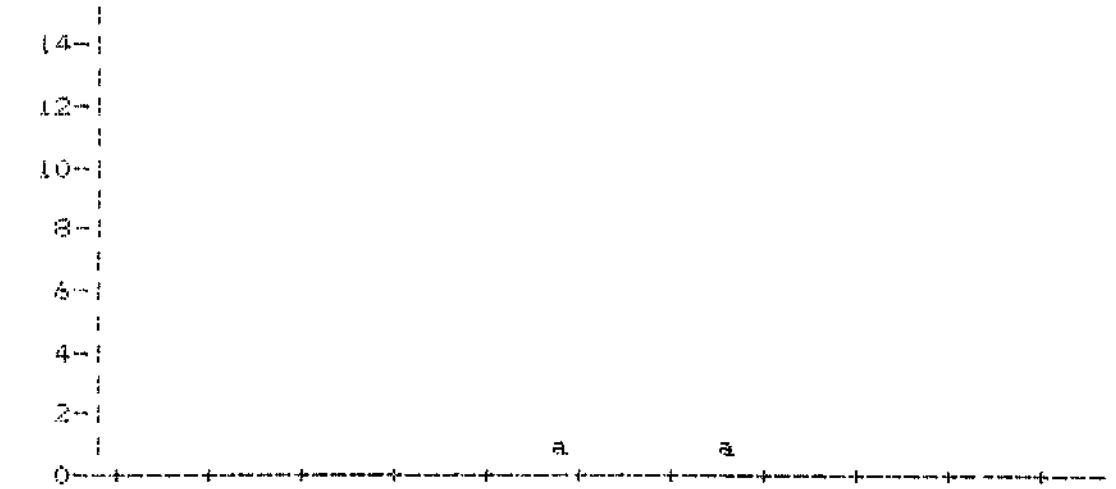


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	1.25	1.35	ALL	2	1.29	0.03
Y	1.50	1.60	ALL	3	1.53	0.03
N	0.80	0.85	ALL	1	0.83	0.00
			OVERALL	6	1.34	0.28

ORDERED VALUES FOLLOW:

0.83a 1.27A 1.31A 1.50A 1.54A 1.56A

IKU# A 8461 4605.0M 7117/9-2

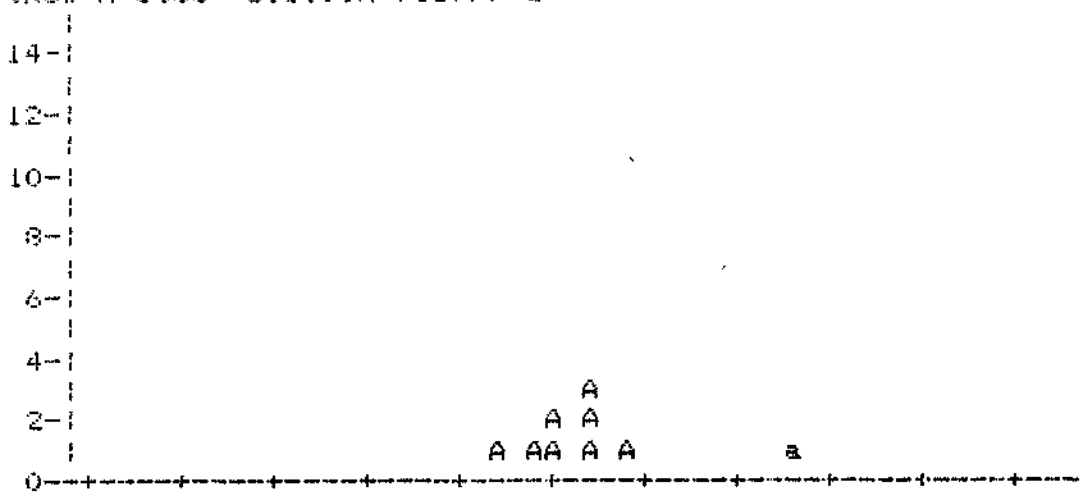


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
N	1.20	1.25	ALL	1	1.22	0.00
N	1.65	1.70	ALL	1	1.67	0.00
			OVERALL	2	1.45	0.32

ORDERED VALUES FOLLOW:

1.22a 1.67a

TKU# A 3586 5010.0M 7117/9-2



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	1.10	1.50	ALL	8	1.30	0.12
N	1.90	1.95	ALL	1	1.90	0.00
			OVERALL	9	1.37	0.23

ORDERED VALUES FOLLOW:

1.11A 1.20A 1.27A 1.27A 1.35A 1.36A 1.38A 1.48A 1.90a